Stormwater Pollution Prevention Plan (SWPPP)

The Masters School
Innovation and Entrepreneurship Center

Dobbs Ferry, New York

Gonzalo M. Trenosky, PE, LEED AP
Associate Engineer

PREPARED FOR:

Ms. Jennifer Olson, AIA, LEED AP
MARVEL
145 Hudson Street
New York, NY 10013

PREPARED BY:

MFS Consulting Engineers & Surveyor, DPC
320 Fifth Avenue, Suite 1102
New York, NY 10001

T: (908) 922-4622
F: (866) 517-7413

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EXECUTIVE SUMMARY

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the construction of the proposed site development at 49 Clinton Avenue (The Masters School Innovation and Entrepreneurship Center), a 96-acre college preparatory campus in the village of Dobbs Ferry, Westchester County, New York.

As described in Appendix B, Table 2 of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (Permit No. GP-01-20-001), this SWPPP will include Cost-Construction Stormwater Management Practices.

The SWPPP describes practices and procedures required to prevent pollutants from entering the waters of the United States via stormwater runoff. The stormwater management design and erosion control plan for the project were prepared using criteria established in the New York State Standards and Specifications for Erosion and Sediment Control.

SITE OWNER

Owner

The Masters School
49 Clinton Avenue
Dobbs Ferry, NY 10522

Contact

Seth Marx
Director of Institutional Advancement
The Masters School
49 Clinton Avenue
Dobbs Ferry, NY 10522
+1 (914)-479-6527
seth.marx@mastersny.org

CONSTRUCTION MANAGER/OPERATOR

The construction manager for the construction activities is responsible to install and maintain all stormwater pollution prevention measures proposed in the plan.

Construction Manager

Yorke Construction Corporation
140 West 31st Street, 4th Floor
New York, NY 10001
+1 (212)-564-8467

Contact

Artie Pearsall
Project Manager
Yorke Construction Corporation
140 West 31st Street, 4th Floor
New York, NY 10001
+1 (212)-564-8467 ext. 117 (Office)
+1 (917)-817-5478 (Cell)
artie@yorkeconstruction.com

SWPPP DEVELOPMENT, REVIEW, AND UPDATE

SWPPP DEVELOPMENT

This SWPPP was developed in accordance with accepted engineering practices and provides the following:

- Offers protective measures to minimize sediment transport during construction activities.
- Describes the implementation of control measures that are to be used to reduce pollutant loadings from stormwater runoff during construction activities.
- Identifies potential sources of stormwater pollution from the construction site.

SWPPP REVIEW

This SWPPP will be kept on-site and will be made available for review by the designer, construction manager, subcontractors, and applicable federal, state, and local regulatory agencies that have jurisdiction over the construction site. If necessary, any of these regulatory agencies may notify the owner that the SWPPP is not in compliance with required regulations. If the SWPPP is in need of revision, the construction manager of the project will make the required revisions to the SWPPP within 7 days of notification by the regulatory agency. In addition, the construction manager will submit a written certification that the revisions have been made and will be implemented.

SWPPP UPDATE

When deemed necessary, the owner or construction manager may amend this SWPPP by making a change in design, construction, operations, maintenance, or other item that has an effect on the potential for discharge of pollutants from stormwater runoff associated with the construction activities. Amendment of the SWPPP by the owner or construction manager may also be deemed necessary under the following conditions:

- Field conditions render the erosion and sediment control measures to be ineffective in minimizing pollutants from stormwater discharges.
- To identify a new contractor that will implement any measure of the SWPPP.

The revised SWPPP should be marked as such with the revision date and shall be distributed by the owner or construction manager to the relevant parties.

EXISTING CONDITIONS

PROPERTY INFORMATION

The Masters School campus is presently comprised of several parcels. The proposed improvements ("Project Site") are located within Dobbs Ferry Parcel ID 3.90-66-1, which is bounded as listed below.

- To the north, by Dobbs Ferry Parcel ID 3.80-47-4.
- To the west, by private property (including Dobbs Ferry Parcel ID 3.80-46-3, 3.80-46-2 and 3.80-46-1) and Clinton Avenue.
- To the south, by Dobbs Ferry Parcel ID 3.120-111-1 and 3.171-153-5.
- To the east, by private property (including Dobbs Ferry Parcel ID 3.90-56-5, 3.90-56-6, 3.90-56-7, 3.90-56-8, 3.90-56-9, 3.90-63-5, 3.90-63-6, 3.90-63-7, 3.90-63-8, 3.90-63-9, 3.90-63-10, 3.90-63-11 and 3.90-63-12) and Estherwood Avenue.

The project site area that will be disturbed by the proposed improvements is approximately 0.83 acres. The site receives minimal tributary waters and is tributary to the Hudson River. It has been determined through site investigations performed by a licensed professional engineer of the State of New York that no surface waters or wetlands are present at the site.

The project site is not located in a Critical Environmental Area (CEA), per the New York State Department of Environmental Conservation Westchester County. A copy of the map is included with this submission for your reference.

EXISTING SITE DESCRIPTION

The project site is primarily grassed lawn, with the following neighboring existing features.

- Athletic Field for Softball, Soccer and Shot-Put
- Athletic Field Accessories (inc. fencing, benches, metal storage containers and net cages)
- Thirty-three (33) parking spaces
- Landscaping

A survey dated January 17, 2021, and prepared by Kenneth B. Salzmann, Land Surveyor is included for your reference.

The site topography generally slopes from south to north with a man-made steep-sloped area (20% - 28% grade) to accommodate the softball outfield along the west side of the project site and gentle slopes (4%-7% grade) within the remainder of the project site.

EXISTING UTILITIES

The site has the following existing subsurface utilities.

- Steam & return service lines
- Water valves & service lines (incl. abandoned)
- Electrical manholes & service lines
- Telecommunications manholes & service lines
- Sanitary sewer manholes & service lines
- Gas service lines (incl. abandoned)
- Fire hydrant

EXISTING SOIL CONDITIONS

Based on the Web Soil Survey by the Natural Resources Conservation Society, soils at the site are generally described as Paxton fine sandy loam (±0.83 acres) encompassing the entire area. The Paxton fine sandy loam (PnB) has a hydrologic soil group designation of 'C.' A 'C' classification is defined as a material with the moderately high runoff potential and low infiltration rates. Infiltration tests performed in the location of proposed stormwater management confirm that the soils have suitable infiltration rates for management practices, see Appendix.

The Soil Survey Map is included with this submission for your reference.

PROPOSED CONDITIONS

Proposed improvements for the project site include construction a new two-story 6,080-sf academic building with two (2) entrance paver patios, site walkways, driveway, and ADA-accessible parking spaces; along with associated utilities including one (1) new transformer with concrete pad, one (1) new emergency generator with concrete pad, condensing units with concrete pad, and necessary relocation and/or realigned of existing utilities; site regrading, landscaping, bioretention, underground stormwater management chambers, and associated structures and piping. Site regrading is proposed where necessary for drainage and aesthetic purposes.

A more detailed explanation of the proposed site improvements is listed below. The work is categorized by the type of site features proposed for the project site within the limits of disturbance: Building & Access, Utilities, and Grading & Drainage.

BUILDING & ACCESS

Innovation & Entrepreneurship Center (IEC)

The proposed two-story building will be bounded by a footprint of approximately 6,080 square feet. Two (2) proposed paver patios will serve as access to the IEC building at the north and south entrances. A proposed asphalt walkway will encompass the perimeter of the IEC building and paver patios in order to provide ADA-compliant pedestrian access from Cochrane Avenue.

UTILITIES

Relocated Utilities

- Steam & Condensate Return – to be rerouted along the western side of the project site, between the proposed IEC Building and the western asphalt walkway.
- Sanitary Sewer – to be rerouted along the western side of the project site, from the existing manhole adjacent to the southern proposed paver patio to the existing manhole within the proposed northern patio area. Two (2) sanitary sewer manhole are proposed at the northern end of the building within the landscaping. Additionally, one (1) existing sanitary sewer service from the eastern side of the property will be relocated around the northeastern area of proposed development and tied into the existing sanitary line to the north.
- Water – to be realigned along the western side of the project site and run north, parallel to the western face of the proposed IEC building. One (1) proposed 3-inch domestic service and one (1) proposed 6-inch fire service lines are to run from the realigned service line to the southwestern corner of the IEC building.
- Electrical – to be realigned along the western side of the project site, from the existing manhole adjacent to the southern proposed paver patio, around the perimeter of the proposed IEC building, to the existing electrical manhole at the northern end of the site. Additionally, one (1) proposed electrical connection will be installed to provide service from the proposed emergency generator at the northern end of the project site to the northern face of the IEC building. Furthermore, one (1) proposed electrical connection will be installed to provide service from the proposed transformer at the southern end of the project site to the eastern face of the IEC building.
- Telecommunications – to be rerouted along the western side of the project site, from the existing manhole adjacent to the southern proposed paver patio to the existing manhole in the landscaped area at the northern end of the project site.
- Gas – to be realigned at a point from the western side of the project site to a point on the existing gas service line at the northern end of the project site.

GRADING & DRAINAGE

Stormwater Chambers

One (1) proposed ADS Stormtech stormwater infiltration chamber system below the northern paver patio will serve as the project site's stormwater detention facility. The chamber system will feature fourteen (14) infiltration chambers, with a mandatory isolation row for maintenance.

Additionally, underdrains are to be installed within the proposed bioretention area at the northern end of the project site. All stormwater from the proposed IEC building and bioretention area will collect via underground pipe to the proposed infiltration chamber system. The chamber system will include two (2) manhole structures; one (1) for all stormwater entering, and one (1) for all stormwater conveyed out to the existing corner curb inlet, east of the project site.

STORMWATER MANAGEMENT

The following information details the stormwater management systems designed to collect and infiltrate stormwater from the proposed impervious areas. Regrading is proposed to promote overland flow and minimize channeling while maintaining existing drainage courses.

Existing drainage patterns convey a tributary area of approximately 1.0 acres to the new building area, and is graded to generally split drainage between two drainage areas. Drainage area one flows overland towards the Carriage House and ultimately splits between flow into the wooded area east of the House, and flow along the circulation road towards the track and Estherwood Avenue. Drainage area two overland to a catch basin in the parking area just north of the Middle School, ultimately being conveyed via pipes to precast drywells in the adjacent lawn. Refer to Existing Drainage Area Map, attached.

Proposed drainage pattern conveys to the extent practicable a tributary area of approximately 1.19 acres, with site drainage being routed to the on-site bioretention basin, and roof drainage routed into the proposed subgrade stormwater chambers. Refer to Proposed Drainage Area Map, attached.

TABULAR SUMMARY OF STORMWATER RUNOFF CONDITIONS

PRE VS POST STORMWATER RUNOFF RATES AND VOLUMES		
	PRE *Node: Pre-Existing Composite*	POST *Node: 7L Composite*
1-YR RAINFALL = 2.93 INCHES (Type III 24-hr)		
FLOW	0.99 CFS	0.00 CFS
VOLUME	0.078 AF	0.000 AF
10-YR RAINFALL = 5.53 INCHES (Type III 24-hr)		
FLOW	3.51 CFS	2.66 CFS
VOLUME	0.258 AF	0.153 AF
25-YR RAINFALL = 6.75 INCHES (Type III 24-hr)		
FLOW	4.81 CFS	3.97 CFS
VOLUME	0.355 AF	0.247 AF
100-YR RAINFALL = 8.63 INCHES (Type III 24-hr)		
FLOW	6.88 CFS	6.64 CFS
VOLUME	0.512 AF	0.404 AF

SIX STEP PROCESS FOR STORMWATER SITE PLANNING AND PRACTICES SELECTION

The NYS Stormwater Management Design Manual (SMDM) requires a six-step process to integrated site planning, green infrastructure, and stormwater management practices.

1. Site Planning

Reduction of impervious cover, preservation of natural areas…

Preservation of Natural Resources

- **Locating Development in Less Sensitive Areas**
  This project is designed to avoid sensitive resource areas such as nearby mature forests and critical habitats by locating development to fit within unused grass lawn.
- **Reduction of Clearing & Grading**
  This project is design within a compact footprint for all necessary foundations, utility relocations, site utilities, and stormwater management design.

Reduction of impervious coverage includes:

- **Roadway Reduction**
  This project is designed within an existing campus and requires no new roadway for access, although a small driveway is provided for maintenance access.
- **Building Footprint Reduction**
  This project is designed within a compact footprint and low elevation-view exposure by nestling into a slope and incorporating a cellar level.

2. Calculate initial required Water Quality Volume for the site.

P =	1.5	*In*
A =	1.19	*ac*
Ai =	0.28*	*ac* *This reflects a reduction of 100sf per tree (24 trees proposed)*
I =	24	%
Rv =	0.262	

WQv =	0.0389	*af*
	1696	*cf*

3. Runoff Reduction Volume (RRv)

Provide Runoff Reduction by incorporating green infrastructure techniques and standard stormwater management practices (SMP) with Runoff Reduction Volume (RRv) capacity.

The full WQv of 1,696-cf is proposed for infiltration through green infrastructure and standard SWPs, which are capable of infiltrating 3,474-cf.

4. **Calculate minimum RRv required.**

   The full WQv of 1,696-cf is proposed for infiltration through green infrastructure and standard SWPs, which are capable of infiltrating 3,474-cf.

5. **Provide standard SMPs**

   Provide standard SMPs to treat remaining portion of water quality volume (WQv) not addressed by green infrastructure and standard SMPs with RRv capacity.

   Bioretention infiltration and underground detention chambers are proposed for stormwater infiltration of the WQv.

6. **Provide volume and peak rate control practices where required.**

   Underground detention chambers and restricted-flow outlet control structure are proposed for peak and volume reduction of 1-, 10-, and 100-year storms.

CHANNEL PROTECTION VOLUME (CPV)

The CPv criteria is intended to protect stream banks from erosion, and will be demonstrated by provided 24 hour extended detention of the Type III 1-year, 24-hour storm event. The CPv requirement does not apply in certain conditions, including where Reduction of the entire CPv volume is achieved at a site through green infrastructure or infiltration.

This project proposes infiltration of the entire CPv (3,412-cf) via the bioretention infiltration and the underground infiltration chambers, which are capable of infiltrating 3,474-cf of stormwater.

P = 2.93” **Q** = 1.32” **CN** = 81 **Tc** = 9.1min **A** = 1.19ac **qu** = 550csm/in **qo/qi** = 0.04

OVERBANK FLOOD CONTROL (QP)

The Qp criteria is intended to prevent and increase in frequency and magnitude of out-of-bank flooding generated by new development, and will be demonstrated by attenuating the Type III 10-year, 24-hour peak discharge rate to pre-development conditions.

This project achieves attenuation of the Type III 10-year, 24-hour peak discharge rate to pre-development conditions.

Qpre = 3.51 cfs **Qpost** = 2.66 cfs

EXTREME FLOOD CONTROL (QF)

The Qf criteria is intended to prevent the increased risk of flood damage from large storm events, maintain the boundaries of pre-development conditions, and protect the physical integrity of stormwater management practices. It will be demonstrated by attenuating the Type III 100-year, 24-hour peak discharge rate to pre-development conditions.

This project achieves attenuation of the Type III 100-year, 24-hour peak discharge rate to pre-development conditions.

Qpre = 6.88 cfs **Qpost** = 6.64 cfs

SOIL EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

Temporary soil erosion and sediment control measures have been applied to this site to minimize the amount of sediment carried by stormwater runoff and truck hauling during construction activities. The soil erosion and sediment control measures have been designed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (July 2016). The following summarizes the planned soil erosion and sediment control practices as shown on Sheet C-400.

SOIL EROSION AND SEDIMENT CONTROL PRACTICES

- Silt Fence: Silt fence shall be installed around topsoil stockpile area.
- Surface Stabilization: Surface stabilization will be accomplished with vegetation and mulch. Roadway and building base courses will be installed as soon as finished grade is reached.
- Inlet Protection: Inlet protection shall be installed at all stormwater inlets receiving runoff from disturbed areas of the site.
- Temporary Tree Protection: Where applicable, 6.0-foot-high protective fence will be erected around the dripline of trees that are to remain to prevent damage during construction.
- Stabilized Construction Entrance: A temporary stabilized construction entrance shall be installed for access to and from the construction site. Wash-down water and runoff from the construction entrance shall be directed to the appropriate soil erosion and sediment control measures.
- Staging and Laydown Areas: Staging and laydown areas for vehicles and equipment shall be located on stabilized portions of the site. Vehicles and equipment shall be washed down in stabilized areas prior to exiting the site.
- Dust Control: Should excessive dust be generated; it shall be controlled by sprinkling.

- Erosion Control Blanket: Temporary biodegradable erosion control blankets will be installed along the disturbed steep-slope areas. Install per manufacturer's specification.
- Grading: The maximum created slope is limited to 2' horizontal to 1' vertical. Refer to the Grading Plan (Sheet C-600) for details of design slopes.

CONSTRUCTION SCHEDULE

This construction schedule has been prepared to clearly outline the construction and the implementation of the soil erosion and sediment control measures.

1. Obtain all required village, town, city, county, state, and federal permits, and approvals prior to commencing earthwork.
2. Install erosion and sediment perimeter controls, such as construction fence and stabilized construction entrances, as shown on the Construction Access Plan Sheet C-502 prior to any site disturbances.
3. If required, install excavation support, and begin foundation excavation.
4. Sprinkle areas of exposed soil to control dust, as necessary.
5. Complete excavation, utility installation, and rough grading.
6. Soil erosion features shall remain in place until after construction is completed and final stabilization is reached. Only after the site is stabilized, remove temporary erosion and sediment control structural measures. "Stabilized" shall be defined as a 70% uniform perennial vegetative cover in all unpaved areas and areas not covered by permanent structure.

STAGING AREAS

Locations for contractor stockpiling and staging will be on-site. The approximate limits of these areas are shown on the Construction Access Plan (Sheet C-502).

VEGETATIVE PLAN

The contractor shall initiate surface stabilization measures as soon as practical in portions of the site where construction activities have permanently ceased and in no case more than 14 days after construction activity in that portion of the site has temporarily ceased. Areas to be seeded are referred to as disturbed areas. Refer to Landscape Planting Plan (Sheet L-400) for permanent seeding.

<u>For Temporary Seeding and Mulch:</u>

1. The altered areas that have been final-graded are to be seeded to establish a permanent ground cover with little or no maintenance. A side mixture of bluegrass (88%) and redtop (12%) or some other species shall be applied at a rate of 40lbs per acre, to a prepared ground surface which includes lime and fertilizer at a rate indicated by soils tests.
2. Rake the seed into the soil and lightly pack to establish good contact.

3. Mulching will be used as an aid in establishing vegetation. Straw or hay mulch will be applied at a rate of 3 tons per acre, in areas where mulching is required. Wood cellulose fiber will be applied at a rate of 1500lbs per acre.
4. Seed and mulch fill slopes in regular vertical increments of 15-feet immediately upon placement.
5. Planting Times
    a. Sod: May be laid at any time except during the months of June and July, provided that the ground is not frozen.
    b. Seed: May be laid between March 15 and May 1, and between August 15 and October 1.

Seeding Bed Preparation:

1. Clear the sub-soil upon which topsoil is to be placed of all stones, woody roots, rubbish, and other objectionable matter, scarify the surface thoroughly and loosen to a depth of at least 4"; spread the topsoil to a smooth even surface and to the depth required, then rake or otherwise manipulate to form smooth drainage grades to the levels shown on the Grading Plan (Sheet C-600).
2. Deposit topsoil and spread to a minimum depth of 8" over earth where seeded and sodded areas are indicated, 12" where ground cover areas are indicated, 18" over rock where seeded, sodded or ground cover areas are indicated, and to a minimum depth of 18" over earth, and 36" over rock where planted, garden or shrubbery areas are indicated on the Landscape Planting Plan (Sheet L-400).

For Permanent Seeding:

1. The altered areas that have been final-graded are to be seeded to establish a permanent ground cover with little or no maintenance. A side mixture of bluegrass (88%) and redtop (12%) or some other species shall be applied at a rate of 40 lbs. per acre, to a prepared ground surface which includes lime and fertilizer at a rate indicated by soils tests.
2. Mulching will be used as an aid in establishing vegetation. Straw or hay mulch will be applied at a rate of 3 tons per acre, in areas where mulching is required. Wood cellulose fiber will be applied at a rate of 1500lbs per acre.
3. Lime and fertilizer for all the listed seed mixes shall be applied according to the following rates (per acre) for the development. Fertilizer is to be applied at a rate of 1000 lbs./acre.
    a. 6 tons agricultural lime
    b. 100 lbs. N
    c. 200 lbs. P_2O_5
    d. 200 lbs. K_2O
4. Planting Times

a. Sod: May be laid at any time except during the months of June and July, provided that the ground is not frozen.

b. Seed: May be laid between March 15 and May 1, and between August 15 and October 1.

Maintenance:

1. The contractor may be directed to reseed any areas which, in the opinion of the engineer are unacceptable.
2. The contractor shall adequately maintain the erosion control cover, including watering, as necessary.
3. If the growth is inadequate for erosion control, the contractor shall overseed using half the rate of seed originally applied.
4. If the grass seed growth is over 60% damaged, reseed at the originally specified rate.

SOIL RESTORATION REQUIREMENTS

This project shall comply with NYS DEC requirements for soil restoration, as noted in the Stormwater Management Design Manual Table 5.3 and summarized below.

DEC STORMWATER MANAGEMENT DESIGN MANUAL TABLE 5.3 SOIL RESTORATION REQUIREMENTS		
TYPE OF SOIL DISTURBANCE	SOIL RESTORATION REQUIREMENT	COMMENTS/EXAMPLES
No soil disturbance	Restoration not permitted	Preservation of Natural Features
Minimal soil disturbance	Restoration not required	Clearing and Grubbing
Areas where topsoil is stripped only – no change in grade	HSG C: Aerate and apply 6-in of topsoil	Protect area from ongoing construction activites
Areas of cut or fill	HSG C: Apply full soil restoration (per Deep Ripping and De-compaction, DEC 2008)	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not wthin a 5-ft perimeter around foundation walls)	Apply full Soil Restoration (per Deep Ripping and De-compaction, DEC 2008)	
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.*

MAINTENANCE PROGRAM

The construction manager shall be responsible for the installation and maintenance of all temporary erosion and sediment control measures. A log shall be kept, documenting the maintenance of the control measures. Inspections shall be done under the supervision of a licensed Professional Engineer or Landscape Architect, or a Certified Professional in Erosion and Sediment Control.

All maintenance methods described below are in direct accordance with the New York State Standards and Specifications for Erosion and Sediment Control (July 2016).

1. The contractor shall be responsible for the proper construction, stabilization, and maintenance of all temporary erosion and sedimentation control measures and related items included within this plan.
2. Soil sediment removed from any temporary soil erosion and sediment control measure during regular maintenance shall be incorporated back into the earthwork as fill on the site. Soil sediment materials shall be distributed on-site without changing drainage patterns during a specific construction stage.
3. All erosion and sediment control practices shall be inspected for stability and operation within 24 hours of every 0.5-inch or greater rainfall, but in no case less than once in a seven-day period. Any needed repairs shall be made immediately to maintain all practices as designed. A Construction Duration Inspections form is included in Appendix B and shall be completed and inserted into this SWPPP after each inspection.
4. Sediment shall be removed from behind the silt fence when it reaches 0.5-feet deep at the silt fence. The silt fence shall be repaired as necessary to maintain a barrier.
5. Debris and litter shall be removed from the site on a monthly basis, or more frequently if necessary.
6. Construction equipment and vehicles within the work area shall be properly maintained and inspected for leaking, particularly for identification of vehicles leaking petroleum products that may enter adjacent stormwater drainage facilities.
7. All seeded areas shall be fertilized, reseeded, and mulched as necessary to maintain a vigorous, dense vegetative cover.

NON-STORMWATER DISCHARGES

Possible sources of non-stormwater discharges associated with the construction activity are identified below. The following are additional stormwater pollution prevention measures for non-stormwater discharges.

- Cleaning water for construction vehicles and equipment shall be diverted to the temporary and approved erosion and sediment control measures. Chemicals and detergents shall not be used.

- The construction manager is to coordinate with the owner for identifying areas on-site for construction vehicle transit (i.e., haul roads, contractor trailers and parking areas, etc.) or equipment staging which shall be monitored and where runoff can be controlled.
- Water used for dust control measures shall be applied using proper quantities and equipment. No chemical additives shall be used.
- Water service flushing, hydrostatic test water, fire test water, and chlorination test water shall be directed to the control measures on the site. Turbid water is to be detained to allow sufficient sedimentation time (minimum of 24 hours). Chlorinated water is to be detained until the water is dechlorinated (minimum of 24 hours).
- Concrete trucks shall be washed out in an area approved of by the owner or owner's representative. All runoff from these activities shall be directed to the on-site control measures.

STORAGE PRACTICES

The following is a description of additional controls and measures that are to be implemented at the site by the general contractor to minimize pollutant transport.

- Solid waste disposal dumpsters and containers are to be covered and emptied regularly. Solid waste is to be disposed of properly in accordance with local regulations.
- Portable toilets are to be installed and cleaned regularly with their contents properly disposed of.
- Building materials are to be properly stored and contained on-site.

SPILL PREVENTION PRACTICES

The following are material management practices that are to be used by the general contractor to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff during construction. These are a minimum as per the following environmental documents in effect on site: (BUD) - Beneficial Use Determination, (HASP) - Health and Safety Plan, and (RAWP) - Remedial Action Work Plan. The stricter shall govern.

- Materials stored on-site with potential for spillage are to be stored in a neat and orderly manner in their appropriate containers. Materials with a potential for spillage shall be stored under a roof or other enclosure when possible.
- Products are to be kept in their original containers with the original manufacturer's label.
- Substances are not to be mixed with one another unless recommended by the manufacturer.

- Prior to disposal, a product is to be completely used up or its container is to be resealed whenever possible.
- Manufacturers' recommendations for proper use and disposal are to be followed.
- During periodic inspections, the proper use and disposal of materials is to be recorded on the inspection form.
- On-site vehicles are to be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage of petroleum products. Petroleum products are to be stored in closed containers that are clearly labeled. Used oils are to be disposed of properly.
- Materials are to be brought on-site in the minimum quantities required to limit on-site storage.
- Paint containers are to be tightly sealed and properly stored when not required for use.
- Excess paint, solvents, and other similar products shall not be discharged to the storm sewer system. These items are to be properly disposed of according to manufacturers' instructions or state and local regulations.
- Proper precautions are to be taken so materials do not spill onto public thoroughfares. If materials are spilled in these areas, they are to be removed immediately so that they do not enter the surface and subsurface drainage systems.
- Oil containers are to have appropriate secondary containment. If total oil storage on-site exceeds a cumulative total of 1,320 gallons, then a Spill Prevention Control and Countermeasure (SPCC) plan must be prepared by the owner.
- If necessary, the contractor is to prepare a SPCC plan to cover proposed activities.

SPILL CONTROL PRACTICES

The following practices are to be adhered to by the general contractor for spill prevention and cleanup:

- Spills of petroleum, toxins, or hazardous material are to be reported to the owner and appropriate state or local government agencies immediately, regardless of size.
- Manufacturers' recommended methods for spill cleanup are to be clearly posted at the site. Site personnel are to be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup are to be kept in designated material storage areas on-site. Equipment and materials are to include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, spill control materials, sand, sawdust, and trash containers specifically for this purpose.

- Spills are to be cleaned up immediately after discovery.
- The spill area is to be kept well ventilated and personnel are to wear appropriate protective clothing to prevent injury from contact with hazardous substances.
- A spill report is to be completed and filed in the SWPPP and is to include a description of the spill, the cause of the spill, and the corrective actions taken.

INSPECTION DURING CONSTRUCTION

SPDES GENERAL REQUIREMENTS AND GUIDELINES

The SPDES General Permit for Construction Activity GP-0-20-001 outlines the following requirements and guidelines for inspections during construction:

The owner or operator shall have a qualified professional conduct a site inspection at least once every seven calendar days. Qualified professional 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), licensed Landscape Architect, or other NYSDEC (Department) endorsed individuals. It also means someone working under the direct supervision of the licensed Professional Engineer or licensed 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 an individual performing a site inspection has received four hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESP, Inc. or other Department-endorsed entity in proper erosion and sediment control principles no later than two years from date this general permit is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four hours of training every three years.

At a minimum, the qualified professional shall inspect all soil erosion and sediment control practices 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, and all points of discharge from the construction site.

The qualified professional shall prepare an inspection report subsequently to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

1. Date and time of inspection;
2. Name (printed and signed) and title of the person(s) performing inspection;
3. A description of the weather and soil conditions (e.g., dry, wet, saturated) at the time of the inspection;
4. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the

construction site. Include discharges from conveyance systems (i.e., pipes, culverts, ditches, etc.) and overland flow;

5. A description of the condition of all, natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody;
6. Identification of all erosion and sediment control practices that need repair or maintenance;
7. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;
8. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;
9. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;
10. Corrective action(s) that must be taken to install, repair, replace, or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and
11. 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 on site within seven 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.

Within one business day of the completion of an inspection, the qualified professional shall notify the owner or operator and the appropriate 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, prior to the next weekly submission.

A typical inspection report form for conducting the inspections is included in Appendix B. If an alternate inspection form is used, it must at least provide the same information as provided on the referenced form. A monthly inspection summary for the inspections of the erosion and sediment control measures shall be prepared by the qualified professional. The general contractor is to post on site a summary of site inspection activities on a monthly basis.

Prior to the completion of work, the general contractor shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone

final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment control measures are no longer required.

WINTER CONDITIONS

During winter months, periodic inspections are to occur as described above until construction is completed and the site is stabilized. During winter operation (i.e., suspended soil disturbance, site stabilization), however, the owner may reduce inspection frequencies in accordance with the NYSDEC's Winter Site Stabilization/Site Inspections for Construction Sites. Under winter conditions, inspections are to be performed at least once every 30 days and within 24 hours of the end of a rainfall event of 0.5 inches or greater. Non-winter inspection frequencies are to resume upon resumption of construction activities, but no later than March 15th.

CERTIFICATIONS AND FORMS

The following certifications and forms are to be reviewed, understood, filled out, and signed by the appropriate personnel at the appropriate time:

- The Pre-Construction Documents and Certifications, provided in Appendix A, shall be filled out by the owner, operator, preparer, and qualified professional, as appropriately shown in the section.
- The Construction Duration Inspections form provided in Appendix B is to be filled out and signed by the qualified professional that will perform site inspections and oversee installation of erosion control measures for the project.
- The Monthly Summary of Site Inspection Activities form provided in Appendix C is to be completed by the qualified inspector.
- The Contractor's Certification Statement provided in Appendix D is to be filled out and signed by the operator/general contractor.
- The Sub-Contractor's Certification Statement provided in Appendix D is to be filled out and signed by all sub-contractors.
- The Certificate of Issuance provided in Appendix D is to be filled out and signed by the operator and preparer prior to performing any site work.
- The Erosion and Water Quality Control Identification form provided in Appendix D is to be filled out by the operator.
- Records of site work and site stabilization are to be kept on the Construction Stabilization form provided in Appendix D, to be filled out by the operator, as necessary.
- The Certificate of Change by the Contractor provided in Appendix D is to be filled out and signed by the operator upon implementation of any requested changes to the SWPPP by the owner, preparer, or any local authority having jurisdiction over the project site. Changes to the SWPPP are only to be made when the plan or contractor's implementation

proves to be ineffective in eliminating or significantly minimizing pollutants from the construction activity.

- The Final Stabilization and Retention of Records form provided in Appendix E is to be filled out and signed by the qualified professional that will perform site inspections and oversee installation of erosion control measures for the project.
- The Certificate of Return provided in Appendix E is to be filled out and signed by the operator and owner after final stabilization of the site has been completed.

RETENTION OF RECORDS

The following are to be retained by the owner at the site and for a period of three years from the date the site is finally stabilized.

- SWPPP
- Contract Documents including contract drawings and technical specifications
- Stormwater inspections and maintenance reports
- Contractor Certification
- SWPPP Certification Statement of Satisfactory Completion
- Correspondence regarding stormwater practices

REFERENCES

New York State Standards and Specifications for Erosion and Sediment Control. New York State Department of Environmental Conservation, August 2005.

APPENDIX A:
NOTICE OF INTENT

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.30

(Submission #: HPA-0RM8-X53D2, version 1)

Details

Submission Alias	NOI SW General Permit - 49 Clinton Ave (IEC)
Originally Started By	Gonzalo Trenosky
Submission ID	HPA-0RM8-X53D2
Submission Reason	New
Status	Draft

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
The Masters School

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

Owner/Operator Contact Person First Name
Biddle

Owner/Operator Mailing Address
49 Clinton Avenue

City
Dobbs Ferry

State
NY

Zip
10522

Phone
9144796431

Email
ed.biddle@mastersny.org

Federal Tax ID
NONE PROVIDED

Project Location

Project/Site Name
The Masters School - Innovation & Entrepreneurship Center

Street Address (Not P.O. Box)
49 Clinton Avenue

Side of Street
East

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Dobbs Ferry

State
NY

Zip
10522

DEC Region
3

County
WESTCHESTER

Name of Nearest Cross Street
NONE PROVIDED

Distance to Nearest Cross Street (Feet)
NONE PROVIDED

Project In Relation to Cross Street
NONE PROVIDED

Tax Map Numbers Section-Block-Parcel
NONE PROVIDED

Tax Map Numbers
NONE PROVIDED

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are:
- Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates.
- The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates
41.012179586711795,-73.86963084664356

Project Details

2. What is the nature of this project?
New Construction

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse
Institutional/School

Post-Development Future Land Use
Institutional/School

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.
NONE PROVIDED

---

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area.

*** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)
96

Total Area to be Disturbed (acres)
2.2

Existing Impervious Area to be Disturbed (acres)
.1

Future Impervious Area Within Disturbed Area (acres)
.3

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

---

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

A (%)
0

B (%)
0

C (%)
100

D (%)
0

7. Is this a phased project?
No

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

Start Date
10/1/2021

End Date
9/30/2023

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

9a. Type of waterbody identified in question 9?
River Off Site

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
NONE PROVIDED

10. Has the surface waterbody(ies in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?
No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001?
No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
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?
No

If Yes, what is the acreage to be disturbed?
NONE PROVIDED

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

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?
NONE PROVIDED

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?
Unknown

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

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

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

Required SWPPP Components

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

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

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

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

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

SWPPP Preparer
Gonzalo Trenosky

Contact Name (Last, Space, First)
Trenosky Gonzalo

Mailing Address
2780 Hamilton Boulevard

City
South Plainfield

State
New Jersey

Zip
07080

Phone
9089224625

Email
gmt@mfsengineers.com

Download SWPPP Preparer Certification Form
Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form
2) The certified SWPPP preparer should sign this form

3) Scan the signed form
4) Upload the scanned document
Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification

1120062_SWPPP Preparer Certification Form_signed.pdf - 07/07/2021 01:48 PM
Comment
Please see attached SWPPP Preparer Certification Form. The Owner of the Property is The Masters School.

Erosion & Sediment Control Criteria

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

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

Temporary Structural
Storm Drain Inlet Protection
Stabilized Construction Entrance
Silt Fence
Dust Control
Construction Road Stabilization

Biotechnical
None

Vegetative Measures
Topsoiling
Seeding

Permanent Structural
Land Grading

Other
NONE PROVIDED

Post-Construction Criteria

*** 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.
Locating Development in Less Sensitive Areas
Roadway 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).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
.042

29. Post-construction SMP Identification
Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28).

Identify the SMPs to be used by providing 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 the Post-Construction SMP Identification section 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.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
.026

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?
No

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

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)
.012

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

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

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

33. SMPs
Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30).

Also, provide the total impervious area that contributes runoff to each practice selected.

NOTE: Use the Post-construction SMP Identification section 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. (acre-feet)
.026

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 - 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).
.051

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

If Yes, go to question 36.

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

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

CPv Required (acre-feet)
.115

CPv Provided (acre-feet)
.076

36a. The need to provide channel protection has been waived because:
NONE PROVIDED

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

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
3.60

Post-Development (CFS)
3.53

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
7.06

Post-Development (CFS)
7.03

37a. The need to meet the Qp and Qf criteria has been waived because:
NONE PROVIDED

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

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

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

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs
Identify the Post-construction SMPs to be used by providing 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.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Garden (RR-6)
NONE PROVIDED

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
NONE PROVIDED

Total Contributing Impervious Acres for Porous Pavement (RR-9)
NONE PROVIDED

Total Contributing Impervious Acres for Green Roof (RR-10)
NONE PROVIDED

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
NONE PROVIDED

Total Contributing Impervious Acres for Infiltration Basin (I-2)
NONE PROVIDED

Total Contributing Impervious Acres for Dry Well (I-3)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
.29

Total Contributing Impervious Acres for Bioretention (F-5)
.19

Total Contributing Impervious Acres for Dry Swale (O-1)
NONE PROVIDED

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Pond (P-2)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
NONE PROVIDED

Total Contributing Impervious Acres for Multiple Pond System (P-4)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Pond (P-5)
NONE PROVIDED

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
NONE PROVIDED

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
NONE PROVIDED

Total Contributing Impervious Acres for Organic Filter (F-4)
NONE PROVIDED

Total Contributing Impervious Acres for Shallow Wetland (W-1)
NONE PROVIDED

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
NONE PROVIDED

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Wetland (W-4)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Swale (O-2)
NONE PROVIDED

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

Total Contributing Impervious Area for Hydrodynamic
NONE PROVIDED

Total Contributing Impervious Area for Wet Vault
NONE PROVIDED

Total Contributing Impervious Area for Media Filter
NONE PROVIDED

"Other" Alternative SMP?
NONE PROVIDED

Total Contributing Impervious Area for "Other"
NONE PROVIDED

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

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

Manufacturer of Alternative SMP
NONE PROVIDED

Name of Alternative SMP
NONE PROVIDED

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.
None

If SPDES Multi-Sector GP, then give permit ID
NONE PROVIDED

If Other, then identify
NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?
No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.
NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?
Yes - Please attach the MS4 Acceptance form below

If No, skip question 44

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

MS4 SWPPP Acceptance Form Download
Download form from the link below. Complete, sign, and upload.
MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download
Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.
Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
7/7/2021 1:48 PM	1120062_SWPPP Preparer Certification Form_signed.pdf	Attachment	Gonzalo Trenosky

APPENDIX B:
SOIL REPORT

Soil Map—Westchester County, New York

Map Scale: 1:1,710 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 16, Jun 11, 2020

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

Date(s) aerial images were photographed: Aug 22, 2020—Sep 23, 2020

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
PnB	Paxton fine sandy loam, 3 to 8 percent slopes	12.1	95.6%
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	0.6	4.4%
Totals for Area of Interest		**12.6**	**100.0%**

Westchester County, New York

PnB—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qp
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge
Percent of map unit: 9 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury
Percent of map unit: 6 percent
Landform: Drainageways, hills, ground moraines, depressions
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton
Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 16, Jun 11, 2020

APPENDIX C:
INFILTRATION TESTS SECTION FROM MFS GEOTECHNICAL REPORT, DATED 03 FEBRUARY 2021

engineering software and is provided in Appendix A.

Infiltration Tests

In addition to the borings, MFS completed 12 infiltration tests at three (3) locations, identified as IT-1 through IT-3. Each infiltration test was completed adjacent to a previously completed geotechnical boring in accordance with the NYS SMDM Appendix D (B-1 (IT) corresponds to IT-1, B-2A (IT) and B-2B (IT) corresponds to IT-2, and B-5 corresponds to IT-3). The infiltration test locations are shown in the "As-Drilled Subsurface Investigation Location Plan" located in Figure 2. The depths of the borings and infiltration tests were performed in accordance with Appendix D of the NYS SMDM based on the bottom depths of the proposed stormwater management practice (SMP) as determined by the MFS civil engineering team. The 24-hour presoak period at each infiltration testing location started on 30 December 2020 once the temperature was above freezing point. The ambient temperature remained above the freezing point for the duration of the presoak period and the durations of the infiltration tests performed.

The infiltration tests were performed adjacent to each respective boring in order to determine the permeability coefficient of the soil at the respective depths. Each of the infiltration tests were completed two (2) feet below the proposed SMP depth. The infiltration tests at IT-1 and IT-3 were completed at a depth of 8-feet below grade and the infiltration tests at IT-2 were completed at a depth of 7 feet below grade. The infiltration test logs for each of the three (3) infiltration test locations (12 total infiltration tests performed) are provided in Appendix B.

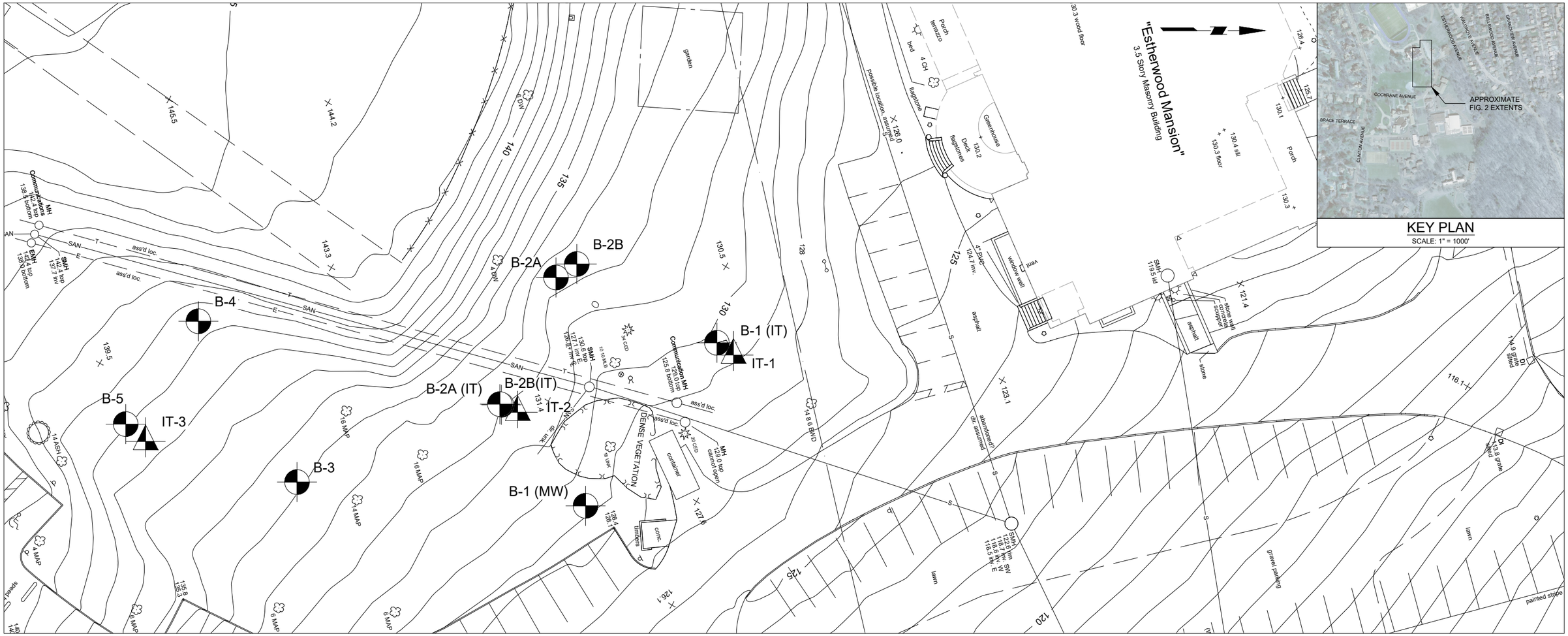
Temporary Monitoring Well

One (1) temporary monitoring well was installed in boring B-1 (MW) to a depth of 29 feet below grade (EL. +100.3±) upon completion of soil sampling on 30 December 2020. The well construction consisted of 10 feet of 2-inch diameter 0.01-inch slotted PVC screens below 20 feet of 2-inch PVC riser extending to one (1) foot above grade. The annular space between the installed monitoring well and the borehole was backfilled with No. 2 filtration sand over the entire screen length and extending two (2) feet above the screen and riser interface (17 feet below grade). Above the filter sand, a bentonite seal was used to backfill to existing grade.

Due to the drilling methods utilized during the field subsurface investigation, it was not clear if the borings were performed below the groundwater level on site. The purpose of the temporary monitoring well installation was to identify if the groundwater table was present. Upon installation of the temporary monitoring well, the water that was present in the well on the day of drilling (from the drilling operations) had infiltrated out into the existing soils the day following the well installation. As such, it was determined that the groundwater level was not encountered and is expected to be deeper than 29 feet below grade (EL. +100.3±) on site. As no groundwater was observed in the temporary monitoring well, the well was removed and the borehole was backfilled on 31 December 2020. Refer to the Well Construction Log in Appendix C for elevations, and specific well construction information.

Geotechnical Laboratory Testing

Upon completion of the field investigation, all soil samples were transported back to our office for further evaluation and selection of samples for geotechnical laboratory testing. Soil



1 AS-DRILLED SUBSURFACE INVESTIGATION LOCATION PLAN

Scale: 1" = 30'

0 30' 60'

NOTE:

1. ALL AS-DRILLED BORING, INFILTRAITON TEST, AND MONITORING WELL LOCATIONS REFERENCE THE FIELD SUBSURFACE INVESTIGATION COMPLETED BY MFS CONSTRUCTION, LLC UNDER THE FULL TIME ENGINEERING INSPECTION OF MFS CONSULTING ENGINEERS AND SURVEYOR, DPC FROM 28 DECEMBER 2020 TO 6 JANUARY 2021.
2. THE PARTIAL BACKGROUND SURVEY USED FOR THIS PLAN WAS OBTAINED FROM THE "TOPOGRAPHIC MAP OF THE DEVELOPED PORTION OF THE MASTERS SCHOOL" DATED 9 JANUARY 2017 PROVIDED IN AUTOCAD FORMAT WHICH IS BASED UPON PHOTOGRAMMETRIC MAPPING PREPARED BY GEOMAPS INTERNATIONAL, INC. USING AERIAL PHOTOGRAPHY TAKEN IN APRIL 2008 WITH SUPPLEMENTAL FIELD MEASUREMENTS COMPLETED BETWEEN 4 OCTOBER AND 31 DECEMBER 2016 COMBINED WITH MAPPING OF PORTIONS OF THE CAMPUS PREVIOUSLY PREPARED BY KENNETH B. SALZMANN, LAND SURVEYOR.
3. ALL AS-DRILLED BORING, MONITORING WELL, AND INFILTRATION TEST LOCATIONS WERE MEASURED IN THE FIELD AT THE TIME OF COMPLETION FROM FIXED OBJECTS AT THE PROJECT SITE AND THE RESPECTIVE LOCATIONS SHALL BE CONSIDERED APPROXIMATE.
4. ALL ELEVATIONS REFERENCED HEREIN ARE BASED ON THE MASTERS SCHOOL DATUM.

LEGEND

- B-#/B-#(IT) — AS-DRILLED BORING LOCATION
- B-# (MW) — MONITORING WELL LOCATION
- IT-# — INFILTRATION TEST LOCATION

MFS ENGINEERS & SURVEYORS
MFS CONSULTING ENGINEERS & SURVEYOR, DPC
320 FIFTH AVE., FLOOR 11-SUITE #1102, NEW YORK, NY 10001
T: 212.943.6576 www.MFSengineers.com
F: 866.517.7413
N.Y. CERTIFICATE OF AUTHORIZATION: 0007564

PROJECT NAME
THE MASTERS SCHOOL
INNOVATION AND ENTREPRENEURSHIP CENTER
DOBBS FERRY, WESTCHESTER COUNTY, NEW YORK

DRAWING TITLE
AS-DRILLED SUBSURFACE INVESTIGATION LOCATION PLAN

PROJECT NO.	1120062	SHEET NO.
DATE	01/11/21	FIG. 2
SCALE	AS_NOTED	
DRAWN BY	ATG	
CHECKED BY	JMF	# OF 1

MFS Consulting Engineers and Surveyor, DPC

IT ID No. IT- 1

Sheet 1 of 1

Prepared for:	Marvel Architects, PLLC	PROJECT:	Masters School - Innovation and Entrepreneurship Center
		LOCATION / BOROUGH :	Dobbs Ferry, NY

INSPECTOR:	Gilbert Del Orbe	DRILLER:	Danny Ninevski	Start Date:	12/31/2020	Weather:	41°F / Light Rain
CONTRACTOR:	MFS Construction, LLC	HELPER:	Tom Feaser	Start Time:	9:00 AM		
P.E./REP.:	Michael Mudalel, PE						

Depth of IT:	8	ft	Drill Bit Type:	3-7/8" TCRB		Weight of Hammer for casing:	140 lbs
Rig Type:	CME 45B		Casing Internal Diameter:	4	in	Type of Hammer:	Auto
			Casing Length:	126	in		

ASTM D-6391 – 11

PERMEABILITY COEFFICIENT (Km) FORMULA:

General Formula:

$$K_m = \pi R_t \times \frac{\left[D\left\{Ln\left(\frac{h_1}{h_2}\right)\right\}\right]}{11 \times (t_2 - t_1)}$$

Formula for 4" internal diameter casing (in/hr):

$$K_m = 1.142 R_t \times \frac{\left[Ln\left(\frac{h_1}{h_2}\right)\right]}{(t_2 - t_1)}$$

where:

$$R_t = {2.2902(0.9842^T)}/{T^{0.1702}}$$

IT-1 @ 8 ft

TEST 1

Water temperature (°C), T: 8.2 Rt= 1.40

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	12.000	114.000	0.100	0.167	0.9637
20	22.500	103.500	0.197	0.167	0.9304
30	29.000	97.000	0.262	0.167	0.6246
40	34.000	92.000	0.314	0.167	0.5096
60	44.500	81.500	0.436	0.333	0.5835

TEST 2

Water temperature (°C), T: 7.6 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	14.000	112.000	0.118	0.167	1.1600
20	22.875	103.125	0.200	0.167	0.8130
30	29.000	97.000	0.262	0.167	0.6030
40	34.375	91.625	0.319	0.167	0.5614
60	43.625	82.375	0.425	0.333	0.5240

TEST 3

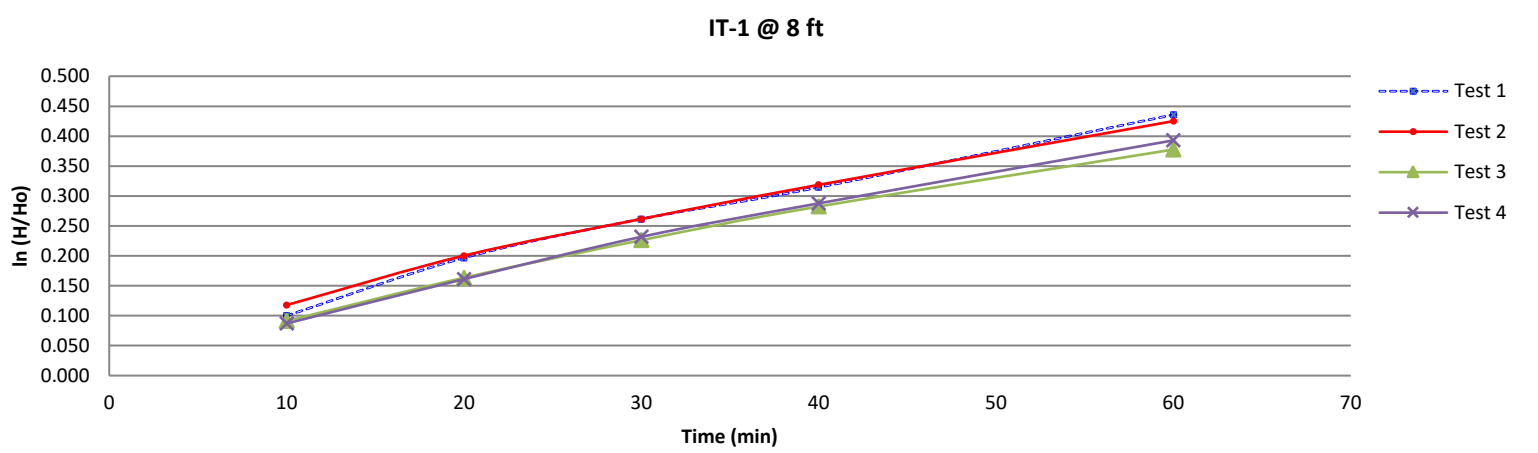
Water temperature (°C), T: 7.5 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	11.000	115.000	0.091	0.167	0.9031
20	19.000	107.000	0.163	0.167	0.7128
30	25.500	100.500	0.226	0.167	0.6196
40	31.000	95.000	0.282	0.167	0.5564
60	39.625	86.375	0.378	0.333	0.4705

TEST 4

Water temperature (°C), T: 7.4 Rt= 1.45

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	10.500	115.500	0.087	0.167	0.8636
20	18.750	107.250	0.161	0.167	0.7355
30	26.063	99.937	0.232	0.167	0.7009
40	31.500	94.500	0.288	0.167	0.5552
60	40.938	85.063	0.393	0.333	0.5221



TEST 1 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.6992 in/hr

TEST 2 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.6976 in/hr

TEST 3 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.6221 in/hr

TEST 4 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.6499 in/hr

AVERAGE IT-1 @ 8 ft

Time Weighted Average Permeability Coefficient **Km=** 0.6672 in/hr

Inspectors Remarks:

24 hour pre-soak started 12/30/2020 at 9:00 AM once the temperature was above freeze point. (Note that the temperature did not drop below freezing point during the pre-soak period)

DEFINITION OF VARIABLES

*Km= Mean permeability

T = Temperature of permeant (water), in °C

Ln = Natural Logarithmic

t1 = Time at the start of the test in the same units selected for Km

t2= Time at the end of the test in the units selected for Km

h1= Height of the water above the bottom of the casing at the start of the test in the same units selected for Km

h2= Height of the water above the bottom of the casing at the end of the test in the same units selected for Km

Rt = Ratio of viscosity of water at test temperature to the viscositye of water at 20°C

MFS Consulting Engineers and Surveyor, DPC

IT ID No. IT- 2

Sheet 1 of 1

Prepared for:	Marvel Architects, PLLC	PROJECT:	Masters School - Innovation and Entrepreneurship Center
		LOCATION / BOROUGH :	Dobbs Ferry, NY

INSPECTOR:	Gilbert Del Orbe	DRILLER:	Danny Ninevski	Start Date:	12/31/2020	Weather:	41°F / Light Rain
CONTRACTOR:	MFS Construction, LLC	HELPER:	Tom Feaser	Start Time:	9:03 AM		
P.E./REP.:	Michael Mudalel, PE						

Depth of IT:	7	ft	Drill Bit Type:	3-7/8" TCRB		Weight of Hammer for casing:	140 lbs
Rig Type:	CME 45B		Casing Internal Diameter:	4	in	Type of Hammer:	Auto
			Casing Length:	90	in		

ASTM D-6391 – 11

PERMEABILITY COEFFICIENT (Km) FORMULA:

General Formula:

$$K_m = \pi R_t \times \frac{\left[D\left\{Ln\left(\frac{h_1}{h_2}\right)\right\}\right]}{11 \times (t_2 - t_1)}$$

Formula for 4" internal diameter casing (in/hr):

$$K_m = 1.142 R_t \times \frac{\left[Ln\left(\frac{h_1}{h_2}\right)\right]}{(t_2 - t_1)}$$

where:

$$R_t = {2.2902(0.9842^{T})}/{T^{0.1702}}$$

IT-2 @ 7 ft

TEST 1

Water temperature (°C), T: 7.9 Rt= 1.42

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	6.500	83.500	0.075	0.167	0.7299
20	13.250	76.750	0.159	0.167	0.8208
30	20.000	70.000	0.251	0.167	0.8964
40	25.625	64.375	0.335	0.167	0.8157
60	35.000	55.000	0.492	0.333	0.7663

TEST 2

Water temperature (°C), T: 7.5 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	7.000	83.000	0.081	0.167	0.8005
20	14.000	76.000	0.169	0.167	0.8711
30	20.500	69.500	0.258	0.167	0.8839
40	26.500	63.500	0.349	0.167	0.8926
60	37.250	52.750	0.534	0.333	0.9168

TEST 3

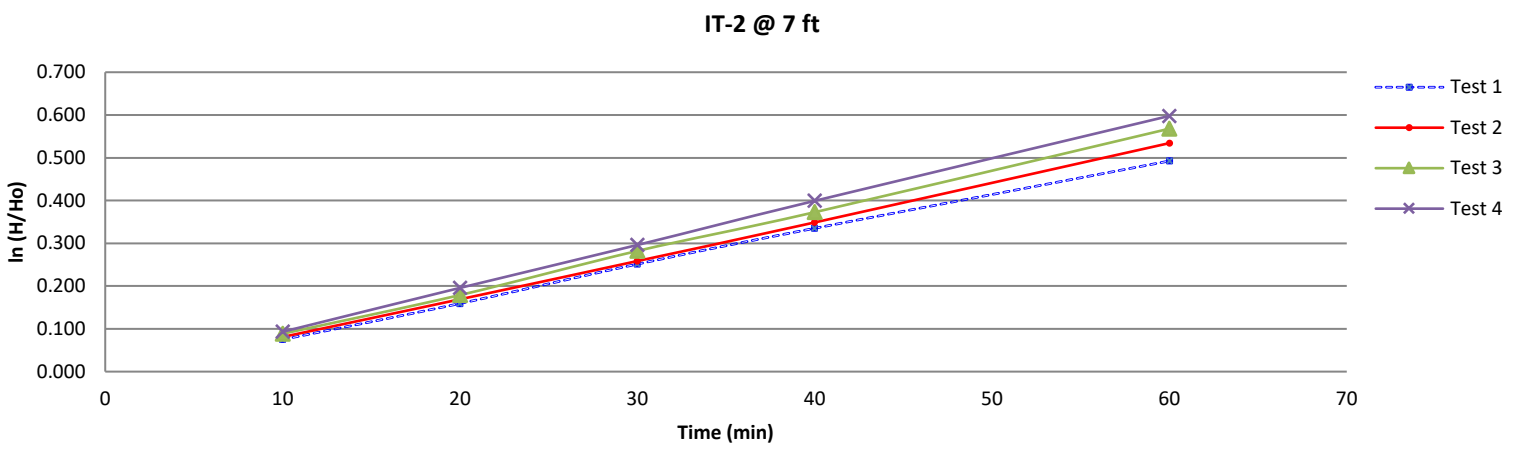
Water temperature (°C), T: 7.6 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	7.625	82.375	0.089	0.167	0.8718
20	14.750	75.250	0.179	0.167	0.8909
30	22.125	67.875	0.282	0.167	1.0158
40	28.000	62.000	0.373	0.167	0.8916
60	39.000	51.000	0.568	0.333	0.9617

TEST 4

Water temperature (°C), T: 7.4 Rt= 1.45

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	8.000	82.000	0.093	0.167	0.9239
20	16.000	74.000	0.196	0.167	1.0188
30	23.063	66.937	0.296	0.167	0.9956
40	29.625	60.375	0.399	0.167	1.0240
60	40.500	49.500	0.598	0.333	0.9855



TEST 1 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.7992 in/hr

TEST 2 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.8803 in/hr

TEST 3 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.9323 in/hr

TEST 4 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 0.9889 in/hr

AVERAGE IT-2 @ 7 ft

Time Weighted Average Permeability Coefficient **Km=** 0.9002 in/hr

Inspectors Remarks:

24 hour pre-soak started 12/30/2020 at 9:00 AM once the temperature was above freeze point. (Note that the temperature did not drop below freezing point during the pre-soak period)

DEFINITION OF VARIABLES

*Km= Mean permeability

T = Temperature of permeant (water), in °C

Ln = Natural Logarithmic

t1 = Time at the start of the test in the same units selected for Km

t2= Time at the end of the test in the units selected for Km

h1= Height of the water above the bottom of the casing at the start of the test in the same units selected for Km

h2= Height of the water above the bottom of the casing at the end of the test in the same units selected for Km

Rt = Ratio of viscosity of water at test temperature to the viscositye of water at 20°C

MFS Consulting Engineers and Surveyor, DPC

IT ID No. IT- 3

Sheet 1 of 1

Prepared for: Marvel Architects, PLLC

PROJECT: Masters School - Innovation and Entrepreneurship Center

LOCATION / BOROUGH : Dobbs Ferry, NY

INSPECTOR:	Gilbert Del Orbe	DRILLER:	Danny Ninevski	Start Date:	12/31/2020	Weather:	41°F / Light Rain
CONTRACTOR:	MFS Construction, LLC	HELPER:	Tom Feaser	Start Time:	9:05 AM		
P.E./REP.:	Michael Mudalel, PE						

Depth of IT:	8	ft	Drill Bit Type:	3-7/8" TCRB		Weight of Hammer for casing:	140 lbs
Rig Type:	CME 45B		Casing Internal Diameter:	4	in	Type of Hammer:	Auto
			Casing Length:	126	in		

ASTM D-6391 – 11

PERMEABILITY COEFFICIENT (Km) FORMULA:

General Formula:

$$K_m = \pi R_t \times \frac{\left[D\left\{Ln\left(\frac{h_1}{h_2}\right)\right\}\right]}{11 \times (t_2 - t_1)}$$

Formula for 4" internal diameter casing (in/hr):

$$K_m = 1.142 R_t \times \frac{\left[Ln\left(\frac{h_1}{h_2}\right)\right]}{(t_2 - t_1)}$$

where:

$$R_t = {2.2902(0.9842^T)}/{T^{0.1702}}$$

IT-3 @ 8 ft

TEST 1

Water temperature (°C), T: 8.1 Rt= 1.41

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	13.000	113.000	0.109	0.167	1.0524
20	24.875	101.125	0.220	0.167	1.0731
30	35.000	91.000	0.325	0.167	1.0196
40	43.875	82.125	0.428	0.167	0.9918
60	59.000	67.000	0.632	0.333	0.9836

TEST 2

Water temperature (°C), T: 7.6 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	14.125	111.875	0.119	0.167	1.1710
20	26.250	99.750	0.234	0.167	1.1297
30	37.000	89.000	0.348	0.167	1.1230
40	47.000	79.000	0.467	0.167	1.1738
60	63.000	63.000	0.693	0.333	1.1144

TEST 3

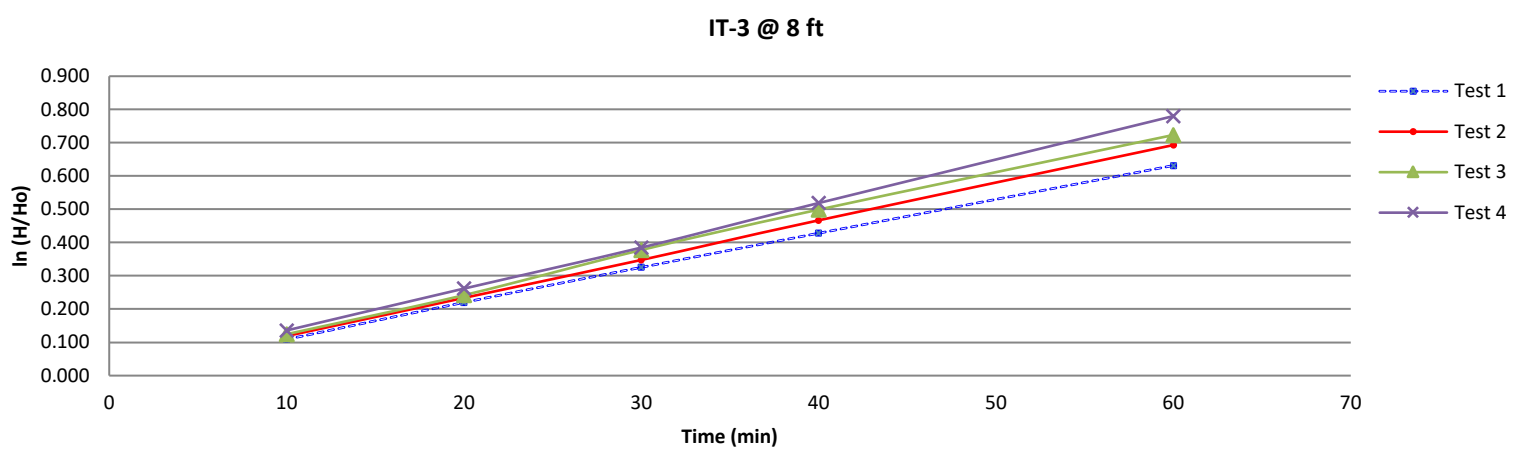
Water temperature (°C), T: 7.5 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	14.750	111.250	0.125	0.167	1.2309
20	27.063	98.937	0.242	0.167	1.1596
30	39.625	86.375	0.378	0.167	1.3424
40	49.500	76.500	0.499	0.167	1.2003
60	64.875	61.125	0.723	0.333	1.1091

TEST 4

Water temperature (°C), T: 7.5 Rt= 1.44

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
10	16.000	110.000	0.136	0.167	1.3426
20	29.000	97.000	0.262	0.167	1.2434
30	40.250	85.750	0.385	0.167	1.2187
40	51.000	75.000	0.519	0.167	1.3242
60	68.250	57.750	0.780	0.333	1.2920



TEST 1 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 1.0174 in/hr

TEST 2 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 1.1377 in/hr

TEST 3 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 1.1919 in/hr

TEST 4 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 1.2855 in/hr

AVERAGE IT-3 @ 8 ft

Time Weighted Average Permeability Coefficient **Km=** 1.1581 in/hr

Inspectors Remarks:

24 hour pre-soak started 12/30/2020 at 9:00 AM once the temperature was above freeze point. (Note that the temperature did not drop below freezing point during the pre-soak period)

DEFINITION OF VARIABLES

*Km= Mean permeability

T = Temperature of permeant (water), in °C

Ln = Natural Logarithmic

t1 = Time at the start of the test in the same units selected for Km

t2= Time at the end of the test in the units selected for Km

h1= Height of the water above the bottom of the casing at the start of the test in the same units selected for Km

h2= Height of the water above the bottom of the casing at the end of the test in the same units selected for Km

Rt = Ratio of viscosity of water at test temperature to the viscositye of water at 20°C

APPENDIX D:
NYS DEC CRITICAL ENVIRONMENTAL AREAS MAP

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DECinfo Locator

Base Map: Topographical

Help

Search

Tools

DEC Information Layers

Environmental Quality | Outdoor Activity

- Permits and Registrations
- Environmental Cleanup
- Environmental Monitoring
- Public Involvement
- **Environmentally Sensitive Areas**

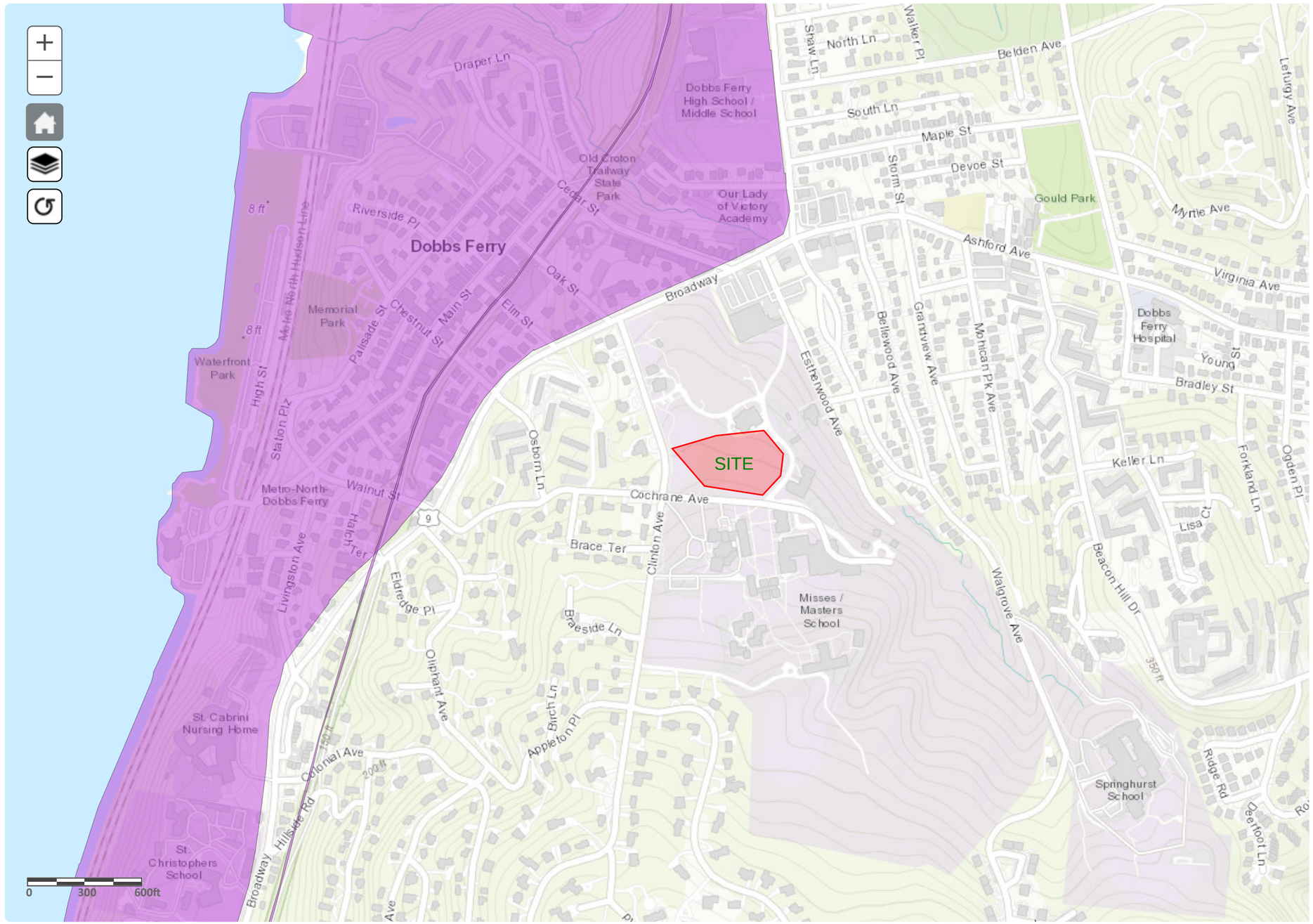
Check / Uncheck all

Layer Information

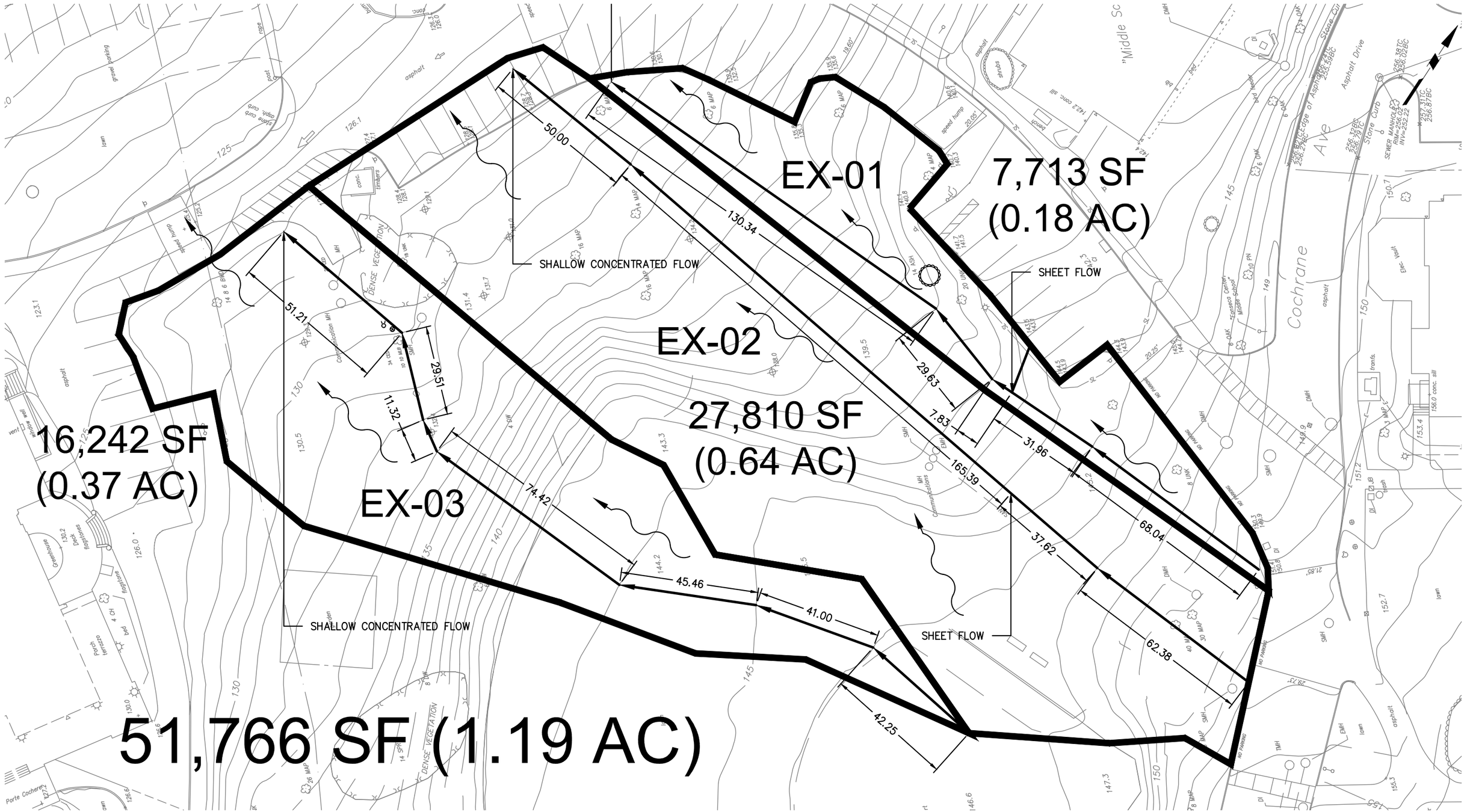
- [x] **Critical Environmental Areas**
- [ ] **Regulatory Tidal Wetlands Areas**

Legal Information

Reference Layers



APPENDIX E:
DRAWINGS



EXISTING DRAINAGE AREAS	
DRAINAGE AREA	AREA (AC)
EX-01	0.18
EX-02	0.64
EX-03	0.37
TOTAL:	1.19

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW ARROW
- TIME OF CONCENTRATION PATH

1 EXISTING DRAINAGE AREA PLAN

Scale: 1"=30'

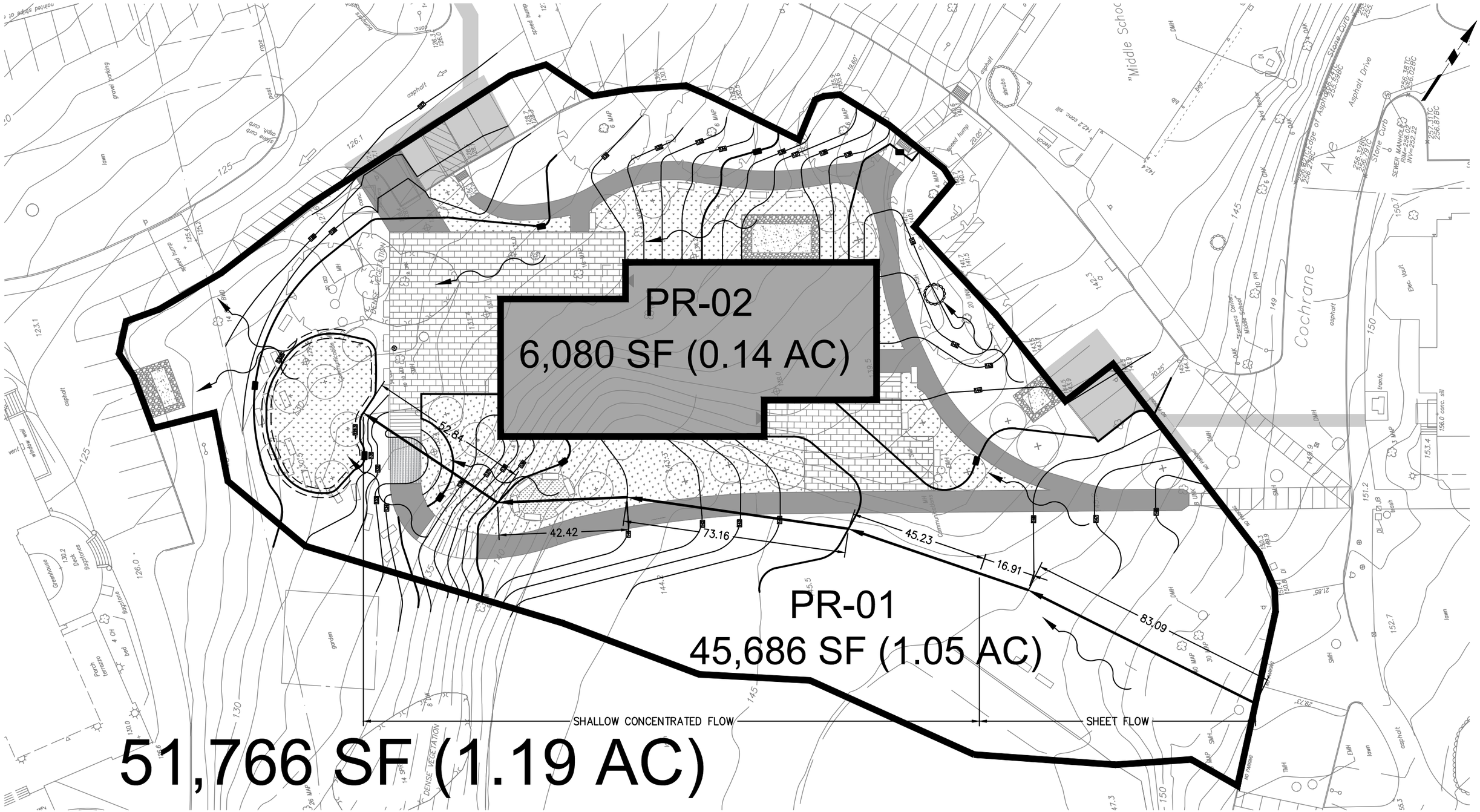
0 30' 60'

MFS ENGINEERS & SURVEYORS
MFS CONSULTING ENGINEERS & SURVEYOR, DPC
31 W34TH ST. SUITE #7071. NEW YORK, NY 10001
T: 212.943.6576 www.MFSengineers.com
F: 866.517.7413
N.Y. CERTIFICATE OF AUTHORIZATION: 0007564

PROJECT NAME
MASTERS SCHOOL OF ENTREPRENEURSHIP
49 CLINTON AVENUE
-
WESTCHESTER COUNTY
DOBBS FERRY NEW YORK

DRAWING TITLE
EXISTING DRAINAGE AREA MAP

PROJECT NO.	1120062	SHEET NO.
DATE	7/6/2021	DR-01
SCALE	AS_NOTED	
DRAWN BY	VCM	
CHECKED BY	SEB	1 OF 2



PROPOSED DRAINAGE AREAS	
DRAINAGE AREA	AREA (AC)
PR-01	1.05
PR-02	0.14
TOTAL:	1.19

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW ARROW
- TIME OF CONCENTRATION PATH

1 PROPOSED DRAINAGE AREA PLAN

Scale: 1"=30'

0 30' 60'

MFS ENGINEERS & SURVEYORS

MFS CONSULTING ENGINEERS & SURVEYOR, DPC
31 W34TH ST. SUITE #7071. NEW YORK, NY 10001
T: 212.943.6576 www.MFSengineers.com
F: 866.517.7413
N.Y. CERTIFICATE OF AUTHORIZATION: 0007564

PROJECT NAME
MASTERS SCHOOL OF ENTREPRENEURSHIP
49 CLINTON AVENUE
-
DOBBS FERRY WESTCHESTER COUNTY NEW YORK

DRAWING TITLE
PROPOSED DRAINAGE AREA MAP

PROJECT NO.	1120062	SHEET NO.
DATE	7/6/2021	DR-02
SCALE	AS_NOTED	
DRAWN BY	VCM	
CHECKED BY	SEB	2 OF 2

LEGEND

- DEMOLISH & REMOVAL
- EXISTING VEGETATION TO BE REMOVED
- EXISTING ASPHALT TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED
- EXISTING TREES TO BE REMOVED

EXISTING PAVEMENT TO BE REMOVED FOR STORMWATER CONNECTION REFER TO C-600

AREA OF ADDITIONAL VEGETATION REMOVAL FOR PROPOSED FUTURE PARKING

EXISTING STRIPING TO BE REMOVED

EXISTING ASPHALT TO BE REMOVED

EXISTING SIGN TO BE REMOVED

EXISTING TIMBERS TO BE REMOVED

EXISTING CURB TO BE REMOVED

TREE PROTECTION, TYP.

EXISTING CONCRETE PAD TO BE REMOVED

EXISTING EDGE OF PAVEMENT TO BE REMOVED

EXISTING ASPHALT TO BE REMOVED

EXISTING TREES TO BE REMOVED (TYP)

EXISTING GAS SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING SANITARY SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING STEAM LINE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

ABANDON EX. GAS SERVICE BENEATH EX. TREE TO REMAIN.

EXISTING ELECTRICAL MANHOLE TO REMAIN, ADJUST FRAME/GRATE TO MATCH NEW GRADE

EXISTING TELECOMM MANHOLE TO REMAIN, ADJUST FRAME/GRATE TO MATCH NEW GRADE

EXISTING FIRE HYDRANT TO BE RELOCATED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING SANITARY MANHOLE TO REMAIN, ADJUST FRAME/GRATE TO MATCH NEW GRADE

EXISTING VEGETATION TO BE REMOVED

EXISTING WATER SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING VEGETATION TO BE REMOVED

EXISTING ELECTRIC SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING UTILITY MANHOLES TO REMAIN, ADJUST FRAME/GRATE TO MATCH NEW GRADE

PROPOSED TRENCH FOR NEW ELECTRICAL TO TRANSFORMER AT MORRIS HALL. REFER TO C-701 FOR CONTINUATION OF ROUTING

EXISTING ASPHALT PAVEMENT TO BE DEMOLISHED & RESTORE

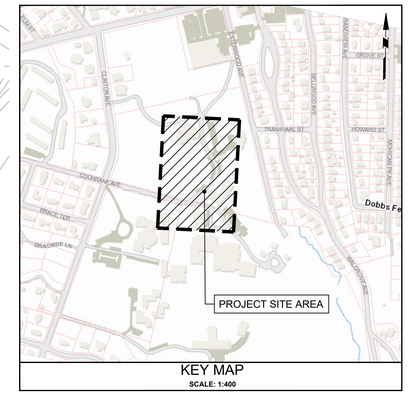
EXISTING TELECOMM SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

EXISTING SANITARY SERVICE TO BE REMOVED REFER TO C-700 FOR NEW UTILITY PLACEMENT

PROPOSED TRENCH FOR NEW UTILITIES REFER TO C-701 FOR CONTINUATION OF ROUTING

EXISTING FENCELINE TO BE REMOVED

EXISTING SOFTBALL FIELD TO BE REMOVED REFER TO C-502 FOR ASSOCIATED REMOVALS



KEY MAP
SCALE: 1:400

1 DEMOLITION & SITE CLEARING PLAN
Scale: 1"=10'

0 10' 20'

EXCAVATION & FILL
CUT: 3,600 CY
FILL: 650 CY
NET: 2,950 CY CUT

-PRELIMINARY-
NOT FOR CONSTRUCTION

DOB STAMP ZONE

MARVEL
145 HUDSON STREET, FLR 3 NEW YORK, NY 10013
212.616.0420

OWNER
THE MASTERS SCHOOL
49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522
TEL 914 479 6400

PROJECT ARCHITECTS + LANDSCAPE ARCHITECTS
MARVEL
145 HUDSON STREET, FLOOR 3
NEW YORK, NEW YORK 10013
TEL 212 616 0420

GEOTECHNICAL / CIVIL ENGINEER
MFS ENGINEERS & SURVEYORS, DPC
2780 HAMILTON BOULEVARD
SOUTH PLAINFIELD, NEW JERSEY 07080
TEL 908 922 4622

STRUCTURAL ENGINEER
SILMAN
32 OLD SLIP, FLOOR 10
NEW YORK, NEW YORK 10005
TEL 212 620 7970

BUILDING SYSTEMS ENGINEER
POLISE CONSULTING ENGINEERS, DPC
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NEW YORK, NEW YORK 10011
TEL 212 645 1002

VERTICAL TRANSPORTATION
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NEW YORK, NEW YORK 10001
TEL 212 868 9090

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498 SEVENTH AVENUE
NEW YORK, NEW YORK 10018
TEL 212 615 3600

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76 BEAVER STREET
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TEL 347 788 0810

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MW-SKINS
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NEW YORK, NEW YORK 10004
TEL 347 809 6790

LIGHTING DESIGNER
DOT DASH LIGHTING DESIGN
120 WALKER STREET, SUITE #6E
NEW YORK, NEW YORK 10013
TEL 212 951 0660

CODE AND ACCESSIBILITY CONSULTANT
CODE CONSULTANTS, INC.
440 PARK AVENUE S.
NEW YORK, NEW YORK 10016
TEL 212 447 4033

ARCHITECTURAL SPECIFICATIONS
CONSTRUCTION SPECIFICATIONS, INC
22 TENNENT ROAD
MORGANVILLE, NEW JERSEY 07751
TEL 732 970 0700

GEOTHERMAL ENGINEER

REV	DATE	DESCRIPTION
1	02/17/2021	VILLAGE OF DOBBS FERRY SITE APPLICATION
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4	08/31/2021	SITE APPLICATION RESUBMISSION

08/31/2021

KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

DEMOLITION & SITE CLEARING PLAN

SCALE: AS NOTED

DRAWING #:
C-300
2 of 10
DOB JOB: -

LEGEND

PROPERTY LINE

PROPOSED RETAINING WALL

MAN DOOR OPENING

PROPOSED CONCRETE PAVEMENT

PROPOSED ASPHALT PAVEMENT

NEW ASPHALT PAVEMENT TO EXTENTS OF STORMWATER TRENCHING

EXISTING TREE TO REMAIN (TYP.)

PROPOSED ASPHALT PAVING

PROPOSED HANDICAP PARKING (4 / C-900)

PROPOSED CONCRETE RAMP TO PATIO

PROPOSED BELGIAN BLOCK CURB, TYP. (1 / C-900)

PROPOSED H'CAP SIGN, TYP. (5 / C-900)

PROPOSED ACCESSIBLE RAMP. (16 / C-900)

CONCRETE PAVEMENT

PROPOSED ASPHALT PATHWAY

PROPOSED LANDSCAPE AREA BY OTHERS

PROPOSED CONCRETE PAD FOR VRV CONDENSING UNITS

PROPOSED INSPECTION PORT

PROPOSED 12-INCH WIDE 6-INCH THICK CONCRETE COLLAR

PAVER PATIO SEE LANDSCAPE FOR LAYOUT & DETAILS

LIMITS OF CANOPY ABOVE

PROPOSED IEC BUILDING
(±6,080 S.F.)

PROPOSED ACCESSIBLE RAMP (16 / C-900)

PROPOSED CROSSWALK AND STRIPING (17 / C-900)

REFER TO LANDSCAPE SERIES (TYP)

PROPOSED CONCRETE PAD FOR EMERGENCY GENERATOR, BY STRUCTURAL

PROPOSED BIORETENTION

PROPOSED LANDSCAPE AREA BY OTHERS

ELEVATED WALKWAY REFER TO LANDSCAPE SERIES

PROPOSED STEPS REFER TO LANDSCAPE SERIES

PROPOSED CONCRETE PAD FOR UTILITY TRANSFORMER,PER CON EDISON SPECIFICATIONS

PROPOSED TREE (TYP, PER LANDSCAPE ARCHITECT)

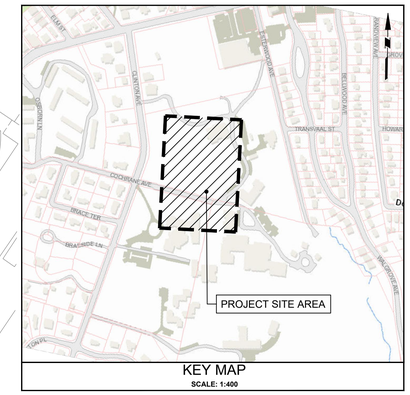
PROPOSED SITE FEATURE (BY OTHER)

EXISTING CURB

PROPOSED CURB

NEW ASPHALT PAVEMENT TO EXTENTS OF ELECTRICAL TRENCHING

1 SITE PLAN
Scale: 1"=10'
0 10' 20'



KEY MAP
SCALE: 1:400

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SOUTH PLAINFIELD, NEW JERSEY 07080
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08/31/2021

KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

OVERALL SITE PLAN

SCALE: AS NOTED

-PRELIMINARY-
NOT FOR CONSTRUCTION

DOB STAMP ZONE

DRAWING #:
C-500
4 of 10

DOB JOB: -

2/10/2021 10:49:38 PM

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08/31/2021

KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

CONSTRUCTION ACCESS PLAN

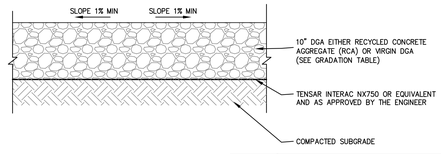
SCALE: AS NOTED

DRAWING #:
C-502
5 of 10
DOB JOB: -

DOB STAMP ZONE

LEGEND

- PROPERTY LINE
- CHAIN LINK FENCE — X — X —
- UTILITY RELOCATION FENCE
- PROPOSED ASPHALT MILLINGS
- CONSTRUCTION ENTRANCE



NOTES:
1. TO BE COMPACTED IN 4" LIFTS.
2. PROOF ROLLING WITH SMOOTH ROLLER DRUM TO BE COMPLETED FOR FINAL SECTION INSPECTION.
3. CONTRACTOR TO EXCAVATE OUT 10" OF TOPSOIL AND PLACE IN THE STOCKPILE PRIOR TO CONSTRUCTION OF THE TEMPORARY ACCESS ROADWAY.

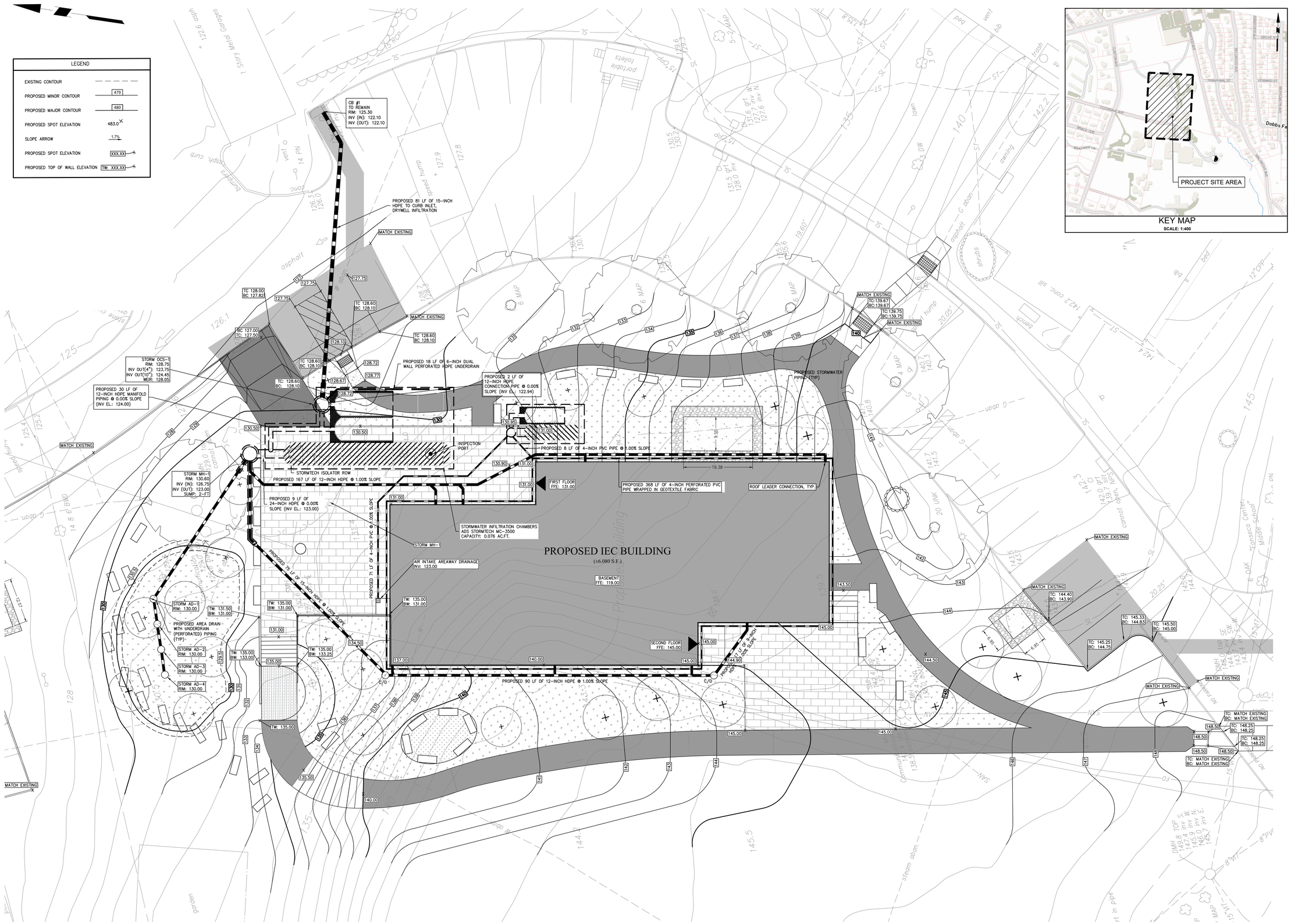
Table 901.10.01-1 Gradation Requirements for DGA

Sieve Size	Percent Passing
1-1/2"	100
3/4"	55 - 90
No. 4	25 - 50
No. 50	5 - 20
No. 200	3 - 10

A-A DRIVEWAY SECTION DETAIL
Scale: NOT TO SCALE

NOTES:
1. THE EXISTING SIDEWALK AND CURB WILL LIKELY BE DISTURBED A SAVE AND ACCESSIBLE PEDESTRIAN ROUTING ACROSS THE TEMPORARY ENTRANCE SHOULD BE PROVIDED.
2. THE SIDEWALK, CURB, AND RIGHT-OF-WAY SHALL BE RESTORED TO THE SATISFACTION OF THE VILLAGE HIGHWAY DEPARTMENT.

1 CONSTRUCTION ACCESS PLAN
Scale: 1"=20'
0 20' 40'



KEY MAP
SCALE: 1:400

MARVEL

145 HUDSON STREET, FLR 3 NEW YORK, NY 10013
212.616.0420

OWNER
THE MASTERS SCHOOL
49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522
TEL 914 479 6400

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145 HUDSON STREET, FLOOR 3
NEW YORK, NEW YORK 10013
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SOUTH PLAINFIELD, NEW JERSEY 07080
TEL 908 922 4622

STRUCTURAL ENGINEER
SILMAN
32 OLD SLIP, FLOOR 10
NEW YORK, NEW YORK 10005
TEL 212 620 7970

BUILDING SYSTEMS ENGINEER
POLISE CONSULTING ENGINEERS, DPC
133 WEST 19TH STREET
NEW YORK, NEW YORK 10011
TEL 212 645 1002

VERTICAL TRANSPORTATION
VDA
145 WEST 30TH STREET, FLOOR 4
NEW YORK, NEW YORK 10001
TEL 212 868 9090

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TEL 212 951 0660

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CODE CONSULTANTS, INC.
440 PARK AVENUE S.
NEW YORK, NEW YORK 10016
TEL 212 447 4033

ARCHITECTURAL SPECIFICATIONS
CONSTRUCTION SPECIFICATIONS, INC
22 TENNENT ROAD
MORGANVILLE, NEW JERSEY 07751
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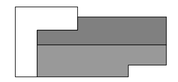


KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

PROPOSED GRADING & DRAINAGE PLAN

SCALE: AS NOTED

1 GRADING & DRAINAGE PLAN
Scale: 1"=10'

0 10' 20'

-PRELIMINARY-
NOT FOR CONSTRUCTION

DOB STAMP ZONE

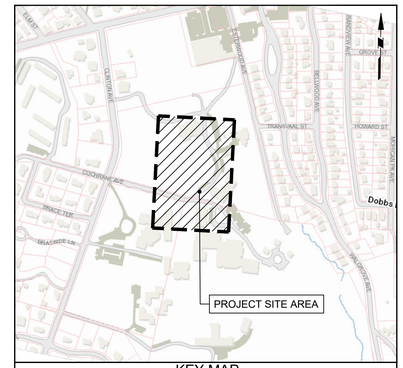
DRAWING #:
C-600
6 of 10

DOB JOB: -

2/10/2021 10:49:38 PM

LEGEND

PROPERTY LINE	
PROPOSED ELECTRIC SERVICE	E E E
PROPOSED SANITARY SERVICE	S
PROPOSED GAS SERVICE	G G G
PROPOSED STEAM SERVICE	STM
PROPOSED WATER SERVICE	W
PROPOSED TELECOM SERVICE	TCOMM



KEY MAP
SCALE: 1:400

SAN MH-6
RIM: 127.7
INV. IN: 124.6
INV. OUT: 124.6

66-LF 6-INCH DIP @ 2.1%

PROPOSED RELOCATION OF EXISTING SANITARY SERVICE, 6-IN DIP

SAN MH-5
RIM: 132.0
INV. IN: 128.0
INV. OUT: 126.0

PROPOSED FIRE HYDRANT W/ (2) 2.5-IN NEW YORK CORP THREADS & (1) 5-IN STORZ CONN.

PROPOSED CONN. TO RELOCATED WATER SERVICE

PROPOSED RELOCATION OF EX. 2-IN WATER SERVICE, PVC

62-LF 6-INCH DIP @ 1.1%

PROPOSED STORZ CONN. AND DRY STANDPIPE (6 C-90)

INSTALL GAS SERVICE TEE FOR FUTURE CONNECTION

PROPOSED RELOCATION OF EXISTING 2" CAST IRON GAS SERVICE

SAN MH-7
RIM: 128.5
INV. IN: 123.9
INV. OUT: 123.9

CONNECT PROPOSED GAS SERVICE TO EXISTING GAS SERVICE

19.38

EXTEND SECONDARY TO 1200A CT CABINET

4 SETS OF 4#500 MCM AL IN 4-IN HDPE CONDUIT AND (1) 4-IN HDPE SPARE CONDUIT. PROVIDE RED WOOD PLANK AND 1-IN WARNING MAGNETIC TAPE ABOVE CONDUIT. PROVIDE 24-IN CLEAN COVER

SAN MH-4
(EX. TO REMAIN)
RIM: 130.65
INV. IN: 126.80
INV. IN: 127.0±
INV. OUT: 126.80
RELOCATED (ABANDONED) CONN. TO BE GROUTED IN PLACE, NEW CONN. TO BE CORE-DRILLED ADJUST FRAME/GRATE TO MATCH GRADE.

PROPOSED SEWER CONNECTION. INVERT AT 127.8 WITH 2% SLOPE

PROPOSED IEC BUILDING
(±6,080 S.F.)

GROUND AS PER CON EDISON STANDARD

300kVA UTILITY TRANSFORMER FURNISHED BY CON EDISON INSTALLED UNDER THIS SCOPE ON CONCRETE HOUSEKEEPING PAD

CONNECT REALIGNED STEAM AND CONDENSATE RETURN SERVICE TO EXISTING SERVICES

SPLICE BOX WITH CRABS AND MANHOLE COVER

4' X 4' HAND HOLE

1/0 AL 15KV PRIMARY CABLE, CON EDISON SPEC 7238AEJ IN 4-IN HDPE CONDUIT. PROVIDE RED WOOD PLANK AND 1-IN WARNING MAGNETIC TAPE ABOVE CONDUIT. PROVIDE 24-IN CLEAN COVER

PROVIDE 15 kV 200A LOAD BREAK, PRIMARY ELBOWS (1/0 AL CONN) AS PER CON EDISON EO-13973-B

80 kW 208V3PA DIESEL-FIRED EMERGENCY GENERATOR ON CONCRETE HOUSEKEEPING PAD

SAN MH-3
RIM: 135.0
INV. IN: 130.2
INV. OUT: 127.2

PROPOSED NEW 3-INCH PVC WATER SERVICE

PROPOSED POST INDICATOR VALVE (7 C-90)

PROPOSED SEWER CONNECTION 4' FROM CORNER. INVERT 126.4 SEWER AT 2% SLOPE

PROPOSED NEW 6-INCH PVC FIRE SERVICE

EXISTING ELECTRICAL MANHOLE TO REMAIN, ADJUST FRAME/GRATE TO MATCH GRADE.

145-LF 10-INCH DIP @ .3%

CONNECT REALIGNED 6-INCH WATER SERVICE TO EXISTING SERVICE

SAN MH-2
RIM: 137.5
INV. IN: 133.5
INV. OUT: 132.5

CONNECT REALIGNED 6" TRICON STEEL 300 STEAM PIPE AND 4" CONDENSATE TRICON STEEL 250 PIPE RETURN SERVICE TO EXISTING SERVICES

PROPOSED RELOCATION OF EXISTING 6-INCH PVC WATER SERVICE WITH IN-KIND

PROPOSED RELOCATION OF CONCRETE-ENCASED ELECTRICAL SERVICE FROM EXISTING (3) T-TAP MEDIUM VOLTAGE CABLES 18" WIDE CONCRETE ENCASEMENT OBSERVED IN 4" CONDUIT

PROPOSED WATER VALVE

PROPOSED RELOCATION OF EXISTING SANITARY SERVICE

PROPOSED RELOCATION OF EXISTING TELECOMMUNICATION AND FIBER OPTIC SERVICE, (1) 100-PAIR COPPER TELEPHONE CABLE & (2) 2" PVC CONDUIT FIBER OPTIC CABLE, TO BE REINSTALLED AS (2) 4" CONDUITS

EXISTING TELECOMMUNICATION AND FIBER OPTIC MANHOLE TO REMAIN. ADJUST FRAME AND GRATE TO MATCH GRADE

SAN MH-1
(EX. TO REMAIN)
RIM: 142.4
INV. IN: 137.7
INV. OUT: 137.53
RELOCATED (ABANDONED) CONN. TO BE GROUTED IN PLACE, NEW CONN. TO BE CORE-DRILLED ADJUST FRAME/GRATE TO MATCH GRADE.

NEW TELECOMM AND FIBER OPTIC SERVICE FROM MASTERS HALL, (2) 4-IN PVC CONDUIT

1 UTILITY RELOCATION PLAN
Scale: 1"=10'

0 10' 20'

-PRELIMINARY-
NOT FOR CONSTRUCTION

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GEOTHERMAL ENGINEER

REV	DATE	DESCRIPTION
1	02/17/2021	VILLAGE OF DOBBS FERRY SITE APPLICATION
2	06/17/2021	SITE APPLICATION RESUBMISSION
3	07/22/2021	SITE APPLICATION RESUBMISSION
4	08/31/2021	SITE APPLICATION RESUBMISSION

08/31/2021

KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

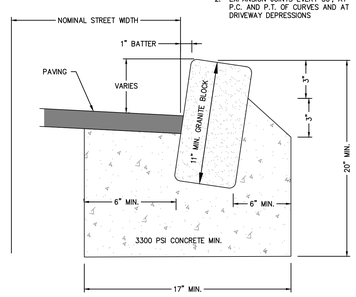
UTILITY PLAN

SCALE: AS NOTED

DRAWING #:
C-700
7 of 10

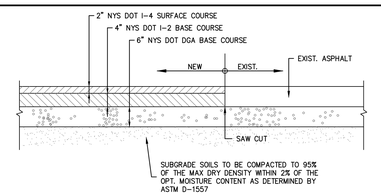
DOB JOB: -

2/10/2021 10:49:38 PM



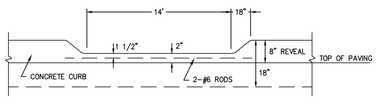
1 STANDARD BELGIAN BLOCK CURB DETAIL

Scale: N.T.S.



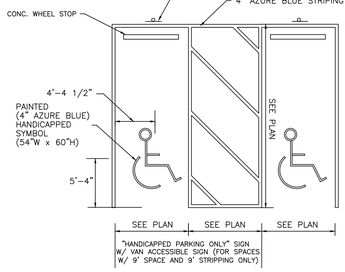
2 STANDARD ASPHALT PAVEMENT DETAIL

Scale: N.T.S.



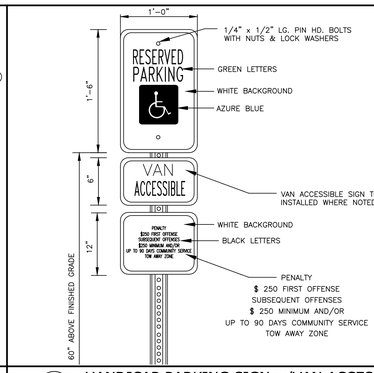
3 STANDARD CURB CUT DETAIL

Scale: N.T.S.



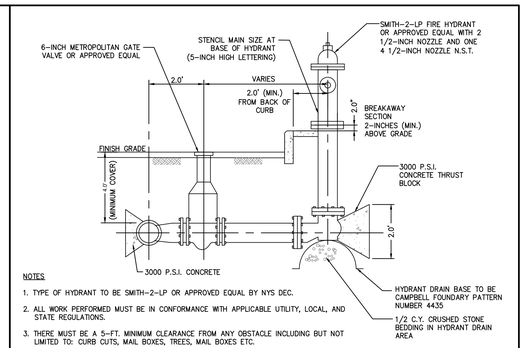
4 HANDICAP STALL MARKINGS DETAIL

Scale: N.T.S.



5 HANDICAP PARKING SIGN w/VAN ACCESSIBLE SIGN

Scale: N.T.S.

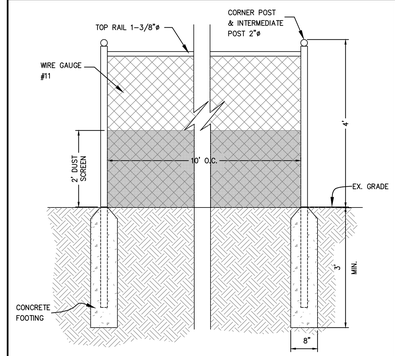


NOTES

1. TYPE OF HYDRANT TO BE SMITH-2-LP OR APPROVED EQUAL BY NYS DEC.
2. ALL WORK PERFORMED MUST BE IN CONFORMANCE WITH APPLICABLE UTILITY, LOCAL, AND STATE REGULATIONS.
3. THERE MUST BE A 5-FT. MINIMUM CLEARANCE FROM ANY OBSTACLE INCLUDING BUT NOT LIMITED TO: CURB CUTS, MAIL BOXES, TREES, MAIL BOXES ETC.

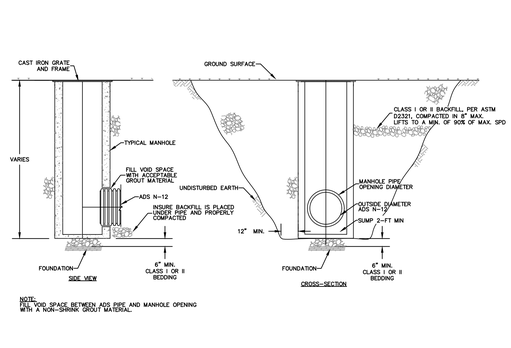
6 STANDARD FIRE HYDRANT DETAIL

Scale: N.T.S.



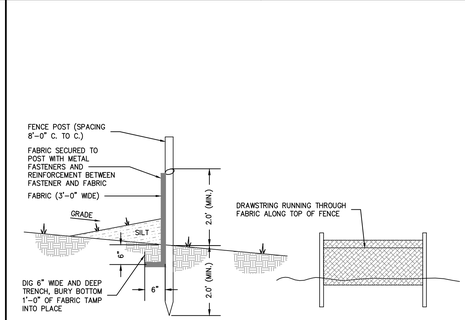
7 STANDARD CHAIN LINKED FENCE DETAIL

Scale: N.T.S.



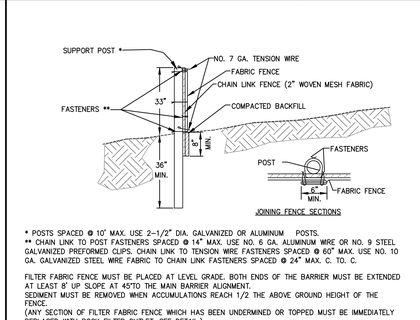
8 STANDARD AREA DRAIN DETAIL

Scale: N.T.S.



9 STANDARD SILT FENCE DETAIL

Scale: N.T.S.

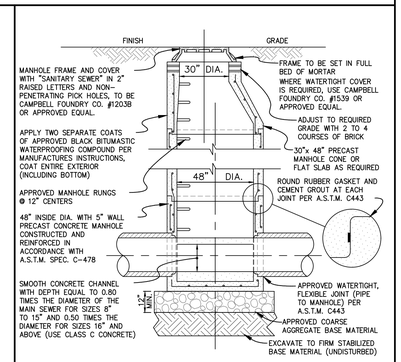


* POSTS SPACED @ 10' MAX. USE 2-1/2" DIA. GALVANIZED OR ALUMINUM POSTS.
** CHAIN LINK TO POST FASTENERS SPACED @ 14" MAX. USE NO. 6 GA. ALUMINUM WIRE OR NO. 9 STEEL GALVANIZED PREFORMED CLIPS. CHAIN LINK TO TENSION WIRE FASTENERS SPACED @ 60" MAX. USE NO. 10 GA. GALVANIZED STEEL WIRE FABRIC TO CHAIN LINK FASTENERS SPACED @ 24" MAX. C. TO. C.

FILTER FABRIC FENCE MUST BE PLACED AT LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8' UP SLOPE AT 45°TO THE MAIN BARRIER ALIGNMENT.
SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
(ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH ROCK FILTER OUTLET. SEE DETAIL.)

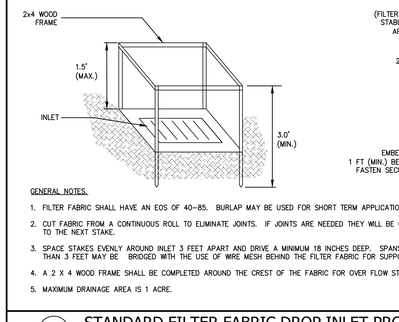
10 STANDARD SUPER SILT FENCE DETAIL

Scale: N.T.S.



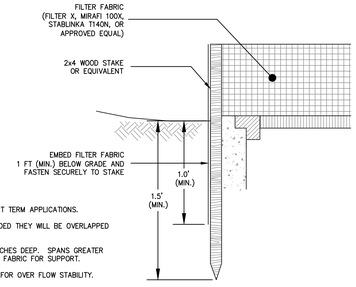
11 PRECAST CONCRETE SANITARY SEWER MANHOLE DETAIL

Scale: N.T.S.



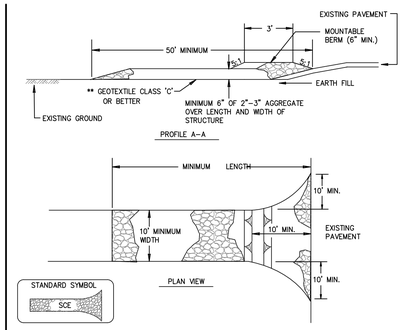
GENERAL NOTES.

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
4. A 2 X 4 WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.
5. MAXIMUM DRAINAGE AREA IS 1 ACRE.



12 STANDARD FILTER FABRIC DROP INLET PROTECTION DETAIL

Scale: N.T.S.



STABILIZED CONSTRUCTION SPECIFICATION FOR STABILIZED ACCESS

1. STONE SIZE - USE ASTM C-33, SIZE NO. 2 (2 ½ TO 1 ½ IN). USE CLEAN CRUSHED ANGULAR STONE. CRUSHED CONCRETE OF SIMILAR SIZE MAY BE SUBSTITUTED BUT WILL REQUIRE MORE FREQUENT UPGRADING AND MAINTENANCE.
2. THICKNESS OF STABILIZED CONSTRUCTION ACCESS SHALL BE NO LESS THAN SIX (6) INCHES.
3. WIDTH OF STABILIZED CONSTRUCTION ACCESS SHALL BE NO LESS THAN THE FULL WIDTH OF POINTS OF INGRESS OR EGRESS.
4. LENGTH
   4.1. 50 FEET MINIMUM WHERE THE SOILS ARE COURSE GRAINED SANDS AND GRAVELS)
   4.2. 100 FEET MINIMUM WHERE SOILS ARE FINE GRAINED (CLAYS OR SILTS), EXCEPT WHERE THE TRAVELED LENGTH IS LESS THAN 50 TO 100 FEET RESPECTIVELY.
5. GEOTEXTILE FABRIC (FILTER FABRIC) SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE.
6. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE REQUIRED AT ALL POINTS WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES THE CONSTRUCTION SITE. ALL CONSTRUCTION VEHICLES AND EQUIPMENT MUST TRAVEL OVER THE STABILIZED CONSTRUCTION ENTRANCE BEFORE LEAVING THE CONSTRUCTION SITE.
7. STORMWATER FROM UP-SLOPE AREAS SHALL BE DIVERTED AWAY FROM THE STABILIZED PAD (SEE STANDARD FOR DIVERSIONS). WHERE DIVERSION IS NOT POSSIBLE, THE LENGTH OF THE STABILIZED PAD SHALL FOLLOW TABLE 29-1.
8. WHERE THE SLOPE OF THE ACCESS ROAD EXCEEDS 5%, A STABILIZED BASE COURSE OF FINE AGGREGATE BITUMINOUS CONCRETE (FABC) SHALL BE INSTALLED. THE TYPE AND THICKNESS OF THE FABC AND USE OF A DENSE GRADED AGGREGATE SUB-BASE SHALL BE AS PRESCRIBED BY LOCAL MUNICIPAL ORDINANCE OR OTHER GOVERNING AUTHORITY.

TABLE 29-1

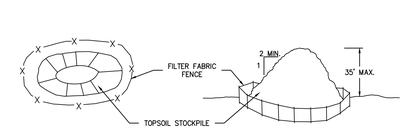
PERCENT SLOPE OF ROADWAY	LENGTH OF STONE REQUIRED	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0 TO 2%	50 FT	100 FT
2 TO 5%	100 FT	200 FT
> 5%	ENTIRE SURFACE STABILIZED WITH FABC BASE COURSE	

MAINTENANCE OF STABILIZED CONSTRUCTION ENTRANCE

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS.
2. MAINTENANCE MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
3. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO ROADWAYS (PUBLIC OR PRIVATE) OR OTHER IMPERVIOUS SURFACES MUST BE REMOVED IMMEDIATELY.
4. WHERE ACCUMULATION OF DUST/SEDIMENT IS INADEQUATELY CLEANED OR REMOVED BY CONVENTIONAL METHODS, A POWER BROOM OR STREET SWEEPER WILL BE REQUIRED TO CLEAN PAVED OR IMPERCIUOS SURFACES.

13 STANDARD CONSTRUCTION ENTRANCE DETAIL

Scale: N.T.S.

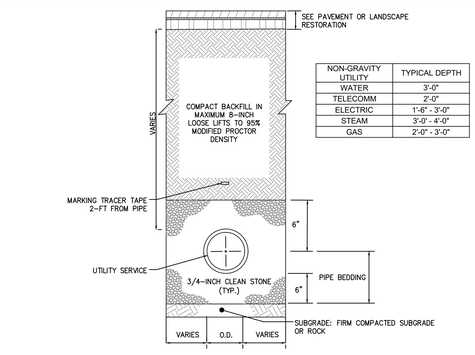


NOTES.

1. SILT FENCE MUST BE PLACED AROUND THE PERIMETER OF ALL STOCKPILES.
2. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL REMAIN IN PLACE 20 DAYS OR MORE.

14 TOPSOIL STOCKPILE DETAIL

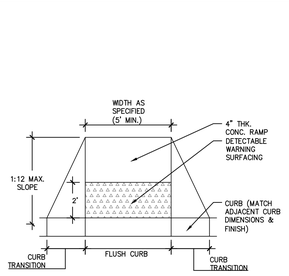
Scale: N.T.S.



NON-GRAVITY UTILITY	TYPICAL DEPTH
WATER	3'-0"
TELECOMM	2'-0"
ELECTRIC	1'-6" - 3'-0"
STEAM	3'-0" - 4'-0"
GAS	2'-0" - 3'-0"

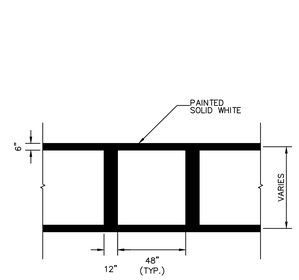
15 UTILITY TRENCHING DETAIL

Scale: N.T.S.



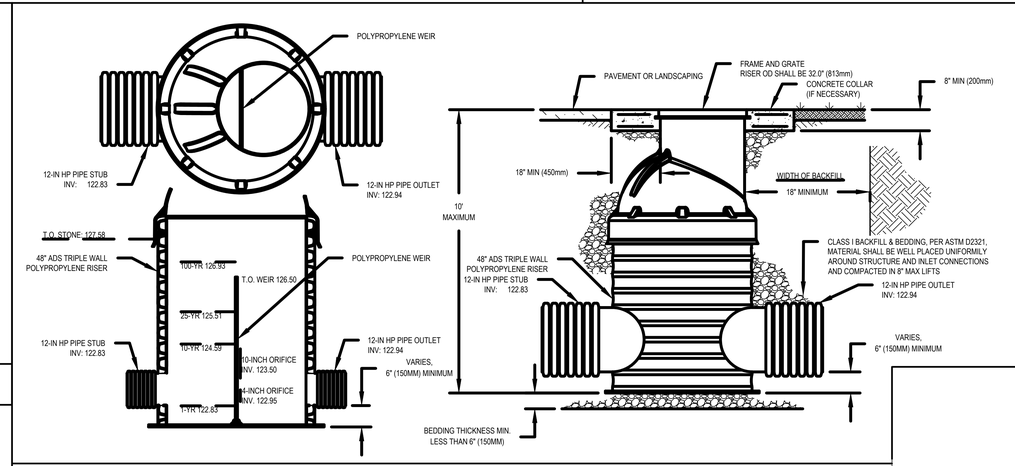
16 PEDESTRIAN CURB RAMP DETAIL

Scale: N.T.S.



17 CROSSWALK STRIPING DETAIL

Scale: N.T.S.



18 OUTLET CONTROL STRUCTURE DETAIL

Scale: N.T.S.

DOB STAMP ZONE

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145 HUDSON STREET, FLR 3 NEW YORK, NY 10013
212.616.0420

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DOBBS FERRY, NEW YORK 10522
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TEL 732 970 0700

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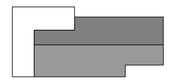
08/31/2021



KEY PLAN:NTS

2029

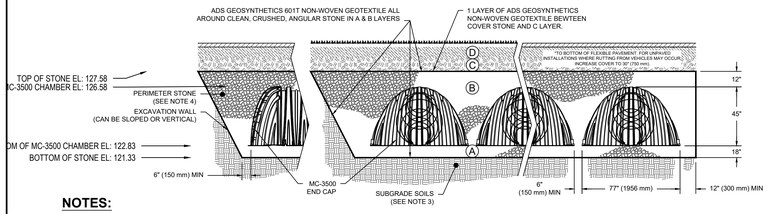
THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

CONSTRUCTION DETAILS

SCALE: AS NOTED

DRAWING #:
C-900
9 of 10
DOB JOB: -

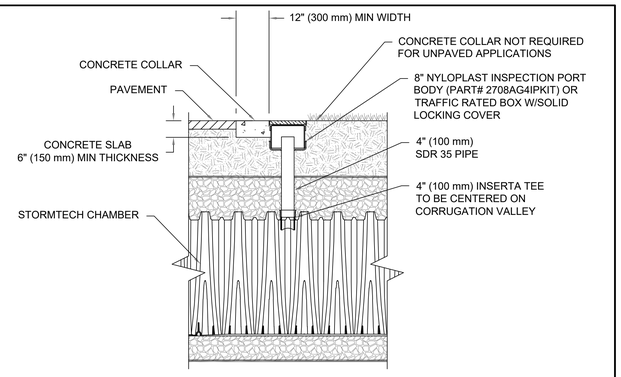


NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45476 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

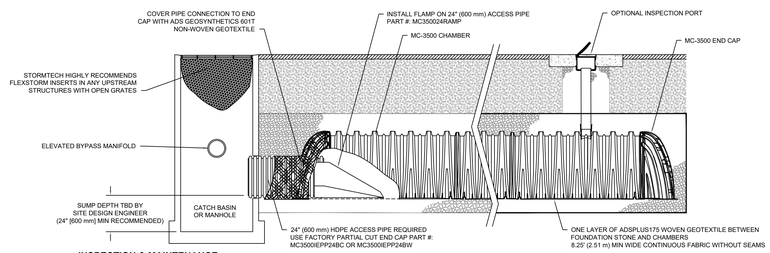
1 ADS STORMTECH MC3500 CHAMBER
Scale: N.T.S.

2 BIORETENTION
Scale: N.T.S.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

3 4" PVC INSPECTION PORT (MC SERIES CHAMBER)
Scale: N.T.S.



INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

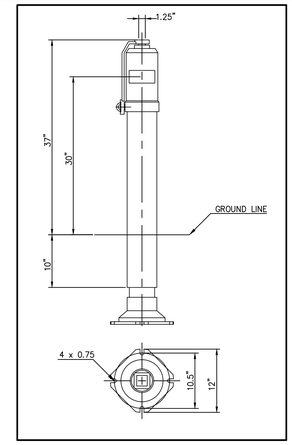
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

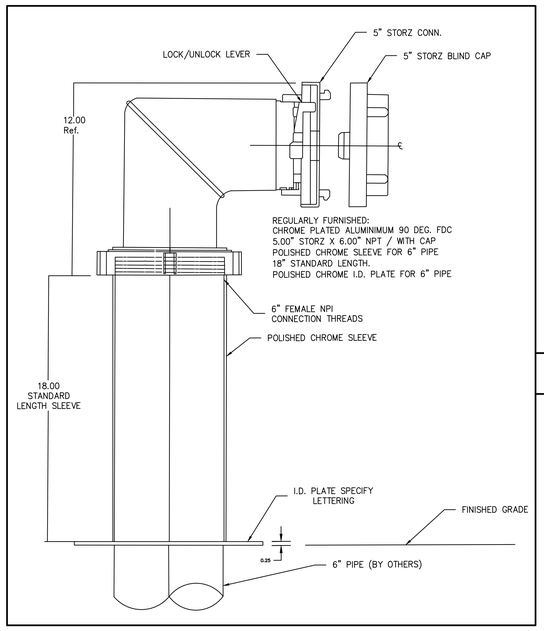
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

4 MC3500 ISOLATOR ROW PLUS
Scale: N.T.S.

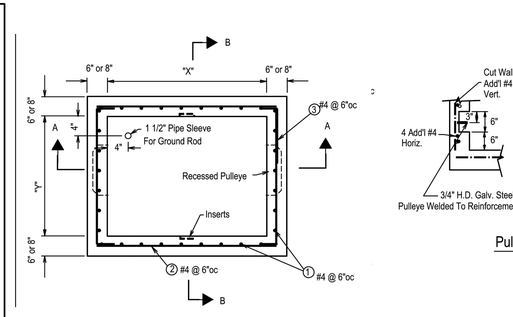
5 NOT USED
Scale: N.T.S.

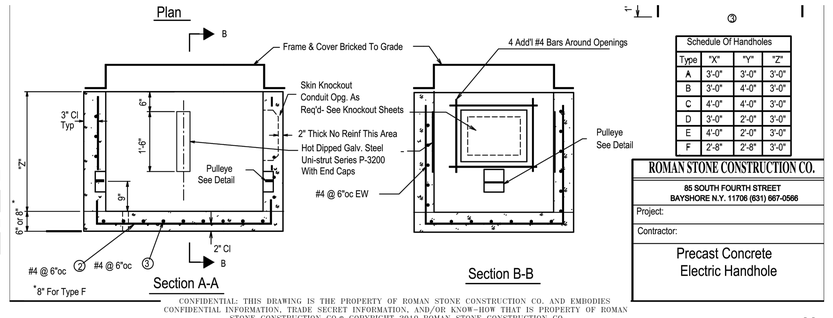


6 POST INDICATOR VALVE
Scale: N.T.S.



7 5" STORZ X 6" NPT 90 DEG. FDC
Scale: N.T.S.





Schedule Of Handholes			
Type	"X"	"Y"	"Z"
A	3'-0"	3'-0"	3'-0"
B	3'-0"	4'-0"	3'-0"
C	4'-0"	4'-0"	3'-0"
D	3'-0"	2'-0"	3'-0"
E	4'-0"	2'-0"	3'-0"
F	2'-8"	2'-8"	3'-0"

ROMAN STONE CONSTRUCTION CO.
85 SOUTH FOURTH STREET
BAYSHORE N.Y. 11706 (631) 667-0566
Project:
Contractor:
Precast Concrete Electric Handhole

33

8 PRECAST CONCRETE ELECTRIC HANDHOLE
Scale: N.T.S.

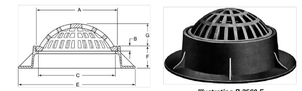
■ Note: When specifying/ordering grates, refer to "Choosing the Proper Inlet Grate" on pages 125-126.
For a complete listing of FREE OPEN AREAS and WEIR PERIMETERS of all NEENAH grates, refer to pages 327-332.

FLAT GRATES & CURB INLET GRATES

R-2560 Series
Inlet Frame, Beehive Grate

Suitable for drainage in circumstances where clogging of a flat grating is a problem. Excellent for roadside or earth ditch inlets.

CATALOG NUMBER	GRATE TYPE	SQ. FT. OPEN	WEIR PERIMETER LINEAL FEET
R-2560-A	Beehive	0.3	3.1



Illustrating R-2560-E

Dimensions in inches

Catalog No.	A	B	C	D	E	F	G	Frame/Lid
R-2560-A	12	1	11	1/8	4	3 1/4		R-1781-A

9 AREA DRAIN
Scale: N.T.S.

MARVEL
145 HUDSON STREET, FLR 3 NEW YORK, NY 10013
212.616.0420

OWNER
THE MASTERS SCHOOL
49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522
TEL 914 479 6400

PROJECT ARCHITECTS + LANDSCAPE ARCHITECTS
MARVEL
145 HUDSON STREET, FLOOR 3
NEW YORK, NEW YORK 10013
TEL 212 616 0420

GEOTECHNICAL / CIVIL ENGINEER
MFS ENGINEERS & SURVEYORS, DPC
2780 HAMILTON BOULEVARD
SOUTH PLAINFIELD, NEW JERSEY 07080
TEL 908 922 4622

STRUCTURAL ENGINEER
SILMAN
32 OLD SLIP, FLOOR 10
NEW YORK, NEW YORK 10005
TEL 212 620 7970

BUILDING SYSTEMS ENGINEER
POLISE CONSULTING ENGINEERS, DPC
133 WEST 19TH STREET
NEW YORK, NEW YORK 10011
TEL 212 645 1002

VERTICAL TRANSPORTATION
VDA
145 WEST 30TH STREET, FLOOR 4
NEW YORK, NEW YORK 10001
TEL 212 868 9090

AV / IT / SECURITY CONSULTANT
COSENTINI ASSOCIATES, INC.
498 SEVENTH AVENUE
NEW YORK, NEW YORK 10018
TEL 212 615 3600

ACOUSTICS CONSULTANT
LSTN CONSULTANTS
76 BEAVER STREET
NEW YORK, NEW YORK 10005
TEL 347 788 0810

ENVELOPE CONSULTANT
MW-SKINS
1 WHITEHALL STREET, FLOOR 14
NEW YORK, NEW YORK 10004
TEL 347 809 6790

LIGHTING DESIGNER
DOT DASH LIGHTING DESIGN
120 WALKER STREET, SUITE #6E
NEW YORK, NEW YORK 10013
TEL 212 951 0660

CODE AND ACCESSIBILITY CONSULTANT
CODE CONSULTANTS, INC.
440 PARK AVENUE S.
NEW YORK, NEW YORK 10016
TEL 212 447 4033

ARCHITECTURAL SPECIFICATIONS
CONSTRUCTION SPECIFICATIONS, INC
22 TENNENT ROAD
MORGANVILLE, NEW JERSEY 07751
TEL 732 970 0700

GEOTHERMAL ENGINEER

REV	DATE	DESCRIPTION
1	02/17/2021	VILLAGE OF DOBBS FERRY SITE APPLICATION
2	06/17/2021	SITE APPLICATION RESUBMISSION
3	07/22/2021	SITE APPLICATION RESUBMISSION
4	08/31/2021	SITE APPLICATION RESUBMISSION

08/31/2021

KEY PLAN:NTS

2029

THE MASTERS SCHOOL INNOVATION AND ENTREPRENEURSHIP CENTER

49 CLINTON AVENUE
DOBBS FERRY, NEW YORK 10522

CONSTRUCTION DETAILS

SCALE: AS NOTED

DOB STAMP ZONE

DRAWING #:
C-901
10 of 10
DOB JOB: -

2/10/2021 10:49:38 PM

APPENDIX F:
POST CONSTRUCTION INSPECTION AND MAINTENANCE CHECKLIST
UNDERGROUND INFILTRATION SYSTEM

Post Construction Inspection and Maintenance Checklist
Underground Infiltration System

	Yes	No	NA
1. Inlet and Outlet Structures (Frequency: Annual)			
a. Concrete structure	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement.	☐	☐	☐
Maintenance: Repair any minor cracks. If minor displacement is observed, re-inspect in 6 months. Replace structure if major cracks or significant displacement is observed.			
b. Minor spalling (<1").	☐	☐	☐
Maintenance: Repair any minor spalling.			
c. Major spalling (rebars exposed).	☐	☐	☐
Maintenance: Replace structure.			
d. Joint failures.	☐	☐	☐
Maintenance: Replace structure.			
e. Water tightness.	☐	☐	☐
Maintenance: Reseal structure for water tightness if minor leaks are observed. Replace structure if significant leaks are observed.			
ii. Clear of sediment.	☐	☐	☐
Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of sump height.			
iii. Clear of debris and trash.	☐	☐	☐
Maintenance: Remove and properly dispose of any debris and trash.			
iv. Pipes free from damage, corrosion, and sediment.	☐	☐	☐
Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.			

	Yes	No	NA
2. Header System (Frequency: Annual)			
a. Clear of debris and litter.	☐	☐	☐
Maintenance: Use a high pressure nozzle with rear facing jets to wash the sediment and debris into the upstream structure. Remove sediment and debris from the sump of the upstream structure.			
b. Clear of sediment.	☐	☐	☐
Maintenance: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.			

3. Isolator/Containment Row

(Frequency: Annual)	**Yes**	**No**	**NA**
a. Clear of debris and litter. *Maintenance: Remove and properly dispose of any debris and trash. Use a high pressure nozzle with rear facing jets to wash the debris into the upstream structure. Remove debris from the sump of the upstream structure.*	☐	☐	☐
b. Clear of sediment. *Maintenance: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.*	☐	☐	☐

4. Underground Chambers

(Frequency: Annual)	**Yes**	**No**	**NA**
a. Chambers are in good condition. *Maintenance: Inspect the interior of the chambers using a CCTV or comparable inspection method through the inspection port. If deficiencies are noted immediately contact a NYS licensed Professional Engineer.*	☐	☐	☐
b. Clear of debris and litter. *Maintenance: Remove and properly dispose of any debris and trash. Use a high pressure nozzle with rear facing jets to wash the debris into the upstream structure. Remove debris from the sump of the upstream structure.*	☐	☐	☐
c. Clear of sediment. *Maintenance: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.*	☐	☐	☐
d. Dewaters between storms. *Maintenance: If standing water during inspection, recheck after 48 hours. If standing water is still present, contact a NYS licensed Professional Engineer.*	☐	☐	☐

5. Surrounding Site

(Frequency: Monthly)	**Yes**	**No**	**NA**
a. Vegetation and ground cover adequate. *Maintenance: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
b. Area free from depressions. *Maintenance: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.*	☐	☐	☐

	Yes	No	NA
c. Unauthorized plants over system. *<u>Maintenance</u>: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐
d. Unauthorized structures over system. *<u>Maintenance</u>: Remove any unauthorized structures. Immediately inspect the interior of the chambers using a CCTV or comparable inspection method through the inspection port. If deficiencies are noted immediately contact a NYS licensed Professional Engineer.*	☐	☐	☐

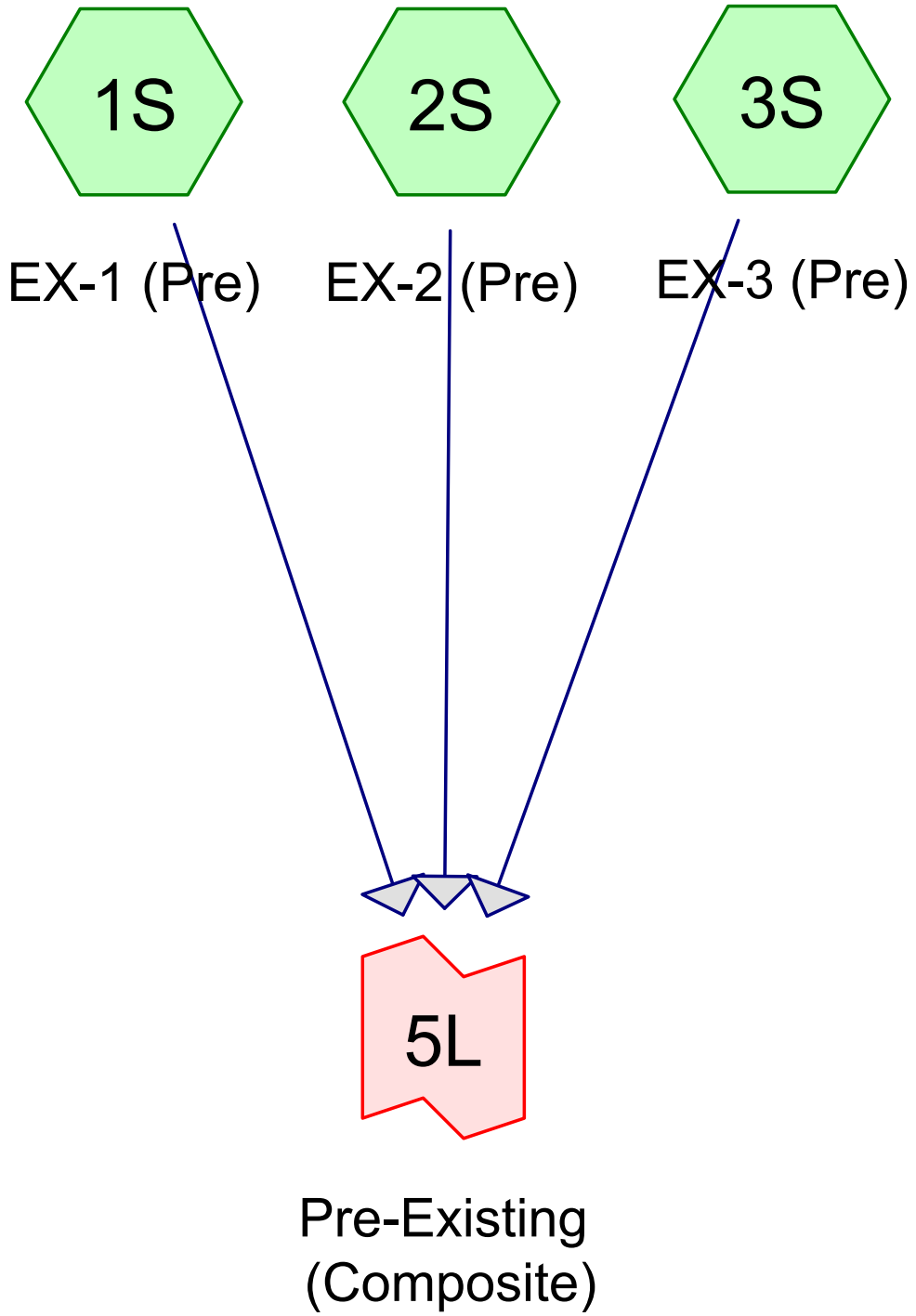
Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.

Comments:

Actions to be taken:

APPENDIX G:
SUPPORTING CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for 1120062_Pre
Prepared by MFS Consulting Engineers & Surveyor, DPC, Printed 8/27/2021
HydroCAD® 10.00-26 s/n 08924 © 2020 HydroCAD Software Solutions LLC

Project Notes

Defined 10 rainfall events from NY-Westchester IDF

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.193	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
1.193	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.193	HSG C	1S, 2S, 3S
0.000	HSG D	
0.000	Other	
1.193		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.193	0.000	0.000	1.193	>75% Grass cover, Good	1S, 2S, 3S
0.000	**0.000**	**1.193**	**0.000**	**0.000**	**1.193**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX-1 (Pre) Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>0.78"
Flow Length=260' Tc=6.6 min CN=74 Runoff=0.16 cfs 0.012 af

Subcatchment2S: EX-2 (Pre) Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>0.78"
Flow Length=330' Tc=7.2 min CN=74 Runoff=0.57 cfs 0.042 af

Subcatchment3S: EX-3 (Pre) Runoff Area=0.373 ac 0.00% Impervious Runoff Depth>0.78"
Flow Length=280' Tc=10.7 min CN=74 Runoff=0.30 cfs 0.024 af

Link 5L: Pre-Existing(Composite) Inflow=0.99 cfs 0.078 af
Primary=0.99 cfs 0.078 af

Total Runoff Area = 1.193 ac Runoff Volume = 0.078 af Average Runoff Depth = 0.78"
100.00% Pervious = 1.193 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX-1 (Pre)

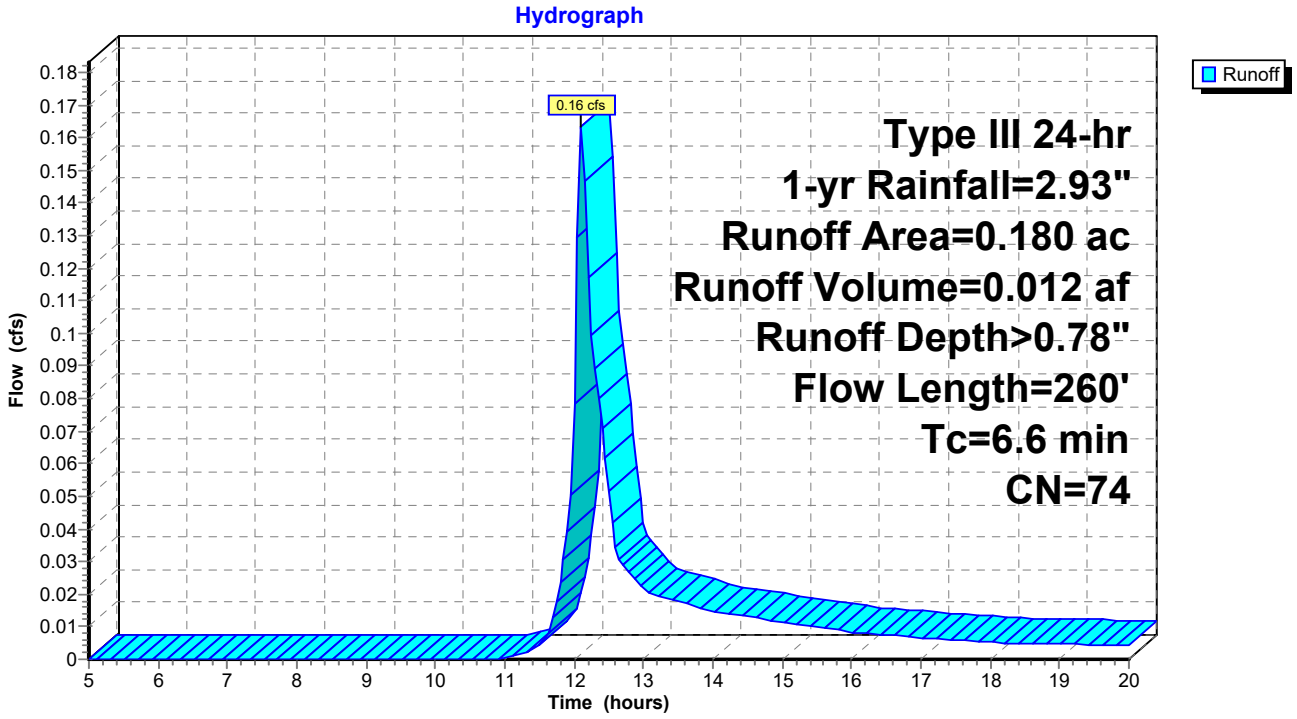
Runoff = 0.16 cfs @ 12.11 hrs, Volume= 0.012 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.93"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.3	160	0.0812	1.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.6	260	Total			

Subcatchment 1S: EX-1 (Pre)



Hydrograph for Subcatchment 1S: EX-1 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00
5.25	0.18	0.00	0.00
5.50	0.19	0.00	0.00
5.75	0.20	0.00	0.00
6.00	0.21	0.00	0.00
6.25	0.22	0.00	0.00
6.50	0.24	0.00	0.00
6.75	0.25	0.00	0.00
7.00	0.27	0.00	0.00
7.25	0.28	0.00	0.00
7.50	0.30	0.00	0.00
7.75	0.32	0.00	0.00
8.00	0.33	0.00	0.00
8.25	0.35	0.00	0.00
8.50	0.38	0.00	0.00
8.75	0.40	0.00	0.00
9.00	0.43	0.00	0.00
9.25	0.46	0.00	0.00
9.50	0.49	0.00	0.00
9.75	0.52	0.00	0.00
10.00	0.55	0.00	0.00
10.25	0.59	0.00	0.00
10.50	0.63	0.00	0.00
10.75	0.68	0.00	0.00
11.00	0.73	0.00	0.00
11.25	0.79	0.00	0.00
11.50	0.87	0.01	0.00
11.75	1.04	0.03	0.02
12.00	1.46	0.14	**0.08**
12.25	1.89	0.30	**0.10**
12.50	2.06	0.38	0.05
12.75	2.14	0.42	0.03
13.00	2.20	0.45	0.02
13.25	2.25	0.47	0.02
13.50	2.30	0.50	0.02
13.75	2.34	0.52	0.02
14.00	2.38	0.54	0.01
14.25	2.41	0.56	0.01
14.50	2.44	0.58	0.01
14.75	2.47	0.59	0.01
15.00	2.50	0.61	0.01
15.25	2.53	0.62	0.01
15.50	2.55	0.64	0.01
15.75	2.58	0.65	0.01
16.00	2.60	0.66	0.01
16.25	2.61	0.67	0.01
16.50	2.63	0.68	0.01
16.75	2.65	0.69	0.01
17.00	2.66	0.70	0.01
17.25	2.68	0.71	0.01
17.50	2.69	0.72	0.01
17.75	2.71	0.73	0.01
18.00	2.72	0.74	0.01
18.25	2.73	0.74	0.01
18.50	2.74	0.75	0.00
18.75	2.75	0.76	0.00
19.00	2.76	0.76	0.00
19.25	2.77	0.77	0.00
19.50	2.78	0.77	0.00
19.75	2.79	0.78	0.00
20.00	**2.80**	**0.79**	0.00

Summary for Subcatchment 2S: EX-2 (Pre)

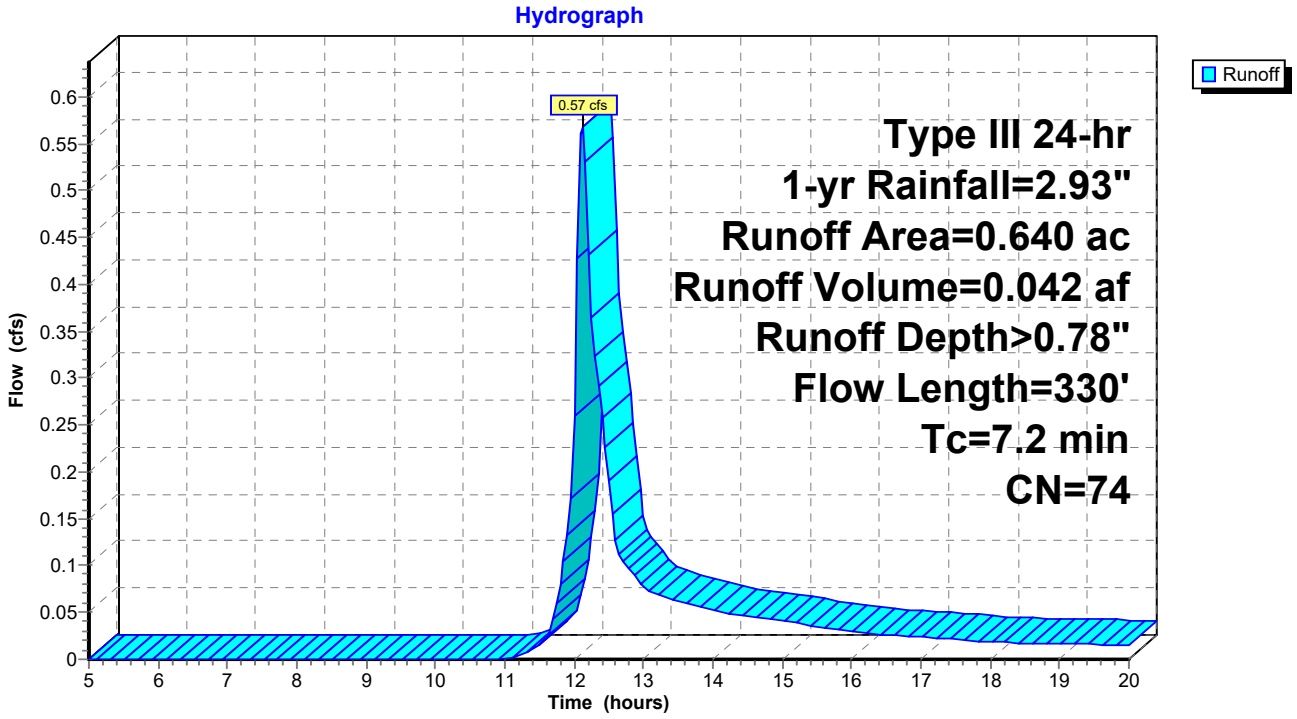
Runoff = 0.57 cfs @ 12.12 hrs, Volume= 0.042 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.93"

Area (ac)	CN	Description
0.640	74	>75% Grass cover, Good, HSG C
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.9	230	0.0840	2.03		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
7.2	330	Total			

Subcatchment 2S: EX-2 (Pre)



Hydrograph for Subcatchment 2S: EX-2 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00
5.25	0.18	0.00	0.00
5.50	0.19	0.00	0.00
5.75	0.20	0.00	0.00
6.00	0.21	0.00	0.00
6.25	0.22	0.00	0.00
6.50	0.24	0.00	0.00
6.75	0.25	0.00	0.00
7.00	0.27	0.00	0.00
7.25	0.28	0.00	0.00
7.50	0.30	0.00	0.00
7.75	0.32	0.00	0.00
8.00	0.33	0.00	0.00
8.25	0.35	0.00	0.00
8.50	0.38	0.00	0.00
8.75	0.40	0.00	0.00
9.00	0.43	0.00	0.00
9.25	0.46	0.00	0.00
9.50	0.49	0.00	0.00
9.75	0.52	0.00	0.00
10.00	0.55	0.00	0.00
10.25	0.59	0.00	0.00
10.50	0.63	0.00	0.00
10.75	0.68	0.00	0.00
11.00	0.73	0.00	0.00
11.25	0.79	0.00	0.01
11.50	0.87	0.01	0.01
11.75	1.04	0.03	0.06
12.00	1.46	0.14	**0.26**
12.25	1.89	0.30	**0.36**
12.50	2.06	0.38	0.19
12.75	2.14	0.42	0.10
13.00	2.20	0.45	0.08
13.25	2.25	0.47	0.07
13.50	2.30	0.50	0.06
13.75	2.34	0.52	0.06
14.00	2.38	0.54	0.05
14.25	2.41	0.56	0.05
14.50	2.44	0.58	0.05
14.75	2.47	0.59	0.04
15.00	2.50	0.61	0.04
15.25	2.53	0.62	0.04
15.50	2.55	0.64	0.04
15.75	2.58	0.65	0.03
16.00	2.60	0.66	0.03
16.25	2.61	0.67	0.03
16.50	2.63	0.68	0.03
16.75	2.65	0.69	0.03
17.00	2.66	0.70	0.02
17.25	2.68	0.71	0.02
17.50	2.69	0.72	0.02
17.75	2.71	0.73	0.02
18.00	2.72	0.74	0.02
18.25	2.73	0.74	0.02
18.50	2.74	0.75	0.02
18.75	2.75	0.76	0.02
19.00	2.76	0.76	0.02
19.25	2.77	0.77	0.02
19.50	2.78	0.77	0.02
19.75	2.79	0.78	0.02
20.00	**2.80**	**0.79**	0.02

Summary for Subcatchment 3S: EX-3 (Pre)

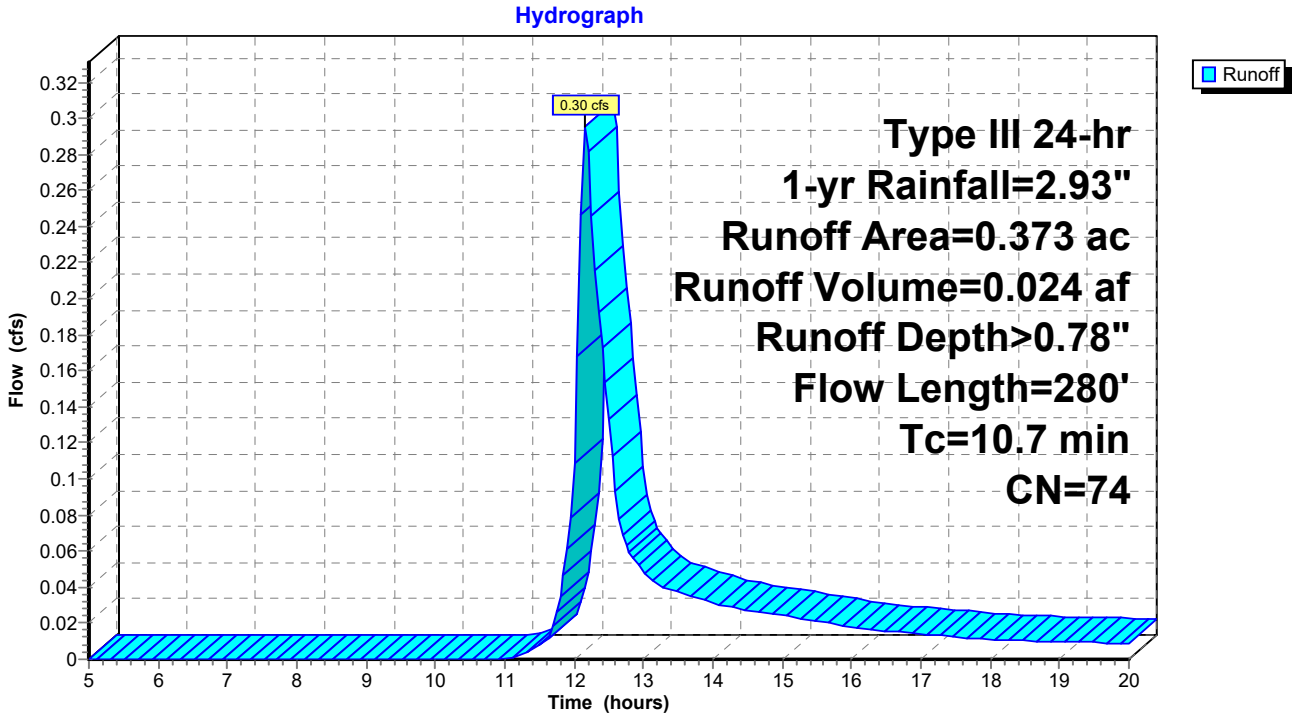
Runoff = 0.30 cfs @ 12.17 hrs, Volume= 0.024 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.93"

Area (ac)	CN	Description
0.373	74	>75% Grass cover, Good, HSG C
0.373		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0200	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.4	180	0.0972	2.18		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.7	280	Total			

Subcatchment 3S: EX-3 (Pre)



Hydrograph for Subcatchment 3S: EX-3 (Pre)

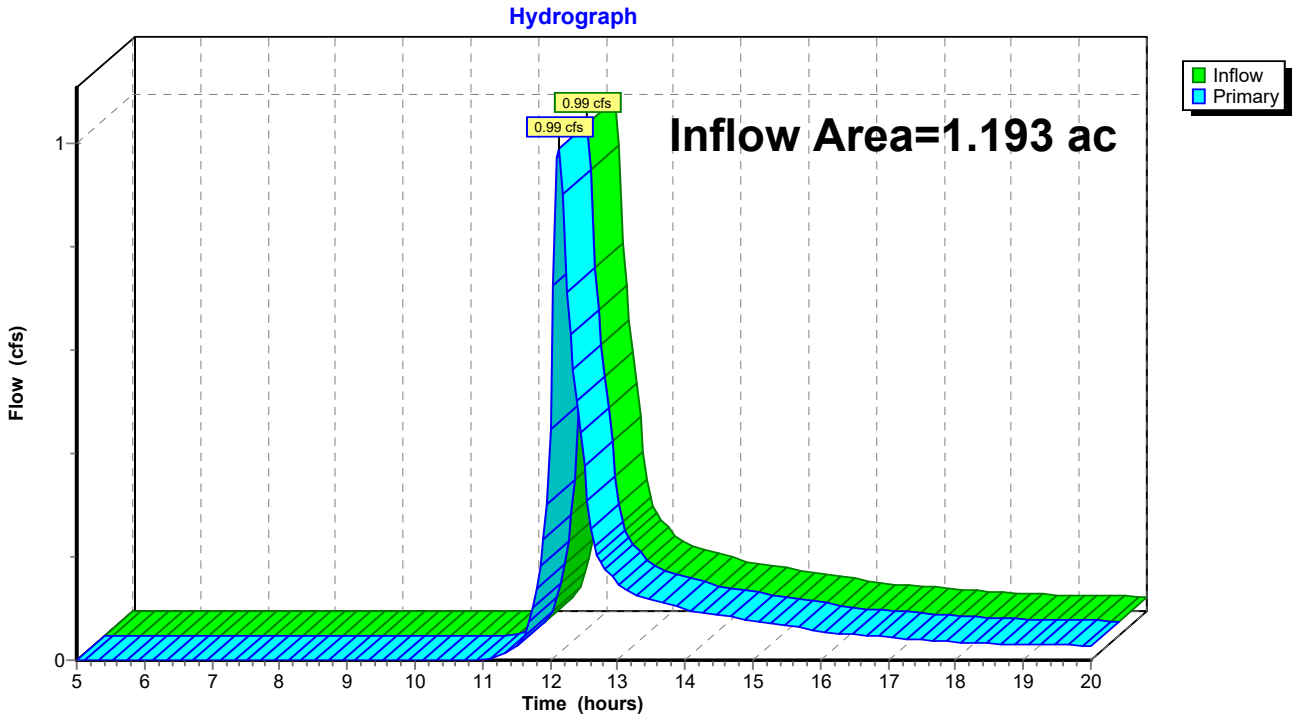
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00
5.25	0.18	0.00	0.00
5.50	0.19	0.00	0.00
5.75	0.20	0.00	0.00
6.00	0.21	0.00	0.00
6.25	0.22	0.00	0.00
6.50	0.24	0.00	0.00
6.75	0.25	0.00	0.00
7.00	0.27	0.00	0.00
7.25	0.28	0.00	0.00
7.50	0.30	0.00	0.00
7.75	0.32	0.00	0.00
8.00	0.33	0.00	0.00
8.25	0.35	0.00	0.00
8.50	0.38	0.00	0.00
8.75	0.40	0.00	0.00
9.00	0.43	0.00	0.00
9.25	0.46	0.00	0.00
9.50	0.49	0.00	0.00
9.75	0.52	0.00	0.00
10.00	0.55	0.00	0.00
10.25	0.59	0.00	0.00
10.50	0.63	0.00	0.00
10.75	0.68	0.00	0.00
11.00	0.73	0.00	0.00
11.25	0.79	0.00	0.00
11.50	0.87	0.01	0.01
11.75	1.04	0.03	0.03
12.00	1.46	0.14	**0.11**
12.25	1.89	0.30	**0.25**
12.50	2.06	0.38	0.13
12.75	2.14	0.42	0.06
13.00	2.20	0.45	0.05
13.25	2.25	0.47	0.04
13.50	2.30	0.50	0.04
13.75	2.34	0.52	0.03
14.00	2.38	0.54	0.03
14.25	2.41	0.56	0.03
14.50	2.44	0.58	0.03
14.75	2.47	0.59	0.03
15.00	2.50	0.61	0.02
15.25	2.53	0.62	0.02
15.50	2.55	0.64	0.02
15.75	2.58	0.65	0.02
16.00	2.60	0.66	0.02
16.25	2.61	0.67	0.02
16.50	2.63	0.68	0.02
16.75	2.65	0.69	0.01
17.00	2.66	0.70	0.01
17.25	2.68	0.71	0.01
17.50	2.69	0.72	0.01
17.75	2.71	0.73	0.01
18.00	2.72	0.74	0.01
18.25	2.73	0.74	0.01
18.50	2.74	0.75	0.01
18.75	2.75	0.76	0.01
19.00	2.76	0.76	0.01
19.25	2.77	0.77	0.01
19.50	2.78	0.77	0.01
19.75	2.79	0.78	0.01
20.00	**2.80**	**0.79**	0.01

Summary for Link 5L: Pre-Existing (Composite)

Inflow Area = 1.193 ac, 0.00% Impervious, Inflow Depth > 0.78" for 1-yr event
Inflow = 0.99 cfs @ 12.13 hrs, Volume= 0.078 af
Primary = 0.99 cfs @ 12.13 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Pre-Existing (Composite)



Hydrograph for Link 5L: Pre-Existing (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00
7.25	0.00	0.00	0.00
7.50	0.00	0.00	0.00
7.75	0.00	0.00	0.00
8.00	0.00	0.00	0.00
8.25	0.00	0.00	0.00
8.50	0.00	0.00	0.00
8.75	0.00	0.00	0.00
9.00	0.00	0.00	0.00
9.25	0.00	0.00	0.00
9.50	0.00	0.00	0.00
9.75	0.00	0.00	0.00
10.00	0.00	0.00	0.00
10.25	0.00	0.00	0.00
10.50	0.00	0.00	0.00
10.75	0.00	0.00	0.00
11.00	0.00	0.00	0.00
11.25	0.01	0.00	0.01
11.50	0.03	0.00	0.03
11.75	0.10	0.00	0.10
12.00	**0.45**	0.00	**0.45**
12.25	**0.71**	0.00	**0.71**
12.50	0.38	0.00	0.38
12.75	0.19	0.00	0.19
13.00	0.15	0.00	0.15
13.25	0.13	0.00	0.13
13.50	0.12	0.00	0.12
13.75	0.11	0.00	0.11
14.00	0.10	0.00	0.10
14.25	0.09	0.00	0.09
14.50	0.09	0.00	0.09
14.75	0.08	0.00	0.08
15.00	0.08	0.00	0.08
15.25	0.07	0.00	0.07
15.50	0.07	0.00	0.07
15.75	0.06	0.00	0.06
16.00	0.06	0.00	0.06
16.25	0.05	0.00	0.05
16.50	0.05	0.00	0.05
16.75	0.05	0.00	0.05
17.00	0.04	0.00	0.04
17.25	0.04	0.00	0.04
17.50	0.04	0.00	0.04
17.75	0.04	0.00	0.04
18.00	0.03	0.00	0.03
18.25	0.03	0.00	0.03
18.50	0.03	0.00	0.03
18.75	0.03	0.00	0.03
19.00	0.03	0.00	0.03
19.25	0.03	0.00	0.03
19.50	0.03	0.00	0.03
19.75	0.03	0.00	0.03
20.00	0.03	0.00	0.03

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX-1 (Pre) Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>2.59"
Flow Length=260' Tc=6.6 min CN=74 Runoff=0.57 cfs 0.039 af

Subcatchment2S: EX-2 (Pre) Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>2.59"
Flow Length=330' Tc=7.2 min CN=74 Runoff=1.98 cfs 0.138 af

Subcatchment3S: EX-3 (Pre) Runoff Area=0.373 ac 0.00% Impervious Runoff Depth>2.59"
Flow Length=280' Tc=10.7 min CN=74 Runoff=1.03 cfs 0.081 af

Link 5L: Pre-Existing(Composite) Inflow=3.51 cfs 0.258 af
Primary=3.51 cfs 0.258 af

Total Runoff Area = 1.193 ac Runoff Volume = 0.258 af Average Runoff Depth = 2.59"
100.00% Pervious = 1.193 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX-1 (Pre)

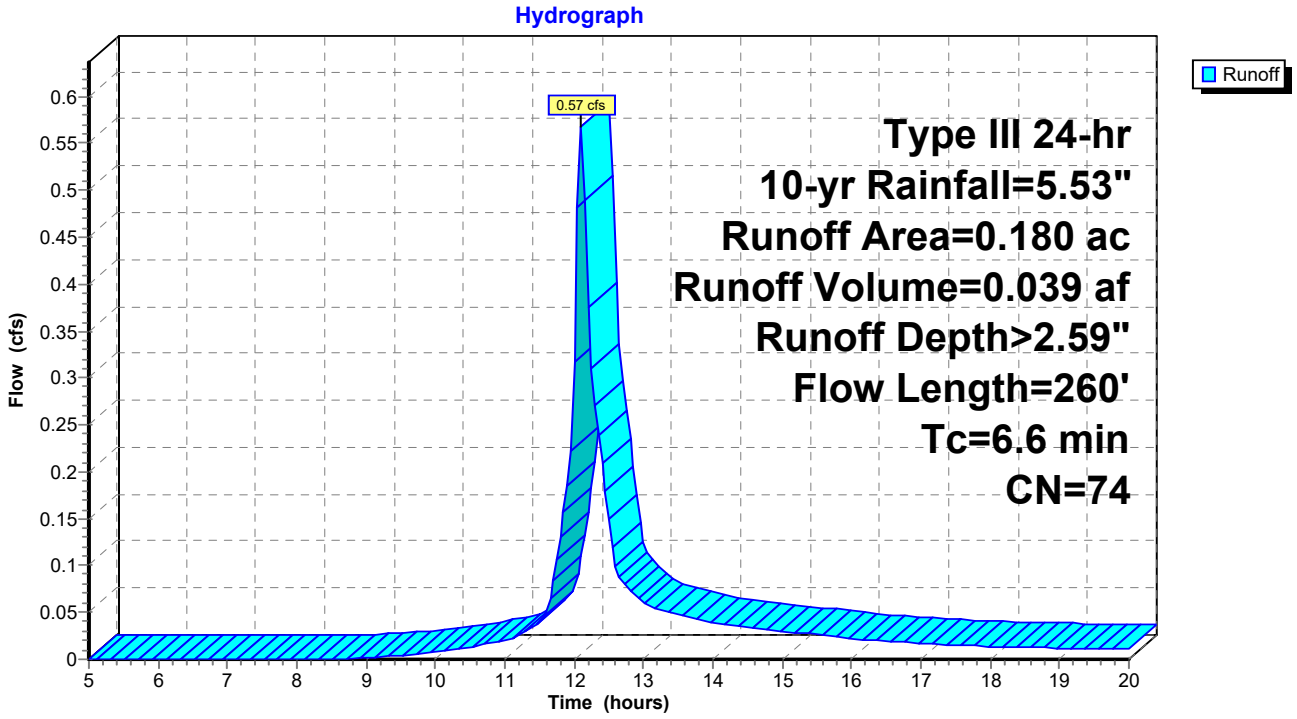
Runoff = 0.57 cfs @ 12.10 hrs, Volume= 0.039 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.53"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.3	160	0.0812	1.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.6	260	Total			

Subcatchment 1S: EX-1 (Pre)



Hydrograph for Subcatchment 1S: EX-1 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.31	0.00	0.00
5.25	0.33	0.00	0.00
5.50	0.35	0.00	0.00
5.75	0.38	0.00	0.00
6.00	0.40	0.00	0.00
6.25	0.42	0.00	0.00
6.50	0.45	0.00	0.00
6.75	0.47	0.00	0.00
7.00	0.50	0.00	0.00
7.25	0.53	0.00	0.00
7.50	0.56	0.00	0.00
7.75	0.60	0.00	0.00
8.00	0.63	0.00	0.00
8.25	0.67	0.00	0.00
8.50	0.71	0.00	0.00
8.75	0.76	0.00	0.00
9.00	0.81	0.00	0.00
9.25	0.86	0.01	0.00
9.50	0.92	0.01	0.00
9.75	0.98	0.02	0.01
10.00	1.05	0.03	0.01
10.25	1.12	0.04	0.01
10.50	1.20	0.06	0.01
10.75	1.29	0.08	0.02
11.00	1.38	0.11	0.02
11.25	1.50	0.15	0.03
11.50	1.65	0.20	0.04
11.75	1.96	0.33	0.11
12.00	2.76	0.76	**0.32**
12.25	3.57	1.29	**0.31**
12.50	3.88	1.51	0.15
12.75	4.03	1.62	0.08
13.00	4.15	1.71	0.06
13.25	4.24	1.78	0.05
13.50	4.33	1.84	0.05
13.75	4.41	1.91	0.04
14.00	4.48	1.96	0.04
14.25	4.55	2.01	0.04
14.50	4.61	2.06	0.03
14.75	4.67	2.10	0.03
15.00	4.72	2.15	0.03
15.25	4.77	2.19	0.03
15.50	4.82	2.22	0.03
15.75	4.86	2.25	0.02
16.00	4.90	2.28	0.02
16.25	4.93	2.31	0.02
16.50	4.97	2.34	0.02
16.75	5.00	2.36	0.02
17.00	5.03	2.39	0.02
17.25	5.06	2.41	0.02
17.50	5.08	2.43	0.02
17.75	5.11	2.45	0.01
18.00	5.13	2.47	0.01
18.25	5.15	2.49	0.01
18.50	5.18	2.50	0.01
18.75	5.20	2.52	0.01
19.00	5.22	2.54	0.01
19.25	5.24	2.55	0.01
19.50	5.26	2.57	0.01
19.75	5.27	2.58	0.01
20.00	**5.29**	**2.60**	0.01

Summary for Subcatchment 2S: EX-2 (Pre)

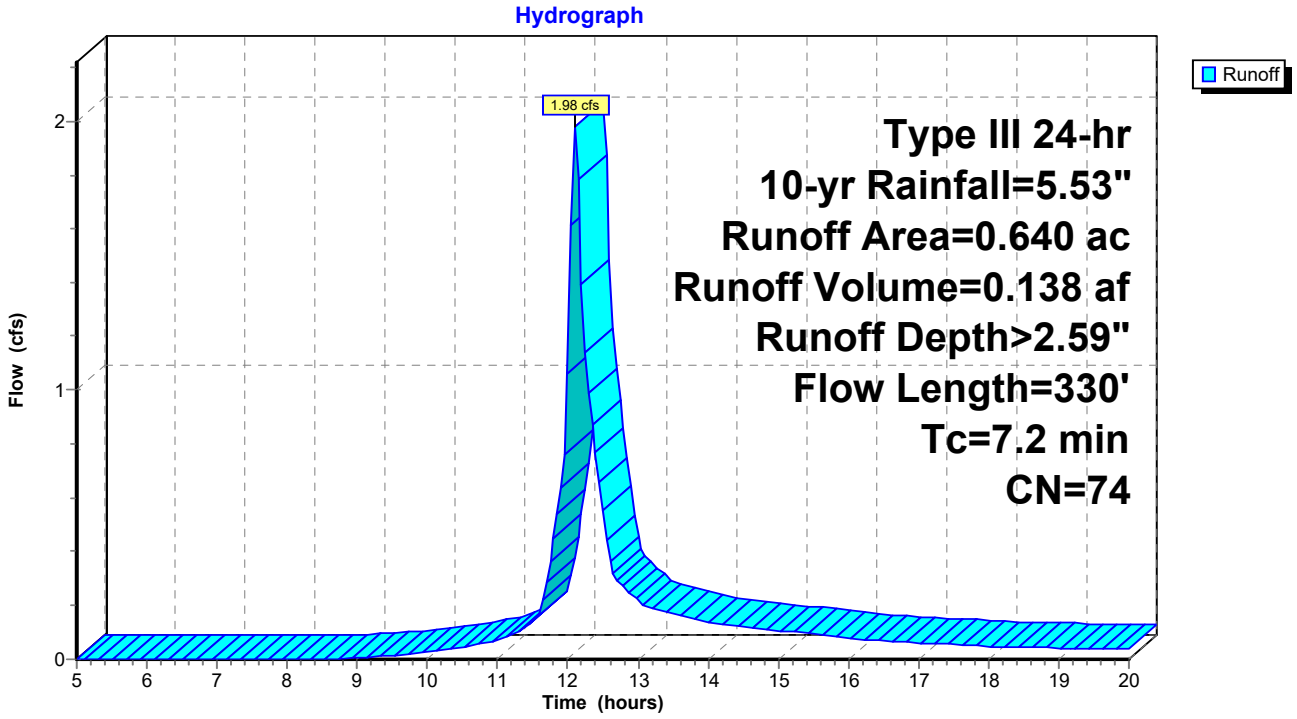
Runoff = 1.98 cfs @ 12.11 hrs, Volume= 0.138 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.53"

Area (ac)	CN	Description
0.640	74	>75% Grass cover, Good, HSG C
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.9	230	0.0840	2.03		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
7.2	330	Total			

Subcatchment 2S: EX-2 (Pre)



Hydrograph for Subcatchment 2S: EX-2 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.31	0.00	0.00
5.25	0.33	0.00	0.00
5.50	0.35	0.00	0.00
5.75	0.38	0.00	0.00
6.00	0.40	0.00	0.00
6.25	0.42	0.00	0.00
6.50	0.45	0.00	0.00
6.75	0.47	0.00	0.00
7.00	0.50	0.00	0.00
7.25	0.53	0.00	0.00
7.50	0.56	0.00	0.00
7.75	0.60	0.00	0.00
8.00	0.63	0.00	0.00
8.25	0.67	0.00	0.00
8.50	0.71	0.00	0.00
8.75	0.76	0.00	0.00
9.00	0.81	0.00	0.01
9.25	0.86	0.01	0.01
9.50	0.92	0.01	0.01
9.75	0.98	0.02	0.02
10.00	1.05	0.03	0.03
10.25	1.12	0.04	0.03
10.50	1.20	0.06	0.05
10.75	1.29	0.08	0.06
11.00	1.38	0.11	0.07
11.25	1.50	0.15	0.10
11.50	1.65	0.20	0.14
11.75	1.96	0.33	0.36
12.00	2.76	0.76	**1.06**
12.25	3.57	1.29	**1.14**
12.50	3.88	1.51	0.55
12.75	4.03	1.62	0.28
13.00	4.15	1.71	0.22
13.25	4.24	1.78	0.19
13.50	4.33	1.84	0.17
13.75	4.41	1.91	0.16
14.00	4.48	1.96	0.14
14.25	4.55	2.01	0.13
14.50	4.61	2.06	0.12
14.75	4.67	2.10	0.12
15.00	4.72	2.15	0.11
15.25	4.77	2.19	0.10
15.50	4.82	2.22	0.09
15.75	4.86	2.25	0.08
16.00	4.90	2.28	0.08
16.25	4.93	2.31	0.07
16.50	4.97	2.34	0.07
16.75	5.00	2.36	0.06
17.00	5.03	2.39	0.06
17.25	5.06	2.41	0.06
17.50	5.08	2.43	0.05
17.75	5.11	2.45	0.05
18.00	5.13	2.47	0.05
18.25	5.15	2.49	0.05
18.50	5.18	2.50	0.04
18.75	5.20	2.52	0.04
19.00	5.22	2.54	0.04
19.25	5.24	2.55	0.04
19.50	5.26	2.57	0.04
19.75	5.27	2.58	0.04
20.00	**5.29**	**2.60**	0.04

Summary for Subcatchment 3S: EX-3 (Pre)

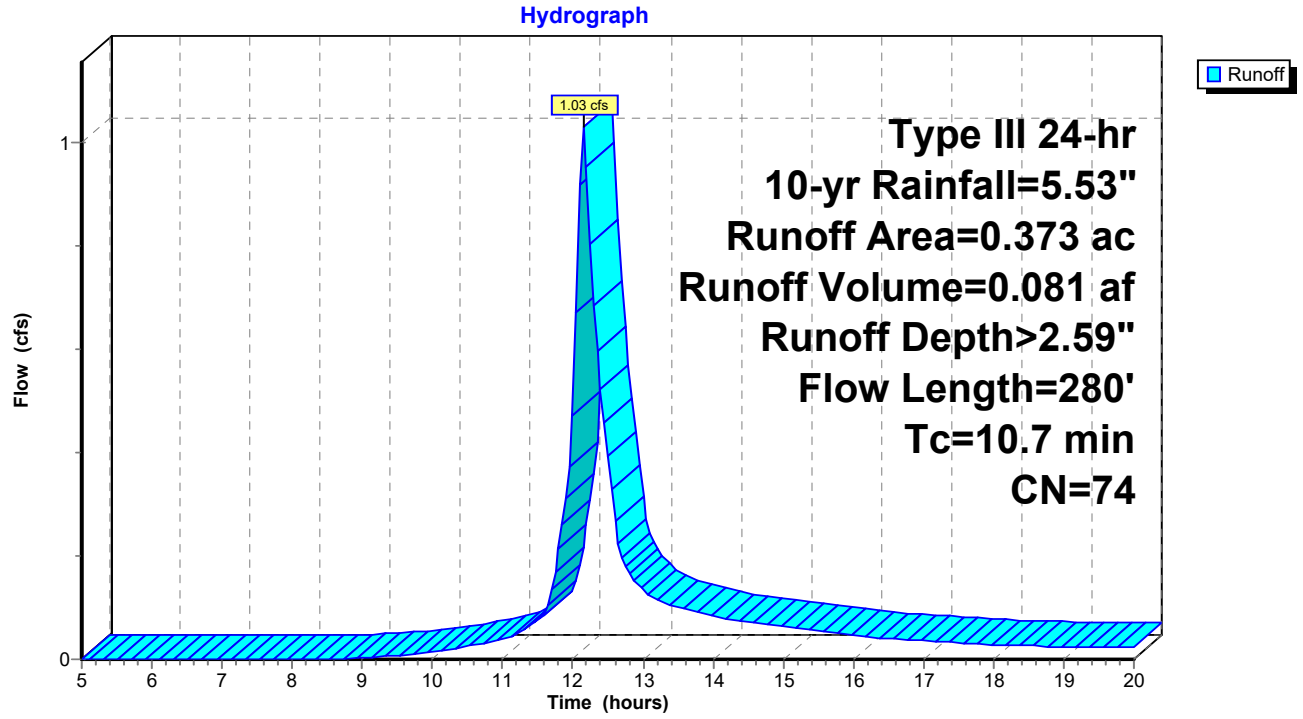
Runoff = 1.03 cfs @ 12.15 hrs, Volume= 0.081 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.53"

Area (ac)	CN	Description
0.373	74	>75% Grass cover, Good, HSG C
0.373		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0200	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.4	180	0.0972	2.18		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.7	280	Total			

Subcatchment 3S: EX-3 (Pre)



Hydrograph for Subcatchment 3S: EX-3 (Pre)

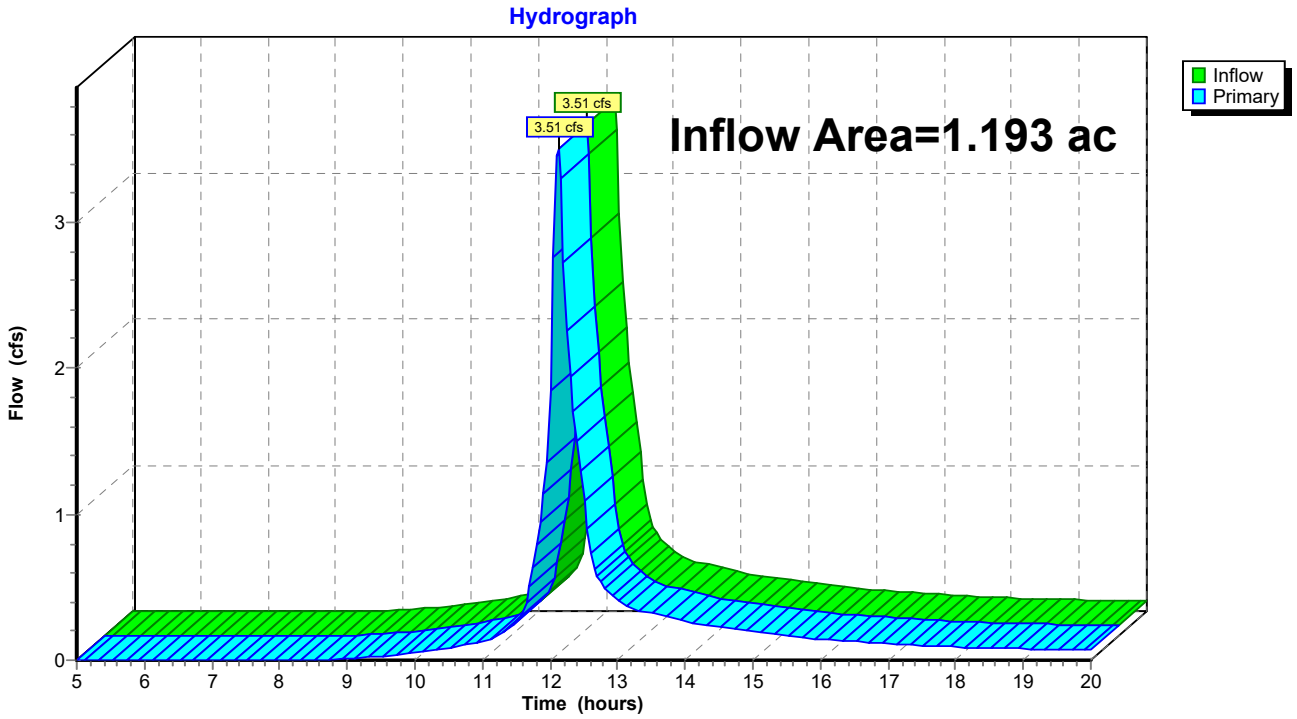
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.31	0.00	0.00
5.25	0.33	0.00	0.00
5.50	0.35	0.00	0.00
5.75	0.38	0.00	0.00
6.00	0.40	0.00	0.00
6.25	0.42	0.00	0.00
6.50	0.45	0.00	0.00
6.75	0.47	0.00	0.00
7.00	0.50	0.00	0.00
7.25	0.53	0.00	0.00
7.50	0.56	0.00	0.00
7.75	0.60	0.00	0.00
8.00	0.63	0.00	0.00
8.25	0.67	0.00	0.00
8.50	0.71	0.00	0.00
8.75	0.76	0.00	0.00
9.00	0.81	0.00	0.00
9.25	0.86	0.01	0.01
9.50	0.92	0.01	0.01
9.75	0.98	0.02	0.01
10.00	1.05	0.03	0.01
10.25	1.12	0.04	0.02
10.50	1.20	0.06	0.03
10.75	1.29	0.08	0.03
11.00	1.38	0.11	0.04
11.25	1.50	0.15	0.05
11.50	1.65	0.20	0.08
11.75	1.96	0.33	0.17
12.00	2.76	0.76	**0.47**
12.25	3.57	1.29	**0.81**
12.50	3.88	1.51	0.39
12.75	4.03	1.62	0.18
13.00	4.15	1.71	0.14
13.25	4.24	1.78	0.11
13.50	4.33	1.84	0.10
13.75	4.41	1.91	0.09
14.00	4.48	1.96	0.08
14.25	4.55	2.01	0.08
14.50	4.61	2.06	0.07
14.75	4.67	2.10	0.07
15.00	4.72	2.15	0.06
15.25	4.77	2.19	0.06
15.50	4.82	2.22	0.06
15.75	4.86	2.25	0.05
16.00	4.90	2.28	0.05
16.25	4.93	2.31	0.04
16.50	4.97	2.34	0.04
16.75	5.00	2.36	0.04
17.00	5.03	2.39	0.04
17.25	5.06	2.41	0.03
17.50	5.08	2.43	0.03
17.75	5.11	2.45	0.03
18.00	5.13	2.47	0.03
18.25	5.15	2.49	0.03
18.50	5.18	2.50	0.03
18.75	5.20	2.52	0.03
19.00	5.22	2.54	0.02
19.25	5.24	2.55	0.02
19.50	5.26	2.57	0.02
19.75	5.27	2.58	0.02
20.00	**5.29**	**2.60**	0.02

Summary for Link 5L: Pre-Existing (Composite)

Inflow Area = 1.193 ac, 0.00% Impervious, Inflow Depth > 2.59" for 10-yr event
Inflow = 3.51 cfs @ 12.12 hrs, Volume= 0.258 af
Primary = 3.51 cfs @ 12.12 hrs, Volume= 0.258 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Pre-Existing (Composite)



Hydrograph for Link 5L: Pre-Existing (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00
7.25	0.00	0.00	0.00
7.50	0.00	0.00	0.00
7.75	0.00	0.00	0.00
8.00	0.00	0.00	0.00
8.25	0.00	0.00	0.00
8.50	0.00	0.00	0.00
8.75	0.00	0.00	0.00
9.00	0.01	0.00	0.01
9.25	0.02	0.00	0.02
9.50	0.03	0.00	0.03
9.75	0.04	0.00	0.04
10.00	0.05	0.00	0.05
10.25	0.06	0.00	0.06
10.50	0.08	0.00	0.08
10.75	0.11	0.00	0.11
11.00	0.13	0.00	0.13
11.25	0.18	0.00	0.18
11.50	0.26	0.00	0.26
11.75	0.64	0.00	0.64
12.00	**1.85**	0.00	**1.85**
12.25	**2.26**	0.00	**2.26**
12.50	1.09	0.00	1.09
12.75	0.54	0.00	0.54
13.00	0.42	0.00	0.42
13.25	0.35	0.00	0.35
13.50	0.32	0.00	0.32
13.75	0.29	0.00	0.29
14.00	0.27	0.00	0.27
14.25	0.24	0.00	0.24
14.50	0.23	0.00	0.23
14.75	0.22	0.00	0.22
15.00	0.20	0.00	0.20
15.25	0.19	0.00	0.19
15.50	0.17	0.00	0.17
15.75	0.16	0.00	0.16
16.00	0.14	0.00	0.14
16.25	0.13	0.00	0.13
16.50	0.13	0.00	0.13
16.75	0.12	0.00	0.12
17.00	0.11	0.00	0.11
17.25	0.11	0.00	0.11
17.50	0.10	0.00	0.10
17.75	0.10	0.00	0.10
18.00	0.09	0.00	0.09
18.25	0.08	0.00	0.08
18.50	0.08	0.00	0.08
18.75	0.08	0.00	0.08
19.00	0.08	0.00	0.08
19.25	0.08	0.00	0.08
19.50	0.08	0.00	0.08
19.75	0.07	0.00	0.07
20.00	0.07	0.00	0.07

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX-1 (Pre) Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>3.57"
Flow Length=260' Tc=6.6 min CN=74 Runoff=0.78 cfs 0.054 af

Subcatchment2S: EX-2 (Pre) Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>3.57"
Flow Length=330' Tc=7.2 min CN=74 Runoff=2.72 cfs 0.190 af

Subcatchment3S: EX-3 (Pre) Runoff Area=0.373 ac 0.00% Impervious Runoff Depth>3.56"
Flow Length=280' Tc=10.7 min CN=74 Runoff=1.42 cfs 0.111 af

Link 5L: Pre-Existing(Composite) Inflow=4.81 cfs 0.355 af
Primary=4.81 cfs 0.355 af

Total Runoff Area = 1.193 ac Runoff Volume = 0.355 af Average Runoff Depth = 3.57"
100.00% Pervious = 1.193 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX-1 (Pre)

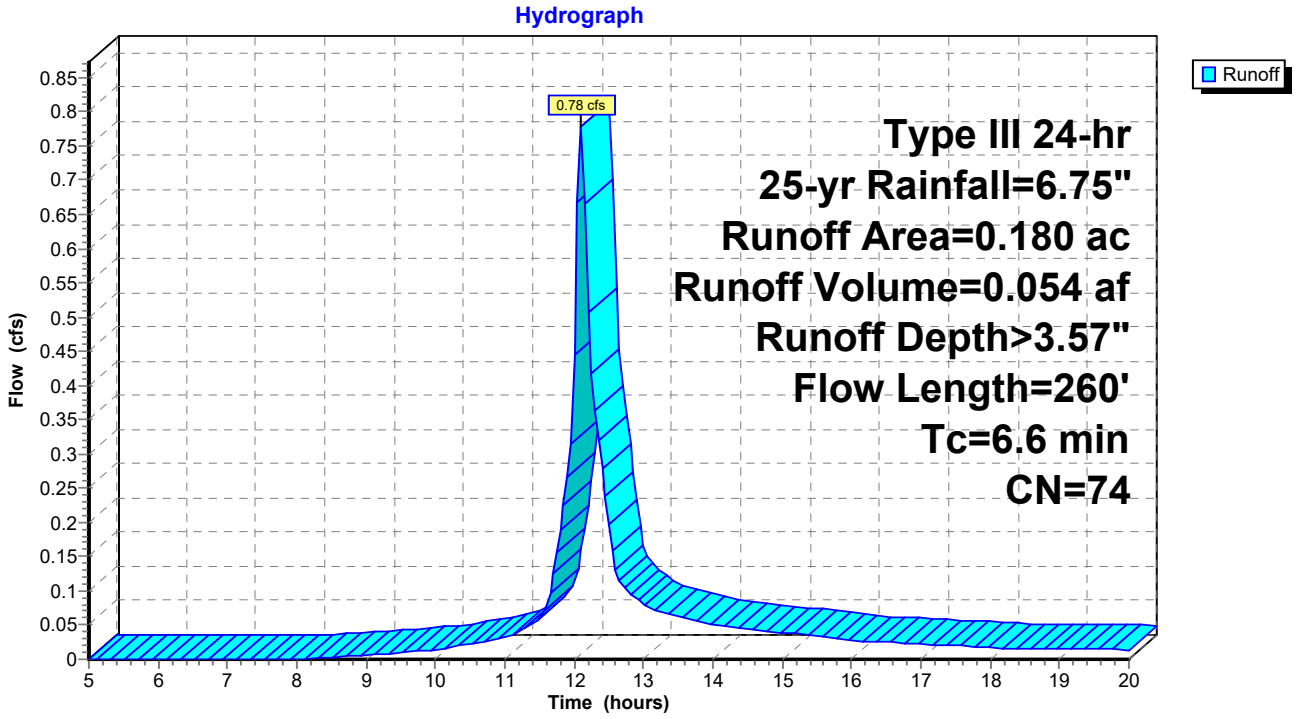
Runoff = 0.78 cfs @ 12.10 hrs, Volume= 0.054 af, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.75"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.3	160	0.0812	1.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.6	260	Total			

Subcatchment 1S: EX-1 (Pre)



Hydrograph for Subcatchment 1S: EX-1 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.38	0.00	0.00
5.25	0.41	0.00	0.00
5.50	0.43	0.00	0.00
5.75	0.46	0.00	0.00
6.00	0.49	0.00	0.00
6.25	0.51	0.00	0.00
6.50	0.54	0.00	0.00
6.75	0.58	0.00	0.00
7.00	0.61	0.00	0.00
7.25	0.65	0.00	0.00
7.50	0.69	0.00	0.00
7.75	0.73	0.00	0.00
8.00	0.77	0.00	0.00
8.25	0.82	0.00	0.00
8.50	0.87	0.01	0.00
8.75	0.92	0.01	0.00
9.00	0.98	0.02	0.01
9.25	1.05	0.03	0.01
9.50	1.12	0.04	0.01
9.75	1.20	0.06	0.01
10.00	1.28	0.08	0.01
10.25	1.36	0.10	0.02
10.50	1.46	0.13	0.02
10.75	1.57	0.17	0.03
11.00	1.69	0.22	0.03
11.25	1.83	0.27	0.04
11.50	2.01	0.36	0.06
11.75	2.40	0.55	0.16
12.00	3.37	1.15	**0.44**
12.25	4.35	1.86	**0.42**
12.50	4.74	2.16	0.20
12.75	4.92	2.30	0.10
13.00	5.06	2.41	0.08
13.25	5.18	2.51	0.07
13.50	5.29	2.60	0.06
13.75	5.39	2.68	0.06
14.00	5.47	2.75	0.05
14.25	5.55	2.81	0.05
14.50	5.63	2.88	0.04
14.75	5.70	2.93	0.04
15.00	5.77	2.99	0.04
15.25	5.83	3.04	0.04
15.50	5.88	3.09	0.03
15.75	5.93	3.13	0.03
16.00	5.98	3.17	0.03
16.25	6.02	3.20	0.03
16.50	6.06	3.24	0.02
16.75	6.10	3.27	0.02
17.00	6.14	3.30	0.02
17.25	6.17	3.33	0.02
17.50	6.21	3.36	0.02
17.75	6.24	3.38	0.02
18.00	6.26	3.41	0.02
18.25	6.29	3.43	0.02
18.50	6.32	3.45	0.02
18.75	6.34	3.47	0.02
19.00	6.37	3.50	0.02
19.25	6.39	3.52	0.01
19.50	6.41	3.54	0.01
19.75	6.44	3.56	0.01
20.00	**6.46**	**3.58**	0.01

Summary for Subcatchment 2S: EX-2 (Pre)

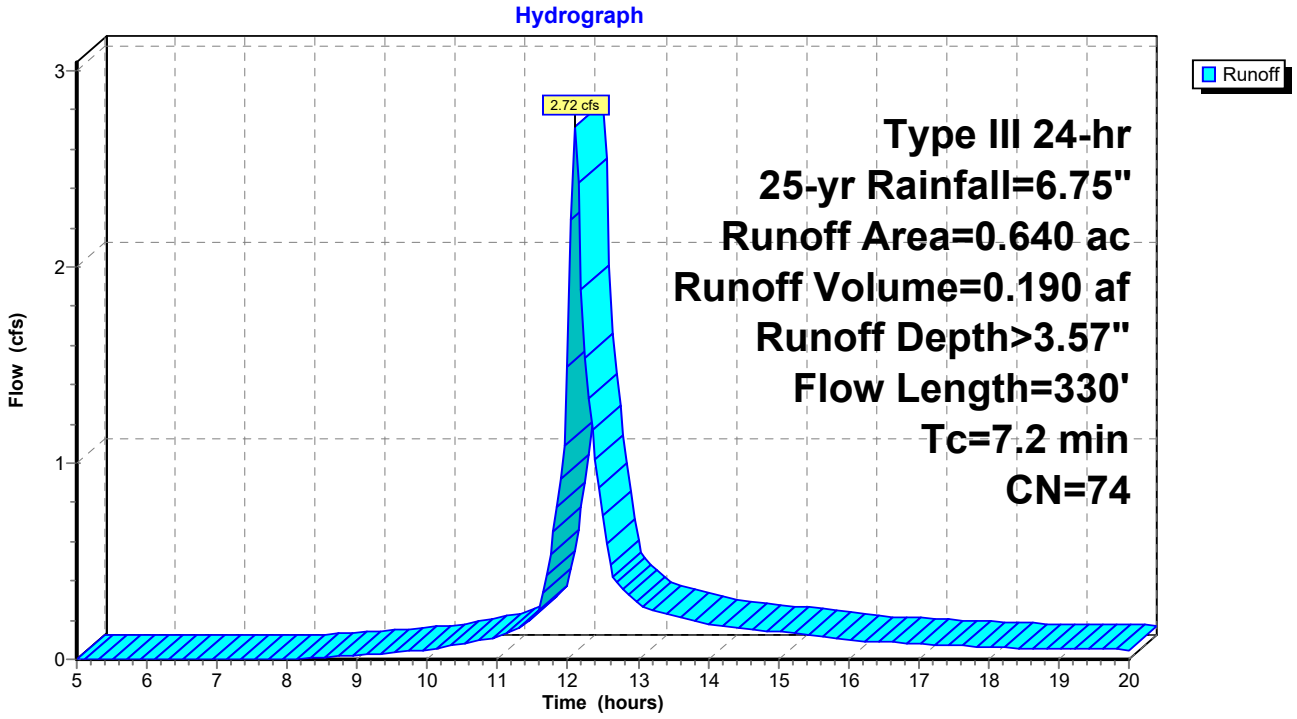
Runoff = 2.72 cfs @ 12.11 hrs, Volume= 0.190 af, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.75"

Area (ac)	CN	Description
0.640	74	>75% Grass cover, Good, HSG C
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.9	230	0.0840	2.03		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
7.2	330	Total			

Subcatchment 2S: EX-2 (Pre)



Hydrograph for Subcatchment 2S: EX-2 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.38	0.00	0.00
5.25	0.41	0.00	0.00
5.50	0.43	0.00	0.00
5.75	0.46	0.00	0.00
6.00	0.49	0.00	0.00
6.25	0.51	0.00	0.00
6.50	0.54	0.00	0.00
6.75	0.58	0.00	0.00
7.00	0.61	0.00	0.00
7.25	0.65	0.00	0.00
7.50	0.69	0.00	0.00
7.75	0.73	0.00	0.00
8.00	0.77	0.00	0.00
8.25	0.82	0.00	0.01
8.50	0.87	0.01	0.01
8.75	0.92	0.01	0.01
9.00	0.98	0.02	0.02
9.25	1.05	0.03	0.03
9.50	1.12	0.04	0.03
9.75	1.20	0.06	0.04
10.00	1.28	0.08	0.05
10.25	1.36	0.10	0.06
10.50	1.46	0.13	0.08
10.75	1.57	0.17	0.10
11.00	1.69	0.22	0.11
11.25	1.83	0.27	0.15
11.50	2.01	0.36	0.21
11.75	2.40	0.55	0.54
12.00	3.37	1.15	**1.49**
12.25	4.35	1.86	**1.54**
12.50	4.74	2.16	0.73
12.75	4.92	2.30	0.37
13.00	5.06	2.41	0.29
13.25	5.18	2.51	0.24
13.50	5.29	2.60	0.22
13.75	5.39	2.68	0.20
14.00	5.47	2.75	0.18
14.25	5.55	2.81	0.17
14.50	5.63	2.88	0.16
14.75	5.70	2.93	0.15
15.00	5.77	2.99	0.14
15.25	5.83	3.04	0.13
15.50	5.88	3.09	0.12
15.75	5.93	3.13	0.11
16.00	5.98	3.17	0.10
16.25	6.02	3.20	0.09
16.50	6.06	3.24	0.09
16.75	6.10	3.27	0.08
17.00	6.14	3.30	0.08
17.25	6.17	3.33	0.07
17.50	6.21	3.36	0.07
17.75	6.24	3.38	0.07
18.00	6.26	3.41	0.06
18.25	6.29	3.43	0.06
18.50	6.32	3.45	0.06
18.75	6.34	3.47	0.06
19.00	6.37	3.50	0.05
19.25	6.39	3.52	0.05
19.50	6.41	3.54	0.05
19.75	6.44	3.56	0.05
20.00	**6.46**	**3.58**	0.05

Summary for Subcatchment 3S: EX-3 (Pre)

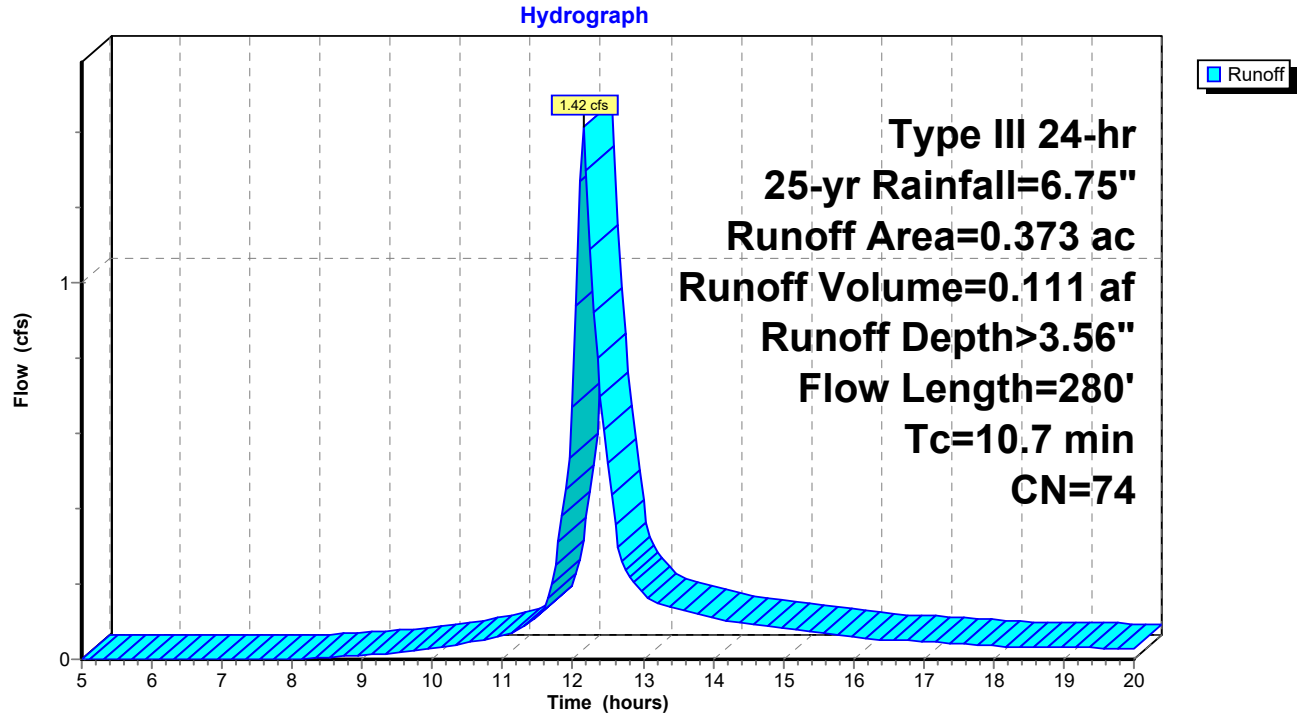
Runoff = 1.42 cfs @ 12.15 hrs, Volume= 0.111 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.75"

Area (ac)	CN	Description
0.373	74	>75% Grass cover, Good, HSG C
0.373		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0200	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.4	180	0.0972	2.18		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.7	280	Total			

Subcatchment 3S: EX-3 (Pre)



Hydrograph for Subcatchment 3S: EX-3 (Pre)

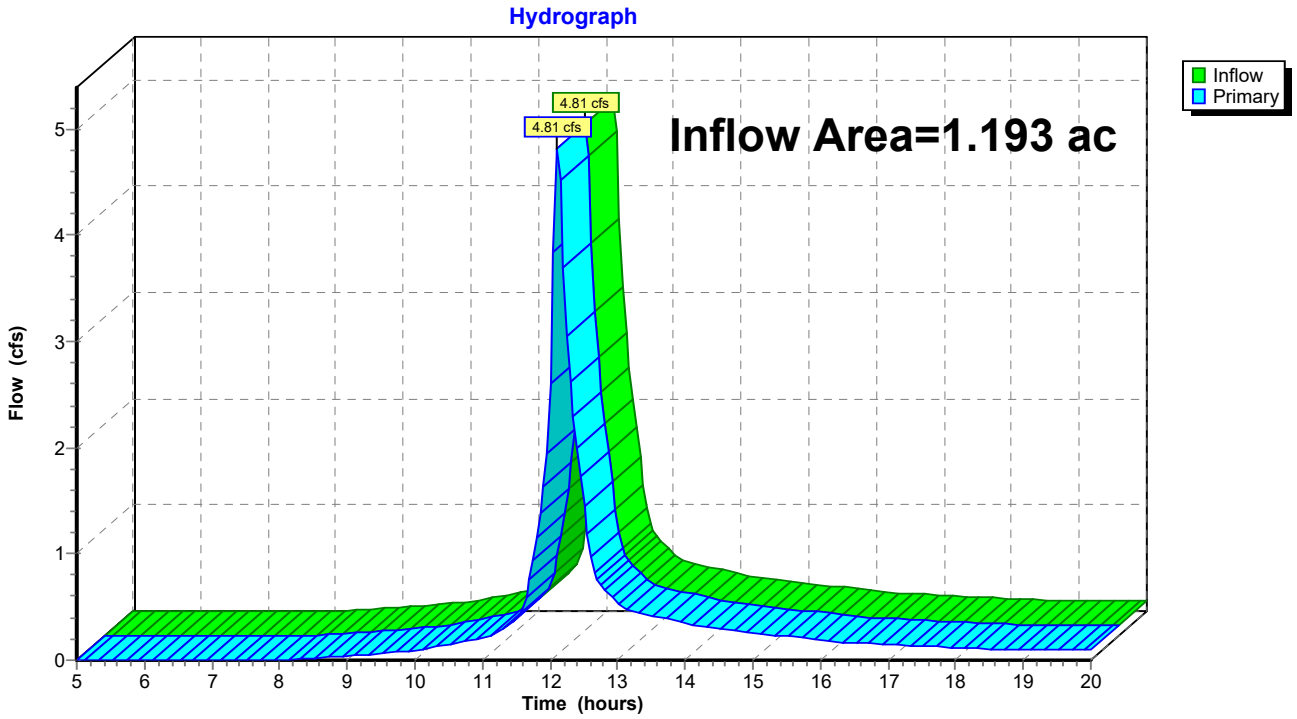
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.38	0.00	0.00
5.25	0.41	0.00	0.00
5.50	0.43	0.00	0.00
5.75	0.46	0.00	0.00
6.00	0.49	0.00	0.00
6.25	0.51	0.00	0.00
6.50	0.54	0.00	0.00
6.75	0.58	0.00	0.00
7.00	0.61	0.00	0.00
7.25	0.65	0.00	0.00
7.50	0.69	0.00	0.00
7.75	0.73	0.00	0.00
8.00	0.77	0.00	0.00
8.25	0.82	0.00	0.00
8.50	0.87	0.01	0.01
8.75	0.92	0.01	0.01
9.00	0.98	0.02	0.01
9.25	1.05	0.03	0.01
9.50	1.12	0.04	0.02
9.75	1.20	0.06	0.02
10.00	1.28	0.08	0.03
10.25	1.36	0.10	0.04
10.50	1.46	0.13	0.04
10.75	1.57	0.17	0.05
11.00	1.69	0.22	0.06
11.25	1.83	0.27	0.08
11.50	2.01	0.36	0.12
11.75	2.40	0.55	0.25
12.00	3.37	1.15	**0.67**
12.25	4.35	1.86	**1.09**
12.50	4.74	2.16	0.52
12.75	4.92	2.30	0.24
13.00	5.06	2.41	0.18
13.25	5.18	2.51	0.15
13.50	5.29	2.60	0.13
13.75	5.39	2.68	0.12
14.00	5.47	2.75	0.11
14.25	5.55	2.81	0.10
14.50	5.63	2.88	0.09
14.75	5.70	2.93	0.09
15.00	5.77	2.99	0.08
15.25	5.83	3.04	0.08
15.50	5.88	3.09	0.07
15.75	5.93	3.13	0.07
16.00	5.98	3.17	0.06
16.25	6.02	3.20	0.05
16.50	6.06	3.24	0.05
16.75	6.10	3.27	0.05
17.00	6.14	3.30	0.05
17.25	6.17	3.33	0.04
17.50	6.21	3.36	0.04
17.75	6.24	3.38	0.04
18.00	6.26	3.41	0.04
18.25	6.29	3.43	0.03
18.50	6.32	3.45	0.03
18.75	6.34	3.47	0.03
19.00	6.37	3.50	0.03
19.25	6.39	3.52	0.03
19.50	6.41	3.54	0.03
19.75	6.44	3.56	0.03
20.00	**6.46**	**3.58**	0.03

Summary for Link 5L: Pre-Existing (Composite)

Inflow Area = 1.193 ac, 0.00% Impervious, Inflow Depth > 3.57" for 25-yr event
Inflow = 4.81 cfs @ 12.11 hrs, Volume= 0.355 af
Primary = 4.81 cfs @ 12.11 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Pre-Existing (Composite)



Hydrograph for Link 5L: Pre-Existing (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00
7.25	0.00	0.00	0.00
7.50	0.00	0.00	0.00
7.75	0.00	0.00	0.00
8.00	0.01	0.00	0.01
8.25	0.01	0.00	0.01
8.50	0.02	0.00	0.02
8.75	0.03	0.00	0.03
9.00	0.04	0.00	0.04
9.25	0.05	0.00	0.05
9.50	0.06	0.00	0.06
9.75	0.08	0.00	0.08
10.00	0.09	0.00	0.09
10.25	0.12	0.00	0.12
10.50	0.14	0.00	0.14
10.75	0.18	0.00	0.18
11.00	0.21	0.00	0.21
11.25	0.28	0.00	0.28
11.50	0.39	0.00	0.39
11.75	0.95	0.00	0.95
12.00	**2.61**	0.00	**2.61**
12.25	**3.04**	0.00	**3.04**
12.50	1.45	0.00	1.45
12.75	0.71	0.00	0.71
13.00	0.55	0.00	0.55
13.25	0.46	0.00	0.46
13.50	0.42	0.00	0.42
13.75	0.38	0.00	0.38
14.00	0.35	0.00	0.35
14.25	0.32	0.00	0.32
14.50	0.30	0.00	0.30
14.75	0.28	0.00	0.28
15.00	0.26	0.00	0.26
15.25	0.24	0.00	0.24
15.50	0.23	0.00	0.23
15.75	0.21	0.00	0.21
16.00	0.19	0.00	0.19
16.25	0.17	0.00	0.17
16.50	0.17	0.00	0.17
16.75	0.16	0.00	0.16
17.00	0.15	0.00	0.15
17.25	0.14	0.00	0.14
17.50	0.13	0.00	0.13
17.75	0.12	0.00	0.12
18.00	0.11	0.00	0.11
18.25	0.11	0.00	0.11
18.50	0.11	0.00	0.11
18.75	0.10	0.00	0.10
19.00	0.10	0.00	0.10
19.25	0.10	0.00	0.10
19.50	0.10	0.00	0.10
19.75	0.09	0.00	0.09
20.00	0.09	0.00	0.09

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX-1 (Pre) Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>5.15"
Flow Length=260' Tc=6.6 min CN=74 Runoff=1.11 cfs 0.077 af

Subcatchment2S: EX-2 (Pre) Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>5.15"
Flow Length=330' Tc=7.2 min CN=74 Runoff=3.89 cfs 0.275 af

Subcatchment3S: EX-3 (Pre) Runoff Area=0.373 ac 0.00% Impervious Runoff Depth>5.14"
Flow Length=280' Tc=10.7 min CN=74 Runoff=2.03 cfs 0.160 af

Link 5L: Pre-Existing(Composite) Inflow=6.88 cfs 0.512 af
Primary=6.88 cfs 0.512 af

Total Runoff Area = 1.193 ac Runoff Volume = 0.512 af Average Runoff Depth = 5.15"
100.00% Pervious = 1.193 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX-1 (Pre)

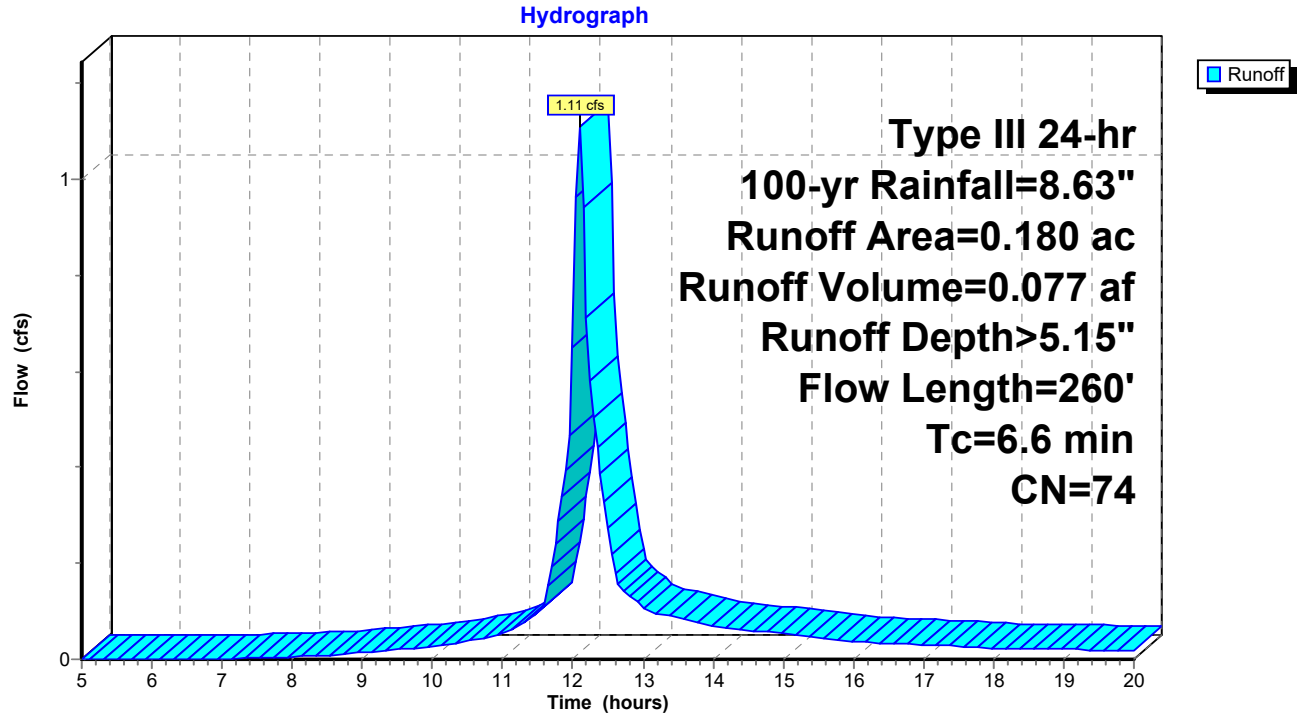
Runoff = 1.11 cfs @ 12.10 hrs, Volume= 0.077 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.63"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.3	160	0.0812	1.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.6	260	Total			

Subcatchment 1S: EX-1 (Pre)



Hydrograph for Subcatchment 1S: EX-1 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.49	0.00	0.00
5.25	0.52	0.00	0.00
5.50	0.55	0.00	0.00
5.75	0.59	0.00	0.00
6.00	0.62	0.00	0.00
6.25	0.66	0.00	0.00
6.50	0.70	0.00	0.00
6.75	0.74	0.00	0.00
7.00	0.78	0.00	0.00
7.25	0.83	0.00	0.00
7.50	0.88	0.01	0.00
7.75	0.93	0.01	0.00
8.00	0.98	0.02	0.01
8.25	1.04	0.03	0.01
8.50	1.11	0.04	0.01
8.75	1.18	0.06	0.01
9.00	1.26	0.08	0.01
9.25	1.34	0.10	0.02
9.50	1.43	0.13	0.02
9.75	1.53	0.16	0.02
10.00	1.63	0.19	0.03
10.25	1.74	0.24	0.03
10.50	1.87	0.29	0.04
10.75	2.01	0.35	0.05
11.00	2.16	0.43	0.05
11.25	2.34	0.52	0.07
11.50	2.57	0.65	0.10
11.75	3.07	0.95	0.24
12.00	4.31	1.83	**0.65**
12.25	5.56	2.82	**0.58**
12.50	6.06	3.23	0.27
12.75	6.29	3.43	0.14
13.00	6.47	3.59	0.11
13.25	6.62	3.72	0.09
13.50	6.76	3.84	0.09
13.75	6.89	3.94	0.08
14.00	7.00	4.04	0.07
14.25	7.10	4.13	0.06
14.50	7.20	4.22	0.06
14.75	7.29	4.29	0.06
15.00	7.37	4.37	0.05
15.25	7.45	4.44	0.05
15.50	7.52	4.50	0.05
15.75	7.59	4.56	0.04
16.00	7.65	4.61	0.04
16.25	7.70	4.66	0.04
16.50	7.75	4.71	0.03
16.75	7.80	4.75	0.03
17.00	7.85	4.79	0.03
17.25	7.89	4.83	0.03
17.50	7.93	4.87	0.03
17.75	7.97	4.90	0.02
18.00	8.01	4.93	0.02
18.25	8.04	4.96	0.02
18.50	8.08	4.99	0.02
18.75	8.11	5.02	0.02
19.00	8.14	5.05	0.02
19.25	8.17	5.08	0.02
19.50	8.20	5.11	0.02
19.75	8.23	5.13	0.02
20.00	**8.26**	**5.16**	0.02

Summary for Subcatchment 2S: EX-2 (Pre)

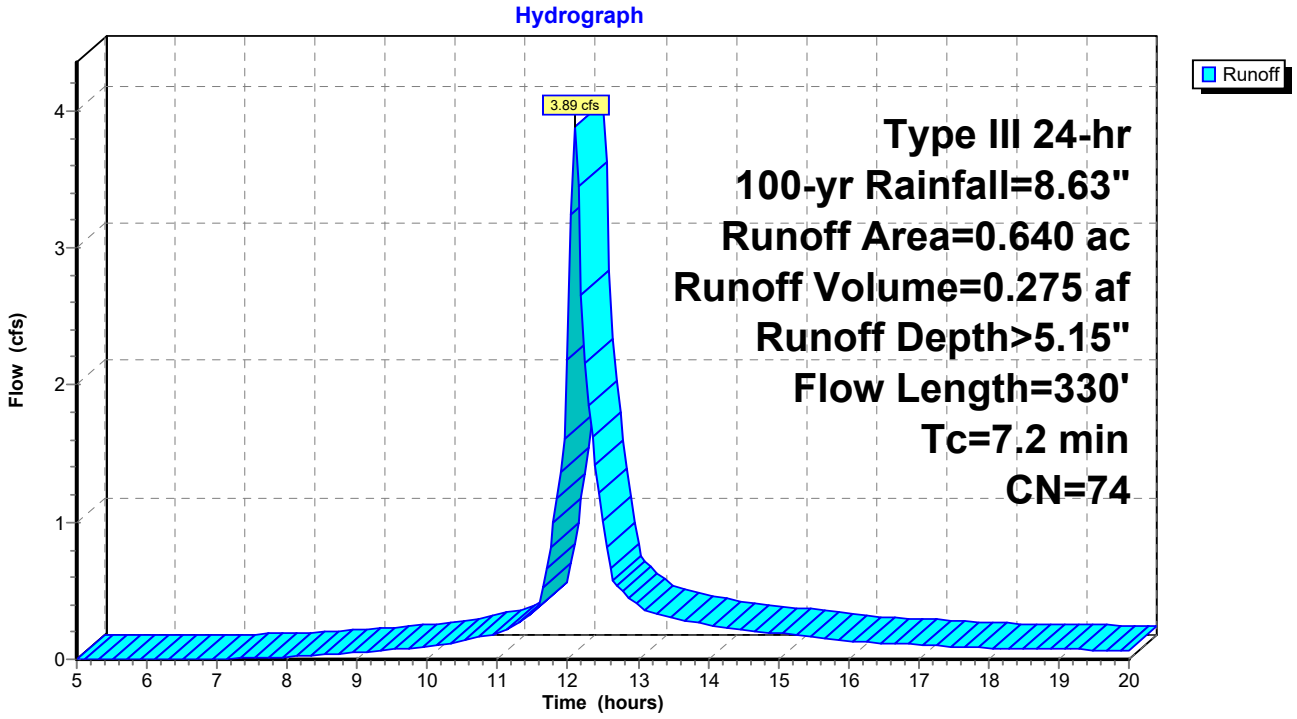
Runoff = 3.89 cfs @ 12.10 hrs, Volume= 0.275 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.63"

Area (ac)	CN	Description
0.640	74	>75% Grass cover, Good, HSG C
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.9	230	0.0840	2.03		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
7.2	330	Total			

Subcatchment 2S: EX-2 (Pre)



Hydrograph for Subcatchment 2S: EX-2 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.49	0.00	0.00
5.25	0.52	0.00	0.00
5.50	0.55	0.00	0.00
5.75	0.59	0.00	0.00
6.00	0.62	0.00	0.00
6.25	0.66	0.00	0.00
6.50	0.70	0.00	0.00
6.75	0.74	0.00	0.00
7.00	0.78	0.00	0.00
7.25	0.83	0.00	0.01
7.50	0.88	0.01	0.01
7.75	0.93	0.01	0.01
8.00	0.98	0.02	0.02
8.25	1.04	0.03	0.02
8.50	1.11	0.04	0.03
8.75	1.18	0.06	0.04
9.00	1.26	0.08	0.05
9.25	1.34	0.10	0.06
9.50	1.43	0.13	0.07
9.75	1.53	0.16	0.08
10.00	1.63	0.19	0.10
10.25	1.74	0.24	0.11
10.50	1.87	0.29	0.14
10.75	2.01	0.35	0.16
11.00	2.16	0.43	0.19
11.25	2.34	0.52	0.25
11.50	2.57	0.65	0.34
11.75	3.07	0.95	0.82
12.00	4.31	1.83	**2.19**
12.25	5.56	2.82	**2.15**
12.50	6.06	3.23	1.01
12.75	6.29	3.43	0.51
13.00	6.47	3.59	0.40
13.25	6.62	3.72	0.33
13.50	6.76	3.84	0.31
13.75	6.89	3.94	0.28
14.00	7.00	4.04	0.25
14.25	7.10	4.13	0.23
14.50	7.20	4.22	0.22
14.75	7.29	4.29	0.20
15.00	7.37	4.37	0.19
15.25	7.45	4.44	0.18
15.50	7.52	4.50	0.16
15.75	7.59	4.56	0.15
16.00	7.65	4.61	0.13
16.25	7.70	4.66	0.13
16.50	7.75	4.71	0.12
16.75	7.80	4.75	0.11
17.00	7.85	4.79	0.11
17.25	7.89	4.83	0.10
17.50	7.93	4.87	0.09
17.75	7.97	4.90	0.09
18.00	8.01	4.93	0.08
18.25	8.04	4.96	0.08
18.50	8.08	4.99	0.08
18.75	8.11	5.02	0.08
19.00	8.14	5.05	0.07
19.25	8.17	5.08	0.07
19.50	8.20	5.11	0.07
19.75	8.23	5.13	0.07
20.00	**8.26**	**5.16**	0.07

Summary for Subcatchment 3S: EX-3 (Pre)

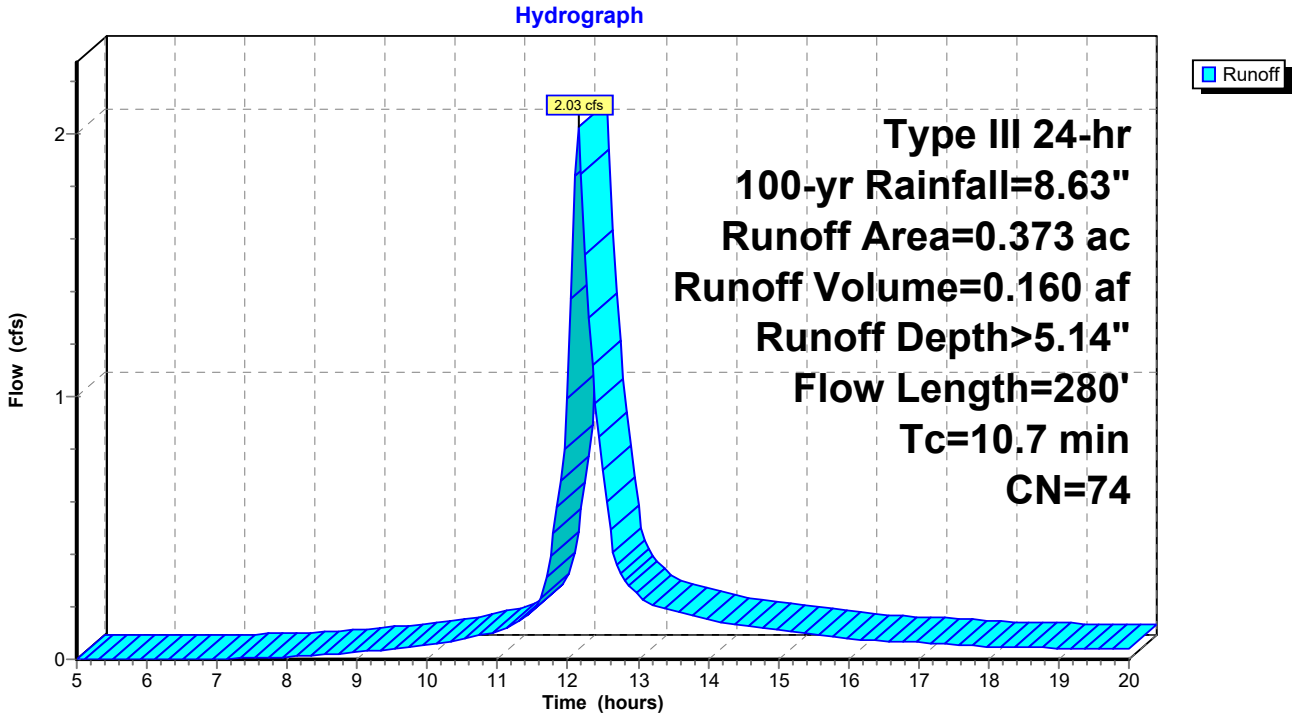
Runoff = 2.03 cfs @ 12.15 hrs, Volume= 0.160 af, Depth> 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.63"

Area (ac)	CN	Description
0.373	74	>75% Grass cover, Good, HSG C
0.373		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0200	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.4	180	0.0972	2.18		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.7	280	Total			

Subcatchment 3S: EX-3 (Pre)



Hydrograph for Subcatchment 3S: EX-3 (Pre)

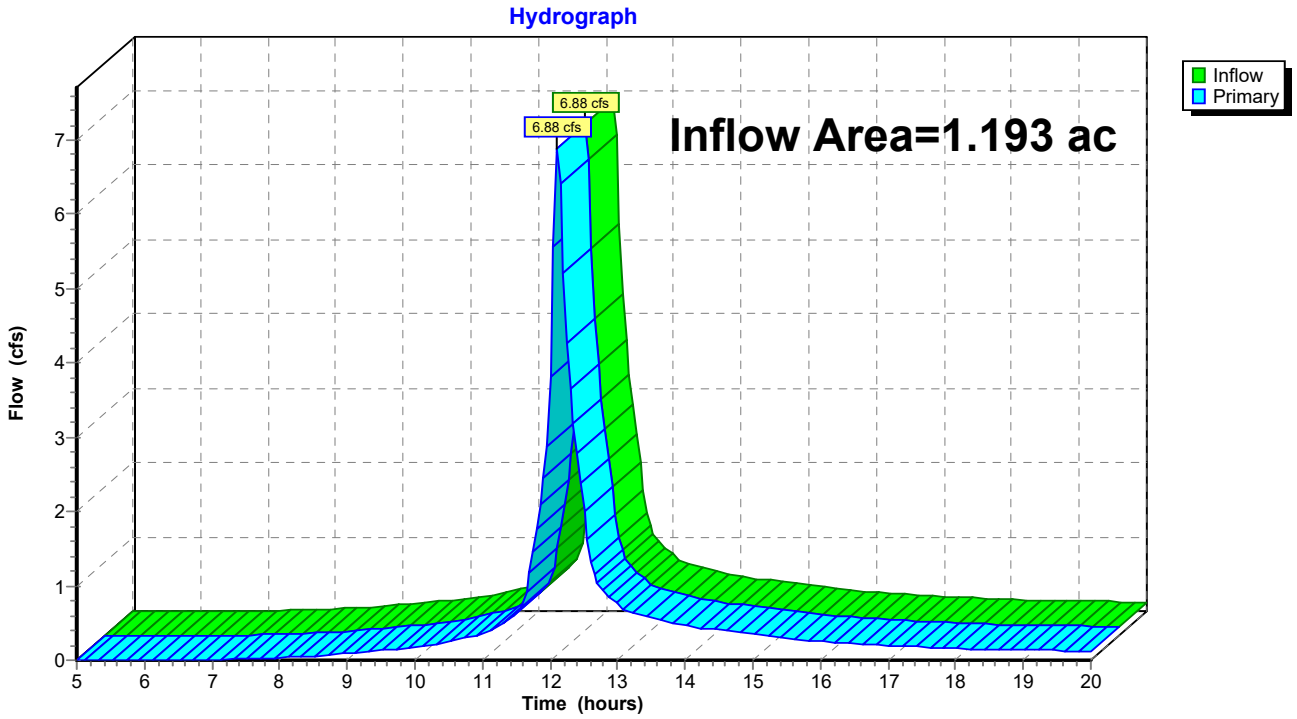
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.49	0.00	0.00
5.25	0.52	0.00	0.00
5.50	0.55	0.00	0.00
5.75	0.59	0.00	0.00
6.00	0.62	0.00	0.00
6.25	0.66	0.00	0.00
6.50	0.70	0.00	0.00
6.75	0.74	0.00	0.00
7.00	0.78	0.00	0.00
7.25	0.83	0.00	0.00
7.50	0.88	0.01	0.01
7.75	0.93	0.01	0.01
8.00	0.98	0.02	0.01
8.25	1.04	0.03	0.01
8.50	1.11	0.04	0.02
8.75	1.18	0.06	0.02
9.00	1.26	0.08	0.03
9.25	1.34	0.10	0.03
9.50	1.43	0.13	0.04
9.75	1.53	0.16	0.05
10.00	1.63	0.19	0.05
10.25	1.74	0.24	0.06
10.50	1.87	0.29	0.08
10.75	2.01	0.35	0.09
11.00	2.16	0.43	0.11
11.25	2.34	0.52	0.14
11.50	2.57	0.65	0.18
11.75	3.07	0.95	0.39
12.00	4.31	1.83	**0.99**
12.25	5.56	2.82	**1.54**
12.50	6.06	3.23	0.72
12.75	6.29	3.43	0.32
13.00	6.47	3.59	0.24
13.25	6.62	3.72	0.20
13.50	6.76	3.84	0.18
13.75	6.89	3.94	0.17
14.00	7.00	4.04	0.15
14.25	7.10	4.13	0.14
14.50	7.20	4.22	0.13
14.75	7.29	4.29	0.12
15.00	7.37	4.37	0.11
15.25	7.45	4.44	0.10
15.50	7.52	4.50	0.10
15.75	7.59	4.56	0.09
16.00	7.65	4.61	0.08
16.25	7.70	4.66	0.07
16.50	7.75	4.71	0.07
16.75	7.80	4.75	0.07
17.00	7.85	4.79	0.06
17.25	7.89	4.83	0.06
17.50	7.93	4.87	0.06
17.75	7.97	4.90	0.05
18.00	8.01	4.93	0.05
18.25	8.04	4.96	0.05
18.50	8.08	4.99	0.05
18.75	8.11	5.02	0.04
19.00	8.14	5.05	0.04
19.25	8.17	5.08	0.04
19.50	8.20	5.11	0.04
19.75	8.23	5.13	0.04
20.00	**8.26**	**5.16**	0.04

Summary for Link 5L: Pre-Existing (Composite)

Inflow Area = 1.193 ac, 0.00% Impervious, Inflow Depth > 5.15" for 100-yr event
Inflow = 6.88 cfs @ 12.11 hrs, Volume= 0.512 af
Primary = 6.88 cfs @ 12.11 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Pre-Existing (Composite)



Hydrograph for Link 5L: Pre-Existing (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.01	0.00	0.01
7.25	0.01	0.00	0.01
7.50	0.02	0.00	0.02
7.75	0.03	0.00	0.03
8.00	0.03	0.00	0.03
8.25	0.04	0.00	0.04
8.50	0.06	0.00	0.06
8.75	0.07	0.00	0.07
9.00	0.09	0.00	0.09
9.25	0.11	0.00	0.11
9.50	0.13	0.00	0.13
9.75	0.15	0.00	0.15
10.00	0.18	0.00	0.18
10.25	0.21	0.00	0.21
10.50	0.25	0.00	0.25
10.75	0.30	0.00	0.30
11.00	0.35	0.00	0.35
11.25	0.45	0.00	0.45
11.50	0.62	0.00	0.62
11.75	1.45	0.00	1.45
12.00	**3.83**	0.00	**3.83**
12.25	**4.28**	0.00	**4.28**
12.50	2.01	0.00	2.01
12.75	0.97	0.00	0.97
13.00	0.75	0.00	0.75
13.25	0.63	0.00	0.63
13.50	0.57	0.00	0.57
13.75	0.52	0.00	0.52
14.00	0.47	0.00	0.47
14.25	0.43	0.00	0.43
14.50	0.41	0.00	0.41
14.75	0.38	0.00	0.38
15.00	0.36	0.00	0.36
15.25	0.33	0.00	0.33
15.50	0.30	0.00	0.30
15.75	0.28	0.00	0.28
16.00	0.25	0.00	0.25
16.25	0.23	0.00	0.23
16.50	0.22	0.00	0.22
16.75	0.21	0.00	0.21
17.00	0.20	0.00	0.20
17.25	0.19	0.00	0.19
17.50	0.18	0.00	0.18
17.75	0.17	0.00	0.17
18.00	0.15	0.00	0.15
18.25	0.15	0.00	0.15
18.50	0.14	0.00	0.14
18.75	0.14	0.00	0.14
19.00	0.14	0.00	0.14
19.25	0.13	0.00	0.13
19.50	0.13	0.00	0.13
19.75	0.13	0.00	0.13
20.00	0.12	0.00	0.12

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX-1 (Pre) Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>0.13"
Flow Length=260' Tc=6.6 min CN=74 Runoff=0.01 cfs 0.002 af

Subcatchment2S: EX-2 (Pre) Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>0.13"
Flow Length=330' Tc=7.2 min CN=74 Runoff=0.04 cfs 0.007 af

Subcatchment3S: EX-3 (Pre) Runoff Area=0.373 ac 0.00% Impervious Runoff Depth>0.13"
Flow Length=280' Tc=10.7 min CN=74 Runoff=0.03 cfs 0.004 af

Link 5L: Pre-Existing(Composite) Inflow=0.08 cfs 0.013 af
Primary=0.08 cfs 0.013 af

Total Runoff Area = 1.193 ac Runoff Volume = 0.013 af Average Runoff Depth = 0.13"
100.00% Pervious = 1.193 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX-1 (Pre)

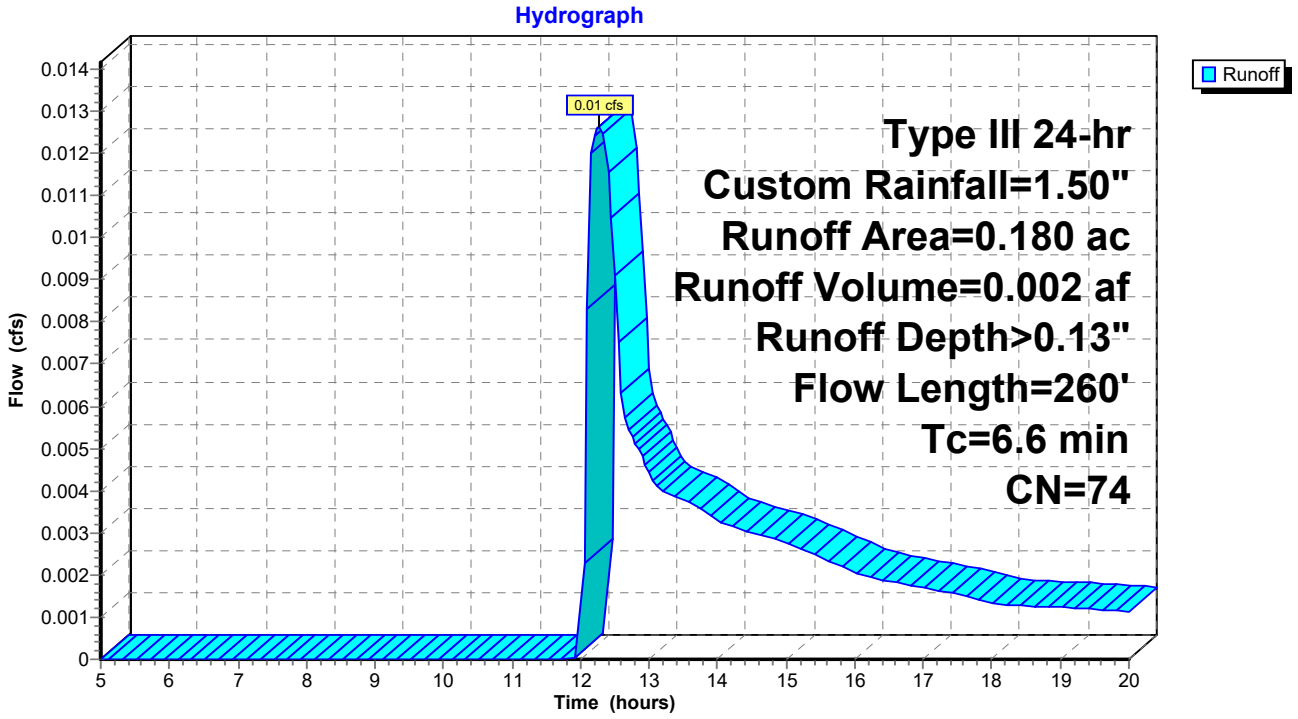
Runoff = 0.01 cfs @ 12.28 hrs, Volume= 0.002 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.50"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.3	160	0.0812	1.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.6	260	Total			

Subcatchment 1S: EX-1 (Pre)



Hydrograph for Subcatchment 1S: EX-1 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.09	0.00	0.00
5.50	0.10	0.00	0.00
5.75	0.10	0.00	0.00
6.00	0.11	0.00	0.00
6.25	0.11	0.00	0.00
6.50	0.12	0.00	0.00
6.75	0.13	0.00	0.00
7.00	0.14	0.00	0.00
7.25	0.14	0.00	0.00
7.50	0.15	0.00	0.00
7.75	0.16	0.00	0.00
8.00	0.17	0.00	0.00
8.25	0.18	0.00	0.00
8.50	0.19	0.00	0.00
8.75	0.21	0.00	0.00
9.00	0.22	0.00	0.00
9.25	0.23	0.00	0.00
9.50	0.25	0.00	0.00
9.75	0.27	0.00	0.00
10.00	0.28	0.00	0.00
10.25	0.30	0.00	0.00
10.50	0.32	0.00	0.00
10.75	0.35	0.00	0.00
11.00	0.38	0.00	0.00
11.25	0.41	0.00	0.00
11.50	0.45	0.00	0.00
11.75	0.53	0.00	0.00
12.00	0.75	0.00	0.00
12.25	0.97	0.02	**0.01**
12.50	1.05	0.03	**0.01**
12.75	1.09	0.04	0.01
13.00	1.12	0.05	0.00
13.25	1.15	0.05	0.00
13.50	1.18	0.06	0.00
13.75	1.20	0.06	0.00
14.00	1.22	0.07	0.00
14.25	1.23	0.07	0.00
14.50	1.25	0.07	0.00
14.75	1.27	0.08	0.00
15.00	1.28	0.08	0.00
15.25	1.29	0.09	0.00
15.50	1.31	0.09	0.00
15.75	1.32	0.09	0.00
16.00	1.33	0.09	0.00
16.25	1.34	0.10	0.00
16.50	1.35	0.10	0.00
16.75	1.36	0.10	0.00
17.00	1.36	0.10	0.00
17.25	1.37	0.11	0.00
17.50	1.38	0.11	0.00
17.75	1.39	0.11	0.00
18.00	1.39	0.11	0.00
18.25	1.40	0.11	0.00
18.50	1.40	0.12	0.00
18.75	1.41	0.12	0.00
19.00	1.41	0.12	0.00
19.25	1.42	0.12	0.00
19.50	1.43	0.12	0.00
19.75	1.43	0.12	0.00
20.00	**1.44**	**0.13**	0.00

Summary for Subcatchment 2S: EX-2 (Pre)

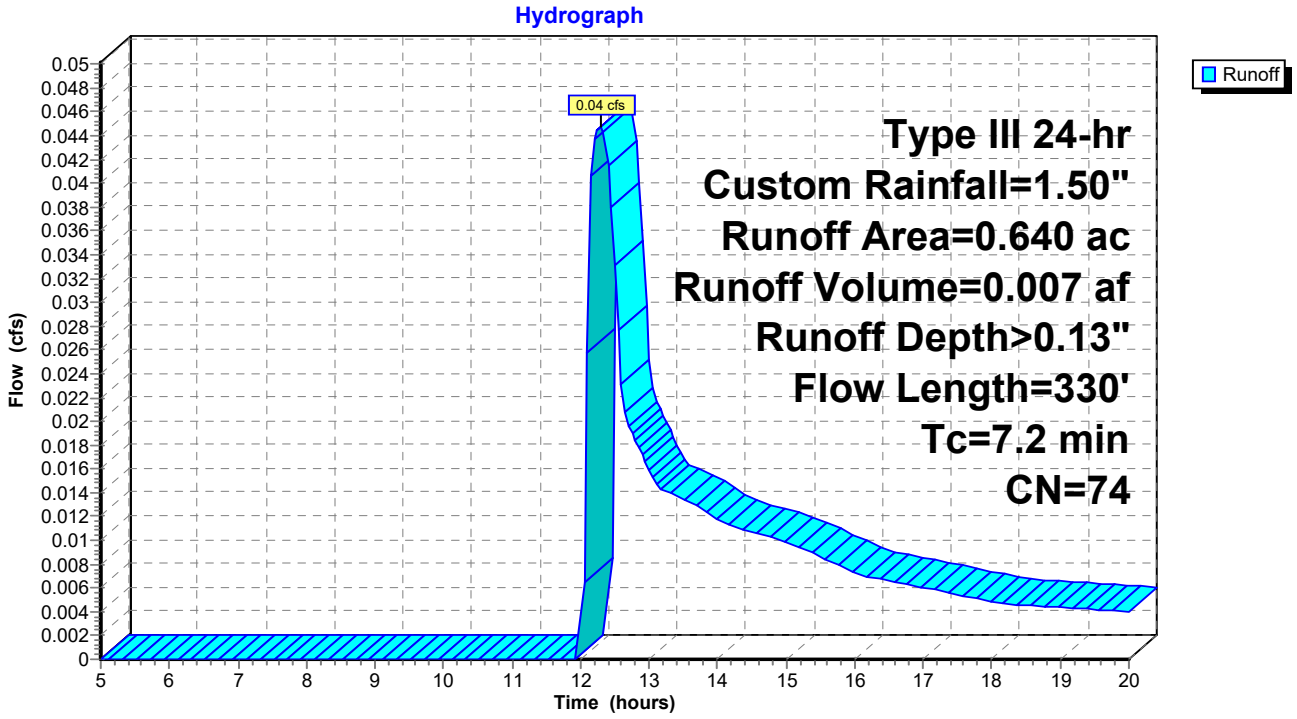
Runoff = 0.04 cfs @ 12.29 hrs, Volume= 0.007 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.50"

Area (ac)	CN	Description
0.640	74	>75% Grass cover, Good, HSG C
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.0800	0.31		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.9	230	0.0840	2.03		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
7.2	330	Total			

Subcatchment 2S: EX-2 (Pre)



Hydrograph for Subcatchment 2S: EX-2 (Pre)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.09	0.00	0.00
5.50	0.10	0.00	0.00
5.75	0.10	0.00	0.00
6.00	0.11	0.00	0.00
6.25	0.11	0.00	0.00
6.50	0.12	0.00	0.00
6.75	0.13	0.00	0.00
7.00	0.14	0.00	0.00
7.25	0.14	0.00	0.00
7.50	0.15	0.00	0.00
7.75	0.16	0.00	0.00
8.00	0.17	0.00	0.00
8.25	0.18	0.00	0.00
8.50	0.19	0.00	0.00
8.75	0.21	0.00	0.00
9.00	0.22	0.00	0.00
9.25	0.23	0.00	0.00
9.50	0.25	0.00	0.00
9.75	0.27	0.00	0.00
10.00	0.28	0.00	0.00
10.25	0.30	0.00	0.00
10.50	0.32	0.00	0.00
10.75	0.35	0.00	0.00
11.00	0.38	0.00	0.00
11.25	0.41	0.00	0.00
11.50	0.45	0.00	0.00
11.75	0.53	0.00	0.00
12.00	0.75	0.00	0.00
12.25	0.97	0.02	**0.04**
12.50	1.05	0.03	**0.03**
12.75	1.09	0.04	0.02
13.00	1.12	0.05	0.02
13.25	1.15	0.05	0.01
13.50	1.18	0.06	0.01
13.75	1.20	0.06	0.01
14.00	1.22	0.07	0.01
14.25	1.23	0.07	0.01
14.50	1.25	0.07	0.01
14.75	1.27	0.08	0.01
15.00	1.28	0.08	0.01
15.25	1.29	0.09	0.01
15.50	1.31	0.09	0.01
15.75	1.32	0.09	0.01
16.00	1.33	0.09	0.01
16.25	1.34	0.10	0.01
16.50	1.35	0.10	0.01
16.75	1.36	0.10	0.01
17.00	1.36	0.10	0.01
17.25	1.37	0.11	0.01
17.50	1.38	0.11	0.01
17.75	1.39	0.11	0.01
18.00	1.39	0.11	0.00
18.25	1.40	0.11	0.00
18.50	1.40	0.12	0.00
18.75	1.41	0.12	0.00
19.00	1.41	0.12	0.00
19.25	1.42	0.12	0.00
19.50	1.43	0.12	0.00
19.75	1.43	0.12	0.00
20.00	**1.44**	**0.13**	0.00

Summary for Subcatchment 3S: EX-3 (Pre)

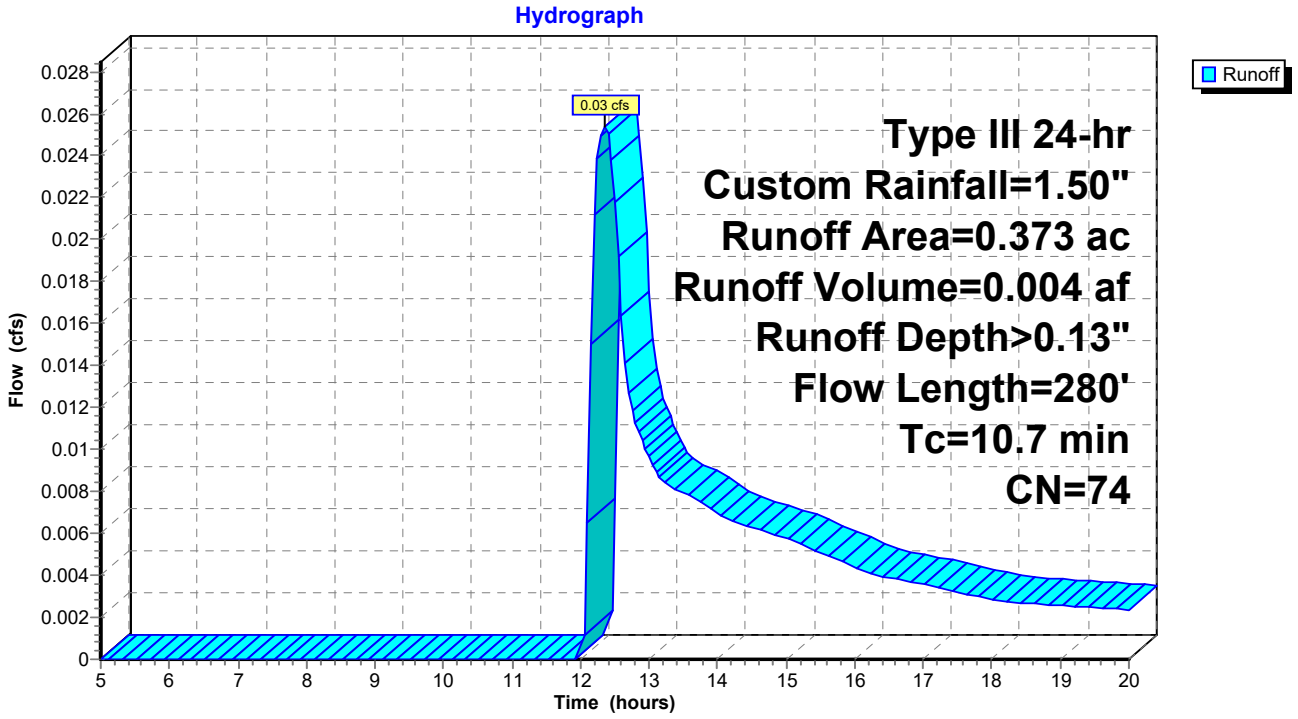
Runoff = 0.03 cfs @ 12.35 hrs, Volume= 0.004 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.50"

Area (ac)	CN	Description
0.373	74	>75% Grass cover, Good, HSG C
0.373		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0200	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.58"
1.4	180	0.0972	2.18		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.7	280	Total			

Subcatchment 3S: EX-3 (Pre)



Hydrograph for Subcatchment 3S: EX-3 (Pre)

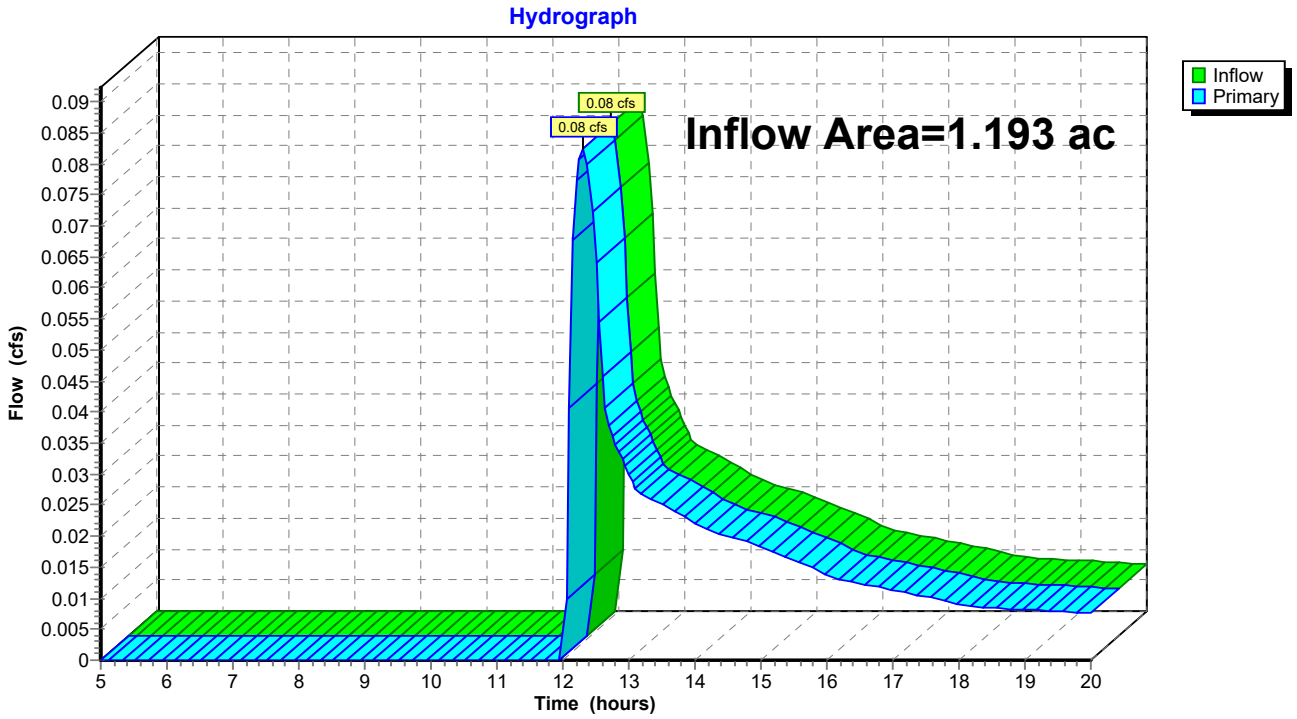
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.09	0.00	0.00
5.50	0.10	0.00	0.00
5.75	0.10	0.00	0.00
6.00	0.11	0.00	0.00
6.25	0.11	0.00	0.00
6.50	0.12	0.00	0.00
6.75	0.13	0.00	0.00
7.00	0.14	0.00	0.00
7.25	0.14	0.00	0.00
7.50	0.15	0.00	0.00
7.75	0.16	0.00	0.00
8.00	0.17	0.00	0.00
8.25	0.18	0.00	0.00
8.50	0.19	0.00	0.00
8.75	0.21	0.00	0.00
9.00	0.22	0.00	0.00
9.25	0.23	0.00	0.00
9.50	0.25	0.00	0.00
9.75	0.27	0.00	0.00
10.00	0.28	0.00	0.00
10.25	0.30	0.00	0.00
10.50	0.32	0.00	0.00
10.75	0.35	0.00	0.00
11.00	0.38	0.00	0.00
11.25	0.41	0.00	0.00
11.50	0.45	0.00	0.00
11.75	0.53	0.00	0.00
12.00	0.75	0.00	0.00
12.25	0.97	0.02	**0.02**
12.50	1.05	0.03	**0.02**
12.75	1.09	0.04	0.01
13.00	1.12	0.05	0.01
13.25	1.15	0.05	0.01
13.50	1.18	0.06	0.01
13.75	1.20	0.06	0.01
14.00	1.22	0.07	0.01
14.25	1.23	0.07	0.01
14.50	1.25	0.07	0.01
14.75	1.27	0.08	0.01
15.00	1.28	0.08	0.01
15.25	1.29	0.09	0.01
15.50	1.31	0.09	0.01
15.75	1.32	0.09	0.00
16.00	1.33	0.09	0.00
16.25	1.34	0.10	0.00
16.50	1.35	0.10	0.00
16.75	1.36	0.10	0.00
17.00	1.36	0.10	0.00
17.25	1.37	0.11	0.00
17.50	1.38	0.11	0.00
17.75	1.39	0.11	0.00
18.00	1.39	0.11	0.00
18.25	1.40	0.11	0.00
18.50	1.40	0.12	0.00
18.75	1.41	0.12	0.00
19.00	1.41	0.12	0.00
19.25	1.42	0.12	0.00
19.50	1.43	0.12	0.00
19.75	1.43	0.12	0.00
20.00	**1.44**	**0.13**	0.00

Summary for Link 5L: Pre-Existing (Composite)

Inflow Area = 1.193 ac, 0.00% Impervious, Inflow Depth > 0.13" for Custom event
Inflow = 0.08 cfs @ 12.31 hrs, Volume= 0.013 af
Primary = 0.08 cfs @ 12.31 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Pre-Existing (Composite)



Hydrograph for Link 5L: Pre-Existing (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00
7.25	0.00	0.00	0.00
7.50	0.00	0.00	0.00
7.75	0.00	0.00	0.00
8.00	0.00	0.00	0.00
8.25	0.00	0.00	0.00
8.50	0.00	0.00	0.00
8.75	0.00	0.00	0.00
9.00	0.00	0.00	0.00
9.25	0.00	0.00	0.00
9.50	0.00	0.00	0.00
9.75	0.00	0.00	0.00
10.00	0.00	0.00	0.00
10.25	0.00	0.00	0.00
10.50	0.00	0.00	0.00
10.75	0.00	0.00	0.00
11.00	0.00	0.00	0.00
11.25	0.00	0.00	0.00
11.50	0.00	0.00	0.00
11.75	0.00	0.00	0.00
12.00	0.00	0.00	0.00
12.25	**0.08**	0.00	**0.08**
12.50	**0.06**	0.00	**0.06**
12.75	0.04	0.00	0.04
13.00	0.03	0.00	0.03
13.25	0.03	0.00	0.03
13.50	0.03	0.00	0.03
13.75	0.02	0.00	0.02
14.00	0.02	0.00	0.02
14.25	0.02	0.00	0.02
14.50	0.02	0.00	0.02
14.75	0.02	0.00	0.02
15.00	0.02	0.00	0.02
15.25	0.02	0.00	0.02
15.50	0.02	0.00	0.02
15.75	0.02	0.00	0.02
16.00	0.01	0.00	0.01
16.25	0.01	0.00	0.01
16.50	0.01	0.00	0.01
16.75	0.01	0.00	0.01
17.00	0.01	0.00	0.01
17.25	0.01	0.00	0.01
17.50	0.01	0.00	0.01
17.75	0.01	0.00	0.01
18.00	0.01	0.00	0.01
18.25	0.01	0.00	0.01
18.50	0.01	0.00	0.01
18.75	0.01	0.00	0.01
19.00	0.01	0.00	0.01
19.25	0.01	0.00	0.01
19.50	0.01	0.00	0.01
19.75	0.01	0.00	0.01
20.00	0.01	0.00	0.01

Hydrograph for Pond 8P: Bioretention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	125.50	0.00	0.00	**0.00**
0.50	0.00	0.000	125.50	0.00	0.00	0.00
1.00	0.00	0.000	125.50	0.00	0.00	0.00
1.50	0.00	0.000	125.50	0.00	0.00	0.00
2.00	0.00	0.000	125.50	0.00	0.00	0.00
2.50	0.00	0.000	125.50	0.00	0.00	0.00
3.00	0.00	0.000	125.50	0.00	0.00	0.00
3.50	0.00	0.000	125.50	0.00	0.00	0.00
4.00	0.00	0.000	125.50	0.00	0.00	0.00
4.50	0.00	0.000	125.50	0.00	0.00	0.00
5.00	0.00	0.000	125.50	0.00	0.00	0.00
5.50	0.00	0.000	125.50	0.00	0.00	0.00
6.00	0.00	0.000	125.50	0.00	0.00	0.00
6.50	0.00	0.000	125.50	0.00	0.00	0.00
7.00	0.00	0.000	125.50	0.00	0.00	0.00
7.50	0.00	0.000	125.50	0.00	0.00	0.00
8.00	0.00	0.000	125.50	0.00	0.00	0.00
8.50	0.00	0.000	125.50	0.00	0.00	0.00
9.00	0.00	0.000	125.50	0.00	0.00	0.00
9.50	0.00	0.000	125.50	0.00	0.00	0.00
10.00	0.00	0.000	125.50	0.00	0.00	0.00
10.50	0.00	0.000	125.50	0.00	0.00	0.00
11.00	0.00	0.000	125.50	0.00	0.00	0.00
11.50	0.00	0.000	125.50	0.00	0.00	0.00
12.00	**0.05**	0.000	125.51	0.01	0.01	0.00
12.50	**0.11**	0.005	125.90	0.03	0.03	0.00
13.00	0.04	0.007	125.99	0.03	0.03	0.00
13.50	0.04	**0.007**	**126.02**	**0.03**	**0.03**	0.00
14.00	0.03	**0.007**	**126.03**	**0.03**	**0.03**	0.00
14.50	0.03	0.007	126.02	0.03	0.03	0.00
15.00	0.02	0.007	126.00	0.03	0.03	0.00
15.50	0.02	0.006	125.98	0.03	0.03	0.00
16.00	0.02	0.006	125.94	0.03	0.03	0.00
16.50	0.02	0.005	125.90	0.03	0.03	0.00
17.00	0.01	0.005	125.85	0.03	0.03	0.00
17.50	0.01	0.004	125.80	0.03	0.03	0.00
18.00	0.01	0.003	125.74	0.03	0.03	0.00
18.50	0.01	0.002	125.68	0.03	0.03	0.00
19.00	0.01	0.002	125.62	0.03	0.03	0.00
19.50	0.01	0.001	125.56	0.03	0.03	0.00
20.00	0.01	0.000	125.52	0.01	0.01	0.00
20.50	0.01	0.000	125.52	0.01	0.01	0.00
21.00	0.01	0.000	125.51	0.01	0.01	0.00
21.50	0.01	0.000	125.51	0.01	0.01	0.00
22.00	0.01	0.000	125.51	0.01	0.01	0.00
22.50	0.01	0.000	125.51	0.01	0.01	0.00
23.00	0.01	0.000	125.51	0.01	0.01	0.00
23.50	0.01	0.000	125.51	0.01	0.01	0.00
24.00	0.01	0.000	125.51	0.01	0.01	0.00

Stage-Discharge for Pond 8P: Bioretention

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
125.50	0.00	0.00	0.00
125.55	0.03	0.03	0.00
125.60	0.03	0.03	0.00
125.65	0.03	0.03	0.00
125.70	0.03	0.03	0.00
125.75	0.03	0.03	0.00
125.80	0.03	0.03	0.00
125.85	0.03	0.03	0.00
125.90	0.03	0.03	0.00
125.95	0.03	0.03	0.00
126.00	0.03	0.03	0.00
126.05	0.03	0.03	0.00
126.10	0.03	0.03	0.00
126.15	0.03	0.03	0.00
126.20	0.03	0.03	0.00
126.25	0.03	0.03	0.00
126.30	0.03	0.03	0.00
126.35	0.03	0.03	0.00
126.40	0.03	0.03	0.00
126.45	0.03	0.03	0.00
126.50	0.03	0.03	0.00
126.55	0.03	0.03	0.00
126.60	0.03	0.03	0.00
126.65	0.03	0.03	0.00
126.70	0.03	0.03	0.00
126.75	0.03	0.03	0.00
126.80	0.03	0.03	0.00
126.85	0.03	0.03	0.00
126.90	0.03	0.03	0.00
126.95	0.03	0.03	0.00
127.00	0.06	0.06	0.00
127.05	0.06	0.06	0.00
127.10	0.06	0.06	0.00
127.15	0.06	0.06	0.00
127.20	0.06	0.06	0.00
127.25	0.06	0.06	0.00
127.30	0.06	0.06	0.00
127.35	0.06	0.06	0.00
127.40	0.06	0.06	0.00
127.45	0.06	0.06	0.00
127.50	0.06	0.06	0.00
127.55	0.06	0.06	0.00
127.60	0.06	0.06	0.00
127.65	0.06	0.06	0.00
127.70	0.06	0.06	0.00
127.75	0.06	0.06	0.00
127.80	0.06	0.06	0.00
127.85	0.06	0.06	0.00
127.90	0.06	0.06	0.00
127.95	0.06	0.06	0.00
128.00	0.06	0.06	0.00
128.05	0.06	0.06	0.00
128.10	0.06	0.06	0.00
128.15	0.06	0.06	0.00
128.20	0.06	0.06	0.00
128.25	0.06	0.06	0.00
128.30	0.06	0.06	0.00
128.35	0.06	0.06	0.00
128.40	0.06	0.06	0.00
128.45	0.06	0.06	0.00
128.50	0.07	0.07	0.00
128.55	0.07	0.07	0.00
128.60	0.07	0.07	0.00
128.65	0.07	0.07	0.00
128.70	0.07	0.07	0.00
128.75	0.07	0.07	0.00
128.80	0.07	0.07	0.00
128.85	0.07	0.07	0.00
128.90	0.07	0.07	0.00
128.95	0.07	0.07	0.00
129.00	0.07	0.07	0.00
129.05	0.07	0.07	0.00
129.10	0.07	0.07	0.00
129.15	0.07	0.07	0.00
129.20	0.07	0.07	0.00
129.25	0.07	0.07	0.00
129.30	0.07	0.07	0.00
129.35	0.07	0.07	0.00
129.40	0.07	0.07	0.00
129.45	0.07	0.07	0.00
129.50	0.09	0.09	0.00
129.55	0.09	0.09	0.00
129.60	0.09	0.09	0.00
129.65	0.09	0.09	0.00
129.70	0.09	0.09	0.00
129.75	0.09	0.09	0.00
129.80	0.09	0.09	0.00
129.85	0.09	0.09	0.00
129.90	0.09	0.09	0.00
129.95	0.09	0.09	0.00
130.00	0.09	0.09	0.00
130.05	0.55	0.09	0.46
130.10	1.39	0.10	1.30
130.15	2.48	0.10	2.39
130.20	3.77	0.10	3.68
130.25	5.23	0.10	5.14
130.30	6.85	0.10	6.75
130.35	8.61	0.10	8.51
130.40	9.67	0.10	9.57
130.45	10.25	0.10	10.15
130.50	**10.80**	**0.10**	**10.70**

Stage-Area-Storage for Pond 8P: Bioretention

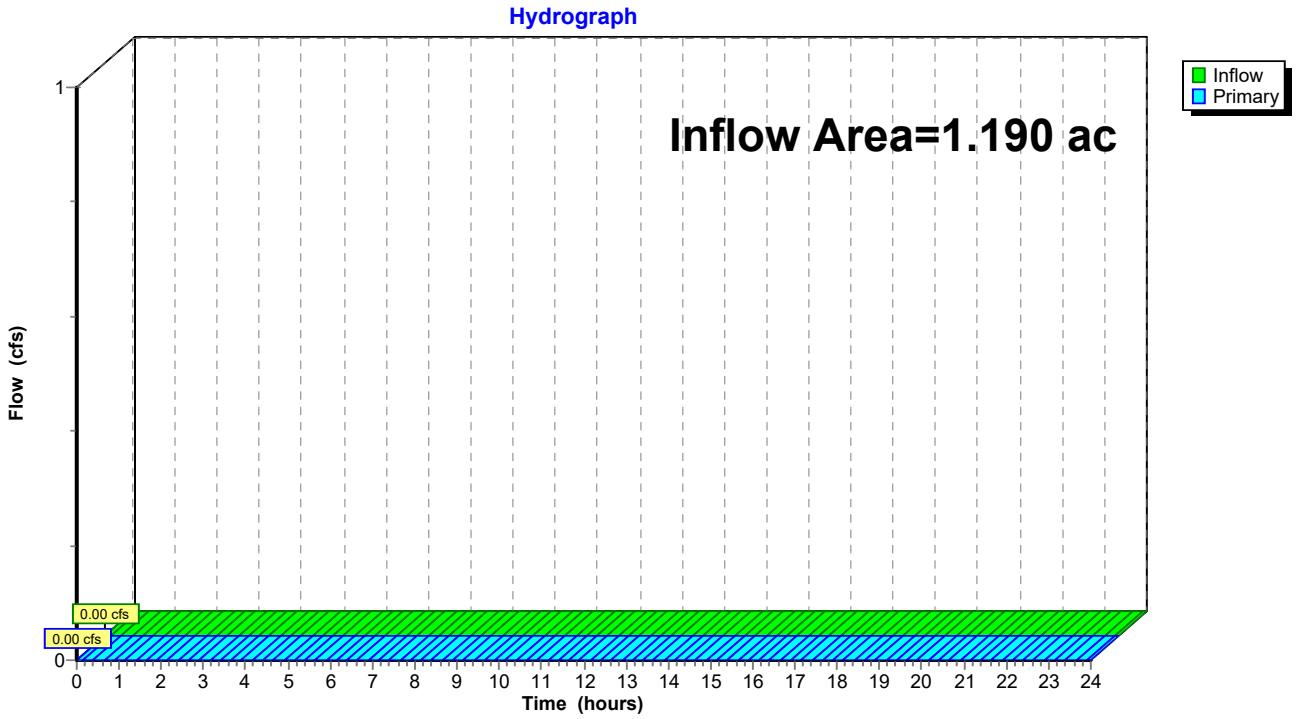
Elevation (feet)	Surface (acres)	Storage (acre-feet)
125.50	0.033	0.000
125.55	0.033	0.001
125.60	0.033	0.001
125.65	0.033	0.002
125.70	0.033	0.003
125.75	0.033	0.003
125.80	0.033	0.004
125.85	0.033	0.005
125.90	0.033	0.005
125.95	0.033	0.006
126.00	0.033	0.007
126.05	0.033	0.007
126.10	0.033	0.008
126.15	0.033	0.009
126.20	0.033	0.009
126.25	0.033	0.010
126.30	0.033	0.011
126.35	0.033	0.011
126.40	0.033	0.012
126.45	0.033	0.013
126.50	0.033	0.013
126.55	0.033	0.014
126.60	0.033	0.015
126.65	0.033	0.015
126.70	0.033	0.016
126.75	0.033	0.017
126.80	0.033	0.017
126.85	0.033	0.018
126.90	0.033	0.018
126.95	0.033	0.019
127.00	0.066	0.020
127.05	0.066	0.020
127.10	0.066	0.021
127.15	0.066	0.022
127.20	0.066	0.022
127.25	0.066	0.023
127.30	0.066	0.023
127.35	0.066	0.024
127.40	0.066	0.024
127.45	0.066	0.025
127.50	0.066	0.026
127.55	0.066	0.026
127.60	0.066	0.027
127.65	0.066	0.027
127.70	0.066	0.028
127.75	0.066	0.028
127.80	0.066	0.029
127.85	0.066	0.030
127.90	0.066	0.030
127.95	0.066	0.031
128.00	0.066	0.031
128.05	0.066	0.032
128.10	0.066	0.033
128.15	0.066	0.033
128.20	0.066	0.034
128.25	0.066	0.034
128.30	0.066	0.035
128.35	0.066	0.035
128.40	0.066	0.036
128.45	0.066	0.037
128.50	0.066	0.037
128.55	0.066	0.038
128.60	0.066	0.038
128.65	0.066	0.039
128.70	0.066	0.039
128.75	0.066	0.040
128.80	0.066	0.041
128.85	0.066	0.041
128.90	0.066	0.042
128.95	0.066	0.042
129.00	0.066	0.043
129.05	0.066	0.043
129.10	0.066	0.044
129.15	0.066	0.045
129.20	0.066	0.045
129.25	0.066	0.046
129.30	0.066	0.046
129.35	0.066	0.047
129.40	0.066	0.048
129.45	0.066	0.048
129.50	0.089	0.049
129.55	0.090	0.050
129.60	0.090	0.051
129.65	0.091	0.052
129.70	0.091	0.053
129.75	0.091	0.055
129.80	0.092	0.056
129.85	0.092	0.057
129.90	0.093	0.059
129.95	0.093	0.060
130.00	0.094	0.061
130.05	0.095	0.063
130.10	0.095	0.064
130.15	0.096	0.066
130.20	0.096	0.067
130.25	0.096	0.069
130.30	0.097	0.070
130.35	0.097	0.072
130.40	0.098	0.073
130.45	0.098	0.075
130.50	**0.099**	**0.077**

Summary for Link 7L: Post (Composite)

Inflow Area = 1.190 ac, 28.57% Impervious, Inflow Depth = 0.00" for Custom event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Post (Composite)



Hydrograph for Link 7L: Post (Composite)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.00**	**0.00**	13.00	0.00	0.00	0.00
0.25	0.00	0.00	0.00	13.25	0.00	0.00	0.00
0.50	0.00	0.00	0.00	13.50	0.00	0.00	0.00
0.75	0.00	0.00	0.00	13.75	0.00	0.00	0.00
1.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00
1.25	0.00	0.00	0.00	14.25	0.00	0.00	0.00
1.50	0.00	0.00	0.00	14.50	0.00	0.00	0.00
1.75	0.00	0.00	0.00	14.75	0.00	0.00	0.00
2.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
2.25	0.00	0.00	0.00	15.25	0.00	0.00	0.00
2.50	0.00	0.00	0.00	15.50	0.00	0.00	0.00
2.75	0.00	0.00	0.00	15.75	0.00	0.00	0.00
3.00	0.00	0.00	0.00	16.00	0.00	0.00	0.00
3.25	0.00	0.00	0.00	16.25	0.00	0.00	0.00
3.50	0.00	0.00	0.00	16.50	0.00	0.00	0.00
3.75	0.00	0.00	0.00	16.75	0.00	0.00	0.00
4.00	0.00	0.00	0.00	17.00	0.00	0.00	0.00
4.25	0.00	0.00	0.00	17.25	0.00	0.00	0.00
4.50	0.00	0.00	0.00	17.50	0.00	0.00	0.00
4.75	0.00	0.00	0.00	17.75	0.00	0.00	0.00
5.00	0.00	0.00	0.00	18.00	0.00	0.00	0.00
5.25	0.00	0.00	0.00	18.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00	18.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00	18.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00	19.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00	19.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00	19.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00	19.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
7.25	0.00	0.00	0.00	20.25	0.00	0.00	0.00
7.50	0.00	0.00	0.00	20.50	0.00	0.00	0.00
7.75	0.00	0.00	0.00	20.75	0.00	0.00	0.00
8.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00
8.25	0.00	0.00	0.00	21.25	0.00	0.00	0.00
8.50	0.00	0.00	0.00	21.50	0.00	0.00	0.00
8.75	0.00	0.00	0.00	21.75	0.00	0.00	0.00
9.00	0.00	0.00	0.00	22.00	0.00	0.00	0.00
9.25	0.00	0.00	0.00	22.25	0.00	0.00	0.00
9.50	0.00	0.00	0.00	22.50	0.00	0.00	0.00
9.75	0.00	0.00	0.00	22.75	0.00	0.00	0.00
10.00	0.00	0.00	0.00	23.00	0.00	0.00	0.00
10.25	0.00	0.00	0.00	23.25	0.00	0.00	0.00
10.50	0.00	0.00	0.00	23.50	0.00	0.00	0.00
10.75	0.00	0.00	0.00	23.75	0.00	0.00	0.00
11.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00
11.25	0.00	0.00	0.00				
11.50	0.00	0.00	0.00				
11.75	0.00	0.00	0.00				
12.00	0.00	0.00	0.00				
12.25	0.00	0.00	0.00				
12.50	0.00	0.00	0.00				
12.75	0.00	0.00	0.00				

APPENDIX H:
PRE-CONSTRUCTION DOCUMENTS & CERTIFICATIONS

PRE-CONSTRUCTION DOCUMENTS

Project Name: The Masters School Innovation and Entrepreneurship Center
Name of Owner: The Masters School
Name of Operator: Yorke Construction Corporation
Name of Preparer: Gonzalo Trenosky, P.E.
Name of Qualified Professional: Gonzalo Trenosky, P.E.

PREAMBLE TO SITE ASSESSMENT AND INSPECTIONS

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

A qualified professional1 shall conduct an assessment of the site prior to the commencement of construction activities2,3 and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

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

When construction starts, site inspections shall be conducted by the qualified professional at least every seven (7) calendar days (Construction Duration Inspections), except as otherwise

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[1] "Qualified Professional" 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), licensed Landscape Architect, or other NYSDEC (Department) endorsed individual(s). It also means someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, if person has training in the principles and practices of erosion and sediment control. Training in that principles and practices of erosion and sediment control means that an individual performing a site inspection has received four (4) hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity in proper erosion and sediment control principles no later than two (2) years from date this general permit is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four (4) hours of training every three (3) years.

[2] "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.

[3] "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.

required during "winter frequency". The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

A qualified professional shall perform a final site inspection. The qualified professional shall certify that the site had undergone final stabilization[4] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Preparer must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

[4] "Final stabilization" means that all soil-disturbing 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.

PRE-CONSTRUCTION CERTIFICATIONS

PREPARER'S CERTIFICATION

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

Name (please print): Gonzalo Trenosky, P.E.

Title: Associate Engineer \ MFS **Date:** _____

Address: 320 Fifth Avenue, Suite 1102 New York, NY 10001

Phone: (212)-943-6576 **Email:** gmt@mfsengineers.com

Signature:

OWNER'S CERTIFICATION

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards.

I certify that the storm water control measures as shown in the SWPPP will be in place before commencement of construction of any segment of the project that requires each measure."

Name (please print): Mr. Seth Marx

Title: Director of Institutional Advancement **Date:** _____

Address: 49 Clinton Avenue, Dobbs Ferry, NY 10522

Phone: +1 (914)-479-6527 **Email:** seth.marx@mastersny.org

Signature:

OPERATOR'S CERTIFICATION

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards.

I certify that the stormwater control measure as shown in the SWPPP will be in place before commencement of construction of any segment of the project that requires each measure."

Name (please print): Yorke Construction Corporation

Title: _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature:

PREPARER'S CERTIFICATION

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

Name (please print): Gonzalo Trenosky, P.E.

Title: Associate Engineer \ MFS **Date:** _____

Address: 320 Fifth Avenue, Suite 1102 New York, NY 10001

Phone: (212)-943-6576 **Email:** gmt@mfsengineers.com

Signature:

APPENDIX I:
CONSTRUCTION DURATION INSPECTIONS

CONSTRUCTION DURATION INSPECTIONS

Directions:
Inspection Forms will be filled out during the entire construction phase of the project. Required Elements:

On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated risers pipes to pass water; and

Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector(Printname)	Date of Inspection
Qualified Professional (print name)	Qualified Professional Signature

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

MAINTAINING WATER QUALITY				
Yes	No	N/A	Item	Comments
			Is there an increase in turbidity causing a substantial visible contrast to natural conditions?	
			Is there residue from oil and floating substances, visible oil film, or globules or grease?	
			All disturbances are within the limits of the approved plans?	
			Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?	

HOUSEKEEPING				
Yes	No	N/A	Item	Comments
			Is construction site litter and debris appropriately managed?	
			Are facilities and equipment necessary for implementation or erosion and sediment control in working order and/or properly maintained?	
			Is construction impacting the adjacent property?	
			Is dust adequately controlled?	

RUNOFF CONTROL PRACTICES				
Yes	No	N/A	Item	Comments
			Is sediment laden water from work area being discharged to silt trapping device(s)?	

SOIL STABILIZATION				
Yes	No	N/A	Item	Comments
			Are stockpiles are stabilized with vegetation and/or mulch?	
			Do stockpiles have silt fence at base?	
			Is sediment control installed at the toe of the slope?	
			Is silt fence installed off-mound areas only?	
			Have temporary seedings and mulch been applied to idle areas?	
			Has 4 inches minimum of topsoil been applied under permanent seedings?	

SEDIMENT CONTROL PRACTICES				
Stabilized Construction Entrance				
Yes	**No**	**N/A**	**Item**	**Comments**
			Stone is clean enough to effectively remove mud from vehicles?	
			Installed per standards and specifications?	
			Does all traffic use the stabilized entrance to enter and leave site?	
			Is adequate drainage provided to prevent ponding at entrance?	
Silt Fence/Straw Bale Dike				
Yes	**No**	**N/A**	**Item**	**Comments**
			Installed on contour, 10 feet from toe of slope (not across conveyance channels)?	
			Installed per standards and specifications?	
			Silt Fence: joints constructed by wrapping the two ends together for continuous support?	
			Silt Fence: fabric buried 6 inches minimum?	
			Straw Bale: embedded 4 inches minimum?	
			Silt Fence: posts are stable, fabric is tight and without rips or frayed areas?	
			Straw Bale: securely anchored in place?	
Sediment accumulation is _____% of design capacity.				
Sediment Trap				
Yes	**No**	**N/A**	**Item**	**Comments**
			Drainage area is 5 acre or less?	
			Installed per standards and specifications?	

CONDITIONS OF OUTFALLS (ANNUAL AND AFTER MAJOR STORM EVENTS)				
Yes	No	N/A	Item	Comments
			Riprap failure?	
			Slope Erosion?	
			Storm drain pipe condition?	
			Headwall Structure condition?	

Note: Not all erosion and sediment control practices are included in this document. Additional pages shall be included as required for this project. Construction inspection checklists for post-development stormwater management practices can be found in Appendix F and G of the New York State Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS - MODIFICATIONS

Modifications to the SWPPP (To be completed as described below) The Operator shall amend the SWPPP whenever:

There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or

The SWPPP proves to be ineffective in;

Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or

Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and

Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

APPENDIX J:
MONTHLY SUMMARY OF SITE INSPECTION ACTIVITIES

MONTHLY SUMMARY OF SITE INSPECTION ACTIVITIES

Name of Facility:	Today's Date:	Reporting Month:
Location:		
Name and Telephone Number of Site Inspector:		

Date Of Inspection	Regular / Rainfall Based Inspection	Name of Inspector	Items of Concern

Qualified Professional's Certification:

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

Signature of Qualified Professional

Name of Qualified Professional

APPENDIX K:
CONTRACTOR'S CERTIFICATIONS AND FORMS

CONTRACTOR'S CERTIFICATION STATEMENT

I. SITE INFORMATION

Construction Site Name: The Masters School Innovation and Entrepreneurship Center

Site Location: 49 Clinton Avenue, Dobbs Ferry, NY 10522

II. CONTRACTOR'S INFORMATION

Contracting Firm: Yorke Construction Corporation

Contracting Firm Address: 140 West 31st Street, 4th Floor, New York, NY 10001

Contact: _____

Telephone Number: _____

III. STORMWATER MEASURES

Contractor is responsible for but not limited to the following stormwater measures.

1.	Piping	4.	_____	7.	_____
2.	Underground Detention	5.	_____	8.	_____
3.	Landscaping	6.	_____	9.	_____

IV. CERTIFICATION

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

V. SIGNATURE: _____ DATE: _____

Name (print): _____

Title: _____

SUB-CONTRACTOR'S CERTIFICATION STATEMENT

The General Contractor, _____shall have this statement completed and signed by all subcontractors of the project that will be responsible for any measure outlined in this stormwater pollution prevention plan.

I. SITE INFORMATION

Construction Site Name: _____

Site Location: _____

II. SUB-CONTRACTORS INFORMATION

Sub-Contracting Firm: _____

Sub-Contracting Firm: _____

Telephone Number(s): _____

Contact(s): 1) _____
2) _____

III. STORMWATER MEASURES

Sub-Contractor is responsible for but not limited to the following storm water measures.

1. _____ 4. _____ 7. _____

2. _____ 5. _____ 8. _____

3. _____ 6. _____ 9. _____

IV. STORMWATER MEASURES

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

V. SIGNATURE: _____ **DATE:** _____

Name (print): _____

Title: _____

CERTIFICATE OF ISSUANCE

As directed by the Operator, a copy of the storm water pollution prevention plan will be retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor. Upon completion the storm water pollution prevention plan and all records shall be returned to the operator.

Date of Issuance: _____

Name: _____

Title: _____

Firm: _____

Signature:

Received from:

Name: _____

Title: _____

Firm: _____

Address/ Phone No: _____

_____

_____

Signature:

Inquiries in regards to copies of pollution prevention plan by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.

EROSION AND WATER QUALITY CONTROL IDENTIFICATION

The contractor and/or subcontractors that will implement each erosion control measure must be identified:

IDENTIFICATION

NAME OF CONTRACTOR AND/OR SUBCONTRACTOR	MEASURE TO BE IMPLEMENTED

Each contractor and subcontractor identified must sign a copy of the certification statement.

This identification does not reassign or remove responsibility for all measures as agreed to the contract documents. The contractor is responsible for all subcontractors.

CONSTRUCTION STABILIZATION

The Contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. When construction activity is precluded by snow cover, stabilization measures shall be initiated as soon as practicable. When construction activity will resume within 21 days from when activity ceased, then stabilization measures do not have to be initiated on that portion of the site by the 14th day after construction activity temporarily ceased.

THE CONTRACTOR IS RESPONSIBLE TO KEEP THE FOLLOWING RECORDS:

MAJOR GRAVITY ACTIVITY	PORTION OF THE SITE	DATE COMMENCED	DATE CEASED (PERMANENTLY OR TEMPORARILY)	DATE STABILIZATION MEASURES INITITATED

THESE MUST BE KEPT UP TO DATE AND ON-SITE FOR INSPECTION AT ANYTIME.

CERTIFICATE OF CHANGE BY CONTRACTOR

To: _____
_____
_____

Project: _____

Site Address: _____

Enclosed, please find your written notification of the following provision(s) of the SWPPP not being met:

_____
_____
_____
_____

Provisions of the plan requiring modification:

_____
_____
_____
_____

Action taken to modify plan to bring project into compliance:

_____
_____
_____
_____

Date Completed: _____

Name: _____
Title: _____

Contracting Firm: _____
Address: _____
_____
_____
Phone Number: _____
Signature: _____

Received By: _____

Name: _____
Title: _____

Firm: _____
Address: _____
_____
_____
Phone Number: _____
Signature: _____

APPENDIX L:
END OF CONSTRUCTION DOCUMENTS

FINAL STABILIZATION AND RETENTION OF RECORDS

A. Qualified Professional Certification - A qualified professional shall perform a final site inspection.

Yes	No	NA	
[ ]	[ ]	[ ]	Final site drainage will prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.
[ ]	[ ]	[ ]	Conveyance systems are stabilized.
[ ]	[ ]	[ ]	Channels and stream banks are seeded at the outlet points.

"I hereby certify that the site has undergone final stabilization. Final stabilization means that all soil disturbing activities have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures. Further, all temporary erosion and sediment controls (such as silt fence) not specified for permanent erosion control have been removed."

Name of Qualified Professional:

_____

Signature: _____

B. Retention of Records - The Operator shall retain copies of SWPPPs and any reports and records of all data for a period of at least three years from the date that the site is finally stabilized.

C. Maintenance of SWPPP and any reports at the construction site – The Operator shall retain a copy of the SWPPP at the construction site from the data of initiation of construction activities to the date of final stabilization.

CERTIFICATE OF RETURN

As directed by the Owner's representative, the copy of the storm water pollution prevention plan retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor are to be returned to the owner. The owner shall retain the plan, reports and records of all data for a period of three years from the date that the site is stabilized. This period may be extended by the State director at any time upon written notification.

Date of site stabilization: _____

Name: _____

Title: _____

Firm: _____

Signature: _____

Received by: _____

Name/ Title: _____

Address/ Phone No: _____

Signature: _____

Inquiries in regards to copies of pollution prevention plan by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.

APPENDIX M:
EROSION AND SEDIMENT CONTROL MATERIAL SPECS

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	JUSTIN PICCILLO 917-716-6420 JUSTIN.PICCILLO@ADS-PIPE.COM
ADS SALES REP:	TIMOTHY KUZIO 315-525-7760 TIMOTHY.KUZIO@ADS-PIPE.COM
PROJECT NO:	S254171

Advanced Drainage Systems, Inc.

SiteASSIST™
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

THE MASTERS SCHOOL

DOBBS FERRY, NY

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT

14	STORMTECH MC-3500 CHAMBERS
6	STORMTECH MC-3500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	% STONE VOID
3,316	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
1,063	SYSTEM AREA (ft²)
151	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

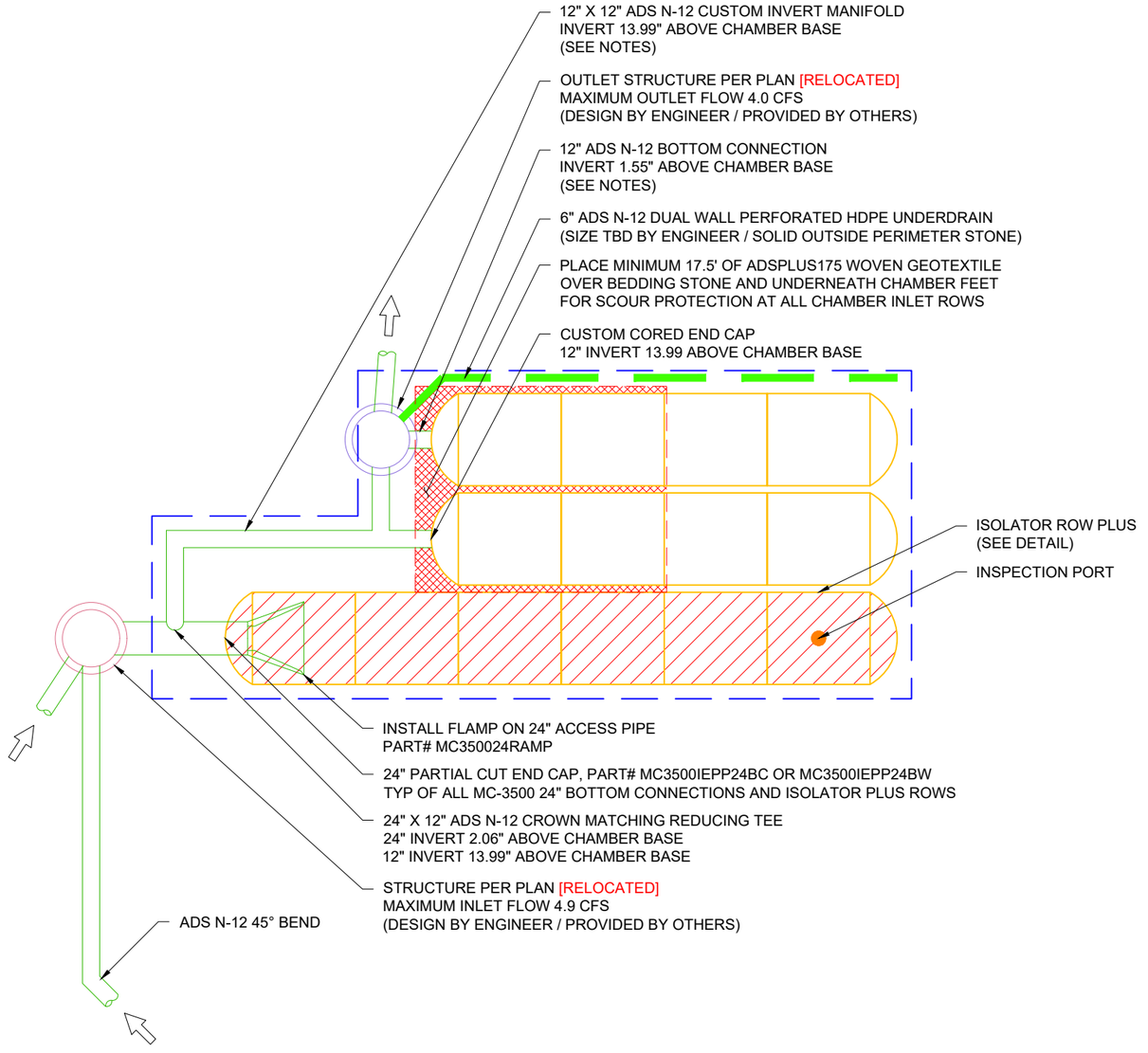
134.58	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
128.58	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
128.08	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
128.08	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
128.08	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
127.58	TOP OF STONE
126.58	TOP OF MC-3500 CHAMBER
124.00	12" MANIFOLD INVERT
123.00	24" ISOLATOR ROW PLUS CONNECTION INVERT
122.94	12" BOTTOM CONNECTION INVERT
122.83	BOTTOM OF MC-3500 CHAMBER
122.08	UNDERDRAIN INVERT
121.33	BOTTOM OF STONE

EXPECTED ELEVATIONS FOR MODELLED STORM EVENTS

122.83	1-YR STORM
124.59	10-YR STORM
125.51	25-YR STORM
126.93	100-YR STORM

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



THE MASTERS SCHOOL
DOBBS FERRY, NY
DATE: 08-19-21
DRAWN: TSG
PROJECT #: S254171
CHECKED: XXX

DATE	DRWN	CHKD	DESCRIPTION

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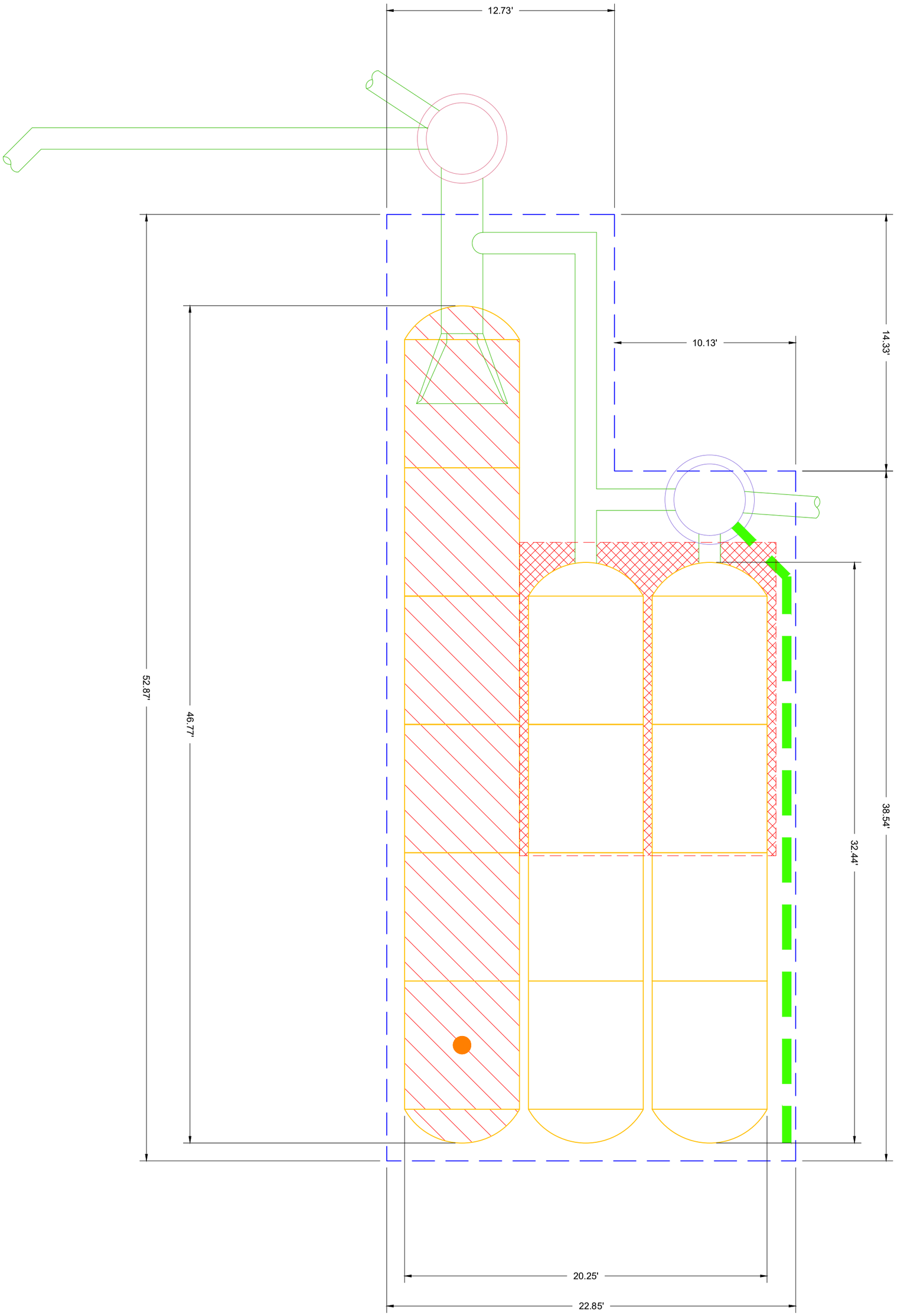
Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

0 10' 20'



4640 TRUEMAN BLVD
HILLIARD, OH 43026

0 5' 10'

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THE MASTERS SCHOOL

DOBBS FERRY, NY

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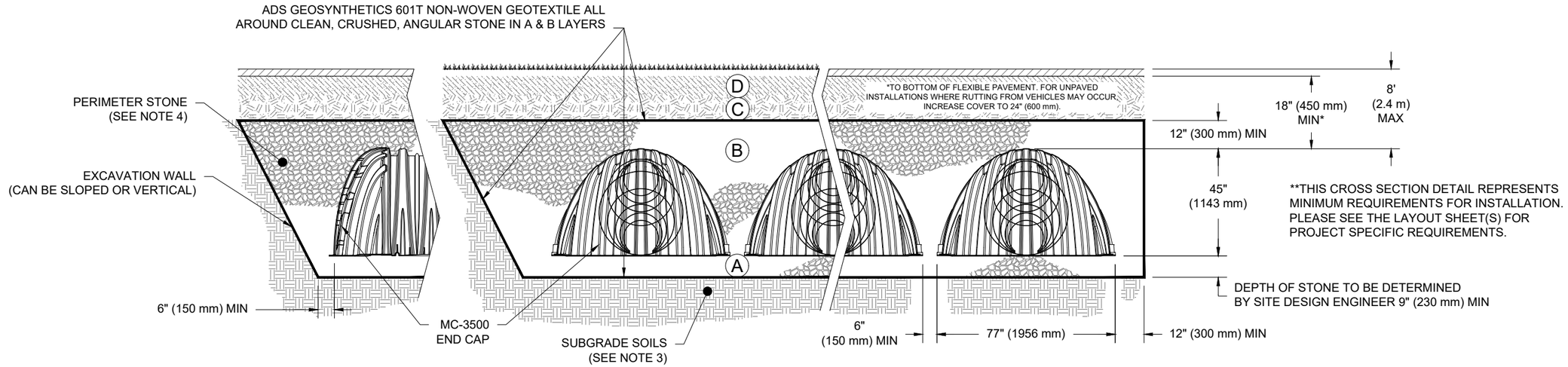
ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

THE MASTERS SCHOOL
DOBBS FERRY, NY
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THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

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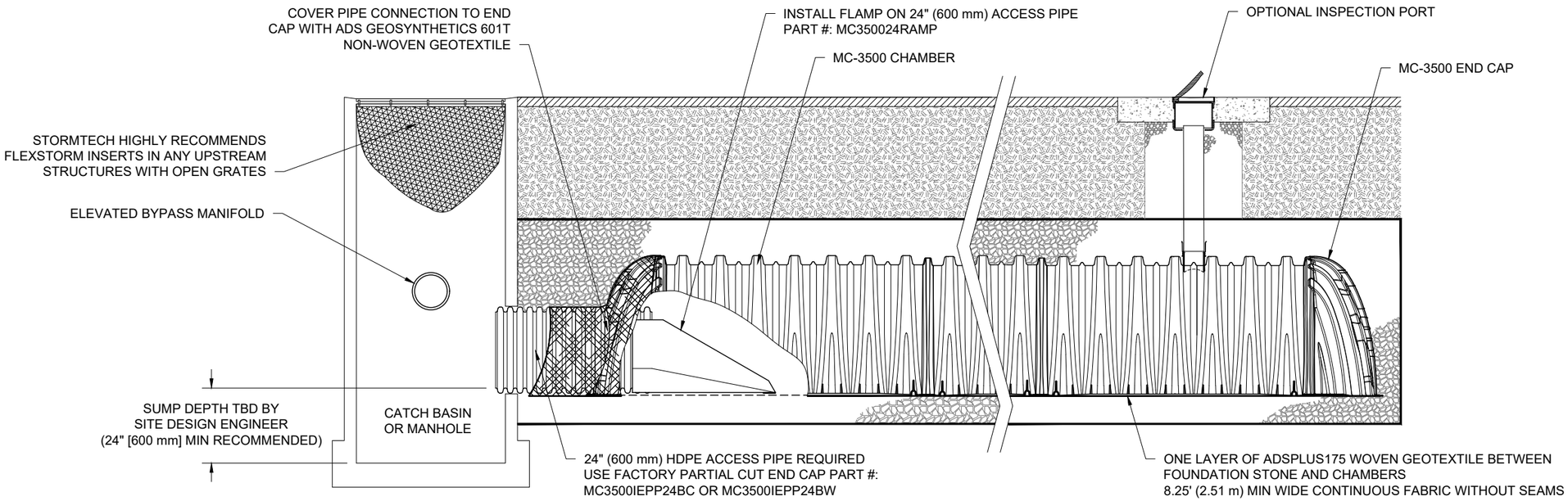


MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

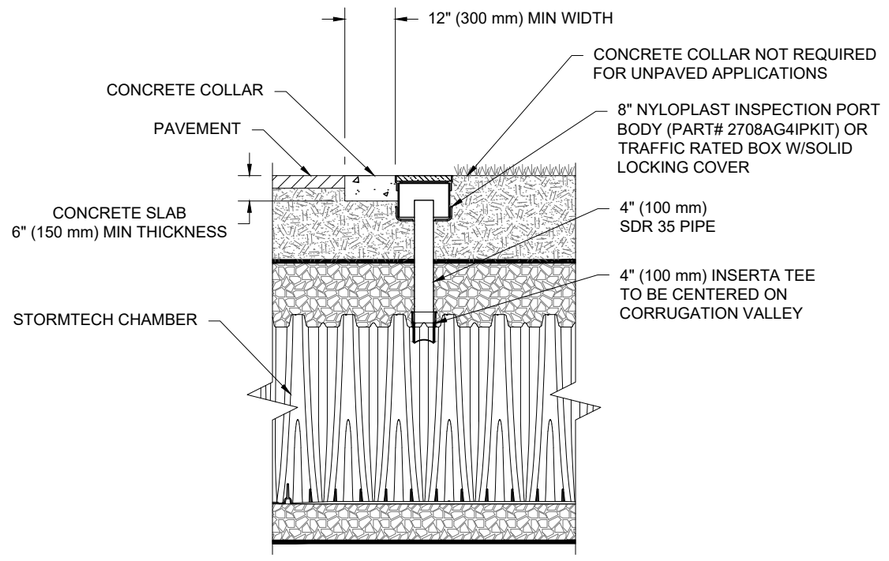
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)
NTS

THE MASTERS SCHOOL
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THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

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UNDERDRAIN DETAIL

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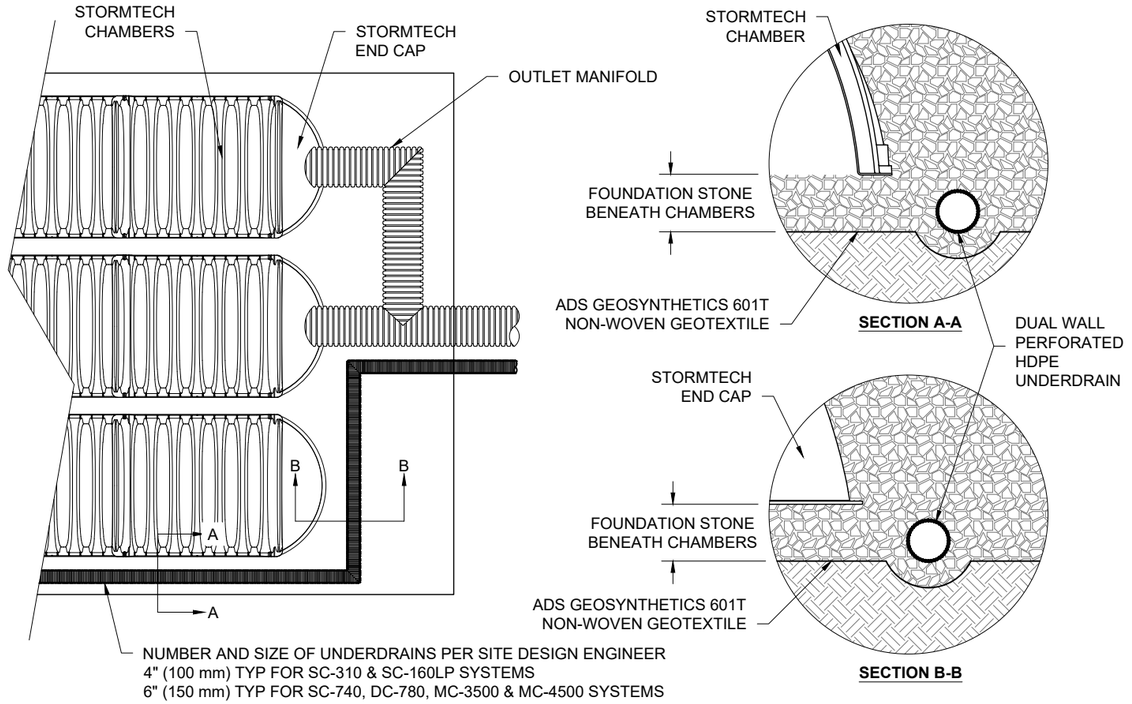
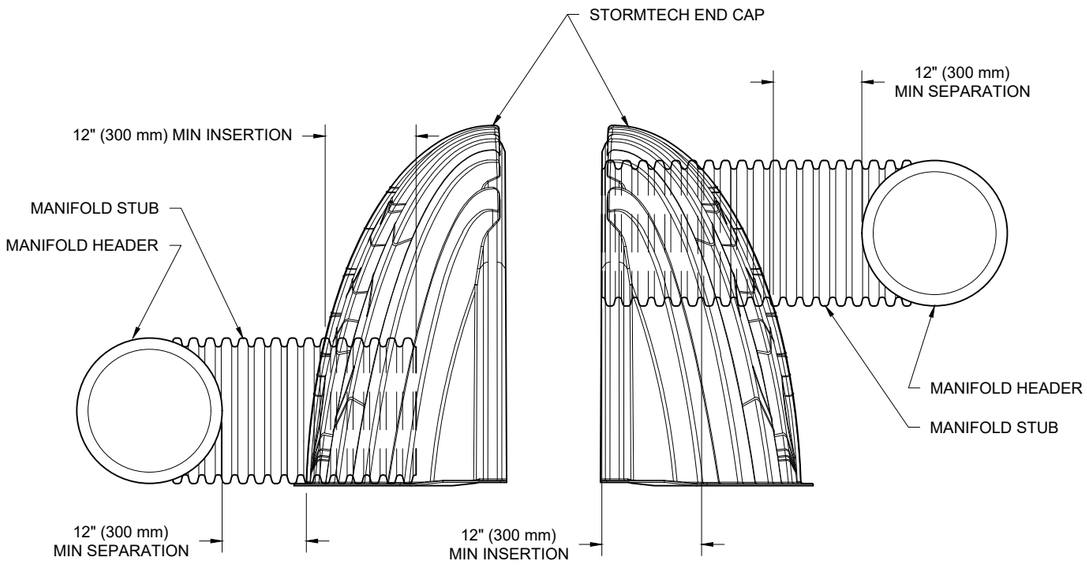


MC-SERIES END CAP INSERTION DETAIL

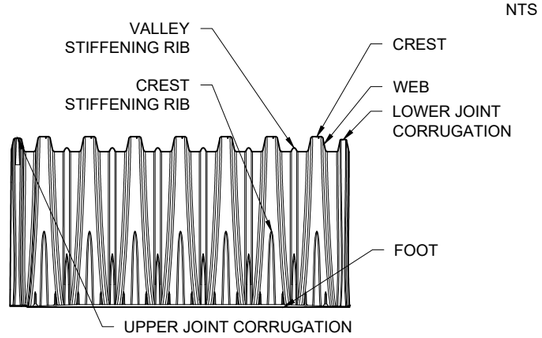
NTS

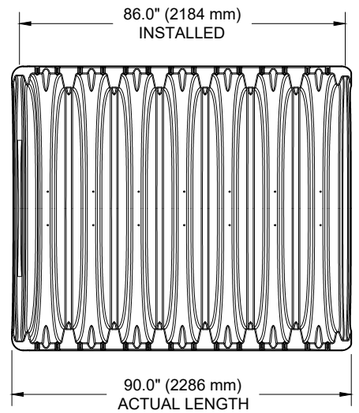


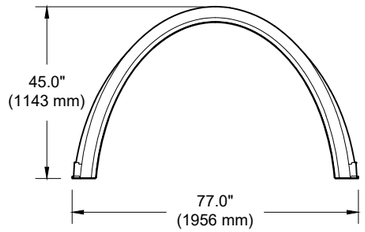
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

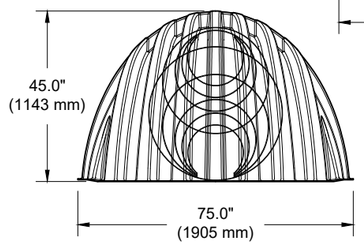
MC-3500 TECHNICAL SPECIFICATION

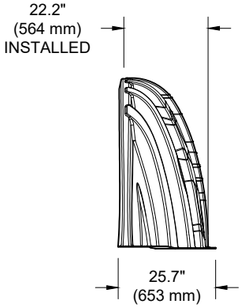
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

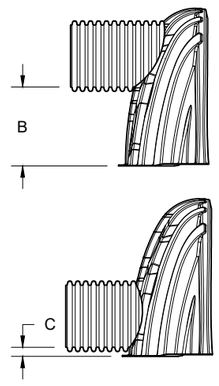
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

THE MASTERS SCHOOL
DOBBS FERRY, NY

DATE: 08-19-21 | DRAWN: TSG | CHECKED: XXX | PROJECT #: S254171

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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

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THE MASTERS SCHOOL - PERIMETER DRAIN

DOBB'S FERRY, NY

DC-780 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH DC-780.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE DC-780 CHAMBER SYSTEM

1. STORMTECH DC-780 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER DC-780 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

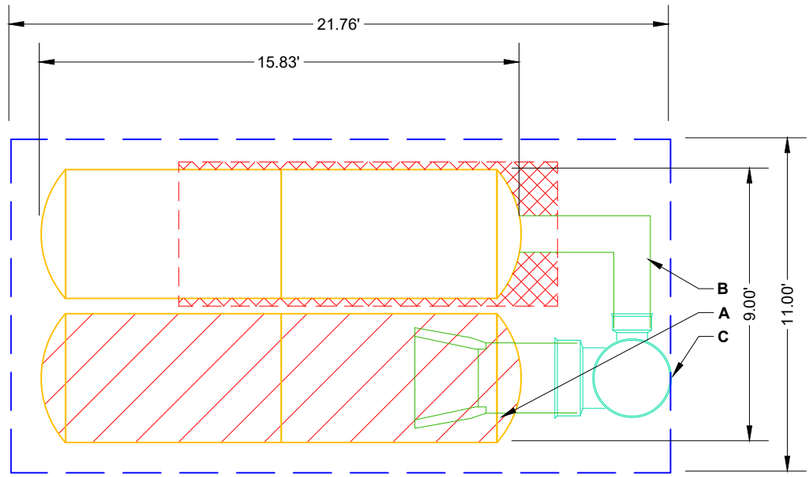
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
4	STORMTECH DC-780 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	15.25
4	STORMTECH DC-780 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	5.25
6	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	4.75
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	4.75
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	4.75
470	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	3.75
		TOP OF DC-780 CHAMBER:	3.25
		12" x 12" TOP MANIFOLD INVERT:	1.79
		24" ISOLATOR ROW PLUS INVERT:	0.76
239	SYSTEM AREA (SF)	BOTTOM OF DC-780 CHAMBER:	0.75
65.5	SYSTEM PERIMETER (ft)	BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PREFABRICATED END CAP, PART#: SC740EPE24BR / TYP OF ALL 24" ISOLATOR ROW PLUS CONNECTIONS	0.10"	
MANIFOLD	B	12" x 12" TOP MANIFOLD, ADS N-12	12.50"	
NYLOPLAST (INLET W/ ISO PLUS ROW)	C	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 12.50' OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

THE MASTERS SCHOOL - PERIMETER DRAIN
DOBB'S FERRY, NY

DRAWN: JP
CHECKED: N/A
DATE:
PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

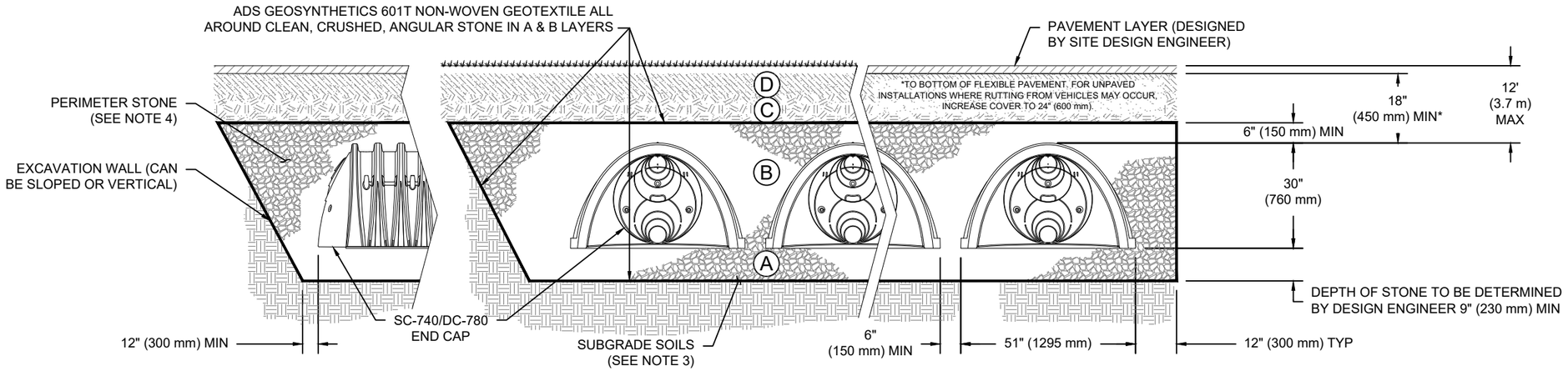
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

0 5' 10'

ACCEPTABLE FILL MATERIALS: STORMTECH DC-780 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. DC-780 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

THE MASTERS SCHOOL - PERIMETER DRAIN
DOBB'S FERRY, NY

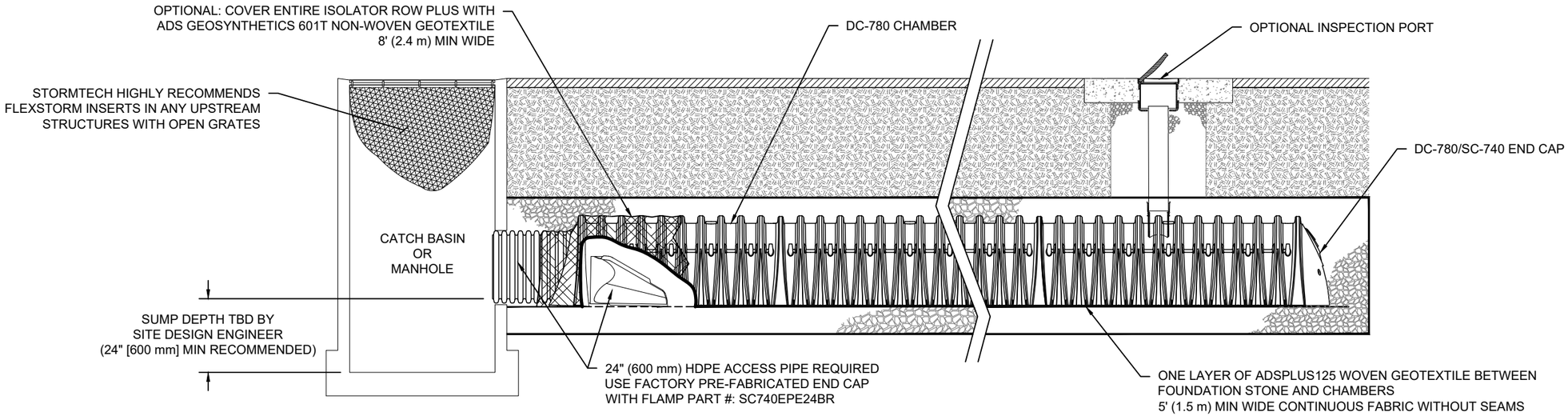
DRAWN: JP
CHECKED: N/A
DATE:
PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SHEET
3 OF 6



DC-780 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

THE MASTERS SCHOOL - PERIMETER DRAIN
DOBB'S FERRY, NY
DATE:
DRAWN: JP
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

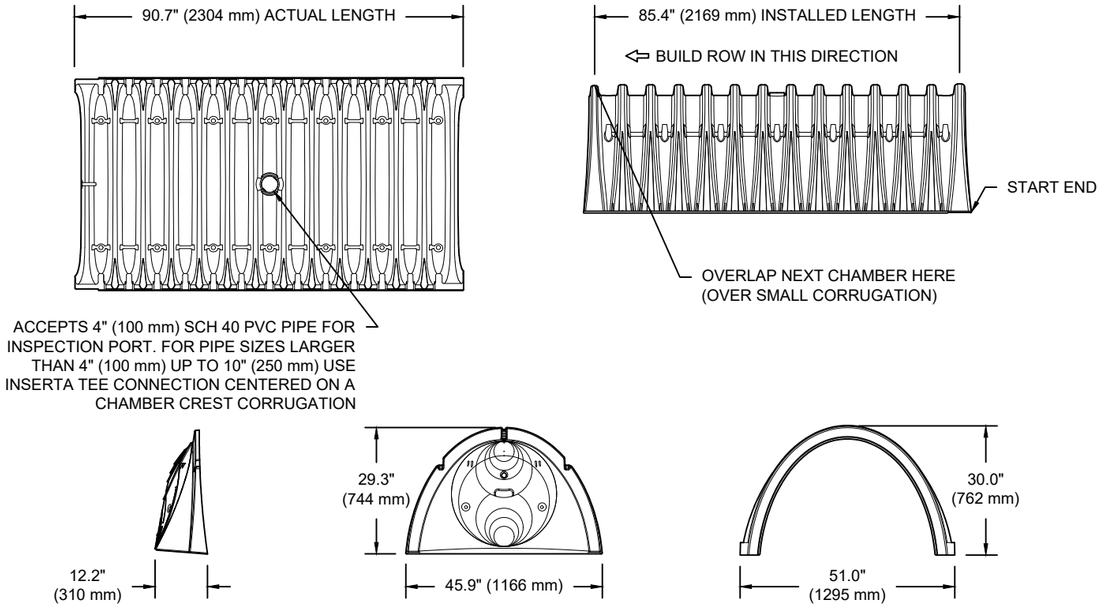
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

StormTech® Chamber System

888-892-2694 | WWW.STORMTECH.COM

DC-780 TECHNICAL SPECIFICATION

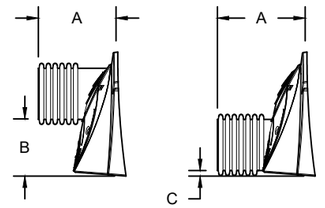
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	46.2 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	78.4 CUBIC FEET	(2.20 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, 9" (229 mm) BELOW,
AND 6" (152 mm) BETWEEN CHAMBERS



STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T/ SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

THE MASTERS SCHOOL - PERIMETER DRAIN
DOBB'S FERRY, NY

DATE:
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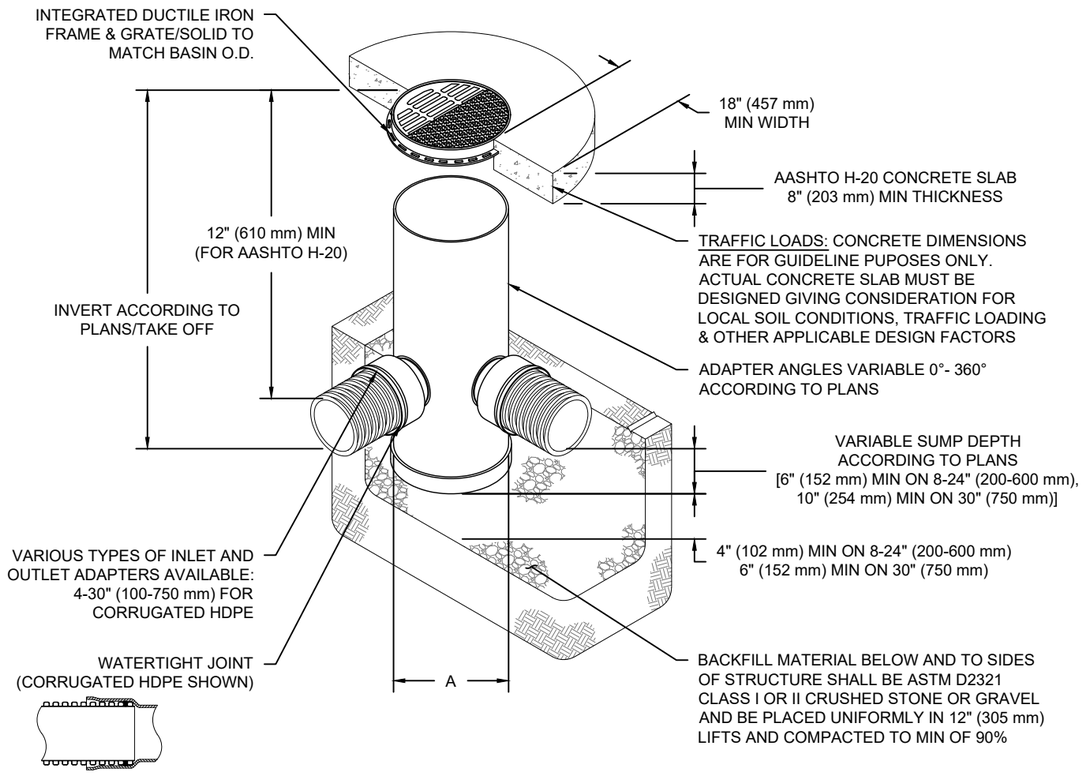
NYLOPLAST DRAIN BASIN

NTS



NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

THE MASTERS SCHOOL - PERIMETER DRAIN
DOBB'S FERRY, NY

DATE:
DRAWN: JP
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

Nyloplast®
770-932-2443 | WWW.NYLOPLAST-US.COM

ADS.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
175.0 ft³ (4.96 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

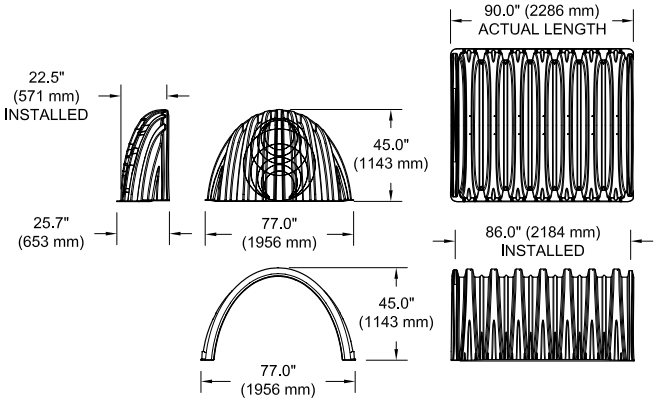
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

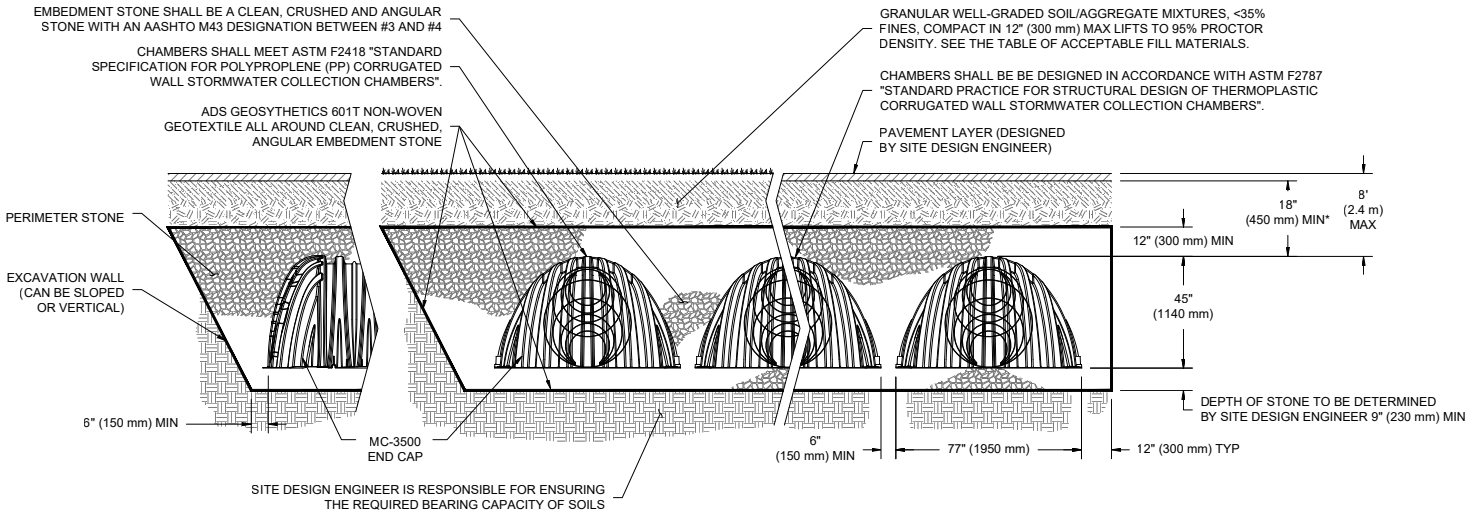
End Cap Storage
14.9 ft³ (0.42 m³)

Min. Installed Storage*
45.1ft ³ (1.28 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
MC-3500 End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
MC-3500 End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	11.9 (9.1)	12.4 (9.5)	12.8(9.8)	13.3 (10.2)
MC-3500 End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

StormTech®

MC-3500 & MC-4500 Design Manual

StormTech® Chamber Systems for Stormwater Management

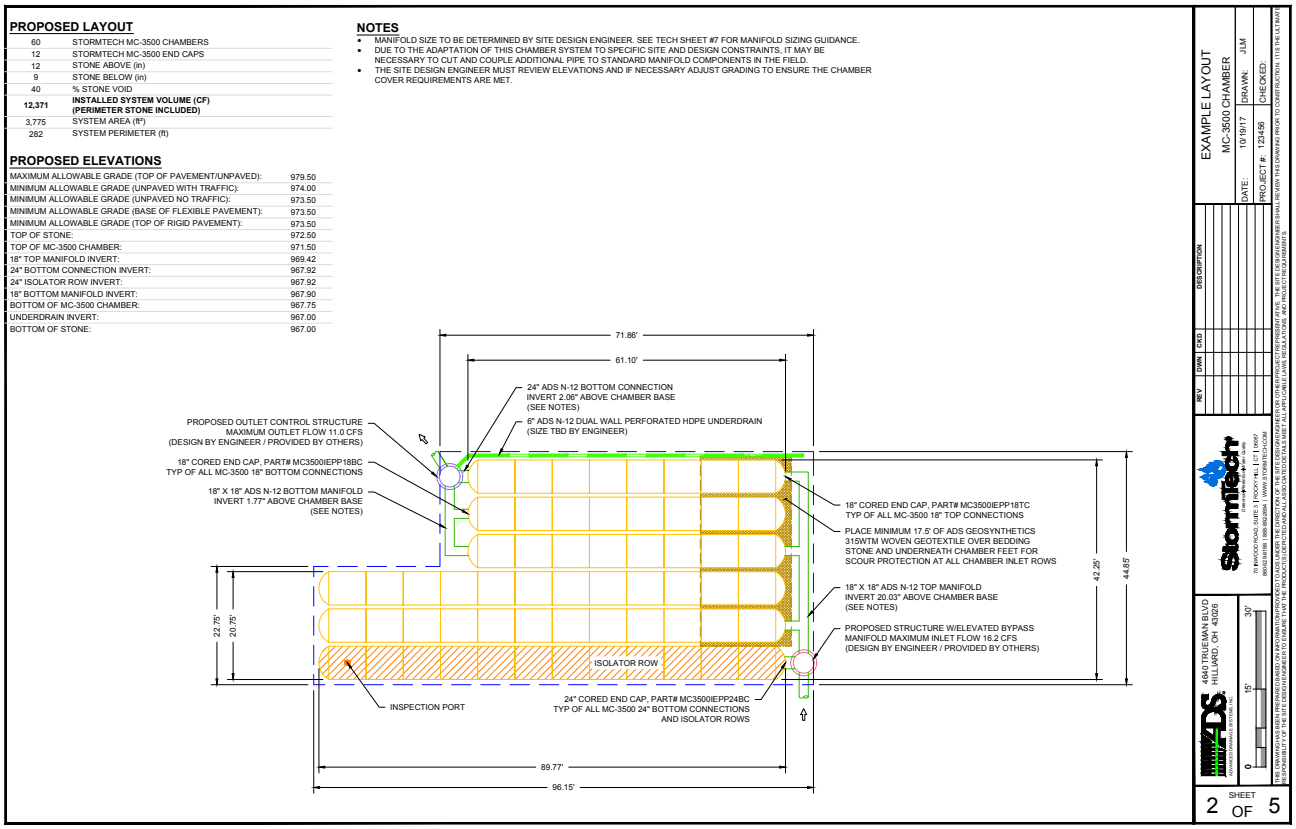
*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

ADS®

Table of Contents

***For SC-160LP, SC-310, SC-740 & DC-780 designs, please refer to the SC-160LP/SC-310/SC-740/DC-780 Design Manual.**

StormTech Engineering Services assists design professionals in specifying StormTech stormwater systems. This assistance includes the layout of chambers to meet the engineer's volume requirements and the connections to and from the chambers. They can also assist converting and cost engineering projects currently specified with ponds, pipe, concrete vaults and other manufactured stormwater detention/retention products. Please note that it is the responsibility of the site design engineer to ensure that the chamber bed layout meets all design requirements and is in compliance with applicable laws and regulations governing a project.

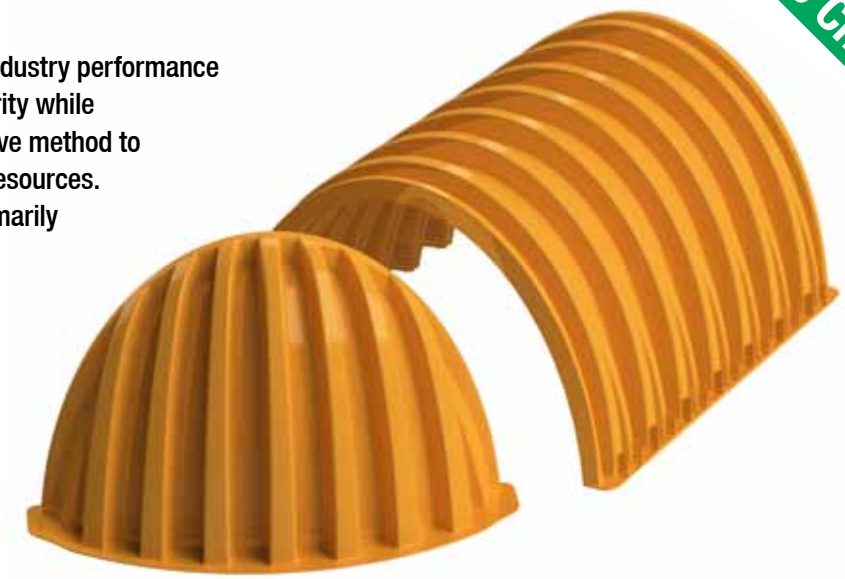


This manual is exclusively intended to assist engineers in the design of subsurface stormwater systems using StormTech chambers.

StormTech MC-3500 Chamber

MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for commercial and municipal applications.



StormTech MC-3500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	90” (2286 mm) x 77” (1956 mm) x 45” (1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	175.0 ft³ (4.96 m³)
Weight	134 lbs (60.8 kg)

*This assumes a minimum of 12” (300 mm) of stone above, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.

StormTech MC-3500 End Cap (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	26.5” (673 mm) x 71” (1803 mm) x 45.1” (1145 mm)
Chamber Storage	14.9 ft³ (0.42 m³)
Min. Installed Storage*	45.1 ft³ (1.28 m³)
Weight	49 lbs (22.2 kg)

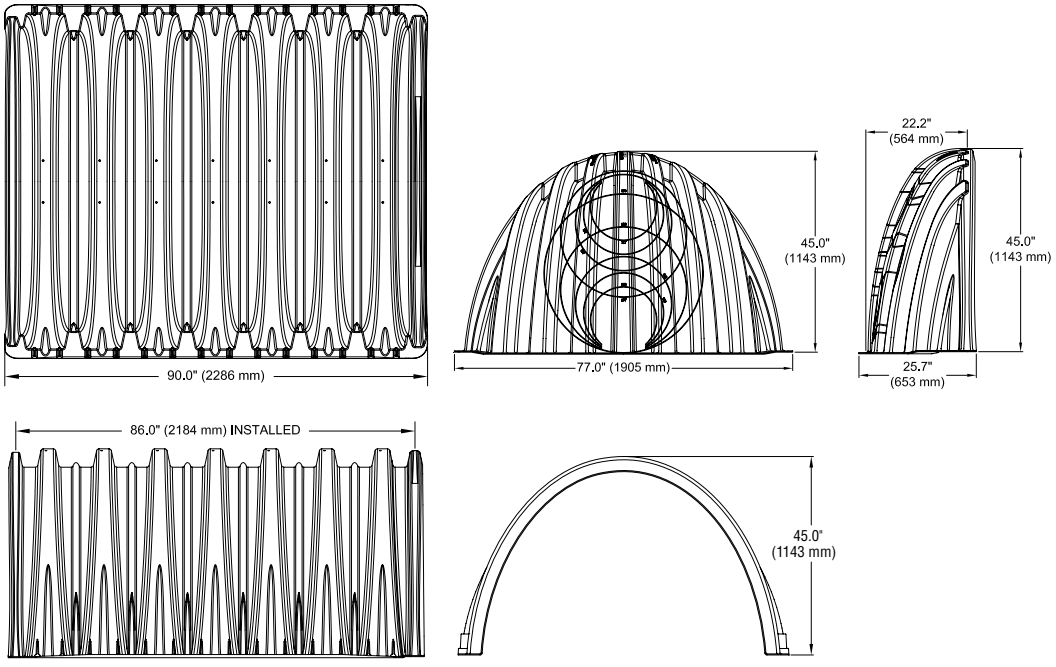
*This assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) between chambers/end caps and 40% stone porosity.

Shipping

15 chambers/pallet

16 end caps/pallet

7 pallets/truck



StormTech MC-3500 Chamber

Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

NOTE: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 6" (150 mm) stone perimeter.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	230 mm	300 mm	375 mm	450 mm
MC-3500	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

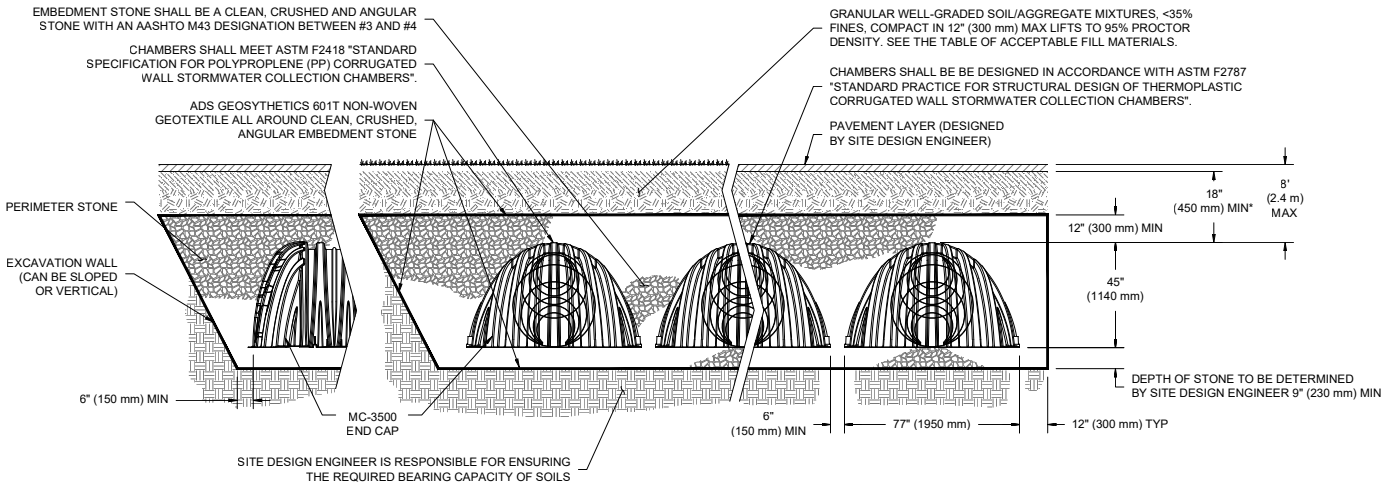
NOTE: Assumes 12" (300 mm) of stone above, and 6" (150 mm) row spacing, and 6" (150 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15"(375 mm)	18"(450 mm)
MC-3500	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

NOTE: Assumes 6" (2150 mm) separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

General Cross Section



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

StormTech MC-4500 Chamber

MC-4500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for commercial and municipal applications.

StormTech MC-4500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	52” (1321 mm) x 100” (2540 mm) x 60” (1524 mm)
Chamber Storage	106.5 ft³ (3.01 m³)
Min. Installed Storage*	162.6 ft³ (4.60 m³)
Weight	120 lbs (54.4 kg)

*This assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230)mm between chambers/end caps and 40% stone porosity.

StormTech MC-4500 End Cap (not to scale)

Nominal Chamber Specifications

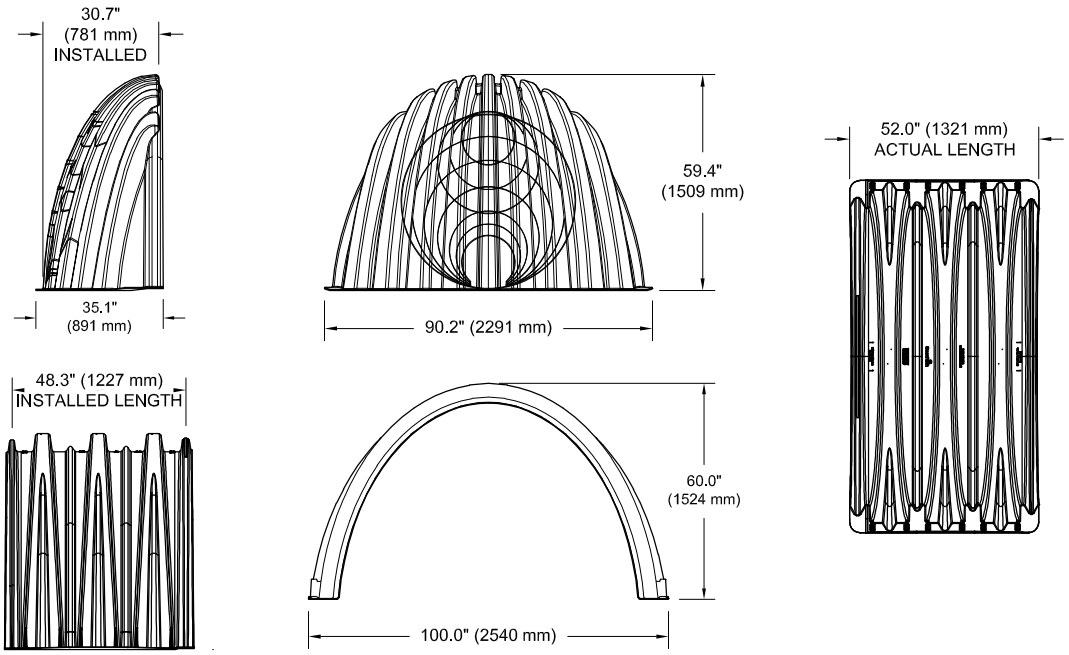
Size (L x W x H)	35.1” (891 mm) x 90.2” (2291 mm) x 59.4” (1509 mm)
Chamber Storage	35.7 ft³ (1.01 m³)
Min. Installed Storage*	108.7 ft³ (3.08 m³)
Weight	120 lbs (54.4 kg)

*This assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 9” (230 mm) between chambers/end caps and 40% stone porosity.

Shipping

7 chambers/pallet

11 pallets/truck



StormTech MC-4500 Chamber

Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-4500 Chamber	106.5 (3.02)	162.6 (4.60)	166.3 (4.71)	169.9 (4.81)	173.6 (4.91)
MC-4500 End Cap	35.7 (1.01)	108.7 (3.08)	111.9 (3.17)	115.2 (3.26)	118.4 (3.35)

NOTE: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-4500	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
End Cap	9.6 (6.8)	10.0 (7.1)	10.4 (7.4)	10.9 (7.7)
METRIC kg (m³)	230 mm	300 mm	375 mm	450 mm
MC-4500	6681 (4.0)	7117 (4.2)	7552 (4.5)	7987 (4.7)
End Cap	8691 (5.2)	9075 (5.4)	9460 (5.6)	9845 (5.9)

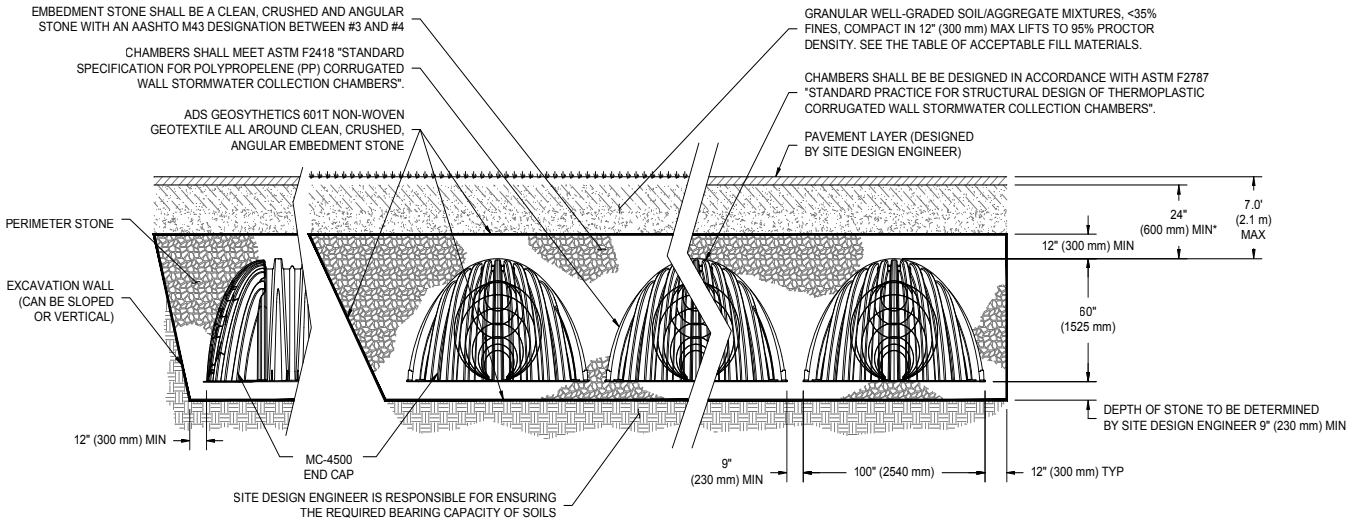
NOTE: Assumes 12" (300 mm) of stone above, and 9" (230 mm) row spacing, and 12" (300 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15"(375 mm)	18"(450 mm)
MC-4500	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
End Cap	9.3 (7.1)	9.6 (7.3)	9.9 (7.6)	10.2 (7.8)

NOTE: Assumes 9" (230 mm) separation between chamber rows, 12" (300 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

General Cross Section



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

1.0 Product Information

1.1 PRODUCT DESIGN

StormTech's commitment to thorough product testing programs, materials evaluation and adherence to national standards has resulted in two more superior products. Like other StormTech chambers, the MC-3500 and MC-4500 are designed to meet the full scope of design requirements of the American Society of Testing Materials (ASTM) International specification F2787 "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers" and produced to the requirements of the ASTM F 2418 "Standard Specification for Polypropylene (PP) Corrugated Stormwater Collection Chambers".

The StormTech MC-3500 and MC-4500 chambers provide the full AASHTO safety factors for live loads and permanent earth loads. The ASTM F 2787 standard provides specific guidance on how to design thermoplastic chambers in accordance with AASHTO Section 12.12. of the AASHTO LRFD Bridge Design Specifications. ASTM F 2787 requires that the safety factors included in the AASHTO guidance are achieved as a prerequisite to meeting ASTM F 2418. The three standards provide both the assurance of product quality and safe structural design.

The design of larger chambers in the same tradition of our other chambers required the collaboration of experts in soil-structure interaction, plastics and manufacturing. Years of extensive research, including laboratory testing and field verification, were required to produce chambers that are ready to meet both the rigors of installation and the longevity expected by engineers and owners.

This Design Manual provides the details and specifications necessary for consulting engineers to design stormwater management systems using the MC-3500 and MC-4500 chambers. It provides specifications for storage capacities, layout dimensions as well as requirements for design to ensure a long service life. The basic design concepts for foundation and backfill materials, subgrade bearing capacities and row spacing remain equally as pertinent for the MC-3500 and MC-4500 as the SC-740, SC-310 and DC-780 chamber systems. However, since many design values and dimensional requirements are different for these larger chambers than the SC-740, SC-310 and DC-780 chambers, design manuals and installation instructions are not interchangeable.

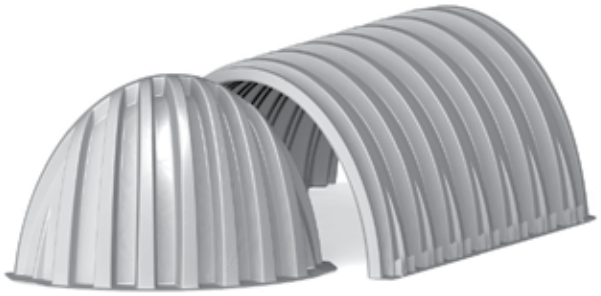
This manual includes only those details, dimensions, cover limits, etc for the MC-3500 and MC-4500 and is intended to be a stand-alone design guide for the MC-3500 and MC-4500 chambers. A Construction Guide specifically for these two chamber models has also been published.

1.2 TECHNICAL SUPPORT

The StormTech Technical Services Department is available to assist the engineer with the layout of MC-3500 and MC-4500 chamber systems and answer questions regarding all the StormTech chamber models. Call the Technical Services Department, email us at info@stormtech.com or contact your local StormTech representative.

1.3 MC-3500 AND MC-4500 CHAMBERS

All StormTech chambers are designed to the full scope of AASHTO requirements without repeating end walls or other structural reinforcing. StormTech's continuously curved, elliptical arch and the surrounding angular backfill are the key components of the structural system. With the addition of patent pending integral stiffening ribs **(Figure 5)**, the MC-3500 and MC-4500 are assured to provide a long, safe service life. Like other StormTech chambers, the MC-3500 and MC-4500 are produced from high quality, impact modified resins which are tested for short-term and long-term mechanical properties.



With all StormTech chambers, one chamber type is used for the start, middle and end of rows. Rows are formed by overlapping the upper joint corrugation of the next chamber over the lower joint corrugation of the previous chamber **(Figure 6)**.

1.4 CHAMBER JOINTS

All StormTech chambers are designed with an optimized joining system. The height and width of the end corrugations have been designed to provide the required structural safety factors while providing an unobstructed flow path down each row.

To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. The corrugation valley immediately adjacent to the lower joint corrugation is marked “Overlap Here - Lower Joint.” The corrugation valley immediately adjacent to the upper joint corrugation is marked “Build This Direction - Upper Joint.”

Two people can safely and efficiently carry and place chambers without cumbersome connectors, special tools or heavy equipment. Each row of chambers must begin and end with a joint corrugation. Since joint corrugations are of a different size than the corrugations along the body of the chamber, chambers cannot be field cut and installed. Only whole MC-3500 and MC-4500 chambers can be used. For system layout assistance contact StormTech.

1.5 MC-3500 AND MC-4500 END CAPS

The MC-3500 and MC-4500 end caps are easy to install. These end caps are designed with a corrugation joint that fits over the top of either end of the chamber. The end cap joint is simply set over the top of either of the upper or lower chamber joint corrugations **(Figure 7)**.

The MC-3500 end cap has pipe cutting guides for 12”–24” (300 mm–600 mm) top inverts **(Figure 9)**.

The MC-4500 end cap has pipe cutting guides for 12”–42” (300 mm–1050 mm) bottom inverts and 12”–24” (300 mm–600 mm) top inverts **(Figure 8)**.

Standard and custom pre-cored end caps are available. Pre-cored end caps, 18” in diameter and larger include a welded crown plate.

FIGURE 5—Chamber and End Cap Components

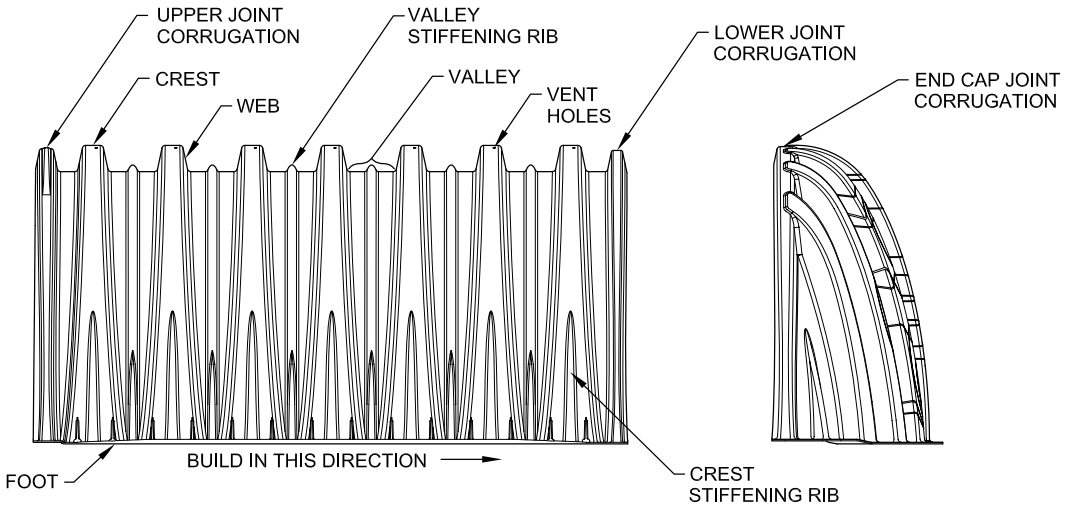


FIGURE 6—Chamber Joint Overlap

FIGURE 7—End Cap Joint Overlap

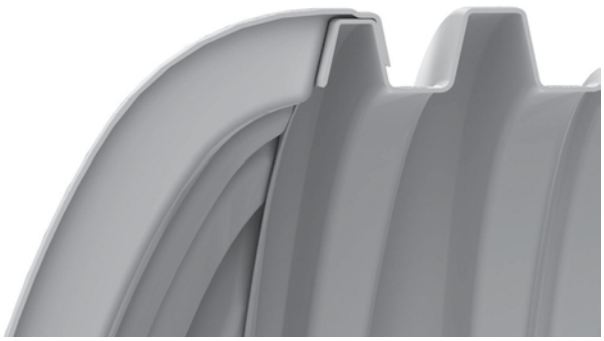


FIGURE 8—MC-4500 End Cap Inverts

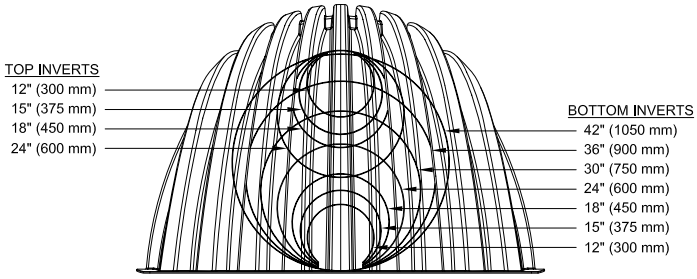
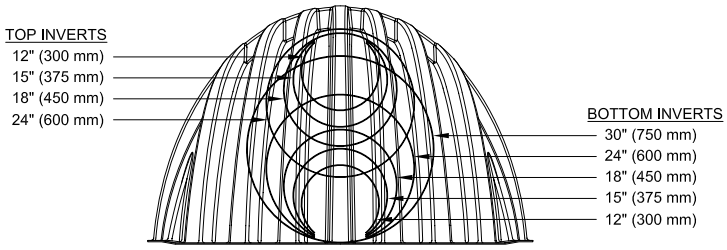


FIGURE 9—MC-3500 End Cap Inverts

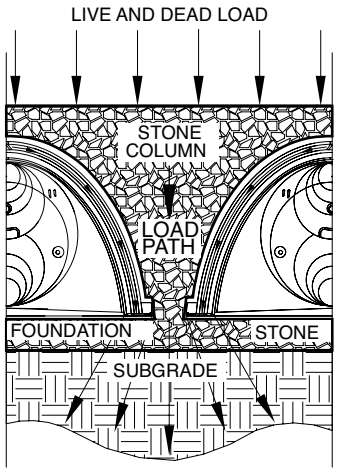


2.0 Foundations for Chambers

2.1 FOUNDATION REQUIREMENTS

StormTech chamber systems can be installed in various soil types. The subgrade bearing capacity and the cover height over the chambers determine the required depth of clean, crushed, angular foundation stone below the chambers. Foundation stone, also called bedding, is the stone between the subgrade soils and the feet of the chamber. Flexible structures are designed to transfer a significant portion of both live and dead loads through the surrounding soils. Chamber systems accomplish this by creating load paths through the columns of embedment stone between and around the rows of chambers. This creates load concentrations at the base of the columns between the rows. The foundation stone spreads out the concentrated loads to distributed loads that can be supported by the subgrade soils.

Since increasing the cover height (top of chamber to finished grade) causes increasing soil load, a greater depth of foundation stone is necessary to distribute the load to the subgrade soils. **Table 1** and **2** specify the minimum required foundation depths for varying cover heights and allowable subgrade bearing capacities. These tables are based on StormTech service loads. The minimum required foundation depth is 9” (230 mm) for both chambers.



2.2 WEAKER SOILS

StormTech has not provided guidance for subgrade bearing capacities less than 2000 pounds per square foot [(2.0 ksf) (96 kPa)]. These soils are often highly variable, may contain organic materials and could be more sensitive to moisture. A geotechnical engineer must be consulted if soils with bearing capacities less than 2000 psf (96 kPa) are present.

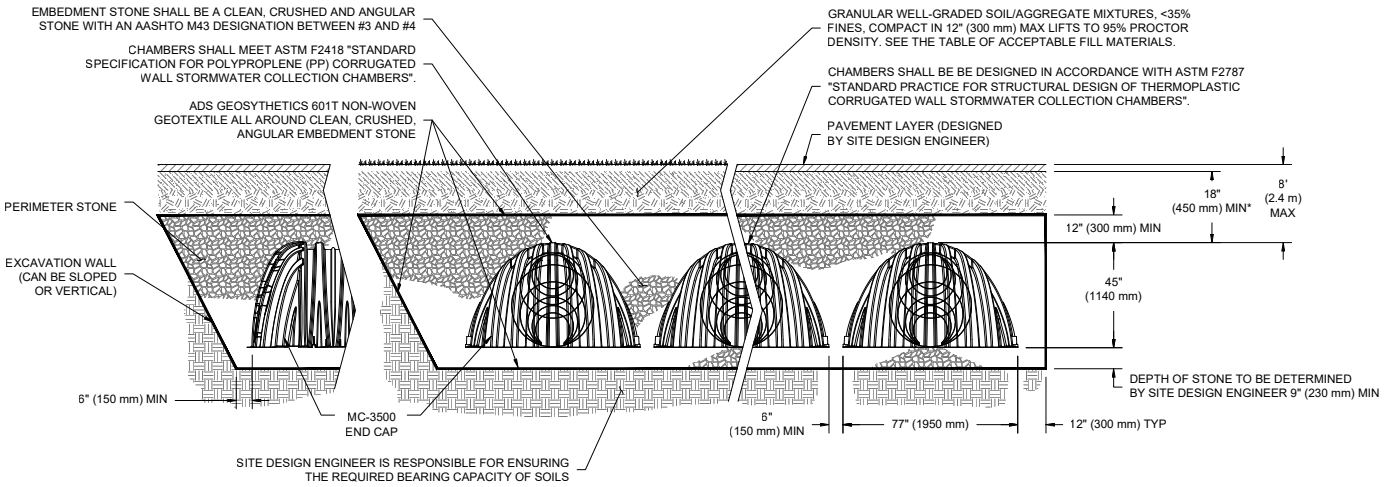
2.0 Foundations for Chambers

TABLE 1—MC-3500 Minimum Required Foundation Depth in inches (millimeters)
Assumes 9” (230 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	24 (600)	24 (600)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	30 (750)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)
5.5 (1.68)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)
6.0 (1.83)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)
6.5 (1.98)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	30 (750)
7.0 (2.13)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	30 (750)	36 (900)
7.5 (2.30)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)
8.0 (2.44)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)	36 (900)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

FIGURE 10A—MC-3500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

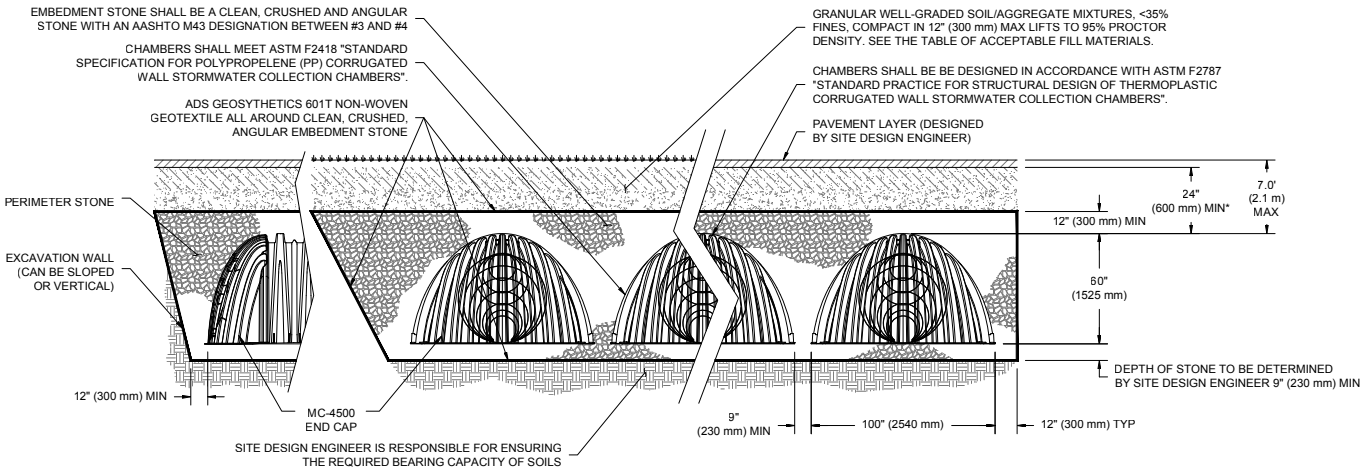
2.0 Foundations for Chambers

TABLE 2—MC-4500 Minimum Required Foundation Depth in inches (millimeters)
Assumes 9" (230 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	18 (450)	18 (450)	24 (600)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	36 (900)
5.5 (1.68)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)
6.0 (1.83)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)	36 (900)
6.5 (1.98)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)	36 (900)	42 (1050)
7.0 (2.13)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	24 (600)	24 (600)	24 (600)	24 (600)	24 (600)	30 (750)	30 (750)	30 (750)	30 (750)	36 (900)	36 (900)	36 (900)	42 (1050)	42 (1050)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

FIGURE 10B—MC-4500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

3.1 Foundation and Embedment Stone

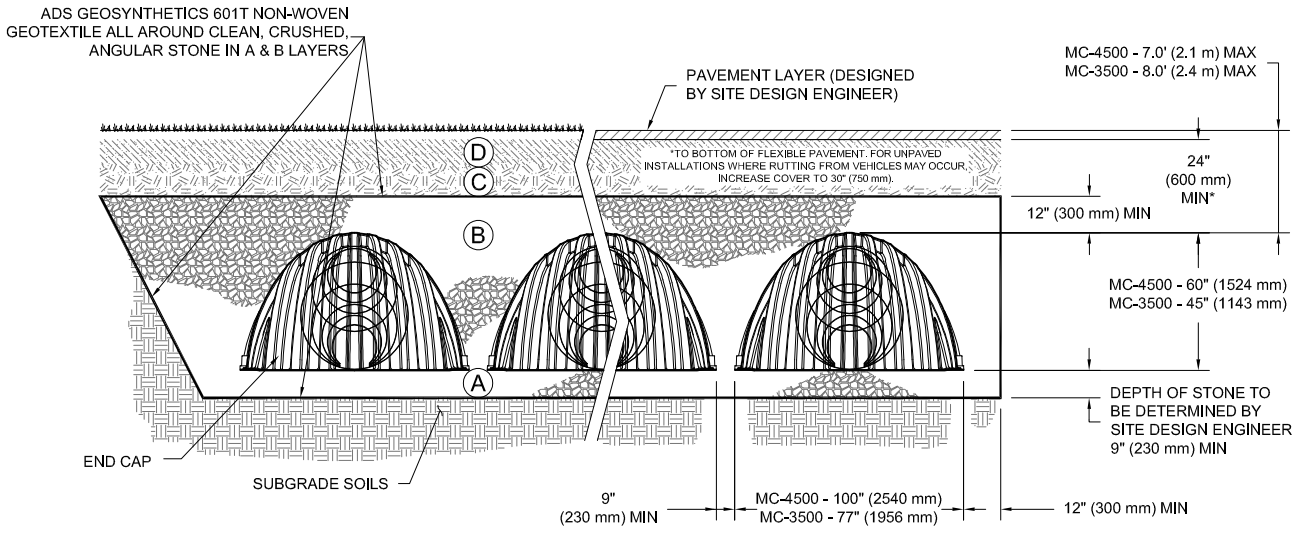
The stone surrounding the chambers consists of the foundation stone below the chambers and embedment stone surrounding the chambers. The foundation stone and embedment stone are important components of the structural system and also provide open void space for stormwater storage. **Table 3** provides the stone specifications that achieve both structural requirements and a porosity of 40% for stormwater storage. **Figure 11** specifies the extents of each backfill stone location.

TABLE 3—Acceptable Fill Materials

	MATERIAL LOCATION	DESCRIPTION	AASHTO DESIGNATION	COMPACTION/DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1,A-2-4,A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTOINS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDTIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL-GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FORM THE FOUDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2 3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.

FIGURE 11—Fill Material Locations



Once layer 'C' is placed, any soil/material can be placed in layer 'D' up to the finished grade. Most pavement subbase soils can be used to replace the materials of layer 'C' or 'D' at the design engineer's discretion.

3.0 Required Materials/Row Separation

3.2 FILL ABOVE CHAMBERS

Refer to **Table 3** and **Figure 11** for acceptable fill material above the clean, crushed, angular stone. StormTech requires a minimum of 24" (600 mm) from the top of the chamber to the bottom of flexible pavement. For non-paved installations where rutting from vehicles may occur StormTech requires a minimum of 30" (750 mm) from top of chamber to finished grade.

3.3 GEOTEXTILE SEPARATION

A non-woven geotextile meeting AASHTO M288 Class 2 separation requirements must be installed to completely envelope the system and prevent soil intrusion into the crushed, angular stone. Overlap adjacent geotextile rolls per AASHTO M288 separation guidelines. Contact StormTech for a list of acceptable geotextiles.

3.4 PARALLEL ROW SEPARATION/ PERPENDICULAR BED SEPARATION

Parallel Row Separation

The minimum installed spacing between parallel rows after backfilling is 9" (230 mm) for the MC-4500 chambers and 6" (150mm) for the MC-3500 (measurement taken between the outside edges of the feet). Spacers may be used for layout convenience. Row spacing wider than the minimum spacing above may be specified.

Perpendicular Bed Separation

When beds are laid perpendicular to each other, a minimum installed spacing of 36" (900 mm) between beds is required.

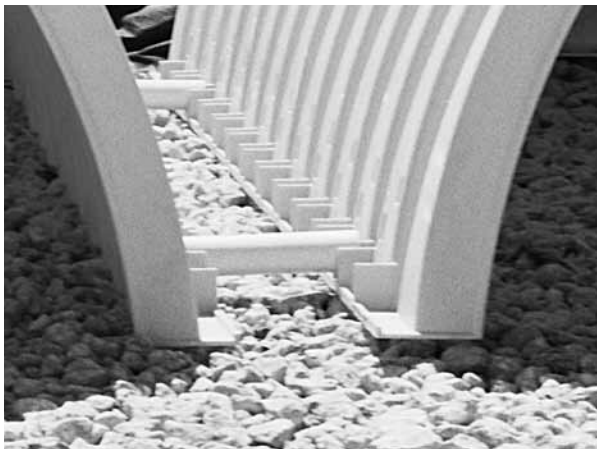
3.5 Special Structural Designs

StormTech engineers may provide special structural designs to enable deeper cover depths or increase the capacity to carry higher live loads. Special designs may utilize the additional strength that can be achieved by compaction of embedment stone or by increasing the spacing between rows.

Increasing the spacing between chamber rows may also facilitate the application of StormTech chambers with either less foundation stone or with weaker subgrade soils. This may be a good option where vertical restrictions on site prevent the use of a deeper foundation.

Contact ADS Engineering Services for more information on special structural designs.

System Cross Section



Minimum Row Spacing

4.1 GENERAL

StormTech subsurface chamber systems offer the flexibility for a variety of inlet and outlet configurations. Contact the StormTech Technical Services Department or your local StormTech representative for assistance configuring inlet and outlet connections.

The open graded stone around and under the chambers provides a significant conveyance capacity ranging from approximately 0.8 cfs (23 l/s) to 13 cfs (368 l/s) per MC-3500 chamber and 0.54 cfs (15 l/s) to 8.5 cfs (240 l/s) for the MC-4500 chamber. The actual conveyance capacity is dependent upon stone size, depth of foundation stone and head of water. Although the high conveyance capacity of the open graded stone is an important component of the flow network, StormTech recommends that a system of inlet and outlet manifolds be designed to distribute and convey the peak flow through the chamber system.

It is the responsibility of the design engineer to provide the design flow rates and storage volumes for the stormwater system and to ensure that the final design meets all conveyance and storage requirements. However, StormTech will work with the design engineer to assist with manifold and chamber layouts that meet the design objectives.

4.2 THE ISOLATOR® ROW

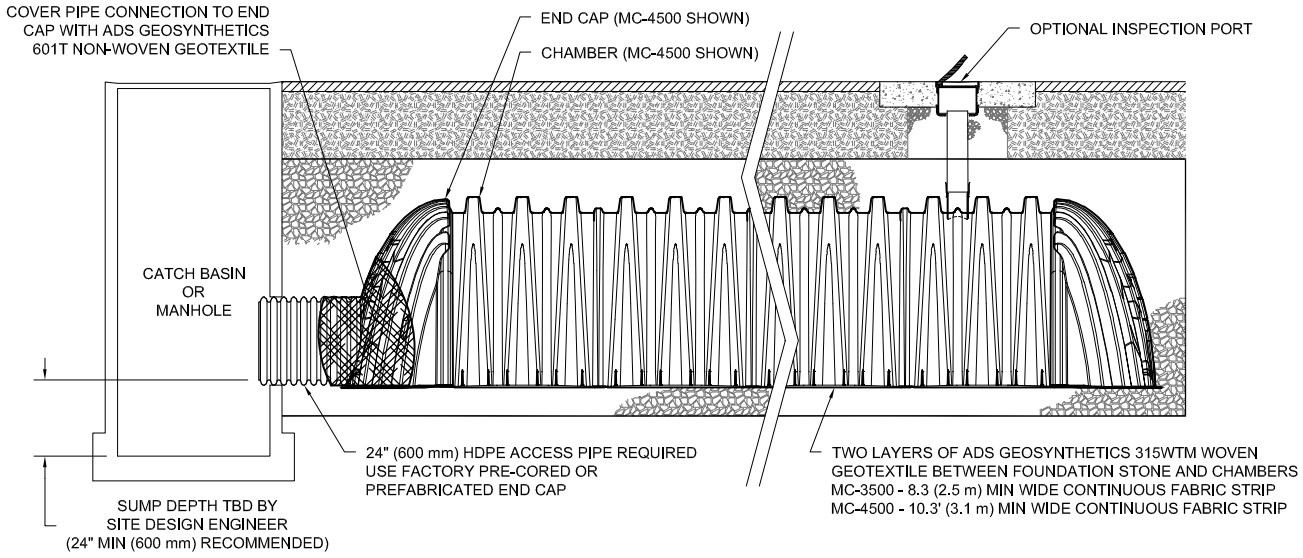
The Isolator Row is a patented system that inexpensively captures total suspended solids (TSS) and debris and provides easy access for inspection and maintenance. A double layer of woven geotextile between the bottom of the chambers and the foundation stone provides the filter media that satisfies most contaminant removal objectives. Each installed MC-3500 chamber and MC-3500 end cap provides 42.9 ft2 (4.0 m2) and 7.5 ft2 (0.7 m2) of bottom filter area respectively. Each installed MC-4500 chamber and MC-4500 end cap provides 30.1 ft^2 (2.80 m^2) and 12.8 ft^2 (1.19 m^2) of bottom filter area respectively.

The Isolator Row can be configured for maintenance objectives or, in some regulatory jurisdictions, for water quality objectives. For water quality applications, Isolator Rows can be sized based on water quality volume or flow rate.

All Isolator Rows require: 1) a manhole for maintenance access, 2) a means of diversion of flows to the Isolator Row and 3) a high flow bypass. Flow diversion can be accomplished by either a weir in the upstream access manhole or simply by feeding the Isolator Row at a lower elevation than the high flow bypass. Contact StormTech for assistance sizing Isolator Rows.

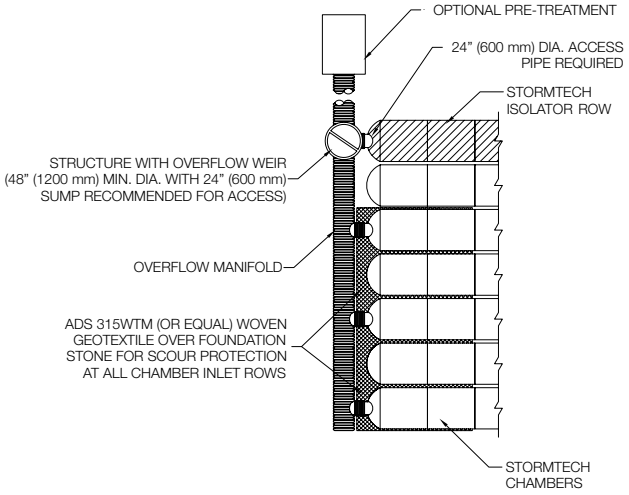
When additional stormwater treatment is required, StormTech systems can be configured using a treatment train approach where other stormwater BMPs are located in series.

FIGURE 12—StormTech Isolator Row Detail



4.0 Hydraulics

FIGURE 13—Typical Inlet Configuration With Isolator Row and Scour Protection



4.3 INLET MANIFOLDS

The primary function of the inlet manifold is to convey and distribute flows to a sufficient number of rows in the chamber bed such that there is ample conveyance capacity to pass the peak flows without creating an unacceptable backwater condition in upstream piping or scour the foundation stone under the chambers.

Manifolds are connected to the end caps either at the top or bottom of the end cap. Standard distances from the base of chamber to the invert of inlet and outlet manifolds connecting to StormTech end caps can be found in table 6. High inlet flow rates from either connection location produce a shear scour potential of the foundation stone. Inlet flows from top inlets also produce impingement scour potential. Scour potential is reduced when standing water is present over the foundation stone. However, for safe design across the wide range of applications, StormTech assumes minimal standing water at the time the design flow occurs.

To minimize scour potential, StormTech recommends the installation of woven scour protection fabric at each inlet row. This enables a protected transition zone from the concentrated flow coming out of the inlet pipe to a uniform flow across the entire width of the chamber for both top and bottom connections.

Allowable flow rates for design are dependent upon: the elevation of inlet pipe, foundation stone size and scour protection. With an appropriate scour protection geotextile installed from the end cap to at least 14.5 ft (4.42 m) in front of the inlet pipe for the MC-3500 and for the MC-4500, for both top and bottom feeds, the flow rates listed in **Table 4** can be used for all StormTech specified foundation stone gradations.

***See StormTech's Tech Sheet #7 for manifold sizing guidance.**

Table 4—Allowable Inlet Flows*

Inlet Pipe Diameter Inches (mm)	Allowable Maximum Flow Rate cfs (l/s)
12 (300)	2.48 (70)
15 (375)	3.5 (99)
18 (450)	5.5 (156)
24 (600)	8.5 (241) [MC-3500]
24 (600)	9.5 (269) [MC-4500]

*Assumes appropriate length of scour fabric per section 4.3

Table 5—Maximum Outlet Flow Rate Capacities From StormTech Oulet Manifolds

PIPE DIA.	FLOW (CFS)	FLOW (L/S)
6" (150 mm)	0.4	11.3
8" (200 mm)	0.7	19.8
10" (250 mm)	1.0	28.3
12" (300 mm)	2.0	56.6
15" (375 mm)	2.7	76.5
18" (450 mm)	4.0	113.3
24" (600 mm)	7.0	198.2
30" (750 mm)	11.0	311.5
36" (900 mm)	16.0	453.1
42" (1050 mm)	22.0	623.0
48" (1200 mm)	28.0	792.9

Table 6—Standard Distances From Base of Chamber to Invert of Inlet and Outlet Manifolds on StormTech End Caps

MC-3500 ENDCAPS			
	PIPE DIA.	INV. (IN)	INV. (MM)
TOP	6" (150 mm)	33.21	841
	8" (200 mm)	31.16	789
	10" (250 mm)	29.04	738
	12" (300 mm)	26.36	671
	15" (375 mm)	23.39	594
	18" (450 mm)	20.03	509
	24" (600 mm)	14.48	369
BOTTOM	12" (750 mm)	1.35	34
	15" (900 mm)	1.5	40
	18" (1050 mm)	1.77	46
	24" (1200 mm)	2.06	52

MC-4500 ENDCAPS			
	PIPE DIA.	INV. (IN)	INV. (MM)
	12" (300 mm)	35.69	907
	15" (375 mm)	32.72	831
	18" (450 mm)	29.36	746
	24" (600 mm)	23.05	585
BOTTOM	12" (750 mm)	1.55	34
	15" (900 mm)	1.7	43
	18" (1050 mm)	1.97	50
	24" (1200 mm)	2.26	57

4.4 OUTLET MANIFOLDS

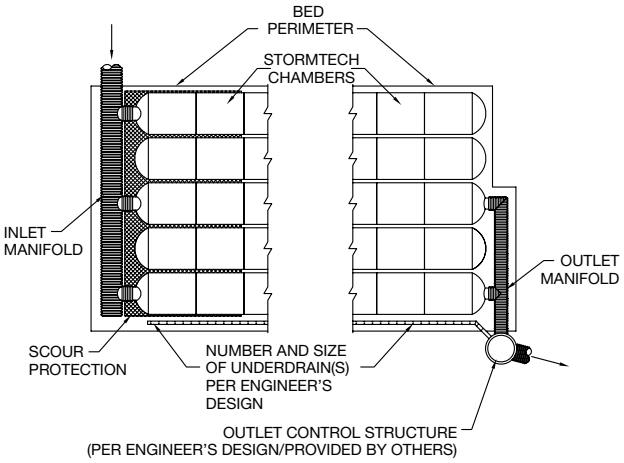
The primary function of the outlet manifold is to convey peak flows from the chamber system to the outlet control structure. Outlet manifolds are often sized for attenuated flows. They may be smaller in diameter and have fewer row connections than inlet manifolds. In some applications however, the intent of the outlet piping is to convey an unattenuated bypass flow rate and manifolds may be sized similar to inlet manifolds.

Since chambers are generally flowing at or near full at the time of the peak outlet flow rate, scour is generally not governing and outlet manifold sizing is based on pipe flow equations. In most cases, StormTech recommends that outlet manifolds connect the same rows that are connected to an inlet manifold. This provides a continuous flow path through open conduits to pass the peak flow without dependence on passing peak flows through stone.

The primary function of the underdrains is to draw down water stored in the stone below the invert of the manifold. Underdrains are generally not sized for conveyance of the peak flow.

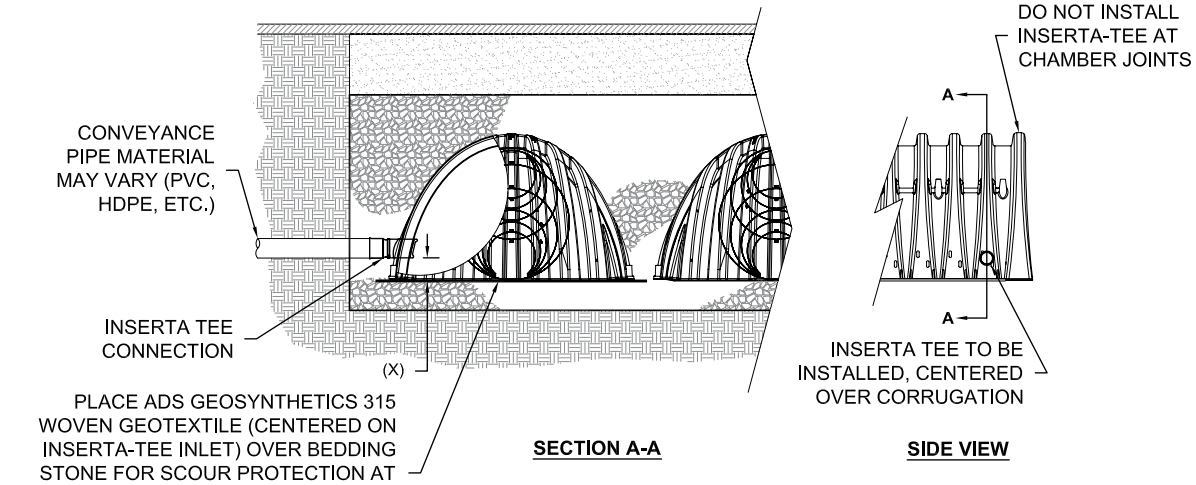
The maximum outlet flow rate capacities from StormTech outlet manifolds can be found in **Table 5.**

FIGURE 14—Typical Inlet, Outlet and Underdrain Configuration



4.5 INSERTA TEE INLET CONNECTIONS

FIGURE 15—Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
MC-3500	12" (250 mm)	6" (150 mm)
MC-4500	12" (250 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

5.0 Cumulative Storage Volumes

Tables 7 and **8** provide cumulative storage volumes for the MC-3500 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at www.stormtech.com. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

TABLE 7 – MC-3500 Incremental Storage Volume Per Chamber

Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 6" (150 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
66 (1676)	0.00	175.02 (4.956)
65 (1651)	0.00	173.36 (4.909)
64 (1626)	0.00	171.71 (4.862)
63 (1600)	Stone 0.00	170.06 (4.816)
62 (1575)	Cover 0.00	168.41 (4.7.69)
61 (1549)	0.00	166.76 (4.722)
60 (1524)	0.00	165.10 (4.675)
59 (1499)	0.00	163.45 (4.628)
58 (1473)	0.00	161.80 (4.582)
57 (1448)	0.00	160.15 (4.535)
56 (1422)	0.00	158.49 (4.488)
55 (1397)	0.00	156.84 (4.441)
54 (1372)	109.95 (3.113)	155.19 (4.394)
53 (1346)	109.89 (3.112)	153.50 (4.347)
52 (1321)	109.69 (3.106)	151.73 (4.297)
51 (1295)	109.40 (3.098)	149.91 (4.245)
50 (1270)	109.00 (3.086)	148.01 (4.191)
49 (1245)	108.31 (3.067)	145.95 (4.133)
48 (1219)	107.28 (3.038)	143.68 (4.068)
47 (1194)	106.03 (3.003)	141.28 (4.000)
46 (1168)	104.61 (2.962)	138.77 (3.930)
45 (1143)	103.04 (2.918)	136.17 (3.856)
44 (1118)	101.33 (2.869)	133.50 (3.780)
43 (1092)	99.50 (2.818)	130.75 (3.702)
42 (1067)	97.56 (2.763)	127.93 (3.623)
41 (1041)	95.52 (2.705)	125.06 (3.541)
40 (1016)	93.39 (2.644)	122.12 (3.458)
39 (991)	91.16 (2.581)	119.14 (3.374)
38 (965)	88.86 (2.516)	116.10 (3.288)
37 (948)	86.47 (2.449)	113.02 (3.200)
36 (914)	84.01 (2.379)	109.89 (3.112)
35 (889)	81.49 (2.307)	106.72 (3.022)
34 (864)	78.89 (2.234)	103.51 (2.931)
33 (838)	76.24 (2.159)	100.27 (2.839)

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
32 (813)	73.52 (2.082)	96.98 (2.746)
31 (787)	70.75 (2.003)	93.67 (2.652)
30 (762)	67.92 (1.923)	90.32 (2.558)
29 (737)	65.05 (1.842)	86.94 (2.462)
28 (711)	62.12 (1.759)	83.54 (2.366)
27 (686)	59.15 (1.675)	80.10 (2.268)
26 (680)	56.14 (1.590)	76.64 (2.170)
25 (635)	53.09 (1.503)	73.16 (2.072)
24 (610)	49.99 (1.416)	69.65 (1.972)
23 (584)	46.86 (1.327)	66.12 (1.872)
22 (559)	43.70 (1.237)	62.57 (1.772)
21 (533)	40.50 (1.147)	59.00 (1.671)
20 (508)	37.27 (1.055)	55.41 (1.569)
19 (483)	34.01 (0.963)	51.80 (1.467)
18 (457)	30.72 (0.870)	48.17 (1.364)
17 (432)	27.40 (0.776)	44.53 (1.261)
16 (406)	24.05 (0.681)	40.87 (1.157)
15 (381)	20.69 (0.586)	37.20 (1.053)
14 (356)	17.29 (0.490)	33.51 (0.949)
13 (330)	13.88 (0.393)	29.81 (0.844)
12 (305)	10.44 (0.296)	26.09 (0.739)
11 (279)	6.98 (0.198)	22.37 (0.633)
10 (254)	3.51 (0.099)	18.63 (0.527)
9 (229)	0.00	14.87 (0.421)
8 (203)	0.00	13.22 (0.374)
7 (178)	0.00	11.57 (0.328)
6 (152)	Stone 0.00	9.91 (0.281)
5 (127)	Foundation 0.00	8.26 (0.234)
4 (102)	0.00	6.61 (0.187)
3 (76)	0.00	4.96 (0.140)
2 (51)	0.00	3.30 (0.094)
1 (25)	0.00	1.65 (0.047)

NOTE: Add 1.65 ft³ (0.047 m³) of storage for each additional inch (25 mm) of stone foundation.
Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volume

TABLE 8 – MC-3500 Incremental Storage Volume Per End Cap

Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above end caps, and 6" (150 mm) of spacing between end caps and 6" (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
66 (1676)	0.00	45.10 (1.277)
65 (1651)	0.00	44.55 (1.262)
64 (1626)	0.00	44.00 (1.246)
63 (1600)	Stone 0.00	43.46 (1.231)
62 (1575)	Cover 0.00	42.91 (1.2.15)
61 (1549)	0.00	42.36 (1.200)
60 (1524)	0.00	41.81 (1.184)
59 (1499)	0.00	41.27 (1.169)
58 (1473)	0.00	40.72 (1.153)
57 (1448)	0.00	40.17 (1.138)
56 (1422)	0.00	39.62 (1.122)
55 (1397)	0.00	39.08 (1.107)
54 (1372)	15.64 (0.443)	38.53 (1.091)
53 (1346)	15.64 (0.443)	37.98 (1.076)
52 (1321)	15.63 (0.443)	37.42 (1.060)
51 (1295)	15.62 (0.442)	36.85 (1.043)
50 (1270)	15.60 (0.442)	36.27 (1.027)
49 (1245)	15.56 (0.441)	35.68 (1.010)
48 (1219)	15.51 (0.439)	35.08 (0.993)
47 (1194)	15.44 (0.437)	34.47 (0.976)
46 (1168)	15.35 (0.435)	33.85 (0.959)
45 (1143)	15.25 (0.432)	33.22 (0.941)
44 (1118)	15.13 (0.428)	32.57 (0.922)
43 (1092)	14.99 (0.424)	31.91 (0.904)
42 (1067)	14.83 (0.420)	31.25 (0.885)
41 (1041)	14.65 (0.415)	30.57 (0.866)
40 (1016)	14.45 (0.409)	29.88 (0.846)
39 (991)	14.24 (0.403)	29.18 (0.826)
38 (965)	14.00 (0.396)	28.48 (0.806)
37 (948)	13.74 (0.389)	27.76 (0.786)
36 (914)	13.47 (0.381)	27.04 (0.766)
35 (889)	13.18 (0.373)	26.30 (0.745)
34 (864)	12.86 (0.364)	25.56 (0.724)

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
33 (838)	12.53 (0.355)	24.82 (0.703)
32 (813)	12.18 (0.345)	24.06 (0.681)
31 (787)	11.81 (0.335)	23.30 (0.660)
30 (762)	11.42 (0.323)	22.53 (0.638)
29 (737)	11.01 (0.312)	21.75 (0.616)
28 (711)	10.58 (0.300)	20.96 (0.594)
27 (686)	10.13 (0.287)	20.17 (0.571)
26 (680)	9.67 (0.274)	19.37 (0.549)
25 (635)	9.19 (0.260)	18.57 (0.526)
24 (610)	8.70 (0.246)	17.76 (0.503)
23 (584)	8.19 (0.232)	16.94 (0.480)
22 (559)	7.67 (0.217)	16.12 (0.456)
21 (533)	7.13 (0.202)	15.29 (0.433)
20 (508)	6.59 (0.187)	14.45 (0.409)
19 (483)	6.03 (0.171)	13.61 (0.385)
18 (457)	5.46 (0.155)	12.76 (0.361)
17 (432)	4.88 (0.138)	11.91 (0.337)
16 (406)	4.30 (0.122)	11.06 (0.313)
15 (381)	3.70 (0.105)	10.20 (0.289)
14 (356)	3.10 (0.088)	9.33 (0.264)
13 (330)	2.49 (0.071)	8.46 (0.240)
12 (305)	1.88 (0.053)	7.59 (0.215)
11 (279)	1.26 (0.036)	6.71 (0.190)
10 (254)	0.63 (0.018)	5.83 (0.165)
9 (229)	0.00	4.93 (0.139)
8 (203)	0.00	4.38 (0.124)
7 (178)	0.00	3.83 (0.108)
6 (152)	Stone 0.00	3.28 (0.093)
5 (127)	Foundation 0.00	2.74 (0.077)
4 (102)	0.00	2.19 (0.062)
3 (76)	0.00	1.64 (0.046)
2 (51)	0.00	1.09 (0.031)
1 (25)	0.00	0.55 (0.015)

NOTE: Add 0.56 ft³ (0.016 m³) of storage for each additional inch (25 mm) of stone foundation.
Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volumes

Tables 9 and **10** provide cumulative storage volumes for the MC-4500 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at www.stormtech.com. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

TABLE 9 – MC-4500 Incremental Storage Volume Per Chamber

Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 9" (230 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
81 (2057)	0.00	162.62 (4.065)
80 (2032)	0.00	161.40 (4.570)
79 (2007)	0.00	160.18 (4.536)
78 (1981)	Stone 0.00	158.98 (4.501)
77 (1956)	Cover 0.00	157.74 (4.467)
76 (1930)	0.00	156.62 (4.432)
75 (1905)	0.00	155.30 (4.398)
74 (1880)	0.00	154.09 (4.363)
73 (1854)	0.00	152.87 (4.329)
72 (1829)	0.00	151.65 (4.294)
71 (1803)	0.00	150.43 (4.294)
70 (1778)	0.00	149.21 (4.225)
69 (1753)	106.51 (3.016)	147.99 (4.191)
68 (1727)	106.47 (3.015)	146.75 (4.156)
67 (1702)	106.35 (3.012)	145.46 (4.119)
66 (1676)	106.18 (3.007)	144.14 (4.082)
65 (1651)	105.98 (3.001)	142.80 (4.044)
64 (1626)	105.71 (2.993)	141.42 (4.005)
63 (1600)	105.25 (2.981)	139.93 (3.962)
62 (1575)	104.59 (2.962)	138.31 (3.917)
61 (1549)	103.79 (2.939)	136.61 (3.869)
60 (1524)	102.88 (2.913)	134.85 (3.819)
59 (1499)	101.88 (2.885)	133.03 (3.767)
58 (1473)	100.79 (2.854)	131.16 (3.714)
57 (1448)	99.63 (2.821)	129.24 (3.660)
56 (1422)	98.39 (2.786)	127.28 (3.604)
55 (1397)	97.10 (2.749)	125.28 (3.548)
54 (1372)	95.73 (2.711)	123.25 (3.490)
53 (1346)	94.32 (2.671)	121.18 (3.490)
52 (1321)	92.84 (2.629)	119.08 (3.372)
51 (1295)	91.32 (2.586)	116.94 (3.311)
50 (1270)	89.74 (2.541)	114.78 (3.250)
49 (1245)	88.12 (2.495)	112.59 (3.188)
48 (1219)	86.45 (2.448)	110.37 (3.125)
47 (1194)	84.75 (2.400)	108.13 (3.062)
46 (1168)	83.00 (2.350)	105.86 (2.998)
45 (1143)	81.21 (2.300)	103.56 (2.933)
44 (1118)	79.38 (2.248)	101.25 (2.867)
43 (1092)	77.52 (2.195)	98.91 (2.801)

NOTE: Add 1.22 ft³ (0.035 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)	75.62 (2.141)	96.55 (2.734)
41 (1041)	73.69 (2.087)	94.18 (2.667)
40 (1016)	71.72 (2.031)	91.78 (2.599)
39 (991)	69.73 (1.974)	89.36 (2.531)
38 (965)	67.70 (1.917)	86.93 (2.462)
37 (948)	65.65 (1.859)	84.48 (2.392)
36 (914)	63.57 (1.800)	82.01 (2.322)
35 (889)	61.46 (1.740)	79.53 (2.252)
34 (864)	59.32 (1.680)	77.03 (2.181)
33 (838)	57.17 (1.619)	74.52 (2.110)
32 (813)	54.98 (1.557)	71.99 (2.038)
31 (787)	52.78 (1.495)	69.45 (1.966)
30 (762)	50.55 (1.431)	66.89 (1.894)
29 (737)	48.30 (1.368)	64.32 (1.821)
28 (711)	46.03 (1.303)	61.74 (1.748)
27 (686)	43.74 (1.239)	59.19 (1.675)
26 (680)	41.43 (1.173)	56.55 (1.601)
25 (610)	39.11 (1.107)	53.93 (1.527)
24 (609)	36.77 (1.041)	51.31 (1.453)
23 (584)	34.41 (0.974)	48.67 (1.378)
22 (559)	32.03 (0.907)	46.03 (1.303)
21 (533)	29.64 (0.839)	43.38 (1.228)
20 (508)	27.23 (0.771)	40.71 (1.153)
19 (483)	24.81 (0.703)	38.04 (1.077)
18 (457)	22.38 (0.634)	35.37 (1.001)
17 (432)	19.94 (0.565)	32.68 (0.925)
16 (406)	17.48 (0.495)	29.99 (0.849)
15 (381)	15.01 (0.425)	27.29 (0.773)
14 (356)	12.53 (0.355)	24.58 (0.696)
13 (330)	10.05 (0.284)	21.87 (0.619)
12 (305)	7.55 (0.214)	19.15 (0.542)
11 (279)	5.04 (0.143)	16.43 (0.465)
10 (254)	2.53 (0.072)	13.70 (0.388)
9 (229)	0.00	10.97 (0.311)
8 (203)	0.00	9.75 (0.276)
7 (178)	0.00	8.53 (0.242)
6 (152)	Stone 0.00	7.31 (0.207)
5 (127)	Foundation 0.00	6.09 (0.173)
4 (102)	0.00	4.87 (0.138)
3 (76)	0.00	3.66 (0.104)
2 (51)	0.00	2.44 (0.069)
1 (25)	0.00	1.22 (0.035)

TABLE 10 – MC-4500 Incremental Storage Volume Per End Cap

Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above end caps, and 9" (230 mm) of spacing between end caps and 6" (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
81 (2057)	0.00	108.69 (3.078)
80 (2032)	0.00	107.62 (3.047)
79 (2007)	0.00	106.54 (3.017)
78 (1981)	Stone 0.00	105.46 (2.986)
77 (1956)	Cover 0.00	104.38 (2.956)
76 (1930)	0.00	103.31 (2.925)
75 (1905)	0.00	102.23 (2.895)
74 (1880)	0.00	101.15 (2.864)
73 (1854)	0.00	100.07 (2.834)
72 (1829)	0.00	99.00 (2.803)
71 (1803)	0.00	97.92 (2.773)
70 (1778)	0.00	96.84 (2.742)
69 (1753)	35.71 (1.011)	95.76 (2.712)
68 (1727)	35.71 (1.011)	94.69 (2.681)
67 (1702)	35.70 (1.011)	93.60 (2.651)
66 (1676)	35.67 (1.010)	92.51 (2.620)
65 (1651)	35.62 (1.009)	91.40 (2.588)
64 (1626)	35.56 (1.007)	90.29 (2.557)
63 (1600)	35.47 (1.004)	89.16 (2.525)
62 (1575)	35.36 (1.001)	88.01 (2.492)
61 (1549)	35.21 (0.997)	86.85 (2.459)
60 (1524)	35.05 (0.992)	85.67 (2.426)
59 (1499)	34.86 (0.987)	84.48 (2.392)
58 (1473)	34.64 (0.981)	83.27 (2.358)
57 (1448)	34.40 (0.974)	82.05 (2.323)
56 (1422)	34.13 (0.966)	80.81 (2.288)
55 (1397)	33.83 (0.958)	79.55 (2.253)
54 (1372)	33.51 (0.949)	78.28 (2.217)
53 (1346)	33.16 (0.939)	77.00 (2.180)
52 (1321)	32.79 (0.928)	75.70 (2.144)
51 (1295)	32.39 (0.917)	74.38 (2.106)
50 (1270)	31.98 (0.906)	73.06 (2.069)
49 (1245)	31.54 (0.893)	71.71 (2.031)
48 (1219)	31.07 (0.880)	70.36 (1.992)
47 (1194)	30.59 (0.866)	68.99 (1.954)
46 (1168)	30.09 (0.852)	67.61 (1.915)
45 (1143)	29.56 (0.837)	66.22 (1.875)
44 (1118)	29.02 (0.822)	64.81 (1.835)
43 (1092)	28.45 (0.806)	63.40 (1.795)

NOTE: Add 1.08 ft³ (0.031 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)	27.87 (0.789)	61.97 (1.755)
41 (1041)	27.27 (0.772)	60.53 (1.714)
40 (1016)	26.65 (0.755)	59.08 (1.673)
39 (991)	26.01 (0.736)	57.62 (1.632)
38 (965)	25.35 (0.718)	56.15 (1.590)
37 (948)	24.68 (0.699)	54.67 (1.548)
36 (914)	23.99 (0.679)	53.18 (1.506)
35 (889)	23.28 (0.659)	51.68 (1.463)
34 (864)	22.56 (0.639)	50.17 (1.421)
33 (838)	21.82 (0.618)	48.64 (1.377)
32 (813)	21.06 (0.596)	47.11 (1.334)
31 (787)	20.29 (0.575)	45.57 (1.290)
30 (762)	19.50 (0.552)	44.02 (1.247)
29 (737)	18.70 (0.530)	42.46 (1.202)
28 (711)	17.88 (0.506)	40.89 (1.158)
27 (686)	17.04 (0.483)	39.31 (1.113)
26 (680)	16.19 (0.459)	37.73 (1.068)
25 (610)	15.33 (0.434)	36.14 (1.023)
24 (609)	14.46 (0.410)	34.53 (.0978)
23 (584)	13.58 (0.384)	32.93 (0.932)
22 (559)	12.68 (0.359)	31.31 (0.887)
21 (533)	11.77 (0.333)	29.69 (0.841)
20 (508)	10.85 (0.307)	26.06 (0.794)
19 (483)	9.91 (0.281)	26.42 (0.748)
18 (457)	8.97 (0.254)	24.77 (0.702)
17 (432)	8.01 (0.227)	23.12 (0.655)
16 (406)	7.04 (0.199)	21.46 (0.608)
15 (381)	6.07 (0.172)	19.80 (0.561)
14 (356)	5.08 (0.144)	18.13 (0.513)
13 (330)	4.08 (0.116)	16.45 (0.466)
12 (305)	3.07 (0.087)	14.77 (0.418)
11 (279)	2.06 (0.058)	13.09 (0.371)
10 (254)	1.03 (0.029)	11.39 (0.323)
9 (229)	0.00	9.70 (0.275)
8 (203)	0.00	8.62 (0.244)
7 (178)	0.00	7.54 (0.214)
6 (152)	Stone 0.00	6.46 (0.183)
5 (127)	Foundation 0.00	5.39 (0.153)
4 (102)	0.00	4.31 (0.122)
3 (76)	0.00	3.23 (0.092)
2 (51)	0.00	2.15 (0.061)
1 (25)	0.00	1.08 (0.031)

6.0 MC-3500 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-3500 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

TABLE 11—Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

NOTE: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 6" (150 mm) stone perimeter.

2) Determine the number of chambers (C) required. To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 11**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required. The number of end caps (EC) required depends on the number of rows required by the project. Once the number of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps. End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S). The size of the bed will depend on the number of chambers and end caps required:

MC-3500 area per chamber = 49.6 ft² (4.6 m²)
MC-3500 area per end cap = 16.4 ft² (1.5 m²)

S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required. To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 12.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

TABLE 12—Amount of Stone Per Chamber/End Cap

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	230 mm	300 mm	375 mm	450 mm
MC-3500	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

NOTE: Assumes 12" (300 mm) of stone above, and 6" (150 mm) row spacing, and 6" (150 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required. Each additional foot of cover will add a volume of excavation of 1.9 yd³ (1.5 m³) per MC-3500 chamber and

TABLE 13—Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15"(375 mm)	18"(450 mm)
MC-3500	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

NOTE: Assumes 6" (150 mm) separation between chamber rows, 6" (150 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

0.6 yd³ (0.5 m³) per MC-3500 end cap.

9) Determine the area of geotextile (F) required. The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

6.0 MC-4500 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-4500 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

TABLE 14—Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-4500 Chamber	106.5 (3.01)	162.6 (4.60)	166.3 (4.71)	169.9 (4.81)	173.6 (4.91)
MC-4500 End Cap	35.7 (1.01)	108.7 (3.08)	111.9 (3.17)	115.2 (3.26)	118.4 (3.35)

NOTE: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter.

2) Determine the number of chambers (C) required. To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 14**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required. The number of end caps (EC) required depends on the number of rows required by the project. Once the number of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps. End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S). The size of the bed will depend on the number of chambers and end caps required:

MC-4500 area per chamber = 36.6 ft² (3.4 m²)
MC-4500 area per end cap = 23.2 ft² (2.2 m²)

S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required. To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 15.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

TABLE 15—Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-4500	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
End Cap	9.6 (6.8)	10.0 (7.1)	10.4 (7.4)	10.9 (7.7)
METRIC kg (m³)	230 mm	300 mm	375 mm	450 mm
MC-4500	6681 (4.0)	7117 (4.2)	7552 (4.5)	7987 (4.7)
End Cap	8691 (5.2)	9075 (5.4)	9460 (5.6)	9845 (5.9)

NOTE: Assumes 12" (300 mm) of stone above, and 9" (230 mm) row spacing, and 12" (300 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required. Each additional foot of cover will add a volume of excavation of 1.4 yd³ (1.0 m³) per MC-4500 chamber and 1.4 yd³ (0.8 m³) per MC-4500 end cap.

TABLE 16—Volume of Excavation Per Chamber/End Cap yd³ (m³)

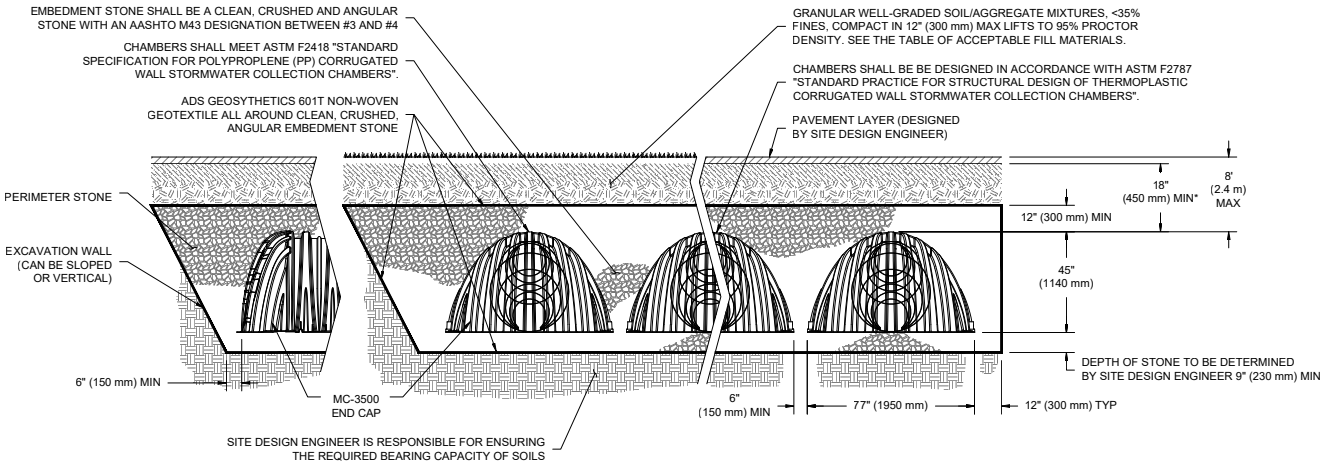
	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15"(375 mm)	18"(450 mm)
MC-4500	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
End Cap	9.3 (7.1)	9.6 (7.3)	9.9 (7.6)	10.2 (7.8)

NOTE: Assumes 9" (230 mm) separation between chamber rows, 12" (300 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

9) Determine the area of geotextile (F) required. The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

7.0 Structural Cross Sections and Specifications

FIGURE 16—MC-3500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

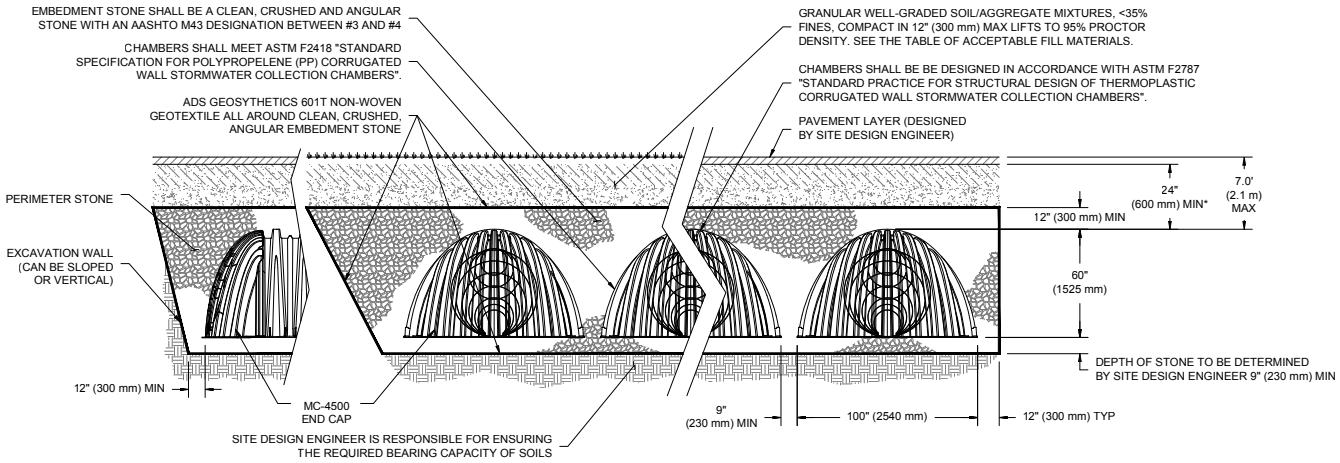
MC-3500 STORMWATER CHAMBER SPECIFICATIONS

1. Chambers shall be StormTech MC-3500 or approved equal.
2. Chambers shall be made from virgin, impact-modified polypropylene copolymers.
3. Chamber rows shall provide continuous, unobstructed internal space with no internal panels that would impede flow.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall meet the requirements of ASTM F 2418, "Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers."
6. Chambers shall conform to the requirements of ASTM F 2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers."
7. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
   - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F 2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.
   - Structural cross section detail on which the structural cross section is based.
8. The installation of chambers shall be in accordance with the manufacturer's latest Construction Guide.

Detail drawings available in Cad Rev. 2000 format at www.stormtech.com

7.0 Structural Cross Sections and Specifications

FIGURE 16—MC-4500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

MC-4500 STORMWATER CHAMBER SPECIFICATIONS

1. Chambers shall be StormTech MC-4500 or approved equal.
2. Chambers shall be made from virgin, impact-modified polypropylene copolymers.
3. Chamber rows shall provide continuous, unobstructed internal space with no internal panels that would impede flow.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall meet the requirements of ASTM F 2418, "Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers."
6. Chambers shall conform to the requirements of ASTM F 2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers."
7. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
   - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F 2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.
   - Structural cross section detail on which the structural cross section is based.
8. The installation of chambers shall be in accordance with the manufacturer's latest Construction Guide.

Detail drawings available in Cad Rev. 2000 format at www.stormtech.com

8.0 General Notes

1. StormTech requires installing contractors to use and understand the latest **StormTech MC-3500 and MC-4500 Construction Guide** prior to beginning system installation.

2. StormTech offers installation consultations to installing contractors. Contact our Technical Service Department or local StormTech representative at least 30 days prior to system installation to arrange a pre-installation consultation. Our representatives can then answer questions or address comments on the StormTech chamber system and inform the installing contractor of the minimum installation requirements before beginning the system's construction. Call 860-529-8188 to speak to a Technical Service Representative or visit www.stormtech.com to receive a copy of our Construction Guide.

3. StormTech requirements for systems with pavement design (asphalt, concrete pavers, etc.): Minimum cover is 18" (450mm) for the MC-3500 and 24"(600mm) for the MC-4500 not including pavement; MC-3500 maximum cover is 8.0' (1.98 m) and MC-4500 maximum cover is 7.0' (2.43 m) both including pavement. For designs with cover depths deeper than these maximums, please contact Stormtech. For installations that do not include pavement, where rutting from vehicles may occur, minimum required cover is increased to 30" (762 mm).

4. The contractor must report any discrepancies with the bearing capacity of the subgrade materials to the design engineer.

5. AASHTO M288 Class 2 non-woven geotextile (ADS601 or equal) (filter fabric) must be used as indicated in the project plans.

6. Stone placement between chamber rows and around perimeter must follow instructions as indicated in the most current version of StormTech MC-3500 / MC-4500 Construction Guide.

7. Backfilling over the chambers must follow requirements as indicated in the most current version of StormTech MC-3500 / MC-4500 Construction Guide.

8. The contractor must refer to StormTech MC-3500 / MC-4500 Construction Guide for a Table of Acceptable Vehicle Loads at various depths of cover. This information is also available at the StormTech website: www.stormtech.com. The contractor is responsible for preventing vehicles that exceed StormTech requirements from traveling across or parking over the stormwater system. Temporary fencing, warning tape and appropriately located signs are commonly used to prevent unauthorized vehicles from entering sensitive construction areas.

9. The contractor must apply erosion and sediment control measures to protect the stormwater system during all phases of site construction per local codes and design engineer's specifications.

10. STORMTECH PRODUCT WARRANTY IS LIMITED. Contact StormTech for warranty information.

9.0 Inspection and Maintenance

9.1 ISOLATOR ROW INSPECTION

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a confined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (76 mm), cleanout is required.

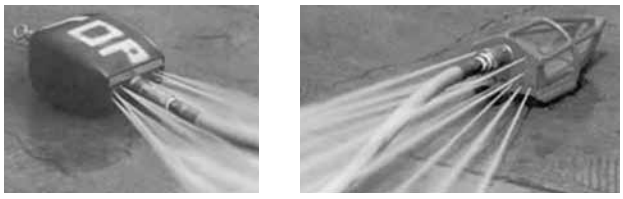
A StormTech Isolator Row should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

9.2 ISOLATOR ROW MAINTENANCE

JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (76 mm) inside the Isolator Row. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combination vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1143 mm) are best. The JetVac process shall only be performed on StormTech Rows that have AASHTO class 1 woven geotextile over their foundation stone (ADS 315WTM or equal).

Looking down the Isolator Row

A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products).

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MC-3500/MC-4500

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StormTech Construction Guide

REQUIRED MATERIALS AND EQUIPMENT LIST

- Acceptable fill materials per Table 1
- Woven and non-woven geotextiles
- StormTech solid end caps, pre-cored and pre-fabricated end caps
- StormTech chambers, manifolds and fittings

NOTE: MC-3500 chamber pallets are 77” x 90” (2.0 m x 2.3 m) and weigh about 2010 lbs. (912 kg) and MC-4500 pallets are 100” x 52” (2.5 m x 1.3 m) and weigh about 840 lbs. (381 kg). Unloading chambers requires 72” (1.8 m) (min.) forks and/or tie downs (straps, chains, etc).

IMPORTANT NOTES:

A. This installation guide provides the minimum requirements for proper installation of chambers. Nonadherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

B. Use of a dozer to push embedment stone between the rows of chambers may cause damage to chambers and is not an acceptable backfill method. Any chambers damaged by using the “dump and push” method are not covered under the StormTech standard warranty.

C. Care should be taken in the handling of chambers and end caps. End caps must be stored standing upright. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer’s plans.

Place non-woven geotextile over prepared soils and up excavation walls.

Place clean, crushed, angular stone foundation 9” (230 mm) min. Install underdrains if required. Compact to achieve a flat surface.

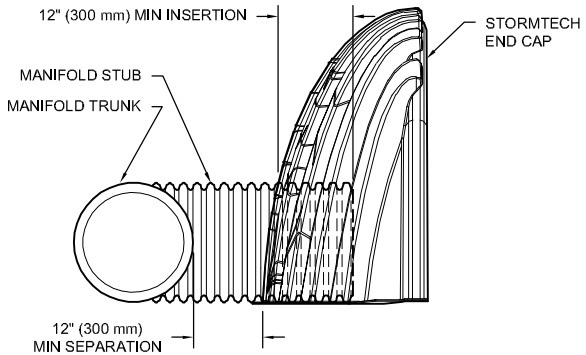
Manifold, Scour Fabric and Chamber Assembly

Install manifolds and lay out woven scour geotextile at inlet rows [min. 17.5 ft (5.33 m)] at each inlet end cap. Place a continuous piece (no seams) along entire length of Isolator® Row(s) in two layers.

Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled “Lower Joint – Overlap Here” and “Build this direction – Upper Joint” Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 6” (150 mm) spacing between MC-3500 rows and 9” (230 mm) spacing between MC-4500 rows. For the Isolator Row place two continuous layers of ADS Woven fabric between the foundation stone and the isolator row chambers, making sure the fabric lays flat and extends the entire width of the chamber feet.

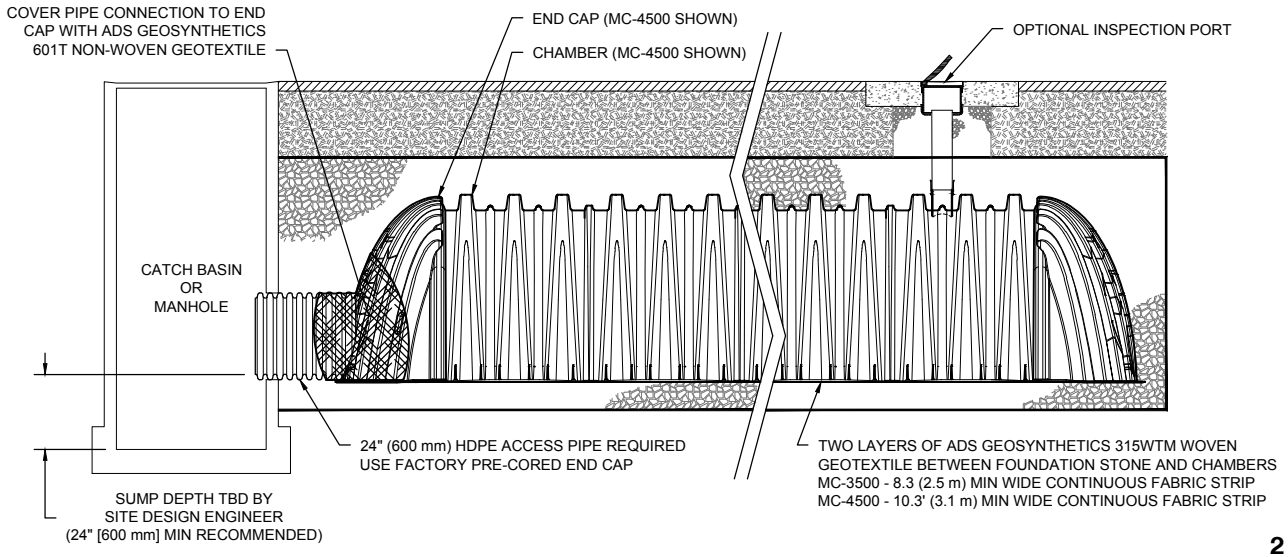
Manifold Insertion



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

Insert inlet and outlet manifolds a minimum 12” (300 mm) into chamber end caps. Manifold header should be a minimum 12” (300 mm) from base of end cap.

StormTech Isolator Row Detail

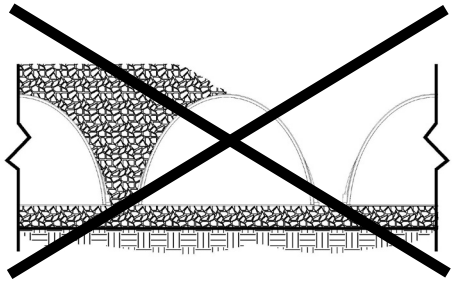


Initial Anchoring of Chambers – Embedment Stone

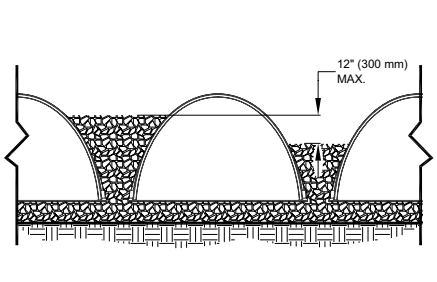
Initial embedment shall be spotted along the centerline of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

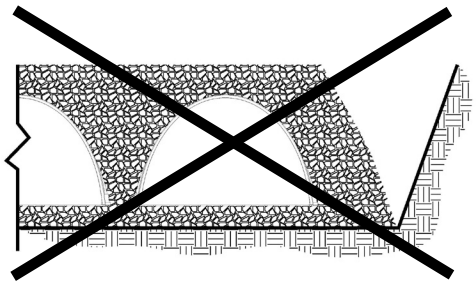
Backfill of Chambers – Embedment Stone



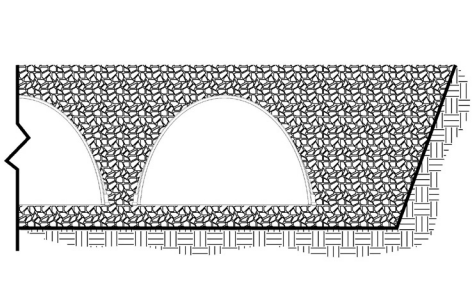
UNEVEN BACKFILL



EVEN BACKFILL



PERIMETER NOT BACKFILLED



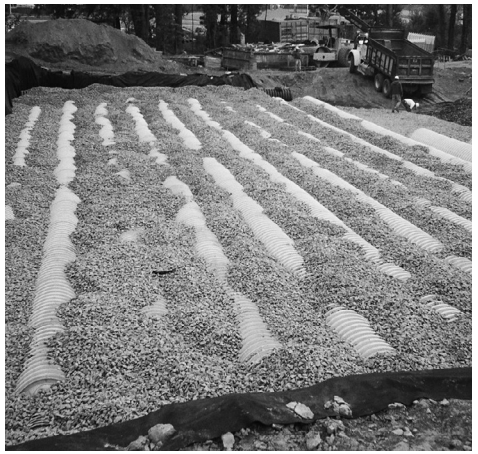
PERIMETER FULLY BACKFILLED

Backfill chambers evenly. Stone column height should never differ by more than 12” (300 mm) between adjacent chamber rows or between chamber rows and perimeter.

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill of Chambers – Embedment Stone and Cover Stone

Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers and a minimum 12” (300 mm) of cover stone is in place. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. The recommended backfill methods are with a stone conveyor outside of the bed or build as you go with an excavator inside the bed reaching along the rows. Backfilling while assembling chambers rows as shown in the picture will help to ensure that equipment reach is not exceeded.

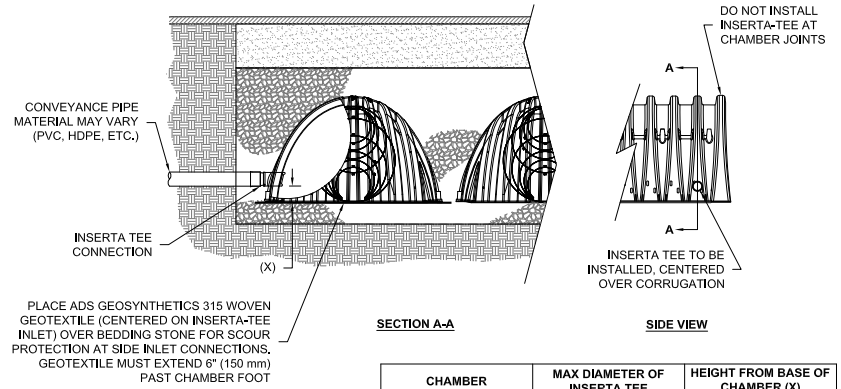


Only after chambers have been backfilled to top of chamber and with a minimum 12” (300 mm) of cover stone on top of chambers can skid loaders and small LGP dozers be used to final grade cover stone and backfill material in accordance with ground pressure limits in Table 2. Equipment must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends the contractor inspect chamber rows before placing final backfill. Any chambers damaged by construction equipment shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24” (600 mm) where edges meet. Compact at 24” (600 mm) of fill. Roller travel parallel with rows.

Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

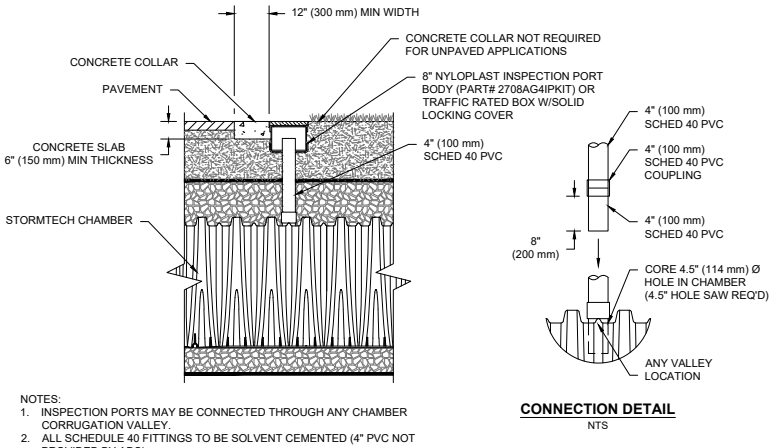
Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	Compaction/Density Requirement
(D) **Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that the pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils or per engineer's plans. Check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
(C) **Initial Fill:** Fill Material for layer 'C' starts from the top of the embedment stone ('B' layer) to 24" (600 mm) above the top of the chamber. Note that pavement subbase may be part of the 'C' layer.	Granular well-graded soil/aggregate mixtures, <35% fines or processed aggregate. Most pavement subbase materials can be used in lieu of this layer.	AASHTO M145 A-1, A-2-4, A-3 or AASHTO M431 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compaction after min. 24" (600 mm) of material over the chambers is reached. Compact additional layers in 12" (300 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials.
(B) **Embedment Stone:** Fill the surrounding chambers from the foundation stone ('A' layer) to the 'C' layer above.	Clean, crushed, angular stone	AASHTO M43[1] 3, 357, 4	No compaction required.
(A) **Foundation Stone:** Fill below chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone,	AASHTO M43[1] 3, 357, 4	Place and compact in 9" (230 mm) max lifts using two full coverages with a vibratory compactor.[2,3]

PLEASE NOTE:

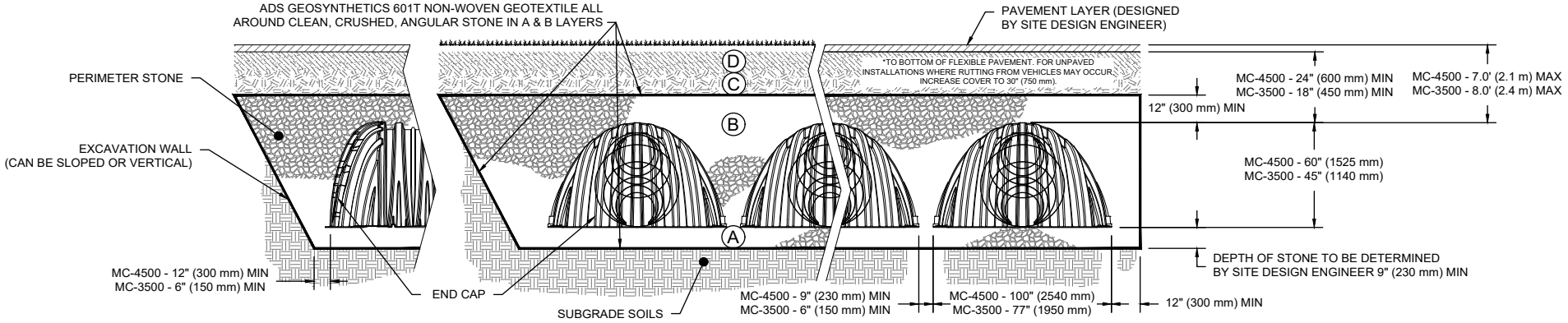
1. ***The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular no. 4 (AASHTO M43) stone".***
2. ***StormTech compaction requirements are met for 'A' location materials when placed and compacted in 9" (230 mm) (max) lifts using two full coverages with a vibratory compactor.***
3. ***Where infiltration surfaces may be comprised by compaction, for standard installations and standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact StormTech for compaction requirements.***

Figure 1- Inspection Port Detail



NOTES:
1. INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED (4" PVC NOT PROVIDED BY ADS).

Figure 2 - Fill Material Locations



NOTES:

1. ***36" (900 mm) of stabilized cover materials over the chambers is required for full dump truck travel and dumping.***
2. ***During paving operations, dump truck axle loads on 24" (600mm) of cover may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 24" (600 mm) of cover exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.***
3. ***Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.***
4. ***Mini-excavators (<8,000lbs/3,628 kg) can be used with at least 12" (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.***
5. ***StormTech does not require compaction of initial fill at 18" (450 mm) of cover. However, requirements by others for 6" (150 mm) lifts may necessitate the use of small compactors at 18" (450 mm) of cover.***
6. ***Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.***
7. ***Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.***

Table 2 - Maximum Allowable Construction Vehicle Loads[6]

Material Location	Fill Depth over Chambers in. [mm]	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs [kN]	Max Wheel Load for Loaders lbs [kN]	Track Width in. [mm]	Max Ground Pressure psf [kPa]	Max Drum Weight or Dynamic Force lbs [kN]
Ⓓ **Final Fill Material**	36" [900] Compacted	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	3420 [164] 2350 [113] 1850 [89] 1510 [72] 1310 [63]	38,000 [169]
Ⓒ **Initial Fill Material**	24" [600] Compacted	32,000 [142]	16,000 [71]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	2480 [119] 1770 [85] 1430 [68] 1210 [58] 1070 [51]	20,000 [89]
	24" [600] Loose/Dumped	24,000 [107]	12,000 [53]	12" [305] 18" [457] 24" [610] 30" [762] 36" [914]	2245 [107] 1625 [78] 1325 [63] 1135 [54] 1010 [48]	16,000 [71]
	18" [450]	24,000 [107]	12,000 [53]	12" [305] 18" [457] 24" [610] 30" [762]	2010 [96] 1480 [71] 1220 [58] 1060 [51]	5,000 [22] (static loads only)[5]
Ⓑ **Embedment Stone**	12" [300]	NOT ALLOWED	NOT ALLOWED	12" [305] 18" [457] 24" [610] 30" [762]	1100 [53] 715 [34] 660 [32] 580 [28]	NOT ALLOWED
	6" [150]	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ **Final Fill Material**	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36" (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows.[4]	Roller travel parallel to rows only until 36" (900 mm) compacted cover is reached.
Ⓒ **Initial Fill Material**	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 24" (600 mm) above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 12" (300 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 24" (600 mm) over chambers. Roller travel parallel to chamber rows only.
Ⓑ **Embedment Stone**	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 12" (300 mm) cover stone is in place.	No rollers allowed.
Ⓐ **Foundation Stone**	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			