Site Restoration and Post-Construction Stormwater Management Plan

Pennsylvania Pipeline Project
Doylesburg Pump Station Expansion

November 2016

Prepared for:
Sunoco Pipeline, L.P.
525 Fritztown Road
Sinking Spring, PA19608
610-670-3200

Prepared by:
Tetra Tech, Inc. 661
Andersen Drive
Pittsburgh, PA 15220

TABLE OF CONTENTS

Section **Page**

LIST OF APPENDICES

LIST OF ACRONYMS

ACRONYM	MEANING
AASHTO	American Association of State Highway and Transportation Officials
ABACT	Antidegradation Best Available Combination of Technologies
BMP	Best Management Practice
CCE	Calcium Carbonate Equivalent
CWF	Cold Water Fishery
E&SC	Erosion and Sediment Control
ENV	Effective Neutralizing Value
HDD	Horizontal directional drilling
HDPE	High-density polyethylene
HQ	High Quality
LOD	Limit of Disturbance
NRCS	Natural Resource Conservation Service
NGL	Natural gas liquids
PA	Pennsylvania
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Access

PCSM	Post-Construction Stormwater Management
ROW	Right of way
SCS	U.S. Soil Conservation Service
SR	Sight Restoration
SPLP	Sunoco Pipeline, L.P.
TSF	Trout stock fisheries
Tt	Tetra Tech, Inc.
UNT	Unnamed tributary
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WWF	Warm water fisheries

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Site Restoration Plan and Post-Construction Stormwater Management (PCSM) Plan for Sunoco Pipeline, L.P. (SPLP). The Plan addresses restoration and post-construction stormwater management following installation of the Doylesburg Station (Project). The Project is located in Toboyne Township, Perry County, Pennsylvania (PA). A United States Geological Survey (USGS) site location map is provided in Appendix A.

Sunoco Pipeline, L.P. (SPLP) is proposing to expand the SPLP Doylesburg Station (Project) in Toboyne Township, Perry County, PA. The station is located on State Route 274 at latitude 40° 17' 10.67'', longitude -77° 36' 51.48''. The Doylesburg Station will include the expansion of the pump station, installation of above ground pipes and pipe supports, and site restoration. The proposed Doylesburg Station will be improved within a limit of disturbance (LOD) of approximately 1.80 acres.

Section 2.0 discusses the existing site and its characteristics. Section 3.0 discusses the construction sequence, site restoration practices, and the inspection and maintenance procedures. Section 4.0 discusses the proposed BMPs, the design criteria, and design process

2.0 EXISTING SITE DESCRIPTION

Past and present land use of the Project area includes an existing equipment pad and access road surrounded by woodland and grass lot. Future land use will be a maintained expanded gravel pad, access road, and restored areas being returned to meadow in good condition. A site location map is located in Appendix A. The project area drains to Sherman Creek. The current land use within the project area is wooded and industrial. Site soils information was taken from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey. A soil map and list of existing soil types is located in Appendix B.

2.1 TOPOGRAPHY

The work zone is located on ground of varying elevations. Site elevations vary from approximately 920 feet (access road entrance) to 948 feet (northwest edge of pad) above mean sea level based on the Pennsylvania Spatial Data Access. The construction plans show the topography of the site and the surrounding area.

2.2 GEOLOGY AND SOILS

The soils and geologic formations surrounding the site are shown on the figures provided in Appendix B. Appendix B also provides soil descriptions and properties of the soils found at the site. In general, the following actions will be taken to counteract soil limitations:

- Pipes installed will be protected from potential corrosive soils. The pipeline(s) being installed will be either high-density polyethylene (HDPE) or coated steel.
- Soils will be evaluated throughout the construction process to determine whether additional measures will need to be taken to make the soil suitable for its intended use on site. Soil amendments will be added to site soils to promote vegetative growth.
- A wetland delineation and stream investigation has been conducted to determine the presence and location of hydric soils.

The site consists of **Albrights (AbB)** silt loam, 3 to 8 percent slopes and **Calvin (CaC)** shaly silt loam, 8 to 15 percent slopes, which are described below.

AbB – Albrights- silt loam, 3 to 8 percent slopes.

This moderately well-draining soil is located on toeslopes and footslopes of ridges at elevations ranging from 500 to 2,800 feet above mean sea-level. It is formed from fine-loamy colluvium derived from sedimentary rock. The typical soil profile is: 0 to 10 inches: silt loam (Hydrological Soil Group A); 10 to 30

inches clay loam (Hydrological Soil Group B); and 30 to 60 inches: silt loam (Hydrological Soil Group C). The depth to water table is 12 to 28 inches. The restrictive feature, fragipan, is encountered 18 to 32 inches below the surface. There is no frequency of flooding or ponding. Limitations for the Allbrights silt loam are cutbanks cave, corrosivity, droughty, erodibility, seasonal high water table, hydric inclusions, low strength, slow percolation, piping, poor source of topsoil, susceptible to frost action, and wetness.

CaC-Calvin-shaly silt loam, 8 to 15 percent slopes.

This well-draining soil is located on summit hills at elevations ranging from 300 to 1,600 feet above mean sea-level. It is formed from red, residuum weathered from shale and siltstone. The typical soil profile is: 0 to 8 inches: channery silt loam (Hydrological Soil Group A); 8 to 26 inches: very channery silt loam (Hydrological Soil Group B); and 26 to 40 inches: extremely channery silt loam (Hydrological Soil Group C); 40 to 44 inches: bedrock. The depth to water table is more than 80 inches. The restrictive feature, lithic bedrock, is encountered 20 to 40 inches below the surface. There is no frequency of flooding or ponding. Limitations for the Calvin shaly silt loam are cutbanks cave, corrosivity, droughty, erodibility, hydric inclusions, piping, and susceptible to frost action.

2.3 SURFACE WATER HYDROLOGY

The Project area surface water runoff drains offsite to the southeast, approximately 1000 feet downgradient, towards Sherman Creek which is designated as a High Quality Cold Water Fishery (HQ-CWF) under PA Code 25 Chapter 93. These waters are designated as attained, supporting recreation and aquatic life.

ABACT PCSM BMPs are required to maintain the designated use of the receiving waters. The locations of the receiving waters relative to the Project area can be seen on Appendix A, USGS Project Location figure.

3.0 SITE RESTORATION PRACTICES

Grounds disturbed by any of the operations necessary to complete the work for this project are to be permanently seeded, or if specified, sodded, unless occupied by structures, paved, graveled, or designated as a permanent access road. Disturbed areas will be seeded and mulched as soon as practical once final grades are achieved. If seeding cannot be completed within a four (4) day period due to weather conditions, the disturbed area will be mulched with straw at the rate of three (3) tons per acre. This straw will be anchored using a method described in Section 3.4. Underground storage will be installed as post construction stormwater BMP to mitigate the permanent stormwater impacts of construction.

3.1 CONSTRUCTION SEQUENCE

Refer to the PCSM plan drawings for the locations of the proposed stormwater BMPs. A construction sequence is provided below for installing post construction stormwater BMPs. The construction sequence is intended to provide a course of action to conform to the applicable regulatory agency requirements for restoration and post-construction stormwater management of the site. Necessary steps for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. The contractor must comply with all requirements listed in this section. If the contractor needs to alter controls based on the effectiveness of controls or differing conditions encountered in the field, they must first receive the approval of the Perry County Conservation District and Pennsylvania Department of Environmental Protection (PADEP).

A pre-construction meeting is required prior to the start of any construction activity. The PADEP or applicable county conservation district, contractors, the landowner, appropriate municipal officials, and the plan preparer shall be invited to this meeting at least 7 days in advance.

1. Install post construction BMPs after completion and stabilization of the Project to prevent sediment accumulation in the BMPs.

2. A licensed professional shall oversee all installation and testing procedures for the underground storage pipes, level spreader, vegetated channels, and stormwater inlets, piping and outlets.

Minimize Total Disturbed Area

1. All construction shall take place within the designated limits of disturbance as shown on the plans.
2. Maintain soil stockpiles in the areas designated on the plans.
3. The existing compressor station gravel pad shall be used for equipment and material storage to minimize the limits of disturbance and soil compaction.

4. Within the limits of disturbance, contractors are to minimize land disturbance to the maximum extent. Repeated travel is restricted to travel lanes and travel through areas are limited to those necessary to complete the work.

5. Surface roughing is the practice of providing a rough soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. During the preparation for seeding on slopes 3H:1V or steeper, unless a stable rock face is provided, surface roughening is to be conducted by tracking the slopes by running tracked equipment (with blades up) across the surface as to leave grooves parallel to the contour. Any area where stone and/or timber mats are used for temporary stabilization, soil will be decompacted through multiple passes using tracked equipment. The tracking method can be used elsewhere to aid in the decompaction of soils as deemed necessary to facilitate successful restoration. The tracking method can be used on the subsoil before topsoil replacement and/or on the topsoil prior to seeding. In agricultural areas, severely compacted areas are to be plowed with a harrow, paraplow, paratill or other equipment before subsoil replacement. Vehicular traffic is to be restricted from areas that are ready to be seeded. The level of soil compaction will vary greatly across the project and the decompaction measures to be implemented will be considered on case-by-case basis and evaluated through testing (e.g., penetrometer) and discussions between Spread Managers and Environmental Inspectors.

Re-Vegetate Disturbed Areas

1. Apply permanent seeding as described in Section 3.2

Level Spreader Installation

1. Construct earthen level spreaders on zero percent grades to ensure uniform spreading of sediment-free runoff.

2. Minimum width of earthen level spreaders shall be 6 feet.

3. A transition section shall be constructed between the diversion channel and the earthen level spreader if the widths are different.

4. Protect the lip of an earthen level spreader with an erosion-resistant material to prevent erosion and enable vegetation to become established. For the permanent installation, the material shall be a rigid lip of non-erodible material, such as concrete curbing.

5. Provide a smooth transition between the level spreader and the native ground downslope.

6. A rigid level lip shall be entrenched at least 2 inches below the ground surface and securely anchored to prevent displacement. Immediately after the earthen level spreader is constructed, the entire area of the spreader shall be appropriately seeded and mulched.

Underground Storage Pipe Installation

1. Excavate the trench for the underground storage pipes from the sides without entering the trench with heavy equipment. Structures shall be installed in accordance with the manufacturers' or design engineers guidance.

2. Structures shall be set on a layer of clean, gravel (such as AASHTO #57).

3. The underground storage system shall be underlain by a layer of permeable non-woven-geotextile.

4. Place gravel/stone in minimum 6 inch lifts and lightly spread with equipment bucket until stone is level and does not settle. The gravel shall be self-compacted under its own weight. Place pipes in gravel during placement.

5. Wrap and secure nonwoven geotextile to prevent gravel/stone from clogging with sediments.

6. Gravel shall be free of fine sands, silts and clays within and above the underground storage system to the ground surface to allow infiltration into the pipes.

Vegetated Channel Installation

1. Fine grade the vegetated channel. Accurate grading is crucial for channels. Even the smallest nonconformities may compromise flow conditions.

2. Seed, vegetate and install protective lining as per approved plans and according to final planting list. Plant the swale at a time of the year when successful establishment without irrigation is most likely. However, temporary irrigation may be needed in periods of little rain or drought. Vegetation should be established as soon as possible to prevent erosion and scour.

3. Once all tributary areas are sufficiently stabilized, remove temporary erosion and sediment controls. It is very important that the swale be stabilized before receiving upland stormwater flow.

Stormwater Inlets, Piping and Outlets

1. Excessive sediment generated during construction can clog the inlets, outlets, and piping and prevent or reduce the anticipated post-construction water quality benefits. Stabilize all contributing areas

before runoff enters structures. If inlets require installation prior to site stabilization, the inlet shall be protected with sand bags or other means necessary to prevent sediment laden runoff from entering.

2. Excavate trenches for stormwater inlets, piping, and outlets. Take care to ensure slope stability during excavation in order to avoid slope failure.

3. Place underlying gravel, stone, or clean fill per the construction details provided on the PCSM plan sheets. Lightly compact the underlying media.

4. Place stormwater structure on top of the lightly compacted underlying media.

5. Cover the inlets, outlets, and piping per the construction details provided in the PCSM plan sheets.

3.2 PERMANENT SEEDING

Site preparation and establishment of permanent cover will be conducted according to the following guidelines:

1. Install needed surface water control measures.

2. Hydroseed or follow Steps 3 through 6 below.

3. Perform all cultural operations at right angles to the slope.

4. Determine agricultural lime application rates by field pH testing at a rate of 1 test per acre (min.). In the absence of testing, apply at 6 tons per acre.

5. Apply dry 10-20-20 formulation of fertilizer at the rate of 678 lb. per acre or at a rate determined by field testing.

6. Work in lime and fertilizer to a depth of 4 inches using suitable equipment.

7. Seed Mixture – The seed mixture will be:

SCIENTIFIC NAME	COMMON NAME	REQUIRED VARIETIES	% BY WEIGHT	MINIMUM % PURITY	MINIMUM % GERMINATION	MAX % WEED	SEEDING RATE (LBS/1000 SF)
Festuca Arundinacea	Tall Fesuce	Festuca arundinacea var. Kentucy 31	70	98	85	0.15	7.5
Lotus Corniculatus	Birdsfoot Trefoil Mixture	A combination of varieties (Viking, Empire, Norcen, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	20	98	80(1)	0.1	2
Agrostis Alba	Redtop	Agrostis alba	10	92	80	0.15	1

8. If not hydroseeding, apply mulch.

Notes:

1. *Spread seeds where indicated and at the rates specified in Table 1, or as otherwise indicated.*
2. *Spread seeds within April 1 to June 15 or August 16 to September 15.*
3. *Extend seeding dates where project conditions warrant. Apply full treatment or apply only 50% of the permanent seeding and soil supplements and apply the remaining 50% within the next seeding dates, as directed in writing.*
4. *Use tillage and soil supplements before permanent seeding on topsoiled areas, where temporary seeding or mulching has been applied.*
    a. *On topsoiled areas, 1:3 (3:1) and flatter, loosen the surface to a depth of at least 50 mm (2 inches) by disking, harrowing, or other acceptable methods until the tillage is satisfactory. On untopsoiled areas, 1:3 (3:1) and flatter, till only as directed. Also, till or scarify areas if the surface is glazed or crusted.*
    b. *Correct surface irregularities by filling depressions and leveling rough or uneven areas. Remove metal objects, stones larger than 50 mm (2 inches) in any dimension, and other debris or objects deemed detrimental to maintenance operations.*
5. *Inoculate leguminous seed, such as Crownvetch and Birdsfoot Trefoil, with proper cultures, according to the manufacturer's directions.*
6. *At the rates specified in Table 1, sow seeds uniformly on the prepared areas by the helicopter, hydraulic placement, broadcasting, drilling, or hand seeding methods. Inspect seeding equipment and adjust the equipment, if required, to ensure the specified application rates. Periodically perform a check on the rate and uniformity of application, as directed. Prior to seed application of each designated seed formula, thoroughly clean-out seed tank by rinsing with clean water to prevent contamination from one seed formula to the next.*

Repeat rinsing cycle until tank is clean. Collect all non-applied seed derived from each clean-out event and remove as waste from the project.

7. *After seeding, roll topsoiled areas that are to be mowed. Use a roller with a mass (weight) not more than 100 kg/m (65 pounds per foot). If soil is wet or frozen, roll only when directed.*
8. *Apply herbicides as directed, to areas that are to be mowed and where weed growth is prominent. The Representative will designate existing plants or groups of plants to be saved within these areas before herbicide application. If directed, more than one application may be required to control undesirable growth. Apply material with application personnel certified by the Department of Agriculture and with equipment specified in Section 108.05(c).*
9. *Final acceptance of seeding and soil supplement materials and installation are subject to the results of official sampling and testing as specified before use and installation and the resultant establishment of the specified vegetation. Remove non-approved materials from the project.*
    a. *Reseed rejected areas with additional applications of the specified seed and soil supplement materials. Redress soil surfaces when directed. Perform reapplication of seed and soil supplements within the next applicable seeding date if necessary or as directed. When directed, reseed areas damaged by herbicide applications and mowing operations. NOTE: Reseeded areas will also require the application of appropriate mulch as specified in Section 805.*
    b. *Seeded areas may be rejected based on the lack of actual grass seedling establishment exhibited in the area for the specified seed formula.*
        i. *Table 1 formula seeded areas that exhibit less than 70% surface area coverage with the specified germinated grass seedlings after 90 days of growth may be rejected upon visual inspection. The seed germination and growth period is determined from the date of the seeding operation for the area when these operations are performed within the specified seeding dates.*
        ii. *Special seed formula planted areas (seed mixtures not indicated in Table 1) may be rejected based on the lack of the specified seed germination and growth of less than 11 seedlings/m2 (9 seedlings/square yard) after 120 days of growth determined by visual inspection. The seed germination and growth period is determined from the date of the seeding operation of the area when these operations are performed within the specified seeding dates.*
        iii. *Seeded areas exhibiting soil surface erosion rills or gullies deeper than 250 mm (1-inch) may be rejected upon visual inspection. Redress and reseed designated eroded areas with specified materials and application rates as directed.*

Liming Rates

Minimum 6 tons per acre at 100% effective neutralizing value (% ENV), unless the soil test determines that a lesser amount is needed. To determine the actual amount of regular lime to apply, divide the amount called for by the soil test by the % ENV for the product used. For example, if 6 tons per acre is needed and the ENV for the lime used is 88%, divide 6 by 0.88 resulting in 6.8 tons needing to be applied. For dolomitic lime, which has a significant amount of magnesium in it, divide the amount called for by the soil test by the % calcium carbonate equivalent (% CCE) listed for the product instead of the % ENV. The % CCE may be

above 100% which accounts for the fact that magnesium has a greater effect per pound than the calcium in regular lime. Note: When a soil test requires more than 8,000 pounds of lime per acre, the lime must be mixed into the top 6 inches of soil.

Fertilization Rates

Prepare areas for seeding by uniformly applying supplements. Document bulk delivery. Blend the initial soil supplements into the soil at least 50 mm (2 inches), on topsoiled areas, by raking, disking, harrowing, or other acceptable methods. Blend the supplements into the soil during tillage operations. Apply slow-release nitrogen fertilizer to the surface of Formula W seeded areas before project completion. Apply soil supplements as shown in the following table, unless otherwise indicated:

Permanent Seeding Application Rate				
Soil Amendment	**Per Acre**	**Per 1,000 sq. ft.**	**Per 1,000 sq. yds.**	**Notes**
Agricultural Lime	3872 LBS.	89 LBS.	800 LBS.	or as per soil test; may not be required in agricultural fields
10-20-20 Fertilizer	678 LBS.	16 LBS.	140 LBS.	
38-0-0 Ureaform Fertilizer, OR	242 LBS.	6 LBS.	50 LBS.	
32-0-0 to 38-0-0 Sulfur Coated Urea Fertilizer, OR	286 LBS.	7 LBS.	59 LBS.	
31-0-0 IBDU Fertilizer	295 LBS.	7 LBS.	61 LBS.	

3.3 TEMPORARY SEEDING

Temporary grass cover will be established in the following areas:

- Where vegetative filters must be established below filter bags, a minimum distance of 10 feet will be seeded down slope of the trap outlet. Seed mixture for temporary cover will consist of 100-percent annual ryegrass. Seed will be applied at the rate of 40 lb. per acre or as recommended by a local recognized seed supplier and approved by the owner's representative. Prior to seeding, apply 1 ton of agricultural grade limestone per acre plus 10-10-10 fertilizer at the rate of 500 lb. per acre and work into soil.

- Where soil stockpiles are to be exposed for a period greater than four (4) days, the stockpile shall be seeded.

Temporary Seeding Application Rate				
Soil Amendment	**Per Acre**	**Per 1,000 sq. ft.**	**Per 1,000 sq. yd.**	**Notes**
Agricultural Lime	1 ton	40lb.	410 lb.	Typically not required for topsoil stockpiles
10-10-10 Fertilizer	500lb.	12.5 lb.	100lb.	Typically not required for topsoil stockpiles

3.4 MULCHING

The purpose of mulch is to reduce runoff and erosion, prevent surface compaction or crusting, conserve moisture, aid in establishing plant cover, and control weeds. Mulch will be applied on any area subject to erosion, or which has unfavorable conditions for plant establishment and growth. The practice will be used alone or in conjunction with other structural and vegetative conservation practices, such as waterways, ponds, sedimentation traps or critical area planting. On sediment producing areas where the period of exposure is less than 2 months, mulch materials will be applied according to the following guidelines:

- Apply straw mulch at the rate of 3 tons per acre. Chemically treated or salted straw is not acceptable as mulch.
- Anchor straw mulch immediately after application by at least one of the following methods.

  A. "Crimp" straw mulch into the soil using tractor drawn equipment (straight bladed coulter or similar). This method is limited to slopes no steeper than 3:1. Operate machinery on the contour. Crimping of hay or straw by running it over with tracked machinery is not recommended.

  B. Uniformly apply asphalt, either emulsified or cut-back, containing no solvents or other diluting agents toxic to plant or animal life, at the rate of 31 gallons per 1,000 square feet.

  C. Use synthetic binders (chemical binders) as recommended by the manufacturer to anchor mulch provided sufficient documentation is provided to show that it is non-toxic to native plant and animal species.

  D. Staple lightweight plastic, fiber, or paper nets over the mulch according to the manufacturer's recommendations.

Mulched areas will be checked periodically and after each runoff event (e.g. rain, snowmelt, etc.) for damage until the desired purpose of the mulching is achieved. Damaged portions of the mulch or tie-down material will be repaired upon discovery.

3.5 MATERIAL RECYCLING AND DISPOSAL

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 PA Code 260.1 et seq., 271.1 et seq., and

287.1 et seq. The operator will first characterize the waste materials as municipal, residual or hazardous waste. Before the waste material is hauled away, the material will be stored and labeled in accordance with the applicable management procedures, if any, under the Solid Waste Management Act regulations. The operator will then hire a licensed and insured waste hauler to transport the waste material to a properly permitted waste disposal facility. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. Expected construction wastes will consist of packaging material and sediment cleaned from BMPs. Sediment removed from BMPs will either be spread in a protected area, within the LOD, to dry and then recycled as fill material or disposed of off-site. Off-site spoil and/or borrow sites greater than one acre must be operated under an E&SC Plan approved by the County Conservation District.

3.6 THERMAL IMPACTS

Potential pollution to surface waters from thermal impacts will be minimized by minimizing clearing and retaining existing vegetation where possible during construction. Following construction, permanent seeding will occur as soon as practicable to facilitate vegetative growth. All post-construction water storage will be underground, thus minimizing the opportunity for increase in water temperature. Additionally, all other proposed BMPs allow for stormwater runoff to flow consistently, thus reducing the opportunity for the temperature to rise in the stormwater.

3.7 RIPARIAN FOREST BUFFERS

Exiting riparian forest buffers do not exist within the Project area.

3.8 INSPECTION AND MAINTENANCE PROCEDURES

Seeded areas will be inspected weekly and after each runoff event for bare spots, washouts, and healthy growth. Necessary repairs will be made immediately. Mulched areas will be checked periodically and after severe storms for damage until the desired purpose of the mulching is achieved. Damaged portions of the mulch or tie-down material will be repaired upon discovery.

All sedimentation control measures will remain in place until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established. Any area not achieving a 70-percent vegetative cover will be reseeded and mulched within 24 hours of detection. The following inspection and maintenance practices will be used to maintain PCSM BMPs on site during restoration activities:

- PCSM BMPs will be in place and inspected according to the schedule below. PCSM BMPs will also be inspected after each runoff event. The Contractor will immediately repair any deficiencies.
- Maintenance and inspection of PCSM BMPs will conform to PADEP Chapter 102 and 105 rules and regulations.

If BMPs are found to be inoperative or ineffective during an inspection, PADEP should be contacted within 24 hours, followed by submission of a written noncompliance report to PADEP within 5 days of the initial contact.

Long-Term Maintenance

The owner will maintain the stormwater management facilities for this site. Maintenance of the stormwater management facilities includes, but is not limited to, the following:

1. The proposed stormwater detention system, private storm systems, and stormwater BMP's will be inspected and maintained by the property owner in accordance with the approved operation and maintenance program.

2. The stormwater BMP's are fixtures that can be altered or removed only after approval by the Municipality and PA Department of Environmental Protection.

3. Vegetation should be inspected around the site during all regular inspections. Vegetation outside of the fence and equipment pad shall be mowed sparingly to maintain a meadow condition. Bare spots shall be re-seeded and mulched to maintain full vegetated cover. Invasive plants shall be removed manually or by mowing.

4. Level Spreader:

    - Inspect Level Spreaders quarterly for the first two years following installation, and then semiannually thereafter and within 48 hours after every major storm event (> 1 inch rainfall depth). The receiving land area should be immediately restored to design conditions after any disturbance. Vegetated areas should be seeded and blanketed.

    - It is critical that even sheet flow conditions are sustained throughout the life of the level spreader, as their effectiveness can deteriorate due to lack of maintenance, inadequate design/location, and poor vegetative cover.

        o Inspection – the area below a level spreader should be inspected for clogging, density of vegetation, damage by foot or vehicular traffic, excessive accumulations, and channelization. Inspections should be made on a quarterly basis for the first two years following installation, and then on a semiannual basis thereafter. Inspections should also be made after every storm event greater than 1-inch.

        o Removal – sediment and debris should be routinely removed (but never less than semiannually), or upon observation, when buildup occurs. Regrading and reseeding may be necessary in the areas below the level spreader. Regrading may also be required when

pools of standing water are observed along the slope. (In no case should standing water be allowed for longer than 72 hours.)

- Vegetation – maintaining a vigorous vegetative cover on the areas below a level spreader is critical for maximizing pollutant removal efficiency and erosion prevention. If vegetative cover is not fully established within the designated time, it may need to be replaced with an alternative species. (It is standard practice to contractually require the contractor to replace dead vegetation.) Unwanted or invasive growth should be removed on an annual basis. Biweekly inspections are recommended for at least the first growing season, or until the vegetation is permanently established. Once the vegetation is established, inspections of health, diversity, and density should be performed at least twice per year, during both the growing and non-growing season. Vegetative cover should be sustained at 85% and replaced if damage greater than 50% is observed.

5. Stormwater Inlets, Piping and Outlets:

- Stormwater inlets, piping, and outlets shall be checked in accordance with the inspection schedule.
- Remove sediment or debris that is blocking inlets.
- Sediment shall be removed from inlet sumps when the sediment depth is greater than 6 inches.
- Inspect outlet protection for displaced riprap and erosion and repair as necessary.

6. Underground Storage Pipes:

- Inspect Underground Storage Pipes and associated inlets and piping at least four times per year and within 48 hours after every major storm event (> 1 inch rainfall depth). Inspection considerations include:
  - Inspect cleanouts – any water left in a surface filter after the design drain down time indicates the filter is not optimally functioning. The drawdown rate should be observed if possible during inspections.
  - Film or discoloration of any surface filter material – this indicates organics or debris have clogged the filter surface.
- Remove trash and debris as necessary.
- Catch Basins and Inlets should be cleaned of sediment when accumulation is more than 6 inches.
- Scrape gravel with rakes or vacuum to remove silt.
- Replace gravel / filter media if scraping/removal has reduced depth of filtering media or if dewatering times are inadequate.
- Dispose of gravel / filter media in accordance with all state and federal regulations.

7. Vegetated Channel:

    - Inspect Vegetated Channel at least four times per year and within 48 hours after every major storm event (> 1 inch rainfall depth).Inspect and correct erosions problems, damage to vegetation, and sediment and debris accumulation (address when > 3 inches at any spot or covering vegetation)
    - Inspect vegetation on side slopes for erosion and formation of rills or gullies, correct as needed
    - Inspect for pools of standing water, dewater and discharge to an approved location and restore to design grade
    - Mow and trim vegetation to ensure safety, aesthetics, proper swale operation, or to suppress weeds and invasive vegetation; dispose of cuttings in a local composting facility; mow only when swale is dry to avoid rutting
    - Inspect for litter; remove prior to mowing
    - Inspect for uniformity is cross-section and longitudinal slope, correct as needed
    - Inspect swale inlet (curb cuts, pipes, etc.) and outlet for signs of erosion or blockage, correct as needed

- Maintenance to be done as needed
    - Plant alternative grass species in the event of unsuccessful establishment
    - Reseed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming
    - Rototill and replant swale if draw down time is more than 48 hours
    - Inspect and correct check dams when signs of altered water flow (channelization, obstructions, erosion, etc.) are identified
    - Water during dry periods, fertilize, and apply pesticide only when absolutely necessary
- Additional maintenance necessitated by winter conditions
    - Inspect swale immediately after spring melt, remove residuals (e.g. sand) and replace damaged vegetation without disturbing remaining vegetation

- If roadside road side or parking lot runoff is directed to the swale, mulching and/or soil aeration/manipulation may be required in the spring to restore structure and moisture capacity and to reduce the impacts of deicing agents
- Use nontoxic, organic deicing agents, applied either as blended, magnesium chloride-based liquid products or as pretreated salt
- Use salt-tolerant vegetation in swales

Long-Term Operation and Maintenance Schedule

PCSM BMP	Inspection	Repairs	Reconstruction	BMP Life Expectancy
Underground Storage Pipes	1 hr Quarterly @ $70/hr	Replace 10% of gravel: 1 day / $2,200	4-5 days Cost: $50,000	20-30 years
Level Spreader	1 hr Quarterly @ $70/hr	Repair erosion: 1 day / $700	1-2 days Cost: $2,100	20-30 years
Vegetated Channel	1 hr Annually @ $70/hr	Repair erosion: 1 day / $1,200	1-2 days Cost: $5,900	20-30 years
Stormwater Inlets, Piping, and Outlets	1 hr Annually @ $70/hr	Repair erosion: 1 day / $800	1-2 days Cost: $2,800	20-30 years

3.9 ANTIDEGRADATION REQUIREMENTS

Earth- disturbance activities associated with the Doylesburg Station will be located within a HQ-CWF watershed. Therefore; antidegradation requirements for special protection waters apply. A combination of non-discharge alternatives and the use of PCSM BMPs on site will protect the water quality of the receiving waters.

The post-construction stormwater infiltration volume equals or exceeds the pre-construction stormwater infiltration volume after application of PCSM BMPs as shown in Section 4.0 of this report. In addition, post-construction stormwater discharge is pre-treated and managed so that it will not degrade the physical, chemical or biological characteristics of the receiving stream for the following reasons:

- The facility is designed for zero discharge of sanitary waste water and grey water.
- The PSCM BMP functions at the surface like a filter, providing treatment of surface runoff.
- The PCSM BMP discharges to a grass channel, then to a level spreader onto a grass slope, providing additional pollutant filtration prior to discharging into existing conveyances offsite.

4.0 POST-CONSTRUCTION STORMWATER MANAGEMENT ANALYSIS

4.1 DESIGN BASIS

This plan has been prepared to comply with the Pennsylvania Stormwater Best Management Practices Manual.

The site's pre-development and post-development drainage characteristics were modeled in accordance with local and state requirements. The hydrology calculations were performed utilizing the U.S. Soil Conservation Service (SCS) TR-55 Urban Hydrology for Small Watersheds. The 2, 5, 10, 25, 50, and 100-year, 24-hour storm events have been analyzed for pre- and post-developed conditions. The rainfall depths for each storm event are 2.9, 3.6, 4.2, 5.1, 5.9, and 6.9 inches respectively, and follow the SCS 24-hour Type II rainfall distribution. Rainfall depths were taken from the NOAA Atlas 14 data, which is provided in Appendix E. Bentley PondPack V8i was used to perform the hydrology analysis. The pre-development watershed maps are located in Appendix C. The post-development watershed maps are located in Appendix D. The PondPack report is located in Appendix E.

Stormwater Best Management Practices (BMPs) have been designed for the pump station to comply with the stormwater quality and quantity management requirements. The watershed network and detention facility routing calculations were performed using Bentley PondPack V8i. The BMPs also have been designed meet state stormwater quality and quantity management requirements. Calculation worksheets from Chapter 8 of the Pennsylvania Stormwater Best Management Practices Manual were used to ensure compliance with state requirements. The completed worksheets are located in Appendix F.

4.2 HYDROLOGY

Pre-development and post-development runoff results were calculated using the previously described design basis. The pre-development and post-development watersheds have the same single point of interest that encompass both developed and undeveloped areas. The point of interest is located just east of the development and encompasses the entire developed area. Table 1 provides a summary of the pre-development and post-development watersheds and associated peak flow discharge rates.

Table 1: Pre-Development and Post-Development Hydrology

				Peak Flow (cfs)					
DA	**Drainage Area (ac.)**	**Tc (hr)**	**CN**	**2-yr**	**5-yr**	**10-yr**	**25-yr**	**50-yr**	**100-yr**
Pre-Development	8.170	0.319	69.03	4.50	8.15	11.76	17.75	23.52	30.47
Post-Development Controlled	0.813	0.083	77.29	1.21	1.83	2.41	3.35	4.25	5.30
Post-Development Uncontrolled	7.358	0.319	69.49	4.21	7.52	10.79	16.20	21.39	27.64

Maps for the pre-development and post-development watersheds are located in Appendix C and Appendix D respectively.

4.3 BMP DESIGN

A single BMP is used to control runoff volume and peak flow rates. The BMP is an infiltration filter with perforated piping for additional storage. BMP is designed to control both peak runoff and runoff volume in the controlled watershed. The BMP design details are shown in Appendix G.

The infiltration filter consists of a 5-foot deep flat gravel bed surrounded by filter fabric. A 1 foot high berm is constructed downslope of the filter to retain surface runoff. The berm directs runoff into a drop inlet that connects to four, 150-foot long lengths of perforated HDPE pipe that run the length of the infiltration filter. The opposite side of the drop inlet is connected to a manhole with an interior weir that controls discharge from the infiltration filter during larger storm events. The PondPack report of the storm routing for the BMP is provided in Appendix E. The cumulative storage volume of the BMP is shown in Table 2. The routing summary for the BMP is shown in Table 3.

Table 2: BMP Cumulative Storage Volume

Elevation of Water in System[1]	Cumulative Pipe Storage[2]	Cumulative Pipe and Gravel Storage[3]	Total System Cumulative Storage[4]	Total System Cumulative Storage
(Feet)	**(Cubic Feet / Foot)**	**(Cubic Feet / Foot)**	**(Cubic Feet)**	**(Acre Feet)**
0.0	0.00	0.00	0.00	0.000
0.5	0.00	1.00	900.00	0.021

Elevation of Water in System[1]	Cumulative Pipe Storage[2]	Cumulative Pipe and Gravel Storage[3]	Total System Cumulative Storage[4]	Total System Cumulative Storage
(Feet)	(Cubic Feet / Foot)	(Cubic Feet / Foot)	(Cubic Feet)	(Acre Feet)
1.0	0.61	2.37	2,131.67	0.049
1.5	1.57	3.94	3,548.23	0.081
2.0	2.53	5.52	4,964.80	0.114
2.5	3.14	6.88	6,196.46	0.142
3.0	3.14	7.88	7,096.46	0.163
3.5	3.14	8.88	7,996.46	0.184
4.0	3.14	9.88	8,896.46	0.204

1. BMP bottom elevation 0.0 corresponds to elevation 925.00 AMSL on the plan.
2. Storage per foot of length of a 24" pipe set at invert elevation 0.5.
3. Storage per foot of length of a 24" pipe set at invert elevation 0.5 plus surrounding gravel set in a 5 foot wide trench with 40% pore space [pipe storage + 40% * ((5ft * depth) – pipe storage)]
4. Total System Cumulative Storage = Cumulative Pipe and Gravel Storage * 900 feet of pipe length.

Table 3: BMP Routing Summary

Storm Event (years)	Peak BMP Inflow (cfs)	Routed Peak BMP Outflow (cfs)	Maximum Storage Volume (ac-ft)	Water Surface Elevation (feet)
2	1.21	0.00	0.000	926.29
5	1.83	0.00	0.000	926.81
10	2.41	0.04	0.019	927.05
25	3.35	0.12	0.071	927.17
50	4.25	0.28	0.120	927.40
100	5.30	0.55	0.178	927.93

4.4 INFILTRATION AREAS

The BMP is designed to provide infiltration for volume control. PondPack allows for infiltration information to be included in the BMP design and it can be used to calculate the volumes removed by the BMPs through infiltration. Infiltration testing was performed according to the Pennsylvania Stormwater Best Management Practices Manual to determine the infiltration rates to use in the calculations. Infiltration test results are located in Appendix B. Infiltration rates were determined as follows:

BMP-1 is located at infiltration test points IT-3 and IT-4. The previous infiltration test results at IT-1 and IT-2 were invalid due to incorrect location and depth. The infiltration rate at IT-3 was measured to be 0.00 in/hr. The infiltration rate at IT-4 was measured to be 0.03 in/hr. The rate at each test location is too low for an infiltration BMP. Given that there is no alternative BMP location available, an underdrain was designed at the base of the BMP to produce a slow release rate similar to soil infiltration. A calculation worksheet is provided in Appendix E that shows the underdrain will dewater the BMP in approximately 46 hours. This falls within the normal range for dewatering of infiltration BMPs in 24 to 72 hours. The volume reduction required for the 2-year storm is contained between the bottom of the BMP and the lowest outlet orifice on the riser as shown in the PondPack report provided in Appendix E.

4.5 STORMWATER MANAGEMENT

Stormwater quality management for the project will comply with Township ordinances and state regulations through the implementation and maintenance of post construction stormwater management (PCSM) controls after construction. Stormwater quality is achieved with the proposed BMP design, which is in accordance with the Pennsylvania Stormwater Best Management Practices Manual. Table 4 shows how the design criterion for peak discharge rate and volume reduction is achieved for this project. The post development peak flow is less than 100% of the pre-development peak flow for each design storm event. For the 2-year storm, the post development hydrograph volume is less than the pre-development hydrograph volume.

Table 4: POI-1 Peak Discharge Rate Reduction Summary

Storm Event (years)	Total Pre-Development Peak Flow (cfs)	Total Post-Development Peak Flow (cfs)[1]	Total Peak Flow Difference Post-Pre (cfs)	Total Pre-Development Hydrograph Volume (ac-ft)	Total Post-Development Hydrograph Volume (ac-ft)	Total Volume Difference Post-Pre (ac-ft)
2	4.50	4.21	-0.29	**0.410**	**0.381**	**-0.029**
5	8.15	7.52	-0.63	0.675	0.623	-0.052
10	11.76	10.79	-0.97	0.940	0.884	-0.056
25	17.75	16.20	-1.55	1.384	1.340	-0.044
50	23.52	21.49	-2.03	1.817	1.782	-0.035
100	30.47	28.11	-2.36	2.345	2.318	-0.027

1. The total post development peak flow is the routed flow of all post-development watersheds to POI-1

5.0 REFERENCES

Erosion and Sediment Pollution Control Program Manual, Commonwealth of Pennsylvania, Department of Environmental Protection, Office of Water Management, March 2012.

Pennsylvania Stormwater Best Management Practices Manual Draft (Document Number 363-0300-002), Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, December 2006.

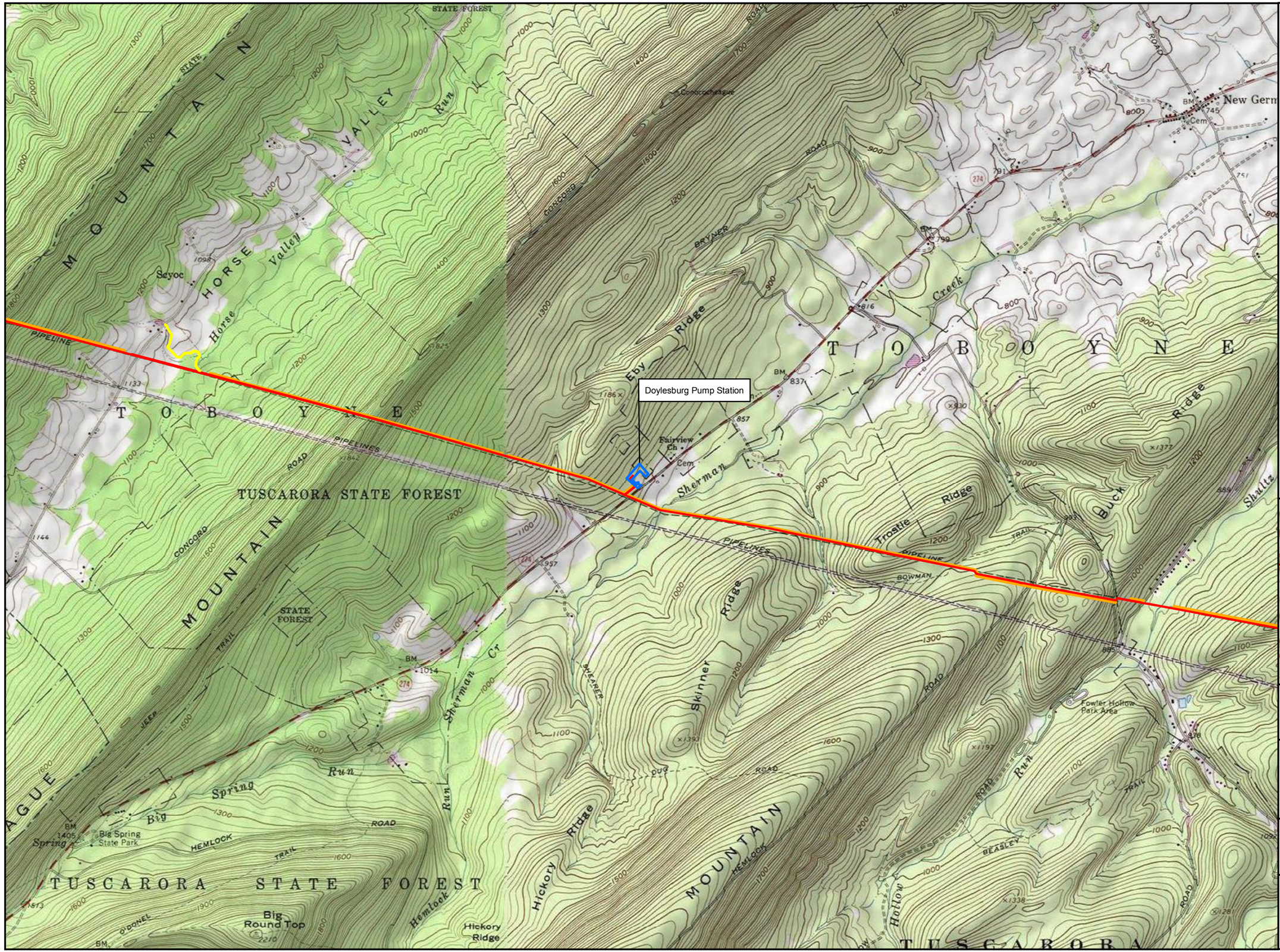
Perry County Subdivision and Land Development Ordinance, April, 2011.

Blain Quadrangle, Pennsylvania – Perry County, Geological Survey, United States Department of Interior.

Blairs Mills Quadrangle, Pennsylvania – Perry County, Geological Survey, United States Department of Interior.

Soil Survey of Perry County, Pennsylvania, United States Department of Agriculture, Soil Conservation Service.

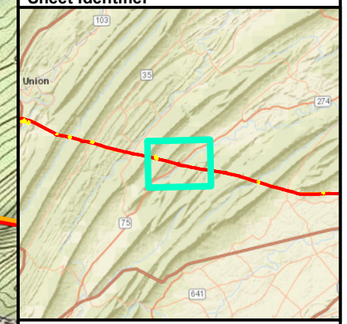
APPENDIX A – SITE LOCATION MAP



Legend

- Access Road
- Alignment Centerline
- Limit of Disturbance
- Pump Station

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

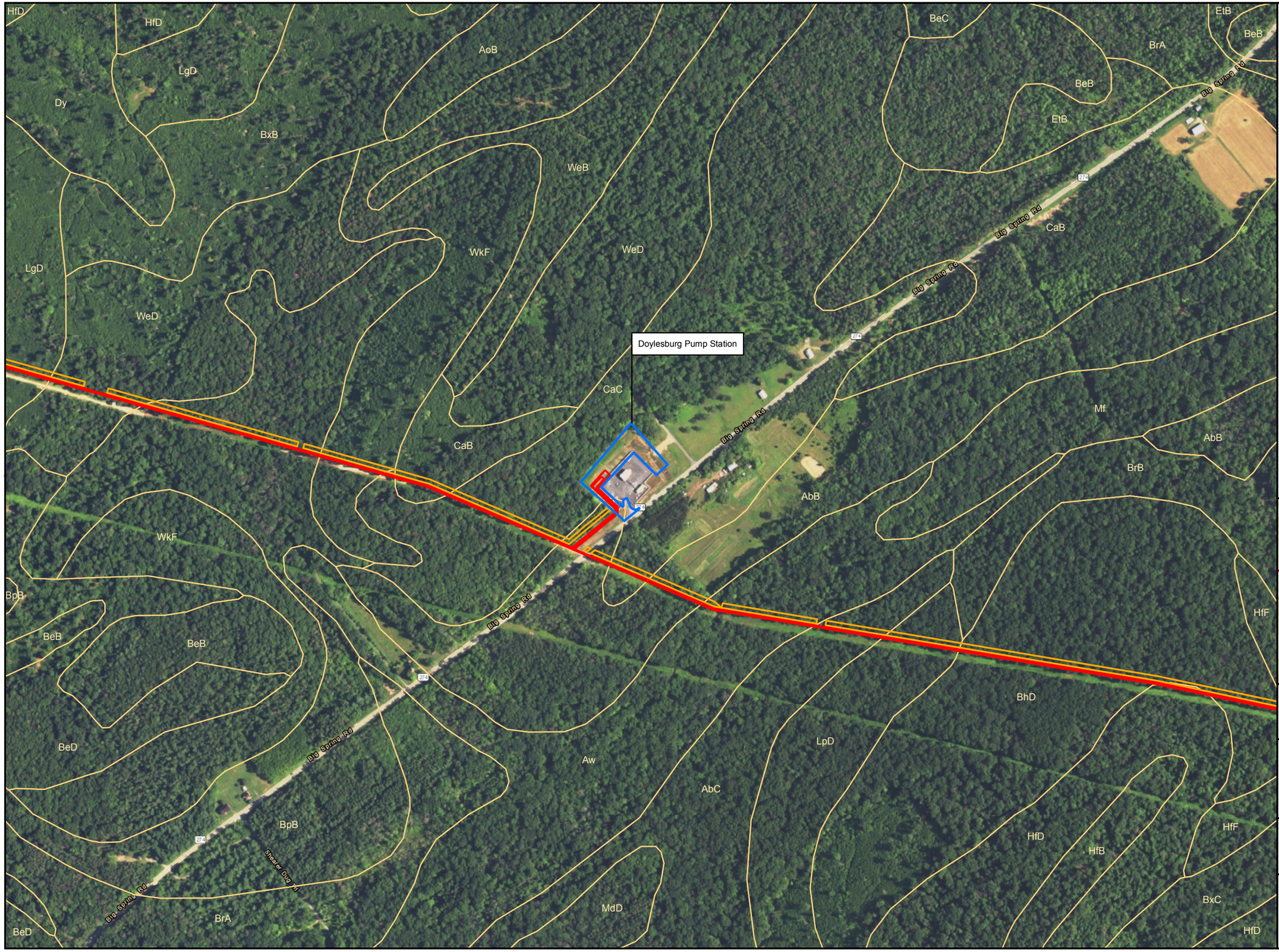
PROJECT LOCATION MAP
ATTACHMENT 1
PENNSYLVANIA PIPELINE PROJECT
OCTOBER 3, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangles being displayed are Blain, Blairs Mills

P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESCGP\PUMP STATIONS\PENNPIPELINE_PUMPSTATIONS_USGS_ESCGP.MXD 10/14/16 SP

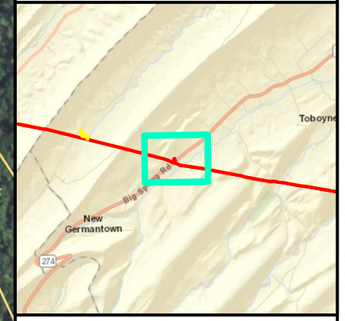
APPENDIX B – SOILS LOCATION MAP AND INFILTRATION TEST RESULTS



Legend

- Access Road
- Alignment Centerline
- Limit of Disturbance
- NRCS Soils and Codes
- Pump Station

Sheet Identifier



N

0 250 500 Feet

0 76.2 152.4 Meters

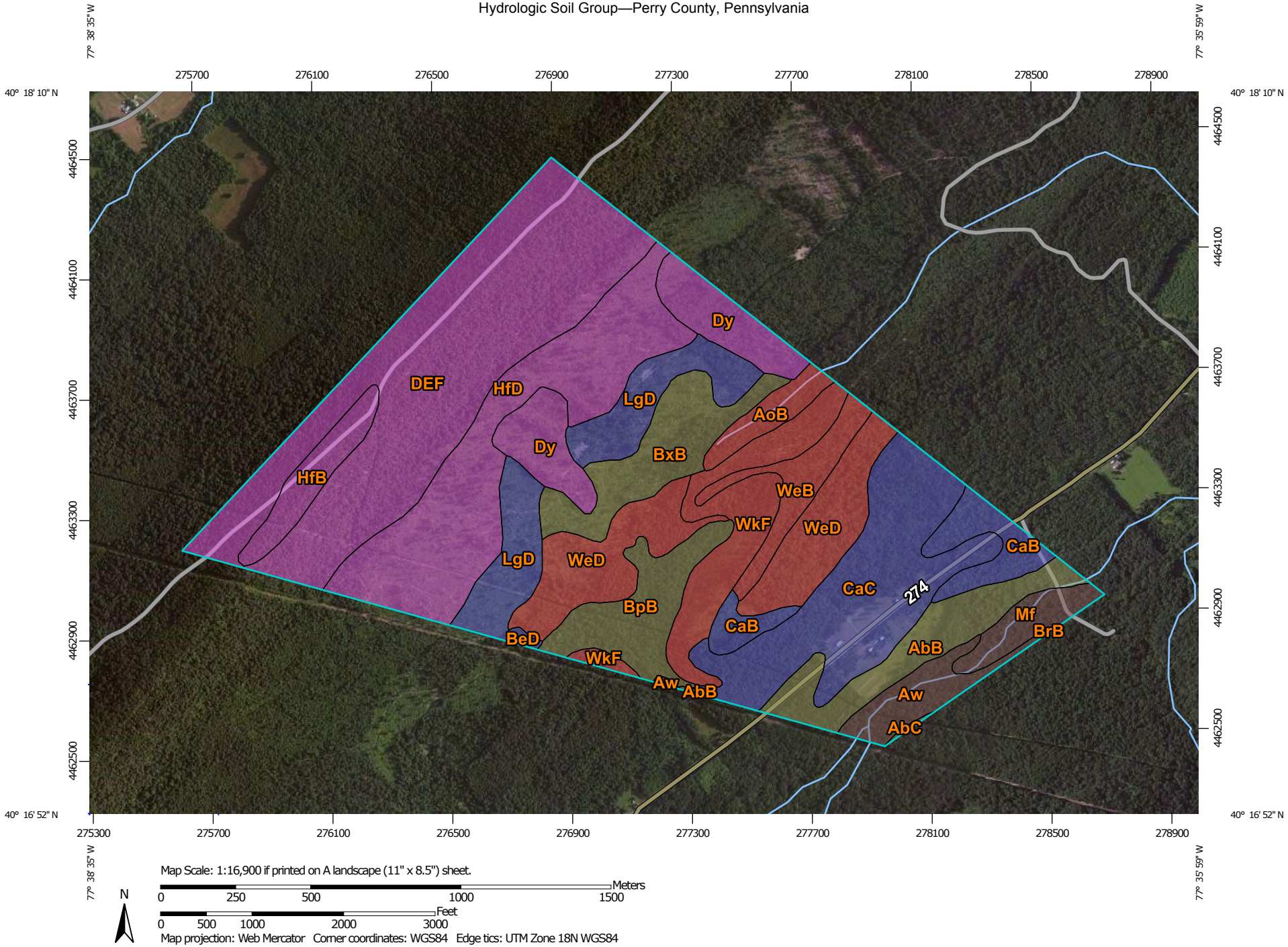
NRCS SOILS MAP
ATTACHMENT 2
PENNSYLVANIA PIPELINE PROJECT
OCTOBER 3, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

Notes:
Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers)

P:\GIS\SUNOCO\MARINER EAST 2\MXD\PP ESCGP\PUMP STATIONS\PENNPIPELINE_PUMPSTATIONS_SOILS_ESCGP1.MXD 10/14/16 SP

Hydrologic Soil Group—Perry County, Pennsylvania



Map Scale: 1:16,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

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 1:15,800.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: Perry County, Pennsylvania
Survey Area Data: Version 6, Sep 22, 2014

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

Date(s) aerial images were photographed: Jun 18, 2010—Sep 25, 2010

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Perry County, Pennsylvania (PA099)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AbB	Albrights silt loam, 3 to 8 percent slopes	C/D	33.4	4.6%
AbC	Albrights silt loam, 8 to 15 percent slopes	C/D	0.5	0.1%
AoB	Andover very stony loam, 0 to 8 percent slopes	D	11.0	1.5%
Aw	Atkins silt loam	B/D	17.4	2.4%
BeD	Berks channery silt loam, 15 to 25 percent slopes	B	1.2	0.2%
BpB	Blairton silt loam, 3 to 8 percent slopes	C/D	31.0	4.3%
BrB	Brinkerton silt loam, 3 to 8 percent slopes	D	0.1	0.0%
BxB	Buchanan very stony loam, 0 to 8 percent slopes	C/D	35.8	4.9%
CaB	Calvin shaly silt loam, 3 to 8 percent slopes	B	24.0	3.3%
CaC	Calvin shaly silt loam, 8 to 15 percent slopes	B	80.3	11.0%
DEF	Dekalb and Hazleton soils, 25 to 75 percent slopes, rubbly	A	164.3	22.6%
Dy	Dystrochrepts, bouldery	A	37.2	5.1%
HfB	Hazleton extremely stony sandy loam, 0 to 8 percent slopes	A	16.4	2.3%
HfD	Hazleton extremely stony sandy loam, 8 to 25 percent slopes	A	92.1	12.7%
LgD	Laidig very stony loam, 8 to 25 percent slopes	B	46.4	6.4%
Mf	Middlebury soils	B/D	13.3	1.8%
WeB	Weikert very channery silt loam, 3 to 8 percent slopes	D	18.2	2.5%
WeD	Weikert very channery silt loam, 15 to 25 percent slopes	D	62.3	8.6%

Hydrologic Soil Group— Summary by Map Unit — Perry County, Pennsylvania (PA099)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WkF	Weikert and Klinesville very shaly silt loams, 25 to 75 percent slopes	D	42.4	5.8%
Totals for Area of Interest			**727.3**	**100.0%**

Description

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

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

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

TRIP REPORT

Date: October 25, 2016

To: Tim Dunaway, P.E.

From: Scott Anderson, Hydrogeologist

Subject: Summary of Soil Infiltration Tests
Doylesburg Station
Sunoco PPP
Toboyne Township, Perry County, Pennsylvania

This trip report provides results of soil infiltration tests that were completed at the Doylesburg Station located in Toboyne Township, Perry County, Pennsylvania as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Logistics L.P.

1.0 PURPOSE

This report presents the field data and results of double-ring soil infiltration tests conducted to support stormwater management system design. Two deep tests (IT-3 and IT-4) were performed at the property. Test locations are listed by coordinates in World Geodetic System 84 (WGS 84) latitude and longitude format in Table 1, and locations are also illustrated on a figure attached to this report.

2.0 FIELD ACTIVITIES

The infiltration tests were conducted by Keith Simpson and Jake Marlow of Tetra Tech, Inc., on October 4, 2016. The test locations were positioned in the field using a handheld, WAAS-enabled GPS unit. Table 1 provides the coordinates of the test locations. IT-3 and IT-4 were located near the bottom of a moderately steep slope just outside of the substation fence.

The infiltration tests were performed in accordance with the procedure specified in the 2006 Pennsylvania Stormwater Best Management Practices (BMP) Manual. Double-ring tests were performed. The double-ring test locations were prepared for test locations with the assistance of a mini-excavator, with care taken to minimize disturbance of the soil surface to be tested. The double-ring infiltrometers that were used for testing consisted of 10-inch and 6-inch diameter sections of steel casing. After digging to the target depth, the test surface was leveled, and any loose soil or fallen vegetation was removed. The rings were driven a minimum of 2 inches into the soil. Infiltration test depths are provided on Table 1.

Test locations were pre-soaked for 1 hour. The tests were then conducted with measurements at 30-minute intervals, based on the observed water level drops during the second half of the presoak period. Presoak and test information was recorded on infiltration test sheets; copies of the test sheets are attached to this report.

During the testing, the weather was overcast and cool, approximately 60 degrees Fahrenheit, and no precipitation was observed during the tests. No rain for a period of 24 hours prior to testing was noted.

In addition, test pits were machine-excavated for each testing location to characterize the soil, determine the depth to bedrock, if encountered, and inspect for evidence of a seasonal high water table. The test pits were identified with the corresponding infiltration test name. The test pits were completed to two feet below the target infiltration test depth. Descriptions of the soil from the test pits were recorded by a Tetra Tech geologist on field logs, which were based on the form example in the BMP manual. Copies of the field soil logs are attached to this report.

3.0 RESULTS

3.1 SOILS DESCRIPTION

Soils encountered consisted of thin (8 to 11 inches) brown to dark brown topsoil/surface soil overlying reddish-brown, yellowish-red, and red silty clay loam and silty clay, with weathered parent material noted in the bottom horizons (silty clay horizons) of the test pits. Munsell color classifications for each horizon are provided on attached soil logs. Thin grass roots were encountered in the topsoil/surface soils. Soils were noted to be damp to moist during the excavation activities. No distinct mottling of soils was observed in test pit IT-4; however, mottling was noted at 60 inches below ground surface in test pit IT-3. Seasonal high groundwater was not observed in either test pits. Additionally, bedrock was not encountered. Table 1 summarizes the depths of the infiltration tests (test pits completed approximately 2 feet deeper than infiltration test depths).

According to United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey[1] data, the soil types for the test locations are mapped as Calvin shaly silt loam (CaC soil symbol), 8 to 15 percent slopes

3.2 INFILTRATION TEST RESULTS

Table 1 summarizes the infiltration rates (inches per hour) calculated from the test data. Infiltration rates presented in Table 1 were calculated from the averaged water level drop of the last four (stabilized) readings measured in the inner ring. The tests exhibited no to very slow infiltration, utilizing a 30-minute test cycle.

[1] http://websoilsurvey.nrcs.usda.gov/. Accessed October 4, 2016.

TABLE 1
Summary of Infiltration Test Results and Work Locations
Doylesburg Station

Location (IT-#)	Location Data[1]		Test Depth (inches)	Infiltration Test Result (inches per hour)
	LATITUDE WGS 84	LONGITUDE WGS 84		
3	40.28642	-77.61463	48	0
4	40.28659	-77.61436	36	0.031

Note

[1] Field coordinates

In consideration of the infiltration rates for design purposes, a safety factor of 3 is assumed based on the significant presence of silty clay at the test depths. The arithmetic mean of IT-A and IT-B is 0.016 inches per hour (geometric mean could not be determined due to 0 result for IT-A). With application of the safety factor of 3, the resultant recommended rate is essentially 0 inches per hour (0.0052 inches per hour).

ATTACHMENTS

SITE FIGURE


Figure 1
Infiltration Testing Locations
Doylesburg
Soil Type: Calvin Shaly Silt Loam (CaC)
Perry County, PA
Legend
Infiltration Tests
CaC
CaB
AbB
IT-4
IT-3
274
Google Earth
© 2016 Google
1000 ft
N

INFILTRATION TEST DATA SHEETS

INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

DOYLESBURG (STATION)

PROJECT NAME: SUNOCO LOGISTICS
PROJECT NUMBER: 112IC05958 - 17
TEST AREA ID: IT-3
PERSONNEL: K. SIMPSON, J. MARLOW

TEST METHOD: (Double Ring Infiltrometer) Percolation
Single Ring Infiltrometer

Location Coordinates or Description:
40.28642 N
-077.61463 W

INNER RING INSIDE DIAMETER/HEIGHT: 6" X 10"
OUTER RING INSIDE DIAMETER/HEIGHT: 10" X 10"

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 10/4/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 7 3/4"

MEASURING POINT: (Ring Rim) Indicator Mark

DEPTH OF TEST: ~~7 3/4~~ RLS 4' BGS

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DATA				
14:17	0	---	3.8	
1447	30	0	0	
1517	60	0	0	
TEST DATA		30 MIN TEST		
1517	0 (60)	---	—	START TEST
1547	30 (90)	0	0	
1617	60 (120)	0	0	
1647	90 (150)	0	0	
1717	120 (180)	0	0	END TEST, STABILE
	NO RAIN OVER THE LAST			25 HRS.

SEE ALSO PHOTOS & SOIL LOG

INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

DOYLESBURG (STATION)

PROJECT NAME: SUNOCO LOGISTICS
PROJECT NUMBER: 112IC05958 - 17
TEST AREA ID: IT - 4
PERSONNEL: K. SIMPSON, J. MARLOW

TEST METHOD: (Double Ring Infiltrometer) Percolation
Single Ring Infiltrometer

INNER RING INSIDE DIAMETER/HEIGHT: 6" X 10"
OUTER RING INSIDE DIAMETER/HEIGHT: 10" X 10"

Location Coordinates or Description:
40.28659 N
-077.61436W

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 10/4/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 7"

MEASURING POINT: (Ring Rim) Indicator Mark

DEPTH OF TEST: 3' BGS

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DATA				
1525	0	----------	3.5	
1555	30	0	0	
1625	60	0	0	
TEST DATA		30 MIN TEST		
1625	0 (60)	----------	—	START TEST
1655	30 (90)	0	0	
1725	60 (120)	1/16	0.04	(40 ML)
1755	90 (150)	0	0	
1825	120 (180)	0	0	END TEST, STABILE
	NO RAIN OVER THE LAST 24 HRS			

SEE ALSO PHOTOS & SOIL LOG

Doylesburg Station		Test Loc. IT-3 (Deep - 4' Deep)	10/4/2016	
Time	Elapsed Time (minutes)	Water Level Drop (in)	Volume of Water Added (L)	
1517	0	0.000	0.000	
1547	30	0.000	0.000	
1617	60	0.000	0.000	
1647	90	0.000	0.000	
1717	120	0.000	N/A	
				Infiltration Rate
				Average Stabilized Rate (in/hr)
				0.00

Doylesburg Station		Test Loc. IT-4 (Deep Test - 3' Deep)	10/4/2016	
Time	Elapsed Time (minutes)	Water Level Drop (in)	Volume of Water Added (L)	
1625	0	0.000	0.000	
1655	30	0.000	0.000	
1725	60	0.063	0.040	
1755	90	0.000	0.000	
1825	120	0.000	N/A	
				Infiltration Rate
				Average Stabilized Rate (in/hr)
				0.031

SOIL LOGS

TETRA TECH

Soil Log

Tested By: Jake Marlow
Project: Sunoco - PDP
Project No.: 112IC05958
Test Pit: Doylesburg IT-3
Date: 10/4/16
Elevation: ~940
Equipment Used Mini Excavator
Geology: Bloomsburg and Mifflintown Formations
Soil Type: Calvin shaly silt loam (CaC)
Land Use: Maintained Grass
Weather: 60's Cloudy

Additional Comments Mini Excavator to 72"

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
O/A	0"	8"	Silty Clay loam	Clay w/ trace silt and Fine sand	7.5YR 4/2	Solid	Pores, Roots	-	-	Dump <1" of Organic Debris to top soil
B	8"	53"	Silty Clay	Fine trace silt w/ clay	5YR 4/6	Solid	Few pores	-	-	Moist
C	53"	72"	Silty clay	Clay w/ trace fine silt, weathered Bedrock	2.5YR 4/6	Mottling at 60" 2.5Y 8.5/2	~~No~~ Pores Few	-	-	Moist Mottling >60"

Horizon:	USDA Definition
O	Organic debris
A	Dark colored, mixed mineral organic matter
B	Maximum accumulation of silicate clay minerals
C	Weathered parent material
R	Layer of consolidated rock beneath the soil

Soil Textural Class
Use ternary diagram from US Department of Agriculture Soil Conservation Service

Boundary
Use depth and classification
Classification as Follows:
Abrupt
(Clear)
Gradual
Diffuse

Notes:
- No Refusal
- Did Not Encounter Seasonal High Groundwater
- <0.5" of Rain in Past 24 hours

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual
USDA Definitions located from: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308

TETRA TECH

Soil Log

Tested By: Jake Marlow
Test Pit: Doylesburg IT-4 **Date:** 10/4/16
Geology: Bloomsburg and Mifflintown Formation **Soil Type:** Colvin shaly silt loam (CaC)
Project: Sunoco -PPP
Elevation: ~940
Land Use: Maintained Grass
Project No.: 112IC05458
Equipment Used Mini Excavator
Weather: 60's Cloudy

Additional Comments Mini Excavator to 60"

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
O/A	0"	11"	Silty Clay	Fine silt w/ Major clay	7.5 YR 3/3	Solid	Pores, Roots	-	-	Damp to Moist
B	11"	42"	Silty Clay loam	Clay w/ Fine silt and trace Fine Sand	5 YR 4/4	Solid	Few roots Few pores	-	-	Moist
C	42"	60"	Silty Clay	Clay w/ Fine silt Weathered parent Material	5 YR 4/6	Solid	Few pores >½" rock fragments	-	-	Moist

Horizon:	USDA Definition
O	Organic debris
A	Dark colored, mixed mineral organic matter
B	Maximum accumulation of silicate clay minerals
C	Weathered parent material
R	Layer of consolidated rock beneath the soil

Soil Textural Class
Use ternary diagram from US Department of Agriculture Soil Conservation Service

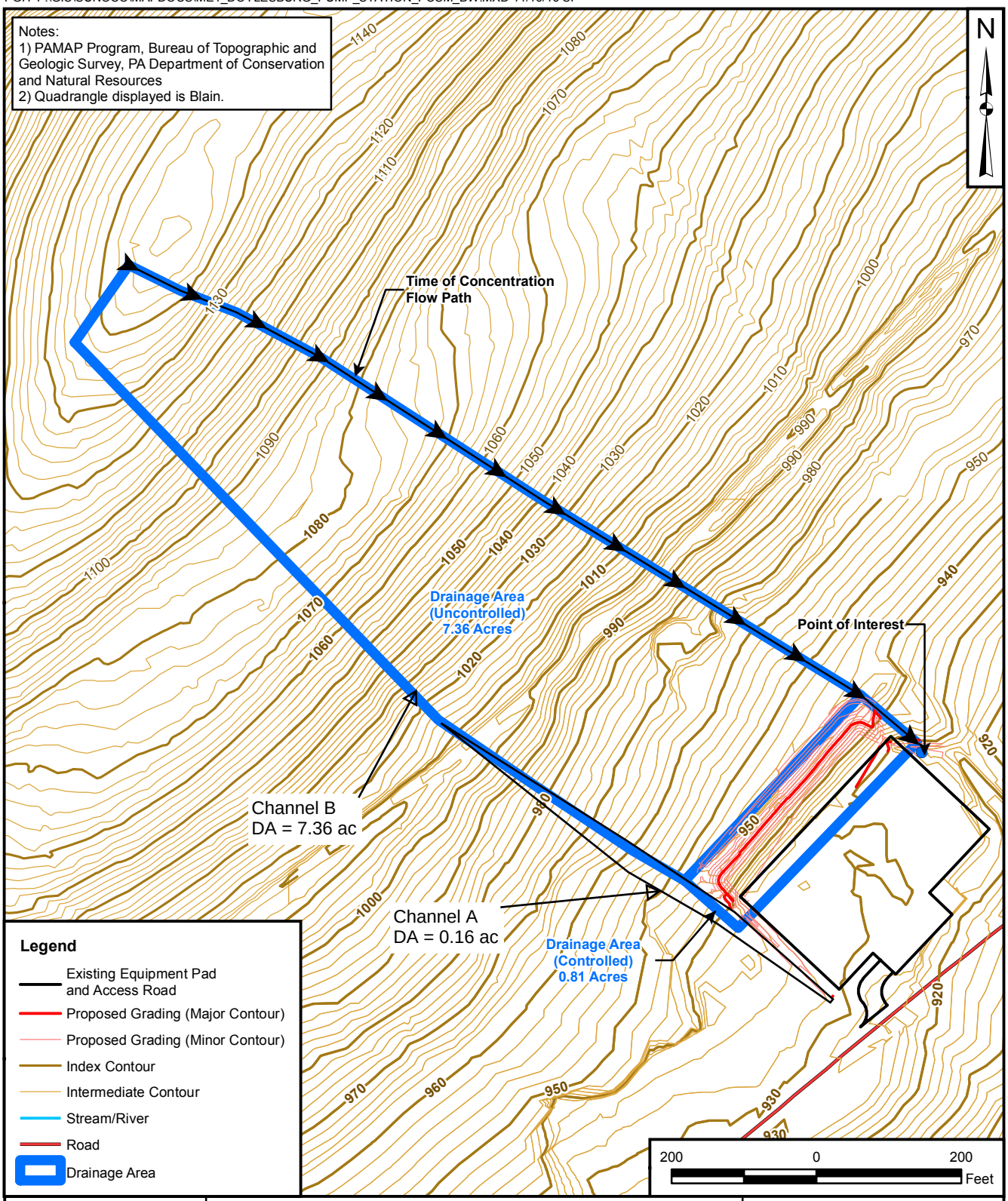
Boundary
Use depth and classification
Classification as Follows:
Abrupt
Clear
Gradual
Diffuse

Notes:
- Did Not Encounter Seasonal High Groundwater
- No Refusal
- < 0.5" of Rain in past 24 hours

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual
USDA Definitions located from: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308

APPENDIX C – PRE-DEVELOPED RUNOFF MAP

PGH P:\GIS\SUNOCO\MAPDOCS\ME1_DOYLESBURG_PUMP_STATION_PCSM_BW.MXD 11/16/16 SP



TETRA TECH

DRAINAGE AREA MAP
DOYLESBURG PUMP STATION
MARINER EAST
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PENNSYLVANIA

DRAWN BY: K. MOORE 10/12/15
CHECKED BY: T. DUNAWAY 11/16/16
APPROVED BY:

CONTRACT NUMBER: 212IC-PB-00136

FIGURE NUMBER	REV
1	0

PGH P:\GIS\SUNOCO\MAPDOCS\ME1_DOYLESBURG_PUMP_STATION_PCSM_PRE-CONSTRUCTION.MXD 10/24/16 SP

TETRA TECH

PRE-CONSTRUCTION DRAINAGE AREA MAP

DOYLESBURG PUMP STATION

MARINER EAST

SUNOCO LOGISTICS, L.P.

PERRY COUNTY, PENNSYLVANIA

DRAWN BY: S. PAXTON 10/12/15
CHECKED BY: T. DUNAWAY 10/24/16
APPROVED BY:

CONTRACT NUMBER: 212IC-PB-00136

FIGURE NUMBER	REV
1	0

APPENDIX D – POST-DEVELOPED RUNOFF MAP

PGH P:\GIS\SUNOCO\MAPDOCS\ME1_DOYLESBURG_PUMP_STATION_PCSM_POST-CONSTRUCTION.MXD 11/16/16 SP

TETRA TECH

POST-CONSTRUCTION DRAINAGE AREA MAP
DOYLESBURG PUMP STATION
MARINER EAST
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PENNSYLVANIA

DRAWN BY: S. PAXTON 10/12/15
CHECKED BY: T. DUNAWAY 11/16/16
APPROVED BY:

CONTRACT NUMBER: 212IC-PB-00136

FIGURE NUMBER	REV
1	0

APPENDIX E – CALCULATIONS

Table of Contents

Table of Contents

Table of Contents

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Post Uncontrolled	2-yr	2	0.381	12.100	4.21
Post Uncontrolled	5-yr	5	0.623	12.100	7.52
Post Uncontrolled	10-yr	10	0.865	12.100	10.79
Post Uncontrolled	25-yr	25	1.269	12.100	16.20
Post Uncontrolled	50-yr	50	1.662	12.100	21.39
Post Uncontrolled	100-yr	100	2.140	12.100	27.64
Pre-Developed	2-yr	2	0.410	12.100	4.50
Pre-Developed	5-yr	5	0.675	12.100	8.15
Pre-Developed	10-yr	10	0.940	12.100	11.76
Pre-Developed	25-yr	25	1.384	12.100	17.75
Pre-Developed	50-yr	50	1.817	12.100	23.52
Pre-Developed	100-yr	100	2.345	12.100	30.47
Post Controlled	2-yr	2	0.068	11.950	1.21
Post Controlled	5-yr	5	0.101	11.950	1.83
Post Controlled	10-yr	10	0.133	11.950	2.41
Post Controlled	25-yr	25	0.185	11.900	3.35
Post Controlled	50-yr	50	0.234	11.900	4.25
Post Controlled	100-yr	100	0.292	11.900	5.30

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Pre-Out	2-yr	2	0.410	12.100	4.50
Pre-Out	5-yr	5	0.675	12.100	8.15
Pre-Out	10-yr	10	0.940	12.100	11.76
Pre-Out	25-yr	25	1.384	12.100	17.75
Pre-Out	50-yr	50	1.817	12.100	23.52
Pre-Out	100-yr	100	2.345	12.100	30.47
Post-Out	2-yr	2	0.381	12.100	4.21
Post-Out	5-yr	5	0.623	12.100	7.52
Post-Out	10-yr	10	0.884	12.100	10.79
Post-Out	25-yr	25	1.340	12.100	16.20
Post-Out	50-yr	50	1.782	12.100	21.49
Post-Out	100-yr	100	2.318	12.100	28.11

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
BMP (IN)	2-yr	2	0.068	11.950	1.21	(N/A)	(N/A)
BMP (OUT)	2-yr	2	0.000	0.000	0.00	926.29	0.068

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
BMP (IN)	5-yr	5	0.101	11.950	1.83	(N/A)	(N/A)
BMP (OUT)	5-yr	5	0.000	0.000	0.00	926.81	0.101
BMP (IN)	10-yr	10	0.133	11.950	2.41	(N/A)	(N/A)
BMP (OUT)	10-yr	10	0.019	19.750	0.04	927.05	0.117
BMP (IN)	25-yr	25	0.185	11.900	3.35	(N/A)	(N/A)
BMP (OUT)	25-yr	25	0.071	14.100	0.12	927.17	0.124
BMP (IN)	50-yr	50	0.234	11.900	4.25	(N/A)	(N/A)
BMP (OUT)	50-yr	50	0.120	12.850	0.28	927.40	0.136
BMP (IN)	100-yr	100	0.292	11.900	5.30	(N/A)	(N/A)
BMP (OUT)	100-yr	100	0.178	12.450	0.55	927.93	0.160

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

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.4	0.4	0.4
4.500	0.4	0.4	0.4	0.4	0.4
5.000	0.4	0.4	0.5	0.5	0.5
5.500	0.5	0.5	0.5	0.5	0.5
6.000	0.6	0.6	0.6	0.6	0.6
6.500	0.6	0.6	0.6	0.7	0.7
7.000	0.7	0.7	0.7	0.7	0.7
7.500	0.8	0.8	0.8	0.8	0.8
8.000	0.8	0.8	0.9	0.9	0.9
8.500	0.9	0.9	1.0	1.0	1.0
9.000	1.0	1.0	1.1	1.1	1.1
9.500	1.1	1.1	1.2	1.2	1.2
10.000	1.3	1.3	1.3	1.3	1.4
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.7	1.7	1.8	1.9
11.500	2.0	2.1	2.4	3.0	3.9
12.000	4.6	4.7	4.8	4.9	5.0
12.500	5.1	5.1	5.2	5.2	5.3
13.000	5.3	5.4	5.4	5.5	5.5
13.500	5.5	5.6	5.6	5.6	5.6
14.000	5.7	5.7	5.7	5.7	5.8
14.500	5.8	5.8	5.8	5.9	5.9
15.000	5.9	5.9	5.9	6.0	6.0
15.500	6.0	6.0	6.0	6.0	6.1
16.000	6.1	6.1	6.1	6.1	6.1
16.500	6.2	6.2	6.2	6.2	6.2
17.000	6.2	6.2	6.3	6.3	6.3
17.500	6.3	6.3	6.3	6.3	6.4

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 100 years
Storm Event: 100-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	6.4	6.4	6.4	6.4	6.4
18.500	6.4	6.4	6.4	6.5	6.5
19.000	6.5	6.5	6.5	6.5	6.5
19.500	6.5	6.5	6.6	6.6	6.6
20.000	6.6	6.6	6.6	6.6	6.6
20.500	6.6	6.6	6.6	6.6	6.7
21.000	6.7	6.7	6.7	6.7	6.7
21.500	6.7	6.7	6.7	6.7	6.7
22.000	6.8	6.8	6.8	6.8	6.8
22.500	6.8	6.8	6.8	6.8	6.8
23.000	6.8	6.8	6.8	6.9	6.9
23.500	6.9	6.9	6.9	6.9	6.9
24.000	6.9	(N/A)	(N/A)	(N/A)	(N/A)

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

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.3
6.000	0.3	0.3	0.3	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.4	0.4	0.4	0.4	0.4
7.500	0.5	0.5	0.5	0.5	0.5
8.000	0.5	0.5	0.5	0.5	0.5
8.500	0.6	0.6	0.6	0.6	0.6
9.000	0.6	0.6	0.6	0.7	0.7
9.500	0.7	0.7	0.7	0.7	0.7
10.000	0.8	0.8	0.8	0.8	0.8
10.500	0.9	0.9	0.9	0.9	1.0
11.000	1.0	1.0	1.0	1.1	1.1
11.500	1.2	1.3	1.5	1.8	2.4
12.000	2.8	2.8	2.9	3.0	3.0
12.500	3.1	3.1	3.1	3.2	3.2
13.000	3.2	3.2	3.3	3.3	3.3
13.500	3.3	3.4	3.4	3.4	3.4
14.000	3.4	3.4	3.4	3.5	3.5
14.500	3.5	3.5	3.5	3.5	3.5
15.000	3.6	3.6	3.6	3.6	3.6
15.500	3.6	3.6	3.6	3.6	3.7
16.000	3.7	3.7	3.7	3.7	3.7
16.500	3.7	3.7	3.7	3.7	3.8
17.000	3.8	3.8	3.8	3.8	3.8
17.500	3.8	3.8	3.8	3.8	3.8

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 10 years
Storm Event: 10-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	3.8	3.8	3.9	3.9	3.9
18.500	3.9	3.9	3.9	3.9	3.9
19.000	3.9	3.9	3.9	3.9	3.9
19.500	3.9	3.9	4.0	4.0	4.0
20.000	4.0	4.0	4.0	4.0	4.0
20.500	4.0	4.0	4.0	4.0	4.0
21.000	4.0	4.0	4.0	4.0	4.0
21.500	4.0	4.1	4.1	4.1	4.1
22.000	4.1	4.1	4.1	4.1	4.1
22.500	4.1	4.1	4.1	4.1	4.1
23.000	4.1	4.1	4.1	4.1	4.1
23.500	4.1	4.2	4.2	4.2	4.2
24.000	4.2	(N/A)	(N/A)	(N/A)	(N/A)

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

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.4
5.500	0.4	0.4	0.4	0.4	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.5	0.5	0.5	0.5	0.5
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.6	0.6	0.6	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.7
8.500	0.7	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.8	0.9	0.9	0.9
10.000	0.9	0.9	1.0	1.0	1.0
10.500	1.0	1.1	1.1	1.1	1.2
11.000	1.2	1.2	1.3	1.3	1.4
11.500	1.4	1.6	1.8	2.2	2.9
12.000	3.4	3.5	3.6	3.6	3.7
12.500	3.7	3.8	3.8	3.9	3.9
13.000	3.9	4.0	4.0	4.0	4.1
13.500	4.1	4.1	4.1	4.1	4.2
14.000	4.2	4.2	4.2	4.2	4.3
14.500	4.3	4.3	4.3	4.3	4.3
15.000	4.4	4.4	4.4	4.4	4.4
15.500	4.4	4.4	4.5	4.5	4.5
16.000	4.5	4.5	4.5	4.5	4.5
16.500	4.5	4.6	4.6	4.6	4.6
17.000	4.6	4.6	4.6	4.6	4.6
17.500	4.6	4.7	4.7	4.7	4.7

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 25 years
Storm Event: 25-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	4.7	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.8	4.8	4.8
19.000	4.8	4.8	4.8	4.8	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.9	4.9	4.9	4.9	4.9
20.500	4.9	4.9	4.9	4.9	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	5.0	5.0	5.0	5.0	5.0
22.000	5.0	5.0	5.0	5.0	5.0
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.1	5.1	5.1
23.500	5.1	5.1	5.1	5.1	5.1
24.000	5.1	(N/A)	(N/A)	(N/A)	(N/A)

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

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.4	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.5	0.6	0.6
10.500	0.6	0.6	0.6	0.6	0.7
11.000	0.7	0.7	0.7	0.7	0.8
11.500	0.8	0.9	1.0	1.2	1.6
12.000	1.9	2.0	2.0	2.0	2.1
12.500	2.1	2.1	2.2	2.2	2.2
13.000	2.2	2.2	2.2	2.3	2.3
13.500	2.3	2.3	2.3	2.3	2.3
14.000	2.4	2.4	2.4	2.4	2.4
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.5	2.5	2.5	2.5
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.6
16.500	2.6	2.6	2.6	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 2 years
Storm Event: 2-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	2.6	2.6	2.7	2.7	2.7
18.500	2.7	2.7	2.7	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.8	2.8	2.8	2.8	2.8
21.000	2.8	2.8	2.8	2.8	2.8
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.9
23.500	2.9	2.9	2.9	2.9	2.9
24.000	2.9	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 50-year	
Label	50-year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	50 years

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.4	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.5	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.6	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.6	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.7	0.8	0.8
8.500	0.8	0.8	0.8	0.8	0.9
9.000	0.9	0.9	0.9	0.9	0.9
9.500	1.0	1.0	1.0	1.0	1.1
10.000	1.1	1.1	1.1	1.2	1.2
10.500	1.2	1.2	1.3	1.3	1.4
11.000	1.4	1.4	1.5	1.5	1.6
11.500	1.7	1.8	2.1	2.6	3.4
12.000	3.9	4.1	4.1	4.2	4.3
12.500	4.4	4.4	4.5	4.5	4.5
13.000	4.6	4.6	4.7	4.7	4.7
13.500	4.7	4.8	4.8	4.8	4.8
14.000	4.9	4.9	4.9	4.9	5.0
14.500	5.0	5.0	5.0	5.0	5.1
15.000	5.1	5.1	5.1	5.1	5.1
15.500	5.2	5.2	5.2	5.2	5.2
16.000	5.2	5.2	5.3	5.3	5.3
16.500	5.3	5.3	5.3	5.3	5.3
17.000	5.4	5.4	5.4	5.4	5.4
17.500	5.4	5.4	5.4	5.4	5.5

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 50 years
Storm Event: 50-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	5.5	5.5	5.5	5.5	5.5
18.500	5.5	5.5	5.5	5.6	5.6
19.000	5.6	5.6	5.6	5.6	5.6
19.500	5.6	5.6	5.6	5.6	5.6
20.000	5.7	5.7	5.7	5.7	5.7
20.500	5.7	5.7	5.7	5.7	5.7
21.000	5.7	5.7	5.7	5.8	5.8
21.500	5.8	5.8	5.8	5.8	5.8
22.000	5.8	5.8	5.8	5.8	5.8
22.500	5.8	5.8	5.9	5.9	5.9
23.000	5.9	5.9	5.9	5.9	5.9
23.500	5.9	5.9	5.9	5.9	5.9
24.000	5.9	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 5-year	
Label	5-year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.3	0.3	0.3	0.3	0.3
6.000	0.3	0.3	0.3	0.3	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.4	0.4	0.4	0.4	0.4
7.500	0.4	0.4	0.4	0.4	0.4
8.000	0.4	0.4	0.4	0.5	0.5
8.500	0.5	0.5	0.5	0.5	0.5
9.000	0.5	0.5	0.5	0.6	0.6
9.500	0.6	0.6	0.6	0.6	0.6
10.000	0.6	0.7	0.7	0.7	0.7
10.500	0.7	0.7	0.8	0.8	0.8
11.000	0.8	0.9	0.9	0.9	1.0
11.500	1.0	1.1	1.3	1.5	2.0
12.000	2.4	2.4	2.5	2.5	2.6
12.500	2.6	2.6	2.7	2.7	2.7
13.000	2.7	2.8	2.8	2.8	2.8
13.500	2.8	2.9	2.9	2.9	2.9
14.000	2.9	2.9	2.9	3.0	3.0
14.500	3.0	3.0	3.0	3.0	3.0
15.000	3.0	3.0	3.1	3.1	3.1
15.500	3.1	3.1	3.1	3.1	3.1
16.000	3.1	3.1	3.1	3.2	3.2
16.500	3.2	3.2	3.2	3.2	3.2
17.000	3.2	3.2	3.2	3.2	3.2
17.500	3.2	3.3	3.3	3.3	3.3

Subsection: Time-Depth Curve
Label: Time-Depth - 1

Return Event: 5 years
Storm Event: 5-year

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
18.000	3.3	3.3	3.3	3.3	3.3
18.500	3.3	3.3	3.3	3.3	3.3
19.000	3.3	3.3	3.3	3.4	3.4
19.500	3.4	3.4	3.4	3.4	3.4
20.000	3.4	3.4	3.4	3.4	3.4
20.500	3.4	3.4	3.4	3.4	3.4
21.000	3.4	3.4	3.4	3.4	3.5
21.500	3.5	3.5	3.5	3.5	3.5
22.000	3.5	3.5	3.5	3.5	3.5
22.500	3.5	3.5	3.5	3.5	3.5
23.000	3.5	3.5	3.5	3.5	3.5
23.500	3.5	3.5	3.5	3.6	3.6
24.000	3.6	(N/A)	(N/A)	(N/A)	(N/A)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.800
Slope	0.200 ft/ft
2 Year 24 Hour Depth	2.7 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.270 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,200.00 ft
Is Paved?	False
Slope	0.175 ft/ft
Average Velocity	6.75 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.319 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

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

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

(Lf / V) / 3600

Where:

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

Storm Event	2-year
Return Event	2 years
Duration	48.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.933 hours
Flow (Peak, Computed)	1.24 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	1.21 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.068 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.068 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	5-year
Return Event	5 years
Duration	48.000 hours
Depth	3.6 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	1.90 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	1.83 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	0.101 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.101 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	10-year
Return Event	10 years
Duration	48.000 hours
Depth	4.2 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	2.52 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	2.41 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	0.133 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.133 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	25-year
Return Event	25 years
Duration	48.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	3.51 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.900 hours
Flow (Peak Interpolated Output)	3.35 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	0.185 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.185 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	50-year
Return Event	50 years
Duration	48.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	4.42 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.900 hours
Flow (Peak Interpolated Output)	4.25 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.5 in
Runoff Volume (Pervious)	0.234 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.234 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	100-year
Return Event	100 years
Duration	48.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.813 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	5.50 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.900 hours
Flow (Peak Interpolated Output)	5.30 ft³/s

Drainage Area	
SCS CN (Composite)	77.287
Area (User Defined)	0.813 acres
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.3 in
Runoff Volume (Pervious)	0.292 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.292 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.05 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	2-year
Return Event	2 years
Duration	48.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.122 hours
Flow (Peak, Computed)	4.26 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.21 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.381 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.381 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	5-year
Return Event	5 years
Duration	48.000 hours
Depth	3.6 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.079 hours
Flow (Peak, Computed)	7.53 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	7.52 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.624 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.623 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	10-year
Return Event	10 years
Duration	48.000 hours
Depth	4.2 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.079 hours
Flow (Peak, Computed)	10.86 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	10.79 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.865 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.865 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	25-year
Return Event	25 years
Duration	48.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.079 hours
Flow (Peak, Computed)	16.38 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	16.20 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	1.269 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.269 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	50-year
Return Event	50 years
Duration	48.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.079 hours
Flow (Peak, Computed)	21.69 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	21.39 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	1.662 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.662 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	100-year
Return Event	100 years
Duration	48.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	7.358 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.079 hours
Flow (Peak, Computed)	28.09 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	27.64 ft³/s

Drainage Area	
SCS CN (Composite)	69.490
Area (User Defined)	7.358 acres
Maximum Retention (Pervious)	4.4 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.5 in
Runoff Volume (Pervious)	2.141 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.140 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	26.13 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.851 hours
Total unit time, Tb	1.063 hours

Storm Event	2-year
Return Event	2 years
Duration	48.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	4.51 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.50 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.410 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.410 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Storm Event	5-year
Return Event	5 years
Duration	48.000 hours
Depth	3.6 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	8.17 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	8.15 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.675 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.675 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Storm Event	10-year
Return Event	10 years
Duration	48.000 hours
Depth	4.2 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	11.80 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	11.76 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.940 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.940 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Storm Event	25-year
Return Event	25 years
Duration	48.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	17.82 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	17.75 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	1.384 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.384 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Storm Event	50-year
Return Event	50 years
Duration	48.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	23.63 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	23.52 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	1.817 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.817 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Storm Event	100-year
Return Event	100 years
Duration	48.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.319 hours
Area (User Defined)	8.170 acres

Computational Time Increment	0.043 hours
Time to Peak (Computed)	12.097 hours
Flow (Peak, Computed)	30.61 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	30.47 ft³/s

Drainage Area	
SCS CN (Composite)	69.026
Area (User Defined)	8.170 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	2.344 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.345 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.319 hours
Computational Time Increment	0.043 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.98 ft³/s
Unit peak time, Tp	0.213 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.852 hours
Total unit time, Tb	1.065 hours

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.000	0.000	0.00
Flow (From)	Post Uncontrolled	0.381	12.100	4.21
Flow (In)	Post-Out	0.381	12.100	4.21

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.000	0.000	0.00
Flow (From)	Post Uncontrolled	0.623	12.100	7.52
Flow (In)	Post-Out	0.623	12.100	7.52

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.019	19.750	0.04
Flow (From)	Post Uncontrolled	0.865	12.100	10.79
Flow (In)	Post-Out	0.884	12.100	10.79

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.071	14.100	0.12
Flow (From)	Post Uncontrolled	1.269	12.100	16.20
Flow (In)	Post-Out	1.340	12.100	16.20

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.120	12.850	0.28
Flow (From)	Post Uncontrolled	1.662	12.100	21.39
Flow (In)	Post-Out	1.782	12.100	21.49

Summary for Hydrograph Addition at 'Post-Out'

Upstream Link	Upstream Node
Outlet-1	BMP
<Catchment to Outflow Node>	Post Uncontrolled

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.178	12.450	0.55
Flow (From)	Post Uncontrolled	2.140	12.100	27.64
Flow (In)	Post-Out	2.318	12.100	28.11

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	0.410	12.100	4.50
Flow (In)	Pre-Out	0.410	12.100	4.50

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	0.675	12.100	8.15
Flow (In)	Pre-Out	0.675	12.100	8.15

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	0.940	12.100	11.76
Flow (In)	Pre-Out	0.940	12.100	11.76

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	1.384	12.100	17.75
Flow (In)	Pre-Out	1.384	12.100	17.75

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	1.817	12.100	23.52
Flow (In)	Pre-Out	1.817	12.100	23.52

Summary for Hydrograph Addition at 'Pre-Out'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Pre-Developed

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Pre-Developed	2.345	12.100	30.47
Flow (In)	Pre-Out	2.345	12.100	30.47

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.00	925.00	925.00
7.250	925.00	925.00	925.00	925.00	925.00
7.500	925.00	925.00	925.00	925.00	925.00
7.750	925.00	925.00	925.00	925.00	925.00
8.000	925.00	925.00	925.00	925.00	925.00
8.250	925.00	925.00	925.00	925.00	925.00
8.500	925.00	925.00	925.00	925.00	925.00
8.750	925.00	925.00	925.00	925.00	925.00
9.000	925.00	925.00	925.00	925.00	925.00
9.250	925.00	925.00	925.00	925.00	925.00
9.500	925.00	925.00	925.00	925.00	925.00
9.750	925.00	925.00	925.00	925.00	925.00
10.000	925.00	925.00	925.00	925.00	925.00
10.250	925.00	925.00	925.00	925.00	925.00
10.500	925.00	925.00	925.00	925.00	925.00

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 2 years
Storm Event: 2-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.00	925.00	925.00	925.00	925.00
11.000	925.00	925.00	925.00	925.01	925.01
11.250	925.01	925.01	925.01	925.02	925.02
11.500	925.02	925.03	925.03	925.04	925.06
11.750	925.08	925.12	925.18	925.28	925.39
12.000	925.51	925.58	925.62	925.64	925.66
12.250	925.68	925.69	925.71	925.72	925.73
12.500	925.74	925.75	925.76	925.77	925.77
12.750	925.78	925.79	925.80	925.80	925.81
13.000	925.82	925.82	925.83	925.84	925.84
13.250	925.85	925.85	925.86	925.87	925.87
13.500	925.88	925.88	925.89	925.89	925.90
13.750	925.90	925.90	925.91	925.91	925.92
14.000	925.92	925.93	925.93	925.93	925.94
14.250	925.94	925.94	925.95	925.95	925.96
14.500	925.96	925.96	925.97	925.97	925.97
14.750	925.98	925.98	925.98	925.99	925.99
15.000	925.99	926.00	926.00	926.00	926.01
15.250	926.01	926.01	926.01	926.02	926.02
15.500	926.02	926.02	926.03	926.03	926.03
15.750	926.03	926.04	926.04	926.04	926.04
16.000	926.05	926.05	926.05	926.05	926.06
16.250	926.06	926.06	926.06	926.06	926.07
16.500	926.07	926.07	926.07	926.07	926.08
16.750	926.08	926.08	926.08	926.08	926.09
17.000	926.09	926.09	926.09	926.10	926.10
17.250	926.10	926.10	926.10	926.10	926.11
17.500	926.11	926.11	926.11	926.11	926.12
17.750	926.12	926.12	926.12	926.12	926.13
18.000	926.13	926.13	926.13	926.13	926.13
18.250	926.14	926.14	926.14	926.14	926.14
18.500	926.14	926.15	926.15	926.15	926.15
18.750	926.15	926.15	926.16	926.16	926.16
19.000	926.16	926.16	926.16	926.17	926.17
19.250	926.17	926.17	926.17	926.17	926.17
19.500	926.18	926.18	926.18	926.18	926.18
19.750	926.18	926.18	926.19	926.19	926.19
20.000	926.19	926.19	926.19	926.19	926.20
20.250	926.20	926.20	926.20	926.20	926.20
20.500	926.20	926.20	926.21	926.21	926.21
20.750	926.21	926.21	926.21	926.21	926.21
21.000	926.22	926.22	926.22	926.22	926.22
21.250	926.22	926.22	926.22	926.23	926.23

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	926.23	926.23	926.23	926.23	926.23
21.750	926.23	926.24	926.24	926.24	926.24
22.000	926.24	926.24	926.24	926.24	926.25
22.250	926.25	926.25	926.25	926.25	926.25
22.500	926.25	926.25	926.26	926.26	926.26
22.750	926.26	926.26	926.26	926.26	926.26
23.000	926.27	926.27	926.27	926.27	926.27
23.250	926.27	926.27	926.27	926.27	926.28
23.500	926.28	926.28	926.28	926.28	926.28
23.750	926.28	926.28	926.29	926.29	926.29
24.000	926.29	926.29	926.29	926.29	926.29
24.250	926.29	926.29	926.29	926.29	926.29
24.500	926.29	926.29	926.29	926.29	926.29
24.750	926.29	926.29	926.29	926.29	926.29
25.000	926.29	926.29	926.29	926.29	926.29
25.250	926.29	926.29	926.29	926.29	926.29
25.500	926.29	926.29	926.29	926.29	926.29
25.750	926.29	926.29	926.29	926.29	926.29
26.000	926.29	926.29	926.29	926.29	926.29
26.250	926.29	926.29	926.29	926.29	926.29
26.500	926.29	926.29	926.29	926.29	926.29
26.750	926.29	926.29	926.29	926.29	926.29
27.000	926.29	926.29	926.29	926.29	926.29
27.250	926.29	926.29	926.29	926.29	926.29
27.500	926.29	926.29	926.29	926.29	926.29
27.750	926.29	926.29	926.29	926.29	926.29
28.000	926.29	926.29	926.29	926.29	926.29
28.250	926.29	926.29	926.29	926.29	926.29
28.500	926.29	926.29	926.29	926.29	926.29
28.750	926.29	926.29	926.29	926.29	926.29
29.000	926.29	926.29	926.29	926.29	926.29
29.250	926.29	926.29	926.29	926.29	926.29
29.500	926.29	926.29	926.29	926.29	926.29
29.750	926.29	926.29	926.29	926.29	926.29
30.000	926.29	926.29	926.29	926.29	926.29
30.250	926.29	926.29	926.29	926.29	926.29
30.500	926.29	926.29	926.29	926.29	926.29
30.750	926.29	926.29	926.29	926.29	926.29
31.000	926.29	926.29	926.29	926.29	926.29
31.250	926.29	926.29	926.29	926.29	926.29
31.500	926.29	926.29	926.29	926.29	926.29
31.750	926.29	926.29	926.29	926.29	926.29
32.000	926.29	926.29	926.29	926.29	926.29

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	926.29	926.29	926.29	926.29	926.29
32.500	926.29	926.29	926.29	926.29	926.29
32.750	926.29	926.29	926.29	926.29	926.29
33.000	926.29	926.29	926.29	926.29	926.29
33.250	926.29	926.29	926.29	926.29	926.29
33.500	926.29	926.29	926.29	926.29	926.29
33.750	926.29	926.29	926.29	926.29	926.29
34.000	926.29	926.29	926.29	926.29	926.29
34.250	926.29	926.29	926.29	926.29	926.29
34.500	926.29	926.29	926.29	926.29	926.29
34.750	926.29	926.29	926.29	926.29	926.29
35.000	926.29	926.29	926.29	926.29	926.29
35.250	926.29	926.29	926.29	926.29	926.29
35.500	926.29	926.29	926.29	926.29	926.29
35.750	926.29	926.29	926.29	926.29	926.29
36.000	926.29	926.29	926.29	926.29	926.29
36.250	926.29	926.29	926.29	926.29	926.29
36.500	926.29	926.29	926.29	926.29	926.29
36.750	926.29	926.29	926.29	926.29	926.29
37.000	926.29	926.29	926.29	926.29	926.29
37.250	926.29	926.29	926.29	926.29	926.29
37.500	926.29	926.29	926.29	926.29	926.29
37.750	926.29	926.29	926.29	926.29	926.29
38.000	926.29	926.29	926.29	926.29	926.29
38.250	926.29	926.29	926.29	926.29	926.29
38.500	926.29	926.29	926.29	926.29	926.29
38.750	926.29	926.29	926.29	926.29	926.29
39.000	926.29	926.29	926.29	926.29	926.29
39.250	926.29	926.29	926.29	926.29	926.29
39.500	926.29	926.29	926.29	926.29	926.29
39.750	926.29	926.29	926.29	926.29	926.29
40.000	926.29	926.29	926.29	926.29	926.29
40.250	926.29	926.29	926.29	926.29	926.29
40.500	926.29	926.29	926.29	926.29	926.29
40.750	926.29	926.29	926.29	926.29	926.29
41.000	926.29	926.29	926.29	926.29	926.29
41.250	926.29	926.29	926.29	926.29	926.29
41.500	926.29	926.29	926.29	926.29	926.29
41.750	926.29	926.29	926.29	926.29	926.29
42.000	926.29	926.29	926.29	926.29	926.29
42.250	926.29	926.29	926.29	926.29	926.29
42.500	926.29	926.29	926.29	926.29	926.29
42.750	926.29	926.29	926.29	926.29	926.29

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	926.29	926.29	926.29	926.29	926.29
43.250	926.29	926.29	926.29	926.29	926.29
43.500	926.29	926.29	926.29	926.29	926.29
43.750	926.29	926.29	926.29	926.29	926.29
44.000	926.29	926.29	926.29	926.29	926.29
44.250	926.29	926.29	926.29	926.29	926.29
44.500	926.29	926.29	926.29	926.29	926.29
44.750	926.29	926.29	926.29	926.29	926.29
45.000	926.29	926.29	926.29	926.29	926.29
45.250	926.29	926.29	926.29	926.29	926.29
45.500	926.29	926.29	926.29	926.29	926.29
45.750	926.29	926.29	926.29	926.29	926.29
46.000	926.29	926.29	926.29	926.29	926.29
46.250	926.29	926.29	926.29	926.29	926.29
46.500	926.29	926.29	926.29	926.29	926.29
46.750	926.29	926.29	926.29	926.29	926.29
47.000	926.29	926.29	926.29	926.29	926.29
47.250	926.29	926.29	926.29	926.29	926.29
47.500	926.29	926.29	926.29	926.29	926.29
47.750	926.29	926.29	926.29	926.29	926.29
48.000	926.29	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 5 years
Storm Event: 5-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.00	925.00	925.00
7.250	925.00	925.00	925.00	925.00	925.00
7.500	925.00	925.00	925.00	925.00	925.00
7.750	925.00	925.00	925.00	925.00	925.00
8.000	925.00	925.00	925.00	925.00	925.00
8.250	925.00	925.00	925.00	925.00	925.00
8.500	925.00	925.00	925.00	925.00	925.00
8.750	925.00	925.00	925.00	925.00	925.00
9.000	925.00	925.00	925.00	925.00	925.00
9.250	925.00	925.00	925.00	925.00	925.00
9.500	925.00	925.00	925.00	925.00	925.00
9.750	925.00	925.00	925.00	925.00	925.00
10.000	925.00	925.00	925.00	925.00	925.00
10.250	925.00	925.00	925.01	925.01	925.01
10.500	925.01	925.01	925.01	925.01	925.01

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 5 years
Storm Event: 5-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.02	925.02	925.02	925.02	925.02
11.000	925.03	925.03	925.03	925.04	925.04
11.250	925.05	925.05	925.06	925.06	925.07
11.500	925.07	925.08	925.10	925.12	925.15
11.750	925.20	925.26	925.36	925.51	925.64
12.000	925.77	925.87	925.94	925.97	926.00
12.250	926.02	926.03	926.05	926.07	926.08
12.500	926.10	926.11	926.12	926.13	926.14
12.750	926.15	926.16	926.17	926.18	926.18
13.000	926.19	926.20	926.21	926.22	926.22
13.250	926.23	926.24	926.24	926.25	926.26
13.500	926.26	926.27	926.28	926.28	926.29
13.750	926.29	926.30	926.30	926.31	926.31
14.000	926.32	926.32	926.33	926.33	926.34
14.250	926.34	926.35	926.35	926.36	926.36
14.500	926.37	926.37	926.37	926.38	926.38
14.750	926.39	926.39	926.40	926.40	926.40
15.000	926.41	926.41	926.42	926.42	926.42
15.250	926.43	926.43	926.44	926.44	926.44
15.500	926.45	926.45	926.45	926.46	926.46
15.750	926.46	926.47	926.47	926.47	926.48
16.000	926.48	926.48	926.49	926.49	926.49
16.250	926.50	926.50	926.50	926.50	926.51
16.500	926.51	926.51	926.52	926.52	926.52
16.750	926.52	926.53	926.53	926.53	926.54
17.000	926.54	926.54	926.54	926.55	926.55
17.250	926.55	926.55	926.56	926.56	926.56
17.500	926.56	926.57	926.57	926.57	926.57
17.750	926.58	926.58	926.58	926.58	926.59
18.000	926.59	926.59	926.59	926.60	926.60
18.250	926.60	926.60	926.61	926.61	926.61
18.500	926.61	926.62	926.62	926.62	926.62
18.750	926.62	926.63	926.63	926.63	926.63
19.000	926.63	926.64	926.64	926.64	926.64
19.250	926.65	926.65	926.65	926.65	926.65
19.500	926.65	926.66	926.66	926.66	926.66
19.750	926.66	926.67	926.67	926.67	926.67
20.000	926.67	926.68	926.68	926.68	926.68
20.250	926.68	926.68	926.69	926.69	926.69
20.500	926.69	926.69	926.69	926.70	926.70
20.750	926.70	926.70	926.70	926.70	926.71
21.000	926.71	926.71	926.71	926.71	926.71
21.250	926.72	926.72	926.72	926.72	926.72

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	926.72	926.73	926.73	926.73	926.73
21.750	926.73	926.73	926.74	926.74	926.74
22.000	926.74	926.74	926.74	926.75	926.75
22.250	926.75	926.75	926.75	926.75	926.76
22.500	926.76	926.76	926.76	926.76	926.76
22.750	926.77	926.77	926.77	926.77	926.77
23.000	926.77	926.78	926.78	926.78	926.78
23.250	926.78	926.78	926.78	926.79	926.79
23.500	926.79	926.79	926.79	926.79	926.80
23.750	926.80	926.80	926.80	926.80	926.80
24.000	926.80	926.81	926.81	926.81	926.81
24.250	926.81	926.81	926.81	926.81	926.81
24.500	926.81	926.81	926.81	926.81	926.81
24.750	926.81	926.81	926.81	926.81	926.81
25.000	926.81	926.81	926.81	926.81	926.81
25.250	926.81	926.81	926.81	926.81	926.81
25.500	926.81	926.81	926.81	926.81	926.81
25.750	926.81	926.81	926.81	926.81	926.81
26.000	926.81	926.81	926.81	926.81	926.81
26.250	926.81	926.81	926.81	926.81	926.81
26.500	926.81	926.81	926.81	926.81	926.81
26.750	926.81	926.81	926.81	926.81	926.81
27.000	926.81	926.81	926.81	926.81	926.81
27.250	926.81	926.81	926.81	926.81	926.81
27.500	926.81	926.81	926.81	926.81	926.81
27.750	926.81	926.81	926.81	926.81	926.81
28.000	926.81	926.81	926.81	926.81	926.81
28.250	926.81	926.81	926.81	926.81	926.81
28.500	926.81	926.81	926.81	926.81	926.81
28.750	926.81	926.81	926.81	926.81	926.81
29.000	926.81	926.81	926.81	926.81	926.81
29.250	926.81	926.81	926.81	926.81	926.81
29.500	926.81	926.81	926.81	926.81	926.81
29.750	926.81	926.81	926.81	926.81	926.81
30.000	926.81	926.81	926.81	926.81	926.81
30.250	926.81	926.81	926.81	926.81	926.81
30.500	926.81	926.81	926.81	926.81	926.81
30.750	926.81	926.81	926.81	926.81	926.81
31.000	926.81	926.81	926.81	926.81	926.81
31.250	926.81	926.81	926.81	926.81	926.81
31.500	926.81	926.81	926.81	926.81	926.81
31.750	926.81	926.81	926.81	926.81	926.81
32.000	926.81	926.81	926.81	926.81	926.81

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	926.81	926.81	926.81	926.81	926.81
32.500	926.81	926.81	926.81	926.81	926.81
32.750	926.81	926.81	926.81	926.81	926.81
33.000	926.81	926.81	926.81	926.81	926.81
33.250	926.81	926.81	926.81	926.81	926.81
33.500	926.81	926.81	926.81	926.81	926.81
33.750	926.81	926.81	926.81	926.81	926.81
34.000	926.81	926.81	926.81	926.81	926.81
34.250	926.81	926.81	926.81	926.81	926.81
34.500	926.81	926.81	926.81	926.81	926.81
34.750	926.81	926.81	926.81	926.81	926.81
35.000	926.81	926.81	926.81	926.81	926.81
35.250	926.81	926.81	926.81	926.81	926.81
35.500	926.81	926.81	926.81	926.81	926.81
35.750	926.81	926.81	926.81	926.81	926.81
36.000	926.81	926.81	926.81	926.81	926.81
36.250	926.81	926.81	926.81	926.81	926.81
36.500	926.81	926.81	926.81	926.81	926.81
36.750	926.81	926.81	926.81	926.81	926.81
37.000	926.81	926.81	926.81	926.81	926.81
37.250	926.81	926.81	926.81	926.81	926.81
37.500	926.81	926.81	926.81	926.81	926.81
37.750	926.81	926.81	926.81	926.81	926.81
38.000	926.81	926.81	926.81	926.81	926.81
38.250	926.81	926.81	926.81	926.81	926.81
38.500	926.81	926.81	926.81	926.81	926.81
38.750	926.81	926.81	926.81	926.81	926.81
39.000	926.81	926.81	926.81	926.81	926.81
39.250	926.81	926.81	926.81	926.81	926.81
39.500	926.81	926.81	926.81	926.81	926.81
39.750	926.81	926.81	926.81	926.81	926.81
40.000	926.81	926.81	926.81	926.81	926.81
40.250	926.81	926.81	926.81	926.81	926.81
40.500	926.81	926.81	926.81	926.81	926.81
40.750	926.81	926.81	926.81	926.81	926.81
41.000	926.81	926.81	926.81	926.81	926.81
41.250	926.81	926.81	926.81	926.81	926.81
41.500	926.81	926.81	926.81	926.81	926.81
41.750	926.81	926.81	926.81	926.81	926.81
42.000	926.81	926.81	926.81	926.81	926.81
42.250	926.81	926.81	926.81	926.81	926.81
42.500	926.81	926.81	926.81	926.81	926.81
42.750	926.81	926.81	926.81	926.81	926.81

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	926.81	926.81	926.81	926.81	926.81
43.250	926.81	926.81	926.81	926.81	926.81
43.500	926.81	926.81	926.81	926.81	926.81
43.750	926.81	926.81	926.81	926.81	926.81
44.000	926.81	926.81	926.81	926.81	926.81
44.250	926.81	926.81	926.81	926.81	926.81
44.500	926.81	926.81	926.81	926.81	926.81
44.750	926.81	926.81	926.81	926.81	926.81
45.000	926.81	926.81	926.81	926.81	926.81
45.250	926.81	926.81	926.81	926.81	926.81
45.500	926.81	926.81	926.81	926.81	926.81
45.750	926.81	926.81	926.81	926.81	926.81
46.000	926.81	926.81	926.81	926.81	926.81
46.250	926.81	926.81	926.81	926.81	926.81
46.500	926.81	926.81	926.81	926.81	926.81
46.750	926.81	926.81	926.81	926.81	926.81
47.000	926.81	926.81	926.81	926.81	926.81
47.250	926.81	926.81	926.81	926.81	926.81
47.500	926.81	926.81	926.81	926.81	926.81
47.750	926.81	926.81	926.81	926.81	926.81
48.000	926.81	(N/A)	(N/A)	(N/A)	(N/A)

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.00	925.00	925.00
7.250	925.00	925.00	925.00	925.00	925.00
7.500	925.00	925.00	925.00	925.00	925.00
7.750	925.00	925.00	925.00	925.00	925.00
8.000	925.00	925.00	925.00	925.00	925.00
8.250	925.00	925.00	925.00	925.00	925.00
8.500	925.00	925.00	925.00	925.00	925.00
8.750	925.00	925.00	925.00	925.00	925.00
9.000	925.00	925.00	925.00	925.00	925.00
9.250	925.00	925.00	925.00	925.00	925.00
9.500	925.00	925.00	925.01	925.01	925.01
9.750	925.01	925.01	925.01	925.01	925.01
10.000	925.01	925.01	925.02	925.02	925.02
10.250	925.02	925.02	925.02	925.03	925.03
10.500	925.03	925.03	925.04	925.04	925.04

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 10 years
Storm Event: 10-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.05	925.05	925.05	925.06	925.06
11.000	925.07	925.07	925.08	925.08	925.09
11.250	925.10	925.11	925.11	925.12	925.13
11.500	925.15	925.16	925.18	925.21	925.26
11.750	925.32	925.42	925.54	925.69	925.87
12.000	926.03	926.15	926.22	926.26	926.29
12.250	926.31	926.34	926.36	926.38	926.40
12.500	926.41	926.43	926.44	926.46	926.47
12.750	926.48	926.49	926.50	926.51	926.53
13.000	926.54	926.55	926.55	926.56	926.57
13.250	926.58	926.59	926.60	926.61	926.61
13.500	926.62	926.63	926.64	926.64	926.65
13.750	926.66	926.67	926.67	926.68	926.68
14.000	926.69	926.70	926.70	926.71	926.71
14.250	926.72	926.73	926.73	926.74	926.74
14.500	926.75	926.75	926.76	926.76	926.77
14.750	926.77	926.78	926.78	926.79	926.79
15.000	926.80	926.80	926.81	926.81	926.82
15.250	926.82	926.83	926.83	926.84	926.84
15.500	926.85	926.85	926.85	926.86	926.86
15.750	926.87	926.87	926.88	926.88	926.88
16.000	926.89	926.89	926.89	926.90	926.90
16.250	926.91	926.91	926.91	926.92	926.92
16.500	926.92	926.93	926.93	926.93	926.94
16.750	926.94	926.94	926.95	926.95	926.96
17.000	926.96	926.96	926.97	926.97	926.97
17.250	926.98	926.98	926.98	926.99	926.99
17.500	926.99	926.99	927.00	927.00	927.00
17.750	927.01	927.01	927.01	927.02	927.02
18.000	927.02	927.02	927.03	927.03	927.03
18.250	927.03	927.03	927.04	927.04	927.04
18.500	927.04	927.04	927.04	927.04	927.04
18.750	927.04	927.05	927.05	927.05	927.05
19.000	927.05	927.05	927.05	927.05	927.05
19.250	927.05	927.05	927.05	927.05	927.05
19.500	927.05	927.05	927.05	927.05	927.05
19.750	927.05	927.05	927.05	927.05	927.05
20.000	927.05	927.05	927.05	927.05	927.05
20.250	927.05	927.05	927.05	927.05	927.05
20.500	927.05	927.05	927.05	927.05	927.05
20.750	927.05	927.05	927.05	927.05	927.05
21.000	927.05	927.05	927.05	927.05	927.05
21.250	927.05	927.05	927.05	927.05	927.05

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	927.05	927.05	927.05	927.05	927.05
21.750	927.05	927.05	927.05	927.05	927.05
22.000	927.05	927.05	927.05	927.05	927.05
22.250	927.05	927.05	927.05	927.05	927.05
22.500	927.05	927.05	927.05	927.05	927.05
22.750	927.05	927.05	927.05	927.05	927.05
23.000	927.05	927.05	927.05	927.05	927.05
23.250	927.05	927.05	927.05	927.05	927.04
23.500	927.04	927.04	927.04	927.04	927.04
23.750	927.04	927.04	927.04	927.04	927.04
24.000	927.04	927.04	927.04	927.04	927.04
24.250	927.04	927.03	927.03	927.03	927.03
24.500	927.03	927.03	927.03	927.02	927.02
24.750	927.02	927.02	927.02	927.02	927.02
25.000	927.02	927.02	927.01	927.01	927.01
25.250	927.01	927.01	927.01	927.01	927.01
25.500	927.01	927.01	927.01	927.01	927.01
25.750	927.01	927.01	927.01	927.01	927.01
26.000	927.01	927.01	927.01	927.00	927.00
26.250	927.00	927.00	927.00	927.00	927.00
26.500	927.00	927.00	927.00	927.00	927.00
26.750	927.00	927.00	927.00	927.00	927.00
27.000	927.00	927.00	927.00	927.00	927.00
27.250	927.00	927.00	927.00	927.00	927.00
27.500	927.00	927.00	927.00	927.00	927.00
27.750	927.00	927.00	927.00	927.00	927.00
28.000	927.00	927.00	927.00	927.00	927.00
28.250	927.00	927.00	927.00	927.00	927.00
28.500	927.00	927.00	927.00	927.00	927.00
28.750	927.00	927.00	927.00	927.00	927.00
29.000	927.00	927.00	927.00	927.00	927.00
29.250	927.00	927.00	927.00	927.00	927.00
29.500	927.00	927.00	927.00	927.00	927.00
29.750	927.00	927.00	927.00	927.00	927.00
30.000	927.00	927.00	927.00	927.00	927.00
30.250	927.00	927.00	927.00	927.00	927.00
30.500	927.00	927.00	927.00	927.00	927.00
30.750	927.00	927.00	927.00	927.00	927.00
31.000	927.00	927.00	927.00	927.00	927.00
31.250	927.00	927.00	927.00	927.00	927.00
31.500	927.00	927.00	927.00	927.00	927.00
31.750	927.00	927.00	927.00	927.00	927.00
32.000	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	927.00	927.00	927.00	927.00	927.00
32.500	927.00	927.00	927.00	927.00	927.00
32.750	927.00	927.00	927.00	927.00	927.00
33.000	927.00	927.00	927.00	927.00	927.00
33.250	927.00	927.00	927.00	927.00	927.00
33.500	927.00	927.00	927.00	927.00	927.00
33.750	927.00	927.00	927.00	927.00	927.00
34.000	927.00	927.00	927.00	927.00	927.00
34.250	927.00	927.00	927.00	927.00	927.00
34.500	927.00	927.00	927.00	927.00	927.00
34.750	927.00	927.00	927.00	927.00	927.00
35.000	927.00	927.00	927.00	927.00	927.00
35.250	927.00	927.00	927.00	927.00	927.00
35.500	927.00	927.00	927.00	927.00	927.00
35.750	927.00	927.00	927.00	927.00	927.00
36.000	927.00	927.00	927.00	927.00	927.00
36.250	927.00	927.00	927.00	927.00	927.00
36.500	927.00	927.00	927.00	927.00	927.00
36.750	927.00	927.00	927.00	927.00	927.00
37.000	927.00	927.00	927.00	927.00	927.00
37.250	927.00	927.00	927.00	927.00	927.00
37.500	927.00	927.00	927.00	927.00	927.00
37.750	927.00	927.00	927.00	927.00	927.00
38.000	927.00	927.00	927.00	927.00	927.00
38.250	927.00	927.00	927.00	927.00	927.00
38.500	927.00	927.00	927.00	927.00	927.00
38.750	927.00	927.00	927.00	927.00	927.00
39.000	927.00	927.00	927.00	927.00	927.00
39.250	927.00	927.00	927.00	927.00	927.00
39.500	927.00	927.00	927.00	927.00	927.00
39.750	927.00	927.00	927.00	927.00	927.00
40.000	927.00	927.00	927.00	927.00	927.00
40.250	927.00	927.00	927.00	927.00	927.00
40.500	927.00	927.00	927.00	927.00	927.00
40.750	927.00	927.00	927.00	927.00	927.00
41.000	927.00	927.00	927.00	927.00	927.00
41.250	927.00	927.00	927.00	927.00	927.00
41.500	927.00	927.00	927.00	927.00	927.00
41.750	927.00	927.00	927.00	927.00	927.00
42.000	927.00	927.00	927.00	927.00	927.00
42.250	927.00	927.00	927.00	927.00	927.00
42.500	927.00	927.00	927.00	927.00	927.00
42.750	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	927.00	927.00	927.00	927.00	927.00
43.250	927.00	927.00	927.00	927.00	927.00
43.500	927.00	927.00	927.00	927.00	927.00
43.750	927.00	927.00	927.00	927.00	927.00
44.000	927.00	927.00	927.00	927.00	927.00
44.250	927.00	927.00	927.00	927.00	927.00
44.500	927.00	927.00	927.00	927.00	927.00
44.750	927.00	927.00	927.00	927.00	927.00
45.000	927.00	927.00	927.00	927.00	927.00
45.250	927.00	927.00	927.00	927.00	927.00
45.500	927.00	927.00	927.00	927.00	927.00
45.750	927.00	927.00	927.00	927.00	927.00
46.000	927.00	927.00	927.00	927.00	927.00
46.250	927.00	927.00	927.00	927.00	927.00
46.500	927.00	927.00	927.00	927.00	927.00
46.750	927.00	927.00	927.00	927.00	927.00
47.000	927.00	927.00	927.00	927.00	927.00
47.250	927.00	927.00	927.00	927.00	927.00
47.500	927.00	927.00	927.00	927.00	927.00
47.750	927.00	927.00	927.00	927.00	927.00
48.000	927.00	(N/A)	(N/A)	(N/A)	(N/A)

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.00	925.00	925.00
7.250	925.00	925.00	925.00	925.00	925.00
7.500	925.00	925.00	925.00	925.00	925.00
7.750	925.00	925.00	925.00	925.00	925.00
8.000	925.00	925.00	925.00	925.00	925.00
8.250	925.00	925.00	925.00	925.00	925.00
8.500	925.00	925.00	925.00	925.01	925.01
8.750	925.01	925.01	925.01	925.01	925.01
9.000	925.01	925.01	925.01	925.02	925.02
9.250	925.02	925.02	925.02	925.02	925.03
9.500	925.03	925.03	925.03	925.03	925.04
9.750	925.04	925.04	925.04	925.05	925.05
10.000	925.05	925.05	925.06	925.06	925.06
10.250	925.07	925.07	925.08	925.08	925.09
10.500	925.09	925.10	925.10	925.11	925.11

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.12	925.13	925.13	925.14	925.15
11.000	925.16	925.17	925.18	925.19	925.20
11.250	925.21	925.22	925.24	925.25	925.27
11.500	925.29	925.31	925.34	925.39	925.46
11.750	925.55	925.65	925.80	926.01	926.22
12.000	926.43	926.58	926.68	926.73	926.76
12.250	926.80	926.83	926.86	926.88	926.91
12.500	926.93	926.95	926.96	926.98	927.00
12.750	927.02	927.03	927.05	927.06	927.08
13.000	927.09	927.10	927.11	927.12	927.12
13.250	927.13	927.14	927.14	927.15	927.15
13.500	927.16	927.16	927.16	927.17	927.17
13.750	927.17	927.17	927.17	927.17	927.17
14.000	927.17	927.17	927.17	927.17	927.17
14.250	927.17	927.17	927.17	927.17	927.17
14.500	927.17	927.17	927.17	927.17	927.17
14.750	927.17	927.17	927.17	927.17	927.16
15.000	927.16	927.16	927.16	927.16	927.16
15.250	927.16	927.16	927.16	927.16	927.15
15.500	927.15	927.15	927.15	927.15	927.15
15.750	927.15	927.14	927.14	927.14	927.14
16.000	927.14	927.14	927.14	927.14	927.13
16.250	927.13	927.13	927.13	927.13	927.13
16.500	927.13	927.13	927.12	927.12	927.12
16.750	927.12	927.12	927.12	927.12	927.12
17.000	927.12	927.12	927.12	927.11	927.11
17.250	927.11	927.11	927.11	927.11	927.11
17.500	927.11	927.11	927.11	927.11	927.11
17.750	927.11	927.10	927.10	927.10	927.10
18.000	927.10	927.10	927.10	927.10	927.10
18.250	927.10	927.10	927.10	927.10	927.10
18.500	927.09	927.09	927.09	927.09	927.09
18.750	927.09	927.09	927.09	927.09	927.09
19.000	927.09	927.09	927.09	927.09	927.09
19.250	927.09	927.08	927.08	927.08	927.08
19.500	927.08	927.08	927.08	927.08	927.08
19.750	927.08	927.08	927.08	927.08	927.08
20.000	927.08	927.08	927.08	927.07	927.07
20.250	927.07	927.07	927.07	927.07	927.07
20.500	927.07	927.07	927.07	927.07	927.07
20.750	927.07	927.07	927.07	927.07	927.07
21.000	927.07	927.07	927.07	927.07	927.07
21.250	927.07	927.07	927.07	927.07	927.07

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	927.06	927.06	927.06	927.06	927.06
21.750	927.06	927.06	927.06	927.06	927.06
22.000	927.06	927.06	927.06	927.06	927.06
22.250	927.06	927.06	927.06	927.06	927.06
22.500	927.06	927.06	927.06	927.06	927.06
22.750	927.06	927.06	927.06	927.06	927.06
23.000	927.06	927.06	927.06	927.06	927.06
23.250	927.06	927.06	927.06	927.06	927.06
23.500	927.06	927.06	927.06	927.06	927.06
23.750	927.06	927.06	927.06	927.06	927.06
24.000	927.06	927.06	927.05	927.05	927.05
24.250	927.05	927.04	927.04	927.04	927.04
24.500	927.04	927.03	927.03	927.03	927.03
24.750	927.03	927.03	927.03	927.02	927.02
25.000	927.02	927.02	927.02	927.02	927.02
25.250	927.02	927.02	927.01	927.01	927.01
25.500	927.01	927.01	927.01	927.01	927.01
25.750	927.01	927.01	927.01	927.01	927.01
26.000	927.01	927.01	927.01	927.01	927.01
26.250	927.01	927.01	927.01	927.00	927.00
26.500	927.00	927.00	927.00	927.00	927.00
26.750	927.00	927.00	927.00	927.00	927.00
27.000	927.00	927.00	927.00	927.00	927.00
27.250	927.00	927.00	927.00	927.00	927.00
27.500	927.00	927.00	927.00	927.00	927.00
27.750	927.00	927.00	927.00	927.00	927.00
28.000	927.00	927.00	927.00	927.00	927.00
28.250	927.00	927.00	927.00	927.00	927.00
28.500	927.00	927.00	927.00	927.00	927.00
28.750	927.00	927.00	927.00	927.00	927.00
29.000	927.00	927.00	927.00	927.00	927.00
29.250	927.00	927.00	927.00	927.00	927.00
29.500	927.00	927.00	927.00	927.00	927.00
29.750	927.00	927.00	927.00	927.00	927.00
30.000	927.00	927.00	927.00	927.00	927.00
30.250	927.00	927.00	927.00	927.00	927.00
30.500	927.00	927.00	927.00	927.00	927.00
30.750	927.00	927.00	927.00	927.00	927.00
31.000	927.00	927.00	927.00	927.00	927.00
31.250	927.00	927.00	927.00	927.00	927.00
31.500	927.00	927.00	927.00	927.00	927.00
31.750	927.00	927.00	927.00	927.00	927.00
32.000	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	927.00	927.00	927.00	927.00	927.00
32.500	927.00	927.00	927.00	927.00	927.00
32.750	927.00	927.00	927.00	927.00	927.00
33.000	927.00	927.00	927.00	927.00	927.00
33.250	927.00	927.00	927.00	927.00	927.00
33.500	927.00	927.00	927.00	927.00	927.00
33.750	927.00	927.00	927.00	927.00	927.00
34.000	927.00	927.00	927.00	927.00	927.00
34.250	927.00	927.00	927.00	927.00	927.00
34.500	927.00	927.00	927.00	927.00	927.00
34.750	927.00	927.00	927.00	927.00	927.00
35.000	927.00	927.00	927.00	927.00	927.00
35.250	927.00	927.00	927.00	927.00	927.00
35.500	927.00	927.00	927.00	927.00	927.00
35.750	927.00	927.00	927.00	927.00	927.00
36.000	927.00	927.00	927.00	927.00	927.00
36.250	927.00	927.00	927.00	927.00	927.00
36.500	927.00	927.00	927.00	927.00	927.00
36.750	927.00	927.00	927.00	927.00	927.00
37.000	927.00	927.00	927.00	927.00	927.00
37.250	927.00	927.00	927.00	927.00	927.00
37.500	927.00	927.00	927.00	927.00	927.00
37.750	927.00	927.00	927.00	927.00	927.00
38.000	927.00	927.00	927.00	927.00	927.00
38.250	927.00	927.00	927.00	927.00	927.00
38.500	927.00	927.00	927.00	927.00	927.00
38.750	927.00	927.00	927.00	927.00	927.00
39.000	927.00	927.00	927.00	927.00	927.00
39.250	927.00	927.00	927.00	927.00	927.00
39.500	927.00	927.00	927.00	927.00	927.00
39.750	927.00	927.00	927.00	927.00	927.00
40.000	927.00	927.00	927.00	927.00	927.00
40.250	927.00	927.00	927.00	927.00	927.00
40.500	927.00	927.00	927.00	927.00	927.00
40.750	927.00	927.00	927.00	927.00	927.00
41.000	927.00	927.00	927.00	927.00	927.00
41.250	927.00	927.00	927.00	927.00	927.00
41.500	927.00	927.00	927.00	927.00	927.00
41.750	927.00	927.00	927.00	927.00	927.00
42.000	927.00	927.00	927.00	927.00	927.00
42.250	927.00	927.00	927.00	927.00	927.00
42.500	927.00	927.00	927.00	927.00	927.00
42.750	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	927.00	927.00	927.00	927.00	927.00
43.250	927.00	927.00	927.00	927.00	927.00
43.500	927.00	927.00	927.00	927.00	927.00
43.750	927.00	927.00	927.00	927.00	927.00
44.000	927.00	927.00	927.00	927.00	927.00
44.250	927.00	927.00	927.00	927.00	927.00
44.500	927.00	927.00	927.00	927.00	927.00
44.750	927.00	927.00	927.00	927.00	927.00
45.000	927.00	927.00	927.00	927.00	927.00
45.250	927.00	927.00	927.00	927.00	927.00
45.500	927.00	927.00	927.00	927.00	927.00
45.750	927.00	927.00	927.00	927.00	927.00
46.000	927.00	927.00	927.00	927.00	927.00
46.250	927.00	927.00	927.00	927.00	927.00
46.500	927.00	927.00	927.00	927.00	927.00
46.750	927.00	927.00	927.00	927.00	927.00
47.000	927.00	927.00	927.00	927.00	927.00
47.250	927.00	927.00	927.00	927.00	927.00
47.500	927.00	927.00	927.00	927.00	927.00
47.750	927.00	927.00	927.00	927.00	927.00
48.000	927.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 50 years
Storm Event: 50-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.00	925.00	925.00
7.250	925.00	925.00	925.00	925.00	925.00
7.500	925.00	925.00	925.00	925.00	925.00
7.750	925.00	925.00	925.01	925.01	925.01
8.000	925.01	925.01	925.01	925.01	925.01
8.250	925.01	925.01	925.01	925.02	925.02
8.500	925.02	925.02	925.02	925.02	925.02
8.750	925.03	925.03	925.03	925.03	925.04
9.000	925.04	925.04	925.04	925.05	925.05
9.250	925.05	925.05	925.06	925.06	925.06
9.500	925.07	925.07	925.07	925.08	925.08
9.750	925.08	925.09	925.09	925.10	925.10
10.000	925.11	925.11	925.12	925.12	925.13
10.250	925.13	925.14	925.15	925.15	925.16
10.500	925.17	925.17	925.18	925.19	925.20

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.21	925.22	925.23	925.24	925.25
11.000	925.26	925.28	925.29	925.31	925.32
11.250	925.34	925.36	925.38	925.40	925.42
11.500	925.44	925.48	925.51	925.56	925.63
11.750	925.73	925.87	926.05	926.29	926.56
12.000	926.80	927.00	927.13	927.19	927.24
12.250	927.27	927.30	927.33	927.35	927.36
12.500	927.37	927.38	927.39	927.39	927.40
12.750	927.40	927.40	927.40	927.40	927.40
13.000	927.40	927.40	927.39	927.39	927.39
13.250	927.38	927.38	927.38	927.37	927.37
13.500	927.36	927.36	927.35	927.35	927.34
13.750	927.34	927.33	927.33	927.32	927.32
14.000	927.31	927.31	927.30	927.30	927.30
14.250	927.29	927.29	927.28	927.28	927.27
14.500	927.27	927.27	927.26	927.26	927.26
14.750	927.25	927.25	927.24	927.24	927.24
15.000	927.24	927.23	927.23	927.23	927.22
15.250	927.22	927.22	927.22	927.21	927.21
15.500	927.21	927.20	927.20	927.20	927.20
15.750	927.19	927.19	927.19	927.19	927.18
16.000	927.18	927.18	927.18	927.18	927.17
16.250	927.17	927.17	927.17	927.17	927.16
16.500	927.16	927.16	927.16	927.16	927.15
16.750	927.15	927.15	927.15	927.15	927.15
17.000	927.15	927.15	927.14	927.14	927.14
17.250	927.14	927.14	927.14	927.14	927.14
17.500	927.13	927.13	927.13	927.13	927.13
17.750	927.13	927.13	927.13	927.13	927.13
18.000	927.12	927.12	927.12	927.12	927.12
18.250	927.12	927.12	927.12	927.12	927.12
18.500	927.12	927.12	927.11	927.11	927.11
18.750	927.11	927.11	927.11	927.11	927.11
19.000	927.11	927.11	927.11	927.11	927.10
19.250	927.10	927.10	927.10	927.10	927.10
19.500	927.10	927.10	927.10	927.10	927.10
19.750	927.10	927.10	927.09	927.09	927.09
20.000	927.09	927.09	927.09	927.09	927.09
20.250	927.09	927.09	927.09	927.09	927.09
20.500	927.09	927.09	927.09	927.08	927.08
20.750	927.08	927.08	927.08	927.08	927.08
21.000	927.08	927.08	927.08	927.08	927.08
21.250	927.08	927.08	927.08	927.08	927.08

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	927.08	927.08	927.08	927.08	927.08
21.750	927.08	927.08	927.08	927.08	927.08
22.000	927.08	927.08	927.08	927.08	927.08
22.250	927.08	927.07	927.07	927.07	927.07
22.500	927.07	927.07	927.07	927.07	927.07
22.750	927.07	927.07	927.07	927.07	927.07
23.000	927.07	927.07	927.07	927.07	927.07
23.250	927.07	927.07	927.07	927.07	927.07
23.500	927.07	927.07	927.07	927.07	927.07
23.750	927.07	927.07	927.07	927.07	927.07
24.000	927.07	927.07	927.07	927.06	927.06
24.250	927.06	927.05	927.05	927.05	927.05
24.500	927.04	927.04	927.04	927.04	927.04
24.750	927.03	927.03	927.03	927.03	927.03
25.000	927.03	927.02	927.02	927.02	927.02
25.250	927.02	927.02	927.02	927.02	927.02
25.500	927.02	927.01	927.01	927.01	927.01
25.750	927.01	927.01	927.01	927.01	927.01
26.000	927.01	927.01	927.01	927.01	927.01
26.250	927.01	927.01	927.01	927.01	927.01
26.500	927.01	927.01	927.00	927.00	927.00
26.750	927.00	927.00	927.00	927.00	927.00
27.000	927.00	927.00	927.00	927.00	927.00
27.250	927.00	927.00	927.00	927.00	927.00
27.500	927.00	927.00	927.00	927.00	927.00
27.750	927.00	927.00	927.00	927.00	927.00
28.000	927.00	927.00	927.00	927.00	927.00
28.250	927.00	927.00	927.00	927.00	927.00
28.500	927.00	927.00	927.00	927.00	927.00
28.750	927.00	927.00	927.00	927.00	927.00
29.000	927.00	927.00	927.00	927.00	927.00
29.250	927.00	927.00	927.00	927.00	927.00
29.500	927.00	927.00	927.00	927.00	927.00
29.750	927.00	927.00	927.00	927.00	927.00
30.000	927.00	927.00	927.00	927.00	927.00
30.250	927.00	927.00	927.00	927.00	927.00
30.500	927.00	927.00	927.00	927.00	927.00
30.750	927.00	927.00	927.00	927.00	927.00
31.000	927.00	927.00	927.00	927.00	927.00
31.250	927.00	927.00	927.00	927.00	927.00
31.500	927.00	927.00	927.00	927.00	927.00
31.750	927.00	927.00	927.00	927.00	927.00
32.000	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	927.00	927.00	927.00	927.00	927.00
32.500	927.00	927.00	927.00	927.00	927.00
32.750	927.00	927.00	927.00	927.00	927.00
33.000	927.00	927.00	927.00	927.00	927.00
33.250	927.00	927.00	927.00	927.00	927.00
33.500	927.00	927.00	927.00	927.00	927.00
33.750	927.00	927.00	927.00	927.00	927.00
34.000	927.00	927.00	927.00	927.00	927.00
34.250	927.00	927.00	927.00	927.00	927.00
34.500	927.00	927.00	927.00	927.00	927.00
34.750	927.00	927.00	927.00	927.00	927.00
35.000	927.00	927.00	927.00	927.00	927.00
35.250	927.00	927.00	927.00	927.00	927.00
35.500	927.00	927.00	927.00	927.00	927.00
35.750	927.00	927.00	927.00	927.00	927.00
36.000	927.00	927.00	927.00	927.00	927.00
36.250	927.00	927.00	927.00	927.00	927.00
36.500	927.00	927.00	927.00	927.00	927.00
36.750	927.00	927.00	927.00	927.00	927.00
37.000	927.00	927.00	927.00	927.00	927.00
37.250	927.00	927.00	927.00	927.00	927.00
37.500	927.00	927.00	927.00	927.00	927.00
37.750	927.00	927.00	927.00	927.00	927.00
38.000	927.00	927.00	927.00	927.00	927.00
38.250	927.00	927.00	927.00	927.00	927.00
38.500	927.00	927.00	927.00	927.00	927.00
38.750	927.00	927.00	927.00	927.00	927.00
39.000	927.00	927.00	927.00	927.00	927.00
39.250	927.00	927.00	927.00	927.00	927.00
39.500	927.00	927.00	927.00	927.00	927.00
39.750	927.00	927.00	927.00	927.00	927.00
40.000	927.00	927.00	927.00	927.00	927.00
40.250	927.00	927.00	927.00	927.00	927.00
40.500	927.00	927.00	927.00	927.00	927.00
40.750	927.00	927.00	927.00	927.00	927.00
41.000	927.00	927.00	927.00	927.00	927.00
41.250	927.00	927.00	927.00	927.00	927.00
41.500	927.00	927.00	927.00	927.00	927.00
41.750	927.00	927.00	927.00	927.00	927.00
42.000	927.00	927.00	927.00	927.00	927.00
42.250	927.00	927.00	927.00	927.00	927.00
42.500	927.00	927.00	927.00	927.00	927.00
42.750	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	927.00	927.00	927.00	927.00	927.00
43.250	927.00	927.00	927.00	927.00	927.00
43.500	927.00	927.00	927.00	927.00	927.00
43.750	927.00	927.00	927.00	927.00	927.00
44.000	927.00	927.00	927.00	927.00	927.00
44.250	927.00	927.00	927.00	927.00	927.00
44.500	927.00	927.00	927.00	927.00	927.00
44.750	927.00	927.00	927.00	927.00	927.00
45.000	927.00	927.00	927.00	927.00	927.00
45.250	927.00	927.00	927.00	927.00	927.00
45.500	927.00	927.00	927.00	927.00	927.00
45.750	927.00	927.00	927.00	927.00	927.00
46.000	927.00	927.00	927.00	927.00	927.00
46.250	927.00	927.00	927.00	927.00	927.00
46.500	927.00	927.00	927.00	927.00	927.00
46.750	927.00	927.00	927.00	927.00	927.00
47.000	927.00	927.00	927.00	927.00	927.00
47.250	927.00	927.00	927.00	927.00	927.00
47.500	927.00	927.00	927.00	927.00	927.00
47.750	927.00	927.00	927.00	927.00	927.00
48.000	927.00	(N/A)	(N/A)	(N/A)	(N/A)

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	925.00	925.00	925.00	925.00	925.00
0.250	925.00	925.00	925.00	925.00	925.00
0.500	925.00	925.00	925.00	925.00	925.00
0.750	925.00	925.00	925.00	925.00	925.00
1.000	925.00	925.00	925.00	925.00	925.00
1.250	925.00	925.00	925.00	925.00	925.00
1.500	925.00	925.00	925.00	925.00	925.00
1.750	925.00	925.00	925.00	925.00	925.00
2.000	925.00	925.00	925.00	925.00	925.00
2.250	925.00	925.00	925.00	925.00	925.00
2.500	925.00	925.00	925.00	925.00	925.00
2.750	925.00	925.00	925.00	925.00	925.00
3.000	925.00	925.00	925.00	925.00	925.00
3.250	925.00	925.00	925.00	925.00	925.00
3.500	925.00	925.00	925.00	925.00	925.00
3.750	925.00	925.00	925.00	925.00	925.00
4.000	925.00	925.00	925.00	925.00	925.00
4.250	925.00	925.00	925.00	925.00	925.00
4.500	925.00	925.00	925.00	925.00	925.00
4.750	925.00	925.00	925.00	925.00	925.00
5.000	925.00	925.00	925.00	925.00	925.00
5.250	925.00	925.00	925.00	925.00	925.00
5.500	925.00	925.00	925.00	925.00	925.00
5.750	925.00	925.00	925.00	925.00	925.00
6.000	925.00	925.00	925.00	925.00	925.00
6.250	925.00	925.00	925.00	925.00	925.00
6.500	925.00	925.00	925.00	925.00	925.00
6.750	925.00	925.00	925.00	925.00	925.00
7.000	925.00	925.00	925.01	925.01	925.01
7.250	925.01	925.01	925.01	925.01	925.01
7.500	925.01	925.01	925.02	925.02	925.02
7.750	925.02	925.02	925.02	925.02	925.03
8.000	925.03	925.03	925.03	925.03	925.03
8.250	925.04	925.04	925.04	925.04	925.05
8.500	925.05	925.05	925.05	925.06	925.06
8.750	925.06	925.07	925.07	925.07	925.08
9.000	925.08	925.09	925.09	925.10	925.10
9.250	925.10	925.11	925.11	925.12	925.12
9.500	925.13	925.13	925.14	925.14	925.15
9.750	925.15	925.16	925.17	925.17	925.18
10.000	925.19	925.19	925.20	925.21	925.22
10.250	925.23	925.24	925.25	925.25	925.26
10.500	925.28	925.29	925.30	925.31	925.32

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 100 years
Storm Event: 100-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.750	925.34	925.35	925.36	925.38	925.40
11.000	925.41	925.43	925.45	925.47	925.49
11.250	925.51	925.53	925.55	925.57	925.59
11.500	925.62	925.65	925.69	925.75	925.85
11.750	925.98	926.13	926.34	926.63	926.96
12.000	927.30	927.58	927.76	927.83	927.87
12.250	927.90	927.91	927.93	927.93	927.93
12.500	927.93	927.92	927.91	927.90	927.88
12.750	927.87	927.85	927.84	927.82	927.81
13.000	927.79	927.77	927.75	927.74	927.72
13.250	927.70	927.68	927.67	927.65	927.63
13.500	927.62	927.60	927.58	927.57	927.55
13.750	927.53	927.52	927.50	927.49	927.48
14.000	927.47	927.46	927.45	927.44	927.43
14.250	927.42	927.41	927.40	927.39	927.39
14.500	927.38	927.37	927.36	927.36	927.35
14.750	927.34	927.34	927.33	927.33	927.32
15.000	927.32	927.31	927.30	927.30	927.29
15.250	927.29	927.29	927.28	927.28	927.27
15.500	927.27	927.26	927.26	927.26	927.25
15.750	927.25	927.24	927.24	927.24	927.23
16.000	927.23	927.23	927.22	927.22	927.22
16.250	927.21	927.21	927.21	927.21	927.20
16.500	927.20	927.20	927.20	927.19	927.19
16.750	927.19	927.19	927.19	927.18	927.18
17.000	927.18	927.18	927.18	927.17	927.17
17.250	927.17	927.17	927.17	927.17	927.17
17.500	927.16	927.16	927.16	927.16	927.16
17.750	927.16	927.16	927.15	927.15	927.15
18.000	927.15	927.15	927.15	927.15	927.15
18.250	927.15	927.14	927.14	927.14	927.14
18.500	927.14	927.14	927.14	927.14	927.14
18.750	927.13	927.13	927.13	927.13	927.13
19.000	927.13	927.13	927.13	927.13	927.13
19.250	927.13	927.12	927.12	927.12	927.12
19.500	927.12	927.12	927.12	927.12	927.12
19.750	927.12	927.11	927.11	927.11	927.11
20.000	927.11	927.11	927.11	927.11	927.11
20.250	927.11	927.11	927.11	927.10	927.10
20.500	927.10	927.10	927.10	927.10	927.10
20.750	927.10	927.10	927.10	927.10	927.10
21.000	927.10	927.10	927.10	927.10	927.10
21.250	927.10	927.10	927.10	927.09	927.09

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 100 years
Storm Event: 100-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.500	927.09	927.09	927.09	927.09	927.09
21.750	927.09	927.09	927.09	927.09	927.09
22.000	927.09	927.09	927.09	927.09	927.09
22.250	927.09	927.09	927.09	927.09	927.09
22.500	927.09	927.09	927.09	927.09	927.09
22.750	927.09	927.09	927.09	927.09	927.09
23.000	927.09	927.09	927.09	927.09	927.09
23.250	927.09	927.09	927.09	927.08	927.08
23.500	927.08	927.08	927.08	927.08	927.08
23.750	927.08	927.08	927.08	927.08	927.08
24.000	927.08	927.08	927.08	927.08	927.07
24.250	927.07	927.06	927.06	927.06	927.06
24.500	927.05	927.05	927.05	927.04	927.04
24.750	927.04	927.04	927.04	927.03	927.03
25.000	927.03	927.03	927.03	927.03	927.03
25.250	927.02	927.02	927.02	927.02	927.02
25.500	927.02	927.02	927.02	927.02	927.01
25.750	927.01	927.01	927.01	927.01	927.01
26.000	927.01	927.01	927.01	927.01	927.01
26.250	927.01	927.01	927.01	927.01	927.01
26.500	927.01	927.01	927.01	927.01	927.01
26.750	927.01	927.00	927.00	927.00	927.00
27.000	927.00	927.00	927.00	927.00	927.00
27.250	927.00	927.00	927.00	927.00	927.00
27.500	927.00	927.00	927.00	927.00	927.00
27.750	927.00	927.00	927.00	927.00	927.00
28.000	927.00	927.00	927.00	927.00	927.00
28.250	927.00	927.00	927.00	927.00	927.00
28.500	927.00	927.00	927.00	927.00	927.00
28.750	927.00	927.00	927.00	927.00	927.00
29.000	927.00	927.00	927.00	927.00	927.00
29.250	927.00	927.00	927.00	927.00	927.00
29.500	927.00	927.00	927.00	927.00	927.00
29.750	927.00	927.00	927.00	927.00	927.00
30.000	927.00	927.00	927.00	927.00	927.00
30.250	927.00	927.00	927.00	927.00	927.00
30.500	927.00	927.00	927.00	927.00	927.00
30.750	927.00	927.00	927.00	927.00	927.00
31.000	927.00	927.00	927.00	927.00	927.00
31.250	927.00	927.00	927.00	927.00	927.00
31.500	927.00	927.00	927.00	927.00	927.00
31.750	927.00	927.00	927.00	927.00	927.00
32.000	927.00	927.00	927.00	927.00	927.00

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
32.250	927.00	927.00	927.00	927.00	927.00
32.500	927.00	927.00	927.00	927.00	927.00
32.750	927.00	927.00	927.00	927.00	927.00
33.000	927.00	927.00	927.00	927.00	927.00
33.250	927.00	927.00	927.00	927.00	927.00
33.500	927.00	927.00	927.00	927.00	927.00
33.750	927.00	927.00	927.00	927.00	927.00
34.000	927.00	927.00	927.00	927.00	927.00
34.250	927.00	927.00	927.00	927.00	927.00
34.500	927.00	927.00	927.00	927.00	927.00
34.750	927.00	927.00	927.00	927.00	927.00
35.000	927.00	927.00	927.00	927.00	927.00
35.250	927.00	927.00	927.00	927.00	927.00
35.500	927.00	927.00	927.00	927.00	927.00
35.750	927.00	927.00	927.00	927.00	927.00
36.000	927.00	927.00	927.00	927.00	927.00
36.250	927.00	927.00	927.00	927.00	927.00
36.500	927.00	927.00	927.00	927.00	927.00
36.750	927.00	927.00	927.00	927.00	927.00
37.000	927.00	927.00	927.00	927.00	927.00
37.250	927.00	927.00	927.00	927.00	927.00
37.500	927.00	927.00	927.00	927.00	927.00
37.750	927.00	927.00	927.00	927.00	927.00
38.000	927.00	927.00	927.00	927.00	927.00
38.250	927.00	927.00	927.00	927.00	927.00
38.500	927.00	927.00	927.00	927.00	927.00
38.750	927.00	927.00	927.00	927.00	927.00
39.000	927.00	927.00	927.00	927.00	927.00
39.250	927.00	927.00	927.00	927.00	927.00
39.500	927.00	927.00	927.00	927.00	927.00
39.750	927.00	927.00	927.00	927.00	927.00
40.000	927.00	927.00	927.00	927.00	927.00
40.250	927.00	927.00	927.00	927.00	927.00
40.500	927.00	927.00	927.00	927.00	927.00
40.750	927.00	927.00	927.00	927.00	927.00
41.000	927.00	927.00	927.00	927.00	927.00
41.250	927.00	927.00	927.00	927.00	927.00
41.500	927.00	927.00	927.00	927.00	927.00
41.750	927.00	927.00	927.00	927.00	927.00
42.000	927.00	927.00	927.00	927.00	927.00
42.250	927.00	927.00	927.00	927.00	927.00
42.500	927.00	927.00	927.00	927.00	927.00
42.750	927.00	927.00	927.00	927.00	927.00

Subsection: Time vs. Elevation
Label: BMP (OUT)

Return Event: 100 years
Storm Event: 100-year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
43.000	927.00	927.00	927.00	927.00	927.00
43.250	927.00	927.00	927.00	927.00	927.00
43.500	927.00	927.00	927.00	927.00	927.00
43.750	927.00	927.00	927.00	927.00	927.00
44.000	927.00	927.00	927.00	927.00	927.00
44.250	927.00	927.00	927.00	927.00	927.00
44.500	927.00	927.00	927.00	927.00	927.00
44.750	927.00	927.00	927.00	927.00	927.00
45.000	927.00	927.00	927.00	927.00	927.00
45.250	927.00	927.00	927.00	927.00	927.00
45.500	927.00	927.00	927.00	927.00	927.00
45.750	927.00	927.00	927.00	927.00	927.00
46.000	927.00	927.00	927.00	927.00	927.00
46.250	927.00	927.00	927.00	927.00	927.00
46.500	927.00	927.00	927.00	927.00	927.00
46.750	927.00	927.00	927.00	927.00	927.00
47.000	927.00	927.00	927.00	927.00	927.00
47.250	927.00	927.00	927.00	927.00	927.00
47.500	927.00	927.00	927.00	927.00	927.00
47.750	927.00	927.00	927.00	927.00	927.00
48.000	927.00	(N/A)	(N/A)	(N/A)	(N/A)

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
925.00	0.000
925.50	0.021
926.00	0.049
926.50	0.081
927.00	0.114
927.50	0.142
928.00	0.163
928.50	0.184
929.00	0.204

Requested Pond Water Surface Elevations	
Minimum (Headwater)	925.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	929.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir	Weir - 1	Forward	Culvert - 1	928.40	929.00
Stand Pipe	Riser - 1	Forward	Culvert - 1	929.00	929.00
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	927.00	929.00
Culvert-Circular	Culvert - 1	Forward	TW	925.00	929.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	12.0 in
Length	80.00 ft
Length (Computed Barrel)	80.01 ft
Slope (Computed)	0.013 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.000
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 2
K	0.5340
M	0.5550
C	0.0196
Y	0.9000
T1 ratio (HW/D)	1.070
T2 ratio (HW/D)	1.207
Slope Correction Factor	-0.500

Use unsubmerged inlet control 1 equation below T1 elevation.
Use submerged inlet control 1 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	926.07 ft	T1 Flow	2.75 ft³/s
T2 Elevation	926.21 ft	T2 Flow	3.14 ft³/s

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	927.00 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600

Structure ID: Riser - 1 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	929.00 ft
Diameter	30.0 in
Orifice Area	4.9 ft²
Orifice Coefficient	0.600
Weir Length	7.85 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Structure ID: Weir - 1 Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	928.40 ft
Weir Length	2.50 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Convergence Tolerances

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BMP

Return Event: 2 years
Storm Event: 2-year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
925.00	0.00	0.000	0.000	0.00	0.00	0.00
925.50	0.00	0.021	0.000	0.00	0.00	10.16
926.00	0.00	0.049	0.000	0.00	0.00	23.72
926.50	0.00	0.081	0.000	0.00	0.00	39.20
927.00	0.00	0.114	0.000	0.00	0.00	55.18
927.50	0.35	0.142	0.000	0.00	0.35	69.08
928.00	0.58	0.163	0.000	0.00	0.58	79.48
928.40	0.72	0.180	0.000	0.00	0.72	87.74
928.50	0.98	0.184	0.000	0.00	0.98	90.04
929.00	4.20	0.204	0.000	0.00	4.20	102.93

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	1.21 ft³/s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.00 ft³/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	926.29 ft
Volume (Peak)	0.068 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.068 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.000 ac-ft
Volume (Retained)	0.068 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: BMP (IN)

Return Event: 5 years
Storm Event: 5-year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	1.83 ft³/s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.00 ft³/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	926.81 ft
Volume (Peak)	0.101 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.101 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.000 ac-ft
Volume (Retained)	0.101 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: BMP (IN)

Return Event: 10 years
Storm Event: 10-year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	2.41 ft³/s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.04 ft³/s	Time to Peak (Flow, Outlet)	19.750 hours

Elevation (Water Surface, Peak)	927.05 ft
Volume (Peak)	0.117 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.133 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.019 ac-ft
Volume (Retained)	0.114 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: BMP (IN)

Return Event: 25 years
Storm Event: 25-year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	3.35 ft³/s	Time to Peak (Flow, In)	11.900 hours
Flow (Peak Outlet)	0.12 ft³/s	Time to Peak (Flow, Outlet)	14.100 hours

Elevation (Water Surface, Peak)	927.17 ft
Volume (Peak)	0.124 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.185 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.071 ac-ft
Volume (Retained)	0.114 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: BMP (IN)

Return Event: 50 years
Storm Event: 50-year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	4.25 ft³/s	Time to Peak (Flow, In)	11.900 hours
Flow (Peak Outlet)	0.28 ft³/s	Time to Peak (Flow, Outlet)	12.850 hours

Elevation (Water Surface, Peak)	927.40 ft
Volume (Peak)	0.136 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.234 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.120 ac-ft
Volume (Retained)	0.114 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	925.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	5.30 ft³/s	Time to Peak (Flow, In)	11.900 hours
Flow (Peak Outlet)	0.55 ft³/s	Time to Peak (Flow, Outlet)	12.450 hours

Elevation (Water Surface, Peak)	927.93 ft
Volume (Peak)	0.160 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.292 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.178 ac-ft
Volume (Retained)	0.114 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Peak Discharge	0.00 ft³/s
Time to Peak	15.950 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

Peak Discharge	0.00 ft³/s
Time to Peak	15.950 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: BMP (OUT) Storm Event: 10-year

Peak Discharge	0.04 ft³/s
Time to Peak	19.750 hours
Hydrograph Volume	0.019 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
17.650	0.00	0.00	0.01	0.01	0.01
17.900	0.01	0.01	0.02	0.02	0.02
18.150	0.02	0.02	0.02	0.02	0.03
18.400	0.03	0.03	0.03	0.03	0.03
18.650	0.03	0.03	0.03	0.03	0.03
18.900	0.03	0.03	0.03	0.03	0.04
19.150	0.04	0.04	0.04	0.04	0.04
19.400	0.04	0.04	0.04	0.04	0.04
19.650	0.04	0.04	0.04	0.04	0.04
19.900	0.04	0.04	0.04	0.04	0.04
20.150	0.04	0.04	0.04	0.04	0.04
20.400	0.04	0.04	0.04	0.04	0.04
20.650	0.04	0.04	0.04	0.04	0.04
20.900	0.04	0.04	0.04	0.04	0.03
21.150	0.03	0.03	0.03	0.03	0.03
21.400	0.03	0.03	0.03	0.03	0.03
21.650	0.03	0.03	0.03	0.03	0.03
21.900	0.03	0.03	0.03	0.03	0.03
22.150	0.03	0.03	0.03	0.03	0.03
22.400	0.03	0.03	0.03	0.03	0.03
22.650	0.03	0.03	0.03	0.03	0.03
22.900	0.03	0.03	0.03	0.03	0.03
23.150	0.03	0.03	0.03	0.03	0.03
23.400	0.03	0.03	0.03	0.03	0.03
23.650	0.03	0.03	0.03	0.03	0.03
23.900	0.03	0.03	0.03	0.03	0.03
24.150	0.03	0.03	0.03	0.02	0.02
24.400	0.02	0.02	0.02	0.02	0.02
24.650	0.02	0.02	0.02	0.01	0.01
24.900	0.01	0.01	0.01	0.01	0.01
25.150	0.01	0.01	0.01	0.01	0.01
25.400	0.01	0.01	0.01	0.01	0.01
25.650	0.01	0.01	0.01	0.01	0.00
25.900	0.00	0.00	0.00	0.00	0.00
26.150	0.00	0.00	0.00	0.00	0.00
26.400	0.00	0.00	0.00	0.00	0.00
26.650	0.00	0.00	0.00	0.00	0.00
26.900	0.00	0.00	0.00	0.00	0.00
27.150	0.00	0.00	0.00	0.00	0.00

Peak Discharge	0.12 ft³/s
Time to Peak	14.100 hours
Hydrograph Volume	0.071 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.700	0.00	0.01	0.02	0.03	0.04
12.950	0.05	0.06	0.07	0.08	0.08
13.200	0.09	0.09	0.10	0.10	0.10
13.450	0.11	0.11	0.11	0.12	0.12
13.700	0.12	0.12	0.12	0.12	0.12
13.950	0.12	0.12	0.12	0.12	0.12
14.200	0.12	0.12	0.12	0.12	0.12
14.450	0.12	0.12	0.12	0.12	0.12
14.700	0.12	0.12	0.12	0.12	0.12
14.950	0.12	0.12	0.12	0.11	0.11
15.200	0.11	0.11	0.11	0.11	0.11
15.450	0.11	0.11	0.11	0.11	0.11
15.700	0.10	0.10	0.10	0.10	0.10
15.950	0.10	0.10	0.10	0.10	0.10
16.200	0.09	0.09	0.09	0.09	0.09
16.450	0.09	0.09	0.09	0.09	0.09
16.700	0.09	0.09	0.09	0.08	0.08
16.950	0.08	0.08	0.08	0.08	0.08
17.200	0.08	0.08	0.08	0.08	0.08
17.450	0.08	0.08	0.08	0.08	0.08
17.700	0.08	0.07	0.07	0.07	0.07
17.950	0.07	0.07	0.07	0.07	0.07
18.200	0.07	0.07	0.07	0.07	0.07
18.450	0.07	0.07	0.07	0.07	0.07
18.700	0.07	0.07	0.06	0.06	0.06
18.950	0.06	0.06	0.06	0.06	0.06
19.200	0.06	0.06	0.06	0.06	0.06
19.450	0.06	0.06	0.06	0.06	0.06
19.700	0.06	0.06	0.06	0.06	0.05
19.950	0.05	0.05	0.05	0.05	0.05
20.200	0.05	0.05	0.05	0.05	0.05
20.450	0.05	0.05	0.05	0.05	0.05
20.700	0.05	0.05	0.05	0.05	0.05
20.950	0.05	0.05	0.05	0.05	0.05
21.200	0.05	0.05	0.05	0.05	0.05
21.450	0.05	0.05	0.05	0.05	0.05
21.700	0.05	0.05	0.05	0.05	0.04
21.950	0.04	0.04	0.04	0.04	0.04
22.200	0.04	0.04	0.04	0.04	0.04

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: BMP (OUT) Storm Event: 25-year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
22.450	0.04	0.04	0.04	0.04	0.04
22.700	0.04	0.04	0.04	0.04	0.04
22.950	0.04	0.04	0.04	0.04	0.04
23.200	0.04	0.04	0.04	0.04	0.04
23.450	0.04	0.04	0.04	0.04	0.04
23.700	0.04	0.04	0.04	0.04	0.04
23.950	0.04	0.04	0.04	0.04	0.04
24.200	0.04	0.03	0.03	0.03	0.03
24.450	0.03	0.03	0.02	0.02	0.02
24.700	0.02	0.02	0.02	0.02	0.02
24.950	0.02	0.02	0.01	0.01	0.01
25.200	0.01	0.01	0.01	0.01	0.01
25.450	0.01	0.01	0.01	0.01	0.01
25.700	0.01	0.01	0.01	0.01	0.01
25.950	0.01	0.01	0.01	0.00	0.00
26.200	0.00	0.00	0.00	0.00	0.00
26.450	0.00	0.00	0.00	0.00	0.00
26.700	0.00	0.00	0.00	0.00	0.00
26.950	0.00	0.00	0.00	0.00	0.00
27.200	0.00	0.00	0.00	0.00	0.00
27.450	0.00	0.00	0.00	0.00	(N/A)

Peak Discharge	0.28 ft³/s
Time to Peak	12.850 hours
Hydrograph Volume	0.120 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.050	0.00	0.09	0.14	0.17	0.19
12.300	0.21	0.23	0.24	0.26	0.26
12.550	0.27	0.28	0.28	0.28	0.28
12.800	0.28	0.28	0.28	0.28	0.28
13.050	0.28	0.28	0.28	0.27	0.27
13.300	0.27	0.27	0.26	0.26	0.26
13.550	0.25	0.25	0.25	0.24	0.24
13.800	0.24	0.23	0.23	0.23	0.22
14.050	0.22	0.22	0.21	0.21	0.21
14.300	0.20	0.20	0.20	0.19	0.19
14.550	0.19	0.19	0.18	0.18	0.18
14.800	0.18	0.17	0.17	0.17	0.17
15.050	0.16	0.16	0.16	0.16	0.16
15.300	0.15	0.15	0.15	0.15	0.15
15.550	0.14	0.14	0.14	0.14	0.14
15.800	0.14	0.13	0.13	0.13	0.13
16.050	0.13	0.13	0.12	0.12	0.12
16.300	0.12	0.12	0.12	0.12	0.11
16.550	0.11	0.11	0.11	0.11	0.11
16.800	0.11	0.11	0.11	0.10	0.10
17.050	0.10	0.10	0.10	0.10	0.10
17.300	0.10	0.10	0.10	0.10	0.10
17.550	0.09	0.09	0.09	0.09	0.09
17.800	0.09	0.09	0.09	0.09	0.09
18.050	0.09	0.09	0.09	0.09	0.09
18.300	0.08	0.08	0.08	0.08	0.08
18.550	0.08	0.08	0.08	0.08	0.08
18.800	0.08	0.08	0.08	0.08	0.08
19.050	0.08	0.08	0.07	0.07	0.07
19.300	0.07	0.07	0.07	0.07	0.07
19.550	0.07	0.07	0.07	0.07	0.07
19.800	0.07	0.07	0.07	0.07	0.07
20.050	0.07	0.06	0.06	0.06	0.06
20.300	0.06	0.06	0.06	0.06	0.06
20.550	0.06	0.06	0.06	0.06	0.06
20.800	0.06	0.06	0.06	0.06	0.06
21.050	0.06	0.06	0.06	0.06	0.06
21.300	0.06	0.06	0.06	0.06	0.06
21.550	0.06	0.06	0.06	0.05	0.05

Subsection: Pond Routed Hydrograph (total out) Return Event: 50 years
Label: BMP (OUT) Storm Event: 50-year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
21.800	0.05	0.05	0.05	0.05	0.05
22.050	0.05	0.05	0.05	0.05	0.05
22.300	0.05	0.05	0.05	0.05	0.05
22.550	0.05	0.05	0.05	0.05	0.05
22.800	0.05	0.05	0.05	0.05	0.05
23.050	0.05	0.05	0.05	0.05	0.05
23.300	0.05	0.05	0.05	0.05	0.05
23.550	0.05	0.05	0.05	0.05	0.05
23.800	0.05	0.05	0.05	0.05	0.05
24.050	0.05	0.05	0.04	0.04	0.04
24.300	0.04	0.04	0.03	0.03	0.03
24.550	0.03	0.03	0.03	0.03	0.02
24.800	0.02	0.02	0.02	0.02	0.02
25.050	0.02	0.02	0.02	0.01	0.01
25.300	0.01	0.01	0.01	0.01	0.01
25.550	0.01	0.01	0.01	0.01	0.01
25.800	0.01	0.01	0.01	0.01	0.01
26.050	0.01	0.01	0.01	0.01	0.00
26.300	0.00	0.00	0.00	0.00	0.00
26.550	0.00	0.00	0.00	0.00	0.00
26.800	0.00	0.00	0.00	0.00	0.00
27.050	0.00	0.00	0.00	0.00	0.00
27.300	0.00	0.00	0.00	0.00	0.00
27.550	0.00	0.00	0.00	0.00	0.00

Peak Discharge	0.55 ft³/s
Time to Peak	12.450 hours
Hydrograph Volume	0.178 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.950	0.00	0.22	0.39	0.48	0.51
12.200	0.52	0.54	0.54	0.55	0.55
12.450	0.55	0.55	0.55	0.54	0.54
12.700	0.53	0.52	0.52	0.51	0.50
12.950	0.49	0.49	0.48	0.47	0.46
13.200	0.45	0.45	0.44	0.43	0.42
13.450	0.42	0.41	0.40	0.39	0.39
13.700	0.38	0.37	0.36	0.36	0.35
13.950	0.34	0.33	0.33	0.32	0.31
14.200	0.30	0.30	0.29	0.29	0.28
14.450	0.27	0.27	0.26	0.26	0.25
14.700	0.25	0.24	0.24	0.24	0.23
14.950	0.23	0.22	0.22	0.22	0.21
15.200	0.21	0.21	0.20	0.20	0.20
15.450	0.19	0.19	0.19	0.18	0.18
15.700	0.18	0.18	0.17	0.17	0.17
15.950	0.17	0.16	0.16	0.16	0.16
16.200	0.15	0.15	0.15	0.15	0.15
16.450	0.14	0.14	0.14	0.14	0.14
16.700	0.14	0.13	0.13	0.13	0.13
16.950	0.13	0.13	0.13	0.13	0.12
17.200	0.12	0.12	0.12	0.12	0.12
17.450	0.12	0.12	0.12	0.11	0.11
17.700	0.11	0.11	0.11	0.11	0.11
17.950	0.11	0.11	0.11	0.11	0.10
18.200	0.10	0.10	0.10	0.10	0.10
18.450	0.10	0.10	0.10	0.10	0.10
18.700	0.10	0.10	0.09	0.09	0.09
18.950	0.09	0.09	0.09	0.09	0.09
19.200	0.09	0.09	0.09	0.09	0.09
19.450	0.09	0.09	0.08	0.08	0.08
19.700	0.08	0.08	0.08	0.08	0.08
19.950	0.08	0.08	0.08	0.08	0.08
20.200	0.08	0.08	0.08	0.07	0.07
20.450	0.07	0.07	0.07	0.07	0.07
20.700	0.07	0.07	0.07	0.07	0.07
20.950	0.07	0.07	0.07	0.07	0.07
21.200	0.07	0.07	0.07	0.07	0.07
21.450	0.07	0.07	0.07	0.07	0.07

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: BMP (OUT) Storm Event: 100-year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
21.700	0.07	0.07	0.07	0.07	0.07
21.950	0.06	0.06	0.06	0.06	0.06
22.200	0.06	0.06	0.06	0.06	0.06
22.450	0.06	0.06	0.06	0.06	0.06
22.700	0.06	0.06	0.06	0.06	0.06
22.950	0.06	0.06	0.06	0.06	0.06
23.200	0.06	0.06	0.06	0.06	0.06
23.450	0.06	0.06	0.06	0.06	0.06
23.700	0.06	0.06	0.06	0.06	0.06
23.950	0.06	0.06	0.06	0.06	0.05
24.200	0.05	0.05	0.05	0.04	0.04
24.450	0.04	0.04	0.04	0.03	0.03
24.700	0.03	0.03	0.03	0.03	0.02
24.950	0.02	0.02	0.02	0.02	0.02
25.200	0.02	0.02	0.02	0.02	0.01
25.450	0.01	0.01	0.01	0.01	0.01
25.700	0.01	0.01	0.01	0.01	0.01
25.950	0.01	0.01	0.01	0.01	0.01
26.200	0.01	0.01	0.01	0.01	0.01
26.450	0.00	0.00	0.00	0.00	0.00
26.700	0.00	0.00	0.00	0.00	0.00
26.950	0.00	0.00	0.00	0.00	0.00
27.200	0.00	0.00	0.00	0.00	0.00
27.450	0.00	0.00	0.00	0.00	0.00
27.700	0.00	0.00	0.00	0.00	0.00
27.950	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Index

CN Area Collection - Pre-Developed (Catchment)

Description	CN	Area (acres)	Percent Connected Impervious Area (%)	Percent Unconnected Impervious Area (%)
Impervious Areas - Gravel (w/ right-of-way) - Soil B	85.000	0.160	0.0	0.0
Woods - fair - Soil B	60.000	4.295	0.0	0.0
Woods - fair - Soil D	79.000	3.675	0.0	0.0
Meadow - cont. grass (non grazed) - ---- - Soil B	58.000	0.040	0.0	0.0

CN Area Collection - Post Controlled (Catchment)

Description	CN	Area (acres)	Percent Connected Impervious Area (%)	Percent Unconnected Impervious Area (%)
Meadow - cont. grass (non grazed) - ---- - Soil B	58.000	0.421	0.0	0.0
Impervious Areas - Gravel (w/ right-of-way) - Soil B	98.000	0.392	0.0	0.0

CN Area Collection - Post Uncontrolled (Catchment)

Description	CN	Area (acres)	Percent Connected Impervious Area (%)	Percent Unconnected Impervious Area (%)
Woods - fair - Soil B	60.000	3.683	0.0	0.0
Woods - fair - Soil D	79.000	3.675	0.0	0.0

NOAA Atlas 14, Volume 2, Version 3
Location name: Toboyne Twp, Pennsylvania, USA*
Latitude: 40.2896°, Longitude: -77.6144°
Elevation: 1035.15 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.337 (0.295–0.389)	0.403 (0.353–0.464)	0.490 (0.427–0.563)	0.558 (0.485–0.640)	0.652 (0.566–0.746)	0.729 (0.629–0.834)	0.808 (0.693–0.922)	0.894 (0.761–1.02)	1.02 (0.858–1.16)	1.12 (0.935–1.27)
10-min	0.524 (0.459–0.604)	0.629 (0.551–0.725)	0.761 (0.664–0.875)	0.861 (0.749–0.988)	0.998 (0.866–1.14)	1.11 (0.953–1.26)	1.22 (1.04–1.39)	1.34 (1.14–1.52)	1.50 (1.26–1.70)	1.63 (1.36–1.85)
15-min	0.642 (0.563–0.741)	0.770 (0.674–0.887)	0.935 (0.815–1.07)	1.06 (0.921–1.22)	1.23 (1.07–1.41)	1.37 (1.18–1.56)	1.51 (1.30–1.72)	1.66 (1.41–1.89)	1.87 (1.57–2.13)	2.04 (1.70–2.31)
30-min	0.849 (0.744–0.980)	1.03 (0.902–1.19)	1.28 (1.12–1.47)	1.47 (1.28–1.69)	1.74 (1.51–1.99)	1.96 (1.69–2.24)	2.18 (1.87–2.49)	2.42 (2.06–2.75)	2.77 (2.33–3.15)	3.05 (2.55–3.47)
60-min	1.04 (0.909–1.20)	1.26 (1.11–1.46)	1.61 (1.40–1.85)	1.87 (1.63–2.15)	2.26 (1.96–2.58)	2.58 (2.22–2.95)	2.92 (2.50–3.33)	3.29 (2.80–3.74)	3.83 (3.22–4.36)	4.29 (3.58–4.87)
2-hr	1.19 (1.04–1.38)	1.44 (1.26–1.68)	1.84 (1.60–2.13)	2.16 (1.88–2.50)	2.65 (2.29–3.06)	3.08 (2.64–3.54)	3.57 (3.04–4.10)	4.13 (3.49–4.74)	5.01 (4.20–5.74)	5.80 (4.81–6.65)
3-hr	1.30 (1.14–1.51)	1.57 (1.38–1.83)	1.98 (1.74–2.31)	2.33 (2.04–2.70)	2.85 (2.47–3.30)	3.32 (2.86–3.82)	3.85 (3.30–4.42)	4.47 (3.80–5.11)	5.44 (4.57–6.21)	6.31 (5.24–7.21)
6-hr	1.64 (1.46–1.88)	1.98 (1.76–2.26)	2.46 (2.18–2.81)	2.88 (2.54–3.28)	3.51 (3.08–3.99)	4.07 (3.55–4.60)	4.71 (4.08–5.32)	5.45 (4.68–6.14)	6.62 (5.61–7.45)	7.67 (6.43–8.63)
12-hr	2.04 (1.82–2.29)	2.45 (2.18–2.75)	3.04 (2.70–3.41)	3.56 (3.15–3.97)	4.35 (3.82–4.84)	5.06 (4.42–5.61)	5.88 (5.09–6.52)	6.84 (5.86–7.55)	8.35 (7.05–9.20)	9.74 (8.12–10.7)
24-hr	2.39 (2.17–2.66)	2.87 (2.61–3.19)	3.56 (3.23–3.96)	4.17 (3.76–4.62)	5.10 (4.57–5.62)	5.94 (5.28–6.52)	6.91 (6.10–7.55)	8.03 (7.03–8.75)	9.84 (8.47–10.6)	11.5 (9.76–12.4)
2-day	2.77 (2.53–3.07)	3.33 (3.03–3.68)	4.13 (3.75–4.56)	4.83 (4.37–5.32)	5.92 (5.32–6.50)	6.91 (6.15–7.56)	8.06 (7.13–8.80)	9.41 (8.23–10.2)	11.6 (9.94–12.5)	13.5 (11.5–14.6)
3-day	2.94 (2.69–3.25)	3.52 (3.22–3.89)	4.35 (3.97–4.80)	5.07 (4.61–5.58)	6.18 (5.59–6.79)	7.19 (6.45–7.88)	8.36 (7.43–9.13)	9.71 (8.55–10.6)	11.9 (10.3–12.9)	13.8 (11.8–15.0)
4-day	3.11 (2.85–3.43)	3.72 (3.41–4.10)	4.57 (4.19–5.04)	5.31 (4.86–5.84)	6.45 (5.85–7.08)	7.48 (6.74–8.19)	8.65 (7.73–9.47)	10.0 (8.87–10.9)	12.2 (10.6–13.3)	14.1 (12.2–15.4)
7-day	3.65 (3.36–4.02)	4.35 (4.01–4.80)	5.31 (4.88–5.84)	6.12 (5.61–6.72)	7.36 (6.71–8.06)	8.45 (7.65–9.24)	9.69 (8.72–10.6)	11.1 (9.90–12.1)	13.3 (11.7–14.5)	15.3 (13.3–16.7)
10-day	4.20 (3.87–4.64)	5.00 (4.60–5.53)	6.01 (5.52–6.64)	6.87 (6.30–7.56)	8.16 (7.44–8.97)	9.28 (8.42–10.2)	10.5 (9.51–11.6)	12.0 (10.7–13.1)	14.1 (12.5–15.5)	16.1 (14.1–17.6)
20-day	5.73 (5.36–6.18)	6.76 (6.32–7.29)	7.91 (7.37–8.52)	8.86 (8.24–9.55)	10.2 (9.50–11.0)	11.4 (10.6–12.3)	12.7 (11.7–13.6)	14.1 (12.9–15.1)	16.2 (14.7–17.4)	17.9 (16.2–19.3)
30-day	7.14 (6.70–7.66)	8.37 (7.85–8.98)	9.63 (9.02–10.3)	10.7 (9.98–11.4)	12.1 (11.3–13.0)	13.4 (12.4–14.3)	14.7 (13.6–15.7)	16.1 (14.9–17.3)	18.2 (16.7–19.5)	19.9 (18.1–21.4)
45-day	8.99 (8.49–9.60)	10.5 (9.91–11.2)	11.9 (11.2–12.7)	13.0 (12.3–13.9)	14.6 (13.7–15.6)	15.9 (14.9–17.0)	17.3 (16.1–18.4)	18.7 (17.4–19.9)	20.7 (19.2–22.1)	22.4 (20.6–23.9)
60-day	10.8 (10.2–11.4)	12.5 (11.9–13.3)	14.1 (13.3–14.9)	15.3 (14.5–16.3)	17.1 (16.1–18.1)	18.5 (17.4–19.6)	19.9 (18.7–21.1)	21.5 (20.1–22.7)	23.6 (22.0–25.0)	25.4 (23.5–26.9)

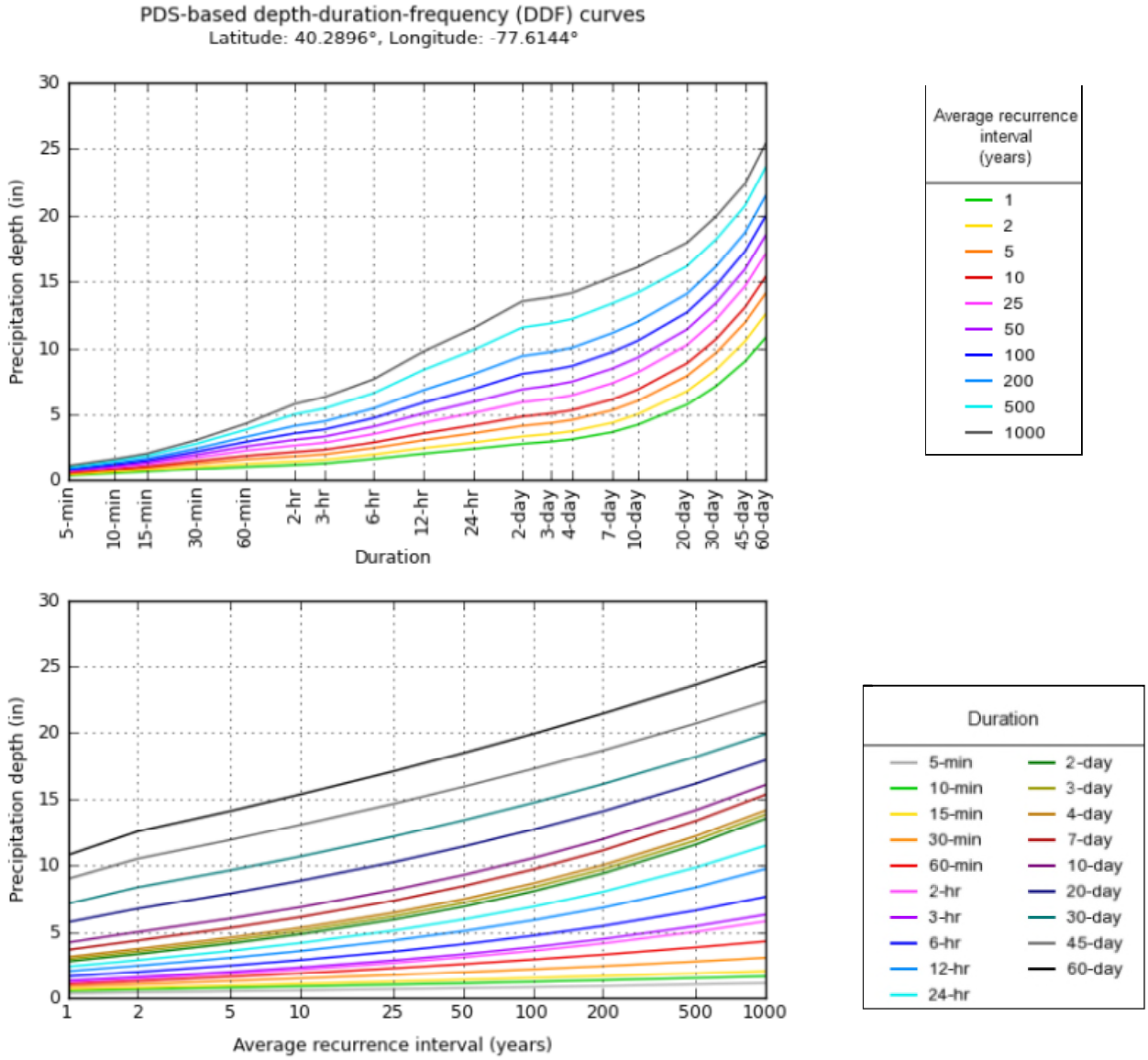
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



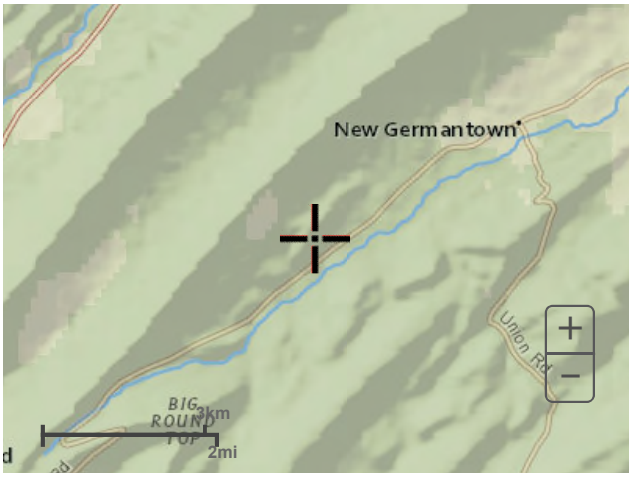
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue Oct 11 22:26:41 2016

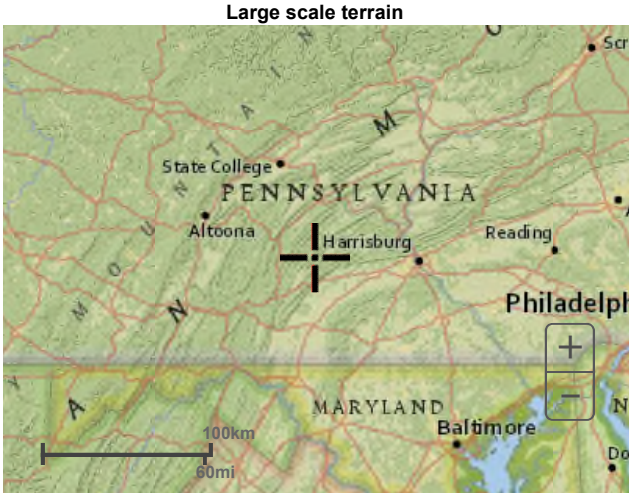
Back to Top

Maps & aerials

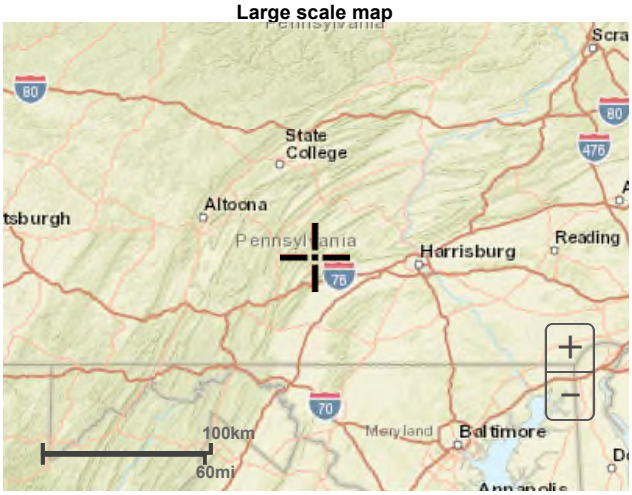
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Underdrain Dewatering Rate Calculation

Project: Doylesburg **BMP:** BMP-1

Filter Media				
Layer	**Media**	**Thickness - T (ft)**	**Min. Infiltration Rate - K (ft/min)[1]**	**Flow Rate (cfs)[2]**
1	Clean Gravel	2	2	300.00
2	Coarse Sand	N/A	0.02	N/A
3	Fine Sand	N/A	0.002	N/A
4	Other[3]	N/A	N/A	N/A
			Minimum Flow Rate (cfs)	**300.00**

1. From Principles of Geotechnical Engineering Third Edition, Braja Das, 1994
2. Q=KA(Hm+T/T)
   A = Area (square feet) = 4,500
   Hm = Head above media (feet) = 2
3. Infiltration rate measured in field or laboratory

Perforated Pipe				
Pipe	**Perforation Area (square inch)[4]**	**# Perforations per Foot - N**	**Pipe Length - L (ft)**	**Flow Rate (cfs)[5]**
1	0.046	100	50	46.14
2	0	0	0	0.00
			Total Flow Rate (cfs)	**46.14**

4. Reference: PVC: certainteed.com HDPE: ads-pipe.com
5. Q= N*L*cAo√(2GH)
   c = Orifice Coefficient = 0.6
   Ao= Perforation Area (sq. ft.)
   G= Grav. Accel. (ft/sec^2) 32.2
   H= Average Head (ft) = 1

Pipe Discharge				
Pipe	**Pipe Diameter - D (in)**	**Pipe Roughness Coefficient -n**	**Pipe Slope - S[6]**	**Flow Rate (cfs)[7]**
1	2	0.012	0.003333333	0.02
2	0	0	0	0.00
			Total Flow Rate (cfs)	**0.02**

6. For flat pipe, use hydraulic grade (pipe diameter/pipe length) for the pipe slope
7. From Manning's equation (attach separate calculation worksheet)

Limiting flow rate from combined underdrain system - Ql (cfs) =	**0.02**
Dewatering Volume (cu-ft) =	**4,966.00**
Dewatering Time (sec) = 2HA/Ql =	**248,300**
Dewatering Time (hrs) =	**68.97**

Worksheet for Underdrain DOY

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00333	ft/ft
Normal Depth	0.17	ft
Diameter	0.17	ft
Discharge	0.02	ft³/s

Results

Discharge	0.02	ft³/s
Normal Depth	0.17	ft
Flow Area	0.02	ft²
Wetted Perimeter	0.53	ft
Hydraulic Radius	0.04	ft
Top Width	0.00	ft
Critical Depth	0.09	ft
Percent Full	100.0	%
Critical Slope	0.00989	ft/ft
Velocity	0.87	ft/s
Velocity Head	0.01	ft
Specific Energy	0.18	ft
Froude Number	0.00	
Maximum Discharge	0.02	ft³/s
Discharge Full	0.02	ft³/s
Slope Full	0.00333	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Underdrain DOY

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.09	ft
Channel Slope	0.00333	ft/ft
Critical Slope	0.00989	ft/ft

APPENDIX F – WORKSHEETS

WORKSHEET 1. GENERAL SITE INFORMATION

Date:	October 28, 2016		
Project Name:	Sunoco - Doylesburg PPP Station		
Municipality:	Toboyne Township		
County:	Perry		
Total Area (acres):	1.80		
Major River Basin:			
Watershed:	Sherman Creek		
Sub Basin:	Sherman Creek		
Nearest Surface Water to Receive Runoff:	Sherman Creek		
Chapter 93 - Designated Water Use:	HQ-CWF		
Impaired according to Chapter 303(d) list?		YES	
List Causes of Impairment:		NO	X
Is Project Subject to, or Part of:			
Municipal Separate Storm Sewer System (MS4) Requirements		YES	
		NO	X
Existing or Planned drinking water supply?		YES	
		NO	X
If yes, distance from proposed discharge (miles):			
Approved Act 167 Plan?		YES	
		NO	X
Existing River Conservation Plan?		YES	
		NO	X

Worksheet 2. Sensitive Natural Resources

INSTRUCTIONS:

1. Provide Sensitive Resources Map according to non-structural BMP 5.4.1 in Chapter 5. This map should identify wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural areas.

2. Summarize the existing extent of each sensitive resource in the Existing Sensitive Resources Table (below, using Acres). If none present, insert 0.

3. Summarize Total Protected Area as defined under BMPs in Chapter 5.

4. Do not count any area twice. For example, an area that is both a floodplain and a wetland may only be considered once.

EXISTING NATURAL SENSITIVE RESOURCE	MAPPED? yes/no/n/a	TOTAL AREA (Ac.)	PROTECTED AREA (Ac.)
Waterbodies	n/a	0	0
Floodplains	n/a	0	0
Riparian Areas	n/a	0	0
Wetlands	n/a	0	0
Woodlands	n/a	0	0
Natural Drainage Ways	n/a	0	0
Steep Slopes, 15% - 25%	no	0	0
Steep Slopes, over 25%	no	0	0
Other:	n/a	0	0
Other:	n/a	0	0
TOTAL EXISTING:		0	0

Worksheet 3. Nonstructural BMP Credits

PROTECTED AREA

1.1 Area of Protected Sensitive/Special Value Features (see WS 2) 0 **Ac.**

1.2 Area of Riparian Forest Buffer Protection 0 **Ac.**

3.1 Area of Minimum Disturbance/Reduced Grading 0 **Ac.**

TOTAL 0 **Ac.**

Site Area	*minus*	Protected Area	=	Stormwater Management Area
1.68	-	0	=	1.68

This is the area that requires stormwater management

VOLUME CREDITS

3.1 Minimum Soil Compaction

Lawn _____ ft^2 x 1/4" x 1/12 = 0 ft^3

Meadow _____ ft^2 x 1/3" x 1/12 = 0 ft^3

3.3 Protect Existing Trees

For Trees within 100 feet of impervious area:

Tree Canopy _____ ft^2 x 1/2" x 1/12 = 0 ft^3

_____ 0

5.1 Disconnect Roof Leaders to Vegetated Areas

For runoff directed to areas protected under 5.8.1 and 5.8.2

Roof Area _____ ft^2 x 1/3" x 1/12 = 0 ft^3

For all other disconnected roof areas

Roof Area _____ ft^2 x 1/4" x 1/12 = 0 ft^3

5.2 Disconnect Non-Roof impervious to Vegetated Areas

For Runoff directed to areas protected under 5.8.1 and 5.8.2

Impervious Area _____ ft^2 x 1/3" x 1/12 = 0 ft^3

For all other disconnected roof areas

Impervious Area _____ ft^2 x 1/4" x 1/12 = 0 ft^3

0

** For use on Worksheet 5*

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

Project: Sunoco - Doylesburg PPP Station
Drainage Area: 8.17 acres
2-Year Rainfall: 2.7 inches

Total Site Area (ac.): 1.80 acres
Protected Site Area: 0.00 acres
Managed Site Area: 1.80 acres

Existing Conditions								
Cover Type/Condition	**Soil Type**	**Area (sf)**	**Area (ac)**	**CN**	**S**	**Ia**	**Q**	**Runoff Volume (cf)**
Gravel	B	6,970	0.160	85	1.76	0.35	1.34	778.12
Meadow	B	1,742	0.040	58	7.24	1.45	0.18	26.79
Woods	B	187,090	4.295	60	6.67	1.33	0.23	3624.93
Woods	D	160,083	3.675	79	2.66	0.53	0.97	12995.25
TOTAL:			**8.170**					**17425.09**
Developed Conditions								
Cover Type/Condition	**Soil Type**	**Area (sf)**		**CN**	**S**	**Ia**	**Q**	**Runoff Volume (cf)**
Gravel	B	17,076	0.392	98	0.20	0.04	2.47	3514.21
Meadow	B	18,339	0.421	58	7.24	1.45	0.18	281.93
Woods	B	160,431	3.683	60	6.67	1.33	0.23	3108.41
Woods	D	160,083	3.675	79	2.66	0.53	0.97	12995.25
TOTAL:			**8.171**					**19899.80**

2-Year Volume Increase (ft3):	**2474.713**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = Q = (P - 0.2S)2 / (P+ 0.8S) where
   P = 2-Year Rainfall (in)
   S = (1000/CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 5. Structural BMP Volume Credits

PROJECT: Sunoco - Doylesburg PPP Station
SUB-BASIN: Sherman Creek

Required Control Volume (ft3) - *from Worksheet 4:* 2,475

Non-structural Volume Credit (ft3) - *from Worksheet 3:* - 0
(maximum is 25% of required volume)

Structural Volume Reqmt (ft3) 2,475
(Required Control Volume minus Non-structural Credit)

Proposed BMPs from PA Stormwater Best Management Practices Manual Chapter 6		**Area (ft2)**	**Volume Reduction Permanently Removed (ft^3)**
6.4.1	Porous Pavement		
6.4.2	Infiltration Basin		
6.4.3	Infiltration Bed	4,500	4,966
6.4.4	Infiltration Trench		
6.4.5	Rain Garden/Bioretention		
6.4.6	Dry Well/Seepage Pit		
6.4.7	Constructed Filter		
6.4.8	Vegetated Swale		
6.4.9	Vegetated Filter Strip		
6.4.10	Berm		
6.5.1	Vegetated Roof		
6.5.2	Capture and Re-Use		
6.6.1	Constructed Wetlands		
6.6.2	Wet Pond/Retention Basin		
6.6.3	Dry Extended Detention Basin		
6.6.4	Water Quality Filters		
6.7.1	Riparian Buffer Restoration		
6.7.2	Landscape Restoration/Reforestation		
6.7.3	Soil Amendment		
6.8.1	Level Spreader		
6.8.2	Special Storage Areas		
Other:			

Total Structural Volume Provided (ft3): **4,966**

Structural Volume Requirement (ft3): **2,475**

DIFFERENCE: **-2,491**

WORKSHEET 10. WATER QUALITY COMPLIANCE FOR NITRATE

Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the

PRIMARY BMPs FOR NITRATE:

	YES	NO
NS BMP 5.4.2 - Protect / Conserve / Enhance Riparian Buffers		X
NS BMP 5.5.4 - Cluster Uses at Each Site		X
NS BMP 5.6.1 - Minimize Total Disturbed Area	X	
NS BMP 5.6.3 - Re-Vegetate / Re-Forest Disturbed Areas (Native Species)	X	
NS BMP 5.9.1 - Street Sweeping / Vacuuming		X
Structural BMP 6.7.1 - Riparian Buffer Restoration		X
Structural BMP 6.7.2 - Landscape Restoration		X

SECONDARY BMPs FOR NITRATE:

NS BMP 5.4.1 - Protect Sensitive / Special Value Features		X
NS BMP 5.4.3 - Protect / Utilize Natural Drainage Features		X
NS BMP 5.6.2 - Minimize Soil Compaction		X
Structural BMP 6.4.5 - Rain Garden / Bioretention		X
Structural BMP 6.4.8 - Vegetated Swale		X
Structural BMP 6.4.9 - Vegetated Filter Strip		X
Structural BMP 6.6.1 - Constructed Wetland		X
Structural BMP 6.7.1 - Riparian Buffer Restoration		X
Structural BMP 6.7.2 - Landscape Restoration		X
Structural BMP 6.7.3 - Soils Amendment/Restoration		X

Stormwater BMP Information Chart 5.B revised March 15, 2016

	Infiltration Information					Drainage Information						BMP Information					
Proposed Infiltration BMP(s) (site specific)	Measured Infiltration Rate[9]	Factor of Safety	Design Infiltration Rate	Dewatering Time[1]	Elevation of Limiting Zone - Water Table, Bedrock, etc.[2]	Total Drainage Area to BMP	Total Impervious Drainage Area to BMP	Infiltration BMP Surface Area	Total Drainage Area Loading Ratio[6]	Impervious Area Loading Ratio[7]	Volume of Runoff Tributary to BMP During the 2yr/24hr Design Storm[5]	Calculated Infiltration Volume (from storms up to and including 2yr/24hr)	Calculated Managed Volume (from storms up to and including 2yr/24hr)[8]	Maximum water surface elevation in BMP from 2yr storm[3]	Infiltration Elevation Bottom of Bed/ Basin[3]	Elevation of Infiltration Test[4]	Elevation of E&S Sediment Basin Bottom (if applies)
	in./hr.	*Min. of 2*	*in./hr.*	*hrs.*		*sq. ft*	*sq. ft.*	*sq. ft.*			*cf*	*cf*	*cf*				
BMP 6.4.1 **Pervious Pvmnt w. Infilt. Bed**																	
BMP 6.4.2 **Infiltration Basin**																	
BMP 6.4.3 **Subsurface Infiltration Bed**																	
BMP 6.4.4 **Infiltration Trench**																	
BMP 6.4.5 **Rain Garden/Bioretention**																	
BMP 6.4.6 **Dry Well / Seepage Pit**																	
Other																	
BMP 6.4.7 **Constructed Filter** BMP 6.4.8 **Vegetated Swale** BMP 6.4.9 **Vegetated Filter Strip** BMP 6.4.10 **Infilt. Berm & Ret. Grading**	0.00	N/A	0	69	none	35,414	12,576	4500	8	3	2,962	2,962	0	926.29	925.0	925.0	N/A

All information to be based on the 2-year/24-hour storm
Provide page numbers from the stormwater narrative identifying the location of the above information.

[1] Can include active infiltration time - dewatering time should not exceed 72 hours after the 2-year/24-hour storm
[2] Depth to limiting zone is recommended to be at least 2 ft below infiltration testing elevation/proposed infiltration elevation.
[3] A maximum of 2 feet of Hydraulic head is recommended.
[4] Provide supporting field notes/documenation from soil evaluation.
[5] This value should be greater than or equal to the Volume to be Infiltrated or Managed by the BMP.
[6] A maximum of 8:1 is recommended.
[7] A maximum of 5:1 is recommended; however, in carbonate geology areas, a maximum of 3:1 is recommended.
[8] Calculated runoff volume that is managed in ways other than infiltration to address 25 PA Code Ch 102.8(g)(2)
[9] The infiltration testing information should be located on the plan view of the PCSM Plan and should include infiltration test elevation and rate.

Any deviations from the recommendations above should be adequately justified by a qualified professional and included with the application.

NOTE: This chart is for summary purposes only and should be consistent with all design calculations and worksheets.

* Notes:
1. The dewatering time was calculated based on the underdrain design.

APPENDIX G – Stormwater Management Plans

SEE FULL SIZE DRAWINGS