

**STORMWATER POLLUTION PREVENTION PLAN &
HYDRAULIC ANALYSIS AND STORMWATER DESIGN
CALCULATIONS
(PREPARED UNDER GP-0-20-001)**

**Prepared for
DIANA PLACE
249 – 259 MAIN STREET
NYACK, NY 10960
65.44-2-8 & 9
VILLAGE OF NYACK
TOWN OF ORANGETOWN
ROCKLAND COUNTY, NEW YORK**

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**DATE: March 17, 2020
REV: May 11, 2020**

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1.0 PERMIT OVERVIEW AND REQUIREMENTS

1.1 Permit Overview

This Stormwater Pollution Prevention Plan (SWPPP) is prepared to inform the landowner and construction personnel of the measures to be implemented for controlling runoff and pollutants from the site during and after construction activities. The objective of this plan is to comply with the New York Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities, Permit No. GP-0-20-001 requirements. Any material conflicts between this plan and the site plans, specification or instructions, must be brought to the attention of the design professional. The project may have other permits and it is the responsibility of the owner and contractor to know and understand all permits.

The operator must maintain the following info on site in a secure location that is accessible during normal working hours to an individual performing a compliance inspection:

- Notice of Intent (NOI)
- SWPPP
- General Permit (included in the SWPPP)
- MS4 SWPPP Acceptance Form (where applicable)
- All inspection reports.

Technical standards are detailed in the “New York State Standards and Specifications for Sediment and Erosion and Sediment Control (November 2016)”, as well as illustrated on the Erosion and Sediment Control Plan Map included in **Appendix C**. The design of post-construction stormwater control practices follows the guidance provided by “New York State Stormwater Management Design Manual”, most recent revision.

2.0 SWPPP REVIEW, UPDATE

2.1 SWPPP Review

Applicable Federal, State, and local regulatory agencies that have jurisdiction may elect to review this SWPPP and notify the permittee in writing that the SWPPP does not meet the requirements of their regulations. If the SWPPP needs to be revised, the Permittee and the site contractor will make the required modifications within seven days of such notification and submit written certification to the notifying agency that the

changes have been implemented. A copy of the SWPPP will be kept available on site for review by regulatory agencies, engineers, and subcontractors.

The Village of Nyack is an MS4 Community and this document is subject to their review.

2.2 SWPPP Update

The permittee identified in this SWPPP shall amend the SWPPP when there is a change in one or more of the following project components which has an effect on the potential for discharge of pollutants from stormwater runoff associated with construction activities:

- Design
- Construction
- Operation
- Maintenance

The SWPPP shall also be updated or amended under the following conditions:

- If measures identified in the SWPPP become ineffective in eliminating or minimizing pollutants from sources identified, or in achieving the general objectives of controlling stormwater pollution from permitted construction activity.
- To identify a new subcontractor that will implement any part of the SWPPP.

3.0 SITE ASSESSMENT, EVALUATION AND PLANNING

3.1 Project Location

The subject site, the Diana Place Site Plan, is a 0.38 acre (16,701 SF) site, located at 249-259 Main Street, on the west side of Main Street, approximately 300 feet north of the intersection of South Midland Avenue, North Midland Avenue, and Main Street, in the Village of Nyack, Town of Orangetown, Rockland County, New York.

3.2 Pre-Development Conditions

The existing parcels are gently sloped from west to east and utilized as residential dwellings. All of the site drains to the east and runoff enters existing catch basins along Main Street, which outlet to the Hudson River. Currently, the site consists of two parcels,

each with a dwelling and macadam parking areas behind the structures. The existing dwellings and macadam areas were counted as impervious surfaces while a portion of the site was counted as grass.

3.3 Project Type

This project is to construct a 2-story residential apartment building, and associated parking lot, which will be accessed by driving beneath the structure. Some of the parking will also be located below the structure. The designer is required to provide water quantity volume mitigation, 25% water quality volume (WQv) mitigation for the existing impervious to remain, and 100% WQv and Runoff Reduction Volume (RRv) for all new impervious surface area above the total area existing at the site. The type of facility or practice chosen to provide runoff reduction volume, infiltration, was selected from Table 3.5 of the NYSDEC Stormwater Management Design Manual. The current design seeks to comply with the NYSDEC Stormwater Design Manual by providing WQv through an approved pre-treatment structure.

The site is being redeveloped per Chapter 9 of the SMDM, which allows for only the increase in impervious surfaces to be accounted for in the RRv calculation. Water Quality volume mitigation, however, will still be calculated and provided based on the following: 25% WQv provided for all existing impervious areas to remain + 100% WQv provided for all new impervious surfaces above what is currently existing at the site. An attempt to reestablish existing vegetation within areas where vegetation has died or been removed will be made. Any area of disturbance that will remain inactive for a period of 14 consecutive days will be mulched or temporarily seeded. This includes any previously disturbed areas that are covered with snow. Limits of disturbance have been shown on the plans and will be maintained by the installation of silt fence.

To achieve compliance with the current NYSDEC Stormwater Design Manual, a stormwater management practice with RRv capacity was chosen. RRv will be provided through two drywells located on the east side of the property. WQv will be provided through both the drywells, and a pre-treatment structure, which is designed to accept all runoff and then divert the required volume to the drywells while sending all other flows to the designed detention system. The drywells meet the NYSDEC Stormwater Design Manual by acting as an Underground Infiltration Facility in the manner of an I-3 (Page 6-34 through 6-39 of NYSSMDM). One (1) Contech CDS-5 unit shall be installed to provide pre-treatment and the required water quality volume. The required pre-treatment volume is directly related to the infiltration rate at the location of the practice. Due to the high infiltration rate of the soils where the practice is proposed, 100% of the required WQv must be pre-treated. The practice proposed accomplishes this. The CDS-5 unit will

pre-treat 100% of the required water quality volume; 975 CF. Therefore, the water quality volume provided at the site will exceed the volume required. The CDS-5 unit is installed at the upstream end of the infiltration system, prior to the infiltration system inflow.

3.4 Project Scope

The project involves the construction of a 2-story office building, which includes an access road and parking lot beneath and behind the proposed building. The total area to be disturbed is 16,701 CF, or 0.38 acres. The disturbed area is comprised of existing pavement and building. The total impervious area at the site will be 14,074 SF; with 8,324 SF currently existing, and 5,750 SF newly proposed. The drainage area will be collected and routed to the proposed drainage facility to be located on the site.

3.5 Historic Preservation Determination

Per the EAF Mapper tool, the project site is not located on or adjacent to an area designated as sensitive for archaeological site or NYSHPO archaeological site inventory. Therefore, no further action is required.

3.6 Receiving Waters

The closest receiving water body for the project site is the Hudson River, which is to the east of the property. Additionally, there are no wetlands within the project limits, nor within close proximity.

3.7 Soils

The USDA/NRCS soil survey for Rockland County shows the soils in the Project Site are Wethersfield-urban land complex. The Wethersfield soils are very deep, gently sloping, well drained soils formed in urban areas. These soils are of the Hydrologic Soil Group C. Groundwater was not encountered where the infiltration facility is proposed.

4.0 EROSION AND SEDIMENT CONTROL

4.1 Erosion & Sediment Control Practices

If any elements of the design are not in conformance with the technical standard, they must be identified with reasons for the deviation included. Information must be provided which demonstrates that the deviation is equivalent to the technical standard.

All erosion control methods must meet the NYS Standards and Specifications for Erosion and Sediment Control dated November 2016 (see Appendix H)

Temporary Structural Practices will include:

- Dust Control
- Silt Fence
- Stabilized Construction Entrance
- Curb inlet protection
- At grade inlet protect

Temporary Stabilization Practices (including vegetative practices) may include:

- Seed and mulch bare soil areas within 14 days of disturbance.

Permanent Stabilization Practices (including vegetative practices) will include:

- Seed and mulch all disturbed areas.

Refer to Construction Drawings attached in **Appendix C** for detailed information on each practice.

4.2 Erosion and Sediment Control Drawings

Erosion and Sediment Control drawings are included in **Appendix C**. Erosion and Sediment Control drawings must include but not be limited to the following:

- Total site area
- All improvements
- Areas of disturbance
- Areas that will not be disturbed
- Existing vegetation
- On-site and adjacent off-site surface waters
- Wetlands and drainage patterns affected by construction
- Existing and final slopes
- Location of stormwater discharges
- Specific locations, sizes, and lengths of each erosion and sediment control practice
- Details of erosion and sediment control practices shall include dimensions, material specifications, installation details, operation and maintenance requirements.
- Location of material, waste, equipment storage areas and washout areas. (Located in an area in close proximity to the entrance to the site)

4.3 Construction Phasing Plan and Sequence of Operations

The Construction Phasing Plan is included on the soil erosion plan contained in Appendix C.

- Temporary structural erosion controls will be installed prior to earthwork as per the attached plans.
- Areas to be undisturbed for more than 14 days will be temporarily stabilized by seeding.
- Disturbed areas will be reseeded and mulched immediately after final contours are re-established and no more than 14 days after the completion of construction at that site.
- Temporary erosion control devices will not be removed until the area served is stabilized by the growth of vegetation and the area is certified as being stabilized by the Erosion Control Superintendent.

Construction Sequence:

- | | |
|---|----------|
| 1. Construct stabilized construction entrance | 1 Day |
| 2. Installation of silt fence | 1 Week |
| 3. Installation of walls | 1 Week |
| 4. Construction erosion control devices | 1 Day |
| 5. Establish truck wash down area, staging areas, waste & Borrow fill areas | 3 Days |
| 6. Clear site within limit of disturbance, strip and stock topsoil and grade site | 2 Weeks |
| 7. Install catch basins and piping | 1 Month |
| 8. Install inlet protection | 1 Day |
| 9. Construct infiltration system | 1 Month |
| 10. Install curbs | 2 Weeks |
| 11. Construct buildings, utilities, infrastructure | 6 Months |
| 12. Rough grade area and stabilize | 1 Weeks |
| 13. Construct base course pavement and stone base for Driveway/parking installation | 2 Weeks |
| 14. Remove all soil erosion control devices when all disturbed areas have been stabilized | 1 Day |

4.4 Erosion and Sediment Control Practice Inspection Schedule

- Silt fence – maintenance shall be performed as needed and material removed when “bulges” develop in the silt fence.
- Storm drain curb inlet protection and at grade inlet protection – inspect after each storm event. Remove sediment when 50 percent of the storage volume is achieved.
- Stabilized construction entrance & wash down areas – entrance shall be maintained in a condition which shall prevent tracking. This may require periodic top dressing with additional aggregate. All sediment tracked onto or spilled on public rights of way shall be removed immediately. When necessary, wheels must be cleaned to remove sediment prior to entrance on public rights of way. When washing is required, it shall be done in an area stabilized with aggregate.

4.5 Contractor Sequence Form

The operator shall prepare a “summary of construction status” using the Construction Sequence Form (included in **Appendix E**) once every month. Significant deviations to the sequence and reasons for those deviations (i.e. weather, subcontractor availability, etc.), shall be noted by the contractor. The schedule shall be used to record the dates for initiation of construction, implementation of erosion control measures, stabilization, etc. A copy of this table will be maintained at the construction site and updated.

5.0 POST CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

5.1 Stormwater Management Controls

If any elements of the design are not in conformance with the technical standard, they must be identified with reasons for the deviation included. Information must be provided which demonstrates that the deviation is equivalent to the technical standard.

5.2 Post Construction Stormwater Management Drawings

Post construction stormwater management drawings are included in **Appendix C**. Post construction stormwater management drawings must include the following:

- Specific locations, sizes, and lengths of each post construction stormwater management practice.
- Details of post construction stormwater management practices shall include dimensions, material specifications, installation details, operation and maintenance requirements.

5.3 Hydraulic and Hydrologic Analyses

The program utilized for quantifying stormwater runoff rates and volumes was Hydraflow Hydrographs Extension 2019 software. The SCS 24-hour Type III design storms for 1, 2, 10, 25 and 100-year frequency rainfall were analyzed.

- Hydrologic/hydraulic analysis for all structural components of the stormwater control system for the applicable design storms (see **Appendix B**).
- Comparison of post-development stormwater runoff conditions with predevelopment conditions (see **Appendix B**).
- Dimensions, material specifications and installation details for each post-construction stormwater control practice (see **Appendix B and C**).

5.4 Comparison of Pre and Post Construction Stormwater Runoff Stormwater Quantity.

These calculation are based on the Hydroflow analysis.

	<u>Pre Development</u>	<u>Post Development</u>
1 year, 24 hour storm (CPv)	0.689 CFS	0.637 CFS
10 year, 24 hour storm (Qp)	1.626 CFS	1.553 CFS
100 year, 24 hour storm (Qf)	3.201 CFS	2.852 CFS

6.0 CONSTRUCTION WASTE

Waste Materials: All waste materials generated during construction will be disposed at a suitable landfill, or transfer station.

Hazardous Waste: The project will not be a generator of hazardous waste and it is not anticipated that any hazardous waste will be generated during construction. If there are any materials generated, a licensed hazardous waste carrier will be contracted to dispose the hazardous material at a suitable disposal site. If hazardous materials are discovered during construction, the work will be stopped until the issue is resolved.

Waste: Portable sanitary facilities will be made available to construction personnel and will be serviced regularly.

7.0 OFFSITE VEHICLE TRACKING

Excavation equipment involved with the construction will remain on the project site and will not regularly egress or ingress the site. Any trucks used to bring in materials or remove materials via municipal paved roads will do so over a stabilized construction entrance. If any off-site vehicle tracking occurs, the contractor will be directed to initiate, street sweeping program in the immediate vicinity of the site.

8.0 EROSION AND SEDIMENT CONTROL INSPECTION (During Construction)

These are the inspection items that will be used to maintain erosion and sediment controls. A qualified SWPPP Inspector shall perform the inspections at a minimum of once a week. The forms shall be made part of the official SWPPP documents. A digital copy of the inspection shall be emailed to Village of Nyack as well as keeping the paper copy in the SWPPP at the site. The practices listed herein shall be implemented in accordance with the attached maintenance schedule.

A maintenance inspection report will be made after each inspection. The report forms to be completed by the inspector are attached in **Appendix D**. Reports should be compiled and maintained on-site. All inspection materials are included in **Appendix D** of the onsite 3-ring binder.

- It is recommended that a rain gage be installed at the site.
- A qualified professional shall conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP and required by GP-0-15-002 have been adequately installed to ensure overall preparedness of the site for commencement of construction.
- ***Structural erosion controls and non-stabilized areas shall be inspected at least once every seven (7) days.*** The Inspection Form must be used for every inspection performed.
- The day-to-day erosion control activities on the site will be monitored by the construction manager. The qualified inspector (as defined by the NYSDEC SPDES regulations) and his crews will make ***at least one inspection of erosion control devices every seven (7) days.***
- All measures will be maintained in good working order. If repair is necessary, it will be initiated within 24 hours of report.
- Silt fence will be inspected for depth of sediment, ripped fabric, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in ground.
- Seeded and planted areas will be inspected for bare spots, washouts, and healthy growth. If necessary, spot reseeding or sodding will be implemented.

- Trained Contractor will be responsible for the implementation of the SWPPP. This person will be onsite when any soil disturbing activities are being conducted. This trained contractor cannot conduct the regular SWPPP compliance inspections. This trained contractor must have received 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 4 hours of training every 3 years. It can also mean an employee from the contracting (construction) company, 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 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).

9.0 TEMPORARY STABILIZATION FOR FROZEN CONDITIONS

The following temporary stabilization measures **MUST** be performed when construction is occurring during winter/frozen ground conditions. The following requirements do not supersede any other requirements of this SWPPP as they apply to non-frozen ground conditions. Refer to Page 2.38 of the Blue Book.

- Perimeter erosion control **MUST** still be installed prior to earthwork disturbance as per this SWPPP.
- Any areas that cannot be seeded to turf by October 1 or earlier will receive a temporary seeding. The temporary seeding will consist of winter rye seeded at the rate of 120 pounds per acre (2.5 pounds per 1,000 square feet) or stabilized as per the temporary stabilization for winter construction/frozen conditions. This will last 2 to 6 months. Seeding shall be done in the spring. If stabilization is required at other times mulching may be used.
- Any area of disturbance that will remain inactive for a period of 14 consecutive days **MUST** be mulched. This includes any previously disturbed areas that are covered with snow.
- Mulch **MUST** consist of loose straw applied at the rate of 2 to 3 bales (90 to 100 pounds) per thousand square feet.

- Mulch **MUST** be applied uniformly over the area of bare soil or bare soil that is covered with snow. For the latter condition, mulch **MUST** be applied on top of snow.
- Using a tracked vehicle, mulch **MUST** be crimped into the bare soil/snow. The tracked vehicle **MUST** be driven across the mulched areas in at least two directions to maximize crimping of mulch into the soil/snow.
- If mulch gets blown off an area to a significant degree, the site inspector **WILL** require that an area be re-mulched in accordance with Items 2 through 5 above, and this area **WILL** be included on the inspection checklist for the next inspection.
- If a particular area repeatedly experiences loss of mulch due to wind, then the inspector **WILL** require that an alternative method be used to secure the mulch in place. Such alternatives may include the use of netting, tackifier or other methods deemed appropriate by the inspector.
- During periods when snow is melting and/or surface soils are thawing during daytime hours, mulched areas **MUST** be re-tracked (crimped) as per Item 5 above at least once every seven days, more frequently if directed by the inspector. Additional mulch may be required to obtain complete coverage of an area. Biodegradable erosion control matting may be required on steeper slopes.
- Additional stabilization measures for non-frozen ground conditions described in this SWPPP **WILL** be implemented at the time deemed appropriate by the inspector. During the winter season, if a site has been stabilized and soil disturbing activities have been suspended for the winter, weekly inspections can be suspended. However, monthly inspections must still be conducted. All normal weekly inspections must resume when soil disturbing activities resume.
- Permanent seeding shall be done according to the Standards and Specifications for Permanent Critical Area Plantings contained within Appendix H. The seeding rates are incorporated in the appendix as well. The optimum time to seed is during the spring. In general it can be done anytime as long as it is properly mulched and there is adequate moisture.

10.0 STORMWATER MAINTENANCE PROCEDURES

Temporary erosion and sediment controls and practices will need to be maintained frequently. It is the responsibility of the operator to inspect and maintain the temporary controls so that they are working efficiently. The operator needs to pay close attention to SWPPP Inspection Reports that will advise of needed maintenance. Captured sediment will have to be removed periodically from each practice in order for the control to function properly. It is likely that if temporary controls are not maintained properly, controls will fail creating a mass discharge of sedimentation to the water body previously

protected. Periodically remove sediment from silt fences, inlet protections and construction entrances. Replace top-soil, mulch and seed where seeding has been disturbed.

Post-construction maintenance for this project will consist of annual inspections of permanent stormwater management facilities and steep slopes. The following procedures must be performed twice annually on the appropriate structural stormwater management practice. These maintenance procedures are essential to assure continual performance of the stormwater management practices on your site.

Catch Basins

- Sediment removal with a vacuum truck should be done at least once a year, preferably after spring runoff and then in early fall, or when they are at 50% capacity, whichever comes first.
- Must clean out floatables and sediment on a regular basis.

11.0 SPILL PREVENTION PRACTICES

Good Housekeeping and Material Management Practices

The following good housekeeping and material management practices will be followed on site during the construction project to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

- Materials will be brought on site in the minimum quantities required.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers, and if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposal.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The construction manager or his designee will inspect regularly to ensure proper use and disposal of materials on site.
- The contractor shall prohibit washing of tools, equipment, and machinery in or within 100 feet of any watercourse or wetland.
- All above grade storage tanks are to be protected from vehicle damage by temporary barriers.

Inventory for Pollution Prevention Plan

The materials and substances listed below are expected to be on-site during construction.

- Petroleum for fueling vehicles will be stored in above ground storage tanks. Tanks will either be steel with an enclosure capable of holding 110% of the storage tank volume or from a Con-Store, concrete encased type typically employed by NYSDOT. Hydraulic oil and other oils will be stored in their original containers. Concrete and asphalt will be stored in the original delivery trucks.
- Fertilizer may be stored on site in its original container for a short period of time prior to seeding. Original containers will be safely piled on pallets or similar devices to protect from moisture.
- Paints and other similar materials will be stored in their original containers and all empty containers will be disposed of in accordance with label directions.
- Portable sanitary facilities, which contain chemical disinfectants (deodorants) will be located on-site, with the disinfectants held in the tank of the toilet.

Hazardous Products

These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data sheets will be retained; they contain important product information.
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

Spill Prevention

The following product specific practices will be followed on site.

Petroleum Products:

- Construction personnel should be made aware that emergency telephone numbers are located in this SWPPP.
- The contractor shall immediately contact NYSDEC in the event of a spill, and shall take all appropriate steps to contain the spill, including construction of a dike around the spill and placing absorbent material over this spill.
- The contractor shall instruct personnel that spillage of fuels, oils, and similar chemicals must be avoided and will have arranged with a qualified spill remediation company to serve the site.

- Fuels, oils, and chemicals will be stored in appropriate and tightly capped containers. Containers shall not be disposed of on the project site.
- Fuels, oils, chemicals, material, equipment, and sanitary facilities will be stored/located away from trees and at least 100 feet from streams, wells, wet areas, and other environmentally sensitive sites.
- Dispose of chemical containers and surplus chemicals off the project site in accordance with label directions.
- Use tight connections and hoses with appropriate nozzles in all operations involving fuels, lubricating materials or chemicals.
- Use funnels when pouring fuels, lubricating materials or chemicals.
- Refueling and cleaning of construction equipment will take place in parking areas to provide rapid response to emergency situations.
- All on-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Any vehicle leaking fuel or hydraulic fuel will be immediately scheduled for repairs and use will be discontinued until repairs are made.

Fertilizers:

- Fertilizer will be stored in its original containers on pallets with water resistant coverings.
- Proper delivery scheduling will minimize storage time.
- Any damaged containers will be repaired immediately upon discovery and any released fertilizer recovered to the fullest extent practicable.

Paints:

- All containers will be tightly sealed and stored when not required for use.
- Excess paint will not be discharged to the storm water system or wastewater system but will be properly disposed of according to manufacturers' instructions or State and local regulations.

Concrete Trucks:

- Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water only at designated locations on site.

Asphalt Trucks:

- Asphalt trucks shall not discharge surplus asphalt on the site.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup. The construction manager responsible for the day-to-day

site operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the onsite construction office or trailer.

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. Any spill in excess or suspected to be in excess of two gallons will be reported to the NYSDEC Regional Spill Response Unit. Notification to the NYSDEC (1-800-457-7362) must be completed within two hours of the discovery of the spill.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to absorbent pads, brooms, dust pans, mops, rags, gloves, goggles, activated clay, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with spilled substance.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.

Appendix A

**Notice of Intent
(NOI)**

NOTICE OF INTENT

New York State Department of Environmental Conservation



Division of Water

625 Broadway, 4th Floor

Albany, New York 12233-3505

NYR

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(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001
 All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

- IMPORTANT -**RETURN THIS FORM TO THE ADDRESS ABOVE**OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

JOSEPH MARAIA & EDWARD MISTRETTA

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

MARAIA

Owner/Operator Contact Person First Name

JOSEPH

Owner/Operator Mailing Address

19 LAUREL ROAD

City

NEW CITY

State

NY

Zip

10956 -

Phone (Owner/Operator)

646 - 739 - 9067

Fax (Owner/Operator)

- - -

Email (Owner/Operator)

JOE.MARAIA@LENDLEASE.COM

FED TAX ID

- - - - -

(not required for individuals)

Project Site Information

Project/Site Name

D I A N A P L A C E

Street Address (NOT P.O. BOX)

2 4 9 - 2 5 9 M A I N S T R E E T

Side of Street

☐ North ☒ South ☐ East ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

V I L L A G E O F N Y A C K

State Zip

N Y 1 0 9 6 0 -

County

R O C K L A N D

DEC Region

3

Name of Nearest Cross Street

S O U T H M I D L A N D A V E N U E

Distance to Nearest Cross Street (Feet)

3 0 0

Project In Relation to Cross Street

☐ North ☐ South ☐ East ☒ West

Tax Map Numbers

Section-Block-Parcel

6 5 . 4 4 - 2 - 8 9

Tax Map Numbers

8 9

1. Provide the Geographic Coordinates for the project site. To do this, go to the NYSDEC Stormwater Interactive Map on the DEC website at:

<https://gisservices.dec.ny.gov/gis/stormwater/>

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located the centroid of your project site, go to the bottom right hand corner of the map for the X, Y coordinates. Enter the coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)

-7 3 9 2 7

Ex. -73.749

Y Coordinates (Northing)

4 1 0 1 9

Ex. 42.652

2. What is the nature of this construction project?

☐ New Construction☒ Redevelopment with increase in impervious area☐ Redevelopment with no increase in impervious area

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

Name

HUDSON RIVER

9a. Type of waterbody identified in Question 9?

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

9b. How was the wetland identified?

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

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?

☐ Yes ☒ No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001?

☐ Yes ☒ No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?

☐ Yes ☒ No

If no, skip question 13.

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

☐ Yes ☐ No

0000.00

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?

☐ Yes ☒ No

[illegible]

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

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

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ☒ Yes ☐ No

If No, skip questions 23 and 27-39.

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

7

- [illegible]

[illegible][illegible][illegible][illegible]

N	Y	1	0	9	2	0	-				
---	---	---	---	---	---	---	---	--	--	--	--

8	4	5
---	---	---

-

2	6	8
---	---	---

-

6	6	6	3
---	---	---	---

[illegible][illegible]

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

[illegible][illegible]

$$\boxed{0} \boxed{3} / \boxed{2} \boxed{4} / \boxed{2} \boxed{0} \boxed{2} \boxed{0}$$

25. Has a construction sequence schedule for the planned management practices been prepared?

☒ Yes ☐ No

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

Temporary Structural

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

Biotechnical

- ☐ Brush Matting
- ☐ Wattling

Other

Vegetative Measures

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

Permanent Structural

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

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

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

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

Total WQv Required

acre-feet

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

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

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

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

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

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

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

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

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

WQv Provided

		0	.	0	2	2
--	--	---	---	---	---	---

 acre-feet

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

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

		0	.	0	4	0
--	--	---	---	---	---	---

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

If Yes, go to question 36.

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

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

CPv Required

		0	.	0	2	2
--	--	---	---	---	---	---

 acre-feet

CPv Provided

		0	.	0	7	0
--	--	---	---	---	---	---

 acre-feet

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

- ☐ Site discharges directly to tidal waters or a fifth order or larger stream.
☐ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

		1	.	6	2	6
--	--	---	---	---	---	---

 CFS

Post-development

		1	.	5	3	3
--	--	---	---	---	---	---

 CFS

Total Extreme Flood Control Criteria (Qf)

Pre-Development

		3	.	2	0	1
--	--	---	---	---	---	---

 CFS

Post-development

		2	.	8	5	2
--	--	---	---	---	---	---

 CFS

7

- ☐ None

☐ Yes ☒ No

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

☒ Yes ☐ No

☒ Yes ☐ No

N	Y	R					
---	---	---	--	--	--	--	--

Owner/Operator Certification

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

Print First Name

J O S E P H

MI**Print Last Name**

M A R A I A

Owner/Operator Signature**Date**

0 3 / 2 4 / 2 0 2 0

Appendix B

Stormwater Management Report Including Water Quality Volume (WQv) & Runoff Reduction Volume (RRv) Calculations

**HYDRAULIC ANALYSIS AND STORMWATER DESIGN
CALCULATIONS**

(PREPARED UNDER GP-0-20-001)

**Prepared for
DIANA PLACE
249 – 259 MAIN STREET
NYACK, NY 10960
65.44-2-8 & 9
VILLAGE OF NYACK
TOWN OF ORANGETOWN
ROCKLAND COUNTY, NEW YORK**

Bart M. Rodi, P.E.
234 South Grant Ave
Congers, NY 10920

Bart M. Rodi, P.E.
NYSPE#070545

DATE: March 17, 2020

The Diana Place site plan, which is a 0.38 acre site, located at 249-259 Main Street, on the west side of Main Street, approximately 300 feet north of the intersection of South Midland Avenue, North Midland Avenue, and Main Street, in the Village of Nyack, Town of Orangetown, Rockland County, New York. The soils on site are Wethersfield (WeB), see enclosed map. The proposed site plan consists of construction of a 2-story apartment building, access road and parking lot along with associated infrastructure. The total area of disturbance is 16,701 square feet (0.38 acres) for the entire project.

Under existing conditions, the site drains from west to east and any runoff enters the existing catch basins within Main Street, and eventually reaches the Hudson River. The proposed detention system was designed to handle 0.38 acres of runoff which is the entire site that is being disturbed. An underground pipe system with an outlet structure will be utilized for the drainage areas. Roof and pavement runoff will enter a pre-treatment structure, which is also designed as a diversion structure. The required runoff reduction volume will outlet to two drywells located on the east side of the site, and will infiltrate into the soil. The remaining water quantity volume will enter the pipe system before passing through the outlet structure. It will then outlet to a proposed drainage manhole within Main Street saddled over the existing drainage pipe, as all runoff from the site previously flowed.

Hydraflow Hydrographs Extension 2019 software was utilized to route various storms through the infiltration system. A hydrograph for the existing flow was determined. A hydrograph for the proposed flow was developed as well. The developed hydrograph was routed through an outlet structure located in the driveway area as depicted on the plans. The software routes the storms through the outlet structure and reduces the flow leaving the site. A copy of the calculations is provided to show the results of the routing.

Water quality and runoff reduction volumes will be provided using two drywells as discussed within the SWPPP.

**PRETREATMENT & WATER QUALITY
CALCULATIONS**

Water Quality Volume (WQv) & Runoff Reduction Volume (RRv) Calculations:

$$WQv = P \cdot Rv \cdot A / 12 \text{ (ac-ft)}$$

$$Rv = .05 + .009 \cdot I$$

$$P = 1.5 \text{ in}$$

$$A = 0.3834 \text{ acres} = 16,701 \text{ square feet}$$

$$\text{Existing Impervious Area} = 0.19109 \text{ acres} = 8,324 \text{ square feet}$$

$$\text{Proposed Impervious Area} = 0.32309 \text{ acres} = 14,074 \text{ square feet}$$

$$\text{Change in Impervious Area} = 0.1320 \text{ acres} = 5,750 \text{ square feet}$$

Water Quality Volume (WQv) and Runoff Reduction Volume (RRv) is required for the new proposed impervious area greater than what is currently existing at the site. Per Chapter 9 of the NYSDEC Stormwater Management Design Manual, 25% of the Water Quality Volume (WQv) for the existing impervious surfaces is required, while Runoff reduction volume (RRv) is not required for the existing impervious area.

Therefore, WQv is as follows:

25% WQv for Existing Impervious Area

$$I = \text{percent impervious} = 0.19109 / 0.3834 = 49.8\%$$

$$Rv = .05 + .009(49.8) = 0.498$$

$$WQv = (1.5)(0.498)(.3834) / 12 = 0.020 \text{ ac-ft} = 891 \text{ ft}^3$$

$$WQv = (25\%) \times 891 \text{ ft}^3 = 223 \text{ ft}^3$$

100% WQv for New Impervious Area = Required RRv

$$I = \text{percent impervious} = 0.132 / 0.3834 = 34.4\%$$

$$Rv = .05 + .009(34.4) = 0.360$$

$$100\%WQv = RRv = (1.5)(0.360)(0.3834) / 12 = 0.0173 \text{ ac-ft} = 752 \text{ ft}^3$$

$$100\%WQv = RRv = 752 \text{ ft}^3$$

$$\text{Total Required WQv} = 223 \text{ ft}^3 + 752 \text{ ft}^3 = 975 \text{ ft}^3$$

$$\text{Total Required RRv} = 752 \text{ ft}^3$$

Infiltration Rate = 1": 6 min

Therefore, Pretreatment is 100% WQv; Pretreatment Volume = 975 ft³

Pretreatment handled through First Defender structure, specified within report.

Drywell Design: Diana Place

Infiltration Rate = 1":6 min

Use drywell system, surrounded by 1 foot of stone between drywells and on bottom (rectangular envelope as shown on plan).

Volume within drywell (V_w):

$$D_i = 6 \text{ ft} \quad D_o = 7 \text{ ft} \quad d = 2 \text{ ft} \quad V_w = \pi * D_i^2 / 4 * 2 \text{ ft} = 56.5 \text{ ft}^3$$

$$V_w = 56.5 \text{ ft}^3$$

Volume within stone:

V = rectangular envelope – drywell space =

$$\text{Drywell space} = \pi * D_o^2 / 4 * 2 \text{ ft} = 77.0 \text{ ft}^3$$

$$\text{Rectangular stone envelope} = \text{Length} \times \text{width} \times \text{height} = 9 \text{ ft} \times 9 \text{ ft} \times 2 \text{ ft} = 162 \text{ ft}^3$$

$$V = 162 \text{ ft}^3 - 77.0 \text{ ft}^3 = 85 \text{ ft}^3$$

Void Coefficient = 0.4

$$V_{st} = 34.0 \text{ ft}^3$$

Soil Infiltration Calculations:

Area of Percolation (A_p):

$$d = 1 \text{ ft}, r = 0.5 \text{ ft}$$

$$\text{Surface Area of Cylinder (A}_c) = \pi \times d \times h_{avg} = 3.14159 \times 1 \text{ ft} \times 8.5 \text{ in} / 12 \text{ in/ft} = 2.23 \text{ ft}^2$$

$$\text{Bottom Area} = A_b = \pi \times r^2 = 0.785 \text{ ft}^2$$

$$A_p = A_c + A_b = 2.23 + 0.785 = 3.01 \text{ ft}^2$$

Volume of Percolation (V_p):

$$V_p = A_b \times h = 0.785 \times 1 \text{ in}/12 \text{ in/ft} = 0.0654 \text{ ft}^3$$

$$\text{Soil Percolation Rate} = S_r = V_p/\text{area}/\text{time}$$

$$\text{Field Infiltration} = 1":6 \text{ min}$$

$$S_r = 0.0654 \text{ ft}^3 / 3.01 \text{ ft}^2 / 6 \text{ min}$$

$$S_r = .00362 \text{ ft}^3/\text{ft}^2/\text{min} = .00362 \text{ ft}^3 / \text{min} \times 60 \text{ min/hr} \times 24 \text{ hr/day} = 5.21 \text{ ft}^3/\text{ft}^2/\text{day}$$

Use Clogging Factor of 25%

$$25\% \times 5.21 = 1.30 \text{ ft}^3/\text{ft}^2/\text{day}$$

$$S_r = 5.21 - 1.30 = 3.91 \text{ ft}^3/\text{ft}^2/\text{day}$$

$$V_p = S_r \times \text{Surface Area} = 3.91 \text{ ft}^3/\text{ft}^2/\text{day} \times 81 \text{ ft}^2$$

$$V_p = 316.71 \text{ ft}^3/\text{day per drywell}$$

Overall 24 hour volume per drywell (V_t):

$$V_t = V_w + V_{st} + V_p = 56.5 + 34.0 + 316.7 = 407.2 \text{ ft}^3$$

Required Storage Calculations:

Store entire Runoff Reduction Volume (RRv) within the drywell infiltration system

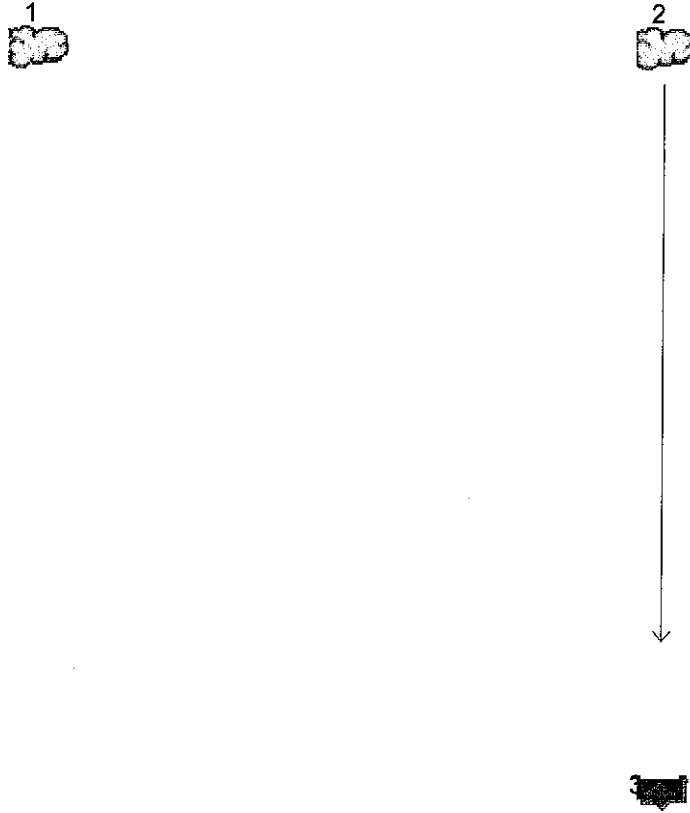
$$\text{RRv Storage Required} = V_s = 735 \text{ ft}^3$$

$$\text{Drywells Required} = V_s / V_t = 752 \text{ ft}^3 / 407.2 \text{ ft}^3 = 1.85 \text{ drywells}$$

Therefore, provide two (2) drywells, 6 ft inner diameter, 2 ft deep

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020



Legend

<u>Hyd. Origin</u>	<u>Description</u>
1	SCS Runoff Existing Condition
2	SCS Runoff Proposed Condition
3	Reservoir ROUTE

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.689	1	725	2,123	----	----	----	Existing Condition
2	SCS Runoff	0.960	1	724	3,068	----	----	----	Proposed Condition
3	Reservoir	0.637	1	730	3,060	2	173.83	540	ROUTE
diana.gpw					Return Period: 1 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

4

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

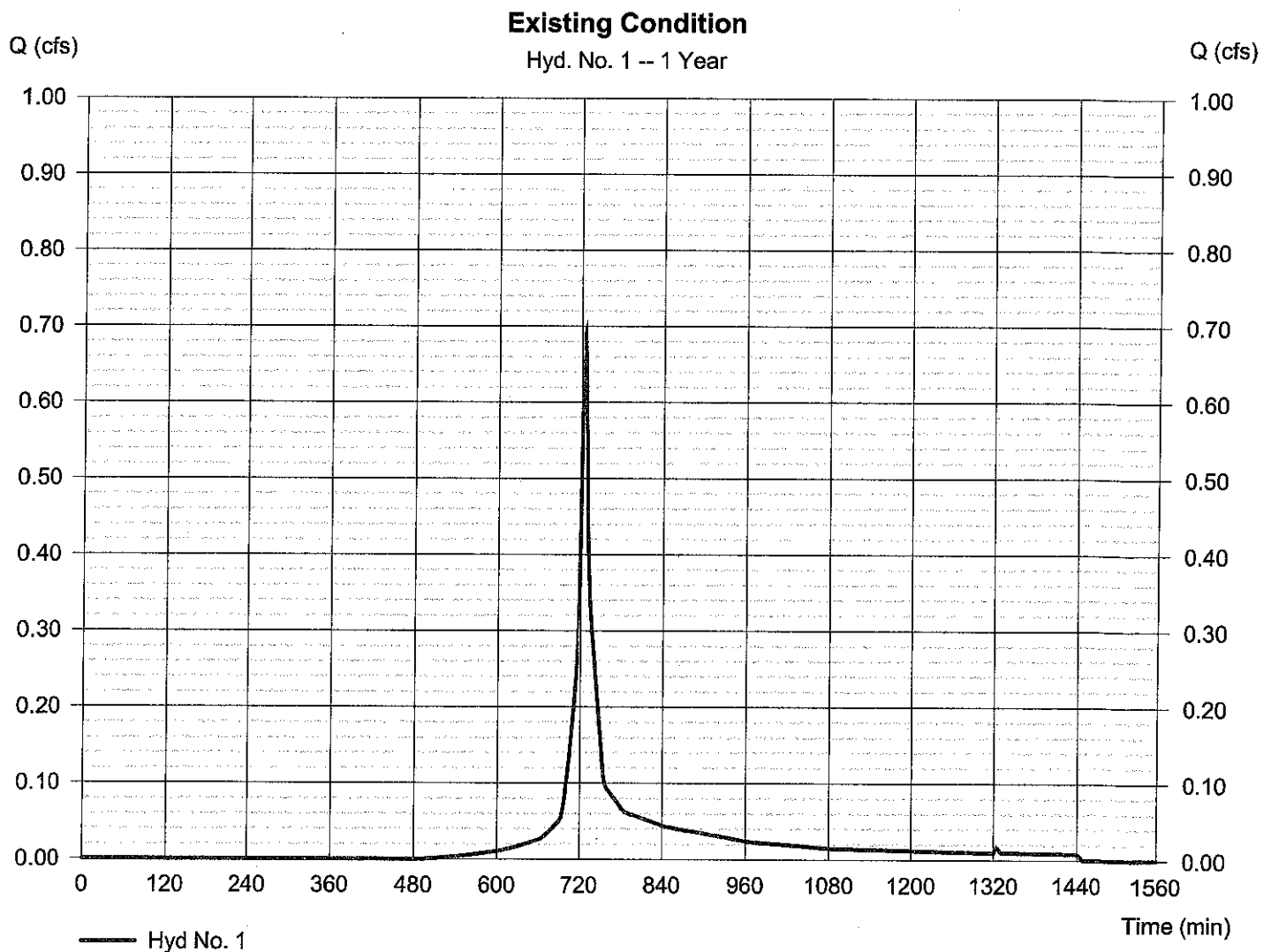
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 0.689 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,123 cuft
Drainage area	= 0.380 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

5

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

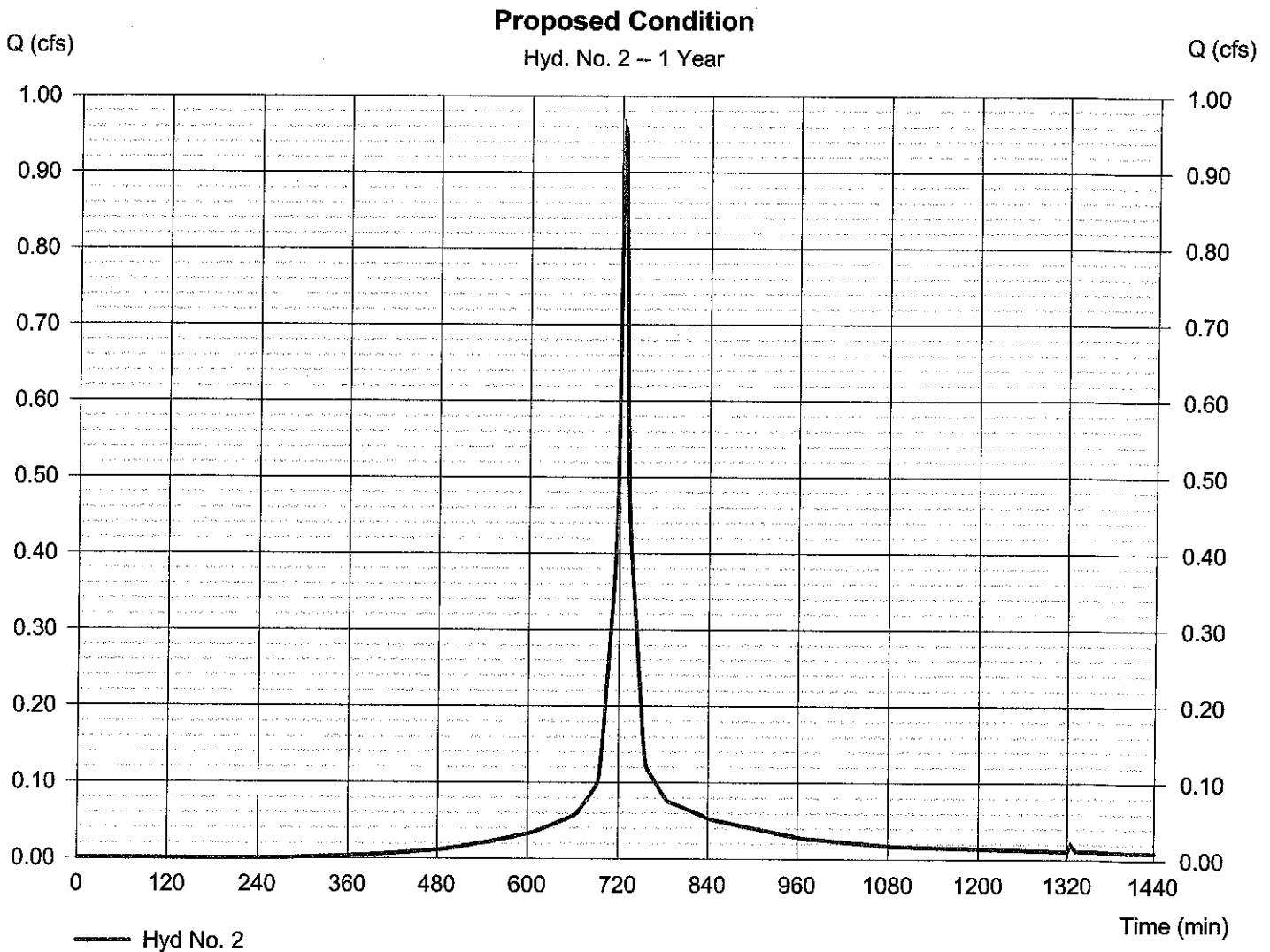
Monday, 03 / 9 / 2020

Hyd. No. 2

Proposed Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.960 cfs
Storm frequency	=	1 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	3,068 cuft
Drainage area	=	0.380 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Hyd. No. 3

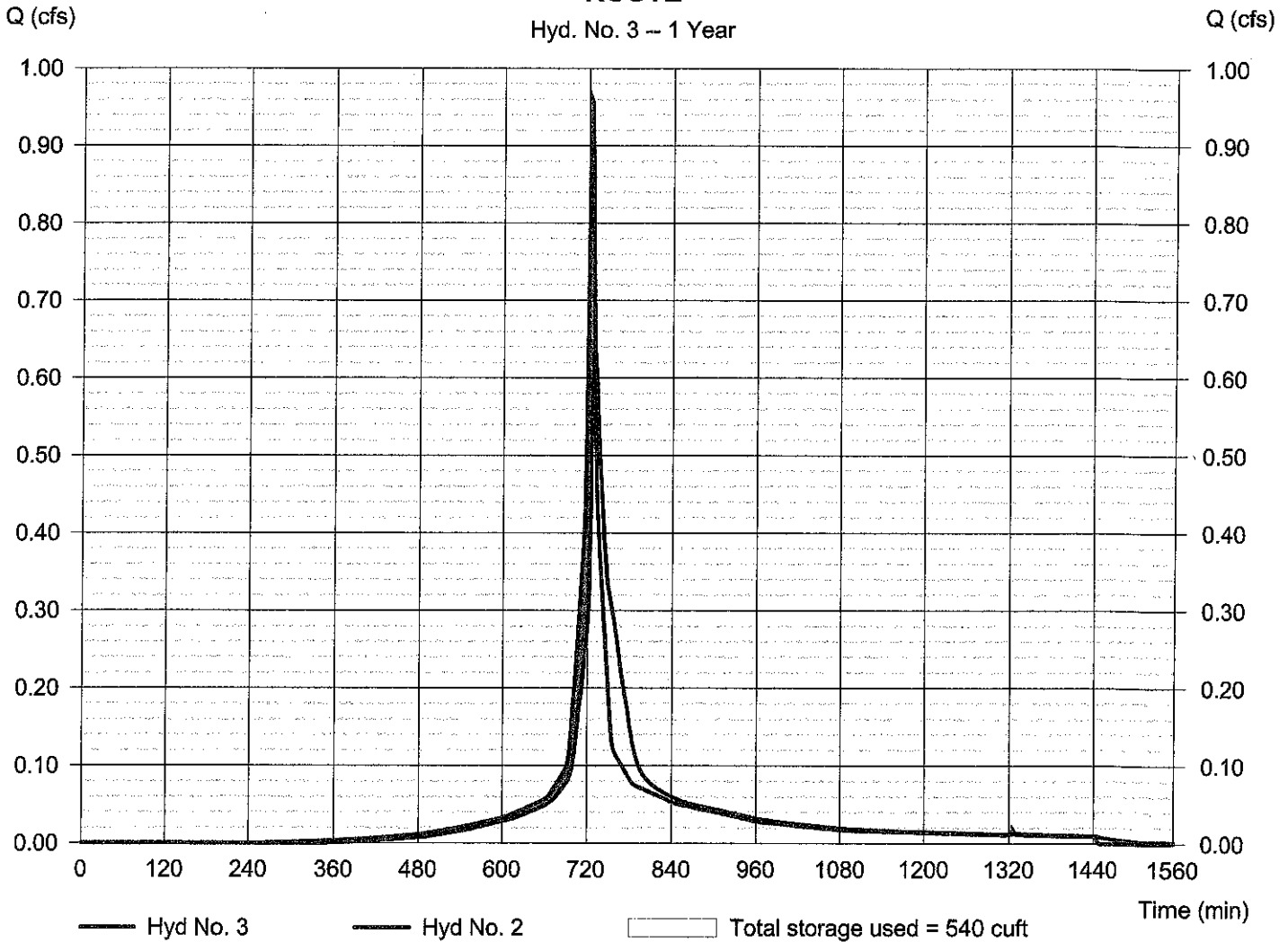
ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 0.637 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 3,060 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 173.83 ft
Reservoir name	= <New Pond>	Max. Storage	= 540 cuft

Storage Indication method used.

ROUTE

Hyd. No. 3 -- 1 Year



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Pond No. 1 - <New Pond>

Pond Data

UG Chambers -Invert elev. = 173.20 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 75.00 ft, No. Barrels = 6, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	173.20	n/a	0	0
0.30	173.50	n/a	185	185
0.60	173.80	n/a	320	505
0.90	174.10	n/a	390	894
1.20	174.40	n/a	429	1,323
1.50	174.70	n/a	448	1,771
1.80	175.00	n/a	448	2,220
2.10	175.30	n/a	429	2,649
2.40	175.60	n/a	389	3,038
2.70	175.90	n/a	320	3,358
3.00	176.20	n/a	184	3,542

Culvert / Orifice Structures

Weir Structures

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	= 15.00	5.00	10.00	0.00	Crest Len (ft)	= 2.00	0.00	0.00	0.00
Span (in)	= 15.00	5.00	10.00	0.00	Crest El. (ft)	= 173.70	0.00	0.00	0.00
No. Barrels	= 1	1	1	0	Weir Coeff.	= 3.33	3.33	3.33	3.33
Invert El. (ft)	= 173.20	173.20	174.20	0.00	Weir Type	= Rect	---	---	---
Length (ft)	= 50.00	0.00	0.00	0.00	Multi-Stage	= Yes	No	No	No
Slope (%)	= 1.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a					
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(in/hr)	= 0.000 (by Wet area)			
Multi-Stage	= n/a	Yes	Yes	No	TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	173.20	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	18	173.23	0.00 ic	0.00 ic	0.00	---	0.00	---	---	---	---	---	0.002
0.06	37	173.26	0.01 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.008
0.09	55	173.29	0.02 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.019
0.12	74	173.32	0.03 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.033
0.15	92	173.35	0.05 ic	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.049
0.18	111	173.38	0.07 ic	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.069
0.21	129	173.41	0.09 ic	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.092
0.24	148	173.44	0.12 ic	0.12 ic	0.00	---	0.00	---	---	---	---	---	0.117
0.27	166	173.47	0.15 ic	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.144
0.30	185	173.50	0.17 ic	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.173
0.33	217	173.53	0.20 ic	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.200
0.36	249	173.56	0.23 ic	0.23 ic	0.00	---	0.00	---	---	---	---	---	0.229
0.39	281	173.59	0.26 ic	0.26 ic	0.00	---	0.00	---	---	---	---	---	0.258
0.42	313	173.62	0.28 ic	0.28 ic	0.00	---	0.00	---	---	---	---	---	0.278
0.45	345	173.65	0.30 ic	0.30 ic	0.00	---	0.00	---	---	---	---	---	0.295
0.48	377	173.68	0.31 ic	0.31 ic	0.00	---	0.00	---	---	---	---	---	0.313
0.51	409	173.71	0.33 ic	0.33 ic	0.00	---	0.01	---	---	---	---	---	0.333
0.54	441	173.74	0.39 ic	0.33 ic	0.00	---	0.05	---	---	---	---	---	0.387
0.57	473	173.77	0.46 ic	0.34 ic	0.00	---	0.12	---	---	---	---	---	0.459
0.60	505	173.80	0.56 ic	0.33 ic	0.00	---	0.21	---	---	---	---	---	0.545
0.63	544	173.83	0.65 ic	0.33 ic	0.00	---	0.31	---	---	---	---	---	0.646
0.66	583	173.86	0.77 ic	0.33 ic	0.00	---	0.43	---	---	---	---	---	0.758
0.69	621	173.89	0.90 ic	0.33 ic	0.00	---	0.55	---	---	---	---	---	0.879
0.72	660	173.92	1.01 ic	0.33 ic	0.00	---	0.69	---	---	---	---	---	1.014
0.75	699	173.95	1.16 ic	0.32 ic	0.00	---	0.83 s	---	---	---	---	---	1.154
0.78	738	173.98	1.29 ic	0.32 ic	0.00	---	0.97 s	---	---	---	---	---	1.289
0.81	777	174.01	1.42 ic	0.32 ic	0.00	---	1.10 s	---	---	---	---	---	1.421
0.84	816	174.04	1.55 ic	0.32 ic	0.00	---	1.23 s	---	---	---	---	---	1.555
0.87	855	174.07	1.69 ic	0.32 ic	0.00	---	1.37 s	---	---	---	---	---	1.691
0.90	894	174.10	1.83 ic	0.32 ic	0.00	---	1.51 s	---	---	---	---	---	1.831
0.93	937	174.13	1.97 ic	0.32 ic	0.00	---	1.65 s	---	---	---	---	---	1.973

Continues on next page...

<New Pond>

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.96	980	174.16	2.12 ic	0.32 ic	0.00	---	1.79 s	---	---	---	---	---	2.117
0.99	1,023	174.19	2.26 ic	0.33 ic	0.00	---	1.94 s	---	---	---	---	---	2.262
1.02	1,066	174.22	2.41 ic	0.33 ic	0.00 ic	---	2.08 s	---	---	---	---	---	2.410
1.05	1,109	174.25	2.56 ic	0.33 ic	0.01 ic	---	2.22 s	---	---	---	---	---	2.560
1.08	1,152	174.28	2.71 ic	0.33 ic	0.03 ic	---	2.36 s	---	---	---	---	---	2.713
1.11	1,194	174.31	2.90 ic	0.33 ic	0.05 ic	---	2.50 s	---	---	---	---	---	2.876
1.14	1,237	174.34	3.05 ic	0.33 ic	0.08 ic	---	2.64 s	---	---	---	---	---	3.046
1.17	1,280	174.37	3.22 ic	0.32 ic	0.11 ic	---	2.78 s	---	---	---	---	---	3.219
1.20	1,323	174.40	3.40 ic	0.32 ic	0.16 ic	---	2.91 s	---	---	---	---	---	3.390
1.23	1,368	174.43	3.57 ic	0.32 ic	0.20 ic	---	3.04 s	---	---	---	---	---	3.568
1.26	1,413	174.46	3.74 ic	0.32 ic	0.26 ic	---	3.16 s	---	---	---	---	---	3.736
1.29	1,458	174.49	3.91 ic	0.31 ic	0.32 ic	---	3.29 s	---	---	---	---	---	3.915
1.32	1,502	174.52	4.08 ic	0.31 ic	0.38 ic	---	3.39 s	---	---	---	---	---	4.083
1.35	1,547	174.55	4.25 ic	0.30 ic	0.44 ic	---	3.50 s	---	---	---	---	---	4.248
1.38	1,592	174.58	4.35 oc	0.29 ic	0.52 ic	---	3.54 s	---	---	---	---	---	4.350
1.41	1,637	174.61	4.36 oc	0.28 ic	0.54 ic	---	3.54 s	---	---	---	---	---	4.355
1.44	1,682	174.64	4.39 oc	0.27 ic	0.57 ic	---	3.55 s	---	---	---	---	---	4.390
1.47	1,727	174.67	4.53 oc	0.26 ic	0.62 ic	---	3.65 s	---	---	---	---	---	4.527
1.50	1,771	174.70	4.66 oc	0.26 ic	0.65 ic	---	3.75 s	---	---	---	---	---	4.660
1.53	1,816	174.73	4.79 oc	0.26 ic	0.69 ic	---	3.84 s	---	---	---	---	---	4.790
1.56	1,861	174.76	4.92 oc	0.25 ic	0.73 ic	---	3.93 s	---	---	---	---	---	4.917
1.59	1,906	174.79	5.04 oc	0.25 ic	0.76 ic	---	4.03 s	---	---	---	---	---	5.039
1.62	1,951	174.82	5.16 oc	0.25 ic	0.79 ic	---	4.12 s	---	---	---	---	---	5.158
1.65	1,996	174.85	5.27 oc	0.24 ic	0.82 ic	---	4.21 s	---	---	---	---	---	5.273
1.68	2,040	174.88	5.39 oc	0.24 ic	0.85 ic	---	4.30 s	---	---	---	---	---	5.388
1.71	2,085	174.91	5.50 oc	0.24 ic	0.87 ic	---	4.39 s	---	---	---	---	---	5.497
1.74	2,130	174.94	5.61 oc	0.24 ic	0.89 ic	---	4.47 s	---	---	---	---	---	5.605
1.77	2,175	174.97	5.71 oc	0.24 ic	0.91 ic	---	4.56 s	---	---	---	---	---	5.710
1.80	2,220	175.00	5.81 oc	0.23 ic	0.92 ic	---	4.66 s	---	---	---	---	---	5.811
1.83	2,263	175.03	5.91 oc	0.23 ic	0.93 ic	---	4.75 s	---	---	---	---	---	5.911
1.86	2,305	175.06	6.01 oc	0.23 ic	0.92 ic	---	4.85 s	---	---	---	---	---	6.007
1.89	2,348	175.09	6.10 oc	0.23 ic	0.92 ic	---	4.96 s	---	---	---	---	---	6.101
1.92	2,391	175.12	6.20 oc	0.23 ic	0.91 ic	---	5.06 s	---	---	---	---	---	6.195
1.95	2,434	175.15	6.29 oc	0.23 ic	0.91 ic	---	5.15 s	---	---	---	---	---	6.286
1.98	2,477	175.18	6.38 oc	0.23 ic	0.90 ic	---	5.25 s	---	---	---	---	---	6.375
2.01	2,520	175.21	6.47 oc	0.22 ic	0.90 ic	---	5.35 s	---	---	---	---	---	6.466
2.04	2,563	175.24	6.56 oc	0.22 ic	0.89 ic	---	5.44 s	---	---	---	---	---	6.554
2.07	2,606	175.27	6.64 oc	0.22 ic	0.89 ic	---	5.53 s	---	---	---	---	---	6.640
2.10	2,649	175.30	6.73 oc	0.22 ic	0.88 ic	---	5.63 s	---	---	---	---	---	6.726
2.13	2,687	175.33	6.81 oc	0.22 ic	0.87 ic	---	5.72 s	---	---	---	---	---	6.811
2.16	2,726	175.36	6.90 oc	0.22 ic	0.87 ic	---	5.81 s	---	---	---	---	---	6.896
2.19	2,765	175.39	6.98 oc	0.22 ic	0.86 ic	---	5.90 s	---	---	---	---	---	6.978
2.22	2,804	175.42	7.06 oc	0.21 ic	0.86 ic	---	5.99 s	---	---	---	---	---	7.059
2.25	2,843	175.45	7.14 oc	0.21 ic	0.85 ic	---	6.08 s	---	---	---	---	---	7.141
2.28	2,882	175.48	7.22 oc	0.21 ic	0.85 ic	---	6.16 s	---	---	---	---	---	7.220
2.31	2,921	175.51	7.30 oc	0.21 ic	0.84 ic	---	6.25 s	---	---	---	---	---	7.300
2.34	2,960	175.54	7.38 oc	0.21 ic	0.84 ic	---	6.33 s	---	---	---	---	---	7.378
2.37	2,999	175.57	7.46 oc	0.21 ic	0.83 ic	---	6.41 s	---	---	---	---	---	7.453
2.40	3,038	175.60	7.53 oc	0.21 ic	0.83 ic	---	6.50 s	---	---	---	---	---	7.529
2.43	3,070	175.63	7.61 oc	0.21 ic	0.82 ic	---	6.58 s	---	---	---	---	---	7.607
2.46	3,102	175.66	7.68 oc	0.20 ic	0.81 ic	---	6.66 s	---	---	---	---	---	7.680
2.49	3,134	175.69	7.76 oc	0.20 ic	0.81 ic	---	6.74 s	---	---	---	---	---	7.756
2.52	3,166	175.72	7.83 oc	0.20 ic	0.80 ic	---	6.82 s	---	---	---	---	---	7.827
2.55	3,198	175.75	7.90 oc	0.20 ic	0.80 ic	---	6.90 s	---	---	---	---	---	7.900
2.58	3,230	175.78	7.97 oc	0.20 ic	0.79 ic	---	6.98 s	---	---	---	---	---	7.971
2.61	3,262	175.81	8.05 oc	0.20 ic	0.79 ic	---	7.06 s	---	---	---	---	---	8.042
2.64	3,294	175.84	8.12 oc	0.20 ic	0.78 ic	---	7.14 s	---	---	---	---	---	8.114
2.67	3,326	175.87	8.19 oc	0.19 ic	0.78 ic	---	7.21 s	---	---	---	---	---	8.183
2.70	3,358	175.90	8.25 oc	0.19 ic	0.77 ic	---	7.29 s	---	---	---	---	---	8.253
2.73	3,376	175.93	8.32 oc	0.19 ic	0.77 ic	---	7.36 s	---	---	---	---	---	8.322
2.76	3,395	175.96	8.39 oc	0.19 ic	0.76 ic	---	7.44 s	---	---	---	---	---	8.390
2.79	3,413	175.99	8.46 oc	0.19 ic	0.76 ic	---	7.51 s	---	---	---	---	---	8.456
2.82	3,432	176.02	8.53 oc	0.19 ic	0.75 ic	---	7.58 s	---	---	---	---	---	8.525
2.85	3,450	176.05	8.59 oc	0.19 ic	0.75 ic	---	7.65 s	---	---	---	---	---	8.589
2.88	3,468	176.08	8.66 oc	0.19 ic	0.74 ic	---	7.73 s	---	---	---	---	---	8.656
2.91	3,487	176.11	8.72 oc	0.18 ic	0.74 ic	---	7.80 s	---	---	---	---	---	8.721
2.94	3,505	176.14	8.79 oc	0.18 ic	0.73 ic	---	7.87 s	---	---	---	---	---	8.785
2.97	3,524	176.17	8.85 oc	0.18 ic	0.73 ic	---	7.94 s	---	---	---	---	---	8.848
3.00	3,542	176.20	8.92 oc	0.18 ic	0.73 ic	---	8.01 s	---	---	---	---	---	8.915

...End

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.966	1	725	2,985	----	----	----	Existing Condition
2	SCS Runoff	1.244	1	724	4,034	----	----	----	Proposed Condition
3	Reservoir	0.932	1	729	4,025	2	173.90	637	ROUTE
diana.gpw					Return Period: 2 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

10

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

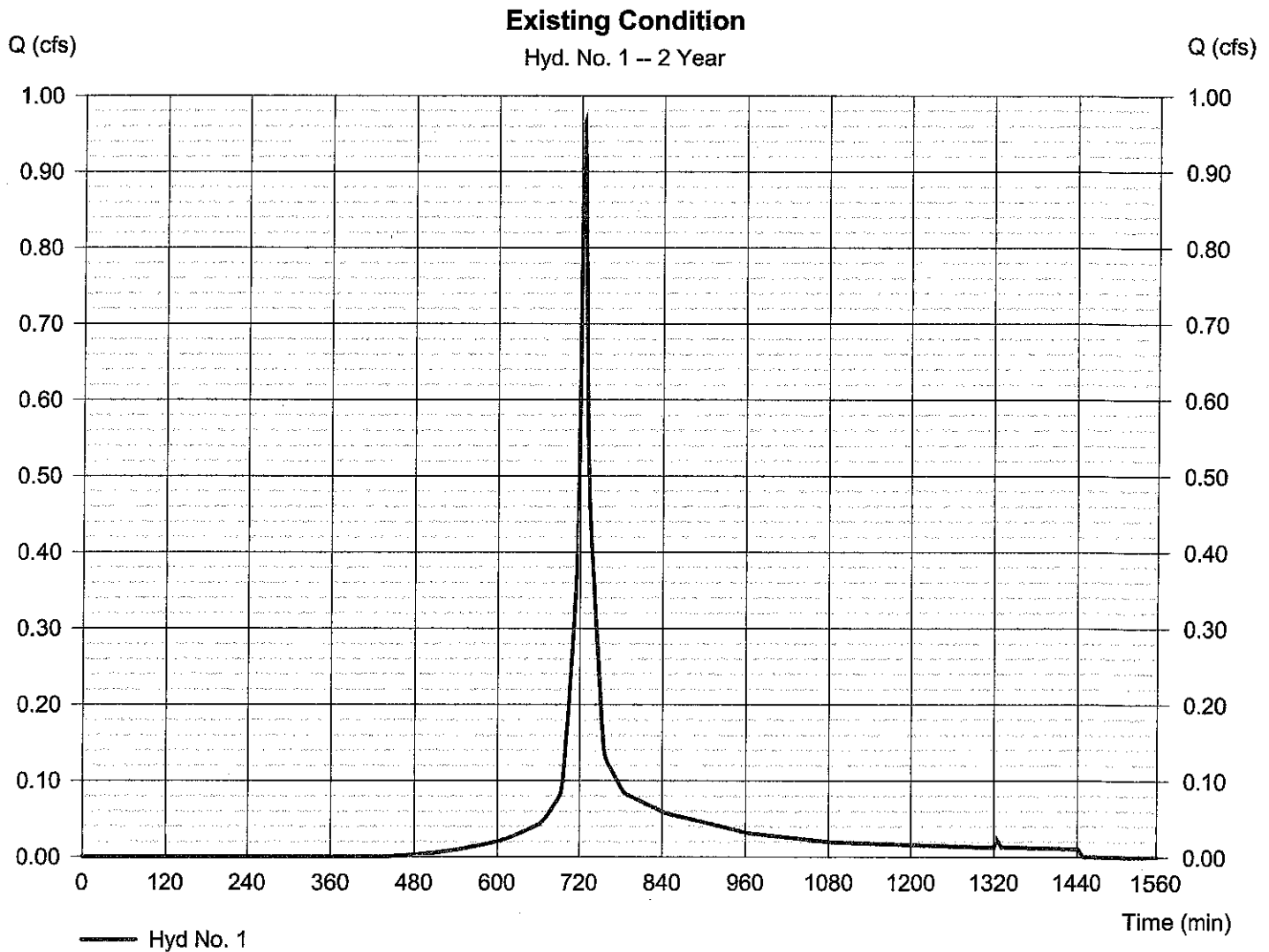
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 0.966 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,985 cuft
Drainage area	= 0.380 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

11

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

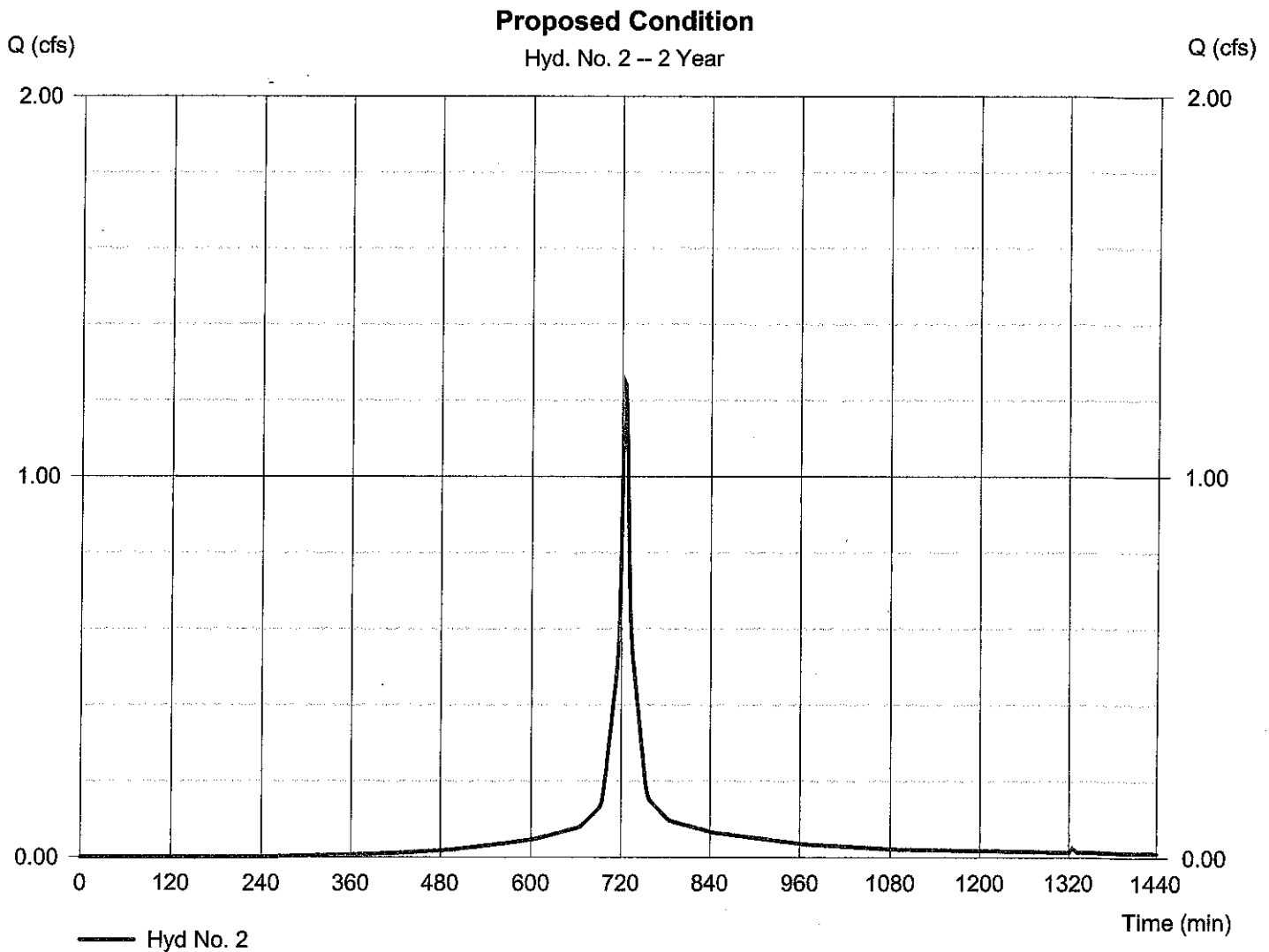
Monday, 03 / 9 / 2020

Hyd. No. 2

Proposed Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 1.244 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 4,034 cuft
Drainage area	= 0.380 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

12

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

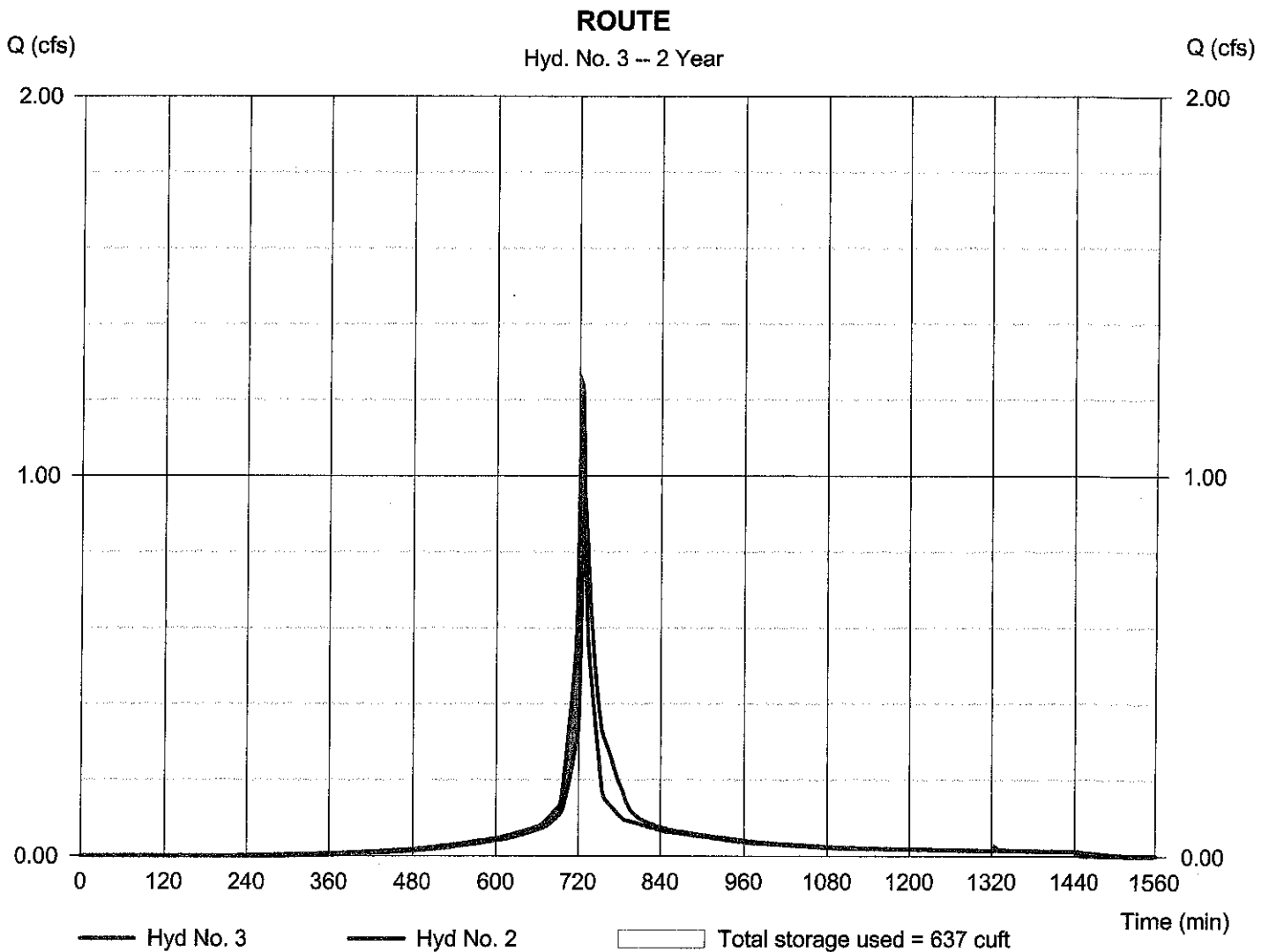
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 0.932 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,025 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 173.90 ft
Reservoir name	= <New Pond>	Max. Storage	= 637 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.626	1	724	5,105	----	----	----	Existing Condition
2	SCS Runoff	1.897	1	724	6,311	----	----	----	Proposed Condition
3	Reservoir	1.553	1	728	6,302	2	174.04	816	ROUTE

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

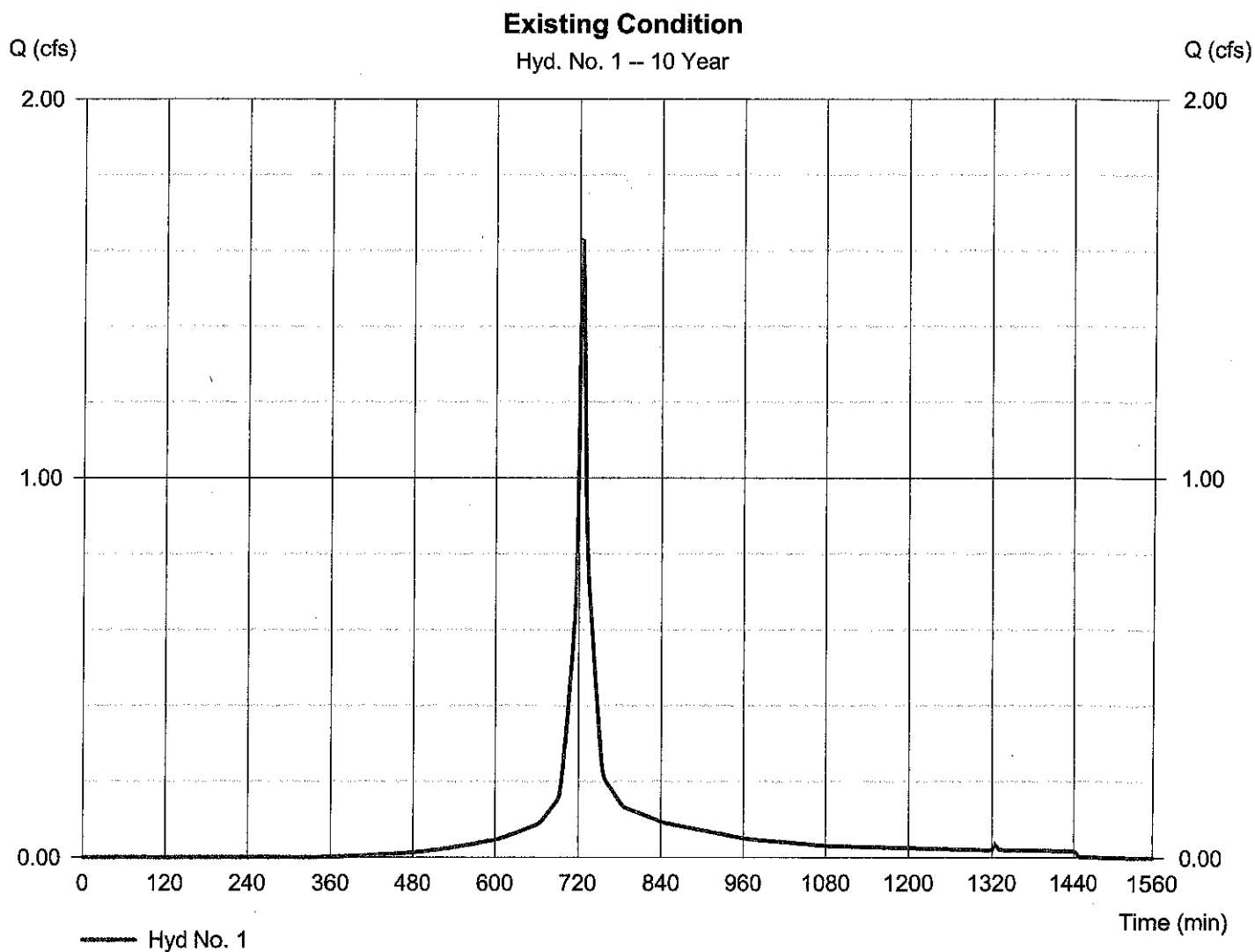
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.626 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	5,105 cuft
Drainage area	=	0.380 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.13 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

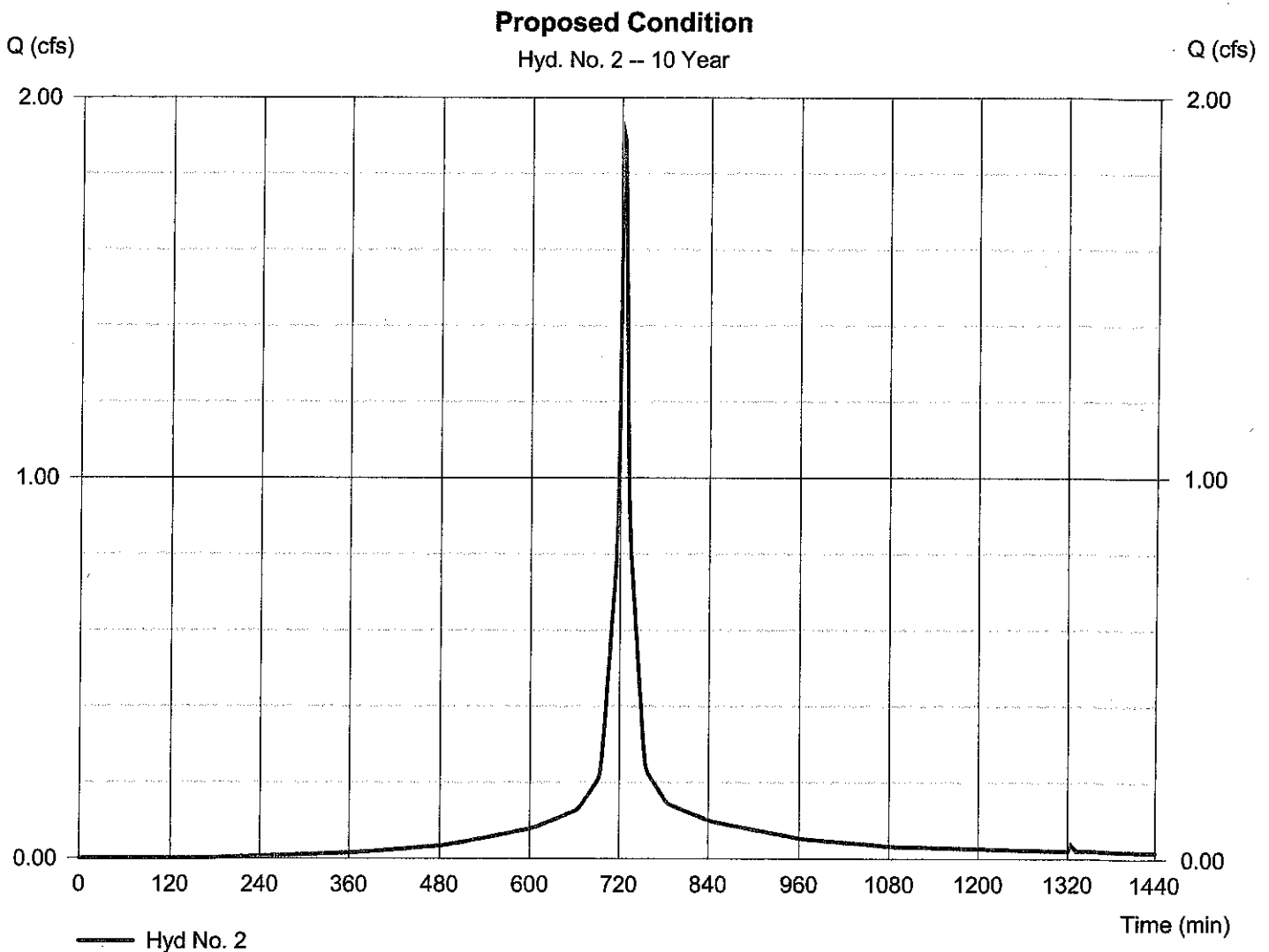
Monday, 03 / 9 / 2020

Hyd. No. 2

Proposed Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 1.897 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 6,311 cuft
Drainage area	= 0.380 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.13 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

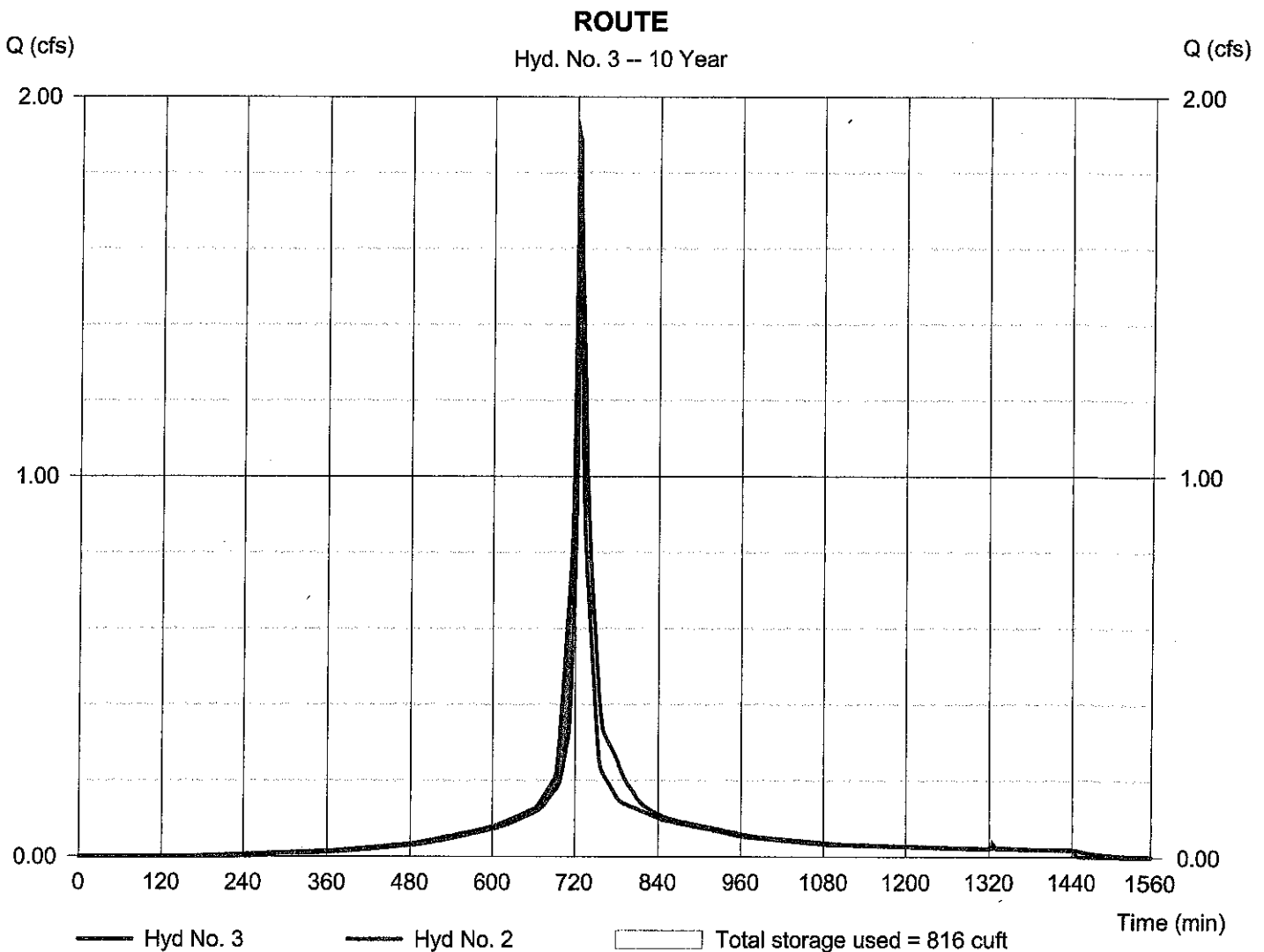
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 1.553 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 6,302 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.04 ft
Reservoir name	= <New Pond>	Max. Storage	= 816 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.092	1	724	6,638	----	----	----	Existing Condition
2	SCS Runoff	2.349	1	724	7,915	----	----	----	Proposed Condition
3	Reservoir	1.942	1	728	7,907	2	174.12	928	ROUTE
diana.gpw					Return Period: 25 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

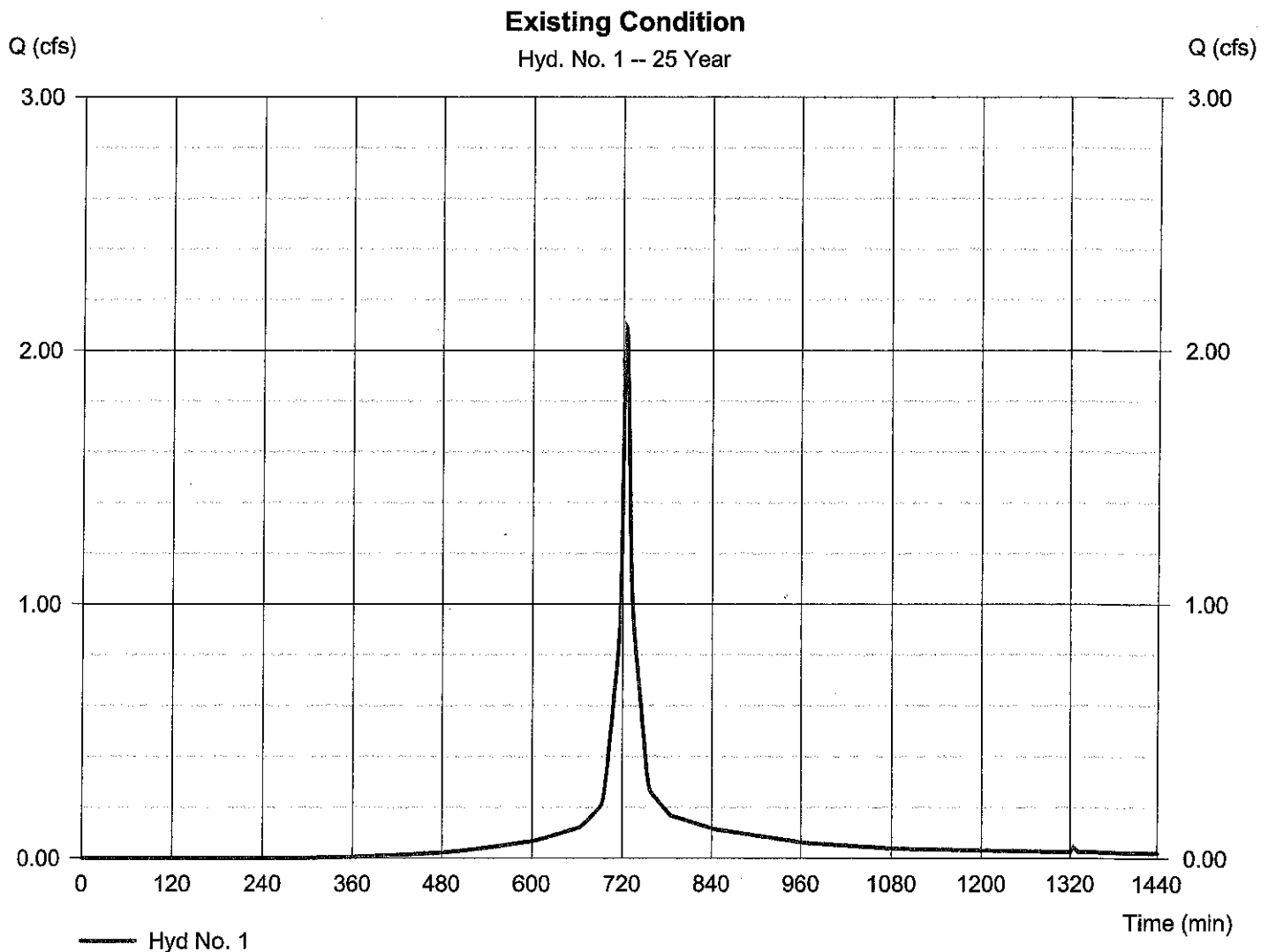
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 2.092 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 6,638 cuft
Drainage area	= 0.380 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

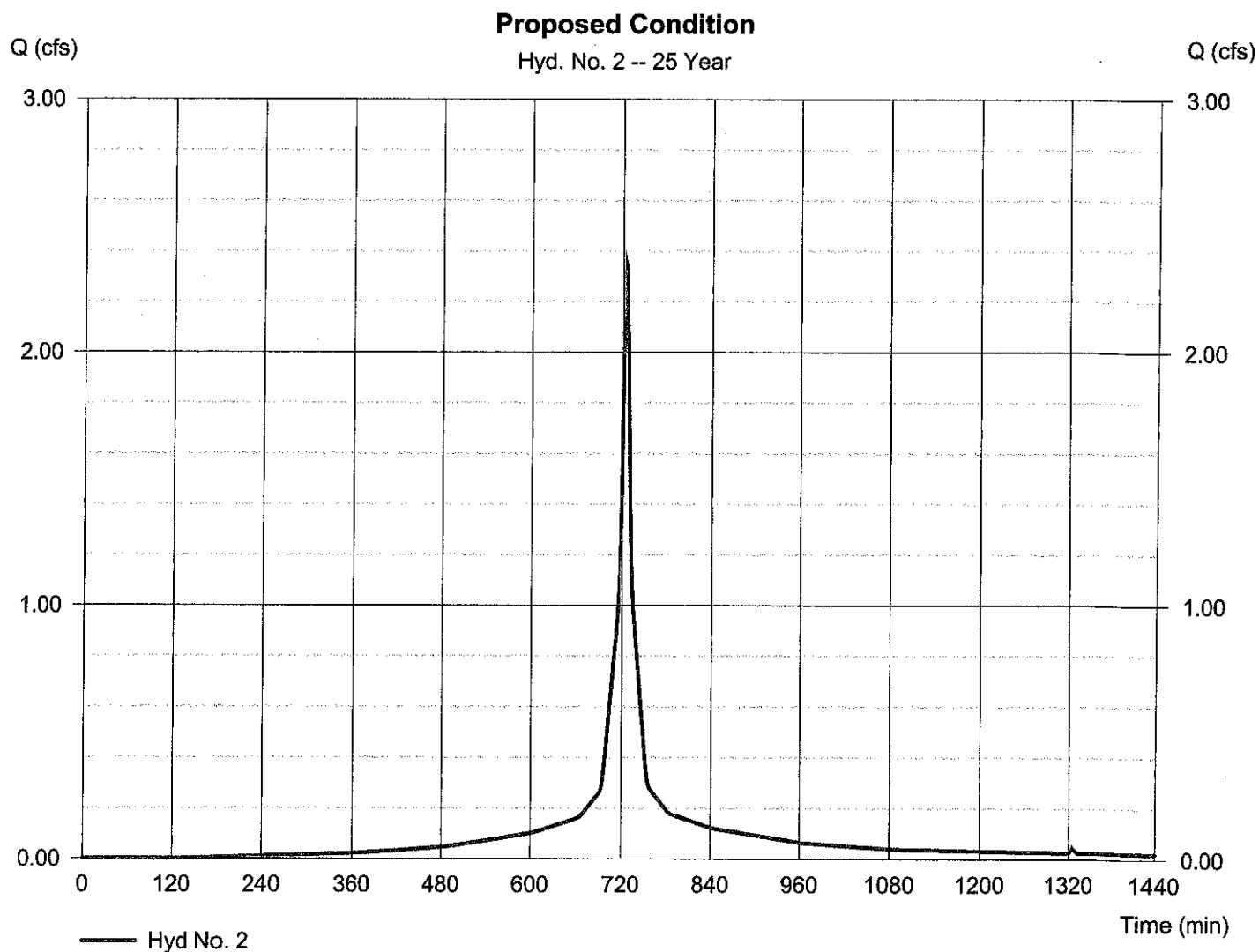
Monday, 03 / 9 / 2020

Hyd. No. 2

Proposed Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 2.349 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 7,915 cuft
Drainage area	= 0.380 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Hyd. No. 3

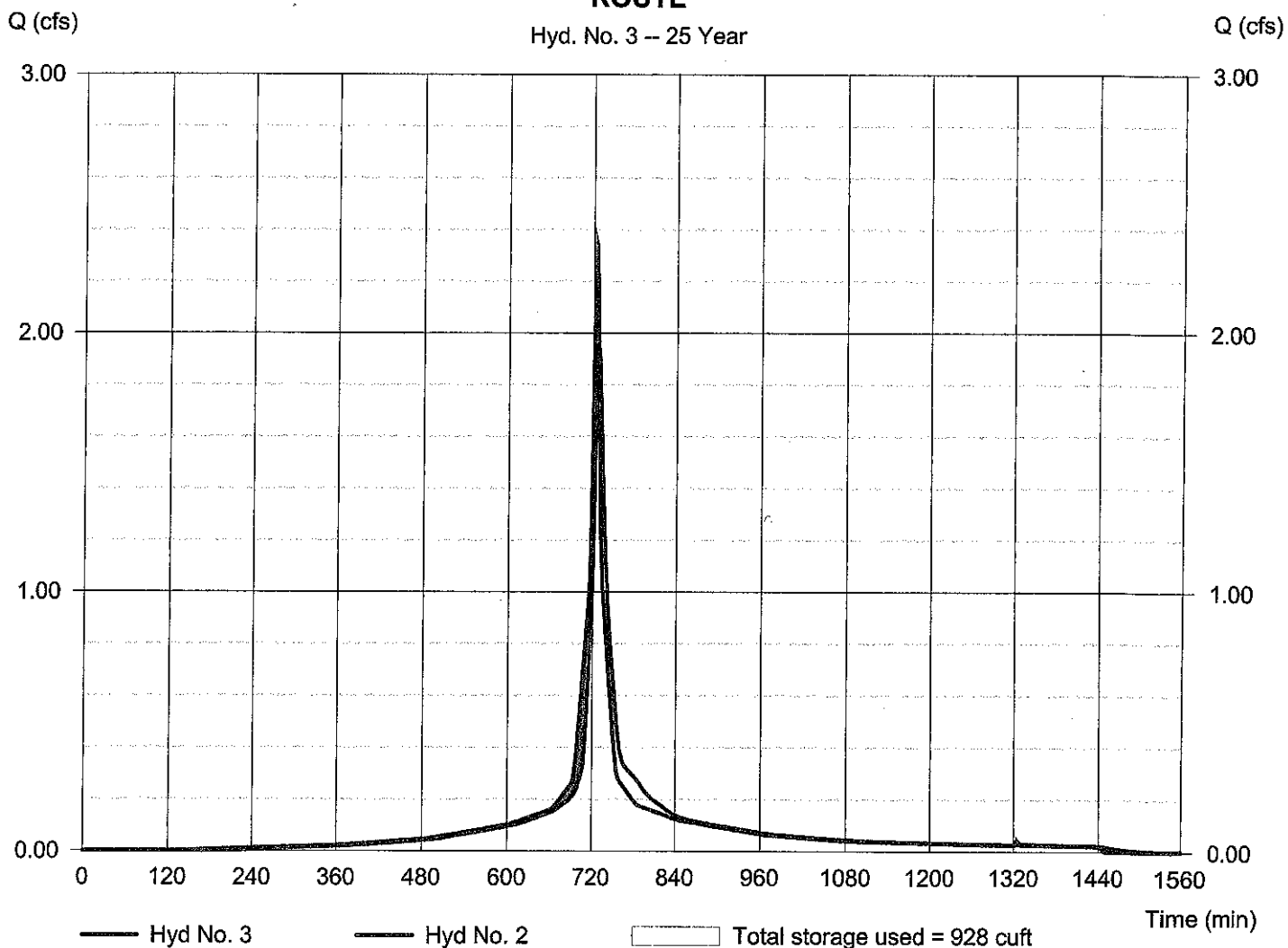
ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 1.942 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 7,907 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.12 ft
Reservoir name	= <New Pond>	Max. Storage	= 928 cuft

Storage Indication method used.

ROUTE

Hyd. No. 3 -- 25 Year



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.201	1	724	10,390	----	----	----	Existing Condition
2	SCS Runoff	3.424	1	724	11,774	----	----	----	Proposed Condition
3	Reservoir	2.852	1	728	11,766	2	174.31	1,188	ROUTE
diana.gpw					Return Period: 100 Year			Monday, 03 / 9 / 2020	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

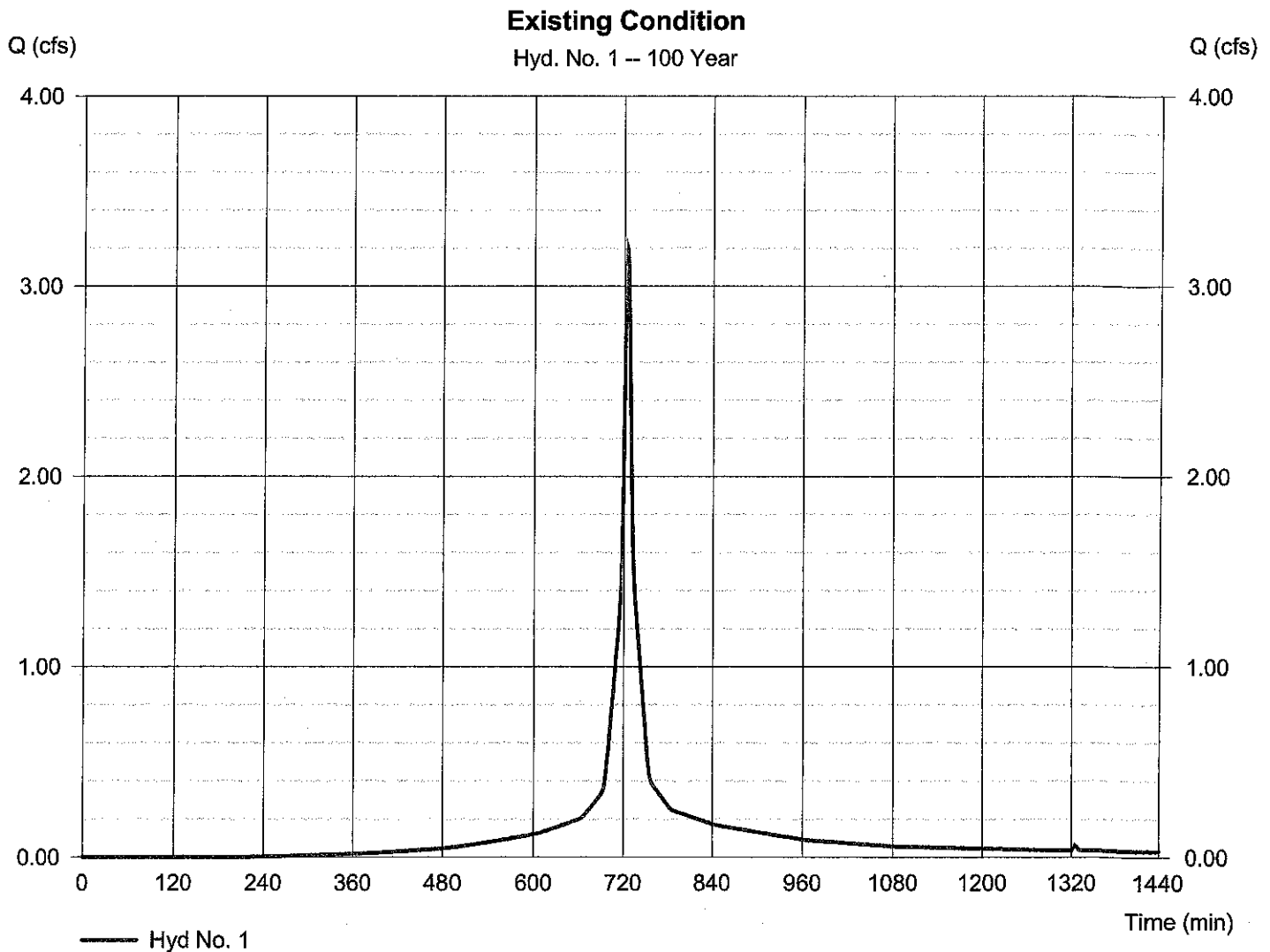
Monday, 03 / 9 / 2020

Hyd. No. 1

Existing Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 3.201 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 10,390 cuft
Drainage area	= 0.380 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 9.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.192 \times 74) + (0.191 \times 98)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

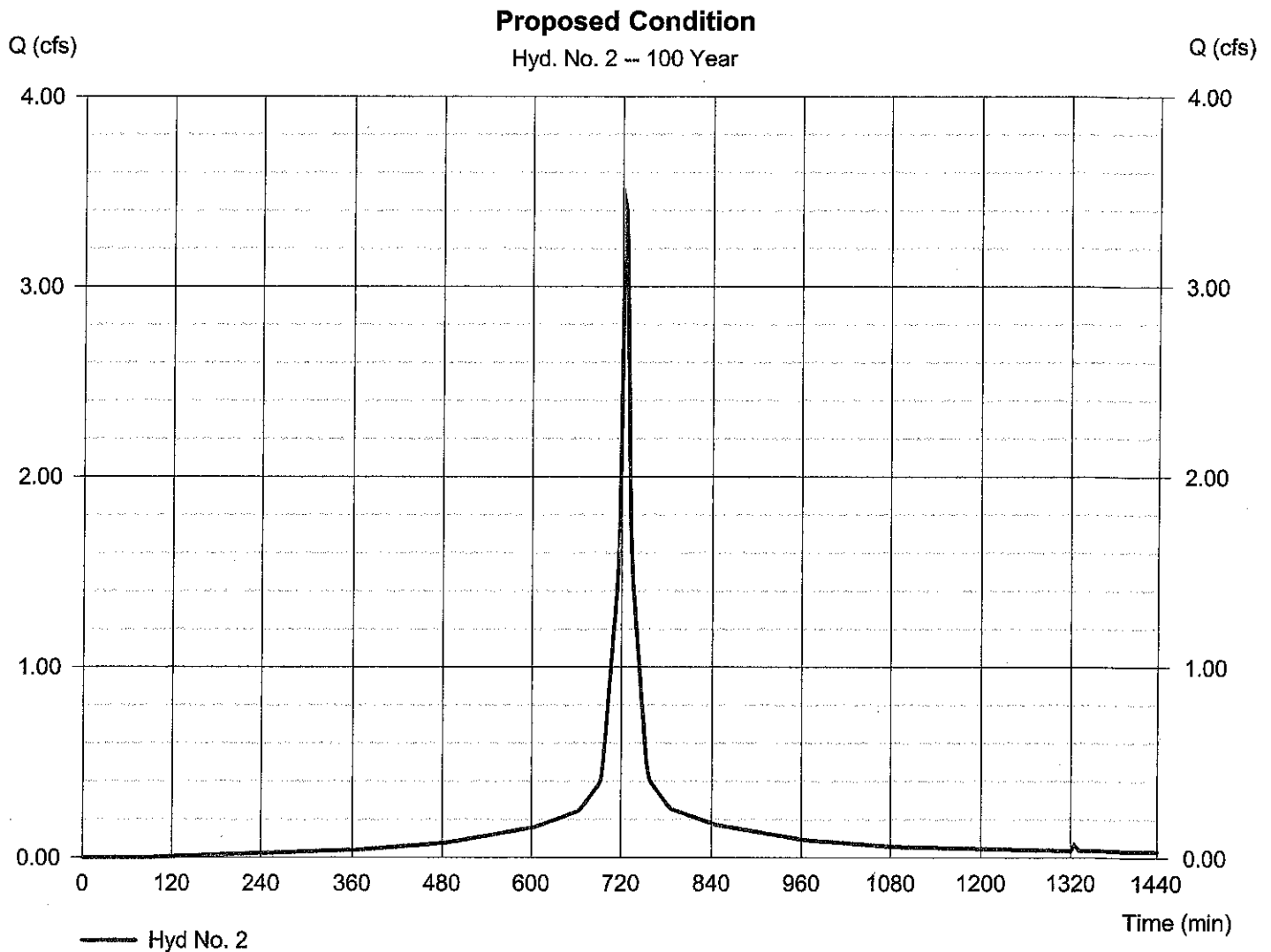
Monday, 03 / 9 / 2020

Hyd. No. 2

Proposed Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 3.424 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 11,774 cuft
Drainage area	= 0.380 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 9.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.323 \times 98) + (0.060 \times 74)] / 0.380$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

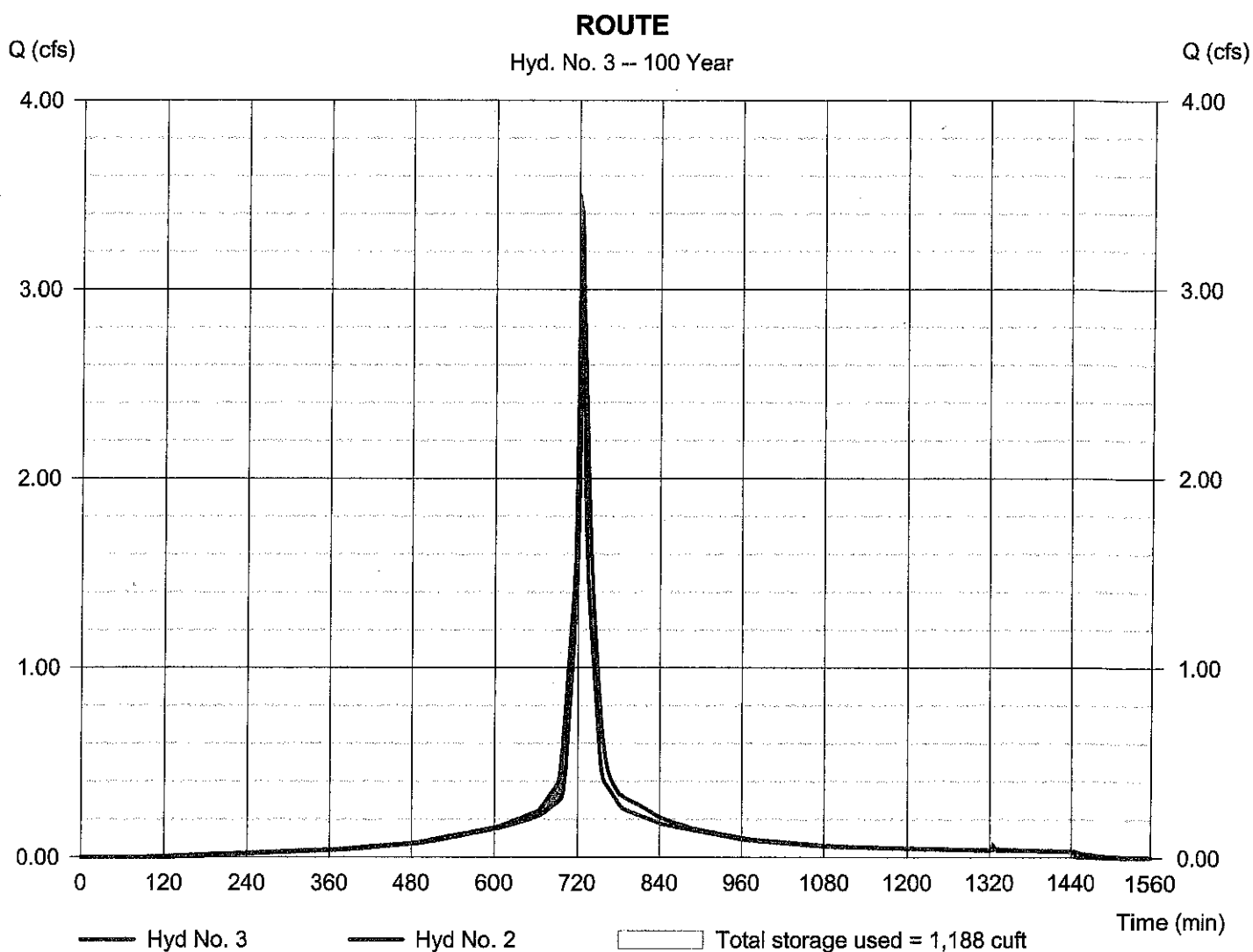
Monday, 03 / 9 / 2020

Hyd. No. 3

ROUTE

Hydrograph type	= Reservoir	Peak discharge	= 2.852 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 11,766 cuft
Inflow hyd. No.	= 2 - Proposed Condition	Max. Elevation	= 174.31 ft
Reservoir name	= <New Pond>	Max. Storage	= 1,188 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Monday, 03 / 9 / 2020

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	69.8703	13.1000	0.8658	-----
3	0.0000	0.0000	0.0000	-----
5	79.2597	14.6000	0.8369	-----
10	88.2351	15.5000	0.8279	-----
25	102.6072	16.5000	0.8217	-----
50	114.8193	17.2000	0.8199	-----
100	127.1596	17.8000	0.8186	-----

File name: SampleFHA.idf

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.50	0.00	3.30	5.13	6.27	6.80	9.00
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Hydraflow Table of Contents

diana.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

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Appendix C

Map Set

Appendix D

SWPPP Inspection Form

STORMWATER CONSTRUCTION SITE INSPECTION REPORT

GENERAL INFORMATION

Project Name:

Location:

Date of Inspection:

Start/End Time:

Inspector's Name:

Inspector's Title:

Inspector's Contact Information:

Describe present phase of construction:

Type of Inspection:

☐ Regular

☐ Pre-storm event

☐ During storm event

☐ Post-storm event

WEATHER INFORMATION

Has there been a storm event since the last inspection? ☐ Yes ☐ No

If yes, provide:

Storm Start Date & Time:

Storm Duration (hrs):

Approximate Amount of Precipitation (in):

Weather at time of this inspection?

☐ Clear

☐ Cloudy

☐ Rain

☐ Sleet

☐ Fog

☐ Snowing

☐ High Winds

☐ Other:

Temperature:

Have any discharges occurred since the last inspection? ☐ Yes ☐ No

If yes, describe:

Are there any discharges at the time of inspection? ☐ Yes ☐ No

If yes, describe:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Inspector

Printed Name and Title

Date

OVERALL SITE ISSUES

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1. All inactive slopes and disturbed areas have been stabilized.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Are all sanitary waste receptacles placed in secondary containment and free of leaks?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4. Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7. Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8. Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9. Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10. Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11. Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12. Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13. (Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Exhibit A

Maintenance Inspection Checklists

Stormwater Maintenance and Management Inspection Checklist

Project Location: 249-259 Main Street

Site Status:

Date:

Time:

Inspector:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
A. Catch Basins / Field Inlets / Trench Drains (Annual, After Major Storms)		
1. Structure is sound		
2. Condition of concrete		
3. Settling at grate / leaves or silt at grate		
4. Floating or floatable debris		
5. Silt accumulation at sump		
6. Condition of piping in / out		

Comments:

Actions to be Taken:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
B. HDPE Pipe & Outlet Structure (Annual, After Major Storms)		
1. Structure is sound		
2. Condition of concrete		
3. Condition of access cover		
4. Standing water		
5. Floating or floatable debris		
6. Silt accumulation >2" (must be cleaned)		
7. Condition of piping in / out		

Comments:

Actions to be Taken:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
C. Contech CD-5 (Annual, After Major Storms)		
1. Condition of manhole cover		
2. Floating or floatable debris		
3. Sediment and / or trash accumulation		

Comments:

Actions to be Taken:

Appendix E

Other SWPPP Forms

Appendix F

SPDES General Permit GP-0-20-001



Department of
Environmental
Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

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

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

A handwritten signature in black ink, appearing to be "John J. Ferguson", written over a horizontal line.

Authorized Signature

1-23-20

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 administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

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 ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* 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**

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Part 1. 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 November 2016, 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 *discharges*, including both peak flowrates and total stormwater volume, 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 *discharges* from the site;
 - (vi) Provide and maintain *natural buffers* around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharges*, 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;
 - (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and
 - (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.
- 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.** *Discharges 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, hazardous and toxic 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 discharges 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 discharges 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 discharges 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges*; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.
3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharges* from *construction site* de-watering operations. All non-stormwater discharges 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.D.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 are undertaken on land with no existing *impervious cover*; and
 - c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.
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 are undertaken on land with no existing *impervious cover*; and
 - c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

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.D.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
- (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. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not 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 Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.
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 the 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.
3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control 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.F. (Change of Owner or Operator) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*. This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, 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. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.
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.

C. 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 all 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), or the equivalent from another New York State agency, 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.C.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. 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.C. of this permit.

D. 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-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor’s or subcontractor’s certification statement (see Part III.A.6.), 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 November 2016.
 - 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 or consistent with Part VII.K..
 5. 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*.
 6. 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.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of a *construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, 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-0-20-001.

F. Change of Owner or Operator

1. 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. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4*, the original *owner or operator* must also notify the *MS4*, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.
2. 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.B.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.
3. 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, including construction drawings:
 - 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*;
 - c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, the Department or other regulatory authority; and
 - d. to document the final construction conditions.
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.D.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 November 2016. 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 November 2016, 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 November 2016;

- 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 November 2016. 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* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

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),
- New York State Erosion and Sediment Control Certificate Program holder
- 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.D.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* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the 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*, and 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.B.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

- I. 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.D.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.B.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; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and 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; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;
 - c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. 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 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 NOI submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOI, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.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 discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger 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 – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

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.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for “*Commence (Commencement of) Construction Activities*” and “*Larger Common Plan of Development or Sale*” also.

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

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*.

Embankment – means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

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).

Natural Buffer – means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

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*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank – means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

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.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

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, New York State Erosion and Sediment Control Certificate Program holder 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 authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

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,
- 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 stabilizes 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 designated on the current United States Department of Agriculture (“USDA”) Soil Survey as Soil Slope Phase “D”, (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

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, New York State Erosion and Sediment Control Certificate Program holder, 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 not located in one of the watersheds listed in Appendix C or not 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 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
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.

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.

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
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover
- Cross-country ski trails and walking/hiking trails
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

**Table 1 (Continued) 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:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) 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* and 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 greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

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 home that disturbs five (5) or more acres of land
- 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 duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- 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 development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

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:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- 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
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction 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 Requiring Enhanced Phosphorus Removal

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

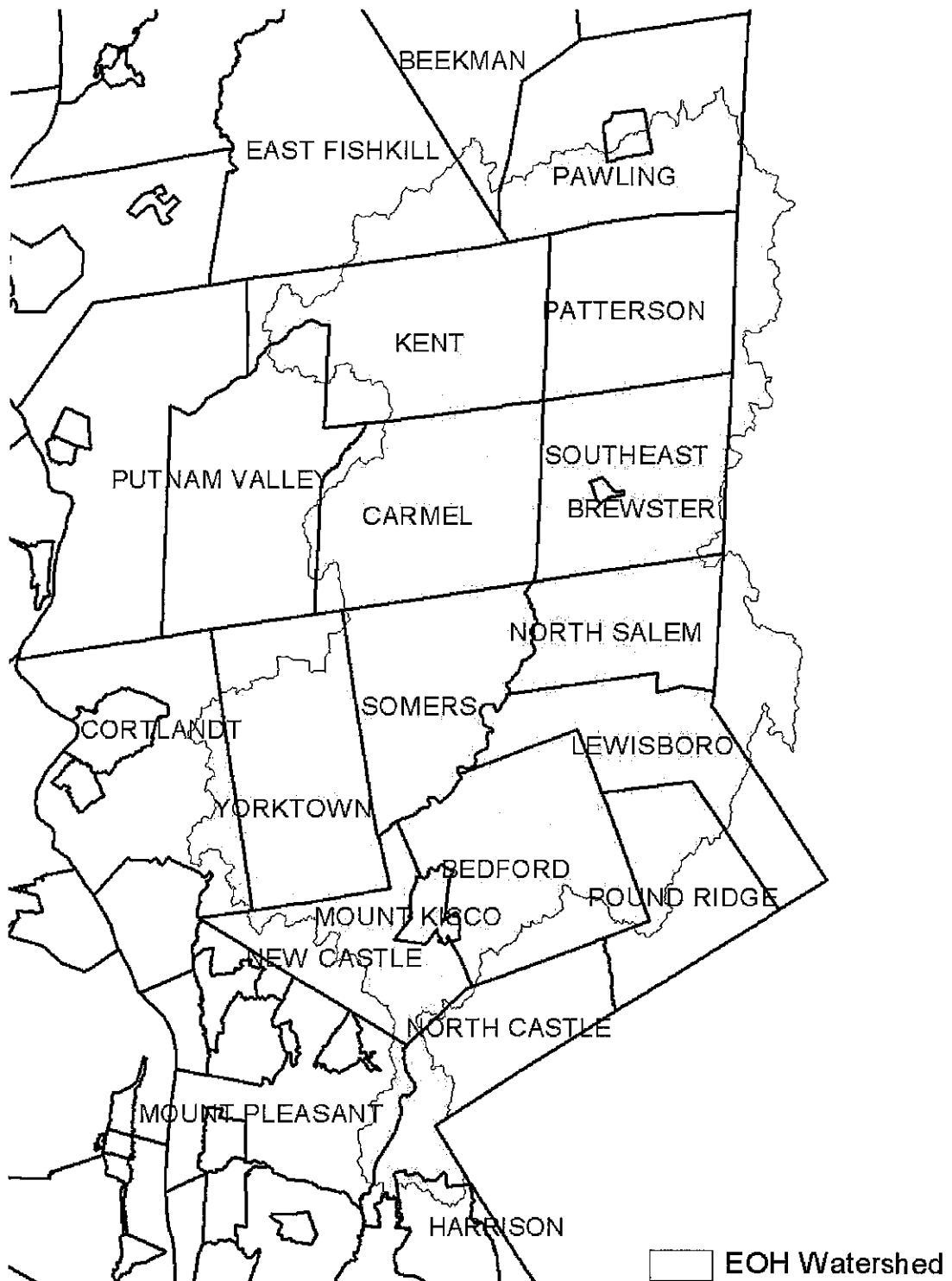


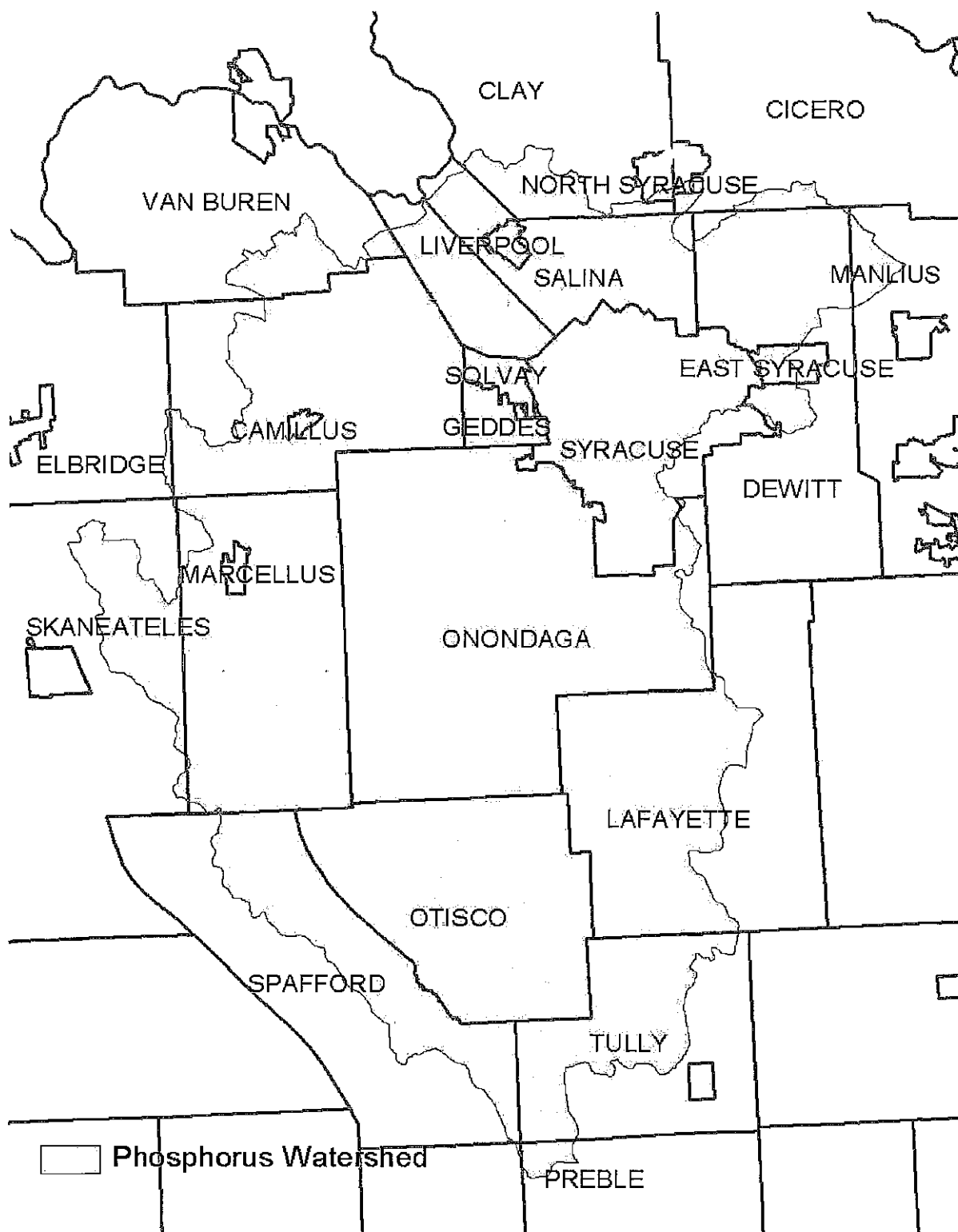
Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

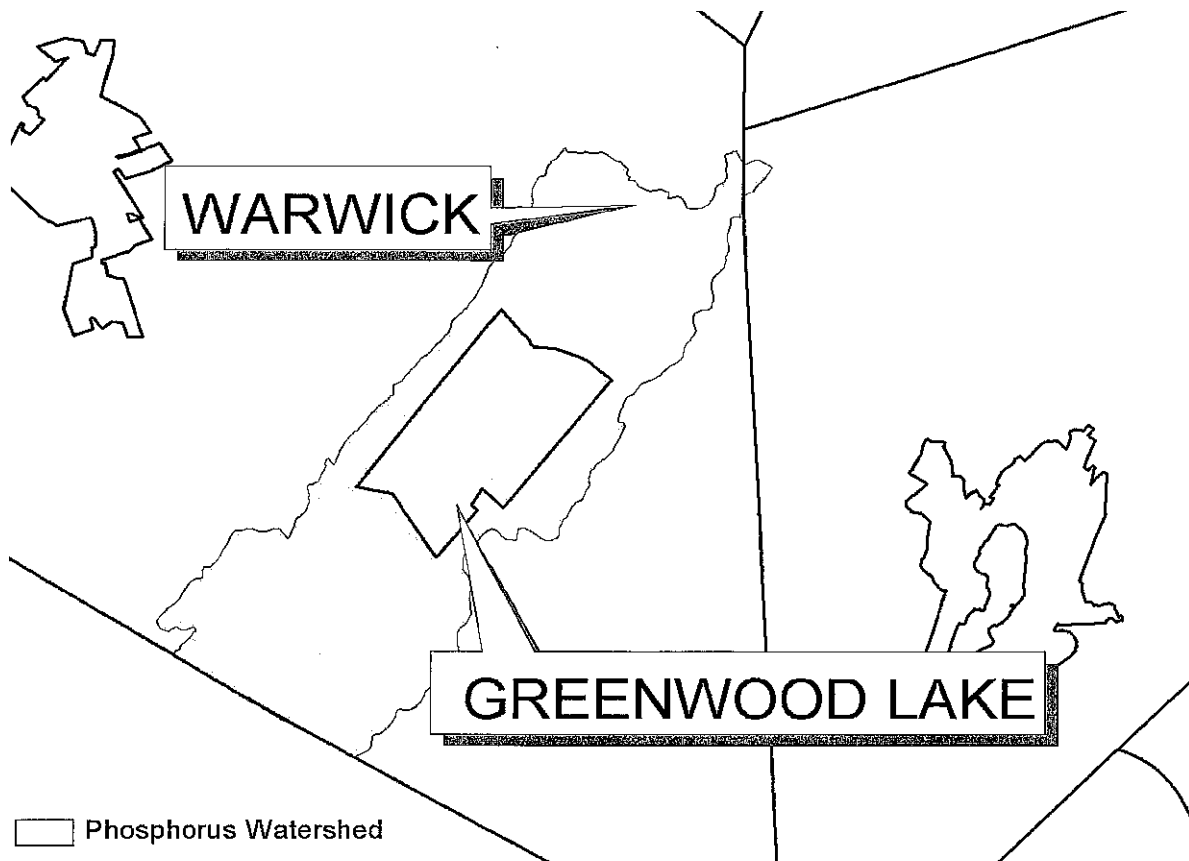


Figure 4 - Oscawana Lake Watershed

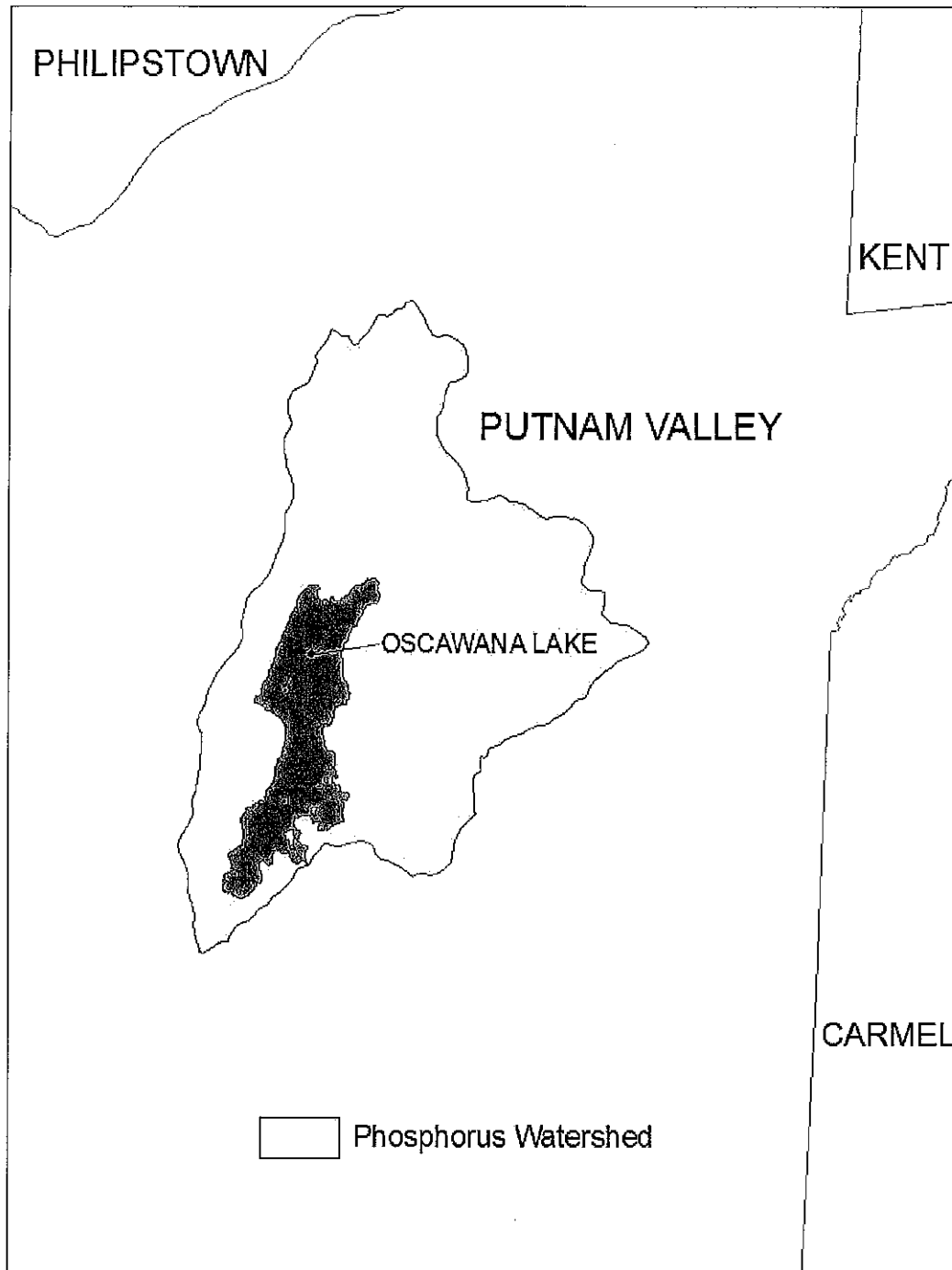
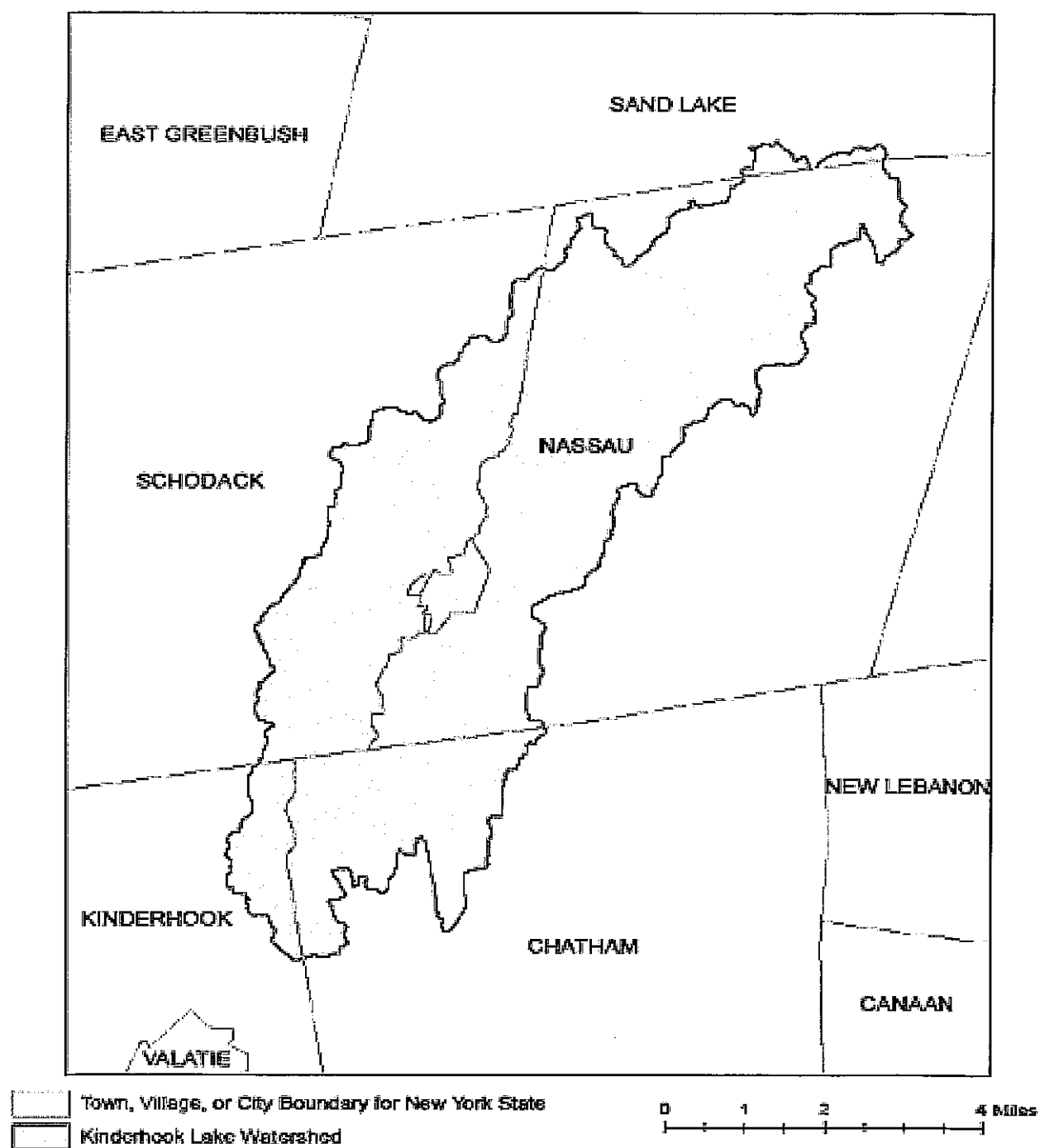


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

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 – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *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	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	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, STEBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, 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 AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Appendix G

Drainage System Installation & Maintenance

5-0 INSTALLATION

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BUYER/USER IS RESPONSIBLE FOR SERVICEABILITY OF THE PRODUCT IN ANY GIVEN APPLICATION. SELLER IS NOT RESPONSIBLE FOR INJURY OR DAMAGE RESULTING FROM IMPROPER INSTALLATION, NONCOMPLIANCE WITH THESE GUIDELINES FOR INSTALLATION OF PRODUCT, OR USE OUTSIDE THE GUIDELINES SET FORTH HEREIN.

5-1 OVERVIEW OF INSTALLATION CONSIDERATIONS

Installation of ADS pipe is in most respects very much like that of any quality pipe installation. The strength of a pipe system shall be considered a combination of the pipe itself and the backfill envelope. Proper construction maximizes the drainage capabilities designed into the pipe by maintaining alignment and load-carrying ability.

Recommendations for proper backfill and installation for ADS products are based primarily on the requirements of ASTM D2321

"Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe", CSA B182.11-11 *"Standard Practice for the Installation of Thermoplastic Drain, and BNQ 1809-3 "Construction Work-General Technical Specification- Drinking Water and Sewer Lines"*.

These handbooks are not intended to replace standard industry or project specifications, but to provide guidance based on our experience, research and recommendations for proper product performance.

The elements regarding backfill that are addressed in this section are as follows:

Proper backfill material selection - A variety of materials can be used as structural backfill with the final decision, many times, based on what is most available locally. Native soil may be an appropriate material providing it meets the basic criteria established in this section.

Proper backfill compaction - Compaction forces out air and moisture to provide a more stable structure. Minimum compaction levels are based on the material characteristics and the design load; some situations may require the use of mechanical compactor while others require simply tamping the material to eliminate voids.

Proper backfill structure - An adequate quantity of structural backfill is necessary to ensure adequate support. Undisturbed native soil from a trench wall often provides additional support. Typical trench dimensions and the effect of the trench wall are discussed in this section.

In addition, this section discusses job-site handling, trench construction and pipe installation for ADS products, compaction methods, and several specialized installation considerations.

Federal regulations covering safety for construction are published in the **Safety and Health Regulations for Construction** under the Department of Labor, Occupational Safety and Health Administration (OSHA). These regulations define practices, which must be followed.

5-2 PRE-INSTALLATION STORAGE AND HANDLING

Thermoplastic pipes such as polyethylene and polypropylene are lightweight and easy to use. While no special care is needed in handling and installation a few precautions should be set forth.

- Follow all applicable safety regulations when handling pipe.
- The pipe shall not be dropped from the delivery truck into an open trench, or onto uneven surfaces.
- Avoid dragging or striking the pipe against another pipe or object.
- Avoid dragging the pipe across the ground.
- Avoid any impact to the bell or spigot.
- Do not drive over the pipe prior to installation.
- Inspect the pipe and joining systems before installation.
- Care shall be taken to not over handle the pipe during assembly.

Many ADS drainage products are available palletized allowing for convenient transporting and orderly storage. If the products were not received on a pallet, the pipe should be carefully stacked. One method commonly used is to secure the bottom lengths of pipe together side-by-side, or use stop blocks, and then place additional pipe on top. Where pipe is stock piled, the total pile height shall not exceed 5-feet and the pipe must be adequately restrained to prevent pile collapse. Do not walk on stock piled pipe. Additional handling and storage information is available upon request.

Ambient temperature extremes do not affect the strength or handling characteristics of ADS pipe products. Cold temperatures can affect the impact resistance of some thermoplastics, although polyethylene and polypropylene remain highly impact resistant. In-house quality checks on polyethylene products demonstrate that the impact resistance at zero degrees F (-18C) is many times that required by specification. Additionally, hot weather, especially when coupled with direct sunlight, will raise the pipe temperature, but will not significantly affect handling or installation behavior.

Depending on the product, either carbon black or another UV stabilizer is added to the polyethylene or polypropylene to protect against ultraviolet light; unprotected plastic can become less impact resistant over time. Such additives are required by the specification and protect the pipe during storage periods at the manufacturing facility and at the job site. Ultraviolet light is no longer an issue after installation.

Long-term exposure to ultraviolet light causes slightly different results. The UV stabilizer protects the pipe for several years, after which the impact strength of the exposed layer, generally 0.001-inch (0.03mm), is significantly reduced. This damaged layer then functions in shielding the remainder of the pipe wall from any further damage. There are HDPE

culverts, currently under observation, that were installed in 1974. The culverts have retained nearly all of their original strength characteristics and support strong evidence of continued service.

5-3 LINE AND GRADE

Storm drain and sewer pipe systems are designed to provide hydraulic capacity based on pipe size and slope. The alignment or line of the pipe is the horizontal location of the pipe while the grade is the vertical slope of the pipe. In order for a pipe system to function as designed, it is important to install the pipe to the proper line and grade.

Generally, no special practices are required to maintain line and grade; however, certain installation techniques can greatly increase the system performance and rate of installation.

Alignment is established by a field survey. Once the trench is excavated on line, the pipe bedding shall be placed to proper thickness. The top of the bedding shall be adjusted to allow for the difference between the plan invert (flowline) and pipe profile wall thickness. To determine the dimension to be subtracted from the pipe inverts indicated on the plans when checking bedding elevations measure the distance from the interior side of the liner to the crown of the corrugation.

5-4 TRENCH EXCAVATION

The width of the trench depends on the pipe diameter, backfill material, and the method of compaction. Trenches that are too narrow will not allow for proper pipe installation, whereas trenches that are overly wide are unnecessarily costly. As a practical matter, standard bucket sizes may also factor into the decision. The design engineer may modify the trench widths based on an evaluation of the competency of the in-situ materials, the quality and compaction level of the backfill, the design loads and the compaction equipment to be used. In lieu of the engineer's recommendations or governing agency specifications, the following trench widths are suggested in table 5-1.

Table 5-1
Minimum Trench Widths

Nominal Pipe Diameter, in. (mm)	Minimum Trench in. (m)	Nominal Pipe Diameter, in. (mm)	Minimum Trench in. (m)
4 (100)	21 (0.5)	24 (600)	48 (1.2)
6 (150)	23 (0.6)	30 (750)	56 (1.4)
8 (200)	26 (0.7)	36 (900)	64 (1.6)
10 (250)	28 (0.7)	42 (1050)	72 (1.8)
12 (300)	30 (0.8)	48 (1200)	80 (2.0)

15 (375)	34 (0.9)	54 (1350)	88 (2.2)
18 (450)	39 (1.0)	60 (1500)	96 (2.4)

Trench widths should only be wide enough to permit the adequate placement and compaction of the embedment materials. This ideal trench width is normally referred to as the minimum trench width. It is designated in accordance with national standards and generally assures the width allows for backfill material to flow on either side of the pipe and permits the compaction of this material. If the width is not sufficiently wide for the materials and proposed compaction methods a wider trench allowing for proper installation shall be constructed.

In very poor native soils (for example; peat, muck, or highly expansive soils), a wider trench width with possibly filter fabric may be required. This wider trench width shall be based on an evaluation of the in-situ soil, and the design and construction loads.

Trench widths for pipe are often determined by the bucket size available for the excavator. In many cases, the bucket width can significantly exceed the ideal trench width. Wide trenches are not only costly to excavate and fill with backfill material they actually reduce the structural integrity of the pipe/backfill system. This fact is noted in the AASHTO *LRFD Bridge Construction Specification*, Section 30, "Trenches shall be kept to the specified width as any increase in trench width will increase the load on the pipe."

Years of consolidation create a very stable soil environment. The desire is to destroy as little of that stability as necessary when digging the trench. Stable trench walls actually enhance the structural integrity of the system when the trench is relatively narrow. Overly wide trenches also require more backfill material and more compaction which are typically not as stable as the undisturbed native material. A stable trench wall is characterized as one that can stand without support; however this does not refer to the possible need of trench wall supports to comply with OSHA.

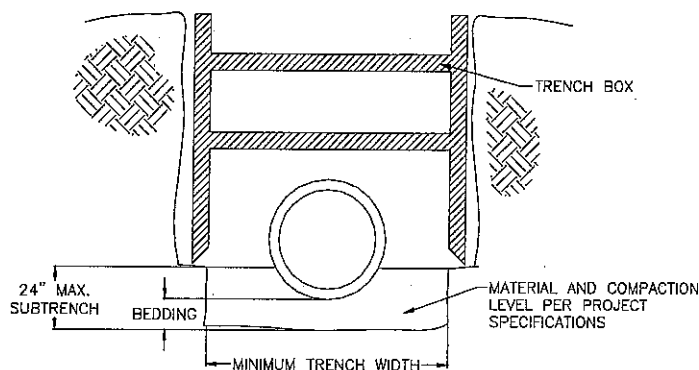
It should be noted that although the pipe will have less load in a narrow trench condition, a wide trench application is used for the design methodology for thermoplastic pipe found in *AASHTO LRFD Bridge Design Specifications* Section 12. This point is clearly illustrated in Section 12.12, "narrow trenches yield a desirable level of conservatism, since the transfer of the load to in-situ trench wall is not considered in flexible pipe design."

The depth of the trench is dictated by the geography of the site and the pipe slope required. However, if an adequate foundation for the pipe is not available at the desired depth, additional excavation will be needed. Rock outcroppings, muck, and other unsuitable materials do not provide proper support. They shall be removed and replaced with suitable granular material. Refer also to Figure 5-1.

Trenching shall be completed in existing soils with sidewalls reasonably vertical to the top of the pipe. For positive projection embankment

installations, the embankment material shall be placed and compacted to a minimum of one (1') foot above the pipe and the trench excavated into the embankment. When excavation depths or soil conditions require shoring or use of a trench box, the bottom of the shoring or trench box should be placed no lower than the top of the pipe. This prevents disruption of the backfill envelope when removing the shoring or trench box. Dragging the trench box shall only be done if it does not damage the pipe or disrupt the backfill, otherwise, the box shall be lifted vertically into its new position. If this practice cannot be followed, consideration should be given to leaving the shoring in place. When the trench box must be located below the top of the pipe, the most effective way to maintain a sound system is to provide a 'sub trench' within which to place the pipe and backfill. For safety, the bottom of the trench box should not be greater than 24" above the bottom of the trench. For more information on the use of trench boxes, refer to Technical Note 5.01: *Recommended Use for Trench Boxes*.

Figure 5-1
Typical Sub Trench Installation



5-5 BACKFILL ENVELOPE CONSTRUCTION

Backfill construction shall be evaluated as part of the structural design of polyethylene and polypropylene pipe like it is for other pipe materials. ASTM D2321/ CSA B182.11-11 serve as the basis for installation recommendations in trafficked installations. Acceptable backfill materials and construction methods are very similar or, in many cases, identical to those required for other types of pipe material.

The primary purpose of the backfill envelope is to provide long-term support to the pipe. In a properly constructed backfill envelope, the loads are distributed across the crown of the pipe to the material along the sides and then to the pipe bedding and foundation. This load arching effect reduces the total load applied to the pipe.

The load that a flexible pipe will carry is related to the backfill envelope construction. The load-carrying capacity of a pipe/backfill system will be

determined by a combination of the backfill material, the level of compaction, and the placement of the backfill material. However, the type of application may also influence what type of backfill is required. These and other related issues are discussed in subsequent paragraphs in this section.

BACKFILL MATERIAL

Material selection is the first and most important step to creating a structurally sound backfill envelope. In general, backfill material should be of an aggregate nature, able to be compacted, if necessary, into a structurally sound structure. A variety of materials, including some native soils, meet these requirements.

Backfill offers passive resistance, termed the "modulus of soil reaction". The modulus of soil reaction is determined by a combination of the material and the amount of compaction. The type of material (sand, gravel, clay, etc.) and compaction level (standard Proctor density) determine overall strength of the backfill. Some research indicates that other factors, such as the beneficial effects of trench walls, may add to the conservancy of the backfill strength, although those relationships are often neglected. (This information assumes the trench walls are at least as strong as the backfill material.)

The strength of the backfill can be described using different parameters. One way is by describing it in terms of the modulus of soil reaction (E'), which is an empirical value developed by the Bureau of Reclamation to calculate deflection. Another parameter used to describe backfill strength is the secant constrained soil modulus (M_s). Values for M_s and E' are discussed further in the Structures chapter of this handbook.

Recommendations for soil type and compaction level will vary based on the application and product; Appendix A-5 provides product-specific guidelines and literature references. Shallow, non-trafficked installations may not require the same level of backfill quality, but any modifications should be discussed with ADS engineers prior to establishing backfill criteria on a particular project. Installations involving higher loads sometimes require a higher soil strength; ADS engineers can also provide additional guidance on backfill requirements in these situations.

As discussed in the Structures section of this handbook, it is the combination of the type of material and compaction level that will determine the soil strength. When a variety of options will work in a particular installation, the final decision can depend on what is most available locally in order to keep the cost of the installation to a minimum. Native soil may be specified depending on the ADS product being installed, the application and when following the requirements of Table 5-2 and the respective technical literature as listed in Appendix A-5. Using native soil eliminates the cost of imported backfill material and the effort spent grading or hauling the excavated material off site. If the native material is not acceptable, then appropriate material will need to be brought in.

Flowable fill, also known as controlled low strength material (CLSM), controlled density fill (CDF) and slurry fill, is another, more specialized, type of backfill material that is increasing in use throughout the country. This material is a mixture of soil, cementitious material, and water. With acceptable in-situ material, flowable fill trench widths can be reduced. Although the structural integrity of flowable fill is excellent, it will misalign or float the pipe unless precautions, such as weighting the pipe or pouring the flowable fill in lifts, are taken. For more information on the use of flowable fill refer to Technical Note 5.02: *Flowable Fill Backfill for Pipe*.

Table 5-2
Classes of Embedment and Backfill Materials

ASTM D2321 ^(A) (CSA B182.11) Class Description		ASTM D2487		AASHTO	AASHTO M145 Notation	BNQ 2560	ASTM D2321 ^(A) (CSA B182.11)							
		Notation	Description	M43 Notation			Percentage Passing Sieve Sizes				Atterberg Limits		Coefficients	
							1 ½ in. (40mm)	3/8" (9.5mm)	No. 4 (4.75mm)	No. 200 (0.075 mm)	LL	PI	Cu	Cc
I ^(B)	Crushed rock, angular ^C	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	5, 56, 57 ^(D) , 6, 67 ^(D)	N/A		100%	≤25%	≤15%	<12%	Non Plastic		N/A	
II	Clean, coarse- grained soils	GW	Well-graded gravel, gravel-sand mixtures; little or no fines	5, 6	A1, A3	CG- 14, MG- 20	100%		<50% of "Coarse Fraction"	<5%	Non Plastic	>4	1 to 3	
		GP	Poorly-graded gravels, gravel-sand mixtures; little or no fines	56, 57, 67					<4			<1 or >3		
		SW	Well-graded sands, gravelly sands; little or no fines						>6			1 to 3		
		SP ^F	Poorly-graded sands, gravelly sands; little or no fines						<6			<1 or >3		
	Coarse- Grained Soils, borderline clean to w/fines	GW- GC, SP-SM	Sands and gravels which are borderline between clean and with fines	N/A				100%		Varies	5% to 12%	Non Plastic	Same as for GW, GP, SW and SP	
III	Coarse- grained soils with fines	GM	Silty gravels, gravel- sand-silt mixtures	Gravel & sand with <10% fines	A-2-4, A-2- 5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve	100%		<50% of "Coarse Fraction"	12% to 50%	N/A	<4 or <"A" Line	N/A		
		GC	Clayey gravels, gravel-sand-clay mixtures					<7 & >"A" Line						
		SM	Silty sands, sand-silt mixtures					>4 or <"A" Line						
		SC	Clayey sands, sand- clay mixtures					>7 & >"A" Line						
	Inorganic fine-grained soils	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity					100%	> 30% (Retain ed)	<50	<4 or <"A" Line			
		CL	Inorganic clays of low to medium plasticity; gravelly, sandy, or silty clays; lean clays					> 30% (Retain ed)	>7 & >"A" Line					
IV ^(E)	Inorganic fine-grained soils	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity	N/A	A-2-7 or A- 4 or A-6 soils with 30% or less retained on #200 sieve	100%		100%	< 30% (Retain ed)	<50	<4 or <"A" Line	N/A		
		CL	Inorganic clays of low to medium plasticity; gravelly, sandy, or silty clays; lean clays	N/A							>7 & >"A" Line			
V ^(G)	Inorganic fine-grained soils	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	N/A	A5, A7	100%		100%	>50%	>50	<"A" Line	N/A		
		CH	Inorganic clays of high plasticity, fat clays	N/A							>"A" Line			
	Organic soils or Highly organic soils	OL	Organic silts and organic silty clays of low plasticity	N/A		100%		100%	>50%	<50	<4 or <"A" Line	N/A		
		OH	Organic clays of medium to high plasticity, organic silts	N/A						>50	<"A" Line			
		PT	Peat and other high organic soils	N/A										

Notes:

- A) Refer to ASTM D2321 / CSA B182.11/ BNQ 2560 for more complete soil descriptions.
- B) Class I materials allow for a broader range of fines than previous versions of D2321 / B182.11. When specifying class I material for infiltration systems, the engineering shall include a requirement for an acceptable level of fines.
- C) All particle faces shall be fractured.
- D) Assumes less than 25% passes the 3/8" sieve.
- E) Class IV materials require a geotechnical evaluation prior to use and should only be used as backfill under the guidance of a qualified engineer.
- F) Uniform fine sands (SP) with more than 50% passing a 100 sieve behave like silts and should be treated as Class III soils if allowed.
- G) Class V materials shall not be permitted as bedding and backfill material.

Backfill Placement

Storm and sanitary sewers, as well as drainage lines are sometimes placed on foundations that settle and shift in a non-uniform manner. Fortunately, flexible pipe can accommodate many of these changes without detrimental effects. The best construction practices, however, involve placing the pipe on a firm foundation for maximum performance and structural integrity throughout the design life.

In some cases it may be necessary to perform subsurface evaluations of the soil conditions where muck, rock, or other unsuitable conditions are suspected. Zones of soft material, such as muck, allow the pipe to settle, potentially affecting the structural integrity and hydraulic characteristics of the system. Rock and rock protrusions apply point loads where they contact the pipe that can affect the hydraulics or structural integrity of the system. It is recommended that unsuitable foundation material be excavated before installation of the pipe proceeds. Where a rock or unyielding or soft foundation is present, the design engineer or a geotechnical engineer shall be consulted to determine the extent to which the undesirable material is to be excavated.

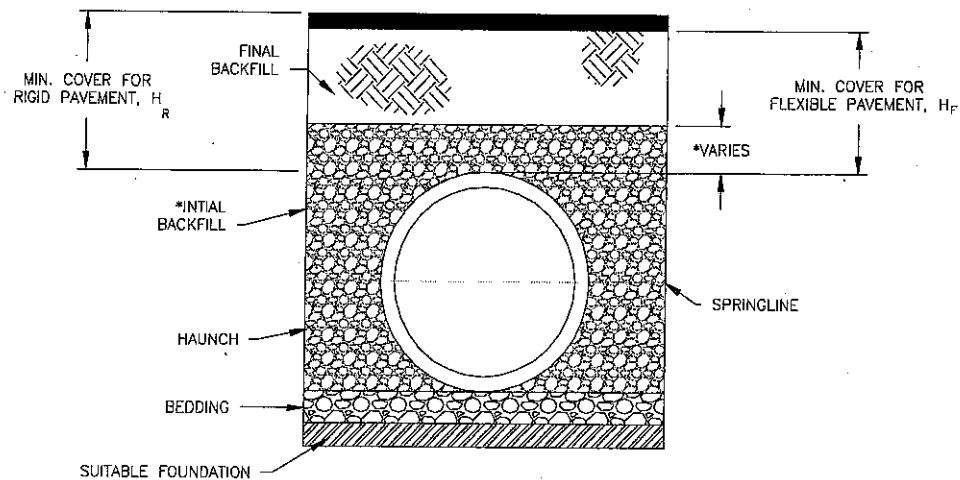
Bedding

If no undesirable foundation material is found, a minimum of 4- to 6-inches (0.1 - 0.15m) of bedding shall be placed and compacted on the foundation to equalize load distributions along the invert of the pipe. Refer to Figure 5-2 for a pictorial description of backfill terminology.

A stable and uniform bedding shall be provided for the pipe and any protruding features of its joints and/or fittings. The middle of the bedding, under the pipe invert, equal to 1/3 of the pipe O.D. should be loosely placed, with the remainder compacted to minimum standard proctor density as listed in Appendix A, Table A-5-2. The same class of material recommended for the initial backfill is suitable for the bedding; however, the compaction requirements for the bedding may be higher than compaction requirements for the initial backfill to ensure the stability of line and grade. Refer to Appendix A-5, Table A-5-2 for product-specific installation recommendations for each zone.

Note: Where using open-graded material (class I with little fines for example) in any fill zone, additional precaution must be taken to reduce or eliminate the risk of migration of fines from adjacent material. Precautionary steps could include the use of geotextile between the varying fill materials, gradation selection to prevent the migration of fines, or other precautionary measures. Refer to ASTM D2321 / CSA B182.11 for more complete information.


Figure 5-2
Typical Backfill Structure



$H_R, H_F = 12"$ (0.15m) FOR PIPE DIAMETERS UP TO 48" (1200mm)
 $= 24"$ (0.6m) FOR PIPE DIAMETERS 54" (1350mm) AND 60" (1500mm)

BEDDING = 4" (100mm) MIN

*INITIAL BACKFILL, TYPE AND AMOUNT ABOVE CROWN VARIES DEPENDING ON PRODUCT AND APPLICATION. SEE TABLE A-5-2 OF APPENDIX A-5 FOR DETAILS.

 FILL AS SPECIFIED BY DESIGN ENGINEER
 STRUCTURAL BACKFILL (SEE NOTE)

STRUCTURAL BACKFILL
 SEE TABLE A-5-2 OR APPENDIX A-5 FOR MATERIAL AND COMPACTION REQUIREMENTS BASED ON PIPE MATERIAL AND APPLICATION

Haunch Backfill

The next layer of backfill, the haunching, is the most important since it is this layer that provides the pipe with support against the soil and traffic loadings. Haunching shall be placed in lifts of 4- to 6-inches (0.10 - 0.15m) and compacted in accordance with product specific guidelines listed in Appendix A-5, Table A-5-2 to achieve required depth of fill. Construction of each lift should be repeated up to the spring line.

Initial Backfill

Initial backfill extends from the spring line, and depending on product and application, to the crown of the pipe or six inches (0.15m) above the crown of the pipe. This area of the backfill anchors the pipe and ensures that loads are distributed as evenly as possible into the haunching. The same material used in the haunching shall be used for the initial backfill. Where differing materials are used, backfill material size should be selected as to prevent migration of fines or a geosynthetic shall be used to separate the backfill zones. Additionally, it is crucial to obtain similar backfill strength between fill zones if differing materials are used. Using the same material throughout the embedment zone is recommended for all ADS products; however, using different materials between the haunch and initial backfill zones may be accomplished under strict guidelines that

are outlined in the appropriate product's fill height table technical note. See Table A-5-1 for a list of fill height table technical notes.

When using a material that requires compaction it is important not to use mechanical compaction equipment directly on the pipe itself. Initial backfill shall be placed in lifts of 4- to 6-inches (0.10 - 0.15m) and compacted in accordance with product-specific guidelines in Appendix A-5, Table A-5-2 to achieve required depth of fill. Tamp to achieve the specified compaction, or shovel into the area, eliminating voids, if the material doesn't require mechanical compaction. Construction of each lift should be repeated until the initial backfill zone is completed.

Flowable fill can be used throughout the pipe zone as an alternative to compacted granular material, however special precautions are necessary for a successful installation. Flowable fill may cause the pipe to float or misalign. Therefore the pipe will need to be weighted with sandbags or held with some type of anchoring system. The flowable fill may also be poured in layers that are allowed to cure before the next layer is poured to help reduce the tendency for the pipe to float. As with any backfill material, proper installation of the flowable fill around the pipe is critical to the structural performance of the pipe. For additional information on the use of flowable fill, refer to Technical Note 5.02: *Flowable Fill Backfill for Pipe*.

Final Backfill

Final backfill, which extends from the initial backfill layer to the ground surface, does not directly support the pipe. Excavated materials may be of adequate quality for final backfill, depending on the intended use at the surface. Selection, placement and compaction of final backfill shall be as directed by the design engineer. When placing final backfill, consideration needs to be given to compaction equipment and construction loads operating over top of the pipe. Proper compaction of the final backfill area is not nearly so critical for the pipe as in the other layers; however, if roads or drives will be crossing the pipe, a relatively high degree of compaction is needed to prevent pavement settlement.

Minimum Cover

For traffic applications total minimum cover is 12-inches (0.3m) for single run applications for 4- to 48-inch (100mm-1200mm) diameters pipe. For 54- and 60-inch (1350mm and 1500mm) diameter pipe total minimum cover is 24-inches (0.6m) for single run applications. Total minimum cover is measured from top of pipe to bottom of flexible pavement or to top of rigid pavement.

When no pavement will be installed, but vehicle traffic is expected (e.g. gravel driveway), a total minimum cover of 18-inches (0.5m) for 4- to 48-inch (100-1200mm) diameters and 30-inches (0.8m) for 54- and 60-inch (1350mm and 1500mm) diameters is recommended to minimize rutting. If the ground surface is truly green space or a landscape area, minimum cover may be 12-inches (0.3m) from top of pipe to ground surface for all diameters. These recommendations assume the pipe is installed in accordance with manufactures recommendations and may not address the cover needed to prevent flotation.

Table 5-3
General Recommendations for Installation and Use of Soils and Aggregates¹

Backfill Zone	Class 1	Class 2	Class 3 ²
General Restrictions	Acceptable and common where no migration is probable or when combined with a geotextile filter media.	Where hydraulics gradient exists check gradation to minimize migration.	Do not use where water condition in trench may cause instability and/or prevent proper placement and compaction..
Foundation	√ Suitable as foundation and for replacing over-excavated and unstable trench bottoms as restricted above and as directed by design engineer.	√ Suitable as foundation and for replacing over-excavated and unstable trench bottoms as restricted above and as directed by design engineer.	√ Suitable as foundation and for replacing over-excavated and unstable trench bottoms as restricted above and as directed by design engineer.
Bedding	√ - 4" for 12"-24" pipe 6" for 30" to 60" pipe - Loosely place middle 1/3*OD with remainder compacted	√ - 4" for 12"-24" pipe 6" for 30" to 60" pipe - Loosely place middle 1/3*OD with remainder compacted	√ - 4" for 12"-24" pipe 6" for 30" to 60" pipe - Loosely place middle 1/3*OD with remainder compacted
Haunch	√ - Work in around pipe by hand to provide uniform support - knife in to remove any voids	√ - Work in around pipe by hand to provide uniform support - knife in to remove any voids	√ - Work in around pipe by hand to provide uniform support - knife in to remove any voids
Initial Backfill	√ - knife in to remove any voids	√	√
	For compaction and material recommendations, refer to product-specific guidelines in Appendix A-5, Table A-5-2		
Relative Compaction Effort	Low	Moderate	High
	For compaction and material recommendations, refer to product-specific guidelines in Appendix A-5, Table A-5-2		
Final Backfill	√ - Place and compact as required by the engineer	√ - Place and compact as required by the engineer	√ - Place and compact as required by the engineer

√ = Material may be suitable. Ultimately, the design engineer must determine the acceptable backfill material based on specific project conditions and structural requirements for the product.

- 1) Refer to Table 5-2 for more complete soil requirements.
- 2) Class 3 is not recommended for all products. Refer to Appendix A-5, Table A-5-2A & B for product-specific recommendations.

COMPACTION

The level of compaction will vary depending on the material and installation requirements, see product specific guidelines in Appendix A-5, Table A-5-2 for minimum compaction requirements based on soil type and application. Crushed stone or similar materials are usually not compacted, but do require care during installation to eliminate large voids in the backfill envelope. Using a shovel to 'slice' or 'knife' the material under and around the pipe is many times sufficient.

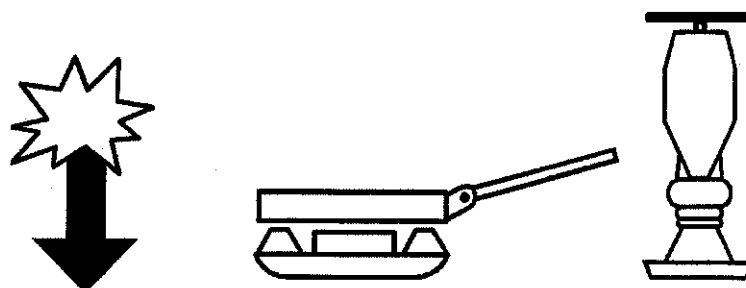
For other materials, compaction methods will depend primarily on the amount of compaction, or modulus of soil reaction, required and the moisture level of the material. At optimum moisture levels, some Class II and III soils can be compacted to minimum recommended levels simply by walking on each backfill lift. While this technique may not be acceptable for all installations, the point is that compaction need not always require a great deal of extra effort or mechanical equipment. If, however, mechanical compaction equipment is needed in the backfill envelope or elsewhere on the site, the subsequent paragraphs provide guidance on compaction equipment and the soils for which they are most appropriate.

MECHANICAL COMPACTION EQUIPMENT

Hand Tampers and Hand-Held Power Tampers: Compaction of the haunch layer may require a small tamping mechanism to obtain the specified compaction in a confined area. A hand-held pole or two-by-four can be used to compact the haunching. Tampers for horizontal layers shall not weigh more than twenty pounds (89N) and the tamping face shall be limited to an area no larger than 6-inch by 6-inch (0.15 by 0.15m).

Rammers or rammer plates (Figure 5-3): Impact action is used to force out air and water from between soil particles to consolidate the fill. This equipment works well on cohesive or high-clay content soils. Care should be taken not to use rammer-type compactors directly on the pipe. For heavy-duty compaction equipment, such as a Ho-pac® or equivalent type compactors, a minimum of 4-feet (1.2m) of backfill shall separate the pipe from the equipment at all times.

Figure 5-3
Rammer Compactors



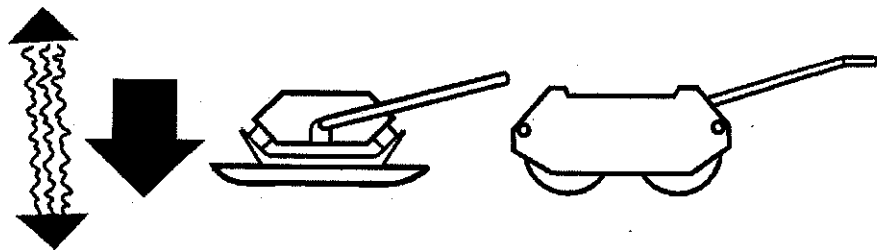
Static Compactors (Figure 5-4): Consolidation with static compactors occurs as a result of the rolling weight of the equipment itself. Sheeps-foot rollers employ projecting feet to concentrate the weight of the machine. Static compactors are most valuable when used on non-cohesive backfill away from the pipe. Other methods of compaction should be used near the pipe.

Figure 5-4
Static Compactors



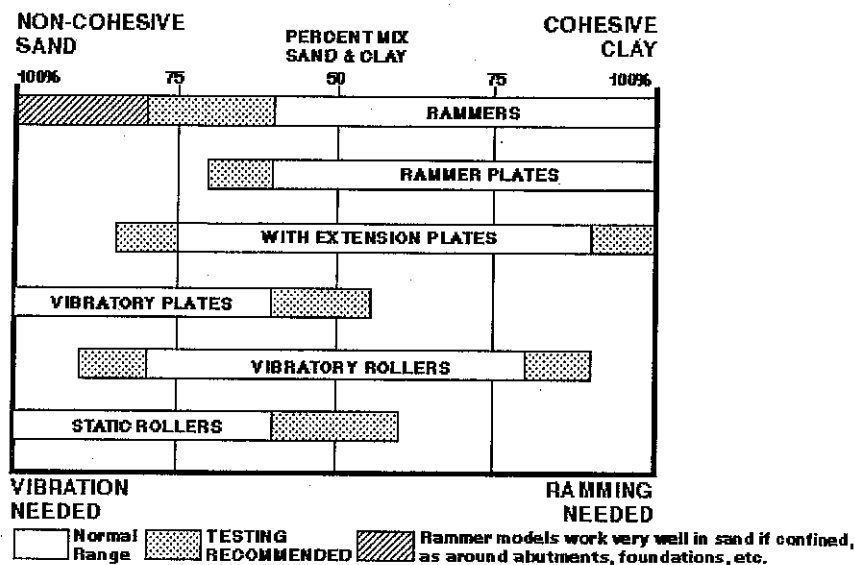
Vibrating Compactors (Figure 5-5): The motion of vibrating rollers or plates “shake” the soil particles into a more dense arrangement and works best with non-cohesive fills. Depending on the size and weight of the machine, vibrating compactors may be used close to the pipe. As always, care should be taken not to impact the pipe directly with a great deal of force.

Figure 5-5
Vibrating Compactors



Selecting the right equipment for the fill material is the key to achieving the most efficient compaction. For soil mixtures, the component having the highest percentage will dictate what type of compaction equipment is needed. Table 5-4 provides guidance in the selection of compaction equipment.

Table 5-4
Compaction Equipment Selection Guide



5-6 JOINTS

Joints serve several purposes in a pipe system. Their primary purpose is to preserve the structural integrity by keeping the embedment material out of the system. Well-designed joints also preserve the hydraulic properties of the pipe by maintaining alignment between pipe ends. Joints can keep effluent inside the pipe, which is necessary when environmental issues are a concern. Site-specific requirements or local regulations will usually dictate the performance of joint required. Joint configuration details are available in the respective product specification located in Section 1.

N-12 PLAIN END (SOIL-TIGHT COUPLERS)

ADS N-12 plain end pipe joint use external coupling bands, such as a split band coupler, that meet the soil-tight requirements of AASHTO M252, AASHTO M294, ASTM F2306, CSA B182.8, or BNQ 3624-120. Typically, soil-tight joints are used with perforated systems where soil migration is not a design concern.

N-12 ST IB (GASKETED SOIL-TIGHT COUPLERS)

The N-12 ST IB joining system is designed to perform in demanding soil conditions. The gasket meets all the testing requirements of ASTM F477. The gasket, combined with an interference fit, provides outstanding joint performance meeting or exceeding the soil-tight joint performance requirements of AASHTO M252, AASHTO M294, ASTM F2306, CSA B182.8, or BNQ 3624-120.

N-12 WT IB (GASKETED WATERTIGHT COUPLERS)

The ADS 4- through 60-inch (100mm - 1500mm) N-12 WT IB joint meets the watertight joint performance requirements of AASHTO M252, AASHTO M294, ASTM F2306, CSA B182.8, and BNQ 3624-120. This joint shows no leakage when pressurized to 10.8 psi (74.5 kPa) under the laboratory conditions established in ASTM D3212.

This level of watertightness is recommended for systems that require a very tight joint for normal storm drainage conditions or other site and/or environmental reasons.

HP STORM (GASKETED WATERTIGHT COUPLERS)

The ADS 12- through 60-inch (300mm - 1500mm) N-12 HP meet the watertight joint performance requirements of ASTM D3212. This joint shows no leakage when pressurized to 10.8 psi (74.5 kPa) under the laboratory conditions.

This level of watertightness is recommended for systems that will be pressure tested, or that require a very tight joint for other site and/or environmental reasons.

SANITITE (GASKETED WATERTIGHT COUPLERS)

The ADS 24- through 60-inch SaniTite joint meet the watertight joint performance requirements of AASHTO M252, AASHTO M294, ASTM F2306, CSA B182.8, and BNQ 3624-120. This joint shows no leakage when pressurized to 10.8 psi (74.5 kPa) under the laboratory conditions established in ASTM D3212.

This level of watertightness is recommended for systems that will be pressure tested to sanitary sewer standards, or that require a very tight joint for other site and/or environmental reasons. A longer bell design and two gaskets are used for SaniTite pipe.

SANITITE HP (GASKETED WATERTIGHT COUPLERS)

The ADS 12- through 60-inch SaniTite HP joint meet the watertight joint performance requirements of ASTM D3212. This joint shows no leakage when pressurized to 10.8 psi (74.5 kPa) under the laboratory conditions established in ASTM D3212.

This level of watertightness is recommended for systems that will be pressure tested to sanitary sewer standards, or that require a very tight joint for other site and/or environmental reasons. A longer bell design and two gaskets are used for SaniTite HP pipe.

N-12 LOW HEAD (GASKETED WATERTIGHT COUPLERS)

The ADS 24- through 60-inch (600mm - 1500mm) N-12 Low Head IB joint meet the watertight joint performance requirements of AASHTO M252, AASHTO M294, and ASTM F2306. This joint shows no leakage when pressurized to 10.8 psi (74.5 kPa) under the laboratory conditions established in ASTM D3212.

This level of watertightness is recommended for systems that will be under continuous pressures less than 5psi and surge pressures of 10psi or that require a very tight joint for other site and/or environmental reasons. A longer bell configuration with two gaskets is used for N-12 Low Head pipe.

Guidelines for deciding what joint performance is appropriate in a particular application are provided in Table 5-5.

Table 5-5
Guidelines for Joint Performance Selection

Project Conditions	Joint Performance Options				
	Soil Tight		Water Tight		
	N-12 Plain End (4"-30")	N-12 ST IB Gasketed (4"-60")	N-12 WT IB (4"-60")	HP STORM SaniTite or SaniTite HP (12"-60")	N-12 Low Head (24"-60")
SOIL FACTORS					
Potential for small or negligible soil migration (e.g., gravel, medium to coarse sands, cohesive soil).	✓	✓	✓	✓	✓
Potential for moderate soil migration (e.g., fine sands, silts).	N/R	✓	✓	✓	✓
Potential for severe soil migration (e.g., very fine sands, non-cohesive fines).	N/R	N/R	✓	✓	✓
EFFLUENT CONDITIONS					
Effluent is permitted to infiltrate into ground; poses little or no environmental concern.	✓	✓	✓	✓	✓
Effluent has potential to cause groundwater or other contamination.	N/R	N/R	✓	✓	✓
PRESSURE CONDITIONS					
Installation will operate under non-pressure conditions.	✓	✓	✓	✓	✓
Installation will operate under non-pressure conditions; minimized leakage desired.	N/R	✓	✓	✓	✓
Installations with low temporary pressures due to operational events and ASTM D3212 joint quality required. Installed system to be hydrostatic pressure tested with an associated leakage allowance.	N/R	N/R	✓	✓	✓
Installations with continuous pressure (≤ 5 psi) or frequent surge pressure (≤ 10 psi)	N/R	N/R	N/R	N/R	✓

✓ The most restrictive of the project conditions will ultimately determine minimum joint quality. Ultimately, the design engineer must determine the acceptable joint quality for the project.

N/R Not recommended by manufacturer. Final approval contingent on design engineer.

Where more than one product or joint design will be acceptable in a particular installation, the most cost effective alternative should be selected. Bell-and-spigot joints shorten installation duration and reduce

labor because they require little time and effort to assemble; the result can be significant overall cost savings.

5-7 OTHER INSTALLATION CONSIDERATIONS

Not all drainage projects can be considered "typical" installations. Unusual soil conditions cannot always be found until the actual excavation is made. More complicated pipe configurations may be needed to arrive at the desired drainage pattern or to increase the capacity of an existing drainage network. ADS cannot anticipate all situations encountered on specific installations; however, several common questions are answered in the following material. Contact the ADS Applications Engineering Department or visit our website at www.ads-pipe.com for answers to other unique conditions.

CONSTRUCTION AND PAVING EQUIPMENT

Some construction vehicles, such as many types of paving equipment, are not as heavy as the design load. For situations with relatively light construction vehicles, the minimum cover criteria discussed in Section 2: *Structures* can be decreased during the construction phase; however, rutting may still occur at the surface. Table 5-6 presents the surface applied loads and the corresponding minimum cover that can be permitted on a temporary basis. *These criteria should only be employed during construction; finished projects should always meet minimum cover requirements for the anticipated final-use loading conditions. Vehicles exceeding criteria in Table 5-6 must not be permitted to drive over the installation.*

Table 5-6
Temporary Cover Requirements for Light Construction Traffic

Type of Vehicle	Vehicular Load at Surface, psi(kPa)	Temporary Minimum Cover, in (mm) for:	
		4"-48" (100mm-12mm) Pipe	54"-60" (1350mm-1500mm) Pipe
Semi-tractor ¹	75 (517)	9 (230)	12 (300)
Loaded pick-up truck ²	50 (345)	6 (150)	9 (230)
Skid steer loader ³	25 (172)	3 (80)	6 (150)

1. Based on typical 3-axel day-trip tractor without trailer.

2. Chevy[®] 3500 Series, fully loaded

3. Bobcat[®] T180 Model skid steer loader

Very heavy construction traffic poses additional concern for buried flexible pipe when buried at shallow depths. The extremely high loads created by construction vehicles can potentially reduce the safety factors below reasonable levels in minimum cover conditions. It is recommended that three feet (0.9m) of cover be used over the pipe in installations involving construction vehicles between 30T and 60T (267-534kN). For heavier vehicles a greater amount cover is required. The amount of cover is dependent on the load and loading footprint. This additional cover can

simply be mounded and compacted over the pipe during the construction phase and then graded following construction. If, in a particular installation the pipe already has minimum amounts of cover, no additional precautions are needed.

JOINING DIFFERENT PIPE TYPES OR SIZES

Drainage systems often involve connecting pipe of different materials or sizes. Options to make these transitions are often limited by the joint quality required. One very common method of connecting different types of pipe of the same size, and in some cases different sizes, is through the use of a concrete collar. This generally provides a minimum silt-tight joint quality but ultimately depends on workmanship. A concrete collar is formed by butting the two pipe ends together, wrapping the junction with a geotextile to keep out most soil and concrete, and then pouring a concrete collar that covers both pipe ends.

Another option may be using fittings or adapters specifically designed for this application. ADS offers a selection of fittings designed to make the transition from one material directly to another. In other cases an ADS fitting may need to be used in combination with another manufacturer's gasket to complete the transition. Transitions made in this manner may be more watertight than a concrete collar.

FIELD CONNECTIONS

Field connections may be necessary to complete pipe runs for short pipe lengths or for repairs to pipe damaged during construction. Field connections and repairs should be performed with couplers compatible to the overall system. See Technical Note 5.03, 5.12 and 5.13 for *Thermoplastic Pipe Repair Options* for more details on field cuts and connections.

CURVILINEAR INSTALLATIONS

ADS pipe can be laid on a curved alignment as a series of tangent (straight sections) deflected horizontally at each joint. However, the amount of joint articulation is dependent on the type of joint selected. See Table 5-7 for minimum bend radii based on joint type.

Table 5-7
Bend Radii for ADS Thermoplastic Pipe

Pipe Diameter, In (mm)	Joint Type	Maximum Deflection at Joint (deg)	Radius, ft (m), per pipe length		
			10 ft (3m)	13 ft (4m)	20 ft (6m)
4 – 36 (100 – 900)	N-12 (split band or bell- bell couplers)	3	191 (58)	248 (76)	382 (116)
42 – 60 (1050 – 1500)	N-12 (split band or bell- bell couplers)	1.5	382 (117)	497 (152)	764 (233)
4 – 24 (100 – 600)	N-12 ST IB or N-12 WT IB (bell & spigot)	1.5	n/a	497 (152)	764 (233)
30 – 60 (750 – 1500)	N-12 ST IB or N-12 WT IB (bell & spigot)	1	n/a	745 (227)	1146 (349)
12 – 60 (300 – 1500)	HP STORM, SaniTite, SaniTite HP or Low Head, (extended bell & spigot)	3	n/a	248 (76)	382 (116)

Bend radii calculated with joint articulations only. Calculations do not assume any bend in the pipe wall. Joint deflections based on joint profiles and accounts for possible field variances.

MANHOLE AND CATCH BASIN CONNECTIONS

Manholes and catch basins can be more costly than other alternatives but also allow grade and directional changes in addition to changes in pipe material and size. Consideration shall be given to the project performance specified when selecting manhole connections. For connection options, refer to Appendix A, Table A-5-1 for list of list of technical literature associated with the appropriate product.

VERTICAL INSTALLATIONS

ADS thermoplastic pipe is sometimes installed vertically for use as catch basins or manholes, meter pits, and similar applications. Vertical installations do not behave the same as pipe that is installed horizontally because the pipe/soil interaction is different. The soil surrounding a vertical pipe locks into the corrugations, allowing the pipe to move along with the soil consolidation that occurs over time. This movement can cause a rippling of the interior liner that generally does not affect the performance of the finished installation.

Installation requirements are especially important for vertical installations. Backfill material and compaction levels will determine the performance of the finished installation. Backfill shall extend a minimum of one-foot (0.3m) completely around the vertical structure. Only Class 1 or 2 backfill material is recommended and should be compacted to minimum 90% SPD.

Additional general applications limits include the following:

- Height of the vertical structure must not exceed eight feet (2.4m), unless the design is reviewed by the ADS Application Engineering Department.

- If traffic will be driving over a vertical structure, a concrete collar or similar structure designed to transmit the load into the ground must be used. Traffic loads must *not* be transmitted directly into the pipe wall.
- Cast iron frames holding grates or lids must be seated on a concrete collar or similar structure so that the weight of the frame and grate or lid is transferred into the ground, *not* to the vertical pipe.

Vertical installations of any ADS fitting should first be reviewed for suitability with ADS Application Engineering. This includes, but is not limited to, tees, elbows, and reducers of any combination. Improper application or inadequate installation may affect the function of the part or the drainage system. There may also be other product performance limits depending on the application. Contact ADS for further information.

GROUNDWATER

Excessive groundwater hinders proper placement and compaction of bedding and backfill. ADS thermoplastic pipe will float in standing water; therefore, it is imperative that a dry trench be provided. In order to insure a stable trench bottom, the water level in the trench shall remain below the bedding during the installation procedure. It may be necessary to provide sump pumps, well points, deep wells, geofabrics, underdrains or a diversion ditch to insure a dry trench. The project engineer shall be consulted to determine appropriate dewatering methods given specific project conditions.

FLOTATION

Pipe of any material and size can float under the right conditions. The soil type and density, amount of cover, height of the water table, pipe weight, and the amount of effluent in the pipe will all have an effect on the flotation potential.

The pipe property affecting flotation is its weight where heavier products are not as likely to float. One of the primary installation benefits of ADS polyethylene pipe is its light weight. The same quality that provides easy handling and installation also provides it with a greater opportunity to float. Table 5-8 gives approximate weights by inside diameter for ADS thermoplastic pipes.

Table 5-8
Approximate Weight of ADS Thermoplastic Pipes

Inside Diameter in (mm)	Approximate Weight* lb/ft (kg/m)		
	Single Wall	Dual Wall	Triple Wall
4(100)	0.31 (0.46)	0.44 (0.65)	N/A
6(150)	0.58 (0.86)	0.85 (1.3)	N/A
8(200)	1.2 (1.8)	1.5 (2.2)	N/A
10(250)	1.8 (2.7)	2.3 (3.4)	N/A
12(300)	2.9 (4.3)	3.3 (4.9)	N/A
15(375)	4.0 (5.9)	4.6 (6.8)	N/A
18 (450)	6.0 (8.9)	6.4 (9.5)	N/A
24 (600)	11.2 (16.7)	11.0 (16.4)	N/A
30 (750)	N/A	15.4 (22.9)	20.7 (30.8)
36 (900)	N/A	19.8 (29.4)	24.2 (36.0)
42 (1050)	N/A	26.4 (39.3)	N/A
48 (1200)	N/A	31.3 (46.6)	41.8 (62.3)
54 (1350)	N/A	34.6 (51.5)	N/A
60 (1500)	N/A	45.2 (67.3)	55.0 (81.9)

* Weights are for reference purposes only. Actual values will vary.
 For product-specific weights, contact an ADS Representative

In order to evaluate for possible flotation problems many factors were considered and several assumptions had to be made based on typical installation conditions. A detailed list of the design assumptions and other design considerations are available in Technical Note 5.05: *Pipe Flotation*. A summary of the fill required to prevent flotation is shown in Table 5-9. Note that in many cases, less than one foot (0.3m) is needed to prevent flotation but for structural purposes, minimum cover requirements will be greater based on pipe diameter and loading conditions. Due to many factors affecting flotation, several assumptions had to be made. For a detail list of the assumptions made, please refer to Technical Note 5.05: *Pipe Flotation*.

In spite of their light weight, ADS products will not float when adequate cover is placed on the pipe. Additionally, if effluent were in the pipe, as would be likely in the case of a fully saturated soil, its weight would further hinder flotation.

A second very important variable is the burial depth. During installation when the pipe has not yet been covered over with soil, flotation potential increases. If conditions on a specific project differ greatly from these and flotation is believed to be a valid consideration, ADS Application Engineers are available to help determine the extent of the problem.

Table 5-9
Minimum Cover Required to Prevent Flotation

Diameter in. (mm)	Cover in. (mm)	
	Single Wall	Dual or Triple Wall
4 (100)	3 (77)	3 (77)
6 (150)	4 (102)	4 (102)
8 (200)	6 (152)	5 (127)
10 (250)	7 (178)	7 (178)
12 (300)	9 (229)	9 (229)
15 (375)	11 (280)	11 (280)
18 (450)	13 (330)	13 (330)
24 (600)	17 (432)	17 (432)
30 (750)	N/A	22 (559)
36 (900)	N/A	25 (635)
42 (1050)	N/A	29 (737)
48 (1200)	N/A	33 (838)
60 (1500)	N/A	40 (1016)

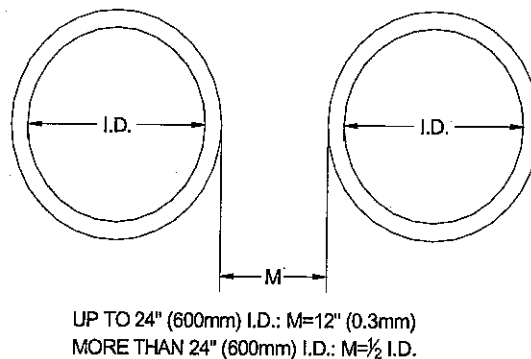
PARALLEL PIPE INSTALLATIONS

Sewer pipes can be installed parallel when the capacity supplied by one of the pipes is not sufficient, such as in a relief situation.

A minimum amount of backfill is needed to provide adequate side support and a minimum spacing is also needed to compact the fill properly to develop this support. Generally, accepted minimum spacings are shown in Figure 5-6. These recommendations assume there are no fittings connecting the two adjacent runs; if fittings are used, spacing recommendations will differ and are outlined in Section 6:

Retention/Defention.

Figure 5-6
Minimum Pipe Spacing



STEEP SLOPE INSTALLATIONS

In applications where a steep slope is necessary, generally slopes equal to or greater than 12%, precaution must be taken to ensure the application conditions will not adversely affect the pipe structure or flow characteristics. One design consideration should be proper venting. The pipe must be properly vented to ensure negative pressure does not form inside the pipe. Venting can be provided along the pipe slope, at the head of the slope, or by designing the flow in the slope to not flow more than 75% full in peak design flow conditions. Next, thrust blocks must be used at all fittings and grade changes. Change in flow direction can cause excessive force against the pipe wall; therefore thrust blocks must be used to dissipate this energy. Thrust blocks should be constructed as designed and specified by the project engineer for the specific project conditions. Finally, consideration must be given to pipe slippage along the slope. Pipe slippage can result in slope failure of the surrounding soil, structural damage of the pipe wall, or compromising of joint quality for the overall system. Pipe should be restrained through the use of concrete blocks or pipe anchors.

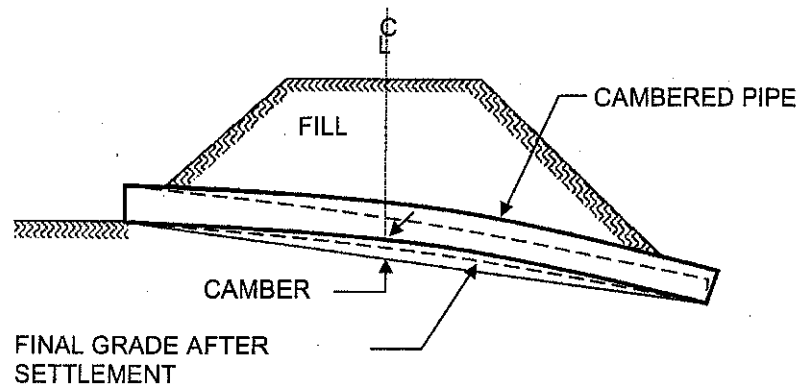
Note: Twelve percent grade is listed for reference purposes only, additional design consideration may be necessary for slopes less than 12% where slope stabilization, negative pressure, or water hammer, may be of concern.

CAMBERED INSTALLATIONS

Some pipe installations may need to design for uneven settlement regardless of the backfill envelope quality and construction. High embankments are especially prone to uneven settlement because the load on the pipe near the center of the embankment will be greater than at the top of the slope. In order to eliminate low pockets under the embankment, the pipe should be cambered.

Cambering is the process of installing the pipe so that the expected settlement will create the design slope. It can be achieved by installing the upstream half of the pipe on a flat grade and downstream half on a grade that is larger than design, as shown in Figure 5-7. Corrugated pipe, because of its flexibility, can be cambered quite easily. A qualified soils engineer should be consulted for this specialized situation.

Figure 5-7
Cambered Pipe Installations



SLIPLINING

Due to abrasive or corrosive environments, premature deterioration of some types of pipe may occur. In lieu of a total replacement, sliplining the existing pipe with ADS thermoplastic pipe is often an economical and efficient way to significantly extend a culverts' service life.

Typically, ADS thermoplastic pipe can only be used for open-ended applications where the pipe does not need to be bent for installation. Other considerations during design and pre-construction should include the inside and outside diameter of the carrier pipe and new slipline pipe, length of installation and grout installation. For more information, refer to Technical Notes 5.06, and 5.14, *Sliplining Considerations* for more details.

POST-CONSTRUCTION INSPECTION

Generally, no post construction is necessary for ADS pipe installations; however it is good practice to perform a visual inspection to insure proper line and grade have been achieved. It is important to understand that under normal conditions, any deflection will be realized within the first thirty (30) days after installation. This affords the inspector the opportunity to inspect the pipe shortly after installation with the ability to note deficiencies before the project is complete. The inspection should be performed after the pipe has been laid and backfilled, but may be before final paving has been placed.

The following outlines various inspection methods commonly specified for flexible pipes (plastic or metal). Additional post-installation inspection and testing information is available in Technical Note 5.07: *Post Installation Testing for HDPE Pipe*, Technical Note 5.08: *Laser Profiling of Flexible Pipe*, 5.17: *Post Installation Testing SaniTite HP Pipe* and 5.20: *Post Installation Testing of HP Storm*

Visual Inspection

A visual inspection will usually reveal improper line and grade as well as excessive deflection. For most projects, which specify a soil-tight or silt-tight joint performance, a visual inspection is sufficient to insure a successful installation. Caution is advised when inspecting pipe or entering manhole or inlet structures to insure compliance with all OSHA regulations.

Infiltration/Exfiltration Testing

For systems designed for watertight applications without specifying any ASTM specification for testing, an infiltration/exfiltration test is a simple and easy method of insuring proper joint performance. For an exfiltration test, a run of piping is tested by filling the system with water from structure to structure (manhole or inlets), with appropriate bulk heads or pipe bladders to seal off the pipe from the structure. Allow the system to stabilize for 24 hours, measuring the water level at the beginning of the test and then measuring the water level again after a specified period of time. The drop in water level can then be converted to gallons leakage/ inch pipe diameter/ mile length of pipe /day and compared to the permissible level established for the project. In the absence of a specified level, 200-gal/ in. dia. of pipe/ mi of sewer/ day is commonly considered watertight for storm and sanitary sewer applications. An acceptable ASTM specification for testing infiltration/exfiltration is ASTM F2487.

Air Testing

After the pipe has been laid and backfilled, each section of the pipeline between manholes may be tested using standard procedures for a low pressure air test. Individual joints may also be tested with appropriate equipment. This test is usually for systems where performance standards require watertight joints. ASTM F1417 may be used for air testing these systems and shall be completed from structure to structure or for individual joints. Fabricated structures and fittings shall not be tested to avoid damaging these components.

ASTM F1417 specifies a 3.5 psi air pressure be held for a specified length of time based on the pipe diameter with a maximum 0.5 psi pressure drop. Although the diameters listed in ASTM F1417 only include up to 36-inch (900mm), linear interpolation for larger diameters is generally acceptable. Pipe diameters greater than 36-Inch shall be tested in accordance to ASTM F3058 *Preliminary field Testing of Thermoplastic Pipe Joints for Gravity Flow (Non-Pressure) Sewer Lines*.

5-8 APPENDIX A-5

Table A-5-1A

Available U.S. Product-Specific Technical Literature & Detail Drawings

	Storm Sewer			Sanitary Sewer		Irrigation
Product	N-12 Pipe per ASTM F2306 /AASHTO	N-12 Pipe & Mega Green per ASTM F2648	HP STORM	Sanitite®	Sanitite® HP	N-12 Low Head Pipe
Minimum & Maximum Cover	Technical Note 2.01	Technical Note 2.02	Technical Note 2.04	Technical Note 2.01	Technical Note 2.05	Technical Note 2.01
Trench Installation Details	STD-101	STD-101A	STD-101D, 101E	STD-101	STD-101F	STD-101
Connections to Manholes & Structures	200 Series	200 Series	200 Series	200 Series	200 Series	200 Series

Table A-5-1B

Available Canadian Product Specific Technical Literature & Detail Drawings

	Storm Sewer		Sanitary Sewer
Product	N-12 Pipe per CSA B182.8	Sanitite® HP	Sanitite® HP
Minimum & Maximum Cover	Technical Note 2.01C	Technical Note 2.05C	Technical Note 2.05C
Trench Installation Details	STD-101	STD-101F	STD-101F
Connections to Manholes & Structures	200 series	200 series	200 series

Table A-5-2A

Minimum Installation Requirements for ADS Thermoplastic Products (U.S.)

		AASHTO or ASTM F2306	ASTM F2648 or Mega Green	HP STORM for Storm Drainage	SaniTite & SaniTite HP for Sanitary Sewer	N-12 Low Head
Minimum Cover (<2-ft) Backfill Recommendations	Bedding	Class 1, 2 or 3 loosely placed in middle 1/3, 90% SPD in remainder	Class 1 or 2 loosely placed in middle 1/3, 90% SPD in remainder	Class 1, 2 or 3 loosely placed in middle 1/3, 90% SPD in remainder	Class 1 or 2 loosely placed in middle 1/3, 90% SPD in remainder	Class 1 or 2 loosely placed in middle 1/3, 90% SPD in remainder
	Haunch & Initial Backfill	Class 1 Class 2 @ 90% Class 3 @ 90% SPD	Class 1 Class 2 @ 90% SPD	Class 1 Class 2 @ 90% Class 3 @ 90% SPD	Class 1 Class 2 @ 90% SPD	Class 1 Class 2 @ 90% SPD
Maximum Cover Backfill Recommendations	Bedding	Class 1, 2 or 3 loosely placed in middle 1/3, 90% SPD in remainder	Class 1, 2 or 3 loosely placed in middle 1/3, Class 1, 2 @ 90% or Class 3 @ 95% SPD in remainder	Class 1, 2, 3 or 4 loosely placed in middle 1/3, Class 1, Class 2 or Class 3 @ 90% or Class 4 @ 95% SPD in remainder	Class 1 or 2 loosely placed in middle 1/3, 90% SPD in remainder	Class 1, 2 or 3 loosely placed in middle 1/3, 90% SPD in remainder
	Haunch & Initial Backfill	Class 1 Class 2 @ 85% Class 3 @ 90% SPD	Class 1 Class 2 @ 90% Class 3 @ 95% SPD	Class 1 Class 2 @ 85% Class 3 @ 90% Class 4 @ 95% SPD	Class 1 compact Class 2 @ 90% SPD	Class 1 Class 2 @ 85% Class 3 @ 90% SPD

1) Table provides minimum compaction levels for the respective soil class; higher compaction levels than stated are acceptable and may be necessary depending on fill height.

2) For additional information, refer to the product specific Technical Note on minimum & maximum cover recommendations.

Table A-5-2B Minimum Installation Requirements for ADS Thermoplastic Products (Canadian)

		CSA B182.8	BNQ 1809
Minimum Cover (<2-ft) Backfill Recommendations	Bedding	Class 1, 2 or 3 90% SPD	MG-20 or CG-14 @ 90% SPD
	Haunch & Initial Backfill	Class 1 Class 2 @ 90% Class 3 @ 95%	MG-20 or CG-14 @ 90% SPD
Maximum Cover Backfill Recommendations	Bedding	Class 1, 2 or 3 90% SPD	MG-20 or CG-14 @ 90% SPD
	Haunch & Initial Backfill	Class 1 Class 2 @ 90% Class 3 @ 90%	MG-20 or CG-14 @ 90% SPD

1) Table provides minimum compaction levels for the respective soil class; higher compaction levels than stated are acceptable and may be necessary depending on fill height.

2) For additional information, refer to the product specific Technical Note on minimum & maximum cover recommendations.

OTHER TECHNICAL RESOURCES

(APPLICABLE TO ALL ADS PRODUCTS)

ADS Technical Notes

Technical Note 5.01: *Recommended Use of Trench Boxes*

Technical Note 5.02: *Flowable Fill Backfill for Thermoplastic Pipe*

Technical Note 5.03: *HDPE Pipe Repair Options*

Technical Note 5.04: *HDPE and HP Connections to Manholes and Structures*

Technical Note 5.05: *Pipe Flotation*

Technical Note 5.06: *Culvert Sliplining with HDPE Pipe*

Technical Note 5.07: *Post-Installation Testing for HDPE*

Technical Note 5.08: *Laser Profiling of Flexible Pipe*

Technical Note 5.09: *Utility Crossings*

Technical Note 5.10: *Integral Bell Transition for HDPE*

Technical Note 5.11: *Sliplining Extended Lengths with HDPE Pipe*

Technical Note 5.12: *HP Storm Drainage Pipe Repair Options*

Technical Note 5.13: *SaniTite HP Sanitary Sewer Pipe Repair Options*

Technical Note 5.14: *Culvert Sliplining with HP Pipe*

Technical Note 5.15: *Integral Bell Transitions for HP Storm Pipe*

Technical Note 5.16: *Methods for Sealing Vent Tubes*

Technical Note 5.17: *Post Installation Testing of SaniTite HP*

Technical Note 5.18: *Lining of Casings with SaniTite HP Pipe*

Technical Note 5.20: *Post Installation Testing of HP Storm*

6-0 RETENTION/DETENTION SYSTEMS

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6-1 STORMWATER MANAGEMENT TODAY

Stringent environmental regulations and increasing land values have made finding an effective way to manage stormwater runoff – one that both protects groundwater quality *and* complies with agency regulations – a high priority for land developers and engineers. Typically, the stormwater management method selected involves some type of stormwater retention or detention system, and possibly other products that improve the effectiveness of the management method.

The purpose of a *stormwater retention system* is to capture stormwater runoff in a designated area where it can be allowed to percolate into the ground. The net effect is fairly rapid exfiltration of stormwater into the adjacent native soil. A *stormwater detention system*, on the other hand, slows and temporarily holds stormwater runoff so that it can be released into the environment at a controlled rate. An effective means of stormwater management can be retention, detention, or a combination of both.

Stormwater retention/detention systems vary widely in design, from open ponds to subsurface piping systems and underground vaults to gravel pits. The most frequently used designs are open ponds and subsurface piping and/or vault systems. Open ponds occupy a great deal of space, reducing the land available for facilities, such as parking lots, playgrounds, and landscape areas. In addition, they create safety risks and serve as a breeding ground for insects.

Subsurface systems, however, offer several advantages in addition to effective stormwater runoff management. Because they are below grade, subsurface systems increase the amount of usable land since some facilities, like recreational green areas or parking lots, can be built over them. Subsurface systems also decrease safety risks because they are inaccessible to the public, are more easily maintained, and are options in situations where high groundwater tables or small lot sizes make a pond impractical.

Subsurface retention/detention systems can be designed in almost any shape and size using a variety of materials. Plastics, especially high density polyethylene (HDPE) and polypropylene (PP) are an attractive, economical option for retention/detention stormwater management. They are often faster and more cost-effective to install than other systems, and are highly resistant to the damaging effects of salts, oils, fuels, and other chemicals, and freeze/thaw conditions. In aggressive conditions plastics can provide a long service life.

6-2 ADS[®] SUBSURFACE RETENTION/DETENTION PRODUCTS

A long-time leader in both water management and plastics technology, ADS offers different options for subsurface retention/detention systems to meet the management needs of practically any stormwater runoff situation. Retention/Detention systems are offered with a choice of N-12[®], N-12[®] ST IB, either solid or with perforations, or N-12[®] WT IB pipe.

RETENTION/DETENTION SYSTEMS

ADS corrugated polyethylene pipes are the building blocks of the retention/detention product line. N-12 pipes (see Specifications section) use a state-of-the-art design that incorporates a smooth inner wall and a corrugated outer wall. The smooth inner wall combines superior hydraulics and the ability to resist abrasion and corrosion. The corrugated outer wall provides the strength necessary to withstand heavy traffic loads with varying cover heights. See Figure 6-2 in this section for minimum recommended cover heights for standard installations.

N-12 ST pipe features a bell-and-spigot joint that promotes faster, easier installation. This joining method ensures joint alignment, improves joint reliability, and eliminates the need for glue, split couplers, or wire ties. N-12 ST joints meet or exceed a soil-tight level of performance. N-12 pipe requires coupling bands for soil-tight performance. The pipe itself is available with or without perforations.

N-12 WT pipe features joints which provide a watertight level of performance meeting the laboratory requirements set in ASTM D3212. In field applications, N-12 WT pipe is subject to allowable leakage rates and may be considered watertight per gasketed storm drain and even some sanitary sewer standards. ADS N-12 WT detention systems, which include N-12 WT pipe and compatible fabricated fittings, are intended for non-pressure, gravity flow storm water detention and will be subject to greater leakage rates and may not be appropriate for applications requiring long-term fluid containment. For these types of applications please refer to ADS Technical Note 7.01 *Rain Harvesting with HDPE Pipe* or contact ADS for additional details or assistance with your specific application.

The ADS retention/detention system utilizes corrugated polyethylene pipe and specially designed manifolds and other fittings to provide a complete retention/detention system. ADS can assist the customer in laying out the actual system with all necessary components for each application. From the contractor's point of view, retention/detention components coupled with ADS technical assistance allows the products to fit together much like building blocks.

Table 1 summarizes the primary features and benefits of retention/detention systems, and how the ADS system meets the needs of the application.

Table 6-1

Retention/Detention Systems Features and Benefits

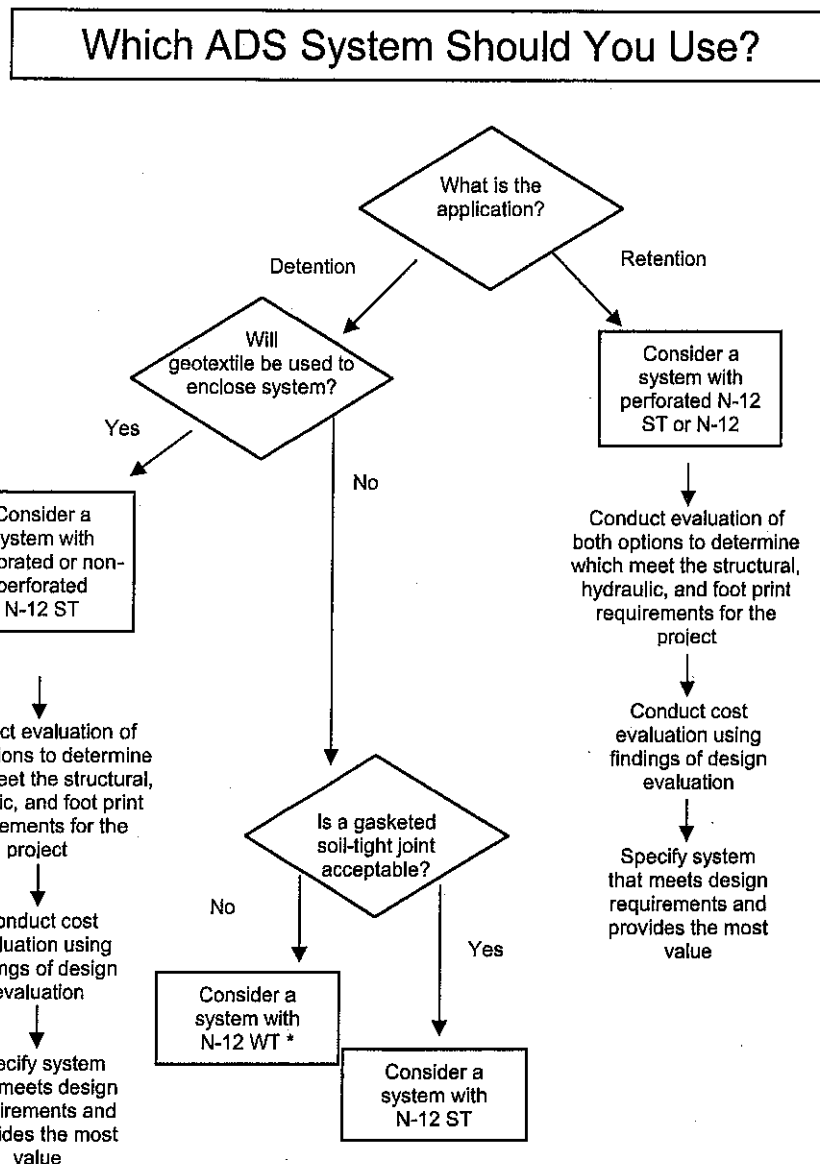
Subsurface retention/detention design	<ul style="list-style-type: none"> • Increases the usable land available • Reduces hazards and safety risks • Reduces system maintenance costs • Recharges groundwater table more efficiently
Unique Manifold Designs	<ul style="list-style-type: none"> • Increased structural integrity • Increased versatility of manifold design options • Easier assembly and installation • Helps to reduce debris in laterals and allows for easy cleaning
Quality Plastic Composition	<ul style="list-style-type: none"> • Resists harmful effects of salts, oils, fuels, chemicals • Withstands repeated freeze/thaw cycles • Strong, yet light in weight – easier, safer, more cost-effective to install • Highly abrasion resistant for longer service life than metal or RCP • Unaffected by extremes in pH; won't rust or deteriorate
System options: <i>Retention/Detention with N-12, N-12 ST or N-12 WT pipe</i>	<ul style="list-style-type: none"> • High strength – withstands H-25 and HS-25 traffic loads under minimum cover • Meets specific application requirements: 4- to 60-inch (100 to 1500mm) diameters, lengths to 20 feet (6m), perforated or non-perforated, soil-tight or watertight joints, variety of manifold pipe designs
Variety of Fittings	<ul style="list-style-type: none"> • Promotes faster, more versatile system installations • Enables systems to meet specific application requirements • Reduces labor for system installation and/or modification
Custom product fabrication	<ul style="list-style-type: none"> • Meets unique/specialized application needs • Reduces labor for system installation and/or modification

6-3 CHOOSING THE CORRECT RETENTION/DETENTION SYSTEM

All retention/detention products are specifically designed for subsurface stormwater management systems. Figure 6-1 assists the specifier in selecting the correct product to use for a particular subsurface stormwater application.

Figure 6-1

Retention/Detention System Selection Guidelines



* ADS retention/detention systems are intended for storm sewer applications. For use of ADS products in applications requiring little to no leakage, please see ADS Technical Note 7.01: Rain Harvesting with HDPE Pipe.

6-4 DESIGNING A RETENTION/DETENTION SYSTEM

The following general guidelines provide a systematic approach to designing a retention/detention subsurface stormwater management system.

CHECK REGULATIONS

- 1 – Check with federal, state, and local agencies for regulations on subsurface stormwater retention/detention systems.

Key issues to resolve include: Should the system be a retention system, detention system, or a combination of both? Are water quality structures required? If so, which structures are approved? Is a soil-tight or watertight joint required?

CALCULATE STORAGE VOLUME REQUIRED

- 2 – Calculate the storage volume required for the specific site based on site conditions and local stormwater regulations.

The storage volume required for a given site is often regulated as the excess of stormwater runoff resulting from post-construction conditions. In essence, all new runoff and peak flows generated from a project site must be accounted for through adequate sizing of the stormwater system and/or onsite storage and dissipation of excess water. There are numerous ways and methods determining required storage volume and peak flows such as: Rational method, Unit Hydrographs, TR55 etc. The designer should choose a specific method based on their experience and those requirements as established by the local regulatory agency.

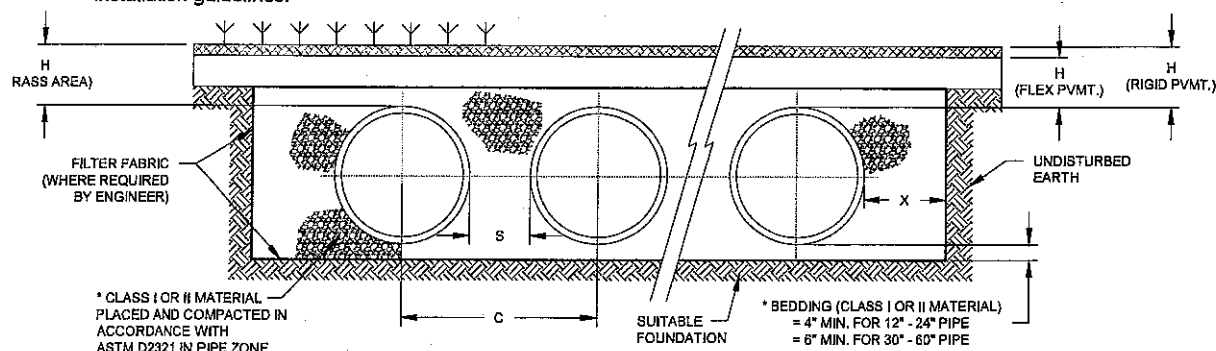
CALCULATE STORAGE CAPACITY

- 3 – Calculate the size, in feet or meters, of the system that will provide stormwater capacity requirements.

Retention/detention systems can achieve needed storage capacity by using either larger diameter corrugated polyethylene pipe and a shorter overall system length, or by using smaller diameter pipe and a longer system length. The final decision depends on the size of the site, its groundwater level, and cover requirements. Figure 6-2 shows a typical cross-section of a retention/detention system. Table 6-2 summarizes retention and detention volumes, pipe lengths, and surface area requirements based on this section; other system designs will result in different values.

Figure 6-2
Typical Retention/Detention Cross Section

Note: This is a typical cross section only. See Structures, Section 2, or Installation, Section 5, of the *Drainage Handbook* for specific installation guidelines.



MINIMUM H (FLEX PVMT.), H (RIGID PVMT.) = 12\"/>

* CLASS I BACKFILL REQUIRED AROUND 60\"/>

MAXIMUM FILL HEIGHT LIMITED TO 8-FT OVER FITTINGS FOR STANDARD INSTALLATIONS. CONTACT REPRESENTATIVE WHEN MAXIMUM FILL HEIGHTS EXCEED 8-FT FOR INSTALLATION CONSIDERATIONS.

Table 6-2
Storage Capacities of N-12[®], N-12[®] ST, and N-12[®] WT Pipes

Nominal Inside Diameter	Average Outside Diameter	"X" Spacing	"S" Spacing ¹	"C" Spacing ¹	Pipe Volume ²	Stone Void Volume ^{3,4,5}	Total Retention Storage	Retention Surface Area Required	Detention Surface Area Required
in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	ft ³ /ft (m ³ /m)	ft ³ /ft (m ³ /m)	ft ³ /ft (m ³ /m)	ft ² /ft ³ (m ² /m ³)	ft ² /ft ³ (m ² /m ³)
12 (300)	14.5 (368)	8 (210)	10.9 (280)	25.4 (650)	0.81 (0.07)	0.84 (0.08)	1.65 (0.15)	1.3 (4.2)	2.7 (8.6)
15 (375)	18 (457)	8 (210)	10.9 (280)	28.9 (750)	1.2 (0.11)	1.1 (0.10)	2.3 (0.21)	1.1 (3.5)	1.97 (6.4)
18 (450)	21 (533)	9 (230)	14.3 (360)	35.3 (900)	1.8 (0.16)	1.4 (0.13)	3.2 (0.29)	0.93 (3.0)	1.6 (5.4)
24 (600)	28 (711)	10 (260)	13.4 (340)	41.4 (1050)	3.1 (0.29)	2.0 (0.18)	5.1 (0.47)	0.68 (2.2)	1.1 (3.6)
30 (750)	36 (914)	18 (460)	17.1 (430)	53.1 (1350)	4.9 (0.46)	3.1 (0.28)	8.0 (0.74)	0.55 (1.8)	0.90 (3.0)
36 (900)	42 (1067)	18 (460)	21 (530)	63.0 (1600)	7.1 (0.66)	4.2 (0.39)	11.3 (1.05)	0.47 (1.5)	0.74 (2.4)
42 (1050)	48 (1219)	18 (460)	24 (610)	72 (1830)	9.2 (0.87)	5.8 (0.53)	15.0 (1.40)	0.40 (1.3)	0.65 (2.1)
48 (1200)	54 (1372)	18 (460)	24.5 (620)	78.5 (2000)	12.4 (1.15)	6.7 (0.62)	19.1 (1.77)	0.34 (1.1)	0.53 (1.7)
60 (1500)	67 (1702)	18 (460)	23 (580)	90 (2290)	19.3 (1.79)	8.5 (0.78)	27.8 (2.57)	0.27 (0.89)	0.39 (1.3)

Notes:

See Figure 6-2 for typical cross section used in volume calculations. Bedding depth assumed 4\"/>

1. Based on A-profile pipe.
2. Actual ID values used in calculation.
3. Stone Porosity assumed 40%.
4. Stone height above crown of pipe is not included in void volume calculations.
5. Calculation is based on the average OD of the pipe.

See "Design Aids" for a system design tool to calculate total HDPE pipe system storage with an example calculation.

DETERMINE SYSTEM LAYOUT

4 – Determine the most cost-effective system layout.

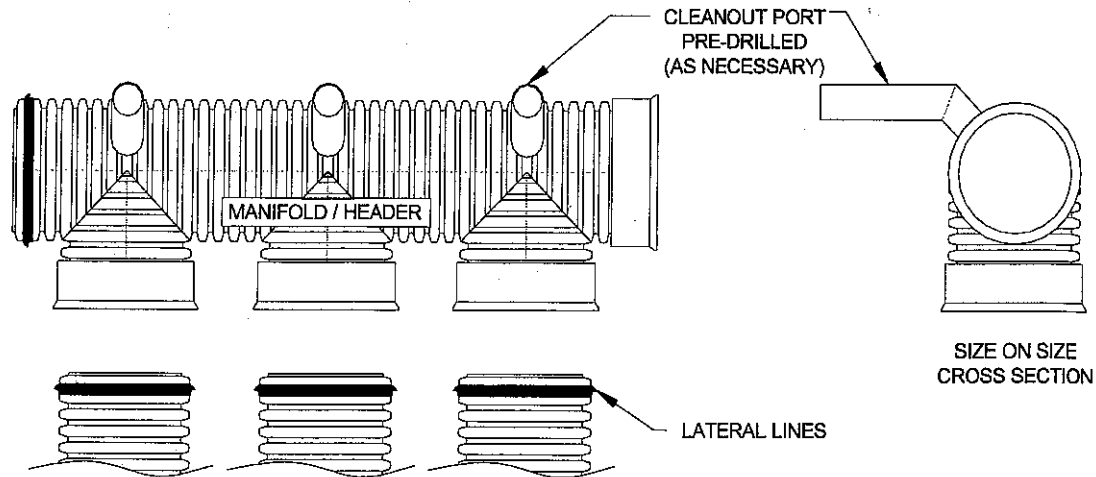
Fitting configuration can have a significant impact on overall system cost. A system with longer lateral runs and fewer manifold fittings is generally more cost effective than a wide system with short lateral runs. Additionally, placing a distribution manifold at one end of the system and simply placing end caps at the opposite end of each lateral can prove to be more cost effective than distribution manifolds at either end of the system.

SELECT PRODUCTS

5 – Select the Retention/Detention components specifically suited for the system design (refer to Figure 6-1).

Manifold design alternatives are:

- Standard manifold with attached reducing connections to the laterals or standard manifold with size-on-size connections to the laterals. Manifold systems typically incorporate any combination of single component manifolds (i.e. one lateral), double component manifolds (i.e. two laterals), and triple component manifolds. Figures 6-3 shows a triple component manifold layout for size-on-size manifold systems; specific information regarding the sizes and manifold lengths are included in the Fittings section of this handbook or in the *ADS Fittings Manual*.
- Series of standard fittings including tees and elbows. The size of this layout will be affected by the fitting dimensions. The and Fittings section of this handbook and the *ADS Fittings Manual* contains more information.
- Custom manifolds with attached concentric or eccentric reducing connections to laterals. Custom manifolds are available for special site conditions. Custom fittings may require special installation considerations; contact your local ADS sales representative when using a custom fitting. It should be noted that minimum lateral spacing must be maintained for all manifold design alternatives. For custom manifolds, see the Technical Assistance section of this chapter.
- Maximum fill heights over manifold fittings are generally limited to less than 8-ft (2.4-m). Contact your local ADS sales representative for installation considerations for manifold fittings in excess of 8-ft.

Figure 6-3**Watertight Triple Component Retention/Detention Manifold with Size on Size Connections**

NOTE: For Retention/Detention System size-on-size manifold dimensions refer to the Fittings section

In retention systems, perforation pattern options are:

- ASTM F2306 perforations. This is considered the ADS standard perforation pattern and is stocked at most manufacturing facilities. Table 3 provides more detail.
- Other perforation patterns may be available; please refer to Technical Note 1.01: *Dual Wall HDPE Perforation Patterns* for or consult with an ADS sales representative.

Table 6-3
Perforation Patterns

Nominal I.D.		Perforation Type	Maximum Diameter		Minimum Inlet Area	
in	mm		in	mm	in ² /ft	cm ² /m
12	300	Circular	0.375	10	1.5	30
15	375	Circular	0.375	10	1.5	30
18	450	Circular	0.375	10	1.5	30
24	600	Circular	0.375	10	2.0	40
30	750	Circular	0.375	10	2.0	40
36	900	Circular	0.375	10	2.0	40
42	1050	Circular	0.375	10	2.0	40
48	1200	Circular	0.375	10	2.0	40
54	1350	Circular	0.375	10	2.0	40
60	1500	Circular	0.375	10	2.0	40

EVALUATE MAINTENANCE REQUIREMENTS

6 – Evaluate system maintenance requirements.

Should stormwater debris be encouraged to settle in the system's manifold pipe or be allowed to flow into the laterals? Does the system need such items as clean-out ports, catch basins with sump areas, settling basins, and water quality units? If so, how many are needed and where should they be located? Refer to Figures 6-5 through 6-9 as examples of products used for maintenance purposes.

- Concentric reducing manifold components (components where the reducing stub is positioned in the center of the main fitting ie: flow lines do not match) can promote trapping of debris and sediment in designated sections of the system.
- Clean-out stubs and jetting ports should be strategically placed to allow ease of maintenance (commonly located to push debris and sediment toward the downstream end of the system with clean-out positioned near or at the downstream outlet)
- Vent ports should be strategically positioned to prevent any airlocks in the manifold or lateral stubs.
- Water Quality Units may be used at the inlet end of the system to reduce debris or sediment entering the system. Units may also be used at the outlet end of the system as a final clarifying stage for the stormwater prior to discharge into the natural waterway or sewer system.

For additional information regarding inspection and maintenance of retention/detention systems, refer to Technical Note 6.01:
Retention/Detention System Maintenance.

SELECT FITTINGS AND ACCESSORIES

7 – Select the related ADS fittings needed to assemble and connect the Retention/Detention system.

These include such products as tees, elbows, stubs, adapters, reducers, flared end sections, end caps, and prefabricated end plates. For a listing of commonly specified system accessories, refer to Technical Note 7.01: *Retention/Detention System Maintenance*. All available standard fittings and accessories are provided in the *ADS Fittings Manual*.

Figure 6-4

Retention/Detention Cleanout and Riser Ports

For additional detail see ADS Standard Detail #703

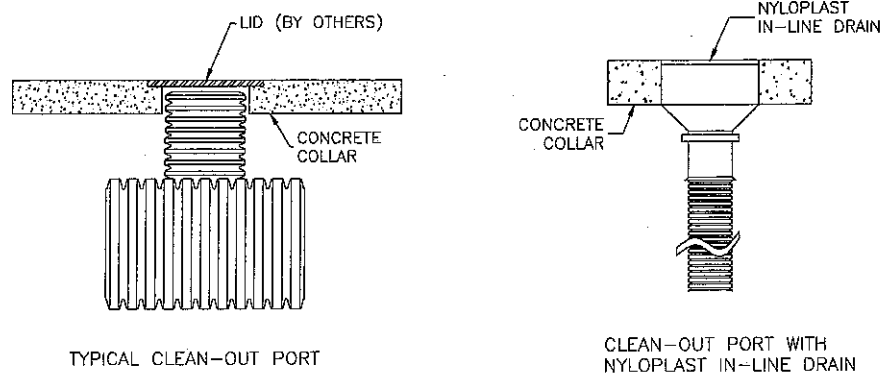
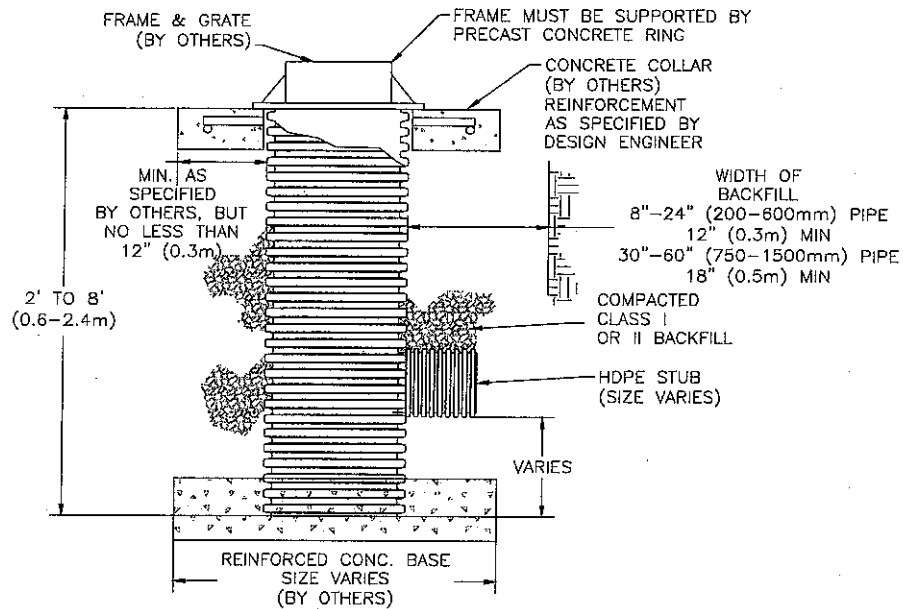


Figure 6-5
Typical Catch Basin (Non-Traffic Areas Only)
 For additional detail see ADS Standard Detail #401



NOTE: For more information on this application, refer to the Vertical Installations topic in the Installation section (Section 5) of the Drainage Handbook.

Figure 6-6
Water Quality Unit

For additional detail see ADS Standard Details #501 & #502

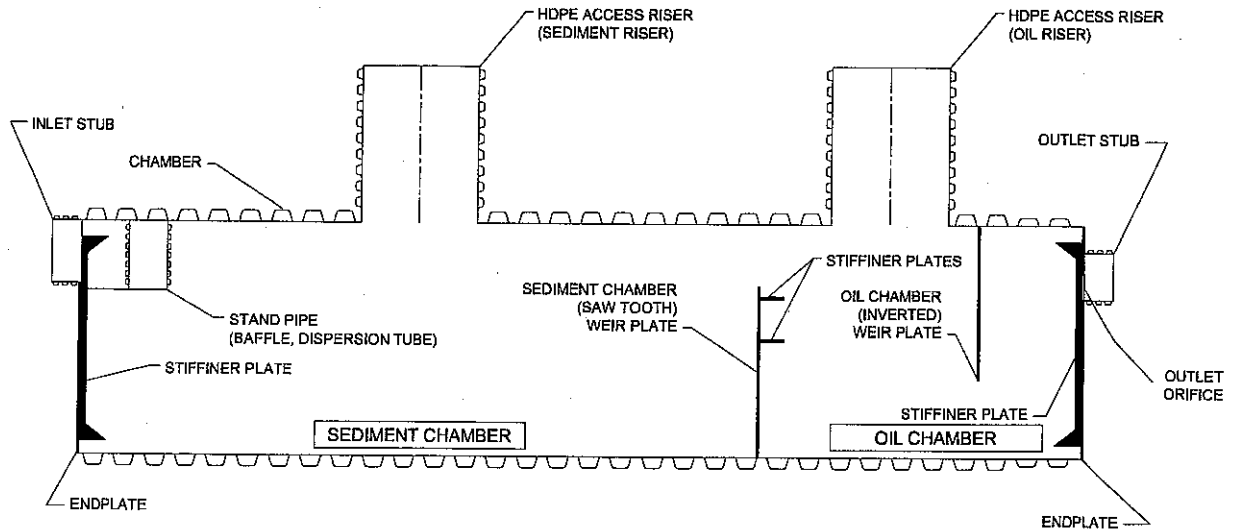


Figure 6-7
Typical End Cap Sections

For additional details see *ADS Fittings Manual*



SOIL-TIGHT



WATERTIGHT
(GASKET INCLUDED)

Figure 6-8a
Roof Drain with Wye Cleanout

For additional detail see ADS Standard Details #1001 & #1003

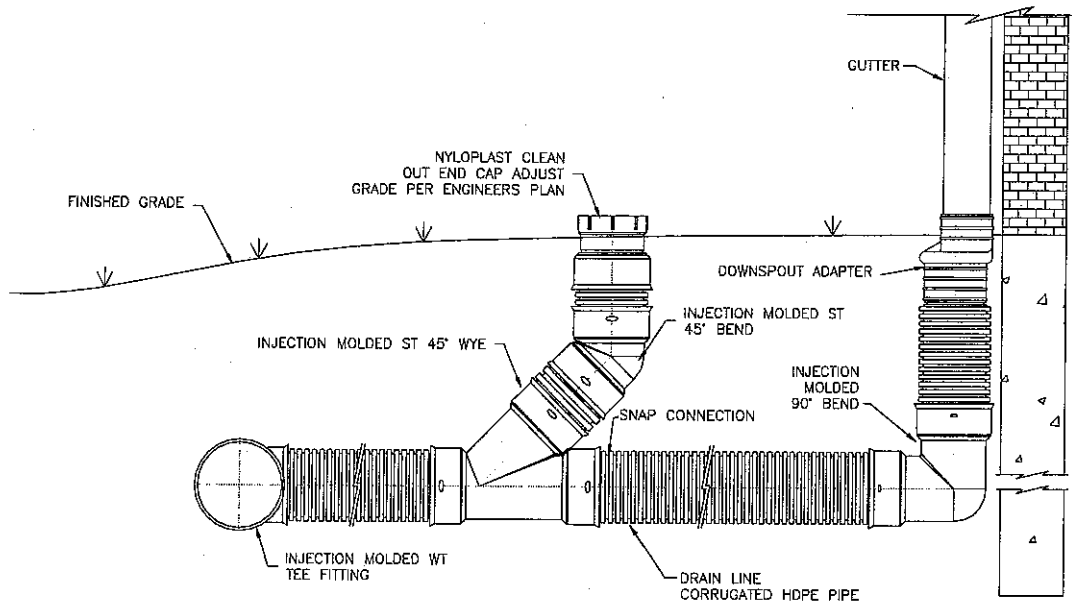
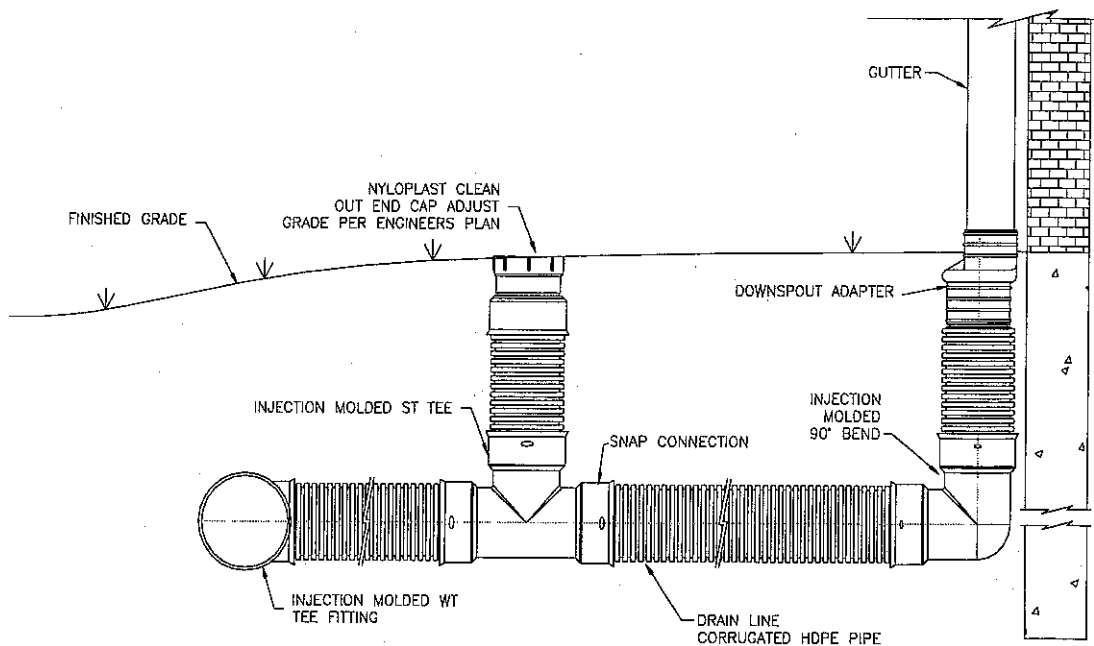


Figure 6-8b
Roof Drain with Tee Cleanout

For additional detail see ADS Standard Details #1002 & #1004



6-5 DESIGN AIDS


To aid in the design and layout of an HDPE pipe retention or detention system, a Retention/Detention sizing tool is available at www.ads-pipe.com or by contacting an ADS representative.

Figure 6-9 is a screen shot of the Retention/Detention sizing worksheet with example user inputs and the resulting information on the designed system. Some information provided for the designed system include: system storage (including stone storage, if applicable), system and excavation footprints, and estimated excavation. Also, a generic layout of the systems can be generated along with installation details for the system, risers, and cleanouts.

Figure 6-9

ADS Retention/Detention System Sizing Tool

Allows for user inputs with calculated results.



THE MOST ADVANCED NAME IN DRAINAGE SYSTEMS
Version 7.5

Enter or Select values in the Yellow fields ONLY

UNITS	
Unit of Measure	<input checked="" type="checkbox"/> Imperial (ft, in) <input type="checkbox"/> Metric (mm, m)

SYSTEM	
Joint Type	Plain End ST
Design Storage Volume	5240 CF
Average Cover Height ⁴	1.00 FT

**STORMWATER RETENTION / DETENTION
PIPE SYSTEM SIZING WORKSHEET**

Project Name: SAMPLE PROJECT

Location (City, State): U.S.A.

Prepared For: _____

Date Prepared: _____

Engineer: _____

Contractor: _____

Regional Engineer: _____

Area Sales Representative: _____

Surface Application: PARKING LOT

HEADER		LATERALS					BACKFILL	
Header Diameter	36	Lateral Diameter (in)	Lateral Length (ft)	Number of Laterals	# of Sticks / Lateral	Approx. Length of End Stick	A non-perforated system has been selected	
Number of Headers	2	Group 1	36	90	7	5		18.2-ft
Perforate Headers?	No	Group 2	12			0		0-ft
Include Header(s) in Storage Volume?	Yes	Group 3	12			0		0-ft
		Perforate Laterals? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes						

STORAGE VOLUME				APPROXIMATE SYSTEM SIZE		EXCAVATION						
COMPONENT			Total System (CF)	Width (FT)	Length (FT)	Pipe Diameter (IN)	Width (FT)	Length (FT)	Disturbed Surface Area (SYD)	Excavation ² (CYD)	Estimated Backfill ³ (CYD)	ASV (CYD)
Product Volume (CF)	Stone (CF)	ASV (CF)										
Group 1	5,245	0	0	35	108	36	38	108	455	728	534	0
Group 2	0	0	0	0	0	12	0	0	0	0	0	0
Group 3	0	0	0	0	0	12	0	0	0	0	0	0
TOTALS	5,245	0	0	35	108				455	728	534	0

100.1% of the required storage

NOTES

1 - Full Stick: Assumed a standard lay length of 10'-8".

2 - Excavation: Based on manufacturer's recommended trench width and bedding depth. Estimated volumes assume a flat system based on the user-entered Average Cover Height.

3 - Backfill: Does not account for pipe corrugations - calculated for conservative quantities. Not for use with take-offs or ordering purposes.

4 - Cover Height: For traffic installations, 1-ft of minimum cover is required for diameters 12-36", 2-ft for 42-60". Maximum cover shall not exceed 8-ft without consulting Applications Engineering.

5 - Bill of Materials: Does not differentiate between ST and WT fittings or between A and H profile connections. Determined on a project-specific basis.

6 - Quantities: Assumes all Groups are same diameter. Run separate calculations to determine quantities and costs for different Group diameters.

This Excel spreadsheet is provided for rough estimating purposes only. This tool is intended to assist the design engineer in sizing stormwater management systems using ADS pipe and manifold components. As with any calculation aid, this tool should be used for estimating only; the engineer must verify the assumptions and methods to ensure they satisfy the project and local design criteria.

6-6 BEST MANAGEMENT PRACTICES (BMP)

At ADS, managing our water resources is something close to our heart. For over a century, we have been an industry leader in environmental stewardship and protecting the quality of our water resources.

ADS is continually developing new, innovative ways to help municipalities, developers and contractors implement storm water management systems and meet EPA requirements. We offer a full line of Best Management Practices (BMP) products to manage the quality and quantity of storm water and meet increasing government regulations. Among our latest developments is the ADS Water Quality Unit offering outstanding performance in a lightweight unit. For more information related to BMPs or other drainage needs visit our website at www.ads-pipe.com.

6-7 TECHNICAL ASSISTANCE

Throughout system design, ADS, Inc. can assist you on a variety of technical issues, including:

- Product performance information and suggested product usage.
- Manifold pipe configuration and design.
- Number and spacing of system laterals (based on provided design storage).
- Existing product modifications; custom product fabrication.
- Suggestions to maximize cost effectiveness.

Please contact an ADS representative for further information.

6-8 OTHER TECHNICAL RESOURCES

ADS Technical Notes

Technical Note 1.01: *Perforation Patterns for Dual Wall HDPE*

Technical Note 6.01: *Retention/Detention System Maintenance*

Technical Note 7.01: *Rainwater Harvesting with HDPE Pipe*

ADS Standard Details

Standard Detail 7.01: *Typical Retention/Detention System Layout*

Standard Detail 7.02: *Typical Retention/Detention Cross Section*

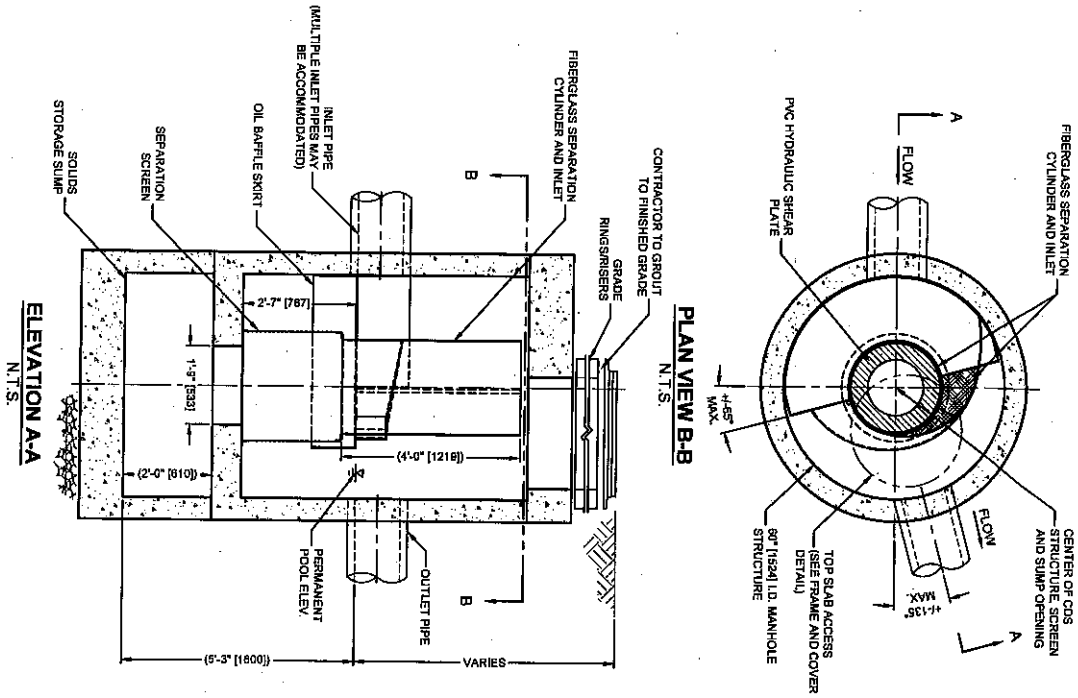
Standard Detail 7.03: *Typical Riser and Cleanout*

Exhibit A
UNDERGROUND INFILTRATION MAINTENANCE

A retention/detention system should be inspected at a minimum of one time a year or after major rain events if necessary.

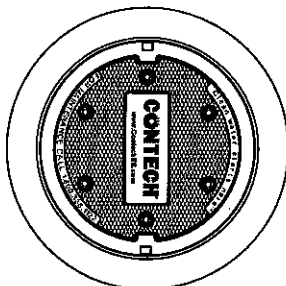
The following is the recommended procedure to inspect system in service:

1. Locate maintenance manholes.
2. Remove the lid.
3. Measure the sediment buildup at each manhole/cleanout location. Only certified confined space entry personnel having appropriate equipment should be permitted to enter the detention/retention system.
4. Inspect all inlet locations and outlets for sediment buildup, obstructions, or other problems. Obstructions should be removed at this time.
5. If measured sediment build up is between 5% - 20% of the height of the structure, cleaning should be considered; if sediment build up exceeds 20%, cleaning should be performed the earliest opportunity. A thorough cleaning of the system (chamber and outlet structure) shall be performed by either manual methods or by a vacuum truck.



CDS-5-C (CDS2520) DESIGN NOTES

THE STANDARD CDS-5-C (CDS2520) CONFIGURATION IS SHOWN.



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

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/S)			
PEAK FLOW RATE (CFS OR L/S)			
RETURN PERIOD OF PEAK FLOW (YRS)			
SCREEN APERTURE (2400 OR 4700)			
PIPE DATA:			
INLET PIPE 1	1.E	MATERIAL	DIAMETER
INLET PIPE 2			
OUTLET PIPE			
RIM ELEVATION			
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

- GENERAL NOTES**
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
 2. ALL DIMENSIONS SHOWN ARE UNLESS OTHERWISE NOTED. ACTUAL DIMENSIONS MAY VARY.
 3. FOR FABRICATION DETAILS, DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE: www.contech.com
 4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
 5. STRUCTURE SHALL MEET ASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT OR BELOW THE OUTLET PIPE INVERT. ELEVATION, ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET 1500 (ASTM A 306) AND BE CAST WITH THE CONTECH LOGO.
 6. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- INSTALLATION NOTES**
- A. ANY SUB-BASE, BACKFILL, DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
 - B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
 - C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
 - D. CONTRACTOR TO PROVIDE INSTALLATION AND GROUT PRESS. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
 - E. CONTRACTOR TO TAKE APPROPRIATE MEASUREMENTS TO ENSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH
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937-335-1122 937-346-7000 937-345-7353 FAX

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CDS® Inspection and Maintenance Guide



Maintenance

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

Inspection

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

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

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

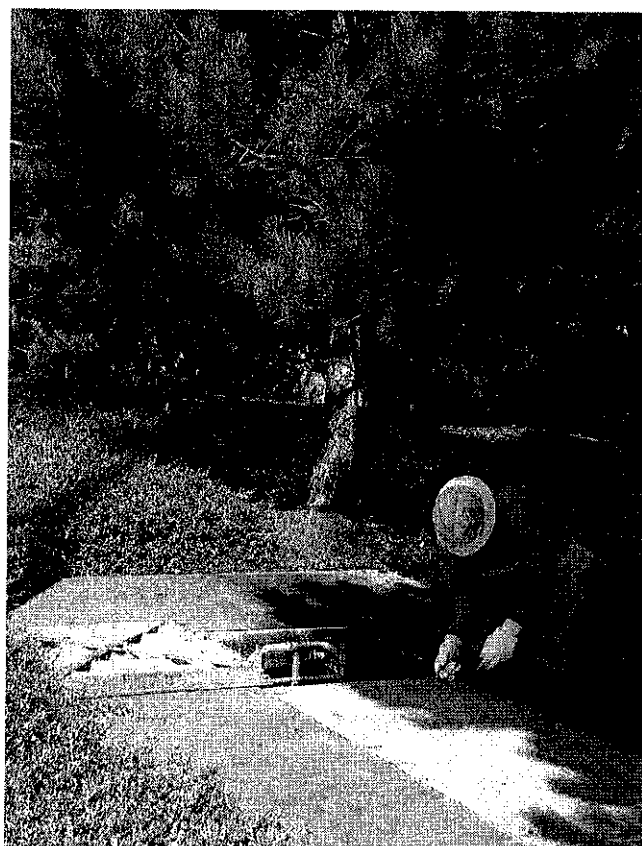
The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be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

Cleaning

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

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

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



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment ¹	Floatable Layer Thickness ²	Describe Maintenance Performed	Maintenance Personnel	Comments

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

Appendix H

Soil Erosion Measure Cut Sheets

STANDARD AND SPECIFICATIONS FOR CONSTRUCTION ROAD STABILIZATION



Definition & Scope

The stabilization of temporary construction access routes, on-site vehicle transportation routes, and construction parking areas to control erosion on temporary construction routes and parking areas.

Conditions Where Practice Applies

All traffic routes and parking areas for temporary use by construction traffic.

Design Criteria

Construction roads should be located to reduce erosion potential, minimize impact on existing site resources, and maintain operations in a safe manner. Highly erosive soils, wet or rocky areas, and steep slopes should be avoided. Roads should be routed where seasonal water tables are deeper than 18 inches. Surface runoff and control should be in accordance with other standards.

Road Grade – A maximum grade of 12% is recommended, although grades up to 15% are possible for short distances.

Road Width – 12 foot minimum for one-way traffic or 24 foot minimum for two-way traffic.

Side Slope of Road Embankment – 2:1 or flatter.

Ditch Capacity – On-site roadside ditch and culvert capacities shall be the 10 yr. peak runoff.

Composition – Use a 6-inch layer of NYS DOT sub-base Types 1,2,3, 4 or equivalent as specified in NYSDOT Standard Specifications.

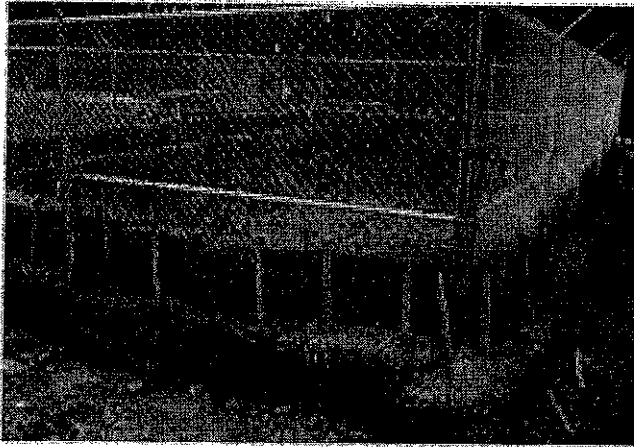
Construction Specifications

1. Clear and strip roadbed and parking areas of all vegetation, roots, and other objectionable material.
2. Locate parking areas on naturally flat areas as available. Keep grades sufficient for drainage, but not more than 2 to 3 percent.
3. Provide surface drainage and divert excess runoff to stabilized areas.
4. Maintain cut and fill slopes to 2:1 or flatter and stabilized with vegetation as soon as grading is accomplished.
5. Spread 6-inch layer of sub-base material evenly over the full width of the road and smooth to avoid depressions.
6. Provide appropriate sediment control measures to prevent offsite sedimentation.

Maintenance

Inspect construction roads and parking areas periodically for condition of surface. Top dress with new gravel as needed. Check ditches for erosion and sedimentation after rainfall events. Maintain vegetation in a healthy, vigorous condition. Areas producing sediment should be treated immediately.

STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT



Definition & Scope

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

Liner: All washout facilities will be lined to prevent

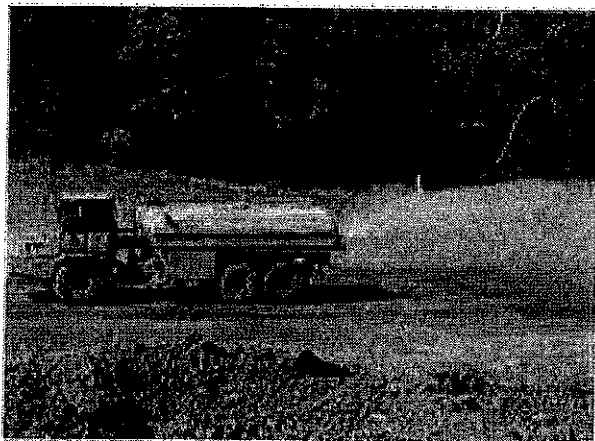
leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

STANDARD AND SPECIFICATIONS FOR DUST CONTROL



Definition & Scope

The control of dust resulting from land-disturbing activities, 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 NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

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 route to provide short term limited dust control.

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 geo-textiles 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.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR PROTECTING VEGETATION DURING CONSTRUCTION



Definition & Scope

The protection of trees, shrubs, ground cover and other vegetation from damage by construction equipment. In order 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.

Conditions Where Practices 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 "Determine Limits of Clearing and Grading" on page 2.2).

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 ground 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.

PROTECTING TREES IN HEAVY USE AREAS

The compaction of soil over the roots of trees and shrubs by the trampling of recreationists, vehicular traffic, etc., reduces oxygen, water, and nutrient uptake by feeder roots. This weakens and may eventually kill the plants. Table 2.6 rates the "Susceptibility of Tree Species to Compaction."

Where heavy compaction is anticipated, apply and maintain a 3 to 4 inch layer of undecayed wood chips or 2 inches of No. 2 washed, crushed gravel. In addition, use of a wooden or plastic mat may be used to lessen compaction, if applicable.

Table 2.6
Susceptibility of Tree Species to Compaction¹

Resistant:

Box elder.....	<i>Acer negundo</i>	Willows.....	<i>Salix spp.</i>
Green ash.....	<i>Fraxinus pennsylvanica</i>	Honey locust.....	<i>Gleditsia triacanthos</i>
Red elm.....	<i>Ulmus rubra</i>	Eastern cottonwood.....	<i>Populus deltoides</i>
Hawthornes.....	<i>Crataegus spp.</i>	Swamp white oak.....	<i>Quercus bicolor</i>
Bur oak.....	<i>Quercus macrocarpa</i>	Hophornbeam.....	<i>Ostrya virginiana</i>
Northern white cedar....	<i>Thuja occidentalis</i>		

Intermediate:

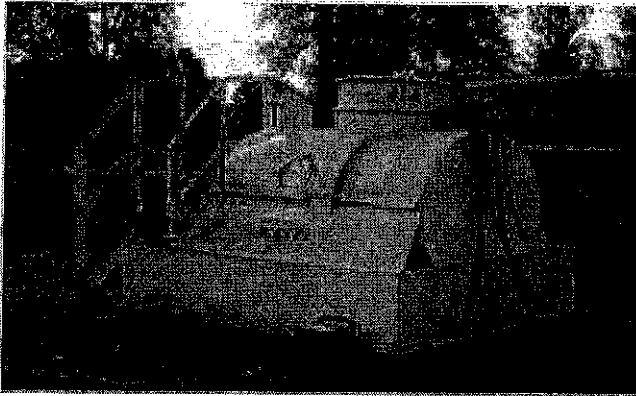
Red maple.....	<i>Acer rubrum</i>	Sweetgum.....	<i>Liquidambar styraciflua</i>
Silver maple.....	<i>Acer saccharinum</i>	Norway maple.....	<i>Acer platanoides</i>
Hackberry.....	<i>Celtis occidentalis</i>	Shagbark hickory.....	<i>Carya ovata</i>
Black gum.....	<i>Nyssa sylvatica</i>	London plane.....	<i>Platanus x hybrida</i>
Red oak.....	<i>Quercus rubra</i>	Pin oak.....	<i>Quercus palustris</i>
Basswood.....	<i>Tilia americana</i>		

Susceptible:

Sugar maple.....	<i>Acer saccharum</i>	Austrian Pine.....	<i>Pinus nigra</i>
White pine.....	<i>Pinus strobus</i>	White ash.....	<i>Fraxinus americana</i>
Blue spruce.....	<i>Picea pungens</i>	Paper birch.....	<i>Betula papyrifera</i>
White oak.....	<i>Quercus alba</i>	Mountain ash.....	<i>Sorbus aucuparia</i>
Red pine.....	<i>Pinus resinosa</i>	Japanese maple.....	<i>Acer palmatum</i>

¹ If a tree species does not appear on the list, insufficient information is available to rate it for this purpose.

STANDARD AND SPECIFICATIONS FOR SITE POLLUTION PREVENTION



Definition & Scope

A collection of management practices intended to control non-sediment pollutants associated with construction activities to prevent the generation of pollutants due to improper handling, storage, and spills and prevent the movement of toxic substances from the site into surface waters.

Conditions Where Practice Applies

On all construction sites where the earth disturbance exceeds 5,000 square feet, and involves the use of fertilizers, pesticides, petroleum based chemicals, fuels and lubricants, as well as sealers, paints, cleared woody vegetation, garbage, and sanitary wastes.

Design Criteria

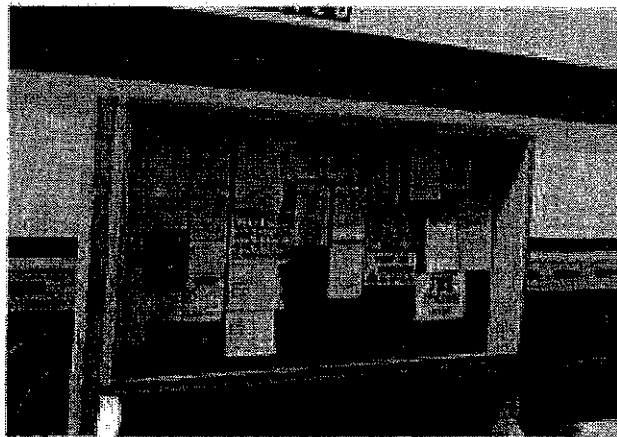
The variety of pollutants on a particular site and the severity of their impacts depend on factors such as the nature of the construction activity, the physical characteristics of the construction site, and the proximity of water bodies and conveyances to the pollutant source.

1. All state and federal regulations shall be followed for the storage, handling, application, usage, and disposal of pesticides, fertilizers, and petroleum products.
2. Vehicle and construction equipment staging and maintenance areas will be located away from all drainage ways with their parking areas graded so the runoff from these areas is collected, contained and treated prior to discharge from the site.
3. Provide sanitary facilities for on-site personnel.
4. Store, cover, and isolate construction materials including topsoil, and chemicals, to prevent runoff of

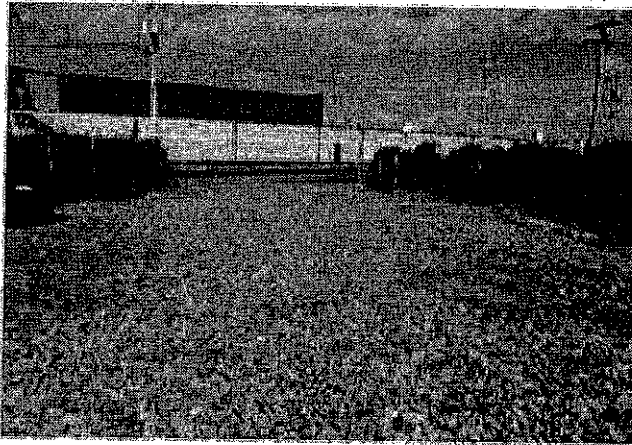


pollutants and contamination of groundwater and surface waters.

5. Develop and implement a spill prevention and control plan. The plan should include NYSDEC's spill reporting and initial notification requirements.
6. Provide adequate disposal for solid waste including woody debris, stumps, and other construction waste and include these methods and directions in the construction details on the site construction drawings. Fill, woody debris, stumps and construction waste shall not be placed in regulated wetlands, streams or other surface waters.
7. Distribute or post informational material regarding proper handling, spill response, spill kit location, and emergency actions to be taken, to all construction personnel.
8. Refueling equipment shall be located at least 100 feet from all wetlands, streams and other surface waters.



STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS



Definition & Scope

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. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 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 Sub-grade	Heavy Duty ¹ Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

¹Light 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.

²Heavy 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.

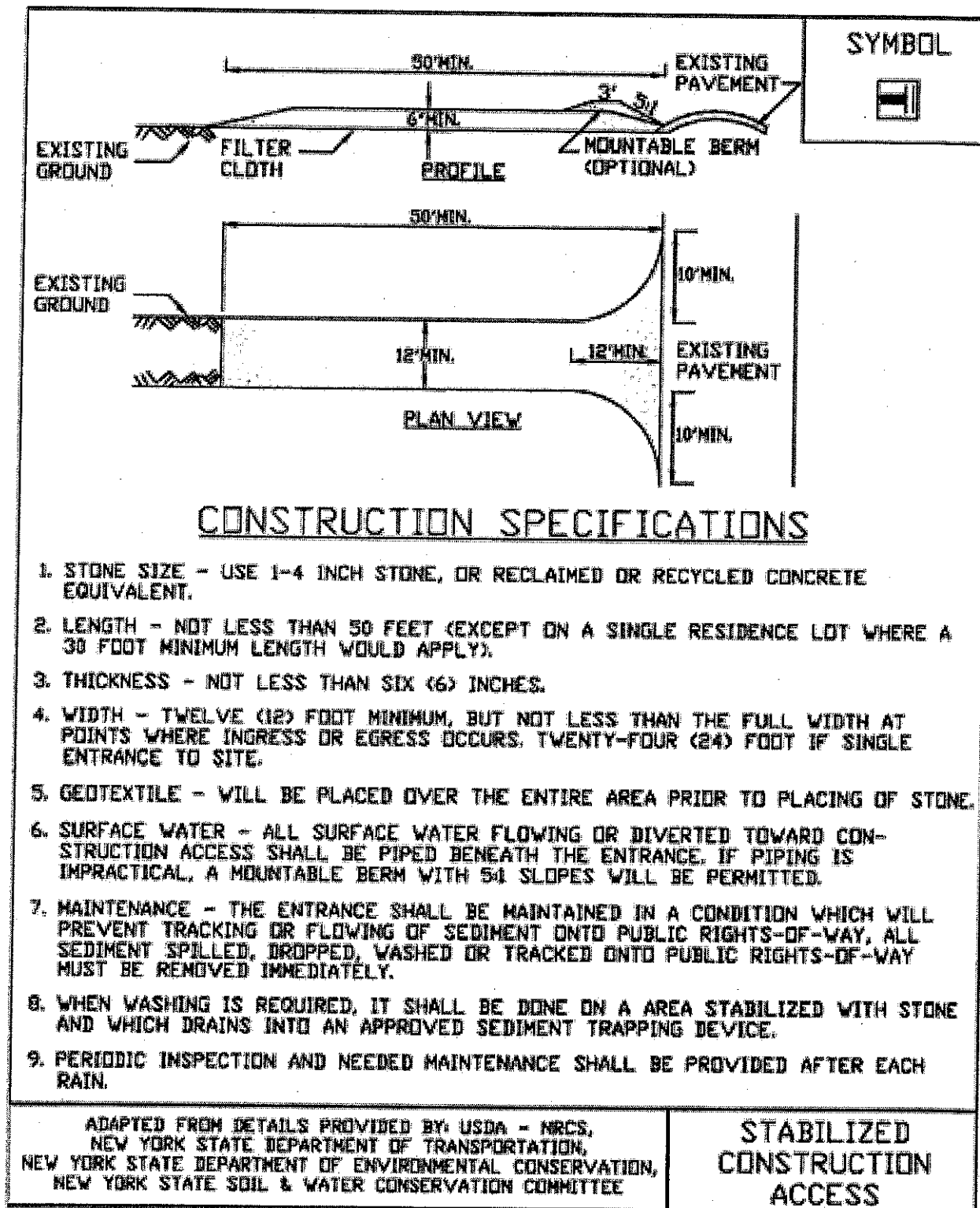
³Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The access 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 2.1
Stabilized Construction Access



STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION



Definition & Scope

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources.

Conditions Where Practice Applies

This standard applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

Design Criteria

1. Prepare a snow management plan with adequate storage for snow and control of melt water, requiring cleared snow to be stored in a manner not affecting ongoing construction activities.
2. Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.
3. A minimum 25 foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.
4. Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.
5. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.
6. Sediment barriers must be installed at all appropriate

perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

7. Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.
8. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three (3) days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.
9. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.
10. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil should be stabilized at the end of each work day unless:
 - a. work will resume within 24 hours in the same area and no precipitation is forecast or;
 - b. the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.
11. Use stone paths to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

Maintenance

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", all bare exposed soil must be stabilized by established vegetation, straw or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under a winter shutdown.

References

1. Northeastern Illinois Soil and Sedimentation Control Steering Committee. October 1981. Procedures and Standards for Urban Soil Erosion and Sediment Control in Illinois.
2. J.F. Rushing, V.M. Moore, J.S. Tingle, Q. Mason, and T. McCaffery, 2005. Dust Abatement Methods for Lines of Communication and Base Camps in Temperate Climates. ERDC/GSL TR-05-23, October 2005.

STANDARD AND SPECIFICATIONS FOR MULCHING



Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

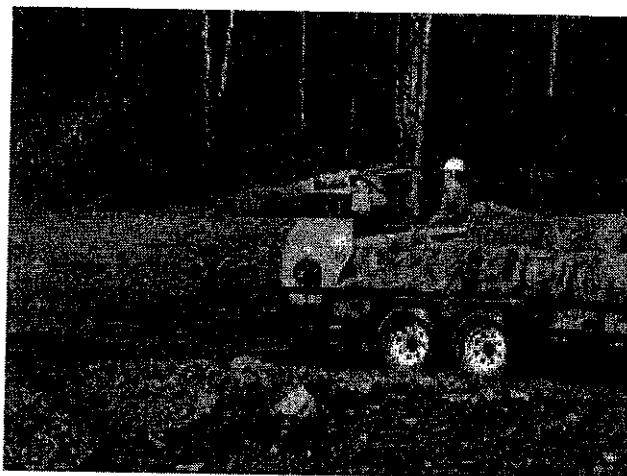


Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7"	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2"	9 cu. yds.	405 cu. yds.	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4' x 112.5' or 8' x 112.5'	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45° Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING



Definition & Scope

Establishing **permanent** grasses with other forbs and/or shrubs to provide a minimum 80% perennial vegetative cover on areas disturbed by construction and critical areas to reduce erosion and sediment transport. Critical areas may include but are not limited to steep excavated cut or fill slopes as well as eroding or denuded natural slopes and areas subject to erosion.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12", see Soil Restoration Standard. The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply

ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-5-10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seeding is preferred. See Table 4.4, "Permanent Construction Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:

	Variety	lbs./acre	lbs/1000 sq. ft.
Red Clover ¹ <u>OR</u>	Acclaim, Rally, Red Head II, Renegade	8 ²	0.20
Common white clover ¹	Common	8	0.20
PLUS			
Creeping Red Fescue	Common	20	0.45
PLUS			
Smooth Brome grass <u>OR</u>	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10
¹ add inoculant immediately prior to seeding ² Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre. All seeding rates are given for Pure Live Seed (PLS)			

Pure Live Seed, or (PLS) refers to the amount of live seed in a lot of bulk seed. Information on the seed bag label includes the type of seed, supplier, test date, source of seed, purity, and germination. Purity is the percentage of pure seed. Germination is the percentage of pure seed that will produce normal plants when planted under favorable conditions.

To compute Pure Live Seed multiply the "germination percent" times the "purity" and divide that by 100 to get Pure Live Seed.

$$\text{Pure Live Seed (PLS)} = \frac{\% \text{ Germination} \times \% \text{ Purity}}{100}$$

For example, the PLS for a lot of Kentucky Blue grass with 75% purity and 96% germination would be calculated as follows:

$$\frac{(96) \times (75)}{100} = 72\% \text{ Pure Live Seed}$$

For 10lbs of PLS from this lot =

$$\frac{10}{0.72} = 13.9 \text{ lbs}$$

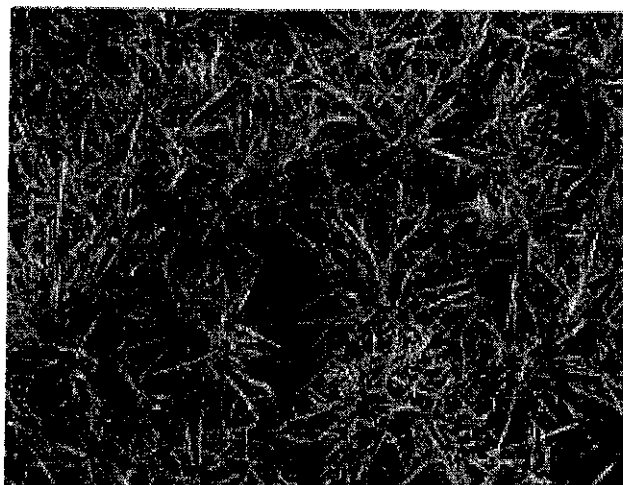
Therefore, 13.9 lbs of seed is the actual weight needed to meet 10lbs PSL from this specific seed lot.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

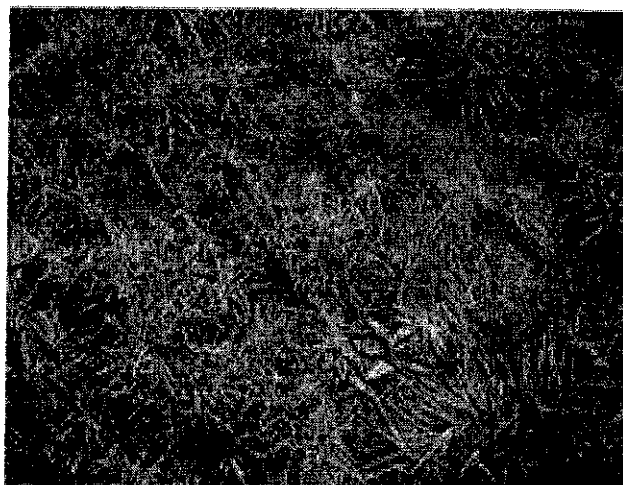
Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the Standard and Specifications for Mulching for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.



80% Perennial Vegetative Cover

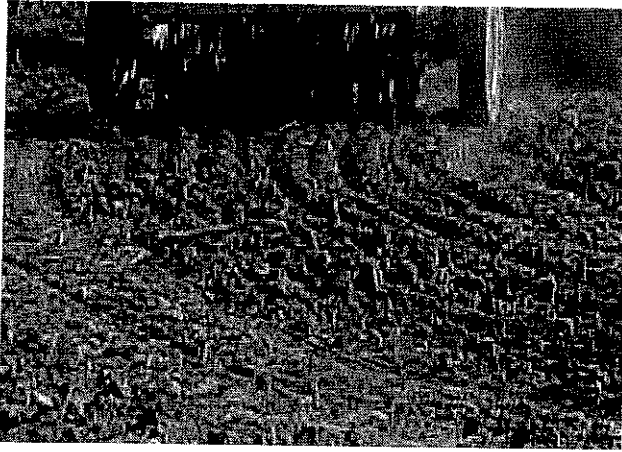


50% Perennial Vegetative Cover

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

Seed Mixture	Variety	Rate in lbs./acre (PLS)	Rate in lbs./ 1,000 ft ²
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25
*This mix is used extensively for shaded areas.			
Mix #2			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.50
*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).			
Mix #3			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.10
Big bluestem	Niagara	4	.10
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.10
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.50	.01
*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.			
Mix #4			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25
*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.			
Mix #5			
Saltmeadow cordgrass (<i>Spartina patens</i>)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions.			
'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.			
Mix #6			
Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Chewings Fescue	Common	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Red Clover	Common	10	.45
*General purpose erosion control mix. Not to be used for a turf planting or play grounds.			

STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION



Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.



Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.

2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**



2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
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 (decompaction 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".			

STANDARD AND SPECIFICATIONS FOR STABILIZATION WITH SOD



Definition & Scope

Stabilizing restored, exposed soil surfaces by establishing long term stands of grass with sod to reduce damage from sediment and runoff to downstream areas and enhance natural beauty.

Conditions Where Practice Applies

On exposed soils that have a potential for causing off site environmental damage where a quick vegetative cover is desired. Moisture, either applied or natural, is essential to success.

Design Criteria

1. Sod shall be bluegrass or a bluegrass/red fescue mixture or a perennial ryegrass for average sites. (CAUTION: Perennial ryegrass has limited cold tolerance and may winter kill.) Use turf type cultivars of tall fescue for shady, droughty, or otherwise more critical areas. For variety selection, contact Cornell Cooperative Extension Turf Specialist.
2. Sod shall be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/4 inch. Measurement for thickness shall exclude top growth and thatch.
3. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.
4. Sod shall be free of weeds and undesirable coarse weedy grasses. Wild native or pasture grass sod shall not be used unless specified.
5. Sod shall not be harvested or transplanted when

moisture content (excessively dry or wet) may adversely affect its survival.

6. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved by the contracting officer or his designated representative prior to its installation.

Site Preparation

Fertilizer and lime application rates shall be determined by soil tests. Under unusual circumstances where there is insufficient time for a complete soil test and the contracting officer agrees, fertilizer and lime materials may be applied in amounts shown in subsection 2 below. Slope land such as to provide good surface water drainage. Avoid depressions or pockets.

1. Prior to sodding, the surface shall be smoothed and cleared of all trash, debris, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.
2. **The soil should be tested to determine the amounts of amendments needed.** Where the soil is acid or composed of heavy clays, ground limestone shall be spread to raise the pH to 6.5. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 20 lbs. of 5-5-10 (or equivalent) and mix into the top 3 inches of soil with the required lime for every 1,000 square feet. Soil should be moist prior to sodding. Arrange for temporary storage of sod to keep it shaded and cool.

Sod Installation

1. For the operation of laying, tamping, and irrigating for any areas, sod shall be completed within eight hours. During periods of excessively high temperature, the soil shall be lightly moistened immediately prior to laying the sod.
2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to, and tightly wedged against, each other. Lateral joints shall be staggered to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots. On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with

staggered joints.

3. Secure the sod by tamping and pegging, or other approved methods. As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface.
4. Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Keep sod moist for at least two weeks.

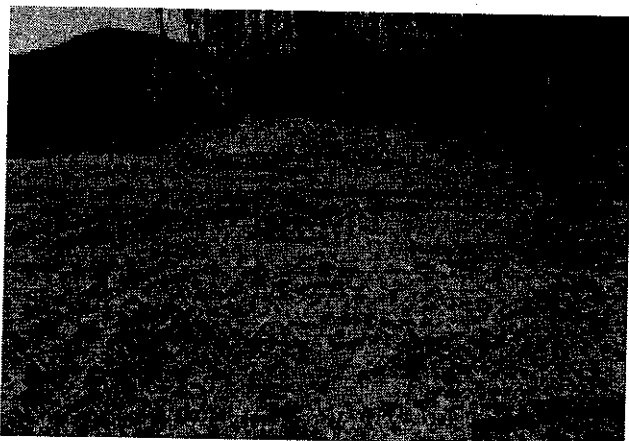
Sod Maintenance

1. In the absence of adequate rainfall, watering shall be performed daily, or as often as deemed necessary by the inspector, during the first week and in sufficient quantities to maintain moist soil to a depth of 4 inches. Watering should be done in the morning. Avoid excessive watering during applications.
2. After the first week, sod shall be watered as necessary to maintain adequate moisture and ensure establishment.
3. The first mowing should not be attempted until sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2 and 3 inches unless otherwise specified. Avoid heavy mowing equipment for several weeks to prevent rutting.
4. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply fertilizer three to four weeks after sodding, at a rate of 1 pound nitrogen/1,000 sq.ft. Use a complete fertilizer with a 2-1-1 ratio.
5. Weed Control: Target herbicides for weeds present. Consult current Cornell Pest Control Recommendations for Commercial Turfgrass Management or consult the local office of Cornell Cooperative Extension.
6. Disease Control: Consult the local office of the Cornell Cooperative Extension.

Additional References

1. Home Lawns, Establishment and Maintenance, CCE Information Bulletin 185, Revised November 1994. Cornell University, Ithaca, NY.
2. Installing a Sod Lawn. CCE Suffolk County, NY. Thomas Kowalsick February 1994, Revised January 1999. www.cce.cornell.edu/counties/suffolk/grownet

STANDARD AND SPECIFICATIONS FOR TEMPORARY CONSTRUCTION AREA SEEDING



Definition & Scope

Providing temporary erosion control protection to disturbed areas and/or localized critical areas for an interim period by covering all bare ground that exists as a result of construction activities or a natural event. Critical areas may include but are not limited to steep excavated cut or fill slopes and any disturbed, denuded natural slopes subject to erosion.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).

IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding and can be a hazard to young wildlife species.

STANDARD AND SPECIFICATIONS FOR TOPSOILING



Site Preparation

1. As needed, install erosion and sediment 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 in accordance with the Soil Restoration Standard.
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.
6. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

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 amounts shown in Table 4.7 below:

Definition & Scope

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas 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. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.
3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Table 4.7 - Topsoil Application Depth		
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, clay loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR TREES, SHRUBS, AND VINES



Definition & Scope

Establishing trees, shrubs, and vines or selectively reducing stand density and trimming woody plants to protect the soil and plant resources, improve an area for recreation and increase the attractiveness and usefulness of areas.

Conditions Where Practice Applies

On any area planned for recreation or landscape use such as yard areas, leisure areas, picnic areas, and park lands providing outdoor recreational opportunities.

Criteria and Specifications

1. Planting nursery stock

- A. Select species to serve the intended purpose. See Appendix G, Table G.1, "Trees Suitable for Landscape and Conservation Plantings in New York." Where planting of trees is to be done in recreation areas, use those species resistant to compaction listed in Table G.2, "Susceptibility of Tree Species to Compaction" whenever possible.
- B. Plant Materials
 - 1) Plants shall conform to the species, variety, size, number, and conditions as stated in a conservation plan or on a plant list shown on landscape drawings. "American Standard for Nursery Stock," by American Association of Nurserymen, shall be used to develop the plant list for landscape drawings and to check quality of plant materials.
 - 2) Durable, legible labels with the scientific and common name and cultivar shall be securely

attached to plants, bundles of seedlings, containers, and/or flats.

C. Plant Protection

Prior to delivery, the trunk, branches, and foliage of the plants shall be sprayed with non-toxic antidesiccant, applied according to the manufacturer's recommendations. This does not apply to state nursery seedlings.

D. Planting Time

Deciduous trees and shrubs: April 1 to June 1 and October 15 to December 15. Evergreen trees and shrubs: April 1 to June 1 and September 1 to November 15.

E. Spacing

Plant all trees and shrubs well back from buildings to allow for mature crown size. The following are guides for planning:

Large Trees	50-60 feet apart
Small Trees	20-30 feet apart
Columnar Species	6-8 feet apart
Hedges	1-4 feet apart
Shrubs	For clumps, plan spacing so mature shrubs will be touching or overlapping by only 1 or 2 feet

F. Site Preparation

- 1) Individual sites for planting seedlings can be prepared by scalping the sod away from a four foot square area where the seedling is to be planted.
- 2) All planting beds shall be cultivated to a depth of 8 inches, or chemically treated for weed control. Remove objectionable objects that will interfere with maintenance of site.

G. Planting

- 1) Plants shall be located as shown on plans and/or drawings and, where necessary, located on the site by stakes, flags or other means.
- 2) Prior to planting, remove galvanized wire basket securing root ball, untie and roll down burlap covering from around the stem.

3) The plants shall be set upright in holes as illustrated in Figure G.1 in Appendix G.

4) All plants shall be thoroughly watered on the same day of planting. Plants that have settled shall be reset to grade.

H. Wrapping

Immediately after planting, wrap deciduous tree trunks from the bottom to the first limb with a 4 inch wide bituminous impregnated, insect resistant tape or paper manufactured for that purpose. Tie with jute (bag strings) at top and bottom. The wrap should be removed per nursery recommendations.

I. Mulching

Mulch the disturbed area around individual trees and shrubs with a 2-3" layer of wood chips. Pull wood chips 1 inch away from the base of shrubs to avoid fungus development.

J. Pruning

After planting, prune to remove injured twigs and branches. The natural shape of the plant should not be changed.

K. Cleanup and Maintenance

1) After all work is complete, all excess soil, peat moss, debris, etc., shall be removed from the site.

2) Water plants two weeks after planting. For two years, water plants every two weeks during dry periods, which exceed three weeks without a good soaking rain, or water as needed in accordance with local conditions. Shrubs may require 5 to 10 gallons and trees, 20 to 30 gallons for each watering.

3) Remove trunk wrap per nursery recommendation.

2. Transplanting "Wild" Stock

Successful transplanting of wild stock will require heavy equipment and considerable labor as a large weight of soil must be moved with the roots.

A. Select trees and shrubs with good form and full crowns.

B. Transplant only when plants are dormant and soil is moist. Wrap soil ball with burlap to prevent soil from separating from roots.

C. Table 4.8 shows minimum diameter and

approximate weight of soil ball that must be moved with each size plant.

D. Plant and maintain as described above for nursery stock.

PRUNING AND THINNING

Use	Cleared Width Each Side of Trail Tread (ft.)	Cleared Height (ft.)
TRAILS		
Hiking	1	8
Bicycle	2	10
Motorbike	2	10
Horse	2	12
X-Country Ski	Total: 3-12	12 ¹
Snowmobile	Total: 6-12	12 ¹
PICNIC & CAMPING AREAS		
Campfire/Grill	10 ft. diam.	15
¹ Includes allowance for snow depth and snow load on branches		

1. Pruning

A. Remove trees, limbs, and limb stubs to the above widths and heights specified for the intended use.

B. Remove dead, diseased, or dying limbs that may fall.

C. Do not remove more than one-third of the live crown of a tree in a year.

D. Cut limbs flush to the branch bark ridge.

E. Use the 3 or 4 cut pruning method on all branches over 2 inches in diameter: 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.

2. Thinning

- A. Remove dead, diseased, dying, poorly anchored, or ice damaged trees that pose a hazard to recreationists or that interfere with intended use.
- B. To maintain grass cover in a wooded area, thin according to formula $D \times 3$ (average diameter of the trunk of overstory trees, in inches, times three—the answer is the spacing between trees to be left, in feet). For example, for trees with average diameter of 6 inches, spacing after thinning should leave trees 18 feet apart on average. Crown cover after thinning should be about 50 percent.
- C. Selectively thin as needed to favor those trees that are most “resistant” to compaction around their roots. See Table G.2, “Susceptibility of Tree Species to Compaction” in Appendix G. If the soil on the site is naturally well drained, those species in the “intermediate” group may also be favored.

Table 4.8
Size and Weight of Earth Ball Required to Transplant Wild Stock

Shade Trees (Maple, Ash, Oak, Birch, etc.)			Small Trees & Shrubs (Crabapple, Thornapple, Viburnum, Dogwood, etc.)		
Caliper ¹ (Inches)	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)	Up to 6 ft. Height — 6 ft. and Caliper ¹	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)
1/2	14	88	2	12	55
3/4	16	130	3	14	88
1	18	186	4	16	130
1-1/4	20	227	5	18	186
1-1/2	22	302	3/4	18	186
1-3/4	24	390	1	20	227
2	28	621	1-1/2	22	302
3	32	836	1-3/4	24	390
3-1/2	38	1,400	2	28	621
4	42	1,887	2-1/2	32	836
			3	38	1,400

¹Caliper is a diameter measurement of trees at a height of 6 inches above the ground.

STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition & Scope

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 by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. 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; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and

roll down. The area beyond the fence must be undisturbed or stabilized.

3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

Slope	Steepness	Slope Length/Fence Length (ft.)		
		Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.

Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.

Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

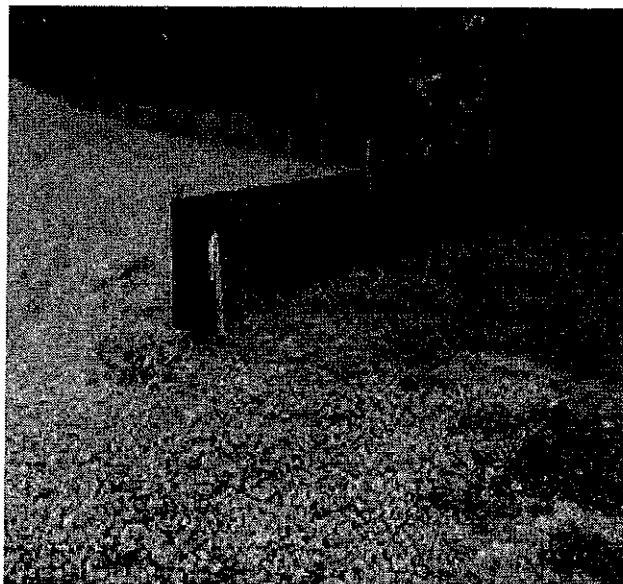
The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

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)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

Super Silt Fence

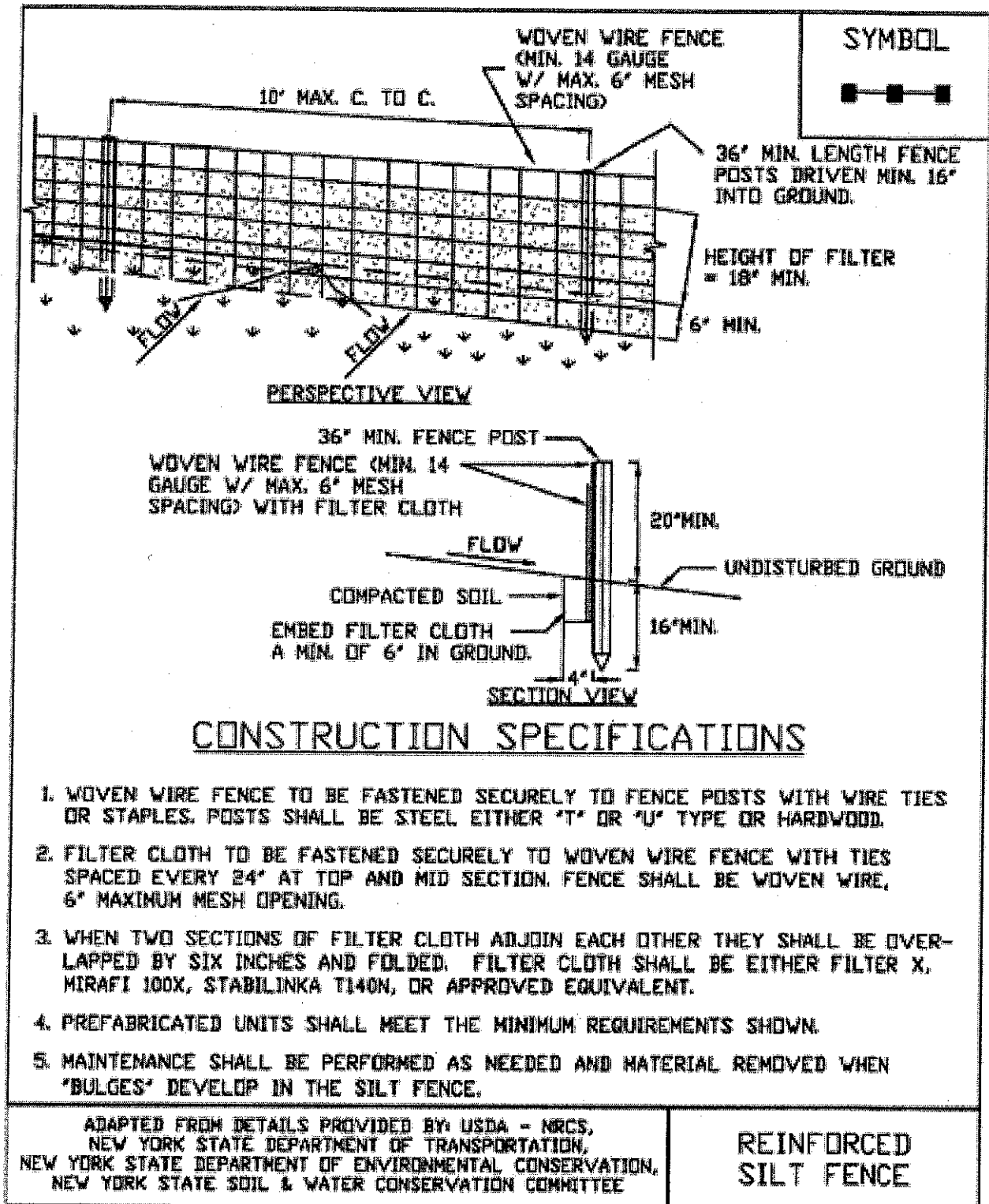


2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.
4. Prefabricated silt fence is acceptable as long as all material specifications are met.

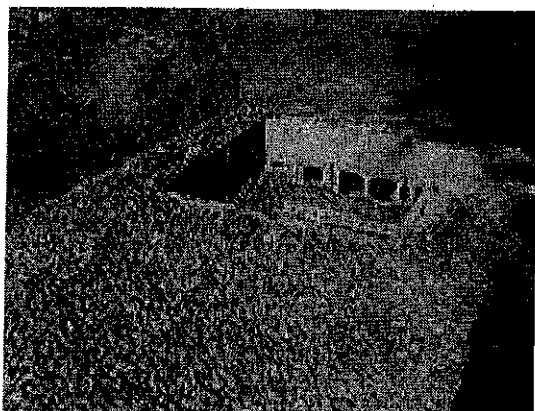
Reinforced Silt Fence



Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION



Definition & Scope

A temporary barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

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 practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It 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 five (5) 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. Paved Surface Inlet Protection
- V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed

drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

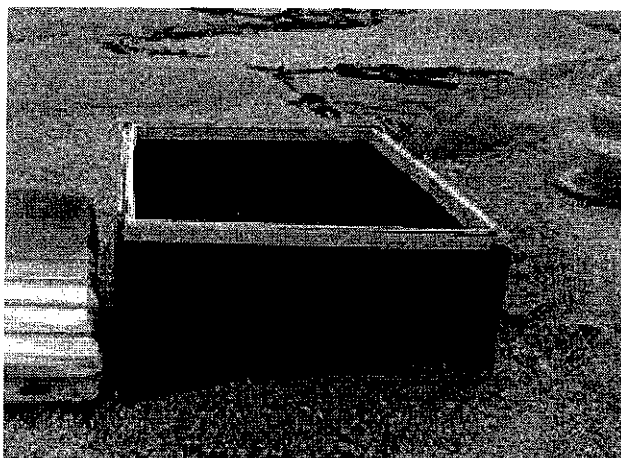
Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

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



This practice is generally used during final elevation grading phases after the storm drain system is completed.

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 over-flow 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.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

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.

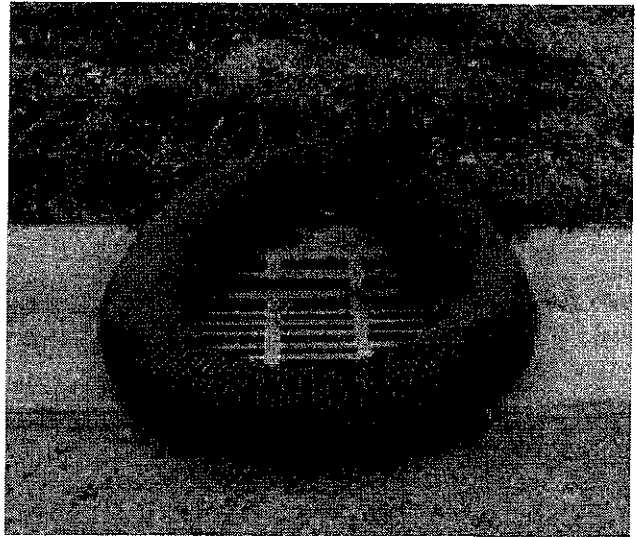
As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will 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 stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection



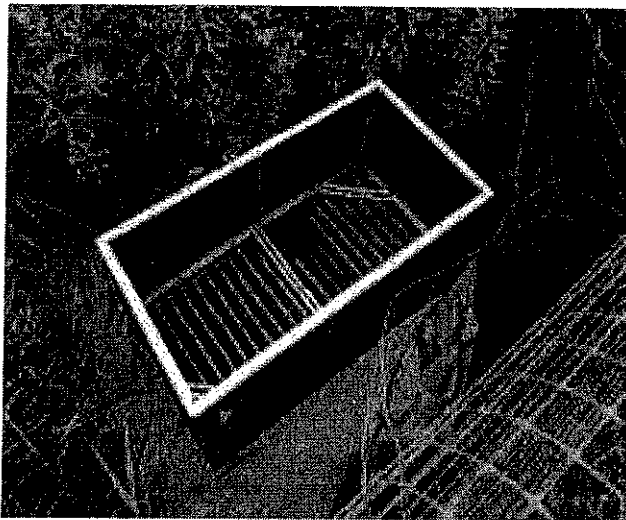
This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.



The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection



The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection

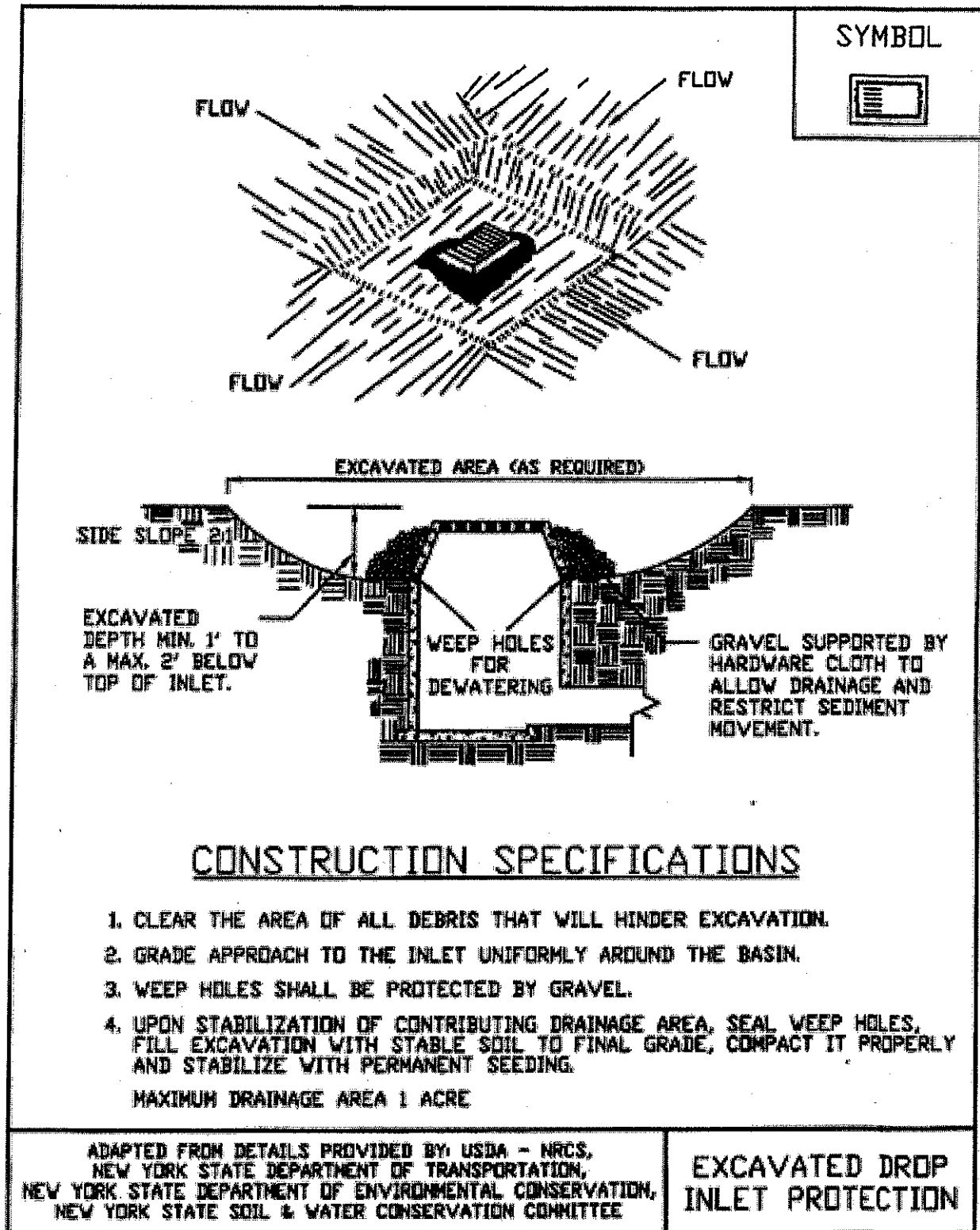


Figure 5.32
Fabric Drop Inlet Protection

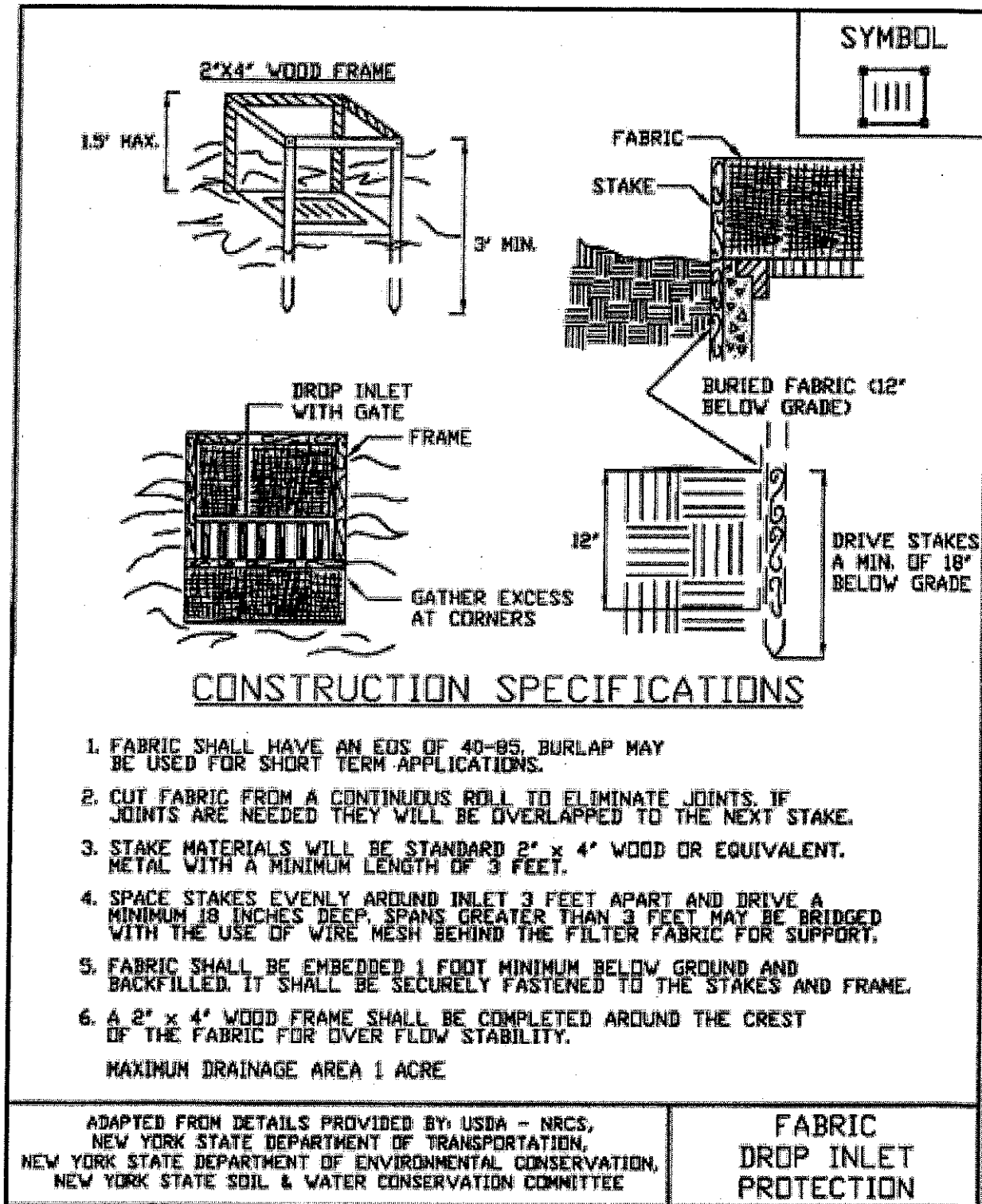
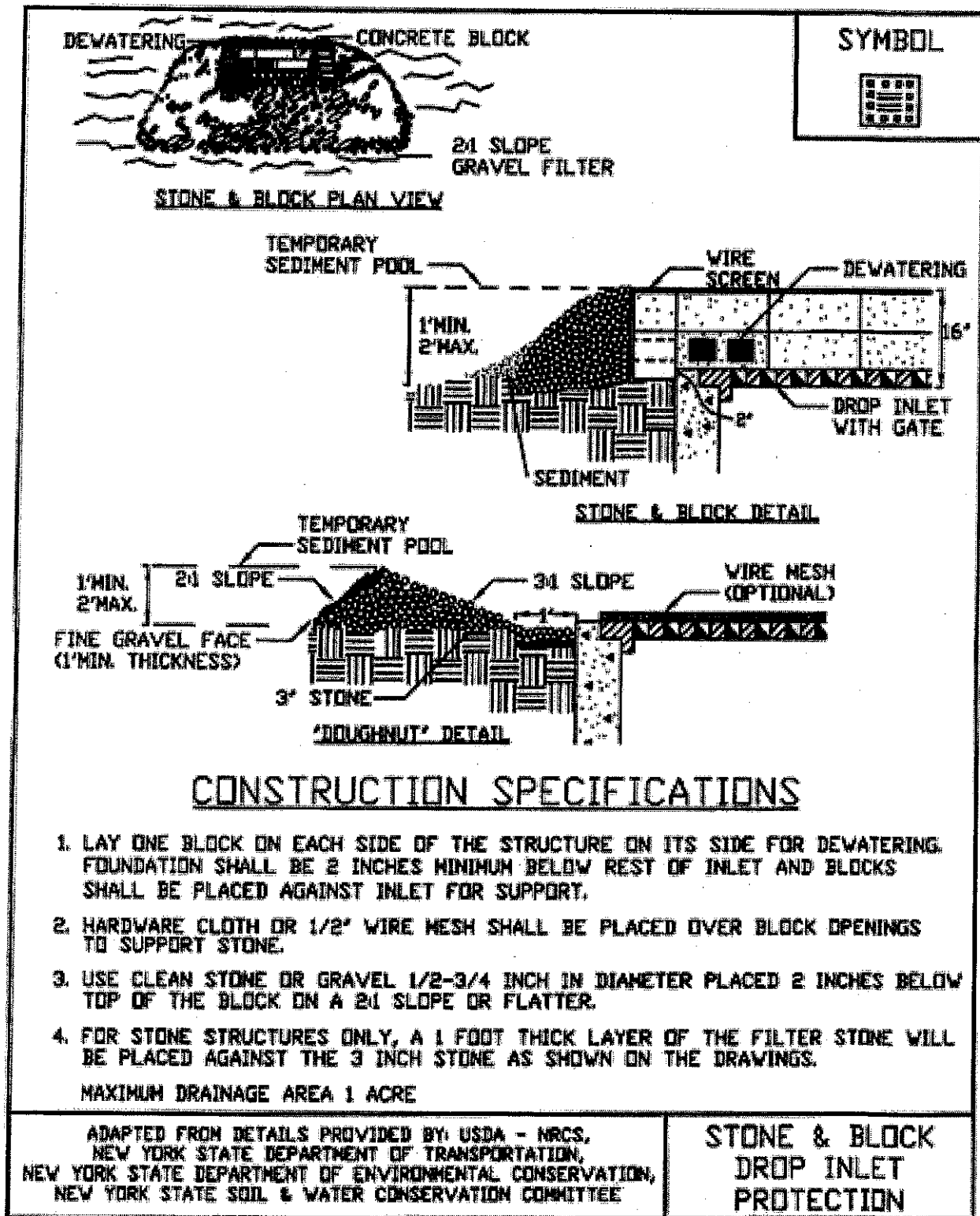


Figure 5.33
Stone & Block Drop Inlet Protection



Appendix I

SWPPP Acceptance Form



**Department of
Environmental
Conservation**

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

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

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information

1. Owner/Operator Name: **JOSEPH MARAIA**
2. Contact Person: **JOSEPH MARAIA**
3. Street Address: **19 LAUREL ROAD**
4. City/State/Zip: **NEW CITY, NY 10956**

II. Project Site Information

5. Project/Site Name: **DIANA PLACE**
6. Street Address: **249-259 MAIN STREET**
7. City/State/Zip: **NYACK, NY 10960**

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

8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:

IV. Regulated MS4 Information

11. Name of MS4:
12. MS4 SPDES Permit Identification Number: **NYR20A**
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

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

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).

Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

Appendix J

Post-construction Stormwater Maintenance Agreement

**DECLARATION OF COVENANT FOR THE ANNUAL INSPECTION AND MAINTENANCE
OF STORM WATER CONTROL FACILITIES**

DIANA PLACE

Site Plan for Diana Place

This Declaration of Covenant for the Annual Inspection and Maintenance of Storm Water Control Facilities (hereinafter sometimes referred to as "this Declaration and Agreement") dated as of the 24th day of March, 2020 by Joseph Maraia & Edward Mistretta whose address is 19 Laurel Road New City, NY 10956____ (hereinafter referred to as "Declarant" and/or "Facility Owner").

RECITALS:

WHEREAS, Joseph Maraia & Edward Mistretta is the owner of certain real property located in the Village of Nyack, County of Rockland, State of New York, being more particularly described on Schedule A annexed hereto and forming a part hereof and designated as Village of Nyack Tax Lot Section 65.44 Block 2 Lots 8 &9 (hereinafter referred to as the "Property"); and

WHEREAS, Declarant intends to develop the aforementioned property known as the "Diana Place" in accordance with, and pursuant to a certain Site Plan entitled Diana Place prepared by Bart M. Rodi - Engineer dated May 9, 2019 last revised _____ and which said Site Plan has received Final Site Plan Approval, Subject to Conditions, from the Village of Nyack Planning Board in its decision in PB #_____ (hereinafter referred to as the "Diana Place"); and

WHEREAS, as a condition of Final Site Plan Approval, the facility owner was required to create and declare a covenant providing for the annual inspection and maintenance of the storm water control facilities to be constructed upon the Property pursuant to Diana Place Site Plan (The "Facilities") and

WITNESSETH:

NOW, THEREFORE, the following covenants, restrictions, easements and agreements shall affect the Property:

1. The Facility Owner shall maintain, clean, repair, replace and continue the storm water control measures depicted in Diana Place Site Plan as necessary to ensure optimum performance of the measures to design specifications. The storm water control measures shall include, but shall not be limited to, the following: drainage ditches, swales, dry wells, seepage pits, ADS underground detention system, infiltrators, drop inlets, pipes, culverts, soil absorption devices and retention ponds.
2. The Facility Owner hereby designates Joseph Maraia, Business Address: 19 Laurel Road New City , NY 10956; Telephone No.: (646)739-9067 Cell Phone No.: (646)739-9067 as the Contact Person for all storm water related emergencies at the property and activities related to this agreement. It is the responsibility of the Facility Owner to advise the Village, in writing, of any change as to the name or contact information for the Contact Person.
3. The Facility Owner shall be responsible for all expenses related to the maintenance of the storm water control measures.
4. The Facility Owner shall provide for the periodic inspection of the storm water control measures, not less than once per calendar year, on or before **May 1 of every year** to determine the condition and integrity of the measures. The Facility Owner shall prepare and submit to the Village of Nyack (Building Department or such other Village department or representative as the Village may designate for such purpose) within thirty (30) days of the inspection, a written report of the findings, including recommendations for those actions necessary for the continuation of the storm water control measures. The submission to the Village shall be in the checklist form annexed hereto as Exhibit A, and any other supplements required by the Village.
5. The Facility Owner shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the storm water control measures except in accordance with written approval of the Village.
6. The Facility Owner shall undertake necessary repairs and replacement of the storm water control measures at the direction of the Village or as the Facility Owner may otherwise deem necessary.
7. This agreement shall be recorded in the Office of the County Clerk, County of Rockland at the sole cost and expense of the Facility Owner.
8. If ever the Village determines that the Facility Owner has failed to maintain the storm water control measures in accordance with the project plan or has failed to

undertake corrective action specified by the Village or by the inspecting engineer, the Village is authorized to undertake such steps as reasonably necessary for the preservation, continuation or maintenance of the storm water control measures and to affix the expenses thereof as a lien against the property. Failure to comply with the obligations under this Agreement shall be considered a violation of the Site Plan and Building Department Approvals for the subject site and the Village of Nyack may pursue all available legal and equitable remedies.

9. This Declaration and Agreement shall be governed by, construed, and enforced in accordance with, the laws of the State of New York.

10. This Declaration and Agreement shall inure to the benefit of the Village of Nyack and be binding upon, and may be enforced by, as applicable, the Village of Nyack, against the Declarant and/or the owners, from time to time, of the Property, as well as their respective heirs, distributees, successors and/or assigns, as well as those holding any interest or estate, or acquiring any subsequent possessory rights, therein, and shall be perpetual and deemed to run with the land.

It shall be the obligation of both the declarant and any heirs, distributes, successors and/or assigns to provide updates to the Village of Nyack as to any new or successor Facility Owner information and contact information for emergencies.

IN WITNESS WHEREOF, the Declarant, intending to be legally bound, has executed, or has caused this Declaration and Agreement to be executed by its authorized representative(s), as of the day and year first above written.

BY: _____

STATE OF NEW YORK
COUNTY OF ROCKLAND } ss.

On the _____ day of _____ in the year 20____, 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, that he is authorized to execute same in his capacity as set forth above, and that by his signature on the instrument, the individual, or the person or entity upon behalf of which the individual acted, executed the instrument.

Notary Public

SCHEDULE "A"

Diana Place

Exhibit A

Maintenance Inspection Checklists

Stormwater Maintenance and Management Inspection Checklist

Project Location: 249-259 Main Street

Site Status:

Date:

Time:

Inspector:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
A. Catch Basins / Field Inlets / Trench Drains/Seepage Pits (Annual, After Major Storms)		
1. Structure is sound		
2. Condition of concrete		
3. Settling at grate / leaves or silt at grate		
4. Floating or floatable debris		
5. Silt accumulation at sump		
6. Condition of piping in / out		

Comments:

Actions to be Taken:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
B. ADS HDPE Pipe & Outlet Structure (Annual, After Major Storms)		
1. Structure is sound		
2. Condition of concrete		
3. Condition of access cover		
4. Standing water		
5. Floating or floatable debris		
6. Silt accumulation >2" (must be cleaned)		
7. Condition of piping in / out		

Comments:

Actions to be Taken:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
C. Contech CD-5 (Annual, After Major Storms)		
1. Condition of manhole cover		
2. Floating or floatable debris		
3. Sediment and / or trash accumulation		

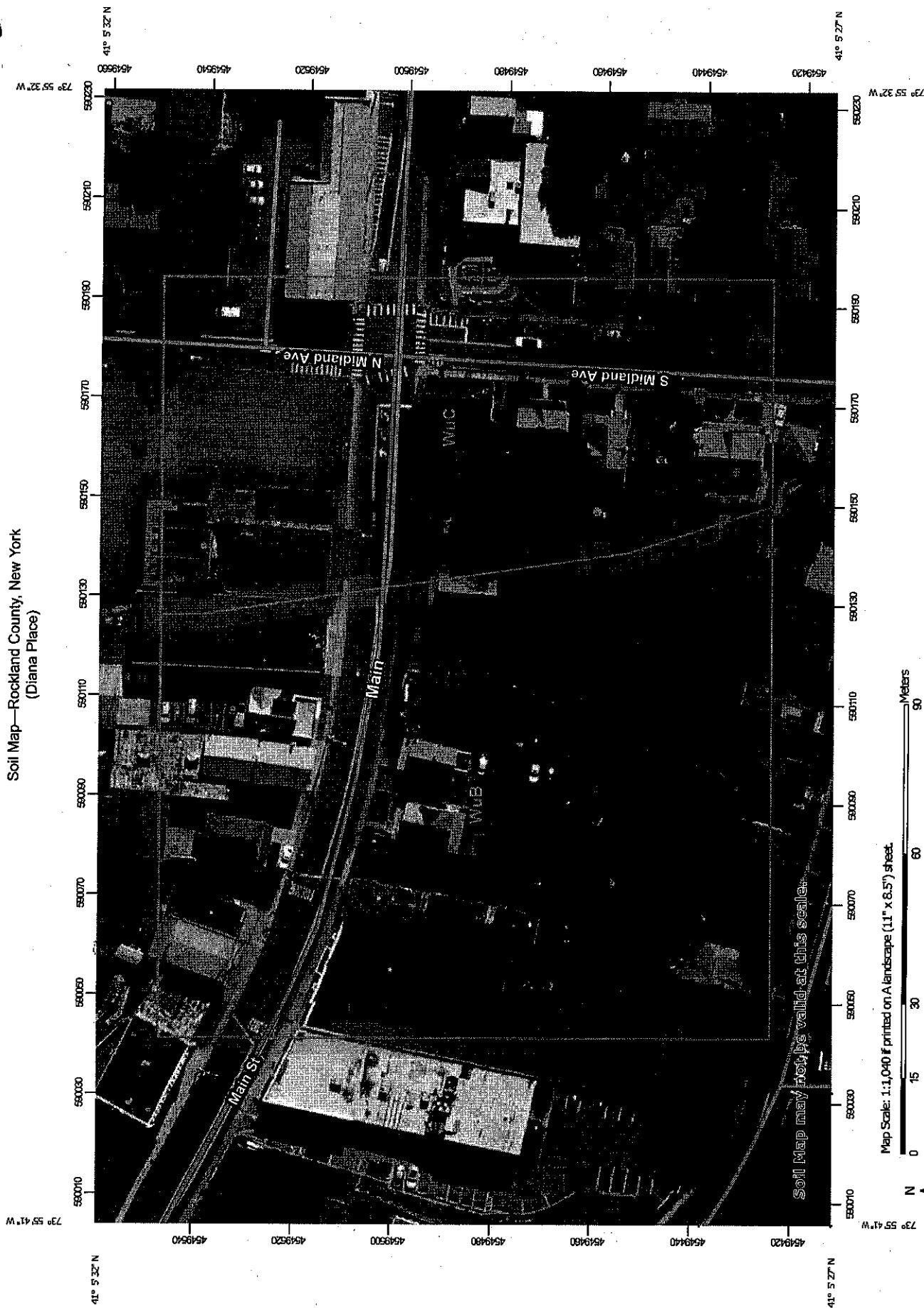
Comments:

Actions to be Taken:

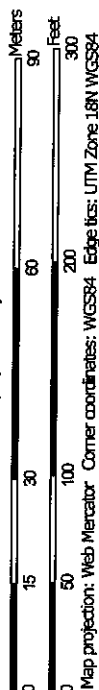
Appendix K

Soil Survey

Soil Map—Rockland County, New York
(Diana Place)



Map Scale: 1:1,040 if printed on A landscape (11" x 8.5") sheet.










































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

USDA
Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Area of Interest (AOI)		Stony Spot
	Soils		Very Stony Spot
	Soils		Wet Spot
	Special Point Features		Other
	Blowout		Special Line Features
	Borrow Pit		Streams and Canals
	Clay Spot		Transportation
	Closed Depression		Rails
	Gravel Pit		Interstate Highways
	Gravelly Spot		US Routes
	Landfill		Major Roads
	Lava Flow		Local Roads
	Marsh or swamp		Background
	Mine or Quarry		Aerial Photography
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockland County, New York
Survey Area Data: Version 17, Sep 16, 2019

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WuB	Wethersfield-Urban land complex, 2 to 8 percent slopes	2.8	61.1%
WuC	Wethersfield-Urban land complex, 8 to 15 percent slopes	1.8	38.9%
Totals for Area of Interest		4.7	100.0%

Rockland County, New York

WuB—Wethersfield-Urban land complex, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9v5p
Mean annual precipitation: 47 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Wethersfield and similar soils: 50 percent
Urban land: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wethersfield

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy acid till derived mainly from reddish sandstone, shale, and conglomerate, with some basalt

Typical profile

H1 - 0 to 13 inches: gravelly silt loam
H2 - 13 to 22 inches: gravelly loam
H3 - 22 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 38 inches to densic material
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Minor Components

Wallington

Percent of map unit: 5 percent

Hydric soil rating: No

Cheshire

Percent of map unit: 5 percent

Hydric soil rating: No

Riverhead

Percent of map unit: 5 percent

Hydric soil rating: No

Charlton

Percent of map unit: 5 percent

Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rockland County, New York

Survey Area Data: Version 17, Sep 16, 2019

Appendix L

Percolation Test Results

DANIEL G. LOUCKS, P.E.
G E O T E C H N I C A L E N G I N E E R I N G ,

10 March 2020

Allied Drilling Inc
PO Box 118
Sparkill, New York 10976

Re: Infiltration Testing For 249 - 259 Main Street, Nyack, New York
File No. 3581

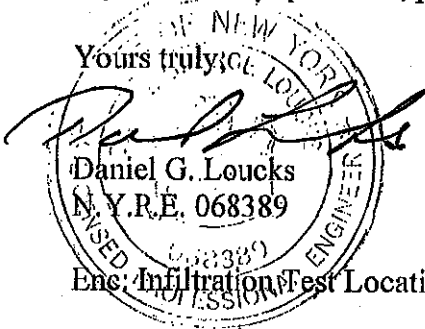
I have enclosed the additional infiltration test results for the referenced project. One soil boring was performed at the staked location by Allied Drilling Inc. They installed, 4 inch diameter solid steel casing in one boring hole to perform the infiltration testing in accordance with NYSDEC Stormwater Appendix D guidelines.

One boring was performed in an adjacent hole, where groundwater was encountered at approximately 9.0 feet below existing grade. The infiltration testing was performed, in a second hole, at a depth of 4 feet and a ground surface elevation of approximately 176 ft. The hole was presoaked approximately 24 hours before the infiltration testing was performed. The infiltration test consisted of filling the PVC pipe with 24 inches of water and then recording the drop in water level over a one hour time. This procedure was repeated 3 times.

The infiltration testing showed that in the first hour the water level dropped 10.0 inches, in the second hour it dropped 11.0 inches and in the third hour it dropped 10.5 inches.

If you have any questions, please call.

Yours truly,



Enc: Infiltration Test Location Diagram

Appendix M

**SWPPP
Certification Forms**

STORMWATER POLLUTION PREVENTION PLAN

INSPECTOR'S CERTIFICATION

I have agreed to perform compliance inspections for the 51 Route 9W project (including Site Stabilization) in accordance with this Storm Water Pollution Prevention Plan (SWPPP)

I have agreed to notify, within one business day of completion of the inspection, the owner, the contractor, and appropriate subcontractor(s) of any corrective measures that need to be taken and also obtain a schedule of completion for such measures.

I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for conducting the required inspections.

Printed Name _____ Title _____

Signature _____ Date _____

Firm _____

Address _____

Phone _____

Field Person in Charge _____

Phone _____

STORMWATER POLLUTION PREVENTION PLAN

CONSTRUCTION CONTRACTOR'S/SUB-CONTRACTOR'S CERTIFICATION

CONTRACTOR CERTIFICATION

I certify under penalty of law that I understand and agree to comply with the terms and conditions of SWPPP for the construction site identified in such SWPPP as a condition of authorization of discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollution 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.

CONTRACTOR/SUB-CONTRACTOR

Printed Name

Title

Signature

Date

Company Name

Address

Phone

Field Person in Charge

Phone



Department of
Environmental
Conservation

SWPPP Preparer Certification Form

*SPDES General Permit for Stormwater
Discharges From Construction Activity
(GP-0-20-001)*

Project Site Information

Project/Site Name

Diana Place

Owner/Operator Information

Owner/Operator (Company Name/Private Owner/Municipality Name)

Joseph Maraia

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Bart

First name

M

MI

Rodi

Last Name

Signature

Date



Department of
Environmental
Conservation

Owner/Operator Certification Form

SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001)

Project/Site Name: Diana Place

eNOI Submission Number: _____

eNOI Submitted by: ☐ Owner/Operator ☐ SWPPP Preparer ☐ Other

Certification Statement - Owner/Operator

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

Owner/Operator First Name

M.I. Last Name

Signature

Date