STORMWATER POLLUTION PREVENTION PLAN

BBQ/PATIO IMPROVEMENTS

412 Munro Avenue
Village of Mamaroneck, NY

Prepared for:
Archer Property Management
105 Calvert Street
Harrison, NY 10528

August 19, 2022

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1. INTRODUCTION

This SWPPP has been prepared for the property known as 412 Munro Avenue, located within the Village of Mamaroneck (tax parcel 9-15-282). The site consists of a four-story residential building, a parking lot, and a patio area. The site includes 0.33 acres of existing impervious cover, which includes walkways, building cover, parking lot, and gravel. The remaining 0.13 acres is open space. The project proposes the construction of a new patio East of the parking lot, which will result in a disturbance of 0.03 acres. The existing impervious cover located on the proposed patio area is 0.02 acres of gravel. This area will be converted to 0.02 acres of permeable pavement. Although the impervious cover will not increase in acreage, the CN will increase from 85 to 98 from the conversion of gravel pavement to impervious area. For conservative results, the proposed permeable pavement is modeled as impervious with the stone underlayment modeled as stormwater storage. This Project is located within the Sheldrake River-Mamaroneck River watershed.

2. REGULATORY COMPLIANCE

2.1. NYSDEC General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001)

The following is an excerpt from the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001);

Pursuant to Section 402 of the Clean Water Act ("CWA"), operators of small municipal separate storm sewer systems ("small MS4s"), located in urbanized areas ("UA") and those additionally designated by New York State are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program. New York's State Pollutant Discharge Elimination System ("SPDES") is an NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL").

Only those small MS4 operators who develop and implement a stormwater management program (SWMP) and obtain permit coverage in accordance with Part II of this SPDES general permit are authorized to discharge stormwater from their small MS4 under this SPDES general permit. The Town of Mamaroneck is regulated under GP-0-15-003.

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;
2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*
3. *Construction activities* located in the watershed(s) identified in Appendix D [of Appendix K, GP-0-20-001] that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

The project does not trigger any of the above thresholds, therefore, coverage under the General Permit 0-20-001 is **not** required.

2.2. Village of Mamaroneck

This Stormwater Pollution Prevention Plan has been developed in accordance with §294 of the Village of Mamaroneck code. Accordingly, stormwater facilities have been designed to attenuate peak flows to be consistent with existing conditions.

2.3. Design Criteria

The criteria for this Stormwater Pollution Prevention Plan (SWPPP) are as follows:

1. To develop an erosion and sediment control plan in accordance with the latest revision to the New York Standards and Specifications for Erosion and Sediment Controls (November 2016), which implements best management practices to stabilize disturbed areas, protect off site areas and sensitive areas and minimize the transport of sediment.
2. To demonstrate that temporary and permanent stormwater systems and facilities are designed in accordance with the latest revision to the New York State Stormwater Management Design Manual, January 2015 and that the stormwater discharge flow rates from the site after development do not exceed pre-development levels for all storms modeled. The Project does not change the overall CN of the site, therefore, there is no increase in discharge flow rates.
3. To demonstrate that the water quality criteria of Section 9.3.2B of the New York State Stormwater Management Design Manual are met such that 25% WQv from disturbed impervious area 100% of new impervious surfaces is captured and treated using a "Standard Practice". A Standard Practice is not required for this Project since there is no change between pre-development and post-development runoff and the calculated WQv and RRv round to zero.

3. METHODOLOGY

3.1. Planning

Stormwater facilities have been selected in accordance with Section 3.6 "Six Step Process for Stormwater Site Planning Practice and Selection" of the NYSDEC Stormwater Management Design Manual. This section of the "Manual" focuses on minimizing impacts to ecological systems by promoting green design to satisfy the entire or a portion of the Water Quality Volume, channel protection volume, overbank flood control and/or extreme flood control requirements. The Six Step Process for Stormwater Site Planning Practice and Selection are as follows:

1. Site Planning.
2. Determine Water Quality Treatment Volume (WQv).
3. Apply Runoff Reduction Techniques and Standards SMPs with RRv Capacity.
4. Determine the minimum RRv required.
5. Apply Standard Stormwater Management Practices to address remaining Water Quality Volume.
6. Apply Volume and Peak Rate Control Practices if still needed to meet Requirements.

3.2. Runoff Calculations

Runoff calculations were performed utilizing "Hydraflow Hydrographs" software, published by Autodesk, Inc. The software utilizes the principals of TR-55 and TR-20 to generate unit hydrographs. Rainfall events are generated utilizing Soil Conservation Service (SCS) Type III, 24-hour rainfall event for Westchester County, NY. The required design storms were taken from the New York State Stormwater Management Design Manual, dated January 2015. The rainfall return periods evaluated in this report are the 1-yr, 10-yr, and 100-yr, generating 2.8", 5.1"and 9.0" of rainfall, respectively.

3.2.1. Curve Number

Curve Number (CN) is a rating assigned to a drainage area which determines the areas ability to infiltrate stormwater. CN is dependent on soil hydrologic group and ground cover. The lower the CN the more likely the area is to infiltrate stormwater. For impervious surfaces a CN of 98 is used.

3.2.2. Time of Concentration

Time of concentration (Tc) is defined as the time needed for water to flow from the most remote point in the drainage area or watershed to the design point or watershed outlet. The time of concentration is a function of the size, topography, geology, and land use of the drainage area or watershed and is used to determine the response of a drainage area or watershed to a rainfall event. A short Tc results in peak discharge flows at the design point shortly after the peak rainfall has occurred. A longer Tc means that water is exposed for a longer duration to infiltration and evaporation before it reaches the design point, effectively reducing the peak flow at the discharge point. For the purposes of stormwater modeling, the minimum Tc shall be at least two (2) times the hydrograph calculation time interval and shall not be less than 6 minutes.

3.3. Soil Classification

Soil data was taken from "Soil Map-Westchester County New York" published by the Web Soil Services, National Cooperative Soil Survey. The survey provides soil boundaries and properties including hydrologic group and Kf. The hydrologic soils group (HSG) is a rating for hydraulic conductivity.

The HSG rating is from A to D with A soils having the highest ability to transmit water into the soil structure and D-soils having the lowest.

The Kf factor normally varies from approximately zero to about 0.6. A Kf value of 0.17 denotes a very low erosion potential; a value of 0.32 shows moderate erosion potential; a value of 0.37 suggests a high and a value of 0.43 a very high erosion potential.

On-site soils and their related properties are summarized below in Table 3.3-1. A soils map and properties from "Web Soil Services" is included as Appendix A.

Table 3.3-1
Soil Properties

Map Unit	Site Area (%)	Soils Name	Depth to Restrictive Layer (cm)	Hydrologic Soil Group	Erosion Hazard Kf
UhC	100	Urban Land – Charlton complex, 8 to 15 percent slopes	>200	B	.24

3.4. Soils Testing

Soils testing consists of the excavation of test pits or boring for identifying the soil strata and the depth to groundwater or restrictive layers, and percolation testing to determine the rate at which stormwater can be absorbed into the soils. It is not advisable to perform soils testing during the winter months, particularly when ambient air temperatures drop below freezing, as soils testing in frozen soils can produce inaccurate results.

The analysis does rely on infiltration, although infiltration will further reduce the runoff. Accordingly, soils testing is not proposed.

3.5. Unified Sizing Criteria

Water Quality (WQ) and Runoff Reduction (RR) management measures and designs described herein are in accordance with Chapter 4 of the NYSDEC Design Manual.

Section 4.2 of the NYSDEC Design Manual provides the following equation to determine the WQV:

$$\mathrm{WQ_V} = \frac{(\mathrm{P})(\mathrm{R_V})(\mathrm{A})}{12}$$

Where:

WQ_V = Water Quality Volume (acre-feet)

P = 90% Rainfall event number (1.5", per Figure 4.1, NYSDEC Design Manual)

R_V = $0.05 + 0.009(\mathrm{I})$, Where (I) is percent of impervious cover

A = Site area in acres (Contributing Area)

Section 4.3 of the NYSDEC Design Manual provides the following equation to determine the RR_V:

$$\mathrm{RR_{v,min}} = \frac{(\mathrm{P})(\overline{\mathrm{R}}_\mathrm{V})(\mathrm{Aic})(S)}{12}$$

Where;

$RR_{V,min}$ = Minimum runoff reduction volume required from impervious area (acre-feet)

R_V = $0.05 + 0.009(\mathrm{I})$, Where (I) is 100% impervious

Aic = Total area of new impervious cover

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

3.5.1. Mitigation of Stormwater Quality (WQv) and Runoff Reduction (RRv)

The project proposes to achieve the water quality requirements, using the Standard Management Practices of infiltration (in the form of permeable pavement).

Calculations for required and provided WQv & RRv are included as Appendix D. WQv & RRv are summarized in Table 3.5.1-1 below:

Table 3.5.1-1
Required and Provided WQv & RRv

Drainage Area	Required WQv ac-ft	Required RR_V ac-ft	Provided WQv ac-ft	Provided RRv ac-ft
SDP A	0.002	0.000*	0.011	0.000*

*As mentioned earlier, the CN will increase from 85 to 98 from the conversion of gravel pavement to impervious area. Accordingly, there is no required RRv as the impervious area remains the same in pre and post development.

4. STORMWATER MANAGEMENT

4.1. Design Point

Design Points represent the location where most runoff from an area exits the site or where impacts of development can be evaluated. The same design points are identified in post-development conditions so that a comparison can be made between the pre-development and post-development conditions. Accordingly, this report will evaluate the overall runoff from the site, to demonstrate that the stormwater discharge flow rates after development do not exceed pre-development levels.

The site design points have been identified as follows:

SDP A	Runoff from drainage area SDP A will flow east overland, which will eventually drain to the Sheldrake River-Mamaroneck River watershed.
SDP B	Runoff from drainage area SDP B will flow east overland, which will eventually drain to the Sheldrake River-Mamaroneck River watershed.

4.2. Pre-Development Conditions

A Pre-Development Drainage map is included in Appendix B.

Table 4.2-1 below summarizes the pre-development overland on-site runoff contributing to the Sheldrake River-Mamaroneck River watershed.

Table 4.2-1
Pre-Development Discharge Summary

Area Designation	Area ac	Tc (min)	CN	1-yr (2.8") cfs	10-yr (5.1") cfs	100-yr (9.0") cfs
SDP A	0.03	6	80	0.03	0.09	0.20
SDP B	0.43	6	90	0.79	1.68	3.16
TOTAL PRE	0.46	-	-	0.82	1.77	3.35

Unit Hydrograph Analysis is included in Appendix C.

4.3. Post-Development Conditions

The Project proposes the construction of a new patio. Runoff from the Project area will be collected from the permeable pavement, reducing the peak outflow rate to levels that do-not exceed pre-development flow rates. The stormwater will flow to the existing off-site drainage system. A Post-Development Drainage map is included in Appendix B.

Table 4.3-1 below summarizes the post-development overland on-site runoff contributing to the Sheldrake River-Mamaroneck River watershed.

Table 4.3-1
Post-Development Discharge Summary

Area Designation	Area ac	Tc min	CN	1-yr (2.8") cfs	10-yr (5.1") cfs	100-yr (9.0") cfs
SDP A	0.03	6	92	0.04	0.09	0.15
SDP B	0.43	6	90	0.79	1.68	3.16
TOTAL POST	0.46	-	-	0.81	1.75	3.31

Unit Hydrograph Analysis is included in Appendix C.

4.4. Stormwater Mitigation

The project proposes stormwater mitigation techniques in accordance with the New York Stormwater Management Design Manual, January 2015. The proposed mitigation techniques to achieve design criteria 2.3.2 are as follows;

- The planned development is proposed in areas that have already been disturbed or areas where disturbances and visual impacts are minimized.
- Installation of stormwater pre-treatment facilities, where applicable.
- Installation of subsurface detention with infiltration component, where applicable.
- Repair/maintain outlet protection, where applicable, to minimize erosion downgradient of the discharge point.

4.4.1. Hydraulic Analysis of Ponds

A summary of the pre-development and post-development runoff rates for each design point is presented below.

Table 4.4.1-1 summarizes the inflow and outflow of Detention Pond: Permeable Pavement

Table 4.4.1-1
Detention Pond Summary: Permeable Pavement

Design Storm	Inflow cfs	Outflow cfs	Storage Volume cf	Water Elevation ft	Freeboard ft
1-yr (2.8")	0.06	0.04	43.56	92.55	1.46
10-yr (5.1")	0.12	0.09	87.12	92.63	1.38
100-yr (9.0")	0.22	0.15	130.68	92.73	1.28

The elevation of 94.01 ft was used for the freeboard calculation. 94.01 is the elevation beneath the paving stone and above the stone underlayment, which is the storage.

Tables 4.4.1-2, and 4.4.1-3 summarize the pre-development and post-development on-site runoff contributing to the Sheldrake River-Mamaroneck River watershed.

Table 4.4.1-2
Pre-Development and Post Development Peak Discharge Rate Summary

Design Storm	Pre-Development Peak Outflow cfs	Post-Development Peak Outflow cfs	Peak Flow Rate Reduction cfs	Peak Flow Rate Reduction %
1-yr (2.8")	0.82	0.81	0.01	1.22%
10-yr (5.1")	1.77	1.75	0.02	1.13%
100-yr (9.0")	3.35	3.31	0.04	1.19%

5. CONSTRUCTION SEQUENCING AND PHASING

An erosion and sediment control plan in conformance with NYSDEC requirements is included in SD-202 Erosion & Sediment Control Plan, which also includes notes for construction phasing. The project is proposed to be constructed in a single phase:

The construction sequencing schedule is as follows:

- Install of temporary ESC measures, perimeter fencing.
- Remove trees and stumps.
- Install retaining wall.
- Remove topsoil and grade patio.
- Install permeable pavers.
- Install landscaping.
- Removal of temporary ESC measures.

6. MAINTENANCE AND OPERATIONS

Periodic long-term inspection and maintenance of the Stormwater Management Practices (SWMP) is essential to ensure that the facilities will function as designed. The facility operator shall be responsible for maintaining all onsite SWMP components. These components consist of the subsurface water quality facilities and the storm drainage collection system (pipes, drain inlets and manholes).

Table 6.1-1
Maintenance Schedule for Erosion and Sediment Control Devices

Practice / Item	Inspection Frequency	Maintenance Action	Corrective Action	NYS Blue Book
Temporary				
Silt Fence/ Reinforced silt fence	Daily	Check sediment accumulation. Check integrity.	Replace damaged sections. Repair damage from eroded soil. Remove sediment at 50% capacity.	5.54
Riprap	Periodic	Visually inspect of scour, dislodged stones.	Control weed and brush growth as needed. Replace dislodged stones.	3.21
Dewatering device	Weekly, after runoff event	Check sediment levels, filter integrity.	Replace filter fabric as needed. Replace skimmer within 24hrs of malfunction. remove sediment at marked level/when reaching skimmer.	5.10
Sediment Basin	Daily (working days)	Check sediment levels, check for erosion.	Remove sediment at 50% capacity. Repair all damage from soil erosion at end of each work day.	5.19
Portable Sediment Tank	Daily	Check sediment levels, check outflow is clear.	Remove sediment at 50% capacity.	5.44
Earth dike, Sediment Dike, Filter sock,	(not specified)	Check for erosion and sediment accumulation.	Remove sediment at 75% accumulation. Repair erosion. Fill trench when tributary is stabilized.	3.14, 5.42, 5.7
Permanent				
Stormwater Piping	Yearly	Visual inspection, confirm flow with garden hose	JetVac if catch basin and/or inlet sediment depth exceeds pipe invert.	

Comprehensive descriptions of recommended inspection and required maintenance items and intervals for the SWMP are provided in the following publications:

- "New York State Standards and Specifications for Erosion and Sediment Control", published by New York State Department of Environmental Conservation, November 2016 or its latest revision.

6.1. Water Quality Devices

6.1.1. Inspections

Water quality devices shall be inspected per manufacturers requirements but not less than on an annual basis to ensure that the structure operates in the manner originally intended. The outlet should be inspected once every six (6) months for evidence of damage or clogging. Other problems which should be checked for include: subsidence, erosion, accumulation of sediment, adequacy of upstream/downstream channel erosion control measures, and modifications to the pond or its contributing watershed that may influence its performance.

6.1.2. Debris and Litter Removal

Debris and litter will accumulate outlet control device and should be removed during regularly. Attention should be paid to floatable debris that can eventually clog outlet pipe.

6.1.3. Nuisance Control

Standing water or soggy conditions within the facilities bottom can create nuisance conditions such as odors, insects, weeds and debris. Most of these problems can be controlled through debris removal and by ensuring that outlet structures are kept free of debris and trash.

6.1.4. Structural Repairs and Replacement

Various inlet/outlet devices and standpipe or riser structures will deteriorate with time and may have to be replaced. Concrete pipes and risers should last from 50 to 75 years, while corrugated steel piping may have to be replaced after 15 to 25 years of use. Periodic repair may be required to extend the service life of the facilities.

6.1.5. Sediment Removal

Accumulated sediment should be removed as determined through inspection to preserve the available stormwater management capacity of the facilities, and to prevent the outlet orifices or filter medium from becoming clogged.

6.2. Stormwater Piping

Stormwater piping is typically cleaned by means of a high-pressure water jet. The outlet pipe can be temporally plugged so that the sediment and debris washed down from up gradient pipes is not conveyed. The accumulated sediment can be removed manually or with a vacuum truck.

6.3. Grassed Area

Grassed Area maintenance is largely aimed at keeping the grass cover dense and vigorous and primarily involves periodic mowing, occasional spot reseeding, and weed control. Watering may also be necessary in times of drought, particularly in the first few months after establishment. Additionally, temporary or permanent erosion control matting may be required if the maintenance involves re-grading of the channel for re-establishment of the channel section or slope.

7. EROSION AND SEDIMENT CONTROLS

7.1. Overview

During construction, the potential for soil erosion and sedimentation will be controlled through the use of temporary soil erosion and sediment control devices. These devices shall be installed in accordance with New York State Standards and Specifications for Erosion and Sediment Control dated November 2016.

The soil erosion and sediment control plan will minimize the downstream erosion hazard by controlling runoff at its source, minimizing runoff from disturbed areas and de-concentrating stormwater runoff. The objectives of the erosion control plan will be achieved through the management of stormwater runoff during construction.

The owner/applicant must ensure that temporary and permanent soil erosion and sediment control features are designed, installed and maintained for the duration of the project, to prevent soil disturbance from construction operations from having a negative or adverse effect to adjacent properties.

7.2. Plan Contents

A sediment and erosion control plan has been developed to minimize the offsite transport of sediment associated with construction. The temporary soil erosion and sediment control measures may include:

7.2.1. Silt Fence

Silt fences consist of standard strength filter fabric with wire mesh reinforcement (or extra strength synthetic filter fabric) secured to supporting posts and entrenched at the base. The fence will be three feet high; with the wire fence reinforcement constructed of a minimum 14.5-gauge galvanized steel wire and a minimum mesh spacing of six inches. Fences will be secured in place by galvanized steel or wood posts set at six feet on-center. The filter fabric will be stapled to the up-gradient face of each fence. The purpose of silt fences is to intercept and detain sediment contained in sheet overland runoff from disturbed areas of limited extent. In addition, the silt fencing will physically delineate the limit of work on the down slope side of work areas.

Installation and Maintenance

Silt fences will be installed where the disturbed land is located at a minimum distance of ten feet from critical areas (streams and wetlands) are as indicated on plans.

Silt fences will be installed on the down slope side of work areas, as close to the disturbed areas as possible.

Filter fabric requirements and installation design criteria will be in accordance with the requirements in the New York State Standards and Specifications for Erosion and Sediment Control.

Sediment will be removed from behind silt fences when sediment has accumulated to one-third of the original height of the fence.

7.2.2. Mulch

Mulch shall be the other primary means of stabilizing areas of disturbed earth. Temporary stabilization of disturbed areas will be accomplished by using a mulch of wood chips created from the low-value trees cleared on site. These chips will be stockpiled and protected in a manner like a soil stockpile until needed. Straw mulch will be used for stabilized areas associated with permanent seeding.

Mulches shall be applied in accordance with the requirements of the New York State Standards and Specifications for Erosion and Sediment Control, with the top two inches of compacted or crusted soil loosened prior to application.

Mulching is a very commonly used, well-established and highly effective stabilization method. The mulching on site will be continuously inspected and maintained for ultimate effectiveness.

7.2.3. Sod

Where exposed soils have the potential to generate off-site sediment loading, sod can provide an immediate form of stabilization and extra protection to a disturbed area. Where applied, sod shall be blue grass or a bluegrass/red fescue mixture or a perennial ryegrass and machine cut with a uniform soil thickness of ¾ inch, plus or minus ¼ inch.

Sod shall be used at the discretion of the Owner, unless specifically required by the plans.

7.2.4. Permanent Vegetation

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

7.2.5. Hydroseeding

Hydroseeding will be the means of providing temporary stabilization or permanent. The seed mix of fertilizer, water, and mulch will be applied as a mixture utilizing power equipment. The mix will be applied in two equal applications. Non-toxic, vegetable dyes will be used to determine the extent of coverage upon application. After grass has appeared,

those areas that fail to show a uniform stand of grass will be re-seeded. This process will be repeated until all areas are covered with satisfactory growth. Seed mixtures appropriate to the soils, slopes, and uses will be selected in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

7.2.6. Erosion Control Blankets

Erosion control blankets typically consist of a rolled mat of interwoven straw and/or coconut fibers with a top and/or bottom layer of natural or synthetic netting and used to stabilize all areas with slopes greater than 20%. Erosion control blankets may also be used with Hydroseeding as a temporary stabilization measure until final seeding. In addition, blankets can be used as a permanent stabilization measure to help retain topsoil and seed after final seeding, or as permanent turf reinforcement. This is possible because erosion control blankets are classified under the following categories: temporary, photodegradable; temporary, long-term; temporary, biodegradable; long-term biodegradable; and permanent.

7.2.7. Dust Control

Dust Control shall be accomplished using vegetative cover, mulch, spray adhesive, sprinkling or barriers. Water will be applied by sprinkler or water truck as necessary during grading operations to minimize sediment transport and maintain acceptable air quality conditions. Repetitive treatments will be done as needed until grades are paved or stabilized with vegetation.

7.2.8. Concrete Waste

Discharge of excess or waste concrete and/or wash water from Concrete Ready-Mix Trucks will be allowed on the construction site, but only in specifically designated diked areas that have been prepared to prevent contact between the concrete and/or wash water and stormwater that will be discharged from the site or in locations where waste concrete can be placed into forms to make riprap or other useful concrete products. The cured residue from the concrete washout diked areas shall be disposed in accordance with applicable state and federal regulations. The jobsite superintendent is responsible for assuring that these procedures are followed.

7.2.9. Stabilization

The operator 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. This requirement does not apply in the following instances:

- Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable;
- Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

7.2.10. Dewatering

It is anticipated that dewatering will not be required during construction. If dewatering becomes necessary the contractor shall submit a dewatering plan including the size and number of pumps to be utilized, sediment tank size (minimum of 120 times the pump flow rate in GPM), locations and discharge conditions. Where possible, discharge shall be made to existing stormwater facilities.

8. TEMPORARY AND PERMANENT WASTEWATER FACILITIES

8.1. Sanitary Waste during Construction

Portable sanitary facilities will be provided on the construction site. Sanitary waste will be collected from the portable units in a timely manner by a licensed waste management Contractor, and as required by any local, state and federal regulations.

8.2. Sanitary Waste

The Project is serviced by public water provided by Westchester Joint Water Works. The project is serviced by public sewer and is within the Mamaroneck Sewer District. The project does not propose changes to the existing water or sewer systems.

9. CONSTRUCTION MATERIALS STORAGE AND SPILL PREVENTION RESPONSE (SPR)

During construction, building and waste materials are expected to be stored on site. A description of the controls to reduce pollutants from these materials, and storage practices to minimize exposure of materials and spill prevention response (SPR) are discussed below.

9.1. Non-Stormwater Discharges

The following non-storm water discharges are anticipated during this project:

- Discharges from water line flushing.
- Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- Uncontaminated ground water (if encountered) associated with dewatering activities.

9.2. Materials Inventory

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled and stored appropriately, and in accordance with local, state and federal regulations.

- Concrete and Portland Cement
- Detergents
- Paints
- Metals
- Bituminous Materials
- Petroleum Based Products
- Cleaning Solvents
- Wood
- Epoxy Based Mortars, Grouts, etc.
- Fertilizers

9.3. Spill Prevention

9.3.1. House Keeping

- Only needed products will be stored on-site by the Contractor.
- Except for bulk materials, the Contractor will store all materials under cover and in appropriate containers.
- Products must be stored in original containers and labeled.
- Material mixing will be conducted in accordance with the manufacturer's recommendations.

- When possible, all products will be completely used before properly disposing of the container off site.
- The manufacturer's directions for disposal of materials and containers will be followed.
- The Contractor's site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
- Dust generated will be controlled in an environmentally safe manner.
- Vegetation areas not essential to the construction project will be preserved and maintained as noted on the drawings.

9.3.2. Hazardous Materials

- Products will be kept in original containers unless the container is not re-sealable.
- Original labels and material safety data sheets will be retained in a safe place to relay important product information.
- If surplus product must be disposed of, manufacturer's label directions for disposal will be followed.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
- Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any storm water system or storm water treatment system.
- Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, and mixer washout waters will be collected on site.

9.3.3. Product Specific Practices

- **Petroleum Products**
  - All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.
- **Fertilizers**
  - Once applied, fertilizers will be worked into the soil to limit the exposure to storm water. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.
- **Paints**
  - All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the manufacturer's instructions and applicable state and local regulations.
- **Concrete Trucks**
  - Contractors will provide designated truck washout areas on the site. These areas must be self-contained and not connected to any storm water outlet of the site. Upon completion of construction, washout areas will be properly stabilized

9.4. Spill Control Practices

In addition to the housekeeping and material management practices, the following practices will be followed for spill prevention and cleanup (if needed):

- For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be

clearly posted. Site personnel will be made aware of the procedures, and the locations of the information and cleanup supplies.

- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as booms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for cleanup purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill, a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.

9.5. Spill Response

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into storm water runoff and conveyance systems. If the release has impacted on-site storm water, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens storm water or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.

- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water, action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
- If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to the contacts listed below.
- Personnel with primary responsibility for spill response and cleanup will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.
- Spill Notification

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A reportable spill is a quantity of five (5) gallons or more or any spill of oil which: (1) violates water quality standards, (2) produces a sheen on a surface water, or (3) causes a sludge or emulsion. This spill must be

reported immediately to the agencies listed below.

- Any spill of oil or hazardous substance to waters of the state must be reported immediately by telephone to the following agencies:

Agency	Phone Number	Address
Police, Fire, and EMS	911	
Village of Mamaroneck Police Department	(914) 777-1122	169 Mount Pleasant Ave Mamaroneck, NY 10543
Village of Mamaroneck Fire Department	(914) 825-8777	146 Palmer Ave Mamaroneck, NY 10543
NYS Department of Environmental Conservation (NYSDEC) Spill Reporting Hotline	(800) 457-7362	
National Response Center (USEPA)	(800) 424-8802	Region 2
Local Emergency Planning Committee (LEPC) Westchester County Office of Emergency Management	(914) 864-5450	200 Bradhurst Avenue Hawthorne, NY 10532
Westchester County Department of Health (WCDOH) Spill Reporting Hotline	(914) 813-5000	
U.S. Environmental Protection Agency (USEPA) EPCRA Information Hotline	(800) 535-0202	
U.S. Department of Labor and Occupational Safety and Health Administration (OSHA) Tarrytown, NY	(914) 524-7510	

10. CONCLUSIONS

This SWPPP has been prepared for the property known as 412 Munro Avenue, located within the Village of Mamaroneck (tax parcel 9-15-282). The site consists of a four-story residential building, a parking lot, and a patio area. The site includes 0.33 acres of existing impervious cover, which includes walkways, building cover, parking lot, and gravel. The remaining 0.13 acres is open space. The project proposes the construction of a new patio East of the parking lot, which will result in a disturbance of 0.03 acres. The existing impervious cover located on the proposed patio area is 0.02 acres of gravel. This area will be converted to 0.02 acres of permeable pavement. Although the impervious cover will not increase in acreage, the CN will increase from 85 to 98 from the conversion of gravel pavement to impervious area. For conservative results, the proposed permeable pavement is modeled as impervious with the stone underlayment modeled as stormwater storage. This Project is located within the Sheldrake River-Mamaroneck River watershed. This Project is located within the Sheldrake River-Mamaroneck River watershed. This Stormwater Pollution Prevention Plan demonstrates:

1. That an erosion and sediment control plan has been prepared in accordance with the latest revision to the New York Standards and Specifications for Erosion and Sediment Controls (November 2016), which implements best management practices to stabilize disturbed areas, protect off site areas and sensitive areas and minimize the transport of sediment.
2. That temporary and permanent stormwater systems and facilities have been designed in accordance with the latest revision to the New York State Stormwater Management Design Manual, January 2015 and that the stormwater discharge flow rates from the site after development do not exceed pre-development levels for all storms modeled.
3. That the water quality criteria of Section 9.3.2B of the New York State Stormwater Management Design Manual are met such that 25% WQv from disturbed impervious area 100% of new impervious surfaces is captured and treated using a “Standard Practice”.

APPENDIX A
WEB SOILS SERVICES SOILS MAP AND PROPERTIES

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Westchester County, New York

412 Munro Avenue

August 19, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

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 17, Sep 1, 2021

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

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

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

Map Unit Legend (412 Munro Avenue)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	0.6	100.0%
Totals for Area of Interest		**0.6**	**100.0%**

Map Unit Descriptions (412 Munro Avenue)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Westchester County, New York

UhC—Urban land-Charlton complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wh1m
Elevation: 0 to 840 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: Not prime farmland

Map Unit Composition

Urban land: 40 percent
Charlton and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Charlton

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Leicester

Percent of map unit: 8 percent
Landform: Hills, ground moraines, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Chatfield

Percent of map unit: 7 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent
Landform: Ridges
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

K Factor, Rock Free (412 Munro Avenue)

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

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Factor K does not apply to organic horizons and is not reported for those layers.

Custom Soil Resource Report
Map—K Factor, Rock Free (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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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)

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Table—K Factor, Rock Free (412 Munro Avenue)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	.24	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—K Factor, Rock Free (412 Munro Avenue)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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

K Factor, Whole Soil (412 Munro Avenue)

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

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

Factor K does not apply to organic horizons and is not reported for those layers.

Custom Soil Resource Report
Map—K Factor, Whole Soil (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

.02
.05
.10
.15
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Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Table—K Factor, Whole Soil (412 Munro Avenue)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	.24	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—K Factor, Whole Soil (412 Munro Avenue)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

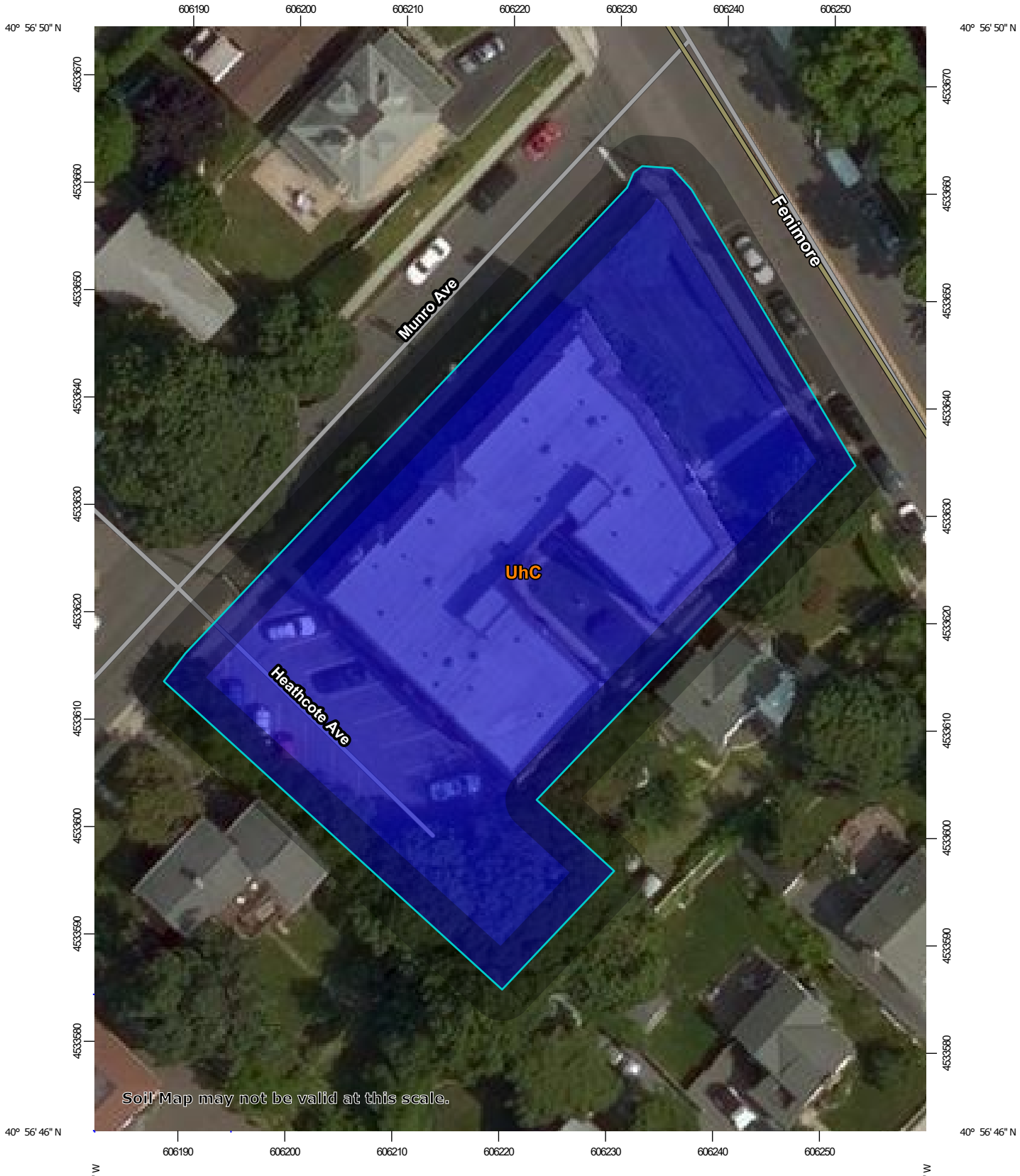
Depth to a Selected Soil Restrictive Layer: Lithic bedrock (412 Munro Avenue)

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to the user selected type of restrictive layer as described in for each map unit. If no restrictive layer is described in a map unit, it is represented by the "greater than 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Map—Depth to a Selected Soil Restrictive Layer: Lithic bedrock (412 Munro Avenue)



Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 17, Sep 1, 2021

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

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

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

Table—Depth to a Selected Soil Restrictive Layer: Lithic bedrock (412 Munro Avenue)

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	>200	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Depth to a Selected Soil Restrictive Layer: Lithic bedrock (412 Munro Avenue)

Units of Measure: centimeters

Restriction Kind: Lithic bedrock

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Depth to Any Soil Restrictive Layer (412 Munro Avenue)

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "greater than 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Any Soil Restrictive Layer (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 17, Sep 1, 2021

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

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

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

Table—Depth to Any Soil Restrictive Layer (412 Munro Avenue)

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	0	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Depth to Any Soil Restrictive Layer (412 Munro Avenue)

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Depth to Bedrock (412 Munro Avenue)

The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile.

There are many types of restrictions that can occur within the soil profile but this theme only includes the three restrictions that use the term bedrock. These are:

1) Lithic Bedrock

2) Paralithic Bedrock

3) Densic Bedrock

Lithic bedrock and paralithic bedrock are comprised of igneous, metamorphic, and sedimentary rocks, which are coherent and consolidated into rock through pressure, heat, cementation, or fusion. Lithic bedrock represents the hardest type of bedrock, with a hardness of strongly coherent to indurated. Paralithic bedrock has a hardness of extremely weakly coherent to moderately coherent. It can occur as a thin layer of weathered bedrock above harder lithic bedrock. Paralithic bedrock can also be much thicker, extending well below the soil profile.

Densic bedrock represents a unique kind of bedrock recognized within the soil survey. It is non-coherent and consolidated, dense root restrictive material, formed by pressure, heat, and dewatering of earth materials or sediments. Densic bedrock differs from densic materials, which formed under the compaction of glaciers, mudflows, and or human-caused compaction.

If more than one type of bedrock is described for an individual soil type, the depth to the shallowest one is given. If no bedrock is described in a map unit, it is represented by the "greater than 200" depth class.

Depth to bedrock is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Bedrock (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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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)

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

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Table—Depth to Bedrock (412 Munro Avenue)

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	>200	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Depth to Bedrock (412 Munro Avenue)

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Hydrologic Soil Group (412 Munro Avenue)

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

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

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at

or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

Custom Soil Resource Report
Map—Hydrologic Soil Group (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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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)

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Table—Hydrologic Soil Group (412 Munro Avenue)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	B	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Hydrologic Soil Group (412 Munro Avenue)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table (412 Munro Avenue)

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Water Table (412 Munro Avenue)

Map Scale: 1:501 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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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.

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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.

Table—Depth to Water Table (412 Munro Avenue)

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	>200	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Depth to Water Table (412 Munro Avenue)

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

References

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APPENDIX B
PRE-DEVELOPMENT AND POST-DEVELOPMENT DRAINAGE MAP

LEGEND

WATERSHED BOUNDARY

SDP B
AREA: 0.43 AC
PERVIOUS: 0.12 AC
CN: 90
Tc: 6 MIN

SDP A
AREA: 0.03 AC
PERVIOUS: 0.01 AC
CN: 80
Tc: 6 MIN

SHELDRAKE RIVER-MAMARONECK RIVER
WATERSHED
(HUC: 020301020202)

0 20 40 Feet

PRE-DEVELOPMENT DRAINAGE MAP

AUGUST 19, 2022

412 MUNRO AVENUE

VILLAGE OF MAMARONECK, N.Y.

B.1

CATIZONE ENGINEERING, P.C.
Civil Engineering Consultants

LEGEND

WATERSHED BOUNDARY

SDP B
AREA: 0.43 AC
PERVIOUS: 0.12 AC
CN: 90
Tc: 6 MIN

SDP A
AREA: 0.03 AC
PERVIOUS: 0.01 AC
CN: 91
Tc: 6 MIN

SHELDRAKE RIVER-MAMARONECK RIVER
WATERSHED
(HUC: 020301020202)

0 20 40 Feet

POST-DEVELOPMENT DRAINAGE MAP

AUGUST 19, 2022

412 MUNRO AVENUE

VILLAGE OF MAMARONECK, N.Y.

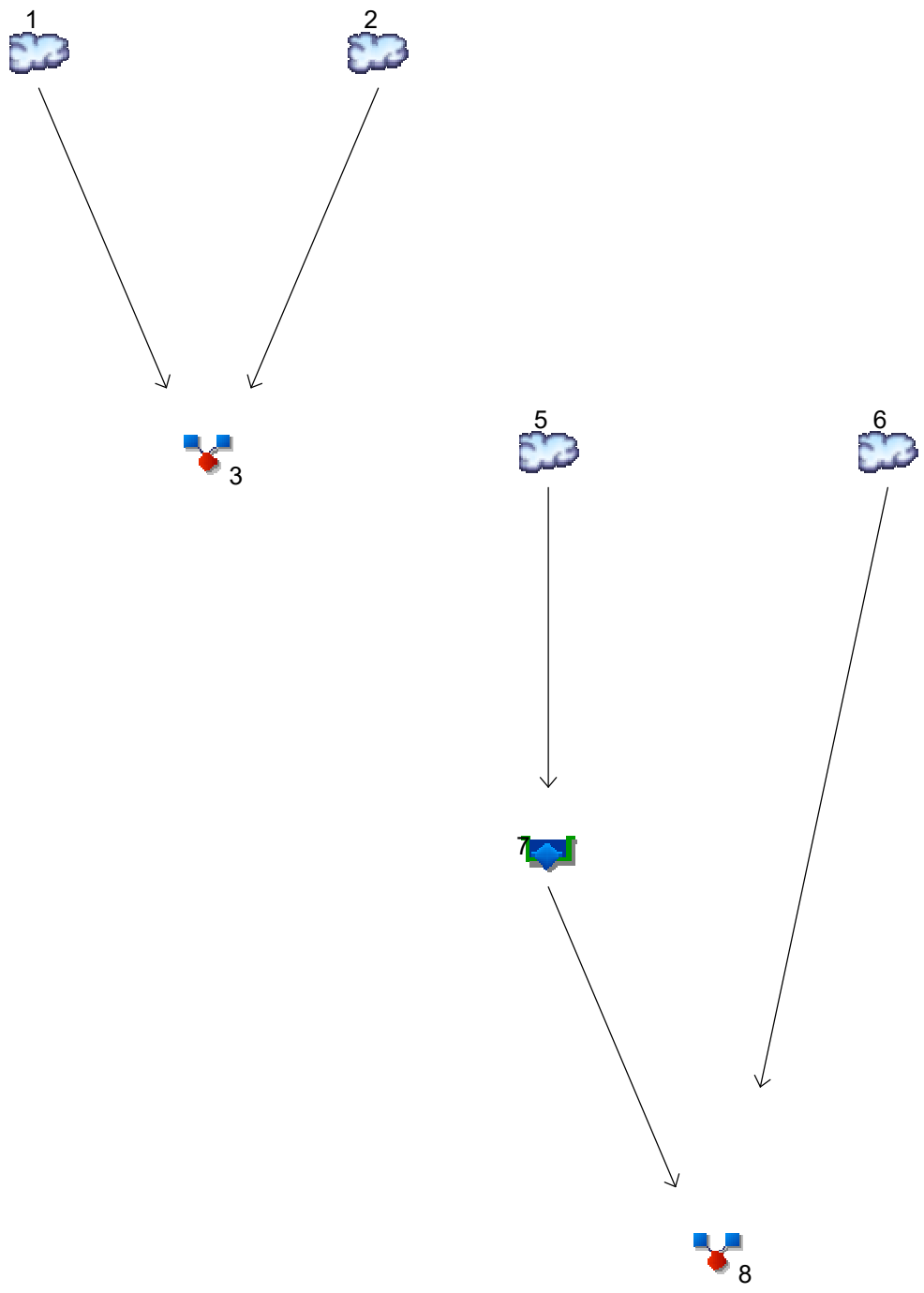
B.2

CATIZONE ENGINEERING, P.C.
Civil Engineering Consultants

APPENDIX C

PRE-DEVELOPMENT AND POST-DEVELOPMENT UNIT HYDROGRAPH ANALYSIS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	SDP A - PRE
2	SCS Runoff	SDP B - PRE
3	Combine	PRE TOTAL
5	SCS Runoff	SDP A - POST
6	SCS Runoff	SDP B - POST
7	Reservoir	Pond
8	Combine	POST TOTAL

Hydraflow Table of Contents

412 Munro.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 08 / 22 / 2022

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.033	0.038	-------	-------	0.091	-------	-------	0.196	SDP A - PRE
2	SCS Runoff	------	0.786	0.863	-------	-------	1.675	-------	-------	3.158	SDP B - PRE
3	Combine	1, 2	0.819	0.901	-------	-------	1.766	-------	-------	3.354	PRE TOTAL
5	SCS Runoff	------	0.057	0.063	-------	-------	0.119	-------	-------	0.222	SDP A - POST
6	SCS Runoff	------	0.786	0.863	-------	-------	1.675	-------	-------	3.158	SDP B - POST
7	Reservoir	5	0.035	0.040	-------	-------	0.086	-------	-------	0.152	Pond
8	Combine	6, 7	0.813	0.894	-------	-------	1.749	-------	-------	3.308	POST TOTAL

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.033	3	726	0.003	------	------	------	SDP A - PRE
2	SCS Runoff	0.786	3	726	0.061	------	------	------	SDP B - PRE
3	Combine	0.819	3	726	0.063	1, 2	------	------	PRE TOTAL
5	SCS Runoff	0.057	3	726	0.004	------	------	------	SDP A - POST
6	SCS Runoff	0.786	3	726	0.061	------	------	------	SDP B - POST
7	Reservoir	0.035	3	732	0.004	5	92.55	0.001	Pond
8	Combine	0.813	3	726	0.065	6, 7	------	------	POST TOTAL

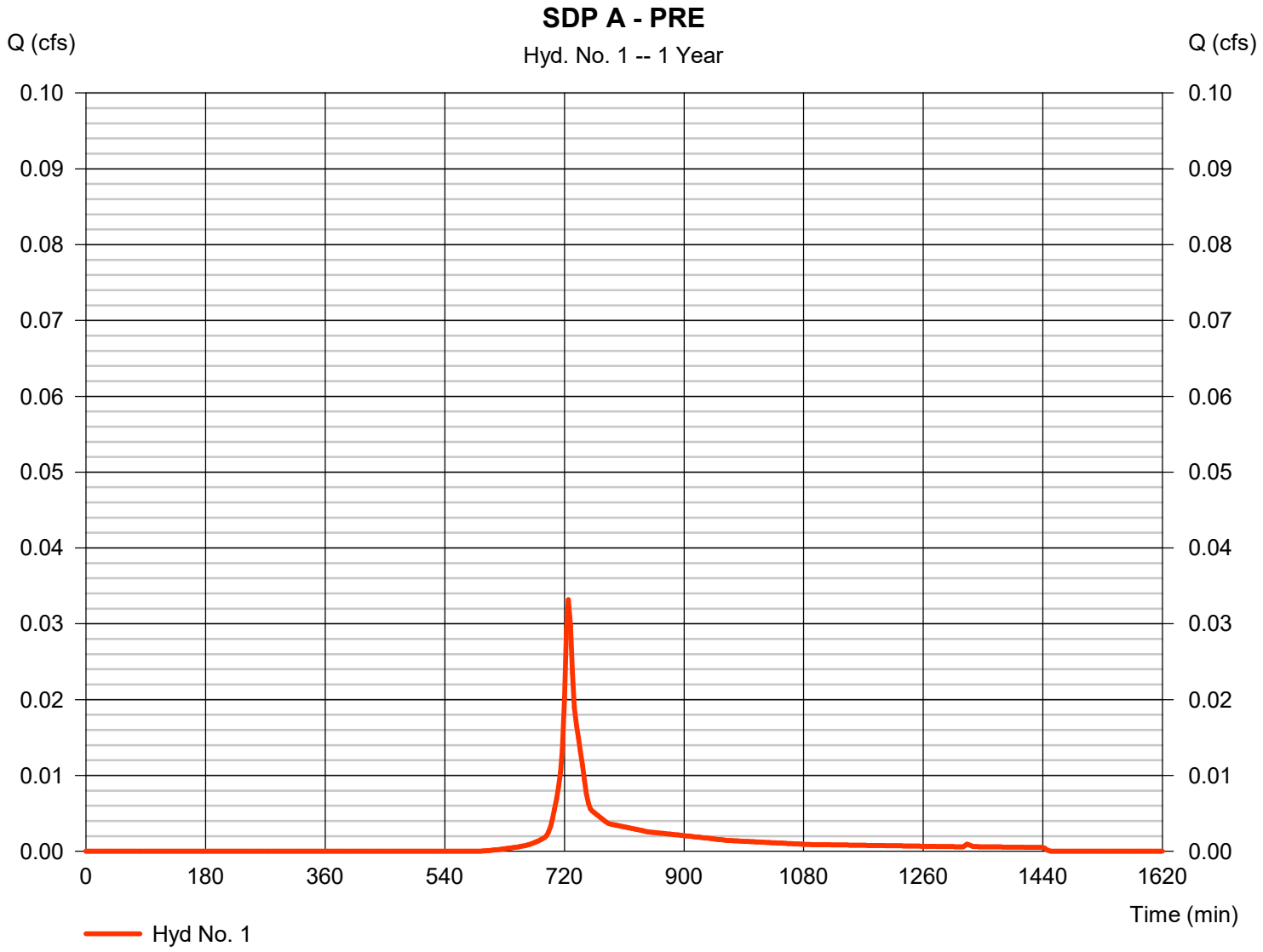
Hydrograph Report

Hyd. No. 1

SDP A - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.033 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.003 acft
Drainage area	=	0.030 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 80)] / 0.030



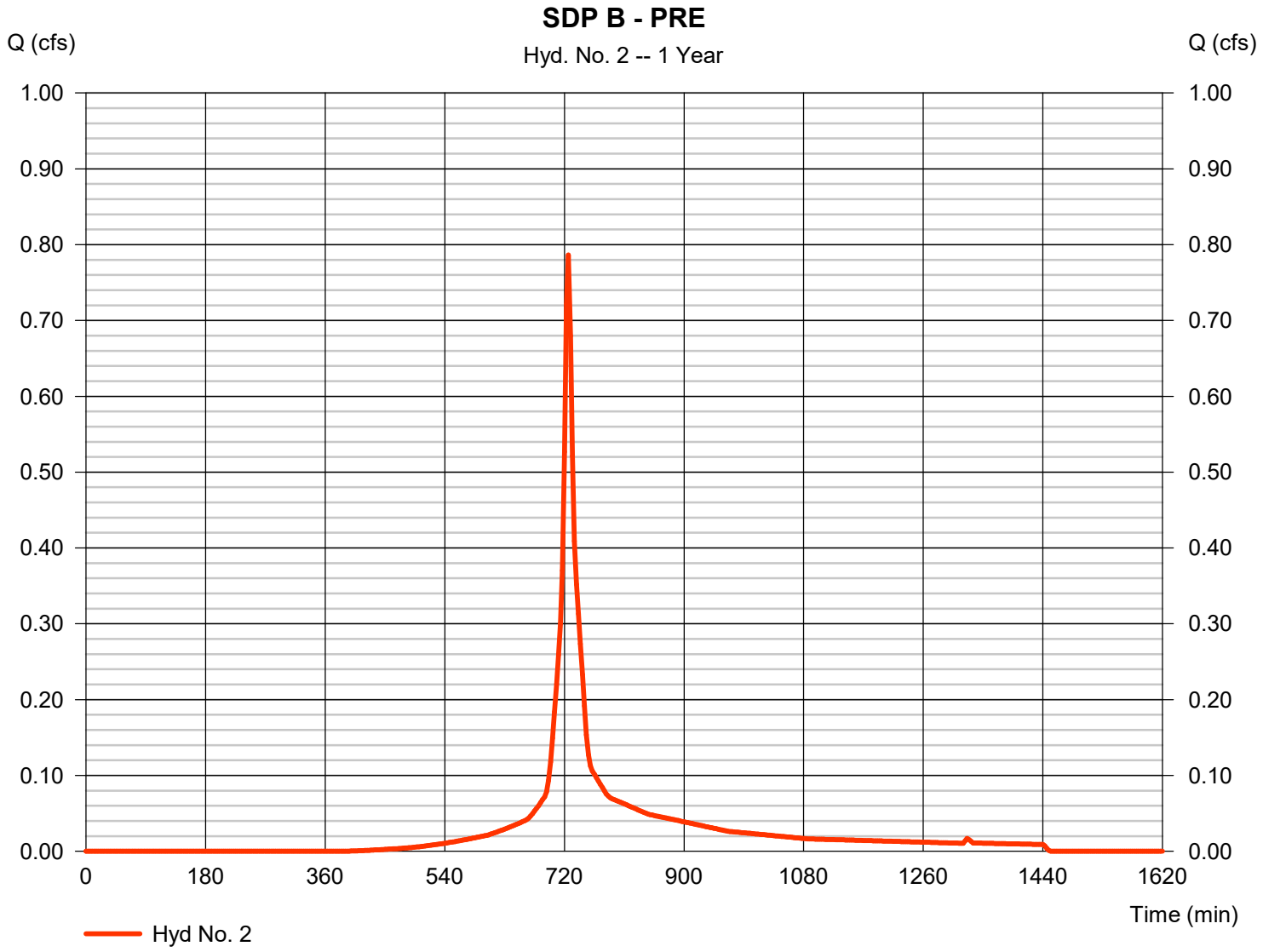
Hydrograph Report

Hyd. No. 2

SDP B - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.786 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.061 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430

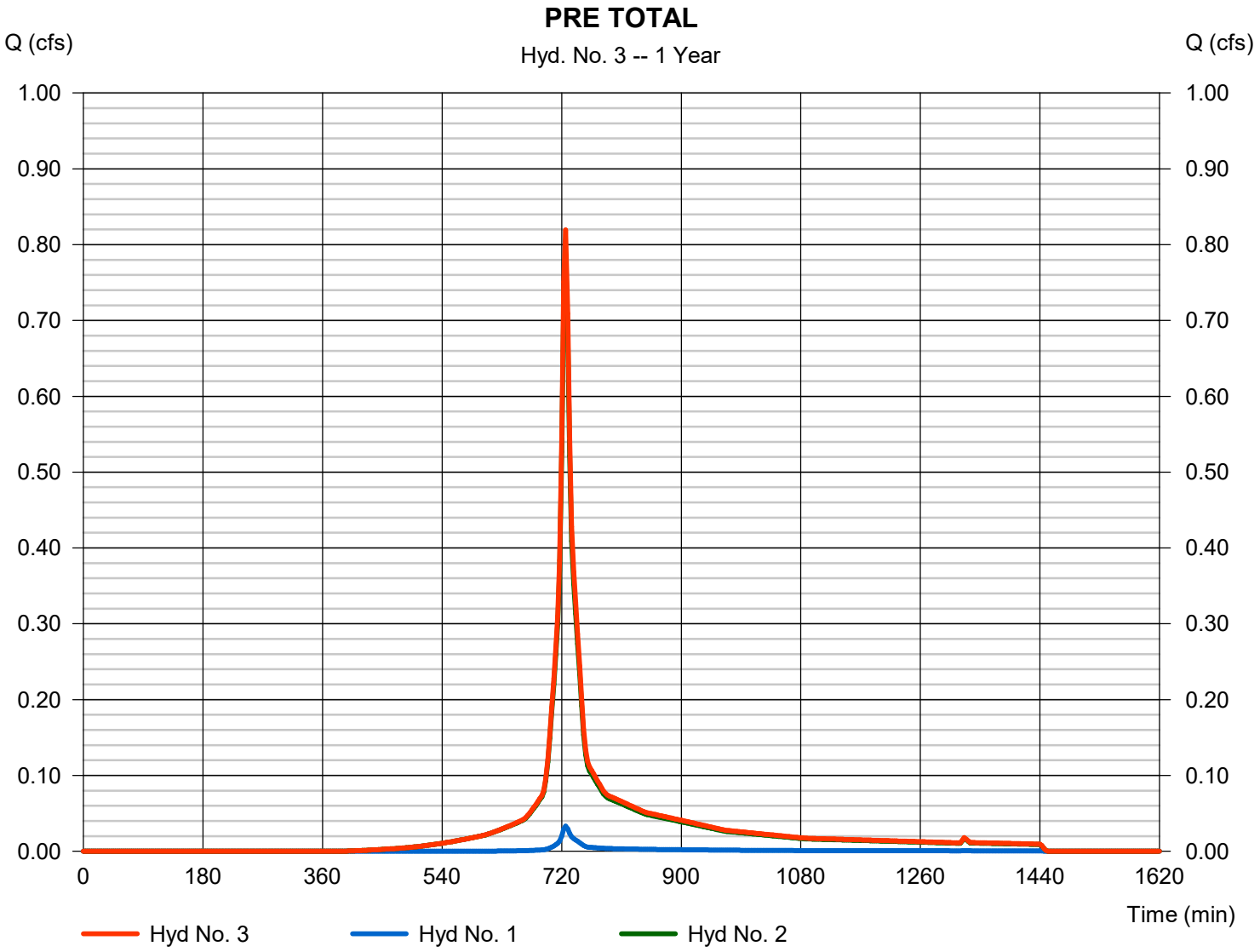


Hydrograph Report

Hyd. No. 3

PRE TOTAL

Hydrograph type	=	Combine	Peak discharge	=	0.819 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.063 acft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.460 ac



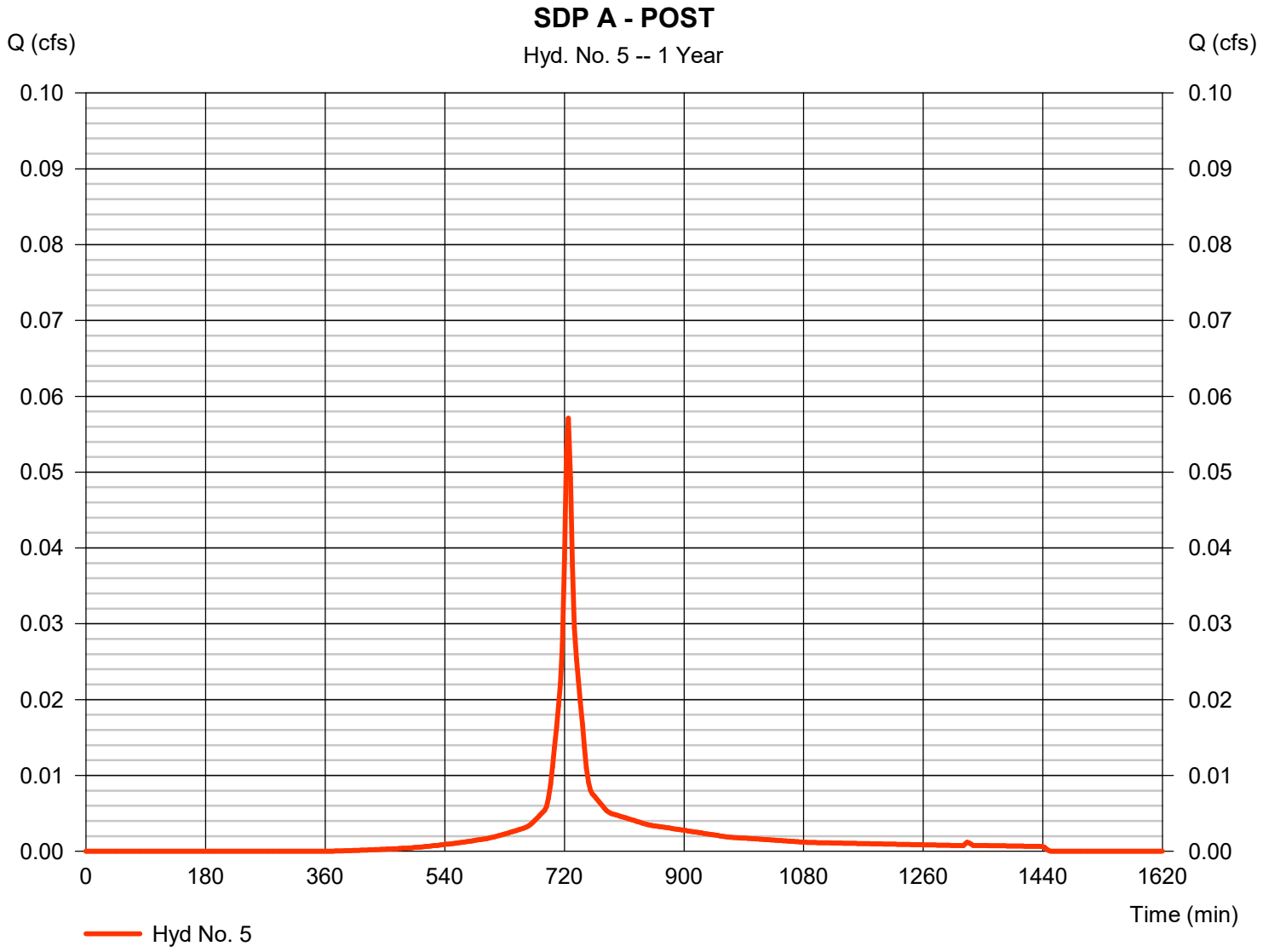
Hydrograph Report

Hyd. No. 5

SDP A - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.057 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.004 acft
Drainage area	=	0.030 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 91)] / 0.030



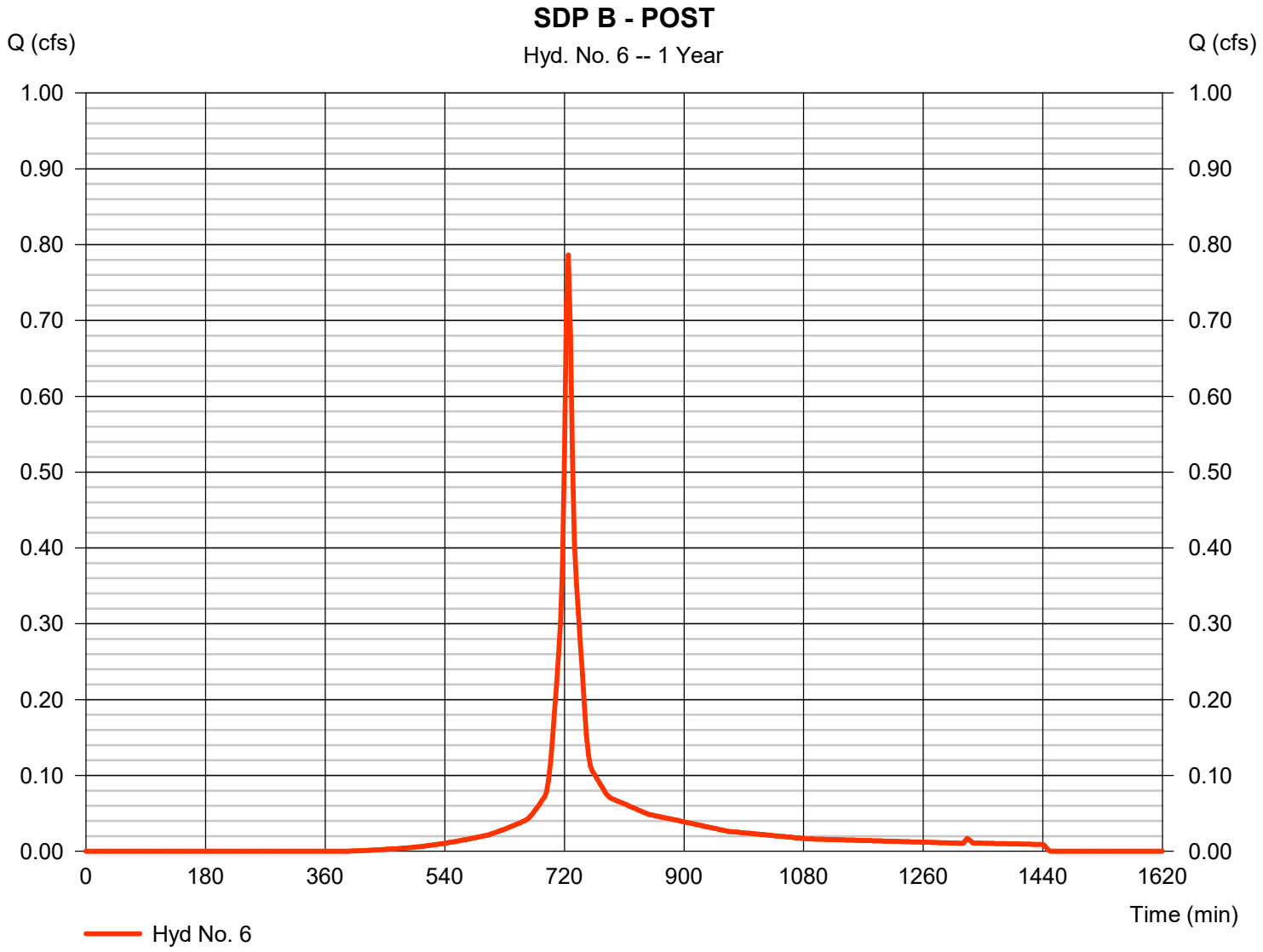
Hydrograph Report

Hyd. No. 6

SDP B - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.786 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.061 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430



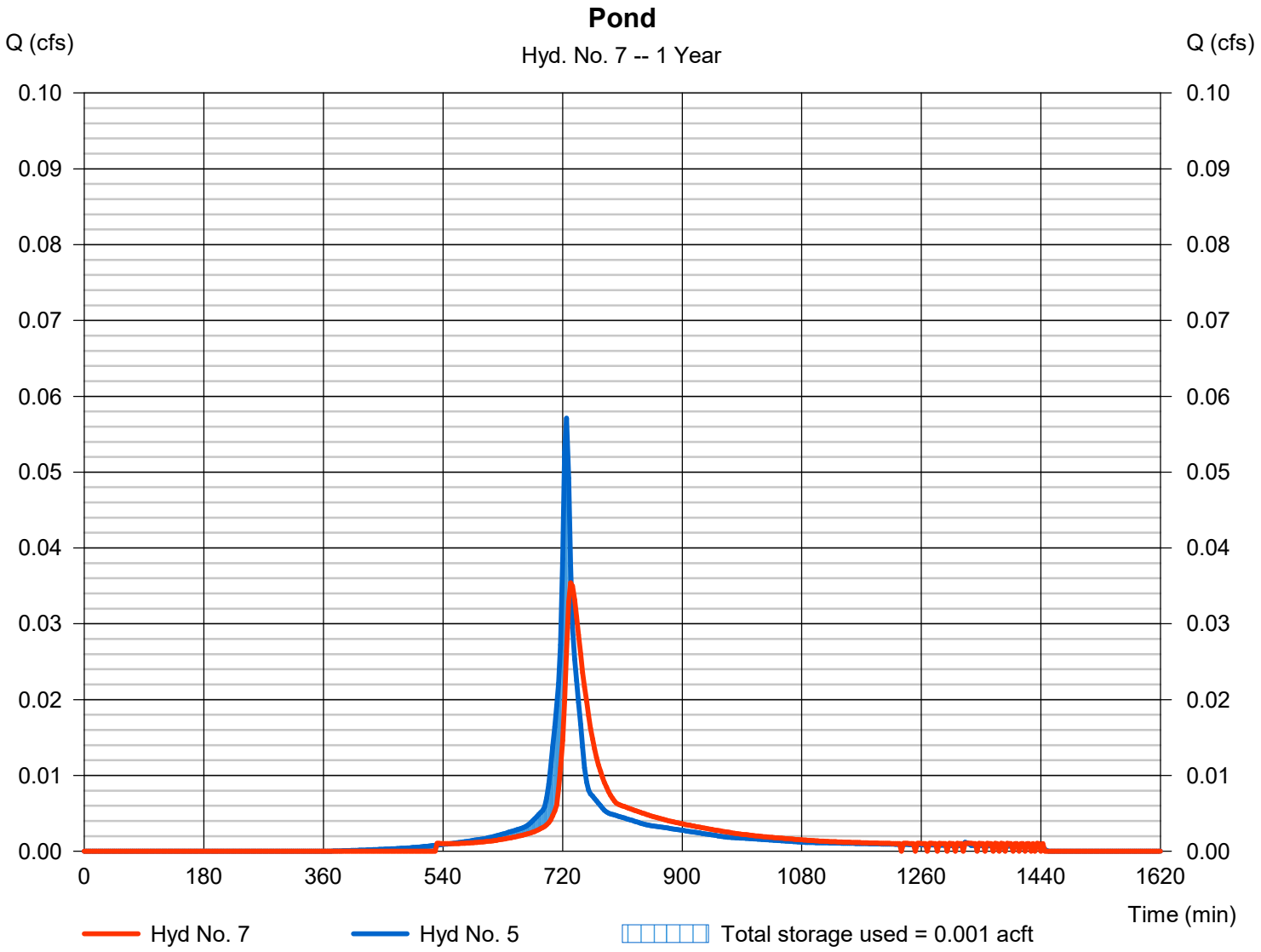
Hydrograph Report

Hyd. No. 7

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.035 cfs
Storm frequency	=	1 yrs	Time to peak	=	732 min
Time interval	=	3 min	Hyd. volume	=	0.004 acft
Inflow hyd. No.	=	5 - SDP A - POST	Max. Elevation	=	92.55 ft
Reservoir name	=	Permeable Pavement	Max. Storage	=	0.001 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Permeable Pavement

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	92.43	n/a	0.000	0.000
0.50	92.93	n/a	0.004	0.004
1.00	93.43	n/a	0.003	0.007
1.58	94.01	n/a	0.006	0.013

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 92.43	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

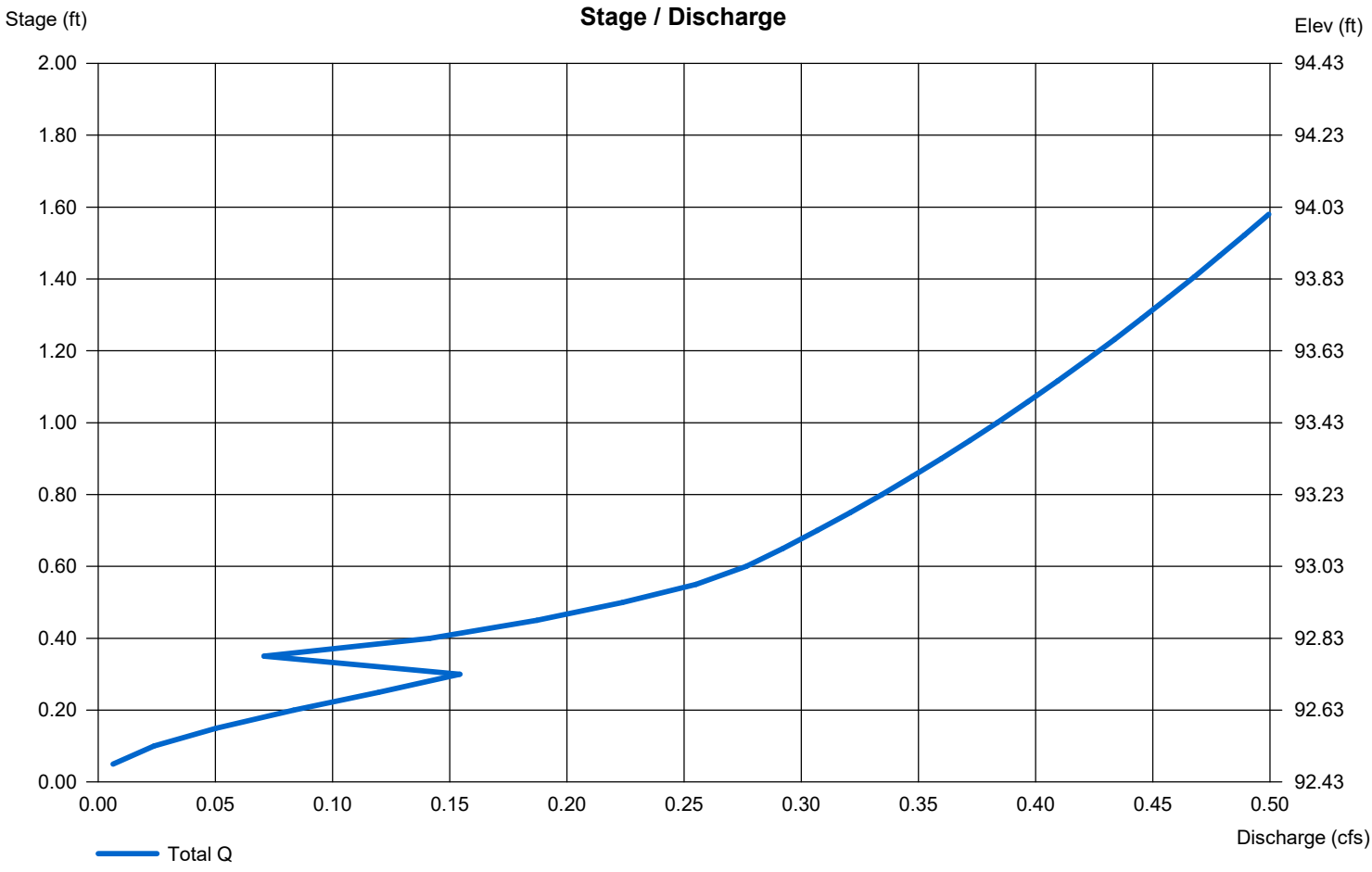
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

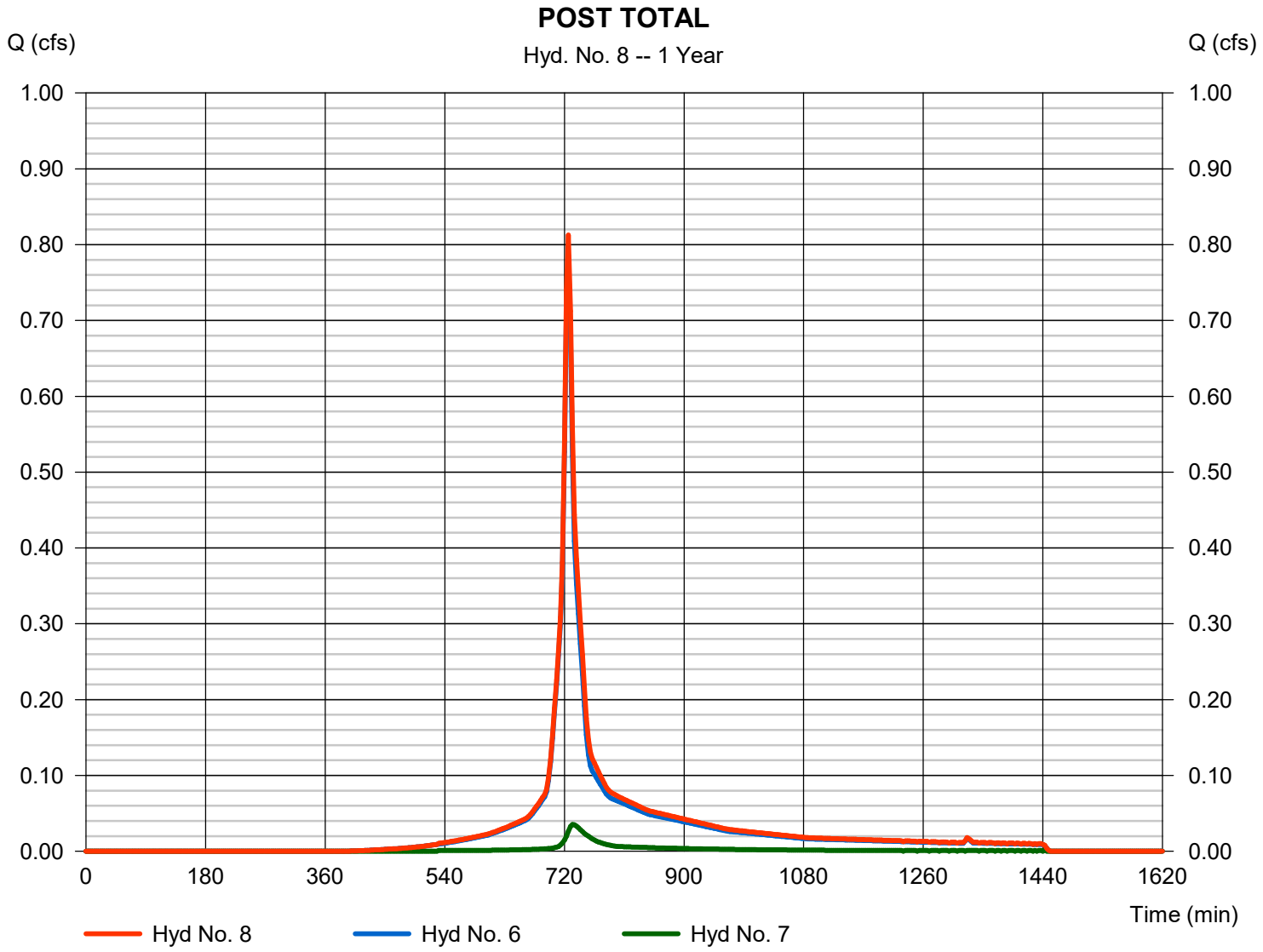


Hydrograph Report

Hyd. No. 8

POST TOTAL

Hydrograph type	=	Combine	Peak discharge	=	0.813 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.065 acft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	0.430 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.091	3	726	0.007	------	------	------	SDP A - PRE
2	SCS Runoff	1.675	3	726	0.133	------	------	------	SDP B - PRE
3	Combine	1.766	3	726	0.140	1, 2	------	------	PRE TOTAL
5	SCS Runoff	0.119	3	726	0.010	------	------	------	SDP A - POST
6	SCS Runoff	1.675	3	726	0.133	------	------	------	SDP B - POST
7	Reservoir	0.086	3	732	0.009	5	92.63	0.002	Pond
8	Combine	1.749	3	726	0.143	6, 7	------	------	POST TOTAL

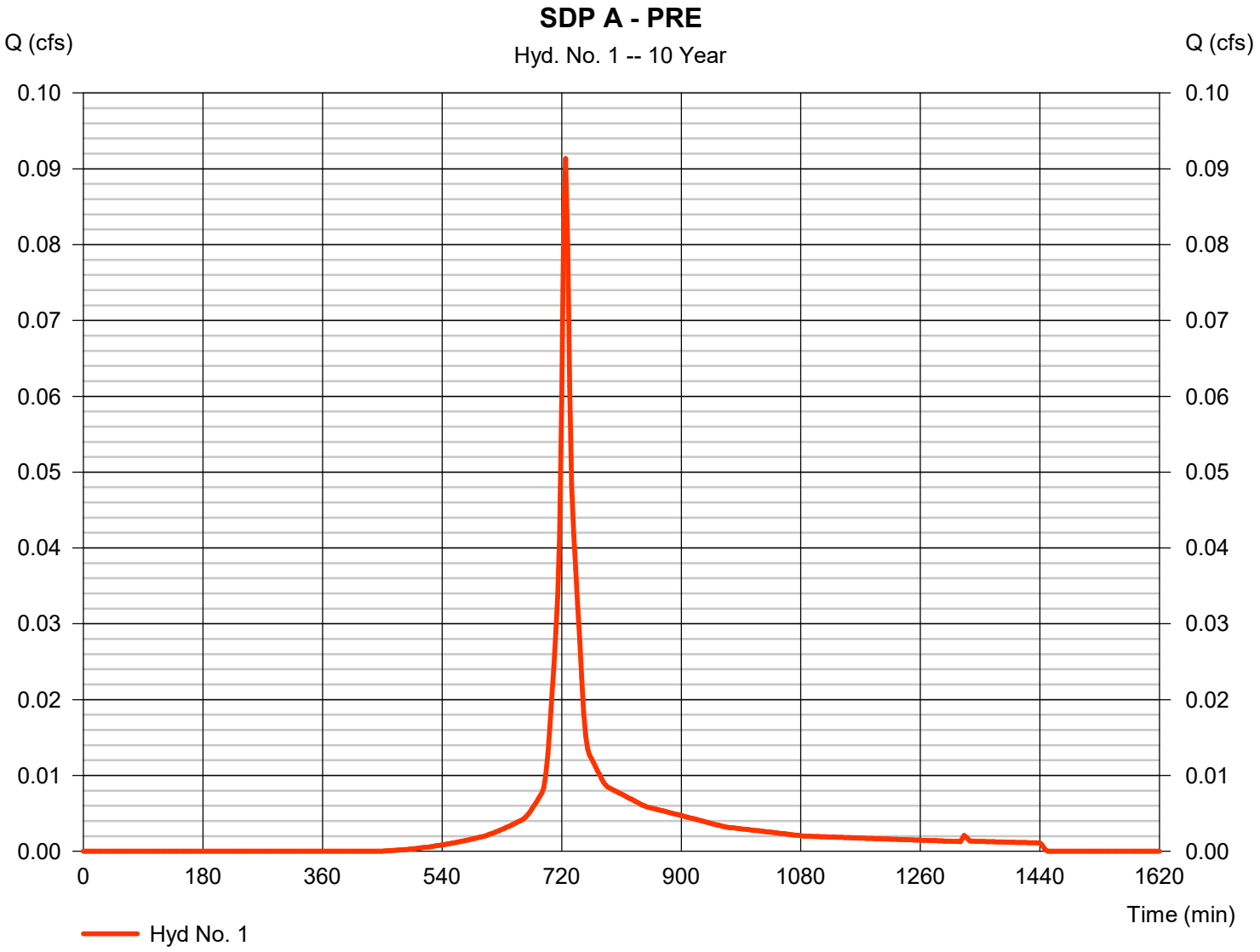
Hydrograph Report

Hyd. No. 1

SDP A - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.091 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.007 acft
Drainage area	=	0.030 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 80)] / 0.030



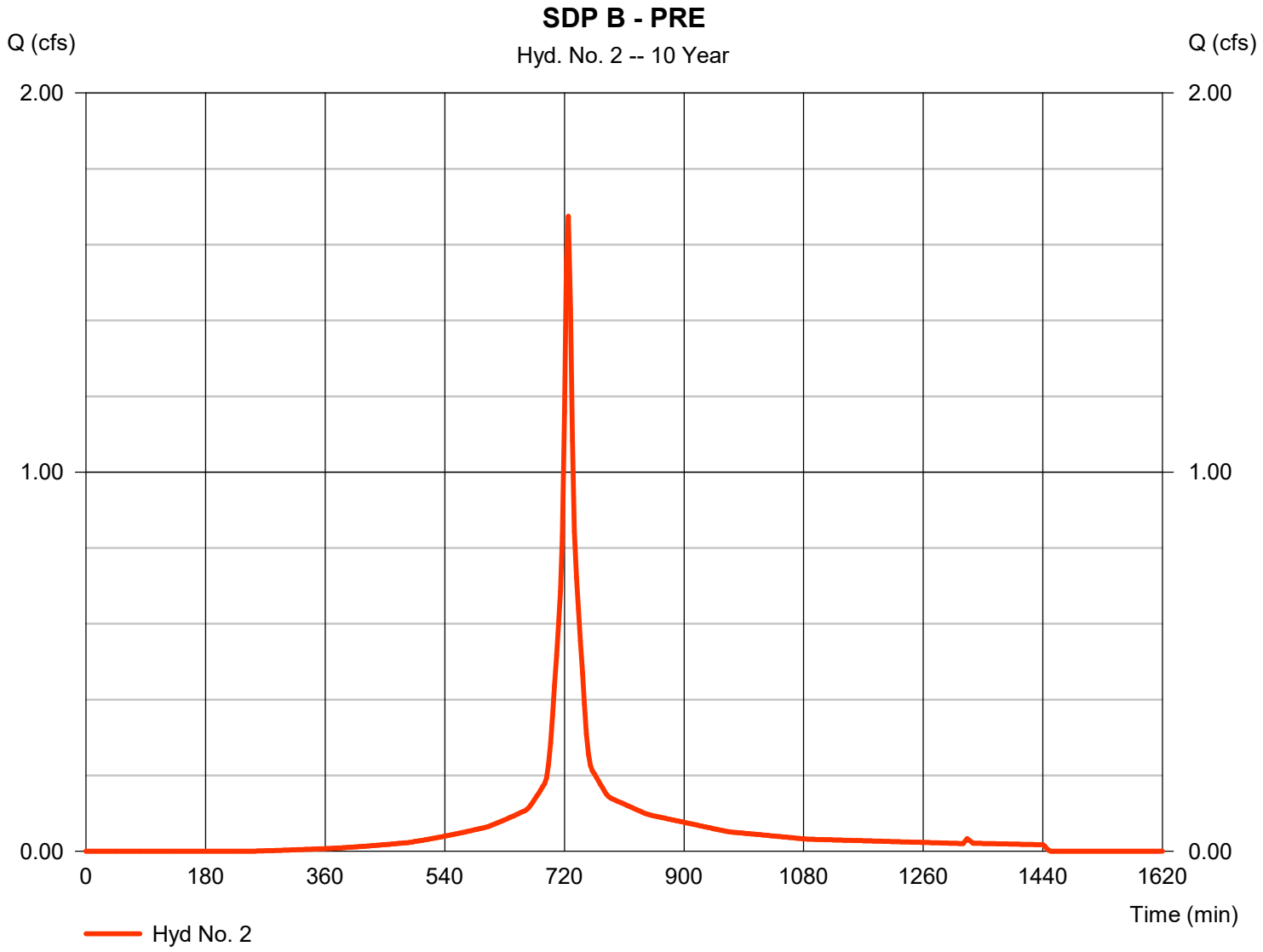
Hydrograph Report

Hyd. No. 2

SDP B - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.675 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.133 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430

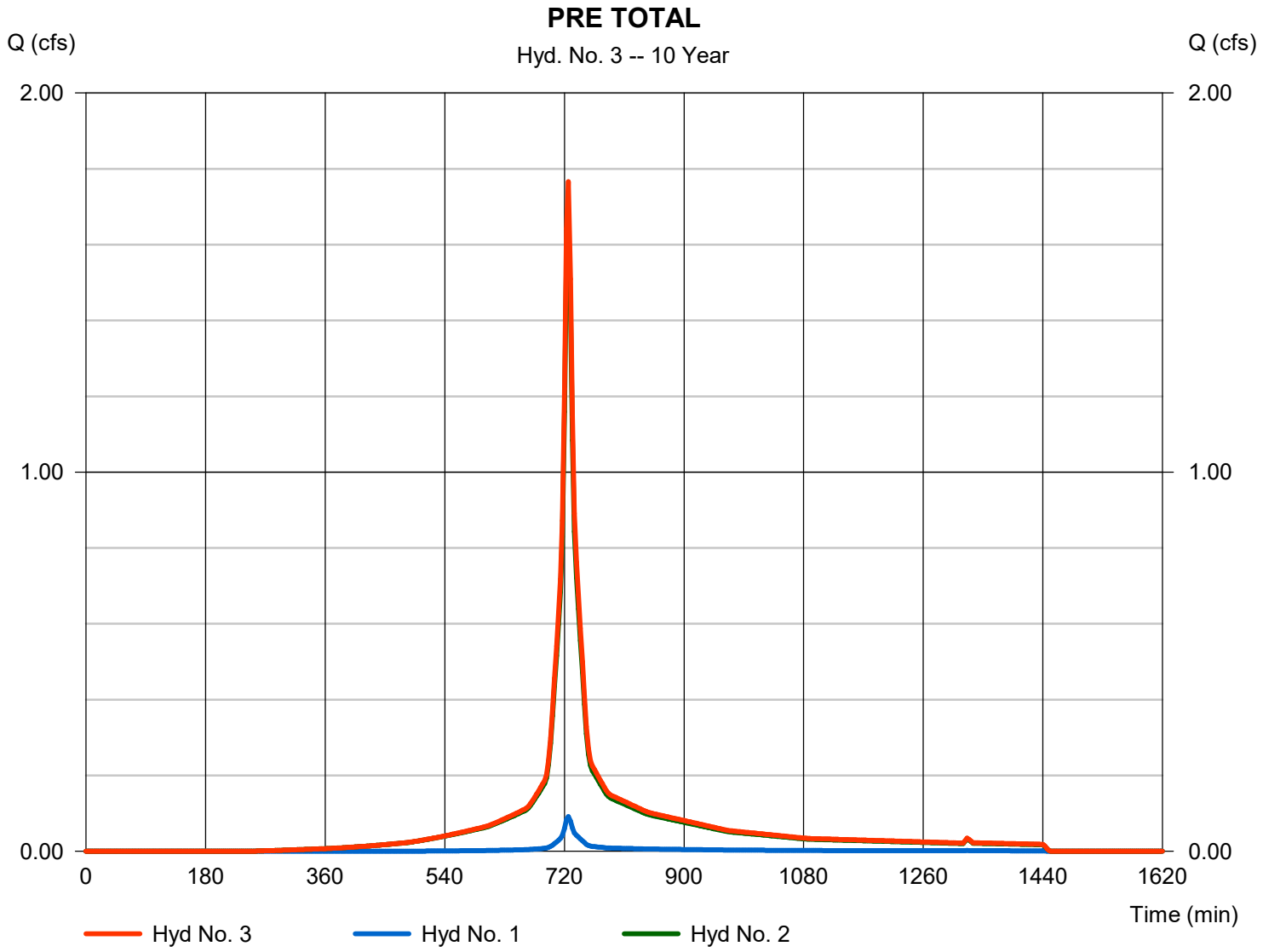


Hydrograph Report

Hyd. No. 3

PRE TOTAL

Hydrograph type	=	Combine	Peak discharge	=	1.766 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.140 acft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.460 ac



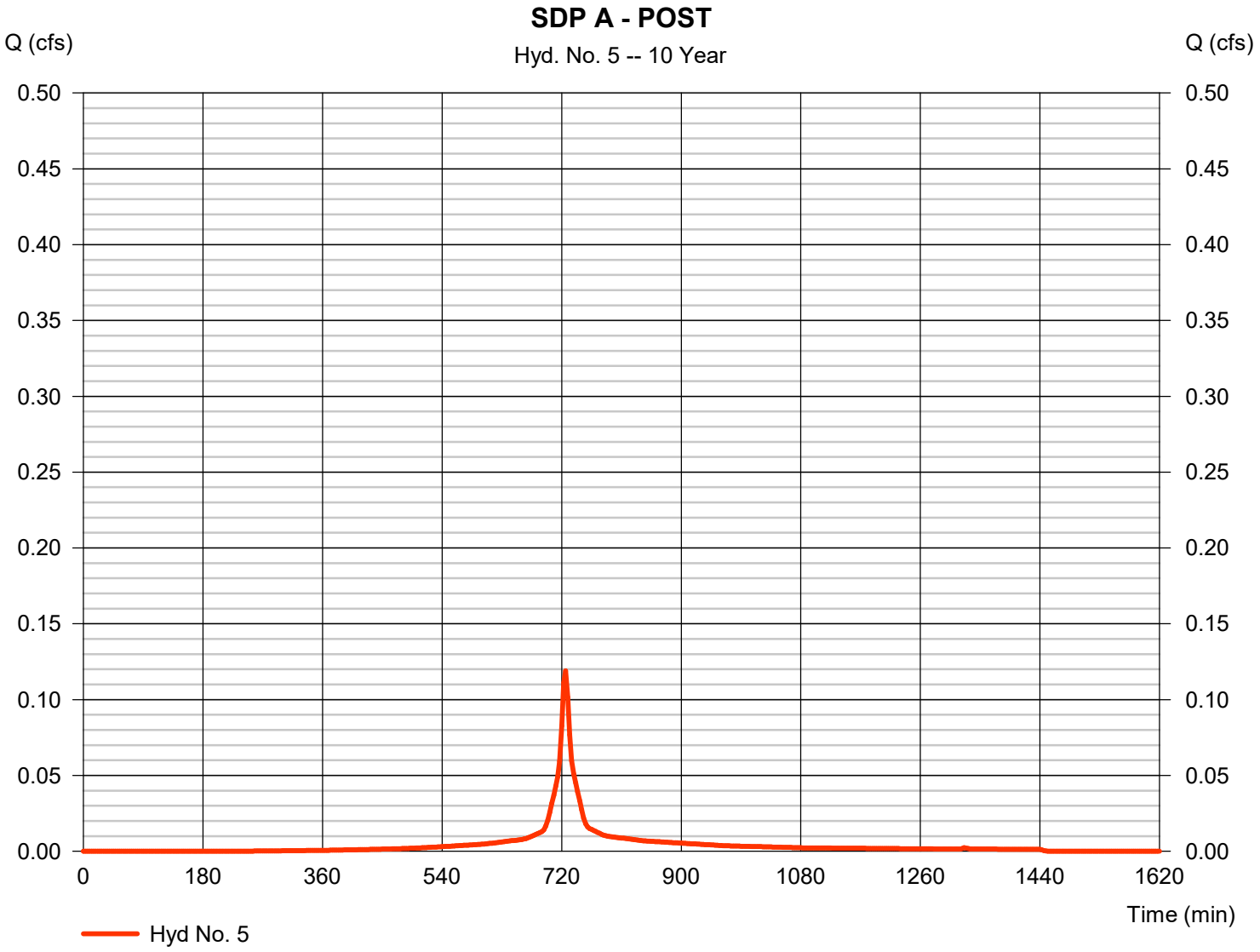
Hydrograph Report

Hyd. No. 5

SDP A - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.119 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.010 acft
Drainage area	=	0.030 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 91)] / 0.030



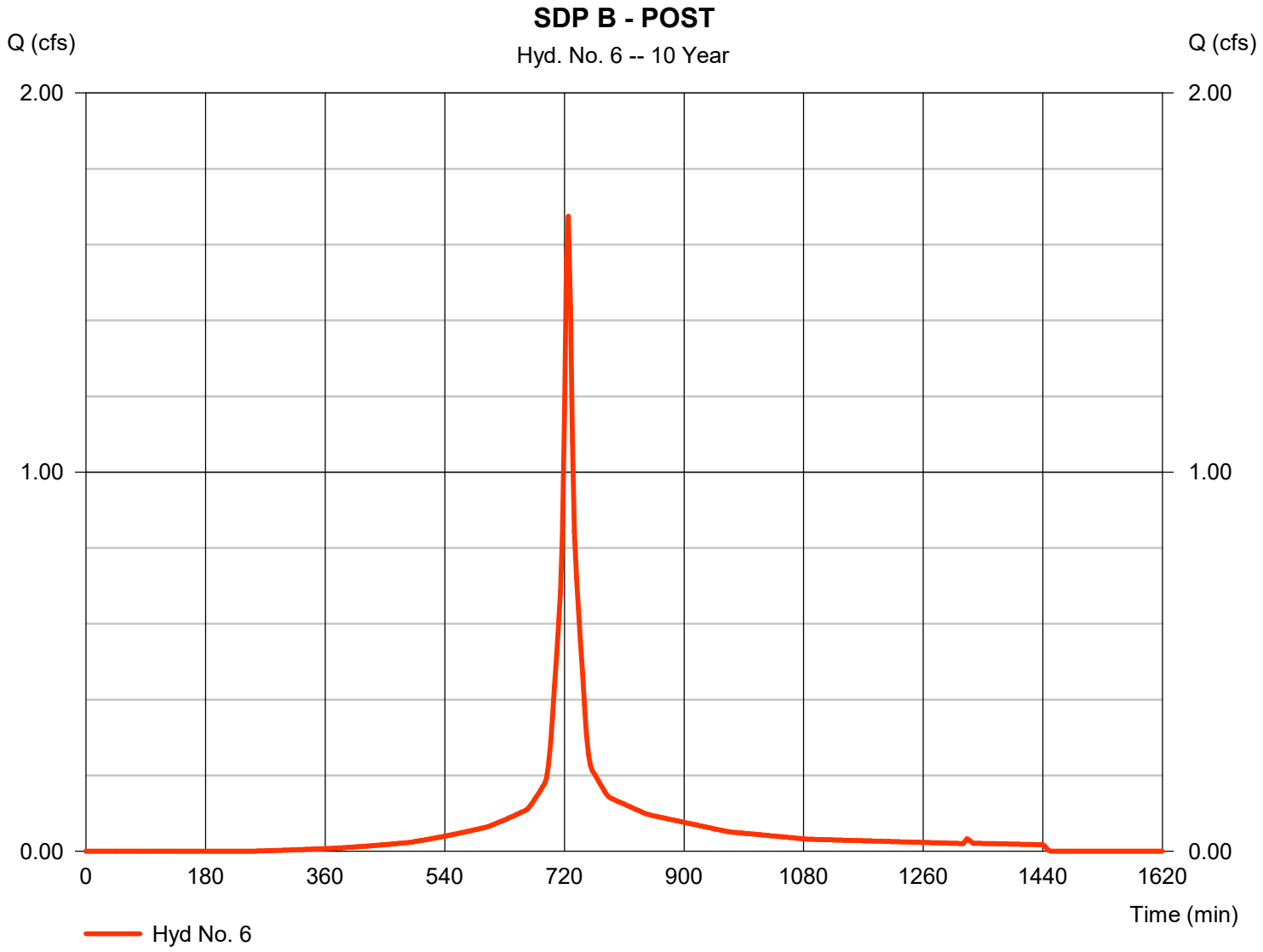
Hydrograph Report

Hyd. No. 6

SDP B - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.675 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.133 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430



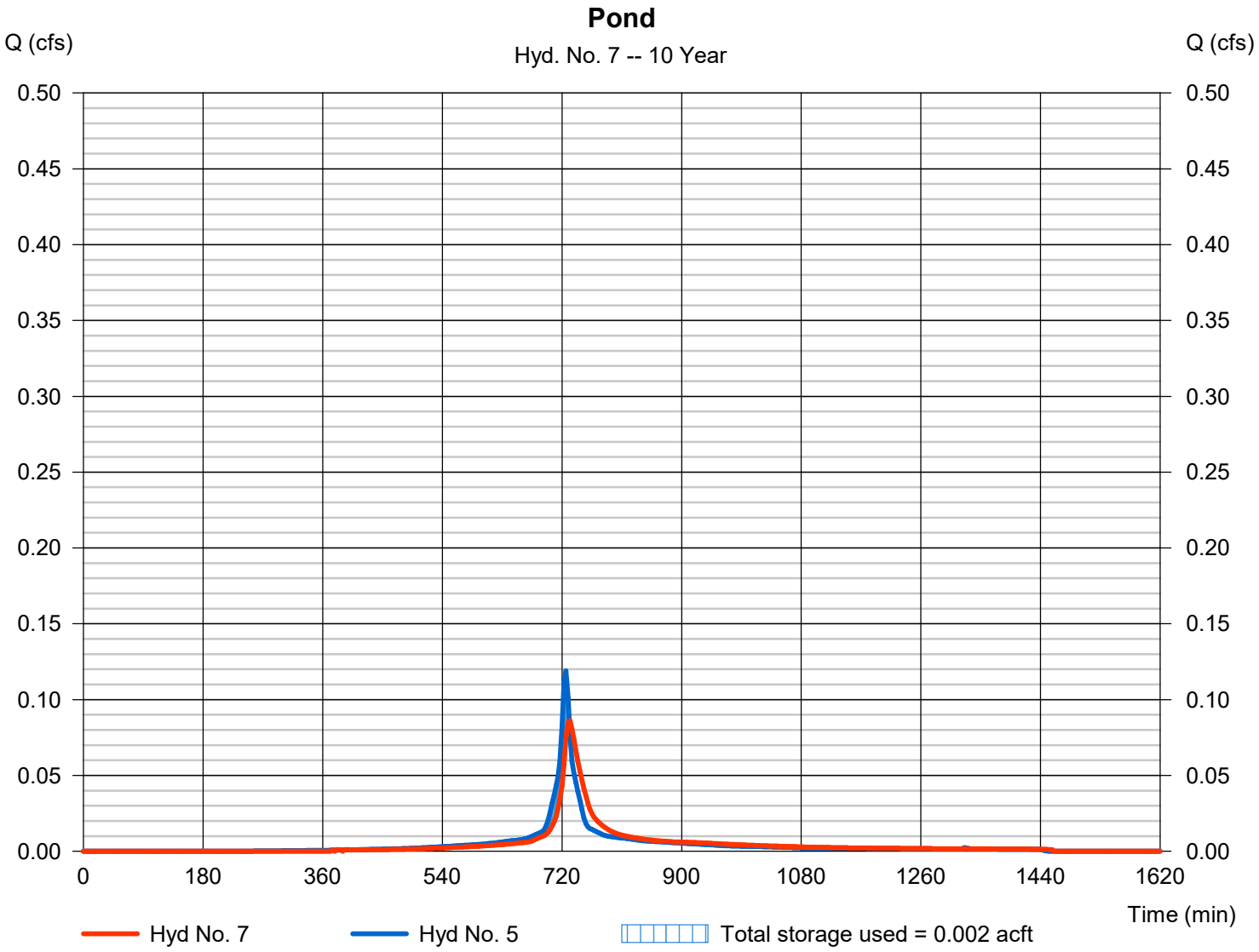
Hydrograph Report

Hyd. No. 7

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.086 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	3 min	Hyd. volume	=	0.009 acft
Inflow hyd. No.	=	5 - SDP A - POST	Max. Elevation	=	92.63 ft
Reservoir name	=	Permeable Pavement	Max. Storage	=	0.002 acft

Storage Indication method used.

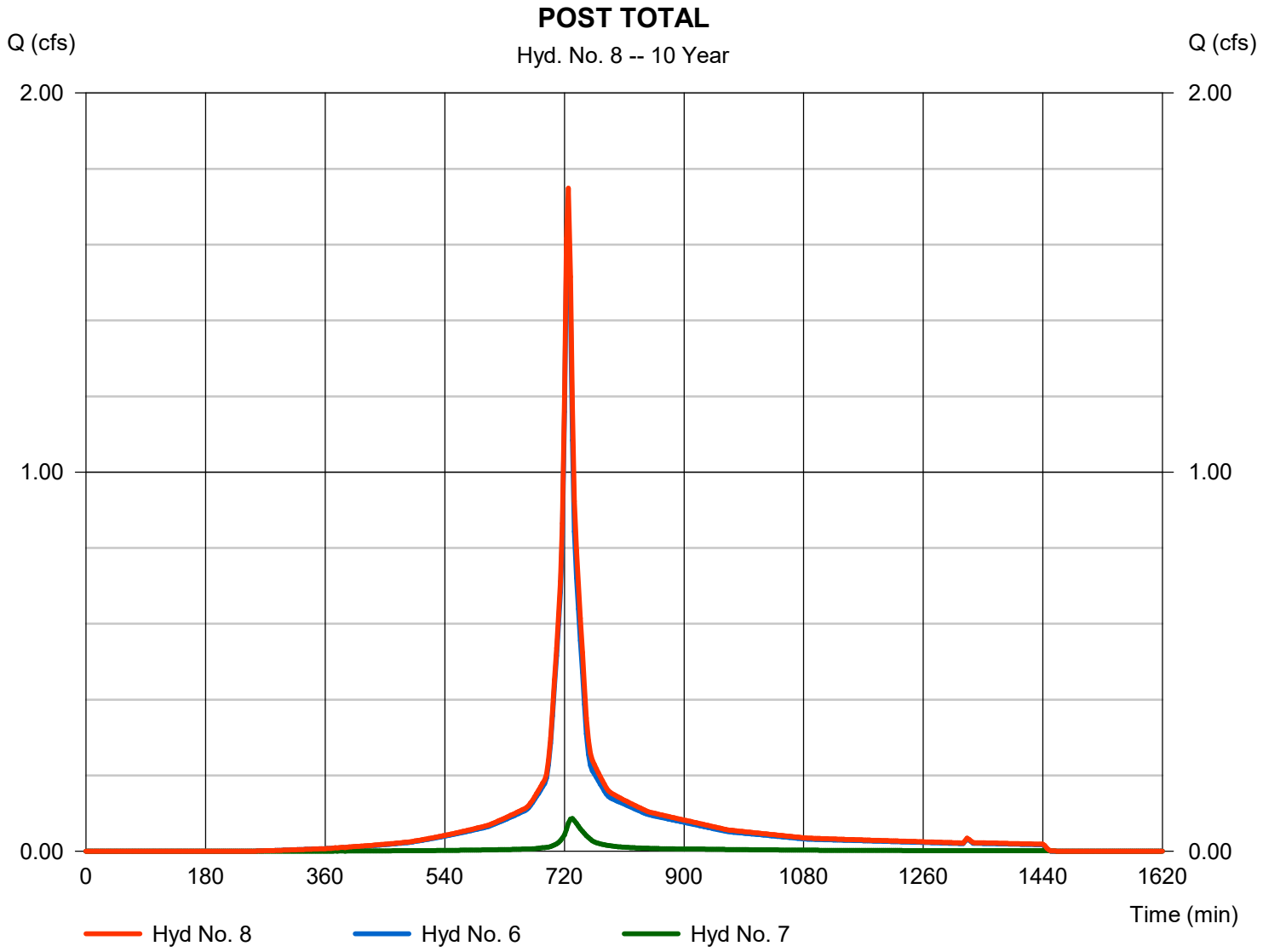


Hydrograph Report

Hyd. No. 8

POST TOTAL

Hydrograph type	=	Combine	Peak discharge	=	1.749 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.143 acft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	0.430 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph Description
1	SCS Runoff	0.196	3	726	0.015	------	------	------	SDP A - PRE
2	SCS Runoff	3.158	3	726	0.262	------	------	------	SDP B - PRE
3	Combine	3.354	3	726	0.277	1, 2	------	------	PRE TOTAL
5	SCS Runoff	0.222	3	726	0.019	------	------	------	SDP A - POST
6	SCS Runoff	3.158	3	726	0.262	------	------	------	SDP B - POST
7	Reservoir	0.152	3	753	0.018	5	92.73	0.003	Pond
8	Combine	3.308	3	726	0.280	6, 7	------	------	POST TOTAL

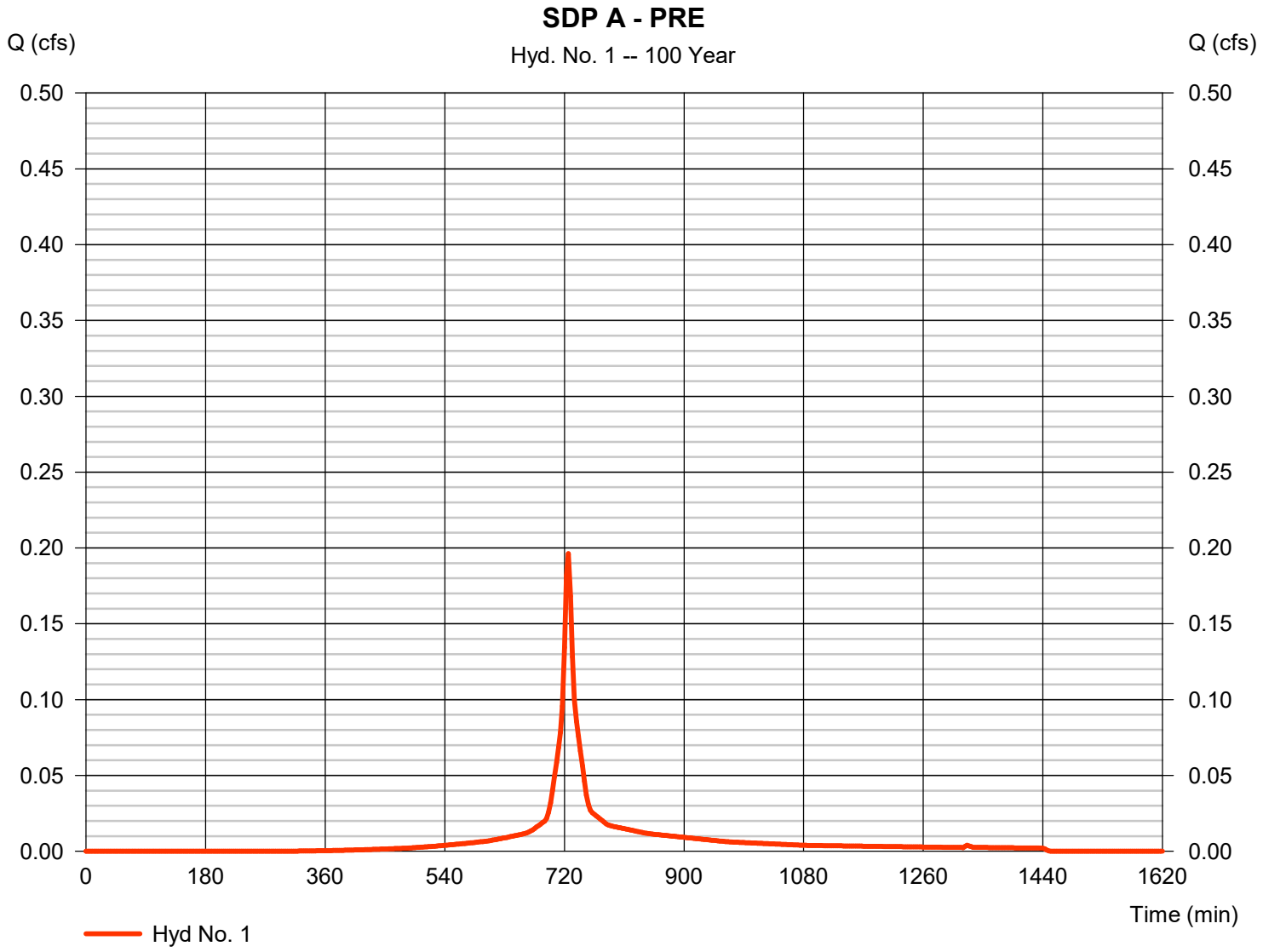
Hydrograph Report

Hyd. No. 1

SDP A - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.196 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.015 acft
Drainage area	=	0.030 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	9.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 80)] / 0.030



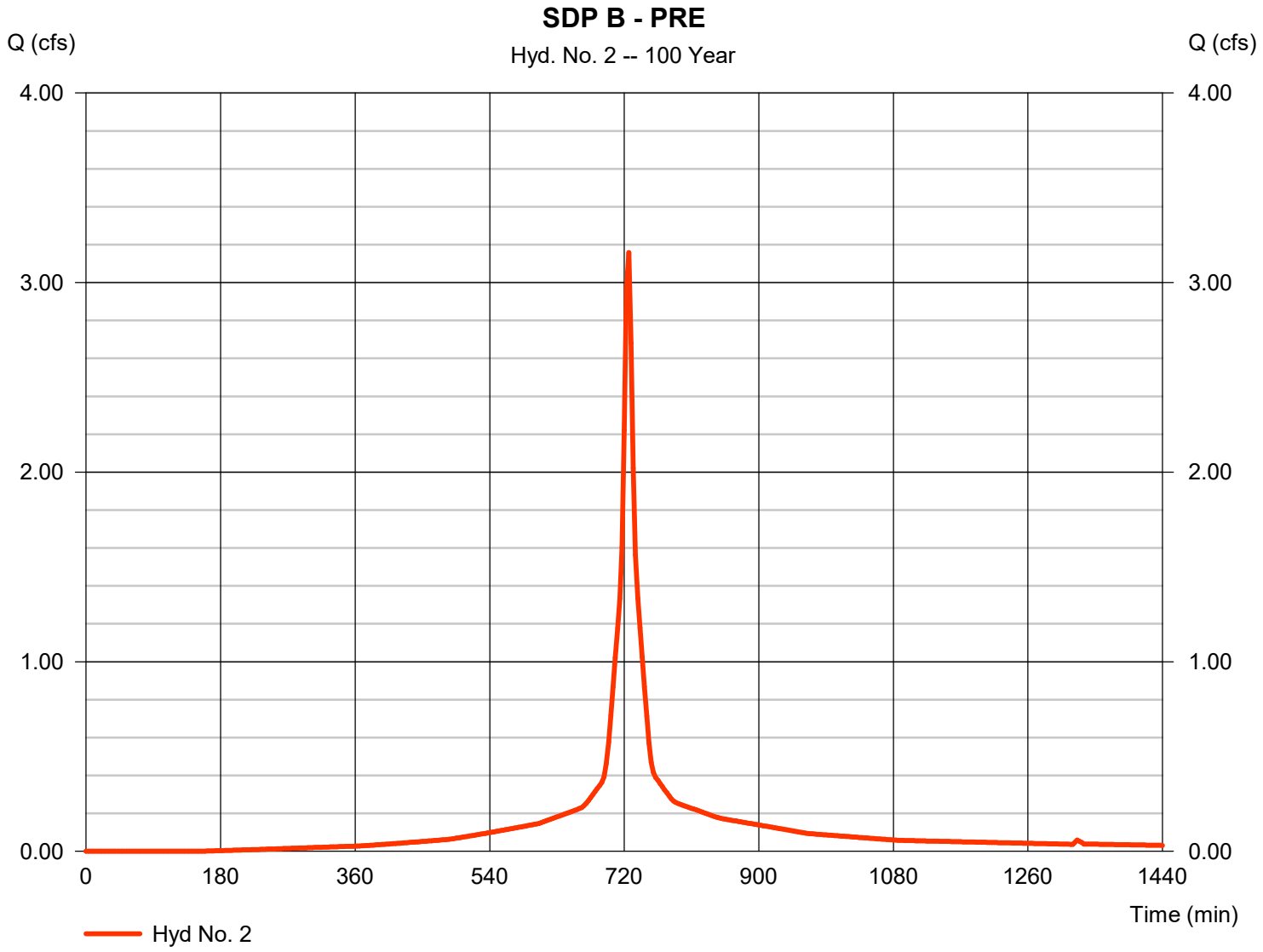
Hydrograph Report

Hyd. No. 2

SDP B - PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.158 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.262 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	9.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430

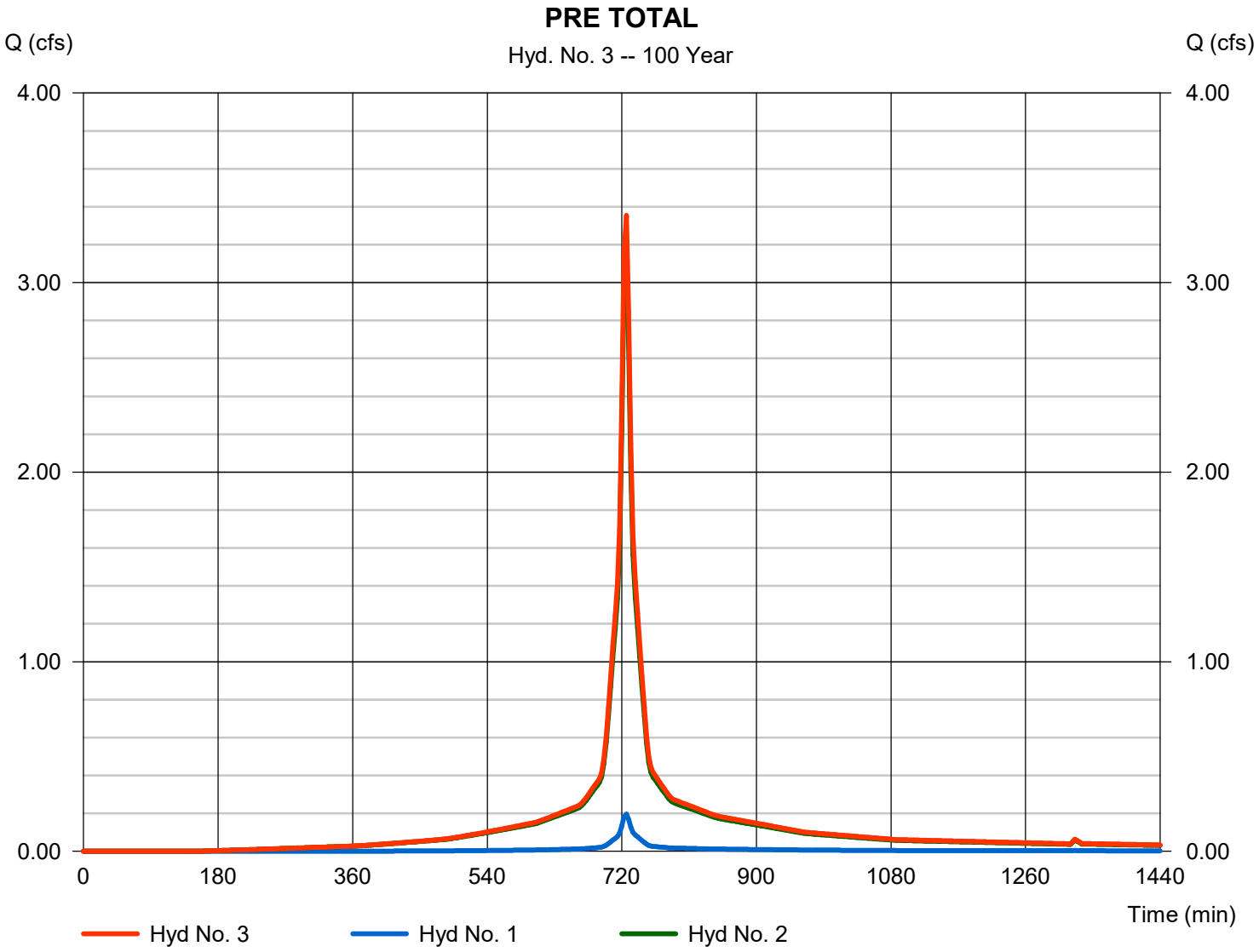


Hydrograph Report

Hyd. No. 3

PRE TOTAL

Hydrograph type	= Combine	Peak discharge	= 3.354 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 0.277 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.460 ac



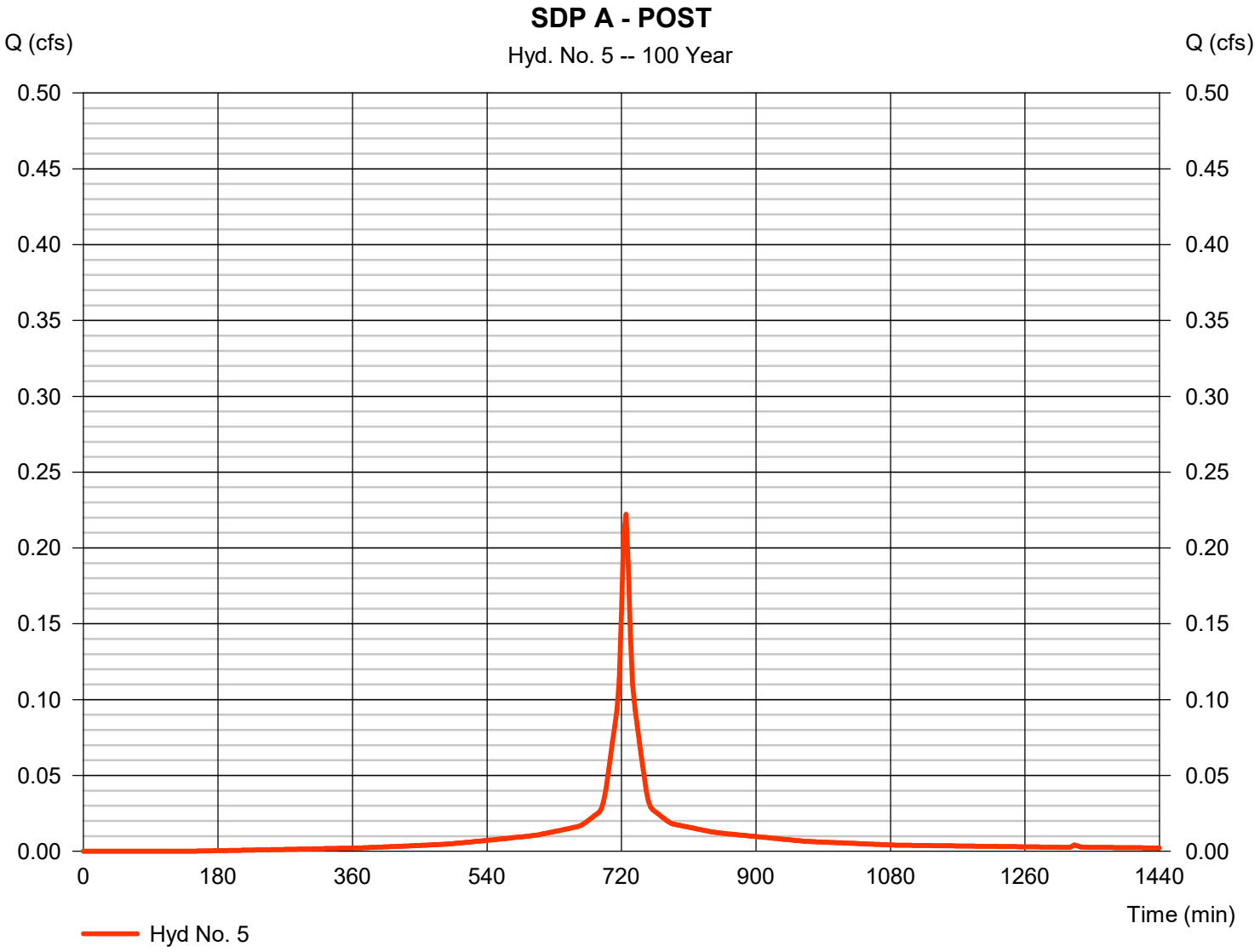
Hydrograph Report

Hyd. No. 5

SDP A - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.019 acft
Drainage area	=	0.030 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	9.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 91)] / 0.030



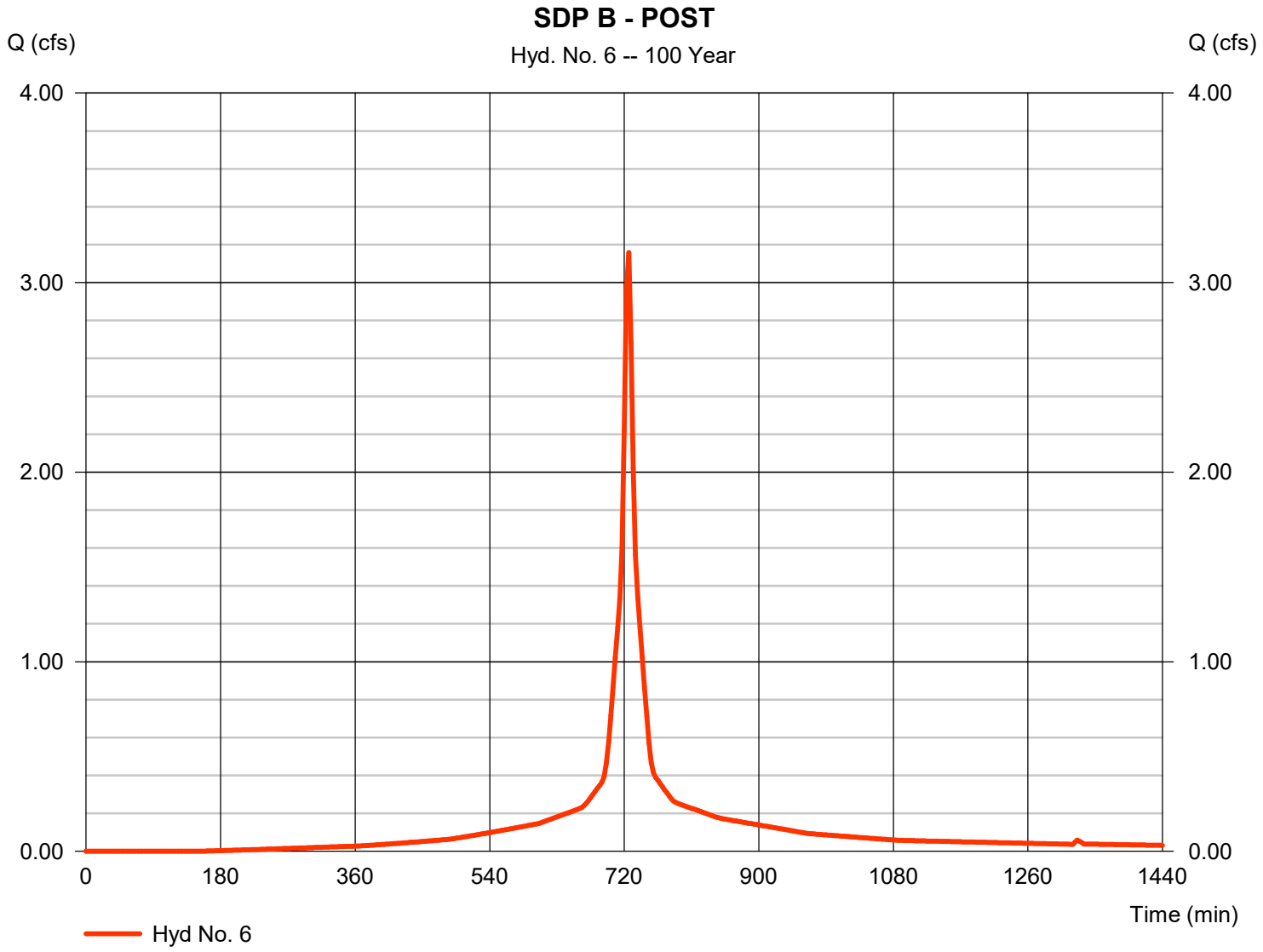
Hydrograph Report

Hyd. No. 6

SDP B - POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.158 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.262 acft
Drainage area	=	0.430 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	9.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.430 x 90)] / 0.430



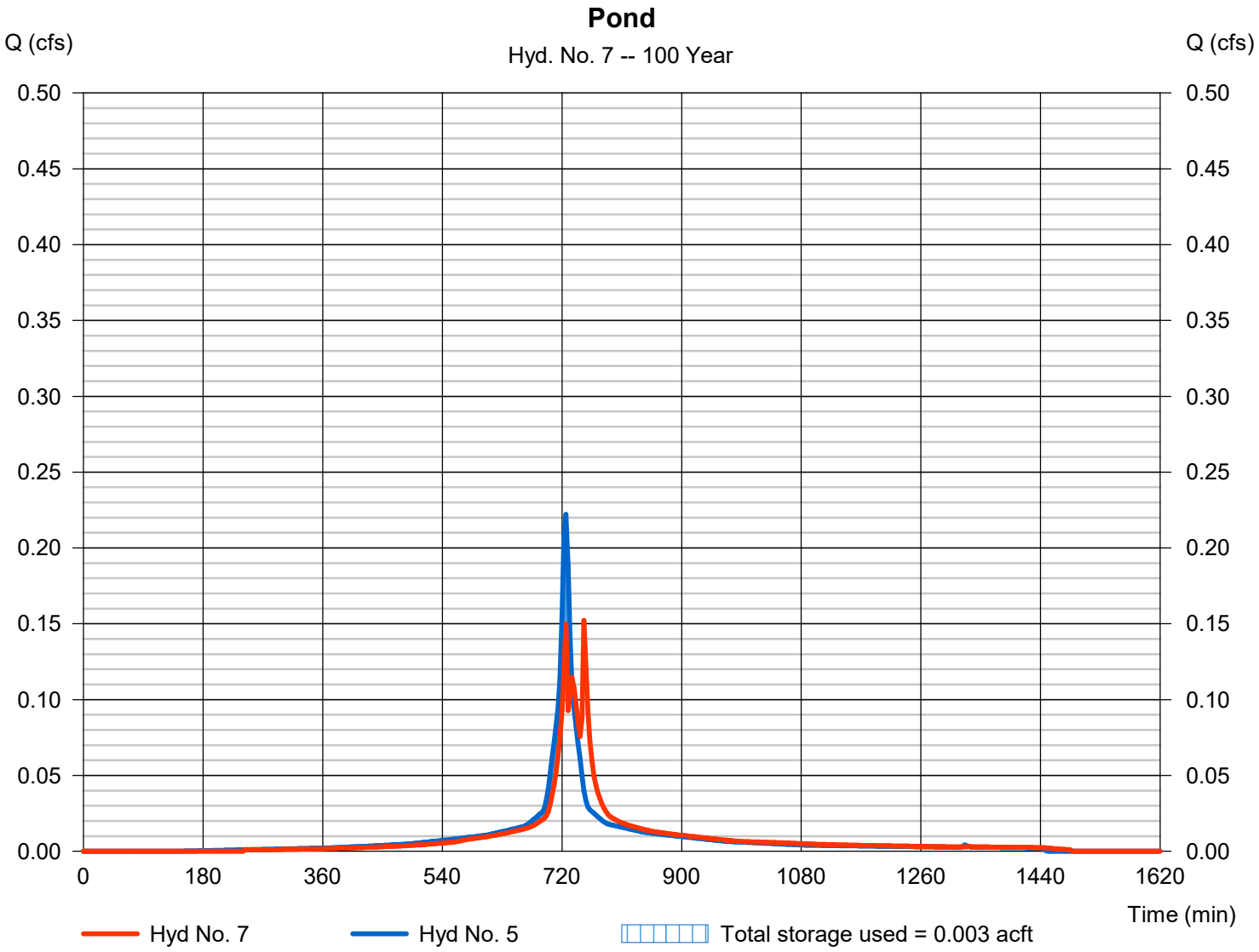
Hydrograph Report

Hyd. No. 7

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.152 cfs
Storm frequency	=	100 yrs	Time to peak	=	753 min
Time interval	=	3 min	Hyd. volume	=	0.018 acft
Inflow hyd. No.	=	5 - SDP A - POST	Max. Elevation	=	92.73 ft
Reservoir name	=	Permeable Pavement	Max. Storage	=	0.003 acft

Storage Indication method used.

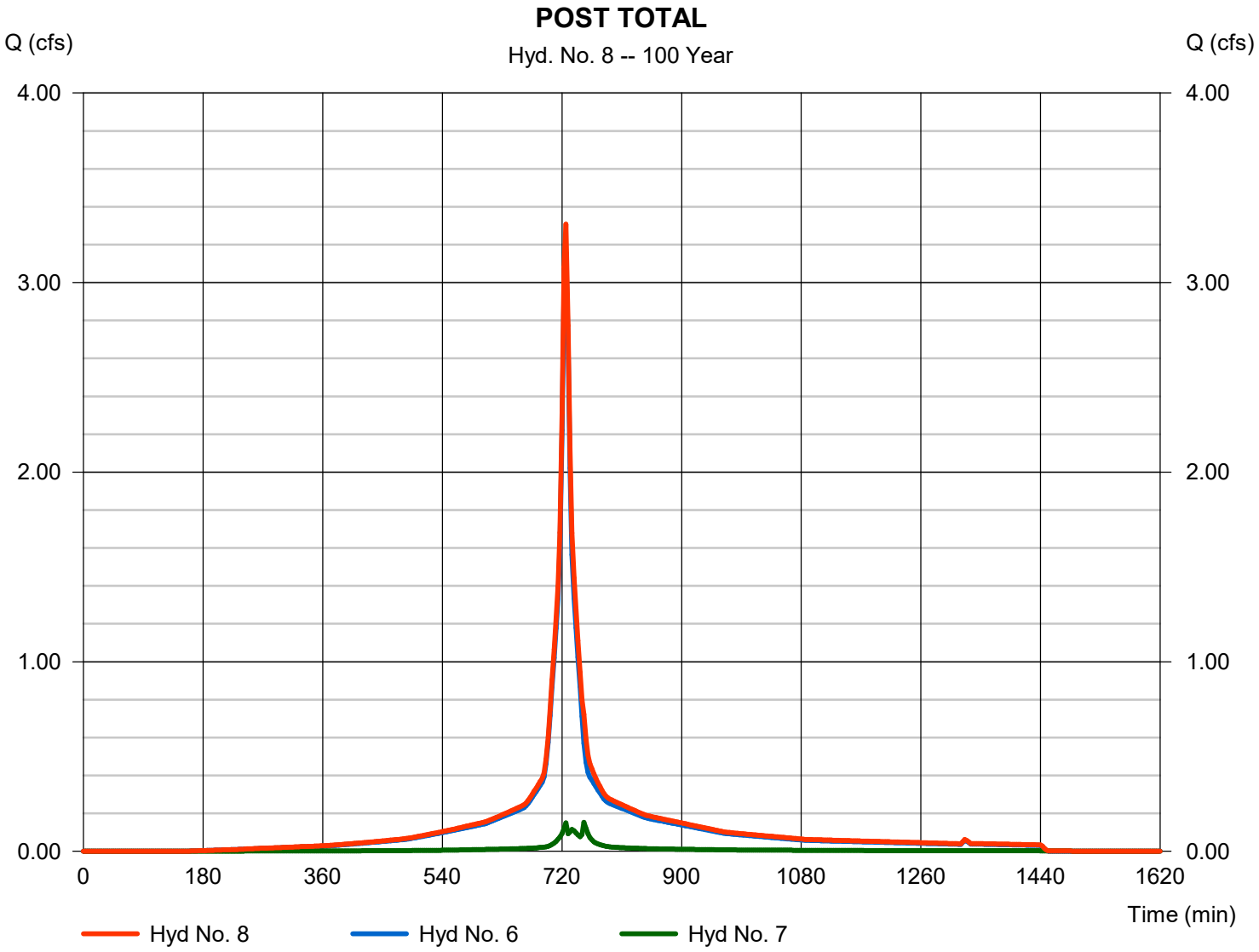


Hydrograph Report

Hyd. No. 8

POST TOTAL

Hydrograph type	=	Combine	Peak discharge	=	3.308 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	0.280 acft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	0.430 ac



Hydraflow Rainfall Report

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

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

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

Tc = time in minutes. Values may exceed 60.

Precip. file name: X:\ACAD\Standards\Stormwater\IDF\Southern Westchester 2015.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.00	0.00	0.00	5.10	6.40	7.60	9.00
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX D

STORMWATER SIZING CALCULATIONS

CATIZONE ENGINEERING, P.C.

CIVIL ENGINEERING CONSULTANTS
ONE WEST AVENUE, SUITE 219
LARCHMONT, NY 10538

Project: 412 Munro

Date: August 19, 2022

Job Number: 21001

Prepared By: DMG

Checked By: MAD

NYSDEC Stormwater Sizing Calculations	Design Point	SDP A
	Drainage Area	SDP A

Drainage Area to be Treated			
Description	Symbol	Value	Units
Design Storm (90% Rainfall Event Number)	P	1.50	inches
Hydrologic Soil Group (HSG)	S	0.40	
Impervious Area (New)	I	0.02	Acres
Area	A	0.03	Acres
Percent Impervious	%I	71.31	%
Runoff Coeficient (0.05 + 0.009 x %I)	R_V	0.69	
Time of Concentration	TC	0.1	hours

Water Quality Volume (EQ: 1)			
25% Water Quality Volume (Existing Impervious)	WQ_V	0.001	Acre-Foot
Water Quality Volume (New Impervious)	WQ_V	0.001	Acre-Foot
Total Volume Required (New + Existing)	**WQ_V**	**0.002**	**Acre-Foot**

Runoff Reduction (EQ: 2)			
Minimum Runoff Reduction	**RR_V**	**0.000**	**Acre-Foot**

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Project: 412 Munro

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NYSDEC Stormwater Sizing Calculations	Design Point	SDP A
Permeable Pavement	Drainage Area	SDP A

Permeable Pavement			
Description	Symbol	Value	Units
Surface Area	A_P	787.00	SF
Depth of Gravel		1.58	FT
Porosity		0.40	
Volume of Ponding		497.38	CF
Water Quality Volume Provided	**WQ_V**	**0.011**	Acre-Foot