



Transcontinental Gas Pipe Line Company, LLC

Section 2-1 E&SC/SR Plan Narrative and Drawings

**Regional Energy Access Expansion Project –
Regional Energy Lateral**

April 2021
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SECTION 2.1.1
NARRATIVE

1. Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), indirectly owned by the Williams Companies, Inc. (Williams) is seeking authorization from the Federal Energy Regulatory Commission (FERC) under Section 7(c) of the Natural Gas Act and Part 157 of the Commission's regulations to construct, own, operate, and maintain the proposed Project facilities associated with the Regional Energy Access Expansion Project (Project). The Project is an expansion of Transco's existing natural gas transmission system that will enable Transco to provide an incremental 829,400 dekatherms per day (Dth/d) of year-round firm transportation capacity from the Marcellus Shale production area in northeastern Pennsylvania to multiple delivery points along Transco's Leidy Line in PA and Mainline in PA, NJ, and MD.

The Regional Energy Lateral (REL) is proposed as part of the overall Regional Energy Access Expansion Project (Project). The Regional Energy Lateral component of the Project will consist of approximately 22.2 miles of 30-inch diameter pipeline, partially co-located with existing Transco Leidy Line-A, in Buck, Bear Creek, Plains, Jenkins, Kingston and Dallas Townships, and Laflin, Wyoming, and West Wyoming Boroughs, Luzerne County, Pennsylvania. The Regional Energy Lateral begins at existing Compressor Station 515 in Buck Township and continues westward to its terminus at Transco's existing Hildebrandt Tie-in/MLV-515RA40 in Dallas Township. A separate E&SC/SR Plan Narrative is provided for Compressor Station 515.

This E&SC and SR Plan has been developed for Regional Energy Lateral which includes: (1) MLV-515RA20, (2) MLV-515RA30, (3) Carverton Tie-in, (4) Lower Demunds REL Tie-in, and (5) Hildebrandt Tie-in/MLV-515RA40. Additionally, three channels have been added to the SR Plan to restabilize and redirect existing streams, S4a-T5/S4-T5 and S5-T5/S6-T5, in Laflin, PA. Located along the pipeline route are two proposed contractor yards, CY-LU-001 and CY-LU-002. The E&SC and SR Plan shall be designed and implemented to be consistent with the Post Construction Stormwater Management (PCSM) Plan under 25 Pa. Code § 102.8 (relating to PCSM requirements). Transco will use and implement the practices, measures and details outlined herein to control soil erosion and off-site sedimentation. The work and disturbed areas are located within Transco property, existing easements or legally obtained workspace. The limit of disturbance (LOD) for the Regional Energy Lateral Pipeline will be approximately 405 acres, which includes portions of Compressor Station 515. Subject to FERC's certification of the Project and receipt of the necessary permits and authorizations, Transco anticipates construction of the Project to start in second quarter 2023 to meet a proposed in-service date in fourth quarter 2024.

1.1 MLV-515RA20

The MLV-515RA20 is proposed along the REL Pipeline in Bear Creek Township, Luzerne County at Milepost 7.54. It is proposed as a means to isolate gas flows along sections of a pipeline. Pig launchers/receivers and communication equipment may be located at the MLV facility. The facility will include a 104 foot long gravel access road, 55 ft x 90 ft gravel pad, various diversion and PCSM conveyance channels, and an infiltration berm and soil amendment area.

1.2 MLV-515RA30

The MLV515-RA30 is proposed along the REL Pipeline in Wyoming Borough, Luzerne County at Milepost 14.84. It is proposed as a means to isolate gas flows along sections of a pipeline. Pig launchers/receivers and communication equipment may be located at the MLV facility. The facility will include a 140 foot long gravel access road, 62 ft x 96 ft gravel pad, and an infiltration berm.

1.3 Carverton Tie-in

The Carverton Tie-in is a receipt tie-in proposed in West Wyoming Borough, Luzerne County at Milepost 16.8. Proposed is the installation of new tie-in piping into the proposed REL Pipeline, valves, and aboveground tie-in piping for an annubar meter. The facility will include a 55 ft x 90 ft gravel pad, and an infiltration berm PCSM BMP.

1.4 Lower Demunds REL Tie-in

The Lower Demunds REL Tie-in is a receipt tie-in proposed in Dallas Township, Luzerne County near the terminus of the Regional Energy Lateral at Milepost 22.1. Proposed is the installation of approximately 400 feet of new 20-inch-diameter tie-in piping and conduit from Transco's existing Leidy Line A tie-in site to the new proposed REL Pipeline tie-in site, valves, and new aboveground tie-in piping for an annubar meter. The facility will include a 74.5 ft x 84 ft gravel pad. Run-on to the pad area will be limited by an upgradient diversion channel, and stormwater management will be accomplished by infiltration within the pad area itself. The pad will be bermed around the exterior to retain stormwater for infiltration. An overflow spillway will be used to discharge excess flow to a level spreader. Runoff rates have been reduced by 40% of the pre-construction flow rates.

1.5 Hildebrandt Tie-in/MLV-515RA40

The Hildebrandt Tie-in/MLV-515RA40 is receipt tie-in proposed in Dallas Township, Luzerne County, at the terminus of the Regional Energy Lateral at Milepost 22.34. Proposed is

the installation of new aboveground tie-in piping, valves, and aboveground piping for an annubar meter, and install Hildebrandt Tie-in/MLV-515RA40 and associated pig trap. The facility will include an 80 ft x 140 ft gravel pad. With run-on to the pad area diverted by an upgradient channel, stormwater management will be accomplished by infiltration within the pad area itself. The pad will be bermed around the exterior to retain stormwater for infiltration. An overflow spillway will be used to discharge excess flow to the diversion channel and subsequently to a level spreader. Runoff rates have been reduced by 40% of the pre-construction flow rates.

1.6 S5-T5/S6-T5 AND S4A-T5/S4-T5 Stream Stabilization

Two areas of existing stream channel and bank stabilization and reconstruction through the REL Pipeline right-of-way are proposed for the project. The eastern stream section is designated as S4a-T5/S4-T5 and is located between Mileposts 11.0 and 11.1. The second section is designated as S5-T5/S6-T5 and is located between Mileposts 11.2 and 11.3. A small section of channel is also required to connect stream S5-T5 to S6-T5. Work will include channel and bank stabilization, reconstruction where necessary, and new channel sections as needed to restore the streams and protect the REL Pipeline.

1.7 Contractor Yards

Along the REL Pipeline are two proposed contractor yards. CY-LU-001 is located at Milepost 15.3 and CY-LU-002 is located at Milepost 10.5. Both contractor yards are temporary in nature and no significant earth disturbance is proposed for either yard.

Contractor Yard CY-LU-001 has an approximate size of 1.2 acres. CY-LU-002 covers an approximate area of 11.4 acres.

E&S BMPs proposed for the contractor yards include rock construction entrances and compost filter socks. Upon completion of construction activities, both yards will be restored to original conditions. No PCSM BMPs are proposed for either yard.

2. Topographic Features of the Area

A Project Location Map for the Regional Energy Lateral Pipeline is included in Attachment 1. This map shows the topographical features of the general site vicinity and is based on the USGS 7.5 Minute topographical mapping of the AVOCA, Kingston, Pittston, Pleasant Valley Summit, and Wilkes-Barre East, Pennsylvania quadrangles.

3. Receiving Surface Waters

The following table (Table 1) list each watershed located Regional Energy Lateral Pipeline Project Area, its Chapter 93 Water Quality Standards, and Pennsylvania Fish and Boat Commission classifications. A Wetland and Watercourse Delineation Report is included in Attachment A of the ESCP permit application.

Table 1 – Receiving Waters			
Watershed Name	Designated Use	Existing Use	PFBC Classification
Stony Run	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream
Shades Creek, Trib 04286 & Trib 04285 to Shades Creek	HQ-CWF, MF	-	Class A Wild Trout
Little Shades Creek & Trib to 04284 to Little Shades Creek	HQ-CWF, MF	-	Class A Wild Trout
Snider Run	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream
Meadow Run	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream
Bear Creek	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream
Trib 046312 to Little Bear Creek	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream
Mill Creek, Trib 63014 & 63015 to Mill Creek	CWF, MF	HQ-CWF, MF	Class A Wild Trout
Gardner Creek	CWF, MF	-	N/A
Susquehanna River	WWF, MF	-	N/A
Trib 64676 to Susquehanna River	CWF, MF	-	N/A
Abrahams Creek, Trib 28363 & Trib 28365 to Abrahams Creek	CWF, MF	-	Naturally Producing Wild Trout Stream, portions of Trib 28363 only (MP 15.8-17.7)
Trib 63020 to Toby Creek	CWF, MF	-	Naturally Producing Wild Trout Stream
Abrahams Creek	CWF, MF	-	N/A
Trib 63034 to Toby Creek	CWF, MF	-	Naturally Producing Wild Trout Stream
Abrahams Creek	CWF, MF	-	N/A
Trib 63036 to Toby Creek	CWF, MF	-	Naturally Producing Wild Trout Stream
Trib 28371 to Abrahams Creek	CWF, MF	-	N/A
Abrahams Creek	CWF, MF	-	N/A
Trout Brook, Trib 63040 to Trout Brook	CWF, MF	-	Naturally Producing Wild Trout Stream
Trib 63042 to Toby Creek	CWF, MF	-	Naturally Producing Wild Trout Stream
MF: Migratory Fishes, CWF: Cold Water Fishes, HQ-CWF: High Quality- Cold Water fishes			

4. Types, Depth, Slope, Locations & Limitation of the Soils and Geologic Formations

The soil associations on site were identified by soil map units as mapped in the Web Soil Survey website (<https://websoilsurvey.sc.egov.usda.gov/>) by the United States Dept. of Agriculture (USDA), Natural Resources Conservation Service (NRCS). There are 60 soil mapping units located within the LOD, see Table 2 below:

Table 2 – Soils mapping units within the LOD	
Soil Mapping Unit	Soil Series
Ag	Alluvial land
ArB	Arnot-Rock outcrop complex, 0 to 8 percent slopes
ArD	Arnot-Rock outcrop complex, 8 to 25 percent slopes
ASF	Arnot-Rock outcrop complex, steep
At	Atherton silt loam, gray subsoil variant
Bf	Basher soils
BrC	Braceville gravelly loam, 8 to 15 percent slopes
CF	Cut and fill land
ChA	Chenango gravelly loam, 0 to 3 percent slopes
ChB	Chenango gravelly loam, 3 to 8 percent slopes
ChC	Chenango gravelly loam, 8 to 15 percent slopes
CIA	Chippewa silt loam, 0 to 3 percent slopes
CnB	Chippewa silt loam, 0 to 8 percent slopes, extremely stony
DdD	Dekalb channery sandy loam, 8 to 25 percent slopes, rubbly
DEF	Dekalb extremely stony sandy loam, steep
GP	Gravel pits
Ho	Holly silt loam
LaC	Lackawanna channery silt loam, 8 to 15 percent slopes
LaD	Lackawanna channery silt loam, 15 to 25 percent slopes
LcB	Lackawanna channery silt loam, 3 to 8 percent slopes, extremely stony
LcD	Lackawanna channery silt loam, 8 to 25 percent slopes, extremely stony
LEF	Lackawanna and Bath soils, steep, extremely stony
Ln	Linden soils
McB	Mardin channery silt loam, 3 to 8 percent slopes, very stony
McD	Mardin channery silt loam, 8 to 25 percent slopes, very stony
Mg	Mine dump
Mh	Mine dump, burned
Mm	Mine wash
MoB	Morris channery silt loam, 0 to 8 percent slopes
MsB	Morris channery silt loam, 0 to 8 percent slopes, extremely stony
Mu	Muck

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OIB	Oquaga and Lordstown channery silt loams, 3 to 8 percent slopes
OIC	Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes
OID	Oquaga and Lordstown channery silt loams, 15 to 25 percent slopes
OpB	Oquaga and Lordstown extremely stony silt loams, 3 to 8 percent slopes
OpD	Oquaga and Lordstown extremely stony silt loams, 8 to 25 percent slopes
OXF	Oquaga and Lordstown extremely stony silt loams steep
Ps	Pope soils
Qu	Quarries and mines
RdA	Rexford loam, 0 to 3 percent slopes
RdB	Rexford loam, 3 to 8 percent slopes
Sm	Strip mine
VoB	Volusia channery silt loam, 0 to 8 percent slopes
VrB	Volusia channery silt loam, 0 to 8 percent slopes, extremely stony
VrC	Volusia channery silt loam, 8 to 15 percent slopes, extremely stony
W	Water
Wa	Wayland silt loam
WeB	Weikert and Klinesville channery silt loams, 3 to 8 percent slopes
WeD	Weikert and Klinesville channery silt loams, 15 to 25 percent slopes
WIB	Wellsboro channery silt loam, 3 to 8 percent slopes
WIC	Wellsboro channery silt loam, 8 to 15 percent slopes
WID	Wellsboro channery silt loam, 15 to 25 percent slopes
WmB	Wellsboro channery silt loam, 3 to 8 percent slopes, extremely stony
WmD	Wellsboro channery silt loam, 8 to 25 percent slopes, extremely stony
WrB	Wurtsboro channery loam, 3 to 8 percent slopes
WrC	Wurtsboro channery loam, 8 to 15 percent slopes
WtB	Wurtsboro extremely stony loam, 3 to 8 percent slopes
WtD	Wurtsboro extremely stony loam, 8 to 25 percent slopes
WyD	Wyoming gravelly loam, 15 to 25 percent slopes
WyF	Wyoming gravelly loam, 25 to 60 percent slopes

Detailed descriptions and mapping of soil mapping units are provided in the Attachment 2. Soil use limitations (outlined in Table 3) were reviewed in relation to the Regional Energy Lateral Pipeline and resolutions were identified in Section 4.1.

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Table 3 – Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)																	
SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE/STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Alluvial Land	Ag	X	C/S			X	X	X		X	X	X	X		X		X
Arnot	ArB, ArD, ASF	X	C	X	X				X	X		X	X				
Atherton	At	X	S				X	X	X	X	X	X	X			X	X
Basher	Bf	X	C/S			X	X	X	X	X	X	X	X				X
Braceville	BrC	X	C/S	X	X		X	X	X	X	X	X	X				X
Cut and Fill*	CF																
Chenango	ChA, ChB, ChC	X	C	X		X	X	X		X	X	X	X				
Chippewa	CIA, CnB	X	C/S	X	X		X	X	X	X	X		X	X		X	
DeKalb	DdD, DEF	X	C	X					X	X	X	X	X				
Gravel Pits*	GP																
Holly	Ho	X	C/S			X	X	X	X	X	X	X	X			X	X
Lackawanna	LaC, LaD, LcB, LcD, LEF	X	C	X			X	X	X			X	X				X
Linden	Ln	X	C			X	X	X	X	X	X		X				
Mardin	McB, McD	X	S	X	X		X	X	X	X	X		X				X
Mine Dump*	Mg																
Mine Dump, Burned*	Mh																
Mine Wash*	Mm																
Morris	MoB, MsB	X	C/S	X	X		X	X	X	X		X	X				X
Muck	Mu		X			X	X	X			X					X	X
Oguaga	OIB, OIC, OID, OpB, OpD, OXF	X	C	X	X			X		X			X				
Pope	Ps	X	C/S		X	X		X	X	X	X	X	X				
Quarries and Mines*	Qu																
Rexford	RdA, RdB	X	C/S	X		X	X	X	X	X	X	X	X				X
Strip Mine*	Sm																
Volusia	VoB, VrB, VrC	X	C/S	X	X		X	X	X	X	X	X	X				

Table 3 – Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)

SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE/STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Water	W																
Wayland	Wa	X	S		X	X	X	X	X	X	X	X	X			X	X
Weikhart	WeB, WeD	X	C/S	X				X	X	X	X	X	X				
Wellsboro	WIB, WIC, WID, WmB, WmD	X	C/S	X	X		X	X	X	X	X		X				X
Wurtsboro	WrB, WrC, WtB, WtD	X	C/S				X	X		X		X	X				
Wyoming	WyD, WyF	X	C	X				X		X		X					

*Soils have similar limitations to the dominant soil or soils in the area.

4.1 Resolution of Soil Limitations

Transco proposes the following resolutions to compensate for soil limitations summarized in Table 3 above:

1. To offset the caving of cutbanks, trenching operations will be conducted in accordance with the OSHA Technical Manual for Trenching.
2. Preventative coatings shall be used to prevent corrosion of concrete and/ or steel.
3. When bedrock is encountered it will be removed by mechanical methods or blasting. Blasting operations will conform with local, state, and federal regulations.
4. Precautions will be taken to prevent slope failure when working within low strength soils by flattening cut / fill slopes, not overloading, maintaining lateral support, and preventing saturation of soils. Low strength soils will not be used for roadway construction.
5. Excavation in soils prone to flooding, slow percolation, ponding, wetness, located in a seasonal high water table, or which are hydric, will likely encounter water.

Compensation will involve dewatering with appropriate means such as pump water filter bags, sediment traps, etc.

6. Soils that have the potential to swell, shrink, or heave due to frost action may cause damage to roadways or pads. Where foundations are critical, compensation may require removal and replacement of soils with suitable material.
7. In circumstances where soils appear to be a poor source of topsoil, drought or prone to wetness, soil testing will be performed to determine the appropriate applications of soil amendments to promote growth. Soils onsite that are fair sources of topsoil, will be identified, stripped and stockpiled for use during restoration.
8. In order to minimize erosion of soils that are easily erodible, compensation may involve providing a protective lining, to apply seed, mulch, erosion control blankets (either in rolls or hydraulically applied), tracking slopes, upstream diversions, waterbars, etc to minimize soil erosion.

4.2 Geologic Formations

Transco utilized United States Geological Survey (USGS), Geologic Map of Pennsylvania - Map 1, dated 1980 (online), to evaluate geologic hazards on the Project. Transco retained Civil & Environmental Consultants, Inc. (CEC) of Pittsburgh, PA to perform a geohazard assessment, the following is provided from their 2020 report. The desktop analysis completed for the Project by CEC revealed that the Regional Energy Lateral Pipeline does not cross known, mapped, or inferred faults. No Karst formations were identified in the site vicinity. However, the analysis outlined that Regional Energy Lateral Pipeline lies within a zone of moderate to high landslide incidence and susceptibility. Also, portions of the Project area were previously mined.

Due to the moderate to high landslide incidence and susceptibility and mining in the Project area, a Geological Hazard Assessment and Mitigation Plan was completed by CEC and is submitted with this application (Attachment B). The Geological Hazard Assessment and Mitigation Plan identifies appropriate best management practices to avoid and mitigate for conditions encountered during construction.

5. Characterizations of Earth Disturbance Activities, Including Past, Present, and Proposed Land Uses

Transco will be installing various tie-in and mainline valve (MLV) facilities along the REL Pipeline as a means of controlling gas flows. Pig launchers/receivers, valves and other ancillary

equipment will be located at these facilities. The work and disturbed areas are located within Transco property, existing easements, or legally obtained temporary workspace.

Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (<https://www.mrlc.gov/viewer/>), it appears portions of the Regional Energy Lateral has been an existing and maintained gas pipeline or other right-of-way for the past 20 years and will continue to be an existing and maintained right-of-way once the Project is complete, with some new right-of-way being created in areas. Portions of the existing ROW's will be expanded upon as a result of the Project's construction. Based on the surrounding land characteristics, land use prior to ROW construction within the past 50 years likely would have been either forested land or meadow. Past, present, and proposed land uses for each site were as follows in Table 4.

Table 4 – Past, Present, and Proposed Land Uses			
Site	Past Land Use	Present Land Use	Proposed Land Use
MLV-515RA20	Woodland	Woodland	Mainline Valve Yard/ Pipeline Right-of-Way
MLV-515RA30	Urban Area	Urban Area	Mainline Valve Yard/ Pipeline Right-of-Way
Carverton Tie-in	Woodland	Woodland/Pipeline Right-of-way	Tie-In/Pipeline Right-of-Way
Lower Demunds REL Tie-in	Woodland	Pipeline Right-of-Way	Tie-In/Pipeline Right-of-Way
Hildebrandt Tie-in / MLV-515RA40	Woodland	Pipeline Right-of-Way	Tie-In/Pipeline Right-of-Way
Streams S4a-T5/S4-T5 & S5-T5/S6-T5	Woodland/ Surface Mines	Woodland	Pipeline Right-of-Way

Earth disturbance activities at each facility will include grading to create level gravel pad areas, installation of PCSM BMPs, and construction of gravel access roads. Disturbed areas within the temporary workspaces will be restored to the original contours.

The contractor will construct stormwater BMPs to mitigate the increase in volume and peak rates associated with construction. The proposed BMPs are designed to evaporate and/or infiltrate the net increase in volume between the pre- and post-development 2-year rain events. Refer to the Stormwater BMP Sizing Calculations in Attachment 3 for additional information.

6. Erosion and Sediment Control Best Management Practices

Various erosion and sediment control measures will be used during the construction of the

Regional Energy Lateral Pipeline. BMPs proposed to be used at the Site to control soil erosion and sediment pollution are listed below. Details of BMPs proposed for use at the Project location is included in the Erosion and Sedimentation Control Plan sheets. BMPs listed will be used at the Project location at the discretion of the environmental inspector, when found necessary to comply with 25 PA Code Chapter 102 and to adequately address potential erosion and sediment control issues.

Rock Construction Entrances

Rock construction entrances shall be installed whenever sediment tracking onto road surfaces is a potential or if required by the county conservation district or other agency. Soil erosion control measures shall be installed, if required and as needed. In special protection watersheds, either a 100' long rock construction entrance or a standard 50' rock construction entrance with a wash rack will be used at the construction entrance to wash construction vehicle wheels before they enter the public roadway. The wash rack will discharge to a 24" compost filter sock (min.). Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. Sediment deposited on roadways shall be removed and returned to the construction site immediately.

Compost Filter Sock

Compost filter socks shall be placed downslope of disturbed areas to serve as a sediment barrier and filter. Filter socks shall be placed at existing level grade, parallel to contours, with both ends of the sock extended up slope at a 45-degree angle. In areas where it is not feasible to install compost filter sock parallel to contours, compost filter sock j-hooks will be utilized. Compost filter sock j-hooks will be installed in accordance with DEP's list of approved alternative E&S and PCSM BMPs. Socks can be used on both steep and rocky slopes. Socks can range in size from 12" to 32" diameter depending on the site conditions. The maximum permissible slope lengths above compost filter socks will be used to determine the sizes of compost filter.

Broad Based Dips

Broad-based dips may be used to direct runoff from access roads to well-vegetated areas. In HQ/EV watersheds, a sump with compost filter sock should be utilized at the discharge end of the broad-based dip.

Waterbars

Waterbars will be aligned along the pipeline ROW to direct runoff towards the downslope

side of the disturbed area and to avoid backflow into the ROW. Compost filter sock shall be installed along the edge of the limit of disturbance to slow run off. Compost filter sock hooks shall be installed at an upslope angle and shall discharge to a well-vegetated area. Upslope of the CFS, a sump shall be constructed to reduce velocity and provide a sheet flow condition to the CFS. Permanent waterbars within the ROW shall be left in place after permanent stabilization has been achieved.

Compost Filter Sock Waterbar Discharge / Waterbar Sump

An 18" Compost Filter Sock shall be installed at the edge of the LOD where waterbar cross the LOD. Upslope of the CFS a 24" x 24" sump shall be constructed to reduce velocity and provide a sheet flow condition to the CFS. The sump shall be filled and stabilized when the CFS is removed after site stabilization.

French Mattress

In some instances, waterbars are discharging to existing gravel access roads. To minimize the potential for waterbars to cause roadway erosion, a French mattress is proposed to allow discharges to seep under the roadways and discharge to stabilized areas below the road.

Diversion Channels / Mountable Berms

Diversion channels or mountable berms shall be used to divert runoff from disturbed areas and convey it to appropriate BMPs such as a sedimentation basin sediment trap or clean water crossing.

Trench Plug

These will be placed at the banks of waterbodies in order to maintain stable working conditions and keep sediment from entering the waterways. Earth filled sacks will be used to secure the plug. The spacing of these structures varies based on the site and the slope of the dig location, as indicated in the plan drawings.

Erosion Control Blankets

A suitable erosion control blanket or soil stabilizer shall be used wherever earth disturbance occurs within 50 feet of surface waters, or 100 feet if special protection water, especially if site conditions make use of conventional E&S BMPs difficult. Erosion control blankets should be used on finished slopes greater than 3:1.

Timber Mats

Timber mats can be used for temporary wetland crossings. The timber mats are placed

over the wetland to allow equipment to cross and then are removed.

Temporary Equipment Bridges

A temporary bridge equipment crossing will be built in order to cross streams along the pipeline installation. The bridge equipment crossing will utilize geotextile material, timber mats, and a timber or metal bridge with side rails may include instream supports (where necessary). Culvert Equipment crossings may be used in areas where equipment must cross stream channels. Culverts shall be placed in the stream channel sized appropriately to convey the flow within the channel and shall be placed at least one-half their diameter apart. Coarse aggregate may be used for fill surrounding the culverts. Upon completion, material placed in the stream channel shall be completely removed.

Flumed Crossing/ Dam and Pump Crossing

These may be used when work is to be completed in a waterway. A flumed crossing involves the placement of a flume pipe within the waterway and using diversion structures up and down gradient to divert flow through the flume pipe and out of the work area. A dam and pump crossing involves placing sandbag barriers on the upstream and downstream sides of the work space to prevent water from entering the maintenance area. A pump shall be placed to move water from the upstream side, around the workspace and back to the downstream side of the work area. Trench plugs may be used on the banks of the stream to keep water from leaving the bed and banks limit of the waterway.

Pumped Water Filter Bag

Filter bags shall be placed in well-vegetated grassy areas and discharge onto stable, erosion resistant areas, and staked if the slope is greater than 5 percent. In the event that this is not possible, a geotextile path will be provided. A compost filter sock shall be placed below the filter bag when placed within 50 of streams or wetlands located within a HQ/EV watershed.

Trench Dewatering

Trench dewatering may be required, depending on the site conditions during the excavation. Water shall be pumped out and discharged into a filter bag or a dewatering structure when deemed necessary.

Safety Fence

Safety fence shall be installed to protect sensitive environmental features as depicted on the plan drawings. The fencing shall remain in place during phases of construction.

Silttron Pollution Prevention Fence

Silttron Pollution Prevention Fence may be used throughout the project where environmental features make it necessary in lieu of Compost Filter Sock (CFS). The site-specific sediment barriers will be selected by the environmental inspector on a site-by-site basis. These barriers will be placed at existing level grade, with both ends of the barrier extending at least 8' upslope at a 45 degree angle. Sediment must be removed when accumulations reach $\frac{1}{2}$ the above ground height of the fence. The size and type of fence will be selected based on slope lengths as determined in the maximum slope length for Multi-Layer Geotextile Filter Fence figures. The 16-inch filter fence is equivalent to an 18-inch compost filter sock, the 21-inch filter fence is equivalent to a 24-inch compost filter sock, and a 28-inch filter fence is equivalent to a 32-inch compost filter sock. Approved for use as an Alternative E&S and PCSM BMP by PA DEP on 8/22/18.

Rock Filter Outlet

Rock filter outlets may be used to address areas where concentrated flows intersect sediment barriers. They may also be used in instances where sediment barriers such as silt fence or compost filter socks have failed due to concentrated flow.

Inlet Protection/Rock Filter

Rock filters may be used to control runoff within constructed channels or at the inlet of stormwater piping to reduce erosion and collect sediment. The efficiency may be raised by anchoring a 6" layer of compost on the upgradient side.

Wetland Installation Procedures

During the course of pipeline maintenance and replacement within wetland areas, BMPs including slope breakers, equipment mats, sediment barriers, and trench plugs may be used to prevent altering the hydrology of the wetland and to prevent sediment from entering the wetland. Work within the wetland boundaries shall be limited to the extent possible. Upon completion of work the wetland area shall be restored to pre-construction grades and seeded with an appropriate wetland seed mixture.

Hydrostatic Dewatering Structure

A hydrostatic dewatering structure will be placed on a level, well vegetated site such that water will flow away from the structure and work areas. Flow rates through discharge and diverter pipes will be such that structures will not overflow. Contractor will properly remove and dispose

of the dewatering structure immediately upon completion of dewatering operations.

Bored Road Crossing/Trenched Road Crossing

These may be used where pipeline installation or maintenance under a bored road is necessary. Sediment barriers shall be used around the work area. Culverts will be placed where required to maintain water flow for stormwater ditches.

Structural Level Spreader

Structural level spreaders are used to collect concentrated runoff in a plunge pool and distribute flow uniformly across a weir to a vegetative surface, such that the velocity of the flow is reduced and the risk of erosion is minimized.

Perforated Pipe Level Spreader

Perforated pipe level spreaders are used to distribute stormwater runoff to established vegetative surfaces as sheet flow using perforated pipes. The perforated pipe is placed subsurface within a gravel bed.

Sediment Trap Outlet Basin

Sediment trap outlet basins are used to an alternative to riprap aprons and are used at clean water crossing outfalls. The basin will help dissipate flows velocities before entering vegetated areas and/or receiving streams.

Riprap Apron

Riprap aprons may be used at pipe or channel outfalls. The aprons will help dissipate flow velocity before entering vegetated areas and/or receiving stream(s).

Clean Water Crossings

Temporary diversion channels or mountable berms shall be used to divert runoff from undisturbed upslope areas and convey the runoff around areas of earth disturbance within the pipeline ROW corridor. From the diversion, the flow will outlet to a temporary pipe(s) crossing, which is installed across the right-of-way, and discharge to an outlet basin or structural level spreader. Clean water leaving the outlet basin will return to sheet flow downslope of the disturbed ROW.

Revegetation Plan and Procedures

The construction site should be stabilized as soon as possible after completion. Establishment of final cover must be initiated no later than 7 days after reaching final grade.

Temporary erosion and sedimentation control BMPs can be removed when the site meets final stabilization. Final stabilization means that soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70% or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.

Surface Roughening

Surface roughening 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. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended.

Typical Topsoil Stockpile

The maximum topsoil stockpile height shall not exceed 35 feet. Stockpile slopes shall be no steeper than 2H:1V. Stockpiles shall be stabilized in accordance with temporary seeding specifications and mulch is to be maintained until the stockpile is stabilized. Stockpile location shown on the plans are illustrative and may vary in location as construction proceeds.

Typical Channel and Vegetation Restoration

The impacted riparian zone will be restored for a minimum of 15 feet landward of the top of bank. If the pre-impact riparian buffer of native herbaceous and shrub vegetation exceeds 15 feet beyond the top of bank, the area to be seeded should be as follows: 150 feet in High-Quality waters, 100 feet in other waters, or existing width of the riparian zone if it is less than the minimum requirements. Ernst Seed Mix 178 (Riparian Buffer Mix) or similar shall be applied on restored banks and riparian zones. In addition, where existing forested buffers are impacted these shall be replanted outside of the existing maintained ROW, as indicated in forest replanting plans for the Project outlined in the Chapter 105 permit.

7. Recycling and Disposal of Materials

The restoration of the pipeline right-of-way will require the removal of the temporary materials. The temporary materials include, but may not be limited to, stone surfaces and associated geotextiles. The contractors are required to dispose of the materials at suitable

disposal or recycling sites and in compliance with local, state and federal regulations.

Contractors are required to inventory and manage their construction site materials. The goal is to be aware of the materials on-site, ensure they are properly maintained, used, and disposed of, and to make sure the materials are not exposed to stormwater. The following materials or substances are expected to be present on-site during construction (Note: this list is not an all-inclusive list and the materials management plan can be modified to address additional materials used on-site):

- Acids
- Detergents
- Fertilizers (nitrogen/phosphorus)
- Hydroseeding mixtures
- Petroleum based products
- Sanitary wastes
- Soil stabilization additives
- Solder
- Solvents

These materials must be stored as appropriate and shall not contact storm or non-stormwater discharges. Contractor shall provide a weatherproof container to store chemicals or erodible substances that must be kept on the site. Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of Safety Data Sheets (SDSs).

8. Thermal Impacts

Clearing riparian vegetative cover has the potential to increase stream temperatures. However, due to the nature of the proposed Project and limited extent of riparian forest impacts, potential thermal effects resulting construction or operation of the Project are expected to be negligible and localized. Transco has routed the proposed pipelines to parallel existing rights-of-way to the extent practicable. As such, most pipeline installation activities will take place within or immediately adjacent to an existing cleared and maintained pipeline right-of-way. Transco also reduced workspace to the extent practical within 50 feet of the top-of-bank for all streams crossed by the pipeline. Additionally, Transco has minimized workspace or reduced additional temporary workspace to the extent practicable within forested riparian buffers. A 10-foot-wide corridor centered over the proposed pipeline must be maintained to facilitate period inspection and maintenance activities. The rest of the forested riparian buffers cleared for the Project will be restored following construction. As outlined in the Wetland and Riparian

Reforestation plan included within Section 1-7 of the Application, most of the trees and shrubs adjacent to streams will be cleared at ground level and, to the extent practical, root systems will be left intact to promote stump sprouts to regenerate woody vegetation. In addition, temporarily cleared forested riparian buffers will be replanted with native trees and shrubs to reestablish canopy cover across most of the affected area. These restoration measures are expected to minimize solar exposure and mitigate potential temperature increases, which should further attenuate downstream from the right-of-way.

There will be no increase in stormwater discharge. Stormwater runoff associated with the installation of the MLV's will be routed through stormwater BMPs designed to retain and infiltrate the first surge of water from the site. The first surge of water will be the warmest water for the duration of the storm event and will quickly cool as the storm event progresses. The BMPs are designed to capture and infiltrate this warmest surge of stormwater. Based on routing calculations, stormwater is not discharged from the BMPs for the first 8 hours during a 100-year/24-hour storm event. The retention period is longer for less intense storms. Therefore, as a result of these measures, no significant thermal impact to the receiving waters is anticipated.

9. Antidegradation Requirements

Transco is meeting the state antidegradation requirements contained in Chapters 93, 95, 102 and 105 through various measures provided in the Project design, such as proposed construction measures and requests for permit approvals for activities associated with the Project. Where the Project is located within Exceptional Value (EV) or High Quality (HQ) watersheds or impacts EV wetlands, as defined by Chapter 93 and Chapter 105, Transco will install required antidegradation best available combination of technologies (ABACT) best management practices (BMPs), protecting the designated and existing uses of the resources. BMPs outlined in the erosion and sediment control and site restoration plans will be installed, monitored and maintained until the Project meets the vegetative cover requirements required by the approved permits for earth disturbance and water obstruction and encroachment. During the Project's construction, any issues identified with the BMPs shall be repaired as described in the permits and plans.

Transco evaluated the feasibility of non-discharge alternatives that would be located outside of exceptional value (EV) or high-quality (HQ) watersheds. Hydraulic models were analyzed from an efficiency and effectiveness point of view to confirm and minimize the necessary

pipeline lengths and diameters to meet the Project purpose and need. In order for the Project to meet the required purpose and need, siting the Regional Energy Lateral Pipeline outside of EV and HQ watersheds, is not feasible.

Therefore, Transco determined that there are no cost-effective and environmental sound viable non-discharge alternatives for the project. Transco has minimized project impacts to EV and HQ watersheds through the use of co-location with existing pipelines where practicable and protecting riparian buffers within the project workspace. Earth disturbance will be minimized to the extent practical and will be phased or sequenced to only disturbed portions that are necessary for the specific scope of work. Wherever possible, the LOD was decreased to avoid disturbing additional ground and will be kept to the minimum width and depth necessary to safely complete construction activities.

ABACT standards have been proposed for the Regional Energy Lateral because there are no viable non-discharge alternatives. The Erosion and Sediment Control Plan prepared for the Project outlines a more stringent design and E&S BMPs that meet ABACT standards.

Pipeline installation activities along the pipeline ROW and at the contractor yards/staging areas will not result in increase in discharge of stormwater to surface waters. The existing / designated use of the streams within the Project area are to be protected through E&S and post-construction stormwater management (PCSM) measures taken by Transco.

Absent controls, the MLV-515RA20, MLV-515RA30, Carverton Tie-in, Lower Demunds REL Tie-in, and Hildebrandt Tie-in/MLV-515RA40 sites will result in increased discharge of stormwater to surface waters which will be mitigated by the implementation of PCSM BMPs. Proposed PCSM BMPs are designed with stormwater volume reduction and water quality treatment maximized to the extent practicable within the site constraints to maintain and protect existing water quality and existing and designated uses.

No changes to the aquatic community or water chemistry within the streams or wetlands crossed or impacted by the Project are anticipated to occur. All streams crossed by the Project shall utilize clean water bypass BMPs during construction to allow continuous flow of all streams crossed, and these streams will be restored to pre-existing conditions once construction is complete. The wetland impacts associated with temporary disturbance will be restored and stabilized upon final restoration, with PSS and PFO impacted wetlands outside the proposed

maintained corridor being replanted. The wetland, stream, and floodway impacts are considered isolated to their disturbance area and do not extend beyond the Projects LOD.

As part of the Project design, impacts to resources were avoided and minimized where possible and include the following measures: pipeline collocation, to the extent practical, within/adjacent to an existing ROW, restoration of disturbed areas to pre-existing conditions with the exception of above ground facilities, and limiting the extent and duration of earth disturbance. Transco has provided a nominal workspace of 75 feet in wetlands and floodways and 50 feet within the stream top-of-bank for the pipeline installation where possible. Where these nominal workspaces were exceeded, site specific justification has been provided in the Chapter 105 Joint Permit Application. During construction, excavated trenches will be kept to the minimum width and depth necessary to safely complete construction activities. Project access has been designed to utilize existing access roads as much as possible, thereby minimizing the need for new road construction.

Consultation with state and federal agencies regulating threatened and endangered (T&E) species has occurred and is ongoing. The agencies include the Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, Department of Conservation of Natural Resources and the United States Fish and Wildlife Service. Transco is conducting a concurrent review of the PNDI coordination and will obtain necessary approvals prior to commencing construction of the Project.

During construction, Transco's Construction Spill Prevention and Response Procedures for Oil and Hazardous Materials (Spill Plan) outlined in Section 1-10 will be implemented to minimize the potential for spills and the effects of any spills that may occur. Details of how the site materials are managed, including the storage of equipment, hazardous materials, fuels, and lubricating oils and other construction items are identified in the Spill Plan. The plan defines the procedures for spill notification, emergency response, spill response, personal protective equipment, clean-up procedures and spill presentation practices. As part of the Project, hydrostatic discharge testing will be completed. Discharges associated with the testing will conform to permit conditions specific to the discharge, meeting the state antidegradation requirements.

The cumulative effect of the Project will not result in the impairment of the Commonwealth's EV and other wetland resources. A review of the Section 303(d) list of the

Clean Water Act indicated that two surface waters, Gardner Creek and the Susquehanna River, crossed by the Project are classified as impaired waterbodies. The Susquehanna River is listed as impaired for fish consumption due to polychlorinated biphenyls and mercury, and impaired for aquatic life due to acid mine drainage. The Regional Energy Lateral would cross the Susquehanna River between MP 13.6 to MP 13.7. Gardner Creek, located at approximately MP 10.5 along the Regional Energy Lateral, is listed as impaired for aquatic life due to urban runoff/storm sewers, flow regime modification and acid mine drainage. The wetland impacts will involve temporary disturbance while the pipeline is being installed, and the wetlands will be restored in accordance with the Onsite Restoration Plan, as outlined in Attachment 2 – Wetland and Riparian Reforestation Plan of Section 1.7, and the approved Chapter 102 permit. Wetlands will be stabilized upon final restoration. The wetland impacts are isolated to their disturbance area and do not extend beyond the Projects LOD. Transco designed the Regional Energy Lateral to be collocated with the existing Transco Leidy Line System or adjacent to existing utility corridors where practicable. Construction BMPs, including erosion control devices and timber matting, to mitigate for soil compaction within the wetlands, will be utilized to minimize impacts throughout the Project.

The impacted wetlands, their Chapter 105.17 Classification, Cowardin Code, Milepost, Palustrine Community Classification, and Hydrogeomorphic Classification are provided in Table 1. The Palustrine Community Classification identifies the wetland vegetation cover type impacted by the Project. The Hydrogeomorphic Classification identifies the hydrologic source for the impacted wetlands. Table 1 identifies the existing conditions of the impact wetlands, including both “EV” and “Other” wetlands.

Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
CS515	W38-T2	Other	Depression temporary	PEM	Mixed Forb – Graminoid Wet Meadow
AR-LU-032	W5-T3	Other	Stratigraphic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
AR-LU-032	W6-T3	Other	Stratigraphic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
0.27	W22-T1	EV	Riverine Headwater Complex	PEM	Tussock Sedge Marsh

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Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
0.48	W79-T1	EV	Riverine Headwater Complex	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Hemlock – Mixed Hardwood Palustrine Forest
1.02	W41-T3	EV	Riverine floodplain complex	PSS	Alder – Dogwood Floodplain Thicket
AR-LU-030.1	W55-T1	EV	Topographic Slope – mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
AR-LU-030.1	W11-T4	EV	Riverine Upper Perennial	PEM	Mixed Forb – Graminoid Wet Meadow
1.23	W10-T4	EV	Riverine Upper Perennial	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Acidic Mixed Shrub – Sphagnum Wetland, Red Maple – Highbush Blueberry Palustrine Woodland
1.25	W10b-T4	Other	Riverine Upper Perennial	PEM	Mixed Forb – Graminoid Wet Meadow
1.26	W10a-T4	Other	Riverine Upper Perennial	PFO	Red Maple – Highbush Blueberry Palustrine Woodland
AR-LU-030.1	W54-T1	Other	Topographic slope - slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.37	W108-T2	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
1.40	W107-T2	Other	Topographic Slope - mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.42	W8-T4	Other	Topographic Slope - mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.43	W106-T2	Other	Topographic Slope – mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.45	W105-T2	Other	Topographic Slope - mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.54	W39-T3	EV	Riverine floodplain complex	PEM, PFO	Tussock Sedge Marsh, Hemlock – Mixed Hardwood Palustrine Forest
1.56	W104-T2	EV	Riverine floodplain complex	PEM	Mixed Forb – Graminoid Wet Meadow
1.57	W103-T2	EV	Riverine floodplain complex	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Hemlock –

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Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
					Mixed Hardwood Palustrine Forest
1.66	W38-T3	EV	Depression Temporary	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Hemlock – Mixed Hardwood Palustrine Forest
1.70	W5-T13	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
1.86	W37-T3	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
2.04	W36-T3	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
2.13	W101-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
2.16	W3-T13	Other	Topographic Slope mineral soil	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed Shrub Palustrine Woodland
2.27	W7a-T4	EV	Riverine upper perennial	PEM	Mixed Forb – Graminoid Wet Meadow
2.36	W4-T4	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
2.64	W99-T2	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
2.72	W1-T4	Other	Topographic Slope mineral soil	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed Shrub Palustrine Woodland
2.87	W42-T1	EV	Depression Perennial	PEM, PSS, PFO	Woolgrass – Mannagrass Mixed shrub Marsh, Highbush Blueberry – Meadow-sweet Wetland, Red Maple – Highbush Blueberry Palustrine Woodland
3.5	W6-T11	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
3.54	W92-T2	Other	Stratigraphic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
3.62	W93-T2	Other	Stratigraphic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow

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Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
3.74	W31-T3	EV	Topographic Slope mineral soil	PEM, PSS, PFO	Woolgrass – Mannagrass Mixed shrub Marsh, Highbush Blueberry – Meadow-sweet Wetland, Red Maple – Mixed shrub Palustrine Woodland
3.87	W47-T1	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
4.16	W14-T5	Other	Topographic Slope mineral soil	PSS	Circumneutral Mixed Shrub Wetland
4.21	W96-T2	EV	Topographic Slope mineral soil	PEM, PSS, PFO, POW	Mixed Forb – Graminoid Wet Meadow, Black Willow Floodplain Thicket, Red Spruce – Mixed Hardwood Palustrine Woodland, Sparsely Vegetated Vernal Pool Community
4.44	W15b-T5	EV	Riverine floodplain complex	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Highbush Blueberry – Meadow-sweet Wetland, Red Maple – Mixed shrub Palustrine Woodland
4.48	W48-T1	EV	Depression Seasonal	PEM, PSS	Mixed Forb – Graminoid Wet Meadow, Alder – Dogwood Floodplain Thicket
4.50	W49-T1	EV	Depressional Temporary	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Highbush Blueberry – Meadow-sweet Wetland, Red Maple – Mixed shrub Palustrine Woodland
4.70	W97-T2	EV	Depressional Temporary	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Highbush Blueberry – Sphagnum wetland, Red Maple – Highbush Blueberry Palustrine Woodland
AR-LU-029	W34-T3	Other	Depressional Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
4.90	W9-T5	EV	Topographic Slope mineral soil	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple

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Table 5 Wetland Resource Classification					
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					– Highbush Blueberry Palustrine Woodland
4.96	W84-T2	EV	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
4.99	W4-T12	EV	Depression Temporary	PEM, PFO	Sparsely Vegetated Vernal Pool Community, Red Maple – Sedge Palustrine Woodland
5.19	W86-T2	Other	Depression Temporary	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Highbush Blueberry Palustrine Woodland
5.42	W12-T5	Other	Topographic Slope mineral soil	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Highbush Blueberry Palustrine Woodland
5.55	W87-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
5.63	W13-T5	EV	Riverine upper Perennial	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed shrub Palustrine Woodland
5.89	W89-T2	EV	Riverine Floodplain Complex	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed shrub Palustrine Woodland
5.95	W90-T2	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
6.77	W132-T2	EV	Riverine Floodplain Complex	PSS	Alder – Dogwood Floodplain Thicket
6.80	W14-T13	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
6.82	W137-T2	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
7.18	W16-T13	EV	Riverine Floodplain Complex	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed shrub Palustrine Woodland
7.50	W150-T2	EV	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
8.01	W17-T13	EV	Riverine Intermittent	PEM, PSS	Mixed Forb – Graminoid Wet Meadow,

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Table 5 Wetland Resource Classification					
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					Circumneutral Mixed Shrub Wetland
8.05	W51-T3	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
8.49	W53-T3	Other	Depression Temporary	PEM	Cat-tail Marsh
AR-LU-048	W176-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
9.35	W36b-T1	EV	Riverine Floodplain Complex	PFO	Red Maple – Mixed shrub Palustrine Woodland
9.37	W36-T1	EV	Riverine Floodplain Complex	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Alder – Dogwood Floodplain Thicket, Red Maple – Mixed shrub Palustrine Woodland
9.41	W163-T2	EV	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
9.47	W66-T2	EV	Depression Seasonal	PEM, PFO	Mixed Forb – Graminoid Wet Meadow, Red Maple – Mixed shrub Palustrine Woodland
9.87	W65-T2	Other	Depressional Seasonal	PEM	Mixed Forb – Graminoid Wet Meadow
10.46	W37-T1	Other	Riverine Intermittent	PEM	Mixed Forb-Graminoid Wet Meadow
10.5	W71-T2	Other	Riverine Intermittent	PSS	Red Maple-Sedge Palustrine Woodland
10.62	W74-T2	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
10.63	W75-T2	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
10.87	W1-T10	Other	Riverine Ephemeral	PEM, PSS	Mixed Forb – Graminoid Wet Meadow, Circumneutral Mixed Shrub Wetland
10.94		Other	Riverine Intermittent	PEM, PFO	Mixed Forb-Graminoid Wet Meadow, Red Maple-Mixed Shrub Palustrine Woodland

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Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
	W2-T10				
10.99	W160-T2	Other	Depression Temporary	PFO	Red Maple-Highbush Blueberry Palustrine Woodland
11.25	W76-T2	Other	Depressional Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
11.80	W46-T2	Other	Depression Temporary	PSS	Red Maple-Highbush Blueberry Palustrine Woodland
11.92	W23-T1	Other	Depression Seasonal	PEM	Mixed Forb-Graminoid Wet Meadow
12.99	W20-T3	Other	Depression Temporary	PEM, PFO	Mixed Forb-Graminoid Wet Meadow, Red Maple-Sedge Palustrine Woodland
13.86	W12-T1	Other	Depression Seasonal	PFO	Sugar Maple-Mixed Hardwood Floodplain Forest
13.95	W61-T1	Other	Depression Temporary	PFO	Red Maple-Elm-Willow Floodplain Forest
14.00	W62-T1	Other	Depression Temporary	PFO	Red Maple-Elm-Willow Floodplain Forest
14.40	W5-T5	Other	Depression Temporary	PEM	Reed Canary Grass-Floodplain Grassland
14.80	W11-T3	Other	Depression Seasonal	PEM, PFO	Red Maple-Elm-Willow Floodplain Forest, Reed Canary Grass-Floodplain Grassland
15.02	W25-T2	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
15.27	W27-T2	Other	Depression Temporary	PEM	Sparsely Vegetated Vernal Pool Community

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Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
15.30	W26-T2	Other	Depression Seasonal	PEM	Sparsely Vegetated Vernal Pool Community
15.39	W30-T2	Other	Depression Temporary	PSS	Mixed Hardwood Floodplain Thicket
15.43	W31-T2	Other	Depression Seasonal	PEM	Common Reed Marsh
15.43	W32-T2	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
15.47	W14-T3	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
15.49	W33-T2	Other	Depression Temporary	PEM	Mixed Forb-Graminoid Wet Meadow
15.51	W15-T3	Other	Riverine Floodplain Complex	PEM, PSS, PFO	Mixed Forb-Graminoid Wet Meadow, Red Maple-Mixed Shrub Palustrine Woodland
16.34	W49-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
16.43	W48-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
16.92	W60-T2	Other	Topographic Slope mineral soil	PEM	Bluejoint – Reed Canary-grass Marsh
17.23	W54-T2	EV	Riverine Floodplain Complex	PEM	Mixed Forb – Graminoid Wet Meadow
17.28	W51-T2	EV	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
18.63	W6-T13	EV	Riverine Floodplain Complex	PEM, PFO	Skunk-cabbage – Golden Saxifrage Seep, Hemlock – Mixed Hardwood Palustrine Forest
19.72	W117-T2	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
20.39	W59-T1	Other	Topographic Slope mineral soil	PEM, PSS	Mixed Forb – Graminoid Wet Meadow, Circumneutral Mixed Shrub Wetland
20.52	W60-T1	EV	Riverine Floodplain Complex	PEM, PSS, PFO	Tussock Sedge Marsh, Alder – Dogwood Floodplain Thicket, Red

Table 5 Wetland Resource Classification					
Milepost or Access Road	Wetland ID	Chapter 105.17 Classification¹	HGM Classification²	Cowardin Classification²	Palustrine Community Classification
					Maple - Mixed Shrub Palustrine Woodland
21.00	W15-T4	EV	Riverine Floodplain Complex	PSS, PFO	Alder – Dogwood floodplain Thicket, Red Maple – Sedge Palustrine Woodland
21.03	W83-T2	EV	Topographic Slope mineral soil	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Circumneutral Mixed Shrub Wetland, Red Maple – Mixed Shrub Palustrine Woodland
21.79	W82-T2	Other	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow
21.80	W131-T3	EV	Riverine Intermittent	PEM	Mixed Forb – Graminoid Wet Meadow
21.81	W44-T3	EV	Riverine Floodplain Complex	PSS	Black Willow Floodplain Thicket
22.05	W2-T12	Other	Topographic Slope mineral soil	PEM	Mixed Forb – Graminoid Wet Meadow
22.14	W81-T2	EV	Depression Temporary	PEM, PSS, PFO	Mixed Forb – Graminoid Wet Meadow, Highbush Blueberry – Meadow-sweet Wetland, Red Maple – Mixed Shrub Palustrine Woodland
22.20	W5-T11	EV	Depression Temporary	PEM	Mixed Forb – Graminoid Wet Meadow

9.1 Primary Wetland Impacts

To minimize adverse impacts at wetland crossings, Transco will implement its Plan and Procedures during the construction, post-construction restoration, and operation of the Project. Transco developed the Procedures to address temporary wetland effects associated with construction of the Project. The Procedures are intended to satisfy the wetland restoration requirements of applicable resource protection agencies with jurisdiction over areas affected by the Project.

Transco will use pipeline construction crossing methods based on site-specific conditions and resource sensitivity. These methods primarily consist of conventional dry open-cut with a few crossing locations associated with existing road infrastructure being conventional bore. Operation of construction equipment through wetlands will be limited to only what is necessary for each stage of construction (e.g., clearing, trenching, staging). Transco will minimize compaction of topsoil within unsaturated wetlands by stripping, segregating, and stockpiling topsoil separately from subsoil during construction. Topsoil segregation techniques will be used in unsaturated wetlands to preserve the seed bank and to facilitate successful restoration. Construction workspaces have been minimized to the extent practicable within these resources. Pipeline construction will use the conventional dry open-cut method at most locations. Construction equipment will use timber mats to prevent soil rutting for construction access through the wetlands. Matting and geotextile will be used for topsoil segregation within wetland resources. Trench plugs will be installed at the entrance and exit of the pipeline through the wetland to ensure that the wetland is not drained along the pipeline. In forested and scrub-shrub wetlands, Transco will minimize clearing to the extent practicable while maintaining safe construction conditions.

Pipe stringing and fabrication may occur within saturated and unsaturated wetlands adjacent to the trench or adjacent to the wetland. Soil structure and the presence of standing water commonly found in wetlands along with the large surface loads of construction equipment and materials to construct large diameter pipelines contribute to the need for additional workspace adjacent to wetland crossings. Hydric soils typically are lower in strength and become weaker when saturated. Handling weak material during the excavation/stockpile process further reduces the strength of the soil mass by disturbance/remolding/mixing, thus requiring a larger area to stockpile the soils. Additionally, buoyancy control (e.g., weights, concrete-coated pipe) may be necessary in wetland environments, which require the trench to be larger in both width and depth, resulting in additional stockpile material.

Upon completion of construction within wetlands, Transco will promptly restore wetlands to their original configurations and contours and stabilize disturbed adjacent upland areas. Wetland areas will be revegetated with Ernst FACW Meadow Mix (ERNMX-122), or an alternative wetland seed mix that contains similar species, where standing water is not present, to stabilize disturbed soils. PEM wetlands, dominated primarily by low-growing sedges, rushes, and other herbaceous vegetation, will revert to emergent vegetation following construction, resulting in no permanent change to wetland type. PSS and PFO wetlands affected during construction will be

seeded with the wetland seed mix and also replanted with native trees and shrubs outside of the proposed maintained ROW. Following construction, Transco will monitor disturbed wetlands and adjacent uplands until restoration and long-term stabilization is documented.

Vegetation Impacts

Construction of the Project will result in temporary impacts to one hundred and eight PEM, PSS and PFO wetlands. Permanent functional conversion impacts (PFO/PSS to PEM) wetlands located within the proposed maintained pipeline ROW will occur to 39 wetlands, for a total of 1.57 acres. Temporary functional conversion impacts of wetlands located within the temporary workspace will occur to 48 wetlands, for a total of 3.50 acres. Forested riparian areas, PFO and PSS wetlands shall be restored with the exception of portions located within the proposed maintained ROW. Riparian areas and wetlands will be revegetated using approved seed mixes. Transco will replant existing forested riparian buffers, PFO and PSS wetlands impacted outside of the permanent maintained ROW. A 10-foot-wide herbaceous corridor will be maintained over the center of the pipeline within the riparian buffer areas. Trees within 15 feet of the centerline or between existing pipelines will be removed to maintain the integrity of the pipelines. Wetlands outlined as temporary functional conversion impacted wetlands will be replanted onsite, as outlined in Attachment 2 – Wetland and Riparian Reforestation Plan of Section 1.7.

Hydrology Impacts

The characteristics of water quantity, stream flow, and sources, groundwater basal flows, drainage patterns, flushing characteristics, flow currents, natural recharge or source areas, stormwater and floodwater storage and control, and hydrodynamics are discussed below.

Water Quantity, Stream Flow and Sources

Transco will cross streams with flowing water present at the time of construction primarily using dry-ditch construction methodology. The dry-ditch construction method shall be completed with a clean water bypass that may include dam and pump or flume pipe. Each option passes water around the crossing location, minimizing construction impacts downstream. The pipeline is installed in the dry, with the trench excavation, pipe installation, and backfill completed at this time. To stabilize the banks, stream banks and riparian areas will be revegetated using approved seed mixes and/or erosion control blankets or matting.

Four wetlands (W131-T3, W44-T3, W83-T2, and W15-T4) will be conventionally bored due to being adjacent a to state highway at two separate locations. One conventional bore will include S49-T2, W15-T4 and W83-T2. The other conventional bore will include S52-T2, W131-T3 and W44-T3. Abrahams Creek (S14-T2) will be crossed via a conventional bore. In addition, watercourse (S1-T5 – Susquehanna River) will be crossed via Direct Pipe®. The trenchless construction methodology proposed would not result in effects to water quantity, stream flow and sources. Soil borings reports are included within Attachment B of the application, associated with the trenchless construction methodology.

Groundwater Basal Flows and Natural Recharge or Source Areas

No impacts to groundwater basal flows and natural recharge or source areas are anticipated as part of the Project. Impacts to groundwater basal flows and natural recharge or source areas will be avoided and minimized through the utilization of Transco's Plan and Procedures. Additionally, potential impacts will also be minimized through the use of the Spill Plan for Oil and Hazardous Materials (Spill Plan) if incidents occur.

The proposed Project will have minimal impacts during construction and post-construction to stormwater storage and control, with no long-term impacts anticipated. At Compressor Station 515, Transco will be expanding the existing facility, which will include additional impervious area. Transco will be installing four mainline valves (MLV) with appurtenant equipment, as a means to isolate gas flows along the Regional Energy Lateral. The mainline valve sites at each pipeline terminus (MLV515RA10 at Station 515 and MLV515RA40 at the Hildebrandt Tie-In) will also have pig traps (industry term for manifolds that launch or receive in-line inspection tools). The other two valve sites are proposed along the pipeline route (MLV515RA20 at Milepost 7.5 and MLV515RA30 at Milepost 14.8). Modifications at three existing pipeline interconnects are proposed to tie-in the proposed pipeline to the existing facilities. The Carverton Tie-In is located at Milepost 16.8. The Lower Demunds Tie-In is located at Milepost 22.3 and also includes a +/- 400-ft segment of 20-in pipeline to connect to the existing facility. The Hildebrandt Tie-In is located at the Regional Energy Lateral pipeline terminus and includes MLV515RA40. The MLV's, interconnects, and existing Compressor Station 515 will include the addition of impervious area. The additional impervious areas will be mitigated through a PADEP approved post-construction stormwater management (PCSM) design. Site restoration and the proposed stormwater management design shall limit the facilities from having adverse effects on groundwater basal flows and natural recharge or source areas.

Drainage Patterns, Flushing Characteristics and Flow Currents

The proposed Project will have minimal impacts during construction to drainage patterns, flushing characteristics and flow currents to wetlands and waterbodies during construction with no long-term impacts anticipated.

The proposed Project will generally take place within or adjacent to a previously disturbed pipeline and powerline ROWs. Stormwater controls, which will be installed during construction, have been designed to avoid impacts to natural drainage features. These controls will only have temporary impacts while installed and will be removed once the site is stabilized with vegetation. Minimal impacts to wetland resources are anticipated, as these functions are generally limited when compared to watercourses. Transco will restore pipeline facility workspaces to pre-construction contours with the exception of areas Transco has identified other restoration measures.

Transco proposes to restore wetlands impacted by ATV usage along the existing ROW between MP 3.8 and 5.9. Transco has expanded its workspace in these areas to restore these impacted areas while constructing the pipeline. The wetlands include: W31-T3, W96-T2, W49-T1, W97-T2, W9-T5, W86-T2, W12-T5, W87-T2, W13-T5, and W89-T2. One stream, S35-T2 will also be relocated within the ROW at this location through wetland W89-T2, as its current route follows ATV ruts on the existing ROW. The proposed stream realignment is within wetland W89-T2 and is located along the edge of the ROW prior to crossing perpendicular to the pipeline ROW. The realigned channel is designed to be restored to match the existing conditions upstream and downstream of the ROW.

Stormwater and Floodwater Storage and Control

The proposed Project will have minimal impacts during construction and post-construction to stormwater and floodwater storage and control, with no adverse long-term impacts anticipated. Aboveground facilities will be located outside of FEMA Floodplains, FEMA Floodways and 50-foot floodways. Transco will preserve the existing condition of the FEMA floodplains, 50-foot floodways, and wetlands, with the exception of those areas where pre-construction contours are not proposed for restoration.

The Projects proposed restoration shall limit the pipeline facilities from having adverse effects on flood-storage capacity or stormwater control. The proposed Project will have minimal impacts during construction and post-construction to stormwater storage and control, with no

adverse long-term impacts anticipated. The MLV's, interconnects, and existing Compressor Station 515 will include the addition of impervious areas. The additional impervious areas will be mitigated through a PADEP approved PCSM. Site restoration and the proposed stormwater management design shall limit the facilities from having adverse effects on groundwater basal flows and natural recharge or source areas.

These changes will not alter the stormwater and flood storage or control of the area, as the areas will be properly restored and stabilized during restoration.

Hydrodynamics

Stream and wetland crossings will be restored to pre-existing conditions with the exception of those areas related to the stream stabilization and ATV impacts within wetlands. Natural streambed materials will be replaced in the streambed and the pre-existing stream alignment should be restored to pre-construction alignments, except in the areas where stream stabilization is proposed. Erosion control blankets shall be placed on restored stream banks to the ordinary high-water mark and surrounding wetland areas. If streams have existing bank protection, these bank protection measures shall be restored.

9.2 Secondary Impacts

This section describes the potential secondary impacts to aquatic resources associated with the Project's wetland crossings, including aquatic habitats, water quantity and water quality.

Water Quantity

Potential secondary impacts on water quantity or wetland hydrology could result from changes in the existing drainage patterns and alteration in flow and water levels from construction. The Project does not involve any addition of structures or impervious surfaces in the wetlands, however areas with existing ATV impacts will be restored during Project restoration. Because the Project does not involve direct impacts to natural and current drainage patterns and wetlands will be restored to approximate original contours following construction, the Project will not result in adverse secondary impacts to existing drainage patterns. A Post-Construction Wetland and Watercourse Monitoring Plan will include monitoring for potential secondary impacts to hydrology.

Compaction of wetland soils and rutting within wetlands could temporarily impact wetland hydrology. These impacts will be minimized by using temporary equipment mats. The segregation of topsoil within the trench line of wetland crossings will also limit the potential for soil

compaction. The replacement of topsoil to the original soil horizons and elevations will promote the return of native vegetation along with the return of natural groundwater direction and flow rates.

Water Quality

As noted above, secondary impacts related to the loss of water quality to adjacent wetland locations have the opportunity to occur during construction and restoration of the Project. Construction activities can disturb surface soils and cause subsequent sediment transport into adjacent wetlands. Sedimentation will be minimized by installing temporary sediment control measures between the upland construction areas and the wetlands, as described above. Permanent erosion controls, including slope breakers, trench breakers, and vegetative cover, will be used in adjacent upland areas to minimize long-term sedimentation into the wetlands. During construction, potential secondary impacts will be minimized by installing energy-dissipation devices at the down-slope end of slope breakers to minimize erosion of soil off the ROW into wetlands. Trench plugs will be installed in upland slopes adjacent to wetlands to prevent trench erosion. Trench plugs also will be installed at the edges of the wetland and on either side of waterbody crossings to prevent subsurface drainage along the pipeline.

Habitat

General construction related impacts on wildlife species, as it relates to wetlands, will result from habitat disturbance and human activities. Secondary impacts on wildlife will include those associated with increased human activity. Construction of the Project is likely to result in the temporary displacement of, or stress on, animals in areas adjacent to construction and cause movement of some wildlife away from the Project area. Stress on wildlife could affect general health, reproduction, and viability of young animals, depending on the sensitivity of a particular species, season of the year, and other factors. Other temporary impacts on wildlife species as a result of the general habitat impact could include those from pipeline trenching activities and associated spoil piles, which could result in a short-term barrier to movement to some species.

During clearing and grading activities, more mobile wildlife species (e.g., larger mammals, birds, and reptiles) will be able to avoid the construction area, and many are expected to temporarily leave the area during construction and migrate to surrounding areas. Construction activity will generally be temporary and will occur in a given area for only a few weeks, in general. Habitat recovery will occur, aided by the use of the impact minimization and restoration measures

thereby minimizing secondary impacts.

Transco does not anticipate the Project will reduce or degrade habitat for terrestrial, aquatic, or avian species significantly due to the design of the pipeline being primarily collocated, to the extent practical, within/adjacent to an existing pipeline and utility ROWs. In the areas where wetland restoration is proposed to repair impacts from ATV's, habitat improvement is anticipated as the current degraded conditions will be restored. While temporary impacts on food, cover, and water sources may occur, none of the species located within the Project area are specialized in such a way that construction of the Project will inhibit the overall fitness or reproductive output of the populations as a whole. Minimal changes to existing habitat types will occur due to this Project siting. Wildlife populations that utilize the Project area are not expected to be permanently adversely affected by the proposed Project.

10. Riparian Buffers

Pipeline installation will take place within an existing cleared and maintained pipeline ROW and forested areas. Due to the linear nature of the project, temporary impacts within riparian buffers are unavoidable. At locations where it was impossible to avoid riparian impacts due to safety issues, Transco will implement BMPs to minimize the impacts. After completing the construction activities, areas used for pipeline installation and as contractor yards/staging areas will be restored back to pre-existing contours and reseeded with a riparian seed mix in areas where slopes are less than 10%. The MLV-515RA20, MLV-515RA30, Carverton Tie-in, Lower Demunds REL Tie-in, and Hildebrandt Tie-in/MLV-515RA40 sites, where a permanent increase in impervious area is proposed, were examined for riparian buffers. Riparian buffers were identified at MLV-515REL20 and BMPs were designed to minimize the impacts to this area. Tree and shrub plantings will occur in forested riparian buffers outside of the maintained ROW as outlined in riparian reforestation plans outlined in the Chapter 105 permit.

Linear projects including pipelines are eligible for the Riparian Buffer Waiver under 25 PA Code §102.14(d)(2)(ii) if riparian buffers are undisturbed to the extent practicable. As such, a Riparian Buffer Waiver has been requested along with this ESCP application (Section 1-7).

11. Project Site Runoff

Changes in project site runoff are not anticipated for the Project except at the MLV-515RA20, MLV-515RA30, Carverton Tie-in, Lower Demunds REL Tie-in, and Hildebrandt Tie-in/MLV-515RA40 sites where increases in impervious areas are proposed. The Project site is

primarily existing and maintained pipeline right-of-way in meadow condition with a forested fringe. The ROW will be restored to meadow condition upon the completion of construction. Proposed BMPs were sized based on the maximum tributary drainage area anticipated during construction. An analysis of pre- and post-development stormwater runoff was performed for the valve yard and tie-in sites. The installation of the valves and associated access road will increase the volume of stormwater runoff due to the increase in the type and size of the impervious area. The contractor will construct stormwater BMPs to mitigate the increase in volume and peak rates associated with construction. Refer to the Post-Construction Stormwater Management (PCSM) Plan for additional information (Section 3 of this ESCP Application). Changes in stormwater runoff between pre- and post-development conditions for 2-year rainfall event and changes in peak discharge rates for 1-, 2-, 10-, 25-, 50- and 100-yr storms are given in the tables below.

11.1 MLV-515RA20

Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
3,470	4,093	2,689	-781

Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.91	1.35	2.71	3.81	4.87	6.15

Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
1.15	1.64	3.12	4.29	5.39	6.72

Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.67	0.97	2.21	3.48	4.42	6.01

Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.24	-0.38	-0.50	-0.33	-0.45	-0.14

11.2 MLV-515RA30

Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
1,040	1,520	0	-1,040

Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.28	0.46	1.01	1.47	1.93	2.48

Post-Construction Peak Discharge Rates (cfs)

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1-year	2-year	10-year	25-year	50-year	100-year
0.48	0.70	1.35	1.86	2.35	2.93

Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.00	0.00	0.00	0.00

Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.28	-0.46	-1.01	-1.47	-1.93	-2.48

11.3 Carverton Tie-in

Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
1,164	1,801	0	-1,164

Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.49	0.69	1.27	1.74	2.17	2.70

Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.76	0.99	1.64	2.12	2.56	3.09

Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.00	0.30	1.47	2.50

Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.49	-0.69	-1.27	-1.44	-0.70	-0.20

11.4 Lower Demunds REL Tie-in

Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
795	1,865	345	-450

Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.15	0.21	0.40	0.56	0.71	0.89

Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.55	0.64	0.95	1.18	1.40	1.65

Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.09	0.11	0.16	0.20	0.24	0.28

Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.06	-0.10	-0.24	-0.36	-0.47	-0.61

11.5 Hildebrandt Tie-in/MLV-515RA40

Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
1,443	3,014	404	-1,039

Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.27	0.38	0.74	1.03	1.31	1.64

Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.96	1.15	1.77	2.23	2.67	3.19

Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.13	0.18	0.33	0.44	0.55	0.73

Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.14	-0.20	-0.41	-0.59	-0.76	-0.91

12. Offsite Discharge Analysis

The stormwater BMPs being constructed along the REL Pipeline are in areas that will discharge stormwater to offsite non-surface water. These areas have been analyzed to reduce the likelihood that these discharges will be erosive to adjacent property owners. The analysis has been performed in accordance with PADEP Document 3150-FS-DEP4124, "Off-Site Discharges of Stormwaters to Areas That Are Not Surface Waters". The full analysis is presented in Attachment 4 – Offsite Discharge Report. A summary of the findings is presented below.

12.1 MLV-515RA20

The MLV-515RA20 site utilizes an infiltration berm. The collected stormwater discharges through an outlet pipe, through a structural level spreader, and across a riprap apron toward the adjacent forested area located west of the Limits of Disturbance. The stormwater is discharged as sheet flow and travels along a vegetative flow path until it reaches a Bald Mountain Road culvert and then a delineated stream, S83-T2. Another point of discharge comes from PCSM

Diversion Channel DC-D1, which discharges into an earthen level spreader. The stormwater then flows as sheet flow along a vegetative flow path until it reaches delineated stream, S76-T2. Calculations provided for the project site runoff show a reduction in the post-construction discharge rates and volumes. The area downstream of the infiltration berm and channel is over 90% vegetated. The discharge velocities at the structural level spreader is 1.35 feet per second (fps) for the 100 year, 24-hour storm event. The discharge velocity at the apron DC-D1 discharges to is 0.75 fps. Since the outlet velocities are below 2.5 fps, downstream erosion will be minimal, if not negligible.

12.2 MLV-515RA30

The MLV-515RA30 site utilizes an infiltration berm. This infiltration berm does not discharge water during any storms, 1-yr through the 100-yr. If the berm were to discharge water it flows into the adjacent wetland and agricultural areas located southwest of the Limits of Disturbance. The stormwater is discharged as sheet flow and travels along a vegetative flow path until it reaches an unnamed blue line stream, upstream of the Susquehanna River. Calculations provided for the project site runoff show a reduction in the post-construction discharge rates and volumes. The area downstream of the vegetative swale is over 90% vegetated. Calculations indicated that the discharge velocity over the berm is 0.0 fps for the 100-yr storm. Considering the calculations indicate the berm doesn't discharge and the downstream being well vegetated erosion at this site is very unlikely.

12.3 Carverton Tie-in

The Carverton Tie-in site utilizes an infiltration berm. This infiltration berm discharges water, and it flows into the adjacent forested area located east of the Limits of Disturbance. The stormwater is being discharged as sheet flow and travels along a vegetative flow path until it reaches an unnamed blue line stream. Calculations provided for the project site runoff show a reduction in the post-construction discharge rates and volumes. The area downstream of the infiltration berm is over 90% vegetated. Additionally, the velocity coming out of the outfall protection for the 100-year 24-hour was calculated and found to be 0.97 fps. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible.

12.4 Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40

The Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40 sites each utilize subsurface infiltration beds. These subsurface infiltration beds are located beneath each gravel pad where water accumulates and flows away from the pads.

At the Lower Demunds REL Tie-in, the pad will be bermed around the exterior to retain stormwater for infiltration. An overflow spillway will be used to discharge excess flow to a riprap apron on the east side of the pad. The stormwater is being discharged as sheet flow and travels along a vegetative flow path until it reaches a water collection pond. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the outfall protection is 1.3 fps for the for the 25 year, 24-hour storm event. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible.

At Hildebrandt Tie-in/MLV-515RA40, the pad will be bermed around the exterior to retain stormwater for infiltration. An overflow spillway on the north side of the pad will be used to discharge excess flow to the diversion channel. The water will then be directed northwest to a level spreader where it is discharged as sheet flow and travels along a vegetative flow path until it reaches an unnamed blueline stream. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed level spreader is 0.95 fps for the for the 25 year, 24-hour storm event. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible.

13. Site Restoration Plan

13.1 Previous Land Use

The Project site is primarily existing and maintained pipeline right-of-way in meadow condition with a forested fringe. Some areas are located adjacent to other utility right-of-ways or within undeveloped, primarily forested or agricultural areas.

Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (<https://www.mrlc.gov/viewer/>), it appears portions of the Regional Energy Lateral has been an existing and maintained gas pipeline or other right-of-way for the past 20 years and will continue to be an existing and maintained right-of-way once the Project is complete, with some new right-of-way being created in areas. Portions of the existing ROW's will be expanded upon as a result of the Project's construction. Based on the surrounding land characteristics, land use prior to ROW construction within the past 50 years likely would have

been either forested land or meadow.

13.2 Disturbance Activities, Changes to Permanent Topographic Land Cover Along Pipeline Alignment

The Regional Energy Lateral component of the Project will consist of approximately 22.2 miles of 30-inch diameter pipeline, partially co-located with existing Transco Leidy Line-A, in Buck, Bear Creek, Plains, Jenkins, Kingston and Dallas Townships, and Laflin, Wyoming, and West Wyoming Boroughs, Luzerne County, Pennsylvania. The Regional Energy Lateral begins at existing Compressor Station 515 in Buck Township and continues westward to its terminus at Transco's existing Hildebrandt Tie-in/MLV-515RA40 in Dallas Township.

The work and disturbed areas are located within Transco property, existing easements, or legally obtained workspace where the past, present, and proposed land use is primarily an existing pipeline ROW. Along the edges of the ROW land use is primarily forested. The proposed contractor yard and staging areas will be used temporarily and subsequently removed after the completion of the Project. Staging areas will be used for parking, equipment turn-arounds, and temporary storage of equipment. Transco will use a contractor yard for parking, contractor offices, and the storage of construction equipment and pipes. This contractor yard consists of an agricultural field. Disturbed areas within these temporary workspaces will be restored to the original contours. In addition to the E&S BMP measures listed in Section 6.0 Transco will use and implement the following practices, measures, and details to control soil erosion and off-site sedimentation during construction.

13.3 Restoration Measures

Pipeline components of the Project will take place within or adjacent to a previously disturbed pipeline ROW. Stormwater controls which will be installed during construction have been designed to avoid impacts to natural drainage features. These controls will only have temporary impacts while installed and will be removed once the site is stabilized with vegetation. Minimal impacts to wetland resources are anticipated, as these functions are generally limited when compared to watercourses. The Regional Energy Access Expansion workspaces will be restored by to pre-construction contours.

Cleanup operations will commence immediately following backfill operations. Final grading, topsoil replacement, and installation of permanent erosion control structures will be completed within 20 days after backfilling the trench (10 days in residential areas). Construction debris will be removed from construction work areas unless the landowner or land managing

agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration. Rock in excess of four inches from at least the top 12 inches of soil in cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas will be removed at the landowner's request. Construction right-of-way will be graded to restore pre-construction contours and leave the soil in the proper condition for planting. Temporary sediment barriers will be removed and replaced by permanent erosion control measures or when revegetation is successful.

Wetland Restoration Procedures

The wetlands will be revegetated with annual ryegrass at 40 lbs / acre pure live seed and with the recommended wetland seed mix, unless standing water is present. Lime, fertilizer or mulch will not be used in wetland areas. In the event that final seeding and mulching is deferred more than 20 days after the trench is backfilled, slopes adjacent to wetlands shall be blanketed for a minimum of 100 feet on each side of the crossing.

Specific procedures will be developed in coordination with the appropriate land management or state agency, where necessary, to prevent the invasion or spread of undesirable exotic vegetation (such as purple loose strife and phragmites). Disturbed areas will be revegetated.

Equipment mats will be removed upon completion of construction, as well as temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are successful.

Permanent Erosion Control Measures

Trench plugs are intended to slow the flow of subsurface water along the trench. Trench plugs may be constructed of materials such as sandbags or polyurethane foam. Do not use topsoil in trench breakers. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Trench breakers will be installed in wetlands to prevent water from traveling along the trench and altering micro-watersheds within the wetlands.

Waterbars are intended to reduce runoff velocity, divert water and prevent sediment deposition into sensitive resources. Waterbars shall be constructed using spacing recommendations outlined below. In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-

of-way:

Slope (%)	Spacing (feet)
<5	250
5-15	150
>15-30	100
>30	50

Waterbars will be constructed to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the waterbar.

Soil Compaction Measures

Topsoil and subsoil will be tested for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Tests will be conducted on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Penetrometers or other appropriate devices will be used to conduct tests.

Severely compacted agricultural areas will be plowed with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling. Refer to the Transco Project-specific Agricultural Construction and Monitoring Plan. Appropriate soil compaction mitigation will be performed in severely compacted residential areas.

Revegetation Plan and Procedures

The construction site should be stabilized as soon as possible after completion. Establishment of final cover must be initiated no later than 7 days after reaching final grade. Temporary erosion and sedimentation control BMPs can be removed when the site meets final stabilization. Final stabilization means that soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70% or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.

Surface Roughening

Surface roughening 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. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended.

Typical Channel and Vegetation Restoration

The impacted riparian zone will be restored for a minimum of 15 feet landward of the top of bank. If the pre-impact riparian buffer of native herbaceous and shrub vegetation exceeds 15 feet beyond the top of bank, the area to be seeded should be as follows: 150 feet or the existing width of the riparian zone if it is less than the minimum requirements. Ernst Seed Mix 178 (Riparian Buffer Mix) or similar shall be applied on restored banks and riparian zones. In addition, where existing forested buffers are impacted these shall be replanted outside of the existing maintained ROW, as indicated in forest replanting plans for the Project outlined in the riparian buffer waiver request.

13.4 Maintenance and Evaluation for Effectiveness

Follow-up inspections of disturbed areas will be conducted as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Continue revegetation efforts until revegetation is successful.

PCSM BMPs should be properly maintained to ensure their effectiveness. Sheet flow conditions and infiltration must be sustained throughout the life of the BMP. BMPs should be inspected for clogging from sediment or debris, damage by foot or vehicular traffic, and flow channelization. Inspections should be made on a quarterly basis for the first two years following installation, and then twice per year thereafter. Inspections should also be made after every storm event greater than 1 inch during the establishment period.

Channel linings should be inspected for signs of erosion or dislodging, as applicable. Channels should be inspected for debris, overgrown vegetation, and other blockages. Vegetated

areas will be inspected weekly and after runoff events until permanent vegetation is achieved. 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 reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore to BMPs to the original design condition.

Drainage and irrigation systems problems resulting from pipeline construction in agricultural areas will be monitored and corrected until restoration is successful. Restoration will be considered successful when the surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

Vegetated areas will be inspected weekly and after runoff events until permanent vegetation is achieved. 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 reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore damaged BMPs to the original design condition.

Maintenance activities on the vegetated swale should be done annually and within 48 hours after every major storm event (> 1-inch rainfall depth). Erosion problems, damage to vegetation, sediment and debris accumulation, uniformity of in cross-section and pools of standing water should be inspected.

Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands will not be done more frequently than every three years. Transco will limit routine vegetation mowing or clearing within wetlands and adjacent to waterbodies. A 10-foot-wide herbaceous corridor will be maintained over the center of the pipeline within the wetland and riparian buffer areas. Trees and other woody vegetation will also be allowed to reestablish naturally within the construction ROWs that were cleared for construction of the pipeline. However, trees within 15 feet of the centerline and between existing pipelines will be removed to maintain the integrity of the pipeline. In no case will routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife

Service. Transco will not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

Wetlands and waterbodies will be protected through use of waterbars, diversion channels, trench plugs, and erosion control blankets. Broad-based dips may be used to direct runoff from access roads to well-vegetated areas. In HQ/EV watersheds, sump with compost filter sock should be utilized at the discharge end of the waterbar. Diversion channels shall be used to divert runoff from disturbed areas and convey it to appropriate BMPs such as a sediment trap or clean water crossing. These will be placed at the banks of waterbodies in order to maintain stable working conditions and keep sediment from entering the waterways. Earth filled sacks will be used to secure the plug. The spacing of these structures varies based on the site and the slope of the dig location, as indicated in the plan drawings. A suitable erosion control blanket or soil stabilizer shall be used wherever earth disturbance occurs in close proximity of surface waters especially if site conditions make use of conventional E&S BMPs difficult. Erosion control blankets should be used on finished slopes greater than 3:1.

Monitoring of the onsite wetland and riparian buffers replanting areas shall take place biannually for the first three years and annually for the remaining two years after planting to determine the success of the replanting areas. During the monitoring, the survival of trees and shrubs will be counted and documented. Any threats to the riparian buffers will be documented and remedial measures will be recommended. Photographs will be taken at representative crossings to document the success of the replanting areas. The monitoring reports will include, at a minimum, the following information:

- a) Dates of inspection and names of inspectors;
- b) Photographic Documentation;
- c) Hydrology indicators (wetlands);
- d) Vegetation data
 - a. percent coverage of native hydrophytic species (wetlands);
 - b. inventory of plant species; and,
 - c. stem count survival.

e) Identification of any problems that need required remedial measures.
Contractor shall provide a weatherproof container to store chemicals or erodible substances that must be kept on the site. Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of Safety Data Sheets (SDSs).

14. Erosion and Sediment Control Plan Shall be Prepared by a Person Trained and Experienced in Erosion Control Methods and Techniques

These plans and narrative were prepared by Patrick A. Wozinski, PE (BAI Group, LLC) of State College, PA in accordance with the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual, March 2012. Plan preparer's resume is provided in Attachment C of the ESCP permit package.

ATTACHMENT 1
PROJECT LOCATION MAP

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 30" REGIONAL ENERGY LATERAL

PROJECT LOCATION MAP

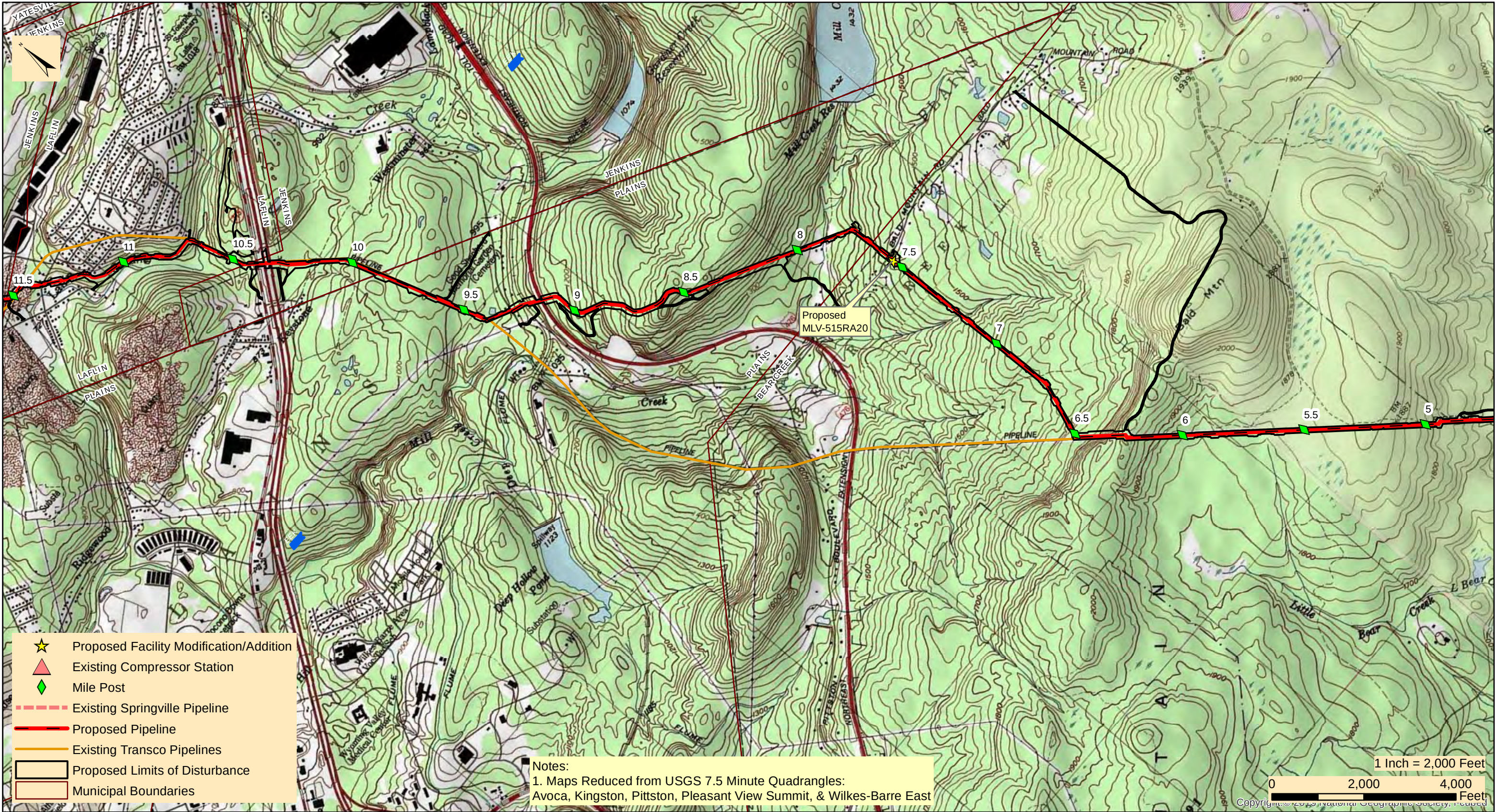
BUCK & BEAR CREEK TOWNSHIPS

LUZERNE COUNTY

PENNSYLVANIA

Date:	2/28/2022
Drawn By:	FTN
Figure Number:	REL-1

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 30" REGIONAL ENERGY LATERAL

PROJECT LOCATION MAP

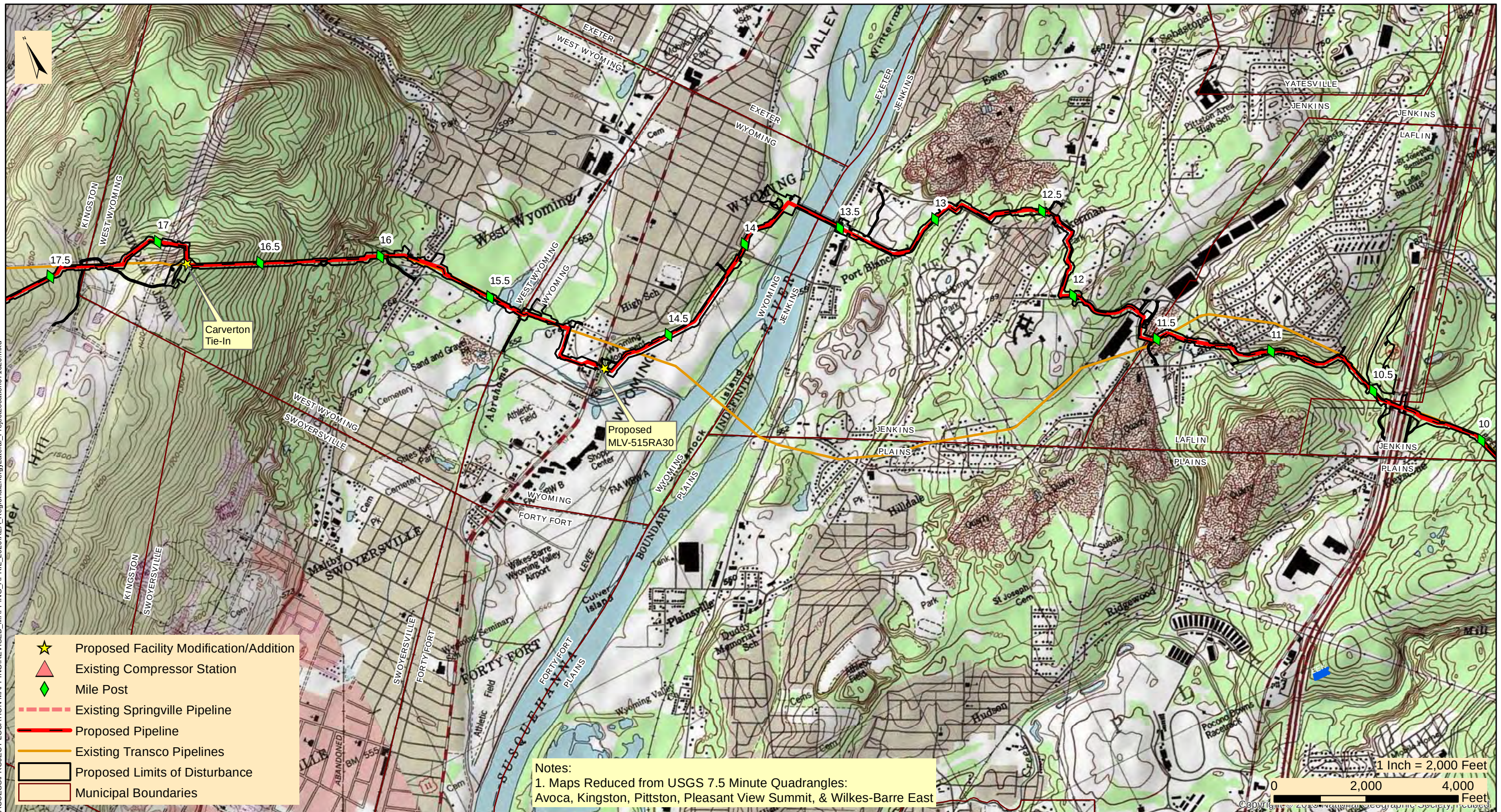
BEAR CREEK, JENKINS, PLAINS TWPS, & LAFLIN BOROUGH

LUZERNE COUNTY

PENNSYLVANIA

Date:	2/28/2022
Drawn By:	FTN
Figure Number:	REL-2

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 30" REGIONAL ENERGY LATERAL

PROJECT LOCATION MAP

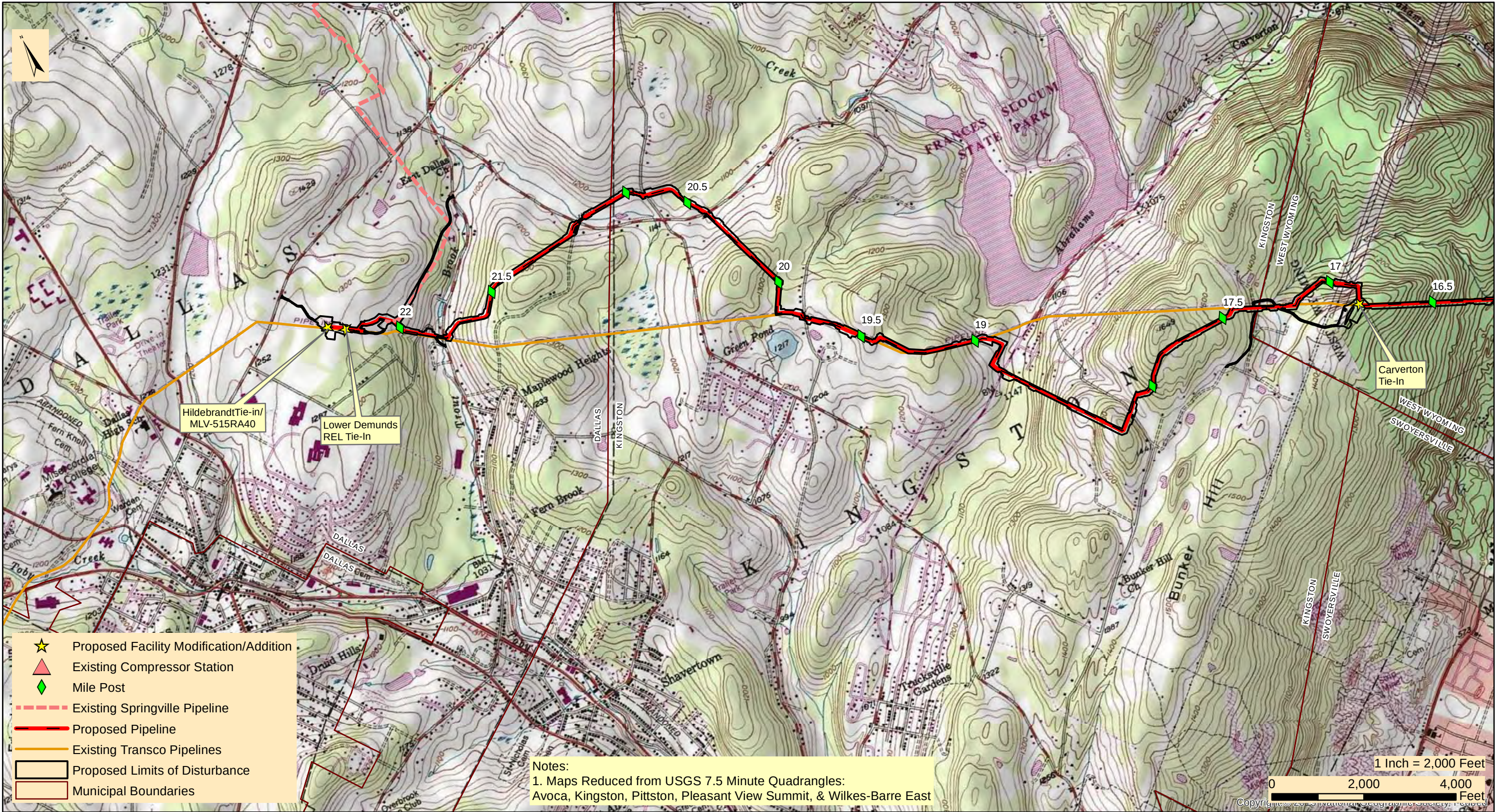
KINGSTON, JENKINS, WEST WYOMING, WYOMING, & LAFLIN

LUZERNE COUNTY

PENNSYLVANIA

Date:	2/28/2022
Drawn By:	FTN
Figure Number:	REL-3

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 30" REGIONAL ENERGY LATERAL
PROJECT LOCATION MAP

DALLAS, KINGSTON, & WEST WYOMING TOWNSHIP

LUZERNE COUNTY

PENNSYLVANIA

Date:	2/28/2022
Drawn By:	FTN
Figure Number:	REL-4

ATTACHMENT 2
SOILS MAP AND REPORT



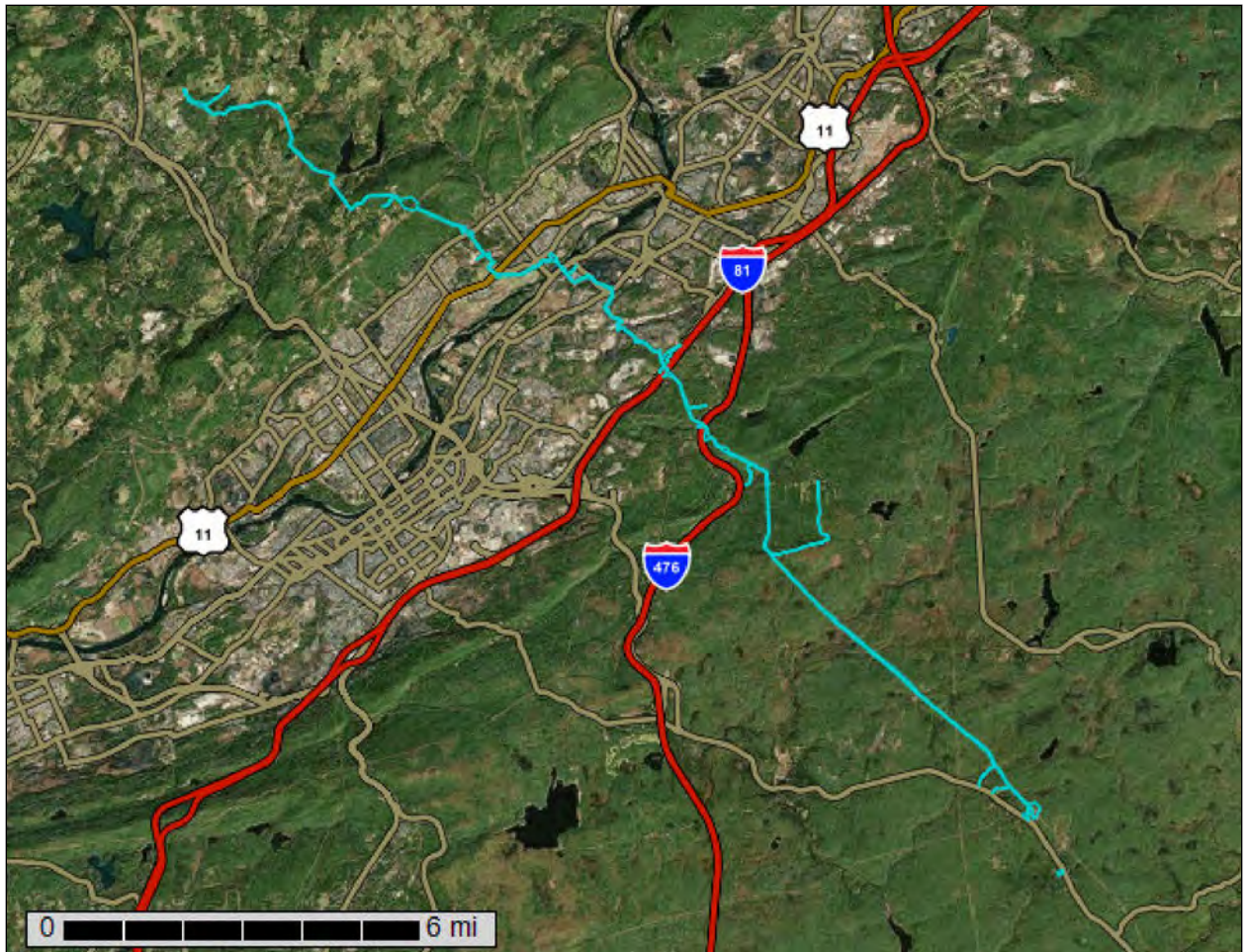
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for **Luzerne County, Pennsylvania**



March 3, 2022

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

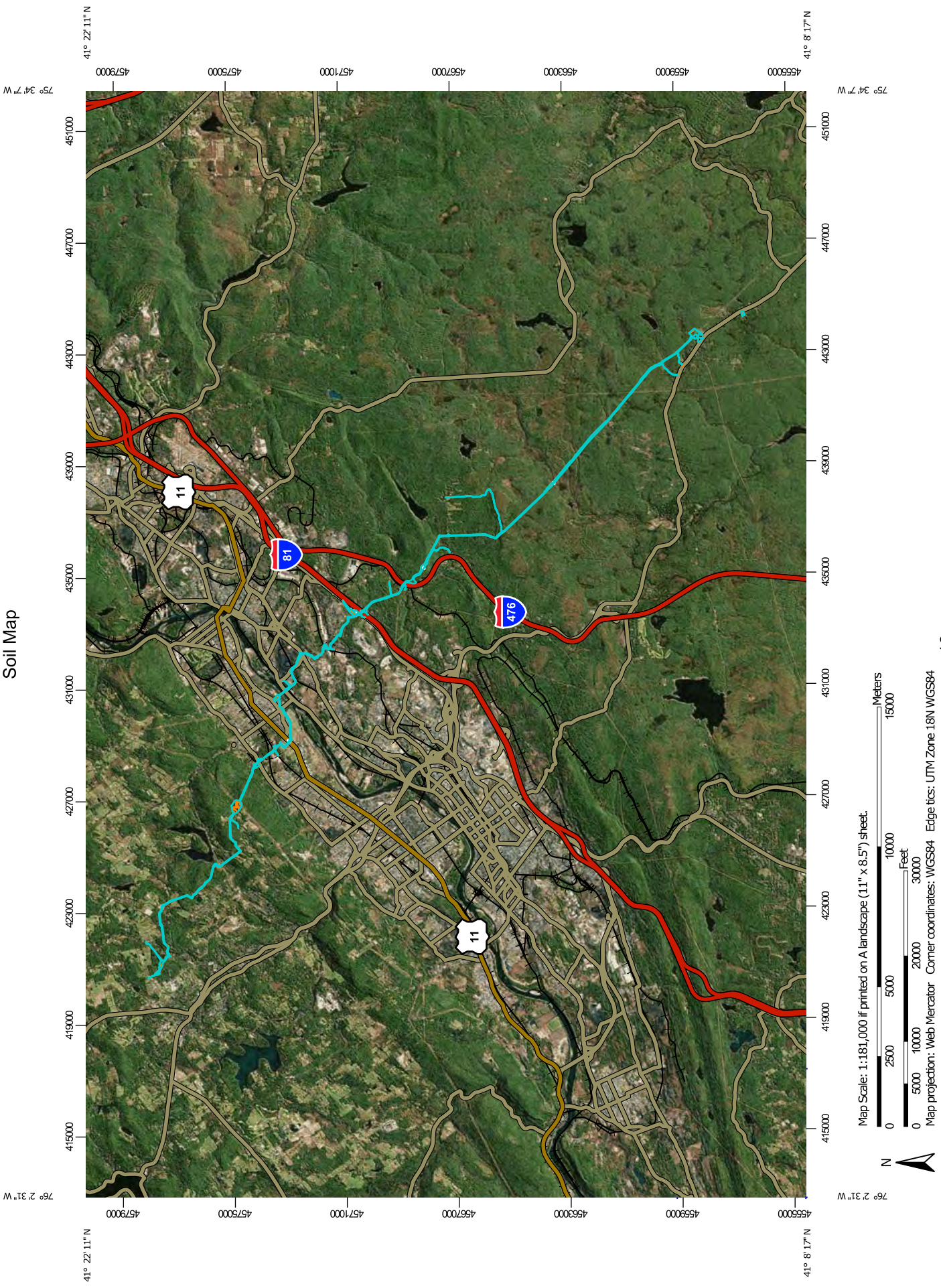
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

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Soil Map



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

Soil Survey Area: Luzerne County, Pennsylvania
Survey Area Data: Version 16, Aug 31, 2021

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

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ag	Alluvial land	1.3	0.3%
ArB	Arnot-Rock outcrop complex, 0 to 8 percent slopes	9.7	2.1%
ArD	Arnot-Rock outcrop complex, 8 to 25 percent slopes	19.7	4.3%
ASF	Arnot-Rock outcrop complex, steep	29.6	6.5%
At	Atherton silt loam, gray subsoil variant	0.0	0.0%
Bf	Basher soils	0.4	0.1%
BrC	Braceville gravelly loam, 8 to 15 percent slopes	2.9	0.6%
CF	Cut and fill land	2.0	0.4%
ChA	Chenango gravelly loam, 0 to 3 percent slopes	1.9	0.4%
ChB	Chenango gravelly loam, 3 to 8 percent slopes	8.5	1.9%
ChC	Chenango gravelly loam, 8 to 15 percent slopes	2.4	0.5%
CIA	Chippewa silt loam, 0 to 3 percent slopes	2.7	0.6%
CnB	Chippewa silt loam, 0 to 8 percent slopes, extremely stony	3.0	0.7%
DdD	Dekalb channery sandy loam, 8 to 25 percent slopes, rubbly	1.4	0.3%
DEF	Dekalb extremely stony sandy loam, steep	1.2	0.3%
GP	Gravel pits	4.6	1.0%
Ho	Holly silt loam	7.3	1.6%
LaC	Lackawanna channery silt loam, 8 to 15 percent slopes	1.5	0.3%
LaD	Lackawanna channery silt loam, 15 to 25 percent slopes	0.6	0.1%
LcB	Lackawanna channery silt loam, 3 to 8 percent slopes, extremely stony	4.5	1.0%
LcD	Lackawanna channery silt loam, 8 to 25 percent slopes, extremely stony	9.9	2.2%
LEF	Lackawanna and Bath soils, steep, extremely stony	6.3	1.4%
Ln	Linden soils	0.5	0.1%

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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
McB	Mardin channery silt loam, 3 to 8 percent slopes, very stony	6.5	1.4%
McD	Mardin channery silt loam, 8 to 25 percent slopes, very stony	1.0	0.2%
Mg	Mine dump	6.9	1.5%
Mh	Mine dump, burned	1.2	0.3%
Mm	Mine wash	2.7	0.6%
MoB	Morris channery silt loam, 0 to 8 percent slopes	3.8	0.8%
MsB	Morris channery silt loam, 0 to 8 percent slopes, extremely stony	14.9	3.3%
Mu	Muck	0.9	0.2%
OIB	Oquaga and Lordstown channery silt loams, 3 to 8 percent slopes	4.8	1.0%
OIC	Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes	12.0	2.6%
OID	Oquaga and Lordstown channery silt loams, 15 to 25 percent slopes	4.0	0.9%
OpB	Oquaga and Lordstown extremely stony silt loams, 3 to 8 percent slopes	16.3	3.6%
OpD	Oquaga and Lordstown extremely stony silt loams, 8 to 25 percent slopes	51.6	11.3%
OXF	Oquaga and Lordstown extremely stony silt loams steep	26.2	5.7%
Ps	Pope soils	25.0	5.5%
Qu	Quarries and mines	1.5	0.3%
RdA	Rexford loam, 0 to 3 percent slopes	0.3	0.1%
RdB	Rexford loam, 3 to 8 percent slopes	2.1	0.5%
Sm	Strip mine	20.9	4.6%
VoB	Volusia channery silt loam, 0 to 8 percent slopes	0.5	0.1%
VrB	Volusia channery silt loam, 0 to 8 percent slopes, extremely stony	7.8	1.7%
VrC	Volusia channery silt loam, 8 to 15 percent slopes, extremely stony	6.1	1.3%
W	Water	1.5	0.3%
Wa	Wayland silt loam	0.5	0.1%

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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WeB	Weikert and Klinesville channery silt loams, 3 to 8 percent slopes	0.6	0.1%
WeD	Weikert and Klinesville channery silt loams, 15 to 25 percent slopes	0.1	0.0%
WIB	Wellsboro channery silt loam, 3 to 8 percent slopes	9.0	2.0%
WIC	Wellsboro channery silt loam, 8 to 15 percent slopes	16.1	3.5%
WID	Wellsboro channery silt loam, 15 to 25 percent slopes	3.0	0.7%
WmB	Wellsboro channery silt loam, 3 to 8 percent slopes, extremely stony	60.8	13.3%
WmD	Wellsboro channery silt loam, 8 to 25 percent slopes, extremely stony	10.6	2.3%
WrB	Wurtsboro channery loam, 3 to 8 percent slopes	4.7	1.0%
WrC	Wurtsboro channery loam, 8 to 15 percent slopes	3.0	0.6%
WtB	Wurtsboro extremely stony loam, 3 to 8 percent slopes	1.6	0.4%
WtD	Wurtsboro extremely stony loam, 8 to 25 percent slopes	4.9	1.1%
WyD	Wyoming gravelly loam, 15 to 25 percent slopes	0.8	0.2%
WyF	Wyoming gravelly loam, 25 to 60 percent slopes	0.7	0.1%
Totals for Area of Interest		456.6	100.0%

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

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of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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

Luzerne County, Pennsylvania

Ag—Alluvial land

Map Unit Setting

National map unit symbol: 9yff
Elevation: 200 to 1,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluents, (alluvial land), and similar soils: 80 percent
Holly and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluents, (alluvial Land)

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: gravelly sandy loam
H2 - 6 to 42 inches: sandy loam
H3 - 42 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 5 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: About 18 to 48 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Holly

Setting

Landform: Depressions on flood plains, backswamps
Landform position (two-dimensional): Toeslope

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Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 5 inches: silt loam

H2 - 5 to 28 inches: silt loam

H3 - 28 to 43 inches: silt loam

H4 - 43 to 60 inches: stratified gravelly sand to silt loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: FrequentNone

Frequency of ponding: Occasional

Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

ArB—Arnot-Rock outcrop complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2wbmw

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Arnot, extremely stony, and similar soils: 60 percent

Rock outcrop: 30 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arnot, Extremely Stony

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder

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Landform position (three-dimensional): Mountainflank, mountaintop, interfluve, nose slope, crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: very channery silt loam

Bw1 - 3 to 12 inches: very channery silt loam

Bw2 - 12 to 17 inches: very channery silt loam

2R - 17 to 27 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 10.0 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: F140XY023NY - Shallow Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Lordstown, very stony

Percent of map unit: 10 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Mountainflank, nose slope, crest

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

ArD—Arnot-Rock outcrop complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2wbn0

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Arnot, rubbly, and similar soils: 50 percent

Rock outcrop: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arnot, Rubbly

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Mountainflank, mountaintop, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: very channery silt loam

Bw1 - 3 to 12 inches: very channery silt loam

Bw2 - 12 to 17 inches: very channery silt loam

2R - 17 to 27 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent

Surface area covered with cobbles, stones or boulders: 15.0 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F140XY023NY - Shallow Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Oquaga, rubbly

Percent of map unit: 10 percent

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

Wellsboro, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

ASF—Arnot-Rock outcrop complex, steep

Map Unit Setting

National map unit symbol: 2wbn4

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Arnot, rubbly, and similar soils: 50 percent

Rock outcrop: 30 percent

Minor components: 20 percent

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Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arnot, Rubbly

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank, mountaintop, free face, nose slope, side slope, free face

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: very channery silt loam

Bw1 - 3 to 12 inches: very channery silt loam

Bw2 - 12 to 17 inches: very channery silt loam

2R - 17 to 27 inches: bedrock

Properties and qualities

Slope: 25 to 70 percent

Surface area covered with cobbles, stones or boulders: 15.0 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F140XY023NY - Shallow Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Cadosia, very stony

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Oquaga, rubbly

Percent of map unit: 10 percent

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

At—Atherton silt loam, gray subsoil variant

Map Unit Setting

National map unit symbol: 9yfl

Elevation: 50 to 1,500 feet

Mean annual precipitation: 30 to 56 inches

Mean annual air temperature: 45 to 54 degrees F

Frost-free period: 120 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Atherton, gray subsoil variant, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atherton, Gray Subsoil Variant

Setting

Landform: Outwash terraces

Parent material: Loamy glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 37 inches: silt loam

H3 - 37 to 60 inches: stratified gravelly sand to silty clay loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Occasional

Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F140XY016NY - Mineral Wetlands

Hydric soil rating: Yes

Minor Components

Braceville

Percent of map unit: 10 percent

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Bf—Basher soils

Map Unit Setting

National map unit symbol: 9yfm

Elevation: 400 to 840 feet

Mean annual precipitation: 30 to 45 inches

Mean annual air temperature: 45 to 54 degrees F

Frost-free period: 120 to 187 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Basher and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basher

Setting

Landform: Flood plains

Parent material: Reddish alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: silt loam

H2 - 10 to 37 inches: loam

H3 - 37 to 53 inches: fine sandy loam

H4 - 53 to 62 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Low

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: NoneOccasional

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: F140XY014NY - Low Floodplain

Hydric soil rating: No

Minor Components

Holly

Percent of map unit: 10 percent

Landform: Depressions on flood plains, backswamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

BrC—Braceville gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9yfw

Elevation: 160 to 1,970 feet

Mean annual precipitation: 34 to 56 inches

Mean annual air temperature: 40 to 54 degrees F

Frost-free period: 100 to 175 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Braceville and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Braceville

Setting

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Coarse-loamy outwash

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 30 inches: gravelly silt loam
H3 - 30 to 55 inches: very gravelly loam
H4 - 55 to 60 inches: stratified sand and gravel

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 18 to 30 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F140XY020NY - Dense Outwash
Hydric soil rating: No

Minor Components

Rexford, poorly drained

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

CF—Cut and fill land

Map Unit Setting

National map unit symbol: 9yg0
Elevation: 490 to 2,260 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 46 to 56 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, cut and fill, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Cut And Fill

Setting

Down-slope shape: Linear

Across-slope shape: Linear

Properties and qualities

Slope: 0 to 70 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

ChA—Chenango gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9yg1

Elevation: 600 to 1,800 feet

Mean annual precipitation: 30 to 56 inches

Mean annual air temperature: 40 to 54 degrees F

Frost-free period: 100 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Chenango and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Riser

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Parent material: Gravelly outwash

Typical profile

H1 - 0 to 8 inches: gravelly loam

H2 - 8 to 32 inches: gravelly fine sandy loam

H3 - 32 to 72 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Custom Soil Resource Report

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F140XY021NY - Dry Outwash

Hydric soil rating: No

Minor Components

Braceville

Percent of map unit: 5 percent

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Convex, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Rexford, somewhat poorly drained

Percent of map unit: 5 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

ChB—Chenango gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yg2

Elevation: 600 to 1,800 feet

Mean annual precipitation: 30 to 56 inches

Mean annual air temperature: 40 to 54 degrees F

Frost-free period: 100 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Chenango and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango

Setting

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Gravelly outwash

Typical profile

H1 - 0 to 8 inches: gravelly loam

H2 - 8 to 32 inches: gravelly fine sandy loam

H3 - 32 to 72 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: F140XY021NY - Dry Outwash

Hydric soil rating: No

Minor Components

Braceville

Percent of map unit: 5 percent

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Convex, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Rexford, somewhat poorly drained

Percent of map unit: 5 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

ChC—Chenango gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9yg3

Elevation: 600 to 1,800 feet

Mean annual precipitation: 30 to 56 inches

Mean annual air temperature: 40 to 54 degrees F

Custom Soil Resource Report

Frost-free period: 100 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Chenango and similar soils: 93 percent

Minor components: 7 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Riser

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Parent material: Gravelly outwash

Typical profile

H1 - 0 to 8 inches: gravelly loam

H2 - 8 to 32 inches: gravelly fine sandy loam

H3 - 32 to 72 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Ecological site: F140XY021NY - Dry Outwash

Hydric soil rating: No

Minor Components

Braceville

Percent of map unit: 5 percent

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Convex, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Rexford, somewhat poorly drained

Percent of map unit: 2 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

CIA—Chippewa silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v32k

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Chippewa and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chippewa

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Loamy till dominated by siltstone, sandstone, and shale fragments

Typical profile

Ap - 0 to 7 inches: silt loam

Eg - 7 to 15 inches: channery silt loam

Bxg - 15 to 45 inches: channery silt loam

C - 45 to 72 inches: channery silt loam

Properties and qualities

Slope: 0 to 3 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 8 to 20 inches to fragipan

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Ecological site: F140XY016NY - Mineral Wetlands

Hydric soil rating: Yes

Minor Components

Chippewa, very poorly drained

Percent of map unit: 10 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Volusia

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluvium, base slope, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

CnB—Chippewa silt loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2vcjf

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Chippewa, extremely stony, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chippewa, Extremely Stony

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Loamy till dominated by siltstone, sandstone, and shale fragments

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 5 inches: silt loam

Eg - 5 to 15 inches: channery silt loam

Custom Soil Resource Report

Bxg - 15 to 45 inches: channery silt loam

C - 45 to 72 inches: channery silt loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 8 to 20 inches to fragipan

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F140XY016NY - Mineral Wetlands

Hydric soil rating: Yes

Minor Components

Volusia, extremely stony

Percent of map unit: 8 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Chippewa, extremely stony, very poorly drained

Percent of map unit: 7 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

DdD—Dekalb channery sandy loam, 8 to 25 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2w6ng

Elevation: 570 to 2,000 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 50 to 56 degrees F

Frost-free period: 155 to 185 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Dekalb and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dekalb

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 4 inches: channery sandy loam

E - 4 to 7 inches: channery sandy loam

Bw - 7 to 26 inches: very channery sandy loam

C - 26 to 34 inches: extremely channery sandy loam

R - 34 to 44 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent

Surface area covered with cobbles, stones or boulders: 30.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Clymer

Percent of map unit: 10 percent

Landform: Mountain slopes

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Lehew

Percent of map unit: 10 percent

Custom Soil Resource Report

Landform: Mountain slopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

DEF—DeKalb extremely stony sandy loam, steep

Map Unit Setting

National map unit symbol: 9yg7
Elevation: 1,000 to 2,800 feet
Mean annual precipitation: 36 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

DeKalb and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of DeKalb

Setting

Landform: Mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 6 inches: channery sandy loam
H2 - 6 to 21 inches: channery sandy loam
H3 - 21 to 32 inches: very channery sandy loam
R4 - 32 to 35 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 80 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained

Custom Soil Resource Report

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

GP—Gravel pits

Map Unit Setting

National map unit symbol: 1jrv7

Mean annual precipitation: 36 to 46 inches

Mean annual air temperature: 46 to 56 degrees F

Frost-free period: 135 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Pits, shale: 51 percent

Pits, gravel: 49 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Shale

Typical profile

C - 0 to 1 inches: channers

R - 1 to 2 inches: bedrock

Properties and qualities

Slope: 0 to 40 percent

Depth to restrictive feature: 0 to 2 inches to paralithic bedrock

Drainage class: Excessively drained

Runoff class: Medium

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8e

Hydric soil rating: No

Description of Pits, Gravel

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8e

Hydric soil rating: No

Ho—Holly silt loam

Map Unit Setting

National map unit symbol: 9ygb
Elevation: 200 to 1,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 187 days
Farmland classification: Not prime farmland

Map Unit Composition

Holly and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holly

Setting

Landform: Depressions on flood plains, backswamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 28 inches: silt loam
H3 - 28 to 43 inches: silt loam
H4 - 43 to 60 inches: stratified gravelly sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Linden

Percent of map unit: 5 percent

Hydric soil rating: No

LaC—Lackawanna channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w095

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Lackawanna and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lackawanna

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 7 inches: channery silt loam

Bw1 - 7 to 17 inches: channery silt loam

Bw2 - 17 to 26 inches: channery loam

Bx - 26 to 60 inches: channery loam

C - 60 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 17 to 36 inches to fragipan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 16 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Wellsboro

Percent of map unit: 10 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Oquaga

Percent of map unit: 3 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Upper third of mountain flank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

Morris

Percent of map unit: 2 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluvium, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

LaD—Lackawanna channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2w097

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Lackawanna and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lackawanna

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 7 inches: channery silt loam

Bw1 - 7 to 17 inches: channery silt loam

Bw2 - 17 to 26 inches: channery loam

Bx - 26 to 60 inches: channery loam

C - 60 to 72 inches: very channery loam

Properties and qualities

Slope: 15 to 25 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 17 to 36 inches to fragipan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 16 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Wellsboro

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Oquaga

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Upper third of mountainflank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

LcB—Lackawanna channery silt loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w09m
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Lackawanna, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lackawanna, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluvium, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: channery silt loam
Bw1 - 3 to 17 inches: channery silt loam
Bw2 - 17 to 26 inches: channery loam
Bx - 26 to 60 inches: channery loam
C - 60 to 72 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 7.0 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 16 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Custom Soil Resource Report

Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Wellsboro, extremely stony

Percent of map unit: 10 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Morris, extremely stony

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Oquaga, extremely stony

Percent of map unit: 2 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

LcD—Lackawanna channery silt loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w09n
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Lackawanna, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lackawanna, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: channery silt loam

Bw1 - 3 to 17 inches: channery silt loam

Bw2 - 17 to 26 inches: channery loam

Bx - 26 to 60 inches: channery loam

C - 60 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 25 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 17 to 36 inches to fragipan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 16 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Oquaga, rubbly

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

Morris, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluvium, side slope, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Wellsboro, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, head slope, side slope

Down-slope shape: Concave, convex

Across-slope shape: Linear, convex

Hydric soil rating: No

LEF—Lackawanna and Bath soils, steep, extremely stony

Map Unit Setting

National map unit symbol: 2v31t

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Lackawanna, extremely stony, and similar soils: 60 percent

Bath, extremely stony, and similar soils: 20 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lackawanna, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: channery silt loam

Bw1 - 3 to 17 inches: channery silt loam

Bw2 - 17 to 26 inches: channery loam

Bx - 26 to 60 inches: channery loam

C - 60 to 72 inches: very channery loam

Properties and qualities

Slope: 25 to 50 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 17 to 36 inches to fragipan

Drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 16 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

Description of Bath, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: channery silt loam

Bw1 - 3 to 15 inches: channery silt loam

Bw2 - 15 to 25 inches: channery loam

E - 25 to 29 inches: channery loam

Bx - 29 to 52 inches: very channery silt loam

C - 52 to 72 inches: very channery silt loam

Properties and qualities

Slope: 25 to 45 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 26 to 38 inches to fragipan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 24 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Ecological site: F140XY030NY - Well Drained Dense Till

Hydric soil rating: No

Minor Components

Wellsboro, extremely stony

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arnot, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountaintop, free face, mountainflank, nose slope, side slope, free face
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Oquaga, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Upper third of mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Lordstown, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope, free face
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ln—Linden soils

Map Unit Setting

National map unit symbol: 9ygv
Elevation: 200 to 1,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 187 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Linden and similar soils: 92 percent

Custom Soil Resource Report

Minor components: 8 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Linden

Setting

Landform: Flood plains

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: silt loam

H2 - 9 to 45 inches: silt loam

H3 - 45 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: About 36 to 72 inches

Frequency of flooding: NoneOccasional

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Holly

Percent of map unit: 8 percent

Landform: Depressions on flood plains, backswamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

McB—Mardin channery silt loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2srj1

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Mardin, very stony, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin, Very Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till

Typical profile

A - 0 to 4 inches: channery silt loam

BE - 4 to 12 inches: channery silt loam

Bw1 - 12 to 16 inches: channery silt loam

Bw2 - 16 to 20 inches: channery silt loam

Bx1 - 20 to 36 inches: channery silt loam

Bx2 - 36 to 57 inches: channery silt loam

C - 57 to 72 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 14 to 26 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Lordstown

Percent of map unit: 6 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Mountaintop, nose slope, crest

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Volusia, very stony

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Mountains, hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Side slope, interfluvium, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chippewa, very stony

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

McD—Mardin channery silt loam, 8 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2v2zx
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Mardin, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin, Very Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluvium, head slope, side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

A - 0 to 4 inches: channery silt loam
BE - 4 to 12 inches: channery silt loam
Bw1 - 12 to 16 inches: channery silt loam
Bw2 - 16 to 20 inches: channery silt loam
Bx1 - 20 to 36 inches: channery silt loam
Bx2 - 36 to 57 inches: channery silt loam
C - 57 to 72 inches: channery silt loam

Custom Soil Resource Report

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lordstown, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Volusia, very stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Bath, very stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mg—Mine dump

Map Unit Setting

National map unit symbol: 9yh6

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Dumps, mine (unstable fill): 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps, Mine (unstable Fill)

Setting

Parent material: Coal extraction mine spoil

Typical profile

H1 - 0 to 6 inches: very channery silt loam

H2 - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 50 percent

Depth to restrictive feature: 20 to 60 inches to lithic bedrock

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 6.00 in/hr)

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydric soil rating: No

Mh—Mine dump, burned

Map Unit Setting

National map unit symbol: 9yh7

Elevation: 330 to 2,460 feet

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Dumps, burned mine, and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps, Burned Mine

Setting

Parent material: Coal extraction mine spoil

Typical profile

H1 - 0 to 6 inches: very channery silt loam

H2 - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 50 percent

Depth to restrictive feature: 20 to 60 inches to lithic bedrock

Runoff class: Medium

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 6.00 in/hr)*

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Hydric soil rating: No

Mm—Mine wash

Map Unit Setting

National map unit symbol: 9yh8

Elevation: 50 to 500 feet

Mean annual precipitation: 33 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Dumps, mine wash: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps, Mine Wash

Setting

Parent material: Coal extraction mine spoil

Typical profile

H1 - 0 to 6 inches: channery sandy loam

Custom Soil Resource Report

H2 - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 50 percent

Depth to restrictive feature: 24 to 60 inches to lithic bedrock

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)

Depth to water table: About 24 to 72 inches

Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydric soil rating: No

Minor Components

Aqepts

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

MoB—Morris channery silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2vclq

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Morris and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morris

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 12 inches: channery silt loam

Custom Soil Resource Report

Eg - 12 to 16 inches: channery silt loam

Bx - 16 to 60 inches: channery silt loam

C - 60 to 72 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Norwich

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Wellsboro

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

MsB—Morris channery silt loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2vxct

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Morris, extremely stony, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morris, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 5 inches: channery silt loam

Bw - 5 to 12 inches: channery silt loam

Eg - 12 to 16 inches: channery silt loam

Bx - 16 to 60 inches: channery silt loam

C - 60 to 72 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Norwich, extremely stony

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Wellsboro, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Custom Soil Resource Report

Landform position (three-dimensional): Interfluve, head slope, side slope
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Mu—Muck

Map Unit Setting

National map unit symbol: 9yhf
Elevation: 590 to 2,000 feet
Mean annual precipitation: 34 to 51 inches
Mean annual air temperature: 40 to 50 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Freetown, muck, and similar soils: 90 percent
Paupack, mucky peat (shallow), and similar soils: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown, Muck

Setting

Landform: Swamps
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 6 inches: mucky peat
Oa - 6 to 72 inches: muck

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Description of Paupack, Mucky Peat (shallow)

Setting

Landform: Swamps

Parent material: Woody organic material over gravelly alluvium

Typical profile

Oe - 0 to 3 inches: mucky peat

Oa1 - 3 to 26 inches: muck

Oa2 - 26 to 36 inches: very stony muck

Cg - 36 to 70 inches: extremely stony sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: Very high (about 17.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Ecological site: F140XY012PA - Organic Wetlands

Hydric soil rating: Yes

OIB—Oquaga and Lordstown channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yhh

Elevation: 600 to 1,800 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Oquaga and similar soils: 65 percent

Lordstown and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes

Custom Soil Resource Report

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw - 7 to 30 inches: very channery loam
R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Till derived from sedimentary rock

Typical profile

A - 0 to 7 inches: channery silt loam
Bw - 7 to 26 inches: channery silt loam
C - 26 to 30 inches: very channery loam
2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

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

OIC—Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9yhj
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oquaga and similar soils: 65 percent
Lordstown and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw - 7 to 30 inches: very channery loam
R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Typical profile

A - 0 to 7 inches: channery silt loam
Bw - 7 to 26 inches: channery silt loam
C - 26 to 30 inches: very channery loam
2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

OID—Oquaga and Lordstown channery silt loams, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9yhk
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 65 percent

Lordstown and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

Ap - 0 to 7 inches: channery silt loam

Bw - 7 to 30 inches: very channery loam

R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)*

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: F140XY027NY - Well Drained Till Uplands

Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 26 inches: channery silt loam

C - 26 to 30 inches: very channery loam

2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Custom Soil Resource Report

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Hydric soil rating: No

OpB—Oquaga and Lordstown extremely stony silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yhl

Elevation: 700 to 1,800 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 65 percent

Lordstown and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 30 inches: very channery silt loam

R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 15.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Custom Soil Resource Report

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Ecological site: F140XY027NY - Well Drained Till Uplands

Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 26 inches: channery silt loam

C - 26 to 30 inches: very channery loam

2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

OpD—Oquaga and Lordstown extremely stony silt loams, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9yhm
Elevation: 700 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 60 percent
Lordstown and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

A - 0 to 7 inches: channery silt loam
Bw - 7 to 30 inches: very channery silt loam
R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 26 inches: channery silt loam

C - 26 to 30 inches: very channery loam

2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 25 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

OXF—Oquaga and Lordstown extremely stony silt loams steep

Map Unit Setting

National map unit symbol: 9yhg

Elevation: 700 to 1,800 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 60 percent

Lordstown and similar soils: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Reddish ablation till derived from sandstone and siltstone

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 30 inches: very channery silt loam

R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 50 percent

Surface area covered with cobbles, stones or boulders: 15.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Ecological site: F140XY027NY - Well Drained Till Uplands

Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Typical profile

A - 0 to 7 inches: channery silt loam

Bw - 7 to 26 inches: channery silt loam

C - 26 to 30 inches: very channery loam

2R - 30 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 50 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

Ps—Pope soils

Map Unit Setting

National map unit symbol: 9yht

Elevation: 160 to 1,970 feet

Mean annual precipitation: 30 to 51 inches

Mean annual air temperature: 40 to 54 degrees F

Frost-free period: 100 to 187 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Pope and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pope

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Coarse-loamy alluvium derived from sandstone and siltstone

Typical profile

H1 - 0 to 10 inches: silt loam

H2 - 10 to 42 inches: fine sandy loam

H3 - 42 to 62 inches: sandy loam

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F140XY013PA - High Floodplain

Hydric soil rating: No

Minor Components

Holly

Percent of map unit: 5 percent

Landform: Depressions on flood plains, backswamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

Qu—Quarries and mines

Map Unit Setting

National map unit symbol: 9yhn

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Pits, (quarries): 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

RdA—Rexford loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9yhv

Elevation: 590 to 1,970 feet

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rexford, somewhat poorly drained, and similar soils: 60 percent

Rexford, poorly drained, and similar soils: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rexford, Somewhat Poorly Drained

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy outwash derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 18 inches: silt loam
Bx - 18 to 40 inches: gravelly loam
2C - 40 to 63 inches: Error

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 24 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 2 to 10 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F140XY020NY - Dense Outwash
Hydric soil rating: No

Description of Rexford, Poorly Drained

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy outwash derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 18 inches: silt loam
Bx - 18 to 40 inches: gravelly loam
2C - 40 to 63 inches: Error

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 24 inches to fragipan
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F140XY016NY - Mineral Wetlands

Hydric soil rating: Yes

RdB—Rexford loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yhw

Elevation: 590 to 1,970 feet

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rexford, poorly drained, and similar soils: 80 percent

Rexford, somewhat poorly drained, and similar soils: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rexford, Poorly Drained

Setting

Landform: Outwash terraces

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy outwash derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam

Bw - 8 to 18 inches: loam

Bx - 18 to 40 inches: gravelly loam

2C - 40 to 63 inches: Error

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 15 to 24 inches to fragipan

Drainage class: Poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 8 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F140XY016NY - Mineral Wetlands

Hydric soil rating: Yes

Description of Rexford, Somewhat Poorly Drained

Setting

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy outwash derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam

Bw - 8 to 18 inches: gravelly sandy loam

Bx - 18 to 40 inches: gravelly sandy loam

2C - 40 to 63 inches: Error

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 15 to 24 inches to fragipan

Drainage class: Somewhat poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 2 to 10 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F140XY020NY - Dense Outwash

Hydric soil rating: No

Sm—Strip mine

Map Unit Setting

National map unit symbol: 9yh

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Frost-free period: 100 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Pits, strip mine: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Strip Mine

Setting

Parent material: Coal extraction mine spoil

Typical profile

H1 - 0 to 6 inches: very channery sandy loam

H2 - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 50 percent

Depth to restrictive feature: 20 to 60 inches to lithic bedrock

Runoff class: Medium

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 6.00 in/hr)*

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydric soil rating: No

VoB—Volusia channery silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2srff

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Volusia and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Volusia

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till derived from interbedded sedimentary rock

Custom Soil Resource Report

Typical profile

Ap - 0 to 9 inches: channery silt loam
Bw - 9 to 15 inches: channery silt loam
Eg - 15 to 17 inches: channery silt loam
Bx1 - 17 to 29 inches: channery loam
Bx2 - 29 to 54 inches: channery loam
C - 54 to 72 inches: channery silt loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F140XY024NY - Moist Dense Till
Hydric soil rating: No

Minor Components

Chippewa

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Mardin

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

VrB—Volusia channery silt loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2srfw
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Volusia, extremely stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Volusia, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

A - 0 to 4 inches: channery silt loam
Bw - 4 to 15 inches: channery silt loam
Eg - 15 to 17 inches: channery silt loam
Bx1 - 17 to 29 inches: channery loam
Bx2 - 29 to 54 inches: channery loam
C - 54 to 72 inches: channery silt loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 7.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Custom Soil Resource Report

Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

Minor Components

Chippewa, extremely stony

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Mardin, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

VrC—Volusia channery silt loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2srfy

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Volusia, extremely stony, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Volusia, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Interfluvium, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

A - 0 to 4 inches: channery silt loam

Bw - 4 to 15 inches: channery silt loam

Custom Soil Resource Report

Eg - 15 to 17 inches: channery silt loam

Bx1 - 17 to 29 inches: channery loam

Bx2 - 29 to 54 inches: channery loam

C - 54 to 72 inches: channery silt loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

Minor Components

Mardin, extremely stony

Percent of map unit: 6 percent

Landform: Mountains, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Chippewa, extremely stony

Percent of map unit: 4 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

W—Water

Map Unit Setting

National map unit symbol: 9yj6

Mean annual precipitation: 34 to 51 inches

Mean annual air temperature: 40 to 50 degrees F

Custom Soil Resource Report

Frost-free period: 100 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Bodies of water 2 to: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Wa—Wayland silt loam

Map Unit Setting

National map unit symbol: 9yj7

Elevation: 200 to 1,500 feet

Mean annual precipitation: 30 to 56 inches

Mean annual air temperature: 45 to 54 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Wayland and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wayland

Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Talf

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Recent alluvium

Typical profile

H1 - 0 to 3 inches: silt loam

H2 - 3 to 42 inches: silty clay loam

H3 - 42 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: FrequentNone

Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Hydric soil rating: Yes

Minor Components

Braceville

Percent of map unit: 5 percent

Hydric soil rating: No

WeB—Weikert and Klinesville channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yj8

Elevation: 300 to 1,600 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Weikert and similar soils: 60 percent

Klinesville and similar soils: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 8 inches: channery silt loam

H2 - 8 to 17 inches: very channery silt loam

H3 - 17 to 21 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Klinesville

Setting

Landform: Valleys, ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 2 inches: channery silt loam

H2 - 2 to 13 inches: channery silt loam

H3 - 13 to 15 inches: channery silt loam

R - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Hydric soil rating: No

WeD—Weikert and Klinesville channery silt loams, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9yjb

Elevation: 300 to 1,600 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 60 percent

Klinesville and similar soils: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 8 inches: channery silt loam

H2 - 8 to 17 inches: very channery silt loam

H3 - 17 to 21 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Klinesville

Setting

Landform: Valleys, ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 2 inches: channery silt loam

H2 - 2 to 13 inches: channery silt loam

H3 - 13 to 15 inches: channery silt loam

R - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Custom Soil Resource Report

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Hydric soil rating: No

WIB—Wellsboro channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2vck5

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Wellsboro and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 22 inches: channery silt loam

Bx - 22 to 55 inches: channery loam

C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 14 to 30 inches to fragipan

Drainage class: Moderately well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Oquaga

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Upper third of mountain flank, nose slope, crest

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Morris

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Lackawanna

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

WIC—Wellsboro channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2vck6

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Custom Soil Resource Report

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wellsboro and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 22 inches: channery silt loam

Bx - 22 to 55 inches: channery loam

C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 14 to 30 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Lackawanna

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Morris

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope

Custom Soil Resource Report

Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

WID—Wellsboro channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2vck7
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellsboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 22 inches: channery silt loam
Bx - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Morris

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

Oquaga

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Upper third of mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Lackawanna

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WmB—Wellsboro channery silt loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2vckl
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellsboro, extremely stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro, Extremely Stony

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: channery silt loam

Bw - 3 to 22 inches: channery silt loam

Bx - 22 to 55 inches: channery loam

C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 7.0 percent

Depth to restrictive feature: 14 to 30 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Oquaga, extremely stony

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Linear

Hydric soil rating: No

Morris, extremely stony

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

WmD—Wellsboro channery silt loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2vckp
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellsboro, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluvium, head slope, side slope
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

O_e - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: channery silt loam
B_w - 3 to 22 inches: channery silt loam
B_x - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 7.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (K_{sat}): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Morris, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lackawanna, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Oquaga, extremely stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

WrB—Wurtsboro channery loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yjj
Elevation: 800 to 1,800 feet
Mean annual precipitation: 30 to 46 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wurtsboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsboro

Setting

Landform: Hills
Landform position (two-dimensional): Footslope

Custom Soil Resource Report

Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 8 inches: channery loam
H2 - 8 to 21 inches: gravelly loam
H3 - 21 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

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

Minor Components

Swartswood

Percent of map unit: 10 percent
Hydric soil rating: No

Chippewa

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

WrC—Wurtsboro channery loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9yjk
Elevation: 800 to 1,800 feet
Mean annual precipitation: 30 to 46 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wurtsboro and similar soils: 87 percent

Minor components: 13 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsboro

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Typical profile

H1 - 0 to 8 inches: channery loam

H2 - 8 to 21 inches: gravelly loam

H3 - 21 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 17 to 28 inches to fragipan

Drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Swartswood

Percent of map unit: 10 percent

Hydric soil rating: No

Chippewa

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

WtB—Wurtsboro extremely stony loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yjm
Elevation: 590 to 1,970 feet
Mean annual precipitation: 30 to 51 inches
Mean annual air temperature: 40 to 55 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Wurtsboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsboro

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 8 inches: channery loam
H2 - 8 to 21 inches: gravelly loam
H3 - 21 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Swartwood

Percent of map unit: 10 percent

Hydric soil rating: No

Chippewa

Percent of map unit: 5 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

WtD—Wurtsboro extremely stony loam, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9yjn

Elevation: 330 to 2,460 feet

Mean annual precipitation: 30 to 70 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 100 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Wurtsboro and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsboro

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Typical profile

H1 - 0 to 8 inches: channery loam

H2 - 8 to 21 inches: gravelly loam

H3 - 21 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 25 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 17 to 28 inches to fragipan

Drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Custom Soil Resource Report

Depth to water table: About 18 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Swartswood

Percent of map unit: 10 percent

Hydric soil rating: No

Chippewa

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Volusia, rubbly

Percent of map unit: 2 percent

Landform: Hills

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Base slope, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

WyD—Wyoming gravelly loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9yjp

Elevation: 400 to 1,800 feet

Mean annual precipitation: 42 to 50 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 110 to 145 days

Farmland classification: Not prime farmland

Map Unit Composition

Wyoming and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyoming

Setting

Landform: Terraces

Custom Soil Resource Report

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Water sorted gravelly outwash derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: gravelly loam

H2 - 6 to 22 inches: very gravelly sandy loam

H3 - 22 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Hydric soil rating: No

WyF—Wyoming gravelly loam, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: 9yjq

Elevation: 400 to 1,800 feet

Mean annual precipitation: 42 to 50 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 110 to 145 days

Farmland classification: Not prime farmland

Map Unit Composition

Wyoming and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyoming

Setting

Landform: Terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Water sorted gravelly outwash derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: gravelly loam

H2 - 6 to 22 inches: very gravelly sandy loam

H3 - 22 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 25 to 45 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Hydric soil rating: No

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Custom Soil Resource Report

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ATTACHMENT 3
E&SC AND SR PLAN BMP DESIGN WORKSHEETS
AND CALCULATIONS

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Attachment 3

- 3.1 Compost Filter Sock Worksheets
- 3.2 CN Table
- 3.3 Channel Design Worksheets
- 3.4 Apron Design Worksheets
- 3.5 Level Spreader Design Worksheet
- 3.6 Erosion Control Blanket Reports
- 3.7 PCSM Channel Design Worksheets

ATTACHMENT 3.1
COMPOST FILTER SOCK WORKSHEETS

STANDARD E&S WORKSHEET #1

Compost Filter Socks

PROJECT NAME: Williams REAE – REL Pipeline

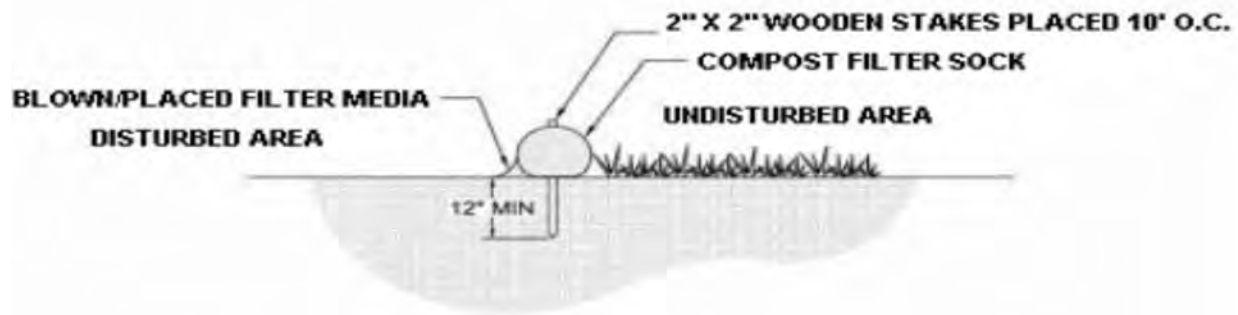
LOCATION: Buck, Bear Creek, Plains, Jenkins, Lington, and Dallas Twps, Luzerne County, Pennsylvania

PREPARED BY: CD

DATE: 03/01/2021

CHECKED BY: KCC

DATE: 03/01/2021



SOCK	DIA (IN.)	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
REL-CFS-00-001	Removed			
REL-CFS-00-002	12	See Map	6%	151
REL-CFS-00-003	12	See Map	6%	151
REL-CFS-00-004	12	See Map	6%	151
REL-CFS-00-005	12	See Map	8%	84
REL-CFS-00-006	12	See Map	8%	84
REL-CFS-00-007	12	See Map	8%	84
REL-CFS-00-008	12	See Map	8%	84
REL-CFS-00-009	12	See Map	8%	80
REL-CFS-00-010	12	See Map	8%	80
REL-CFS-00-011	12	See Map	8%	26
REL-CFS-00-012	12	See Map	5%	185
REL-CFS-00-013	12	See Map	5%	185
REL-CFS-00-014	12	See Map	5%	185
REL-CFS-00-015	12	See Map	5%	185
REL-CFS-00-016	Removed			
REL-CFS-00-017	12	See Map	5%	185
REL-CFS-00-018	12	See Map	3%	295
REL-CFS-00-019	12	See Map	3%	295
REL-CFS-00-020	12	See Map	3%	295
REL-CFS-00-021	12	See Map	wetland	
REL-CFS-00-022	12	See Map	wetland	
REL-CFS-00-023	12	See Map	wetland	
REL-CFS-00-024	12	See Map	wetland	
REL-CFS-00-025	12	See Map	wetland	
REL-CFS-00-026	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-00-027	12	See Map	wetland	
REL-CFS-00-028	12	See Map	wetland	
REL-CFS-00-029	12	See Map	wetland	
REL-CFS-00-030	12	See Map	wetland	
REL-CFS-00-031	12	See Map	wetland	
REL-CFS-00-032	12	See Map	wetland	
REL-CFS-00-033	12	See Map	wetland	
REL-CFS-00-034	12	See Map	wetland	
REL-CFS-00-035	12	See Map	wetland	
REL-CFS-00-036	12	See Map	4%	106
REL-CFS-00-037	12	See Map	6%	54
REL-CFS-00-038	12	See Map	2%	97
REL-CFS-00-039	12	See Map	wetland	
REL-CFS-00-040	12	See Map	wetland	
REL-CFS-00-041	12	See Map	wetland	
REL-CFS-00-042	12	See Map	wetland	
REL-CFS-00-043	12	See Map	1%	178
REL-CFS-00-044	12	See Map	11%	74
REL-CFS-00-045	12	See Map	11%	74
REL-CFS-00-046	12	See Map	11%	74
REL-CFS-00-047	12	See Map	13%	109
REL-CFS-00-048	12	See Map	13%	109
REL-CFS-00-049	12	See Map	13%	109
REL-CFS-00-050	12	See Map	13%	109
REL-CFS-00-051	12	See Map	13%	109
REL-CFS-00-052	12	See Map	13%	109
REL-CFS-00-053	12	See Map	6%	147
REL-CFS-00-054	12	See Map	6%	147
REL-CFS-00-055	12	See Map	6%	147
REL-CFS-00-056	12	See Map	12%	128
REL-CFS-00-057	12	See Map	12%	128
REL-CFS-00-058	12	See Map	12%	128
REL-CFS-00-059	12	See Map	12%	128
REL-CFS-00-060	12	See Map	12%	128
REL-CFS-00-061	12	See Map	12%	128
REL-CFS-00-062	12	See Map	12%	128
REL-CFS-00-063	12	See Map	8%	144
REL-CFS-00-064	12	See Map	8%	144
REL-CFS-00-065	12	See Map	8%	144
REL-CFS-00-066	12	See Map	8%	144
REL-CFS-00-067	12	See Map	4%	134
REL-CFS-00-068	12	See Map	4%	134
REL-CFS-00-069	12	See Map	6%	126

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-00-070	12	See Map	6%	126
REL-CFS-00-071	12	See Map	6%	126
REL-CFS-00-072	12	See Map	9%	94
REL-CFS-00-073	12	See Map	9%	94
REL-CFS-00-074	12	See Map	9%	94
REL-CFS-00-075	12	See Map	5%	199
REL-CFS-00-076	12	See Map	5%	199
REL-CFS-00-077	12	See Map	5%	199
REL-CFS-00-078	12	See Map	5%	199
REL-CFS-00-079	18	See Map	21%	80
REL-CFS-00-080	18	See Map	21%	80
REL-CFS-00-081	18	See Map	21%	80
REL-CFS-00-082	18	See Map	21%	80
REL-CFS-00-083	18	See Map	21%	80
REL-CFS-00-084	18	See Map	21%	80
REL-CFS-00-085	18	See Map	21%	80
REL-CFS-00-086	18	See Map	21%	80
REL-CFS-00-087	18	See Map	16%	112
REL-CFS-00-088	18	See Map	16%	112
REL-CFS-00-089	18	See Map	16%	112
REL-CFS-00-090	18	See Map	16%	112
REL-CFS-00-091	18	See Map	16%	112
REL-CFS-00-092	18	See Map	16%	112
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REL-CFS-00-094	18	See Map	16%	112
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REL-CFS-00-096	12	See Map	9%	90
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REL-CFS-00-101	18	See Map	13%	153
REL-CFS-00-102	18	See Map	13%	153
REL-CFS-00-103	18	See Map	13%	153
REL-CFS-00-104	18	See Map	13%	153
REL-CFS-00-105	18	See Map	13%	153
REL-CFS-00-106	18	See Map	13%	153
REL-CFS-00-107	18	See Map	13%	153
REL-CFS-00-108	18	See Map	13%	153
REL-CFS-00-109	18	See Map	13%	153
REL-CFS-00-110	18	See Map	19%	124
REL-CFS-00-111	18	See Map	19%	124
REL-CFS-00-112	18	See Map	19%	124

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-00-113	18	See Map	19%	124
REL-CFS-00-114	18	See Map	19%	124
REL-CFS-00-115	18	See Map	19%	124
REL-CFS-00-116	18	See Map	19%	124
REL-CFS-00-117	18	See Map	19%	124
REL-CFS-00-118	18	See Map	19%	124
REL-CFS-00-119	18	See Map	19%	124
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REL-CFS-00-144	12	See Map	12%	33
REL-CFS-00-145	12	See Map	12%	33
REL-CFS-00-146	12	See Map	6%	147
REL-CFS-00-147	12	See Map	6%	147
REL-CFS-00-148	12	See Map	6%	147
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REL-CFS-00-153	12	See Map	wetland	
REL-CFS-00-154	12	See Map	wetland	
REL-CFS-00-155	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-00-156	12	See Map	wetland	
REL-CFS-00-157	12	See Map	wetland	
REL-CFS-00-158	12	See Map	wetland	
REL-CFS-00-159	12	See Map	wetland	
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REL-CFS-00-167	12	See Map	wetland	
REL-CFS-00-168	12	See Map	wetland	
REL-CFS-00-169	12	See Map	wetland	
REL-CFS-00-170	12	See Map	14%	49
REL-CFS-00-171	12	See Map	14%	49
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REL-CFS-00-600	12	See Map	6%	151
REL-CFS-00-601	12	See Map	6%	151
REL-CFS-00-602	12	See Map	8%	80
REL-CFS-01-001	18	See Map	18%	114
REL-CFS-01-002	18	See Map	18%	114
REL-CFS-01-003	12	See Map	25%	32
REL-CFS-01-004	12	See Map	25%	32
REL-CFS-01-005	12	See Map	25%	32
REL-CFS-01-006	12	See Map	25%	32
REL-CFS-01-007	12	See Map	25%	32
REL-CFS-01-008	12	See Map	17%	60
REL-CFS-01-009	12	See Map	10%	29
REL-CFS-01-010	12	See Map	10%	29
REL-CFS-01-011	12	See Map	14%	37
REL-CFS-01-012	12	See Map	16%	25
REL-CFS-01-013	12	See Map	26%	27
REL-CFS-01-014	12	See Map	32%	31
REL-CFS-01-015	12	See Map	13%	16
REL-CFS-01-016	12	See Map	13%	16
REL-CFS-01-017	24	See Map	14%	209
REL-CFS-01-018	24	See Map	14%	209
REL-CFS-01-019	24	See Map	14%	209
REL-CFS-01-020	24	See Map	14%	209
REL-CFS-01-021	24	See Map	14%	209
REL-CFS-01-022	24	See Map	14%	209
REL-CFS-01-023	32	See Map	9%	390

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-024	32	See Map	9%	390
REL-CFS-01-025	32	See Map	9%	390
REL-CFS-01-026	32	See Map	9%	390
REL-CFS-01-027	18	See Map	14%	180
REL-CFS-01-028	18	See Map	14%	180
REL-CFS-01-029	18	See Map	14%	180
REL-CFS-01-030	18	See Map	14%	180
REL-CFS-01-031	18	See Map	14%	180
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REL-CFS-01-033	24	See Map	10%	333
REL-CFS-01-034	24	See Map	10%	333
REL-CFS-01-035	24	See Map	10%	333
REL-CFS-01-036	32	See Map	11%	315
REL-CFS-01-037	32	See Map	11%	315
REL-CFS-01-038	32	See Map	11%	315
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REL-CFS-01-041	32	See Map	11%	315
REL-CFS-01-042	32	See Map	11%	315
REL-CFS-01-043	32	See Map	11%	315
REL-CFS-01-044	32	See Map	11%	315
REL-CFS-01-045	12	See Map	wetland	
REL-CFS-01-046	12	See Map	wetland	
REL-CFS-01-047	12	See Map	wetland	
REL-CFS-01-048	12	See Map	wetland	
REL-CFS-01-049	12	See Map	wetland	
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REL-CFS-01-054	12	See Map	wetland	
REL-CFS-01-055	12	See Map	wetland	
REL-CFS-01-056	12	See Map	wetland	
REL-CFS-01-057	12	See Map	wetland	
REL-CFS-01-058	12	See Map	wetland	
REL-CFS-01-059	12	See Map	wetland	
REL-CFS-01-060	12	See Map	wetland	
REL-CFS-01-061	12	See Map	wetland	
REL-CFS-01-062	12	See Map	wetland	
REL-CFS-01-063	12	See Map	wetland	
REL-CFS-01-064	12	See Map	wetland	
REL-CFS-01-065	12	See Map	wetland	
REL-CFS-01-066	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-067	12	See Map	wetland	
REL-CFS-01-068	12	See Map	wetland	
REL-CFS-01-069	12	See Map	wetland	
REL-CFS-01-070	12	See Map	wetland	
REL-CFS-01-071	12	See Map	wetland	
REL-CFS-01-072	12	See Map	wetland	
REL-CFS-01-073	12	See Map	wetland	
REL-CFS-01-074	12	See Map	wetland	
REL-CFS-01-075	12	See Map	wetland	
REL-CFS-01-076	12	See Map	wetland	
REL-CFS-01-077	12	See Map	wetland	
REL-CFS-01-078	12	See Map	wetland	
REL-CFS-01-079	12	See Map	wetland	
REL-CFS-01-080	12	See Map	wetland	
REL-CFS-01-081	12	See Map	wetland	
REL-CFS-01-082	12	See Map	wetland	
REL-CFS-01-083	12	See Map	8%	71
REL-CFS-01-084	12	See Map	13%	85
REL-CFS-01-085	12	See Map	13%	85
REL-CFS-01-086	12	See Map	13%	85
REL-CFS-01-087	12	See Map	13%	85
REL-CFS-01-088	12	See Map	9%	92
REL-CFS-01-089	12	See Map	9%	92
REL-CFS-01-090	12	See Map	9%	92
REL-CFS-01-091	12	See Map	9%	92
REL-CFS-01-092	12	See Map	9%	87
REL-CFS-01-093	12	See Map	9%	87
REL-CFS-01-094	12	See Map	9%	87
REL-CFS-01-095	12	See Map	9%	87
REL-CFS-01-096	12	See Map	9%	87
REL-CFS-01-097	12	See Map	9%	87
REL-CFS-01-098	12	See Map	8%	78
REL-CFS-01-099	12	See Map	8%	78
REL-CFS-01-100	12	See Map	8%	78
REL-CFS-01-101	12	See Map	8%	78
REL-CFS-01-102	12	See Map	5%	154
REL-CFS-01-103	12	See Map	5%	154
REL-CFS-01-104	12	See Map	5%	154
REL-CFS-01-105	12	See Map	5%	154
REL-CFS-01-106	12	See Map	5%	154
REL-CFS-01-107	12	See Map	8%	78
REL-CFS-01-108	12	See Map	8%	78
REL-CFS-01-109	12	See Map	8%	78

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-110	12	See Map	wetland
REL-CFS-01-111	12	See Map	wetland
REL-CFS-01-112	12	See Map	wetland
REL-CFS-01-113	12	See Map	wetland
REL-CFS-01-114	12	See Map	wetland
REL-CFS-01-115	12	See Map	wetland
REL-CFS-01-116	12	See Map	wetland
REL-CFS-01-117	12	See Map	wetland
REL-CFS-01-118	12	See Map	wetland
REL-CFS-01-119	12	See Map	wetland
REL-CFS-01-120	12	See Map	wetland
REL-CFS-01-121	12	See Map	wetland
REL-CFS-01-122	12	See Map	wetland
REL-CFS-01-123	12	See Map	wetland
REL-CFS-01-124	12	See Map	wetland
REL-CFS-01-125	12	See Map	wetland
REL-CFS-01-126	12	See Map	wetland
REL-CFS-01-127	12	See Map	wetland
REL-CFS-01-128	12	See Map	wetland
REL-CFS-01-129	12	See Map	wetland
REL-CFS-01-130	12	See Map	wetland
REL-CFS-01-131	12	See Map	wetland
REL-CFS-01-132	12	See Map	wetland
REL-CFS-01-133	12	See Map	21% 38
REL-CFS-01-134	12	See Map	21% 38
REL-CFS-01-135	12	See Map	wetland
REL-CFS-01-136	12	See Map	wetland
REL-CFS-01-137	12	See Map	wetland
REL-CFS-01-138	12	See Map	wetland
REL-CFS-01-139	12	See Map	wetland
REL-CFS-01-140	12	See Map	wetland
REL-CFS-01-141	12	See Map	wetland
REL-CFS-01-142	12	See Map	wetland
REL-CFS-01-143	12	See Map	wetland
REL-CFS-01-144	12	See Map	wetland
REL-CFS-01-145	12	See Map	wetland
REL-CFS-01-146	12	See Map	wetland
REL-CFS-01-147	12	See Map	wetland
REL-CFS-01-148	12	See Map	7% 177
REL-CFS-01-149	12	See Map	7% 177
REL-CFS-01-150	12	See Map	7% 177
REL-CFS-01-151	12	See Map	7% 177
REL-CFS-01-152	12	See Map	7% 177

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-153	12	See Map	wetland	
REL-CFS-01-154	12	See Map	10%	147
REL-CFS-01-155	12	See Map	10%	147
REL-CFS-01-156	12	See Map	10%	135
REL-CFS-01-157	12	See Map	10%	135
REL-CFS-01-158	12	See Map	10%	135
REL-CFS-01-159	12	See Map	10%	135
REL-CFS-01-160	12	See Map	5%	162
REL-CFS-01-161	18	See Map	19%	140
REL-CFS-01-162	18	See Map	19%	140
REL-CFS-01-163	18	See Map	19%	140
REL-CFS-01-164	18	See Map	19%	140
REL-CFS-01-165	18	See Map	19%	140
REL-CFS-01-166	18	See Map	19%	140
REL-CFS-01-167	18	See Map	19%	140
REL-CFS-01-168	18	See Map	19%	140
REL-CFS-01-169	18	See Map	19%	140
REL-CFS-01-170	18	See Map	19%	140
REL-CFS-01-171	18	See Map	19%	140
REL-CFS-01-172	12	See Map	32%	31
REL-CFS-01-173	12	See Map	27%	41
REL-CFS-01-174	12	See Map	27%	41
REL-CFS-01-175	12	See Map	27%	41
REL-CFS-01-176	12	See Map	27%	41
REL-CFS-01-177	12	See Map	27%	41
REL-CFS-01-178	12	See Map	27%	41
REL-CFS-01-179	12	See Map	15%	68
REL-CFS-01-180	12	See Map	15%	68
REL-CFS-01-181	12	See Map	15%	68
REL-CFS-01-182	12	See Map	15%	68
REL-CFS-01-183	12	See Map	15%	68
REL-CFS-01-184	12	See Map	10%	40
REL-CFS-01-185	12	See Map	10%	40
REL-CFS-01-186	12	See Map	wetland	
REL-CFS-01-187	12	See Map	wetland	
REL-CFS-01-188	12	See Map	wetland	
REL-CFS-01-189	12	See Map	wetland	
REL-CFS-01-190	12	See Map	wetland	
REL-CFS-01-191	12	See Map	wetland	
REL-CFS-01-192	12	See Map	wetland	
REL-CFS-01-193	12	See Map	wetland	
REL-CFS-01-194	12	See Map	wetland	
REL-CFS-01-195	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-196	12	See Map	wetland
REL-CFS-01-197	12	See Map	wetland
REL-CFS-01-198	12	See Map	wetland
REL-CFS-01-199	12	See Map	wetland
REL-CFS-01-200	12	See Map	wetland
REL-CFS-01-201	12	See Map	wetland
REL-CFS-01-202	12	See Map	wetland
REL-CFS-01-203	12	See Map	wetland
REL-CFS-01-204	12	See Map	wetland
REL-CFS-01-205	12	See Map	wetland
REL-CFS-01-206	12	See Map	wetland
REL-CFS-01-207	12	See Map	wetland
REL-CFS-01-208	12	See Map	wetland
REL-CFS-01-209	12	See Map	wetland
REL-CFS-01-210	12	See Map	wetland
REL-CFS-01-211	12	See Map	wetland
REL-CFS-01-212	12	See Map	wetland
REL-CFS-01-213	12	See Map	wetland
REL-CFS-01-214	12	See Map	wetland
REL-CFS-01-215	12	See Map	wetland
REL-CFS-01-216	12	See Map	wetland
REL-CFS-01-217	12	See Map	wetland
REL-CFS-01-218	12	See Map	wetland
REL-CFS-01-219	12	See Map	wetland
REL-CFS-01-220	12	See Map	wetland
REL-CFS-01-221	12	See Map	4% 263
REL-CFS-01-222	12	See Map	4% 263
REL-CFS-01-223	12	See Map	4% 263
REL-CFS-01-224	12	See Map	4% 263
REL-CFS-01-225	12	See Map	4% 263
REL-CFS-01-226	12	See Map	wetland
REL-CFS-01-227	12	See Map	wetland
REL-CFS-01-228	12	See Map	wetland
REL-CFS-01-229	12	See Map	wetland
REL-CFS-01-230	12	See Map	13% 32
REL-CFS-01-231	12	See Map	wetland
REL-CFS-01-232	12	See Map	wetland
REL-CFS-01-233	12	See Map	wetland
REL-CFS-01-600	12	See Map	wetland
REL-CFS-01-601	12	See Map	wetland
REL-CFS-01-602	12	See Map	wetland
REL-CFS-01-603	12	See Map	wetland
REL-CFS-01-604	12	See Map	wetland

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-01-605	12	See Map	10%	10
REL-CFS-01-606	12	See Map	wetland	
REL-CFS-01-607	12	See Map	wetland	
REL-CFS-01-608	12	See Map	wetland	
REL-CFS-01-609	12	See Map	wetland	
REL-CFS-01-610	12	See Map	wetland	
REL-CFS-01-611	12	See Map	wetland	
REL-CFS-01-612	12	See Map	wetland	
REL-CFS-01-613	12	See Map	wetland	
REL-CFS-01-614	12	See Map	wetland	
REL-CFS-01-615	12	See Map	wetland	
REL-CFS-01-616	12	See Map	wetland	
REL-CFS-01-617	12	See Map	wetland	
REL-CFS-01-618	12	See Map	wetland	
REL-CFS-01-619	12	See Map	wetland	
REL-CFS-01-620	12	See Map	wetland	
REL-CFS-01-621	12	See Map	wetland	
REL-CFS-01-622	12	See Map	wetland	
REL-CFS-01-623	12	See Map	wetland	
REL-CFS-01-624	12	See Map	wetland	
REL-CFS-01-625	12	See Map	wetland	
REL-CFS-01-626	12	See Map	wetland	
REL-CFS-02-001	18	See Map	6%	249
REL-CFS-02-002	18	See Map	6%	249
REL-CFS-02-003	18	See Map	6%	249
REL-CFS-02-004	18	See Map	6%	249
REL-CFS-02-005	18	See Map	6%	249
REL-CFS-02-006	18	See Map	6%	249
REL-CFS-02-007	18	See Map	6%	249
REL-CFS-02-008	18	See Map	10%	157
REL-CFS-02-009	18	See Map	10%	157
REL-CFS-02-010	18	See Map	10%	157
REL-CFS-02-011	18	See Map	10%	157
REL-CFS-02-012	18	See Map	10%	157
REL-CFS-02-013	18	See Map	10%	157
REL-CFS-02-014	18	See Map	10%	157
REL-CFS-02-015	18	See Map	10%	157
REL-CFS-02-016	12	See Map	12%	134
REL-CFS-02-017	12	See Map	12%	134
REL-CFS-02-018	12	See Map	12%	134
REL-CFS-02-019	12	See Map	12%	134
REL-CFS-02-020	12	See Map	12%	134
REL-CFS-02-021	12	See Map	12%	134

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-022	12	See Map	12%	134
REL-CFS-02-023	12	See Map	12%	134
REL-CFS-02-024	12	See Map	12%	134
REL-CFS-02-025	12	See Map	10%	127
REL-CFS-02-026	12	See Map	10%	127
REL-CFS-02-027	12	See Map	10%	127
REL-CFS-02-028	12	See Map	10%	127
REL-CFS-02-029	12	See Map	10%	127
REL-CFS-02-030	12	See Map	10%	127
REL-CFS-02-031	12	See Map	7%	30
REL-CFS-02-032	12	See Map	7%	30
REL-CFS-02-033	12	See Map	7%	30
REL-CFS-02-034	12	See Map	7%	30
REL-CFS-02-035	12	See Map	7%	30
REL-CFS-02-036	12	See Map	7%	30
REL-CFS-02-037	12	See Map	wetland	
REL-CFS-02-038	12	See Map	wetland	
REL-CFS-02-039	12	See Map	wetland	
REL-CFS-02-040	12	See Map	wetland	
REL-CFS-02-041	18	See Map	11%	168
REL-CFS-02-042	12	See Map	9%	106
REL-CFS-02-043	12	See Map	9%	106
REL-CFS-02-044	12	See Map	9%	106
REL-CFS-02-045	12	See Map	9%	106
REL-CFS-02-046	12	See Map	7%	29
REL-CFS-02-047	12	See Map	7%	29
REL-CFS-02-048	12	See Map	7%	29
REL-CFS-02-049	12	See Map	7%	29
REL-CFS-02-050	12	See Map	7%	29
REL-CFS-02-051	12	See Map	7%	29
REL-CFS-02-052	12	See Map	7%	29
REL-CFS-02-053	12	See Map	7%	29
REL-CFS-02-054	12	See Map	7%	29
REL-CFS-02-055	12	See Map	7%	29
REL-CFS-02-056	12	See Map	8%	178
REL-CFS-02-057	12	See Map	8%	178
REL-CFS-02-058	12	See Map	wetland	
REL-CFS-02-059	12	See Map	wetland	
REL-CFS-02-060	12	See Map	wetland	
REL-CFS-02-061	12	See Map	wetland	
REL-CFS-02-062	12	See Map	wetland	
REL-CFS-02-063	12	See Map	wetland	
REL-CFS-02-064	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-065	12	See Map	wetland	
REL-CFS-02-066	12	See Map	wetland	
REL-CFS-02-067	12	See Map	8%	144
REL-CFS-02-068	12	See Map	8%	144
REL-CFS-02-069	12	See Map	8%	144
REL-CFS-02-070	12	See Map	8%	144
REL-CFS-02-071	12	See Map	8%	144
REL-CFS-02-072	12	See Map	8%	144
REL-CFS-02-073	12	See Map	8%	144
REL-CFS-02-074	12	See Map	8%	144
REL-CFS-02-075	12	See Map	10%	92
REL-CFS-02-076	12	See Map	10%	92
REL-CFS-02-077	12	See Map	10%	92
REL-CFS-02-078	12	See Map	10%	92
REL-CFS-02-079	12	See Map	19%	54
REL-CFS-02-080	12	See Map	19%	54
REL-CFS-02-081	12	See Map	19%	54
REL-CFS-02-082	12	See Map	19%	54
REL-CFS-02-083	12	See Map	8%	131
REL-CFS-02-084	12	See Map	5%	63
REL-CFS-02-085	12	See Map	9%	32
REL-CFS-02-086	12	See Map	wetland	
REL-CFS-02-087	12	See Map	wetland	
REL-CFS-02-088	12	See Map	wetland	
REL-CFS-02-089	12	See Map	17%	12
REL-CFS-02-090	12	See Map	13%	39
REL-CFS-02-091	12	See Map	13%	39
REL-CFS-02-092	12	See Map	13%	39
REL-CFS-02-093	12	See Map	5%	186
REL-CFS-02-094	12	See Map	5%	186
REL-CFS-02-095	12	See Map	5%	186
REL-CFS-02-096	12	See Map	5%	186
REL-CFS-02-097	12	See Map	10%	92
REL-CFS-02-098	12	See Map	10%	92
REL-CFS-02-099	12	See Map	10%	92
REL-CFS-02-100	12	See Map	10%	92
REL-CFS-02-101	12	See Map	11%	38
REL-CFS-02-102	12	See Map	11%	38
REL-CFS-02-103	12	See Map	15%	96
REL-CFS-02-104	12	See Map	15%	96
REL-CFS-02-105	12	See Map	15%	96
REL-CFS-02-106	12	See Map	15%	96
REL-CFS-02-107	12	See Map	15%	96

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-02-108	12	See Map	15%	96
REL-CFS-02-109	12	See Map	12%	49
REL-CFS-02-110	12	See Map	12%	49
REL-CFS-02-111	12	See Map	11%	71
REL-CFS-02-112	12	See Map	17%	54
REL-CFS-02-113	12	See Map	17%	54
REL-CFS-02-114	12	See Map	17%	54
REL-CFS-02-115	12	See Map	17%	54
REL-CFS-02-116	12	See Map	17%	54
REL-CFS-02-117	18	See Map	25%	79
REL-CFS-02-118	18	See Map	25%	79
REL-CFS-02-119	18	See Map	25%	79
REL-CFS-02-120	18	See Map	25%	79
REL-CFS-02-121	18	See Map	25%	79
REL-CFS-02-122	18	See Map	25%	79
REL-CFS-02-123	18	See Map	25%	79
REL-CFS-02-124	18	See Map	25%	79
REL-CFS-02-125	18	See Map	25%	79
REL-CFS-02-126	18	See Map	25%	79
REL-CFS-02-127	18	See Map	25%	79
REL-CFS-02-128	32	See Map	43%	74
REL-CFS-02-129	32	See Map	43%	74
REL-CFS-02-130	32	See Map	43%	74
REL-CFS-02-131	32	See Map	43%	74
REL-CFS-02-132	32	See Map	43%	74
REL-CFS-02-133	32	See Map	43%	74
REL-CFS-02-134	32	See Map	43%	74
REL-CFS-02-135	32	See Map	43%	74
REL-CFS-02-136	32	See Map	43%	74
REL-CFS-02-137	32	See Map	43%	74
REL-CFS-02-138	32	See Map	43%	74
REL-CFS-02-139	32	See Map	43%	74
REL-CFS-02-140	32	See Map	43%	74
REL-CFS-02-141	32	See Map	43%	74
REL-CFS-02-142	32	See Map	43%	74
REL-CFS-02-143	32	See Map	43%	74
REL-CFS-02-144	32	See Map	16%	194
REL-CFS-02-145	32	See Map	16%	194
REL-CFS-02-146	32	See Map	16%	194
REL-CFS-02-147	32	See Map	16%	194
REL-CFS-02-148	32	See Map	16%	194
REL-CFS-02-149	32	See Map	16%	194
REL-CFS-02-150	32	See Map	16%	194

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-151	32	See Map	16%	194
REL-CFS-02-152	32	See Map	16%	194
REL-CFS-02-153	32	See Map	16%	194
REL-CFS-02-154	32	See Map	16%	194
REL-CFS-02-155	32	See Map	16%	194
REL-CFS-02-156	32	See Map	16%	194
REL-CFS-02-157	12	See Map	wetland	
REL-CFS-02-158	12	See Map	wetland	
REL-CFS-02-159	12	See Map	wetland	
REL-CFS-02-160	12	See Map	wetland	
REL-CFS-02-161	12	See Map	wetland	
REL-CFS-02-162	12	See Map	wetland	
REL-CFS-02-163	12	See Map	wetland	
REL-CFS-02-164	12	See Map	wetland	
REL-CFS-02-165	12	See Map	wetland	
REL-CFS-02-166	18	See Map	wetland	
REL-CFS-02-167	18	See Map	wetland	
REL-CFS-02-168	18	See Map	17%	103
REL-CFS-02-169	18	See Map	17%	103
REL-CFS-02-170	18	See Map	17%	103
REL-CFS-02-171	18	See Map	17%	103
REL-CFS-02-172	12	See Map	wetland	
REL-CFS-02-173	12	See Map	wetland	
REL-CFS-02-174	12	See Map	wetland	
REL-CFS-02-175	12	See Map	wetland	
REL-CFS-02-176	12	See Map	wetland	
REL-CFS-02-177	12	See Map	wetland	
REL-CFS-02-178	12	See Map	wetland	
REL-CFS-02-179	12	See Map	wetland	
REL-CFS-02-180	12	See Map	wetland	
REL-CFS-02-181	12	See Map	15%	55
REL-CFS-02-182	Removed			
REL-CFS-02-183	12	See Map	15%	55
REL-CFS-02-184	12	See Map	15%	55
REL-CFS-02-185	12	See Map	15%	55
REL-CFS-02-186	18	See Map	18%	146
REL-CFS-02-187	18	See Map	18%	146
REL-CFS-02-188	18	See Map	18%	146
REL-CFS-02-189	18	See Map	18%	146
REL-CFS-02-190	18	See Map	18%	146
REL-CFS-02-191	18	See Map	18%	146
REL-CFS-02-192	12	See Map	10%	40
REL-CFS-02-193	12	See Map	7%	81

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-194	12	See Map	7%	81
REL-CFS-02-195	12	See Map	7%	81
REL-CFS-02-196	12	See Map	10%	118
REL-CFS-02-197	12	See Map	10%	118
REL-CFS-02-198	12	See Map	10%	118
REL-CFS-02-199	12	See Map	10%	118
REL-CFS-02-200	12	See Map	10%	118
REL-CFS-02-201	12	See Map	10%	118
REL-CFS-02-202	12	See Map	8%	24
REL-CFS-02-203	12	See Map	wetland	
REL-CFS-02-204	12	See Map	wetland	
REL-CFS-02-205	12	See Map	16%	75
REL-CFS-02-206	12	See Map	25%	40
REL-CFS-02-207	12	See Map	25%	40
REL-CFS-02-208	12	See Map	25%	40
REL-CFS-02-209	12	See Map	25%	40
REL-CFS-02-210	12	See Map	25%	40
REL-CFS-02-211	18	See Map	19%	94
REL-CFS-02-212	18	See Map	19%	94
REL-CFS-02-213	18	See Map	19%	94
REL-CFS-02-214	18	See Map	19%	94
REL-CFS-02-215	18	See Map	19%	94
REL-CFS-02-216	18	See Map	19%	94
REL-CFS-02-217	18	See Map	19%	94
REL-CFS-02-218	18	See Map	22%	93
REL-CFS-02-219	18	See Map	22%	93
REL-CFS-02-220	18	See Map	22%	93
REL-CFS-02-221	18	See Map	22%	93
REL-CFS-02-222	12	See Map	7%	43
REL-CFS-02-223	12	See Map	wetland	
REL-CFS-02-224	18	See Map	11%	144
REL-CFS-02-225	18	See Map	11%	144
REL-CFS-02-226	18	See Map	11%	144
REL-CFS-02-227	12	See Map	wetland	
REL-CFS-02-228	12	See Map	wetland	
REL-CFS-02-229	12	See Map	wetland	
REL-CFS-02-230	12	See Map	wetland	
REL-CFS-02-231	12	See Map	wetland	
REL-CFS-02-232	12	See Map	wetland	
REL-CFS-02-233	12	See Map	wetland	
REL-CFS-02-234	12	See Map	wetland	
REL-CFS-02-235	12	See Map	wetland	
REL-CFS-02-236	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-237	12	See Map	wetland	
REL-CFS-02-238	12	See Map	wetland	
REL-CFS-02-239	12	See Map	wetland	
REL-CFS-02-240	12	See Map	wetland	
REL-CFS-02-241	12	See Map	wetland	
REL-CFS-02-242	12	See Map	wetland	
REL-CFS-02-243	12	See Map	wetland	
REL-CFS-02-244	12	See Map	wetland	
REL-CFS-02-245	12	See Map	wetland	
REL-CFS-02-246	12	See Map	wetland	
REL-CFS-02-247	12	See Map	wetland	
REL-CFS-02-248	12	See Map	wetland	
REL-CFS-02-249	12	See Map	wetland	
REL-CFS-02-250	12	See Map	wetland	
REL-CFS-02-251	18	See Map	13%	175
REL-CFS-02-252	18	See Map	13%	175
REL-CFS-02-253	18	See Map	13%	175
REL-CFS-02-254	12	See Map	7%	61
REL-CFS-02-255	12	See Map	7%	61
REL-CFS-02-256	12	See Map	17%	12
REL-CFS-02-257	12	See Map	10%	50
REL-CFS-02-258	12	See Map	10%	50
REL-CFS-02-259	12	See Map	10%	50
REL-CFS-02-260	12	See Map	wetland	
REL-CFS-02-261	12	See Map	wetland	
REL-CFS-02-262	12	See Map	wetland	
REL-CFS-02-263	12	See Map	wetland	
REL-CFS-02-264	12	See Map	wetland	
REL-CFS-02-265	12	See Map	wetland	
REL-CFS-02-266	12	See Map	wetland	
REL-CFS-02-267	12	See Map	wetland	
REL-CFS-02-268	12	See Map	wetland	
REL-CFS-02-269	12	See Map	wetland	
REL-CFS-02-270	12	See Map	wetland	
REL-CFS-02-271	12	See Map	14%	51
REL-CFS-02-272	12	See Map	14%	51
REL-CFS-02-273	12	See Map	14%	51
REL-CFS-02-274	12	See Map	14%	51
REL-CFS-02-275	12	See Map	14%	51
REL-CFS-02-276	12	See Map	5%	121
REL-CFS-02-277	12	See Map	5%	121
REL-CFS-02-278	12	See Map	5%	121
REL-CFS-02-279	12	See Map	11%	66

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-02-280	12	See Map	wetland	
REL-CFS-02-281	12	See Map	6%	33
REL-CFS-02-282	12	See Map	6%	33
REL-CFS-02-283	12	See Map	24%	41
REL-CFS-02-284	12	See Map	21%	34
REL-CFS-02-285	12	See Map	21%	34
REL-CFS-02-286	12	See Map	21%	34
REL-CFS-02-287	12	See Map	21%	34
REL-CFS-02-600	12	See Map	wetland	
REL-CFS-02-601	12	See Map	wetland	
REL-CFS-02-602	12	See Map	wetland	
REL-CFS-02-603	12	See Map	wetland	
REL-CFS-02-604	12	See Map	wetland	
REL-CFS-02-605	12	See Map	wetland	
REL-CFS-02-606	12	See Map	wetland	
REL-CFS-02-607	12	See Map	wetland	
REL-CFS-02-608	12	See Map	wetland	
REL-CFS-02-609	12	See Map	wetland	
REL-CFS-02-610	12	See Map	wetland	
REL-CFS-02-611	12	See Map	wetland	
REL-CFS-02-612	12	See Map	wetland	
REL-CFS-02-613	12	See Map	wetland	
REL-CFS-02-614	12	See Map	wetland	
REL-CFS-03-001	18	See Map	22%	93
REL-CFS-03-002	18	See Map	22%	93
REL-CFS-03-003	18	See Map	22%	93
REL-CFS-03-004	18	See Map	22%	93
REL-CFS-03-005	18	See Map	22%	93
REL-CFS-03-006	18	See Map	22%	93
REL-CFS-03-007	18	See Map	14%	113
REL-CFS-03-008	18	See Map	14%	113
REL-CFS-03-009	18	See Map	14%	113
REL-CFS-03-010	18	See Map	14%	113
REL-CFS-03-011	18	See Map	14%	113
REL-CFS-03-012	18	See Map	14%	113
REL-CFS-03-013	18	See Map	11%	218
REL-CFS-03-014	18	See Map	11%	218
REL-CFS-03-015	18	See Map	5%	313
REL-CFS-03-016	18	See Map	5%	313
REL-CFS-03-017	18	See Map	5%	313
REL-CFS-03-018	18	See Map	5%	313
REL-CFS-03-019	18	See Map	5%	313
REL-CFS-03-020	18	See Map	5%	313

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-03-021	18	See Map	5%	313
REL-CFS-03-022	12	See Map	5%	37
REL-CFS-03-023	12	See Map	10%	116
REL-CFS-03-024	12	See Map	10%	116
REL-CFS-03-025	12	See Map	10%	116
REL-CFS-03-026	12	See Map	10%	116
REL-CFS-03-027	12	See Map	10%	116
REL-CFS-03-028	12	See Map	10%	116
REL-CFS-03-029	12	See Map	10%	116
REL-CFS-03-030	12	See Map	5%	40
REL-CFS-03-031	12	See Map	6%	110
REL-CFS-03-032	12	See Map	6%	110
REL-CFS-03-033	12	See Map	6%	110
REL-CFS-03-034	12	See Map	9%	158
REL-CFS-03-035	12	See Map	9%	158
REL-CFS-03-036	12	See Map	9%	158
REL-CFS-03-037	18	See Map	9%	201
REL-CFS-03-038	18	See Map	9%	201
REL-CFS-03-039	18	See Map	9%	201
REL-CFS-03-040	18	See Map	9%	201
REL-CFS-03-041	12	See Map	19%	67
REL-CFS-03-042	12	See Map	19%	67
REL-CFS-03-043	12	See Map	19%	67
REL-CFS-03-044	12	See Map	19%	67
REL-CFS-03-045	12	See Map	19%	67
REL-CFS-03-046	12	See Map	19%	67
REL-CFS-03-047	18	See Map	17%	141
REL-CFS-03-048	12	See Map	9%	33
REL-CFS-03-049	12	See Map	7%	115
REL-CFS-03-050	12	See Map	wetland	
REL-CFS-03-051	12	See Map	wetland	
REL-CFS-03-052	12	See Map	wetland	
REL-CFS-03-053	12	See Map	wetland	
REL-CFS-03-054	12	See Map	wetland	
REL-CFS-03-055	12	See Map	wetland	
REL-CFS-03-056	12	See Map	wetland	
REL-CFS-03-057	12	See Map	wetland	
REL-CFS-03-058	12	See Map	wetland	
REL-CFS-03-059	12	See Map	wetland	
REL-CFS-03-060	12	See Map	wetland	
REL-CFS-03-061	12	See Map	wetland	
REL-CFS-03-062	12	See Map	wetland	
REL-CFS-03-063	12	See Map	wetland	

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-03-064	12	See Map	wetland
REL-CFS-03-065	12	See Map	wetland
REL-CFS-03-066	12	See Map	wetland
REL-CFS-03-067	12	See Map	wetland
REL-CFS-03-068	12	See Map	wetland
REL-CFS-03-069	12	See Map	wetland
REL-CFS-03-070	12	See Map	wetland
REL-CFS-03-071	12	See Map	wetland
REL-CFS-03-072	12	See Map	wetland
REL-CFS-03-073	12	See Map	wetland
REL-CFS-03-074	12	See Map	wetland
REL-CFS-03-075	12	See Map	wetland
REL-CFS-03-076	12	See Map	wetland
REL-CFS-03-077	12	See Map	wetland
REL-CFS-03-078	12	See Map	wetland
REL-CFS-03-079	12	See Map	wetland
REL-CFS-03-080	12	See Map	wetland
REL-CFS-03-081	12	See Map	wetland
REL-CFS-03-082	12	See Map	wetland
REL-CFS-03-083	12	See Map	wetland
REL-CFS-03-084	12	See Map	wetland
REL-CFS-03-085	12	See Map	wetland
REL-CFS-03-086	12	See Map	wetland
REL-CFS-03-087	12	See Map	wetland
REL-CFS-03-088	12	See Map	wetland
REL-CFS-03-089	12	See Map	wetland
REL-CFS-03-090	12	See Map	wetland
REL-CFS-03-091	12	See Map	wetland
REL-CFS-03-092	12	See Map	wetland
REL-CFS-03-093	12	See Map	wetland
REL-CFS-03-094	12	See Map	wetland
REL-CFS-03-095	12	See Map	wetland
REL-CFS-03-096	12	See Map	wetland
REL-CFS-03-097	12	See Map	wetland
REL-CFS-03-098	12	See Map	wetland
REL-CFS-03-099	12	See Map	wetland
REL-CFS-03-100	12	See Map	wetland
REL-CFS-03-101	12	See Map	wetland
REL-CFS-03-102	12	See Map	wetland
REL-CFS-03-103	12	See Map	wetland
REL-CFS-03-104	12	See Map	wetland
REL-CFS-03-105	12	See Map	wetland
REL-CFS-03-106	12	See Map	wetland

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-03-107	12	See Map	wetland	
REL-CFS-03-108	12	See Map	wetland	
REL-CFS-03-109	12	See Map	wetland	
REL-CFS-03-110	12	See Map	wetland	
REL-CFS-03-111	12	See Map	wetland	
REL-CFS-03-112	12	See Map	wetland	
REL-CFS-03-113	12	See Map	wetland	
REL-CFS-03-114	12	See Map	wetland	
REL-CFS-03-115	12	See Map	wetland	
REL-CFS-03-116	12	See Map	wetland	
REL-CFS-03-117	12	See Map	wetland	
REL-CFS-03-118	12	See Map	wetland	
REL-CFS-03-119	12	See Map	wetland	
REL-CFS-03-120	12	See Map	wetland	
REL-CFS-03-121	12	See Map	wetland	
REL-CFS-03-122	12	See Map	wetland	
REL-CFS-03-123	12	See Map	wetland	
REL-CFS-03-124	12	See Map	wetland	
REL-CFS-03-125	12	See Map	wetland	
REL-CFS-03-126	12	See Map	wetland	
REL-CFS-03-127	12	See Map	wetland	
REL-CFS-03-128	12	See Map	wetland	
REL-CFS-03-129	12	See Map	wetland	
REL-CFS-03-130	12	See Map	wetland	
REL-CFS-03-131	12	See Map	wetland	
REL-CFS-03-132	12	See Map	wetland	
REL-CFS-03-133	12	See Map	wetland	
REL-CFS-03-134	12	See Map	wetland	
REL-CFS-03-135	12	See Map	wetland	
REL-CFS-03-136	12	See Map	17%	35
REL-CFS-03-137	12	See Map	17%	35
REL-CFS-03-138	12	See Map	17%	35
REL-CFS-03-139	12	See Map	6%	200
REL-CFS-03-140	12	See Map	6%	200
REL-CFS-03-141	12	See Map	6%	200
REL-CFS-03-142	12	See Map	6%	200
REL-CFS-03-143	12	See Map	8%	24
REL-CFS-03-144	12	See Map	8%	24
REL-CFS-03-145	12	See Map	wetland	
REL-CFS-03-146	12	See Map	wetland	
REL-CFS-03-147	12	See Map	wetland	
REL-CFS-03-148	12	See Map	wetland	
REL-CFS-03-149	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-03-150	12	See Map	wetland	
REL-CFS-03-151	12	See Map	wetland	
REL-CFS-03-152	12	See Map	wetland	
REL-CFS-03-153	12	See Map	6%	118
REL-CFS-03-154	12	See Map	6%	118
REL-CFS-03-155	12	See Map	6%	118
REL-CFS-03-156	12	See Map	6%	118
REL-CFS-03-157	12	See Map	6%	118
REL-CFS-03-158	12	See Map	wetland	
REL-CFS-03-159	12	See Map	wetland	
REL-CFS-03-160	12	See Map	wetland	
REL-CFS-03-161	12	See Map	wetland	
REL-CFS-03-162	12	See Map	40%	25
REL-CFS-03-163	12	See Map	40%	25
REL-CFS-03-164	12	See Map	40%	25
REL-CFS-03-165	12	See Map	40%	25
REL-CFS-03-166	12	See Map	36%	28
REL-CFS-03-167	12	See Map	36%	28
REL-CFS-03-168	12	See Map	36%	28
REL-CFS-03-169	12	See Map	36%	28
REL-CFS-03-170	12	See Map	36%	28
REL-CFS-03-171	12	See Map	36%	28
REL-CFS-03-172	12	See Map	56%	16
REL-CFS-03-173	12	See Map	56%	16
REL-CFS-03-174	12	See Map	56%	16
REL-CFS-03-175	12	See Map	56%	16
REL-CFS-03-176	12	See Map	56%	16
REL-CFS-03-177	24	See Map	36%	66
REL-CFS-03-178	24	See Map	36%	66
REL-CFS-03-179	24	See Map	36%	66
REL-CFS-03-180	24	See Map	36%	66
REL-CFS-03-181	12	See Map	34%	35
REL-CFS-03-182	12	See Map	34%	35
REL-CFS-03-183	12	See Map	34%	35
REL-CFS-03-184	12	See Map	32%	19
REL-CFS-03-185	12	See Map	4%	255
REL-CFS-03-186	12	See Map	5%	212
REL-CFS-03-187	18	See Map	14%	181
REL-CFS-03-188	18	See Map	14%	181
REL-CFS-03-189	18	See Map	14%	181
REL-CFS-03-190	18	See Map	14%	181
REL-CFS-03-191	12	See Map	wetland	
REL-CFS-03-192	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-03-193	12	See Map	wetland	
REL-CFS-03-194	12	See Map	4%	95
REL-CFS-03-195	12	See Map	37%	19
REL-CFS-03-196	12	See Map	37%	19
REL-CFS-03-197	12	See Map	37%	19
REL-CFS-03-198	12	See Map	58%	12
REL-CFS-03-199	12	See Map	58%	12
REL-CFS-03-200	24	See Map	59%	32
REL-CFS-03-201	24	See Map	59%	32
REL-CFS-03-202	24	See Map	59%	32
REL-CFS-03-203	24	See Map	59%	32
REL-CFS-03-204	24	See Map	59%	32
REL-CFS-03-205	24	See Map	59%	32
REL-CFS-03-206	24	See Map	59%	32
REL-CFS-03-207	24	See Map	59%	32
REL-CFS-03-208	24	See Map	59%	32
REL-CFS-03-209	24	See Map	59%	32
REL-CFS-03-210	24	See Map	38%	64
REL-CFS-03-211	24	See Map	38%	64
REL-CFS-03-212	24	See Map	38%	64
REL-CFS-03-213	24	See Map	38%	64
REL-CFS-03-214	24	See Map	38%	64
REL-CFS-03-215	24	See Map	38%	64
REL-CFS-03-216	24	See Map	38%	64
REL-CFS-03-217	24	See Map	38%	64
REL-CFS-03-218	24	See Map	38%	64
REL-CFS-03-219	24	See Map	38%	64
REL-CFS-03-220	12	See Map	25%	16
REL-CFS-03-221	12	See Map	25%	16
REL-CFS-03-600	12	See Map	wetland	
REL-CFS-03-601	12	See Map	wetland	
REL-CFS-03-602	12	See Map	wetland	
REL-CFS-03-603	12	See Map	wetland	
REL-CFS-03-604	12	See Map	wetland	
REL-CFS-03-605	12	See Map	wetland	
REL-CFS-03-606	12	See Map	wetland	
REL-CFS-03-607	12	See Map	wetland	
REL-CFS-03-608	12	See Map	wetland	
REL-CFS-03-609	12	See Map	wetland	
REL-CFS-03-610	12	See Map	wetland	
REL-CFS-03-611	12	See Map	wetland	
REL-CFS-03-612	12	See Map	wetland	
REL-CFS-03-613	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-03-614	12	See Map	wetland	
REL-CFS-03-615	12	See Map	wetland	
REL-CFS-03-616	12	See Map	wetland	
REL-CFS-03-617	12	See Map	wetland	
REL-CFS-03-618	12	See Map	wetland	
REL-CFS-03-619	12	See Map	wetland	
REL-CFS-03-620	12	See Map	wetland	
REL-CFS-03-621	12	See Map	wetland	
REL-CFS-03-622	12	See Map	wetland	
REL-CFS-03-623	12	See Map	wetland	
REL-CFS-03-624	12	See Map	wetland	
REL-CFS-03-625	12	See Map	wetland	
REL-CFS-03-626	12	See Map	wetland	
REL-CFS-03-627	12	See Map	wetland	
REL-CFS-03-628	12	See Map	wetland	
REL-CFS-03-629	12	See Map	wetland	
REL-CFS-03-630	12	See Map	wetland	
REL-CFS-03-631	12	See Map	wetland	
REL-CFS-03-632	12	See Map	wetland	
REL-CFS-04-001	12	See Map	6%	200
REL-CFS-04-002	12	See Map	6%	200
REL-CFS-04-003	12	See Map	6%	200
REL-CFS-04-004	12	See Map	6%	200
REL-CFS-04-005	12	See Map	9%	65
REL-CFS-04-006	12	See Map	9%	65
REL-CFS-04-007	12	See Map	5%	37
REL-CFS-04-008	24	See Map	16%	198
REL-CFS-04-009	24	See Map	16%	198
REL-CFS-04-010	24	See Map	16%	198
REL-CFS-04-011	24	See Map	16%	198
REL-CFS-04-012	24	See Map	16%	198
REL-CFS-04-013	24	See Map	16%	198
REL-CFS-04-014	24	See Map	16%	198
REL-CFS-04-015	24	See Map	16%	198
REL-CFS-04-016	24	See Map	16%	198
REL-CFS-04-017	24	See Map	16%	198
REL-CFS-04-018	24	See Map	16%	198
REL-CFS-04-019	24	See Map	16%	198
REL-CFS-04-020	24	See Map	16%	198
REL-CFS-04-021	24	See Map	16%	198
REL-CFS-04-022	24	See Map	16%	198
REL-CFS-04-023	24	See Map	16%	198
REL-CFS-04-024	24	See Map	16%	198

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-04-025	24	See Map	16%	198
REL-CFS-04-026	24	See Map	16%	198
REL-CFS-04-027	24	See Map	16%	198
REL-CFS-04-028	24	See Map	16%	198
REL-CFS-04-029	24	See Map	16%	198
REL-CFS-04-030	12	See Map	wetland	
REL-CFS-04-031	12	See Map	wetland	
REL-CFS-04-032	18	See Map	22%	63
REL-CFS-04-033	18	See Map	22%	63
REL-CFS-04-034	18	See Map	22%	63
REL-CFS-04-035	18	See Map	22%	63
REL-CFS-04-036	18	See Map	22%	63
REL-CFS-04-037	18	See Map	22%	63
REL-CFS-04-038	18	See Map	22%	63
REL-CFS-04-039	18	See Map	22%	63
REL-CFS-04-040	18	See Map	14%	147
REL-CFS-04-041	18	See Map	14%	147
REL-CFS-04-042	18	See Map	14%	147
REL-CFS-04-043	18	See Map	14%	147
REL-CFS-04-044	18	See Map	14%	147
REL-CFS-04-045	18	See Map	14%	147
REL-CFS-04-046	18	See Map	14%	147
REL-CFS-04-047	18	See Map	14%	147
REL-CFS-04-048	18	See Map	14%	147
REL-CFS-04-049	18	See Map	14%	147
REL-CFS-04-050	12	See Map	7%	181
REL-CFS-04-051	12	See Map	7%	181
REL-CFS-04-052	12	See Map	7%	181
REL-CFS-04-053	12	See Map	7%	181
REL-CFS-04-054	12	See Map	7%	181
REL-CFS-04-055	12	See Map	8%	137
REL-CFS-04-056	12	See Map	8%	137
REL-CFS-04-057	12	See Map	8%	137
REL-CFS-04-058	18	See Map	17%	153
REL-CFS-04-059	18	See Map	17%	153
REL-CFS-04-060	18	See Map	17%	153
REL-CFS-04-061	18	See Map	17%	153
REL-CFS-04-062	18	See Map	17%	153
REL-CFS-04-063	18	See Map	17%	153
REL-CFS-04-064	18	See Map	17%	153
REL-CFS-04-065	12	See Map	wetland	
REL-CFS-04-066	12	See Map	2%	81
REL-CFS-04-067	12	See Map	2%	81

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-04-068	12	See Map	wetland	
REL-CFS-04-069	12	See Map	wetland	
REL-CFS-04-070	12	See Map	wetland	
REL-CFS-04-071	12	See Map	4%	101
REL-CFS-04-072	12	See Map	4%	101
REL-CFS-04-073	12	See Map	4%	101
REL-CFS-04-074	12	See Map	4%	101
REL-CFS-04-075	12	See Map	wetland	
REL-CFS-04-076	12	See Map	wetland	
REL-CFS-04-077	12	See Map	wetland	
REL-CFS-04-078	12	See Map	wetland	
REL-CFS-04-079	12	See Map	wetland	
REL-CFS-04-080	12	See Map	wetland	
REL-CFS-04-081	12	See Map	wetland	
REL-CFS-04-082	12	See Map	wetland	
REL-CFS-04-083	12	See Map	wetland	
REL-CFS-04-084	32	See Map	39%	76
REL-CFS-04-085	32	See Map	39%	76
REL-CFS-04-086	12	See Map	14%	83
REL-CFS-04-087	12	See Map	14%	83
REL-CFS-04-088	12	See Map	11%	63
REL-CFS-04-089	12	See Map	11%	63
REL-CFS-04-090	12	See Map	5%	187
REL-CFS-04-091	12	See Map	5%	187
REL-CFS-04-092	12	See Map	5%	187
REL-CFS-04-093	12	See Map	wetland	
REL-CFS-04-094	12	See Map	wetland	
REL-CFS-04-095	12	See Map	wetland	
REL-CFS-04-096	12	See Map	wetland	
REL-CFS-04-097	12	See Map	wetland	
REL-CFS-04-098	12	See Map	wetland	
REL-CFS-04-099	12	See Map	wetland	
REL-CFS-04-100	18	See Map	13%	134
REL-CFS-04-101	18	See Map	13%	134
REL-CFS-04-102	12	See Map	wetland	
REL-CFS-04-103	12	See Map	wetland	
REL-CFS-04-104	12	See Map	wetland	
REL-CFS-04-105	12	See Map	wetland	
REL-CFS-04-106	12	See Map	wetland	
REL-CFS-04-107	12	See Map	wetland	
REL-CFS-04-108	12	See Map	wetland	
REL-CFS-04-109	12	See Map	wetland	
REL-CFS-04-110	12	See Map	wetland	

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-04-111	12	See Map	wetland
REL-CFS-04-112	12	See Map	wetland
REL-CFS-04-113	12	See Map	wetland
REL-CFS-04-114	12	See Map	wetland
REL-CFS-04-115	12	See Map	wetland
REL-CFS-04-116	12	See Map	wetland
REL-CFS-04-117	12	See Map	wetland
REL-CFS-04-118	12	See Map	wetland
REL-CFS-04-119	12	See Map	wetland
REL-CFS-04-120	12	See Map	wetland
REL-CFS-04-121	12	See Map	wetland
REL-CFS-04-122	12	See Map	wetland
REL-CFS-04-123	12	See Map	wetland
REL-CFS-04-124	12	See Map	wetland
REL-CFS-04-125	12	See Map	wetland
REL-CFS-04-126	12	See Map	wetland
REL-CFS-04-127	12	See Map	wetland
REL-CFS-04-128	12	See Map	wetland
REL-CFS-04-129	12	See Map	wetland
REL-CFS-04-130	12	See Map	wetland
REL-CFS-04-131	12	See Map	wetland
REL-CFS-04-132	12	See Map	wetland
REL-CFS-04-133	12	See Map	wetland
REL-CFS-04-134	12	See Map	wetland
REL-CFS-04-135	12	See Map	wetland
REL-CFS-04-136	12	See Map	wetland
REL-CFS-04-137	12	See Map	wetland
REL-CFS-04-138	12	See Map	wetland
REL-CFS-04-139	12	See Map	wetland
REL-CFS-04-140	12	See Map	wetland
REL-CFS-04-141	12	See Map	wetland
REL-CFS-04-142	12	See Map	wetland
REL-CFS-04-143	12	See Map	wetland
REL-CFS-04-144	12	See Map	wetland
REL-CFS-04-145	12	See Map	wetland
REL-CFS-04-146	12	See Map	wetland
REL-CFS-04-147	12	See Map	wetland
REL-CFS-04-148	12	See Map	wetland
REL-CFS-04-149	12	See Map	wetland
REL-CFS-04-150	12	See Map	wetland
REL-CFS-04-151	12	See Map	wetland
REL-CFS-04-152	12	See Map	wetland
REL-CFS-04-153	12	See Map	wetland

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-04-154	12	See Map	wetland	
REL-CFS-04-155	12	See Map	wetland	
REL-CFS-04-156	12	See Map	wetland	
REL-CFS-04-157	12	See Map	wetland	
REL-CFS-04-158	12	See Map	wetland	
REL-CFS-04-159	12	See Map	wetland	
REL-CFS-04-160	12	See Map	wetland	
REL-CFS-04-161	12	See Map	wetland	
REL-CFS-04-162	12	See Map	wetland	
REL-CFS-04-163	12	See Map	wetland	
REL-CFS-04-164	12	See Map	wetland	
REL-CFS-04-165	12	See Map	wetland	
REL-CFS-04-166	12	See Map	wetland	
REL-CFS-04-167	12	See Map	wetland	
REL-CFS-04-168	12	See Map	wetland	
REL-CFS-04-169	12	See Map	wetland	
REL-CFS-04-170	12	See Map	wetland	
REL-CFS-04-171	12	See Map	wetland	
REL-CFS-04-172	12	See Map	wetland	
REL-CFS-04-173	12	See Map	wetland	
REL-CFS-04-174	12	See Map	wetland	
REL-CFS-04-175	12	See Map	wetland	
REL-CFS-04-176	12	See Map	wetland	
REL-CFS-04-177	12	See Map	wetland	
REL-CFS-04-178	12	See Map	wetland	
REL-CFS-04-179	18	See Map	18%	171
REL-CFS-04-180	18	See Map	18%	171
REL-CFS-04-181	12	See Map	17%	48
REL-CFS-04-182	12	See Map	17%	48
REL-CFS-04-183	12	See Map	17%	48
REL-CFS-04-184	12	See Map	wetland	
REL-CFS-04-185	12	See Map	wetland	
REL-CFS-04-186	12	See Map	wetland	
REL-CFS-04-187	12	See Map	2%	81
REL-CFS-04-188	12	See Map	21%	29
REL-CFS-04-189	12	See Map	21%	29
REL-CFS-04-190	12	See Map	21%	29
REL-CFS-04-191	12	See Map	21%	29
REL-CFS-04-192	12	See Map	21%	29
REL-CFS-04-193	24	See Map	33%	66
REL-CFS-04-194	24	See Map	33%	66
REL-CFS-04-195	24	See Map	33%	66
REL-CFS-04-196	24	See Map	33%	66

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-04-197	24	See Map	33%	66
REL-CFS-04-198	24	See Map	33%	66
REL-CFS-04-199	24	See Map	33%	66
REL-CFS-04-200	24	See Map	33%	66
REL-CFS-04-201	24	See Map	33%	66
REL-CFS-04-202	12	See Map	wetland	
REL-CFS-04-203	12	See Map	wetland	
REL-CFS-04-204	12	See Map	wetland	
REL-CFS-04-205	12	See Map	wetland	
REL-CFS-04-206	18	See Map	19%	83
REL-CFS-04-207	18	See Map	19%	83
REL-CFS-04-208	18	See Map	19%	83
REL-CFS-04-209	18	See Map	19%	83
REL-CFS-04-210	18	See Map	19%	83
REL-CFS-04-211	18	See Map	19%	83
REL-CFS-04-212	18	See Map	19%	83
REL-CFS-04-213	18	See Map	19%	83
REL-CFS-04-214	12	See Map	21%	19
REL-CFS-04-215	12	See Map	21%	19
REL-CFS-04-216	12	See Map	13%	46
REL-CFS-04-217	12	See Map	13%	46
REL-CFS-04-218	12	See Map	13%	46
REL-CFS-04-219	12	See Map	13%	46
REL-CFS-04-220	12	See Map	13%	46
REL-CFS-04-221	12	See Map	13%	46
REL-CFS-04-222	32	See Map	50%	42
REL-CFS-04-223	32	See Map	50%	42
REL-CFS-04-224	32	See Map	50%	42
REL-CFS-04-225	32	See Map	50%	42
REL-CFS-04-226	32	See Map	50%	42
REL-CFS-04-227	32	See Map	50%	42
REL-CFS-04-228	32	See Map	50%	42
REL-CFS-04-229	32	See Map	50%	42
REL-CFS-04-230	32	See Map	50%	42
REL-CFS-04-231	32	See Map	50%	42
REL-CFS-04-232	12	See Map	wetland	
REL-CFS-04-233	12	See Map	wetland	
REL-CFS-04-234	12	See Map	wetland	
REL-CFS-04-235	12	See Map	wetland	
REL-CFS-04-236	12	See Map	wetland	
REL-CFS-04-237	18	See Map	43%	40
REL-CFS-04-238	18	See Map	43%	40
REL-CFS-04-239	Removed			

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-04-240				
REL-CFS-04-241				
REL-CFS-04-242				
REL-CFS-04-243				
REL-CFS-04-244	12	See Map	12%	42
REL-CFS-04-245	12	See Map	5%	219
REL-CFS-04-246	12	See Map	wetland	
REL-CFS-04-247	12	See Map	wetland	
REL-CFS-04-248	12 in	See Map	wetland	
REL-CFS-04-249	18	See Map	17%	96
REL-CFS-04-250	18	See Map	17%	96
REL-CFS-04-251	18	See Map	17%	96
REL-CFS-04-252	12	See Map	wetland	
REL-CFS-04-253	12	See Map	wetland	
REL-CFS-04-254	12	See Map	wetland	
REL-CFS-04-255	12	See Map	wetland	
REL-CFS-04-600	12	See Map	wetland	
REL-CFS-04-601	12	See Map	wetland	
REL-CFS-04-602	12	See Map	wetland	
REL-CFS-04-603	12	See Map	wetland	
REL-CFS-04-604	12	See Map	wetland	
REL-CFS-04-605	12	See Map	wetland	
REL-CFS-04-606	12	See Map	wetland	
REL-CFS-04-607	12	See Map	wetland	
REL-CFS-04-608	12	See Map	wetland	
REL-CFS-04-609	12	See Map	wetland	
REL-CFS-04-610	12	See Map	wetland	
REL-CFS-04-611	12	See Map	wetland	
REL-CFS-04-612	12	See Map	wetland	
REL-CFS-04-613	12	See Map	wetland	
REL-CFS-05-001	12	See Map	wetland	
REL-CFS-05-002	12	See Map	wetland	
REL-CFS-05-003	12	See Map	wetland	
REL-CFS-05-004	12	See Map	wetland	
REL-CFS-05-005	12	See Map	12%	50
REL-CFS-05-006	12	See Map	12%	50
REL-CFS-05-007	12	See Map	12%	50
REL-CFS-05-008	12	See Map	12%	50
REL-CFS-05-009	12	See Map	3%	126
REL-CFS-05-010	12	See Map	wetland	
REL-CFS-05-011	12	See Map	2%	132
REL-CFS-05-012	12	See Map	2%	132
REL-CFS-05-013	12	See Map	3%	227

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-05-014	12	See Map	3%	227
REL-CFS-05-015	12	See Map	3%	227
REL-CFS-05-016	12	See Map	4%	252
REL-CFS-05-017	12	See Map	4%	252
REL-CFS-05-018	12	See Map	4%	252
REL-CFS-05-019	12	See Map	4%	252
REL-CFS-05-020	12	See Map	4%	209
REL-CFS-05-021	12	See Map	4%	209
REL-CFS-05-022	12	See Map	4%	209
REL-CFS-05-023	12	See Map	1%	202
REL-CFS-05-024	12	See Map	3%	219
REL-CFS-05-025	12	See Map	3%	219
REL-CFS-05-026	12	See Map	3%	219
REL-CFS-05-027	12	See Map	3%	219
REL-CFS-05-028	12	See Map	5%	234
REL-CFS-05-029	12	See Map	5%	234
REL-CFS-05-030	12	See Map	5%	234
REL-CFS-05-031	12	See Map	5%	234
REL-CFS-05-032	12	See Map	5%	234
REL-CFS-05-033	12	See Map	5%	234
REL-CFS-05-034	12	See Map	6%	126
REL-CFS-05-035	12	See Map	6%	126
REL-CFS-05-036	12	See Map	6%	126
REL-CFS-05-037	12	See Map	6%	126
REL-CFS-05-038	12	See Map	6%	126
REL-CFS-05-039	12	See Map	wetland	
REL-CFS-05-040	12	See Map	wetland	
REL-CFS-05-041	12	See Map	wetland	
REL-CFS-05-042	12	See Map	wetland	
REL-CFS-05-043	12	See Map	wetland	
REL-CFS-05-044	12	See Map	5%	113
REL-CFS-05-045	12	See Map	5%	113
REL-CFS-05-046	12	See Map	5%	113
REL-CFS-05-047	12	See Map	5%	113
REL-CFS-05-048	12	See Map	5%	113
REL-CFS-05-049	12	See Map	6%	144
REL-CFS-05-050	12	See Map	6%	144
REL-CFS-05-051	12	See Map	6%	144
REL-CFS-05-052	12	See Map	4%	93
REL-CFS-05-053	12	See Map	7%	165
REL-CFS-05-054	12	See Map	7%	165
REL-CFS-05-055	12	See Map	7%	165
REL-CFS-05-056	12	See Map	7%	165

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-05-057	12	See Map	8%	154
REL-CFS-05-058	12	See Map	8%	154
REL-CFS-05-059	12	See Map	6%	145
REL-CFS-05-060	12	See Map	6%	145
REL-CFS-05-061	12	See Map	6%	145
REL-CFS-05-062	12	See Map	6%	145
REL-CFS-05-063	12	See Map	6%	145
REL-CFS-05-064	12	See Map	6%	145
REL-CFS-05-065	12	See Map	6%	145
REL-CFS-05-066	12	See Map	wetland	
REL-CFS-05-067	12	See Map	wetland	
REL-CFS-05-068	12	See Map	wetland	
REL-CFS-05-069	12	See Map	wetland	
REL-CFS-05-070	12	See Map	wetland	
REL-CFS-05-071	12	See Map	wetland	
REL-CFS-05-072	12	See Map	wetland	
REL-CFS-05-073	12	See Map	2%	86
REL-CFS-05-074	18	See Map	14%	133
REL-CFS-05-075	18	See Map	14%	133
REL-CFS-05-076	18	See Map	14%	133
REL-CFS-05-077	18	See Map	14%	133
REL-CFS-05-078	18	See Map	14%	133
REL-CFS-05-079	18	See Map	14%	133
REL-CFS-05-080	12	See Map	wetland	
REL-CFS-05-081	12	See Map	wetland	
REL-CFS-05-082	Removed			
REL-CFS-05-083				
REL-CFS-05-084				
REL-CFS-05-085	12	See Map	wetland	
REL-CFS-05-086	12	See Map	wetland	
REL-CFS-05-087	12	See Map	wetland	
REL-CFS-05-088	12	See Map	wetland	
REL-CFS-05-089	12	See Map	wetland	
REL-CFS-05-090	12	See Map	wetland	
REL-CFS-05-091	12	See Map	wetland	
REL-CFS-05-092	12	See Map	wetland	
REL-CFS-05-093	12	See Map	wetland	
REL-CFS-05-094	12	See Map	wetland	
REL-CFS-05-095	12	See Map	wetland	
REL-CFS-05-096	12	See Map	wetland	
REL-CFS-05-097	12	See Map	wetland	
REL-CFS-05-098	12	See Map	wetland	
REL-CFS-05-099	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-05-100	12	See Map	wetland	
REL-CFS-05-101	12	See Map	wetland	
REL-CFS-05-102	12	See Map	wetland	
REL-CFS-05-103	12	See Map	wetland	
REL-CFS-05-104	12	See Map	wetland	
REL-CFS-05-105	12	See Map	wetland	
REL-CFS-05-106	12	See Map	wetland	
REL-CFS-05-107	12	See Map	wetland	
REL-CFS-05-108	12	See Map	wetland	
REL-CFS-05-109	12	See Map	wetland	
REL-CFS-05-110	12	See Map	wetland	
REL-CFS-05-111	12	See Map	wetland	
REL-CFS-05-112	12	See Map	wetland	
REL-CFS-05-113	12	See Map	wetland	
REL-CFS-05-114	12	See Map	wetland	
REL-CFS-05-115	12	See Map	wetland	
REL-CFS-05-116	12	See Map	wetland	
REL-CFS-05-117	12	See Map	wetland	
REL-CFS-05-118	12	See Map	wetland	
REL-CFS-05-119	12	See Map	wetland	
REL-CFS-05-120	12	See Map	wetland	
REL-CFS-06-001	12	See Map	19%	26
REL-CFS-06-002	12	See Map	19%	26
REL-CFS-06-003	12	See Map	13%	63
REL-CFS-06-004	12	See Map	13%	63
REL-CFS-06-005	12	See Map	13%	63
REL-CFS-06-006	12	See Map	7%	168
REL-CFS-06-007	12	See Map	8%	48
REL-CFS-06-008	12	See Map	8%	50
REL-CFS-06-009	12	See Map	8%	50
REL-CFS-06-010	12	See Map	10%	147
REL-CFS-06-011	12	See Map	10%	147
REL-CFS-06-012	12	See Map	10%	147
REL-CFS-06-013	12	See Map	10%	147
REL-CFS-06-014	12	See Map	10%	147
REL-CFS-06-015	12	See Map	10%	147
REL-CFS-06-016	18	See Map	10%	200
REL-CFS-06-017	18	See Map	10%	200
REL-CFS-06-018	18	See Map	10%	200
REL-CFS-06-019	18	See Map	10%	200
REL-CFS-06-020	18	See Map	10%	200
REL-CFS-06-021	18	See Map	10%	200
REL-CFS-06-022	18	See Map	10%	200

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-06-023	18	See Map	10%	200
REL-CFS-06-024	18	See Map	10%	200
REL-CFS-06-025	18	See Map	10%	200
REL-CFS-06-026	18	See Map	23%	79
REL-CFS-06-027	18	See Map	23%	79
REL-CFS-06-028	18	See Map	23%	79
REL-CFS-06-029	18	See Map	23%	79
REL-CFS-06-030	18	See Map	23%	79
REL-CFS-06-031	18	See Map	23%	79
REL-CFS-06-032	18	See Map	23%	79
REL-CFS-06-033	18	See Map	23%	79
REL-CFS-06-034	18	See Map	22%	111
REL-CFS-06-035	18	See Map	22%	111
REL-CFS-06-036	18	See Map	22%	111
REL-CFS-06-037	18	See Map	22%	111
REL-CFS-06-038	18	See Map	22%	111
REL-CFS-06-039	18	See Map	22%	111
REL-CFS-06-040	18	See Map	22%	111
REL-CFS-06-041	18	See Map	22%	111
REL-CFS-06-042	18	See Map	22%	111
REL-CFS-06-043	18	See Map	22%	111
REL-CFS-06-044	18	See Map	22%	111
REL-CFS-06-045	12	See Map	9%	117
REL-CFS-06-046	12	See Map	9%	117
REL-CFS-06-047	12	See Map	9%	117
REL-CFS-06-048	Removed			
REL-CFS-06-049				
REL-CFS-06-050				
REL-CFS-06-051				
REL-CFS-06-052				
REL-CFS-06-053				
REL-CFS-06-054				
REL-CFS-06-055				
REL-CFS-06-056				
REL-CFS-06-057				
REL-CFS-06-058				
REL-CFS-06-059				
REL-CFS-06-060				
REL-CFS-06-061				
REL-CFS-06-062				
REL-CFS-06-063				
REL-CFS-06-064				
REL-CFS-06-065				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-06-066				
REL-CFS-06-067				
REL-CFS-06-068				
REL-CFS-06-069				
REL-CFS-06-070				
REL-CFS-06-071				
REL-CFS-06-072				
REL-CFS-06-073				
REL-CFS-06-074	12	See Map	7%	181
REL-CFS-06-075	12	See Map	7%	181
REL-CFS-06-076	12	See Map	7%	181
REL-CFS-06-077	12	See Map	7%	181
REL-CFS-06-078	12	See Map	7%	181
REL-CFS-06-079	12	See Map	11%	88
REL-CFS-06-080	12	See Map	11%	88
REL-CFS-06-081	12	See Map	11%	88
REL-CFS-06-082	12	See Map	5%	113
REL-CFS-06-083	12	See Map	5%	113
REL-CFS-06-084	12	See Map	5%	113
REL-CFS-06-085	12	See Map	12%	95
REL-CFS-06-086	12	See Map	12%	95
REL-CFS-06-087	12	See Map	12%	95
REL-CFS-06-088	12	See Map	12%	95
REL-CFS-06-089	12	See Map	12%	95
REL-CFS-06-090	18	See Map	19%	96
REL-CFS-06-091	18	See Map	19%	96
REL-CFS-06-092	18	See Map	19%	96
REL-CFS-06-093	18	See Map	19%	96
REL-CFS-06-094	18	See Map	19%	96
REL-CFS-06-095	18	See Map	19%	96
REL-CFS-06-096	18	See Map	19%	96
REL-CFS-06-097	18	See Map	19%	96
REL-CFS-06-098	18	See Map	19%	96
REL-CFS-06-099	18	See Map	19%	96
REL-CFS-06-100	18	See Map	14%	160
REL-CFS-06-101	18	See Map	14%	160
REL-CFS-06-102	18	See Map	14%	160
REL-CFS-06-103	18	See Map	14%	160
REL-CFS-06-104	18	See Map	14%	160
REL-CFS-06-105	18	See Map	14%	160
REL-CFS-06-106	18	See Map	14%	160
REL-CFS-06-107	18	See Map	14%	160
REL-CFS-06-108	18	See Map	14%	160

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-06-109	18	See Map	14%	160
REL-CFS-06-110	18	See Map	14%	160
REL-CFS-06-111	18	See Map	14%	160
REL-CFS-06-112	18	See Map	14%	160
REL-CFS-06-113	12	See Map	13%	79
REL-CFS-06-114	12	See Map	13%	79
REL-CFS-06-115	12	See Map	13%	79
REL-CFS-06-116	12	See Map	13%	79
REL-CFS-06-117	12	See Map	13%	79
REL-CFS-06-118	12	See Map	10%	79
REL-CFS-06-119	12	See Map	10%	79
REL-CFS-06-120	12	See Map	10%	79
REL-CFS-06-121	12	See Map	10%	79
REL-CFS-06-122	12	See Map	10%	79
REL-CFS-06-123	18	See Map	14%	136
REL-CFS-06-124	18	See Map	14%	136
REL-CFS-06-125	18	See Map	14%	136
REL-CFS-06-126	18	See Map	14%	136
REL-CFS-06-127	18	See Map	14%	136
REL-CFS-06-128	Removed			
REL-CFS-06-129				
REL-CFS-06-130				
REL-CFS-06-131				
REL-CFS-06-132				
REL-CFS-06-133				
REL-CFS-06-134				
REL-CFS-06-135				
REL-CFS-06-136				
REL-CFS-06-137				
REL-CFS-06-138				
REL-CFS-06-139				
REL-CFS-06-140				
REL-CFS-06-141	12	See Map	9%	125
REL-CFS-06-142	12	See Map	9%	125
REL-CFS-06-143	12	See Map	9%	125
REL-CFS-06-144	12	See Map	9%	125
REL-CFS-06-145	12	See Map	9%	125
REL-CFS-06-146	12	See Map	8%	120
REL-CFS-06-147	12	See Map	6%	105
REL-CFS-06-148	12	See Map	6%	105
REL-CFS-06-149	12	See Map	7%	83
REL-CFS-06-150	12	See Map	7%	83
REL-CFS-06-151	12	See Map	7%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-06-152	12	See Map	5%	83
REL-CFS-06-153	12	See Map	3%	71
REL-CFS-06-154	12	See Map	9%	115
REL-CFS-06-155	12	See Map	9%	115
REL-CFS-06-156	12	See Map	9%	115
REL-CFS-06-157	12	See Map	11%	142
REL-CFS-06-158	12	See Map	11%	142
REL-CFS-06-159	12	See Map	11%	142
REL-CFS-06-160	12	See Map	11%	142
REL-CFS-06-161	12	See Map	11%	142
REL-CFS-06-162	12	See Map	11%	142
REL-CFS-06-163	12	See Map	8%	123
REL-CFS-06-164	12	See Map	8%	123
REL-CFS-06-165	12	See Map	8%	123
REL-CFS-06-166	12	See Map	8%	123
REL-CFS-06-167	12	See Map	8%	123
REL-CFS-06-168	12	See Map	8%	123
REL-CFS-06-169	12	See Map	8%	123
REL-CFS-06-170	12	See Map	13%	95
REL-CFS-06-171	12	See Map	13%	95
REL-CFS-06-172	12	See Map	13%	95
REL-CFS-06-173	18	See Map	15%	120
REL-CFS-06-174	18	See Map	15%	120
REL-CFS-06-175	18	See Map	15%	120
REL-CFS-06-176	18	See Map	15%	120
REL-CFS-06-177	18	See Map	15%	120
REL-CFS-06-178	18	See Map	15%	120
REL-CFS-06-179	18	See Map	26%	94
REL-CFS-06-180	18	See Map	26%	94
REL-CFS-06-181	18	See Map	26%	94
REL-CFS-06-182	18	See Map	26%	94
REL-CFS-06-183	18	See Map	26%	94
REL-CFS-06-184	18	See Map	26%	94
REL-CFS-06-185	18	See Map	26%	94
REL-CFS-06-186	18	See Map	26%	94
REL-CFS-06-187	18	See Map	26%	94
REL-CFS-06-188	18	See Map	26%	94
REL-CFS-06-189	18	See Map	26%	94
REL-CFS-06-190	12	See Map	15%	93
REL-CFS-06-191	12	See Map	15%	93
REL-CFS-06-192	12	See Map	15%	93
REL-CFS-06-193	12	See Map	15%	93
REL-CFS-06-194	12	See Map	15%	93

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-06-195	18	See Map	32%	56
REL-CFS-06-196	18	See Map	32%	56
REL-CFS-06-197	18	See Map	32%	56
REL-CFS-06-198	18	See Map	32%	56
REL-CFS-06-199	18	See Map	32%	56
REL-CFS-06-200	18	See Map	32%	56
REL-CFS-06-201	18	See Map	32%	56
REL-CFS-06-202	18	See Map	32%	56
REL-CFS-06-203	18	See Map	32%	56
REL-CFS-06-204	18	See Map	29%	49
REL-CFS-06-205	18	See Map	29%	49
REL-CFS-06-206	18	See Map	29%	49
REL-CFS-06-207	18	See Map	29%	49
REL-CFS-06-208	18	See Map	29%	49
REL-CFS-06-209	18	See Map	29%	49
REL-CFS-06-210	18	See Map	36%	42
REL-CFS-06-211	18	See Map	36%	42
REL-CFS-06-212	18	See Map	36%	42
REL-CFS-06-213	18	See Map	36%	42
REL-CFS-06-214	18	See Map	36%	42
REL-CFS-06-215	18	See Map	36%	42
REL-CFS-06-216	18	See Map	36%	42
REL-CFS-06-217	12	See Map	38%	29
REL-CFS-06-218	12	See Map	38%	29
REL-CFS-06-219	12	See Map	38%	29
REL-CFS-06-220	12	See Map	38%	29
REL-CFS-06-221	12	See Map	38%	29
REL-CFS-06-222	18	See Map	48%	40
REL-CFS-06-223	18	See Map	48%	40
REL-CFS-06-224	18	See Map	48%	40
REL-CFS-06-225	18	See Map	48%	40
REL-CFS-06-226	18	See Map	48%	40
REL-CFS-06-227	18	See Map	48%	40
REL-CFS-06-228	18	See Map	48%	40
REL-CFS-06-229	18	See Map	48%	40
REL-CFS-06-230	32	See Map	52%	61
REL-CFS-06-231	32	See Map	52%	61
REL-CFS-06-232	32	See Map	52%	61
REL-CFS-06-233	32	See Map	52%	61
REL-CFS-06-234	32	See Map	52%	61
REL-CFS-06-235	32	See Map	52%	61
REL-CFS-06-236	32	See Map	52%	61
REL-CFS-06-237	32	See Map	52%	61

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-06-238	32	See Map	52%	61
REL-CFS-06-239	32	See Map	52%	61
REL-CFS-06-240	32	See Map	52%	61
REL-CFS-06-241	32	See Map	52%	61
REL-CFS-06-242	32	See Map	52%	61
REL-CFS-06-243	32	See Map	52%	61
REL-CFS-06-244	32	See Map	52%	61
REL-CFS-06-245	32	See Map	55%	44
REL-CFS-06-246	32	See Map	55%	44
REL-CFS-06-247	32	See Map	55%	44
REL-CFS-06-248	32	See Map	55%	44
REL-CFS-06-249	32	See Map	55%	44
REL-CFS-06-250	32	See Map	55%	44
REL-CFS-06-251	32	See Map	55%	44
REL-CFS-06-252	32	See Map	55%	44
REL-CFS-06-253	32	See Map	55%	44
REL-CFS-06-254	32	See Map	55%	44
REL-CFS-06-255	32	See Map	55%	44
REL-CFS-06-256	18	See Map	50%	32
REL-CFS-06-257	18	See Map	50%	32
REL-CFS-06-258	18	See Map	50%	32
REL-CFS-06-259	18	See Map	50%	32
REL-CFS-06-260	18	See Map	50%	32
REL-CFS-06-261	18	See Map	50%	32
REL-CFS-06-262	18	See Map	50%	32
REL-CFS-06-263	18	See Map	61%	28
REL-CFS-06-264	18	See Map	61%	28
REL-CFS-06-265	18	See Map	61%	28
REL-CFS-06-266	18	See Map	61%	28
REL-CFS-06-267	18	See Map	61%	28
REL-CFS-06-268	18	See Map	61%	28
REL-CFS-06-269	18	See Map	61%	28
REL-CFS-06-270	18	See Map	61%	28
REL-CFS-06-271	18	See Map	38%	48
REL-CFS-06-272	18	See Map	38%	48
REL-CFS-06-273	18	See Map	38%	48
REL-CFS-06-274	18	See Map	38%	48
REL-CFS-06-275	18	See Map	38%	48
REL-CFS-06-276	18	See Map	38%	48
REL-CFS-06-277	18	See Map	38%	48
REL-CFS-06-278	18	See Map	38%	48
REL-CFS-06-279	12	See Map	15%	96
REL-CFS-06-280	12	See Map	15%	96

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-06-281	12	See Map	15%	96
REL-CFS-06-282	12	See Map	15%	96
REL-CFS-06-283	12	See Map	15%	96
REL-CFS-06-284	12	See Map	15%	96
REL-CFS-06-285	18	See Map	14%	119
REL-CFS-06-286	18	See Map	14%	119
REL-CFS-06-287	18	See Map	14%	119
REL-CFS-06-288	18	See Map	14%	119
REL-CFS-06-289	18	See Map	14%	119
REL-CFS-06-290	18	See Map	14%	119
REL-CFS-06-291	18	See Map	14%	119
REL-CFS-06-292	12	See Map	8%	128
REL-CFS-06-293	12	See Map	8%	128
REL-CFS-06-294	12	See Map	8%	128
REL-CFS-06-295	12	See Map	8%	128
REL-CFS-06-600	12	See Map	wetland	
REL-CFS-06-601	12	See Map	wetland	
REL-CFS-06-602	18	See Map	11%	180
REL-CFS-06-603	18	See Map	11%	180
REL-CFS-06-604	18	See Map	11%	180
REL-CFS-06-605	18	See Map	11%	180
REL-CFS-06-606	12	See Map	10%	88
REL-CFS-06-607	12	See Map	10%	88
REL-CFS-06-608	12	See Map	wetland	
REL-CFS-07-001	12	See Map	15%	93
REL-CFS-07-002	12	See Map	15%	93
REL-CFS-07-003	18	See Map	24%	86
REL-CFS-07-004	18	See Map	24%	86
REL-CFS-07-005	18	See Map	24%	86
REL-CFS-07-006	18	See Map	24%	86
REL-CFS-07-007	18	See Map	24%	86
REL-CFS-07-008	18	See Map	24%	86
REL-CFS-07-009	18	See Map	24%	86
REL-CFS-07-010	18	See Map	24%	86
REL-CFS-07-011	18	See Map	24%	86
REL-CFS-07-012	18	See Map	24%	86
REL-CFS-07-013	12	See Map	12%	102
REL-CFS-07-014	12	See Map	12%	102
REL-CFS-07-015	12	See Map	12%	102
REL-CFS-07-016	12	See Map	12%	102
REL-CFS-07-017	12	See Map	12%	102
REL-CFS-07-018	12	See Map	12%	102
REL-CFS-07-019	12	See Map	6%	35

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-07-020	18	See Map	19%	85
REL-CFS-07-021	18	See Map	18%	97
REL-CFS-07-022	18	See Map	18%	97
REL-CFS-07-023	18	See Map	18%	97
REL-CFS-07-024	18	See Map	18%	97
REL-CFS-07-025	18	See Map	18%	97
REL-CFS-07-026	18	See Map	18%	97
REL-CFS-07-027	18	See Map	18%	97
REL-CFS-07-028	18	See Map	18%	97
REL-CFS-07-029	18	See Map	19%	97
REL-CFS-07-030	18	See Map	19%	97
REL-CFS-07-031	18	See Map	19%	97
REL-CFS-07-032	18	See Map	19%	97
REL-CFS-07-033	18	See Map	19%	97
REL-CFS-07-034	18	See Map	19%	97
REL-CFS-07-035	32	See Map	25%	178
REL-CFS-07-036	32	See Map	25%	178
REL-CFS-07-037	32	See Map	25%	178
REL-CFS-07-038	32	See Map	25%	178
REL-CFS-07-039	32	See Map	25%	178
REL-CFS-07-040	32	See Map	25%	178
REL-CFS-07-041	32	See Map	25%	178
REL-CFS-07-042	32	See Map	25%	178
REL-CFS-07-043	32	See Map	25%	178
REL-CFS-07-044	32	See Map	25%	178
REL-CFS-07-045	12	See Map	wetland	
REL-CFS-07-046	12	See Map	wetland	
REL-CFS-07-047	12	See Map	wetland	
REL-CFS-07-048	12	See Map	wetland	
REL-CFS-07-049	18	See Map	23%	71
REL-CFS-07-050	18	See Map	23%	71
REL-CFS-07-051	18	See Map	23%	71
REL-CFS-07-052	24	See Map	28%	102
REL-CFS-07-053	24	See Map	28%	102
REL-CFS-07-054	24	See Map	28%	102
REL-CFS-07-055	24	See Map	28%	102
REL-CFS-07-056	24	See Map	28%	102
REL-CFS-07-057	Removed			
REL-CFS-07-058				
REL-CFS-07-059				
REL-CFS-07-060				
REL-CFS-07-061				
REL-CFS-07-062	24	See Map	21%	141

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-07-063	24	See Map	21%	141
REL-CFS-07-064	24	See Map	21%	141
REL-CFS-07-065	24	See Map	21%	141
REL-CFS-07-066	24	See Map	21%	141
REL-CFS-07-067	24	See Map	21%	141
REL-CFS-07-068	18	See Map	14%	123
REL-CFS-07-069	18	See Map	14%	123
REL-CFS-07-070	18	See Map	14%	123
REL-CFS-07-071	18	See Map	14%	123
REL-CFS-07-072	12	See Map	13%	90
REL-CFS-07-073	12	See Map	13%	90
REL-CFS-07-074	12	See Map	7%	105
REL-CFS-07-075	12	See Map	7%	105
REL-CFS-07-076	12	See Map	7%	105
REL-CFS-07-077	12	See Map	7%	105
REL-CFS-07-078	12	See Map	8%	102
REL-CFS-07-079	12	See Map	8%	167
REL-CFS-07-080	12	See Map	8%	167
REL-CFS-07-081	12	See Map	10%	94
REL-CFS-07-082	12	See Map	10%	94
REL-CFS-07-083	12	See Map	10%	94
REL-CFS-07-084	12	See Map	10%	94
REL-CFS-07-085	12	See Map	5%	155
REL-CFS-07-086	12	See Map	5%	155
REL-CFS-07-087	12	See Map	5%	155
REL-CFS-07-088	12	See Map	6%	171
REL-CFS-07-089	12	See Map	6%	171
REL-CFS-07-090	12	See Map	6%	171
REL-CFS-07-091	12	See Map	6%	171
REL-CFS-07-092	12	See Map	5%	88
REL-CFS-07-093	12	See Map	8%	105
REL-CFS-07-094	12	See Map	8%	105
REL-CFS-07-095	12	See Map	8%	105
REL-CFS-07-096	12	See Map	8%	105
REL-CFS-07-097	12	See Map	6%	106
REL-CFS-07-098	12	See Map	6%	106
REL-CFS-07-099	Removed			
REL-CFS-07-100	12	See Map	6%	201
REL-CFS-07-101	12	See Map	6%	201
REL-CFS-07-102	12	See Map	6%	201
REL-CFS-07-103	12	See Map	6%	201
REL-CFS-07-104	12	See Map	6%	201
REL-CFS-07-105	12	See Map	6%	201

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-07-106	18	See Map	13%	174
REL-CFS-07-107	18	See Map	13%	174
REL-CFS-07-108	18	See Map	13%	174
REL-CFS-07-109	18	See Map	13%	174
REL-CFS-07-110	18	See Map	13%	174
REL-CFS-07-111	12	See Map	10%	110
REL-CFS-07-112	12	See Map	10%	110
REL-CFS-07-113	12	See Map	10%	110
REL-CFS-07-114	12	See Map	19%	52
REL-CFS-07-115	12	See Map	19%	52
REL-CFS-07-116	12	See Map	19%	52
REL-CFS-07-117	12	See Map	19%	52
REL-CFS-07-118	18	See Map	17%	133
REL-CFS-07-119	18	See Map	17%	133
REL-CFS-07-120	18	See Map	17%	133
REL-CFS-07-121	18	See Map	17%	133
REL-CFS-07-122	18	See Map	17%	133
REL-CFS-07-123	12	See Map	16%	44
REL-CFS-07-124	12	See Map	16%	44
REL-CFS-07-125	12	See Map	16%	44
REL-CFS-07-126	18	See Map	20%	101
REL-CFS-07-127	18	See Map	20%	101
REL-CFS-07-128	24	See Map	16%	209
REL-CFS-07-129	24	See Map	16%	209
REL-CFS-07-130	24	See Map	16%	209
REL-CFS-07-131	24	See Map	16%	209
REL-CFS-07-132	24	See Map	16%	209
REL-CFS-07-133	18	See Map	30%	63
REL-CFS-07-134	18	See Map	30%	63
REL-CFS-07-135	12	See Map	19%	54
REL-CFS-07-136	12	See Map	19%	54
REL-CFS-07-137	12	See Map	19%	54
REL-CFS-07-138	12	See Map	19%	54
REL-CFS-07-139	18	See Map	28%	69
REL-CFS-07-140	18	See Map	28%	69
REL-CFS-07-141	18	See Map	28%	69
REL-CFS-07-142	18	See Map	28%	69
REL-CFS-07-143	Removed			
REL-CFS-07-144				
REL-CFS-07-145				
REL-CFS-07-146				
REL-CFS-07-147				
REL-CFS-07-148				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-07-149				
REL-CFS-07-150				
REL-CFS-07-151				
REL-CFS-07-152				
REL-CFS-07-153				
REL-CFS-07-154				
REL-CFS-07-155				
REL-CFS-07-156				
REL-CFS-07-157				
REL-CFS-07-158				
REL-CFS-07-159				
REL-CFS-07-160				
REL-CFS-07-161				
REL-CFS-07-162				
REL-CFS-07-161				
REL-CFS-07-162				
REL-CFS-07-163				
REL-CFS-07-164				
REL-CFS-07-165				
REL-CFS-07-166	24	See Map	25%	134
REL-CFS-07-167	12	See Map	19%	54
REL-CFS-07-168	12	See Map	19%	54
REL-CFS-07-169	12	See Map	19%	54
REL-CFS-07-170	Removed			
REL-CFS-07-171				
REL-CFS-07-172				
REL-CFS-07-173				
REL-CFS-07-174				
REL-CFS-07-175				
REL-CFS-07-176				
REL-CFS-07-177				
REL-CFS-07-178				
REL-CFS-07-179				
REL-CFS-07-180				
REL-CFS-07-181				
REL-CFS-07-182				
REL-CFS-07-183				
REL-CFS-07-184				
REL-CFS-07-185	12	See Map	10%	52
REL-CFS-07-186	Removed			
REL-CFS-07-187				
REL-CFS-07-188				
REL-CFS-07-189				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-07-190	12	See Map	15%	46
REL-CFS-07-191	Removed			
REL-CFS-07-192				
REL-CFS-07-193				
REL-CFS-07-194	12	See Map	28%	36
REL-CFS-07-195	24	See Map	19%	103
REL-CFS-07-196	Removed			
REL-CFS-07-197				
REL-CFS-07-198				
REL-CFS-07-199				
REL-CFS-07-200				
REL-CFS-07-201				
REL-CFS-07-202				
REL-CFS-07-203	12	See Map	22%	58
REL-CFS-07-204	12	See Map	22%	58
REL-CFS-07-205	12	See Map	22%	58
REL-CFS-07-206	12	See Map	22%	58
REL-CFS-07-207	12	See Map	22%	58
REL-CFS-07-208	12	See Map	22%	58
REL-CFS-07-209	12	See Map	22%	58
REL-CFS-07-210	12	See Map	4%	209
REL-CFS-07-211	12	See Map	4%	209
REL-CFS-07-212	12	See Map	4%	209
REL-CFS-07-213	12	See Map	6%	35
REL-CFS-07-214	12	See Map	7%	76
REL-CFS-07-215	12	See Map	15%	13
REL-CFS-07-216	12	See Map	15%	13
REL-CFS-07-217	12	See Map	14%	14
REL-CFS-07-218	12	See Map	14%	14
REL-CFS-07-219	12	See Map	3%	187
REL-CFS-07-220	12	See Map	3%	187
REL-CFS-07-221	12	See Map	3%	187
REL-CFS-07-222	12	See Map	3%	187
REL-CFS-07-223	12	See Map	3%	187
REL-CFS-07-224	12	See Map	4%	101
REL-CFS-07-225	12	See Map	39%	31
REL-CFS-07-226	12	See Map	39%	31
REL-CFS-07-227	12	See Map	39%	31
REL-CFS-07-228	12	See Map	39%	31
REL-CFS-07-229	12	See Map	39%	31
REL-CFS-07-230	12	See Map	39%	31
REL-CFS-07-231	18	See Map	25%	56
REL-CFS-07-232	18	See Map	25%	56

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-07-233	18	See Map	25%	56
REL-CFS-07-234	18	See Map	25%	56
REL-CFS-07-235	18	See Map	25%	56
REL-CFS-07-236	18	See Map	25%	56
REL-CFS-07-237	18	See Map	25%	56
REL-CFS-07-238	12	See Map	13%	97
REL-CFS-07-239	12	See Map	13%	97
REL-CFS-07-240	12	See Map	13%	97
REL-CFS-07-241	12	See Map	13%	97
REL-CFS-07-242	32	See Map	11%	335
REL-CFS-07-243	32	See Map	11%	335
REL-CFS-07-244	32	See Map	11%	335
REL-CFS-07-245	18	See Map	22%	79
REL-CFS-07-246	18	See Map	22%	79
REL-CFS-07-247	18	See Map	24%	91
REL-CFS-07-248	18	See Map	24%	91
REL-CFS-07-249	18	See Map	24%	91
REL-CFS-07-250	32	See Map	26%	154
REL-CFS-07-251	32	See Map	26%	154
REL-CFS-07-252	32	See Map	26%	154
REL-CFS-07-253	32	See Map	26%	154
REL-CFS-07-254	32	See Map	26%	154
REL-CFS-07-255	32	See Map	26%	154
REL-CFS-07-256	32	See Map	26%	154
REL-CFS-07-257	32	See Map	26%	154
REL-CFS-07-258	32	See Map	26%	154
REL-CFS-07-259	12	See Map	wetland	
REL-CFS-07-260	12	See Map	10%	104
REL-CFS-07-261	12	See Map	8%	87
REL-CFS-07-262	12	See Map	8%	87
REL-CFS-07-263	12	See Map	8%	87
REL-CFS-07-264	12	See Map	8%	87
REL-CFS-07-265	12	See Map	25%	51
REL-CFS-07-266	12	See Map	25%	51
REL-CFS-07-267	12	See Map	25%	51
REL-CFS-07-268	12	See Map	25%	51
REL-CFS-07-269	12	See Map	25%	51
REL-CFS-07-270	12	See Map	25%	51
REL-CFS-07-271	12	See Map	25%	51
REL-CFS-07-272	Removed			
REL-CFS-07-273				
REL-CFS-07-274	12	See Map	6%	161
REL-CFS-07-275	12	See Map	6%	161

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-07-276	12	See Map	6%	161
REL-CFS-07-277	18	See Map	19%	145
REL-CFS-07-278	18	See Map	19%	145
REL-CFS-07-279	18	See Map	19%	145
REL-CFS-07-280	18	See Map	19%	145
REL-CFS-07-600	12	See Map	6%	128
REL-CFS-07-601	12	See Map	6%	128
REL-CFS-07-602	12	See Map	19%	70
REL-CFS-07-603	12	See Map	19%	70
REL-CFS-07-604	12	See Map	19%	70
REL-CFS-07-605	18	See Map	20%	101
REL-CFS-07-606	18	See Map	20%	101
REL-CFS-07-607	18	See Map	20%	101
REL-CFS-07-608	18	See Map	20%	101
REL-CFS-07-609	18	See Map	20%	101
REL-CFS-08-001	32	See Map	11%	335
REL-CFS-08-002	Removed			
REL-CFS-08-003				
REL-CFS-08-004	12	See Map	12%	58
REL-CFS-08-005	12	See Map	10%	58
REL-CFS-08-006	12	See Map	10%	58
REL-CFS-08-007	12	See Map	10%	58
REL-CFS-08-008	12	See Map	10%	58
REL-CFS-08-009	12	See Map	10%	58
REL-CFS-08-010	Removed			
REL-CFS-08-011				
REL-CFS-08-012				
REL-CFS-08-013				
REL-CFS-08-014				
REL-CFS-08-015	12	See Map	wetland	
REL-CFS-08-016	18	See Map	12%	141
REL-CFS-08-017	18	See Map	12%	141
REL-CFS-08-018	Removed			
REL-CFS-08-019				
REL-CFS-08-020	18	See Map	12%	141
REL-CFS-08-021	18	See Map	12%	141
REL-CFS-08-022	18	See Map	12%	141
REL-CFS-08-023	18	See Map	12%	141
REL-CFS-08-024	18	See Map	12%	141
REL-CFS-08-025	18	See Map	12%	141
REL-CFS-08-026	18	See Map	12%	141
REL-CFS-08-027	18	See Map	12%	230
REL-CFS-08-028	18	See Map	12%	230

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-08-029	18	See Map	12%	230
REL-CFS-08-030	18	See Map	12%	230
REL-CFS-08-031	18	See Map	24%	74
REL-CFS-08-032	18	See Map	24%	74
REL-CFS-08-033	12	See Map	8%	119
REL-CFS-08-034	12	See Map	8%	119
REL-CFS-08-035	12	See Map	8%	119
REL-CFS-08-036	12	See Map	8%	119
REL-CFS-08-037	12	See Map	8%	119
REL-CFS-08-038	18	See Map	17%	101
REL-CFS-08-039	18	See Map	17%	101
REL-CFS-08-040	18	See Map	17%	101
REL-CFS-08-041	18	See Map	17%	101
REL-CFS-08-042	18	See Map	17%	101
REL-CFS-08-043	18	See Map	17%	101
REL-CFS-08-044	18	See Map	17%	101
REL-CFS-08-045	18	See Map	17%	101
REL-CFS-08-046	18	See Map	17%	101
REL-CFS-08-047	18	See Map	20%	105
REL-CFS-08-048	18	See Map	20%	105
REL-CFS-08-049	18	See Map	20%	105
REL-CFS-08-050	18	See Map	20%	105
REL-CFS-08-051	18	See Map	20%	105
REL-CFS-08-052	18	See Map	20%	105
REL-CFS-08-053	18	See Map	20%	105
REL-CFS-08-054	18	See Map	20%	105
REL-CFS-08-055	18	See Map	20%	105
REL-CFS-08-056	18	See Map	20%	105
REL-CFS-08-057	18	See Map	20%	105
REL-CFS-08-058	18	See Map	25%	64
REL-CFS-08-059	18	See Map	25%	64
REL-CFS-08-060	18	See Map	25%	64
REL-CFS-08-061	18	See Map	25%	64
REL-CFS-08-062	18	See Map	25%	64
REL-CFS-08-063	18	See Map	25%	64
REL-CFS-08-064	18	See Map	25%	64
REL-CFS-08-065	18	See Map	25%	64
REL-CFS-08-066	18	See Map	25%	64
REL-CFS-08-067	18	See Map	25%	59
REL-CFS-08-068	18	See Map	25%	59
REL-CFS-08-069	18	See Map	25%	59
REL-CFS-08-070	18	See Map	25%	59
REL-CFS-08-071	18	See Map	25%	59

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-08-072	18	See Map	25%	59
REL-CFS-08-073	18	See Map	25%	59
REL-CFS-08-074	18	See Map	25%	59
REL-CFS-08-075	24	See Map	26%	103
REL-CFS-08-076	24	See Map	26%	103
REL-CFS-08-077	24	See Map	26%	103
REL-CFS-08-078	24	See Map	26%	103
REL-CFS-08-079	24	See Map	26%	103
REL-CFS-08-080	24	See Map	26%	103
REL-CFS-08-081	24	See Map	26%	103
REL-CFS-08-082	24	See Map	26%	103
REL-CFS-08-083	12	See Map	24%	59
REL-CFS-08-084	12	See Map	24%	59
REL-CFS-08-085	12	See Map	24%	59
REL-CFS-08-086	12	See Map	24%	59
REL-CFS-08-087	12	See Map	24%	59
REL-CFS-08-088	12	See Map	24%	59
REL-CFS-08-089	18	See Map	25%	73
REL-CFS-08-090	18	See Map	25%	73
REL-CFS-08-091	18	See Map	25%	73
REL-CFS-08-092	18	See Map	25%	73
REL-CFS-08-093	18	See Map	25%	73
REL-CFS-08-094	18	See Map	25%	73
REL-CFS-08-095	18	See Map	25%	73
REL-CFS-08-096	18	See Map	25%	73
REL-CFS-08-097	18	See Map	21%	63
REL-CFS-08-098	18	See Map	21%	63
REL-CFS-08-099	18	See Map	21%	63
REL-CFS-08-100	18	See Map	21%	63
REL-CFS-08-101	18	See Map	21%	63
REL-CFS-08-102	18	See Map	21%	63
REL-CFS-08-103	18	See Map	21%	63
REL-CFS-08-104	18	See Map	21%	56
REL-CFS-08-105	18	See Map	21%	56
REL-CFS-08-106	18	See Map	21%	65
REL-CFS-08-107	18	See Map	21%	65
REL-CFS-08-108	18	See Map	21%	65
REL-CFS-08-109	18	See Map	21%	65
REL-CFS-08-110	24	See Map	21%	149
REL-CFS-08-111	24	See Map	26%	149
REL-CFS-08-112	24	See Map	26%	149
REL-CFS-08-113	24	See Map	26%	149
REL-CFS-08-114	24	See Map	26%	149

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-08-115	24	See Map	26%	149
REL-CFS-08-116	24	See Map	26%	149
REL-CFS-08-117	24	See Map	26%	149
REL-CFS-08-118	24	See Map	26%	149
REL-CFS-08-119	24	See Map	26%	149
REL-CFS-08-120	24	See Map	26%	149
REL-CFS-08-121	32	See Map	53%	77
REL-CFS-08-122	32	See Map	53%	77
REL-CFS-08-123	12	See Map	15%	48
REL-CFS-08-124	12	See Map	20%	61
REL-CFS-08-125	12	See Map	20%	61
REL-CFS-08-126	12	See Map	20%	61
REL-CFS-08-127	12	See Map	20%	61
REL-CFS-08-128	12	See Map	15%	47
REL-CFS-08-129	12	See Map	15%	47
REL-CFS-08-130	18	See Map	8%	234
REL-CFS-08-131	18	See Map	8%	234
REL-CFS-08-132	18	See Map	8%	234
REL-CFS-08-133	18	See Map	8%	234
REL-CFS-08-134	18	See Map	8%	234
REL-CFS-08-135	18	See Map	8%	234
REL-CFS-08-136	18	See Map	8%	234
REL-CFS-08-137	12	See Map	4%	56
REL-CFS-08-138	12	See Map	4%	56
REL-CFS-08-139	12	See Map	4%	56
REL-CFS-08-140	12	See Map	4%	56
REL-CFS-08-141	12	See Map	4%	56
REL-CFS-08-142	12	See Map	4%	56
REL-CFS-08-143	12	See Map	4%	56
REL-CFS-08-144	12	See Map	4%	56
REL-CFS-08-145	12	See Map	16%	91
REL-CFS-08-146	12	See Map	16%	91
REL-CFS-08-147	12	See Map	16%	91
REL-CFS-08-148	12	See Map	16%	91
REL-CFS-08-149	12	See Map	16%	91
REL-CFS-08-150	12	See Map	16%	91
REL-CFS-08-151	12	See Map	16%	91
REL-CFS-08-152	12	See Map	13%	53
REL-CFS-08-153	18	See Map	21%	112
REL-CFS-08-154	18	See Map	21%	112
REL-CFS-08-155	18	See Map	21%	112
REL-CFS-08-156	18	See Map	21%	112
REL-CFS-08-157	18	See Map	21%	112

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-08-158	18	See Map	21%	112
REL-CFS-08-159	18	See Map	21%	112
REL-CFS-08-160	18	See Map	21%	112
REL-CFS-08-161	18	See Map	21%	112
REL-CFS-08-162	12	See Map	13%	39
REL-CFS-08-163	12	See Map	13%	39
REL-CFS-08-164	12	See Map	13%	39
REL-CFS-08-165	12	See Map	14%	36
REL-CFS-08-166	18	See Map	21%	98
REL-CFS-08-167	18	See Map	21%	98
REL-CFS-08-168	18	See Map	21%	98
REL-CFS-08-169	18	See Map	21%	98
REL-CFS-08-170	18	See Map	21%	98
REL-CFS-08-171	18	See Map	21%	98
REL-CFS-08-172	18	See Map	21%	98
REL-CFS-08-173	18	See Map	21%	98
REL-CFS-08-174	12	See Map	8%	51
REL-CFS-08-175	12	See Map	8%	51
REL-CFS-08-176	18	See Map	17%	121
REL-CFS-08-177	18	See Map	17%	121
REL-CFS-08-178	18	See Map	17%	121
REL-CFS-08-179	18	See Map	17%	121
REL-CFS-08-180	18	See Map	17%	121
REL-CFS-08-181	32	See Map	24%	184
REL-CFS-08-182	32	See Map	24%	184
REL-CFS-08-183	32	See Map	24%	184
REL-CFS-08-184	32	See Map	24%	184
REL-CFS-08-185	32	See Map	24%	184
REL-CFS-08-186	32	See Map	24%	184
REL-CFS-08-187	32	See Map	24%	184
REL-CFS-08-188	32	See Map	24%	184
REL-CFS-08-189	32	See Map	24%	184
REL-CFS-08-190	32	See Map	24%	184
REL-CFS-08-191	32	See Map	24%	184
REL-CFS-08-192	32	See Map	24%	184
REL-CFS-08-193	32	See Map	24%	184
REL-CFS-08-194	32	See Map	24%	184
REL-CFS-08-195	12	See Map	12%	135
REL-CFS-08-196	12	See Map	12%	135
REL-CFS-08-197	18	See Map	15%	159
REL-CFS-08-198	18	See Map	15%	159
REL-CFS-08-199	18	See Map	15%	159
REL-CFS-08-200	18	See Map	15%	159

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-08-201	18	See Map	15%	159
REL-CFS-08-202	18	See Map	15%	159
REL-CFS-08-203	18	See Map	15%	159
REL-CFS-08-204	18	See Map	15%	159
REL-CFS-08-205	18	See Map	15%	159
REL-CFS-08-206	18	See Map	15%	159
REL-CFS-08-207	18	See Map	15%	159
REL-CFS-08-208	18	See Map	15%	159
REL-CFS-08-209	12	See Map	50%	14
REL-CFS-08-210	12	See Map	50%	14
REL-CFS-08-211	12	See Map	50%	14
REL-CFS-08-212	12	See Map	50%	14
REL-CFS-08-213	12	See Map	50%	14
REL-CFS-08-214	12	See Map	50%	14
REL-CFS-08-215	12	See Map	50%	14
REL-CFS-08-216	12	See Map	50%	14
REL-CFS-08-217	12	See Map	50%	14
REL-CFS-08-218	12	See Map	50%	14
REL-CFS-08-219	12	See Map	50%	14
REL-CFS-08-220	12	See Map	10%	120
REL-CFS-08-221	12	See Map	10%	120
REL-CFS-08-222	12	See Map	10%	120
REL-CFS-08-223	12	See Map	8%	91
REL-CFS-08-224	12	See Map	8%	91
REL-CFS-08-225	12	See Map	8%	91
REL-CFS-08-226	24	See Map	33%	80
REL-CFS-08-227	24	See Map	33%	80
REL-CFS-08-228	24	See Map	33%	80
REL-CFS-08-229	24	See Map	33%	80
REL-CFS-08-230	24	See Map	33%	80
REL-CFS-08-231	24	See Map	33%	80
REL-CFS-08-232	24	See Map	33%	80
REL-CFS-08-233	24	See Map	33%	80
REL-CFS-08-234	24	See Map	33%	80
REL-CFS-08-235	24	See Map	33%	80
REL-CFS-08-236	24	See Map	33%	80
REL-CFS-08-237	24	See Map	33%	80
REL-CFS-08-238	24	See Map	33%	80
REL-CFS-08-239	24	See Map	33%	80
REL-CFS-08-240	24	See Map	33%	80
REL-CFS-08-241	24	See Map	33%	80
REL-CFS-08-242	24	See Map	33%	80
REL-CFS-08-243	12	See Map	wetland	

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-08-244	12	See Map	12%	136
REL-CFS-08-245	12	See Map	12%	136
REL-CFS-08-246	12	See Map	12%	136
REL-CFS-08-247	12	See Map	12%	136
REL-CFS-08-248	12	See Map	12%	136
REL-CFS-08-249	12	See Map	12%	136
REL-CFS-08-250	12	See Map	12%	136
REL-CFS-08-251	12	See Map	15%	26
REL-CFS-08-252	12	See Map	5%	44
REL-CFS-08-253	12	See Map	9%	35
REL-CFS-08-600	12	See Map	wetland	
REL-CFS-08-601	12	See Map	wetland	
REL-CFS-08-602	12	See Map	wetland	
REL-CFS-08-603	12	See Map	wetland	
REL-CFS-08-604	12	See Map	wetland	
REL-CFS-08-605	12	See Map	wetland	
REL-CFS-08-606	12	See Map	wetland	
REL-CFS-08-607	12	See Map	wetland	
REL-CFS-08-608	12	See Map	wetland	
REL-CFS-08-609	12	See Map	wetland	
REL-CFS-08-610	12	See Map	wetland	
REL-CFS-08-611	12	See Map	wetland	
REL-CFS-08-612	12	See Map	wetland	
REL-CFS-08-613	12	See Map	wetland	
REL-CFS-08-614	12	See Map	wetland	
REL-CFS-08-615	12	See Map	wetland	
REL-CFS-08-616	12	See Map	wetland	
REL-CFS-08-617	12	See Map	wetland	
REL-CFS-08-618	12	See Map	wetland	
REL-CFS-08-619	12	See Map	wetland	
REL-CFS-08-620	12	See Map	wetland	
REL-CFS-08-621	12	See Map	wetland	
REL-CFS-08-622	12	See Map	wetland	
REL-CFS-08-623	12	See Map	wetland	
REL-CFS-08-624	12	See Map	wetland	
REL-CFS-08-625	12	See Map	wetland	
REL-CFS-08-626	12	See Map	wetland	
REL-CFS-08-627	12	See Map	wetland	
REL-CFS-08-628	12	See Map	wetland	
REL-CFS-08-629	12	See Map	wetland	
REL-CFS-08-630	12	See Map	wetland	
REL-CFS-08-631	12	See Map	wetland	
REL-CFS-08-632	12	See Map	wetland	

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-08-633	12	See Map	wetland	
REL-CFS-08-634	12	See Map	wetland	
REL-CFS-08-635	12	See Map	wetland	
REL-CFS-08-636	12	See Map	wetland	
REL-CFS-08-637	12	See Map	wetland	
REL-CFS-08-638	12	See Map	wetland	
REL-CFS-08-639	12	See Map	wetland	
REL-CFS-08-640	12	See Map	wetland	
REL-CFS-08-641	12	See Map	wetland	
REL-CFS-08-642	12	See Map	wetland	
REL-CFS-08-643	12	See Map	wetland	
REL-CFS-08-644	12	See Map	7%	83
REL-CFS-08-645	12	See Map	7%	83
REL-CFS-08-646	12	See Map	wetland	
REL-CFS-08-647	12	See Map	wetland	
REL-CFS-08-648	12	See Map	wetland	
REL-CFS-08-649	12	See Map	wetland	
REL-CFS-08-650	12	See Map	wetland	
REL-CFS-08-651	12	See Map	wetland	
REL-CFS-08-652	12	See Map	wetland	
REL-CFS-08-653	12	See Map	wetland	
REL-CFS-08-654	12	See Map	wetland	
REL-CFS-08-655	12	See Map	wetland	
REL-CFS-08-656	12	See Map	wetland	
REL-CFS-08-657	12	See Map	wetland	
REL-CFS-08-658	12	See Map	wetland	
REL-CFS-08-659	12	See Map	wetland	
REL-CFS-08-660	12	See Map	wetland	
REL-CFS-08-661	12	See Map	wetland	
REL-CFS-08-662	12	See Map	wetland	
REL-CFS-08-663	12	See Map	wetland	
REL-CFS-08-664	12	See Map	wetland	
REL-CFS-08-665	12	See Map	wetland	
REL-CFS-009-001	18	See Map	15%	138
REL-CFS-009-002	18	See Map	4%	453
REL-CFS-009-003	18	See Map	4%	453
REL-CFS-009-004	18	See Map	4%	453
REL-CFS-009-005	18	See Map	4%	453
REL-CFS-009-006	18	See Map	4%	453
REL-CFS-009-007	18	See Map	4%	453
REL-CFS-009-008	18	See Map	4%	453
REL-CFS-009-009	18	See Map	4%	453
REL-CFS-009-010	12	See Map	12%	97

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-011	12	See Map	12%	97
REL-CFS-009-012	12	See Map	12%	97
REL-CFS-009-013	18	See Map	9%	189
REL-CFS-009-014	18	See Map	9%	189
REL-CFS-009-015	18	See Map	9%	189
REL-CFS-009-016	18	See Map	9%	189
REL-CFS-009-017	18	See Map	9%	189
REL-CFS-009-018	18	See Map	9%	189
REL-CFS-009-019	18	See Map	9%	189
REL-CFS-009-020	18	See Map	9%	189
REL-CFS-009-021	19	See Map	9%	189
REL-CFS-009-022	18	See Map	9%	189
REL-CFS-009-023	12	See Map	12%	138
REL-CFS-009-024	12	See Map	12%	138
REL-CFS-009-025	32	See Map	44%	68
REL-CFS-009-026	32	See Map	44%	68
REL-CFS-009-027	32	See Map	44%	68
REL-CFS-009-028	32	See Map	44%	68
REL-CFS-009-029	32	See Map	44%	68
REL-CFS-009-030	32	See Map	44%	68
REL-CFS-009-031	32	See Map	44%	68
REL-CFS-009-032	32	See Map	44%	68
REL-CFS-009-033	32	See Map	44%	68
REL-CFS-009-034	32	See Map	44%	68
REL-CFS-009-035	32	See Map	44%	68
REL-CFS-009-036	32	See Map	44%	68
REL-CFS-009-037	32	See Map	44%	68
REL-CFS-009-038	32	See Map	44%	68
REL-CFS-009-039	32	See Map	44%	68
REL-CFS-009-040	32	See Map	44%	68
REL-CFS-009-041	32	See Map	44%	68
REL-CFS-009-042	32	See Map	44%	68
REL-CFS-009-043	32	See Map	44%	68
REL-CFS-009-044	32	See Map	44%	68
REL-CFS-009-045	32	See Map	44%	68
REL-CFS-009-046	32	See Map	44%	68
REL-CFS-009-047	32	See Map	44%	68
REL-CFS-009-048	32	See Map	44%	68
REL-CFS-009-049	32	See Map	44%	68
REL-CFS-009-050	32	See Map	44%	68
REL-CFS-009-051	32	See Map	44%	68
REL-CFS-009-052	32	See Map	44%	68
REL-CFS-009-053	32	See Map	44%	68

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-054	32	See Map	44%	68
REL-CFS-009-055	32	See Map	40%	67
REL-CFS-009-056	32	See Map	40%	67
REL-CFS-009-057	32	See Map	40%	67
REL-CFS-009-058	18	See Map	16%	151
REL-CFS-009-059	18	See Map	16%	151
REL-CFS-009-060	18	See Map	16%	151
REL-CFS-009-061	18	See Map	16%	151
REL-CFS-009-062	18	See Map	16%	151
REL-CFS-009-063	18	See Map	16%	151
REL-CFS-009-064	18	See Map	16%	151
REL-CFS-009-065	18	See Map	16%	151
REL-CFS-009-066	18	See Map	16%	151
REL-CFS-009-067	18	See Map	16%	151
REL-CFS-009-068	18	See Map	16%	151
REL-CFS-009-069	18	See Map	16%	151
REL-CFS-009-070	18	See Map	16%	151
REL-CFS-009-071	18	See Map	16%	151
REL-CFS-009-072	18	See Map	16%	151
REL-CFS-009-073	18	See Map	16%	151
REL-CFS-009-074	18	See Map	16%	151
REL-CFS-009-075	12	See Map	15%	101
REL-CFS-009-076	12	See Map	15%	101
REL-CFS-009-077	12	See Map	7%	87
REL-CFS-009-078	12	See Map	7%	87
REL-CFS-009-079	12	See Map	7%	87
REL-CFS-009-080	12	See Map	9%	189
REL-CFS-009-081	12	See Map	9%	189
REL-CFS-009-082	12	See Map	9%	189
REL-CFS-009-083	12	See Map	12%	66
REL-CFS-009-084	12	See Map	12%	66
REL-CFS-009-085	12	See Map	12%	66
REL-CFS-009-086	12	See Map	6%	176
REL-CFS-009-087	12	See Map	6%	176
REL-CFS-009-088	12	See Map	6%	176
REL-CFS-009-089	12	See Map	6%	176
REL-CFS-009-090	12	See Map	6%	176
REL-CFS-009-091	12	See Map	6%	176
REL-CFS-009-092	12	See Map	5%	123
REL-CFS-009-093	12	See Map	5%	123
REL-CFS-009-094	12	See Map	5%	123
REL-CFS-009-095	12	See Map	5%	123
REL-CFS-009-096	12	See Map	8%	144

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-097	12	See Map	8%	144
REL-CFS-009-098	12	See Map	8%	144
REL-CFS-009-099	12	See Map	8%	144
REL-CFS-009-100	12	See Map	8%	144
REL-CFS-009-101	12	See Map	8%	144
REL-CFS-009-102	12	See Map	3%	148
REL-CFS-009-103	12	See Map	3%	148
REL-CFS-009-104	12	See Map	3%	148
REL-CFS-009-105	12	See Map	6%	175
REL-CFS-009-106	12	See Map	6%	175
REL-CFS-009-107	12	See Map	6%	175
REL-CFS-009-108	18	See Map	16%	112
REL-CFS-009-109	18	See Map	16%	112
REL-CFS-009-110	12	See Map	6%	134
REL-CFS-009-111	12	See Map	6%	134
REL-CFS-009-112	12	See Map	6%	134
REL-CFS-009-113	12	See Map	6%	134
REL-CFS-009-114	12	See Map	6%	134
REL-CFS-009-115	12	See Map	6%	134
REL-CFS-009-116	12	See Map	6%	134
REL-CFS-009-117	12	See Map	3%	64
REL-CFS-009-118	12	See Map	3%	64
REL-CFS-009-119	12	See Map	3%	64
REL-CFS-009-120	12	See Map	15%	52
REL-CFS-009-121	12	See Map	15%	52
REL-CFS-009-122	12	See Map	15%	52
REL-CFS-009-123	12	See Map	15%	52
REL-CFS-009-124	12	See Map	15%	52
REL-CFS-009-125	12	See Map	15%	52
REL-CFS-009-126	12	See Map	15%	52
REL-CFS-009-127	12	See Map	15%	52
REL-CFS-009-128	12	See Map	15%	52
REL-CFS-009-129	12	See Map	8%	112
REL-CFS-009-130	12	See Map	8%	112
REL-CFS-009-131	24	See Map	56%	36
REL-CFS-009-132	24	See Map	56%	36
REL-CFS-009-133	24	See Map	56%	36
REL-CFS-009-134	24	See Map	56%	36
REL-CFS-009-135	24	See Map	56%	36
REL-CFS-009-136	24	See Map	56%	36
REL-CFS-009-137	24	See Map	56%	36
REL-CFS-009-138	24	See Map	56%	36
REL-CFS-009-139	24	See Map	56%	36

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-140	24	See Map	56%	36
REL-CFS-009-141	24	See Map	56%	36
REL-CFS-009-142	24	See Map	56%	36
REL-CFS-009-143	24	See Map	62%	39
REL-CFS-009-144	24	See Map	62%	39
REL-CFS-009-145	24	See Map	62%	39
REL-CFS-009-146	24	See Map	62%	39
REL-CFS-009-147	24	See Map	62%	39
REL-CFS-009-148	24	See Map	62%	39
REL-CFS-009-149	24	See Map	62%	39
REL-CFS-009-150	24	See Map	62%	39
REL-CFS-009-151	24	See Map	62%	39
REL-CFS-009-152	24	See Map	62%	39
REL-CFS-009-153	24	See Map	62%	39
REL-CFS-009-154	24	See Map	62%	39
REL-CFS-009-155	24	See Map	62%	39
REL-CFS-009-156	24	See Map	62%	39
REL-CFS-009-157	24	See Map	62%	39
REL-CFS-009-158	24	See Map	62%	39
REL-CFS-009-159	24	See Map	62%	39
REL-CFS-009-160	24	See Map	62%	39
REL-CFS-009-161	24	See Map	62%	39
REL-CFS-009-162	24	See Map	62%	39
REL-CFS-009-163	24	See Map	62%	39
REL-CFS-009-164	24	See Map	62%	39
REL-CFS-009-165	24	See Map	62%	39
REL-CFS-009-166	24	See Map	62%	39
REL-CFS-009-167	24	See Map	62%	39
REL-CFS-009-168	24	See Map	62%	39
REL-CFS-009-169	24	See Map	62%	39
REL-CFS-009-170	24	See Map	62%	39
REL-CFS-009-171	24	See Map	62%	39
REL-CFS-009-172	24	See Map	62%	39
REL-CFS-009-173	24	See Map	62%	39
REL-CFS-009-174	24	See Map	62%	39
REL-CFS-009-175	24	See Map	62%	39
REL-CFS-009-176	24	See Map	62%	39
REL-CFS-009-177	24	See Map	62%	39
REL-CFS-009-178	24	See Map	62%	39
REL-CFS-009-179	24	See Map	62%	39
REL-CFS-009-180	24	See Map	62%	39
REL-CFS-009-181	24	See Map	62%	39
REL-CFS-009-182	24	See Map	62%	39

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-183	24	See Map	62%	39
REL-CFS-009-184	24	See Map	62%	39
REL-CFS-009-185	24	See Map	62%	39
REL-CFS-009-186	24	See Map	62%	39
REL-CFS-009-187	24	See Map	62%	39
REL-CFS-009-188	24	See Map	62%	39
REL-CFS-009-189	24	See Map	62%	39
REL-CFS-009-190	24	See Map	62%	39
REL-CFS-009-191	24	See Map	62%	39
REL-CFS-009-192	24	See Map	62%	39
REL-CFS-009-193	24	See Map	48%	38
REL-CFS-009-194	24	See Map	48%	38
REL-CFS-009-195	24	See Map	48%	38
REL-CFS-009-196	12	See Map	7%	149
REL-CFS-009-197	12	See Map	7%	149
REL-CFS-009-198	12	See Map	7%	149
REL-CFS-009-199	12	See Map	7%	149
REL-CFS-009-200	12	See Map	7%	163
REL-CFS-009-201	12	See Map	7%	163
REL-CFS-009-202	12	See Map	7%	163
REL-CFS-009-203	12	See Map	7%	163
REL-CFS-009-204	12	See Map	7%	163
REL-CFS-009-205	12	See Map	7%	163
REL-CFS-009-206	12	See Map	9%	134
REL-CFS-009-207	12	See Map	9%	134
REL-CFS-009-208	12	See Map	9%	134
REL-CFS-009-209	12	See Map	9%	134
REL-CFS-009-210	12	See Map	9%	134
REL-CFS-009-211	12	See Map	8%	134
REL-CFS-009-212	12	See Map	8%	134
REL-CFS-009-213	12	See Map	8%	134
REL-CFS-009-214	12	See Map	8%	134
REL-CFS-009-215	12	See Map	7%	207
REL-CFS-009-216	12	See Map	7%	207
REL-CFS-009-217	12	See Map	7%	207
REL-CFS-009-218	12	See Map	7%	207
REL-CFS-009-219	12	See Map	7%	207
REL-CFS-009-220	12	See Map	7%	207
REL-CFS-009-221	12	See Map	7%	207
REL-CFS-009-222	12	See Map	7%	207
REL-CFS-009-223	12	See Map	7%	207
REL-CFS-009-224	12	See Map	7%	207
REL-CFS-009-225	12	See Map	7%	207

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-009-226	12	See Map	7%	207
REL-CFS-009-227	12	See Map	7%	207
REL-CFS-009-228	12	See Map	8%	50
REL-CFS-009-229	12	See Map	8%	50
REL-CFS-009-230	12	See Map	8%	50
REL-CFS-009-231	12	See Map	8%	50
REL-CFS-009-232	12	See Map	6%	160
REL-CFS-009-233	12	See Map	6%	160
REL-CFS-009-234	12	See Map	6%	160
REL-CFS-009-235	12	See Map	6%	160
REL-CFS-009-236	12	See Map	14%	43
REL-CFS-009-237	12	See Map	14%	43
REL-CFS-009-238	12	See Map	14%	43
REL-CFS-009-239	18	See Map	28%	70
REL-CFS-009-240	18	See Map	28%	43
REL-CFS-009-241	18	See Map	28%	43
REL-CFS-009-242	18	See Map	28%	43
REL-CFS-009-243	18	See Map	28%	43
REL-CFS-010-001	18	See Map	8%	277
REL-CFS-010-002	18	See Map	8%	277
REL-CFS-010-003	12	See Map	6%	70
REL-CFS-010-004	12	See Map	7%	176
REL-CFS-010-005	12	See Map	7%	176
REL-CFS-010-006	12	See Map	7%	176
REL-CFS-010-007	24	See Map	5%	363
REL-CFS-010-008	24	See Map	5%	363
REL-CFS-010-009	24	See Map	5%	363
REL-CFS-010-010	24	See Map	5%	363
REL-CFS-010-011	24	See Map	5%	363
REL-CFS-010-012	12	See Map	2%	290
REL-CFS-010-013	12	See Map	2%	290
REL-CFS-010-014	12	See Map	2%	290
REL-CFS-010-015	12	See Map	2%	290
REL-CFS-010-016	12	See Map	2%	290
REL-CFS-010-017	12	See Map	2%	290
REL-CFS-010-018	12	See Map	2%	290
REL-CFS-010-019	12	See Map	2%	290
REL-CFS-010-020	12	See Map	2%	290
REL-CFS-010-021	12	See Map	2%	290
REL-CFS-010-022	12	See Map	2%	290
REL-CFS-010-023	12	See Map	2%	290
REL-CFS-010-024	12	See Map	2%	290
REL-CFS-010-025	12	See Map	2%	290

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-026	12	See Map	2%	290
REL-CFS-010-027	12	See Map	2%	290
REL-CFS-010-028	12	See Map	2%	290
REL-CFS-010-029	24	See Map	6%	346
REL-CFS-010-030	24	See Map	6%	346
REL-CFS-010-031	24	See Map	6%	346
REL-CFS-010-032	24	See Map	6%	346
REL-CFS-010-033	12	See Map	2%	346
REL-CFS-010-034	12	See Map	2%	346
REL-CFS-010-035	12	See Map	2%	346
REL-CFS-010-036	12	See Map	5%	207
REL-CFS-010-037	12	See Map	7%	30
REL-CFS-010-038	18	See Map	21%	84
REL-CFS-010-039	18	See Map	21%	84
REL-CFS-010-040	18	See Map	21%	84
REL-CFS-010-041	18	See Map	21%	84
REL-CFS-010-042	18	See Map	21%	84
REL-CFS-010-043	18	See Map	21%	84
REL-CFS-010-044	18	See Map	21%	84
REL-CFS-010-045	18	See Map	21%	84
REL-CFS-010-046	12	See Map	2%	45
REL-CFS-010-047	12	See Map	2%	45
REL-CFS-010-048	12	See Map	24%	56
REL-CFS-010-049	18	See Map	9%	236
REL-CFS-010-050	18	See Map	9%	236
REL-CFS-010-051	18	See Map	9%	236
REL-CFS-010-052	18	See Map	9%	236
REL-CFS-010-053	18	See Map	9%	236
REL-CFS-010-054	18	See Map	9%	236
REL-CFS-010-055	18	See Map	9%	236
REL-CFS-010-056	12	See Map	7%	91
REL-CFS-010-057	12	See Map	7%	91
REL-CFS-010-058	12	See Map	7%	91
REL-CFS-010-059	12	See Map	7%	91
REL-CFS-010-060	32	See Map	27%	132
REL-CFS-010-061	32	See Map	27%	132
REL-CFS-010-062	12	See Map	42%	28
REL-CFS-010-063	12	See Map	42%	28
REL-CFS-010-064	12	See Map	7%	128
REL-CFS-010-065	12	See Map	7%	128
REL-CFS-010-066	12	See Map	7%	128
REL-CFS-010-067	12	See Map	7%	128
REL-CFS-010-068	12	See Map	7%	128

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-069	12	See Map	7%	128
REL-CFS-010-070	12	See Map	7%	128
REL-CFS-010-071	12	See Map	7%	128
REL-CFS-010-072	12	See Map	7%	128
REL-CFS-010-073	12	See Map	7%	128
REL-CFS-010-074	12	See Map	7%	128
REL-CFS-010-075	12	See Map	7%	128
REL-CFS-010-076	12	See Map	7%	128
REL-CFS-010-077	12	See Map	7%	128
REL-CFS-010-078	12	See Map	7%	128
REL-CFS-010-079	12	See Map	7%	128
REL-CFS-010-080	12	See Map	7%	128
REL-CFS-010-081	12	See Map	7%	128
REL-CFS-010-082	12	See Map	7%	128
REL-CFS-010-083	24	See Map	15%	200
REL-CFS-010-084	24	See Map	15%	200
REL-CFS-010-085	24	See Map	15%	200
REL-CFS-010-086	24	See Map	15%	200
REL-CFS-010-087	24	See Map	15%	200
REL-CFS-010-088	24	See Map	15%	200
REL-CFS-010-089	24	See Map	15%	200
REL-CFS-010-090	24	See Map	15%	200
REL-CFS-010-091	24	See Map	15%	200
REL-CFS-010-092	24	See Map	15%	200
REL-CFS-010-093	24	See Map	15%	200
REL-CFS-010-094	24	See Map	15%	200
REL-CFS-010-095	32	See Map, CY 002	9%	400
REL-CFS-010-096	32	See Map, CY 002	9%	400
REL-CFS-010-097	32	See Map, CY 002	9%	400
REL-CFS-010-098	32	See Map, CY 002	9%	400
REL-CFS-010-099	32	See Map, CY 002	9%	400
REL-CFS-010-100	32	See Map, CY 002	9%	400
REL-CFS-010-101	32	See Map, CY 002	9%	400
REL-CFS-010-102	32	See Map, CY 002	9%	400
REL-CFS-010-103	12	See Map, CY 002	12%	101
REL-CFS-010-104	12	See Map, CY 002	12%	101
REL-CFS-010-105	12	See Map, CY 002	12%	101
REL-CFS-010-106	12	See Map, CY 002	12%	101
REL-CFS-010-107	12	See Map, CY 002	12%	101
REL-CFS-010-108	12	See Map, CY 002	12%	101
REL-CFS-010-109	12	See Map, CY 002	12%	101
REL-CFS-010-110	12	See Map, CY 002	12%	101
REL-CFS-010-111	12	See Map, CY 002	12%	101

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-112	12	See Map, CY 002	12%	101
REL-CFS-010-113	18	See Map, CY 002	10%	192
REL-CFS-010-114	18	See Map, CY 002	10%	192
REL-CFS-010-115	18	See Map, CY 002	10%	192
REL-CFS-010-116	18	See Map, CY 002	10%	192
REL-CFS-010-117	18	See Map, CY 002	10%	192
REL-CFS-010-118	18	See Map, CY 002	10%	192
REL-CFS-010-119	18	See Map, CY 002	10%	192
REL-CFS-010-120	18	See Map, CY 002	10%	192
REL-CFS-010-121	18	See Map, CY 002	10%	192
REL-CFS-010-122	18	See Map, CY 002	10%	192
REL-CFS-010-123	18	See Map, CY 002	10%	192
REL-CFS-010-124	18	See Map, CY 002	10%	192
REL-CFS-010-125	18	See Map, CY 002	10%	192
REL-CFS-010-126	18	See Map, CY 002	10%	192
REL-CFS-010-127	12	See Map, CY 002	12%	104
REL-CFS-010-128	12	See Map, CY 002	12%	104
REL-CFS-010-129	12	See Map, CY 002	12%	104
REL-CFS-010-130	12	See Map, CY 002	12%	104
REL-CFS-010-131	12	See Map, CY 002	12%	104
REL-CFS-010-132	12	See Map, CY 002	12%	104
REL-CFS-010-133	12	See Map, CY 002	12%	104
REL-CFS-010-134	12	See Map, CY 002	12%	104
REL-CFS-010-135	12	See Map, CY 002	12%	104
REL-CFS-010-136	12	See Map, CY 002	12%	104
REL-CFS-010-137	12	See Map, CY 002	12%	104
REL-CFS-010-138	12	See Map, CY 002	12%	104
REL-CFS-010-139	12	See Map, CY 002	12%	104
REL-CFS-010-140	12	See Map, CY 002	12%	104
REL-CFS-010-141	12	See Map, CY 002	12%	104
REL-CFS-010-142	12	See Map, CY 002	12%	104
REL-CFS-010-143	12	See Map, CY 002	12%	104
REL-CFS-010-144	12	See Map, CY 002	12%	104
REL-CFS-010-145	12	See Map, CY 002	12%	104
REL-CFS-010-146	12	See Map, CY 002	12%	104
REL-CFS-010-147	12	See Map, CY 002	12%	104
REL-CFS-010-148	12	See Map, CY 002	12%	104
REL-CFS-010-149	12	See Map, CY 002	12%	104
REL-CFS-010-150	18	See Map, CY 002	12%	219
REL-CFS-010-151	18	See Map, CY 002	12%	219
REL-CFS-010-152	18	See Map, CY 002	12%	219
REL-CFS-010-153	18	See Map, CY 002	12%	219
REL-CFS-010-154	18	See Map, CY 002	12%	219

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-155	18	See Map, CY 002	12%	219
REL-CFS-010-156	18	See Map, CY 002	12%	219
REL-CFS-010-157	18	See Map, CY 002	12%	219
REL-CFS-010-158	18	See Map, CY 002	12%	219
REL-CFS-010-159	18	See Map, CY 002	12%	219
REL-CFS-010-160	18	See Map, CY 002	12%	219
REL-CFS-010-161	18	See Map, CY 002	12%	219
REL-CFS-010-162	18	See Map, CY 002	12%	219
REL-CFS-010-163	18	See Map, CY 002	12%	219
REL-CFS-010-164	24	See Map, CY 002	23%	163
REL-CFS-010-165	24	See Map, CY 002	23%	163
REL-CFS-010-166	24	See Map, CY 002	23%	163
REL-CFS-010-167	24	See Map, CY 002	23%	163
REL-CFS-010-168	24	See Map, CY 002	23%	163
REL-CFS-010-169	24	See Map, CY 002	23%	163
REL-CFS-010-170	24	See Map, CY 002	23%	163
REL-CFS-010-171	24	See Map, CY 002	23%	163
REL-CFS-010-172	24	See Map, CY 002	23%	163
REL-CFS-010-173	18	See Map	12%	134
REL-CFS-010-174	18	See Map	12%	134
REL-CFS-010-175	18	See Map	12%	134
REL-CFS-010-176	18	See Map	12%	134
REL-CFS-010-177	18	See Map	12%	134
REL-CFS-010-178	18	See Map	12%	134
REL-CFS-010-179	18	See Map	12%	134
REL-CFS-010-180	18	See Map	12%	134
REL-CFS-010-181	18	See Map	12%	134
REL-CFS-010-182	18	See Map	12%	134
REL-CFS-010-183	18	See Map	12%	134
REL-CFS-010-184	18	See Map	12%	134
REL-CFS-010-185	32	See Map	21%	202
REL-CFS-010-186	32	See Map	21%	202
REL-CFS-010-187	32	See Map	21%	202
REL-CFS-010-188	12	See Map	9%	65
REL-CFS-010-189	12	See Map	9%	65
REL-CFS-010-190	12	See Map	9%	65
REL-CFS-010-191	12	See Map	9%	65
REL-CFS-010-192	12	See Map	9%	65
REL-CFS-010-193	12	See Map	9%	65
REL-CFS-010-194	12	See Map	9%	65
REL-CFS-010-195	12	See Map	9%	65
REL-CFS-010-196	12	See Map	9%	65
REL-CFS-010-197	12	See Map	9%	65

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-198	12	See Map	9%	65
REL-CFS-010-199	12	See Map	9%	65
REL-CFS-010-200	12	See Map	6%	104
REL-CFS-010-201	12	See Map	6%	104
REL-CFS-010-202	12	See Map	6%	104
REL-CFS-010-203	12	See Map	6%	104
REL-CFS-010-204	12	See Map	6%	104
REL-CFS-010-205	12	See Map	31%	38
REL-CFS-010-206	12	See Map	31%	38
REL-CFS-010-207	12	See Map	31%	38
REL-CFS-010-208	12	See Map	31%	38
REL-CFS-010-209	12	See Map	31%	38
REL-CFS-010-210	12	See Map	31%	38
REL-CFS-010-211	12	See Map	31%	38
REL-CFS-010-212	12	See Map	31%	38
REL-CFS-010-213	32	See Map	16%	287
REL-CFS-010-214	32	See Map	16%	287
REL-CFS-010-215	32	See Map	16%	287
REL-CFS-010-216	32	See Map	16%	287
REL-CFS-010-217	32	See Map	16%	287
REL-CFS-010-218	32	See Map	16%	287
REL-CFS-010-219	32	See Map	16%	287
REL-CFS-010-220	32	See Map	16%	287
REL-CFS-010-221	32	See Map	16%	287
REL-CFS-010-222	32	See Map	16%	287
REL-CFS-010-223	32	See Map	16%	287
REL-CFS-010-224	32	See Map	16%	287
REL-CFS-010-225	32	See Map	16%	287
REL-CFS-010-226	32	See Map	16%	287
REL-CFS-010-227	32	See Map	16%	287
REL-CFS-010-228	18	See Map	14%	111
REL-CFS-010-229	18	See Map	14%	111
REL-CFS-010-230	18	See Map	14%	111
REL-CFS-010-231	18	See Map	14%	111
REL-CFS-010-232	18	See Map	14%	111
REL-CFS-010-233	18	See Map	14%	111
REL-CFS-010-234	18	See Map	14%	111
REL-CFS-010-235	18	See Map	14%	111
REL-CFS-010-236	18	See Map	14%	111
REL-CFS-010-237	18	See Map	14%	111
REL-CFS-010-238	18	See Map	14%	111
REL-CFS-010-239	18	See Map	14%	111
REL-CFS-010-240	18	See Map	14%	111

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-241	18	See Map	14%	111
REL-CFS-010-242	32	See Map	9%	450
REL-CFS-010-243	32	See Map	9%	450
REL-CFS-010-244	32	See Map	9%	450
REL-CFS-010-245	32	See Map	9%	450
REL-CFS-010-246	32	See Map	9%	450
REL-CFS-010-247	32	See Map	9%	450
REL-CFS-010-248	32	See Map	9%	450
REL-CFS-010-249	32	See Map	9%	450
REL-CFS-010-250	32	See Map	9%	450
REL-CFS-010-251	32	See Map	9%	450
REL-CFS-010-252	32	See Map	9%	450
REL-CFS-010-253	32	See Map	9%	450
REL-CFS-010-254	32	See Map	9%	450
REL-CFS-010-255	32	See Map	9%	450
REL-CFS-010-256	32	See Map	9%	450
REL-CFS-010-257	32	See Map	9%	450
REL-CFS-010-258	32	See Map	17%	325
REL-CFS-010-259	32	See Map	17%	325
REL-CFS-010-260	32	See Map	17%	325
REL-CFS-010-261	32	See Map	17%	325
REL-CFS-010-262	32	See Map	17%	325
REL-CFS-010-263	32	See Map	17%	325
REL-CFS-010-264	32	See Map	17%	325
REL-CFS-010-265	32	See Map	17%	325
REL-CFS-010-266	32	See Map	17%	325
REL-CFS-010-267	32	See Map	17%	325
REL-CFS-010-268	32	See Map	17%	325
REL-CFS-010-269	32	See Map	17%	325
REL-CFS-010-270	32	See Map	17%	325
REL-CFS-010-271	32	See Map	17%	325
REL-CFS-010-272	32	See Map	17%	325
REL-CFS-010-273	32	See Map	17%	325
REL-CFS-010-274	32	See Map	17%	325
REL-CFS-010-275	32	See Map	17%	325
REL-CFS-010-276	32	See Map	17%	325
REL-CFS-010-277	32	See Map	17%	325
REL-CFS-010-278	32	See Map	17%	325
REL-CFS-010-279	32	See Map	17%	325
REL-CFS-010-280	24	See Map	21%	142
REL-CFS-010-281	24	See Map	21%	142
REL-CFS-010-282	24	See Map	21%	142
REL-CFS-010-600	18	See Map	9%	236

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-010-601	18	See Map	9%	236
REL-CFS-011-001	32	See Map	21%	234
REL-CFS-011-002	32	See Map	21%	234
REL-CFS-011-003	32	See Map	21%	234
REL-CFS-011-004	32	See Map	21%	234
REL-CFS-011-005	32	See Map	21%	234
REL-CFS-011-006	32	See Map	21%	234
REL-CFS-011-007	32	See Map	31%	102
REL-CFS-011-008	32	See Map	31%	102
REL-CFS-011-009	32	See Map	31%	102
REL-CFS-011-010	32	See Map	31%	102
REL-CFS-011-011	32	See Map	31%	102
REL-CFS-011-012	32	See Map	31%	102
REL-CFS-011-013	32	See Map	31%	102
REL-CFS-011-014	32	See Map	24%	183
REL-CFS-011-015	32	See Map	24%	183
REL-CFS-011-016	32	See Map	24%	183
REL-CFS-011-017	32	See Map	24%	183
REL-CFS-011-018	32	See Map	24%	183
REL-CFS-011-019	32	See Map	24%	183
REL-CFS-011-020	32	See Map	24%	183
REL-CFS-011-021	32	See Map	24%	183
REL-CFS-011-022	32	See Map	24%	183
REL-CFS-011-023	32	See Map	24%	183
REL-CFS-011-024	32	See Map	24%	183
REL-CFS-011-025	32	See Map	24%	183
REL-CFS-011-026	32	See Map	24%	183
REL-CFS-011-027	32	See Map	24%	183
REL-CFS-011-028	32	See Map	24%	183
REL-CFS-011-029	32	See Map	24%	183
REL-CFS-011-030	32	See Map	24%	183
REL-CFS-011-031	32	See Map	19%	234
REL-CFS-011-032	32	See Map	19%	234
REL-CFS-011-033	32	See Map	19%	234
REL-CFS-011-034	32	See Map	19%	234
REL-CFS-011-035	32	See Map	19%	234
REL-CFS-011-036	32	See Map	19%	234
REL-CFS-011-037	32	See Map	19%	234
REL-CFS-011-038	32	See Map	19%	234
REL-CFS-011-039	32	See Map	19%	234
REL-CFS-011-040	32	See Map	19%	234
REL-CFS-011-041	32	See Map	19%	234
REL-CFS-011-042	32	See Map	11%	318

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-011-043	32	See Map	11%	318
REL-CFS-011-044	32	See Map	11%	318
REL-CFS-011-045	32	See Map	11%	318
REL-CFS-011-046	32	See Map	11%	318
REL-CFS-011-047	32	See Map	11%	318
REL-CFS-011-048	32	See Map	11%	318
REL-CFS-011-049	32	See Map	11%	318
REL-CFS-011-050	32	See Map	11%	318
REL-CFS-011-051	32	See Map	11%	318
REL-CFS-011-052	32	See Map	11%	318
REL-CFS-011-053	32	See Map	11%	318
REL-CFS-011-054	32	See Map	11%	318
REL-CFS-011-055	32	See Map	11%	318
REL-CFS-011-056	32	See Map	11%	318
REL-CFS-011-057	32	See Map	11%	318
REL-CFS-011-058	32	See Map	11%	318
REL-CFS-011-059	32	See Map	11%	318
REL-CFS-011-060	32	See Map	11%	318
REL-CFS-011-061	18	See Map	16%	110
REL-CFS-011-062	24	See Map	27%	105
REL-CFS-011-063	24	See Map	27%	105
REL-CFS-011-064	24	See Map	27%	105
REL-CFS-011-065	24	See Map	27%	105
REL-CFS-011-066	24	See Map	27%	105
REL-CFS-011-067	24	See Map	27%	105
REL-CFS-011-068	24	See Map	27%	105
REL-CFS-011-069	24	See Map	27%	105
REL-CFS-011-070	24	See Map	27%	105
REL-CFS-011-071	24	See Map	27%	105
REL-CFS-011-072	24	See Map	27%	105
REL-CFS-011-073	24	See Map	27%	105
REL-CFS-011-074	24	See Map	27%	105
REL-CFS-011-075	24	See Map	27%	105
REL-CFS-011-076	24	See Map	27%	105
REL-CFS-011-077	24	See Map	27%	105
REL-CFS-011-078	24	See Map	27%	105
REL-CFS-011-079	24	See Map	27%	105
REL-CFS-011-080	24	See Map	27%	105
REL-CFS-011-081	24	See Map	27%	105
REL-CFS-011-082	24	See Map	27%	105
REL-CFS-011-083	24	See Map	27%	105
REL-CFS-011-084	24	See Map	27%	105
REL-CFS-011-085	24	See Map	27%	105

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-011-086	24	See Map	27%	105
REL-CFS-011-087	24	See Map	27%	105
REL-CFS-011-088	24	See Map	27%	105
REL-CFS-011-089	24	See Map	27%	105
REL-CFS-011-090	24	See Map	27%	105
REL-CFS-011-091	24	See Map	27%	105
REL-CFS-011-092	24	See Map	27%	105
REL-CFS-011-093	12	See Map	2%	365
REL-CFS-011-094	12	See Map	2%	365
REL-CFS-011-095	12	See Map	2%	365
REL-CFS-011-096	12	See Map	2%	365
REL-CFS-011-097	12	See Map	2%	365
REL-CFS-011-098	12	See Map	2%	365
REL-CFS-011-099	12	See Map	2%	365
REL-CFS-011-100	12	See Map	2%	365
REL-CFS-011-101	12	See Map	2%	365
REL-CFS-011-102	12	See Map	13%	90
REL-CFS-011-103	12	See Map	13%	90
REL-CFS-011-104	12	See Map	13%	90
REL-CFS-011-105	12	See Map	13%	90
REL-CFS-011-106	12	See Map	13%	90
REL-CFS-011-107	12	See Map	13%	90
REL-CFS-011-108	12	See Map	4%	160
REL-CFS-011-109	12	See Map	4%	160
REL-CFS-011-110	12	See Map	4%	160
REL-CFS-011-111	12	See Map	4%	160
REL-CFS-011-112	12	See Map	4%	160
REL-CFS-011-113	12	See Map	4%	160
REL-CFS-011-114	12	See Map	4%	160
REL-CFS-011-115	12	See Map	4%	160
REL-CFS-011-116	12	See Map	4%	160
REL-CFS-011-117	12	See Map	4%	160
REL-CFS-011-118	12	See Map	4%	160
REL-CFS-011-119	12	See Map	4%	160
REL-CFS-011-120	12	See Map	4%	160
REL-CFS-011-121	12	See Map	4%	160
REL-CFS-011-122	12	See Map	4%	160
REL-CFS-011-123	12	See Map	4%	160
REL-CFS-011-124	12	See Map	4%	160
REL-CFS-011-125	12	See Map	14%	74
REL-CFS-011-126	12	See Map	14%	74
REL-CFS-011-127	12	See Map	14%	74
REL-CFS-011-128	12	See Map	14%	74

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-011-129	12	See Map	19%	65
REL-CFS-011-130	12	See Map	19%	65
REL-CFS-011-131	12	See Map	7%	95
REL-CFS-011-132	12	See Map	7%	95
REL-CFS-011-133	12	See Map	7%	95
REL-CFS-011-134	12	See Map	7%	95
REL-CFS-011-135	12	See Map	7%	95
REL-CFS-011-136	12	See Map	7%	95
REL-CFS-011-137	12	See Map	7%	95
REL-CFS-011-138	12	See Map	7%	95
REL-CFS-011-139	12	See Map	7%	95
REL-CFS-011-140	12	See Map	7%	95
REL-CFS-011-141	12	See Map	7%	95
REL-CFS-011-142	18	See Map	6%	164
REL-CFS-011-143	18	See Map	6%	164
REL-CFS-011-144	18	See Map	6%	164
REL-CFS-011-145	18	See Map	6%	164
REL-CFS-011-146	18	See Map	6%	164
REL-CFS-011-147	18	See Map	6%	164
REL-CFS-011-148	18	See Map	6%	164
REL-CFS-011-149	18	See Map	6%	164
REL-CFS-011-150	18	See Map	6%	164
REL-CFS-011-151	12	See Map	7%	207
REL-CFS-011-152	12	See Map	7%	207
REL-CFS-011-153	12	See Map	7%	207
REL-CFS-011-154	12	See Map	3%	182
REL-CFS-011-155	12	See Map	3%	182
REL-CFS-011-156	12	See Map	3%	182
REL-CFS-011-157	12	See Map	3%	182
REL-CFS-011-158	12	See Map	3%	346
REL-CFS-011-159	12	See Map	3%	346
REL-CFS-011-160	12	See Map	3%	346
REL-CFS-011-161	12	See Map	3%	346
REL-CFS-011-162	12	See Map	3%	346
REL-CFS-011-163	12	See Map	3%	346
REL-CFS-011-164	18	See Map	12%	156
REL-CFS-011-165	18	See Map	12%	156
REL-CFS-011-166	18	See Map	12%	156
REL-CFS-011-167	18	See Map	12%	156
REL-CFS-011-168	18	See Map	12%	156
REL-CFS-011-169	18	See Map	12%	156
REL-CFS-011-170	18	See Map	12%	156
REL-CFS-011-171	18	See Map	12%	156

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-011-172	18	See Map	12%	156
REL-CFS-011-173	18	See Map	12%	156
REL-CFS-011-174	18	See Map	12%	156
REL-CFS-011-175	18	See Map	12%	156
REL-CFS-011-176	18	See Map	12%	156
REL-CFS-011-177	18	See Map	12%	156
REL-CFS-011-178	18	See Map	12%	156
REL-CFS-011-179	18	See Map	12%	156
REL-CFS-011-180	18	See Map	12%	156
REL-CFS-011-181	18	See Map	12%	156
REL-CFS-011-182	18	See Map	12%	156
REL-CFS-011-183	18	See Map	12%	156
REL-CFS-011-184	18	See Map	12%	156
REL-CFS-011-185	18	See Map	12%	156
REL-CFS-011-186	18	See Map	12%	156
REL-CFS-011-187	12	See Map	7%	163
REL-CFS-011-188	12	See Map	7%	163
REL-CFS-011-189	12	See Map	7%	163
REL-CFS-011-190	12	See Map	7%	163
REL-CFS-011-191	12	See Map	7%	163
REL-CFS-011-192	12	See Map	12%	84
REL-CFS-011-193	12	See Map	12%	84
REL-CFS-011-194	12	See Map	12%	84
REL-CFS-011-195	12	See Map	12%	84
REL-CFS-011-196	12	See Map	10%	126
REL-CFS-011-197	12	See Map	10%	126
REL-CFS-011-198	12	See Map	10%	126
REL-CFS-011-199	12	See Map	10%	126
REL-CFS-011-200	12	See Map	10%	126
REL-CFS-011-201	12	See Map	9%	111
REL-CFS-011-202	12	See Map	9%	111
REL-CFS-011-203	12	See Map	9%	111
REL-CFS-011-204	12	See Map	9%	111
REL-CFS-011-205	12	See Map	9%	111
REL-CFS-011-206	18	See Map	9%	189
REL-CFS-011-207	18	See Map	9%	189
REL-CFS-011-208	18	See Map	9%	189
REL-CFS-011-209	12	See Map	4%	94
REL-CFS-011-210	12	See Map	4%	94
REL-CFS-011-211	12	See Map	4%	94
REL-CFS-011-212	12	See Map	4%	94
REL-CFS-011-213	12	See Map	11%	129
REL-CFS-011-214	12	See Map	11%	129

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-011-215	12	See Map	11%	129
REL-CFS-011-216	12	See Map	11%	129
REL-CFS-011-217	12	See Map	11%	129
REL-CFS-011-218	12	See Map	11%	129
REL-CFS-012-001	18	See Map	8%	214
REL-CFS-012-002	18	See Map	8%	214
REL-CFS-012-003	18	See Map	8%	214
REL-CFS-012-004	18	See Map	8%	214
REL-CFS-012-005	18	See Map	8%	214
REL-CFS-012-006	18	See Map	8%	214
REL-CFS-012-007	18	See Map	8%	214
REL-CFS-012-008	12	See Map	6%	144
REL-CFS-012-009	12	See Map	6%	144
REL-CFS-012-010	12	See Map	6%	144
REL-CFS-012-011	12	See Map	7%	215
REL-CFS-012-012	12	See Map	7%	215
REL-CFS-012-013	12	See Map	7%	215
REL-CFS-012-014	12	See Map	7%	215
REL-CFS-012-015	12	See Map	7%	215
REL-CFS-012-016	12	See Map	7%	215
REL-CFS-012-017	12	See Map	7%	215
REL-CFS-012-018	18	See Map	10%	185
REL-CFS-012-019	18	See Map	10%	185
REL-CFS-012-020	18	See Map	10%	185
REL-CFS-012-021	18	See Map	10%	185
REL-CFS-012-022	18	See Map	10%	185
REL-CFS-012-023	18	See Map	10%	185
REL-CFS-012-024	18	See Map	10%	185
REL-CFS-012-025	18	See Map	10%	185
REL-CFS-012-026	18	See Map	10%	185
REL-CFS-012-027	18	See Map	10%	185
REL-CFS-012-028	18	See Map	10%	232
REL-CFS-012-029	18	See Map	17%	173
REL-CFS-012-030	18	See Map	17%	173
REL-CFS-012-031	18	See Map	17%	173
REL-CFS-012-032	18	See Map	17%	173
REL-CFS-012-033	32	See Map	16%	332
REL-CFS-012-034	32	See Map	16%	332
REL-CFS-012-035	32	See Map	16%	332
REL-CFS-012-036	32	See Map	16%	332
REL-CFS-012-037	32	See Map	16%	332
REL-CFS-012-038	32	See Map	16%	332
REL-CFS-012-039	32	See Map	16%	332

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-012-040	32	See Map	16%	332
REL-CFS-012-041	32	See Map	16%	332
REL-CFS-012-042	32	See Map	16%	332
REL-CFS-012-043	32	See Map	16%	332
REL-CFS-012-044	32	See Map	16%	332
REL-CFS-012-045	32	See Map	16%	332
REL-CFS-012-046	32	See Map	16%	332
REL-CFS-012-047	32	See Map	16%	332
REL-CFS-012-048	32	See Map	16%	332
REL-CFS-012-049	32	See Map	16%	332
REL-CFS-012-050	32	See Map	16%	332
REL-CFS-012-051	32	See Map	16%	332
REL-CFS-012-052	32	See Map	16%	332
REL-CFS-012-053	32	See Map	16%	332
REL-CFS-012-054	32	See Map	16%	332
REL-CFS-012-055	32	See Map	16%	332
REL-CFS-012-056	32	See Map	16%	332
REL-CFS-012-057	32	See Map	16%	332
REL-CFS-012-058	32	See Map	16%	332
REL-CFS-012-059	32	See Map	16%	332
REL-CFS-012-060	32	See Map	16%	332
REL-CFS-012-061	32	See Map	16%	332
REL-CFS-012-062	12	See Map	20%	10
REL-CFS-012-063	12	See Map	14%	83
REL-CFS-012-064	32	See Map	15%	286
REL-CFS-012-065	32	See Map	15%	286
REL-CFS-012-066	32	See Map	15%	286
REL-CFS-012-067	12	See Map	2%	388
REL-CFS-012-068	12	See Map	2%	388
REL-CFS-012-069	12	See Map	2%	329
REL-CFS-012-070	12	See Map	2%	329
REL-CFS-012-071	12	See Map	2%	329
REL-CFS-012-072	12	See Map	9%	120
REL-CFS-012-073	12	See Map	9%	120
REL-CFS-012-074	12	See Map	9%	120
REL-CFS-012-075	12	See Map	6%	87
REL-CFS-012-076	12	See Map	6%	87
REL-CFS-012-077	12	See Map	11%	19
REL-CFS-012-078	12	See Map	11%	19
REL-CFS-012-079	12	See Map	4%	142
REL-CFS-012-080	12	See Map	4%	142
REL-CFS-012-081	12	See Map	4%	142
REL-CFS-012-082	12	See Map	4%	142

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-012-083	12	See Map	4%	142
REL-CFS-012-084	12	See Map	4%	142
REL-CFS-012-085	12	See Map	4%	142
REL-CFS-012-086	12	See Map	4%	142
REL-CFS-012-087	12	See Map	4%	142
REL-CFS-012-088	12	See Map	4%	142
REL-CFS-012-089	12	See Map	4%	142
REL-CFS-012-090	12	See Map	4%	142
REL-CFS-012-091	12	See Map	4%	142
REL-CFS-012-092	12	See Map	2%	116
REL-CFS-012-093	12	See Map	2%	116
REL-CFS-012-094	12	See Map	14%	56
REL-CFS-012-095	12	See Map	14%	56
REL-CFS-012-096	12	See Map	14%	56
REL-CFS-012-097	12	See Map	14%	56
REL-CFS-012-098	12	See Map	14%	56
REL-CFS-012-099	32	See Map	52%	58
REL-CFS-012-100	32	See Map	52%	58
REL-CFS-012-101	32	See Map	52%	58
REL-CFS-012-102	32	See Map	52%	58
REL-CFS-012-103	32	See Map	52%	58
REL-CFS-012-104	32	See Map	52%	58
REL-CFS-012-105	32	See Map	52%	58
REL-CFS-012-106	32	See Map	52%	58
REL-CFS-012-107	32	See Map	52%	58
REL-CFS-012-108	32	See Map	52%	58
REL-CFS-012-109	32	See Map	52%	58
REL-CFS-012-110	32	See Map	52%	58
REL-CFS-012-111	32	See Map	52%	58
REL-CFS-012-112	18	See Map	22%	91
REL-CFS-012-113	18	See Map	22%	91
REL-CFS-012-114	18	See Map	22%	91
REL-CFS-012-115	18	See Map	22%	91
REL-CFS-012-116	18	See Map	22%	91
REL-CFS-012-117	18	See Map	22%	91
REL-CFS-012-118	18	See Map	22%	91
REL-CFS-012-119	18	See Map	22%	91
REL-CFS-012-120	18	See Map	22%	91
REL-CFS-012-121	18	See Map	22%	91
REL-CFS-012-122	18	See Map	22%	91
REL-CFS-012-123	18	See Map	22%	91
REL-CFS-012-124	12	See Map	33%	42
REL-CFS-012-125	12	See Map	33%	42

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-012-126	12	See Map	33%	42
REL-CFS-012-127	12	See Map	33%	42
REL-CFS-012-128	12	See Map	33%	42
REL-CFS-012-129	12	See Map	33%	42
REL-CFS-012-130	12	See Map	33%	42
REL-CFS-012-131	12	See Map	33%	42
REL-CFS-012-132	12	See Map	33%	42
REL-CFS-012-133	12	See Map	33%	42
REL-CFS-012-134	12	See Map	33%	42
REL-CFS-012-135	12	See Map	33%	42
REL-CFS-012-136	12	See Map	33%	42
REL-CFS-012-137	18	See Map	25%	72
REL-CFS-012-138	18	See Map	25%	72
REL-CFS-012-139	18	See Map	25%	72
REL-CFS-012-140	18	See Map	25%	72
REL-CFS-012-141	18	See Map	25%	72
REL-CFS-012-142	18	See Map	25%	72
REL-CFS-012-143	12	See Map	2%	96
REL-CFS-012-144	12	See Map	2%	96
REL-CFS-012-145	12	See Map	2%	96
REL-CFS-012-146	12	See Map	2%	96
REL-CFS-012-147	12	See Map	2%	96
REL-CFS-012-148	12	See Map	2%	96
REL-CFS-012-149	12	See Map	2%	96
REL-CFS-012-150	12	See Map	2%	96
REL-CFS-012-151	12	See Map	2%	96
REL-CFS-012-152	12	See Map	2%	96
REL-CFS-012-153	12	See Map	2%	96
REL-CFS-012-154	12	See Map	2%	96
REL-CFS-012-155	12	See Map	2%	96
REL-CFS-012-156	12	See Map	2%	96
REL-CFS-012-157	12	See Map	2%	96
REL-CFS-012-158	12	See Map	2%	96
REL-CFS-012-159	12	See Map	2%	96
REL-CFS-012-160	12	See Map	2%	96
REL-CFS-012-161	12	See Map	2%	96
REL-CFS-012-162	12	See Map	2%	96
REL-CFS-012-163	12	See Map	2%	96
REL-CFS-012-164	12	See Map	2%	96
REL-CFS-012-165	12	See Map	2%	96
REL-CFS-012-166	12	See Map	2%	96
REL-CFS-012-167	12	See Map	2%	96
REL-CFS-012-168	12	See Map	2%	96

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-012-169	12	See Map	14%	93
REL-CFS-012-170	12	See Map	14%	93
REL-CFS-012-171	12	See Map	14%	93
REL-CFS-012-172	12	See Map	14%	93
REL-CFS-012-173	12	See Map	14%	93
REL-CFS-012-174	12	See Map	14%	93
REL-CFS-012-175	12	See Map	14%	93
REL-CFS-012-176	12	See Map	14%	93
REL-CFS-012-177	12	See Map	14%	93
REL-CFS-012-178	12	See Map	14%	93
REL-CFS-012-179	12	See Map	14%	93
REL-CFS-012-180	12	See Map	10%	84
REL-CFS-012-181	12	See Map	10%	84
REL-CFS-012-182	12	See Map	10%	84
REL-CFS-012-183	12	See Map	10%	84
REL-CFS-012-184	12	See Map	10%	84
REL-CFS-012-185	12	See Map	10%	84
REL-CFS-012-186	12	See Map	10%	84
REL-CFS-012-187	12	See Map	10%	84
REL-CFS-012-188	12	See Map	10%	84
REL-CFS-012-189	12	See Map	10%	84
REL-CFS-012-190	12	See Map	10%	84
REL-CFS-012-191	12	See Map	10%	84
REL-CFS-012-192	12	See Map	10%	84
REL-CFS-012-193	12	See Map	10%	84
REL-CFS-012-194	12	See Map	9%	151
REL-CFS-012-195	12	See Map	9%	151
REL-CFS-012-196	12	See Map	9%	151
REL-CFS-012-197	12	See Map	9%	151
REL-CFS-012-198	12	See Map	9%	151
REL-CFS-012-199	12	See Map	9%	151
REL-CFS-012-200	12	See Map	33%	12
REL-CFS-012-201	12	See Map	33%	12
REL-CFS-012-202	12	See Map	33%	12
REL-CFS-012-203	12	See Map	33%	12
REL-CFS-012-204	12	See Map	33%	12
REL-CFS-012-205	12	See Map	33%	12
REL-CFS-012-206	12	See Map	33%	12
REL-CFS-012-207	12	See Map	25%	24
REL-CFS-012-208	12	See Map	25%	24
REL-CFS-012-209	12	See Map	25%	24
REL-CFS-012-210	12	See Map	25%	24
REL-CFS-012-211	12	See Map	25%	24

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-012-212	12	See Map	10%	105
REL-CFS-012-213	12	See Map	10%	105
REL-CFS-012-214	12	See Map	10%	105
REL-CFS-012-215	12	See Map	3%	172
REL-CFS-012-216	12	See Map	3%	172
REL-CFS-013-001	12	See Map	14%	43
REL-CFS-013-002	12	See Map	14%	43
REL-CFS-013-003	12	See Map	14%	43
REL-CFS-013-004	12	See Map	5%	94
REL-CFS-013-005	12	See Map	5%	94
REL-CFS-013-006	12	See Map	5%	94
REL-CFS-013-007	12	See Map	5%	94
REL-CFS-013-008	12	See Map	5%	94
REL-CFS-013-009	12	See Map	3%	118
REL-CFS-013-010	12	See Map	3%	118
REL-CFS-013-011	12	See Map	3%	118
REL-CFS-013-012	12	See Map	3%	118
REL-CFS-013-013	12	See Map	3%	118
REL-CFS-013-014	12	See Map	6%	139
REL-CFS-013-015	12	See Map	6%	139
REL-CFS-013-016	12	See Map	6%	139
REL-CFS-013-017	12	See Map	6%	139
REL-CFS-013-018	12	See Map	6%	139
REL-CFS-013-019	12	See Map	6%	139
REL-CFS-013-020	12	See Map	6%	139
REL-CFS-013-021	12	See Map	6%	139
REL-CFS-013-022	12	See Map	6%	139
REL-CFS-013-023	12	See Map	5%	86
REL-CFS-013-024	18	See Map	7%	296
REL-CFS-013-025	18	See Map	7%	296
REL-CFS-013-026	18	See Map	7%	296
REL-CFS-013-027	18	See Map	7%	296
REL-CFS-013-028	12	See Map	10%	98
REL-CFS-013-029	12	See Map	10%	98
REL-CFS-013-030	12	See Map	10%	98
REL-CFS-013-031	12	See Map	10%	98
REL-CFS-013-032	12	See Map	10%	98
REL-CFS-013-033	12	See Map	4%	46
REL-CFS-013-034	12	See Map	4%	46
REL-CFS-013-035	12	See Map	4%	46
REL-CFS-013-036	12	See Map	4%	46
REL-CFS-013-037	12	See Map	4%	46
REL-CFS-013-038	12	See Map	7%	162

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-013-039	12	See Map	7%	162
REL-CFS-013-040	12	See Map	7%	162
REL-CFS-013-041	12	See Map	7%	162
REL-CFS-013-042	12	See Map	7%	162
REL-CFS-013-043	12	See Map	14%	88
REL-CFS-013-044	12	See Map	14%	88
REL-CFS-013-045	12	See Map	14%	88
REL-CFS-013-046	12	See Map	14%	88
REL-CFS-013-047	12	See Map	14%	88
REL-CFS-013-048	12	See Map	14%	88
REL-CFS-013-049	12	See Map	4%	286
REL-CFS-013-050	12	See Map	4%	286
REL-CFS-013-051	12	See Map	4%	286
REL-CFS-013-052	12	See Map	4%	286
REL-CFS-013-053	12	See Map	4%	286
REL-CFS-013-054	12	See Map	4%	286
REL-CFS-013-055	12	See Map	4%	286
REL-CFS-013-056	12	See Map	4%	286
REL-CFS-013-057	12	See Map	4%	286
REL-CFS-013-058	12	See Map	9%	117
REL-CFS-013-059	12	See Map	9%	117
REL-CFS-013-060	12	See Map	2%	268
REL-CFS-013-061	12	See Map	2%	268
REL-CFS-013-062	12	See Map	2%	268
REL-CFS-013-063	12	See Map	2%	364
REL-CFS-013-064	12	See Map	2%	364
REL-CFS-013-065	12	See Map	2%	364
REL-CFS-013-066	12	See Map	2%	364
REL-CFS-013-067	12	See Map	2%	365
REL-CFS-013-068	12	See Map	2%	133
REL-CFS-013-069	12	See Map	2%	133
REL-CFS-013-070	12	See Map	2%	133
REL-CFS-013-071	Removed			
REL-CFS-013-072	12	See Map	2%	133
REL-CFS-013-073	12	See Map	2%	133
REL-CFS-013-074	12	See Map	2%	133
REL-CFS-013-075	12	See Map	2%	133
REL-CFS-013-076	18	See Map	18%	113
REL-CFS-013-077	18	See Map	18%	113
REL-CFS-013-078	18	See Map	18%	113
REL-CFS-013-079	18	See Map	18%	113
REL-CFS-013-080	18	See Map	18%	113
REL-CFS-013-081	18	See Map	18%	113

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-013-082	18	See Map	18%	113
REL-CFS-013-083	18	See Map	18%	113
REL-CFS-013-084	18	See Map	18%	113
REL-CFS-013-085	18	See Map	18%	113
REL-CFS-013-086	18	See Map	18%	113
REL-CFS-013-087	18	See Map	18%	113
REL-CFS-013-088	18	See Map	18%	113
REL-CFS-013-089	18	See Map	18%	113
REL-CFS-013-090	18	See Map	18%	113
REL-CFS-013-091	18	See Map	18%	113
REL-CFS-013-092	18	See Map	18%	113
REL-CFS-013-093	18	See Map	18%	113
REL-CFS-013-094	18	See Map	18%	113
REL-CFS-013-095	18	See Map	18%	113
REL-CFS-013-096	18	See Map	18%	113
REL-CFS-013-097	12	See Map	5%	332
REL-CFS-013-098	12	See Map	5%	332
REL-CFS-013-099	12	See Map	5%	332
REL-CFS-013-100	12	See Map	5%	332
REL-CFS-013-101	12	See Map	5%	332
REL-CFS-013-102	12	See Map	5%	332
REL-CFS-013-103	12	See Map	5%	332
REL-CFS-013-104	12	See Map	5%	332
REL-CFS-013-105	12	See Map	5%	332
REL-CFS-013-106	12	See Map	5%	332
REL-CFS-013-107	12	See Map	5%	332
REL-CFS-013-108	12	See Map	5%	332
REL-CFS-013-109	12	See Map	5%	332
REL-CFS-013-110	18	See Map	10%	193
REL-CFS-013-111	18	See Map	10%	193
REL-CFS-013-112	18	See Map	10%	193
REL-CFS-013-113	12	See Map	10%	163
REL-CFS-013-114	12	See Map	10%	163
REL-CFS-013-115	12	See Map	10%	163
REL-CFS-013-116	12	See Map	10%	163
REL-CFS-013-117	12	See Map	10%	163
REL-CFS-013-118	12	See Map	10%	163
REL-CFS-013-119	12	See Map	10%	163
REL-CFS-013-120	12	See Map	10%	163
REL-CFS-013-121	12	See Map	10%	163
REL-CFS-013-122	12	See Map	10%	163
REL-CFS-013-123	12	See Map	10%	163
REL-CFS-013-124	12	See Map	10%	163

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-013-125	12	See Map	10%	163
REL-CFS-013-126	12	See Map	10%	163
REL-CFS-013-127	12	See Map	10%	163
REL-CFS-013-128	12	See Map	10%	163
REL-CFS-013-129	12	See Map	10%	163
REL-CFS-013-130	12	See Map	10%	163
REL-CFS-013-131	12	See Map	10%	163
REL-CFS-013-132	12	See Map	10%	163
REL-CFS-013-133	12	See Map	10%	163
REL-CFS-013-134	12	See Map	10%	163
REL-CFS-013-135	12	See Map	10%	163
REL-CFS-013-136	12	See Map	10%	163
REL-CFS-013-137	12	See Map	10%	163
REL-CFS-013-138	12	See Map	10%	163
REL-CFS-013-139	12	See Map	10%	163
REL-CFS-013-140	12	See Map	10%	163
REL-CFS-013-141	12	See Map	10%	163
REL-CFS-013-142	12	See Map	10%	163
REL-CFS-013-143	12	See Map	10%	163
REL-CFS-013-144	12	See Map	10%	163
REL-CFS-013-145	12	See Map	10%	163
REL-CFS-013-146	12	See Map	10%	163
REL-CFS-013-147	12	See Map	10%	163
REL-CFS-013-148	12	See Map	10%	163
REL-CFS-013-149	12	See Map	10%	163
REL-CFS-013-150	12	See Map	10%	163
REL-CFS-013-151	12	See Map	10%	163
REL-CFS-013-600	12	See Map	10%	98
REL-CFS-013-601	12	See Map	11%	80
REL-CFS-013-602	12	See Map	11%	80
REL-CFS-013-603	12	See Map	11%	80
REL-CFS-013-604	12	See Map	Wetland	
REL-CFS-013-605	12	See Map	Wetland	
REL-CFS-014-001	18	See Map	12%	206
REL-CFS-014-002	18	See Map	12%	206
REL-CFS-014-003	18	See Map	12%	206
REL-CFS-014-004	24	See Map	9%	370
REL-CFS-014-005	24	See Map	9%	370
REL-CFS-014-006	24	See Map	9%	370
REL-CFS-014-007	24	See Map	9%	370
REL-CFS-014-008	24	See Map	9%	370
REL-CFS-014-009	24	See Map	9%	370
REL-CFS-014-010	24	See Map	9%	370

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-014-011	24	See Map	9%	370
REL-CFS-014-012	24	See Map	9%	370
REL-CFS-014-013	24	See Map	9%	370
REL-CFS-014-014	24	See Map	9%	370
REL-CFS-014-015	24	See Map	9%	370
REL-CFS-014-016	24	See Map	9%	370
REL-CFS-014-017	24	See Map	9%	370
REL-CFS-014-018	24	See Map	9%	370
REL-CFS-014-019	24	See Map	9%	370
REL-CFS-014-020	24	See Map	9%	370
REL-CFS-014-021	24	See Map	9%	370
REL-CFS-014-022	24	See Map	9%	370
REL-CFS-014-023	24	See Map	9%	370
REL-CFS-014-024	24	See Map	9%	370
REL-CFS-014-025	24	See Map	9%	370
REL-CFS-014-026	24	See Map	9%	370
REL-CFS-014-027	24	See Map	9%	370
REL-CFS-014-028	24	See Map	9%	370
REL-CFS-014-029	24	See Map	9%	370
REL-CFS-014-030	24	See Map	9%	370
REL-CFS-014-031	24	See Map	9%	370
REL-CFS-014-032	24	See Map	10%	280
REL-CFS-014-033	24	See Map	10%	280
REL-CFS-014-034	24	See Map	10%	280
REL-CFS-014-035	24	See Map	10%	280
REL-CFS-014-036	24	See Map	10%	280
REL-CFS-014-037	24	See Map	10%	280
REL-CFS-014-038	24	See Map	10%	280
REL-CFS-014-039	24	See Map	10%	280
REL-CFS-014-040	24	See Map	10%	280
REL-CFS-014-041	24	See Map	10%	280
REL-CFS-014-042	24	See Map	10%	280
REL-CFS-014-043	24	See Map	10%	280
REL-CFS-014-044	24	See Map	10%	280
REL-CFS-014-045	24	See Map	10%	280
REL-CFS-014-046	24	See Map	10%	280
REL-CFS-014-047	24	See Map	10%	280
REL-CFS-014-048	18	See Map	3%	478
REL-CFS-014-049	18	See Map	3%	478
REL-CFS-014-050	18	See Map	3%	478
REL-CFS-014-051	18	See Map	3%	478
REL-CFS-014-051	12	See Map	2%	188
REL-CFS-014-052	12	See Map	2%	188

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-014-053	12	See Map	2%	188
REL-CFS-014-054	12	See Map	2%	188
REL-CFS-014-055	12	See Map	2%	188
REL-CFS-014-056	12	See Map	2%	188
REL-CFS-014-057	12	See Map	2%	188
REL-CFS-014-058	12	See Map	2%	188
REL-CFS-014-059	12	See Map	2%	188
REL-CFS-014-060	18	See Map	14%	174
REL-CFS-014-061	18	See Map	14%	174
REL-CFS-014-062	12	See Map	2%	141
REL-CFS-014-063	12	See Map	2%	141
REL-CFS-014-064	12	See Map	2%	141
REL-CFS-014-065	12	See Map	2%	141
REL-CFS-014-066	12	See Map	2%	141
REL-CFS-014-067	12	See Map	2%	141
REL-CFS-014-068	12	See Map	2%	141
REL-CFS-014-069	12	See Map	2%	87
REL-CFS-014-070	12	See Map	2%	87
REL-CFS-014-071	12	See Map	2%	87
REL-CFS-014-072	12	See Map	2%	87
REL-CFS-014-073	12	See Map	2%	87
REL-CFS-014-074	12	See Map	2%	87
REL-CFS-014-075	12	See Map	2%	87
REL-CFS-014-076	12	See Map	2%	87
REL-CFS-014-077	12	See Map	3%	374
REL-CFS-014-600	12	See Map	5%	123
REL-CFS-015-001	12	See Map	2%	131
REL-CFS-015-002	Removed			
REL-CFS-015-003	12	See Map	9%	166
REL-CFS-015-004	12	See Map	9%	166
REL-CFS-015-005	12	See Map	2%	190
REL-CFS-015-006	12	See Map	10%	147
REL-CFS-015-007	12	See Map	10%	147
REL-CFS-015-008	12	See Map	10%	147
REL-CFS-015-009	12	See Map	4%	366
REL-CFS-015-010	12	See Map	2%	129
REL-CFS-015-011	12	See Map	2%	129
REL-CFS-015-012	12	See Map	2%	129
REL-CFS-015-013	12	See Map	2%	129
REL-CFS-015-014	12	See Map	2%	129
REL-CFS-015-015	12	See Map	2%	129
REL-CFS-015-016	12	See Map	2%	162
REL-CFS-015-017	12	See Map	2%	162

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-015-018	12	See Map	2%	162
REL-CFS-015-019	12	See Map	2%	162
REL-CFS-015-020	12	See Map	2%	162
REL-CFS-015-021	12	See Map	2%	162
REL-CFS-015-022	12	See Map	2%	162
REL-CFS-015-023	12	See Map	2%	162
REL-CFS-015-024	12	See Map	2%	162
REL-CFS-015-025	12	See Map	2%	162
REL-CFS-015-026	12	See Map	2%	162
REL-CFS-015-027	12	See Map	2%	162
REL-CFS-015-028	12	See Map	2%	162
REL-CFS-015-029	12	See Map	2%	162
REL-CFS-015-030	12	See Map	2%	162
REL-CFS-015-031	12	See Map	2%	162
REL-CFS-015-032	12	See Map	2%	162
REL-CFS-015-033	12	See Map	2%	162
REL-CFS-015-034	12	See Map	2%	162
REL-CFS-015-035	12	See Map	2%	162
REL-CFS-015-036	Removed			
REL-CFS-015-037				
REL-CFS-015-038				
REL-CFS-015-039				
REL-CFS-015-040				
REL-CFS-015-041				
REL-CFS-015-042				
REL-CFS-015-043				
REL-CFS-015-044				
REL-CFS-015-045				
REL-CFS-015-046				
REL-CFS-015-047				
REL-CFS-015-048				
REL-CFS-015-049				
REL-CFS-015-050				
REL-CFS-015-051				
REL-CFS-015-052				
REL-CFS-015-053				
REL-CFS-015-054				
REL-CFS-015-055				
REL-CFS-015-056				
REL-CFS-015-057				
REL-CFS-015-058				
REL-CFS-015-059				
REL-CFS-015-060				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-015-061				
REL-CFS-015-062				
REL-CFS-015-063				
REL-CFS-015-064				
REL-CFS-015-065				
REL-CFS-015-068	12	See Map	9%	96
REL-CFS-015-069	12	See Map	9%	96
REL-CFS-015-070	12	See Map	9%	96
REL-CFS-015-071	12	See Map	9%	96
REL-CFS-015-072	18	See Map	11%	204
REL-CFS-015-073	18	See Map	11%	204
REL-CFS-015-074	18	See Map	11%	204
REL-CFS-015-075	18	See Map	11%	204
REL-CFS-015-076	18	See Map	11%	204
REL-CFS-015-077	18	See Map	11%	204
REL-CFS-015-078	18	See Map	11%	204
REL-CFS-015-079	18	See Map	11%	204
REL-CFS-015-080	18	See Map	11%	204
REL-CFS-015-081	18	See Map	11%	204
REL-CFS-015-082	18	See Map	11%	204
REL-CFS-015-083	18	See Map	11%	204
REL-CFS-015-084	18	See Map	11%	204
REL-CFS-015-085	12	See Map	2%	202
REL-CFS-015-086	12	See Map	2%	202
REL-CFS-015-087	12	See Map	2%	202
REL-CFS-015-088	12	See Map	2%	202
REL-CFS-015-089	12	See Map	2%	202
REL-CFS-015-090	12	See Map	2%	202
REL-CFS-015-091	12	See Map	2%	202
REL-CFS-015-092	12	See Map	2%	203
REL-CFS-015-093	12	See Map	2%	103
REL-CFS-015-094	12	See Map	2%	103
REL-CFS-015-095	12	See Map	2%	103
REL-CFS-015-096	12	See Map	2%	103
REL-CFS-015-097	12	See Map	2%	103
REL-CFS-015-098	12	See Map	2%	103
REL-CFS-015-099	12	See Map	2%	103
REL-CFS-015-100	12	See Map	2%	103
REL-CFS-015-101	12	See Map	2%	103
REL-CFS-015-102	12	See Map	2%	103
REL-CFS-015-103	12	See Map	2%	103
REL-CFS-015-104	12	See Map	2%	103
REL-CFS-015-105	12	See Map	2%	103

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-015-106	12	See Map	2%	103
REL-CFS-015-107	12	See Map	2%	103
REL-CFS-015-108	12	See Map	29%	41
REL-CFS-015-109	12	See Map	29%	41
REL-CFS-015-110	12	See Map	5%	79
REL-CFS-015-111	12	See Map	5%	79
REL-CFS-015-112	12	See Map	5%	79
REL-CFS-015-113	12	See Map	5%	79
REL-CFS-015-114	12	See Map	5%	79
REL-CFS-015-115	12	See Map	5%	79
REL-CFS-015-116	12	See Map	5%	79
REL-CFS-015-117	12	See Map	5%	79
REL-CFS-015-118	12	See Map	5%	79
REL-CFS-015-119	12	See Map	5%	79
REL-CFS-015-120	12	See Map	5%	79
REL-CFS-015-121	12	See Map	5%	79
REL-CFS-015-122	12	See Map	5%	79
REL-CFS-015-123	12	See Map	5%	79
REL-CFS-015-124	12	See Map	5%	79
REL-CFS-015-125	12	See Map	5%	79
REL-CFS-015-126	12	See Map	5%	79
REL-CFS-015-127	12	See Map	5%	79
REL-CFS-015-128	12	See Map	5%	79
REL-CFS-015-129	12	See Map	5%	79
REL-CFS-015-130	12	See Map	2%	93
REL-CFS-015-131	12	See Map	2%	93
REL-CFS-015-132	12	See Map	2%	139
REL-CFS-015-133	12	See Map	2%	139
REL-CFS-015-134	12	See Map	2%	184
REL-CFS-015-135	12	See Map	2%	184
REL-CFS-015-136	12	See Map	2%	184
REL-CFS-015-137	12	See Map	2%	184
REL-CFS-015-138	24	See Map	21%	151
REL-CFS-015-139	24	See Map	21%	151
REL-CFS-015-140	24	See Map	21%	151
REL-CFS-015-141	24	See Map	21%	151
REL-CFS-015-142	24	See Map	21%	151
REL-CFS-015-143	24	See Map	21%	151
REL-CFS-015-144	24	See Map	21%	151
REL-CFS-015-145	24	See Map	21%	151
REL-CFS-015-146	24	See Map	21%	151
REL-CFS-015-147	24	See Map	21%	151
REL-CFS-015-148	24	See Map	21%	151

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-015-149	24	See Map	21%	151
REL-CFS-015-150	24	See Map	21%	151
REL-CFS-015-151	24	See Map	21%	151
REL-CFS-015-152	24	See Map	21%	151
REL-CFS-015-153	24	See Map	21%	151
REL-CFS-015-154	24	See Map	21%	151
REL-CFS-015-155	24	See Map	21%	151
REL-CFS-015-156	24	See Map	21%	151
REL-CFS-015-157	24	See Map	21%	151
REL-CFS-015-158	12	See Map	6%	114
REL-CFS-015-159	12	See Map	6%	114
REL-CFS-015-160	12	See Map	6%	114
REL-CFS-015-161	12	See Map	6%	114
REL-CFS-015-162	12	See Map	6%	114
REL-CFS-015-163	12	See Map	6%	114
REL-CFS-015-164	18	See Map	37%	38
REL-CFS-015-165	18	See Map	37%	38
REL-CFS-015-166	18	See Map	37%	38
REL-CFS-015-167	18	See Map	37%	38
REL-CFS-015-168	18	See Map	37%	38
REL-CFS-015-169	18	See Map	37%	38
REL-CFS-015-170	18	See Map	37%	38
REL-CFS-015-171	18	See Map	37%	38
REL-CFS-015-172	24	See Map	42%	53
REL-CFS-015-173	24	See Map	24%	135
REL-CFS-015-174	18	See Map	16%	128
REL-CFS-015-175	24	See Map	19%	190
REL-CFS-015-176	24	See Map	19%	190
REL-CFS-015-177	24	See Map	19%	190
REL-CFS-015-178	24	See Map	19%	190
REL-CFS-015-179	24	See Map	19%	190
REL-CFS-015-180	24	See Map	19%	190
REL-CFS-015-181	24	See Map	19%	190
REL-CFS-015-182	24	See Map	19%	190
REL-CFS-015-183	24	See Map	19%	190
REL-CFS-015-184	24	See Map	19%	190
REL-CFS-015-185	24	See Map	19%	190
REL-CFS-015-186	24	See Map	19%	190
REL-CFS-015-187	24	See Map	26%	135
REL-CFS-015-188	24	See Map	26%	135
REL-CFS-015-189	24	See Map	26%	135
REL-CFS-015-190	24	See Map	26%	135
REL-CFS-015-191	24	See Map	26%	135

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-015-192	24	See Map	26%	135
REL-CFS-015-193	24	See Map	26%	135
REL-CFS-015-194	24	See Map	26%	135
REL-CFS-015-195	24	See Map	26%	135
REL-CFS-015-196	24	See Map	26%	135
REL-CFS-015-197	24	See Map	26%	135
REL-CFS-015-198	24	See Map	26%	135
REL-CFS-015-199	24	See Map	26%	135
REL-CFS-015-200	24	See Map	26%	135
REL-CFS-015-600	12	See Map	2%	400
REL-CFS-015-601	12	See Map	2%	400
REL-CFS-015-602	12	See Map	Wetland	
REL-CFS-015-603	12	See Map	2%	230
REL-CFS-015-604	12	See Map	Wetland	
REL-CFS-016-001	18	See Map	18%	126
REL-CFS-016-002	18	See Map	18%	126
REL-CFS-016-003	18	See Map	18%	126
REL-CFS-016-004	18	See Map	18%	126
REL-CFS-016-005	18	See Map	18%	126
REL-CFS-016-006	18	See Map	18%	126
REL-CFS-016-007	18	See Map	18%	126
REL-CFS-016-008	18	See Map	18%	126
REL-CFS-016-009	18	See Map	18%	126
REL-CFS-016-010	18	See Map	18%	126
REL-CFS-016-011	18	See Map	18%	126
REL-CFS-016-012	18	See Map	18%	126
REL-CFS-016-013	18	See Map	18%	126
REL-CFS-016-014	18	See Map	18%	126
REL-CFS-016-015	18	See Map	18%	126
REL-CFS-016-016	18	See Map	18%	126
REL-CFS-016-017	18	See Map	18%	126
REL-CFS-016-018	18	See Map	18%	126
REL-CFS-016-019	18	See Map	18%	126
REL-CFS-016-020	18	See Map	18%	126
REL-CFS-016-021	18	See Map	18%	126
REL-CFS-016-022	18	See Map	18%	126
REL-CFS-016-023	18	See Map	18%	126
REL-CFS-016-024	18	See Map	18%	126
REL-CFS-016-025	18	See Map	18%	126
REL-CFS-016-026	18	See Map	18%	126
REL-CFS-016-027	12	See Map	13%	126
REL-CFS-016-028	12	See Map	13%	126
REL-CFS-016-029	12	See Map	13%	126

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-030	12	See Map	13%	126
REL-CFS-016-031	12	See Map	13%	126
REL-CFS-016-032	12	See Map	13%	126
REL-CFS-016-033	12	See Map	13%	126
REL-CFS-016-034	12	See Map	13%	126
REL-CFS-016-035	12	See Map	13%	126
REL-CFS-016-036	12	See Map	13%	126
REL-CFS-016-037	12	See Map	13%	126
REL-CFS-016-038	12	See Map	13%	126
REL-CFS-016-039	12	See Map	13%	126
REL-CFS-016-040	12	See Map	13%	126
REL-CFS-016-041	12	See Map	13%	126
REL-CFS-016-042	12	See Map	13%	126
REL-CFS-016-043	12	See Map	13%	126
REL-CFS-016-044	12	See Map	13%	126
REL-CFS-016-045	12	See Map	13%	126
REL-CFS-016-046	12	See Map	13%	126
REL-CFS-016-047	12	See Map	13%	126
REL-CFS-016-048	12	See Map	13%	126
REL-CFS-016-049	12	See Map	13%	126
REL-CFS-016-050	12	See Map	13%	126
REL-CFS-016-051	12	See Map	13%	126
REL-CFS-016-052	12	See Map	13%	126
REL-CFS-016-053	12	See Map	13%	126
REL-CFS-016-054	12	See Map	13%	126
REL-CFS-016-055	12	See Map	13%	126
REL-CFS-016-056	12	See Map	13%	126
REL-CFS-016-057	12	See Map	13%	126
REL-CFS-016-058	12	See Map	13%	126
REL-CFS-016-059	12	See Map	13%	126
REL-CFS-016-060	12	See Map	13%	126
REL-CFS-016-061	12	See Map	13%	126
REL-CFS-016-062	12	See Map	13%	126
REL-CFS-016-063	12	See Map	13%	126
REL-CFS-016-064	12	See Map	13%	126
REL-CFS-016-065	12	See Map	13%	126
REL-CFS-016-066	12	See Map	13%	126
REL-CFS-016-067	12	See Map	13%	126
REL-CFS-016-068	12	See Map	29%	28
REL-CFS-016-069	12	See Map	29%	28
REL-CFS-016-070	12	See Map	29%	28
REL-CFS-016-071	12	See Map	29%	28
REL-CFS-016-072	12	See Map	29%	28

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-073	12	See Map	29%	28
REL-CFS-016-074	12	See Map	29%	28
REL-CFS-016-075	12	See Map	30%	47
REL-CFS-016-076	12	See Map	30%	47
REL-CFS-016-077	12	See Map	30%	47
REL-CFS-016-078	12	See Map	30%	47
REL-CFS-016-079	12	See Map	30%	47
REL-CFS-016-080	12	See Map	30%	47
REL-CFS-016-081	12	See Map	30%	47
REL-CFS-016-082	12	See Map	30%	47
REL-CFS-016-083	24	See Map	31%	84
REL-CFS-016-084	24	See Map	31%	84
REL-CFS-016-085	24	See Map	31%	84
REL-CFS-016-086	24	See Map	31%	84
REL-CFS-016-087	24	See Map	31%	84
REL-CFS-016-088	24	See Map	31%	84
REL-CFS-016-089	24	See Map	31%	84
REL-CFS-016-090	24	See Map	31%	84
REL-CFS-016-091	24	See Map	31%	84
REL-CFS-016-092	24	See Map	31%	84
REL-CFS-016-093	24	See Map	31%	84
REL-CFS-016-094	24	See Map	31%	84
REL-CFS-016-095	24	See Map	31%	84
REL-CFS-016-096	24	See Map	31%	84
REL-CFS-016-097	24	See Map	31%	84
REL-CFS-016-098	24	See Map	31%	84
REL-CFS-016-099	12	See Map	10%	42
REL-CFS-016-100	12	See Map	10%	42
REL-CFS-016-101	12	See Map	15%	68
REL-CFS-016-102	12	See Map	15%	68
REL-CFS-016-103	12	See Map	15%	68
REL-CFS-016-104	12	See Map	15%	68
REL-CFS-016-105	12	See Map	15%	68
REL-CFS-016-106	12	See Map	15%	68
REL-CFS-016-107	12	See Map	15%	68
REL-CFS-016-108	12	See Map	15%	68
REL-CFS-016-109	12	See Map	15%	68
REL-CFS-016-110	12	See Map	15%	68
REL-CFS-016-111	12	See Map	15%	68
REL-CFS-016-112	12	See Map	15%	68
REL-CFS-016-113	12	See Map	15%	68
REL-CFS-016-114	12	See Map	15%	68
REL-CFS-016-115	12	See Map	15%	68

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-116	12	See Map	15%	68
REL-CFS-016-117	12	See Map	15%	68
REL-CFS-016-118	12	See Map	15%	68
REL-CFS-016-119	12	See Map	15%	68
REL-CFS-016-120	12	See Map	15%	68
REL-CFS-016-121	12	See Map	15%	68
REL-CFS-016-122	12	See Map	15%	68
REL-CFS-016-123	12	See Map	15%	68
REL-CFS-016-124	12	See Map	15%	68
REL-CFS-016-125	12	See Map	15%	68
REL-CFS-016-126	12	See Map	15%	68
REL-CFS-016-127	12	See Map	15%	68
REL-CFS-016-128	12	See Map	15%	68
REL-CFS-016-129	12	See Map	15%	68
REL-CFS-016-130	12	See Map	15%	68
REL-CFS-016-131	12	See Map	15%	68
REL-CFS-016-132	12	See Map	15%	68
REL-CFS-016-133	12	See Map	15%	68
REL-CFS-016-134	12	See Map	15%	68
REL-CFS-016-135	12	See Map	15%	68
REL-CFS-016-136	12	See Map	15%	68
REL-CFS-016-137	12	See Map	15%	68
REL-CFS-016-138	12	See Map	15%	68
REL-CFS-016-139	12	See Map	15%	68
REL-CFS-016-140	12	See Map	15%	68
REL-CFS-016-141	12	See Map	15%	68
REL-CFS-016-142	12	See Map	15%	68
REL-CFS-016-143	12	See Map	15%	68
REL-CFS-016-144	12	See Map	15%	68
REL-CFS-016-145	12	See Map	15%	68
REL-CFS-016-146	12	See Map	15%	68
REL-CFS-016-147	12	See Map	15%	68
REL-CFS-016-148	12	See Map	15%	68
REL-CFS-016-149	12	See Map	15%	68
REL-CFS-016-150	12	See Map	15%	68
REL-CFS-016-151	12	See Map	15%	68
REL-CFS-016-152	12	See Map	15%	68
REL-CFS-016-153	12	See Map	15%	68
REL-CFS-016-154	12	See Map	15%	68
REL-CFS-016-155	12	See Map	15%	68
REL-CFS-016-156	12	See Map	15%	68
REL-CFS-016-157	12	See Map	15%	68
REL-CFS-016-158	12	See Map	15%	68

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-159	12	See Map	15%	68
REL-CFS-016-160	12	See Map	15%	68
REL-CFS-016-161	12	See Map	15%	68
REL-CFS-016-162	12	See Map	15%	68
REL-CFS-016-163	12	See Map	15%	68
REL-CFS-016-164	12	See Map	15%	68
REL-CFS-016-165	12	See Map	15%	68
REL-CFS-016-166	12	See Map	5%	197
REL-CFS-016-167	12	See Map	5%	197
REL-CFS-016-168	12	See Map	5%	125
REL-CFS-016-169	12	See Map	5%	125
REL-CFS-016-170	18	See Map	10%	195
REL-CFS-016-171	18	See Map	10%	195
REL-CFS-016-172	18	See Map	10%	195
REL-CFS-016-173	18	See Map	10%	195
REL-CFS-016-174	18	See Map	10%	195
REL-CFS-016-175	18	See Map	10%	195
REL-CFS-016-176	18	See Map	10%	195
REL-CFS-016-177	18	See Map	10%	195
REL-CFS-016-178	18	See Map	10%	195
REL-CFS-016-179	18	See Map	10%	195
REL-CFS-016-180	18	See Map	10%	195
REL-CFS-016-181	18	See Map	10%	195
REL-CFS-016-182	18	See Map	10%	195
REL-CFS-016-183	18	See Map	10%	195
REL-CFS-016-184	18	See Map	10%	195
REL-CFS-016-185	18	See Map	10%	195
REL-CFS-016-186	18	See Map	10%	195
REL-CFS-016-187	18	See Map	10%	195
REL-CFS-016-188	18	See Map	10%	195
REL-CFS-016-189	18	See Map	10%	195
REL-CFS-016-190	18	See Map	10%	195
REL-CFS-016-191	18	See Map	10%	195
REL-CFS-016-192	18	See Map	10%	195
REL-CFS-016-193	12	See Map	9%	56
REL-CFS-016-194	32	See Map	9%	56
REL-CFS-016-195	12	See Map	8%	49
REL-CFS-016-196	12	See Map	8%	49
REL-CFS-016-197	12	See Map	15%	83
REL-CFS-016-198	12	See Map	15%	83
REL-CFS-016-199	12	See Map	15%	83
REL-CFS-016-200	12	See Map	15%	83
REL-CFS-016-201	12	See Map	15%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-202	12	See Map	15%	83
REL-CFS-016-203	12	See Map	15%	83
REL-CFS-016-204	12	See Map	15%	83
REL-CFS-016-205	12	See Map	15%	83
REL-CFS-016-206	12	See Map	15%	83
REL-CFS-016-207	12	See Map	15%	83
REL-CFS-016-208	12	See Map	15%	83
REL-CFS-016-209	12	See Map	15%	83
REL-CFS-016-210	12	See Map	15%	83
REL-CFS-016-211	12	See Map	15%	83
REL-CFS-016-212	18	See Map	28%	80
REL-CFS-016-213	18	See Map	28%	80
REL-CFS-016-214	18	See Map	28%	80
REL-CFS-016-215	18	See Map	28%	80
REL-CFS-016-216	18	See Map	28%	80
REL-CFS-016-217	18	See Map	28%	80
REL-CFS-016-218	18	See Map	28%	80
REL-CFS-016-219	18	See Map	28%	80
REL-CFS-016-220	18	See Map	28%	80
REL-CFS-016-221	18	See Map	28%	80
REL-CFS-016-222	18	See Map	28%	80
REL-CFS-016-223	18	See Map	28%	80
REL-CFS-016-224	18	See Map	28%	80
REL-CFS-016-225	18	See Map	28%	80
REL-CFS-016-226	12	See Map	22%	45
REL-CFS-016-227	12	See Map	22%	45
REL-CFS-016-228	12	See Map	22%	45
REL-CFS-016-229	12	See Map	22%	45
REL-CFS-016-230	12	See Map	22%	45
REL-CFS-016-231	12	See Map	22%	45
REL-CFS-016-232	12	See Map	22%	45
REL-CFS-016-233	12	See Map	22%	45
REL-CFS-016-234	12	See Map	22%	45
REL-CFS-016-235	12	See Map	22%	45
REL-CFS-016-236	12	See Map	22%	45
REL-CFS-016-237	12	See Map	22%	45
REL-CFS-016-238	12	See Map	22%	45
REL-CFS-016-239	12	See Map	22%	45
REL-CFS-016-240	12	See Map	22%	45
REL-CFS-016-241	12	See Map	22%	45
REL-CFS-016-242	18	See Map	23%	79
REL-CFS-016-243	18	See Map	23%	79
REL-CFS-016-244	18	See Map	23%	79

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-245	18	See Map	23%	79
REL-CFS-016-246	18	See Map	23%	79
REL-CFS-016-247	18	See Map	23%	79
REL-CFS-016-248	18	See Map	23%	79
REL-CFS-016-249	18	See Map	23%	79
REL-CFS-016-250	18	See Map	23%	79
REL-CFS-016-251	18	See Map	22%	72
REL-CFS-016-252	18	See Map	22%	72
REL-CFS-016-253	18	See Map	22%	72
REL-CFS-016-254	18	See Map	22%	72
REL-CFS-016-255	18	See Map	22%	72
REL-CFS-016-256	18	See Map	22%	72
REL-CFS-016-257	18	See Map	22%	72
REL-CFS-016-258	18	See Map	22%	72
REL-CFS-016-259	18	See Map	22%	72
REL-CFS-016-260	18	See Map	22%	72
REL-CFS-016-261	18	See Map	22%	72
REL-CFS-016-262	18	See Map	22%	72
REL-CFS-016-263	18	See Map	22%	72
REL-CFS-016-264	18	See Map	22%	72
REL-CFS-016-265	18	See Map	22%	72
REL-CFS-016-266	18	See Map	22%	72
REL-CFS-016-267	18	See Map	22%	72
REL-CFS-016-268	18	See Map	22%	72
REL-CFS-016-269	18	See Map	22%	72
REL-CFS-016-270	18	See Map	22%	83
REL-CFS-016-271	18	See Map	22%	83
REL-CFS-016-272	18	See Map	22%	83
REL-CFS-016-273	18	See Map	22%	83
REL-CFS-016-274	18	See Map	22%	83
REL-CFS-016-275	18	See Map	22%	83
REL-CFS-016-276	18	See Map	22%	83
REL-CFS-016-277	18	See Map	22%	83
REL-CFS-016-278	18	See Map	22%	83
REL-CFS-016-279	18	See Map	22%	83
REL-CFS-016-280	18	See Map	22%	83
REL-CFS-016-281	18	See Map	22%	83
REL-CFS-016-282	18	See Map	22%	83
REL-CFS-016-283	18	See Map	22%	83
REL-CFS-016-284	18	See Map	22%	83
REL-CFS-016-285	18	See Map	22%	83
REL-CFS-016-286	18	See Map	22%	83
REL-CFS-016-287	18	See Map	22%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-288	18	See Map	22%	83
REL-CFS-016-289	18	See Map	22%	83
REL-CFS-016-290	18	See Map	22%	83
REL-CFS-016-291	18	See Map	22%	83
REL-CFS-016-292	18	See Map	22%	83
REL-CFS-016-293	18	See Map	22%	83
REL-CFS-016-294	18	See Map	22%	83
REL-CFS-016-295	18	See Map	22%	83
REL-CFS-016-296	18	See Map	22%	83
REL-CFS-016-297	18	See Map	22%	83
REL-CFS-016-298	18	See Map	22%	83
REL-CFS-016-299	18	See Map	22%	83
REL-CFS-016-300	18	See Map	22%	83
REL-CFS-016-301	18	See Map	22%	83
REL-CFS-016-302	18	See Map	22%	83
REL-CFS-016-303	18	See Map	22%	83
REL-CFS-016-304	18	See Map	22%	83
REL-CFS-016-305	18	See Map	22%	83
REL-CFS-016-306	18	See Map	22%	83
REL-CFS-016-307	18	See Map	22%	83
REL-CFS-016-308	18	See Map	22%	83
REL-CFS-016-309	18	See Map	22%	83
REL-CFS-016-310	18	See Map	22%	83
REL-CFS-016-311	18	See Map	22%	83
REL-CFS-016-312	18	See Map	22%	83
REL-CFS-016-313	18	See Map	22%	83
REL-CFS-016-314	18	See Map	22%	83
REL-CFS-016-315	18	See Map	22%	83
REL-CFS-016-316	18	See Map	22%	83
REL-CFS-016-317	18	See Map	22%	83
REL-CFS-016-318	18	See Map	22%	83
REL-CFS-016-319	18	See Map	22%	83
REL-CFS-016-320	18	See Map	22%	83
REL-CFS-016-321	18	See Map	22%	83
REL-CFS-016-322	18	See Map	22%	83
REL-CFS-016-323	18	See Map	22%	83
REL-CFS-016-324	18	See Map	22%	83
REL-CFS-016-325	18	See Map	22%	83
REL-CFS-016-326	18	See Map	22%	83
REL-CFS-016-327	18	See Map	22%	83
REL-CFS-016-328	18	See Map	22%	83
REL-CFS-016-329	18	See Map	22%	83
REL-CFS-016-330	18	See Map	22%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-331	18	See Map	22%	83
REL-CFS-016-332	18	See Map	22%	83
REL-CFS-016-333	18	See Map	22%	83
REL-CFS-016-334	18	See Map	22%	83
REL-CFS-016-335	18	See Map	22%	83
REL-CFS-016-336	18	See Map	22%	83
REL-CFS-016-337	18	See Map	22%	83
REL-CFS-016-338	18	See Map	22%	83
REL-CFS-016-339	18	See Map	22%	83
REL-CFS-016-340	18	See Map	22%	83
REL-CFS-016-341	18	See Map	22%	83
REL-CFS-016-342	18	See Map	22%	83
REL-CFS-016-343	18	See Map	22%	83
REL-CFS-016-344	18	See Map	22%	83
REL-CFS-016-345	18	See Map	22%	83
REL-CFS-016-346	18	See Map	22%	83
REL-CFS-016-347	18	See Map	22%	83
REL-CFS-016-348	18	See Map	22%	83
REL-CFS-016-349	18	See Map	22%	83
REL-CFS-016-350	18	See Map	22%	83
REL-CFS-016-351	18	See Map	22%	83
REL-CFS-016-352	18	See Map	22%	83
REL-CFS-016-353	18	See Map	22%	83
REL-CFS-016-354	18	See Map	22%	83
REL-CFS-016-355	18	See Map	22%	83
REL-CFS-016-356	18	See Map	22%	83
REL-CFS-016-357	18	See Map	22%	83
REL-CFS-016-358	18	See Map	22%	83
REL-CFS-016-359	18	See Map	22%	83
REL-CFS-016-360	18	See Map	22%	83
REL-CFS-016-361	18	See Map	22%	83
REL-CFS-016-362	18	See Map	22%	83
REL-CFS-016-363	18	See Map	22%	83
REL-CFS-016-364	18	See Map	22%	83
REL-CFS-016-365	18	See Map	22%	83
REL-CFS-016-366	18	See Map	22%	83
REL-CFS-016-367	18	See Map	22%	83
REL-CFS-016-368	18	See Map	22%	83
REL-CFS-016-369	18	See Map	22%	83
REL-CFS-016-370	18	See Map	22%	83
REL-CFS-016-371	18	See Map	22%	83
REL-CFS-016-372	18	See Map	22%	83
REL-CFS-016-373	18	See Map	22%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-374	18	See Map	22%	83
REL-CFS-016-375	18	See Map	22%	83
REL-CFS-016-376	18	See Map	22%	83
REL-CFS-016-377	18	See Map	22%	83
REL-CFS-016-378	18	See Map	22%	83
REL-CFS-016-379	18	See Map	22%	83
REL-CFS-016-380	18	See Map	22%	83
REL-CFS-016-381	18	See Map	22%	83
REL-CFS-016-382	18	See Map	22%	83
REL-CFS-016-383	18	See Map	22%	83
REL-CFS-016-384	18	See Map	22%	83
REL-CFS-016-385	18	See Map	22%	83
REL-CFS-016-386	18	See Map	22%	83
REL-CFS-016-387	18	See Map	22%	83
REL-CFS-016-388	18	See Map	22%	83
REL-CFS-016-389	18	See Map	22%	83
REL-CFS-016-390	18	See Map	22%	83
REL-CFS-016-391	18	See Map	22%	83
REL-CFS-016-392	18	See Map	22%	83
REL-CFS-016-393	18	See Map	22%	83
REL-CFS-016-394	18	See Map	22%	83
REL-CFS-016-395	18	See Map	22%	83
REL-CFS-016-396	18	See Map	22%	83
REL-CFS-016-397	18	See Map	22%	83
REL-CFS-016-398	18	See Map	22%	83
REL-CFS-016-399	18	See Map	22%	83
REL-CFS-016-400	18	See Map	22%	83
REL-CFS-016-401	18	See Map	22%	83
REL-CFS-016-402	18	See Map	22%	83
REL-CFS-016-403	18	See Map	22%	83
REL-CFS-016-404	18	See Map	22%	83
REL-CFS-016-405	18	See Map	22%	83
REL-CFS-016-406	18	See Map	22%	83
REL-CFS-016-407	18	See Map	22%	83
REL-CFS-016-408	18	See Map	22%	83
REL-CFS-016-409	18	See Map	22%	83
REL-CFS-016-410	18	See Map	22%	83
REL-CFS-016-411	18	See Map	22%	83
REL-CFS-016-412	18	See Map	22%	83
REL-CFS-016-413	18	See Map	22%	83
REL-CFS-016-414	18	See Map	22%	83
REL-CFS-016-415	18	See Map	22%	83
REL-CFS-016-416	18	See Map	22%	83

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-417	18	See Map	22%	83
REL-CFS-016-418	18	See Map	22%	83
REL-CFS-016-419	18	See Map	22%	83
REL-CFS-016-420	18	See Map	22%	83
REL-CFS-016-421	18	See Map	22%	83
REL-CFS-016-422	18	See Map	22%	83
REL-CFS-016-423	18	See Map	22%	83
REL-CFS-016-424	18	See Map	22%	83
REL-CFS-016-425	18	See Map	22%	83
REL-CFS-016-426	18	See Map	22%	83
REL-CFS-016-427	18	See Map	22%	83
REL-CFS-016-428	18	See Map	22%	83
REL-CFS-016-429	18	See Map	22%	83
REL-CFS-016-430	18	See Map	22%	83
REL-CFS-016-431	18	See Map	22%	83
REL-CFS-016-432	18	See Map	22%	83
REL-CFS-016-433	18	See Map	22%	83
REL-CFS-016-434	18	See Map	22%	83
REL-CFS-016-435	18	See Map	22%	83
REL-CFS-016-436	18	See Map	22%	83
REL-CFS-016-437	18	See Map	22%	83
REL-CFS-016-438	18	See Map	22%	83
REL-CFS-016-439	12	See Map	5%	129
REL-CFS-016-440	12	See Map	5%	129
REL-CFS-016-441	12	See Map	5%	129
REL-CFS-016-442	12	See Map	5%	129
REL-CFS-016-443	12	See Map	9%	93
REL-CFS-016-444	12	See Map	9%	93
REL-CFS-016-445	12	See Map	9%	93
REL-CFS-016-446	12	See Map	9%	93
REL-CFS-016-447	12	See Map	9%	93
REL-CFS-016-448	12	See Map	9%	93
REL-CFS-016-449	12	See Map	9%	93
REL-CFS-016-450	12	See Map	9%	93
REL-CFS-016-451	12	See Map	9%	93
REL-CFS-016-452	12	See Map	9%	93
REL-CFS-016-453	12	See Map	9%	93
REL-CFS-016-454	12	See Map	7%	168
REL-CFS-016-455	12	See Map	7%	168
REL-CFS-016-456	12	See Map	7%	168
REL-CFS-016-457	12	See Map	7%	168
REL-CFS-016-458	12	See Map	7%	168
REL-CFS-016-459	12	See Map	7%	168

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-460	18	See Map	13%	154
REL-CFS-016-461	18	See Map	13%	154
REL-CFS-016-462	18	See Map	13%	154
REL-CFS-016-463	18	See Map	13%	154
REL-CFS-016-464	18	See Map	13%	154
REL-CFS-016-465	18	See Map	13%	154
REL-CFS-016-466	18	See Map	13%	154
REL-CFS-016-467	18	See Map	13%	154
REL-CFS-016-468	18	See Map	13%	154
REL-CFS-016-469	18	See Map	13%	154
REL-CFS-016-470	18	See Map	13%	154
REL-CFS-016-471	18	See Map	13%	154
REL-CFS-016-472	18	See Map	13%	154
REL-CFS-016-473	18	See Map	23%	88
REL-CFS-016-474	18	See Map	23%	88
REL-CFS-016-475	18	See Map	23%	88
REL-CFS-016-476	18	See Map	23%	88
REL-CFS-016-477	18	See Map	23%	88
REL-CFS-016-478	18	See Map	23%	88
REL-CFS-016-479	18	See Map	23%	88
REL-CFS-016-480	18	See Map	23%	88
REL-CFS-016-481	18	See Map	23%	88
REL-CFS-016-482	18	See Map	23%	88
REL-CFS-016-483	18	See Map	23%	88
REL-CFS-016-484	18	See Map	16%	116
REL-CFS-016-485	18	See Map	16%	116
REL-CFS-016-486	18	See Map	16%	116
REL-CFS-016-487	18	See Map	16%	116
REL-CFS-016-488	18	See Map	16%	116
REL-CFS-016-489	18	See Map	16%	116
REL-CFS-016-490	18	See Map	17%	142
REL-CFS-016-491	18	See Map	17%	116
REL-CFS-016-492	18	See Map	17%	116
REL-CFS-016-493	18	See Map	17%	116
REL-CFS-016-494	18	See Map	17%	116
REL-CFS-016-495	18	See Map	17%	116
REL-CFS-016-496	18	See Map	17%	116
REL-CFS-016-497	18	See Map	17%	116
REL-CFS-016-498	18	See Map	17%	116
REL-CFS-016-499	18	See Map	17%	116
REL-CFS-016-500	18	See Map	17%	116
REL-CFS-016-501	18	See Map	17%	116
REL-CFS-016-502	18	See Map	17%	116

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-016-503	18	See Map	17%	116
REL-CFS-016-504	18	See Map	17%	116
REL-CFS-016-600	12	See Map	22%	45
REL-CFS-016-601	18	See Map	23%	79
REL-CFS-016-602	12	See Map	9%	93
REL-CFS-016-603	12	See Map	9%	264
REL-CFS-017-001	18	See Map	19%	92
REL-CFS-017-002	18	See Map	19%	92
REL-CFS-017-003	18	See Map	19%	92
REL-CFS-017-004	18	See Map	19%	92
REL-CFS-017-005	18	See Map	19%	92
REL-CFS-017-006	18	See Map	19%	92
REL-CFS-017-007	18	See Map	21%	115
REL-CFS-017-008	18	See Map	21%	115
REL-CFS-017-009	18	See Map	21%	115
REL-CFS-017-010	18	See Map	21%	115
REL-CFS-017-011	18	See Map	21%	115
REL-CFS-017-012	18	See Map	21%	115
REL-CFS-017-013	18	See Map	21%	115
REL-CFS-017-014	18	See Map	21%	115
REL-CFS-017-015	18	See Map	21%	115
REL-CFS-017-016	12	See Map	18%	57
REL-CFS-017-017	12	See Map	18%	57
REL-CFS-017-018	12	See Map	18%	57
REL-CFS-017-019	12	See Map	18%	57
REL-CFS-017-020	18	See Map	21%	131
REL-CFS-017-021	18	See Map	21%	131
REL-CFS-017-022	18	See Map	21%	131
REL-CFS-017-023	18	See Map	21%	131
REL-CFS-017-024	18	See Map	21%	131
REL-CFS-017-025	18	See Map	21%	131
REL-CFS-017-026	18	See Map	21%	131
REL-CFS-017-027	18	See Map	21%	131
REL-CFS-017-028	18	See Map	21%	131
REL-CFS-017-029	18	See Map	21%	131
REL-CFS-017-030	18	See Map	21%	131
REL-CFS-017-031	18	See Map	21%	131
REL-CFS-017-032	18	See Map	21%	131
REL-CFS-017-033	18	See Map	21%	131
REL-CFS-017-034	18	See Map	21%	131
REL-CFS-017-035	18	See Map	21%	131
REL-CFS-017-036	18	See Map	23%	114
REL-CFS-017-037	18	See Map	23%	114

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-017-038	18	See Map	23%	114
REL-CFS-017-039	18	See Map	23%	114
REL-CFS-017-040	18	See Map	23%	114
REL-CFS-017-041	18	See Map	23%	114
REL-CFS-017-042	18	See Map	23%	114
REL-CFS-017-043	18	See Map	23%	114
REL-CFS-017-044	18	See Map	23%	114
REL-CFS-017-045	18	See Map	23%	114
REL-CFS-017-046	18	See Map	23%	114
REL-CFS-017-047	18	See Map	23%	114
REL-CFS-017-048	18	See Map	23%	114
REL-CFS-017-049	18	See Map	23%	114
REL-CFS-017-050	18	See Map	23%	114
REL-CFS-017-051	18	See Map	23%	114
REL-CFS-017-052	18	See Map	23%	114
REL-CFS-017-053	18	See Map	23%	114
REL-CFS-017-054	18	See Map	23%	114
REL-CFS-017-055	12	See Map	10%	62
REL-CFS-017-056	12	See Map	10%	62
REL-CFS-017-057	12	See Map	10%	62
REL-CFS-017-058	12	See Map	10%	62
REL-CFS-017-059	12	See Map	10%	62
REL-CFS-017-060	12	See Map	10%	62
REL-CFS-017-061	18	See Map	10%	158
REL-CFS-017-062	18	See Map	10%	158
REL-CFS-017-063	18	See Map	10%	158
REL-CFS-017-064	18	See Map	10%	158
REL-CFS-017-065	18	See Map	10%	158
REL-CFS-017-066	18	See Map	10%	158
REL-CFS-017-067	18	See Map	10%	158
REL-CFS-017-068	18	See Map	10%	158
REL-CFS-017-069	18	See Map	10%	158
REL-CFS-017-070	12	See Map	9%	131
REL-CFS-017-071	12	See Map	9%	131
REL-CFS-017-072	12	See Map	9%	131
REL-CFS-017-073	12	See Map	9%	131
REL-CFS-017-074	12	See Map	9%	131
REL-CFS-017-075	12	See Map	9%	131
REL-CFS-017-076	24	See Map	23%	124
REL-CFS-017-077	24	See Map	23%	124
REL-CFS-017-078	12	See Map	24%	42
REL-CFS-017-079	12	See Map	24%	42
REL-CFS-017-080	12	See Map	24%	42

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-017-081	12	See Map	24%	42
REL-CFS-017-082	12	See Map	24%	42
REL-CFS-017-083	12	See Map	13%	79
REL-CFS-017-084	12	See Map	13%	79
REL-CFS-017-085	12	See Map	13%	79
REL-CFS-017-086	12	See Map	13%	79
REL-CFS-017-087	12	See Map	13%	79
REL-CFS-017-088	12	See Map	13%	79
REL-CFS-017-089	12	See Map	13%	79
REL-CFS-017-090	12	See Map	13%	79
REL-CFS-017-091	12	See Map	13%	79
REL-CFS-017-092	32	See Map	30%	114
REL-CFS-017-093	32	See Map	30%	114
REL-CFS-017-094	32	See Map	30%	114
REL-CFS-017-095	32	See Map	30%	114
REL-CFS-017-096	32	See Map	30%	114
REL-CFS-017-097	32	See Map	30%	114
REL-CFS-017-098	32	See Map	30%	114
REL-CFS-017-099	32	See Map	30%	114
REL-CFS-017-100	32	See Map	30%	114
REL-CFS-017-101	32	See Map	30%	114
REL-CFS-017-102	32	See Map	30%	114
REL-CFS-017-103	32	See Map	30%	114
REL-CFS-017-104	32	See Map	30%	114
REL-CFS-017-105	32	See Map	30%	114
REL-CFS-017-106	32	See Map	30%	114
REL-CFS-017-107	32	See Map	30%	114
REL-CFS-017-108	32	See Map	30%	114
REL-CFS-017-109	32	See Map	30%	114
REL-CFS-017-110	32	See Map	30%	114
REL-CFS-017-111	32	See Map	30%	114
REL-CFS-017-112	32	See Map	30%	114
REL-CFS-017-113	32	See Map	30%	114
REL-CFS-017-114	32	See Map	30%	114
REL-CFS-017-115	32	See Map	30%	114
REL-CFS-017-116	32	See Map	30%	114
REL-CFS-017-117	32	See Map	30%	114
REL-CFS-017-118	32	See Map	30%	114
REL-CFS-017-119	18	See Map	19%	105
REL-CFS-017-120	18	See Map	19%	105
REL-CFS-017-121	18	See Map	19%	105
REL-CFS-017-122	18	See Map	19%	105
REL-CFS-017-123	18	See Map	19%	105

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-017-124	18	See Map	19%	105
REL-CFS-017-125	18	See Map	19%	105
REL-CFS-017-126	18	See Map	19%	105
REL-CFS-017-127	18	See Map	19%	105
REL-CFS-017-128	18	See Map	19%	105
REL-CFS-017-129	18	See Map	19%	105
REL-CFS-017-130	18	See Map	19%	105
REL-CFS-017-131	18	See Map	19%	105
REL-CFS-017-132	12	See Map	3%	121
REL-CFS-017-133	12	See Map	3%	121
REL-CFS-017-134	12	See Map	3%	121
REL-CFS-017-135	12	See Map	3%	121
REL-CFS-017-136	12	See Map	6%	106
REL-CFS-017-137	12	See Map	6%	106
REL-CFS-017-138	12	See Map	6%	106
REL-CFS-017-139	12	See Map	6%	106
REL-CFS-017-140	12	See Map	6%	106
REL-CFS-017-141	12	See Map	10%	91
REL-CFS-017-142	12	See Map	10%	91
REL-CFS-017-143	12	See Map	10%	91
REL-CFS-017-144	12	See Map	10%	91
REL-CFS-017-145	12	See Map	10%	91
REL-CFS-017-146	12	See Map	10%	91
REL-CFS-017-147	12	See Map	10%	91
REL-CFS-017-148	12	See Map	10%	91
REL-CFS-017-149	12	See Map	10%	91
REL-CFS-017-150	12	See Map	10%	91
REL-CFS-017-151	12	See Map	10%	91
REL-CFS-017-152	12	See Map	10%	91
REL-CFS-017-153	12	See Map	10%	91
REL-CFS-017-154	18	See Map	20%	89
REL-CFS-017-155	18	See Map	20%	89
REL-CFS-017-156	18	See Map	22%	67
REL-CFS-017-157	18	See Map	22%	67
REL-CFS-017-158	18	See Map	22%	67
REL-CFS-017-159	18	See Map	22%	67
REL-CFS-017-160	18	See Map	22%	67
REL-CFS-017-161	18	See Map	22%	67
REL-CFS-017-162	18	See Map	22%	67
REL-CFS-017-163	18	See Map	22%	67
REL-CFS-017-164	18	See Map	22%	67
REL-CFS-017-165	18	See Map	22%	67
REL-CFS-017-166	12	See Map	5%	75

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-017-167	12	See Map	5%	75
REL-CFS-017-168	12	See Map	5%	75
REL-CFS-017-169	12	See Map	5%	75
REL-CFS-017-170	18	See Map	21%	117
REL-CFS-017-171	18	See Map	21%	117
REL-CFS-017-172	18	See Map	21%	117
REL-CFS-017-173	18	See Map	21%	117
REL-CFS-017-174	18	See Map	21%	117
REL-CFS-017-175	18	See Map	21%	117
REL-CFS-017-176	18	See Map	21%	117
REL-CFS-017-177	18	See Map	21%	117
REL-CFS-017-178	18	See Map	21%	117
REL-CFS-017-179	18	See Map	21%	117
REL-CFS-017-180	18	See Map	21%	117
REL-CFS-017-181	18	See Map	21%	117
REL-CFS-017-182	18	See Map	21%	117
REL-CFS-017-183	18	See Map	14%	163
REL-CFS-017-184	18	See Map	14%	163
REL-CFS-017-185	18	See Map	14%	163
REL-CFS-017-186	18	See Map	14%	163
REL-CFS-017-187	18	See Map	14%	163
REL-CFS-017-188	18	See Map	14%	163
REL-CFS-017-189	18	See Map	14%	163
REL-CFS-017-190	18	See Map	14%	163
REL-CFS-017-191	18	See Map	14%	163
REL-CFS-017-192	18	See Map	14%	163
REL-CFS-017-193	18	See Map	12%	145
REL-CFS-017-194	18	See Map	12%	145
REL-CFS-017-195	18	See Map	12%	145
REL-CFS-017-196	18	See Map	12%	145
REL-CFS-017-197	18	See Map	12%	145
REL-CFS-017-198	18	See Map	12%	145
REL-CFS-017-199	18	See Map	12%	145
REL-CFS-017-200	18	See Map	12%	145
REL-CFS-017-201	18	See Map	12%	145
REL-CFS-017-202	18	See Map	12%	145
REL-CFS-017-203	12	See Map	14%	36
REL-CFS-017-204	18	See Map	13%	152
REL-CFS-017-205	18	See Map	13%	152
REL-CFS-017-206	18	See Map	13%	152
REL-CFS-017-207	18	See Map	13%	152
REL-CFS-017-208	18	See Map	13%	152
REL-CFS-017-209	18	See Map	13%	152

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-017-210	18	See Map	13%	152
REL-CFS-017-211	18	See Map	13%	152
REL-CFS-017-212	18	See Map	13%	152
REL-CFS-017-213	REMOVED			
REL-CFS-017-214				
REL-CFS-017-215				
REL-CFS-017-216				
REL-CFS-017-217				
REL-CFS-017-218				
REL-CFS-017-219				
REL-CFS-017-220				
REL-CFS-017-221				
REL-CFS-017-222				
REL-CFS-017-223				
REL-CFS-017-224				
REL-CFS-017-225				
REL-CFS-017-226				
REL-CFS-017-227				
REL-CFS-017-228				
REL-CFS-017-229				
REL-CFS-017-230				
REL-CFS-017-231				
REL-CFS-017-600	12	See Map	10%	142
REL-CFS-017-601	12	See Map	10%	142
REL-CFS-017-602	12	See Map	23%	124
REL-CFS-017-603	12	See Map	23%	124
REL-CFS-017-604	12	See Map	23%	124
REL-CFS-017-605	12	See Map	23%	124
REL-CFS-017-606	12	See Map	23%	124
REL-CFS-017-607	12	See Map	23%	124
REL-CFS-017-608	12	See Map	23%	124
REL-CFS-017-609	12	See Map	23%	124
REL-CFS-017-610	12	See Map	23%	124
REL-CFS-017-611	12	See Map	23%	124
REL-CFS-017-612	12	See Map	23%	124
REL-CFS-017-613	12	See Map	14%	130
REL-CFS-017-614	12	See Map	14%	130
REL-CFS-017-615	12	See Map	14%	130
REL-CFS-017-616	12	See Map	14%	130
REL-CFS-017-617	12	See Map	14%	130
REL-CFS-017-618	12	See Map	14%	130
REL-CFS-017-619	12	See Map	13%	111.53
REL-CFS-017-620	12	See Map	13%	111.53

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-017-621	12	See Map	13%	111.53
REL-CFS-017-622	12	See Map	13%	111.53
REL-CFS-017-623	12	See Map	13%	111.53
REL-CFS-017-624	12	See Map	13%	111.53
REL-CFS-017-625	12	See Map	13%	111.53
REL-CFS-017-626	12	See Map	13%	111.53
REL-CFS-017-627	12	See Map	13%	111.53
REL-CFS-017-628	12	See Map	13%	111.53
REL-CFS-017-629	12	See Map	29%	13.78
REL-CFS-017-630	12	See Map	29%	13.78
REL-CFS-017-631	12	See Map	29%	13.78
REL-CFS-017-632	12	See Map	17%	115.42
REL-CFS-017-633	12	See Map	17%	115.42
REL-CFS-017-634	12	See Map	17%	115.42
REL-CFS-017-635	12	See Map	17%	115.42
REL-CFS-017-636	12	See Map	17%	115.42
REL-CFS-017-637	12	See Map	17%	115.42
REL-CFS-017-638	12	See Map	17%	115.42
REL-CFS-017-639	12	See Map	17%	115.42
REL-CFS-017-640	12	See Map	17%	115.42
REL-CFS-017-641	12	See Map	17%	115.42
REL-CFS-017-642	12	See Map	17%	115.42
REL-CFS-017-643	12	See Map	6%	195.67
REL-CFS-017-644	12	See Map	6%	195.67
REL-CFS-017-645	12	See Map	6%	195.67
REL-CFS-017-646	12	See Map	6%	195.67
REL-CFS-017-647	12	See Map	6%	195.67
REL-CFS-017-648	12	See Map	25%	20
REL-CFS-017-649	12	See Map	25%	20
REL-CFS-018-001	REMOVED			
REL-CFS-018-002				
REL-CFS-018-003				
REL-CFS-018-004				
REL-CFS-018-005				
REL-CFS-018-006				
REL-CFS-018-007				
REL-CFS-018-008				
REL-CFS-018-009				
REL-CFS-018-010				
REL-CFS-018-011				
REL-CFS-018-012				
REL-CFS-018-013				
REL-CFS-018-014				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-018-015				
REL-CFS-018-016				
REL-CFS-018-017				
REL-CFS-018-018				
REL-CFS-018-019				
REL-CFS-018-020				
REL-CFS-018-021				
REL-CFS-018-022				
REL-CFS-018-023				
REL-CFS-018-024				
REL-CFS-018-025				
REL-CFS-018-026				
REL-CFS-018-027				
REL-CFS-018-028				
REL-CFS-018-029				
REL-CFS-018-030	12	See Map	32%	101
REL-CFS-018-031	12	See Map	32%	101
REL-CFS-018-032	12	See Map	32%	101
REL-CFS-018-033	12	See Map	18%	101
REL-CFS-018-034	12	See Map	18%	101
REL-CFS-018-035	12	See Map	18%	101
REL-CFS-018-036	12	See Map	18%	101
REL-CFS-018-037	12	See Map	18%	101
REL-CFS-018-038	12	See Map	18%	101
REL-CFS-018-039	12	See Map	18%	101
REL-CFS-018-040	12	See Map	18%	101
REL-CFS-018-041	12	See Map	18%	101
REL-CFS-018-042	12	See Map	18%	101
REL-CFS-018-043	12	See Map	18%	101
REL-CFS-018-044	12	See Map	48%	101
REL-CFS-018-045	12	See Map	48%	101
REL-CFS-018-046	12	See Map	48%	101
REL-CFS-018-047	12	See Map	48%	101
REL-CFS-018-048	12	See Map	48%	101
REL-CFS-018-049	12	See Map	48%	101
REL-CFS-018-050	12	See Map	48%	101
REL-CFS-018-051	12	See Map	48%	101
REL-CFS-018-052	12	See Map	48%	101
REL-CFS-018-053	REMOVED			
REL-CFS-018-054				
REL-CFS-018-055				
REL-CFS-018-056				
REL-CFS-018-057				

STANDARD E&S WORKSHEET #1
Compost Filter Socks

REL-CFS-018-058				
REL-CFS-018-059				
REL-CFS-018-060				
REL-CFS-018-061				
REL-CFS-018-062				
REL-CFS-018-063				
REL-CFS-018-064				
REL-CFS-018-065				
REL-CFS-018-066				
REL-CFS-018-067				
REL-CFS-018-068				
REL-CFS-018-069				
REL-CFS-018-070				
REL-CFS-018-071				
REL-CFS-018-072				
REL-CFS-018-073	12	See Map	16%	101
REL-CFS-018-074	12	See Map	16%	48
REL-CFS-018-075	12	See Map	16%	48
REL-CFS-018-076	12	See Map	16%	48
REL-CFS-018-077	12	See Map	16%	48
REL-CFS-018-078	12	See Map	16%	48
REL-CFS-018-079	12	See Map	16%	48
REL-CFS-018-080	12	See Map	16%	48
REL-CFS-018-081	12	See Map	16%	48
REL-CFS-018-082	12	See Map	16%	48
REL-CFS-018-083	12	See Map	16%	81
REL-CFS-018-084	12	See Map	6%	81
REL-CFS-018-085	12	See Map	6%	81
REL-CFS-018-086	12	See Map	6%	81
REL-CFS-018-087	12	See Map	6%	81
REL-CFS-018-088	12	See Map	17%	81
REL-CFS-018-089	REMOVED			
REL-CFS-018-090	18	See Map	17%	107
REL-CFS-018-091	18	See Map	17%	107
REL-CFS-018-092	18	See Map	17%	107
REL-CFS-018-093	18	See Map	17%	107
REL-CFS-018-094	18	See Map	17%	107
REL-CFS-018-095	18	See Map	17%	107
REL-CFS-018-096	REMOVED			
REL-CFS-018-097	18	See Map	17%	107
REL-CFS-018-098	18	See Map	17%	107
REL-CFS-018-099	12	See Map	9%	85
REL-CFS-018-100	12	See Map	9%	85

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-101	12	See Map	9%	85
REL-CFS-018-102	12	See Map	9%	85
REL-CFS-018-103	12	See Map	9%	85
REL-CFS-018-104	12	See Map	15%	85
REL-CFS-018-105	12	See Map	15%	85
REL-CFS-018-106	12	See Map	15%	85
REL-CFS-018-107	12	See Map	15%	85
REL-CFS-018-108	12	See Map	15%	85
REL-CFS-018-109	12	See Map	15%	85
REL-CFS-018-110	12	See Map	15%	85
REL-CFS-018-111	12	See Map	15%	85
REL-CFS-018-112	12	See Map	15%	85
REL-CFS-018-113	12	See Map	15%	85
REL-CFS-018-114	12	See Map	15%	85
REL-CFS-018-115	12	See Map	15%	85
REL-CFS-018-116	12	See Map	15%	85
REL-CFS-018-117	12	See Map	15%	85
REL-CFS-018-118	12	See Map	15%	85
REL-CFS-018-119	12	See Map	15%	85
REL-CFS-018-120	18	See Map	28%	87
REL-CFS-018-121	18	See Map	28%	87
REL-CFS-018-122	18	See Map	28%	87
REL-CFS-018-123	18	See Map	28%	87
REL-CFS-018-124	18	See Map	28%	87
REL-CFS-018-125	18	See Map	28%	87
REL-CFS-018-126	18	See Map	28%	87
REL-CFS-018-127	18	See Map	28%	87
REL-CFS-018-128	18	See Map	28%	87
REL-CFS-018-129	18	See Map	28%	87
REL-CFS-018-130	18	See Map	28%	87
REL-CFS-018-131	18	See Map	28%	87
REL-CFS-018-132	24	See Map	30%	87
REL-CFS-018-133	24	See Map	30%	87
REL-CFS-018-134	24	See Map	30%	87
REL-CFS-018-135	24	See Map	30%	87
REL-CFS-018-136	24	See Map	30%	87
REL-CFS-018-137	24	See Map	30%	87
REL-CFS-018-138	24	See Map	30%	87
REL-CFS-018-139	24	See Map	30%	87
REL-CFS-018-140	24	See Map	30%	87
REL-CFS-018-141	24	See Map	30%	87
REL-CFS-018-142	24	See Map	30%	87
REL-CFS-018-143	24	See Map	30%	87

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-144	24	See Map	30%	87
REL-CFS-018-145	24	See Map	30%	87
REL-CFS-018-146	24	See Map	30%	87
REL-CFS-018-147	24	See Map	30%	87
REL-CFS-018-148	24	See Map	30%	87
REL-CFS-018-149	24	See Map	30%	87
REL-CFS-018-150	24	See Map	30%	87
REL-CFS-018-151	24	See Map	30%	87
REL-CFS-018-152	24	See Map	30%	87
REL-CFS-018-153	24	See Map	30%	87
REL-CFS-018-154	24	See Map	30%	87
REL-CFS-018-155	18	See Map	24%	58
REL-CFS-018-156	18	See Map	24%	58
REL-CFS-018-157	18	See Map	24%	58
REL-CFS-018-158	18	See Map	24%	58
REL-CFS-018-159	18	See Map	24%	58
REL-CFS-018-160	18	See Map	24%	58
REL-CFS-018-161	18	See Map	24%	58
REL-CFS-018-162	12	See Map	6%	35
REL-CFS-018-163	12	See Map	6%	35
REL-CFS-018-164	12	See Map	6%	35
REL-CFS-018-165	12	See Map	6%	35
REL-CFS-018-166	12	See Map	6%	35
REL-CFS-018-167	12	See Map	6%	35
REL-CFS-018-168	12	See Map	6%	35
REL-CFS-018-169	12	See Map	6%	35
REL-CFS-018-170	18	See Map	12%	182
REL-CFS-018-171	18	See Map	12%	182
REL-CFS-018-172	18	See Map	12%	182
REL-CFS-018-173	18	See Map	12%	182
REL-CFS-018-174	18	See Map	12%	182
REL-CFS-018-175	18	See Map	12%	182
REL-CFS-018-176	18	See Map	12%	182
REL-CFS-018-177	18	See Map	12%	182
REL-CFS-018-178	18	See Map	12%	182
REL-CFS-018-179	18	See Map	12%	182
REL-CFS-018-180	18	See Map	12%	182
REL-CFS-018-181	18	See Map	12%	182
REL-CFS-018-182	18	See Map	12%	182
REL-CFS-018-183	18	See Map	12%	182
REL-CFS-018-184	18	See Map	12%	182
REL-CFS-018-185	18	See Map	12%	182
REL-CFS-018-186	18	See Map	12%	182

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-187	18	See Map	12%	182
REL-CFS-018-188	24	See Map	39%	67
REL-CFS-018-189	24	See Map	39%	67
REL-CFS-018-190	24	See Map	39%	67
REL-CFS-018-191	24	See Map	39%	67
REL-CFS-018-192	24	See Map	39%	67
REL-CFS-018-193	24	See Map	39%	67
REL-CFS-018-194	24	See Map	39%	67
REL-CFS-018-195	24	See Map	39%	67
REL-CFS-018-196	24	See Map	44%	46
REL-CFS-018-197	24	See Map	44%	46
REL-CFS-018-198	24	See Map	44%	46
REL-CFS-018-199	24	See Map	44%	46
REL-CFS-018-200	24	See Map	44%	46
REL-CFS-018-201	24	See Map	44%	46
REL-CFS-018-202	24	See Map	44%	46
REL-CFS-018-203	24	See Map	44%	46
REL-CFS-018-204	24	See Map	44%	46
REL-CFS-018-205	24	See Map	44%	46
REL-CFS-018-206	24	See Map	44%	46
REL-CFS-018-207	24	See Map	44%	46
REL-CFS-018-208	24	See Map	44%	46
REL-CFS-018-209	24	See Map	44%	46
REL-CFS-018-210	24	See Map	44%	46
REL-CFS-018-211	24	See Map	44%	46
REL-CFS-018-212	24	See Map	44%	46
REL-CFS-018-213	24	See Map	44%	46
REL-CFS-018-214	24	See Map	44%	46
REL-CFS-018-215	12	See Map	22%	54
REL-CFS-018-216	12	See Map	22%	54
REL-CFS-018-217	12	See Map	22%	54
REL-CFS-018-218	12	See Map	22%	54
REL-CFS-018-219	12	See Map	22%	54
REL-CFS-018-220	12	See Map	22%	54
REL-CFS-018-221	18	See Map	36%	45
REL-CFS-018-222	18	See Map	36%	45
REL-CFS-018-223	18	See Map	36%	45
REL-CFS-018-224	18	See Map	36%	45
REL-CFS-018-225	18	See Map	36%	45
REL-CFS-018-226	18	See Map	36%	45
REL-CFS-018-227	18	See Map	36%	45
REL-CFS-018-228	18	See Map	36%	45
REL-CFS-018-229	18	See Map	36%	45

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-230	18	See Map	36%	45
REL-CFS-018-231	18	See Map	36%	45
REL-CFS-018-232	18	See Map	36%	45
REL-CFS-018-233	18	See Map	36%	45
REL-CFS-018-234	18	See Map	36%	45
REL-CFS-018-235	18	See Map	36%	45
REL-CFS-018-236	18	See Map	40%	43
REL-CFS-018-237	18	See Map	40%	43
REL-CFS-018-238	18	See Map	40%	43
REL-CFS-018-239	18	See Map	40%	43
REL-CFS-018-240	18	See Map	40%	43
REL-CFS-018-241	18	See Map	40%	43
REL-CFS-018-242	18	See Map	40%	43
REL-CFS-018-243	18	See Map	40%	43
REL-CFS-018-244	18	See Map	40%	43
REL-CFS-018-245	18	See Map	33%	42
REL-CFS-018-246	18	See Map	33%	42
REL-CFS-018-247	18	See Map	33%	42
REL-CFS-018-248	18	See Map	33%	42
REL-CFS-018-249	18	See Map	33%	42
REL-CFS-018-250	18	See Map	33%	42
REL-CFS-018-251	18	See Map	33%	42
REL-CFS-018-252	18	See Map	33%	42
REL-CFS-018-253	18	See Map	33%	42
REL-CFS-018-254	18	See Map	33%	42
REL-CFS-018-255	18	See Map	33%	42
REL-CFS-018-256	18	See Map	33%	42
REL-CFS-018-257	12	See Map	26%	53
REL-CFS-018-258	12	See Map	26%	53
REL-CFS-018-259	12	See Map	26%	53
REL-CFS-018-260	12	See Map	26%	53
REL-CFS-018-261	12	See Map	26%	53
REL-CFS-018-262	12	See Map	26%	53
REL-CFS-018-263	12	See Map	26%	53
REL-CFS-018-264	12	See Map	26%	53
REL-CFS-018-265	12	See Map	26%	53
REL-CFS-018-266	12	See Map	26%	53
REL-CFS-018-267	12	See Map	26%	53
REL-CFS-018-268	12	See Map	26%	53
REL-CFS-018-269	12	See Map	26%	53
REL-CFS-018-270	12	See Map	29%	42
REL-CFS-018-271	12	See Map	29%	42
REL-CFS-018-272	12	See Map	29%	42

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-273	12	See Map	29%	42
REL-CFS-018-274	12	See Map	29%	42
REL-CFS-018-275	12	See Map	29%	42
REL-CFS-018-276	12	See Map	29%	42
REL-CFS-018-277	12	See Map	29%	42
REL-CFS-018-278	12	See Map	29%	42
REL-CFS-018-279	12	See Map	29%	42
REL-CFS-018-280	12	See Map	29%	42
REL-CFS-018-281	18	See Map	35%	40
REL-CFS-018-282	18	See Map	35%	40
REL-CFS-018-283	18	See Map	35%	40
REL-CFS-018-284	18	See Map	35%	40
REL-CFS-018-285	18	See Map	35%	40
REL-CFS-018-286	18	See Map	35%	40
REL-CFS-018-287	18	See Map	35%	40
REL-CFS-018-288	18	See Map	35%	40
REL-CFS-018-289	18	See Map	35%	40
REL-CFS-018-290	18	See Map	35%	40
REL-CFS-018-291	18	See Map	35%	40
REL-CFS-018-292	18	See Map	35%	40
REL-CFS-018-293	18	See Map	35%	40
REL-CFS-018-294	18	See Map	35%	40
REL-CFS-018-295	18	See Map	35%	40
REL-CFS-018-296	24	See Map	42%	53
REL-CFS-018-297	24	See Map	42%	53
REL-CFS-018-298	24	See Map	42%	53
REL-CFS-018-299	24	See Map	42%	53
REL-CFS-018-300	24	See Map	42%	53
REL-CFS-018-301	24	See Map	42%	53
REL-CFS-018-302	24	See Map	42%	53
REL-CFS-018-303	24	See Map	42%	53
REL-CFS-018-304	24	See Map	42%	53
REL-CFS-018-305	24	See Map	42%	53
REL-CFS-018-306	24	See Map	42%	53
REL-CFS-018-307	24	See Map	42%	53
REL-CFS-018-308	24	See Map	42%	53
REL-CFS-018-309	24	See Map	42%	53
REL-CFS-018-310	24	See Map	42%	53
REL-CFS-018-311	24	See Map	42%	53
REL-CFS-018-312	24	See Map	42%	53
REL-CFS-018-313	24	See Map	42%	53
REL-CFS-018-314	24	See Map	42%	53
REL-CFS-018-315	18	See Map	39%	41

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-018-316	18	See Map	39%	41
REL-CFS-018-317	18	See Map	39%	41
REL-CFS-018-318	18	See Map	39%	41
REL-CFS-018-319	18	See Map	39%	41
REL-CFS-018-320	18	See Map	39%	41
REL-CFS-018-321	18	See Map	39%	41
REL-CFS-018-322	18	See Map	39%	41
REL-CFS-018-323	18	See Map	17%	92
REL-CFS-018-324	18	See Map	17%	92
REL-CFS-018-325	18	See Map	17%	92
REL-CFS-018-326	18	See Map	17%	92
REL-CFS-018-327	18	See Map	17%	92
REL-CFS-018-328	18	See Map	17%	92
REL-CFS-018-329	REMOVED			
REL-CFS-018-330	18	See Map	17%	92
REL-CFS-018-331	18	See Map	17%	92
REL-CFS-018-332	18	See Map	18%	101
REL-CFS-018-333	12	See Map	18%	101
REL-CFS-018-334	12	See Map	18%	101
REL-CFS-018-335	12	See Map	18%	101
REL-CFS-018-336	12	See Map	16%	153
REL-CFS-018-337	12	See Map	16%	153
REL-CFS-018-338	18	See Map	16%	153
REL-CFS-018-339	18	See Map	16%	153
REL-CFS-018-340	18	See Map	16%	153
REL-CFS-018-341	18	See Map	16%	153
REL-CFS-018-342	18	See Map	16%	153
REL-CFS-018-343	18	See Map	16%	153
REL-CFS-018-344	18	See Map	16%	153
REL-CFS-018-345	18	See Map	8%	178
REL-CFS-018-346	18	See Map	8%	178
REL-CFS-018-347	18	See Map	8%	178
REL-CFS-018-348	18	See Map	8%	178
REL-CFS-018-349	18	See Map	8%	178
REL-CFS-018-350	18	See Map	8%	178
REL-CFS-018-351	REMOVED			
REL-CFS-018-352				
REL-CFS-018-353				
REL-CFS-018-354				
REL-CFS-018-355				
REL-CFS-018-356				
REL-CFS-018-357				
REL-CFS-018-358				

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-359	18	See Map	8%	178
REL-CFS-018-360	18	See Map	8%	178
REL-CFS-018-361	18	See Map	8%	178
REL-CFS-018-362	18	See Map	8%	178
REL-CFS-018-363	18	See Map	8%	178
REL-CFS-018-364	32	See Map	18%	275
REL-CFS-018-365	32	See Map	18%	275
REL-CFS-018-366	32	See Map	18%	275
REL-CFS-018-367	32	See Map	18%	275
REL-CFS-018-368	32	See Map	18%	275
REL-CFS-018-369	32	See Map	18%	275
REL-CFS-018-370	32	See Map	18%	275
REL-CFS-018-371	32	See Map	18%	275
REL-CFS-018-372	32	See Map	18%	275
REL-CFS-018-373	32	See Map	18%	275
REL-CFS-018-374	32	See Map	18%	275
REL-CFS-018-375	32	See Map	18%	275
REL-CFS-018-376	32	See Map	18%	275
REL-CFS-018-377	32	See Map	18%	275
REL-CFS-018-378	32	See Map	18%	275
REL-CFS-018-379	32	See Map	18%	275
REL-CFS-018-380	24	See Map	20%	189
REL-CFS-018-381	24	See Map	20%	189
REL-CFS-018-382	24	See Map	20%	189
REL-CFS-018-383	24	See Map	20%	189
REL-CFS-018-384	24	See Map	20%	189
REL-CFS-018-385	24	See Map	20%	189
REL-CFS-018-386	24	See Map	20%	189
REL-CFS-018-387	24	See Map	20%	189
REL-CFS-018-388	24	See Map	20%	189
REL-CFS-018-389	24	See Map	20%	189
REL-CFS-018-390	12	See Map	16%	77
REL-CFS-018-391	12	See Map	16%	77
REL-CFS-018-392	12	See Map	16%	77
REL-CFS-018-393	12	See Map	16%	77
REL-CFS-018-394	12	See Map	16%	77
REL-CFS-018-395	12	See Map	16%	77
REL-CFS-018-396	18	See Map	17%	94
REL-CFS-018-397	18	See Map	17%	94
REL-CFS-018-398	18	See Map	17%	94
REL-CFS-018-399	18	See Map	17%	94
REL-CFS-018-400	18	See Map	17%	94
REL-CFS-018-401	18	See Map	17%	94

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-018-402	18	See Map	17%	94
REL-CFS-018-403	18	See Map	17%	94
REL-CFS-018-404	18	See Map	17%	94
REL-CFS-018-405	18	See Map	17%	94
REL-CFS-018-406	12	See Map	6%	161
REL-CFS-018-407	12	See Map	6%	161
REL-CFS-018-408	12	See Map	6%	161
REL-CFS-018-409	12	See Map	6%	161
REL-CFS-018-410	12	See Map	6%	161
REL-CFS-018-411	12	See Map	6%	161
REL-CFS-018-412	12	See Map	6%	161
REL-CFS-018-413	12	See Map	6%	161
REL-CFS-018-414	12	See Map	6%	161
REL-CFS-018-415	18	See Map	12%	158
REL-CFS-018-416	18	See Map	12%	158
REL-CFS-018-417	18	See Map	12%	158
REL-CFS-018-418	18	See Map	12%	158
REL-CFS-018-419	18	See Map	12%	158
REL-CFS-018-420	18	See Map	12%	158
REL-CFS-018-421	18	See Map	12%	158
REL-CFS-018-422	18	See Map	12%	158
REL-CFS-018-423	18	See Map	12%	158
REL-CFS-018-424	18	See Map	12%	158
REL-CFS-018-425	18	See Map	12%	158
REL-CFS-018-426	18	See Map	12%	158
REL-CFS-018-427	18	See Map	12%	158
REL-CFS-018-428	18	See Map	12%	158
REL-CFS-018-429	18	See Map	12%	158
REL-CFS-018-430	18	See Map	12%	158
REL-CFS-018-600	18	See Map	8%	178
REL-CFS-018-601	18	See Map	8%	178
REL-CFS-018-602	12	See Map	32%	101
REL-CFS-018-603	12	See Map	32%	101
REL-CFS-019-001	12	See Map	19%	73
REL-CFS-019-002	12	See Map	19%	73
REL-CFS-019-003	12	See Map	19%	73
REL-CFS-019-004	12	See Map	19%	73
REL-CFS-019-005	12	See Map	19%	73
REL-CFS-019-006	12	See Map	19%	73
REL-CFS-019-007	18	See Map	17%	150
REL-CFS-019-008	18	See Map	17%	150
REL-CFS-019-009	18	See Map	17%	150
REL-CFS-019-010	18	See Map	17%	150

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-019-011	18	See Map	17%	150
REL-CFS-019-012	18	See Map	17%	150
REL-CFS-019-013	18	See Map	17%	150
REL-CFS-019-014	18	See Map	17%	150
REL-CFS-019-015	18	See Map	17%	150
REL-CFS-019-016	18	See Map	17%	150
REL-CFS-019-017	18	See Map	17%	150
REL-CFS-019-018	18	See Map	17%	150
REL-CFS-019-019	18	See Map	20%	128
REL-CFS-019-020	18	See Map	20%	128
REL-CFS-019-021	18	See Map	20%	128
REL-CFS-019-022	18	See Map	20%	128
REL-CFS-019-023	18	See Map	20%	128
REL-CFS-019-024	18	See Map	20%	128
REL-CFS-019-025	18	See Map	20%	128
REL-CFS-019-026	18	See Map	20%	128
REL-CFS-019-027	18	See Map	20%	128
REL-CFS-019-028	18	See Map	20%	128
REL-CFS-019-029	18	See Map	22%	107
REL-CFS-019-030	18	See Map	22%	107
REL-CFS-019-031	18	See Map	22%	107
REL-CFS-019-032	18	See Map	22%	107
REL-CFS-019-033	18	See Map	22%	107
REL-CFS-019-034	18	See Map	22%	107
REL-CFS-019-035	18	See Map	22%	107
REL-CFS-019-036	18	See Map	22%	107
REL-CFS-019-037	18	See Map	22%	107
REL-CFS-019-038	18	See Map	22%	107
REL-CFS-019-039	18	See Map	22%	107
REL-CFS-019-040	18	See Map	17%	157
REL-CFS-019-041	18	See Map	17%	157
REL-CFS-019-042	18	See Map	17%	157
REL-CFS-019-043	18	See Map	17%	157
REL-CFS-019-044	18	See Map	17%	157
REL-CFS-019-045	18	See Map	17%	157
REL-CFS-019-046	18	See Map	17%	157
REL-CFS-019-047	18	See Map	17%	157
REL-CFS-019-048	18	See Map	17%	157
REL-CFS-019-049	18	See Map	17%	157
REL-CFS-019-050	18	See Map	17%	157
REL-CFS-019-051	18	See Map	14%	143
REL-CFS-019-052	18	See Map	14%	143
REL-CFS-019-053	18	See Map	14%	143

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-019-054	18	See Map	14%	143
REL-CFS-019-055	18	See Map	14%	143
REL-CFS-019-056	18	See Map	14%	143
REL-CFS-019-057	18	See Map	14%	143
REL-CFS-019-058	18	See Map	14%	143
REL-CFS-019-059	18	See Map	14%	143
REL-CFS-019-060	18	See Map	14%	143
REL-CFS-019-061	18	See Map	11%	185
REL-CFS-019-062	18	See Map	11%	185
REL-CFS-019-063	18	See Map	11%	185
REL-CFS-019-064	18	See Map	11%	185
REL-CFS-019-065	18	See Map	11%	185
REL-CFS-019-066	18	See Map	11%	185
REL-CFS-019-067	18	See Map	11%	185
REL-CFS-019-068	18	See Map	11%	185
REL-CFS-019-069	18	See Map	11%	185
REL-CFS-019-070	12	See Map	6%	165
REL-CFS-019-071	12	See Map	6%	165
REL-CFS-019-072	12	See Map	6%	165
REL-CFS-019-073	12	See Map	6%	165
REL-CFS-019-074	12	See Map	6%	165
REL-CFS-019-075	12	See Map	4%	143
REL-CFS-019-076	12	See Map	4%	143
REL-CFS-019-077	12	See Map	4%	143
REL-CFS-019-078	12	See Map	4%	143
REL-CFS-019-079	12	See Map	4%	143
REL-CFS-019-080	12	See Map	4%	143
REL-CFS-019-081	12	See Map	4%	143
REL-CFS-019-082	18	See Map	4%	359
REL-CFS-019-083	18	See Map	4%	359
REL-CFS-019-084	18	See Map	4%	359
REL-CFS-019-085	18	See Map	4%	359
REL-CFS-019-086	18	See Map	4%	359
REL-CFS-019-087	18	See Map	4%	359
REL-CFS-019-088	18	See Map	4%	359
REL-CFS-019-089	18	See Map	4%	359
REL-CFS-019-090	18	See Map	4%	359
REL-CFS-019-091	18	See Map	12%	193
REL-CFS-019-092	18	See Map	12%	193
REL-CFS-019-093	18	See Map	12%	193
REL-CFS-019-094	18	See Map	12%	193
REL-CFS-019-095	18	See Map	12%	193
REL-CFS-019-096	18	See Map	12%	197

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-019-097	18	See Map	12%	197
REL-CFS-019-098	18	See Map	12%	197
REL-CFS-019-099	18	See Map	12%	197
REL-CFS-019-100	18	See Map	12%	197
REL-CFS-019-101	18	See Map	12%	197
REL-CFS-019-102	18	See Map	12%	197
REL-CFS-019-103	18	See Map	12%	197
REL-CFS-019-104	18	See Map	12%	197
REL-CFS-019-105	18	See Map	12%	197
REL-CFS-019-106	18	See Map	12%	197
REL-CFS-019-107	18	See Map	12%	138
REL-CFS-019-108	18	See Map	12%	138
REL-CFS-019-109	18	See Map	12%	138
REL-CFS-019-110	18	See Map	12%	138
REL-CFS-019-111	18	See Map	12%	138
REL-CFS-019-112	18	See Map	12%	138
REL-CFS-019-113	18	See Map	12%	138
REL-CFS-019-114	18	See Map	12%	138
REL-CFS-019-115	32	See Map	20%	257
REL-CFS-019-116	32	See Map	20%	257
REL-CFS-019-117	32	See Map	20%	257
REL-CFS-019-118	32	See Map	20%	257
REL-CFS-019-119	32	See Map	20%	257
REL-CFS-019-120	32	See Map	20%	257
REL-CFS-019-121	32	See Map	20%	257
REL-CFS-019-122	32	See Map	20%	257
REL-CFS-019-123	32	See Map	20%	257
REL-CFS-019-124	32	See Map	20%	257
REL-CFS-019-125	32	See Map	20%	257
REL-CFS-019-126	32	See Map	20%	257
REL-CFS-019-127	32	See Map	20%	257
REL-CFS-019-128	32	See Map	20%	257
REL-CFS-019-129	32	See Map	20%	257
REL-CFS-019-130	32	See Map	20%	257
REL-CFS-019-131	32	See Map	20%	257
REL-CFS-019-132	32	See Map	20%	257
REL-CFS-019-133	32	See Map	20%	257
REL-CFS-019-134	32	See Map	20%	257
REL-CFS-019-135	32	See Map	20%	257
REL-CFS-019-136	32	See Map	20%	257
REL-CFS-019-137	32	See Map	20%	257
REL-CFS-019-138	32	See Map	20%	257
REL-CFS-019-139	32	See Map	20%	257

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-019-140	32	See Map	20%	257
REL-CFS-019-141	32	See Map	20%	257
REL-CFS-019-142	32	See Map	20%	257
REL-CFS-019-143	32	See Map	20%	257
REL-CFS-019-144	32	See Map	20%	257
REL-CFS-019-145	32	See Map	20%	257
REL-CFS-019-146	18	See Map	18%	111
REL-CFS-019-147	18	See Map	18%	111
REL-CFS-019-148	18	See Map	18%	111
REL-CFS-019-149	18	See Map	18%	111
REL-CFS-019-150	18	See Map	18%	111
REL-CFS-019-151	18	See Map	18%	111
REL-CFS-019-152	18	See Map	18%	111
REL-CFS-019-153	24	See Map	24%	153
REL-CFS-019-154	24	See Map	24%	153
REL-CFS-019-155	24	See Map	24%	153
REL-CFS-019-156	24	See Map	24%	153
REL-CFS-019-157	24	See Map	24%	153
REL-CFS-019-158	24	See Map	18%	180
REL-CFS-019-159	24	See Map	18%	180
REL-CFS-019-160	24	See Map	18%	180
REL-CFS-019-161	24	See Map	18%	180
REL-CFS-019-162	24	See Map	18%	180
REL-CFS-019-163	24	See Map	18%	180
REL-CFS-019-164	24	See Map	18%	180
REL-CFS-019-165	18	See Map	9%	197
REL-CFS-019-166	18	See Map	9%	197
REL-CFS-019-167	18	See Map	9%	197
REL-CFS-019-168	18	See Map	9%	197
REL-CFS-019-169	18	See Map	9%	197
REL-CFS-019-170	18	See Map	6%	274
REL-CFS-019-171	18	See Map	6%	274
REL-CFS-019-172	18	See Map	6%	274
REL-CFS-019-173	18	See Map	6%	274
REL-CFS-019-174	18	See Map	6%	274
REL-CFS-019-175	18	See Map	6%	274
REL-CFS-019-176	18	See Map	6%	274
REL-CFS-019-177	18	See Map	6%	274
REL-CFS-019-178	18	See Map	6%	274
REL-CFS-019-179	18	See Map	6%	274
REL-CFS-019-180	18	See Map	6%	274
REL-CFS-019-181	12	See Map	3%	256
REL-CFS-019-182	12	See Map	3%	256

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-019-183	12	See Map	3%	256
REL-CFS-019-184	12	See Map	3%	256
REL-CFS-019-185	12	See Map	3%	256
REL-CFS-019-186	12	See Map	4%	289
REL-CFS-019-187	12	See Map	4%	289
REL-CFS-019-188	12	See Map	3%	63
REL-CFS-019-189	12	See Map	8%	103
REL-CFS-019-190	12	See Map	8%	103
REL-CFS-019-191	12	See Map	8%	103
REL-CFS-019-600	18	See Map	9%	197
REL-CFS-020-001	12	See Map	9%	117
REL-CFS-020-002	12	See Map	9%	117
REL-CFS-020-003	12	See Map	9%	117
REL-CFS-020-004	12	See Map	9%	117
REL-CFS-020-005	12	See Map	9%	117
REL-CFS-020-006	12	See Map	9%	117
REL-CFS-020-007	12	See Map	9%	117
REL-CFS-020-008	18	See Map	18%	131
REL-CFS-020-009	18	See Map	18%	131
REL-CFS-020-010	18	See Map	18%	131
REL-CFS-020-011	18	See Map	18%	131
REL-CFS-020-012	18	See Map	18%	131
REL-CFS-020-013	18	See Map	18%	131
REL-CFS-020-014	18	See Map	18%	131
REL-CFS-020-015	18	See Map	18%	131
REL-CFS-020-016	18	See Map	18%	131
REL-CFS-020-017	18	See Map	18%	131
REL-CFS-020-018	18	See Map	18%	131
REL-CFS-020-019	18	See Map	18%	131
REL-CFS-020-020	18	See Map	12%	131
REL-CFS-020-021	18	See Map	12%	131
REL-CFS-020-022	18	See Map	12%	131
REL-CFS-020-023	18	See Map	12%	131
REL-CFS-020-024	18	See Map	12%	131
REL-CFS-020-025	18	See Map	12%	131
REL-CFS-020-026	18	See Map	12%	131
REL-CFS-020-027	18	See Map	12%	131
REL-CFS-020-028	18	See Map	15%	171
REL-CFS-020-029	18	See Map	15%	171
REL-CFS-020-030	18	See Map	15%	171
REL-CFS-020-031	18	See Map	15%	171
REL-CFS-020-032	18	See Map	15%	171
REL-CFS-020-033	18	See Map	15%	171

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-020-034	18	See Map	15%	171
REL-CFS-020-035	18	See Map	15%	171
REL-CFS-020-036	18	See Map	15%	171
REL-CFS-020-037	18	See Map	15%	171
REL-CFS-020-038	18	See Map	15%	171
REL-CFS-020-039	18	See Map	15%	171
REL-CFS-020-040	18	See Map	15%	171
REL-CFS-020-041	18	See Map	17%	105
REL-CFS-020-042	18	See Map	17%	105
REL-CFS-020-043	18	See Map	17%	105
REL-CFS-020-044	18	See Map	17%	105
REL-CFS-020-045	18	See Map	17%	105
REL-CFS-020-046	18	See Map	17%	105
REL-CFS-020-047	18	See Map	27%	68
REL-CFS-020-048	18	See Map	27%	68
REL-CFS-020-049	18	See Map	27%	68
REL-CFS-020-050	18	See Map	27%	68
REL-CFS-020-051	18	See Map	27%	68
REL-CFS-020-052	18	See Map	27%	68
REL-CFS-020-053	18	See Map	27%	68
REL-CFS-020-054	18	See Map	27%	68
REL-CFS-020-055	18	See Map	29%	69
REL-CFS-020-056	18	See Map	29%	69
REL-CFS-020-057	18	See Map	29%	69
REL-CFS-020-058	18	See Map	29%	69
REL-CFS-020-059	18	See Map	29%	69
REL-CFS-020-060	18	See Map	29%	69
REL-CFS-020-061	18	See Map	29%	69
REL-CFS-020-062	18	See Map	29%	69
REL-CFS-020-063	18	See Map	31%	70
REL-CFS-020-064	18	See Map	31%	70
REL-CFS-020-065	18	See Map	31%	70
REL-CFS-020-066	18	See Map	31%	70
REL-CFS-020-067	18	See Map	31%	70
REL-CFS-020-068	18	See Map	31%	70
REL-CFS-020-069	18	See Map	31%	70
REL-CFS-020-070	18	See Map	31%	70
REL-CFS-020-071	18	See Map	31%	70
REL-CFS-020-072	18	See Map	31%	70
REL-CFS-020-073	18	See Map	24%	93
REL-CFS-020-074	18	See Map	24%	93
REL-CFS-020-075	18	See Map	24%	93
REL-CFS-020-076	18	See Map	24%	93

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-020-077	18	See Map	24%	93
REL-CFS-020-078	18	See Map	24%	93
REL-CFS-020-079	18	See Map	24%	93
REL-CFS-020-080	18	See Map	24%	93
REL-CFS-020-081	18	See Map	24%	93
REL-CFS-020-082	18	See Map	24%	93
REL-CFS-020-083	12	See Map	15%	93
REL-CFS-020-084	12	See Map	15%	93
REL-CFS-020-085	12	See Map	15%	93
REL-CFS-020-086	12	See Map	15%	93
REL-CFS-020-087	12	See Map	15%	93
REL-CFS-020-088	12	See Map	15%	93
REL-CFS-020-089	12	See Map	15%	93
REL-CFS-020-090	12	See Map	15%	93
REL-CFS-020-091	12	See Map	15%	93
REL-CFS-020-092	12	See Map	15%	93
REL-CFS-020-093	12	See Map	15%	93
REL-CFS-020-094	12	See Map	15%	93
REL-CFS-020-095	12	See Map	15%	93
REL-CFS-020-096	12	See Map	15%	93
REL-CFS-020-097	12	See Map	15%	93
REL-CFS-020-098	12	See Map	15%	93
REL-CFS-020-099	18	See Map	20%	108
REL-CFS-020-100	18	See Map	20%	108
REL-CFS-020-101	18	See Map	20%	108
REL-CFS-020-102	18	See Map	20%	108
REL-CFS-020-103	18	See Map	20%	108
REL-CFS-020-104	18	See Map	20%	108
REL-CFS-020-105	18	See Map	20%	108
REL-CFS-020-106	18	See Map	20%	108
REL-CFS-020-107	18	See Map	20%	108
REL-CFS-020-108	18	See Map	20%	108
REL-CFS-020-109	18	See Map	20%	108
REL-CFS-020-110	18	See Map	20%	108
REL-CFS-020-111	18	See Map	20%	108
REL-CFS-020-112	18	See Map	20%	108
REL-CFS-020-113	18	See Map	20%	108
REL-CFS-020-114	18	See Map	20%	108
REL-CFS-020-115	18	See Map	20%	108
REL-CFS-020-116	18	See Map	20%	108
REL-CFS-020-117	18	See Map	20%	108
REL-CFS-020-118	18	See Map	20%	108
REL-CFS-020-119	18	See Map	20%	108

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-020-120	18	See Map	20%	108
REL-CFS-020-121	18	See Map	20%	108
REL-CFS-020-122	18	See Map	20%	108
REL-CFS-020-123	18	See Map	19%	85
REL-CFS-020-124	18	See Map	19%	85
REL-CFS-020-125	18	See Map	19%	85
REL-CFS-020-126	18	See Map	19%	85
REL-CFS-020-127	REMOVED			
REL-CFS-020-128				
REL-CFS-020-129				
REL-CFS-020-130				
REL-CFS-020-131	12	See Map	12%	83
REL-CFS-020-132	12	See Map	12%	83
REL-CFS-020-133	12	See Map	12%	83
REL-CFS-020-134	12	See Map	12%	83
REL-CFS-020-135	12	See Map	12%	83
REL-CFS-020-136	12	See Map	7%	212
REL-CFS-020-137	12	See Map	7%	212
REL-CFS-020-138	12	See Map	7%	212
REL-CFS-020-139	12	See Map	7%	212
REL-CFS-020-140	12	See Map	7%	212
REL-CFS-020-141	12	See Map	7%	212
REL-CFS-020-142	12	See Map	7%	212
REL-CFS-020-143	12	See Map	7%	212
REL-CFS-020-144	12	See Map	7%	212
REL-CFS-020-145	12	See Map	7%	212
REL-CFS-020-146	12	See Map	7%	212
REL-CFS-020-147	12	See Map	7%	212
REL-CFS-020-148	12	See Map	9%	177
REL-CFS-020-149	12	See Map	9%	177
REL-CFS-020-150	12	See Map	9%	177
REL-CFS-020-151	18	See Map	7%	303
REL-CFS-020-152	18	See Map	7%	303
REL-CFS-020-153	18	See Map	7%	303
REL-CFS-020-154	18	See Map	7%	303
REL-CFS-020-155	18	See Map	7%	303
REL-CFS-020-156	12	See Map	6%	126
REL-CFS-020-157	12	See Map	6%	126
REL-CFS-020-158	12	See Map	6%	126
REL-CFS-020-159	12	See Map	6%	126
REL-CFS-020-160	12	See Map	6%	126
REL-CFS-020-161	12	See Map	6%	126
REL-CFS-020-162	12	See Map	6%	126

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-020-163	12	See Map	6%	98
REL-CFS-020-164	12	See Map	6%	98
REL-CFS-020-165	12	See Map	6%	98
REL-CFS-020-166	12	See Map	6%	98
REL-CFS-020-167	12	See Map	6%	98
REL-CFS-020-168	18	See Map	14%	142
REL-CFS-020-169	18	See Map	14%	142
REL-CFS-020-170	18	See Map	14%	142
REL-CFS-020-171	18	See Map	14%	142
REL-CFS-020-172	18	See Map	14%	142
REL-CFS-020-173	18	See Map	14%	142
REL-CFS-020-174	18	See Map	14%	142
REL-CFS-020-175	18	See Map	14%	142
REL-CFS-020-176	18	See Map	14%	142
REL-CFS-020-177	18	See Map	14%	142
REL-CFS-020-178	18	See Map	17%	152
REL-CFS-020-179	18	See Map	17%	152
REL-CFS-020-180	18	See Map	17%	152
REL-CFS-020-181	18	See Map	17%	152
REL-CFS-020-182	18	See Map	17%	152
REL-CFS-020-183	18	See Map	17%	152
REL-CFS-020-184	18	See Map	17%	152
REL-CFS-020-185	18	See Map	17%	152
REL-CFS-020-186	18	See Map	17%	152
REL-CFS-020-187	18	See Map	17%	152
REL-CFS-020-188	18	See Map	17%	152
REL-CFS-020-189	18	See Map	17%	152
REL-CFS-020-190	18	See Map	17%	152
REL-CFS-020-191	18	See Map	17%	152
REL-CFS-020-192	18	See Map	17%	152
REL-CFS-020-193	18	See Map	17%	152
REL-CFS-020-194	18	See Map	17%	152
REL-CFS-020-195	18	See Map	17%	152
REL-CFS-020-196	18	See Map	17%	152
REL-CFS-020-197	18	See Map	17%	152
REL-CFS-020-198	18	See Map	17%	152
REL-CFS-020-199	18	See Map	17%	152
REL-CFS-020-200	18	See Map	17%	152
REL-CFS-020-201	18	See Map	17%	152
REL-CFS-020-202	18	See Map	17%	152
REL-CFS-020-203	18	See Map	17%	152
REL-CFS-020-204	12	See Map	15%	80
REL-CFS-020-205	12	See Map	15%	80

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-020-206	12	See Map	8%	80
REL-CFS-020-207	12	See Map	8%	80
REL-CFS-020-208	12	See Map	8%	80
REL-CFS-020-209	12	See Map	8%	80
REL-CFS-020-210	12	See Map	8%	80
REL-CFS-020-211	12	See Map	8%	80
REL-CFS-020-212	18	See Map	16%	118
REL-CFS-020-213	18	See Map	16%	118
REL-CFS-020-214	18	See Map	16%	118
REL-CFS-020-215	18	See Map	16%	118
REL-CFS-020-216	18	See Map	16%	118
REL-CFS-020-217	18	See Map	16%	118
REL-CFS-020-218	18	See Map	16%	118
REL-CFS-020-219	18	See Map	16%	118
REL-CFS-020-220	18	See Map	14%	112
REL-CFS-020-221	18	See Map	14%	112
REL-CFS-020-222	18	See Map	17%	130
REL-CFS-020-223	18	See Map	17%	130
REL-CFS-020-224	18	See Map	17%	130
REL-CFS-020-225	18	See Map	17%	130
REL-CFS-020-226	18	See Map	17%	130
REL-CFS-020-227	18	See Map	17%	130
REL-CFS-020-228	18	See Map	17%	130
REL-CFS-020-229	18	See Map	17%	130
REL-CFS-020-230	18	See Map	17%	130
REL-CFS-020-231	12	See Map	7%	132
REL-CFS-020-232	12	See Map	7%	132
REL-CFS-020-233	12	See Map	7%	132
REL-CFS-020-234	12	See Map	7%	132
REL-CFS-020-235	12	See Map	10%	131
REL-CFS-020-236	12	See Map	10%	131
REL-CFS-020-237	12	See Map	10%	131
REL-CFS-020-238	12	See Map	10%	131
REL-CFS-020-239	12	See Map	10%	131
REL-CFS-020-240	12	See Map	10%	131
REL-CFS-020-241	12	See Map	10%	131
REL-CFS-020-242	12	See Map	10%	131
REL-CFS-020-243	12	See Map	10%	131
REL-CFS-020-244	12	See Map	10%	131
REL-CFS-020-245	12	See Map	10%	131
REL-CFS-020-246	12	See Map	10%	131
REL-CFS-020-247	12	See Map	10%	131
REL-CFS-020-248	12	See Map	10%	131

STANDARD E&S WORKSHEET #1

Compost Filter Socks

REL-CFS-020-249	12	See Map	10%	131
REL-CFS-020-250	REMOVED			
REL-CFS-020-251				
REL-CFS-020-252				
REL-CFS-020-253				
REL-CFS-020-254				
REL-CFS-020-255				
REL-CFS-020-256				
REL-CFS-020-257				
REL-CFS-020-258				
REL-CFS-020-259				
REL-CFS-020-260				
REL-CFS-020-261				
REL-CFS-020-262				
REL-CFS-020-600	12	See Map	7%	212
REL-CFS-020-601	12	See Map	7%	212
REL-CFS-020-602	12	See Map	7%	212
REL-CFS-020-600	12	See Map	20%	71
REL-CFS-020-601	12	See Map	20%	71
REL-CFS-020-602	12	See Map	20%	71
REL-CFS-020-603	12	See Map	20%	71
REL-CFS-020-604	12	See Map	20%	71
REL-CFS-020-605	12	See Map	20%	71
REL-CFS-020-606	12	See Map	20%	71
REL-CFS-020-607	12	See Map	20%	71
REL-CFS-020-608	12	See Map	20%	71
REL-CFS-021-001	12	See Map	10%	131
REL-CFS-021-002	12	See Map	9%	109
REL-CFS-021-003	12	See Map	9%	109
REL-CFS-021-004	12	See Map	9%	109
REL-CFS-021-005	12	See Map	9%	109
REL-CFS-021-006	12	See Map	9%	109
REL-CFS-021-007	12	See Map	9%	109
REL-CFS-021-008	12	See Map	10%	125
REL-CFS-021-009	12	See Map	11%	108
REL-CFS-021-010	12	See Map	11%	108
REL-CFS-021-011	12	See Map	11%	108
REL-CFS-021-012	12	See Map	11%	108
REL-CFS-021-013	12	See Map	11%	108
REL-CFS-021-014	12	See Map	11%	108
REL-CFS-021-015	12	See Map	11%	108
REL-CFS-021-016	12	See Map	11%	108
REL-CFS-021-017	12	See Map	11%	108

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-018	12	See Map	11%	108
REL-CFS-021-019	12	See Map	11%	108
REL-CFS-021-020	12	See Map	11%	108
REL-CFS-021-021	12	See Map	11%	108
REL-CFS-021-022	12	See Map	11%	108
REL-CFS-021-023	12	See Map	11%	108
REL-CFS-021-024	12	See Map	11%	108
REL-CFS-021-025	12	See Map	11%	108
REL-CFS-021-026	12	See Map	11%	108
REL-CFS-021-027	12	See Map	11%	108
REL-CFS-021-028	12	See Map	11%	108
REL-CFS-021-029	12	See Map	11%	108
REL-CFS-021-030	12	See Map	11%	108
REL-CFS-021-031	12	See Map	11%	108
REL-CFS-021-032	12	See Map	11%	108
REL-CFS-021-033	12	See Map	11%	108
REL-CFS-021-034	12	See Map	11%	108
REL-CFS-021-035	12	See Map	11%	108
REL-CFS-021-036	12	See Map	11%	108
REL-CFS-021-037	12	See Map	11%	108
REL-CFS-021-038	18	See Map	17%	117
REL-CFS-021-039	18	See Map	17%	117
REL-CFS-021-040	18	See Map	17%	117
REL-CFS-021-041	18	See Map	17%	117
REL-CFS-021-042	18	See Map	17%	117
REL-CFS-021-043	18	See Map	17%	117
REL-CFS-021-044	18	See Map	17%	117
REL-CFS-021-045	18	See Map	17%	117
REL-CFS-021-046	18	See Map	17%	117
REL-CFS-021-047	18	See Map	17%	117
REL-CFS-021-048	18	See Map	17%	117
REL-CFS-021-049	18	See Map	17%	117
REL-CFS-021-050	18	See Map	17%	117
REL-CFS-021-051	18	See Map	17%	117
REL-CFS-021-052	18	See Map	17%	117
REL-CFS-021-053	18	See Map	17%	117
REL-CFS-021-054	18	See Map	17%	117
REL-CFS-021-055	18	See Map	17%	117
REL-CFS-021-056	24	See Map	26%	105
REL-CFS-021-057	24	See Map	26%	105
REL-CFS-021-058	24	See Map	26%	105
REL-CFS-021-059	24	See Map	26%	105
REL-CFS-021-060	24	See Map	26%	105

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-061	24	See Map	26%	105
REL-CFS-021-062	24	See Map	26%	105
REL-CFS-021-063	24	See Map	26%	105
REL-CFS-021-064	24	See Map	26%	105
REL-CFS-021-065	24	See Map	26%	105
REL-CFS-021-066	24	See Map	26%	105
REL-CFS-021-067	24	See Map	26%	105
REL-CFS-021-068	24	See Map	26%	105
REL-CFS-021-069	18	See Map	20%	70
REL-CFS-021-070	18	See Map	20%	70
REL-CFS-021-071	18	See Map	20%	70
REL-CFS-021-072	18	See Map	20%	70
REL-CFS-021-073	18	See Map	20%	70
REL-CFS-021-074	18	See Map	16%	111
REL-CFS-021-075	18	See Map	16%	111
REL-CFS-021-076	18	See Map	16%	111
REL-CFS-021-077	18	See Map	16%	111
REL-CFS-021-078	18	See Map	16%	111
REL-CFS-021-079	18	See Map	16%	111
REL-CFS-021-080	18	See Map	16%	111
REL-CFS-021-081	18	See Map	16%	111
REL-CFS-021-082	18	See Map	16%	111
REL-CFS-021-083	12	See Map	10%	123
REL-CFS-021-084	12	See Map	10%	123
REL-CFS-021-085	12	See Map	10%	123
REL-CFS-021-086	12	See Map	10%	123
REL-CFS-021-087	12	See Map	10%	123
REL-CFS-021-088	12	See Map	10%	123
REL-CFS-021-089	12	See Map	10%	123
REL-CFS-021-090	12	See Map	7%	95
REL-CFS-021-091	12	See Map	7%	95
REL-CFS-021-092	12	See Map	7%	95
REL-CFS-021-093	12	See Map	7%	95
REL-CFS-021-094	12	See Map	7%	95
REL-CFS-021-095	12	See Map	7%	95
REL-CFS-021-096	12	See Map	7%	95
REL-CFS-021-097	12	See Map	7%	95
REL-CFS-021-098	18	See Map	7%	95
REL-CFS-021-099	18	See Map	7%	95
REL-CFS-021-100	18	See Map	7%	95
REL-CFS-021-101	18	See Map	7%	95
REL-CFS-021-102	18	See Map	7%	95
REL-CFS-021-103	18	See Map	7%	95

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-104	18	See Map	7%	95
REL-CFS-021-105	18	See Map	7%	95
REL-CFS-021-106	18	See Map	7%	95
REL-CFS-021-107	18	See Map	7%	95
REL-CFS-021-108	18	See Map	7%	95
REL-CFS-021-109	12	See Map	14%	84
REL-CFS-021-110	12	See Map	14%	84
REL-CFS-021-111	12	See Map	14%	84
REL-CFS-021-112	12	See Map	14%	84
REL-CFS-021-113	12	See Map	14%	84
REL-CFS-021-114	12	See Map	14%	84
REL-CFS-021-115	18	See Map	35%	52
REL-CFS-021-116	18	See Map	35%	52
REL-CFS-021-117	18	See Map	35%	52
REL-CFS-021-118	18	See Map	35%	52
REL-CFS-021-119	18	See Map	35%	52
REL-CFS-021-120	18	See Map	35%	52
REL-CFS-021-121	18	See Map	35%	52
REL-CFS-021-122	18	See Map	35%	52
REL-CFS-021-123	18	See Map	35%	52
REL-CFS-021-124	18	See Map	35%	52
REL-CFS-021-125	18	See Map	35%	52
REL-CFS-021-126	18	See Map	35%	52
REL-CFS-021-127	18	See Map	35%	52
REL-CFS-021-128	18	See Map	35%	52
REL-CFS-021-129	18	See Map	35%	52
REL-CFS-021-130	18	See Map	35%	52
REL-CFS-021-131	18	See Map	35%	52
REL-CFS-021-132	18	See Map	35%	52
REL-CFS-021-133	18	See Map	35%	52
REL-CFS-021-134	18	See Map	35%	52
REL-CFS-021-135	18	See Map	35%	52
REL-CFS-021-136	18	See Map	35%	52
REL-CFS-021-137	18	See Map	35%	52
REL-CFS-021-138	18	See Map	35%	52
REL-CFS-021-139	18	See Map	35%	52
REL-CFS-021-140	18	See Map	10%	159
REL-CFS-021-141	18	See Map	10%	159
REL-CFS-021-142	18	See Map	10%	159
REL-CFS-021-143	18	See Map	10%	159
REL-CFS-021-144	18	See Map	10%	159
REL-CFS-021-145	18	See Map	10%	159
REL-CFS-021-146	18	See Map	10%	159

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-147	18	See Map	10%	159
REL-CFS-021-148	18	See Map	10%	159
REL-CFS-021-149	18	See Map	10%	159
REL-CFS-021-150	12	See Map	2%	33
REL-CFS-021-151	12	See Map	2%	33
REL-CFS-021-152	18	See Map	23%	89
REL-CFS-021-153	18	See Map	23%	89
REL-CFS-021-154	18	See Map	23%	89
REL-CFS-021-155	18	See Map	23%	89
REL-CFS-021-156	18	See Map	23%	89
REL-CFS-021-157	18	See Map	23%	89
REL-CFS-021-158	18	See Map	23%	89
REL-CFS-021-159	18	See Map	23%	89
REL-CFS-021-160	18	See Map	23%	89
REL-CFS-021-161	18	See Map	23%	89
REL-CFS-021-162	18	See Map	16%	110
REL-CFS-021-163	18	See Map	16%	110
REL-CFS-021-164	18	See Map	16%	110
REL-CFS-021-165	18	See Map	16%	110
REL-CFS-021-166	18	See Map	23%	110
REL-CFS-021-167	18	See Map	23%	110
REL-CFS-021-168	18	See Map	23%	110
REL-CFS-021-169	18	See Map	23%	110
REL-CFS-021-170	18	See Map	23%	110
REL-CFS-021-171	18	See Map	18%	91
REL-CFS-021-172	18	See Map	18%	91
REL-CFS-021-173	18	See Map	18%	91
REL-CFS-021-174	18	See Map	18%	91
REL-CFS-021-175	18	See Map	18%	91
REL-CFS-021-176	18	See Map	18%	91
REL-CFS-021-177	18	See Map	18%	91
REL-CFS-021-178	18	See Map	18%	91
REL-CFS-021-179	18	See Map	18%	91
REL-CFS-021-180	18	See Map	18%	91
REL-CFS-021-181	18	See Map	18%	91
REL-CFS-021-182	18	See Map	18%	91
REL-CFS-021-183	18	See Map	18%	91
REL-CFS-021-184	12	See Map	22%	23
REL-CFS-021-185	12	See Map	22%	23
REL-CFS-021-186	12	See Map	22%	23
REL-CFS-021-187	18	See Map	9%	67
REL-CFS-021-188	18	See Map	9%	67
REL-CFS-021-189	18	See Map	23%	101

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-190	32	See Map	21%	215
REL-CFS-021-191	24	See Map	21%	182
REL-CFS-021-192	24	See Map	21%	182
REL-CFS-021-193	24	See Map	21%	182
REL-CFS-021-194	24	See Map	21%	182
REL-CFS-021-195	24	See Map	21%	182
REL-CFS-021-196	24	See Map	21%	182
REL-CFS-021-197	24	See Map	21%	182
REL-CFS-021-198	24	See Map	21%	182
REL-CFS-021-199	18	See Map	21%	112
REL-CFS-021-200	18	See Map	21%	112
REL-CFS-021-201	18	See Map	21%	112
REL-CFS-021-202	18	See Map	21%	112
REL-CFS-021-203	18	See Map	21%	112
REL-CFS-021-204	12	See Map	21%	62
REL-CFS-021-205	12	See Map	21%	62
REL-CFS-021-206	12	See Map	21%	62
REL-CFS-021-207	12	See Map	21%	62
REL-CFS-021-208	12	See Map	21%	62
REL-CFS-021-209	12	See Map	21%	62
REL-CFS-021-210	12	See Map	21%	62
REL-CFS-021-211	12	See Map	21%	62
REL-CFS-021-212	24	See Map	21%	182
REL-CFS-021-213	12	See Map	11%	45
REL-CFS-021-214	24	See Map	25%	112
REL-CFS-021-215	24	See Map	25%	112
REL-CFS-021-216	24	See Map	25%	112
REL-CFS-021-217	24	See Map	25%	112
REL-CFS-021-218	24	See Map	25%	112
REL-CFS-021-219	24	See Map	25%	112
REL-CFS-021-220	24	See Map	25%	112
REL-CFS-021-221	24	See Map	25%	112
REL-CFS-021-222	24	See Map	25%	112
REL-CFS-021-223	24	See Map	25%	112
REL-CFS-021-224	24	See Map	25%	112
REL-CFS-021-225	24	See Map	25%	112
REL-CFS-021-226	24	See Map	25%	112
REL-CFS-021-227	24	See Map	25%	112
REL-CFS-021-228	24	See Map	25%	112
REL-CFS-021-229	24	See Map	25%	112
REL-CFS-021-230	24	See Map	25%	112
REL-CFS-021-231	24	See Map	25%	112
REL-CFS-021-232	24	See Map	25%	112

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-021-233	24	See Map	25%	112
REL-CFS-021-234	24	See Map	25%	112
REL-CFS-021-235	24	See Map	25%	112
REL-CFS-021-236	24	See Map	25%	112
REL-CFS-021-237	24	See Map	25%	112
REL-CFS-021-238	24	See Map	25%	112
REL-CFS-021-239	24	See Map	25%	112
REL-CFS-021-240	18	See Map	24%	92
REL-CFS-021-241	18	See Map	24%	92
REL-CFS-021-242	18	See Map	24%	92
REL-CFS-021-243	18	See Map	24%	92
REL-CFS-021-244	18	See Map	24%	92
REL-CFS-021-245	18	See Map	24%	92
REL-CFS-021-246	18	See Map	24%	92
REL-CFS-021-247	18	See Map	24%	92
REL-CFS-021-248	18	See Map	24%	92
REL-CFS-021-249	18	See Map	24%	92
REL-CFS-021-250	18	See Map	24%	92
REL-CFS-021-251	18	See Map	24%	92
REL-CFS-021-252	18	See Map	24%	92
REL-CFS-021-253	18	See Map	24%	92
REL-CFS-021-254	18	See Map	24%	92
REL-CFS-021-255	18	See Map	24%	92
REL-CFS-021-256	18	See Map	24%	92
REL-CFS-021-257	18	See Map	24%	92
REL-CFS-021-258	18	See Map	24%	92
REL-CFS-021-259	12	See Map	8%	107
REL-CFS-021-260	12	See Map	8%	107
REL-CFS-021-261	12	See Map	8%	107
REL-CFS-021-262	12	See Map	8%	107
REL-CFS-021-600	18	See Map	18%	91
REL-CFS-021-601	18	See Map	18%	91
REL-CFS-021-602	18	See Map	18%	91
REL-CFS-021-603	18	See Map	18%	91
REL-CFS-022-001	12	See Map	9%	98
REL-CFS-022-002	12	See Map	9%	98
REL-CFS-022-003	12	See Map	9%	98
REL-CFS-022-004	12	See Map	9%	98
REL-CFS-022-005	12	See Map	9%	98
REL-CFS-022-006	18	See Map	16%	98
REL-CFS-022-007	18	See Map	16%	98
REL-CFS-022-008	18	See Map	16%	98
REL-CFS-022-009	18	See Map	16%	98

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-022-010	12	See Map	10%	62
REL-CFS-022-011	12	See Map	10%	62
REL-CFS-022-012	12	See Map	10%	62
REL-CFS-022-013	12	See Map	10%	62
REL-CFS-022-014	12	See Map	10%	62
REL-CFS-022-015	12	See Map	10%	62
REL-CFS-022-016	12	See Map	9%	89
REL-CFS-022-017	12	See Map	9%	89
REL-CFS-022-018	12	See Map	9%	89
REL-CFS-022-019	12	See Map	6%	87
REL-CFS-022-020	12	See Map	6%	87
REL-CFS-022-021	18	See Map	3%	461
REL-CFS-022-022	18	See Map	3%	461
REL-CFS-022-023	18	See Map	3%	461
REL-CFS-022-024	18	See Map	3%	461
REL-CFS-022-025	18	See Map	3%	461
REL-CFS-022-026	18	See Map	3%	461
REL-CFS-022-027	18	See Map	3%	461
REL-CFS-022-028	18	See Map	3%	461
REL-CFS-022-029	18	See Map	3%	461
REL-CFS-022-030	18	See Map	3%	461
REL-CFS-022-031	18	See Map	3%	461
REL-CFS-022-032	18	See Map	3%	461
REL-CFS-022-033	18	See Map	3%	461
REL-CFS-022-034	18	See Map	3%	461
REL-CFS-022-035	12	See Map	2%	332
REL-CFS-022-036	12	See Map	2%	332
REL-CFS-022-037	12	See Map	2%	332
REL-CFS-022-038	12	See Map	2%	332
REL-CFS-022-039	12	See Map	2%	332
REL-CFS-022-040	12	See Map	2%	332
REL-CFS-022-041	12	See Map	2%	332
REL-CFS-022-042	12	See Map	2%	332
REL-CFS-022-043	12	See Map	2%	332
REL-CFS-022-044	12	See Map	2%	332
REL-CFS-022-045	12	See Map	2%	332
REL-CFS-022-046	12	See Map	2%	332
REL-CFS-022-047	12	See Map	2%	332
REL-CFS-022-048	12	See Map	2%	332
REL-CFS-022-049	12	See Map	2%	332
REL-CFS-022-050	12	See Map	2%	332
REL-CFS-022-051	18	See Map	4%	453
REL-CFS-022-052	18	See Map	4%	453

STANDARD E&S WORKSHEET #1**Compost Filter Socks**

REL-CFS-022-053	18	See Map	4%	453
REL-CFS-022-054	18	See Map	4%	453
REL-CFS-022-055	18	See Map	4%	453
REL-CFS-022-056	18	See Map	4%	453
REL-CFS-022-057	18	See Map	4%	453
REL-CFS-022-058	18	See Map	4%	453
REL-CFS-022-059	18	See Map	4%	453
REL-CFS-022-060	18	See Map	4%	453
REL-CFS-022-061	18	See Map	4%	453
REL-CFS-022-600	12	See Map	7%	163.78
REL-CFS-022-601	12	See Map	7%	163.78
REL-CFS-022-602	12	See Map	7%	163.78
REL-CFS-022-603	12	See Map	7%	163.78
REL-CFS-022-604	12	See Map	6%	131
REL-CFS-022-605	12	See Map	6%	131
REL-CFS-022-606	12	See Map	6%	131
REL-CFS-022-607	12	See Map	6%	131
REL-CFS-022-608	12	See Map	10%	188
REL-CFS-022-609	12	See Map	10%	188
REL-CFS-022-610	12	See Map	10%	188
REL-CFS-022-611	12	See Map	10%	188
REL-CFS-022-612	12	See Map	10%	188
REL-CFS-022-613	12	See Map	10%	188
REL-CFS-022-614	12	See Map	10%	188
REL-CFS-022-615	12	See Map	10%	188
REL-CFS-022-616	12	See Map	4%	162.93
REL-CFS-022-617	12	See Map	4%	162.93
REL-CFS-022-618	12	See Map	4%	162.93
REL-CFS-022-619	12	See Map	4%	162.93
REL-CFS-022-620	12	See Map	4%	162.93
REL-CFS-022-621	12	See Map	10%	188
REL-CFS-022-622	12	See Map	10%	188
REL-CFS-022-623	12	See Map	10%	188
REL-CFS-022-624	12	See Map	10%	188
REL-CFS-022-625	12	See Map	10%	188
REL-CFS-022-626	12	See Map	10%	61
REL-CFS-022-627	12	See Map	2%	91
REL-CFS-022-628	12	See Map	2%	91
REL-CFS-022-629	12	See Map	3%	77
REL-CFS-022-630	12	See Map	3%	77
REL-CFS-022-631	12	See Map	3%	77
REL-CFS-022-632	12	See Map	2%	270
REL-CFS-022-633	12	See Map	2%	270

STANDARD E&S WORKSHEET #1

Compost Filter Socks

[illegible]

ATTACHMENT 3.2
CN TABLE

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area ^{2/}	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weedbarrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

^{1/} Average runoff condition, and $I_a = 0.2S$.^{2/} The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.^{3/} CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.^{4/} Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.^{5/} Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$ ² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ^{6/}	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.² *Poor*: <50% ground cover or heavily grazed with no mulch.*Fair*: 50 to 75% ground cover and not heavily grazed.*Good*: > 75% ground cover and lightly or only occasionally grazed.³ *Poor*: <50% ground cover.*Fair*: 50 to 75% ground cover.*Good*: >75% ground cover.⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.*Fair*: Woods are grazed but not burned, and some forest litter covers the soil.*Good*: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description.....		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and I_a , = 0.2S. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

ATTACHMENT 3.3
CHANNEL DESIGN WORKSHEETS

STANDARD E&S WORKSHEET # 9

Time of Concentration

PROJECT NAME: Williams REAE – Regional Energy Lateral

LOCATION: Luzerne County, PA

PREPARED BY: JB

DATE: 7/08/2022

CHECKED BY: KCC

DATE: 7/08/2022

OVERLAND FLOW:

PATH NUMBER	LENGTH L (FT)	"n" VALUE	AVERAGE SLOPE (S) (ft/ft)	TIME (min)
REL-DC - 001	100	0.4	0.07	13
REL-DC - 002	100	0.4	0.04	16.2
REL-DC - 003	100	0.4	0.07	13
REL-DC - 004	100	0.4	0.035	17.1
REL-DC - 005	100	0.4	0.06	14.1
REL-DC - 006	100	0.4	0.05	15.1
REL-DC - 007-RA	100	0.4	0.09	12.1
REL-DC - 007-RB	100	0.4	0.07	13.3
REL-DC - 008	100	0.4	0.04	16.7
REL-DC - 009	100	0.4	0.045	16
REL-DC - 010	100	0.4	0.1	11.7
REL-DC - 011	100	0.4	0.11	11.2
REL-DC - 012	100	0.4	0.03	19
REL-DC - 013	100	0.4	0.05	15.5
REL-DC - 014	100	0.4	0.05	15.5
REL-DC - 015	100	0.4	0.07	13.6
REL-DC - 016	100	0.4	0.19	9.3
REL-DC - 017	100	0.24	0.11	8
REL-DC - 018	100	0.4	0.025	21.6
REL-DC - 019	100	0.4	0.06	15.1
REL-DC - 020	100	0.4	0.08	13.5
REL-DC - 021	100	0.4	0.05	16.2
REL-DC - 022	100	0.15	0.03	9
REL-DC - 023	100	0.4	0.08	13.4
REL-DC - 024	100	0.4	0.05	16.1
REL-DC - 025	100	0.4	0.0575	15.2
REL-DC - 026	100	0.4	0.13	11

$$T_{c (sheet flow)} = \left[\frac{2.48 (n)}{3.6} \right]^{0.4673}$$

n **Type of Cover**
0.02 smooth pavement
0.1 bare parched soil
0.3 poor grass cover
0.4 average grass cover
0.8 dense grass cover
(L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

PATH NUMBER	LENGTH (FT)	TYPE OF COVER	AVERAGE SLOPE(S) (ft/ft)	V (ft/sec)	TIME (min)
REL-DC - 001	179	Woodland	0.0447	5	2.8
REL-DC - 002	151	Woodland	0.0695	5	1.9
REL-DC - 003	189	Woodland	0.1005	5	2
REL-DC - 004	452	Woodland	0.0796	5	5.3
REL-DC - 005	1091	Woodland	0.0806	5	12.8
REL-DC - 006	1119	Woodland	0.0751	5	13.6
REL-DC - 007-RA	154	Woodland	0.136	5	1.4

REL-DC – 007-RB	214	Woodland	0.168	5	1.7
REL-DC - 008	382	Woodland	0.136	5	3.5
REL-DC - 009	743	Woodland	0.076	5	9
REL-DC - 010	571	Woodland	0.0648	5	7.5
REL-DC - 011	301	Woodland	0.0897	5	3.4
REL-DC - 012	1032	Woodland	0.081	5	12.1
REL-DC - 013	909	Woodland	0.0858	5	10.3
REL-DC - 014	910	Woodland	0.0857	5	10.4
REL-DC - 015	999	Woodland	0.079	5	11.8
REL-DC - 016	1421	Woodland	0.142	5	12.6
REL-DC - 017	389	Pasture	0.237	7	1.9
	340	Woodland	0.235	5	2.3
REL-DC - 018	311	Woodland	0.0952	5	3.4
REL-DC - 019	594	Woodland	0.130	5	5.5
	614	Pasture	0.085	7	5.0
REL-DC - 020	1251	Woodland	0.128	5	11.7
REL-DC - 021	905	Woodland	0.104	5	9.4
REL-DC - 022	1016	Pasture	0.137	7	6.5
REL-DC - 023	1019	Woodland	0.145	5	8.9
REL-DC – 024	273	Woodland	0.069	5	3.5
REL-DC – 025	274	Woodland	0.0958	5	3
REL-DC - 026	437	Woodland	0.168	5	3.6

CHANNEL FLOW:

PATH NUMBER	LENG TH (ft)	AREA (sq. ft.)	AVG. SLOPE (S) (ft/ft)	WET'D PERIM (ft)	HYDR. RADIUS (ft)	MANNING'S "n"	V (ft/sec)	CHANNEL TIME (min)	T _c (min)
REL-DC - 001	93	0.7	0.01	3.2	0.21	0.05	1.1	4.5	20.3
REL-DC - 002	213	0.5	0.02	2.8	0.16	0.05	1.2	2.7	20.8
REL-DC - 003	208	0.6	0.038	3.1	0.19	0.05	2	1.8	16.8
REL-DC - 004	458	1.5	0.021	4.3	0.36	0.047	2.3	3.4	25.8
REL-DC - 005	495	2.3	0.012	5.1	0.46	0.044	2.2	3.8	30.7
REL-DC - 006	198	1.5	0.02	4.2	0.35	0.05	2.08	1.6	30.3
REL-DC – 007-RA	144	0.2	0.168	1.7	0.11	0.032	4.7	1.4	14.9
REL-DC – 007-RB	177	0.7	0.038	2.8	0.26	0.05	2.3	3.1	18.1
REL-DC - 008	259	1.7	0.015	4.4	0.38	0.047	1.9	2.2	22.4
REL-DC - 009	237	1.1	0.03	3.8	0.3	0.05	2.3	1.8	26.8
REL-DC - 010	338	1.5	0.053	4.2	0.35	0.033	5.2	0.9	20.1
REL-DC - 011	181	1.2	0.017	3.9	0.31	0.05	1.74	1.7	16.3
REL-DC - 012	156	1.3	0.026	4	0.32	0.05	2.23	1.1	32.2
REL-DC - 013	113	0.8	0.022	3.3	0.23	0.05	1.7	1.1	26.9
REL-DC - 014	144	0.8	0.021	3.3	0.23	0.05	1.6	1.4	27.3
REL-DC - 015	204	2.8	0.02	5.6	0.51	0.047	2.9	1.2	26.6
REL-DC - 016	197	1.8	0.0406	4.5	0.39	0.048	3.22	1	22.9
REL-DC - 017	455	1	0.053	3.7	0.28	0.05	2.9	2.7	14.9
REL-DC - 018	382	0.7	0.037	3.2	0.21	0.05	1.99	3.1	28.1
REL-DC - 019	190	1.3	0.021	4	0.32	0.05	2	1.6	27.2
REL-DC - 020	261	2.9	0.008	5.6	0.52	0.042	2	2.5	27.7
REL-DC - 021	202	1.8	0.01	4.6	0.4	0.045	1.79	1.9	27.5
REL-DC - 022	591	2.3	0.044	5.1	0.46	0.037	5.01	2	17.5
REL-DC - 023	397	2.8	0.009	5.5	0.511	0.039	2.3	2.9	25.2

REL-DC - 024	240	0.5	0.071	2.8	0.16	0.05	2.3	1.6	21.2
REL-DC - 025	227	0.5	0.084	2.9	0.17	0.05	2.6	1.4	19.6
REL-DC - 026	630	1	0.016	3.6	0.27	0.05	1.6	6.6	21.2

CHANNEL DIMENSIONS:

PATH NUMBER	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
REL-DC - 001	2	2	2	1	6
REL-DC - 002	2	2	2	0.75	5
REL-DC - 003	2	2	2	1	6
REL-DC - 004	2	2	2	1.25	7
REL-DC - 005	2	2	2	1.5	8
REL-DC - 006	2	2	2	1.25	7
REL-DC - 007-RA	1	2	2	0.75	4
REL-DC - 007-RB	1	2	2	1	5
REL-DC - 008	2	2	2	0.75	9
REL-DC - 009	2	2	2	1	6
REL-DC - 010	2	2	2	1.25	7
REL-DC - 011	2	2	2	1	6
REL-DC - 012	2	2	2	1.25	7
REL-DC - 013	2	2	2	1	6
REL-DC - 014	2	2	2	1	6
REL-DC - 015	2	2	2	1.50	8
REL-DC - 016	2	2	2	1.25	7
REL-DC - 021	2	2	2	1	6
REL-DC - 018	2	2	2	1	6
REL-DC - 019	2	2	2	1.25	7
REL-DC - 020	2	2	2	1.75	9
REL-DC - 021	2	2	2	1.25	7
REL-DC - 022	2	2	2	1.25	7
REL-DC - 023	2	2	2	1.75	9
REL-DC - 024	2	2	2	0.75	5
REL-DC - 025	2	2	2	0.75	5
REL-DC - 026	2	2	2	1.25	7

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – Regional Energy Lateral

LOCATION: Luzerne County, PA

PREPARED BY: JB

DATE: 07/08/2022

CHECKED BY: KCC

DATE: 07/08/2022

CHANNEL OR CHANNEL SECTION	REL-DC-001	REL-DC-001	REL-DC-002	REL-DC-002	REL-DC-003
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	0.617	0.617	0.512	0.512	0.644
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	0.69	0.69	0.51	0.51	1.04
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.73	0.76	0.56	0.56	1.16
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT) ²	0.050	0.093	0.050	0.080	0.050
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.1	0.7	1.2	0.9	2.0
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.2	0.2	0.2	0.3	0.6
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.0	0.75	0.75	1.0
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	5.0	5.0	5.0
d (CALCULATED FLOW DEPTH) (FT)	0.27	0.39	0.19	0.25	0.24
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.08	3.56	2.76	3.0	2.96
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	7.41	5.13	10.53	8.0	8.33
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.686	1.084	0.452	0.625	0.595
R (HYDRAULIC RADIUS) (FT)	0.214	0.290	0.159	0.200	0.194
S (BED SLOPE) ³ (FT/FT)	0.010	0.010	0.020	0.020	0.038
S _c (CRITICAL SLOPE) (FT/FT)	0.063	0.200	0.069	0.165	0.065
.7S _c (FT/FT)	0.044	0.140	0.049	0.116	0.046
1.3S _c (FT/FT)	0.082	0.260	0.090	0.215	0.085
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.73	0.61	0.56	0.5	0.51
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-003	REL-DC-004	REL-DC-004	REL-DC-005	REL-DC-005
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	0.644	2.708	2.708	4.758	4.758
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.04	3.22	3.22	4.67	4.67
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.12	3.57	3.62	5.15	5.09
PROTECTIVE LINING ²	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.064	0.047	0.061	0.044	0.068
V _a (ALLOWABLE VELOCITY) (FPS)	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.6	2.3	1.9	2.2	1.6
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.6	0.7	0.8	0.5	0.6
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.25	1.25	1.50	1.50
CHANNEL TOP WIDTH @ D (FT)	6.0	7.0	7.0	7.0	8.0
d (CALCULATED FLOW DEPTH) (FT)	0.27	0.51	0.59	0.69	0.86
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.08	4.04	4.36	4.76	5.42
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	7.41	3.92	3.39	2.90	2.34
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.686	1.540	1.876	2.332	3.176
R (HYDRAULIC RADIUS) (FT)	0.214	0.360	0.404	0.459	0.545
S (BED SLOPE) ³ (FT/FT)	0.038	0.021	0.021	0.012	0.012
S _c (CRITICAL SLOPE) (FT/FT)	0.102	0.048	0.078	0.039	0.089
.7S _c (FT/FT)	0.072	0.034	0.055	0.027	0.062
1.3S _c (FT/FT)	0.133	0.062	0.101	0.051	0.115
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.73	0.74	0.66	0.56	0.64
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-006	REL-DC-006	REL-DC-007-RA	REL-DC-007-RA	REL-DC-007-RB	REL-DC-007-RB
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	3.323	3.323	0.867	0.867	0.680	0.680
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	2.91	2.91	0.98	0.98	0.72	0.72
Q (CALCULATED AT FLOW DEPTH d) (CFS)	3.08	3.09	0.99	1.01	1.69	1.68
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.050	0.066	0.032	0.035	0.050	0.058
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.1	1.7	4.7	4.5	2.3	2.1
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.6	0.7	1.7	1.8	0.9	1.0
CHANNEL BOTTOM WIDTH (FT)	2	2	1	1	1	1
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.25	1.25	0.75	0.75	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	6.0	7.0	4.0	4.0	5.0	5.0
d (CALCULATED FLOW DEPTH) (FT)	0.50	0.58	0.16	0.17	0.40	0.43
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	4.0	4.32	1.64	1.68	2.6	2.72
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	4.0	3.45	6.25	5.88	2.50	2.33
d ₅₀ STONE SIZE (IN)	-	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.500	1.833	0.211	0.228	0.720	0.800
R (HYDRAULIC RADIUS) (FT)	0.354	0.399	0.123	0.129	0.258	0.274
S (BED SLOPE) ³ (FT/FT)	0.019	0.019	0.168	0.168	0.038	0.038
S _c (CRITICAL SLOPE) (FT/FT)	0.054	0.092	0.031	0.037	0.061	0.081
.7S _c (FT/FT)	0.038	0.064	0.022	0.026	0.043	0.057
1.3S _c (FT/FT)	0.071	0.119	0.041	0.048	0.080	0.105
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.5	0.67	0.59	0.58	0.6	0.57
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-008	REL-DC-008	REL-DC-009	REL-DC-009	REL-DC-010	REL-DC-010
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	7.040	7.040	2.220	2.220	5.884	5.884
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	8.21	8.21	2.38	2.38	7.55	7.55
Q (CALCULATED AT FLOW DEPTH d) (CFS)	8.25	8.31	2.54	2.52	7.78	7.75
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.030	0.060	0.050	0.060	0.033	0.041
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	6.4	5.9	2.3	2.0	5.2	4.4
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	2.0	2.2	0.7	0.8	1.7	1.9
CHANNEL BOTTOM WIDTH (FT)	6	6	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2	2
D (TOTAL DEPTH) (FT)	0.75	0.75	1.0	1.0	1.25	1.25
CHANNEL TOP WIDTH @ D (FT)	9.0	9.0	6.0	6.0	6.0	7.0
d (CALCULATED FLOW DEPTH) (FT)	0.20	0.22	0.40	0.44	0.50	0.56
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	6.8	6.9	3.6	3.76	4.00	4.24
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	30.0	27.3	5.0	4.55	4.00	3.57
d ₅₀ STONE SIZE (IN)	-	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.280	1.417	1.120	1.267	1.500	1.747
R (HYDRAULIC RADIUS) (FT)	0.186	0.203	0.296	0.319	0.354	0.388
S (BED SLOPE) ³ (FT/FT)	0.16	0.16	0.030	0.030	0.053	0.053
S _c (CRITICAL SLOPE) (FT/FT)	0.023	0.031	0.057	0.081	0.024	0.036
.7S _c (FT/FT)	0.016	0.022	0.040	0.057	0.017	0.025
1.3S _c (FT/FT)	0.03	0.04	0.075	0.105	0.031	0.046
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.55	0.53	0.6	0.56	0.5	0.69
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-011	REL-DC-011	REL-DC-012	REL-DC-012	REL-DC-013
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	1.358	1.358	2.956	2.956	1.215
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.96	1.96	2.71	2.71	1.26
Q (CALCULATED AT FLOW DEPTH d) (CFS)	2.11	2.11	2.84	2.87	1.30
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT) ²	0.050	0.069	0.050	0.065	0.050
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.8	1.4	2.2	1.9	1.7
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.4	0.5	0.7	0.8	0.4
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.0	1.25	1.25	1.0
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	6.0	7.0	6.0
d (CALCULATED FLOW DEPTH) (FT)	0.42	0.50	0.44	0.51	0.30
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.68	4.0	3.76	4.04	3.2
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	4.76	4.0	4.55	3.92	6.67
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.193	1.50	1.267	1.540	0.780
R (HYDRAULIC RADIUS) (FT)	0.308	0.354	0.319	0.360	0.233
S (BED SLOPE) ³ (FT/FT)	0.017	0.017	0.026	0.026	0.022
S _c (CRITICAL SLOPE) (FT/FT)	0.057	0.104	0.056	0.092	0.062
.7S _c (FT/FT)	0.040	0.073	0.039	0.064	0.043
1.3S _c (FT/FT)	0.074	0.135	0.073	0.119	0.080
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.58	0.5	0.56	0.74	0.7
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-013	REL-DC-014	REL-DC-014	REL-DC-015	REL-DC-015
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	1.215	1.156	1.156	7.382	7.382
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.26	1.18	1.18	7.71	7.71
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.30	1.27	1.26	8.08	7.99
PROTECTIVE LINING ²	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.073	0.050	0.070	0.047	0.055
V _a (ALLOWABLE VELOCITY) (FPS)	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.3	1.6	1.3	2.9	2.5
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.5	0.4	0.5	1.0	1.1
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0	1.5	1.5
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	6.0	8.0	8.0
d (CALCULATED FLOW DEPTH) (FT)	0.37	0.30	0.36	0.79	0.85
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.48	3.2	3.44	5.16	5.4
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	5.41	6.67	5.56	2.53	2.35
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.014	0.780	0.979	2.828	3.145
R (HYDRAULIC RADIUS) (FT)	0.277	0.233	0.271	0.511	0.542
S (BED SLOPE) ³ (FT/FT)	0.022	0.021	0.021	0.020	0.020
S _c (CRITICAL SLOPE) (FT/FT)	0.125	0.062	0.116	0.043	0.058
.7S _c (FT/FT)	0.087	0.043	0.081	0.030	0.041
1.3S _c (FT/FT)	0.162	0.080	0.150	0.056	0.075
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.63	0.7	0.64	0.71	0.65
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-016	REL-DC-016	REL-DC-017	REL-DC-017	REL-DC-018
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	5.385	5.385	3.032	3.032	1.762
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	5.53	5.53	2.65	2.65	1.14
Q (CALCULATED AT FLOW DEPTH d) (CFS)	5.83	5.78	2.95	2.95	1.31
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT) ²	0.048	0.050	0.050	0.055	0.050
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	3.3	3.2	2.9	2.7	2.0
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	1.4	1.5	1.2	1.3	0.6
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.25	1.25	1.0	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	7.0	7.0	6.0	6.0	6.0
d (CALCULATED FLOW DEPTH) (FT)	0.56	0.57	0.37	0.39	0.26
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	4.24	4.28	3.48	3.56	3.04
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	3.57	3.51	5.41	5.13	7.69
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.747	1.790	1.014	1.084	0.655
R (HYDRAULIC RADIUS) (FT)	0.388	0.393	0.277	0.290	0.207
S (BED SLOPE) ³ (FT/FT)	0.041	0.041	0.053	0.053	0.037
S _c (CRITICAL SLOPE) (FT/FT)	0.049	0.053	0.059	0.070	0.064
.7S _c (FT/FT)	0.034	0.037	0.041	0.049	0.045
1.3S _c (FT/FT)	0.064	0.069	0.076	0.091	0.083
STABLE FLOW? (Y/N)	N	N	N	N	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	0.69	0.68	0.63	0.61	-
FREEBOARD BASED ON STABLE FLOW (FT)	-	-	-	-	0.74
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-018	REL-DC-019	REL-DC-019	REL-DC-020	REL-DC-020
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	1.762	4.837	4.837	10.277	10.277
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.14	2.35	2.35	5.46	5.46
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.24	2.55	2.52	5.87	5.78
PROTECTIVE LINING ²	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.064	0.050	0.069	0.042	0.069
V _a (ALLOWABLE VELOCITY) (FPS)	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.7	2.0	1.6	2.0	1.4
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.7	0.3	0.7	0.4	0.5
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.25	1.25	1.75	1.75
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	7.0	8.0	9.0
d (CALCULATED FLOW DEPTH) (FT)	0.29	0.44	0.52	0.80	1.02
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.16	3.76	4.08	5.2	6.06
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	6.9	4.55	3.85	2.50	1.97
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.748	1.267	1.581	2.880	4.099
R (HYDRAULIC RADIUS) (FT)	0.227	0.319	0.365	0.516	0.626
S (BED SLOPE) ³ (FT/FT)	0.037	0.021	0.021	0.008	0.008
S _c (CRITICAL SLOPE) (FT/FT)	0.102	0.056	0.103	0.034	0.087
.7S _c (FT/FT)	0.071	0.039	0.072	0.024	0.061
1.3S _c (FT/FT)	0.133	0.073	0.134	0.045	0.114
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.71	0.56	0.73	0.7	0.73
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-021	REL-DC-021	REL-DC-022	REL-DC-022	REL-DC-023
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	5.665	5.665	8.951	8.951	6.47
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	3.06	3.06	10.90	10.90	5.94
Q (CALCULATED AT FLOW DEPTH d) (CFS)	3.28	3.23	11.68	11.74	6.46
PROTECTIVE LINING ²	SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT) ²	0.045	0.075	0.037	0.040	0.039
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0	8.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.8	1.2	5.0	4.7	2.3
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0	2.1
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.4	0.5	1.9	2.0	0.4
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.25	1.25	1.25	1.25	1.75
CHANNEL TOP WIDTH @ D (FT)	7.0	7.0	7.0	7.0	8.0
d (CALCULATED FLOW DEPTH) (FT)	0.58	0.75	0.69	0.72	0.79
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	4.32	5.0	4.76	4.88	5.16
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	3.45	2.67	2.90	2.78	2.53
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.833	2.625	2.332	2.477	2.828
R (HYDRAULIC RADIUS) (FT)	0.399	0.490	0.459	0.474	0.511
S (BED SLOPE) ³ (FT/FT)	0.010	0.010	0.044	0.044	0.009
S _c (CRITICAL SLOPE) (FT/FT)	0.043	0.111	0.028	0.032	0.030
.7S _c (FT/FT)	0.030	0.078	0.019	0.022	0.021
1.3S _c (FT/FT)	0.055	0.145	0.036	0.042	0.039
STABLE FLOW? (Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.67	0.5	0.56	0.53	0.71
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

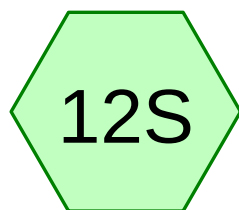
1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-023	REL-DC-024	REL-DC-024	REL-DC-025	REL-DC-025
TEMPORARY OR PERMANENT? (T OR P)	T	T	T	T	T
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR	2 YR	2 YR	2 YR
ACRES (AC)	6.47	1.374	1.374	1.599	1.599
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	5.94	0.92	0.92	1.12	1.12
Q (CALCULATED AT FLOW DEPTH d) (CFS)	6.51	1.05	1.05	1.25	1.25
PROTECTIVE LINING ²	Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT) ²	0.070	0.050	0.050	0.050	0.050
V _a (ALLOWABLE VELOCITY) (FPS)	15.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.5	2.3	2.3	2.6	2.6
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	8.0	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.6	0.8	0.8	1.0	1.0
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2	2
D (TOTAL DEPTH) (FT)	1.75	0.75	0.75	0.75	0.75
CHANNEL TOP WIDTH @ D (FT)	9.0	5.0	5.0	5.0	5.0
d (CALCULATED FLOW DEPTH) (FT)	1.06	0.19	0.19	0.20	0.20
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	6.24	2.76	2.76	2.8	2.8
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	1.89	10.53	10.53	10.0	10.0
d ₅₀ STONE SIZE (IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	4.367	0.452	0.452	0.480	0.480
R (HYDRAULIC RADIUS) (FT)	0.648	0.159	0.159	2.894	2.894
S (BED SLOPE) ³ (FT/FT)	0.009	0.071	0.071	0.084	0.084
S _c (CRITICAL SLOPE) (FT/FT)	0.089	0.069	0.069	0.068	0.068
.7S _c (FT/FT)	0.062	0.049	0.049	0.048	0.048
1.3S _c (FT/FT)	0.116	0.090	0.090	0.089	0.089
STABLE FLOW? (Y/N)	Y	N	N	N	N
FREEBOARD BASED ON UNSTABLE FLOW (FT)	0.69	0.56	0.56	0.55	0.55
FREEBOARD BASED ON STABLE FLOW (FT)	-	-	-	-	-
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

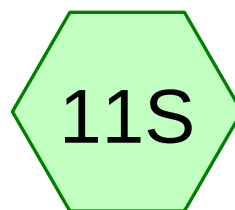
1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	REL-DC-026	REL-DC-026			
TEMPORARY OR PERMANENT? (T OR P)	T	T			
DESIGN STORM (2, 5, OR 10 YR)	2 YR	2 YR			
ACRES (AC)	5.344	5.344			
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A			
Q _r (REQUIRED CAPACITY) (CFS)	3.58	1.48			
Q (CALCULATED AT FLOW DEPTH d) (CFS)	3.98	3.78			
PROTECTIVE LINING ²	SC150BN	Vegetated			
n (MANNING'S COEFFICIENT) ²	0.050	0.071			
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0			
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.1	1.6			
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0			
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.6	0.7			
CHANNEL BOTTOM WIDTH (FT)	2	2			
CHANNEL SIDE SLOPES (H:V)	2	2			
D (TOTAL DEPTH) (FT)	1.25	1.25			
CHANNEL TOP WIDTH @ D (FT)	7.0	7.0			
d (CALCULATED FLOW DEPTH) (FT)	0.60	0.70			
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	4.40	4.80			
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	3.33	2.86			
d ₅₀ STONE SIZE (IN)	-	-			
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.920	2.380			
R (HYDRAULIC RADIUS) (FT)	0.410	0.464			
S (BED SLOPE) ³ (FT/FT)	0.016	0.016			
S _c (CRITICAL SLOPE) (FT/FT)	0.052	0.101			
.7S _c (FT/FT)	0.036	0.072			
1.3S _c (FT/FT)	0.068	0.132			
STABLE FLOW? (Y/N)	Y	Y			
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-			
FREEBOARD BASED ON STABLE FLOW (FT)	0.65	0.55			
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5			
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V			

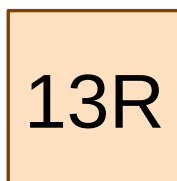
1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.



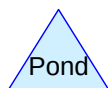
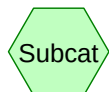
DC-002



DC-001



CWC-001



REL Flow Calcs (CWC 001) - REV 2

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.129	73	Woods, Fair, HSG C (11S, 12S)
1.129	73	TOTAL AREA

REL Flow Calcs (CWC 001) - REV 2

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.129	HSG C	11S, 12S
0.000	HSG D	
0.000	Other	
1.129		TOTAL AREA

REL Flow Calcs (CWC 001) - REV 2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.129	0.000	0.000	1.129	Woods, Fair	11S, 12S
0.000	0.000	1.129	0.000	0.000	1.129	TOTAL	
						AREA	

REL Flow Calcs (CWC 001) - REV 2

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	13R	1,906.00	1,902.00	104.5	0.0383	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 001) - REV 2*Type II 24-hr 2-yr Rainfall=3.21"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment11S: DC-001Runoff Area=0.617 ac 0.00% Impervious Runoff Depth>0.89"
Flow Length=372' Tc=17.2 min CN=73 Runoff=0.69 cfs 0.046 af**Subcatchment12S: DC-002**Runoff Area=0.512 ac 0.00% Impervious Runoff Depth>0.88"
Flow Length=464' Tc=20.8 min CN=73 Runoff=0.51 cfs 0.038 af**Reach 13R: CWC-001**Avg. Flow Depth=0.35' Max Vel=4.85 fps Inflow=1.19 cfs 0.083 af
12.0" Round Pipe n=0.020 L=104.5' S=0.0383 '/ Capacity=4.53 cfs Outflow=1.18 cfs 0.083 af**Total Runoff Area = 1.129 ac Runoff Volume = 0.083 af Average Runoff Depth = 0.88"**
100.00% Pervious = 1.129 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 001) - REV 2

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Type II 24-hr 2-yr Rainfall=3.21"

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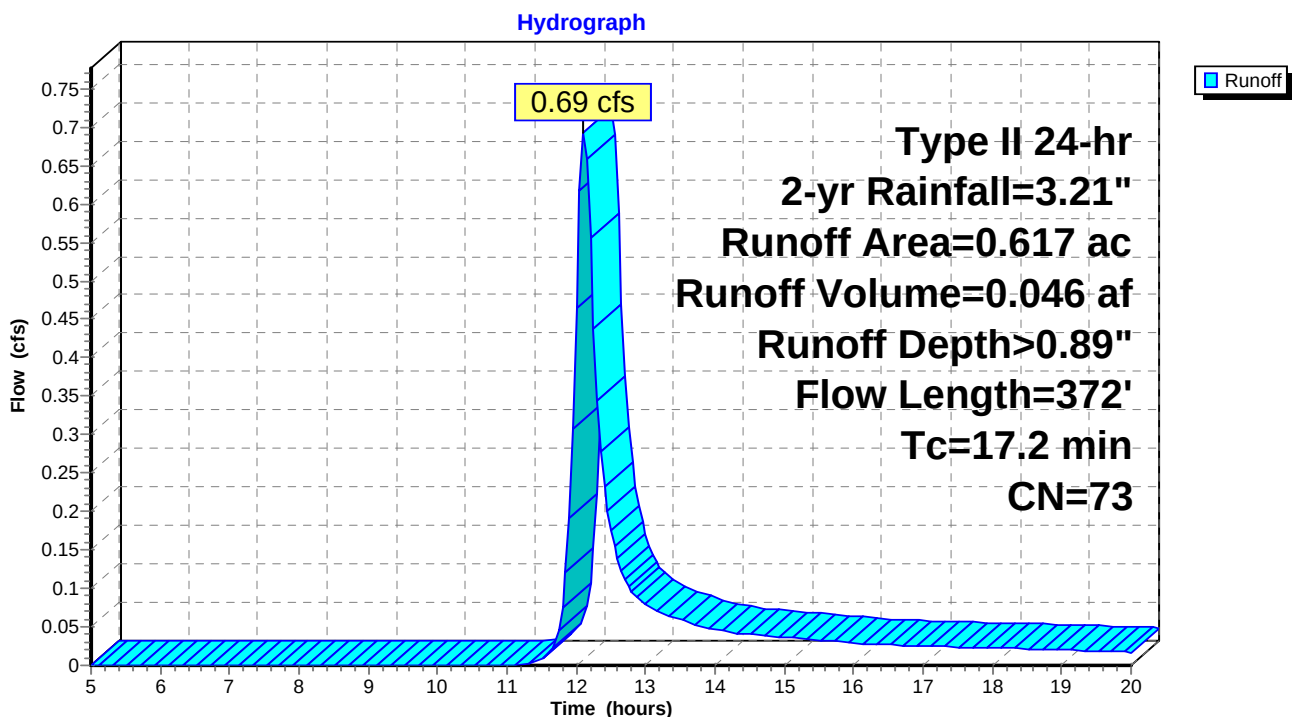
Summary for Subcatchment 11S: DC-001

Runoff = 0.69 cfs @ 12.11 hrs, Volume= 0.046 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.21"

Area (ac)	CN	Description
0.617	73	Woods, Fair, HSG C
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0700	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
2.8	179	0.0447	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	93	0.0100	1.08	0.76	Channel Flow, Area= 0.7 sf Perim= 3.2' r= 0.22' n= 0.050
17.2	372	Total			

Subcatchment 11S: DC-001

REL Flow Calcs (CWC 001) - REV 2

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Type II 24-hr 2-yr Rainfall=3.21"

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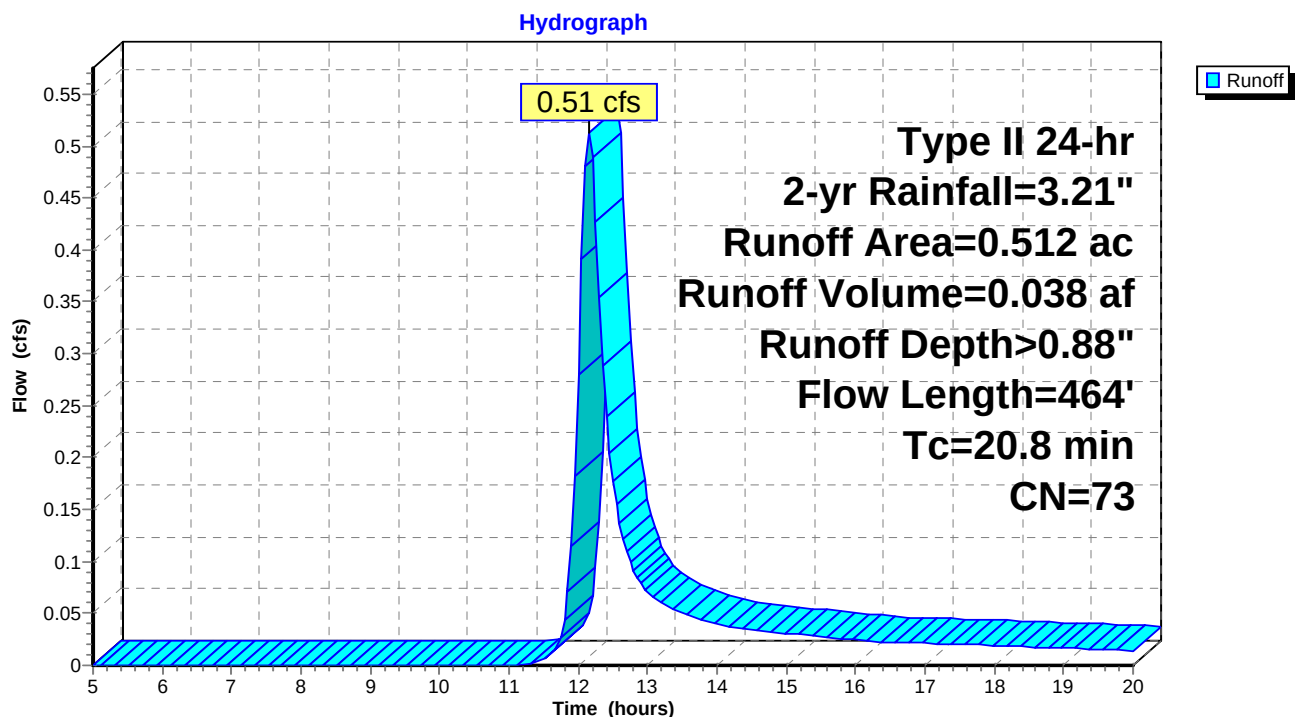
Summary for Subcatchment 12S: DC-002

Runoff = 0.51 cfs @ 12.15 hrs, Volume= 0.038 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.21"

Area (ac)	CN	Description
0.512	73	Woods, Fair, HSG C
0.512		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
1.9	151	0.0695	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.7	213	0.0200	1.33	0.67	Channel Flow, Area= 0.5 sf Perim= 2.8' r= 0.18' n= 0.050
20.8	464	Total			

Subcatchment 12S: DC-002

REL Flow Calcs (CWC 001) - REV 2

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Type II 24-hr 2-yr Rainfall=3.21"

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Summary for Reach 13R: CWC-001

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.129 ac, 0.00% Impervious, Inflow Depth > 0.88" for 2-yr event
Inflow = 1.19 cfs @ 12.13 hrs, Volume= 0.083 af
Outflow = 1.18 cfs @ 12.14 hrs, Volume= 0.083 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.85 fps, Min. Travel Time= 0.4 min

Avg. Velocity= 2.12 fps, Avg. Travel Time= 0.8 min

Peak Storage= 26 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.35'

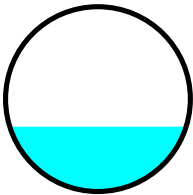
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.53 cfs

12.0" Round Pipe

n= 0.020

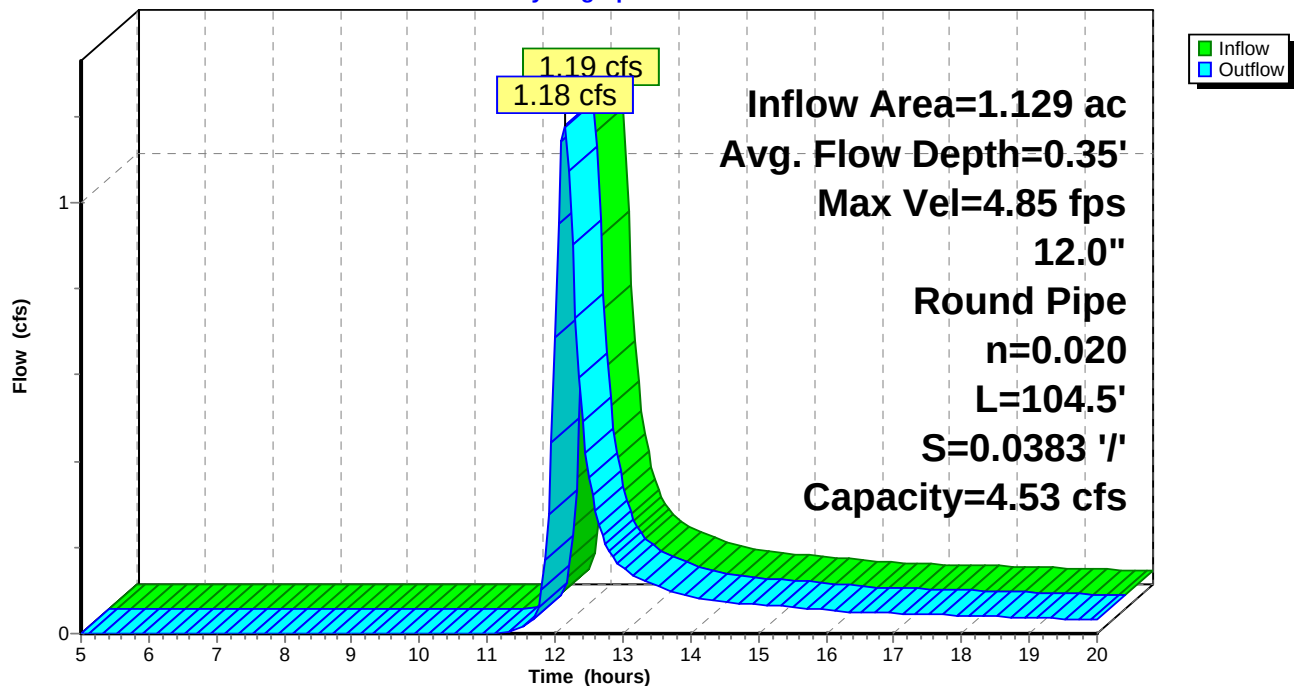
Length= 104.5' Slope= 0.0383 '/'

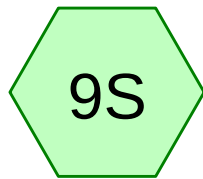
Inlet Invert= 1,906.00', Outlet Invert= 1,902.00'



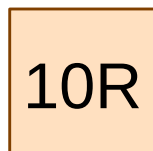
Reach 13R: CWC-001

Hydrograph

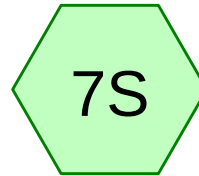




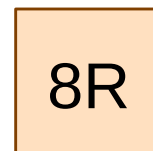
DC-004



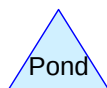
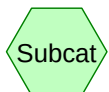
REL-CWC-003



DC-003



REL-CWC-002



Routing Diagram for REL Flow Calcs (CWC 002-003)

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REL Flow Calcs (CWC 002-003)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 002-003)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.277	73	Woods, Fair, HSG C (9S)
3.075	79	Woods, Fair, HSG D (7S, 9S)
3.352	79	TOTAL AREA

REL Flow Calcs (CWC 002-003)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.277	HSG C	9S
3.075	HSG D	7S, 9S
0.000	Other	
3.352		TOTAL AREA

REL Flow Calcs (CWC 002-003)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.277	3.075	0.000	3.352	Woods, Fair	7S, 9S
0.000	0.000	0.277	3.075	0.000	3.352	TOTAL	
						AREA	

REL Flow Calcs (CWC 002-003)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	8R	1,930.00	1,920.00	119.3	0.0838	0.020	12.0	0.0	0.0
2	10R	1,927.00	1,924.00	193.2	0.0155	0.020	18.0	0.0	0.0

REL Flow Calcs (CWC 002-003)*Type II 24-hr 2-yr Rainfall=3.21"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: DC-003Runoff Area=0.644 ac 0.00% Impervious Runoff Depth>1.22"
Flow Length=497' Tc=16.8 min CN=79 Runoff=1.04 cfs 0.066 af**Subcatchment9S: DC-004**Runoff Area=2.708 ac 0.00% Impervious Runoff Depth>1.16"
Flow Length=1,010' Tc=25.8 min CN=78 Runoff=3.22 cfs 0.261 af**Reach 8R: REL-CWC-002**Avg. Flow Depth=0.27' Max Vel=6.20 fps Inflow=1.04 cfs 0.066 af
12.0" Round Pipe n=0.020 L=119.3' S=0.0838 '/ Capacity=6.70 cfs Outflow=1.03 cfs 0.066 af**Reach 10R: REL-CWC-003**Avg. Flow Depth=0.64' Max Vel=4.47 fps Inflow=3.22 cfs 0.261 af
18.0" Round Pipe n=0.020 L=193.2' S=0.0155 '/ Capacity=8.51 cfs Outflow=3.18 cfs 0.261 af**Total Runoff Area = 3.352 ac Runoff Volume = 0.327 af Average Runoff Depth = 1.17"**
100.00% Pervious = 3.352 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 002-003)

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Type II 24-hr 2-yr Rainfall=3.21"

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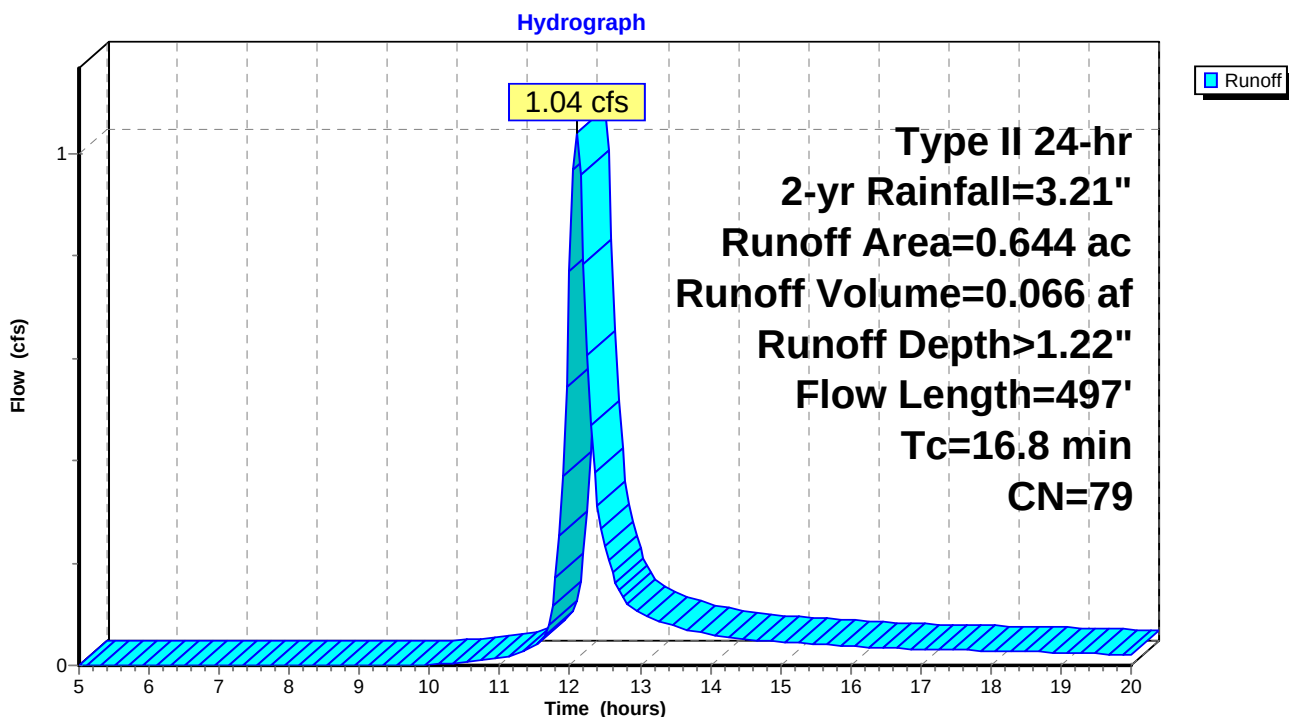
Summary for Subcatchment 7S: DC-003

Runoff = 1.04 cfs @ 12.10 hrs, Volume= 0.066 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.21"

Area (ac)	CN	Description
0.644	79	Woods, Fair, HSG D
0.644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0700	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
2.0	189	0.1005	1.59		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	208	0.0380	1.94	1.16	Channel Flow, Area= 0.6 sf Perim= 3.1' r= 0.19' n= 0.050
16.8	497	Total			

Subcatchment 7S: DC-003

REL Flow Calcs (CWC 002-003)

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Type II 24-hr 2-yr Rainfall=3.21"

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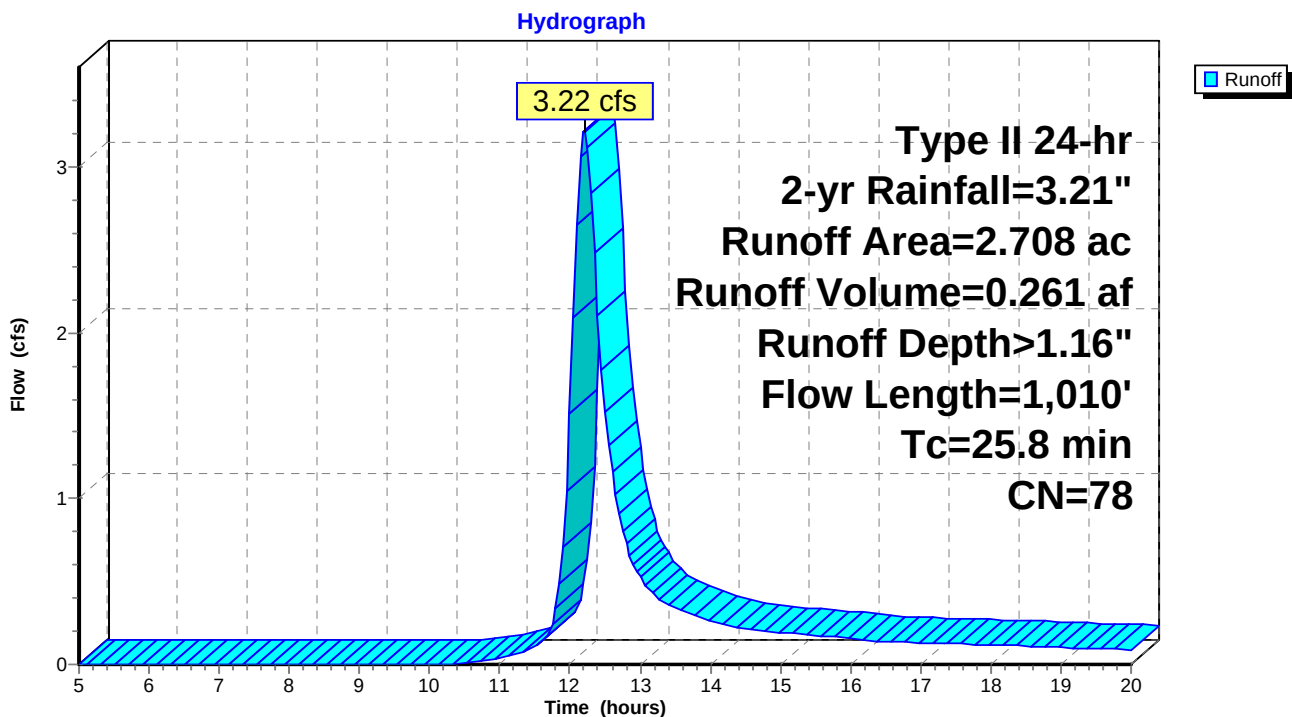
Summary for Subcatchment 9S: DC-004

Runoff = 3.22 cfs @ 12.21 hrs, Volume= 0.261 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.21"

Area (ac)	CN	Description
0.277	73	Woods, Fair, HSG C
2.431	79	Woods, Fair, HSG D
2.708	78	Weighted Average
2.708		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0350	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
5.3	452	0.0796	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
3.4	458	0.0210	2.27	3.41	Channel Flow, Area= 1.5 sf Perim= 4.3' r= 0.35' n= 0.047
25.8	1,010	Total			

Subcatchment 9S: DC-004

REL Flow Calcs (CWC 002-003)

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Type II 24-hr 2-yr Rainfall=3.21"

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Summary for Reach 8R: REL-CWC-002

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.644 ac, 0.00% Impervious, Inflow Depth > 1.22" for 2-yr event
Inflow = 1.04 cfs @ 12.10 hrs, Volume= 0.066 af
Outflow = 1.03 cfs @ 12.11 hrs, Volume= 0.066 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.20 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 2.42 fps, Avg. Travel Time= 0.8 min

Peak Storage= 20 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.27'

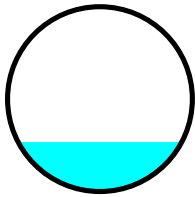
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.70 cfs

12.0" Round Pipe

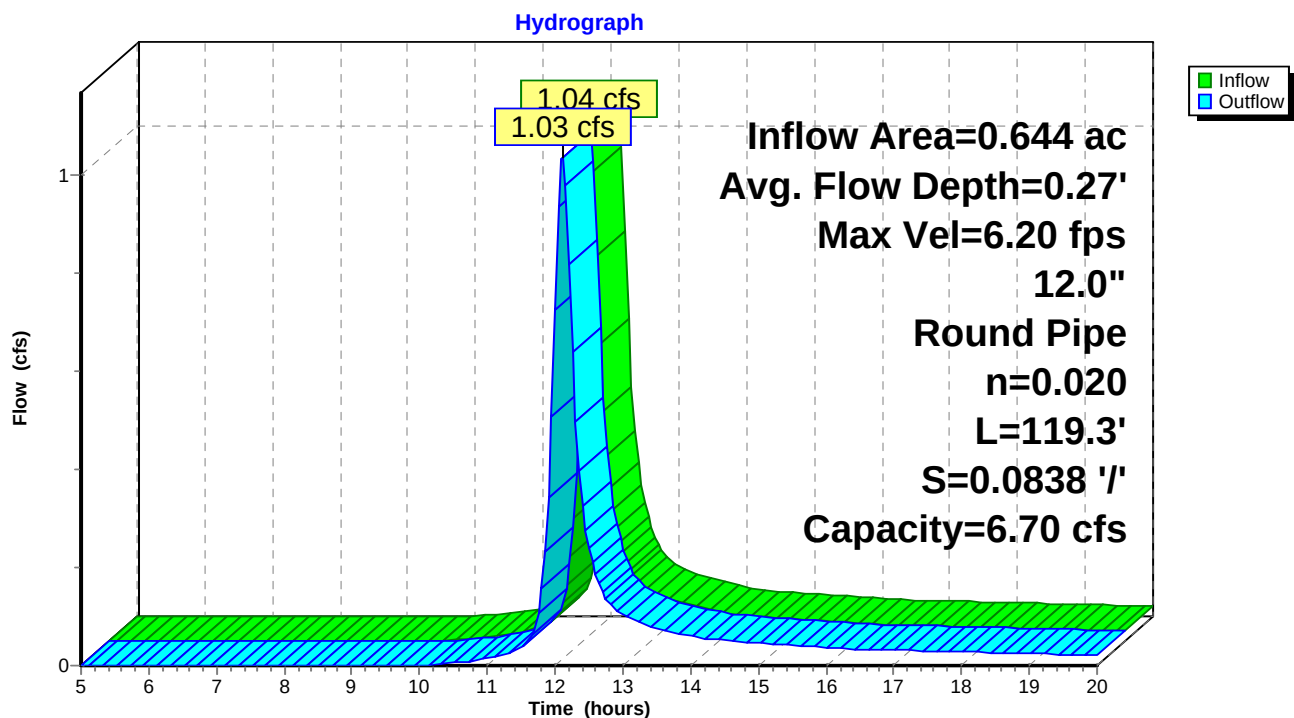
n= 0.020

Length= 119.3' Slope= 0.0838 '/'

Inlet Invert= 1,930.00', Outlet Invert= 1,920.00'



Reach 8R: REL-CWC-002



REL Flow Calcs (CWC 002-003)

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Type II 24-hr 2-yr Rainfall=3.21"

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Summary for Reach 10R: REL-CWC-003

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.708 ac, 0.00% Impervious, Inflow Depth > 1.16" for 2-yr event
Inflow = 3.22 cfs @ 12.21 hrs, Volume= 0.261 af
Outflow = 3.18 cfs @ 12.23 hrs, Volume= 0.261 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.47 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 1.95 fps, Avg. Travel Time= 1.7 min

Peak Storage= 139 cf @ 12.21 hrs

Average Depth at Peak Storage= 0.64'

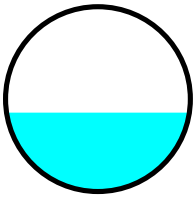
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 8.51 cfs

18.0" Round Pipe

n= 0.020

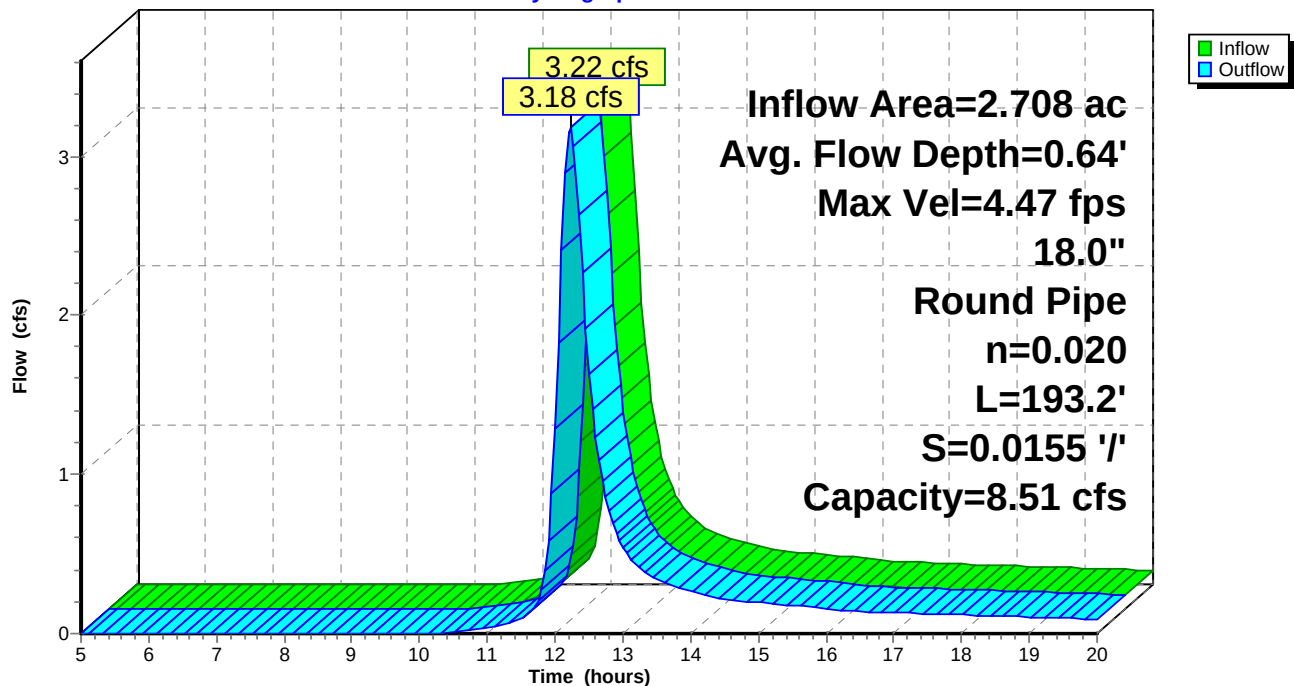
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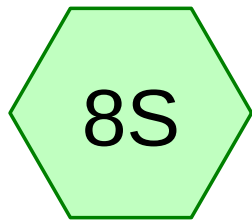
Inlet Invert= 1,927.00', Outlet Invert= 1,924.00'



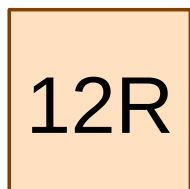
Reach 10R: REL-CWC-003

Hydrograph

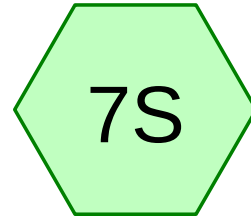




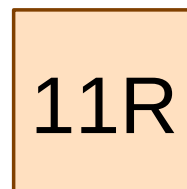
DC-006



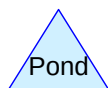
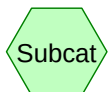
CWC-005



DC-005



CWC-004



Routing Diagram for REL Flow Calcs (CWC 004-005)

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REL Flow Calcs (CWC 004-005)

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.162	73	Woods, Fair, HSG C (7S, 8S)
5.919	79	Woods, Fair, HSG D (7S, 8S)
8.081	77	TOTAL AREA

REL Flow Calcs (CWC 004-005)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.162	HSG C	7S, 8S
5.919	HSG D	7S, 8S
0.000	Other	
8.081		TOTAL AREA

REL Flow Calcs (CWC 004-005)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.162	5.919	0.000	8.081	Woods, Fair	7S, 8S
0.000	0.000	2.162	5.919	0.000	8.081	TOTAL	
						AREA	

REL Flow Calcs (CWC 004-005)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	11R	1,852.00	1,847.00	142.7	0.0350	0.020	12.0	0.0	0.0
2	12R	1,853.00	1,848.50	104.0	0.0433	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 004-005)*Type II 24-hr 2-yr Rainfall=3.09"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: DC-005Runoff Area=4.758 ac 0.00% Impervious Runoff Depth>1.07"
Flow Length=1,686' Tc=30.7 min CN=78 Runoff=4.67 cfs 0.426 af**Subcatchment8S: DC-006**Runoff Area=3.323 ac 0.00% Impervious Runoff Depth>0.96"
Flow Length=1,417' Tc=30.3 min CN=76 Runoff=2.91 cfs 0.267 af**Reach 11R: CWC-004**Avg. Flow Depth=0.91' Max Vel=6.29 fps Inflow=4.67 cfs 0.426 af
12.0" Round Pipe n=0.020 L=142.7' S=0.0350 '/ Capacity=4.33 cfs Outflow=4.64 cfs 0.426 af**Reach 12R: CWC-005**Avg. Flow Depth=0.56' Max Vel=6.41 fps Inflow=2.91 cfs 0.267 af
12.0" Round Pipe n=0.020 L=104.0' S=0.0433 '/ Capacity=4.82 cfs Outflow=2.90 cfs 0.267 af**Total Runoff Area = 8.081 ac Runoff Volume = 0.693 af Average Runoff Depth = 1.03"**
100.00% Pervious = 8.081 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 004-005)

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Type II 24-hr 2-yr Rainfall=3.09"

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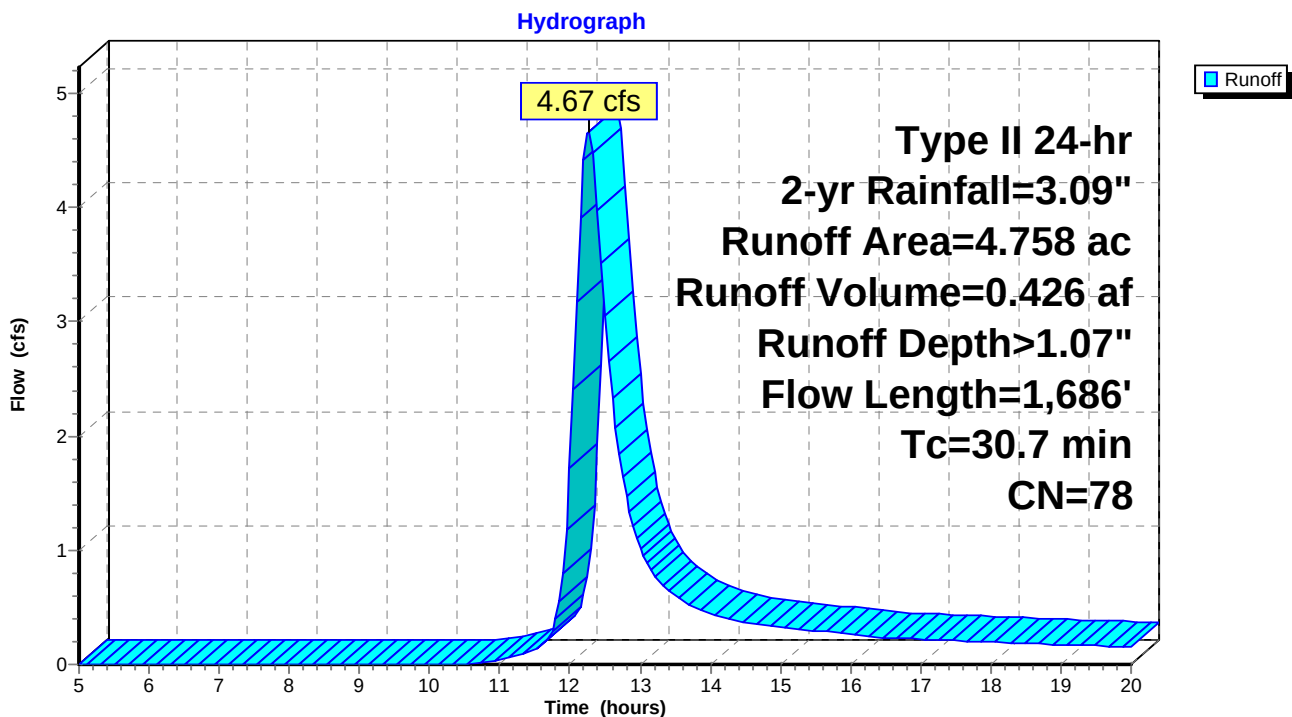
Summary for Subcatchment 7S: DC-005

Runoff = 4.67 cfs @ 12.27 hrs, Volume= 0.426 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.09"

Area (ac)	CN	Description
4.272	79	Woods, Fair, HSG D
0.486	73	Woods, Fair, HSG C
4.758	78	Weighted Average
4.758		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0600	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.09"
12.8	1,091	0.0806	1.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
3.8	495	0.0120	2.18	5.00	Channel Flow, Area= 2.3 sf Perim= 5.1' r= 0.45' n= 0.044
30.7	1,686	Total			

Subcatchment 7S: DC-005

REL Flow Calcs (CWC 004-005)

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Type II 24-hr 2-yr Rainfall=3.09"

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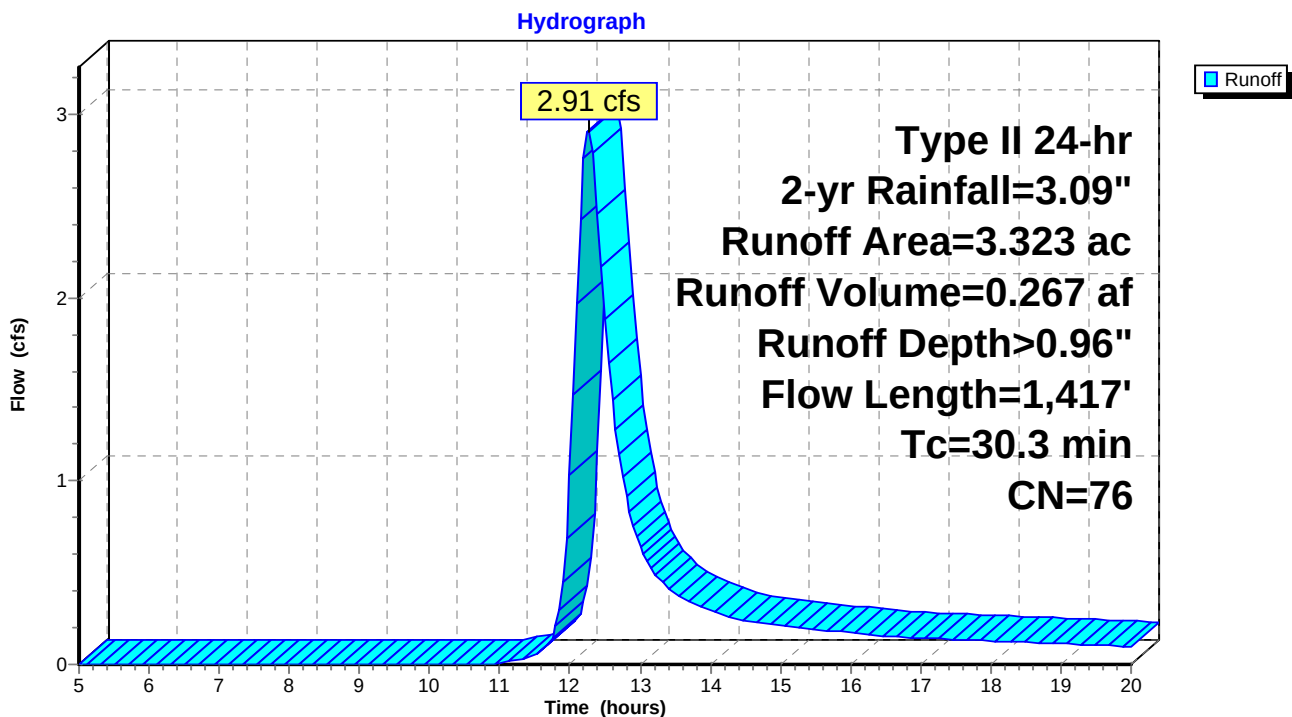
Summary for Subcatchment 8S: DC-006

Runoff = 2.91 cfs @ 12.27 hrs, Volume= 0.267 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.09"

Area (ac)	CN	Description
1.647	79	Woods, Fair, HSG D
1.676	73	Woods, Fair, HSG C
3.323	76	Weighted Average
3.323		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.09"
13.6	1,119	0.0751	1.37		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.6	198	0.0190	2.06	3.09	Channel Flow, Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.050
30.3	1,417	Total			

Subcatchment 8S: DC-006

REL Flow Calcs (CWC 004-005)*Type II 24-hr 2-yr Rainfall=3.09"*

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Summary for Reach 11R: CWC-004

[52] Hint: Inlet/Outlet conditions not evaluated

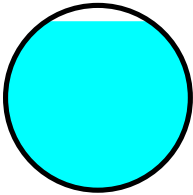
[55] Hint: Peak inflow is 108% of Manning's capacity

Inflow Area = 4.758 ac, 0.00% Impervious, Inflow Depth > 1.07" for 2-yr event
Inflow = 4.67 cfs @ 12.27 hrs, Volume= 0.426 af
Outflow = 4.64 cfs @ 12.28 hrs, Volume= 0.426 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.29 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 3.15 fps, Avg. Travel Time= 0.8 min

Peak Storage= 107 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.020
Length= 142.7' Slope= 0.0350 '/'
Inlet Invert= 1,852.00', Outlet Invert= 1,847.00'



REL Flow Calcs (CWC 004-005)

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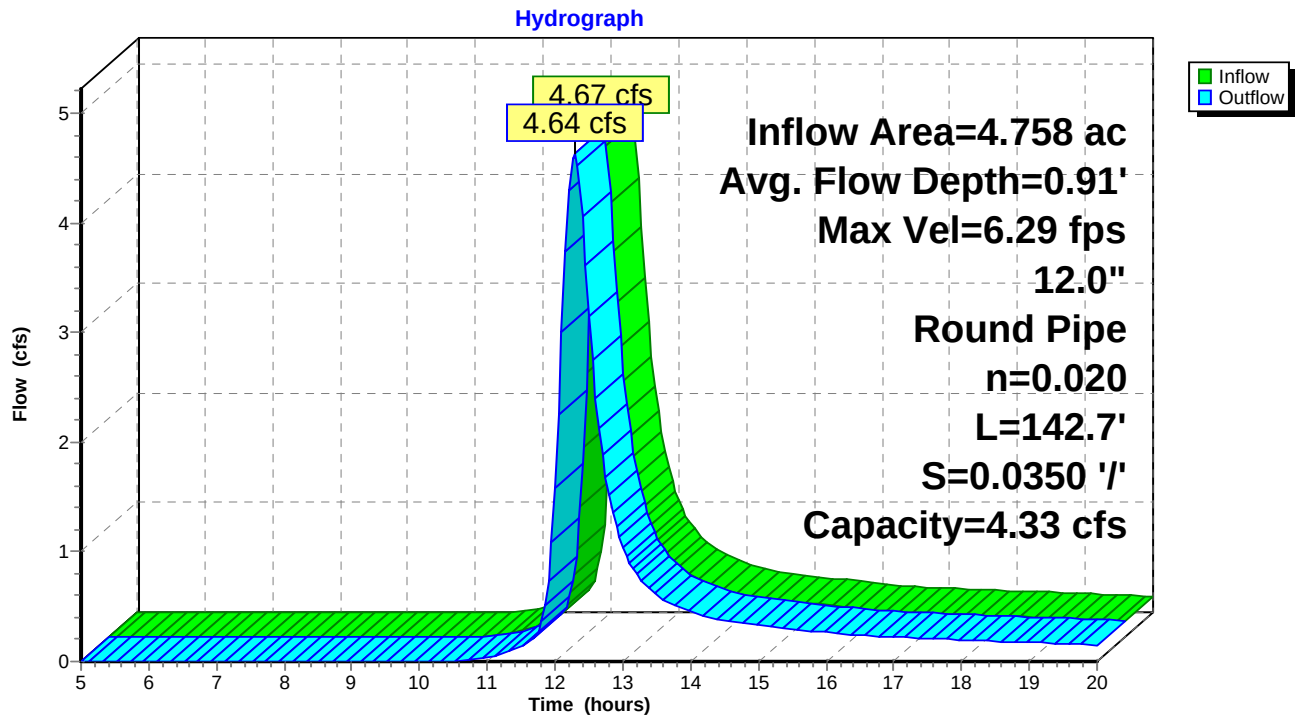
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Type II 24-hr 2-yr Rainfall=3.09"

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Reach 11R: CWC-004



REL Flow Calcs (CWC 004-005)

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Summary for Reach 12R: CWC-005

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 3.323 ac, 0.00% Impervious, Inflow Depth > 0.96" for 2-yr event
Inflow = 2.91 cfs @ 12.27 hrs, Volume= 0.267 af
Outflow = 2.90 cfs @ 12.27 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.41 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 3.06 fps, Avg. Travel Time= 0.6 min

Peak Storage= 47 cf @ 12.27 hrs

Average Depth at Peak Storage= 0.56'

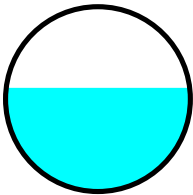
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.82 cfs

12.0" Round Pipe

n= 0.020

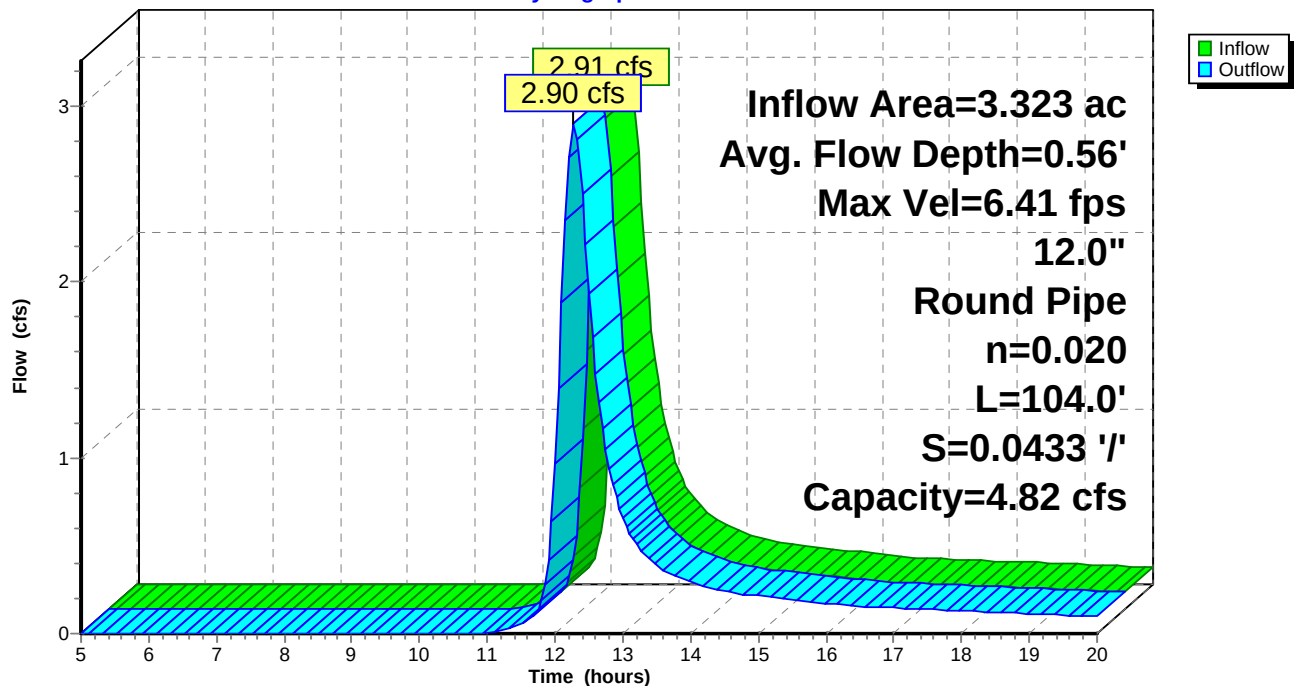
Length= 104.0' Slope= 0.0433 '/'

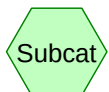
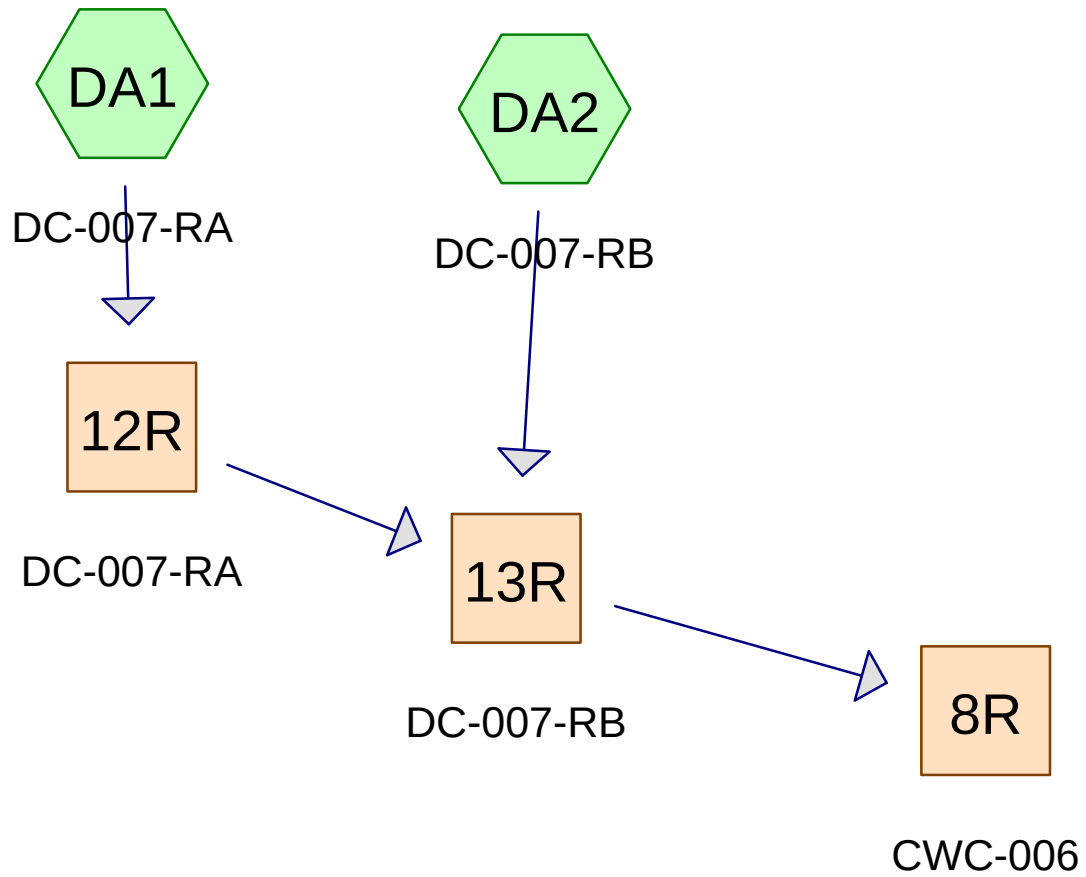
Inlet Invert= 1,853.00', Outlet Invert= 1,848.50'



Reach 12R: CWC-005

Hydrograph

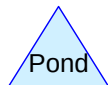




Subcat



Reach



Pond



Link

Routing Diagram for REL Flow Calcs (CWC 006)- REV 1
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REL Flow Calcs (CWC 006)- REV 1

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.548	73	Woods, Fair, HSG C (DA1, DA2)
1.548	73	TOTAL AREA

REL Flow Calcs (CWC 006)- REV 1

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.548	HSG C	DA1, DA2
0.000	HSG D	
0.000	Other	
1.548		TOTAL AREA

REL Flow Calcs (CWC 006)- REV 1

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.548	0.000	0.000	1.548	Woods, Fair	DA1, DA2
0.000	0.000	1.548	0.000	0.000	1.548	TOTAL	
						AREA	

REL Flow Calcs (CWC 006)- REV 1

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	8R	1,933.00	1,926.00	96.7	0.0724	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 006)- REV 1*Type II 24-hr 2-yr Rainfall=3.04"*

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

Subcatchment DA1: DC-007-RA

Runoff Area=37,803 sf 0.00% Impervious Runoff Depth>0.79"
Flow Length=254' Tc=13.5 min CN=73 Runoff=0.98 cfs 0.057 af

Subcatchment DA2: DC-007-RB

Runoff Area=29,633 sf 0.00% Impervious Runoff Depth>0.79"
Flow Length=314' Tc=15.0 min CN=73 Runoff=0.72 cfs 0.045 af

Reach 8R: CWC-006

Avg. Flow Depth=0.35' Max Vel=6.64 fps Inflow=1.63 cfs 0.101 af
12.0" Round Pipe n=0.020 L=96.7' S=0.0724 '/ Capacity=6.23 cfs Outflow=1.61 cfs 0.101 af

Reach 12R: DC-007-RA

Avg. Flow Depth=0.16' Max Vel=4.65 fps Inflow=0.98 cfs 0.057 af
n=0.032 L=144.0' S=0.1684 '/ Capacity=20.38 cfs Outflow=0.96 cfs 0.057 af

Reach 13R: DC-007-RB

Avg. Flow Depth=0.40' Max Vel=2.34 fps Inflow=1.68 cfs 0.102 af
n=0.050 L=177.0' S=0.0381 '/ Capacity=11.66 cfs Outflow=1.63 cfs 0.101 af

Total Runoff Area = 1.548 ac Runoff Volume = 0.102 af Average Runoff Depth = 0.79"
100.00% Pervious = 1.548 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 006)- REV 1

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Type II 24-hr 2-yr Rainfall=3.04"

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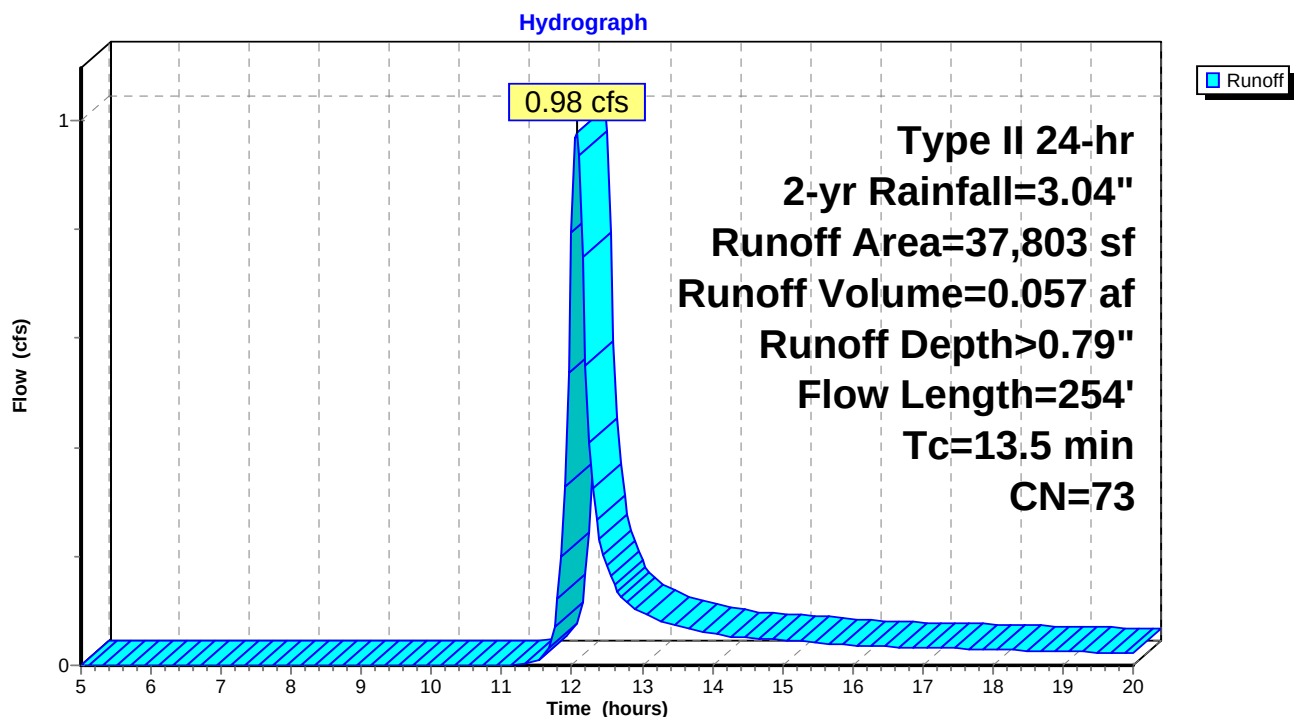
Summary for Subcatchment DA1: DC-007-RA

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 0.057 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.04"

Area (sf)	CN	Description
37,803	73	Woods, Fair, HSG C
37,803		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.04"
1.4	154	0.1360	1.84		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.5	254	Total			

Subcatchment DA1: DC-007-RA

REL Flow Calcs (CWC 006)- REV 1

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Type II 24-hr 2-yr Rainfall=3.04"

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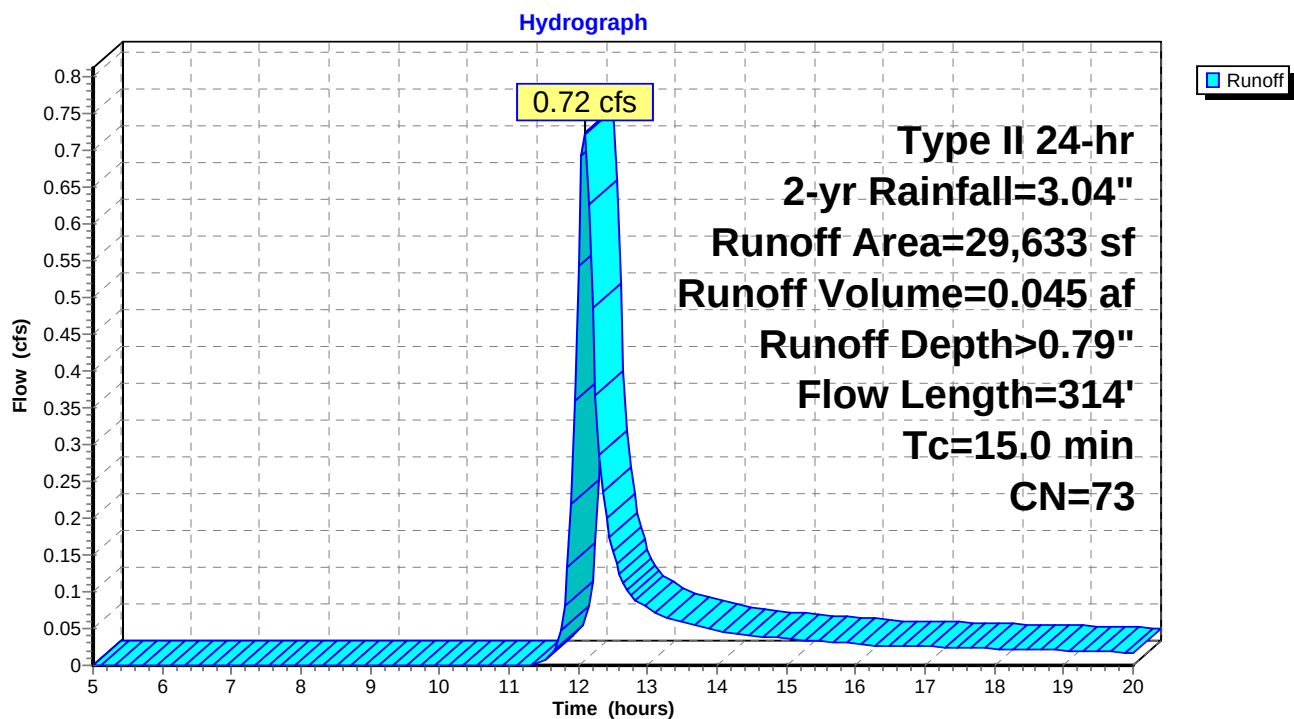
Summary for Subcatchment DA2: DC-007-RB

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.04"

Area (sf)	CN	Description
29,633	73	Woods, Fair, HSG C
29,633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0700	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.04"
1.7	214	0.1680	2.05		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.0	314	Total			

Subcatchment DA2: DC-007-RB

REL Flow Calcs (CWC 006)- REV 1

Type II 24-hr 2-yr Rainfall=3.04"

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Summary for Reach 8R: CWC-006

[52] Hint: Inlet/Outlet conditions not evaluated

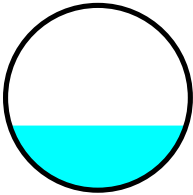
[62] Hint: Exceeded Reach 13R OUTLET depth by 2.01' @ 19.95 hrs

Inflow Area = 1.548 ac, 0.00% Impervious, Inflow Depth > 0.79" for 2-yr event
Inflow = 1.63 cfs @ 12.12 hrs, Volume= 0.101 af
Outflow = 1.61 cfs @ 12.13 hrs, Volume= 0.101 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.64 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 2.85 fps, Avg. Travel Time= 0.6 min

Peak Storage= 24 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.23 cfs

12.0" Round Pipe
n= 0.020
Length= 96.7' Slope= 0.0724 '/'
Inlet Invert= 1,933.00', Outlet Invert= 1,926.00'



REL Flow Calcs (CWC 006)- REV 1

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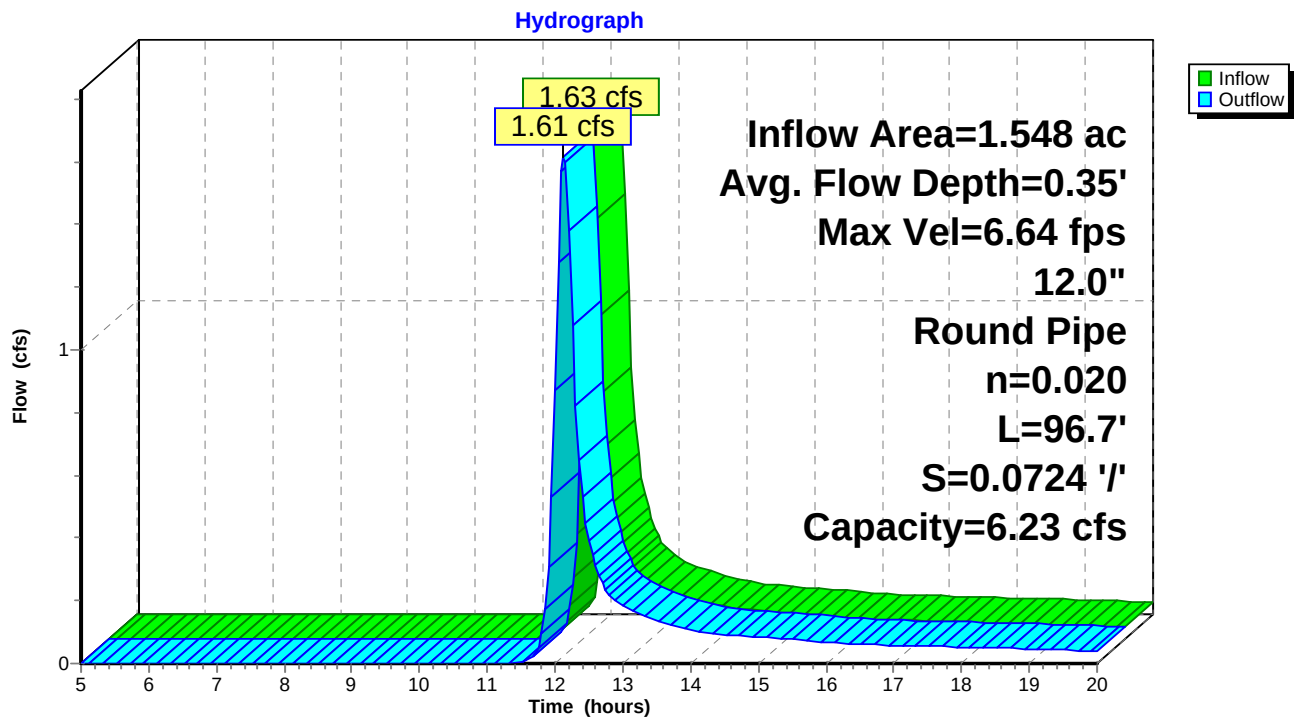
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Reach 8R: CWC-006



REL Flow Calcs (CWC 006)- REV 1

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Type II 24-hr 2-yr Rainfall=3.04"

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Summary for Reach 12R: DC-007-RA

Inflow Area = 0.868 ac, 0.00% Impervious, Inflow Depth > 0.79" for 2-yr event
Inflow = 0.98 cfs @ 12.07 hrs, Volume= 0.057 af
Outflow = 0.96 cfs @ 12.08 hrs, Volume= 0.057 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.65 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.4 min

Peak Storage= 30 cf @ 12.07 hrs

Average Depth at Peak Storage= 0.16'

Bank-Full Depth= 0.75' Flow Area= 1.9 sf, Capacity= 20.38 cfs

1.00' x 0.75' deep channel, n= 0.032

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

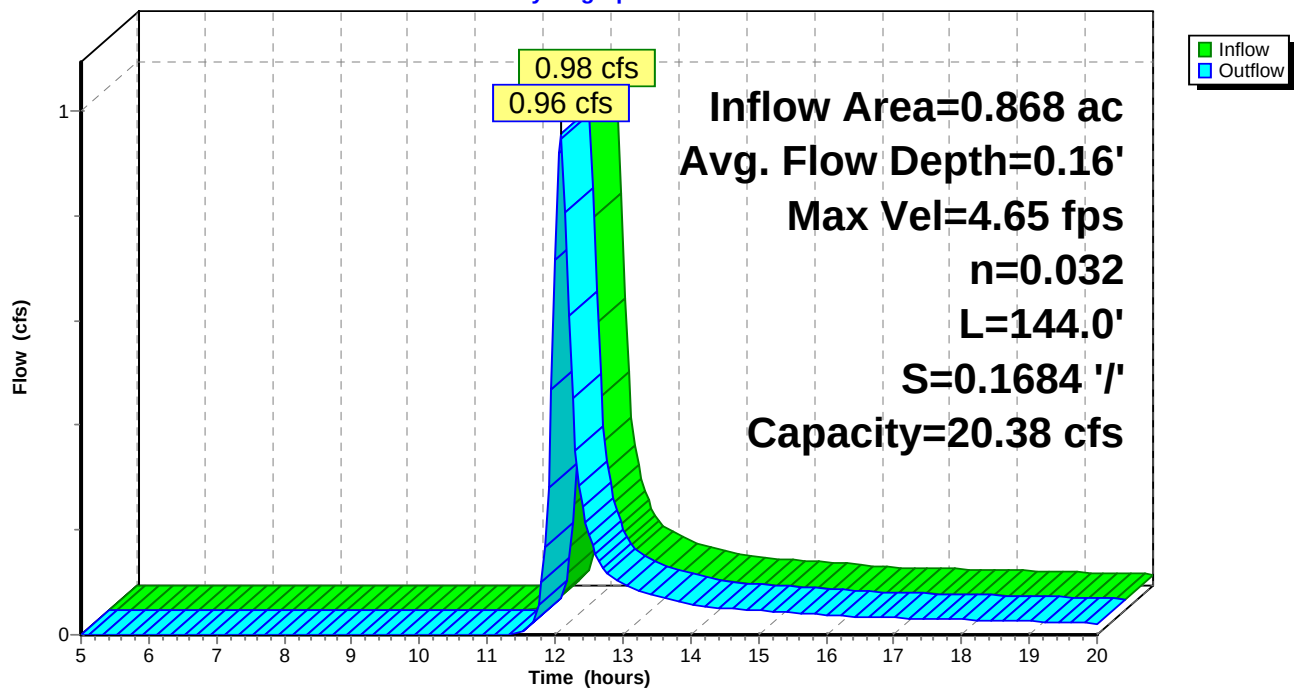
Length= 144.0' Slope= 0.1684 '/'

Inlet Invert= 1,962.00', Outlet Invert= 1,937.75'



Reach 12R: DC-007-RA

Hydrograph



REL Flow Calcs (CWC 006)- REV 1

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Type II 24-hr 2-yr Rainfall=3.04"

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Summary for Reach 13R: DC-007-RB

[62] Hint: Exceeded Reach 12R OUTLET depth by 0.24' @ 12.10 hrs

Inflow Area = 1.548 ac, 0.00% Impervious, Inflow Depth > 0.79" for 2-yr event
Inflow = 1.68 cfs @ 12.08 hrs, Volume= 0.102 af
Outflow = 1.63 cfs @ 12.12 hrs, Volume= 0.101 af, Atten= 3%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.34 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 0.96 fps, Avg. Travel Time= 3.1 min

Peak Storage= 126 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.40'

Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 11.66 cfs

1.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 5.00'

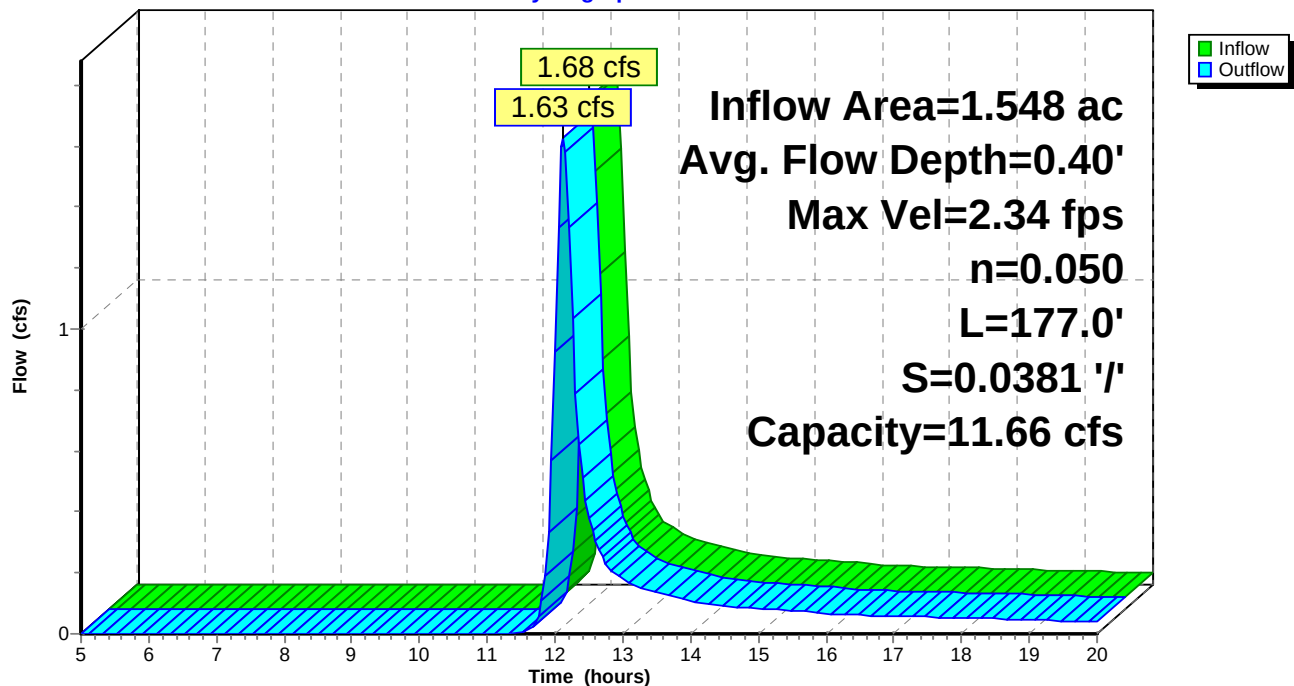
Length= 177.0' Slope= 0.0381 '/'

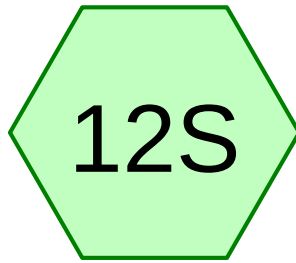
Inlet Invert= 1,937.75', Outlet Invert= 1,931.00'



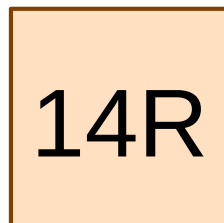
Reach 13R: DC-007-RB

Hydrograph

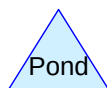
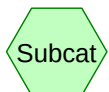




DC-008



CWC-007



REL Flow Calcs (CWC 007)_Rev 2

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.525	73	Woods, Fair, HSG C (12S)
5.515	79	Woods, Fair, HSG D (12S)
7.040	78	TOTAL AREA

REL Flow Calcs (CWC 007)_Rev 2

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.525	HSG C	12S
5.515	HSG D	12S
0.000	Other	
7.040		TOTAL AREA

REL Flow Calcs (CWC 007)_Rev 2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.525	5.515	0.000	7.040	Woods, Fair	12S
0.000	0.000	1.525	5.515	0.000	7.040	TOTAL	
						AREA	

REL Flow Calcs (CWC 007)_Rev 2

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	14R	1,754.00	1,749.00	60.0	0.0833	0.020	18.0	0.0	0.0

REL Flow Calcs (CWC 007)_Rev 2*Type II 24-hr 2-yr Rainfall=3.04"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment12S: DC-008

Runoff Area=7.040 ac 0.00% Impervious Runoff Depth>1.04"

Flow Length=742' Tc=22.4 min CN=78 Runoff=8.21 cfs 0.613 af

Reach 14R: CWC-007

Avg. Flow Depth=0.67' Max Vel=10.63 fps Inflow=8.21 cfs 0.613 af

18.0" Round Pipe n=0.020 L=60.0' S=0.0833 '/' Capacity=19.71 cfs Outflow=8.19 cfs 0.613 af

Total Runoff Area = 7.040 ac Runoff Volume = 0.613 af Average Runoff Depth = 1.04"
100.00% Pervious = 7.040 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 007)_Rev 2

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Type II 24-hr 2-yr Rainfall=3.04"

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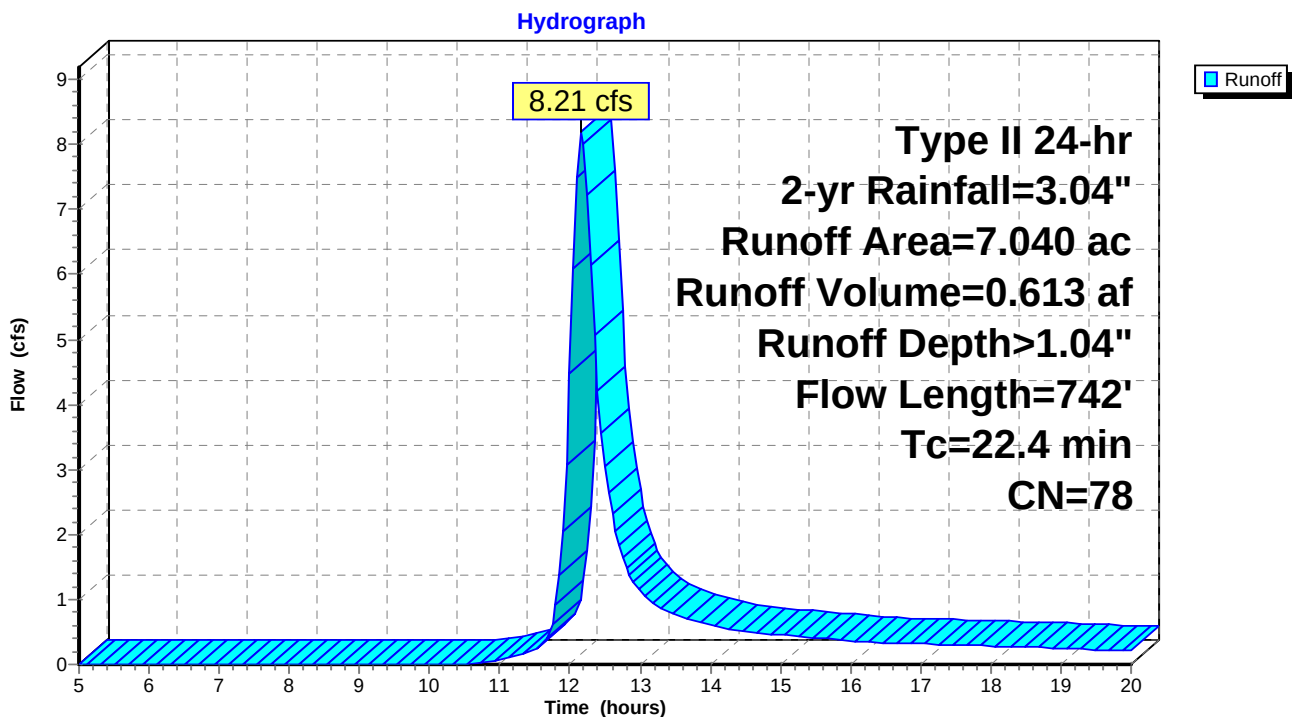
Summary for Subcatchment 12S: DC-008

Runoff = 8.21 cfs @ 12.17 hrs, Volume= 0.613 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.04"

Area (ac)	CN	Description
1.525	73	Woods, Fair, HSG C
5.515	79	Woods, Fair, HSG D
7.040	78	Weighted Average
7.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.04"
3.5	382	0.1360	1.84		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.2	260	0.0150	1.97	3.16	Channel Flow, Area= 1.6 sf Perim= 4.4' r= 0.36' n= 0.047
22.4	742	Total			

Subcatchment 12S: DC-008

REL Flow Calcs (CWC 007)_Rev 2

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Type II 24-hr 2-yr Rainfall=3.04"

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Summary for Reach 14R: CWC-007

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 7.040 ac, 0.00% Impervious, Inflow Depth > 1.04" for 2-yr event
Inflow = 8.21 cfs @ 12.17 hrs, Volume= 0.613 af
Outflow = 8.19 cfs @ 12.17 hrs, Volume= 0.613 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 10.63 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 4.56 fps, Avg. Travel Time= 0.2 min

Peak Storage= 46 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.67'

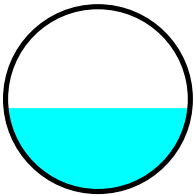
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 19.71 cfs

18.0" Round Pipe

n= 0.020

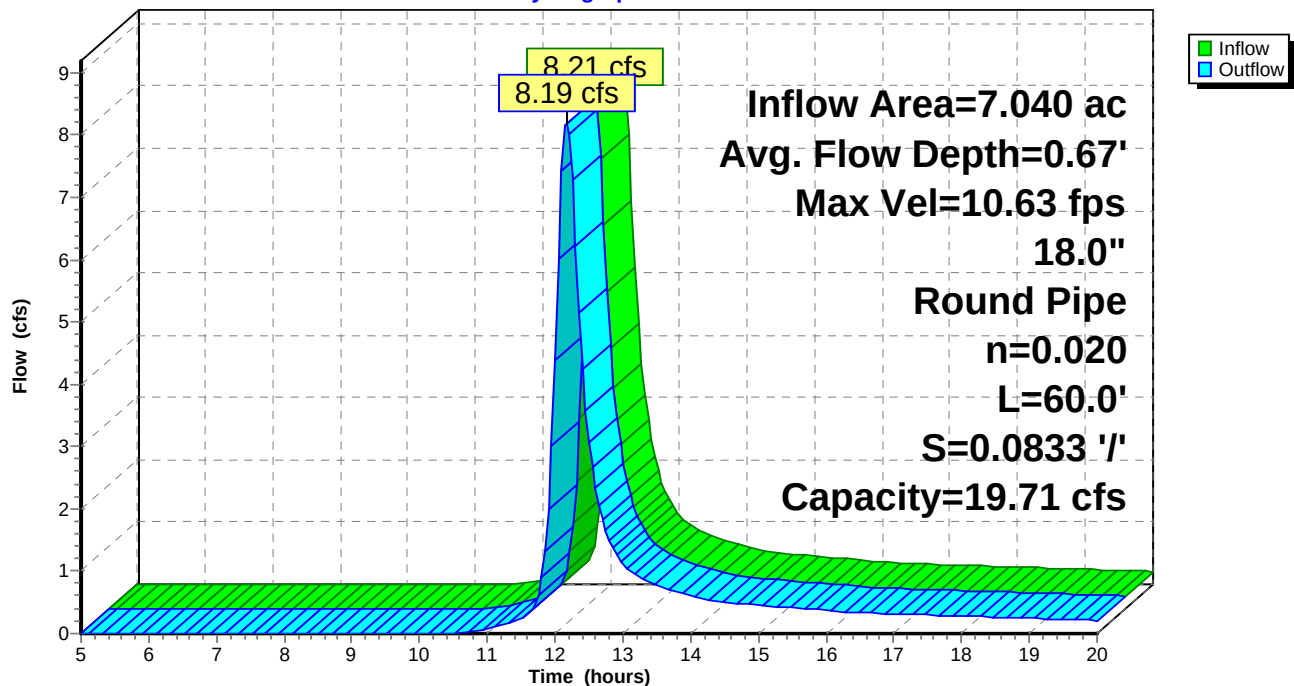
Length= 60.0' Slope= 0.0833 '/'

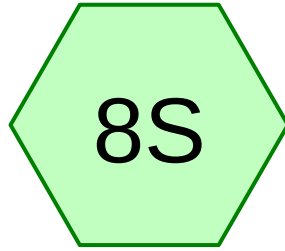
Inlet Invert= 1,754.00', Outlet Invert= 1,749.00'



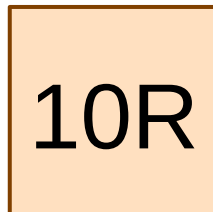
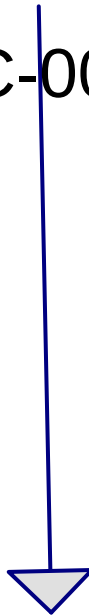
Reach 14R: CWC-007

Hydrograph

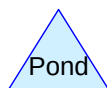
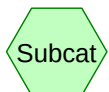




DC-009



CWC-008



Routing Diagram for REL Flow Calcs (CWC 008)

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REL Flow Calcs (CWC 008)

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.220	79	Woods, Fair, HSG D (8S)
2.220	79	TOTAL AREA

REL Flow Calcs (CWC 008)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2.220	HSG D	8S
0.000	Other	
2.220		TOTAL AREA

REL Flow Calcs (CWC 008)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	2.220	0.000	2.220	Woods, Fair	8S
0.000	0.000	0.000	2.220	0.000	2.220	TOTAL	
						AREA	

REL Flow Calcs (CWC 008)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	10R	1,641.50	1,637.00	97.8	0.0460	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 008)*Type II 24-hr 2-yr Rainfall=3.00"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: DC-009Runoff Area=2.220 ac 0.00% Impervious Runoff Depth>1.07"
Flow Length=1,080' Tc=26.8 min CN=79 Runoff=2.38 cfs 0.198 af**Reach 10R: CWC-008**Avg. Flow Depth=0.49' Max Vel=6.25 fps Inflow=2.38 cfs 0.198 af
12.0" Round Pipe n=0.020 L=97.8' S=0.0460 '/ Capacity=4.97 cfs Outflow=2.38 cfs 0.198 af**Total Runoff Area = 2.220 ac Runoff Volume = 0.198 af Average Runoff Depth = 1.07"**
100.00% Pervious = 2.220 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 008)

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Type II 24-hr 2-yr Rainfall=3.00"

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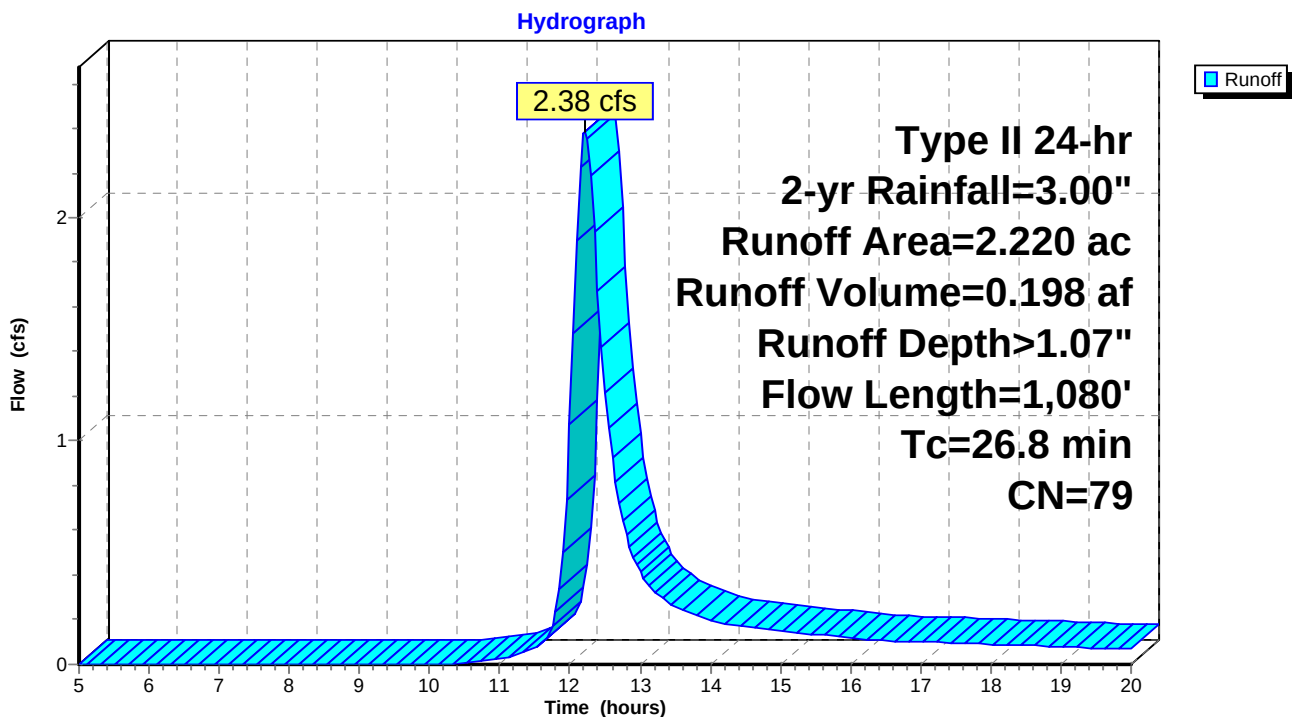
Summary for Subcatchment 8S: DC-009

Runoff = 2.38 cfs @ 12.22 hrs, Volume= 0.198 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.00"

Area (ac)	CN	Description
1.582	79	Woods, Fair, HSG D
0.638	79	Woods, Fair, HSG D
2.220	79	Weighted Average
2.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0450	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.00"
9.0	743	0.0760	1.38		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	237	0.0300	2.25	2.48	Channel Flow, Area= 1.1 sf Perim= 3.8' r= 0.29' n= 0.050
26.8	1,080	Total			

Subcatchment 8S: DC-009

REL Flow Calcs (CWC 008)

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Type II 24-hr 2-yr Rainfall=3.00"

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Summary for Reach 10R: CWC-008

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.220 ac, 0.00% Impervious, Inflow Depth > 1.07" for 2-yr event
Inflow = 2.38 cfs @ 12.22 hrs, Volume= 0.198 af
Outflow = 2.38 cfs @ 12.22 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.25 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 2.78 fps, Avg. Travel Time= 0.6 min

Peak Storage= 37 cf @ 12.22 hrs

Average Depth at Peak Storage= 0.49'

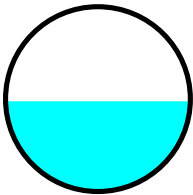
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.97 cfs

12.0" Round Pipe

n= 0.020

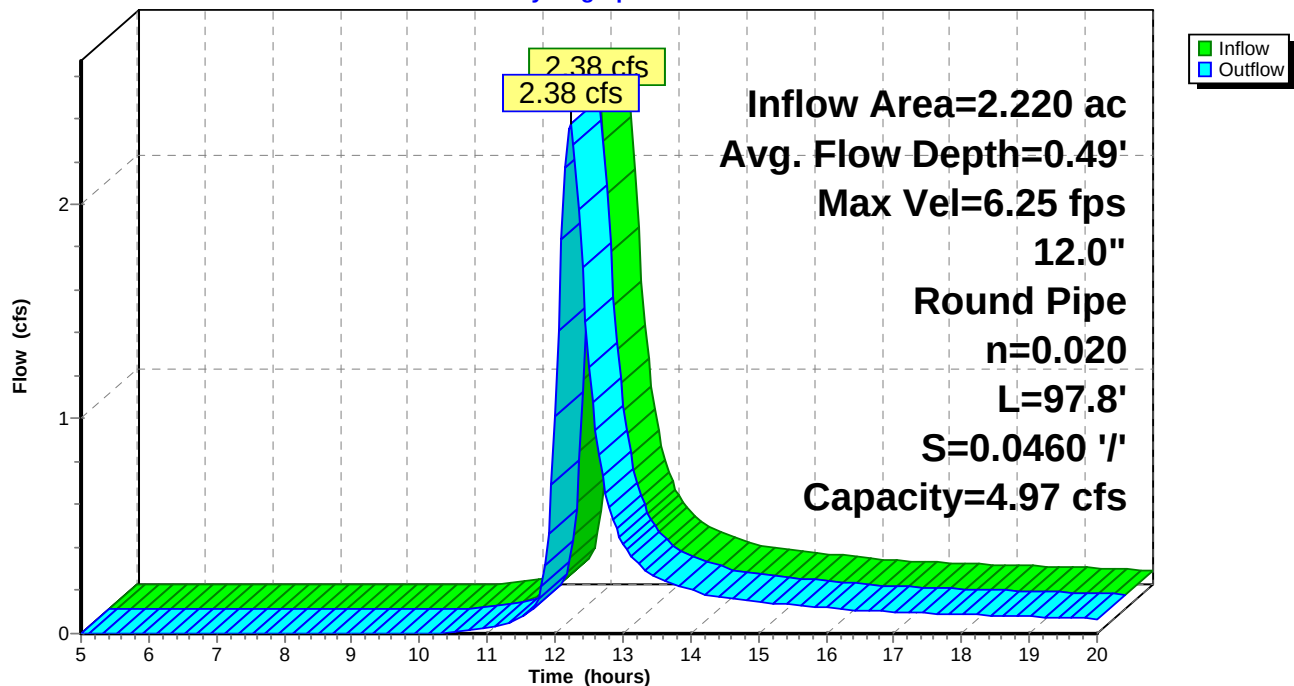
Length= 97.8' Slope= 0.0460 '/'

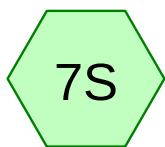
Inlet Invert= 1,641.50', Outlet Invert= 1,637.00'



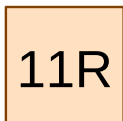
Reach 10R: CWC-008

Hydrograph

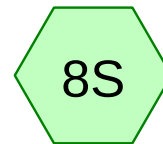




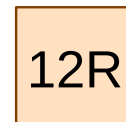
DC-011



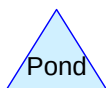
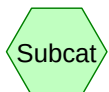
CWC-010



DC-010



CWC-009



Routing Diagram for REL Flow Calcs (CWC 009-010)

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REL Flow Calcs (CWC 009-010)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC 011-012).hcp"

REL Flow Calcs (CWC 009-010)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.242	79	Woods, Fair, HSG D (7S, 8S)
7.242	79	TOTAL AREA

REL Flow Calcs (CWC 009-010)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
7.242	HSG D	7S, 8S
0.000	Other	
7.242		TOTAL AREA

REL Flow Calcs (CWC 009-010)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	7.242	0.000	7.242	Woods, Fair	7S, 8S
0.000	0.000	0.000	7.242	0.000	7.242	TOTAL	
						AREA	

REL Flow Calcs (CWC 009-010)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	11R	1,651.00	1,642.30	91.2	0.0954	0.020	12.0	0.0	0.0
2	12R	1,636.00	1,627.00	115.9	0.0777	0.020	18.0	0.0	0.0

REL Flow Calcs (CWC 009-010)*Type II 24-hr 2-yr Rainfall=3.00"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: DC-011Runoff Area=1.358 ac 0.00% Impervious Runoff Depth>1.08"
Flow Length=582' Tc=16.3 min CN=79 Runoff=1.96 cfs 0.122 af**Subcatchment8S: DC-010**Runoff Area=5.884 ac 0.00% Impervious Runoff Depth>1.08"
Flow Length=1,009' Tc=20.1 min CN=79 Runoff=7.55 cfs 0.528 af**Reach 11R: CWC-010**Avg. Flow Depth=0.36' Max Vel=7.77 fps Inflow=1.96 cfs 0.122 af
12.0" Round Pipe n=0.020 L=91.2' S=0.0954 '/ Capacity=7.15 cfs Outflow=1.95 cfs 0.122 af**Reach 12R: CWC-009**Avg. Flow Depth=0.66' Max Vel=10.14 fps Inflow=7.55 cfs 0.528 af
18.0" Round Pipe n=0.020 L=115.9' S=0.0777 '/ Capacity=19.03 cfs Outflow=7.52 cfs 0.527 af**Total Runoff Area = 7.242 ac Runoff Volume = 0.650 af Average Runoff Depth = 1.08"**
100.00% Pervious = 7.242 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 009-010)

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Type II 24-hr 2-yr Rainfall=3.00"

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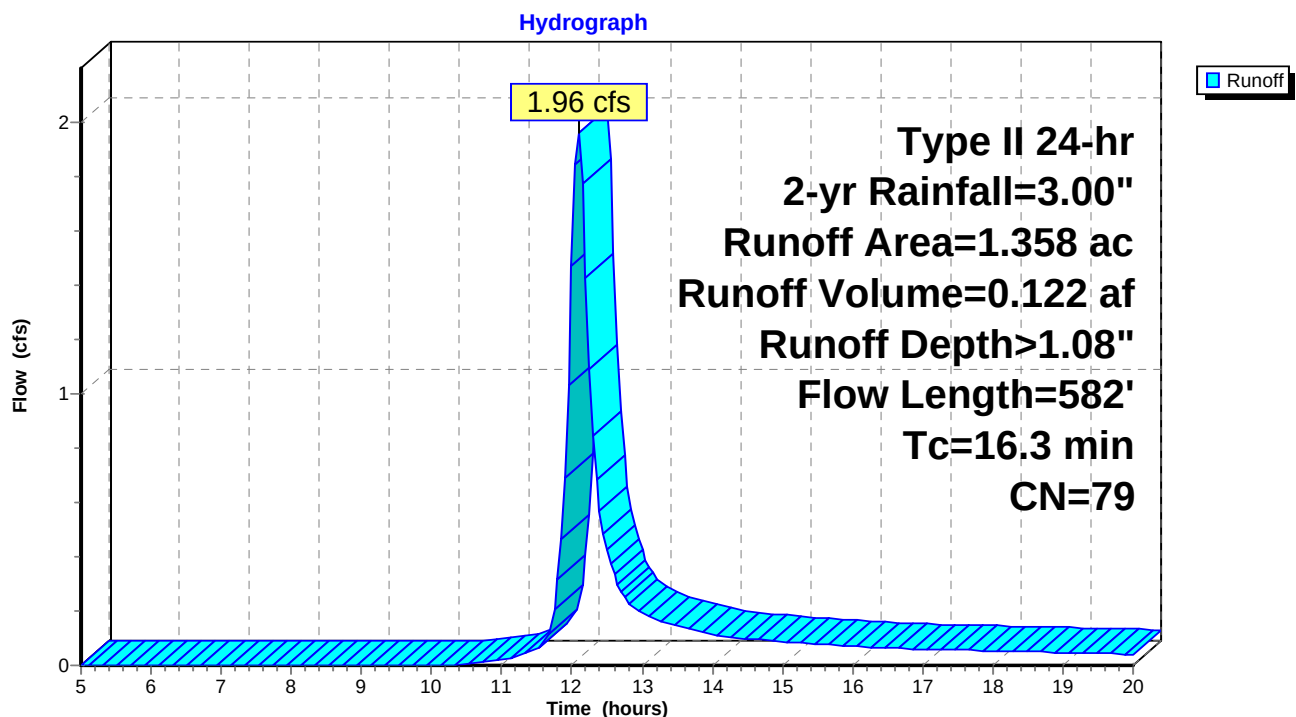
Summary for Subcatchment 7S: DC-011

Runoff = 1.96 cfs @ 12.09 hrs, Volume= 0.122 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.00"

Area (ac)	CN	Description
1.358	79	Woods, Fair, HSG D
1.358		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.1100	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.00"
3.4	301	0.0897	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	181	0.0170	1.77	2.12	Channel Flow, Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.050
16.3	582	Total			

Subcatchment 7S: DC-011

REL Flow Calcs (CWC 009-010)

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Type II 24-hr 2-yr Rainfall=3.00"

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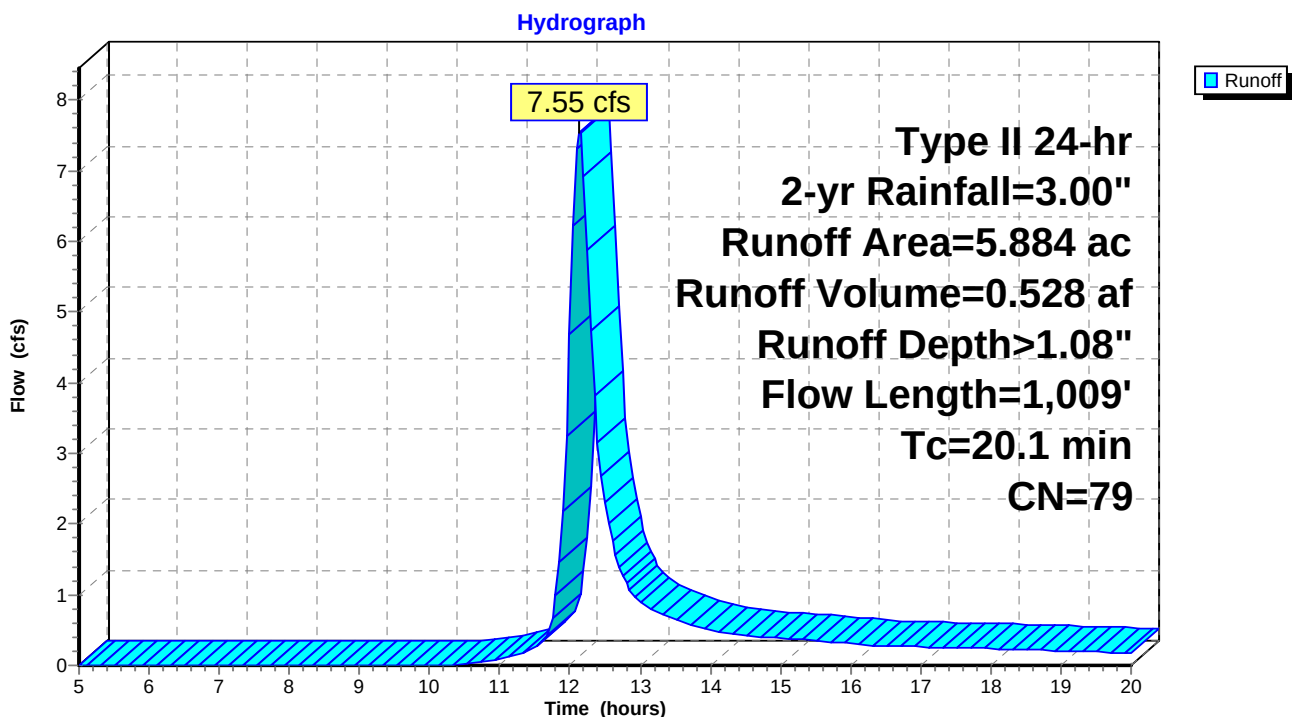
Summary for Subcatchment 8S: DC-010

Runoff = 7.55 cfs @ 12.14 hrs, Volume= 0.528 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.00"

Area (ac)	CN	Description
5.884	79	Woods, Fair, HSG D
5.884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.1000	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.00"
7.5	571	0.0648	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	338	0.0530	6.32	12.64	Channel Flow, Area= 2.0 sf Perim= 4.2' r= 0.48' n= 0.033
20.1	1,009	Total			

Subcatchment 8S: DC-010

REL Flow Calcs (CWC 009-010)

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Type II 24-hr 2-yr Rainfall=3.00"

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Summary for Reach 11R: CWC-010

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.358 ac, 0.00% Impervious, Inflow Depth > 1.08" for 2-yr event
Inflow = 1.96 cfs @ 12.09 hrs, Volume= 0.122 af
Outflow = 1.95 cfs @ 12.10 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.77 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 3.09 fps, Avg. Travel Time= 0.5 min

Peak Storage= 23 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.36'

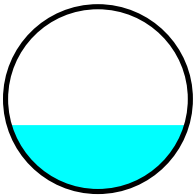
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 7.15 cfs

12.0" Round Pipe

n= 0.020

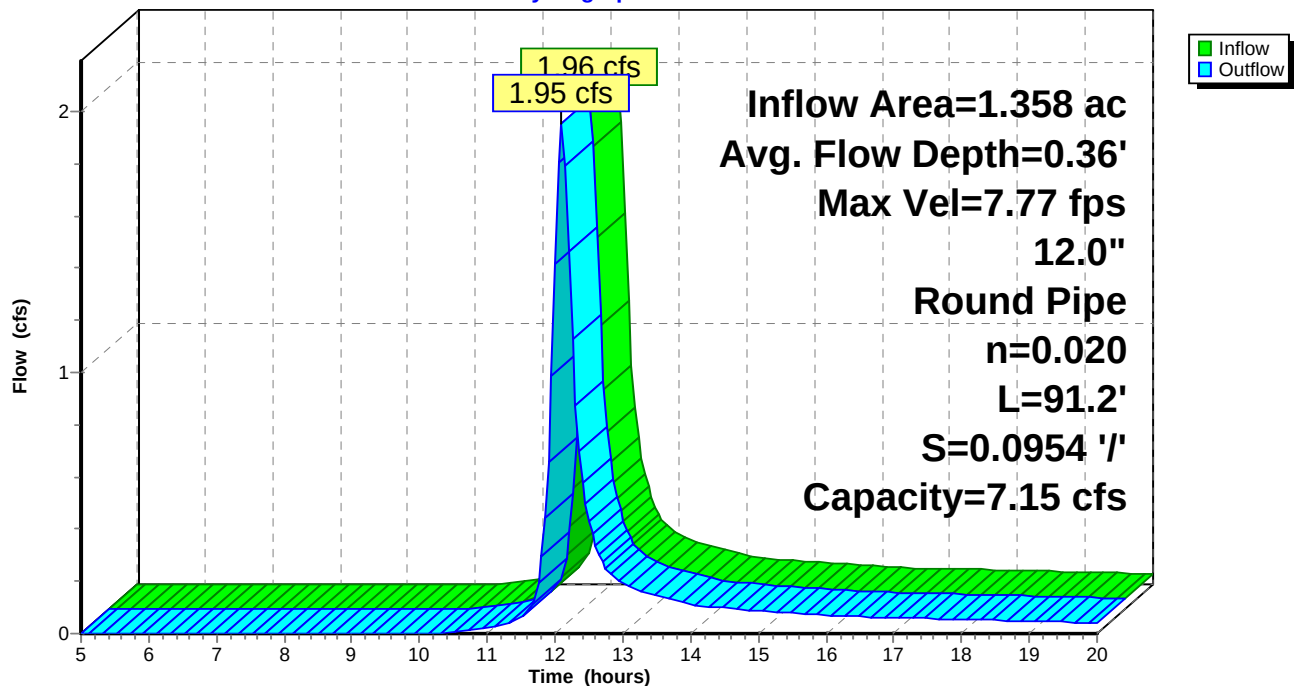
Length= 91.2' Slope= 0.0954 '/'

Inlet Invert= 1,651.00', Outlet Invert= 1,642.30'



Reach 11R: CWC-010

Hydrograph



REL Flow Calcs (CWC 009-010)

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Type II 24-hr 2-yr Rainfall=3.00"

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Summary for Reach 12R: CWC-009

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.884 ac, 0.00% Impervious, Inflow Depth > 1.08" for 2-yr event
Inflow = 7.55 cfs @ 12.14 hrs, Volume= 0.528 af
Outflow = 7.52 cfs @ 12.14 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 10.14 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 4.21 fps, Avg. Travel Time= 0.5 min

Peak Storage= 86 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.66'

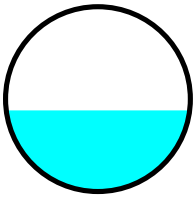
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 19.03 cfs

18.0" Round Pipe

n= 0.020

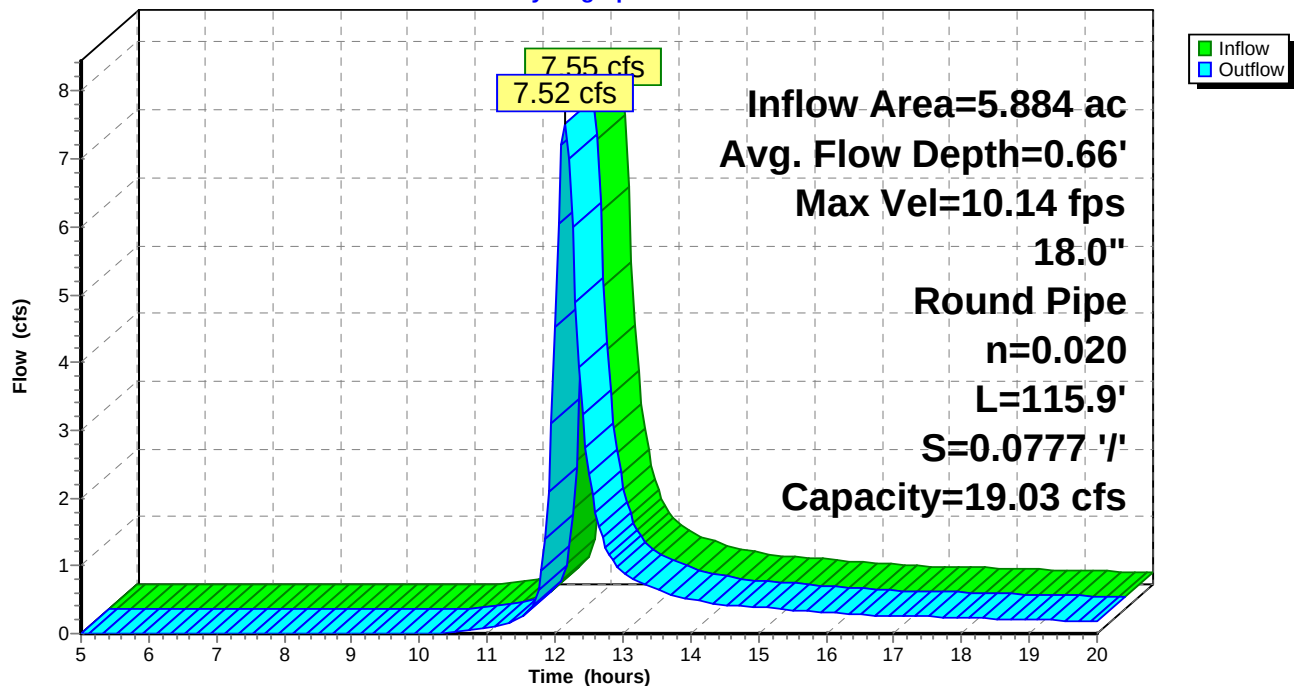
Length= 115.9' Slope= 0.0777 '/'

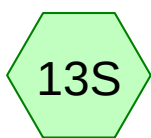
Inlet Invert= 1,636.00', Outlet Invert= 1,627.00'



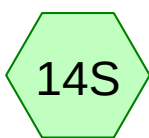
Reach 12R: CWC-009

Hydrograph

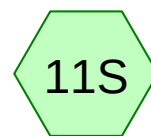




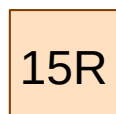
DC-014



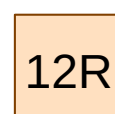
DC-013



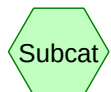
DC-012



CWC-012



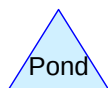
CWC-011



Subcat



Reach



Pond



Link

Routing Diagram for REL Flow Calcs (CWC 011-012)

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REL Flow Calcs (CWC 011-012)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.327	79	Woods, Fair, HSG D (11S, 13S, 14S)
5.327	79	TOTAL AREA

REL Flow Calcs (CWC 011-012)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
5.327	HSG D	11S, 13S, 14S
0.000	Other	
5.327		TOTAL AREA

REL Flow Calcs (CWC 011-012)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	5.327	0.000	5.327	Woods, Fair	11S, 13S, 14S
0.000	0.000	0.000	5.327	0.000	5.327	TOTAL	
						AREA	

REL Flow Calcs (CWC 011-012)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	12R	1,468.00	1,452.00	117.0	0.1368	0.020	12.0	0.0	0.0
2	15R	1,469.00	1,462.00	95.7	0.0731	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 011-012)*Type II 24-hr 2-yr Rainfall=2.95"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment11S: DC-012Runoff Area=2.956 ac 0.00% Impervious Runoff Depth>1.04"
Flow Length=1,288' Tc=32.2 min CN=79 Runoff=2.71 cfs 0.255 af**Subcatchment13S: DC-014**Runoff Area=50,355 sf 0.00% Impervious Runoff Depth>1.04"
Flow Length=1,154' Tc=27.3 min CN=79 Runoff=1.18 cfs 0.100 af**Subcatchment14S: DC-013**Runoff Area=1.215 ac 0.00% Impervious Runoff Depth>1.04"
Flow Length=1,122' Tc=26.9 min CN=79 Runoff=1.26 cfs 0.105 af**Reach 12R: CWC-011**Avg. Flow Depth=0.39' Max Vel=9.67 fps Inflow=2.71 cfs 0.255 af
12.0" Round Pipe n=0.020 L=117.0' S=0.1368 '/ Capacity=8.56 cfs Outflow=2.70 cfs 0.255 af**Reach 15R: CWC-012**Avg. Flow Depth=0.43' Max Vel=7.46 fps Inflow=2.44 cfs 0.205 af
12.0" Round Pipe n=0.020 L=95.7' S=0.0731 '/ Capacity=6.26 cfs Outflow=2.43 cfs 0.205 af**Total Runoff Area = 5.327 ac Runoff Volume = 0.461 af Average Runoff Depth = 1.04"**
100.00% Pervious = 5.327 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 011-012)

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Type II 24-hr 2-yr Rainfall=2.95"

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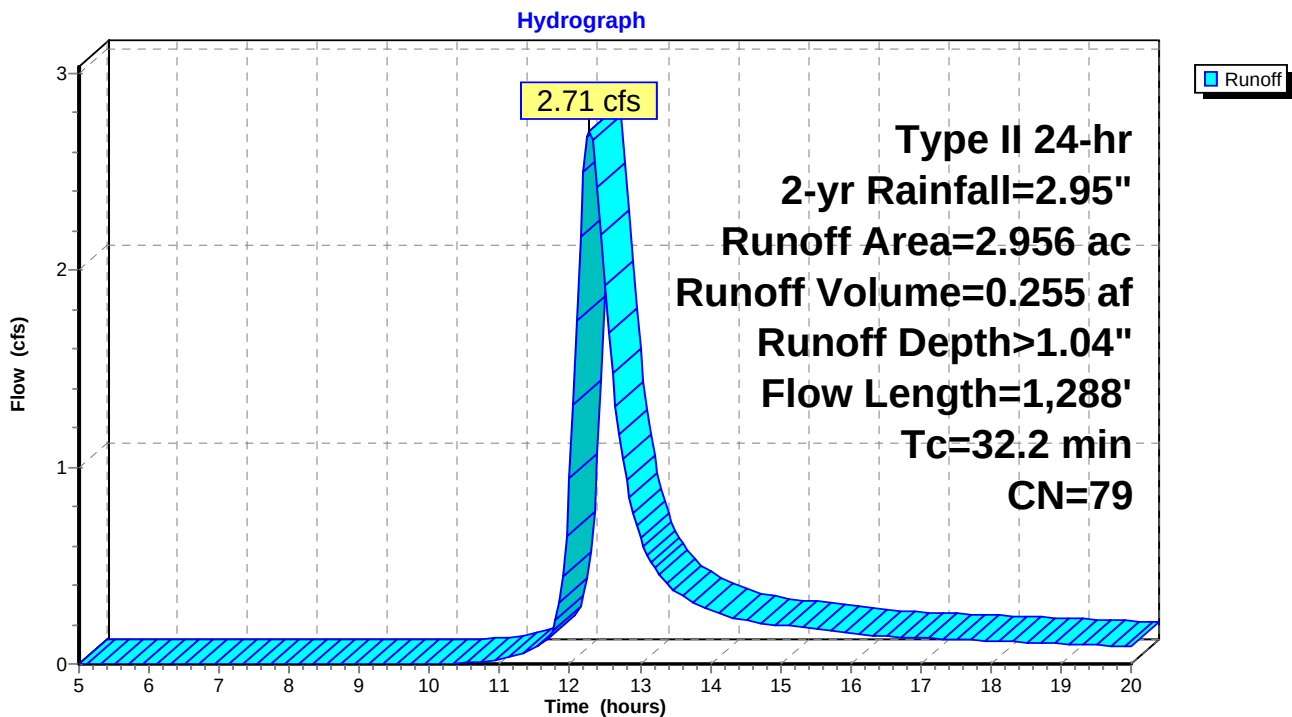
Summary for Subcatchment 11S: DC-012

Runoff = 2.71 cfs @ 12.29 hrs, Volume= 0.255 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.95"

Area (ac)	CN	Description
0.959	79	Woods, Fair, HSG D
1.262	79	Woods, Fair, HSG D
0.735	79	Woods, Fair, HSG D
2.956	79	Weighted Average
2.956		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.0	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.95"
12.1	1,032	0.0810	1.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	156	0.0260	2.27	2.94	Channel Flow, Area= 1.3 sf Perim= 4.0' r= 0.33' n= 0.050
32.2	1,288	Total			

Subcatchment 11S: DC-012

REL Flow Calcs (CWC 011-012)

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Type II 24-hr 2-yr Rainfall=2.95"

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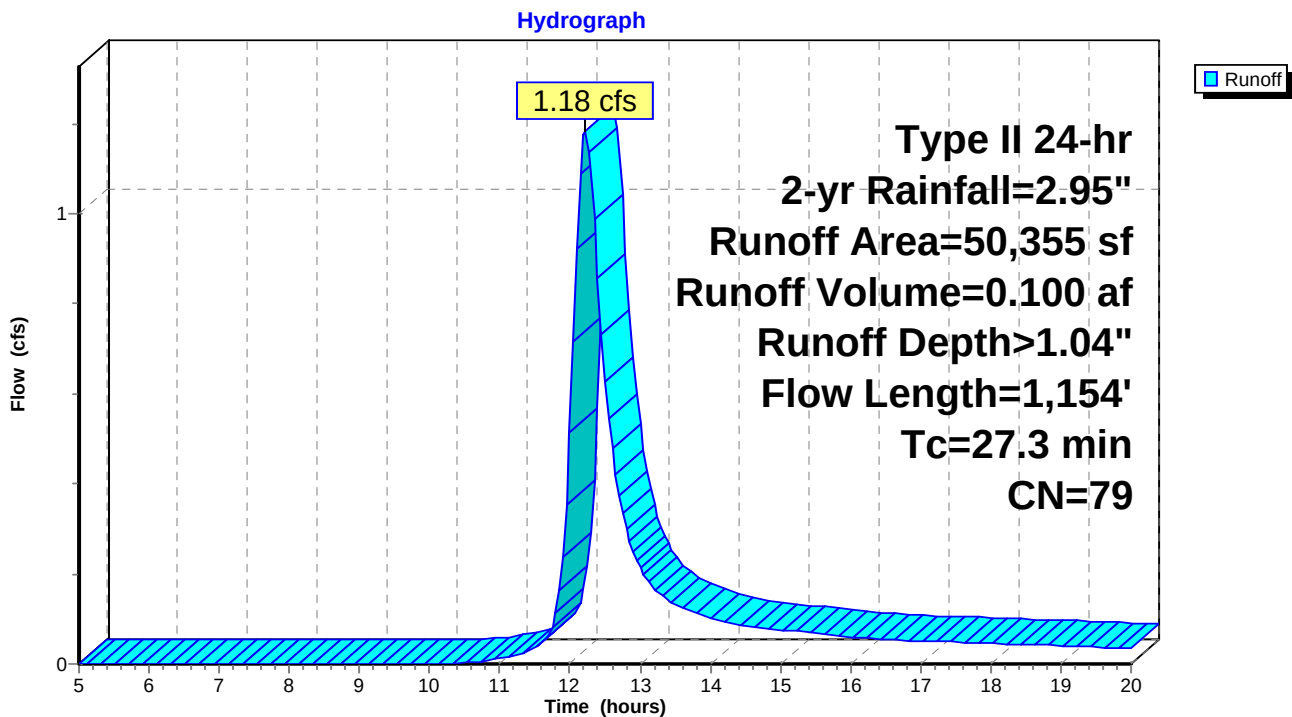
Summary for Subcatchment 13S: DC-014

Runoff = 1.18 cfs @ 12.22 hrs, Volume= 0.100 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.95"

Area (sf)	CN	Description
3,528	79	Woods, Fair, HSG D
* 11,892	79	Woods, Fair, HSG D
* 34,935	79	Woods, Fair, HSG D
50,355	79	Weighted Average
50,355		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.95"
10.4	910	0.0857	1.46		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	144	0.0210	1.67	1.34	Channel Flow, Area= 0.8 sf Perim= 3.3' r= 0.24' n= 0.050
27.3	1,154	Total			

Subcatchment 13S: DC-014

REL Flow Calcs (CWC 011-012)

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Type II 24-hr 2-yr Rainfall=2.95"

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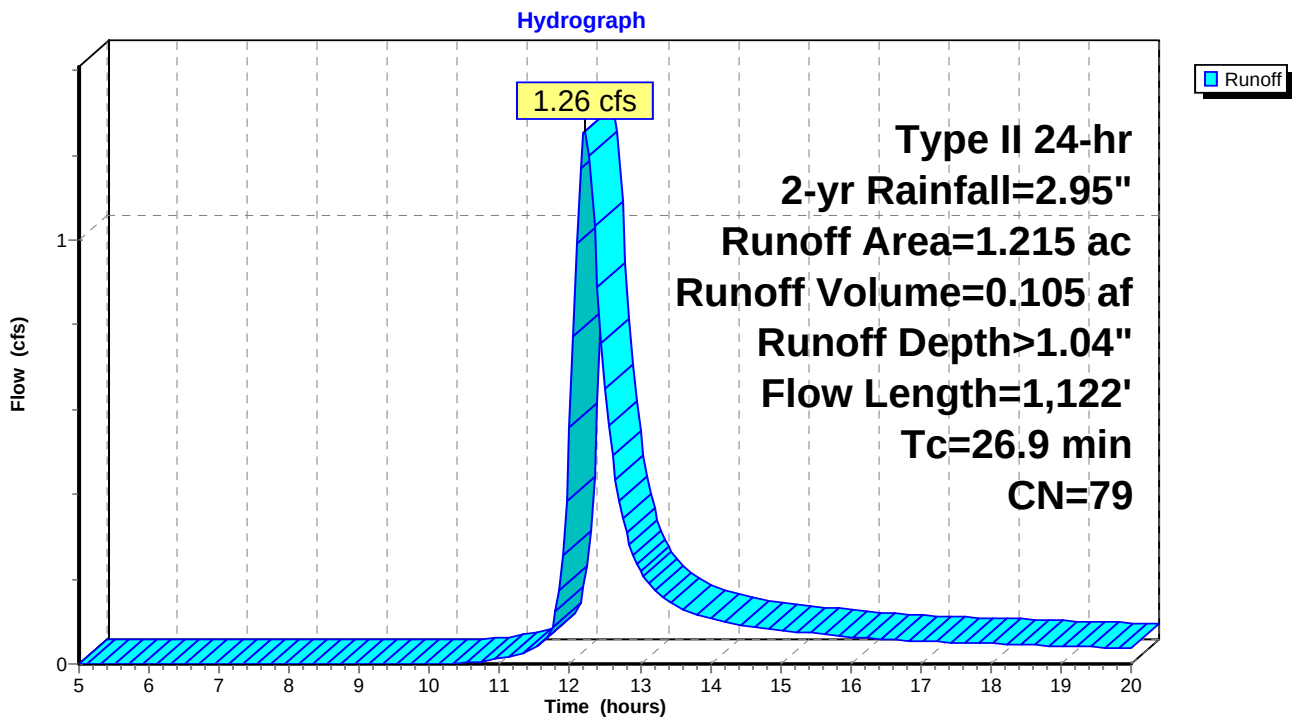
Summary for Subcatchment 14S: DC-013

Runoff = 1.26 cfs @ 12.22 hrs, Volume= 0.105 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.95"

Area (ac)	CN	Description
0.043	79	Woods, Fair, HSG D
* 0.444	79	Woods, Fair, HSG D
* 0.728	79	Woods, Fair, HSG D
1.215	79	Weighted Average
1.215		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.95"
10.3	909	0.0858	1.46		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	113	0.0220	1.71	1.37	Channel Flow, Area= 0.8 sf Perim= 3.3' r= 0.24' n= 0.050
26.9	1,122	Total			

Subcatchment 14S: DC-013

REL Flow Calcs (CWC 011-012)

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Type II 24-hr 2-yr Rainfall=2.95"

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Summary for Reach 12R: CWC-011

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.956 ac, 0.00% Impervious, Inflow Depth > 1.04" for 2-yr event
Inflow = 2.71 cfs @ 12.29 hrs, Volume= 0.255 af
Outflow = 2.70 cfs @ 12.29 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 9.67 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 4.43 fps, Avg. Travel Time= 0.4 min

Peak Storage= 33 cf @ 12.29 hrs

Average Depth at Peak Storage= 0.39'

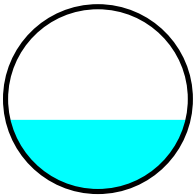
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.56 cfs

12.0" Round Pipe

n= 0.020

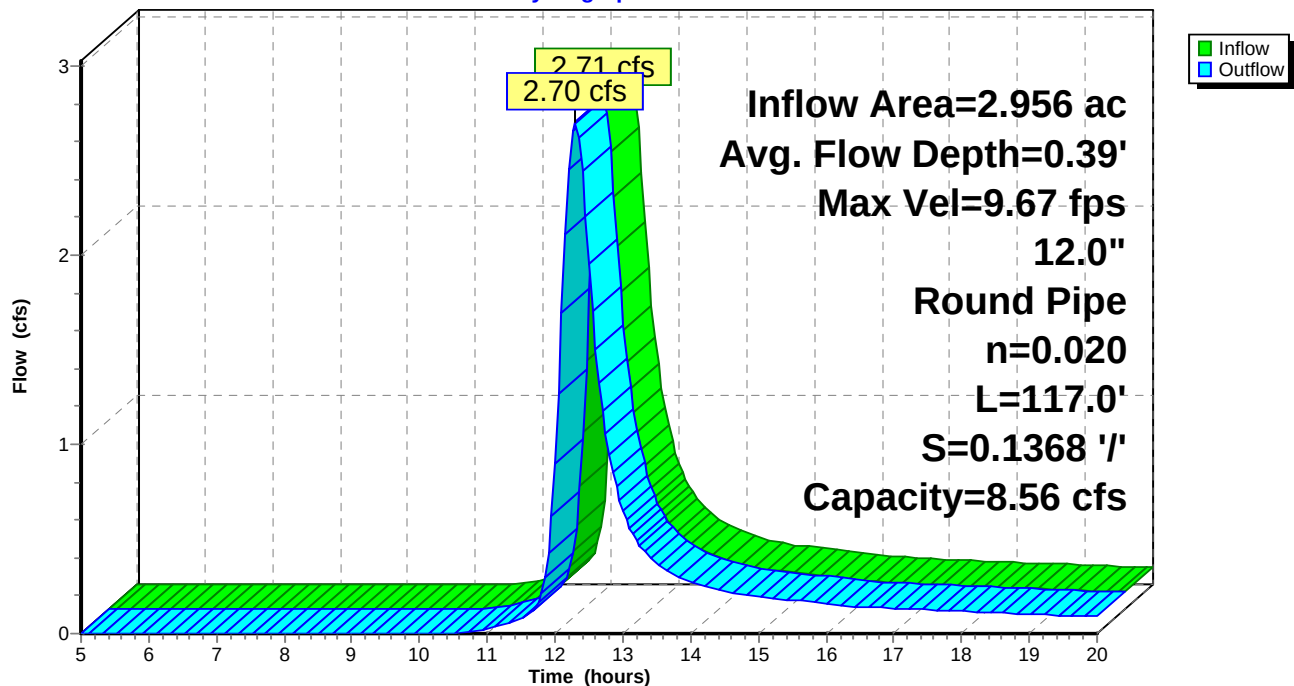
Length= 117.0' Slope= 0.1368 '/'

Inlet Invert= 1,468.00', Outlet Invert= 1,452.00'



Reach 12R: CWC-011

Hydrograph



REL Flow Calcs (CWC 011-012)

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Type II 24-hr 2-yr Rainfall=2.95"

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Summary for Reach 15R: CWC-012

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.371 ac, 0.00% Impervious, Inflow Depth > 1.04" for 2-yr event
Inflow = 2.44 cfs @ 12.22 hrs, Volume= 0.205 af
Outflow = 2.43 cfs @ 12.23 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.46 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 3.31 fps, Avg. Travel Time= 0.5 min

Peak Storage= 31 cf @ 12.22 hrs

Average Depth at Peak Storage= 0.43'

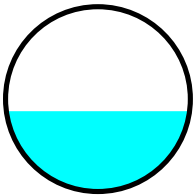
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.26 cfs

12.0" Round Pipe

n= 0.020

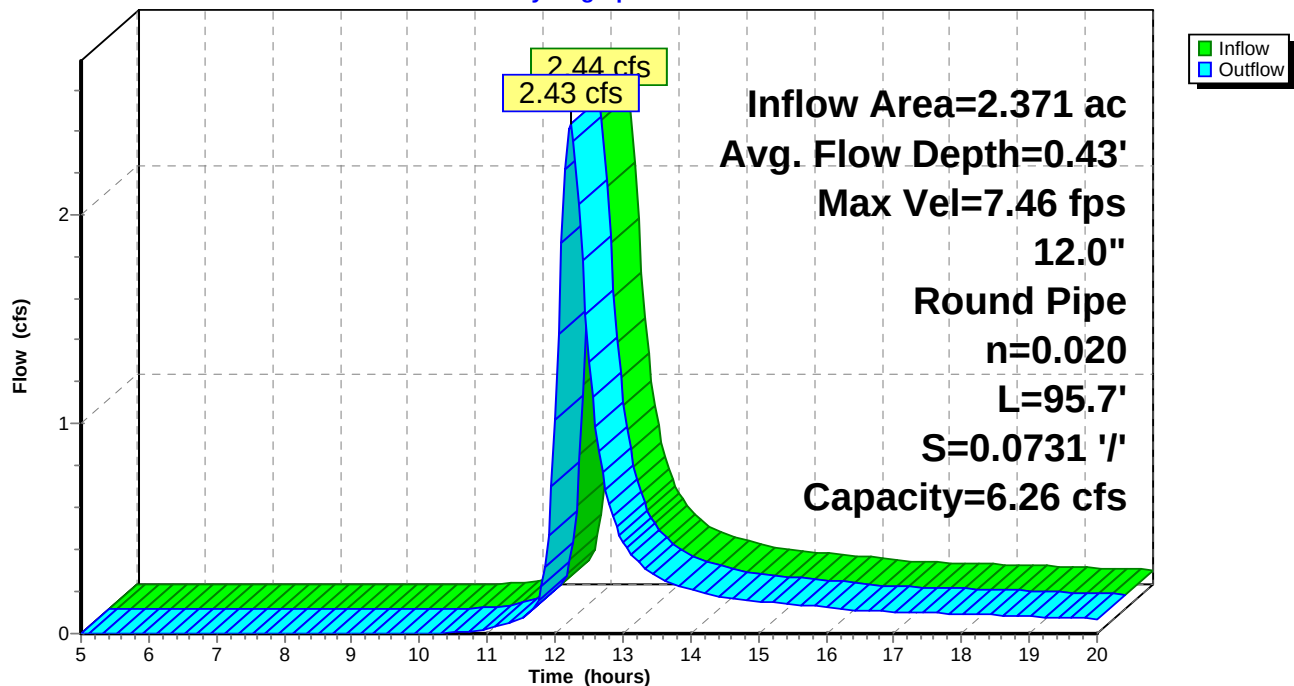
Length= 95.7' Slope= 0.0731 '/'

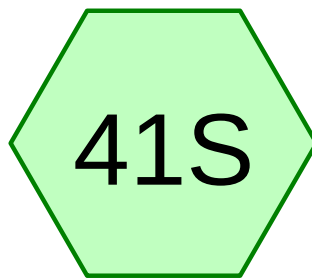
Inlet Invert= 1,469.00', Outlet Invert= 1,462.00'



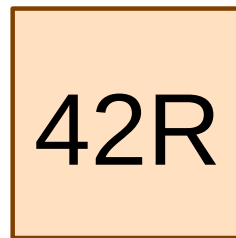
Reach 15R: CWC-012

Hydrograph

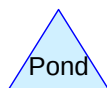
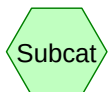




DC - 015



CWC - 013



Routing Diagram for REL Flow Calcs (CWC 013)

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REL Flow Calcs (CWC 013)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 013)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.382	79	Woods, Fair, HSG D (41S)
7.382	79	TOTAL AREA

REL Flow Calcs (CWC 013)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
7.382	HSG D	41S
0.000	Other	
7.382		TOTAL AREA

REL Flow Calcs (CWC 013)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	7.382	0.000	7.382	Woods, Fair	41S
0.000	0.000	0.000	7.382	0.000	7.382	TOTAL	
						AREA	

REL Flow Calcs (CWC 013)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	42R	1,441.00	1,439.00	96.6	0.0207	0.020	18.0	0.0	0.0

REL Flow Calcs (CWC 013)*Type II 24-hr 2-yr Rainfall=2.95"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment41S: DC - 015Runoff Area=7.382 ac 0.00% Impervious Runoff Depth>1.04"
Flow Length=1,303' Tc=26.6 min CN=79 Runoff=7.71 cfs 0.639 af**Reach 42R: CWC - 013**Avg. Flow Depth=1.00' Max Vel=6.15 fps Inflow=7.71 cfs 0.639 af
18.0" Round Pipe n=0.020 L=96.6' S=0.0207 '/' Capacity=9.82 cfs Outflow=7.68 cfs 0.639 af**Total Runoff Area = 7.382 ac Runoff Volume = 0.639 af Average Runoff Depth = 1.04"**
100.00% Pervious = 7.382 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 013)

Type II 24-hr 2-yr Rainfall=2.95"

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Summary for Subcatchment 41S: DC - 015

Runoff = 7.71 cfs @ 12.22 hrs, Volume= 0.639 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.95"

Area (ac)	CN	Description
0.922	79	Woods, Fair, HSG D
1.580	79	Woods, Fair, HSG D
0.136	79	Woods, Fair, HSG D
2.033	79	Woods, Fair, HSG D
0.063	79	Woods, Fair, HSG D
1.980	79	Woods, Fair, HSG D
0.668	79	Woods, Fair, HSG D
7.382	79	Weighted Average
7.382		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0700	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.95"
11.8	999	0.0790	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.2	204	0.0200	2.82	7.89	Channel Flow, Area= 2.8 sf Perim= 5.6' r= 0.50' n= 0.047
26.6	1,303	Total			

REL Flow Calcs (CWC 013)

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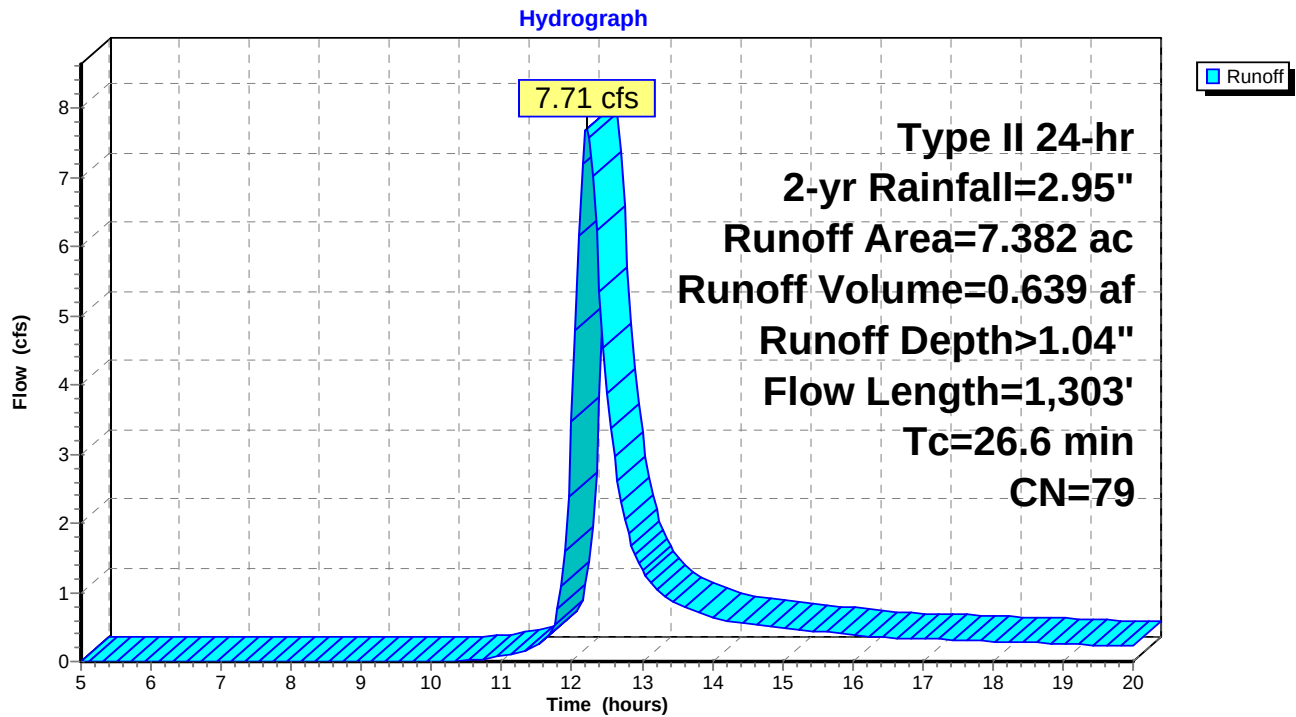
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Type II 24-hr 2-yr Rainfall=2.95"

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Subcatchment 41S: DC - 015



REL Flow Calcs (CWC 013)

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Type II 24-hr 2-yr Rainfall=2.95"

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Summary for Reach 42R: CWC - 013

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 7.382 ac, 0.00% Impervious, Inflow Depth > 1.04" for 2-yr event
Inflow = 7.71 cfs @ 12.22 hrs, Volume= 0.639 af
Outflow = 7.68 cfs @ 12.22 hrs, Volume= 0.639 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.15 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 2.81 fps, Avg. Travel Time= 0.6 min

Peak Storage= 121 cf @ 12.22 hrs

Average Depth at Peak Storage= 1.00'

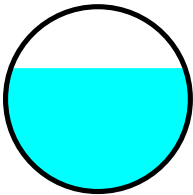
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 9.82 cfs

18.0" Round Pipe

n= 0.020

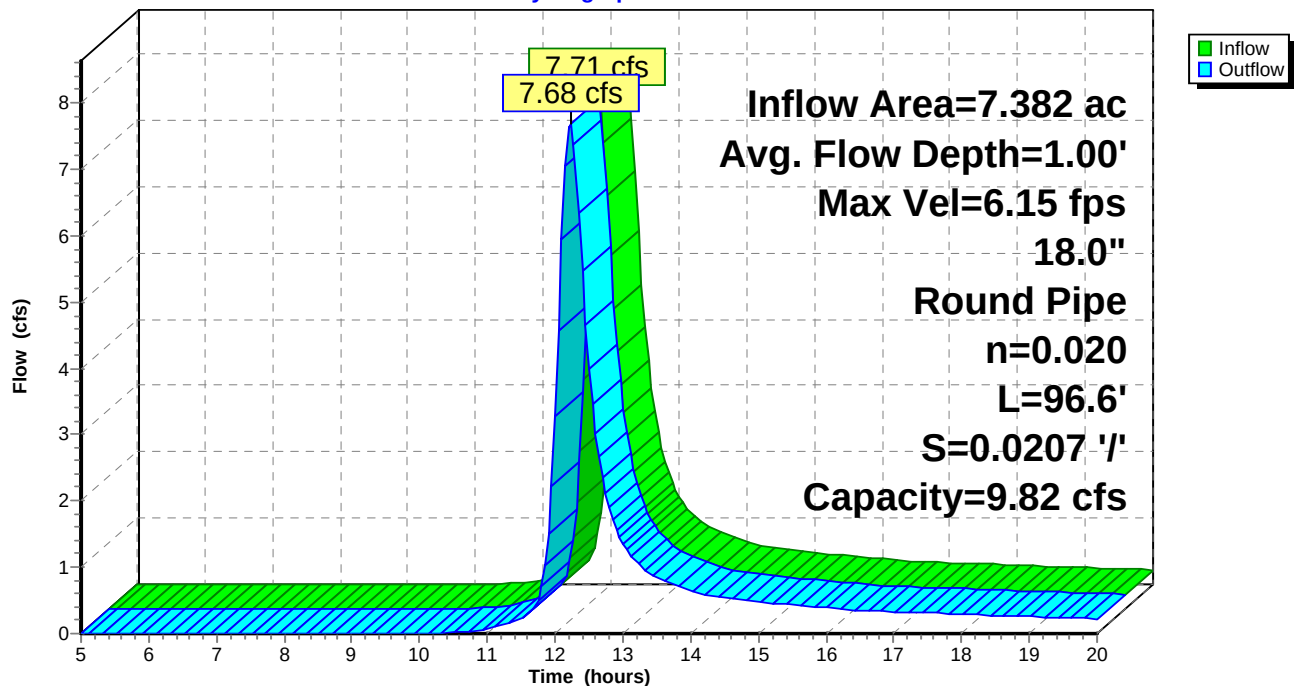
Length= 96.6' Slope= 0.0207 '/'

Inlet Invert= 1,441.00', Outlet Invert= 1,439.00'



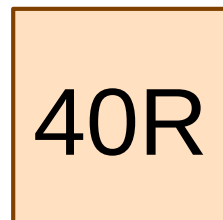
Reach 42R: CWC - 013

Hydrograph

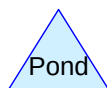
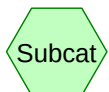




DC - 016



CWC - 014



Routing Diagram for REL Flow Calcs (CWC 014)

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REL Flow Calcs (CWC 014)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 014)

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.385	79	Woods, Fair, HSG D (39S)
5.385	79	TOTAL AREA

REL Flow Calcs (CWC 014)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
5.385	HSG D	39S
0.000	Other	
5.385		TOTAL AREA

REL Flow Calcs (CWC 014)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	5.385	0.000	5.385	Woods, Fair	39S
0.000	0.000	0.000	5.385	0.000	5.385	TOTAL AREA	

REL Flow Calcs (CWC 014)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	40R	1,184.00	1,169.00	144.4	0.1039	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 014)*Type II 24-hr 2-yr Rainfall=2.79"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment39S: DC - 016Runoff Area=5.385 ac 0.00% Impervious Runoff Depth>0.94"
Flow Length=1,718' Tc=22.9 min CN=79 Runoff=5.53 cfs 0.420 af**Reach 40R: CWC - 014**Avg. Flow Depth=0.64' Max Vel=10.38 fps Inflow=5.53 cfs 0.420 af
12.0" Round Pipe n=0.020 L=144.4' S=0.1039 '/ Capacity=7.46 cfs Outflow=5.49 cfs 0.419 af**Total Runoff Area = 5.385 ac Runoff Volume = 0.420 af Average Runoff Depth = 0.94"**
100.00% Pervious = 5.385 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 014)

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Type II 24-hr 2-yr Rainfall=2.79"

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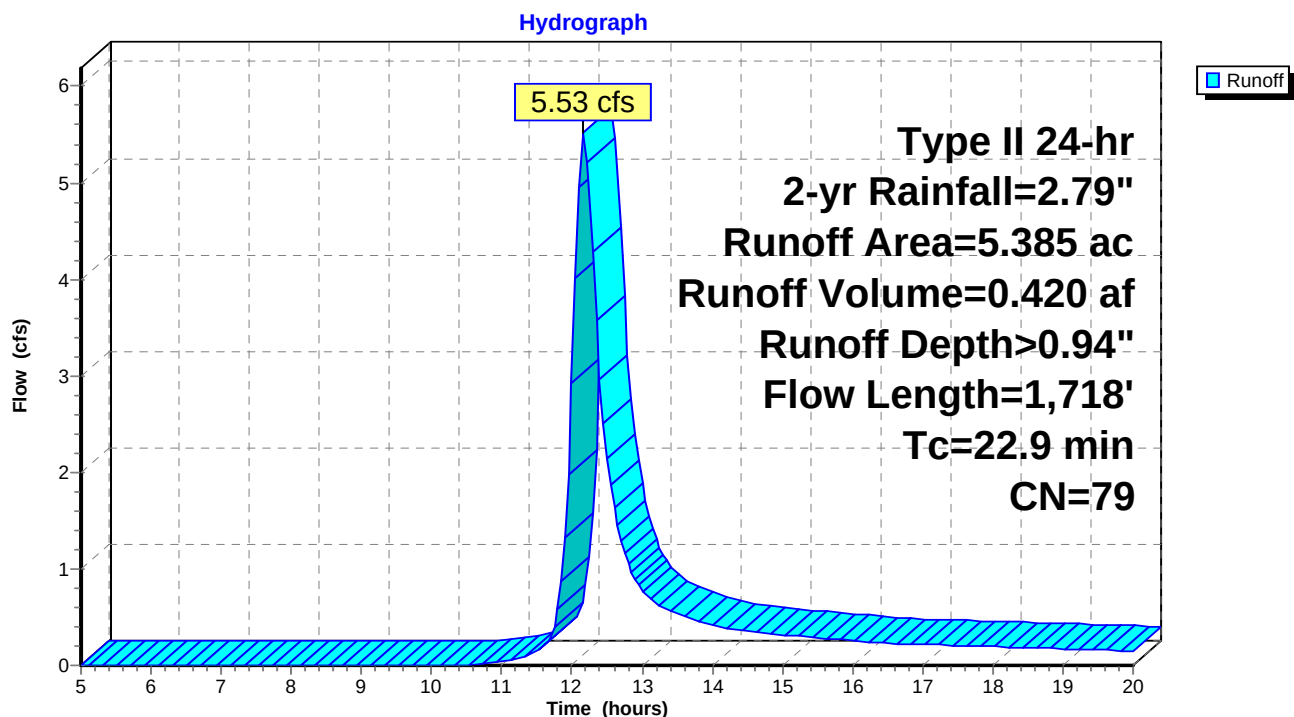
Summary for Subcatchment 39S: DC - 016

Runoff = 5.53 cfs @ 12.17 hrs, Volume= 0.420 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.79"

Area (ac)	CN	Description
5.385	79	Woods, Fair, HSG D
5.385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.1900	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.79"
12.6	1,421	0.1421	1.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	197	0.0410	3.28	5.57	Channel Flow, Area= 1.7 sf Perim= 4.5' r= 0.38' n= 0.048
22.9	1,718	Total			

Subcatchment 39S: DC - 016

REL Flow Calcs (CWC 014)

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Type II 24-hr 2-yr Rainfall=2.79"

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Summary for Reach 40R: CWC - 014

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.385 ac, 0.00% Impervious, Inflow Depth > 0.94" for 2-yr event
Inflow = 5.53 cfs @ 12.17 hrs, Volume= 0.420 af
Outflow = 5.49 cfs @ 12.18 hrs, Volume= 0.419 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 10.38 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 4.67 fps, Avg. Travel Time= 0.5 min

Peak Storage= 77 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.64'

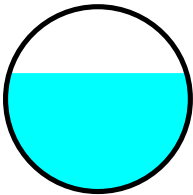
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 7.46 cfs

12.0" Round Pipe

n= 0.020

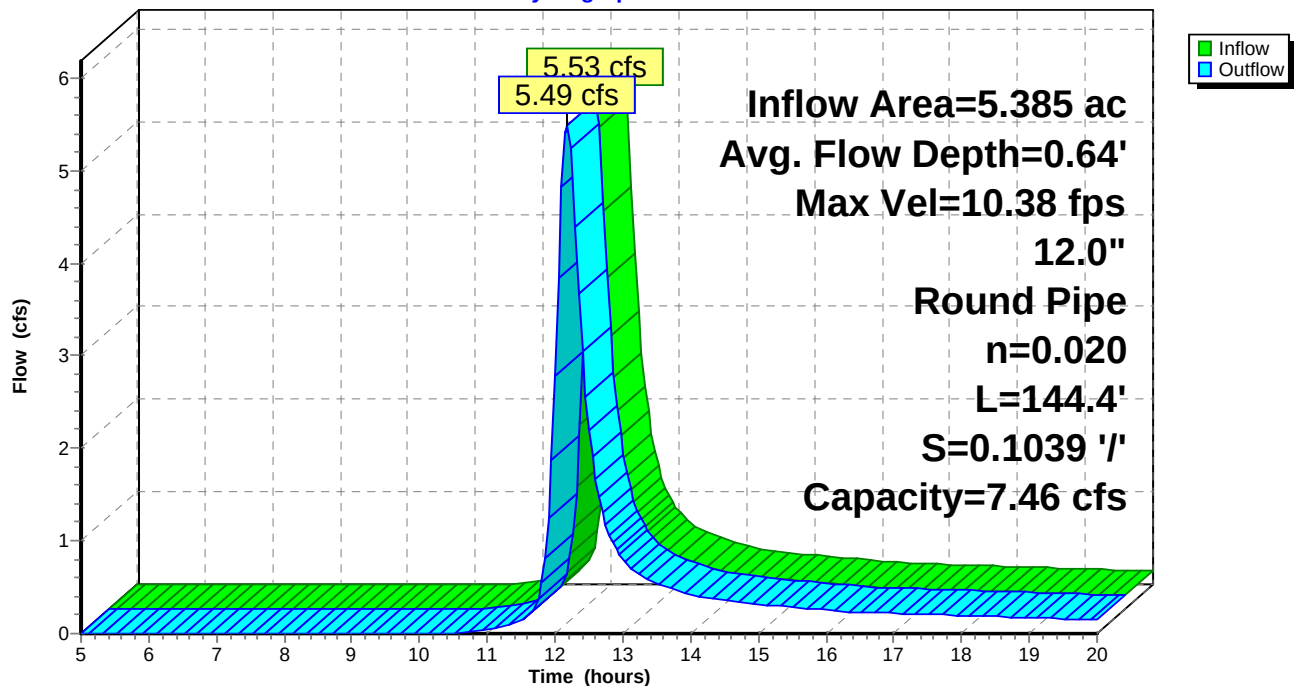
Length= 144.4' Slope= 0.1039 '/'

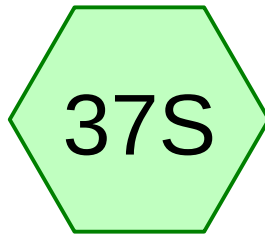
Inlet Invert= 1,184.00', Outlet Invert= 1,169.00'



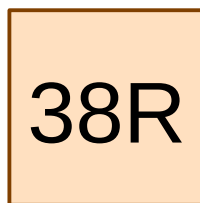
Reach 40R: CWC - 014

Hydrograph

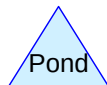
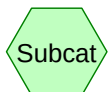




DC - 017



CWC - 015



Routing Diagram for REL Flow Calcs (CWC 015)

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REL Flow Calcs (CWC 015)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 015)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.799	79	50-75% Grass cover, Fair, HSG C (37S)
0.031	74	>75% Grass cover, Good, HSG C (37S)
2.203	73	Woods, Fair, HSG C (37S)
3.033	75	TOTAL AREA

REL Flow Calcs (CWC 015)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
3.033	HSG C	37S
0.000	HSG D	
0.000	Other	
3.033		TOTAL AREA

REL Flow Calcs (CWC 015)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.799	0.000	0.000	0.799	50-75% Grass cover, Fair	37S
0.000	0.000	0.031	0.000	0.000	0.031	>75% Grass cover, Good	37S
0.000	0.000	2.203	0.000	0.000	2.203	Woods, Fair	37S
0.000	0.000	3.033	0.000	0.000	3.033	TOTAL AREA	

REL Flow Calcs (CWC 015)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	38R	1,252.00	1,232.00	140.5	0.1423	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 015)*Type II 24-hr 2-yr Rainfall=2.63"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment37S: DC - 017

Runoff Area=132,122 sf 0.00% Impervious Runoff Depth>0.65"

Flow Length=1,284' Tc=14.9 min CN=75 Runoff=2.65 cfs 0.164 af

Reach 38R: CWC - 015

Avg. Flow Depth=0.38' Max Vel=9.74 fps Inflow=2.65 cfs 0.164 af

12.0" Round Pipe n=0.020 L=140.5' S=0.1423 '/ Capacity=8.74 cfs Outflow=2.63 cfs 0.164 af

Total Runoff Area = 3.033 ac Runoff Volume = 0.164 af Average Runoff Depth = 0.65"
100.00% Pervious = 3.033 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 015)

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Type II 24-hr 2-yr Rainfall=2.63"

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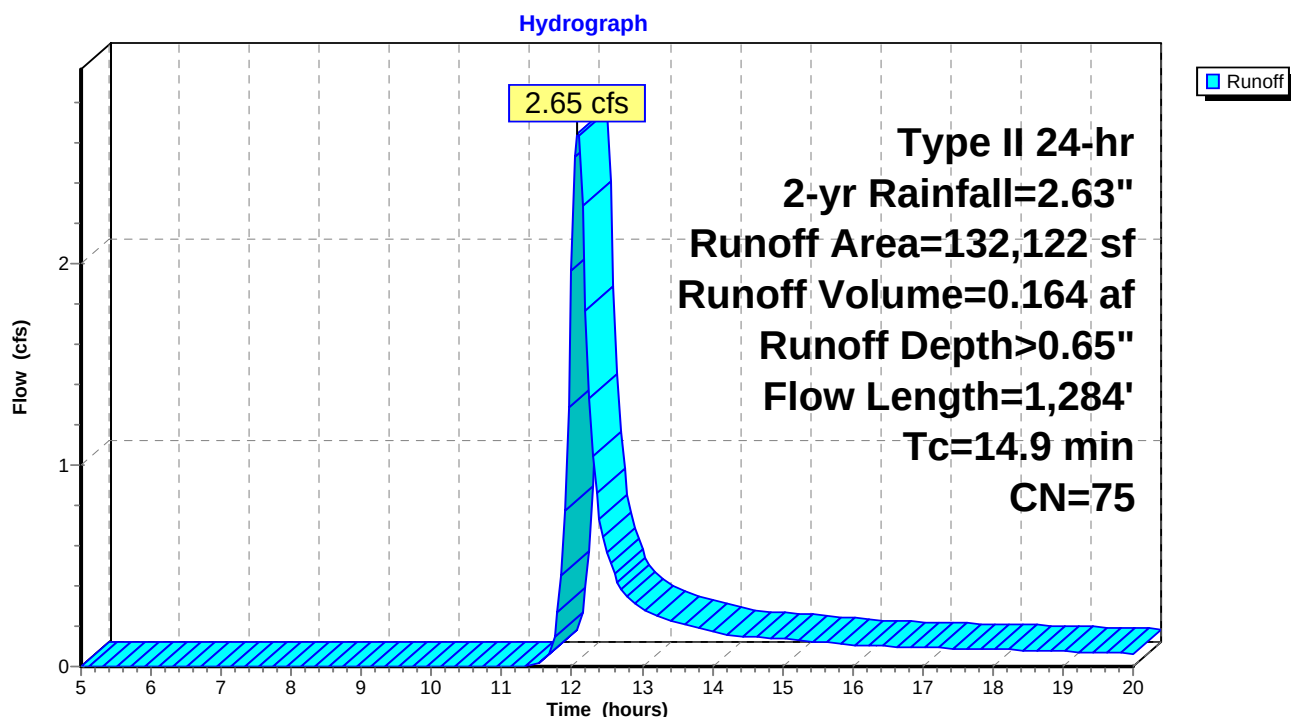
Summary for Subcatchment 37S: DC - 017

Runoff = 2.65 cfs @ 12.09 hrs, Volume= 0.164 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.63"

Area (sf)	CN	Description
1,230	74	>75% Grass cover, Good, HSG C
34,824	79	50-75% Grass cover, Fair, HSG C
102	74	>75% Grass cover, Good, HSG C
95,966	73	Woods, Fair, HSG C
132,122	75	Weighted Average
132,122		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	100	0.1100	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 2.63"
1.9	389	0.2365	3.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.3	340	0.2353	2.43		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.7	455	0.0530	2.86	2.86	Channel Flow, Area= 1.0 sf Perim= 3.7' r= 0.27' n= 0.050
14.9	1,284	Total			

Subcatchment 37S: DC - 017

REL Flow Calcs (CWC 015)

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Type II 24-hr 2-yr Rainfall=2.63"

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Summary for Reach 38R: CWC - 015

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 3.033 ac, 0.00% Impervious, Inflow Depth > 0.65" for 2-yr event
Inflow = 2.65 cfs @ 12.09 hrs, Volume= 0.164 af
Outflow = 2.63 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 9.74 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 4.19 fps, Avg. Travel Time= 0.6 min

Peak Storage= 38 cf @ 12.09 hrs

Average Depth at Peak Storage= 0.38'

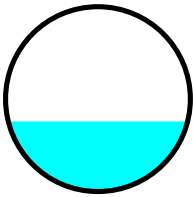
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.74 cfs

12.0" Round Pipe

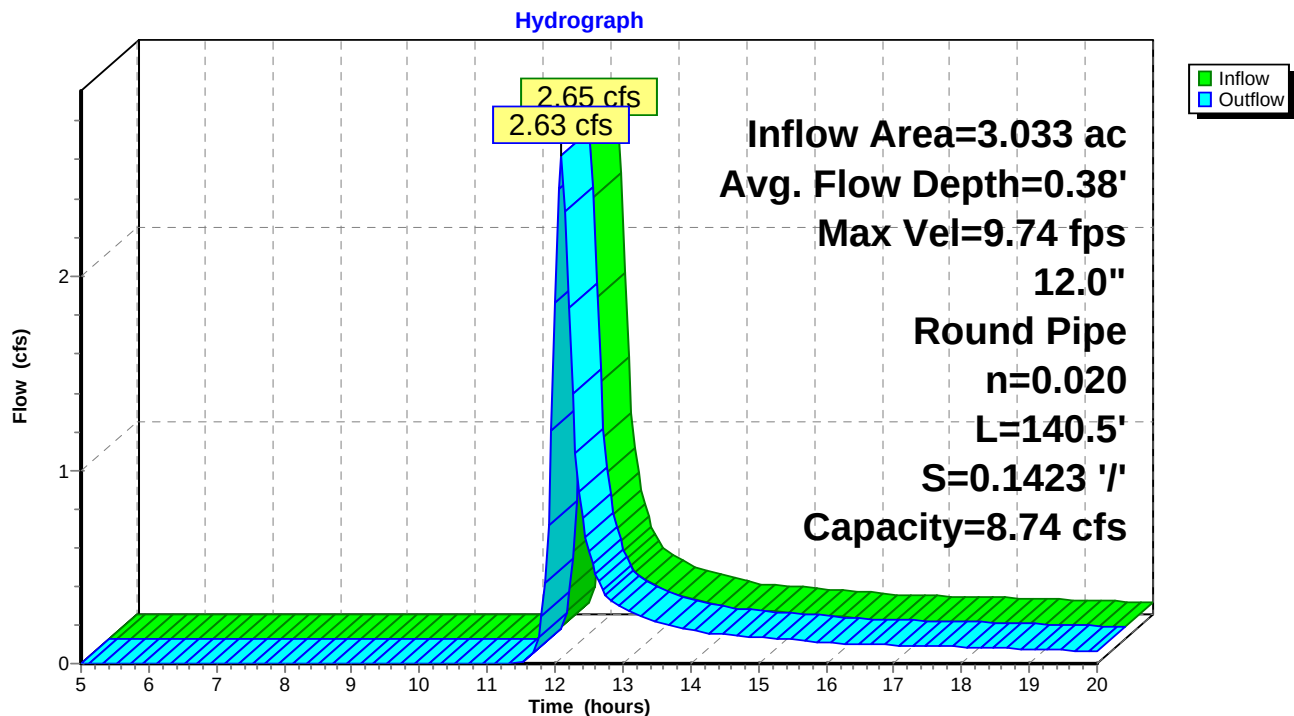
n= 0.020

Length= 140.5' Slope= 0.1423 '/'

Inlet Invert= 1,252.00', Outlet Invert= 1,232.00'



Reach 38R: CWC - 015

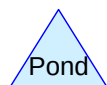
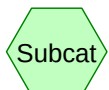




DC - 018



CWC - 016



Routing Diagram for REL Flow Calcs (CWC 016)

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REL Flow Calcs (CWC 016)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 016)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.010	73	Woods, Fair, HSG C (35S)
0.752	79	Woods, Fair, HSG D (35S)
1.762	76	TOTAL AREA

REL Flow Calcs (CWC 016)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.010	HSG C	35S
0.752	HSG D	35S
0.000	Other	
1.762		TOTAL AREA

REL Flow Calcs (CWC 016)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.010	0.752	0.000	1.762	Woods, Fair	35S
0.000	0.000	1.010	0.752	0.000	1.762	TOTAL	
						AREA	

REL Flow Calcs (CWC 016)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	36R	1,600.00	1,584.00	134.0	0.1194	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 016)*Type II 24-hr 2-yr Rainfall=2.65"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment35S: DC - 018Runoff Area=76,754 sf 0.00% Impervious Runoff Depth>0.70"
Flow Length=793' Tc=28.1 min CN=76 Runoff=1.14 cfs 0.103 af**Reach 36R: CWC - 016**Avg. Flow Depth=0.26' Max Vel=7.23 fps Inflow=1.14 cfs 0.103 af
12.0" Round Pipe n=0.020 L=134.0' S=0.1194 '/' Capacity=8.00 cfs Outflow=1.14 cfs 0.103 af**Total Runoff Area = 1.762 ac Runoff Volume = 0.103 af Average Runoff Depth = 0.70"**
100.00% Pervious = 1.762 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 016)

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Type II 24-hr 2-yr Rainfall=2.65"

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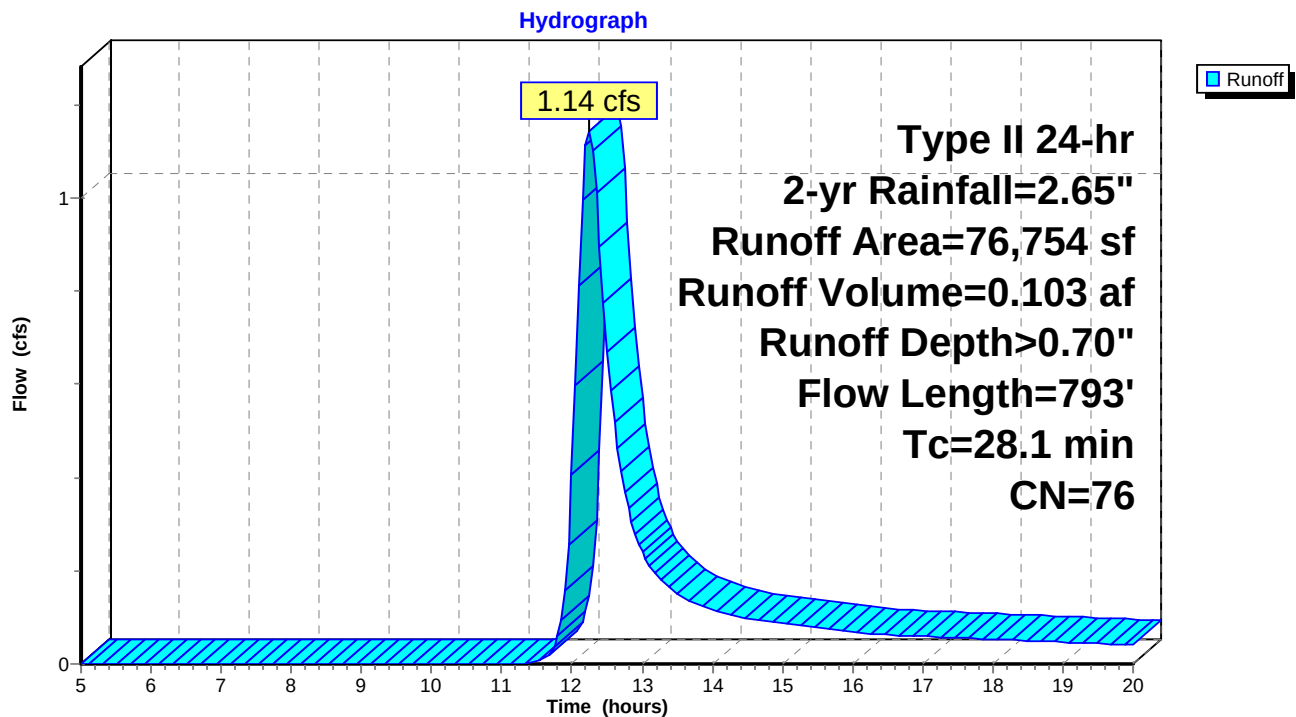
Summary for Subcatchment 35S: DC - 018

Runoff = 1.14 cfs @ 12.25 hrs, Volume= 0.103 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.65"

Area (sf)	CN	Description
29,839	79	Woods, Fair, HSG D
43,996	73	Woods, Fair, HSG C
2,919	79	Woods, Fair, HSG D
76,754	76	Weighted Average
76,754		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0250	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.65"
3.4	311	0.0952	1.54		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
3.1	382	0.0370	2.08	1.45	Channel Flow, Area= 0.7 sf Perim= 3.2' r= 0.22' n= 0.050
28.1	793	Total			

Subcatchment 35S: DC - 018

REL Flow Calcs (CWC 016)

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Type II 24-hr 2-yr Rainfall=2.65"

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Summary for Reach 36R: CWC - 016

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.762 ac, 0.00% Impervious, Inflow Depth > 0.70" for 2-yr event
Inflow = 1.14 cfs @ 12.25 hrs, Volume= 0.103 af
Outflow = 1.14 cfs @ 12.25 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.23 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 3.42 fps, Avg. Travel Time= 0.7 min

Peak Storage= 21 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.26'

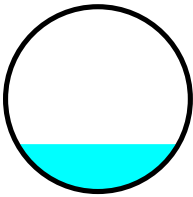
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.00 cfs

12.0" Round Pipe

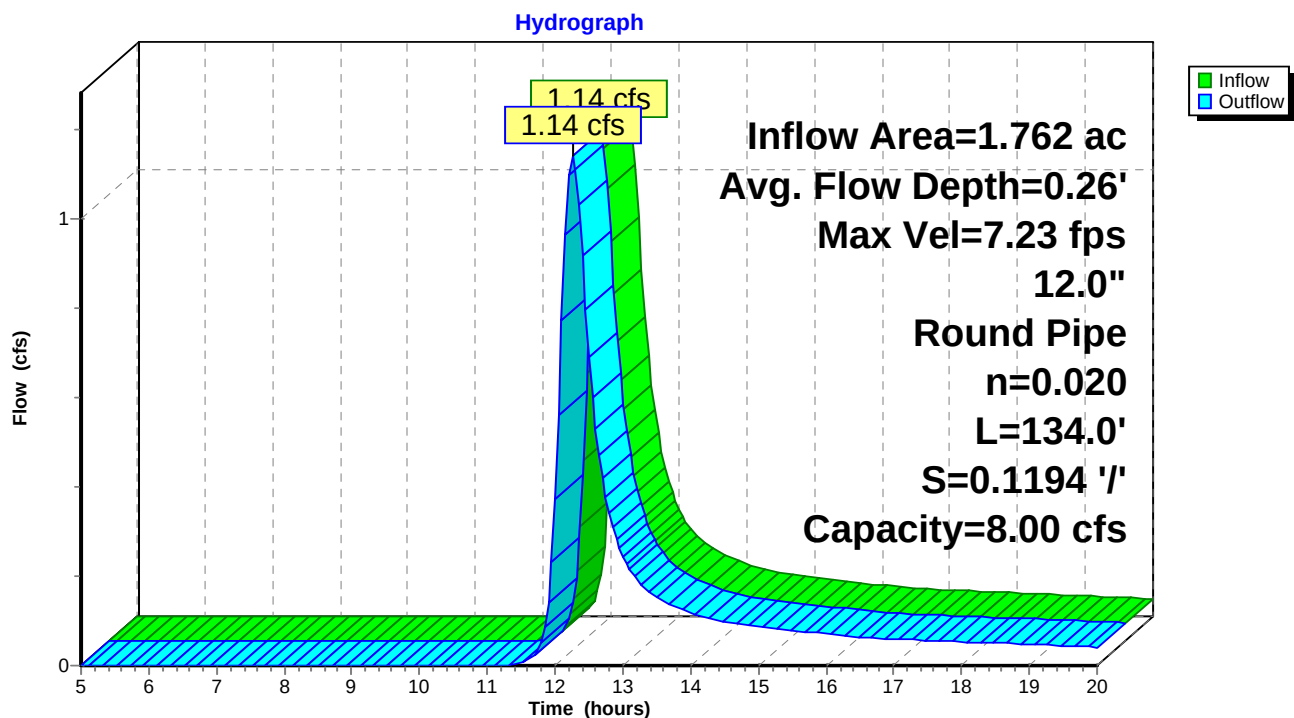
n= 0.020

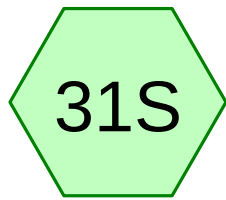
Length= 134.0' Slope= 0.1194 '/'

Inlet Invert= 1,600.00', Outlet Invert= 1,584.00'



Reach 36R: CWC - 016





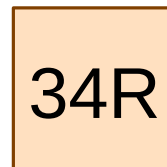
DC - 020



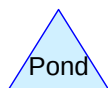
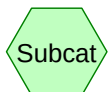
CWC - 018



DC - 019



CWC - 017



REL Flow Calcs (CWC 017-018)

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Project Notes

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REL Flow Calcs (CWC 017-018)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.587	71	Meadow, non-grazed, HSG C (31S, 32S)
10.472	73	Woods, Fair, HSG C (31S, 32S)
1.055	79	Woods, Fair, HSG D (31S)
15.114	73	TOTAL AREA

REL Flow Calcs (CWC 017-018)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.059	HSG C	31S, 32S
1.055	HSG D	31S
0.000	Other	
15.114		TOTAL AREA

REL Flow Calcs (CWC 017-018)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.587	0.000	0.000	3.587	Meadow, non-grazed	31S, 32S
0.000	0.000	10.472	1.055	0.000	11.527	Woods, Fair	31S, 32S
0.000	0.000	14.059	1.055	0.000	15.114	TOTAL AREA	

REL Flow Calcs (CWC 017-018)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	33R	1,139.00	1,120.00	157.5	0.1206	0.020	12.0	0.0	0.0
2	34R	1,134.00	1,127.00	126.4	0.0554	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 017-018)*Type II 24-hr 2-yr Rainfall=2.68"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment31S: DC - 020Runoff Area=10.277 ac 0.00% Impervious Runoff Depth>0.59"
Flow Length=1,612' Tc=27.3 min CN=73 Runoff=5.46 cfs 0.503 af**Subcatchment32S: DC - 019**Runoff Area=4.837 ac 0.00% Impervious Runoff Depth>0.55"
Flow Length=1,498' Tc=27.2 min CN=72 Runoff=2.35 cfs 0.221 af**Reach 33R: CWC - 018**Avg. Flow Depth=0.60' Max Vel=11.01 fps Inflow=5.46 cfs 0.503 af
12.0" Round Pipe n=0.020 L=157.5' S=0.1206 '/ Capacity=8.04 cfs Outflow=5.44 cfs 0.503 af**Reach 34R: CWC - 017**Avg. Flow Depth=0.46' Max Vel=6.68 fps Inflow=2.35 cfs 0.221 af
12.0" Round Pipe n=0.020 L=126.4' S=0.0554 '/ Capacity=5.45 cfs Outflow=2.35 cfs 0.221 af**Total Runoff Area = 15.114 ac Runoff Volume = 0.724 af Average Runoff Depth = 0.57"**
100.00% Pervious = 15.114 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 017-018)

Type II 24-hr 2-yr Rainfall=2.68"

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Summary for Subcatchment 31S: DC - 020

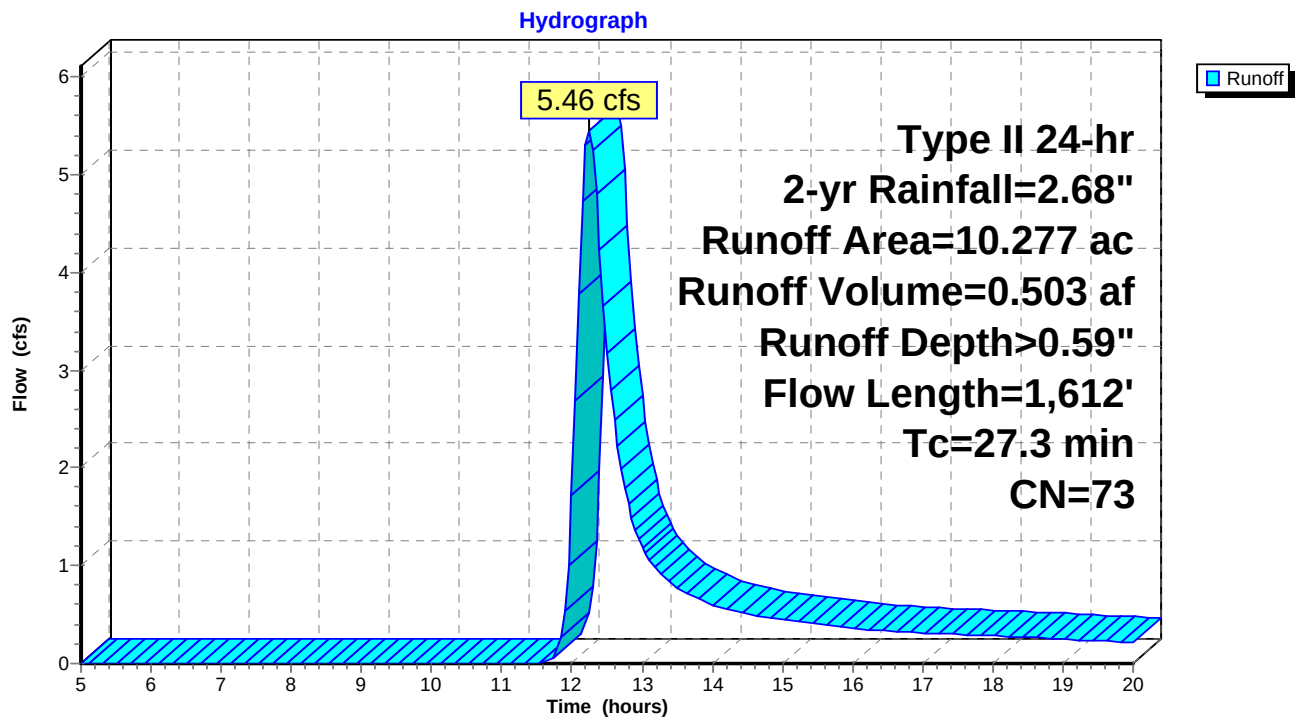
Runoff = 5.46 cfs @ 12.25 hrs, Volume= 0.503 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.68"

Area (ac)	CN	Description
0.605	73	Woods, Fair, HSG C
0.592	73	Woods, Fair, HSG C
1.055	79	Woods, Fair, HSG D
2.254	73	Woods, Fair, HSG C
2.458	73	Woods, Fair, HSG C
0.537	73	Woods, Fair, HSG C
1.432	73	Woods, Fair, HSG C
1.268	71	Meadow, non-grazed, HSG C
0.076	71	Meadow, non-grazed, HSG C
10.277	73	Weighted Average
10.277		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.68"
11.7	1,251	0.1279	1.79		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.1	261	0.0080	2.04	5.92	Channel Flow, Area= 2.9 sf Perim= 5.6' r= 0.52' n= 0.042
27.3	1,612	Total			

Subcatchment 31S: DC - 020



REL Flow Calcs (CWC 017-018)

Type II 24-hr 2-yr Rainfall=2.68"

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Summary for Subcatchment 32S: DC - 019

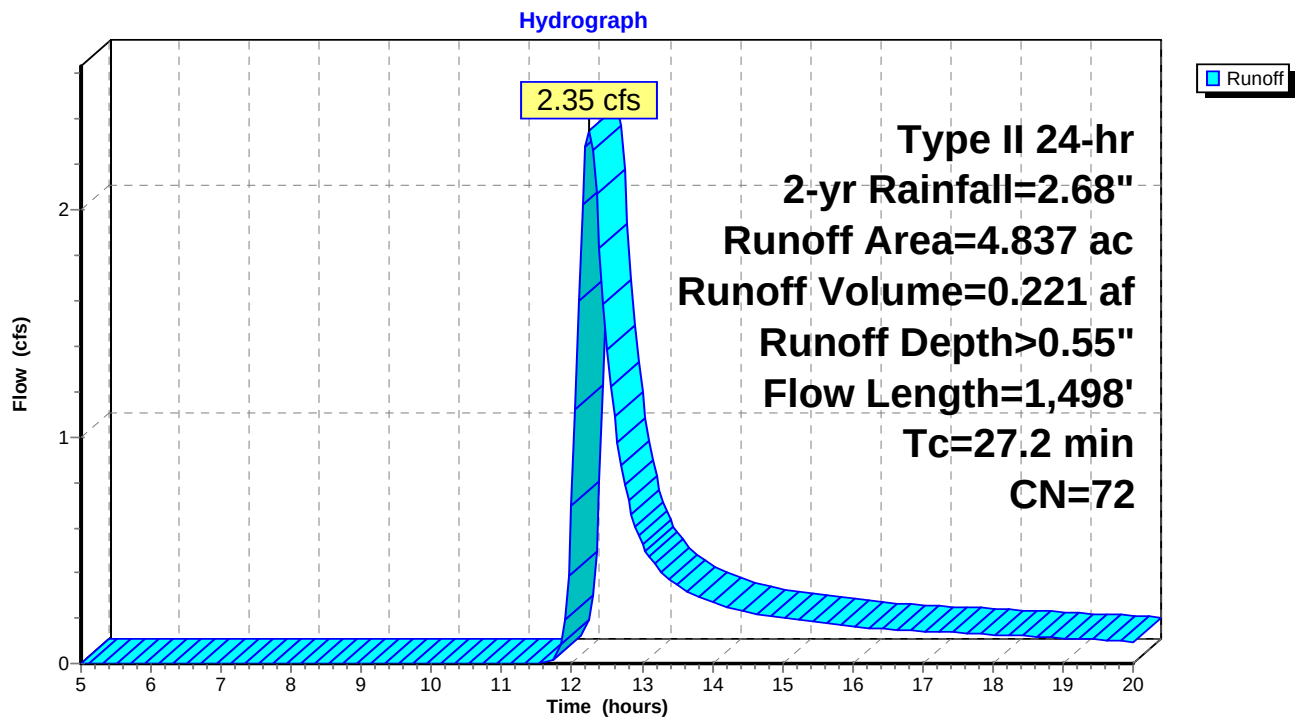
Runoff = 2.35 cfs @ 12.25 hrs, Volume= 0.221 af, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.68"

Area (ac)	CN	Description
1.499	73	Woods, Fair, HSG C
0.690	73	Woods, Fair, HSG C
0.405	73	Woods, Fair, HSG C
1.592	71	Meadow, non-grazed, HSG C
0.647	71	Meadow, non-grazed, HSG C
0.004	71	Meadow, non-grazed, HSG C
4.837	72	Weighted Average
4.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.68"
5.5	594	0.1295	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.0	614	0.0847	2.04		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	190	0.0210	2.04	2.65	Channel Flow, Area= 1.3 sf Perim= 4.0' r= 0.33' n= 0.050
27.2	1,498	Total			

Subcatchment 32S: DC - 019



REL Flow Calcs (CWC 017-018)

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Type II 24-hr 2-yr Rainfall=2.68"

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Summary for Reach 33R: CWC - 018

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 10.277 ac, 0.00% Impervious, Inflow Depth > 0.59" for 2-yr event
Inflow = 5.46 cfs @ 12.25 hrs, Volume= 0.503 af
Outflow = 5.44 cfs @ 12.25 hrs, Volume= 0.503 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 11.01 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 5.66 fps, Avg. Travel Time= 0.5 min

Peak Storage= 78 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.60'

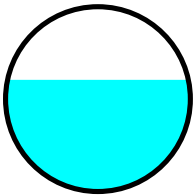
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.04 cfs

12.0" Round Pipe

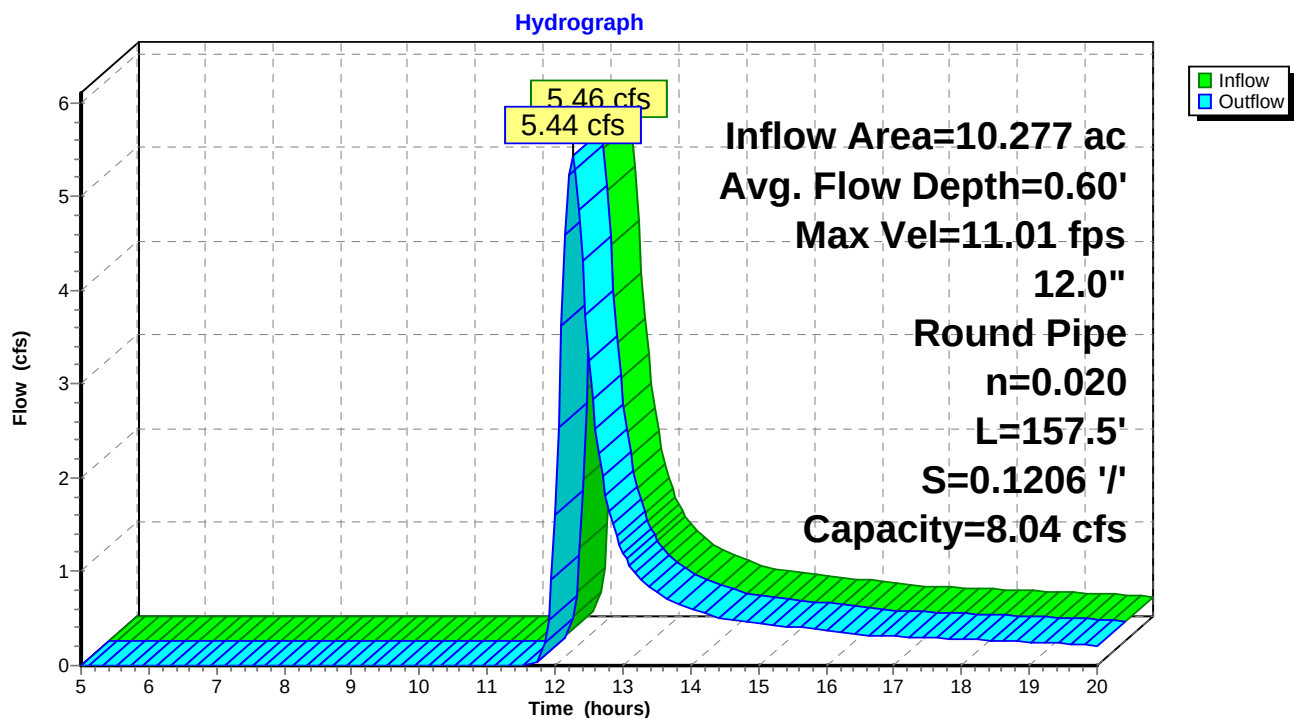
n= 0.020

Length= 157.5' Slope= 0.1206 '/'

Inlet Invert= 1,139.00', Outlet Invert= 1,120.00'



Reach 33R: CWC - 018



REL Flow Calcs (CWC 017-018)

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Type II 24-hr 2-yr Rainfall=2.68"

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Summary for Reach 34R: CWC - 017

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 4.837 ac, 0.00% Impervious, Inflow Depth > 0.55" for 2-yr event
Inflow = 2.35 cfs @ 12.25 hrs, Volume= 0.221 af
Outflow = 2.35 cfs @ 12.26 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.68 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 3.40 fps, Avg. Travel Time= 0.6 min

Peak Storage= 44 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.46'

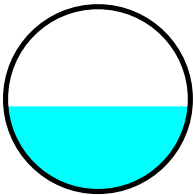
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.45 cfs

12.0" Round Pipe

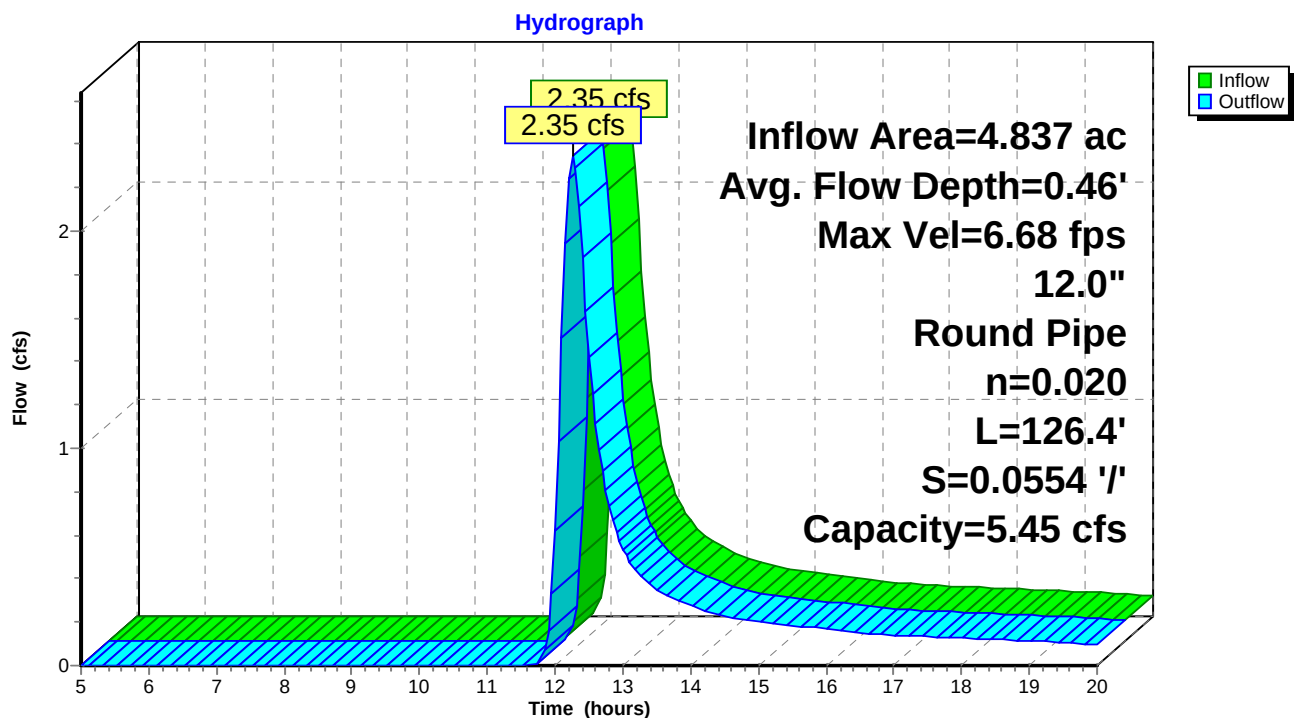
n= 0.020

Length= 126.4' Slope= 0.0554 '/'

Inlet Invert= 1,134.00', Outlet Invert= 1,127.00'

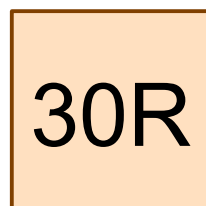


Reach 34R: CWC - 017

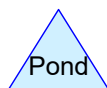
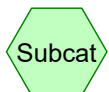




DC - 021



CWC - 019



Routing Diagram for REL Flow Calcs (CWC 019)

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REL Flow Calcs (CWC 019)

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 019)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.665	73	Woods, Fair, HSG C (29S)
5.665	73	TOTAL AREA

REL Flow Calcs (CWC 019)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
5.665	HSG C	29S
0.000	HSG D	
0.000	Other	
5.665		TOTAL AREA

REL Flow Calcs (CWC 019)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	5.665	0.000	0.000	5.665	Woods, Fair	29S
0.000	0.000	5.665	0.000	0.000	5.665	TOTAL AREA	

REL Flow Calcs (CWC 019)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	30R	1,260.30	1,257.50	109.0	0.0257	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 019)

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 019)*Type II 24-hr 2-yr Rainfall=2.70"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment29S: DC - 021Runoff Area=5.665 ac 0.00% Impervious Runoff Depth>0.60"
Flow Length=1,207' Tc=27.5 min CN=73 Runoff=3.06 cfs 0.282 af**Reach 30R: CWC - 019**Avg. Flow Depth=0.69' Max Vel=5.28 fps Inflow=3.06 cfs 0.282 af
12.0" Round Pipe n=0.020 L=109.0' S=0.0257 '/ Capacity=3.71 cfs Outflow=3.05 cfs 0.282 af**Total Runoff Area = 5.665 ac Runoff Volume = 0.282 af Average Runoff Depth = 0.60"**
100.00% Pervious = 5.665 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 019)

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Type II 24-hr 2-yr Rainfall=2.70"

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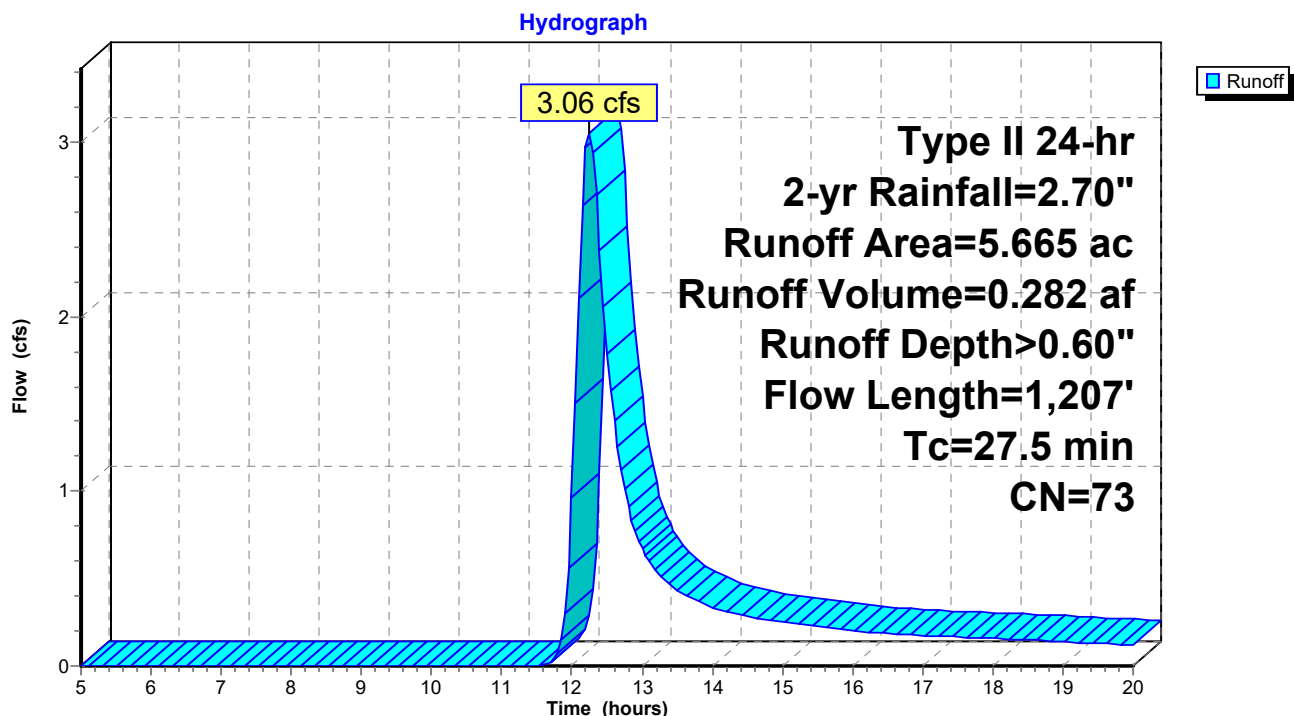
Summary for Subcatchment 29S: DC - 021

Runoff = 3.06 cfs @ 12.25 hrs, Volume= 0.282 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.70"

Area (ac)	CN	Description
1.607	73	Woods, Fair, HSG C
4.005	73	Woods, Fair, HSG C
0.053	73	Woods, Fair, HSG C
5.665	73	Weighted Average
5.665		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.70"
9.4	905	0.1038	1.61		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	202	0.0100	1.77	3.18	Channel Flow, Area= 1.8 sf Perim= 4.6' r= 0.39' n= 0.045
27.5	1,207	Total			

Subcatchment 29S: DC - 021

REL Flow Calcs (CWC 019)

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Type II 24-hr 2-yr Rainfall=2.70"

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Summary for Reach 30R: CWC - 019

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.665 ac, 0.00% Impervious, Inflow Depth > 0.60" for 2-yr event
Inflow = 3.06 cfs @ 12.25 hrs, Volume= 0.282 af
Outflow = 3.05 cfs @ 12.26 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.28 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 2.75 fps, Avg. Travel Time= 0.7 min

Peak Storage= 63 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.69'

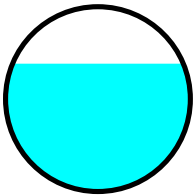
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.71 cfs

12.0" Round Pipe

n= 0.020

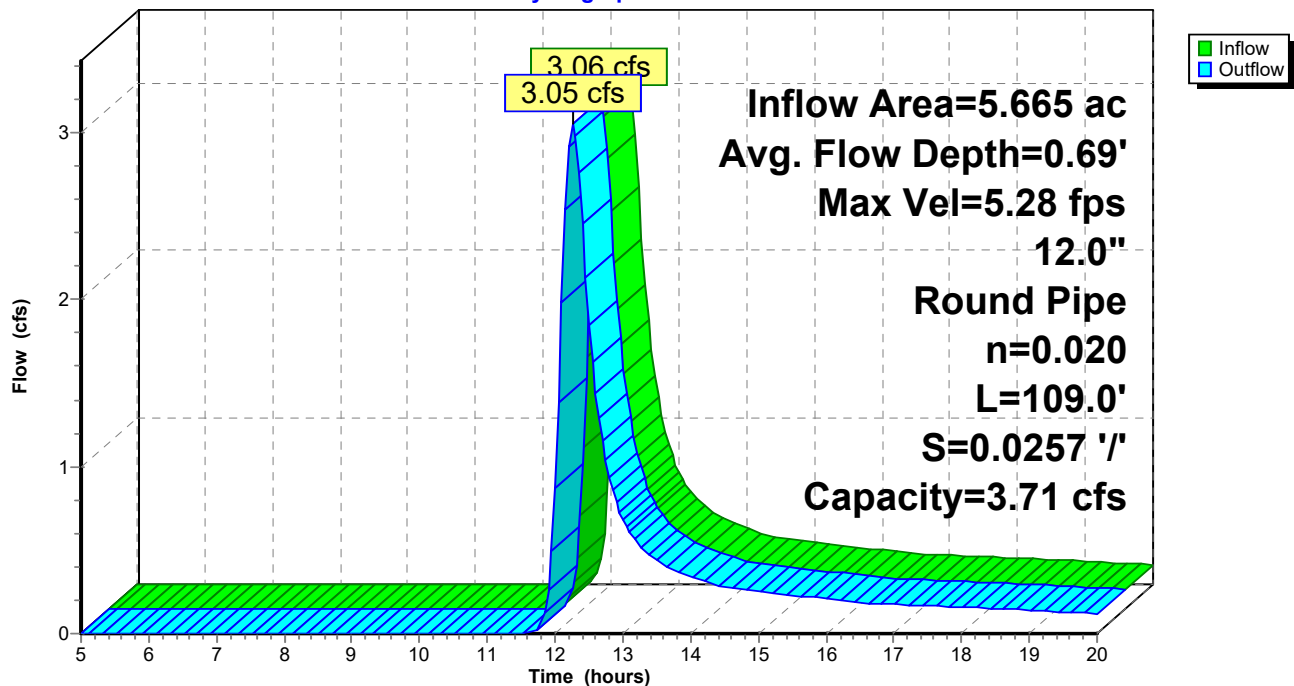
Length= 109.0' Slope= 0.0257 '/'

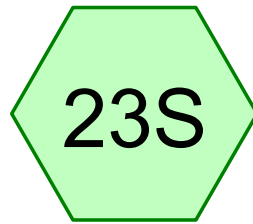
Inlet Invert= 1,260.30', Outlet Invert= 1,257.50'



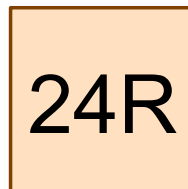
Reach 30R: CWC - 019

Hydrograph

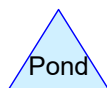
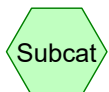




DC - 022



CWC - 020



Routing Diagram for REL Flow Calcs (CWC 020)

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REL Flow Calcs (CWC 020)

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REL Flow Calcs (CWC 020)

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.446	84	50-75% Grass cover, Fair, HSG D (23S)
0.720	89	<50% Grass cover, Poor, HSG D (23S)
1.262	71	Meadow, non-grazed, HSG C (23S)
3.523	78	Meadow, non-grazed, HSG D (23S)
8.951	80	TOTAL AREA

REL Flow Calcs (CWC 020)

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.262	HSG C	23S
7.689	HSG D	23S
0.000	Other	
8.951		TOTAL AREA

REL Flow Calcs (CWC 020)

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	3.446	0.000	3.446	50-75% Grass cover, Fair	23S
0.000	0.000	0.000	0.720	0.000	0.720	<50% Grass cover, Poor	23S
0.000	0.000	1.262	3.523	0.000	4.785	Meadow, non-grazed	23S
0.000	0.000	1.262	7.689	0.000	8.951	TOTAL AREA	

REL Flow Calcs (CWC 020)

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	24R	1,138.65	1,124.00	132.0	0.1110	0.020	18.0	0.0	0.0

REL Flow Calcs (CWC 020)*Type II 24-hr 2-yr Rainfall=2.72"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment23S: DC - 022

Runoff Area=8.951 ac 0.00% Impervious Runoff Depth>0.94"

Flow Length=1,707' Tc=17.5 min CN=80 Runoff=10.90 cfs 0.705 af

Reach 24R: CWC - 020

Avg. Flow Depth=0.73' Max Vel=12.72 fps Inflow=10.90 cfs 0.705 af

18.0" Round Pipe n=0.020 L=132.0' S=0.1110 '/ Capacity=22.75 cfs Outflow=10.85 cfs 0.705 af

Total Runoff Area = 8.951 ac Runoff Volume = 0.705 af Average Runoff Depth = 0.94"
100.00% Pervious = 8.951 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 020)

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Type II 24-hr 2-yr Rainfall=2.72"

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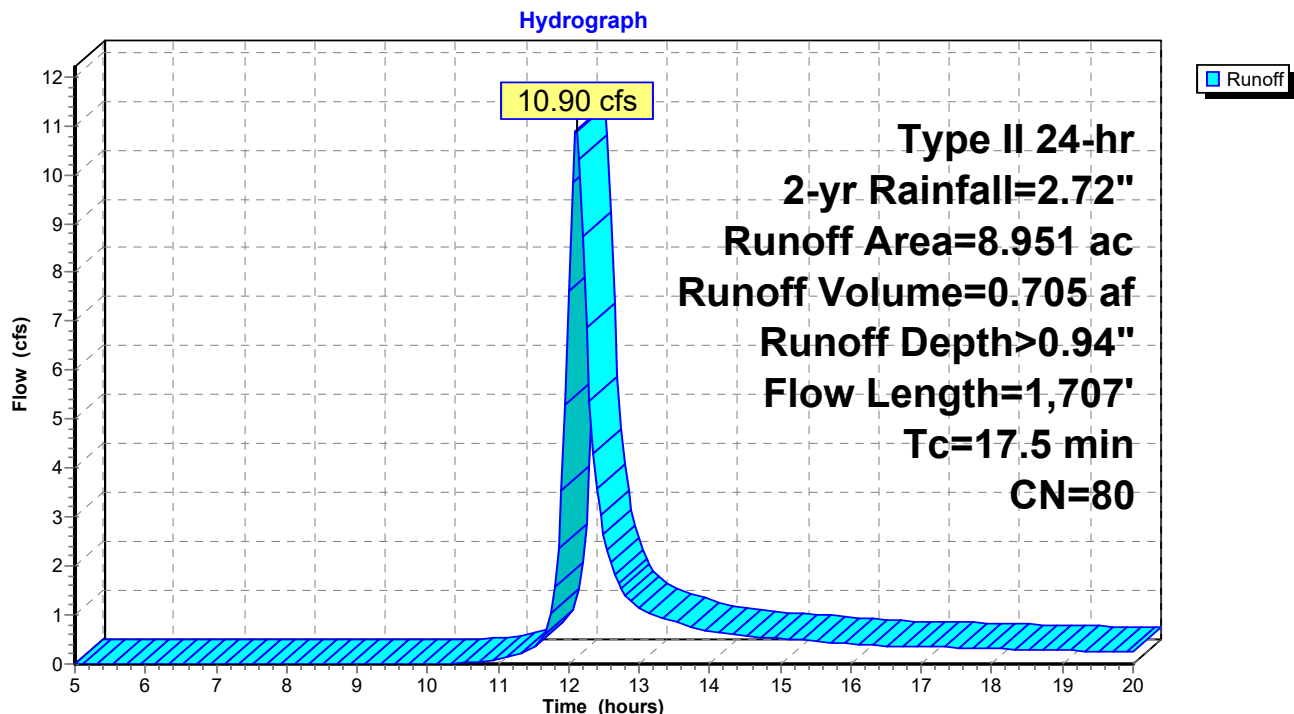
Summary for Subcatchment 23S: DC - 022

Runoff = 10.90 cfs @ 12.11 hrs, Volume= 0.705 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.72"

Area (ac)	CN	Description
0.720	89	<50% Grass cover, Poor, HSG D
3.446	84	50-75% Grass cover, Fair, HSG D
1.262	71	Meadow, non-grazed, HSG C
0.412	78	Meadow, non-grazed, HSG D
3.111	78	Meadow, non-grazed, HSG D
8.951	80	Weighted Average
8.951		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0300	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.72"
6.5	1,016	0.1370	2.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	591	0.0440	4.95	11.39	Channel Flow, Area= 2.3 sf Perim= 5.1' r= 0.45' n= 0.037
17.5	1,707	Total			

Subcatchment 23S: DC - 022

REL Flow Calcs (CWC 020)

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Type II 24-hr 2-yr Rainfall=2.72"

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Summary for Reach 24R: CWC - 020

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.951 ac, 0.00% Impervious, Inflow Depth > 0.94" for 2-yr event
Inflow = 10.90 cfs @ 12.11 hrs, Volume= 0.705 af
Outflow = 10.85 cfs @ 12.11 hrs, Volume= 0.705 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 12.72 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 5.24 fps, Avg. Travel Time= 0.4 min

Peak Storage= 113 cf @ 12.11 hrs

Average Depth at Peak Storage= 0.73'

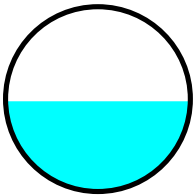
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 22.75 cfs

18.0" Round Pipe

n= 0.020

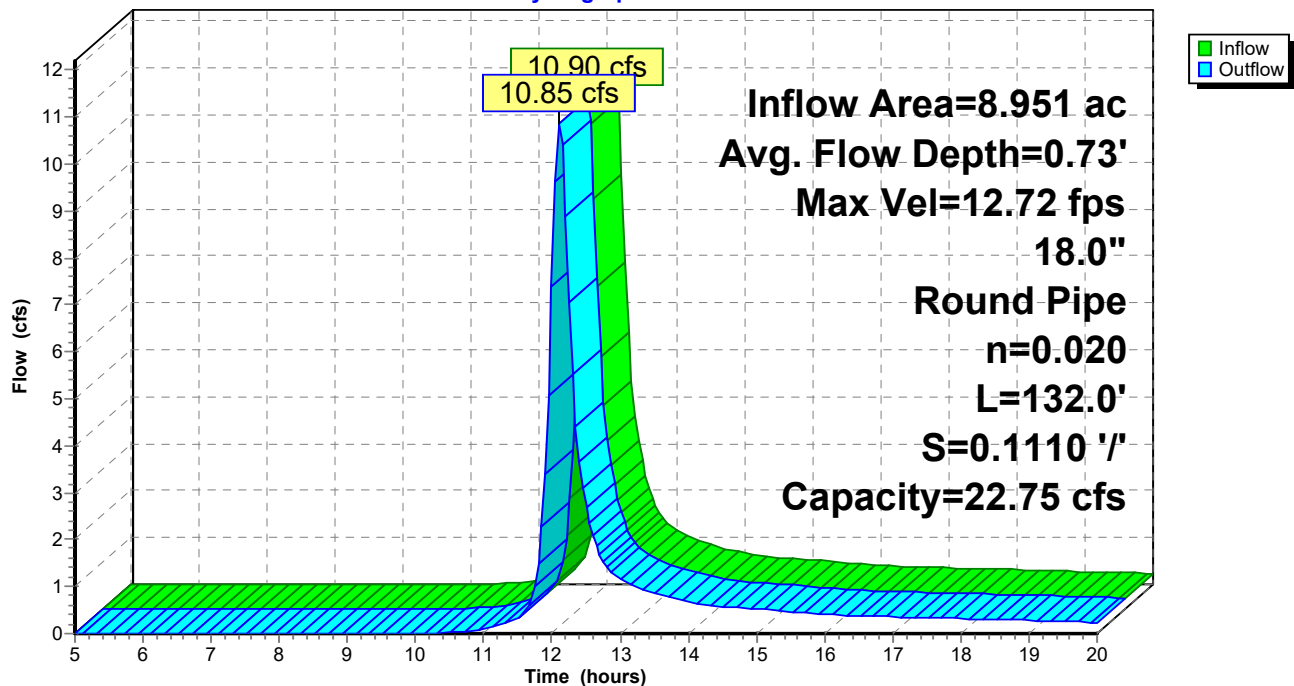
Length= 132.0' Slope= 0.1110 '/'

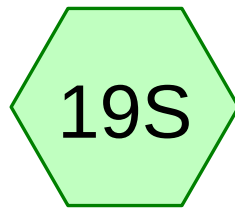
Inlet Invert= 1,138.65', Outlet Invert= 1,124.00'



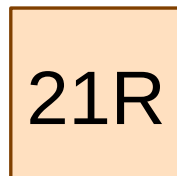
Reach 24R: CWC - 020

Hydrograph

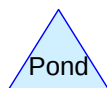
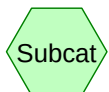




DC-023



CWC - 021



REL Flow Calcs (CWC 021) - REV 2

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Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 021) - REV 2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.477	79	Woods, Fair, HSG D (19S)
6.477	79	TOTAL AREA

REL Flow Calcs (CWC 021) - REV 2

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
6.477	HSG D	19S
0.000	Other	
6.477		TOTAL AREA

REL Flow Calcs (CWC 021) - REV 2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	6.477	0.000	6.477	Woods, Fair	19S
0.000	0.000	0.000	6.477	0.000	6.477	TOTAL AREA	

REL Flow Calcs (CWC 021) - REV 2

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	21R	1,174.00	1,160.00	108.0	0.1296	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 021) - REV 2*Type II 24-hr 2-yr Rainfall=2.72"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment19S: DC-023Runoff Area=282,155 sf 0.00% Impervious Runoff Depth>0.89"
Flow Length=1,516' Tc=25.2 min CN=79 Runoff=5.94 cfs 0.480 af**Reach 21R: CWC - 021**Avg. Flow Depth=0.62' Max Vel=11.53 fps Inflow=5.94 cfs 0.480 af
12.0" Round Pipe n=0.020 L=108.0' S=0.1296 '/ Capacity=8.34 cfs Outflow=5.93 cfs 0.480 af**Total Runoff Area = 6.477 ac Runoff Volume = 0.480 af Average Runoff Depth = 0.89"**
100.00% Pervious = 6.477 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 021) - REV 2

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Type II 24-hr 2-yr Rainfall=2.72"

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Summary for Subcatchment 19S: DC-023

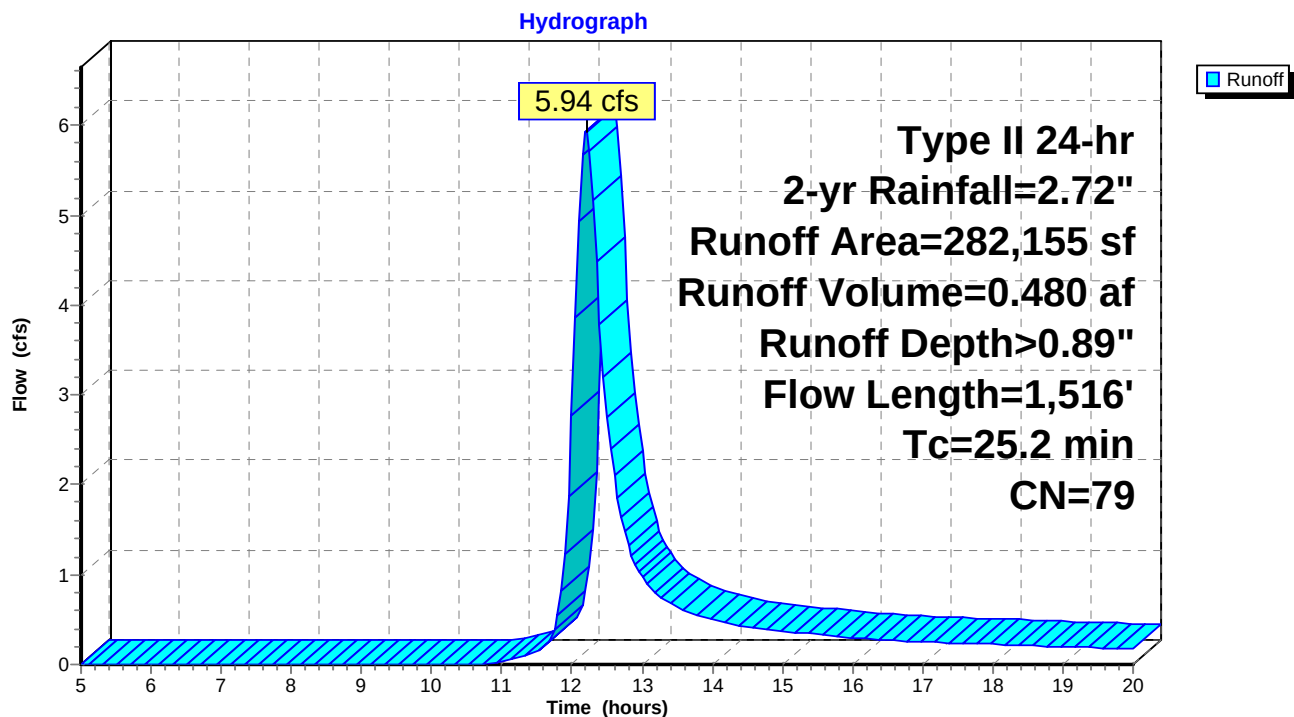
Runoff = 5.94 cfs @ 12.20 hrs, Volume= 0.480 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.72"

Area (sf)	CN	Description
20,922	79	Woods, Fair, HSG D
97,309	79	Woods, Fair, HSG D
63,533	79	Woods, Fair, HSG D
100,391	79	Woods, Fair, HSG D
282,155	79	Weighted Average
282,155		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.72"
8.9	1,019	0.1450	1.90		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.9	397	0.0090	2.30	6.45	Channel Flow, Area= 2.8 sf Perim= 5.5' r= 0.51' n= 0.039
25.2	1,516				Total

LOOKS CORRECT

Subcatchment 19S: DC-023

REL Flow Calcs (CWC 021) - REV 2

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Type II 24-hr 2-yr Rainfall=2.72"

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Summary for Reach 21R: CWC - 021

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 6.477 ac, 0.00% Impervious, Inflow Depth > 0.89" for 2-yr event
Inflow = 5.94 cfs @ 12.20 hrs, Volume= 0.480 af
Outflow = 5.93 cfs @ 12.21 hrs, Volume= 0.480 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 11.53 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 5.28 fps, Avg. Travel Time= 0.3 min

Peak Storage= 56 cf @ 12.20 hrs

Average Depth at Peak Storage= 0.62'

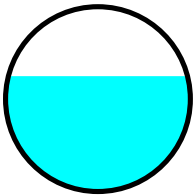
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.34 cfs

12.0" Round Pipe

n= 0.020

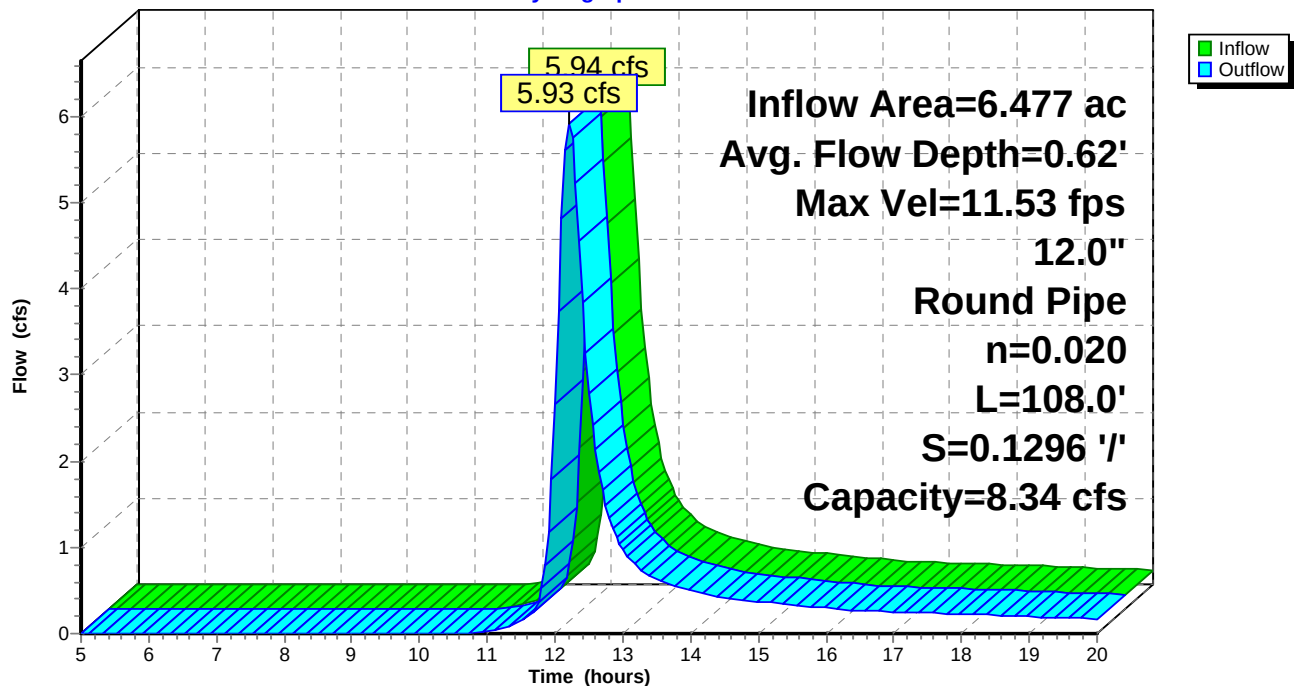
Length= 108.0' Slope= 0.1296 '/'

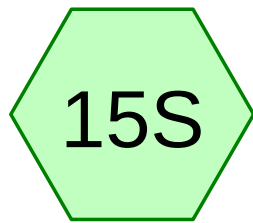
Inlet Invert= 1,174.00', Outlet Invert= 1,160.00'



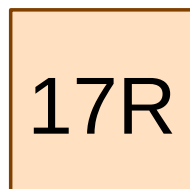
Reach 21R: CWC - 021

Hydrograph

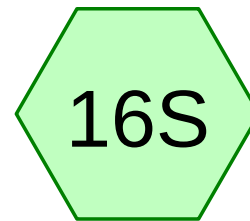




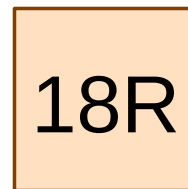
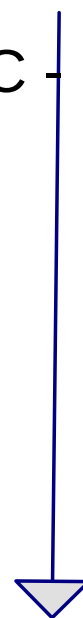
DC - 025



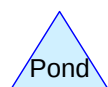
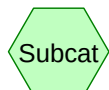
CWC - 023



DC - 024



CWC - 022



REL Flow Calcs (CWC 022-023) - REV 2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.973	73	Woods, Fair, HSG C (15S, 16S)
2.973	73	TOTAL AREA

REL Flow Calcs (CWC 022-023) - REV 2

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.973	HSG C	15S, 16S
0.000	HSG D	
0.000	Other	
2.973		TOTAL AREA

REL Flow Calcs (CWC 022-023) - REV 2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.973	0.000	0.000	2.973	Woods, Fair	15S, 16S
0.000	0.000	2.973	0.000	0.000	2.973	TOTAL	
						AREA	

REL Flow Calcs (CWC 022-023) - REV 2

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	17R	1,284.00	1,278.00	117.4	0.0511	0.020	12.0	0.0	0.0
2	18R	1,286.00	1,269.00	122.6	0.1387	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 022-023) - REV 2*Type II 24-hr 2-yr Rainfall=2.74"*

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

Subcatchment15S: DC - 025

Runoff Area=1.599 ac 0.00% Impervious Runoff Depth>0.62"
Flow Length=601' Tc=19.6 min CN=73 Runoff=1.12 cfs 0.083 af

Subcatchment16S: DC - 024

Runoff Area=1.374 ac 0.00% Impervious Runoff Depth>0.62"
Flow Length=613' Tc=21.2 min CN=73 Runoff=0.92 cfs 0.071 af

Reach 17R: CWC - 023

Avg. Flow Depth=0.31' Max Vel=5.31 fps Inflow=1.12 cfs 0.083 af
12.0" Round Pipe n=0.020 L=117.4' S=0.0511 '/ Capacity=5.24 cfs Outflow=1.12 cfs 0.083 af

Reach 18R: CWC - 022

Avg. Flow Depth=0.22' Max Vel=7.14 fps Inflow=0.92 cfs 0.071 af
12.0" Round Pipe n=0.020 L=122.6' S=0.1387 '/ Capacity=8.62 cfs Outflow=0.92 cfs 0.071 af

Total Runoff Area = 2.973 ac Runoff Volume = 0.154 af Average Runoff Depth = 0.62"
100.00% Pervious = 2.973 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 022-023) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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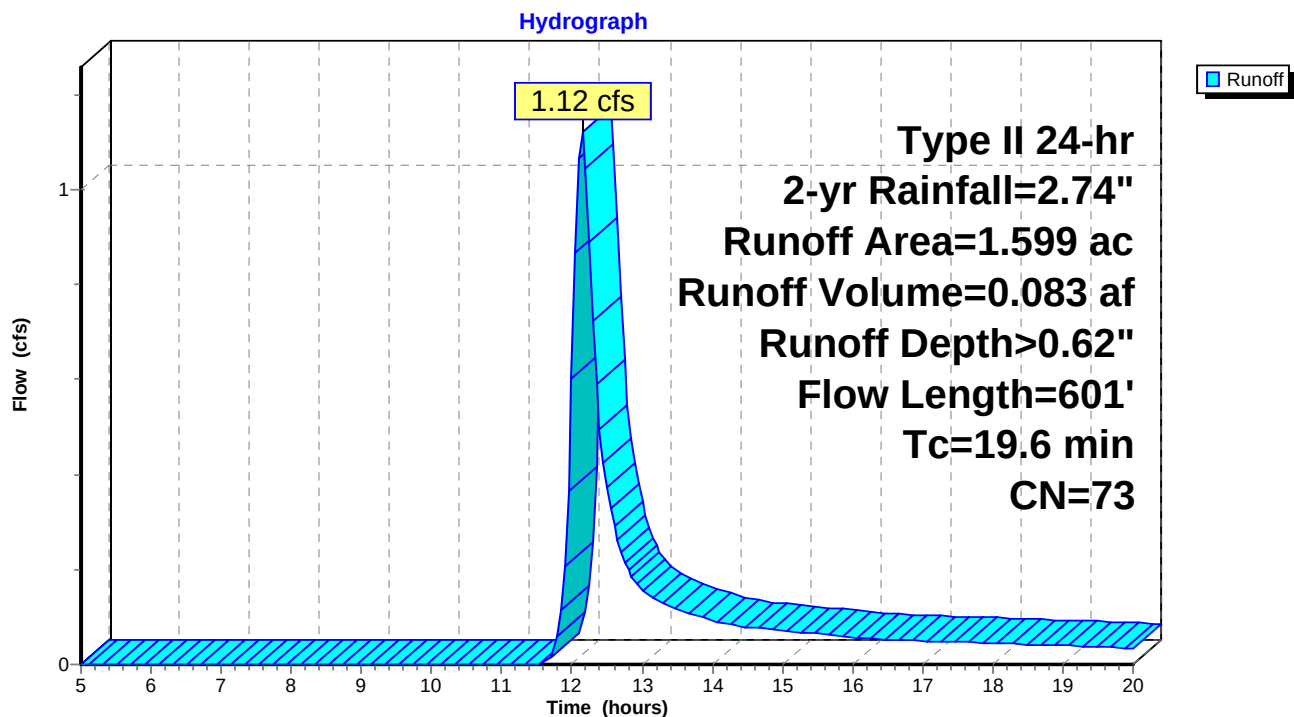
Summary for Subcatchment 15S: DC - 025

Runoff = 1.12 cfs @ 12.15 hrs, Volume= 0.083 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.74"

Area (ac)	CN	Description
0.766	73	Woods, Fair, HSG C
0.833	73	Woods, Fair, HSG C
1.599	73	Weighted Average
1.599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0575	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.74"
3.0	274	0.0958	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	227	0.0840	2.67	1.33	Channel Flow, Area= 0.5 sf Perim= 2.9' r= 0.17' n= 0.050
19.6	601	Total			

Subcatchment 15S: DC - 025

REL Flow Calcs (CWC 022-023) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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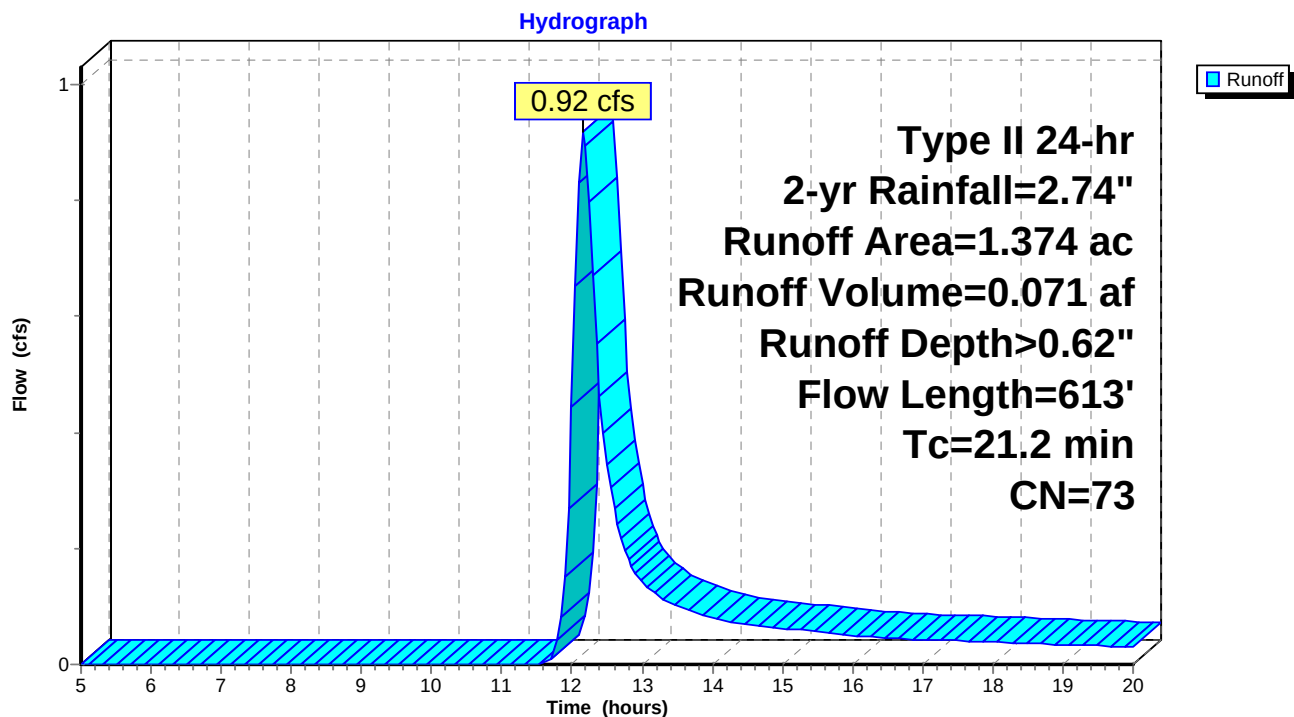
Summary for Subcatchment 16S: DC - 024

Runoff = 0.92 cfs @ 12.16 hrs, Volume= 0.071 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.74"

Area (ac)	CN	Description
0.799	73	Woods, Fair, HSG C
0.575	73	Woods, Fair, HSG C
1.374	73	Weighted Average
1.374		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.74"
3.5	273	0.0690	1.31		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.6	240	0.0710	2.51	1.26	Channel Flow, Area= 0.5 sf Perim= 2.8' r= 0.18' n= 0.050
21.2	613	Total			

Subcatchment 16S: DC - 024

REL Flow Calcs (CWC 022-023) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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Summary for Reach 17R: CWC - 023

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.599 ac, 0.00% Impervious, Inflow Depth > 0.62" for 2-yr event
Inflow = 1.12 cfs @ 12.15 hrs, Volume= 0.083 af
Outflow = 1.12 cfs @ 12.16 hrs, Volume= 0.083 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.31 fps, Min. Travel Time= 0.4 min

Avg. Velocity= 2.43 fps, Avg. Travel Time= 0.8 min

Peak Storage= 25 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.31'

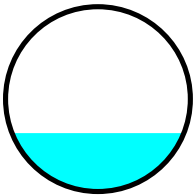
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.24 cfs

12.0" Round Pipe

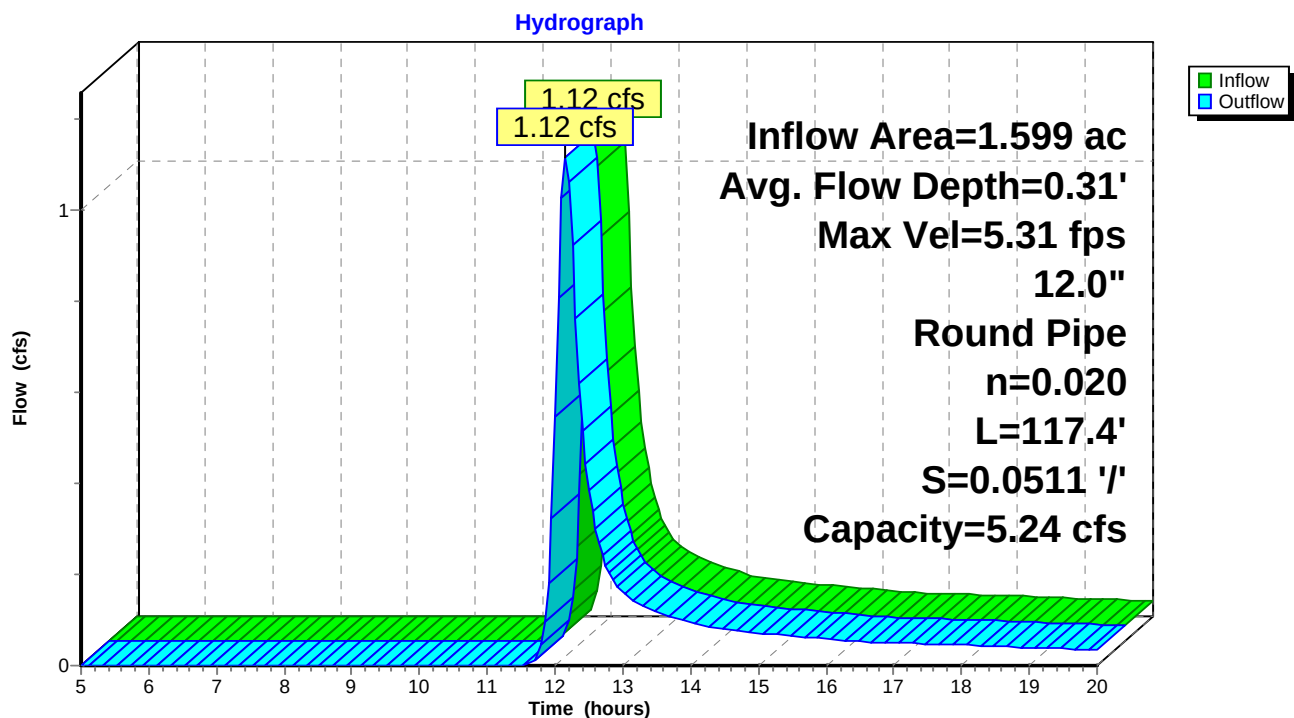
n= 0.020

Length= 117.4' Slope= 0.0511 '/'

Inlet Invert= 1,284.00', Outlet Invert= 1,278.00'



Reach 17R: CWC - 023



REL Flow Calcs (CWC 022-023) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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Summary for Reach 18R: CWC - 022

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.374 ac, 0.00% Impervious, Inflow Depth > 0.62" for 2-yr event
Inflow = 0.92 cfs @ 12.16 hrs, Volume= 0.071 af
Outflow = 0.92 cfs @ 12.17 hrs, Volume= 0.071 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.14 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 3.30 fps, Avg. Travel Time= 0.6 min

Peak Storage= 16 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.22'

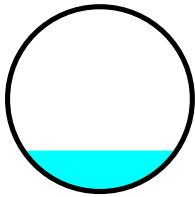
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.62 cfs

12.0" Round Pipe

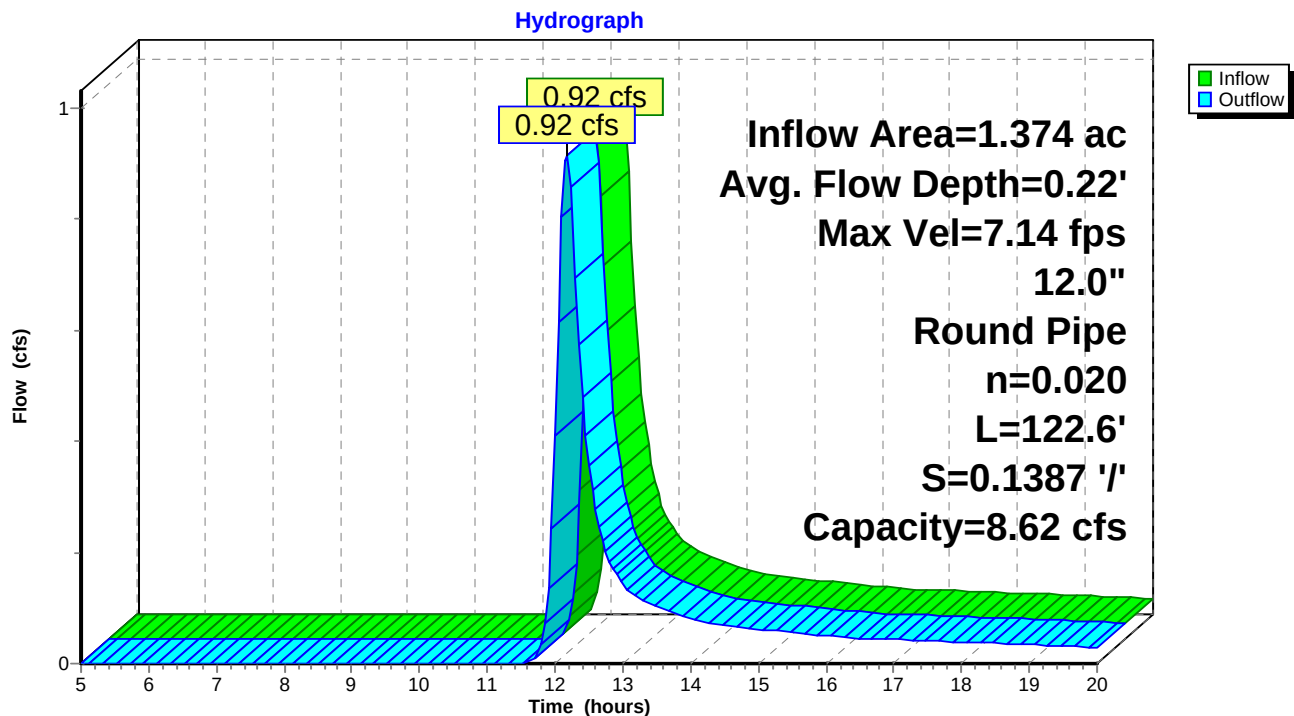
n= 0.020

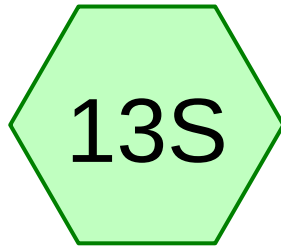
Length= 122.6' Slope= 0.1387 '/'

Inlet Invert= 1,286.00', Outlet Invert= 1,269.00'

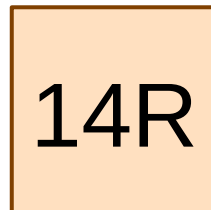


Reach 18R: CWC - 022

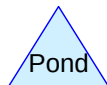
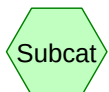




DC-026



CWC-024



REL Flow Calcs (CWC 024) - REV 2

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Page 2

Project Notes

Rainfall events imported from "REL Flow Calcs (CWC EL1 - EL2).hcp"

REL Flow Calcs (CWC 024) - REV 2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.344	73	Woods, Fair, HSG C (13S)
5.344	73	TOTAL AREA

REL Flow Calcs (CWC 024) - REV 2

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
5.344	HSG C	13S
0.000	HSG D	
0.000	Other	
5.344		TOTAL AREA

REL Flow Calcs (CWC 024) - REV 2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	5.344	0.000	0.000	5.344	Woods, Fair	13S
0.000	0.000	5.344	0.000	0.000	5.344	TOTAL AREA	

REL Flow Calcs (CWC 024) - REV 2

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	14R	1,230.00	1,221.00	118.7	0.0758	0.020	12.0	0.0	0.0

REL Flow Calcs (CWC 024) - REV 2*Type II 24-hr 2-yr Rainfall=2.74"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment13S: DC-026Runoff Area=5.344 ac 0.00% Impervious Runoff Depth>0.62"
Flow Length=1,167' Tc=21.2 min CN=73 Runoff=3.58 cfs 0.277 af**Reach 14R: CWC-024**Avg. Flow Depth=0.54' Max Vel=8.34 fps Inflow=3.58 cfs 0.277 af
12.0" Round Pipe n=0.020 L=118.7' S=0.0758 '/ Capacity=6.38 cfs Outflow=3.56 cfs 0.276 af**Total Runoff Area = 5.344 ac Runoff Volume = 0.277 af Average Runoff Depth = 0.62"**
100.00% Pervious = 5.344 ac 0.00% Impervious = 0.000 ac

REL Flow Calcs (CWC 024) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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Summary for Subcatchment 13S: DC-026

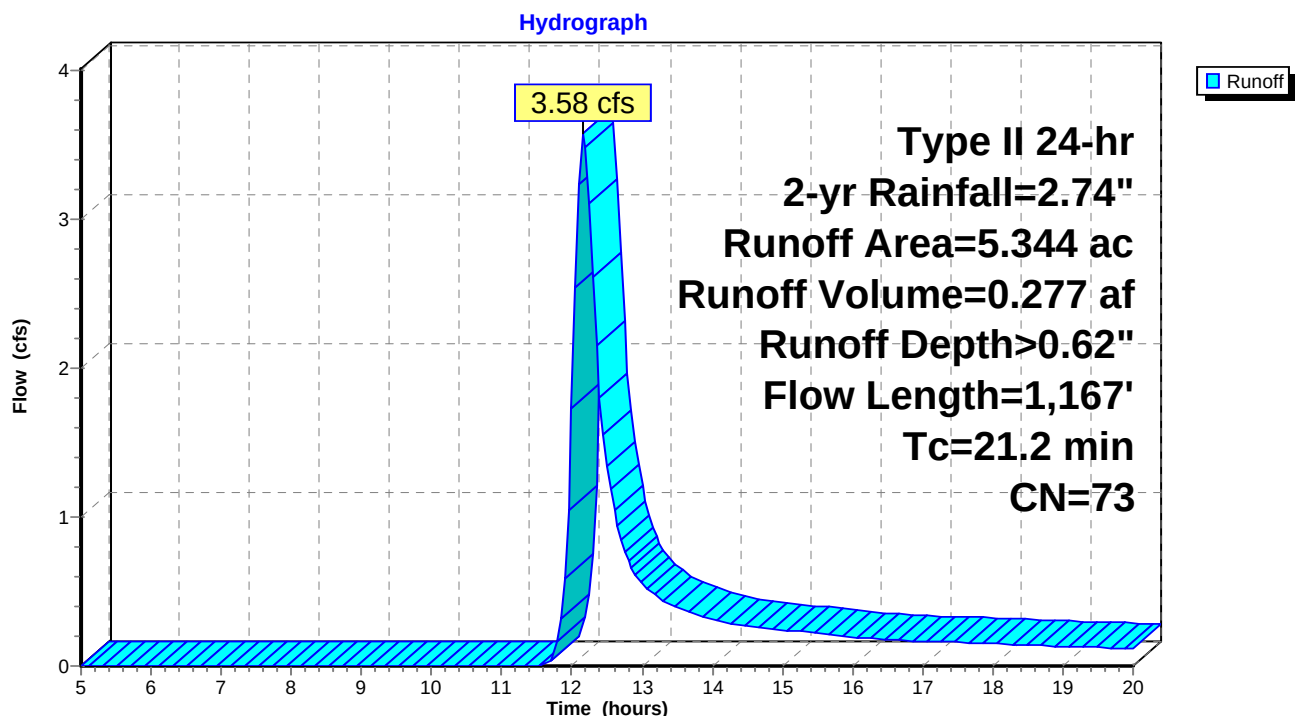
Runoff = 3.58 cfs @ 12.16 hrs, Volume= 0.277 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.74"

Area (ac)	CN	Description
4.615	73	Woods, Fair, HSG C
0.138	73	Woods, Fair, HSG C
0.197	73	Woods, Fair, HSG C
0.285	73	Woods, Fair, HSG C
0.109	73	Woods, Fair, HSG C
5.344	73	Weighted Average
5.344		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.1300	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.74"
3.6	437	0.1680	2.05		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.6	630	0.0160	1.60	1.60	Channel Flow, Area= 1.0 sf Perim= 3.6' r= 0.28' n= 0.050
21.2	1,167	Total			

CORRECT

Subcatchment 13S: DC-026

REL Flow Calcs (CWC 024) - REV 2

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Type II 24-hr 2-yr Rainfall=2.74"

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Summary for Reach 14R: CWC-024

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.344 ac, 0.00% Impervious, Inflow Depth > 0.62" for 2-yr event
Inflow = 3.58 cfs @ 12.16 hrs, Volume= 0.277 af
Outflow = 3.56 cfs @ 12.17 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 8.34 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 3.98 fps, Avg. Travel Time= 0.5 min

Peak Storage= 51 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.54'

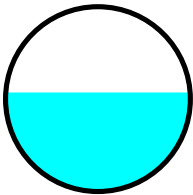
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.38 cfs

12.0" Round Pipe

n= 0.020

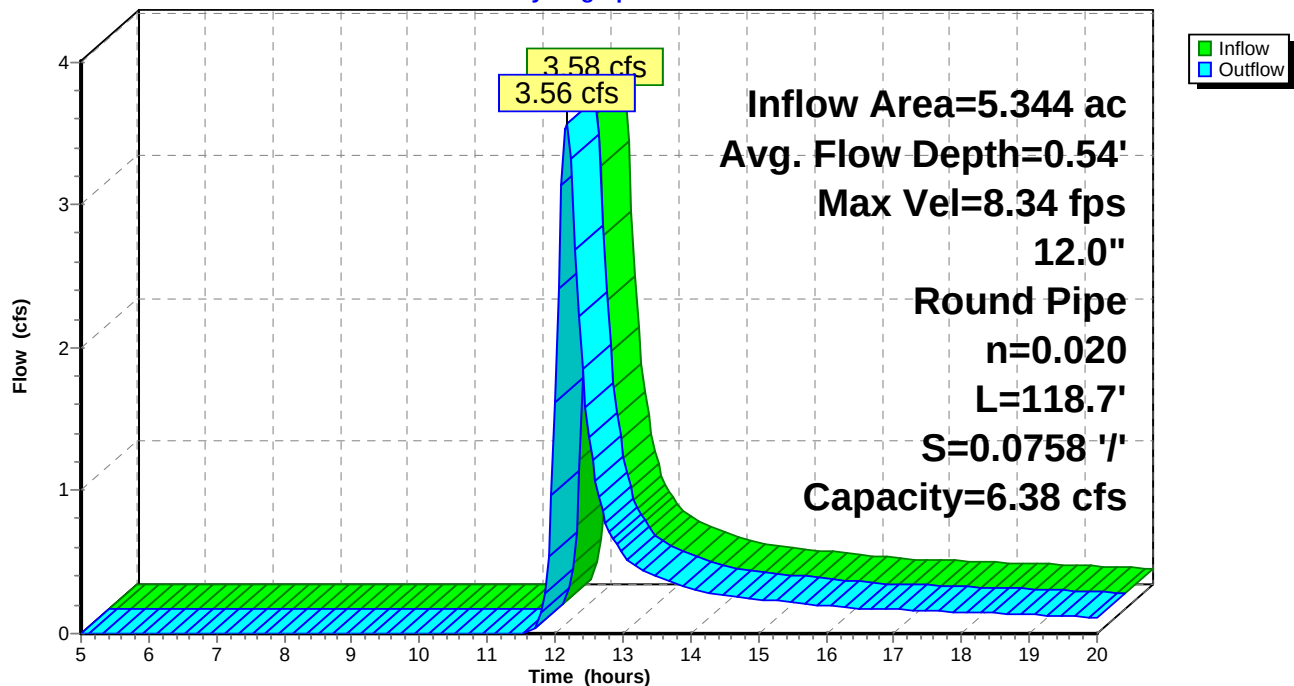
Length= 118.7' Slope= 0.0758 '/'

Inlet Invert= 1,230.00', Outlet Invert= 1,221.00'



Reach 14R: CWC-024

Hydrograph



ATTACHMENT 3.4
APRON DESIGN WORKSHEET

RIPRAP APRON WORKSHEET –
MLV-515RA20

STANDARD E&S WORKSHEET # 20 **Riprap Apron Outlet Protection**

PROJECT NAME: Williams REAE – MLV-515RA20

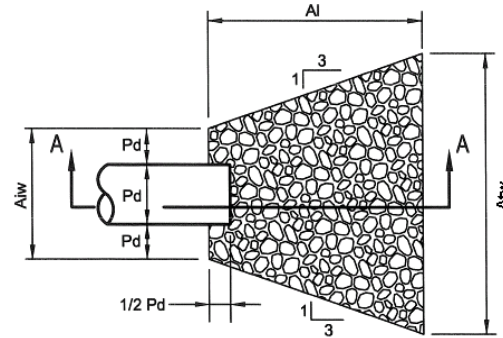
LOCATION: Luzerne County, PA

PREPARED BY: BM

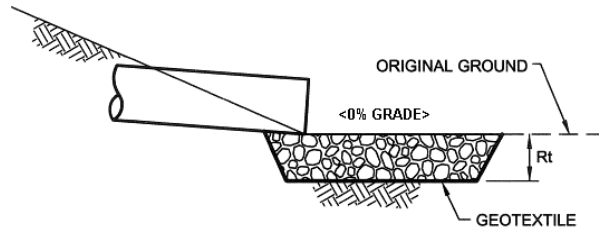
DATE: 07/08/2022

CHECKED BY: PW

DATE: 07/08/2022



PLAN VIEW

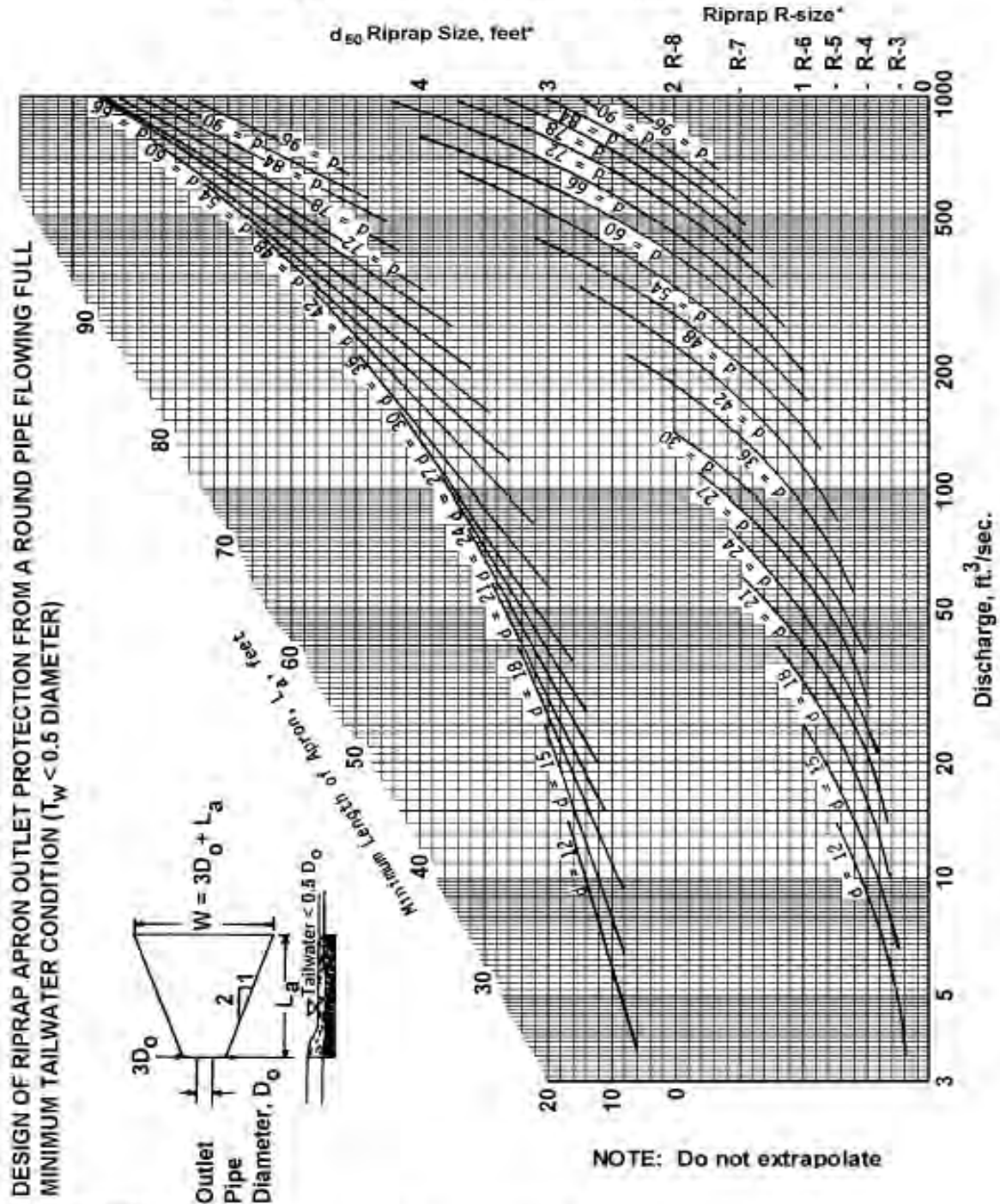


SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
OP1	REMOVED										
OP2	42	MIN	0.05	0.024	1.43	2.1	R-3	9	15	10.5	25.5
OP3	72	MIN	0.05	0.049	1.41	2.3	R-3	9	15	18	33
OP4	(10) -3"	MIN	0.01	0.25	2.03	2.91	R-3	9	6	33	39

***:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.**

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

RIPRAP APRON WORKSHEET –
LOWER DEMUNDS REL TIE-IN

STANDARD E&S WORKSHEET #20

Riprap Apron Outlet Protection

PROJECT NAME: Williams REAE – Lower Demunds REL Tie-in

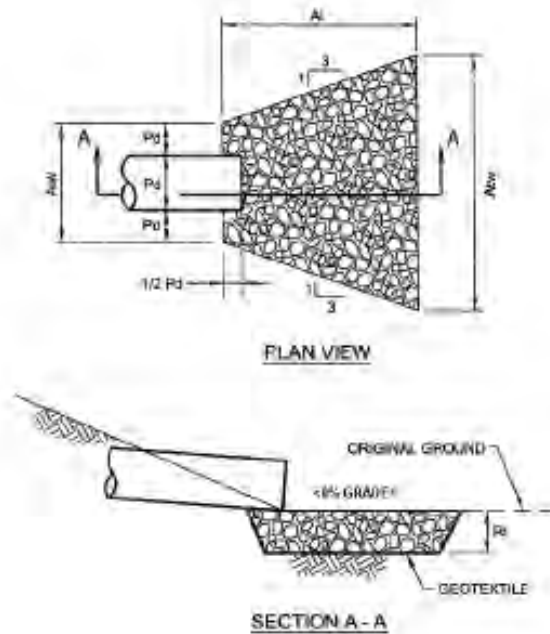
LOCATION: Dallas Township, Luzerne County, Pennsylvania

PREPARED BY: CD

DATE: 02/2021

CHECKED BY: PW

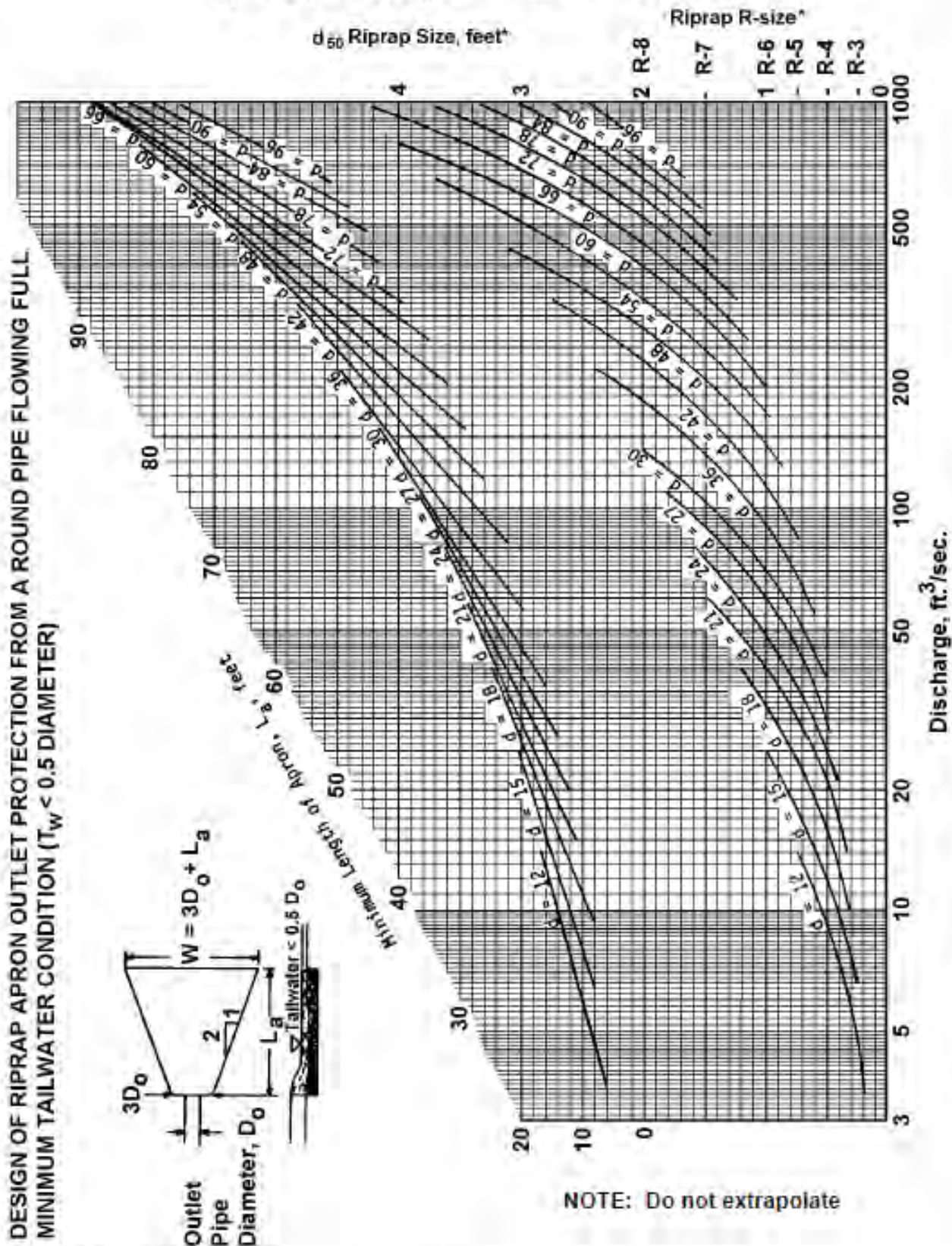
DATE: 02/2022



Location	Pipe Dia. Do (in)	Tail Water Cond. (Max or Min)	Man. "n" For Pipe	Pipe Slope (ft/ft)	Q (cfs)	V* (fps)	Riprap Size	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
Channel D2	12	MIN	0.04	0.02	1.57	2.6	R-3	9	6	3	7
Pad BMP	60	MIN	0.035	0.01	0.31	0.43	R-3	9	6	10	14

*: The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

ATTACHMENT 3.5
LEVEL SPREADER DESIGN WORKSHEET

Williams REAE - REL
LEVEL SPREADER DESIGN FOR CLEAN WATER CROSSINGS

Clean Water Crossing I.D.	NUMBER OF SLOPE PIPES	SLOPE PIPE DIAMETER (IN)	FLOW, Q, (CFS)	STATIC HEAD (FT)	MAJOR LOSSES (DUE TO FRICTION) AND MINOR LOSSES	EFFECTIVE HEAD (FT)	LEVEL SPREADER PIPE DIAMETER (IN)	PERFORATION DIAMETER (IN)	NUMBER OF PERFORATIONS PER LINEAR FOOT OF PIPE	ORIFICE AREA (FT ²)	ORIFICE COEFFICIENT (C _d)	Q _o (PERFORATION FLOW RATE, CFS)	Q _L DISCHARGE PER LINEAR FOOT (CFS/FT)	REQUIRED LENGTH (FT)	ACTUAL LENGTH (FT)	OVERALL LEVEL SPREADER CAPACITY (CFS)
REL-CWC-1	1	12	1.19	4	0.055	3.945	12	0.375	24	7.7E-04	0.60	0.0073	0.176	6.8	10	1.8
REL-CWC-2	1	12	1.04	10	0.040	9.960	12	0.375	24	7.7E-04	0.60	0.0116	0.280	3.7	5	1.4
REL-CWC-3	1	18	3.22	3	0.057	2.943	18	0.375	24	7.7E-04	0.60	0.0063	0.152	21.2	25	3.8
REL-CWC-4	1	12	4.67	5	0.108	4.892	12	0.375	24	7.7E-04	0.60	0.0082	0.196	23.8	25	4.9
REL-CWC-5	1	12	2.91	5	0.323	4.177	12	0.375	24	7.7E-04	0.60	0.0075	0.181	16.1	20	3.6
REL-CWC-6	1	12	1.63	7	0.091	6.909	12	0.375	24	7.7E-04	0.60	0.0097	0.233	7.0	10	2.3
REL-CWC-7	1	18	8.21	5	2.208	2.792	18	0.375	24	7.7E-04	0.60	0.0062	0.148	55.5	60	8.9
REL-CWC-8	1	12	2.22	5	0.029	4.471	12	0.375	24	7.7E-04	0.60	0.0078	0.187	11.9	15	2.8
REL-CWC-9	CROSSING WILL BE USING OUTLET BASIN															
REL-CWC-10	1	12	1.96	9	0.138	8.562	12	0.375	24	7.7E-04	0.60	0.0108	0.259	7.6	10	2.6
REL-CWC-11	1	12	2.71	16	0.251	15.749	12	0.375	24	7.7E-04	0.60	0.0146	0.352	7.7	10	3.5
REL-CWC-12	1	12	2.44	7	0.220	6.780	12	0.375	24	7.7E-04	0.60	0.0096	0.231	10.6	15	3.5
REL-CWC-13	CROSSING WILL BE USING OUTLET BASIN															
REL-CWC-14	1	12	5.53	15	1.062	13.938	12	0.375	24	7.7E-04	0.60	0.0138	0.331	16.7	20	6.6
REL-CWC-15	1	12	2.65	20	0.241	19.759	12	0.375	24	7.7E-04	0.60	0.0164	0.394	6.7	10	3.9
REL-CWC-16	1	12	1.14	16	0.047	15.953	12	0.375	24	7.7E-04	0.60	0.0147	0.354	3.2	5	1.8
REL-CWC-17	1	12	2.35	7	0.205	6.795	12	0.375	24	7.7E-04	0.60	0.0096	0.231	10.2	15	3.5
REL-CWC-18	1	12	5.46	19	0.978	18.022	12	0.375	24	7.7E-04	0.60	0.0157	0.376	14.5	15	5.6
REL-CWC-19	CROSSING WILL BE USING OUTLET BASIN															
REL-CWC-20	CROSSING WILL BE USING OUTLET BASIN															
REL-CWC-21	1	12	5.94	14	1.003	12.997	12	0.375	24	7.7E-04	0.60	0.0133	0.319	18.6	20	6.4
REL-CWC-22	1	12	0.92	17	0.032	16.968	12	0.375	24	7.7E-04	0.60	0.0152	0.365	2.5	5	1.8
REL-CWC-23	1	12	1.12	6	0.049	5.951	12	0.375	24	7.7E-04	0.60	0.0090	0.216	5.2	10	2.2
REL-CWC-24	1	12	3.58	9	0.475	8.525	12	0.375	24	7.7E-04	0.60	0.0108	0.259	13.8	15	3.9

ATTACHMENT 3.6
EROSION CONTROL BLANKET REPORTS



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 www.nagreen.com
 ECMDS v7.0

SPILLWAY ANALYSIS

> > > Carverton Berm

Name Carverton Berm
 Discharge 2.24
 Peak Flow Period 11.96
 Channel Slope 0.5
 Channel Bottom Width 15
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.24 cfs	3.77 ft/s	0.04 ft	0.032	2 lbs/ft ²	1.23 lbs/ft ²	1.62	STABLE	D
Underlying Substrate	Straight	2.24 cfs	3.77 ft/s	0.04 ft	0.032	1.47 lbs/ft ²	1.23 lbs/ft ²	1.19	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.24 cfs	3.28 ft/s	0.05 ft	0.041	4 lbs/ft ²	1.42 lbs/ft ²	2.81	STABLE	--
Underlying Substrate	Straight	2.24 cfs	3.28 ft/s	0.05 ft	0.041	2.18 lbs/ft ²	1.41 lbs/ft ²	1.54	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-001

Name REL-DC-001
 Discharge 0.73
 Channel Slope 0.01
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.73 cfs	1.06 ft/s	0.27 ft	0.05	2 lbs/ft ²	0.17 lbs/ft ²	11.88	STABLE	D
Underlying Substrate	Straight	0.73 cfs	1.06 ft/s	0.27 ft	0.05	1.47 lbs/ft ²	0.13 lbs/ft ²	10.99	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.73 cfs	1.06 ft/s	0.27 ft	0.05	4 lbs/ft ²	0.17 lbs/ft ²	23.77	STABLE	--
Underlying Substrate	Straight	0.73 cfs	1.06 ft/s	0.27 ft	0.05	4 lbs/ft ²	0.13 lbs/ft ²	30.01	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-002

Name REL-DC-002
 Discharge 0.56
 Channel Slope 0.02
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.56 cfs	1.23 ft/s	0.19 ft	0.05	2 lbs/ft ²	0.24 lbs/ft ²	8.41	STABLE	D
Underlying Substrate	Straight	0.56 cfs	1.23 ft/s	0.19 ft	0.05	1.47 lbs/ft ²	0.2 lbs/ft ²	7.38	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.56 cfs	1.23 ft/s	0.19 ft	0.05	4 lbs/ft ²	0.24 lbs/ft ²	16.82	STABLE	--
Underlying Substrate	Straight	0.56 cfs	1.23 ft/s	0.19 ft	0.05	4 lbs/ft ²	0.2 lbs/ft ²	20.15	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-003

Name REL-DC-003
 Discharge 1.16
 Channel Slope 0.038
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.16 cfs	1.94 ft/s	0.24 ft	0.05	2 lbs/ft2	0.57 lbs/ft2	3.51	STABLE	D
Underlying Substrate	Straight	1.16 cfs	1.94 ft/s	0.24 ft	0.05	1.47 lbs/ft2	0.46 lbs/ft2	3.18	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.16 cfs	1.94 ft/s	0.24 ft	0.05	4 lbs/ft2	0.57 lbs/ft2	7.01	STABLE	--
Underlying Substrate	Straight	1.16 cfs	1.94 ft/s	0.24 ft	0.05	4 lbs/ft2	0.46 lbs/ft2	8.69	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-004

Name REL-DC-004
 Discharge 3.57
 Channel Slope 0.021
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.57 cfs	2.32 ft/s	0.51 ft	0.047	2 lbs/ft2	0.67 lbs/ft2	2.99	STABLE	D
Underlying Substrate	Straight	3.57 cfs	2.32 ft/s	0.51 ft	0.047	1.47 lbs/ft2	0.47 lbs/ft2	3.11	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.57 cfs	2.32 ft/s	0.51 ft	0.047	4 lbs/ft2	0.67 lbs/ft2	5.99	STABLE	--
Underlying Substrate	Straight	3.57 cfs	2.32 ft/s	0.51 ft	0.047	4 lbs/ft2	0.47 lbs/ft2	8.49	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-005

Name REL-DC-005
 Discharge 5.15
 Channel Slope 0.012
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	5.15 cfs	2.2 ft/s	0.69 ft	0.044	2 lbs/ft ²	0.52 lbs/ft ²	3.87	STABLE	D
Underlying Substrate	Straight	5.15 cfs	2.2 ft/s	0.69 ft	0.044	1.47 lbs/ft ²	0.34 lbs/ft ²	4.27	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	5.15 cfs	2.2 ft/s	0.69 ft	0.044	4 lbs/ft ²	0.52 lbs/ft ²	7.74	STABLE	--
Underlying Substrate	Straight	5.15 cfs	2.2 ft/s	0.69 ft	0.044	4 lbs/ft ²	0.34 lbs/ft ²	11.65	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-006

Name REL-DC-006
 Discharge 3.08
 Channel Slope 0.019
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.08 cfs	2.05 ft/s	0.5 ft	0.05	2 lbs/ft2	0.59 lbs/ft2	3.38	STABLE	D
Underlying Substrate	Straight	3.08 cfs	2.05 ft/s	0.5 ft	0.05	1.47 lbs/ft2	0.42 lbs/ft2	3.49	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.08 cfs	2.05 ft/s	0.5 ft	0.05	4 lbs/ft2	0.59 lbs/ft2	6.76	STABLE	--
Underlying Substrate	Straight	3.08 cfs	2.05 ft/s	0.5 ft	0.05	4 lbs/ft2	0.42 lbs/ft2	9.54	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-007-RA

Name REL-DC-007-RA
 Discharge 0.99
 Channel Slope 0.168
 Channel Bottom Width 1
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.99 cfs	4.71 ft/s	0.16 ft	0.032	2 lbs/ft2	1.67 lbs/ft2	1.2	STABLE	D
Underlying Substrate	Straight	0.99 cfs	4.71 ft/s	0.16 ft	0.032	1.47 lbs/ft2	1.28 lbs/ft2	1.14	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.99 cfs	3.99 ft/s	0.18 ft	0.041	4 lbs/ft2	1.91 lbs/ft2	2.1	STABLE	--
Underlying Substrate	Straight	0.99 cfs	3.99 ft/s	0.18 ft	0.041	4 lbs/ft2	1.43 lbs/ft2	2.79	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-007-RB

Name REL-DC-007-RB
 Discharge 1.69
 Channel Slope 0.038
 Channel Bottom Width 1
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.69 cfs	2.35 ft/s	0.4 ft	0.05	2 lbs/ft2	0.95 lbs/ft2	2.11	STABLE	D
Underlying Substrate	Straight	1.69 cfs	2.35 ft/s	0.4 ft	0.05	1.47 lbs/ft2	0.61 lbs/ft2	2.39	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.69 cfs	2.35 ft/s	0.4 ft	0.05	4 lbs/ft2	0.95 lbs/ft2	4.22	STABLE	--
Underlying Substrate	Straight	1.69 cfs	2.35 ft/s	0.4 ft	0.05	4 lbs/ft2	0.61 lbs/ft2	6.54	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-008

Name REL-DC-008
 Discharge 3.29
 Channel Slope 0.015
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.29 cfs	2.01 ft/s	0.53 ft	0.047	2 lbs/ft2	0.5 lbs/ft2	4	STABLE	D
Underlying Substrate	Straight	3.29 cfs	2.01 ft/s	0.53 ft	0.047	1.47 lbs/ft2	0.35 lbs/ft2	4.2	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.29 cfs	2.01 ft/s	0.53 ft	0.047	4 lbs/ft2	0.5 lbs/ft2	8.01	STABLE	--
Underlying Substrate	Straight	3.29 cfs	2.01 ft/s	0.53 ft	0.047	4 lbs/ft2	0.35 lbs/ft2	11.45	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-009

Name REL-DC-009
 Discharge 2.54
 Channel Slope 0.03
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.54 cfs	2.28 ft/s	0.4 ft	0.05	2 lbs/ft ²	0.75 lbs/ft ²	2.68	STABLE	D
Underlying Substrate	Straight	2.54 cfs	2.28 ft/s	0.4 ft	0.05	1.47 lbs/ft ²	0.55 lbs/ft ²	2.66	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.54 cfs	2.28 ft/s	0.4 ft	0.05	4 lbs/ft ²	0.75 lbs/ft ²	5.36	STABLE	--
Underlying Substrate	Straight	2.54 cfs	2.28 ft/s	0.4 ft	0.05	4 lbs/ft ²	0.55 lbs/ft ²	7.25	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-010

Name REL-DC-010
 Discharge 7.78
 Channel Slope 0.053
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	7.78 cfs	5.22 ft/s	0.5 ft	0.033	2 lbs/ft ²	1.64 lbs/ft ²	1.22	STABLE	D
Underlying Substrate	Straight	7.78 cfs	5.22 ft/s	0.5 ft	0.033	1.47 lbs/ft ²	1.17 lbs/ft ²	1.26	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	7.78 cfs	4.35 ft/s	0.57 ft	0.042	4 lbs/ft ²	1.88 lbs/ft ²	2.13	STABLE	--
Underlying Substrate	Straight	7.78 cfs	4.35 ft/s	0.57 ft	0.042	4 lbs/ft ²	1.3 lbs/ft ²	3.08	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-011

Name REL-DC-011
 Discharge 2.11
 Channel Slope 0.017
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.11 cfs	1.77 ft/s	0.42 ft	0.05	2 lbs/ft2	0.45 lbs/ft2	4.49	STABLE	D
Underlying Substrate	Straight	2.11 cfs	1.77 ft/s	0.42 ft	0.05	1.47 lbs/ft2	0.33 lbs/ft2	4.49	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.11 cfs	1.77 ft/s	0.42 ft	0.05	4 lbs/ft2	0.45 lbs/ft2	8.97	STABLE	--
Underlying Substrate	Straight	2.11 cfs	1.77 ft/s	0.42 ft	0.05	4 lbs/ft2	0.33 lbs/ft2	12.25	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-012

Name REL-DC-012
 Discharge 2.84
 Channel Slope 0.026
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.84 cfs	2.24 ft/s	0.44 ft	0.05	2 lbs/ft2	0.71 lbs/ft2	2.8	STABLE	D
Underlying Substrate	Straight	2.84 cfs	2.24 ft/s	0.44 ft	0.05	1.47 lbs/ft2	0.52 lbs/ft2	2.83	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.84 cfs	2.24 ft/s	0.44 ft	0.05	4 lbs/ft2	0.71 lbs/ft2	5.61	STABLE	--
Underlying Substrate	Straight	2.84 cfs	2.24 ft/s	0.44 ft	0.05	4 lbs/ft2	0.52 lbs/ft2	7.72	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-013

Name REL-DC-013
 Discharge 1.3
 Channel Slope 0.022
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.3 cfs	1.67 ft/s	0.3 ft	0.05	2 lbs/ft ²	0.41 lbs/ft ²	4.86	STABLE	D
Underlying Substrate	Straight	1.3 cfs	1.67 ft/s	0.3 ft	0.05	1.47 lbs/ft ²	0.32 lbs/ft ²	4.58	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.3 cfs	1.67 ft/s	0.3 ft	0.05	4 lbs/ft ²	0.41 lbs/ft ²	9.73	STABLE	--
Underlying Substrate	Straight	1.3 cfs	1.67 ft/s	0.3 ft	0.05	4 lbs/ft ²	0.32 lbs/ft ²	12.5	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-014

Name REL-DC-014
 Discharge 1.27
 Channel Slope 0.021
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.27 cfs	1.63 ft/s	0.3 ft	0.05	2 lbs/ft ²	0.39 lbs/ft ²	5.1	STABLE	D
Underlying Substrate	Straight	1.27 cfs	1.63 ft/s	0.3 ft	0.05	1.47 lbs/ft ²	0.31 lbs/ft ²	4.8	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.27 cfs	1.63 ft/s	0.3 ft	0.05	4 lbs/ft ²	0.39 lbs/ft ²	10.19	STABLE	--
Underlying Substrate	Straight	1.27 cfs	1.63 ft/s	0.3 ft	0.05	4 lbs/ft ²	0.31 lbs/ft ²	13.1	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-015

Name REL-DC-015
 Discharge 8.08
 Channel Slope 0.02
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	8.08 cfs	2.86 ft/s	0.79 ft	0.047	2 lbs/ft2	0.99 lbs/ft2	2.03	STABLE	D
Underlying Substrate	Straight	8.08 cfs	2.86 ft/s	0.79 ft	0.047	1.47 lbs/ft2	0.64 lbs/ft2	2.3	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	8.08 cfs	2.86 ft/s	0.79 ft	0.047	4 lbs/ft2	0.99 lbs/ft2	4.06	STABLE	--
Underlying Substrate	Straight	8.08 cfs	2.86 ft/s	0.79 ft	0.047	4 lbs/ft2	0.64 lbs/ft2	6.27	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-016

Name REL-DC-016
 Discharge 5.83
 Channel Slope 0.041
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	5.83 cfs	3.33 ft/s	0.56 ft	0.048	2 lbs/ft ²	1.43 lbs/ft ²	1.4	STABLE	D
Underlying Substrate	Straight	5.83 cfs	3.33 ft/s	0.56 ft	0.048	1.47 lbs/ft ²	0.99 lbs/ft ²	1.48	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	5.83 cfs	3.33 ft/s	0.56 ft	0.048	4 lbs/ft ²	1.43 lbs/ft ²	2.79	STABLE	--
Underlying Substrate	Straight	5.83 cfs	3.33 ft/s	0.56 ft	0.048	4 lbs/ft ²	0.99 lbs/ft ²	4.03	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-017

Name REL-DC-017
 Discharge 2.95
 Channel Slope 0.053
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.95 cfs	2.91 ft/s	0.37 ft	0.05	2 lbs/ft2	1.22 lbs/ft2	1.63	STABLE	D
Underlying Substrate	Straight	2.95 cfs	2.91 ft/s	0.37 ft	0.05	1.47 lbs/ft2	0.92 lbs/ft2	1.6	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.95 cfs	2.91 ft/s	0.37 ft	0.05	4 lbs/ft2	1.22 lbs/ft2	3.27	STABLE	--
Underlying Substrate	Straight	2.95 cfs	2.91 ft/s	0.37 ft	0.05	4 lbs/ft2	0.92 lbs/ft2	4.36	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-018

Name REL-DC-018
 Discharge 1.31
 Channel Slope 0.037
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.31 cfs	2 ft/s	0.26 ft	0.05	2 lbs/ft2	0.6 lbs/ft2	3.34	STABLE	D
Underlying Substrate	Straight	1.31 cfs	2 ft/s	0.26 ft	0.05	1.47 lbs/ft2	0.48 lbs/ft2	3.07	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.31 cfs	2 ft/s	0.26 ft	0.05	4 lbs/ft2	0.6 lbs/ft2	6.67	STABLE	--
Underlying Substrate	Straight	1.31 cfs	2 ft/s	0.26 ft	0.05	4 lbs/ft2	0.48 lbs/ft2	8.37	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-019

Name REL-DC-019
 Discharge 2.55
 Channel Slope 0.021
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.55 cfs	2.01 ft/s	0.44 ft	0.05	2 lbs/ft2	0.58 lbs/ft2	3.47	STABLE	D
Underlying Substrate	Straight	2.55 cfs	2.01 ft/s	0.44 ft	0.05	1.47 lbs/ft2	0.42 lbs/ft2	3.5	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.55 cfs	2.01 ft/s	0.44 ft	0.05	4 lbs/ft2	0.58 lbs/ft2	6.94	STABLE	--
Underlying Substrate	Straight	2.55 cfs	2.01 ft/s	0.44 ft	0.05	4 lbs/ft2	0.42 lbs/ft2	9.56	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-020

Name REL-DC-020
 Discharge 5.87
 Channel Slope 0.008
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	5.87 cfs	2.04 ft/s	0.8 ft	0.042	2 lbs/ft ²	0.4 lbs/ft ²	5.01	STABLE	D
Underlying Substrate	Straight	5.87 cfs	2.04 ft/s	0.8 ft	0.042	1.47 lbs/ft ²	0.26 lbs/ft ²	5.68	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	5.87 cfs	2.04 ft/s	0.8 ft	0.042	4 lbs/ft ²	0.4 lbs/ft ²	10.02	STABLE	--
Underlying Substrate	Straight	5.87 cfs	2.04 ft/s	0.8 ft	0.042	4 lbs/ft ²	0.26 lbs/ft ²	15.52	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-021

Name REL-DC-021
 Discharge 3.28
 Channel Slope 0.01
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.28 cfs	1.79 ft/s	0.58 ft	0.045	2 lbs/ft2	0.36 lbs/ft2	5.53	STABLE	D
Underlying Substrate	Straight	3.28 cfs	1.79 ft/s	0.58 ft	0.045	1.47 lbs/ft2	0.25 lbs/ft2	5.89	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.28 cfs	1.79 ft/s	0.58 ft	0.045	4 lbs/ft2	0.36 lbs/ft2	11.05	STABLE	--
Underlying Substrate	Straight	3.28 cfs	1.79 ft/s	0.58 ft	0.045	4 lbs/ft2	0.25 lbs/ft2	16.07	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-022

Name REL-DC-022
 Discharge 11.68
 Channel Slope 0.044
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	11.68 cfs	5.01 ft/s	0.69 ft	0.037	2 lbs/ft2	1.89 lbs/ft2	1.06	STABLE	D
Underlying Substrate	Straight	11.68 cfs	5.01 ft/s	0.69 ft	0.037	1.47 lbs/ft2	1.26 lbs/ft2	1.16	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	11.68 cfs	5.01 ft/s	0.69 ft	0.037	4 lbs/ft2	1.89 lbs/ft2	2.11	STABLE	--
Underlying Substrate	Straight	11.68 cfs	5.01 ft/s	0.69 ft	0.037	3.74 lbs/ft2	1.26 lbs/ft2	2.97	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-023

Name REL-DC-023
 Discharge 1.56
 Channel Slope 0.069
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.56 cfs	2.61 ft/s	0.24 ft	0.05	2 lbs/ft2	1.03 lbs/ft2	1.93	STABLE	D
Underlying Substrate	Straight	1.56 cfs	2.61 ft/s	0.24 ft	0.05	1.47 lbs/ft2	0.83 lbs/ft2	1.76	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.56 cfs	2.61 ft/s	0.24 ft	0.05	4 lbs/ft2	1.03 lbs/ft2	3.87	STABLE	--
Underlying Substrate	Straight	1.56 cfs	2.61 ft/s	0.24 ft	0.05	4 lbs/ft2	0.83 lbs/ft2	4.8	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-024

Name REL-DC-024
 Discharge 2.55
 Channel Slope 0.036
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	2.55 cfs	2.43 ft/s	0.38 ft	0.05	2 lbs/ft2	0.85 lbs/ft2	2.35	STABLE	D
Underlying Substrate	Straight	2.55 cfs	2.43 ft/s	0.38 ft	0.05	1.47 lbs/ft2	0.64 lbs/ft2	2.3	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	2.55 cfs	2.43 ft/s	0.38 ft	0.05	4 lbs/ft2	0.85 lbs/ft2	4.69	STABLE	--
Underlying Substrate	Straight	2.55 cfs	2.43 ft/s	0.38 ft	0.05	4 lbs/ft2	0.64 lbs/ft2	6.29	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-025

Name REL-DC-025
 Discharge 1.05
 Channel Slope 0.071
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.05 cfs	2.32 ft/s	0.19 ft	0.05	2 lbs/ft2	0.84 lbs/ft2	2.38	STABLE	D
Underlying Substrate	Straight	1.05 cfs	2.32 ft/s	0.19 ft	0.05	1.47 lbs/ft2	0.7 lbs/ft2	2.08	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.05 cfs	2.32 ft/s	0.19 ft	0.05	4 lbs/ft2	0.84 lbs/ft2	4.75	STABLE	--
Underlying Substrate	Straight	1.05 cfs	2.32 ft/s	0.19 ft	0.05	4 lbs/ft2	0.7 lbs/ft2	5.69	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-026

Name REL-DC-026
 Discharge 1.25
 Channel Slope 0.084
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.25 cfs	2.6 ft/s	0.2 ft	0.05	2 lbs/ft2	1.05 lbs/ft2	1.91	STABLE	D
Underlying Substrate	Straight	1.25 cfs	2.6 ft/s	0.2 ft	0.05	1.47 lbs/ft2	0.87 lbs/ft2	1.68	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.25 cfs	2.6 ft/s	0.2 ft	0.05	4 lbs/ft2	1.05 lbs/ft2	3.81	STABLE	--
Underlying Substrate	Straight	1.25 cfs	2.6 ft/s	0.2 ft	0.05	4 lbs/ft2	0.87 lbs/ft2	4.6	STABLE	--



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CHANNEL ANALYSIS

> > REL-DC-027

Name REL-DC-027
 Discharge 1.54
 Channel Slope 0.016
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.54 cfs	1.57 ft/s	0.36 ft	0.05	2 lbs/ft ²	0.36 lbs/ft ²	5.57	STABLE	D
Underlying Substrate	Straight	1.54 cfs	1.57 ft/s	0.36 ft	0.05	1.47 lbs/ft ²	0.27 lbs/ft ²	5.42	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.54 cfs	1.57 ft/s	0.36 ft	0.05	4 lbs/ft ²	0.36 lbs/ft ²	11.15	STABLE	--
Underlying Substrate	Straight	1.54 cfs	1.57 ft/s	0.36 ft	0.05	4 lbs/ft ²	0.27 lbs/ft ²	14.79	STABLE	--



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SLOPE ANALYSIS

> > > STA 89+22 to 92+72

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	350
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	11.66
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 350 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.5 in	0.0 in	0.8 in	0.0 in	0.25 in	9.383	STABLE	C
Estb. Veg.	0.3 in	0.0 in	N/A in	N/A in	0.03 in	>10	STABLE	--



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SLOPE ANALYSIS

> > > STA 190+00 to 193+61

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	361
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	5.16
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 361 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.8 in	0.1 in	3.0 in	0.1 in	0.25 in	1.688	STABLE	C
Estb. Veg.	1.1 in	0.0 in	N/A in	N/A in	0.03 in	3.529	STABLE	--



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SLOPE ANALYSIS

> > > STA 339+07 to 339+57

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	50
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.35
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 50 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.1 in	0.0 in	2.0 in	0.1 in	0.25 in	3.068	STABLE	C
Estb. Veg.	1.3 in	0.0 in	N/A in	N/A in	0.03 in	2.81	STABLE	--



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SLOPE ANALYSIS

> > > STA 406+20 to 408+50

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	252
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	5.04
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 252 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.4 in	0.1 in	2.3 in	0.1 in	0.25 in	2.417	STABLE	C
Estb. Veg.	0.9 in	0.0 in	N/A in	N/A in	0.03 in	4.01	STABLE	--



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SLOPE ANALYSIS

> > > STA 431+40 to 433+00

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	165
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	5.89
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 165 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.8 in	0.0 in	1.4 in	0.1 in	0.25 in	4.945	STABLE	C
Estb. Veg.	0.6 in	0.0 in	N/A in	N/A in	0.03 in	5.873	STABLE	--



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SLOPE ANALYSIS

> > > STA 512+66 to 513+50

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	84
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.71
Soil Type	Sandy Loam
K Factor	0.19

Reach 1

Start: 0ft End: 84 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.9 in	0.0 in	1.6 in	0.1 in	0.25 in	4.228	STABLE	D
Estb. Veg.	0.9 in	0.0 in	N/A in	N/A in	0.03 in	4.157	STABLE	--



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SLOPE ANALYSIS

> > > STA 572+75 to 572+90

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	44
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.69
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 44 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.9 in	0.0 in	1.6 in	0.1 in	0.25 in	4.107	STABLE	C
Estb. Veg.	1.1 in	0.0 in	N/A in	N/A in	0.03 in	3.394	STABLE	--



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SLOPE ANALYSIS

> > > STA 592+80 to 593+72

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	92
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.87
Soil Type	Sandy Loam
K Factor	0.19

Reach 1

Start: 0ft End: 92 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.7 in	0.0 in	1.1 in	0.0 in	0.25 in	6.492	STABLE	D
Estb. Veg.	0.6 in	0.0 in	N/A in	N/A in	0.03 in	6.022	STABLE	--



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SLOPE ANALYSIS

> > > STA 619+60 to 620+20

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	34
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.25
Soil Type	Sandy Loam
K Factor	0.19

Reach 1

Start: 0ft End: 34 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.5 in	0.0 in	0.9 in	0.0 in	0.25 in	9.313	STABLE	D
Estb. Veg.	0.6 in	0.0 in	N/A in	N/A in	0.03 in	5.892	STABLE	--



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SLOPE ANALYSIS

> > > STA 664+00 to 664+50

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	54
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.74
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 54 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.1 in	0.0 in	1.9 in	0.1 in	0.25 in	3.33	STABLE	C
Estb. Veg.	1.2 in	0.0 in	N/A in	N/A in	0.03 in	3.087	STABLE	--



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SLOPE ANALYSIS

> > > STA 852+55 to 854+00

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	155
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	3.87
Soil Type	Sandy Loam
K Factor	0.19

Reach 1

Start: 0ft End: 155 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.7 in	0.0 in	1.3 in	0.0 in	0.25 in	5.633	STABLE	D
Estb. Veg.	0.6 in	0.0 in	N/A in	N/A in	0.03 in	6.347	STABLE	--



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SLOPE ANALYSIS

> > > STA 870+50 to 871+30

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	80
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.66
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 80 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.1 in	0.0 in	1.9 in	0.1 in	0.25 in	3.298	STABLE	C
Estb. Veg.	1.1 in	0.0 in	N/A in	N/A in	0.03 in	3.472	STABLE	--



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SLOPE ANALYSIS

> > > STA 889+90 to 890+37

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	47
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.13
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 47 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.8 in	0.0 in	1.5 in	0.1 in	0.25 in	4.663	STABLE	C
Estb. Veg.	1.0 in	0.0 in	N/A in	N/A in	0.03 in	3.824	STABLE	--



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 Poseyville, Indiana 47633
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 >Fax 812.867.0247
 www.nagreen.com
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SLOPE ANALYSIS

> > > STA 966+44 to 966+92

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	48
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.65
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 48 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.0 in	0.0 in	1.8 in	0.1 in	0.25 in	3.656	STABLE	C
Estb. Veg.	1.2 in	0.0 in	N/A in	N/A in	0.03 in	3.189	STABLE	--



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SLOPE ANALYSIS

> > > STA 990+27 to 991+65

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	137
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	3.7
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 137 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.2 in	0.1 in	2.1 in	0.1 in	0.25 in	2.84	STABLE	C
Estb. Veg.	1.0 in	0.0 in	N/A in	N/A in	0.03 in	3.689	STABLE	--



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SLOPE ANALYSIS

> > > STA 1066+00 to 1066+60

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	73
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	3.13
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 73 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.9 in	0.0 in	1.5 in	0.1 in	0.25 in	4.471	STABLE	C
Estb. Veg.	0.9 in	0.0 in	N/A in	N/A in	0.03 in	4.228	STABLE	--



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SLOPE ANALYSIS

> > > STA 1144+10 to 1144+61

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	51
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.83
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 51 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.7 in	0.0 in	1.2 in	0.0 in	0.25 in	5.779	STABLE	C
Estb. Veg.	0.8 in	0.0 in	N/A in	N/A in	0.03 in	4.616	STABLE	--



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SLOPE ANALYSIS

> > > STA 1153+70 to 1156+50

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	266
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	4.22
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 266 ft

Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	1.8 in	0.1 in	3.0 in	0.2 in	0.25 in	1.652	STABLE	C
Estb. Veg.	1.2 in	0.0 in	N/A in	N/A in	0.03 in	3.138	STABLE	--

ATTACHMENT 3.7
PCSM CHANNEL DESIGN WORKSHEETS

CHANNEL DESIGN WORKSHEETS –
MLV-515RA20

STANDARD E&S WORKSHEET # 9**Time of Concentration**PROJECT NAME: Williams REAE –MLV-515RA20LOCATION: Luzerne County, PAPREPARED BY: JBDATE: 07/08/2022CHECKED BY: PWDATE: 07/08/2022**OVERLAND FLOW:**

Path Number	Length (ft)	"n" Value	Average Slope (ft/ft)	Time (min)
ZEN-DC-D1 REACH A	37	0.15	0.27	5.0
ZEN-DC-D1 REACH B	-	-	-	5.0
ZEN-CC-C1	72	0.011	0.056	5.0
ZEN-CC-C2	43	0.15	0.16	5.0

$$T_{c (sheet flow)} = \left[\frac{2.48(n)}{3.6} \right]^{0.4673}$$

n **Type of Cover**
0.02 smooth pavement
0.1 bare parched soil
0.3 poor grass cover
0.4 average grass cover
0.8 dense grass cover
(L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

Path Number	Length (ft)	"n" Value	Average Slope (ft/ft)	Time (min)	Tc Total (min)
ZEN-DC-D1 REACH A	-	-	-	-	5.0
ZEN-DC-D1 REACH B	-	-	-	-	5.0
ZEN-CC-C1	-	-	-	-	5.0
ZEN-CC-C2	-	-	-	-	5.0

Channel Dimensions:

Path Number	Bottom Width (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Total Depth (ft)	Top Width (ft)
ZEN-DC-D1 REACH A	1	1	1	1	3.00
ZEN-DC-D1 REACH B	1	1	1	1.75	4
ZEN-CC-C1	1	1	1	1.25	3.50
ZEN-CC-C2	2	2	2	1	6.0

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – MLV-515RA20

LOCATION: Luzerne County, PA

PREPARED BY: BM

DATE: 07/20/22

CHECKED BY: PW

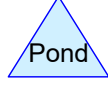
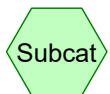
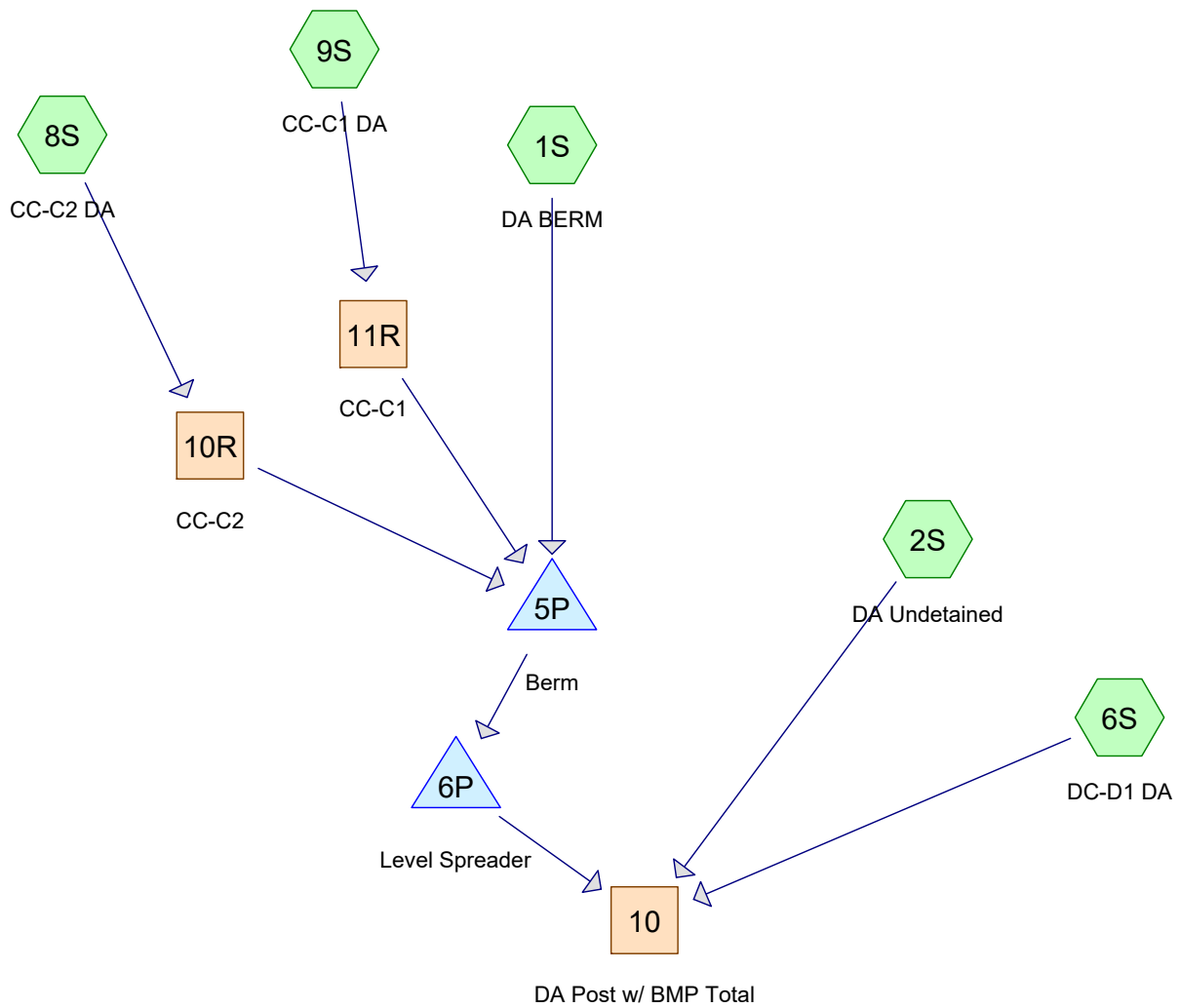
DATE: 07/20/22

CHANNEL OR CHANNEL SECTION	ZEN-DC-D1 REACH A	ZEN-DC-D1 REACH A	ZEN-DC-D1 REACH B	ZEN-DC-D1 REACH B
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM	100 YR	100 YR	100 YR	100 YR
ACRES (AC)	0.05	0.05	0.36	0.36
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	0.44	0.44	3.40	3.40
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.44	0.45	3.44	3.46
PROTECTIVE LINING ²	ECM (SC150BN)	ECM with Vegetation	ECM (SC150BN)	ECM with Vegetation
n (MANNING'S COEFFICIENT) ²	0.05	0.085	0.043	0.068
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V _t (CALCULATED AT FLOW DEPTH d) (FPS)	1.0	0.7	2.0	1.4
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.2	0.2	0.5	0.6
CHANNEL BOTTOM WIDTH (FT)	1	1	1	1
CHANNEL SIDE SLOPES (H:V)	1	1	1	1
D (TOTAL DEPTH) (FT)	1.0	1.0	1.75	1.75
CHANNEL TOP WIDTH @ D (FT)	3.0	3.0	4.5	4.5
d (CALCULATED FLOW DEPTH) (FT)	0.32	0.43	0.90	1.13
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	1.64	1.86	2.80	3.26
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	3.13	2.33	1.11	0.88
d ₅₀ STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.422	0.615	1.710	2.407
R (HYDRAULIC RADIUS) (FT)	0.222	0.277	0.482	0.574
S (BED SLOPE) ³ (FT/FT)	0.009	0.009	0.009	0.009
S _c (CRITICAL SLOPE) (FT/FT)	0.070	0.179	0.043	0.104
.7S _c (FT/FT)	0.049	0.125	0.030	0.073
1.3S _c (FT/FT)	0.091	0.232	0.056	0.136
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.68	0.57	0.85	0.62
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	ZEN-CC-C2	ZEN-CC-C2	ZEN-CC-C1	ZEN-CC-C1
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM	100 YR	100 YR	100 YR	100 YR
ACRES (AC)	0.16	0.16	0.14	0.14
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.41	1.41	1.43	1.43
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.41	1.48	1.47	1.45
PROTECTIVE LINING ²	ECM (SC150BN)	ECM with Vegetation	ECM (SC150BN)	ECM with Vegetation
n (MANNING'S COEFFICIENT) ²	0.05	0.051	0.05	0.065
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.3	2.2	2.1	1.7
s _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0
s _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.8	0.8	0.7	0.8
CHANNEL BOTTOM WIDTH (FT)	2	2	1	1
CHANNEL SIDE SLOPES (H:V)	2	2	1	1
D (TOTAL DEPTH) (FT)	1.0	1.0	1.25	1.25
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	3.5	3.5
d (CALCULATED FLOW DEPTH) (FT)	0.25	0.25	0.48	0.55
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.0	3.0	1.96	2.10
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	8.0	8.0	2.08	1.82
d ₅₀ STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.625	0.655	0.710	0.853
R (HYDRAULIC RADIUS) (FT)	0.20	0.21	0.301	0.334
S (BED SLOPE) ³ (FT/FT)	0.049	0.049	0.024	0.024
S _c (CRITICAL SLOPE) (FT/FT)	0.065	0.067	0.065	0.108
.7S _c (FT/FT)	0.045	0.047	0.046	0.076
1.3S _c (FT/FT)	0.084	0.087	0.085	0.140
STABLE FLOW? (Y/N)	N	N	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	0.75	0.75	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	-	-	0.77	0.70
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.



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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,957	91	Gravel roads, HSG D (8S, 9S)
17,437	78	Meadow, non-grazed, HSG D (1S, 2S, 6S, 8S, 9S)
24,394	82	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
24,394	HSG D	1S, 2S, 6S, 8S, 9S
0	Other	
24,394		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	6,957	0	6,957	Gravel roads	
0	0	0	17,437	0	17,437	Meadow, non-grazed	
0	0	0	24,394	0	24,394	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	5P	1,425.45	1,422.00	13.0	0.2654	0.010	3.0	0.0	0.0

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Time span=0.00-32.00 hrs, dt=0.05 hrs, 641 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA BERM Runoff Area=4,181 sf 0.00% Impervious Runoff Depth=4.83"
 Flow Length=68' Slope=0.0550 '/' Tc=5.0 min CN=78 Runoff=0.81 cfs 1,683 cf

Subcatchment2S: DA Undetained Runoff Area=3,780 sf 0.00% Impervious Runoff Depth=4.83"
 Flow Length=167' Tc=6.0 min CN=78 Runoff=0.70 cfs 1,521 cf

Subcatchment6S: DC-D1 DA Runoff Area=0.078 ac 0.00% Impervious Runoff Depth=4.83"
 Tc=5.0 min CN=78 Runoff=0.66 cfs 1,368 cf

Subcatchment8S: CC-C2 DA Runoff Area=6,796 sf 0.00% Impervious Runoff Depth=5.28"
 Tc=5.0 min CN=82 Runoff=1.42 cfs 2,992 cf

Subcatchment9S: CC-C1 DA Runoff Area=6,239 sf 0.00% Impervious Runoff Depth=6.09"
 Tc=5.0 min CN=89 Runoff=1.43 cfs 3,166 cf

Reach 10: DA Post w/ BMP Total Inflow=3.21 cfs 8,288 cf
 Outflow=3.21 cfs 8,288 cf

Reach 10R: CC-C2 Avg. Flow Depth=0.25' Max Vel=2.22 fps Inflow=1.42 cfs 2,992 cf
 n=0.050 L=187.0' S=0.0492 '/' Capacity=19.13 cfs Outflow=1.32 cfs 2,992 cf

Reach 11R: CC-C1 Avg. Flow Depth=0.47' Max Vel=2.04 fps Inflow=1.43 cfs 3,166 cf
 n=0.050 L=109.0' S=0.0240 '/' Capacity=9.42 cfs Outflow=1.36 cfs 3,166 cf

Pond 5P: Berm Peak Elev=1,426.02' Storage=2,059 cf Inflow=3.44 cfs 7,841 cf
 Discarded=0.02 cfs 1,132 cf Primary=1.85 cfs 5,405 cf Outflow=1.87 cfs 6,537 cf

Pond 6P: Level Spreader Peak Elev=1,422.07' Storage=1 cf Inflow=1.85 cfs 5,405 cf
 Discarded=0.00 cfs 6 cf Primary=1.85 cfs 5,399 cf Outflow=1.85 cfs 5,405 cf

Total Runoff Area = 24,394 sf Runoff Volume = 10,730 cf Average Runoff Depth = 5.28"
100.00% Pervious = 24,394 sf 0.00% Impervious = 0 sf

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Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Subcatchment 1S: DA BERM

[49] Hint: $T_c < 2dt$ may require smaller dt

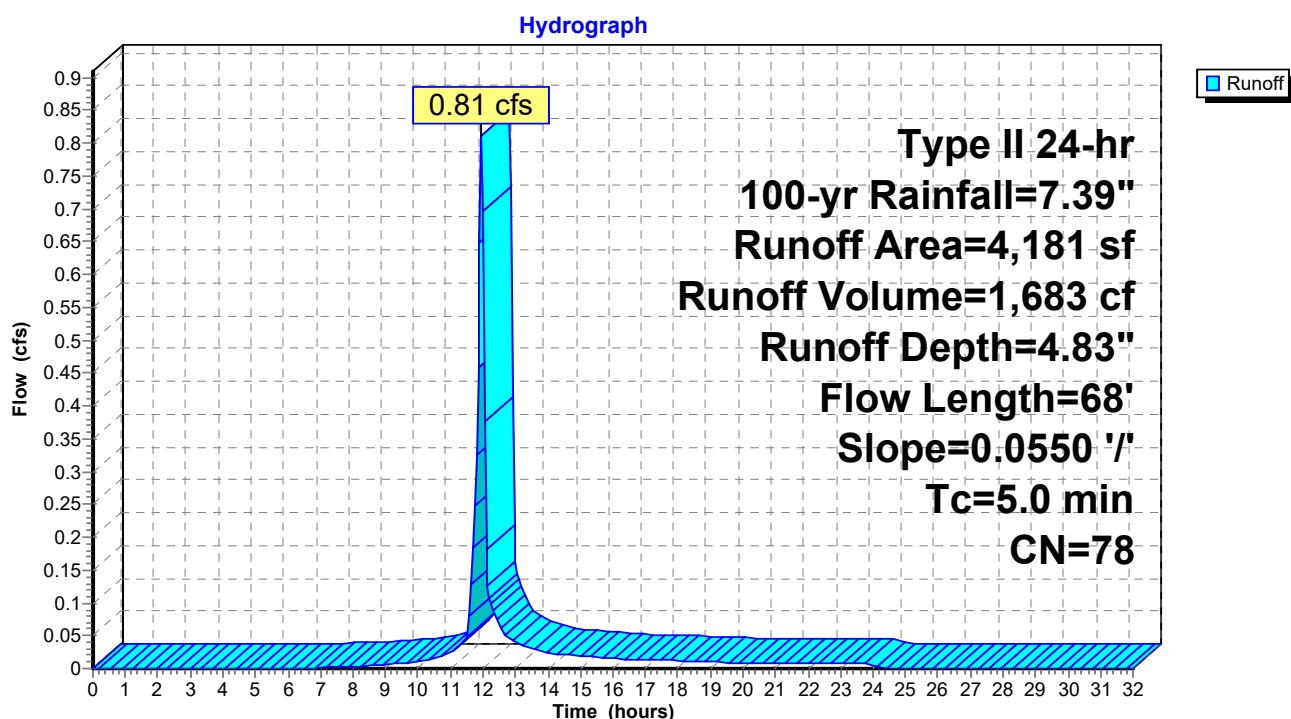
Runoff = 0.81 cfs @ 11.95 hrs, Volume= 1,683 cf, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (sf)	CN	Description
4,181	78	Meadow, non-grazed, HSG D
4,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	68	0.0550	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 2.95"

Subcatchment 1S: DA BERM



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Type II 24-hr 100-yr Rainfall=7.39"

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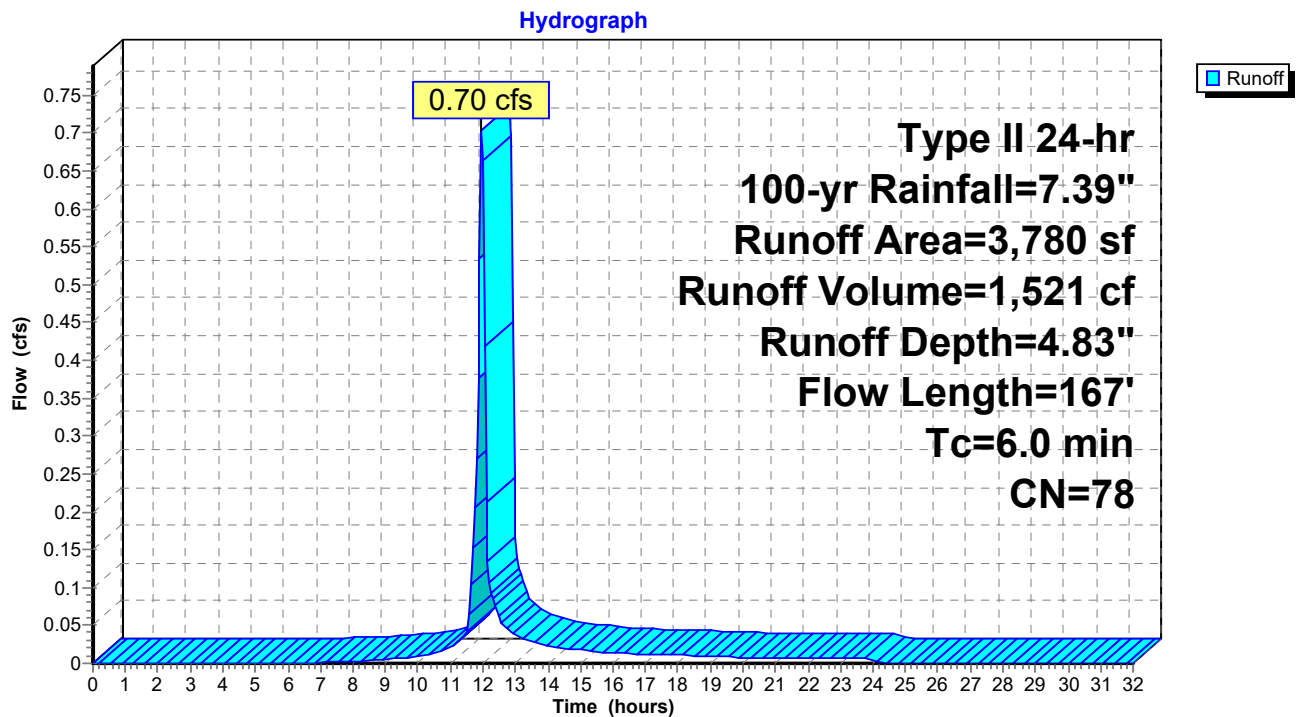
Summary for Subcatchment 2S: DA Undetained

Runoff = 0.70 cfs @ 11.97 hrs, Volume= 1,521 cf, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (sf)	CN	Description
3,780	78	Meadow, non-grazed, HSG D
3,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.1000	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 2.95"
0.6	67	0.0746	1.91		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.0	167	Total			

Subcatchment 2S: DA Undetained

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Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Subcatchment 6S: DC-D1 DA

[49] Hint: $T_c < 2dt$ may require smaller dt

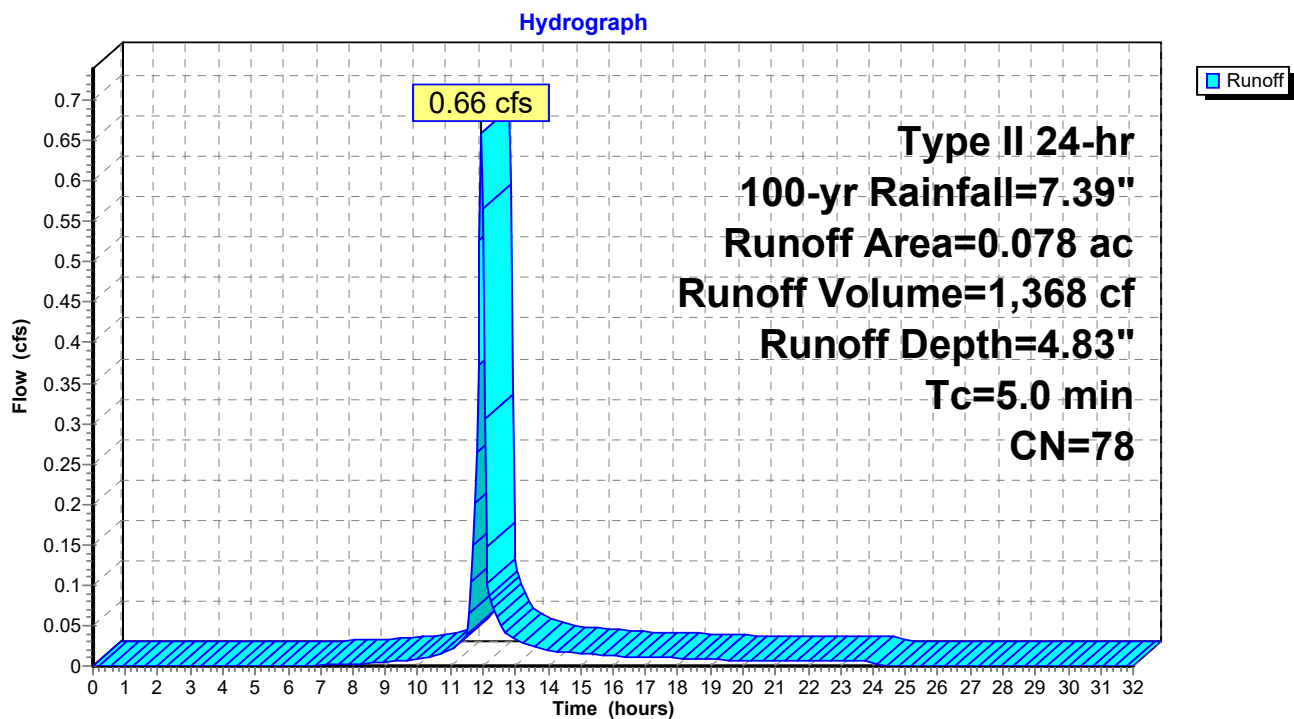
Runoff = 0.66 cfs @ 11.95 hrs, Volume= 1,368 cf, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (ac)	CN	Description
0.078	78	Meadow, non-grazed, HSG D
0.078		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 min minimum

Subcatchment 6S: DC-D1 DA



Zenker Post w BMP- REV2

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Type II 24-hr 100-yr Rainfall=7.39"

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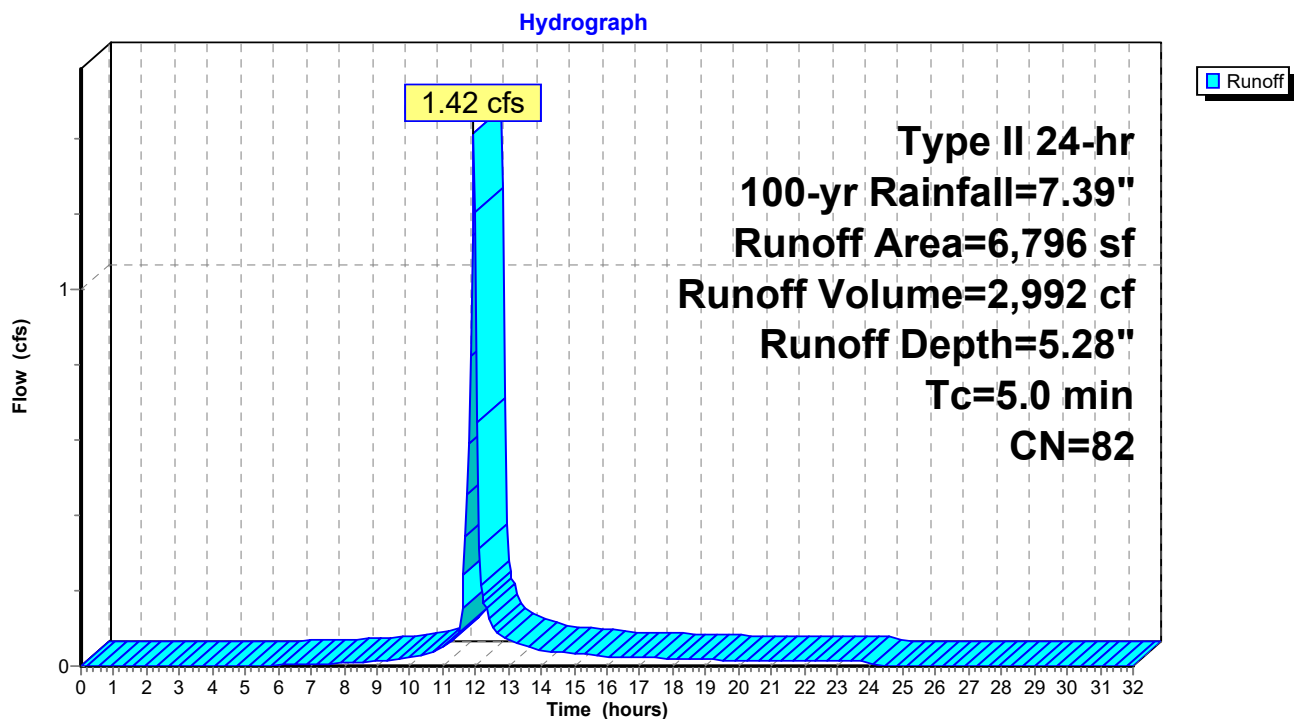
Summary for Subcatchment 8S: CC-C2 DA[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.42 cfs @ 11.95 hrs, Volume= 2,992 cf, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (sf)	CN	Description
1,917	91	Gravel roads, HSG D
4,879	78	Meadow, non-grazed, HSG D
6,796	82	Weighted Average
6,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5min min.

Subcatchment 8S: CC-C2 DA

Zenker Post w BMP- REV2

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Type II 24-hr 100-yr Rainfall=7.39"

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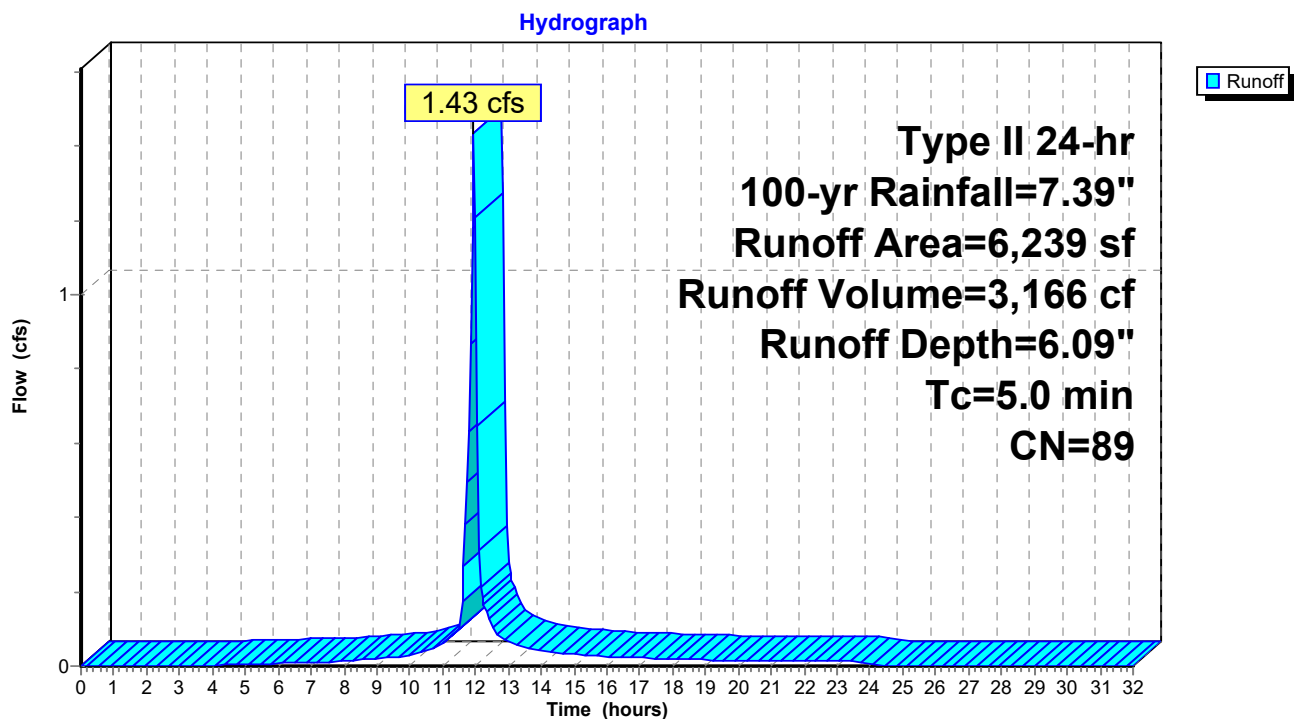
Summary for Subcatchment 9S: CC-C1 DA[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.43 cfs @ 11.95 hrs, Volume= 3,166 cf, Depth= 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (sf)	CN	Description
5,040	91	Gravel roads, HSG D
1,199	78	Meadow, non-grazed, HSG D
6,239	89	Weighted Average
6,239		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5min min.

Subcatchment 9S: CC-C1 DA

Zenker Post w BMP- REV2

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Type II 24-hr 100-yr Rainfall=7.39"

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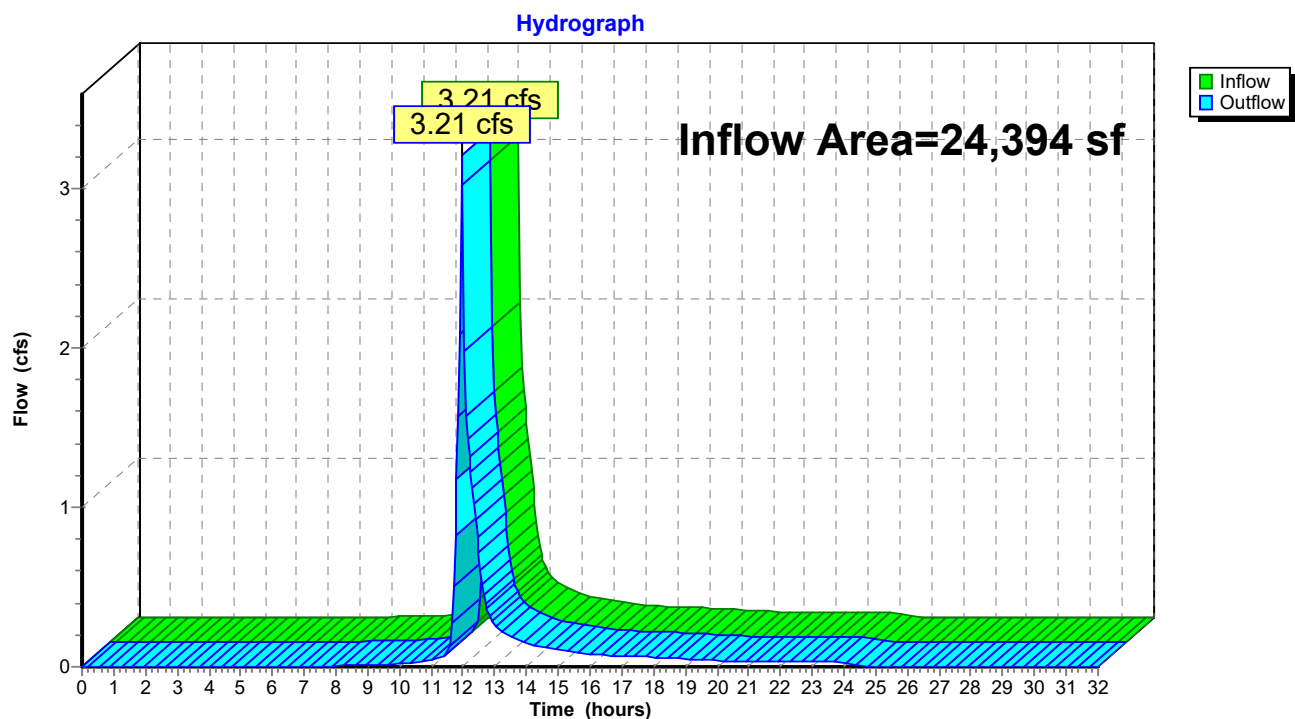
Summary for Reach 10: DA Post w/ BMP Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24,394 sf, 0.00% Impervious, Inflow Depth = 4.08" for 100-yr event
Inflow = 3.21 cfs @ 11.97 hrs, Volume= 8,288 cf
Outflow = 3.21 cfs @ 11.97 hrs, Volume= 8,288 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

Reach 10: DA Post w/ BMP Total



Zenker Post w BMP- REV2

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Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Reach 10R: CC-C2

Inflow Area = 6,796 sf, 0.00% Impervious, Inflow Depth = 5.28" for 100-yr event
Inflow = 1.42 cfs @ 11.95 hrs, Volume= 2,992 cf
Outflow = 1.32 cfs @ 11.99 hrs, Volume= 2,992 cf, Atten= 7%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.22 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 6.0 min

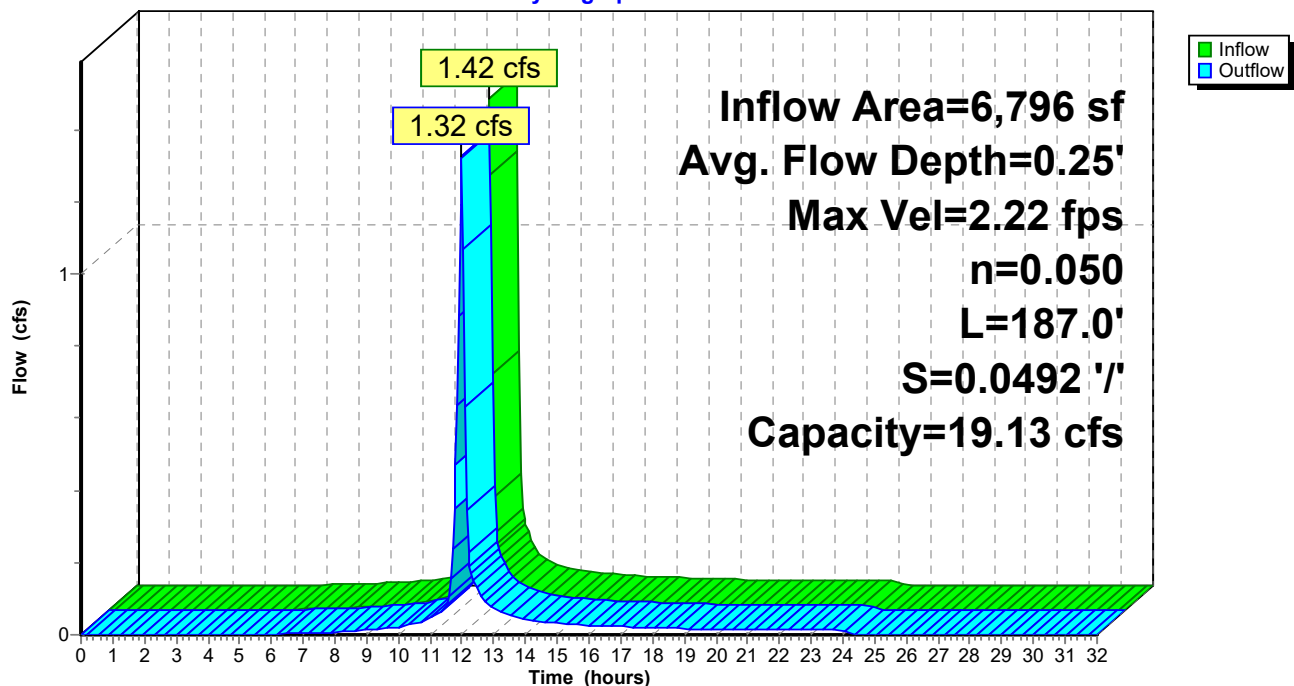
Peak Storage= 114 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 19.13 cfs

2.00' x 1.00' deep channel, n= 0.050
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 187.0' Slope= 0.0492 '/'
Inlet Invert= 1,436.00', Outlet Invert= 1,426.80'



Reach 10R: CC-C2

Hydrograph



Zenker Post w BMP- REV2

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Type II 24-hr 100-yr Rainfall=7.39"

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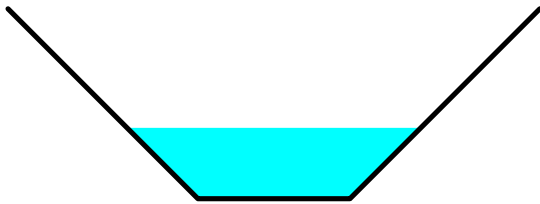
Summary for Reach 11R: CC-C1

Inflow Area = 6,239 sf, 0.00% Impervious, Inflow Depth = 6.09" for 100-yr event
Inflow = 1.43 cfs @ 11.95 hrs, Volume= 3,166 cf
Outflow = 1.36 cfs @ 11.98 hrs, Volume= 3,166 cf, Atten= 5%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.04 fps, Min. Travel Time= 0.9 min
Avg. Velocity= 0.52 fps, Avg. Travel Time= 3.5 min

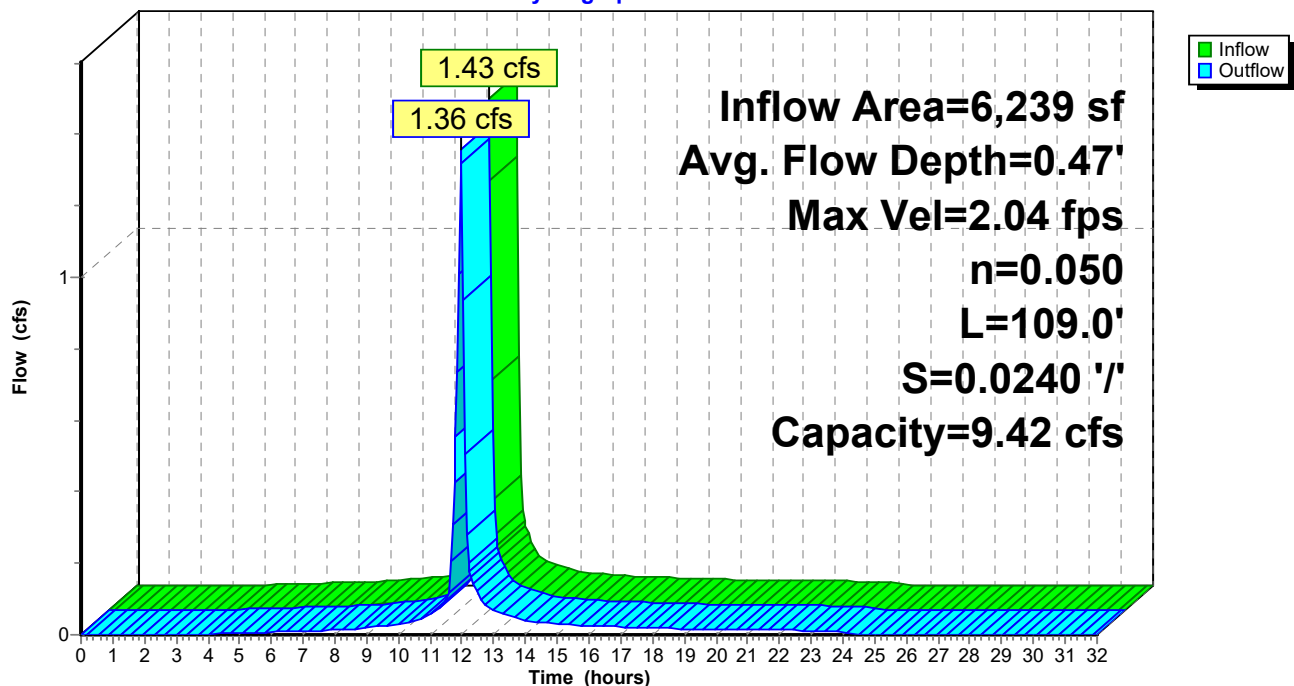
Peak Storage= 75 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.25' Flow Area= 2.8 sf, Capacity= 9.42 cfs

1.00' x 1.25' deep channel, n= 0.050
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 109.0' Slope= 0.0240 '/'
Inlet Invert= 1,429.20', Outlet Invert= 1,426.58'



Reach 11R: CC-C1

Hydrograph



Zenker Post w BMP- REV2

Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Pond 5P: Berm

[93] Warning: Storage range exceeded by 0.01'

Inflow Area = 17,216 sf, 0.00% Impervious, Inflow Depth = 5.47" for 100-yr event
 Inflow = 3.44 cfs @ 11.98 hrs, Volume= 7,841 cf
 Outflow = 1.87 cfs @ 11.98 hrs, Volume= 6,537 cf, Atten= 46%, Lag= 0.1 min
 Discarded = 0.02 cfs @ 11.98 hrs, Volume= 1,132 cf
 Primary = 1.85 cfs @ 11.98 hrs, Volume= 5,405 cf

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,426.02' @ 11.98 hrs Surf.Area= 2,340 sf Storage= 2,059 cf

Plug-Flow detention time= 166.4 min calculated for 6,537 cf (83% of inflow)
 Center-of-Mass det. time= 93.4 min (887.6 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,424.00'	2,059 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,424.00	0	0	0
1,424.50	633	158	158
1,425.00	709	336	494
1,425.25	1,204	239	733
1,425.45	1,437	264	997
1,426.00	2,340	1,039	2,036
1,426.01	2,340	23	2,059

Device	Routing	Invert	Outlet Devices
#1	Primary	1,426.00'	78.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	1,424.00'	0.315 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,422.00'
#3	Primary	1,425.45'	3.0" Round Culvert X 10.00 L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,425.45' / 1,422.00' S= 0.2654 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf

Discarded OutFlow Max=0.02 cfs @ 11.98 hrs HW=1,426.02' (Free Discharge)↑ **2=Exfiltration** (Controls 0.02 cfs)**Primary OutFlow** Max=1.73 cfs @ 11.98 hrs HW=1,426.02' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.48 cfs @ 0.34 fps)↑ **3=Culvert** (Inlet Controls 1.24 cfs @ 2.53 fps)

Zenker Post w BMP- REV2

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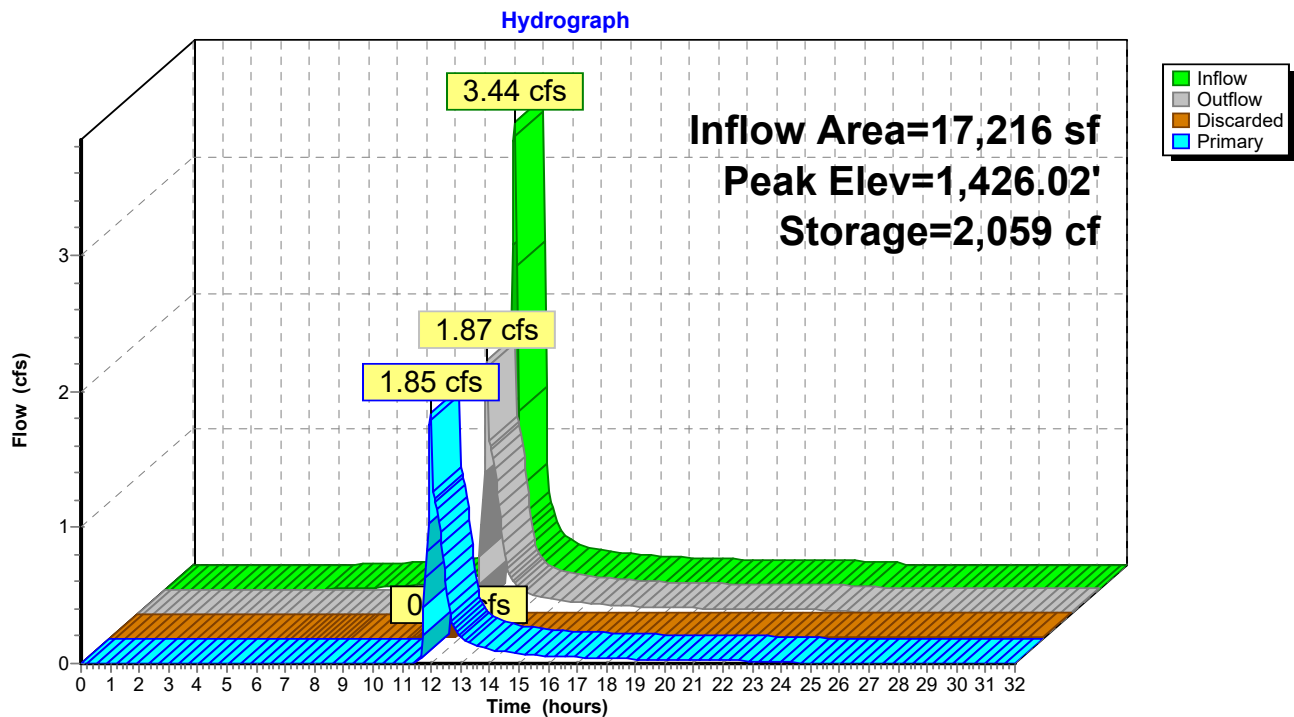
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Type II 24-hr 100-yr Rainfall=7.39"

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Pond 5P: Berm



Summary for Pond 6P: Level Spreader

[79] Warning: Submerged Pond 5P Primary device # 3 OUTLET by 0.07'

Inflow Area = 17,216 sf, 0.00% Impervious, Inflow Depth = 3.77" for 100-yr event
 Inflow = 1.85 cfs @ 11.98 hrs, Volume= 5,405 cf
 Outflow = 1.85 cfs @ 11.98 hrs, Volume= 5,405 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 11.98 hrs, Volume= 6 cf
 Primary = 1.85 cfs @ 11.98 hrs, Volume= 5,399 cf

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,422.07' @ 11.98 hrs Surf.Area= 35 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 5,397 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (824.0 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,422.00'	14 cf	1.00'W x 35.00'L x 1.00'H PrismaToid 35 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,422.00'	0.315 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,420.00'
#2	Primary	1,422.00'	35.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 11.98 hrs HW=1,422.07' (Free Discharge)

↑**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=1.78 cfs @ 11.98 hrs HW=1,422.07' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.78 cfs @ 0.72 fps)

Zenker Post w BMP- REV2

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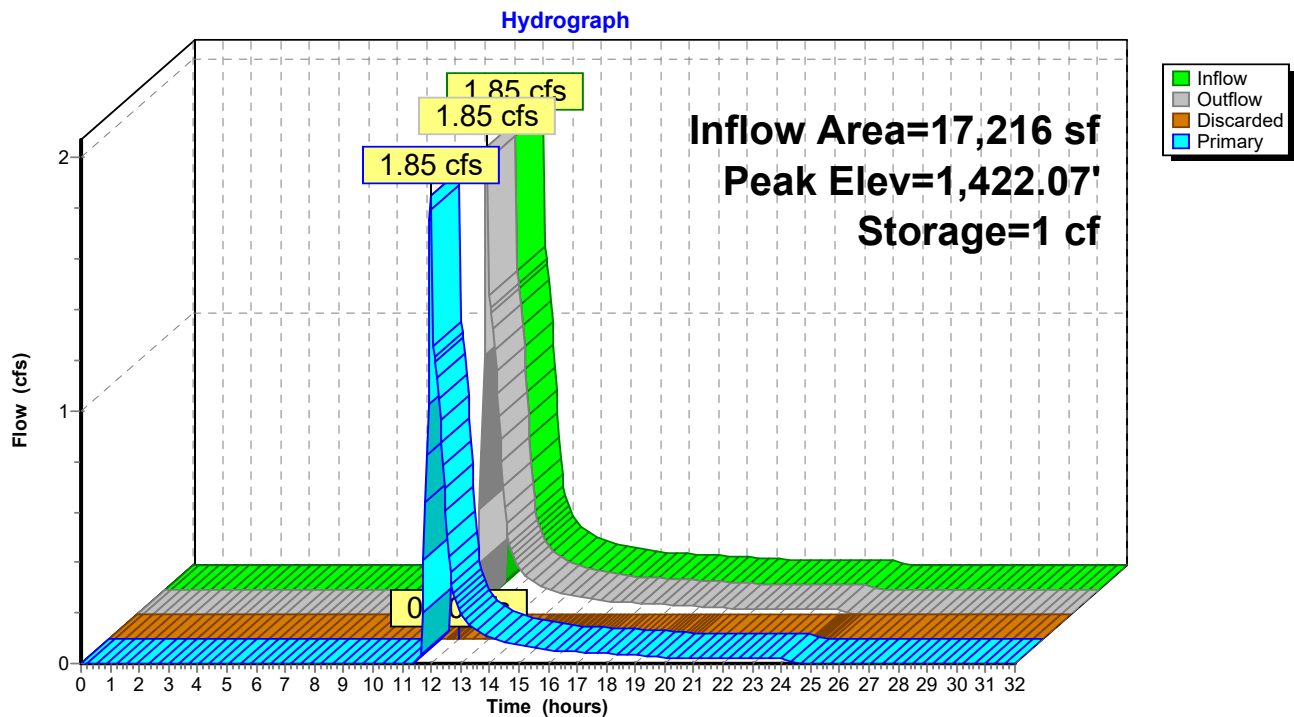
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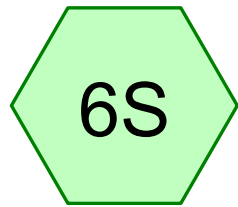
Type II 24-hr 100-yr Rainfall=7.39"

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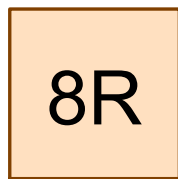
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Pond 6P: Level Spreader

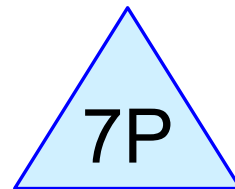




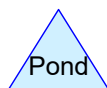
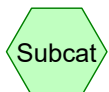
DC-D1 DA



DC-1



Level Spreader



Zenker DC-D1 Level Spreader calc

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
3,398	78	Meadow, non-grazed, HSG D (6S)
3,398	78	TOTAL AREA

Zenker DC-D1 Level Spreader calc

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
3,398	HSG D	6S
0	Other	
3,398		TOTAL AREA

Zenker DC-D1 Level Spreader calc

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	3,398	0	3,398	Meadow, non-grazed	
0	0	0	3,398	0	3,398	TOTAL AREA	

Zenker DC-D1 Level Spreader calc

Type II 24-hr 100-yr Rainfall=7.39"

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Time span=0.00-32.00 hrs, dt=0.05 hrs, 641 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: DC-D1 DA

Runoff Area=0.078 ac 0.00% Impervious Runoff Depth=4.83"

Tc=5.0 min CN=78 Runoff=0.66 cfs 1,368 cf

Reach 8R: DC-1

Avg. Flow Depth=0.39' Max Vel=1.14 fps Inflow=0.66 cfs 1,368 cf
n=0.050 L=134.0' S=0.0090 '/' Capacity=3.66 cfs Outflow=0.60 cfs 1,368 cf

Pond 7P: Level Spreader

Peak Elev=1,431.05' Storage=50 cf Inflow=0.60 cfs 1,368 cf
Outflow=0.60 cfs 1,323 cf

Total Runoff Area = 3,398 sf Runoff Volume = 1,368 cf Average Runoff Depth = 4.83"
100.00% Pervious = 3,398 sf 0.00% Impervious = 0 sf

Zenker DC-D1 Level Spreader calc

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Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Subcatchment 6S: DC-D1 DA

[49] Hint: $T_c < 2dt$ may require smaller dt

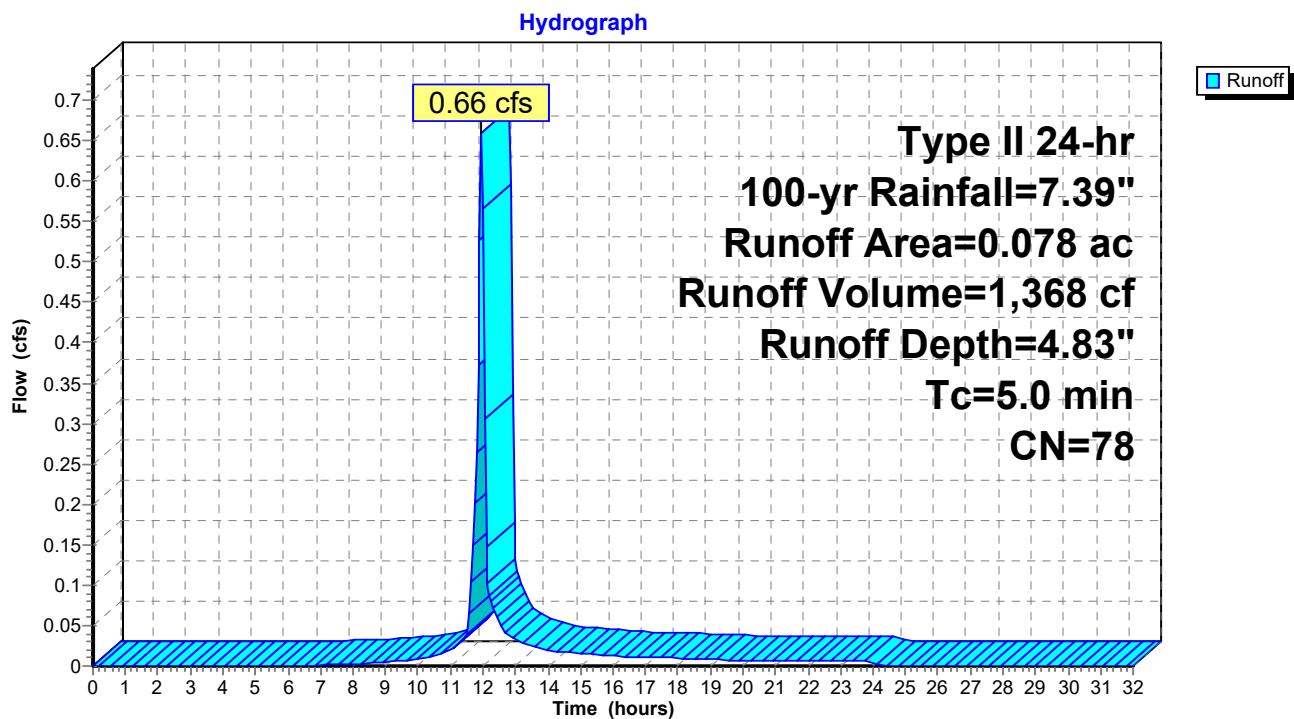
Runoff = 0.66 cfs @ 11.95 hrs, Volume= 1,368 cf, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=7.39"

Area (ac)	CN	Description
0.078	78	Meadow, non-grazed, HSG D
0.078		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 min minimum

Subcatchment 6S: DC-D1 DA



Zenker DC-D1 Level Spreader calc

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Type II 24-hr 100-yr Rainfall=7.39"

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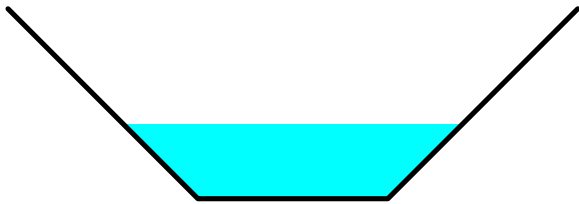
Summary for Reach 8R: DC-1

Inflow Area = 3,398 sf, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
Inflow = 0.66 cfs @ 11.95 hrs, Volume= 1,368 cf
Outflow = 0.60 cfs @ 12.01 hrs, Volume= 1,368 cf, Atten= 9%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 2.0 min
Avg. Velocity= 0.29 fps, Avg. Travel Time= 7.8 min

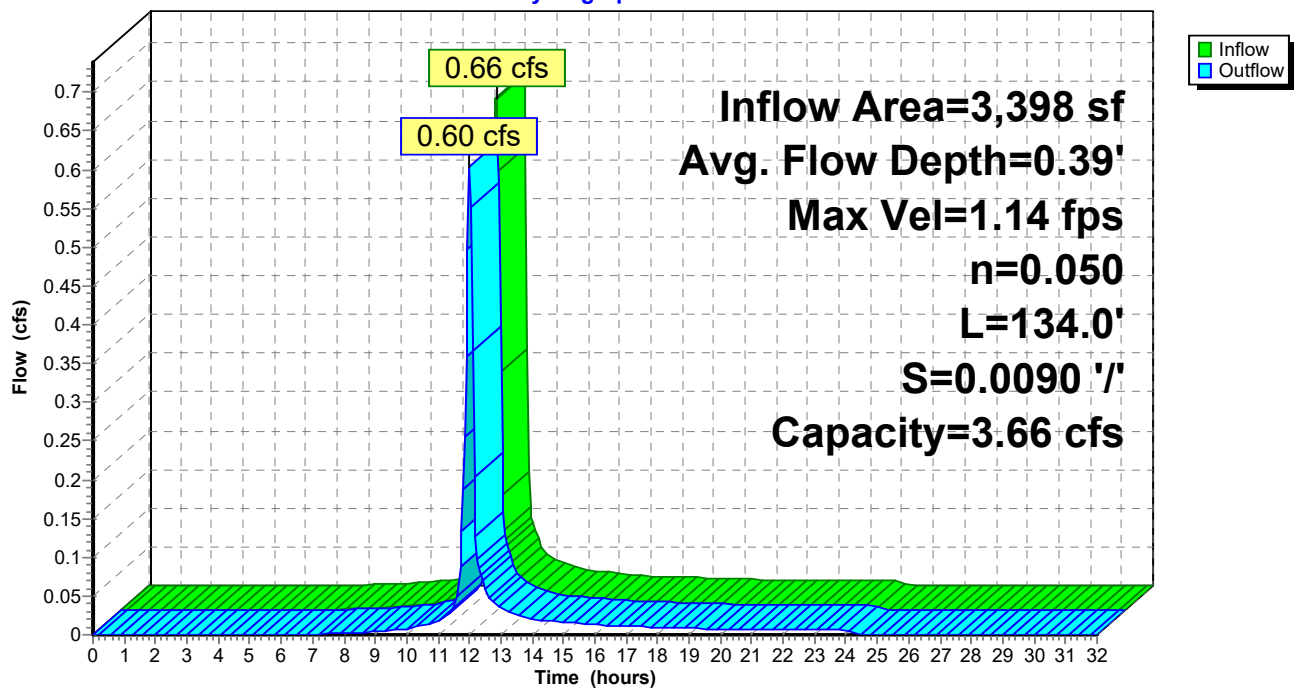
Peak Storage= 73 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 3.66 cfs

1.00' x 1.00' deep channel, n= 0.050
Side Slope Z-value= 1.0 '/' Top Width= 3.00'
Length= 134.0' Slope= 0.0090 '/'
Inlet Invert= 1,432.00', Outlet Invert= 1,430.79'



Reach 8R: DC-1

Hydrograph



Zenker DC-D1 Level Spreader calc

Type II 24-hr 100-yr Rainfall=7.39"

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Summary for Pond 7P: Level Spreader

[62] Hint: Exceeded Reach 8R OUTLET depth by 0.21' @ 31.50 hrs

Inflow Area = 3,398 sf, 0.00% Impervious, Inflow Depth = 4.83" for 100-yr event
 Inflow = 0.60 cfs @ 12.01 hrs, Volume= 1,368 cf
 Outflow = 0.60 cfs @ 12.01 hrs, Volume= 1,323 cf, Atten= 0%, Lag= 0.1 min
 Primary = 0.60 cfs @ 12.01 hrs, Volume= 1,323 cf

Routing by Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,431.05' @ 12.01 hrs Surf.Area= 90 sf Storage= 50 cf

Plug-Flow detention time= 28.8 min calculated for 1,321 cf (97% of inflow)
 Center-of-Mass det. time= 9.4 min (822.7 - 813.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	135 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,430.00	0	0	0
1,431.00	90	45	45
1,432.00	90	90	135

Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=0.58 cfs @ 12.01 hrs HW=1,431.05' (Free Discharge)
 ↑1=Sharp-Crested Rectangular Weir (Weir Controls 0.58 cfs @ 0.75 fps)

Zenker DC-D1 Level Spreader calc

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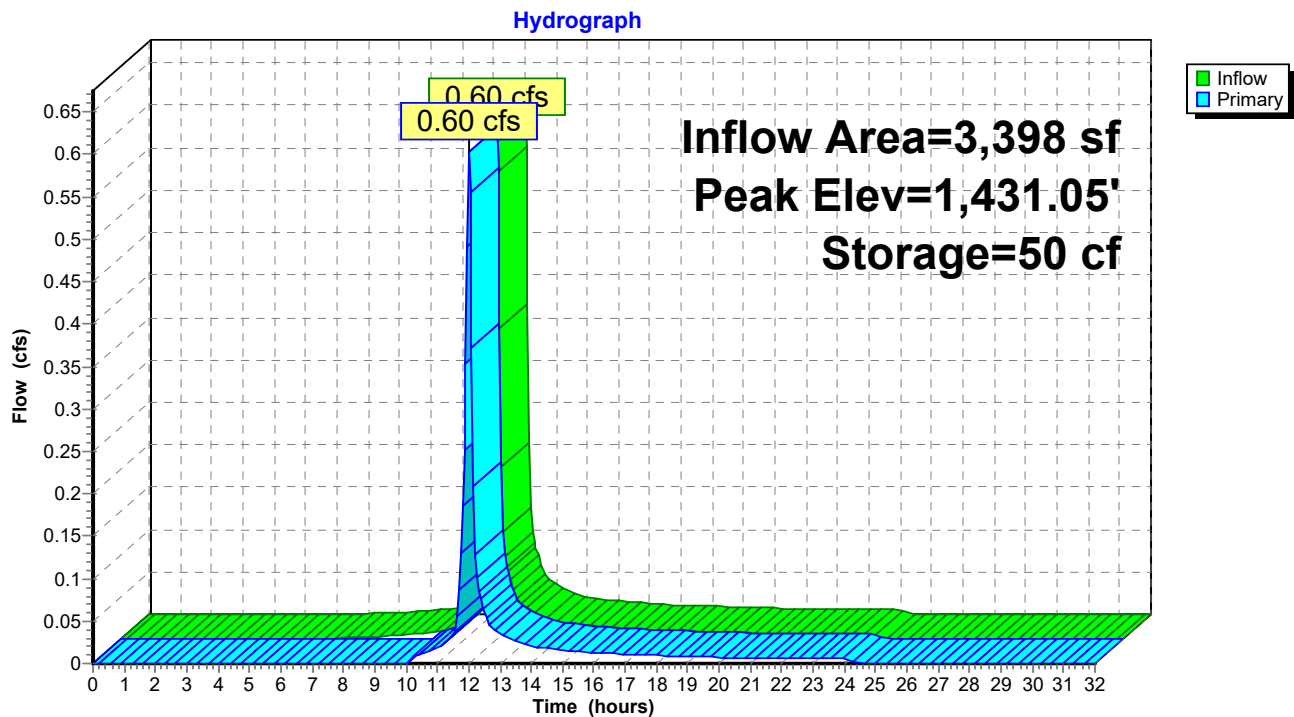
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Type II 24-hr 100-yr Rainfall=7.39"

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Pond 7P: Level Spreader



CHANNEL DESIGN WORKSHEETS –
LOWER DEMUNDS REL TIE-IN

STANDARD E&S WORKSHEET # 9
Time of Concentration

PROJECT NAME: Williams REAE – Lower Demunds REL Tie-in

LOCATION: Luzerne County, PA

PREPARED BY: CD

DATE: 03/02/2021

CHECKED BY: PW

DATE: 03/02/2022

DIRECT ENTRY METHOD:

Path Number	Length (ft)	Time (min)	Tc Total (min)
D - 2 Rch A	100	6.0	6.0
D - 2 Rch B	100	6.0	6.0

Channel Dimensions:

Path Number	Bottom Width (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Total Depth (ft)	Top Width (ft)
D - 2 Rch A	0	2	2	1.0	4.0
D - 2 Rch B	0	2	2	1.25	5.0

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – Lower Demunds REL Tie-in

LOCATION: Luzerne County, PA

PREPARED BY: CD

DATE: 02/28/2022

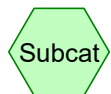
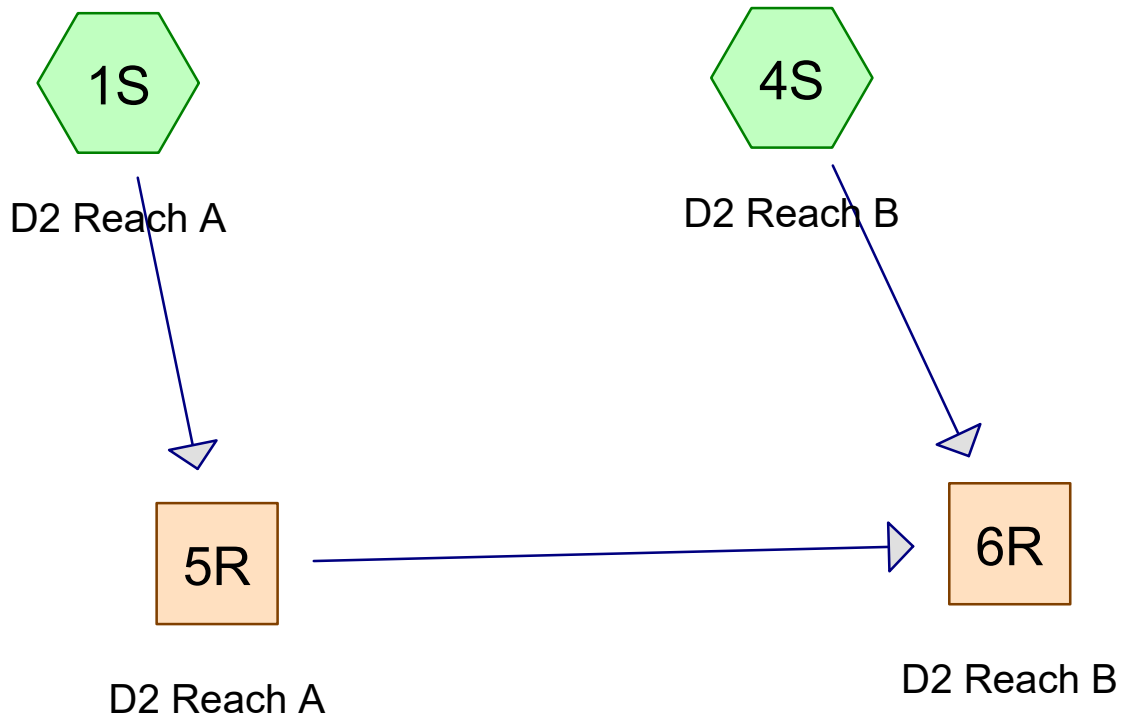
CHECKED BY: PW

DATE: 02/28/2022

CHANNEL OR CHANNEL SECTION	D-2 Reach A	D-2 Reach A	D-2 Reach B		
TEMPORARY OR PERMANENT? (T OR P)	P	P	P		
DESIGN STORM (2, 5, OR 10 YR)	10 YR	10 YR	10 YR		
ACRES (AC)	0.33	0.33	0.1		
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A		
Q _r (REQUIRED CAPACITY) (CFS)	1.28	1.28	1.57		
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.32	1.30	1.60		
PROTECTIVE LINING ²	SC150BN	Grass	R-3 Riprap		
n (MANNING'S COEFFICIENT) ²	0.05	0.088	0.0412		
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	3.0	6.5		
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.8	1.2	2.1		
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	-	-	-		
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	-	-	-		
CHANNEL BOTTOM WIDTH (FT)	0	0	0		
CHANNEL LEFT SIDE SLOPE (H:V)	10	10	2		
CHANNEL RIGHT SIDE SLOPE (H:V)	2	2	2		
D (TOTAL DEPTH) (FT)	1.0	1.0	1.25		
CHANNEL TOP WIDTH @ D (FT)	4.0	4.0	5.0		
d (CALCULATED FLOW DEPTH) (FT)	0.35	0.43	0.61		
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	1.4	1.72	2.44		
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	0	0	0		
d ₅₀ STONE SIZE (IN)	-	-	3		
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.735	1.109	0.744		
R (HYDRAULIC RADIUS) (FT)	0.470	0.577	0.273		
S (BED SLOPE) ³ (FT/FT)	0.01	0.01	0.02		
S _c (CRITICAL SLOPE) (FT/FT)	0.052	0.151	0.043		
.7S _c (FT/FT)	0.037	0.106	0.03		
1.3S _c (FT/FT)	0.07	0.20	0.06		
STABLE FLOW? (Y/N)	Y	Y	Y		
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-		
FREEBOARD BASED ON STABLE FLOW (FT)	0.65	0.57	0.64		
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5		
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V		

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

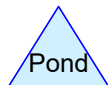
CHANNEL HYDROCAD REPORT –
LOWER DEMUNDS REL TIE-IN



Subcat



Reach



Pond



Link

Routing Diagram for Channel D2

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Channel D2

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Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 7639 PA Luzerne-C

Rainfall events imported from "NRCS-Rain.txt" for 7639 PA Luzerne-C

Channel D2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.370	78	Meadow, non-grazed, HSG D (1S, 4S)
0.060	98	Paved roads w/curbs & sewers, HSG D (1S)
0.430	81	TOTAL AREA

Channel D2

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.430	HSG D	1S, 4S
0.000	Other	
0.430		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.370	0.000	0.370	Meadow, non-grazed	1S, 4S
0.000	0.000	0.000	0.060	0.000	0.060	Paved roads w/curbs & sewers	1S
0.000	0.000	0.000	0.430	0.000	0.430	TOTAL AREA	

Channel D2

NOAA 24-hr C 1-Year Rainfall=2.90"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>1.19"
Flow Length=100' Tc=6.0 min CN=82 Runoff=0.55 cfs 0.033 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>0.96"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.13 cfs 0.008 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.28' Max Vel=1.17 fps Inflow=0.55 cfs 0.033 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=0.52 cfs 0.033 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.43' Max Vel=1.72 fps Inflow=0.65 cfs 0.041 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=0.61 cfs 0.041 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.041 af Average Runoff Depth = 1.14"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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NOAA 24-hr C 1-Year Rainfall=2.90"

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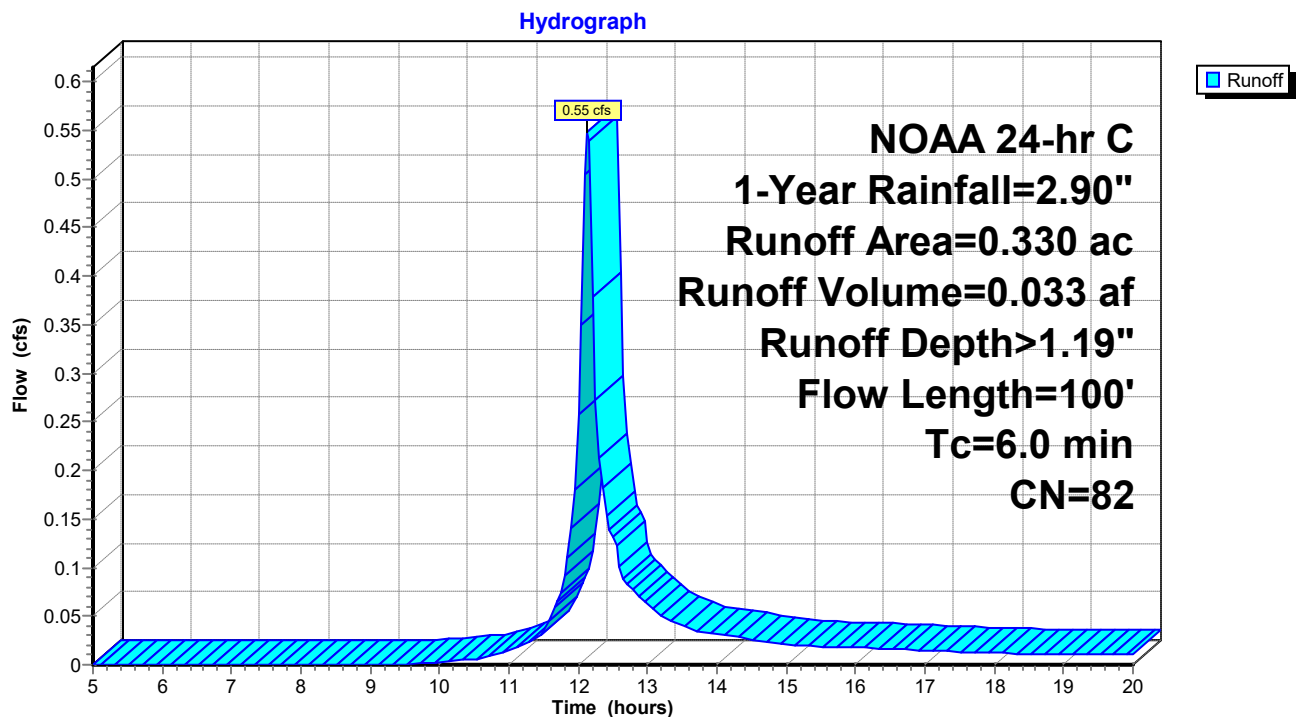
Summary for Subcatchment 1S: D2 Reach A

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.90"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Channel D2

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NOAA 24-hr C 1-Year Rainfall=2.90"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 0.96"

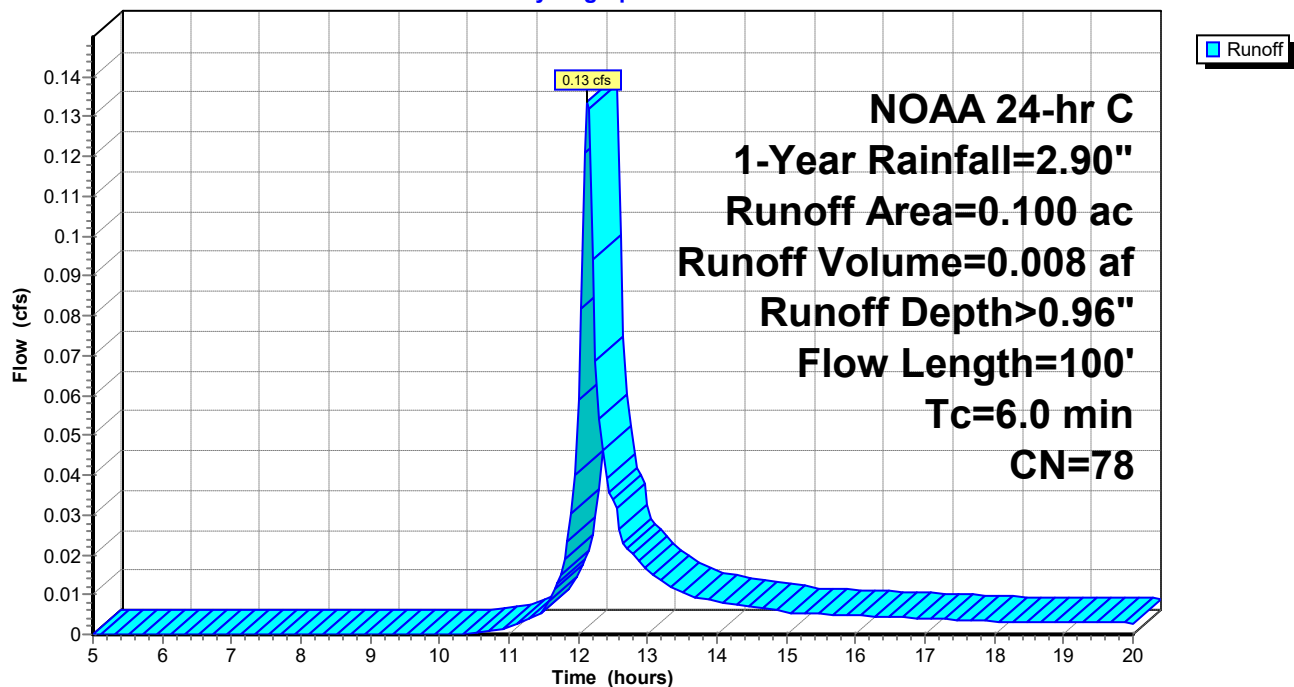
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.90"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

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NOAA 24-hr C 1-Year Rainfall=2.90"

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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 1.19" for 1-Year event
Inflow = 0.55 cfs @ 12.13 hrs, Volume= 0.033 af
Outflow = 0.52 cfs @ 12.16 hrs, Volume= 0.033 af, Atten= 5%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.17 fps, Min. Travel Time= 0.9 min

Avg. Velocity= 0.52 fps, Avg. Travel Time= 2.1 min

Peak Storage= 30 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.28'

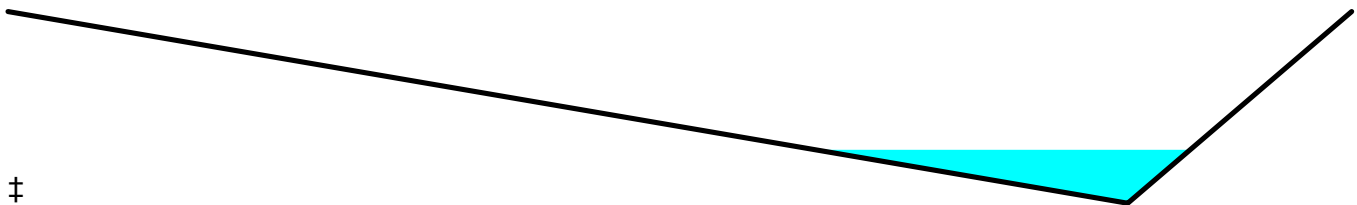
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

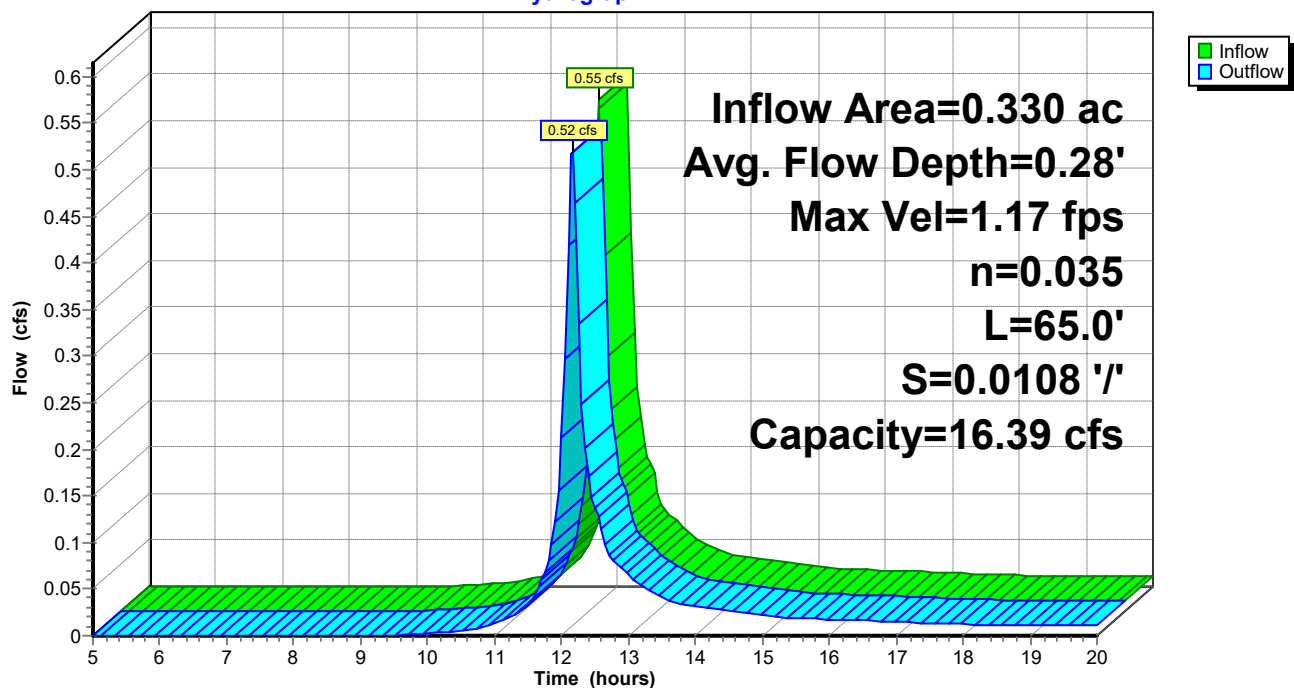
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

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NOAA 24-hr C 1-Year Rainfall=2.90"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.16' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 1.13" for 1-Year event
Inflow = 0.65 cfs @ 12.15 hrs, Volume= 0.041 af
Outflow = 0.61 cfs @ 12.19 hrs, Volume= 0.041 af, Atten= 6%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.72 fps, Min. Travel Time= 1.1 min

Avg. Velocity= 0.77 fps, Avg. Travel Time= 2.4 min

Peak Storage= 41 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.43'

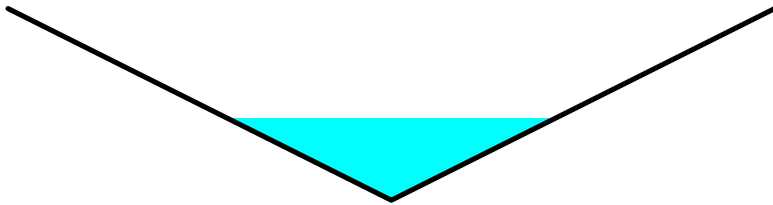
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

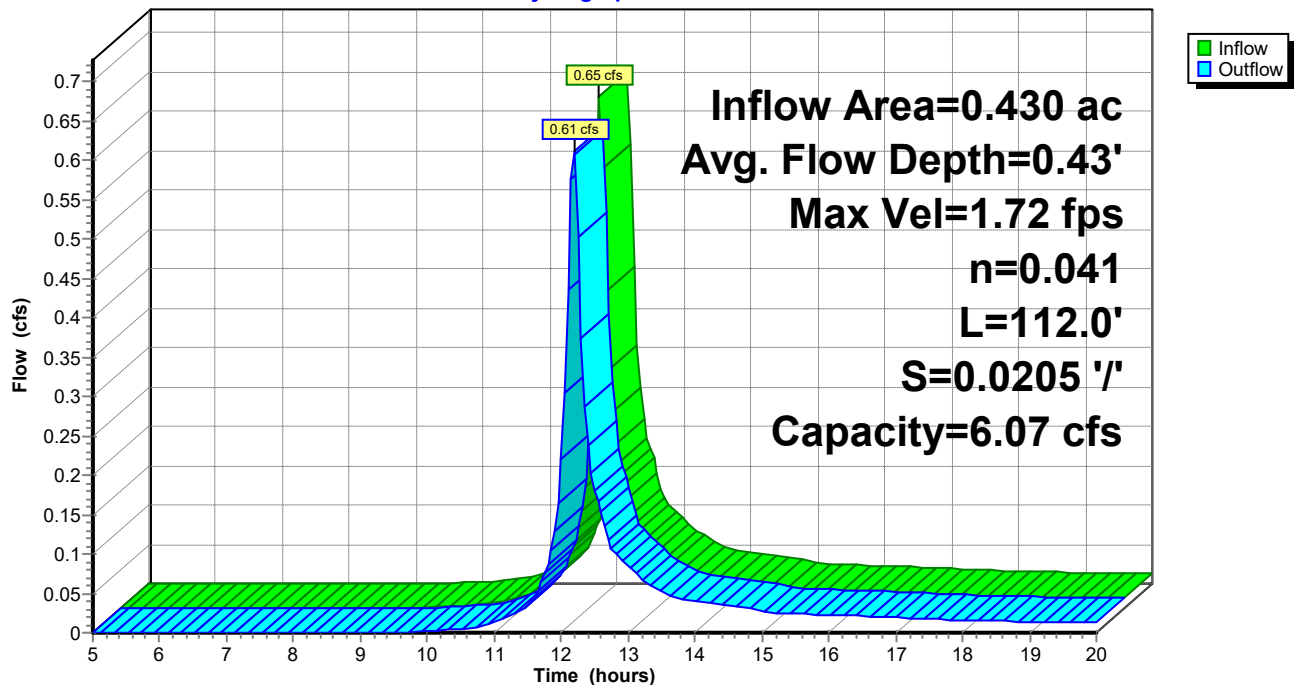
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 2-Year Rainfall=3.40"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>1.56"
Flow Length=100' Tc=6.0 min CN=82 Runoff=0.72 cfs 0.043 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>1.30"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.18 cfs 0.011 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.31' Max Vel=1.25 fps Inflow=0.72 cfs 0.043 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=0.68 cfs 0.043 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.48' Max Vel=1.85 fps Inflow=0.86 cfs 0.054 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=0.81 cfs 0.054 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.054 af Average Runoff Depth = 1.50"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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NOAA 24-hr C 2-Year Rainfall=3.40"

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Summary for Subcatchment 1S: D2 Reach A

Runoff = 0.72 cfs @ 12.13 hrs, Volume= 0.043 af, Depth> 1.56"

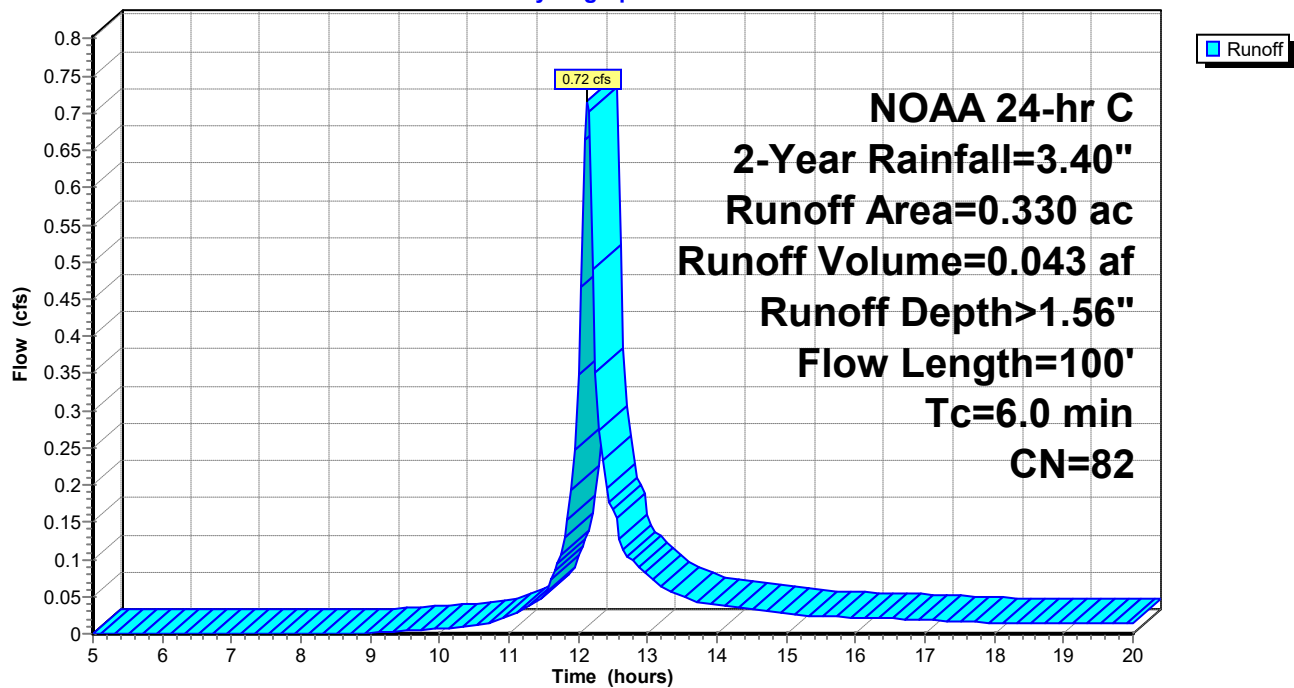
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Hydrograph



Channel D2

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NOAA 24-hr C 2-Year Rainfall=3.40"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 1.30"

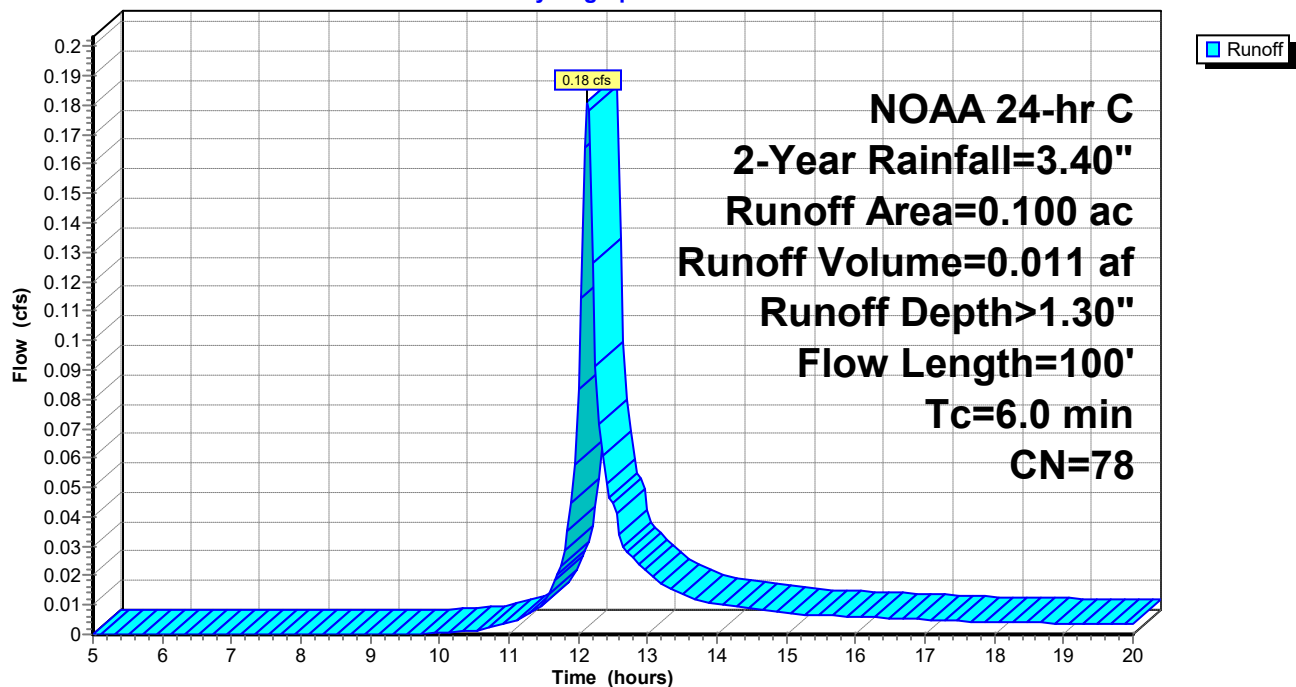
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

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NOAA 24-hr C 2-Year Rainfall=3.40"

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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 1.56" for 2-Year event
Inflow = 0.72 cfs @ 12.13 hrs, Volume= 0.043 af
Outflow = 0.68 cfs @ 12.15 hrs, Volume= 0.043 af, Atten= 5%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.25 fps, Min. Travel Time= 0.9 min

Avg. Velocity= 0.54 fps, Avg. Travel Time= 2.0 min

Peak Storage= 37 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.31'

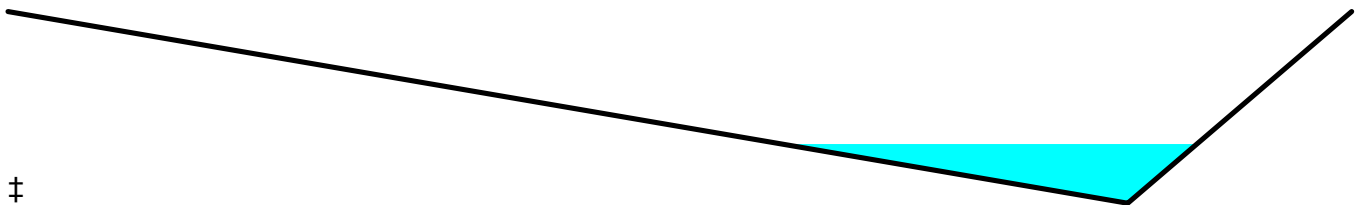
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

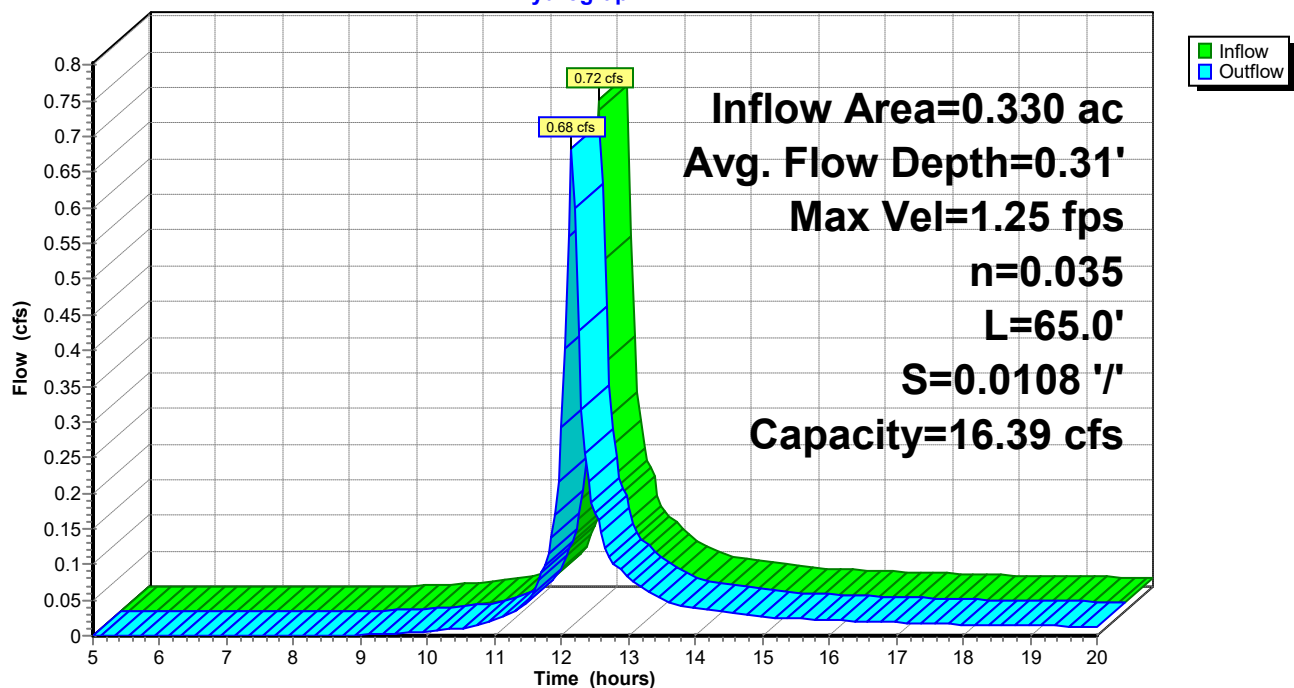
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

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NOAA 24-hr C 2-Year Rainfall=3.40"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.18' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 1.50" for 2-Year event
Inflow = 0.86 cfs @ 12.15 hrs, Volume= 0.054 af
Outflow = 0.81 cfs @ 12.18 hrs, Volume= 0.054 af, Atten= 6%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.85 fps, Min. Travel Time= 1.0 min

Avg. Velocity= 0.81 fps, Avg. Travel Time= 2.3 min

Peak Storage= 51 cf @ 12.16 hrs

Average Depth at Peak Storage= 0.48'

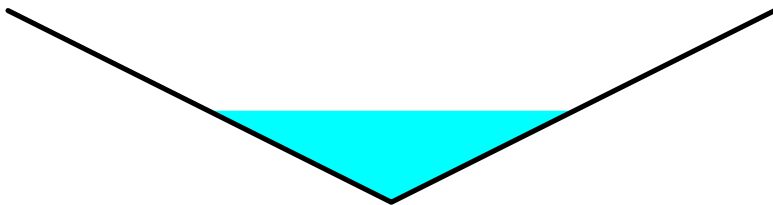
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

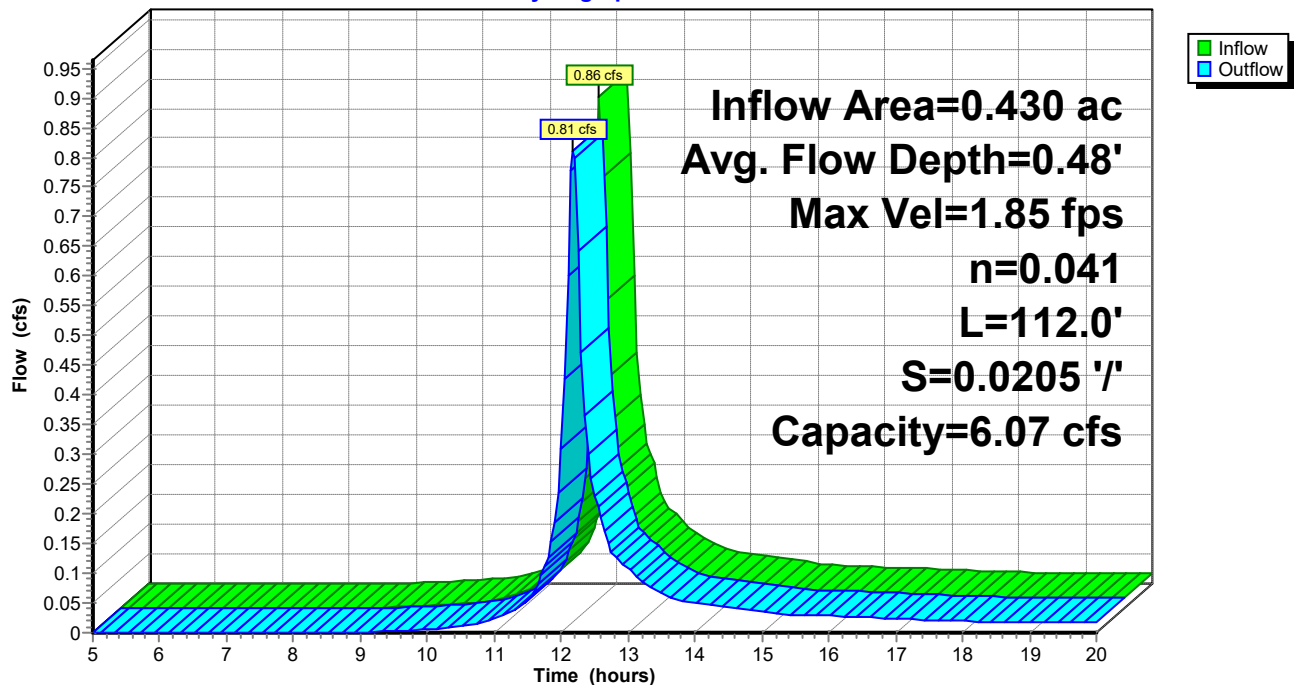
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 5-Year Rainfall=4.30"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>2.28"
Flow Length=100' Tc=6.0 min CN=82 Runoff=1.03 cfs 0.063 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>1.96"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.27 cfs 0.016 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.35' Max Vel=1.37 fps Inflow=1.03 cfs 0.063 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=0.99 cfs 0.063 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.55' Max Vel=2.04 fps Inflow=1.26 cfs 0.079 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=1.19 cfs 0.079 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.079 af Average Runoff Depth = 2.20"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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NOAA 24-hr C 5-Year Rainfall=4.30"

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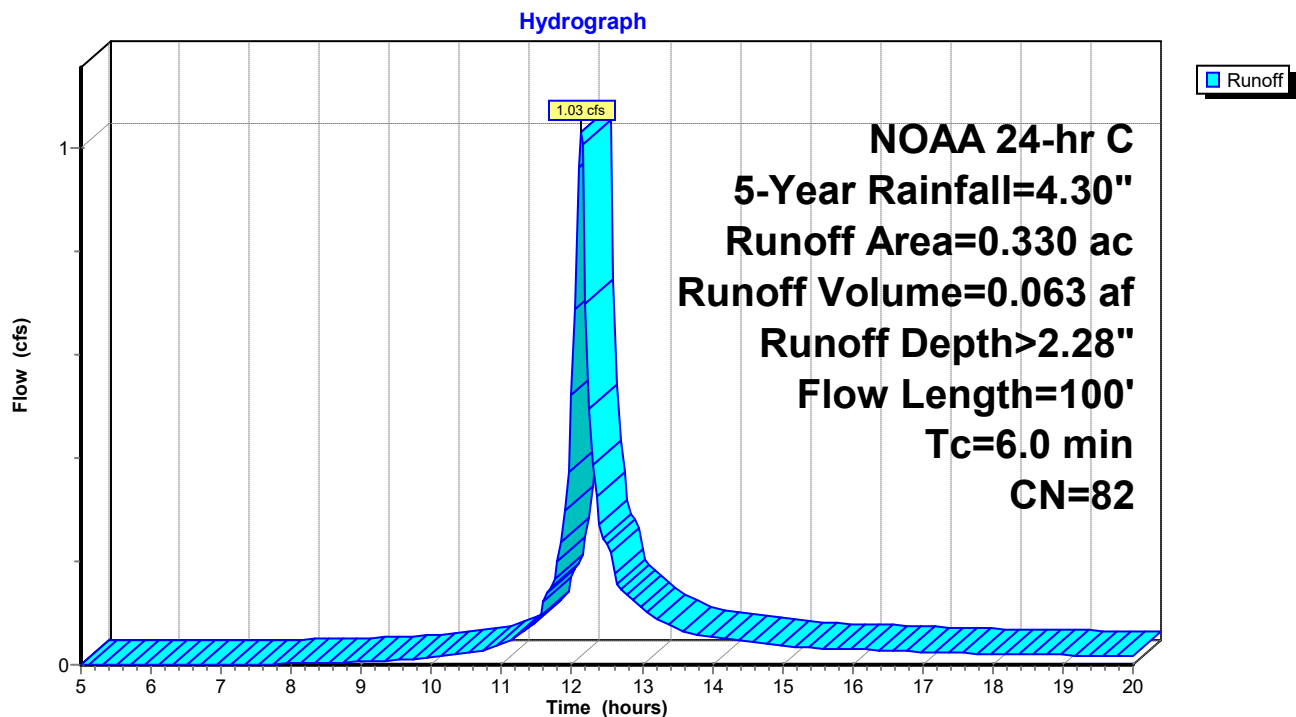
Summary for Subcatchment 1S: D2 Reach A

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.063 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Channel D2

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NOAA 24-hr C 5-Year Rainfall=4.30"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.016 af, Depth> 1.96"

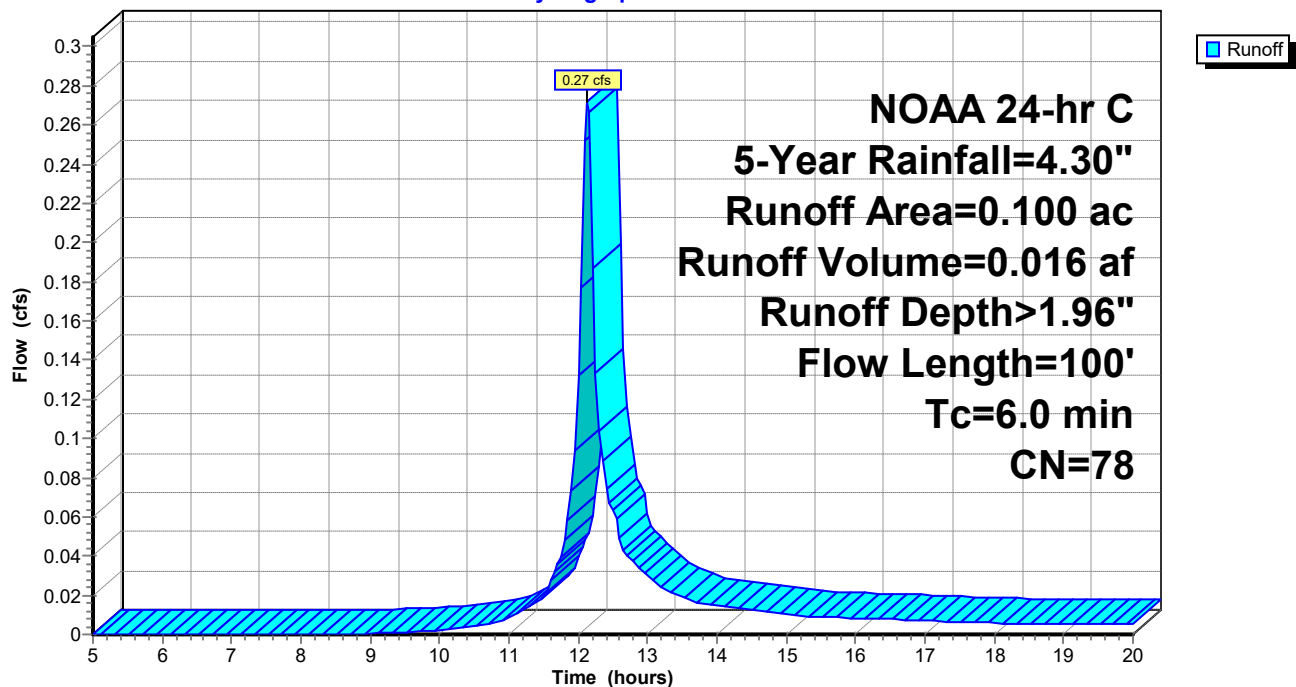
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

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NOAA 24-hr C 5-Year Rainfall=4.30"

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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 2.28" for 5-Year event
Inflow = 1.03 cfs @ 12.13 hrs, Volume= 0.063 af
Outflow = 0.99 cfs @ 12.15 hrs, Volume= 0.063 af, Atten= 4%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.37 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 0.57 fps, Avg. Travel Time= 1.9 min

Peak Storage= 49 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.35'

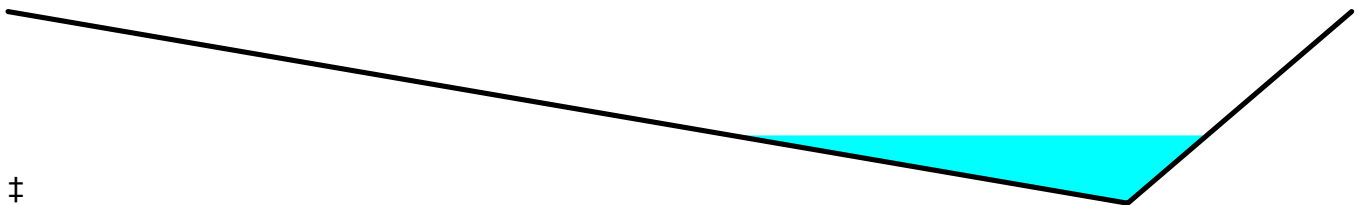
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

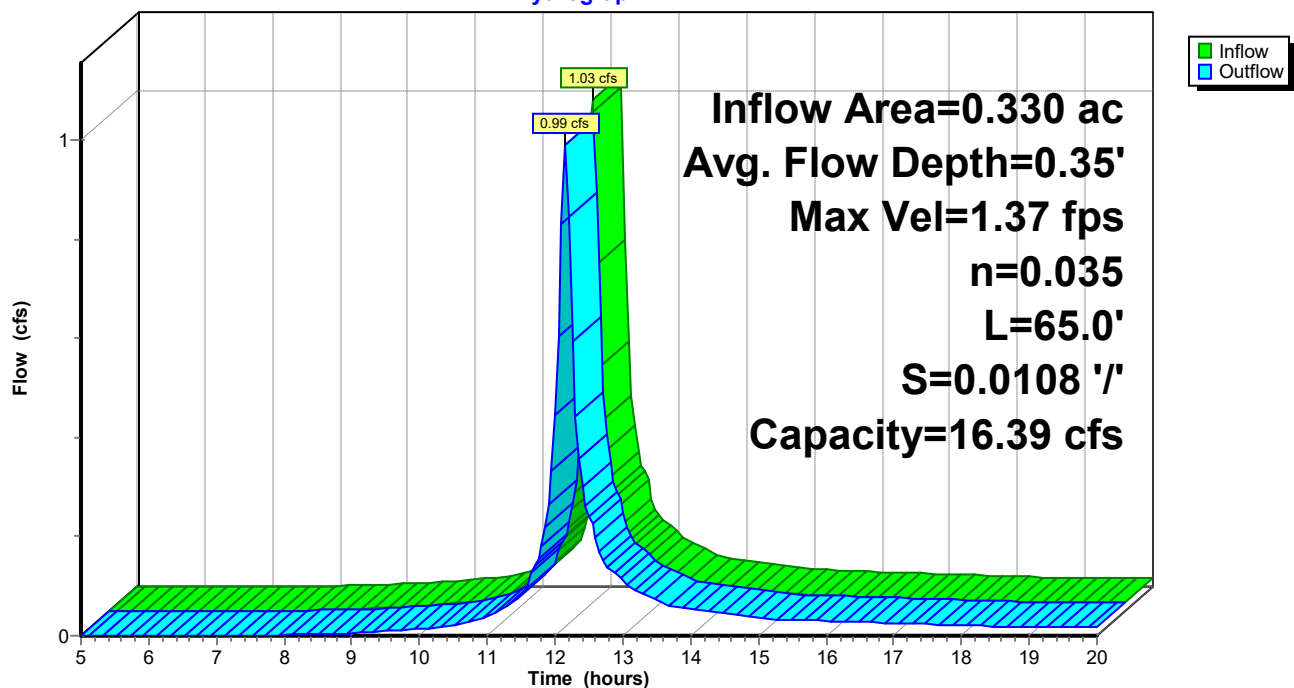
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



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NOAA 24-hr C 5-Year Rainfall=4.30"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.21' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 2.20" for 5-Year event
Inflow = 1.26 cfs @ 12.15 hrs, Volume= 0.079 af
Outflow = 1.19 cfs @ 12.17 hrs, Volume= 0.079 af, Atten= 6%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.04 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 0.85 fps, Avg. Travel Time= 2.2 min

Peak Storage= 68 cf @ 12.16 hrs

Average Depth at Peak Storage= 0.55'

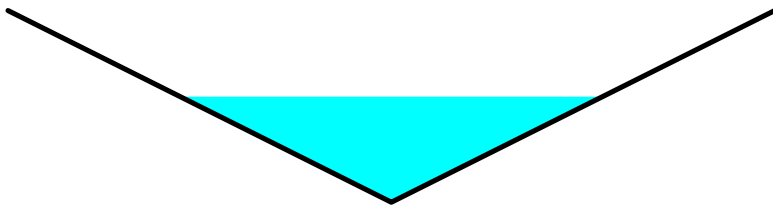
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

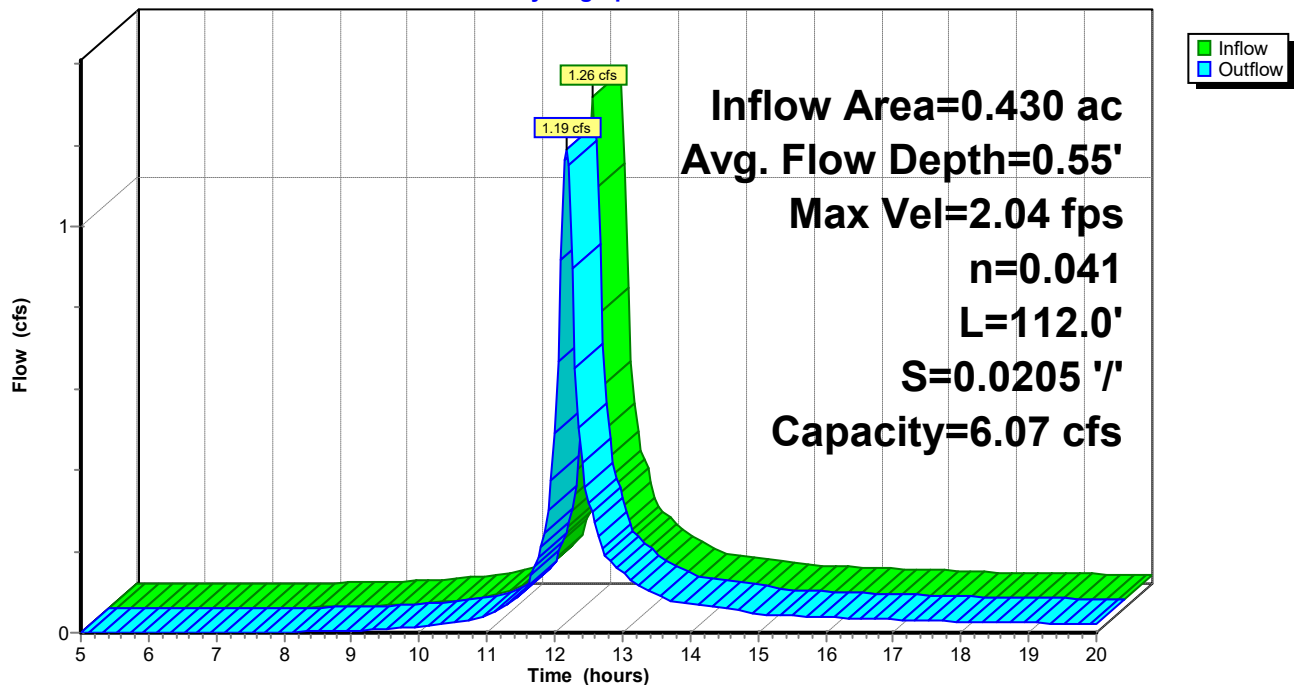
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 10-Year Rainfall=5.00"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>2.86"
Flow Length=100' Tc=6.0 min CN=82 Runoff=1.28 cfs 0.079 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>2.50"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.35 cfs 0.021 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.38' Max Vel=1.44 fps Inflow=1.28 cfs 0.079 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=1.23 cfs 0.078 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.60' Max Vel=2.16 fps Inflow=1.57 cfs 0.099 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=1.49 cfs 0.099 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.099 af Average Runoff Depth = 2.77"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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NOAA 24-hr C 10-Year Rainfall=5.00"

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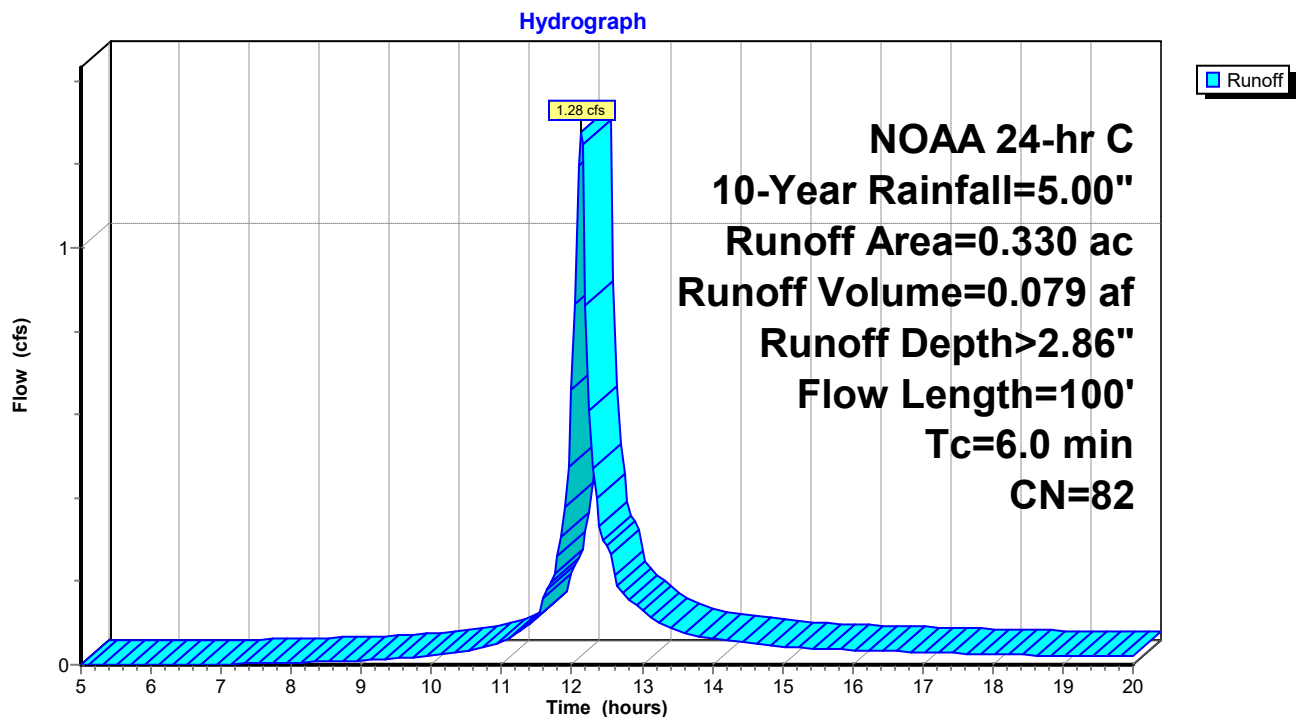
Summary for Subcatchment 1S: D2 Reach A

Runoff = 1.28 cfs @ 12.13 hrs, Volume= 0.079 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

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NOAA 24-hr C 10-Year Rainfall=5.00"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.021 af, Depth> 2.50"

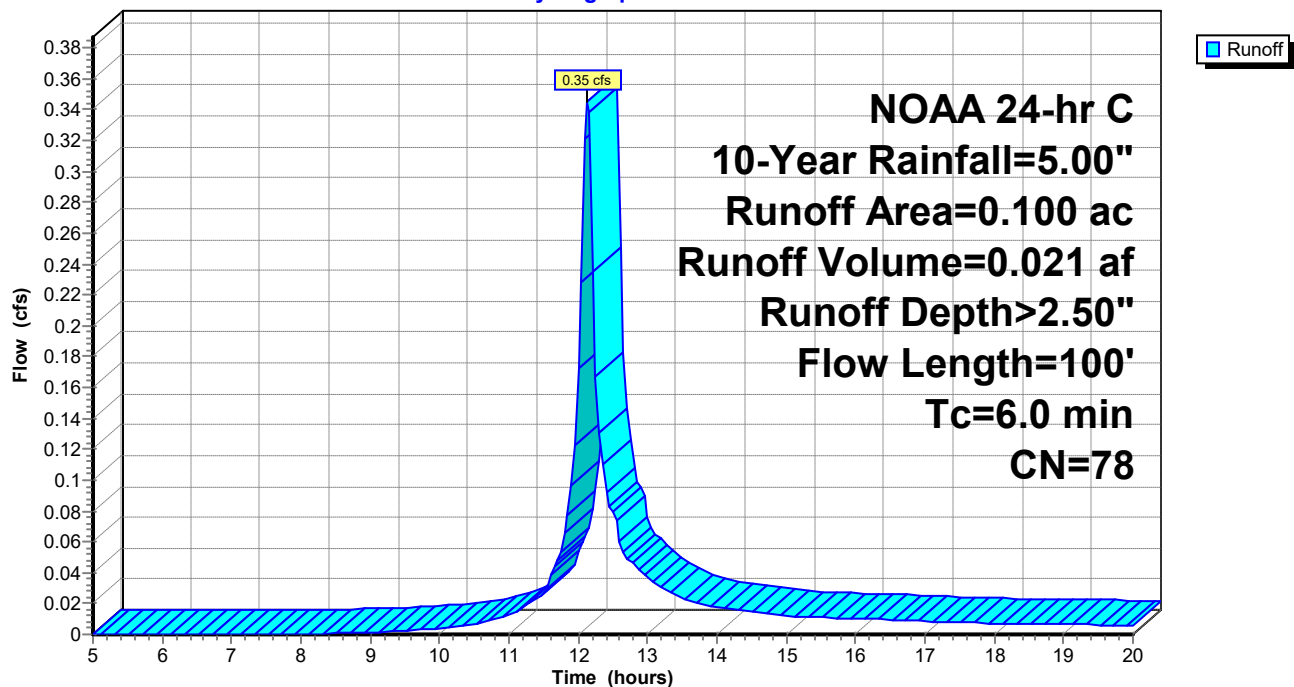
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

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NOAA 24-hr C 10-Year Rainfall=5.00"

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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 1.28 cfs @ 12.13 hrs, Volume= 0.079 af
Outflow = 1.23 cfs @ 12.15 hrs, Volume= 0.078 af, Atten= 4%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.44 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 0.59 fps, Avg. Travel Time= 1.8 min

Peak Storage= 58 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.38'

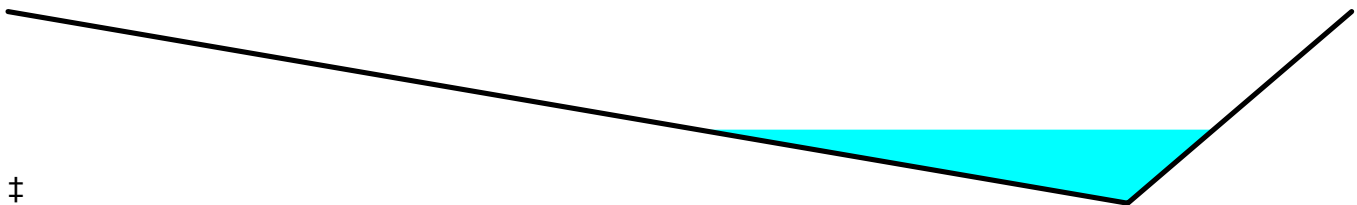
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

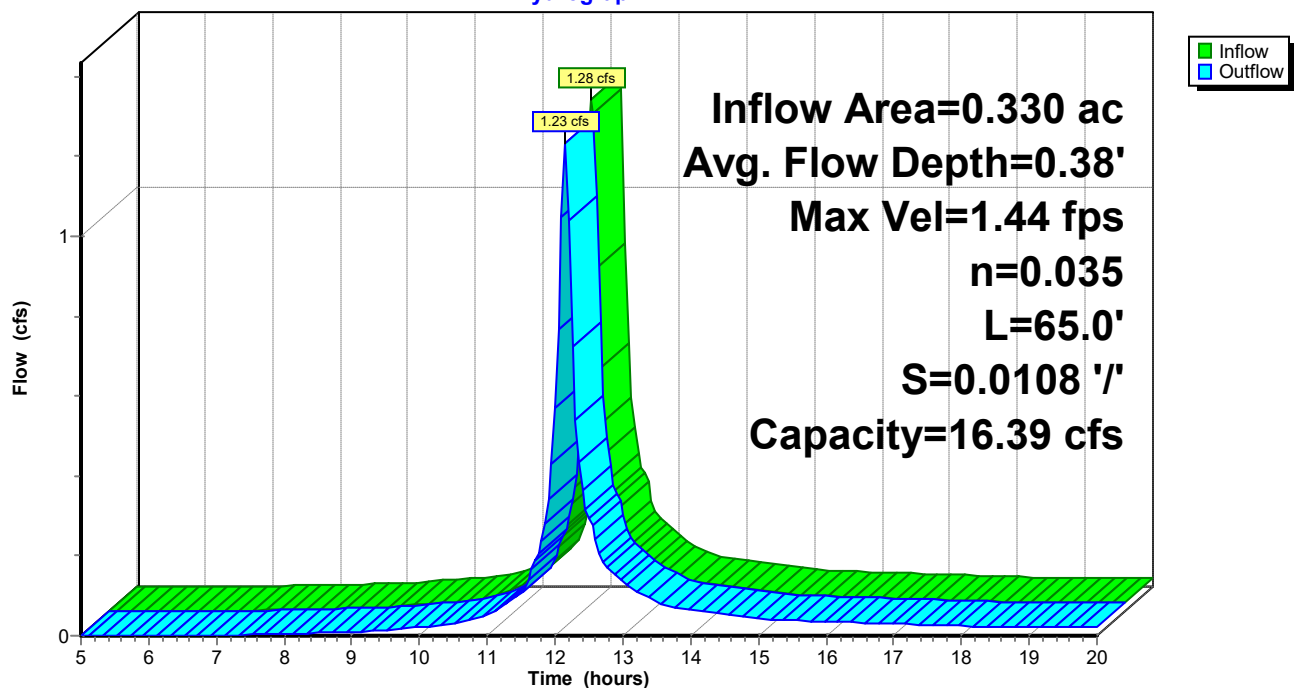
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

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NOAA 24-hr C 10-Year Rainfall=5.00"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.23' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 2.77" for 10-Year event
Inflow = 1.57 cfs @ 12.15 hrs, Volume= 0.099 af
Outflow = 1.49 cfs @ 12.17 hrs, Volume= 0.099 af, Atten= 5%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.16 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 0.89 fps, Avg. Travel Time= 2.1 min

Peak Storage= 80 cf @ 12.16 hrs

Average Depth at Peak Storage= 0.60'

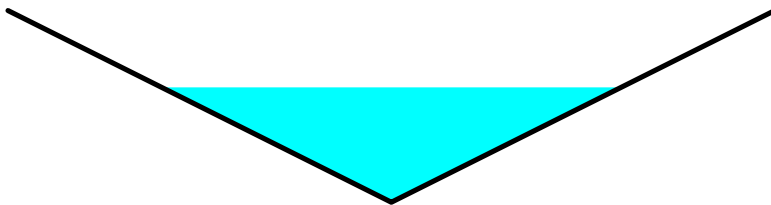
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

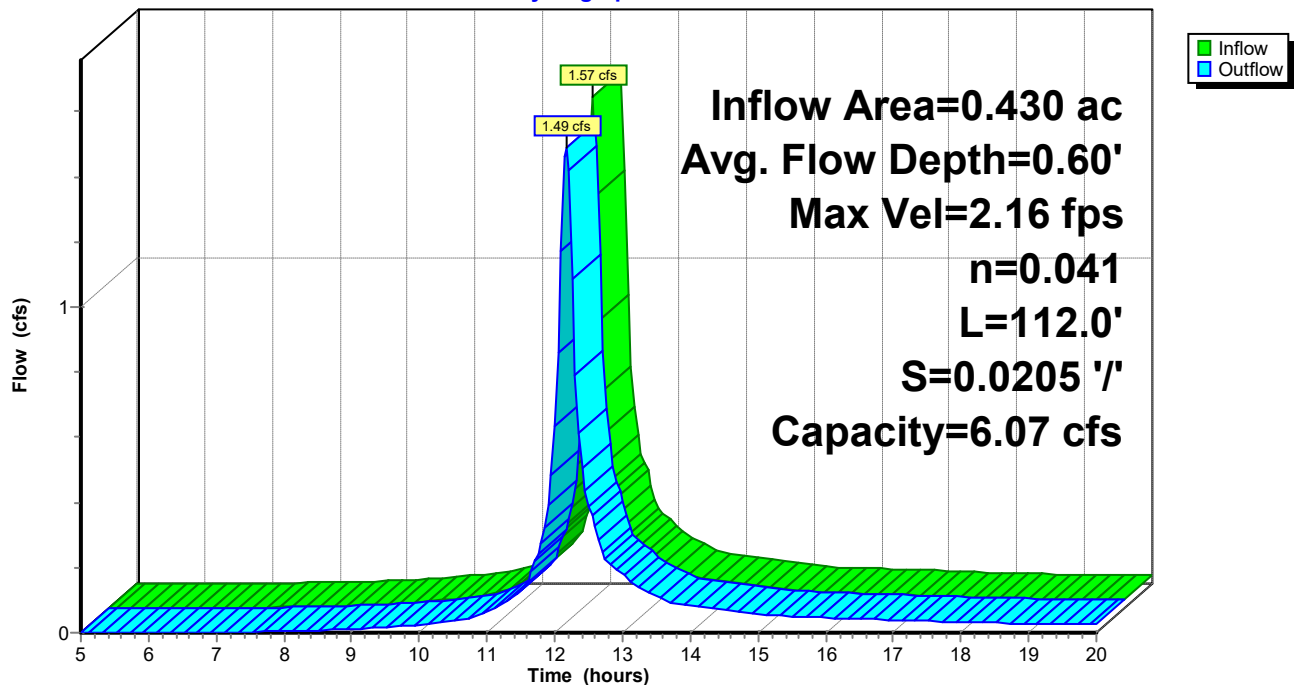
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 25-Year Rainfall=6.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: D2 Reach ARunoff Area=0.330 ac 18.18% Impervious Runoff Depth>3.89"
Flow Length=100' Tc=6.0 min CN=82 Runoff=1.71 cfs 0.107 af**Subcatchment 4S: D2 Reach B**Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>3.48"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.47 cfs 0.029 af**Reach 5R: D2 Reach A**Avg. Flow Depth=0.43' Max Vel=1.55 fps Inflow=1.71 cfs 0.107 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=1.66 cfs 0.107 af**Reach 6R: D2 Reach B**Avg. Flow Depth=0.67' Max Vel=2.33 fps Inflow=2.13 cfs 0.136 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=2.02 cfs 0.136 af**Total Runoff Area = 0.430 ac Runoff Volume = 0.136 af Average Runoff Depth = 3.79"**
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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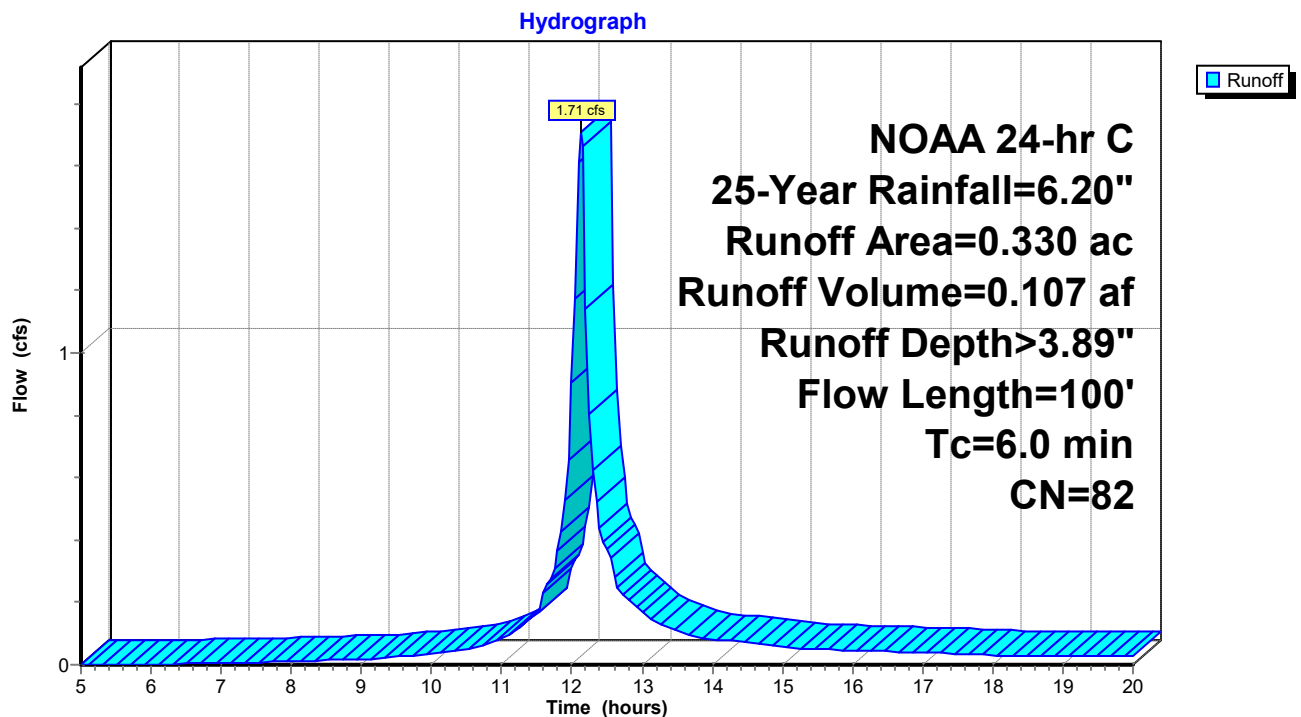
Summary for Subcatchment 1S: D2 Reach A

Runoff = 1.71 cfs @ 12.13 hrs, Volume= 0.107 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.20"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Channel D2

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 3.48"

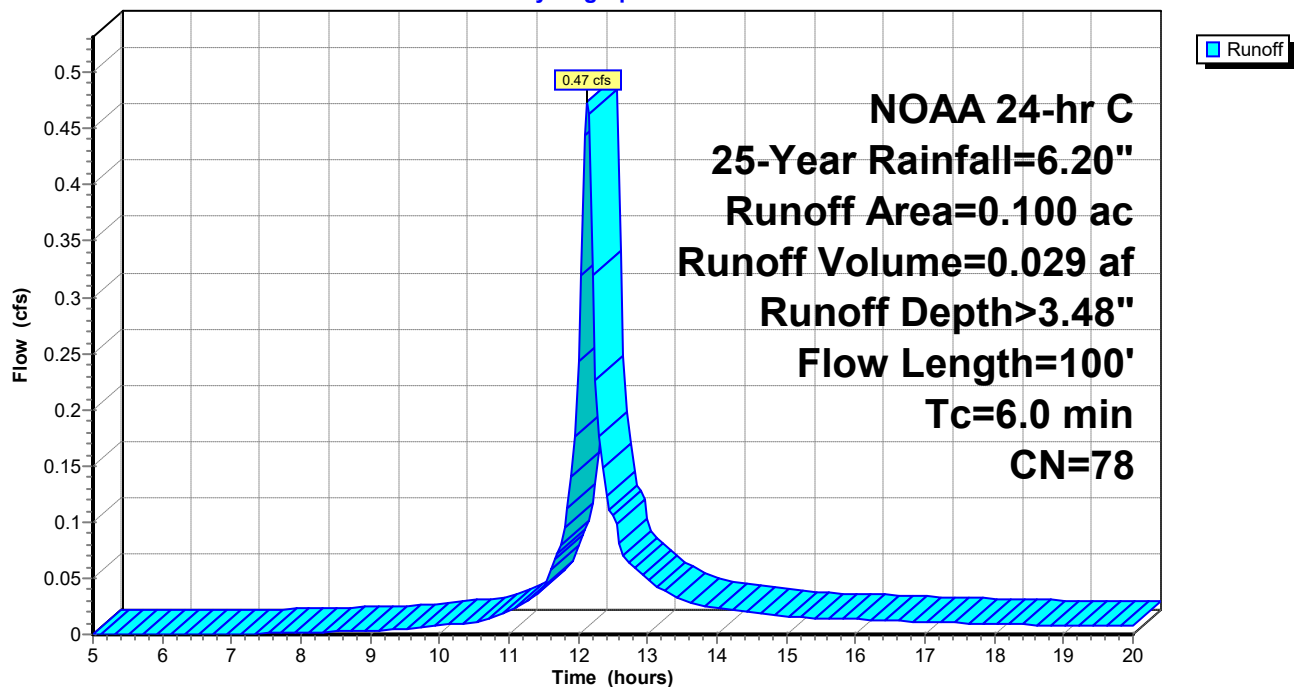
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.20"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 3.89" for 25-Year event
Inflow = 1.71 cfs @ 12.13 hrs, Volume= 0.107 af
Outflow = 1.66 cfs @ 12.15 hrs, Volume= 0.107 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.55 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 0.62 fps, Avg. Travel Time= 1.7 min

Peak Storage= 72 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.43'

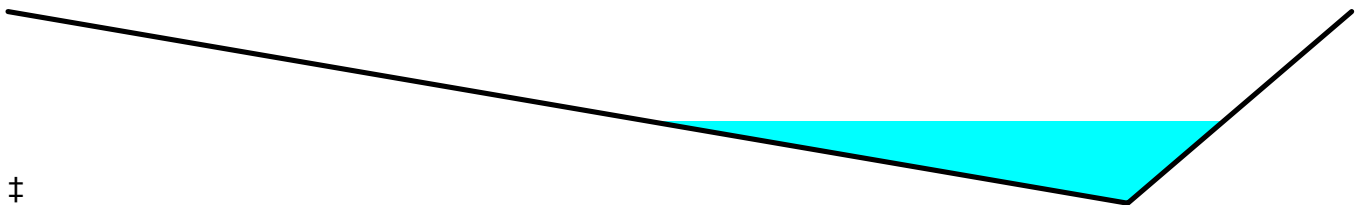
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

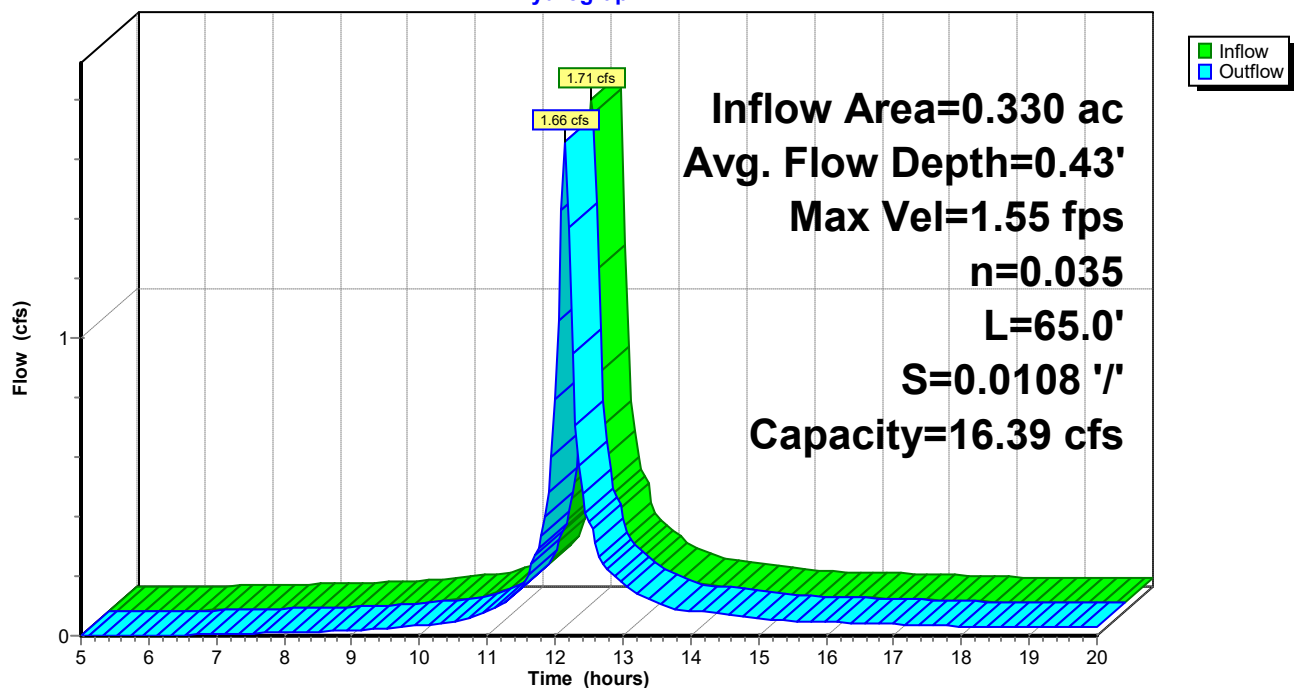
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.25' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 3.79" for 25-Year event
Inflow = 2.13 cfs @ 12.14 hrs, Volume= 0.136 af
Outflow = 2.02 cfs @ 12.16 hrs, Volume= 0.136 af, Atten= 5%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.33 fps, Min. Travel Time= 0.8 min

Avg. Velocity = 0.94 fps, Avg. Travel Time= 2.0 min

Peak Storage= 101 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.67'

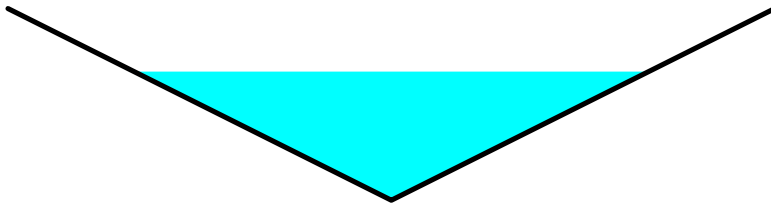
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

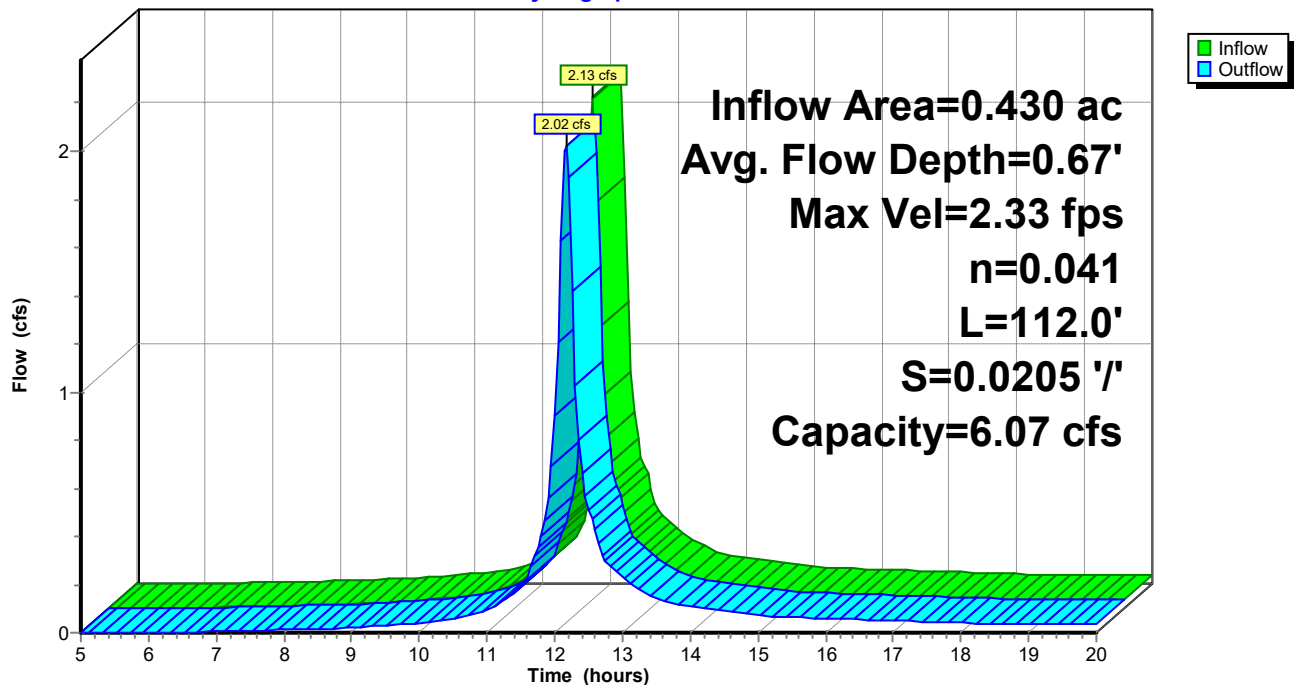
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 50-Year Rainfall=7.33"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>4.88"
Flow Length=100' Tc=6.0 min CN=82 Runoff=2.12 cfs 0.134 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>4.44"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.60 cfs 0.037 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.46' Max Vel=1.64 fps Inflow=2.12 cfs 0.134 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=2.06 cfs 0.134 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.73' Max Vel=2.46 fps Inflow=2.65 cfs 0.171 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=2.53 cfs 0.171 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.171 af Average Runoff Depth = 4.78"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

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NOAA 24-hr C 50-Year Rainfall=7.33"

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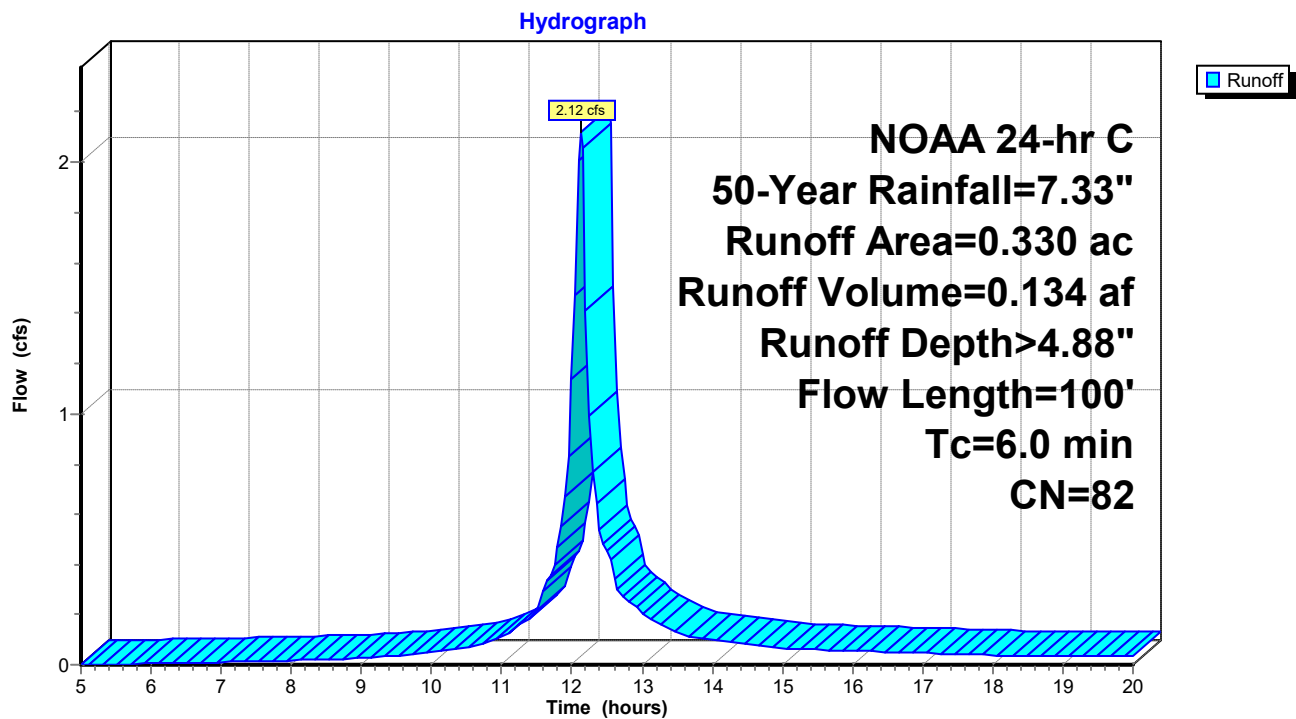
Summary for Subcatchment 1S: D2 Reach A

Runoff = 2.12 cfs @ 12.13 hrs, Volume= 0.134 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 50-Year Rainfall=7.33"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Channel D2

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NOAA 24-hr C 50-Year Rainfall=7.33"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.60 cfs @ 12.13 hrs, Volume= 0.037 af, Depth> 4.44"

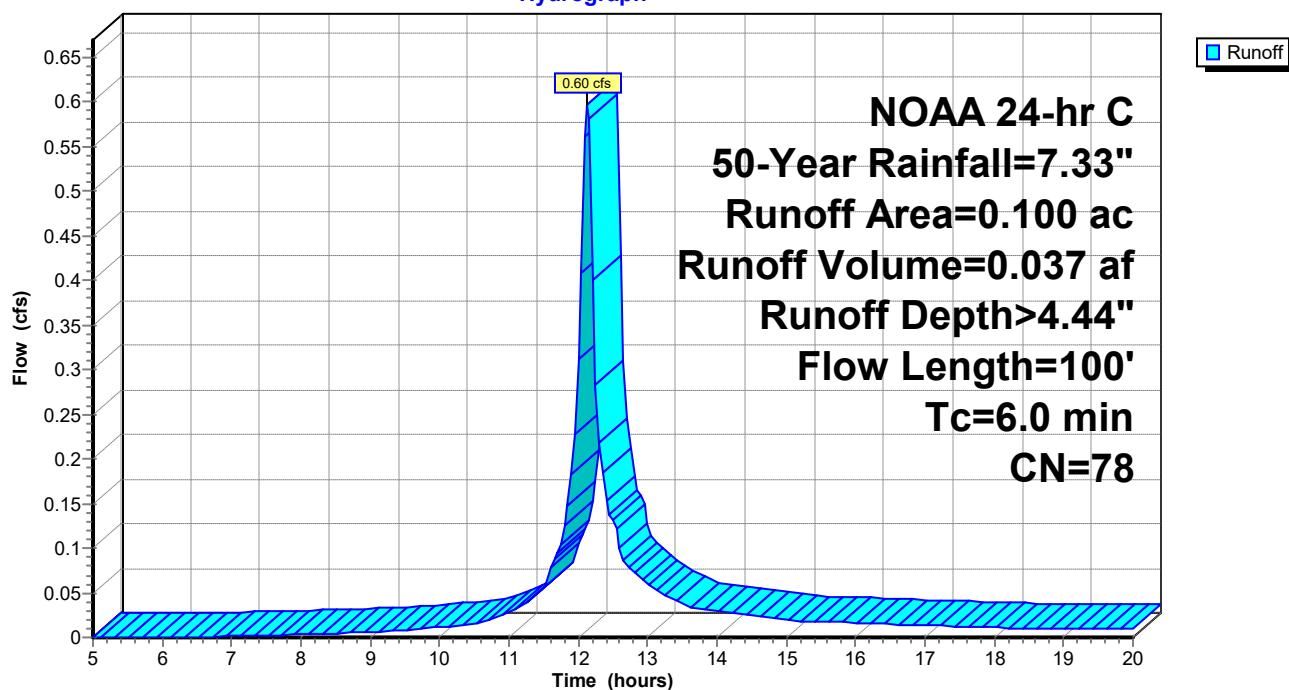
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 50-Year Rainfall=7.33"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

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NOAA 24-hr C 50-Year Rainfall=7.33"

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Summary for Reach 5R: D2 Reach A

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 4.88" for 50-Year event
Inflow = 2.12 cfs @ 12.13 hrs, Volume= 0.134 af
Outflow = 2.06 cfs @ 12.15 hrs, Volume= 0.134 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.64 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 0.65 fps, Avg. Travel Time= 1.7 min

Peak Storage= 84 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.46'

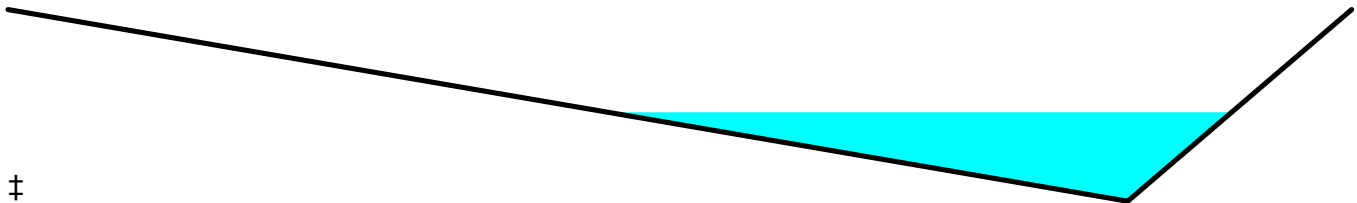
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

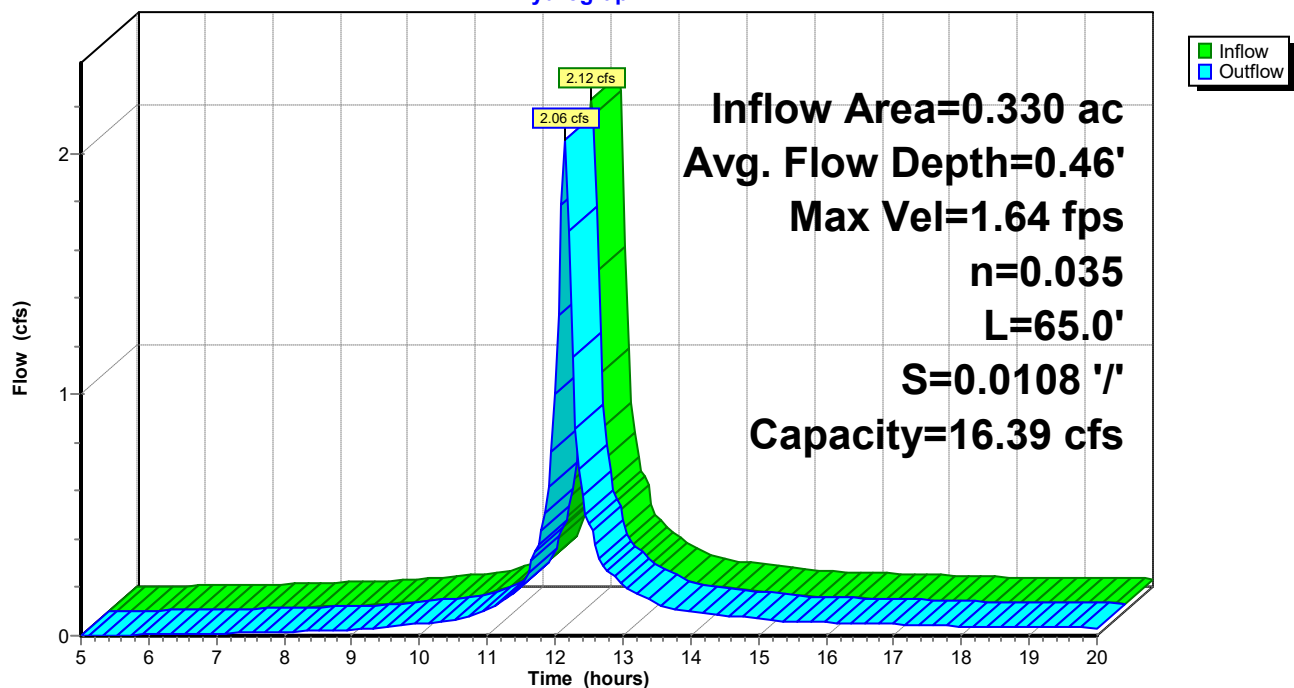
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

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NOAA 24-hr C 50-Year Rainfall=7.33"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.27' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 4.78" for 50-Year event
Inflow = 2.65 cfs @ 12.14 hrs, Volume= 0.171 af
Outflow = 2.53 cfs @ 12.16 hrs, Volume= 0.171 af, Atten= 4%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.46 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 0.98 fps, Avg. Travel Time= 1.9 min

Peak Storage= 119 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.73'

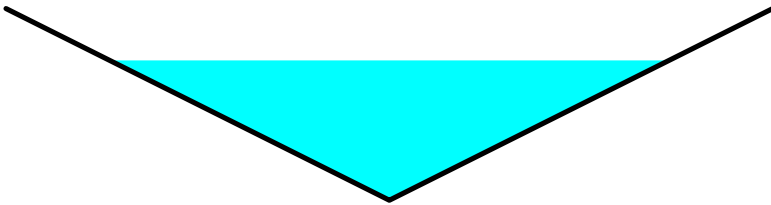
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

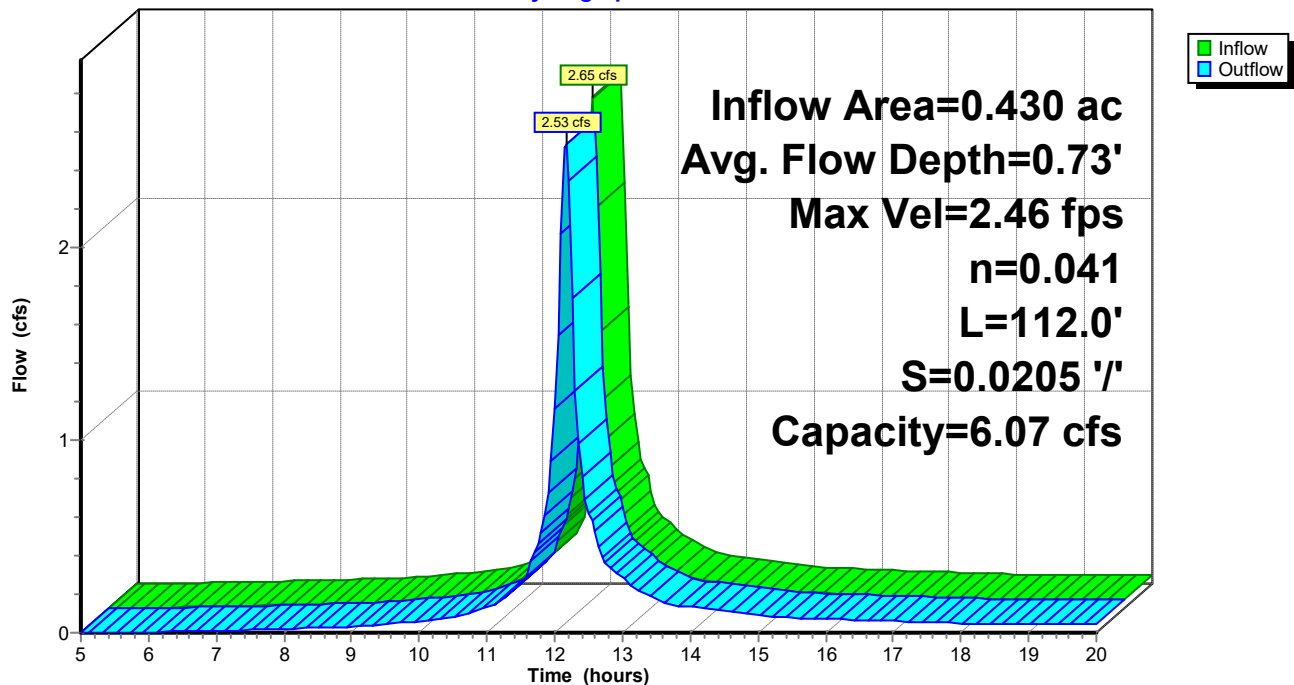
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



Channel D2

NOAA 24-hr C 100-Year Rainfall=8.67"

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

Subcatchment 1S: D2 Reach A

Runoff Area=0.330 ac 18.18% Impervious Runoff Depth>6.08"
Flow Length=100' Tc=6.0 min CN=82 Runoff=2.61 cfs 0.167 af

Subcatchment 4S: D2 Reach B

Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>5.61"
Flow Length=100' Tc=6.0 min CN=78 Runoff=0.74 cfs 0.047 af

Reach 5R: D2 Reach A

Avg. Flow Depth=0.50' Max Vel=1.72 fps Inflow=2.61 cfs 0.167 af
n=0.035 L=65.0' S=0.0108 '/' Capacity=16.39 cfs Outflow=2.54 cfs 0.167 af

Reach 6R: D2 Reach B

Avg. Flow Depth=0.79' Max Vel=2.60 fps Inflow=3.27 cfs 0.214 af
n=0.041 L=112.0' S=0.0205 '/' Capacity=6.07 cfs Outflow=3.13 cfs 0.214 af

Total Runoff Area = 0.430 ac Runoff Volume = 0.214 af Average Runoff Depth = 5.97"
86.05% Pervious = 0.370 ac 13.95% Impervious = 0.060 ac

Channel D2

Prepared by Microsoft

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NOAA 24-hr C 100-Year Rainfall=8.67"

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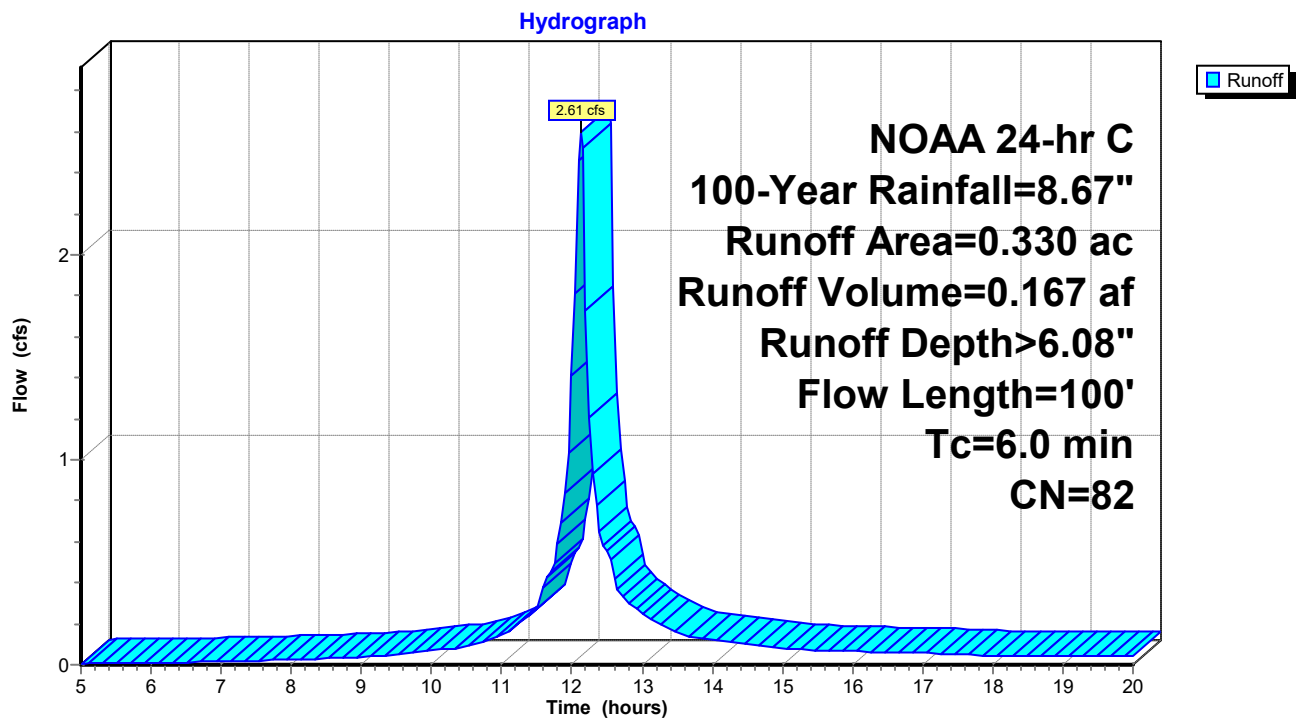
Summary for Subcatchment 1S: D2 Reach A

Runoff = 2.61 cfs @ 12.13 hrs, Volume= 0.167 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.67"

Area (ac)	CN	Description
0.060	98	Paved roads w/curbs & sewers, HSG D
0.270	78	Meadow, non-grazed, HSG D
0.330	82	Weighted Average
0.270		81.82% Pervious Area
0.060		18.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 1S: D2 Reach A

Channel D2

Prepared by Microsoft

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NOAA 24-hr C 100-Year Rainfall=8.67"

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Summary for Subcatchment 4S: D2 Reach B

Runoff = 0.74 cfs @ 12.13 hrs, Volume= 0.047 af, Depth> 5.61"

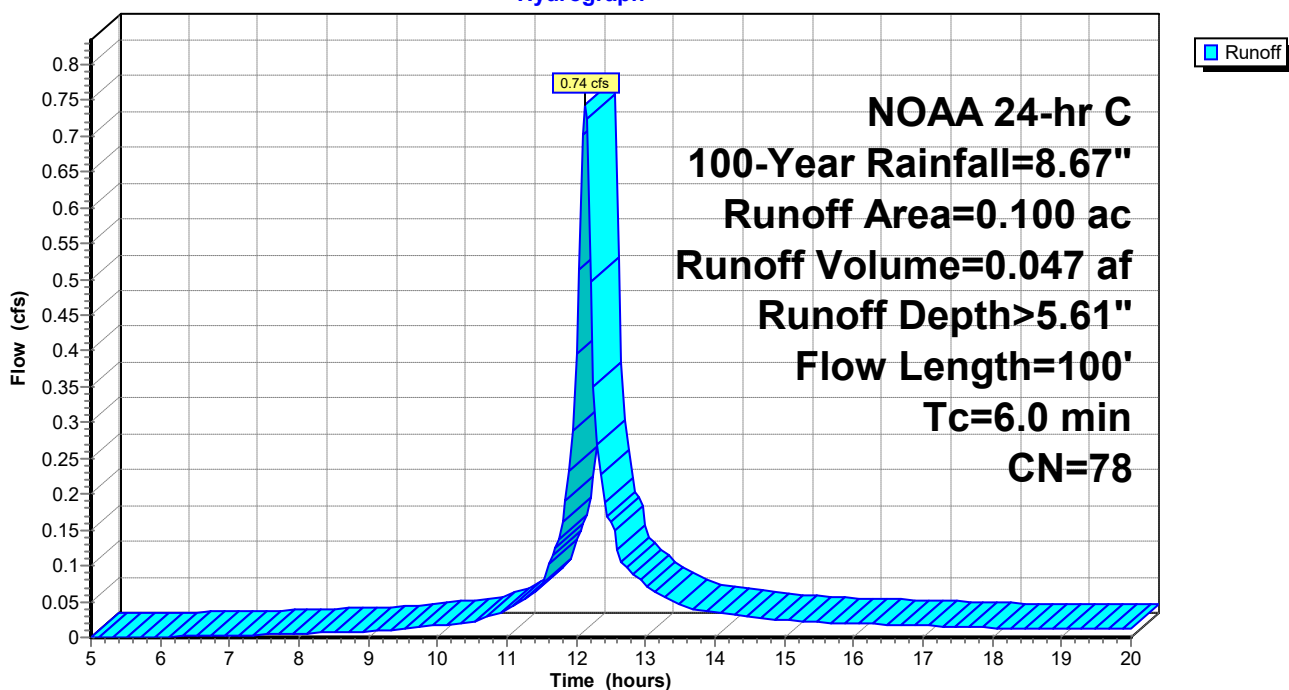
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.67"

Area (ac)	CN	Description
0.100	78	Meadow, non-grazed, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100		0.28		Direct Entry, Tc

Subcatchment 4S: D2 Reach B

Hydrograph



Channel D2

Prepared by Microsoft

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NOAA 24-hr C 100-Year Rainfall=8.67"

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Summary for Reach 5R: D2 Reach A

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.330 ac, 18.18% Impervious, Inflow Depth > 6.08" for 100-Year event
Inflow = 2.61 cfs @ 12.13 hrs, Volume= 0.167 af
Outflow = 2.54 cfs @ 12.14 hrs, Volume= 0.167 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.72 fps, Min. Travel Time= 0.6 min

Avg. Velocity= 0.70 fps, Avg. Travel Time= 1.6 min

Peak Storage= 98 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.50'

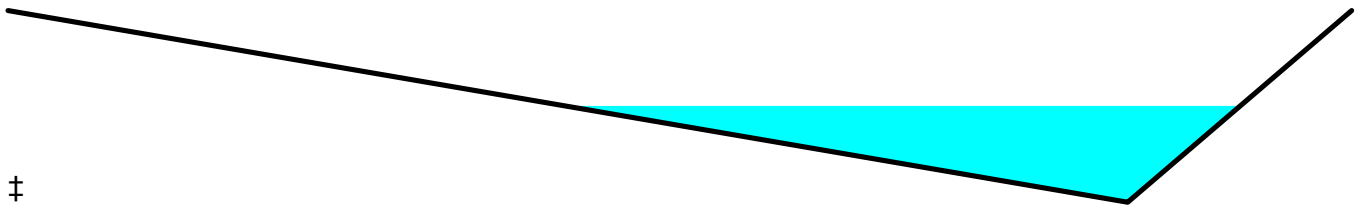
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 16.39 cfs

0.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 10.0 2.0 '/' Top Width= 12.00'

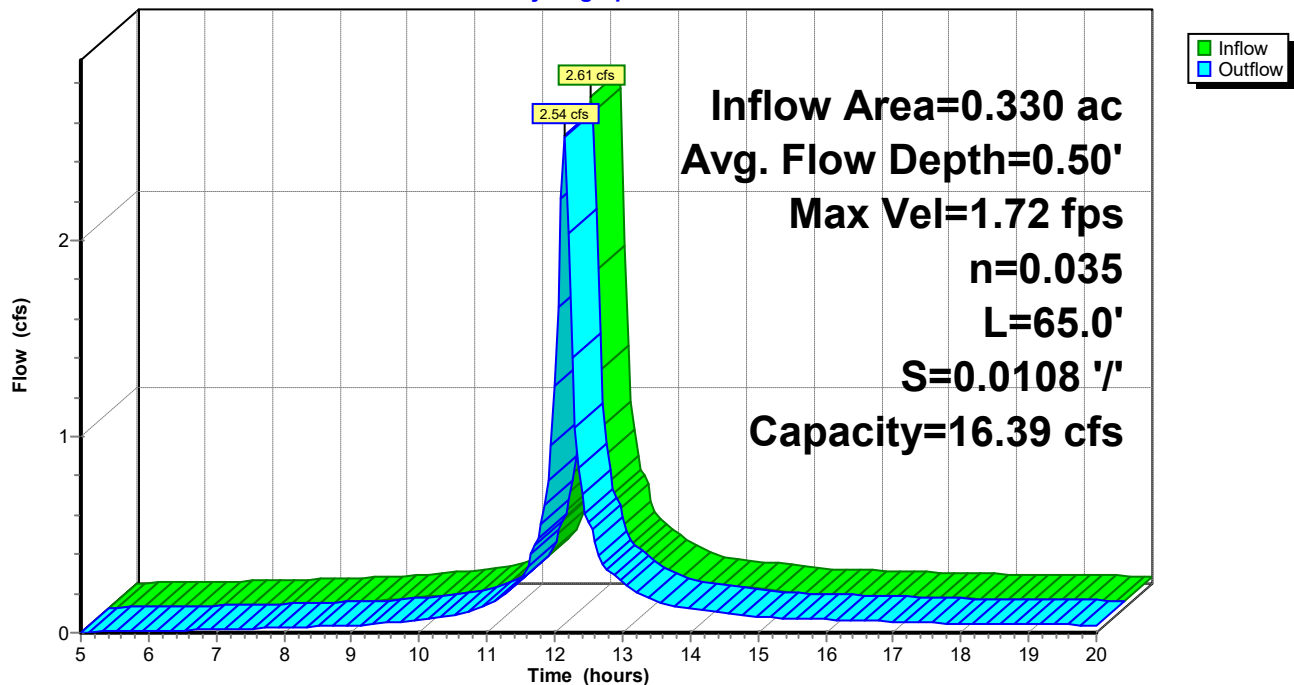
Length= 65.0' Slope= 0.0108 '/'

Inlet Invert= 1,278.00', Outlet Invert= 1,277.30'



Reach 5R: D2 Reach A

Hydrograph



Channel D2

Prepared by Microsoft

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NOAA 24-hr C 100-Year Rainfall=8.67"

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Summary for Reach 6R: D2 Reach B

[62] Hint: Exceeded Reach 5R OUTLET depth by 0.30' @ 12.20 hrs

Inflow Area = 0.430 ac, 13.95% Impervious, Inflow Depth > 5.97" for 100-Year event
Inflow = 3.27 cfs @ 12.14 hrs, Volume= 0.214 af
Outflow = 3.13 cfs @ 12.16 hrs, Volume= 0.214 af, Atten= 4%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.60 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 1.05 fps, Avg. Travel Time= 1.8 min

Peak Storage= 140 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.79'

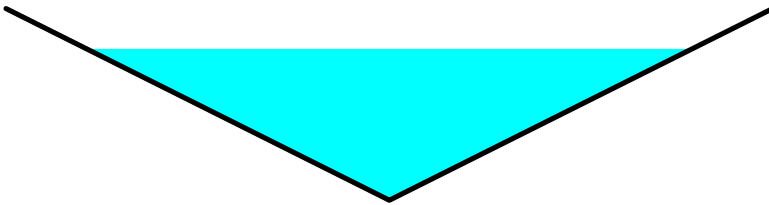
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 6.07 cfs

0.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch

Side Slope Z-value= 2.0 '/' Top Width= 4.00'

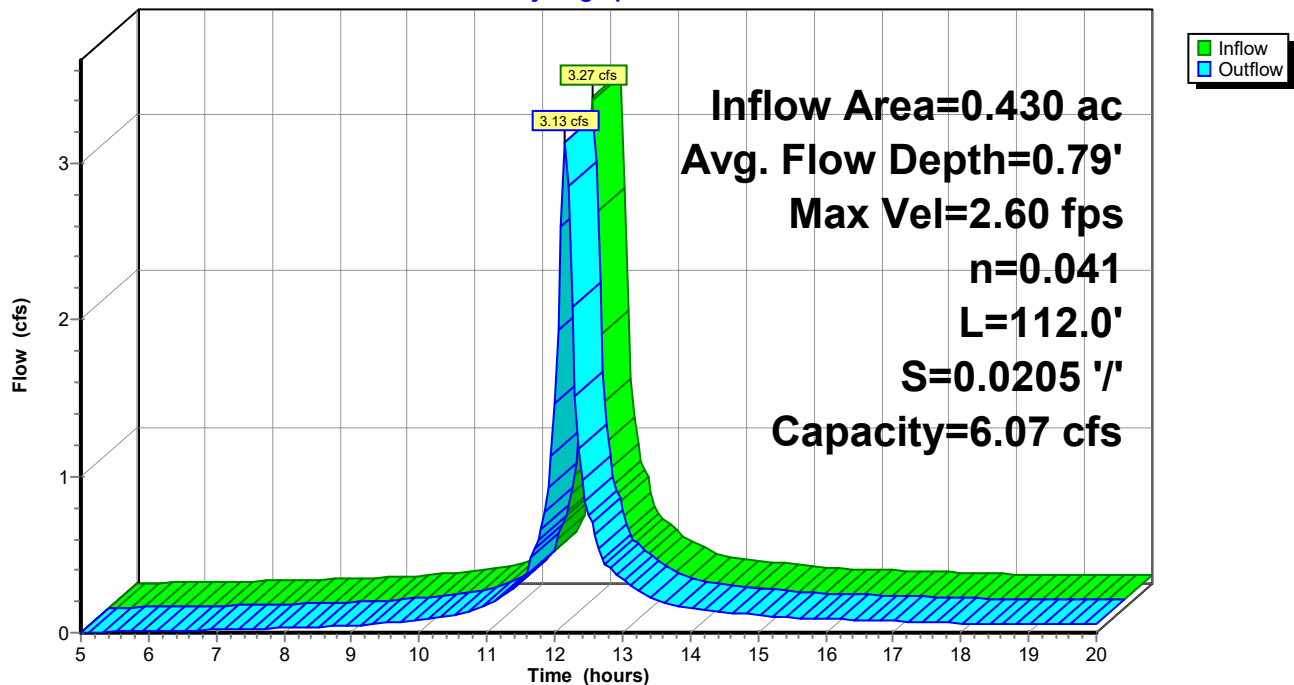
Length= 112.0' Slope= 0.0205 '/'

Inlet Invert= 1,277.30', Outlet Invert= 1,275.00'



Reach 6R: D2 Reach B

Hydrograph



CHANNEL DESIGN WORKSHEETS –
HILDEBRANDT TIE-IN/MLV-515RA40

STANDARD E&S WORKSHEET # 9

Time of Concentration

PROJECT NAME: Williams REAE – Hildebrandt Tie-in/MLV-515RA40

LOCATION: Luzerne County, PA

PREPARED BY: CD

DATE: 03/02/2021

CHECKED BY: PW

DATE: 02/28/2022

OVERLAND FLOW:

Path Number	Length (ft)	"n" Value	Average Slope (ft/ft)	Time (min)
D - 1 Rch A	100	0.4	0.07	0.21
D - 1 Rch B	100	0.4	0.07	0.21

$$T_{c \text{ (sheet flow)}} = \left[\frac{2.48(n)}{3.6} \right]^{0.4673}$$

n Type of Cover

0.02 smooth pavement

0.1 bare parched soil

0.3 poor grass cover

0.4 average grass cover

0.8 dense grass cover

(L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

Path Number	Length (ft)	"n" Value	Average Slope (ft/ft)	Time (min)	Tc Total (min)
D - 1 Rch A	220	0.05	0.04	0.019	0.229
D - 1 Rch B	220	0.05	0.04	0.019	0.229

Channel Dimensions:

Path Number	Bottom Width (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Total Depth (ft)	Top Width (ft)
D - 1 Rch A	2	2	2	1.0	6.0
D - 1 Rch B	2	2	2	1.0	6.0

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – Hildebrandt Tie-in/MLV-515RA40

LOCATION: Luzerne County, PA

PREPARED BY: CD

DATE: 02/28/2022

CHECKED BY: PW

DATE: 02/28/2022

CHANNEL OR CHANNEL SECTION	D-1- Reach A	D-1- Reach A	D-1- Reach B	D-1- Reach B	
TEMPORARY OR PERMANENT? (T OR P)	P	P	P	P	
DESIGN STORM (2, 5, OR 10 YR)	25 YR	25 YR	25 YR	25 YR	
ACRES (AC)	0.22	0.22	0.63	0.63	
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A	
Q _r (REQUIRED CAPACITY) (CFS)	0.81	0.81	2.34	2.34	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.83	0.81	2.44	2.35	
PROTECTIVE LINING ²	SC150BN	Grass	SC150BN	Grass	
n (MANNING'S COEFFICIENT) ²	0.05	0.091	0.05	0.052	
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	3.0	8.0	3.0	
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.1	0.7	2.5	2.4	
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	-	-	-	-	
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	-	-	-	-	
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2	
CHANNEL LEFT SIDE SLOPE (H:V)	2	2	2	2	
CHANNEL RIGHT SIDE SLOPE (H:V)	2	2	2	2	
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0	1.0	
CHANNEL TOP WIDTH @ D (FT)	6.0	6.0	6.0	6.0	
d (CALCULATED FLOW DEPTH) (FT)	0.29	0.4	0.36	0.36	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.16	3.60	3.44	3.44	
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	6.9	5.0	5.56	5.56	
d ₅₀ STONE SIZE (IN)	-	-	-	-	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.75	1.12	0.98	0.98	
R (HYDRAULIC RADIUS) (FT)	0.23	0.30	0.27	0.27	
S (BED SLOPE) ³ (FT/FT)	0.01	0.01	0.04	0.04	
S _c (CRITICAL SLOPE) (FT/FT)	0.062	0.19	0.059	0.064	
.7S _c (FT/FT)	0.044	0.133	0.041	0.045	
1.3S _c (FT/FT)	0.08	0.25	0.08	0.08	
STABLE FLOW? (Y/N)	Y	Y	Y	Y	
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-	
FREEBOARD BASED ON STABLE FLOW (FT)	0.71	0.60	0.64	0.64	
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5	
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL TR-55 REPORT –
HILDEBRANDT TIE-IN/MLV-515RA40

WinTR-55 Current Data Description

--- Identification Data ---

User: PW Date: 10/15/2020
 Project: Hildebrandt Units: English
 SubTitle: will-265 Areal Units: Acres
 State: Pennsylvania
 County: LUZERNE-C
 Filename: Z:\Projects\Williams REA\Hildebrandt\Channel Design D-1.w55

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
D-1 Rch B	channel	Outlet	0.63	77	.229
D-1 Rch A	channel	Outlet	0.22	77	.229

Total area: .85 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	-Yr (in)	-Yr (in)	1-Yr (in)
3.4	4.3	5.0	6.2	.0	.0	2.9

Storm Data Source: LUZERNE-C County, PA (NRCS)
 Rainfall Distribution Type: Type NO_C
 Dimensionless Unit Hydrograph: <standard>

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	-Yr (in)	-Yr (in)	1-Yr (in)
3.4	4.3	5.0	6.2	.0	.0	2.9

Storm Data Source: LUZERNE-C County, PA (NRCS)
Rainfall Distribution Type: Type NO_C
Dimensionless Unit Hydrograph: <standard>

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	10-Yr (cfs)	25-Yr (cfs)

SUBAREAS

D-1 Rch B	1.68	2.34

D-1 Rch A	0.58	0.81

REACHES

OUTLET	2.27	3.15

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow 10-Yr (cfs) (hr)	Peak Time (hr) by Rainfall Return Period 25-Yr (cfs) (hr)

SUBAREAS

D-1 Rch B	1.68 12.20	2.34 12.19

D-1 Rch A	0.58 12.20	0.81 12.19

REACHES

OUTLET	2.27	3.15

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
D-1 Rch B	.63	0.229	77	Outlet	channel
D-1 Rch A	.22	0.229	77	Outlet	channel

Total Area:	.85 (ac)				

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

D-1 Rch B							
SHEET	100	0.0700	0.400				0.210
SHALLOW	220	0.0400	0.050				0.019
						Time of Concentration	.229
							=====
D-1 Rch A							
SHEET	100	0.0700	0.400				0.210
SHALLOW	220	0.0400	0.050				0.019
						Time of Concentration	.229
							=====

PW

Hildebrant
will-265
LUZERNE-C County, Pennsylvania

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
D-1 Rch B Woods		(good) D	.63	77
Total Area / Weighted Curve Number			.63 ===	77 ==
D-1 Rch A Woods		(good) D	.22	77
Total Area / Weighted Curve Number			.22 ===	77 ==

CHANNEL DESIGN WORKSHEETS –
S5-T5/S6-T5 AND S4A-T5/S4-T5
STREAM STABILIZATION

STANDARD E&S WORKSHEET # 9

Time of Concentration

PROJECT NAME: Williams REAE – S4A-T5/S4-T5 Stream Stabilization

LOCATION: Lafin, PA

PREPARED BY: CE

DATE: 02/21/2022

CHECKED BY: PW

DATE: 02/21/2022

OVERLAND FLOW:

PATH NUMBER	LENGTH L (FT)	"n" VALUE	AVERAGE SLOPE (S) (ft/ft)	TIME (minutes)
001	100	0.15	0.070	6.6
002	100	0.15	0.070	6.6
003	100	0.15	0.100	5.7
REACH A	78	0.15	0.077	5.2
REACH B	81	0.15	0.086	5.1
REACH C	100	0.15	0.078	6.3

$$T_{c \text{ (sheet flow)}} = \left[\frac{2.48(n)}{3.6} \right]^{0.4673}$$

n **Type of Cover**
0.02 smooth pavement
0.1 bare parched soil
0.3 poor grass cover
0.4 average grass cover
0.8 dense grass cover
 (L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

PATH NUMBER	LENGTH (FT)	TYPE OF COVER	AVERAGE SLOPE(S) (ft/ft)	V (ft/sec)	TIME (minutes)	TOTAL TIME (minutes)
001	312	Short Grass Past.	0.095	7.0	2.4	9.4
	180	Paved	0.120	20.3	0.4	
002	797	Short Grass Past.	0.086	7.0	6.5	13.1
003	173	Short Grass Past.	0.110	7.0	1.2	8.9
	740	Short Grass Past.	0.094	20.3	2.0	
REACH A	197	Unpaved	0.264	16.1	0.4	5.6
REACH B	219	Unpaved	0.292	16.1	0.4	5.5
REACH C	234	Unpaved	0.286	16.1	0.5	6.8

CHANNEL DIMENSIONS:

CHANNEL	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
REACH A	4.0	2:1	2:1	1.50	10.0
REACH B	5.0	2:1	2:1	1.25	10.0
REACH C	5.0	2:1	2:1	1.25	10.0

STANDARD E&S WORKSHEET # 9

Time of Concentration

PROJECT NAME: Williams REAE – S5-T5 Stream Stabilization

LOCATION: Laflin, PA

PREPARED BY: CE

DATE: 02/21/2022

CHECKED BY: PW

DATE: 02/21/2022

OVERLAND FLOW:

PATH NUMBER	LENGTH L (FT)	"n" VALUE	AVERAGE SLOPE (S) (ft/ft)	TIME (minutes)
S5-T5	88	0.15	0.068	6.0

$$T_c (\text{sheet flow}) = \left[\frac{2.48 (L)^{0.4673}}{3.6 (S)^{0.5}} \right]$$

n Type of Cover

0.02 smooth pavement

0.1 bare parched soil

0.5 poor grass cover

0.6 average grass cover

0.8 dense grass cover

(L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

PATH NUMBER	LENGTH (FT)	TYPE OF COVER	AVERAGE SLOPE(S) (ft/ft)	V (ft/sec)	TIME (minutes)	TOTAL TIME (minutes)
S5-T5	268	Unpaved	0.216	16.1	0.6	6.6

CHANNEL DIMENSIONS:

CHANNEL	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
S5-T5	4.0	2:1	2:1	1.0	10.0

STANDARD E&S WORKSHEET # 9

Time of Concentration

PROJECT NAME: Williams REAE – S6-T5 Stream Stabilization

LOCATION: Laflin, PA

PREPARED BY: CE

DATE: 02/21/2022

CHECKED BY: PW

DATE: 02/21/2022

OVERLAND FLOW:

PATH NUMBER	LENGTH L (FT)	"n" VALUE	AVERAGE SLOPE (S) (ft/ft)	TIME (minutes)
REACH A	100	0.15	0.03	9.3
REACH B	100	0.15	0.03	9.3
REACH C	100	0.15	0.03	9.3
REACH D	100	0.15	0.03	9.3
REACH E	100	0.15	0.035	8.7
REACH F	100	0.15	0.01	14.4

$$T_c (\text{sheet flow}) = \left[\frac{2.48 (L)^{0.5} (n)}{3.6 S^{0.5}} \right]^{0.4673}$$

n **Type of Cover**
0.02 smooth pavement
0.1 bare parched soil
0.7 poor grass cover
0.8 average grass cover
0.8 dense grass cover
(L = 150' maximum)

SHALLOW CONCENTRATED FLOW:

PATH NUMBER	LENGTH (FT)	TYPE OF COVER	AVERAGE SLOPE(S) (ft/ft)	V (ft/sec)	TIME (minutes)	TOTAL TIME (minutes)
REACH A	132	Unpaved	0.320	16.1	0.2	9.5
REACH B	180	Unpaved	0.310	16.1	0.3	9.6
REACH C	207	Unpaved	0.310	16.1	0.4	9.7
REACH D	195	Unpaved	0.300	16.1	0.4	9.7
REACH E	291	Unpaved	0.278	16.1	0.6	9.3
REACH F	457	Unpaved	0.175	16.1	1.1	15.5

CHANNEL DIMENSIONS:

CHANNEL	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
REACH A	4.0	2:1	2:1	1.00	10.0
REACH B	4.0	2:1	2:1	1.00	10.0
REACH C	4.0	2:1	2:1	1.00	10.0
REACH D	4.0	2:1	2:1	1.00	10.0
REACH E	4.0	2:1	2:1	1.00	10.0
REACH F	4.0	2:1	2:1	1.00	10.0

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – S4A-T5/S4-T5

LOCATION: Lafin, PA

PREPARED BY: BM

DATE: 02/22/2022

CHECKED BY: PW

DATE: 02/22/2022

CHANNEL OR CHANNEL SECTION	REACH A	REACH B	REACH C	
TEMPORARY OR PERMANENT? (T OR P)	P	P	P	
DESIGN STORM	10 YR	10 YR	10 YR	
ACRES (AC)	1.119	1.448	1.606	
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	
Q _r (REQUIRED CAPACITY) (CFS)	24.2	24.2	24.3	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	24.2	24.2	24.3	
PROTECTIVE LINING ²	R-3 RIPRAP	R-4 RIPRAP	R-4 RIPRAP	
n (MANNING'S COEFFICIENT) ²	0.0381	0.0566	0.0611	
V _a (ALLOWABLE VELOCITY) (FPS)	6.5	9.0	9.0	
V (CALCULATED AT FLOW DEPTH d) (FPS)	4.9	5.9	7.3	
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	-	2.0	2.0	
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	1.3	1.5	1.0	
CHANNEL BOTTOM WIDTH (FT)	4	5	5	
CHANNEL SIDE SLOPES (H:V)	2	2	2	
D (TOTAL DEPTH) (FT)	1.5	1.25	1.25	
CHANNEL TOP WIDTH @ D (FT)	10.0	10.0	10.0	
d (CALCULATED FLOW DEPTH) (FT)	0.86	0.65	0.54	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	7.46	7.59	7.18	
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	4.63	7.72	9.19	
d ₅₀ STONE SIZE (IN)	3	6	6	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	4.955	4.080	3.313	
R (HYDRAULIC RADIUS) (FT)	0.630	0.517	0.466	
S (BED SLOPE) ³ (FT/FT)	0.029	0.123	0.267	
S _c (CRITICAL SLOPE) (FT/FT)	0.026	0.060	0.074	
.7S _c (FT/FT)	0.0182	0.0423	0.0515	
1.3S _c (FT/FT)	0.03	0.08	0.10	
STABLE FLOW? (Y/N)	N	Y	Y	
FREEBOARD BASED ON UNSTABLE FLOW (FT)	0.64	-	-	
FREEBOARD BASED ON STABLE FLOW (FT)	-	0.6	0.71	
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – S6-T5 and S5-T5

LOCATION: Lafin, PA

PREPARED BY: BM

DATE: 02/22/2022

CHECKED BY: PW

DATE: 02/22/2022

CHANNEL OR CHANNEL SECTION	REACH A	REACH B	REACH C	REACH D
TEMPORARY OR PERMANENT? (T OR P)	P	P	P	P
DESIGN STORM	10 YR	10 YR	10 YR	10 YR
ACRES (AC)	0.262	0.354	0.529	0.658
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	0.59	0.89	1.35	1.66
Q (CALCULATED AT FLOW DEPTH d) (CFS)	17.9	18.0	12.8	15.9
PROTECTIVE LINING ²	R-4 RIPRAP	R-4 RIPRAP	R-4 RIPRAP	R-4 RIPRAP
n (MANNING'S COEFFICIENT) ²	0.0636	0.0636	0.0636	0.0636
V _a (ALLOWABLE VELOCITY) (FPS)	9.0	9.0	9.0	9.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	7.2	7.2	5.1	6.3
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.0	2.0	2.0	2.0
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.5	0.5	0.5	0.4
CHANNEL BOTTOM WIDTH (FT)	4.0	4.0	4.0	4.0
CHANNEL SIDE SLOPES (H:V)	2.0	2.0	2.0	2.0
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	8.0	8.0	8.0	8.0
d (CALCULATED FLOW DEPTH) (FT)	0.5	0.5	0.5	0.5
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	6.0	6.0	6.0	6.0
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	8.0	8.0	8.0	8.0
d ₅₀ STONE SIZE (IN)	6	6	6	6
A (CROSS-SECTIONAL AREA) (SQ. FT.)	2.5	2.5	2.5	2.5
R (HYDRAULIC RADIUS) (FT)	0.401	0.401	0.401	0.401
S (BED SLOPE) ³ (FT/FT)	0.318	0.320	0.162	0.250
S _c (CRITICAL SLOPE) (FT/FT)	0.083	0.083	0.083	0.083
.7S _c (FT/FT)	0.0582	0.0582	0.0582	0.0582
1.3S _c (FT/FT)	0.11	0.11	0.11	0.11
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.5	0.5	0.5	0.5
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – S6-T5 and S6-T5

LOCATION: Lafin, PA

PREPARED BY: BM

DATE: 02/22/2022

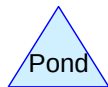
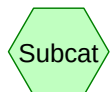
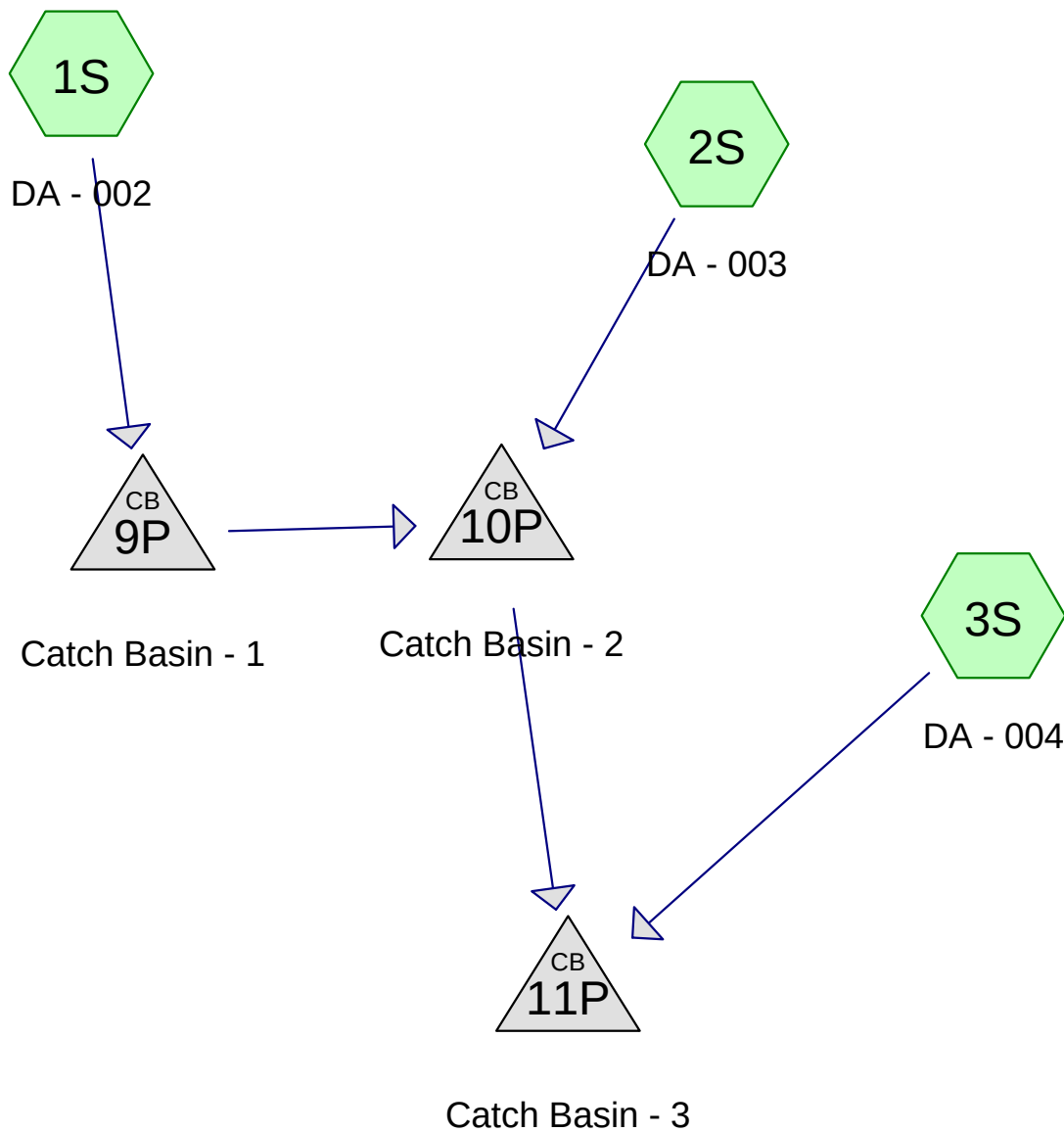
CHECKED BY: PW

DATE: 02/22/2022

CHANNEL OR CHANNEL SECTION	REACH E	REACH F	S5-T5	
TEMPORARY OR PERMANENT? (T OR P)	P	P	P	
DESIGN STORM	10 YR	10 YR	10 YR	
ACRES (AC)	1.426	1.642	1.147	
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	
Q _r (REQUIRED CAPACITY) (CFS)	4.88	5.17	2.76	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	21.3	14.2	11.0	
PROTECTIVE LINING ²	R-4 RIPRAP	R-4 RIPRAP	R-4 RIPRAP	
n (MANNING'S COEFFICIENT) ²	0.0636	0.0636	0.0636	
V _a (ALLOWABLE VELOCITY) (FPS)	9.0	9.0	9.0	
V (CALCULATED AT FLOW DEPTH d) (FPS)	8.5	5.7	4.4	
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.0	2.0	2	
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.7	0.3	0.2	
CHANNEL BOTTOM WIDTH (FT)	4.0	4.0	4	
CHANNEL SIDE SLOPES (H:V)	2.0	2.0	2	
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0	
CHANNEL TOP WIDTH @ D (FT)	8.0	8.0	8	
d (CALCULATED FLOW DEPTH) (FT)	0.5	0.5	0.5	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	6.0	6.0	6.0	
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	8.0	8.0	8.0	
d ₅₀ STONE SIZE (IN)	6	6	6	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	2.5	2.5	2.500	
R (HYDRAULIC RADIUS) (FT)	0.401	0.401	0.401	
S (BED SLOPE) ³ (FT/FT)	0.450	0.200	0.120	
S _c (CRITICAL SLOPE) (FT/FT)	0.083	0.083	0.083	
.7S _c (FT/FT)	0.0582	0.0582	0.0582	
1.3S _c (FT/FT)	0.11	0.11	0.11	
STABLE FLOW? (Y/N)	Y	Y	Y	
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	
FREEBOARD BASED ON STABLE FLOW (FT)	0.5	0.5	0.5	
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	
DESIGN METHOD FOR PROTECTIVE LINING ⁵	S	S	S	
PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)				

- Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
- Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
- Slopes may not be averaged.
- Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
- Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL HYDROCAD REPORT –
S5-T5/S6-T5 AND S4A-T5/S4-T5
STREAM STABILIZATION



REL_Laflin_S4A-T5

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.012	39	>75% Grass cover, Good, HSG A (2S)
0.370	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
3.555	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S)
0.010	72	Dirt roads, HSG A (3S)
2.754	98	Impervious (1S, 2S, 3S)
6.701	87	TOTAL AREA

REL_Laflin_S4A-T5

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.022	HSG A	2S, 3S
0.000	HSG B	
0.370	HSG C	1S, 2S, 3S
3.555	HSG D	1S, 2S, 3S
2.754	Other	1S, 2S, 3S
6.701		TOTAL AREA

REL_Laflin_S4A-T5

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.012	0.000	0.370	3.555	0.000	3.937	>75% Grass cover, Good	1S, 2S, 3S
0.010	0.000	0.000	0.000	0.000	0.010	Dirt roads	3S
0.000	0.000	0.000	0.000	2.754	2.754	Impervious	1S, 2S, 3S
0.022	0.000	0.370	3.555	2.754	6.701	TOTAL AREA	

REL_Laflin_S4A-T5

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	9P	831.46	832.33	27.2	-0.0320	0.025	18.0	0.0	0.0
2	10P	832.33	830.76	40.0	0.0393	0.025	18.0	0.0	0.0
3	11P	830.76	829.00	184.7	0.0095	0.025	18.0	0.0	0.0

REL_Laflin_S4A-T5*Type II 24-hr 10-yr Rainfall=3.74"*

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

Subcatchment1S: DA - 002

Runoff Area=26,425 sf 48.88% Impervious Runoff Depth>2.32"
Flow Length=592' Tc=9.4 min CN=88 Runoff=2.29 cfs 0.117 af

Subcatchment2S: DA - 003

Runoff Area=194,317 sf 37.48% Impervious Runoff Depth>2.14"
Flow Length=897' Tc=13.1 min CN=86 Runoff=14.02 cfs 0.797 af

Subcatchment3S: DA - 004

Runoff Area=71,163 sf 48.10% Impervious Runoff Depth>2.32"
Flow Length=1,013' Tc=8.9 min CN=88 Runoff=6.29 cfs 0.316 af

Pond 9P: Catch Basin - 1

Peak Elev=833.13' Inflow=2.29 cfs 0.117 af
18.0" Round Culvert n=0.025 L=27.2' S=-0.0320 ' Outflow=2.29 cfs 0.117 af

Pond 10P: Catch Basin - 2

Peak Elev=838.84' Inflow=16.13 cfs 0.914 af
18.0" Round Culvert n=0.025 L=40.0' S=0.0393 ' Outflow=16.13 cfs 0.914 af

Pond 11P: Catch Basin - 3

Peak Elev=864.83' Inflow=21.95 cfs 1.230 af
18.0" Round Culvert n=0.025 L=184.7' S=0.0095 ' Outflow=21.95 cfs 1.230 af

Total Runoff Area = 6.701 ac Runoff Volume = 1.230 af Average Runoff Depth = 2.20"
58.90% Pervious = 3.947 ac 41.10% Impervious = 2.754 ac

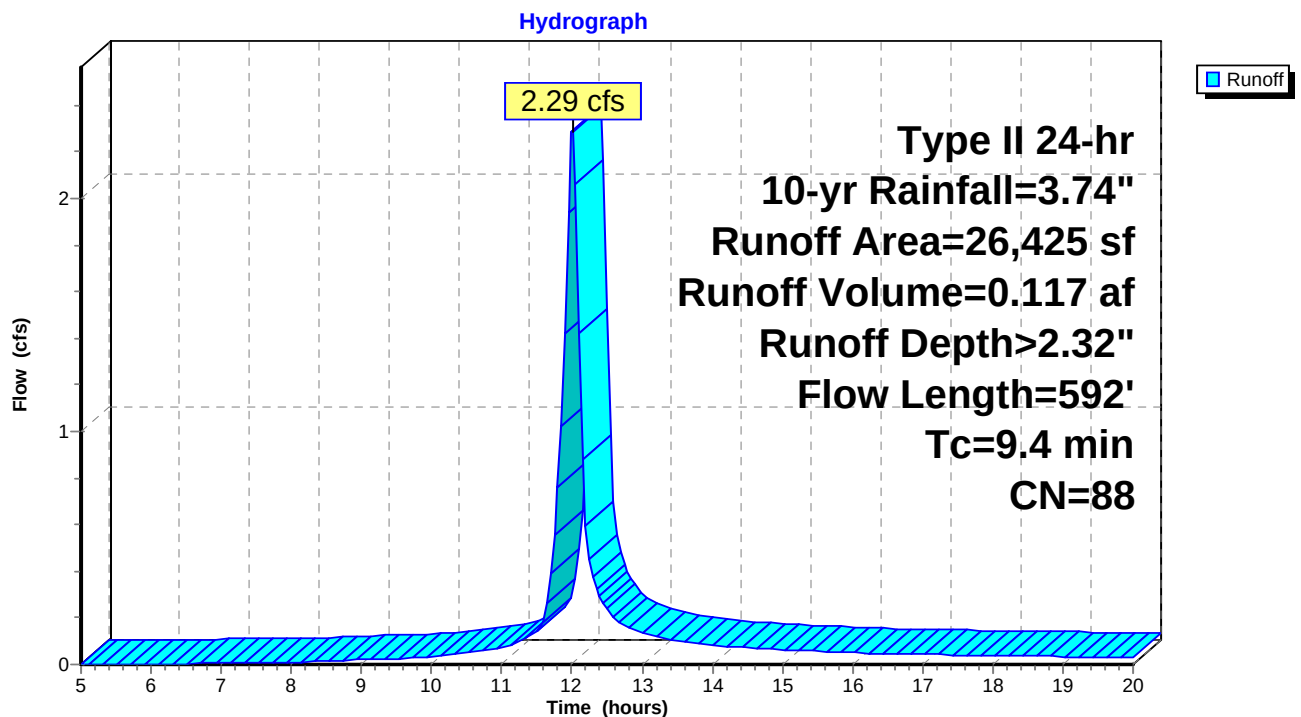
Summary for Subcatchment 1S: DA - 002

Runoff = 2.29 cfs @ 12.01 hrs, Volume= 0.117 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

	Area (sf)	CN	Description
*	12,916	98	Impervious
	9,330	80	>75% Grass cover, Good, HSG D
	4,179	74	>75% Grass cover, Good, HSG C
	26,425	88	Weighted Average
	13,509		51.12% Pervious Area
	12,916		48.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0700	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
2.4	312	0.0945	2.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	180	0.1200	7.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
9.4	592	Total			

Subcatchment 1S: DA - 002

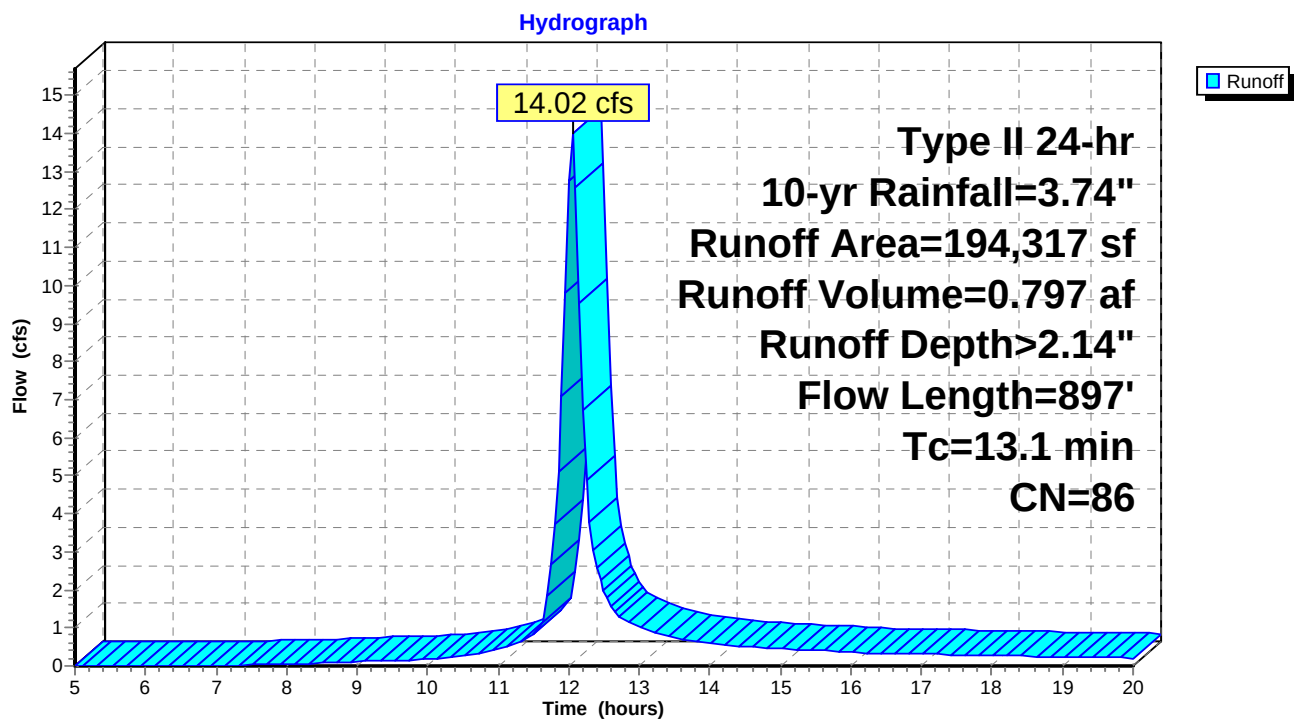
Summary for Subcatchment 2S: DA - 003

Runoff = 14.02 cfs @ 12.05 hrs, Volume= 0.797 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
8,639	74	>75% Grass cover, Good, HSG C
514	39	>75% Grass cover, Good, HSG A
112,334	80	>75% Grass cover, Good, HSG D
* 72,830	98	Impervious
194,317	86	Weighted Average
121,487		62.52% Pervious Area
72,830		37.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0700	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
6.5	797	0.0857	2.05		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	897	Total			

Subcatchment 2S: DA - 003

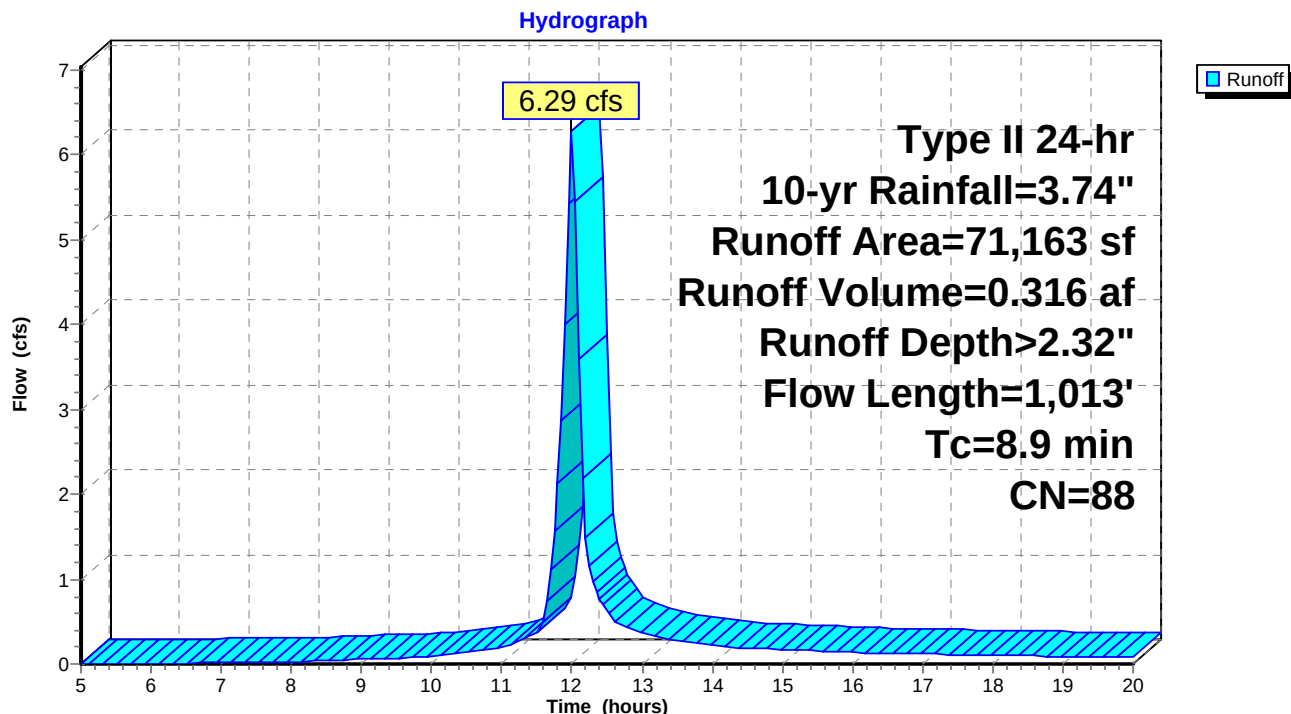
Summary for Subcatchment 3S: DA - 004

Runoff = 6.29 cfs @ 12.00 hrs, Volume= 0.316 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
3,290	74	>75% Grass cover, Good, HSG C
33,190	80	>75% Grass cover, Good, HSG D
455	72	Dirt roads, HSG A
* 34,228	98	Impervious
71,163	88	Weighted Average
36,935		51.90% Pervious Area
34,228		48.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.1000	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
1.2	173	0.1096	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	740	0.0941	6.23		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.9	1,013	Total			

Subcatchment 3S: DA - 004

Summary for Pond 9P: Catch Basin - 1

Inflow Area = 0.607 ac, 48.88% Impervious, Inflow Depth > 2.32" for 10-yr event
 Inflow = 2.29 cfs @ 12.01 hrs, Volume= 0.117 af
 Outflow = 2.29 cfs @ 12.01 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.29 cfs @ 12.01 hrs, Volume= 0.117 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

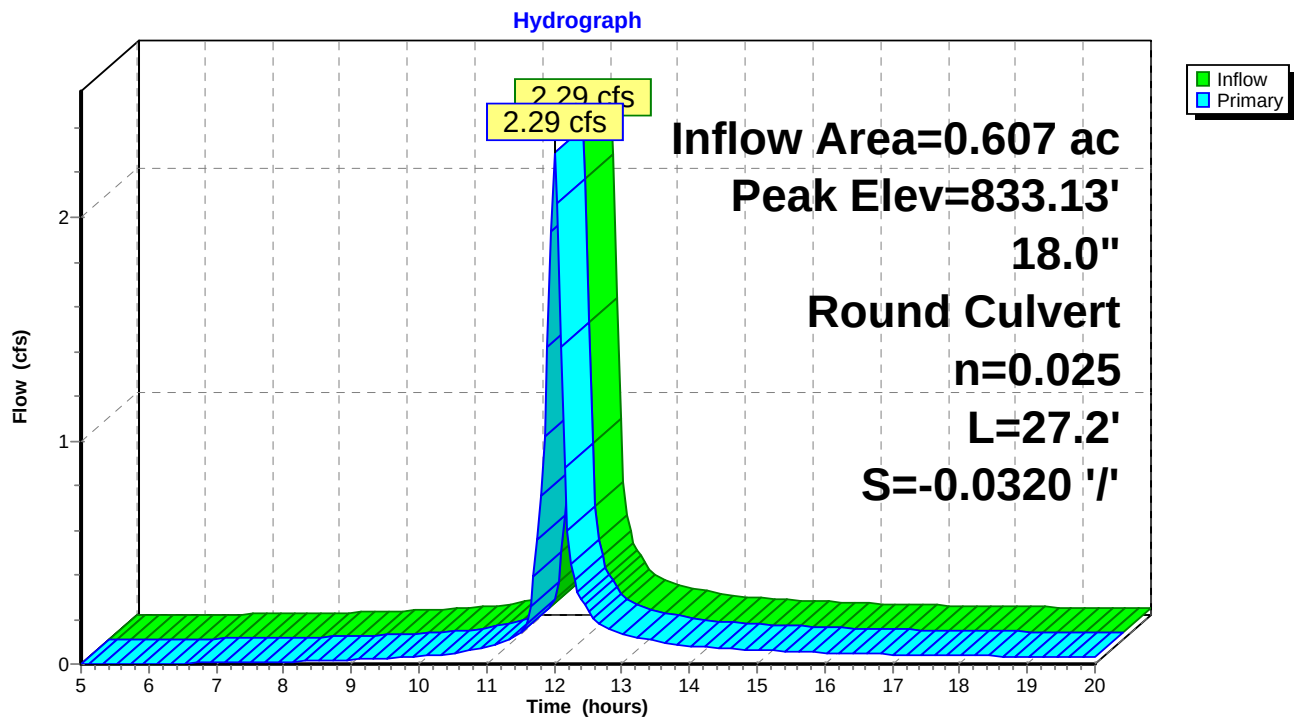
Peak Elev= 833.13' @ 12.01 hrs

Flood Elev= 834.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	832.33'	18.0" Round Culvert L= 27.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 831.46' / 832.33' S= -0.0320 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=2.26 cfs @ 12.01 hrs HW=833.12' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 2.26 cfs @ 2.39 fps)

Pond 9P: Catch Basin - 1

Summary for Pond 10P: Catch Basin - 2

Inflow Area = 5.068 ac, 38.84% Impervious, Inflow Depth > 2.17" for 10-yr event
 Inflow = 16.13 cfs @ 12.04 hrs, Volume= 0.914 af
 Outflow = 16.13 cfs @ 12.04 hrs, Volume= 0.914 af, Atten= 0%, Lag= 0.0 min
 Primary = 16.13 cfs @ 12.04 hrs, Volume= 0.914 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

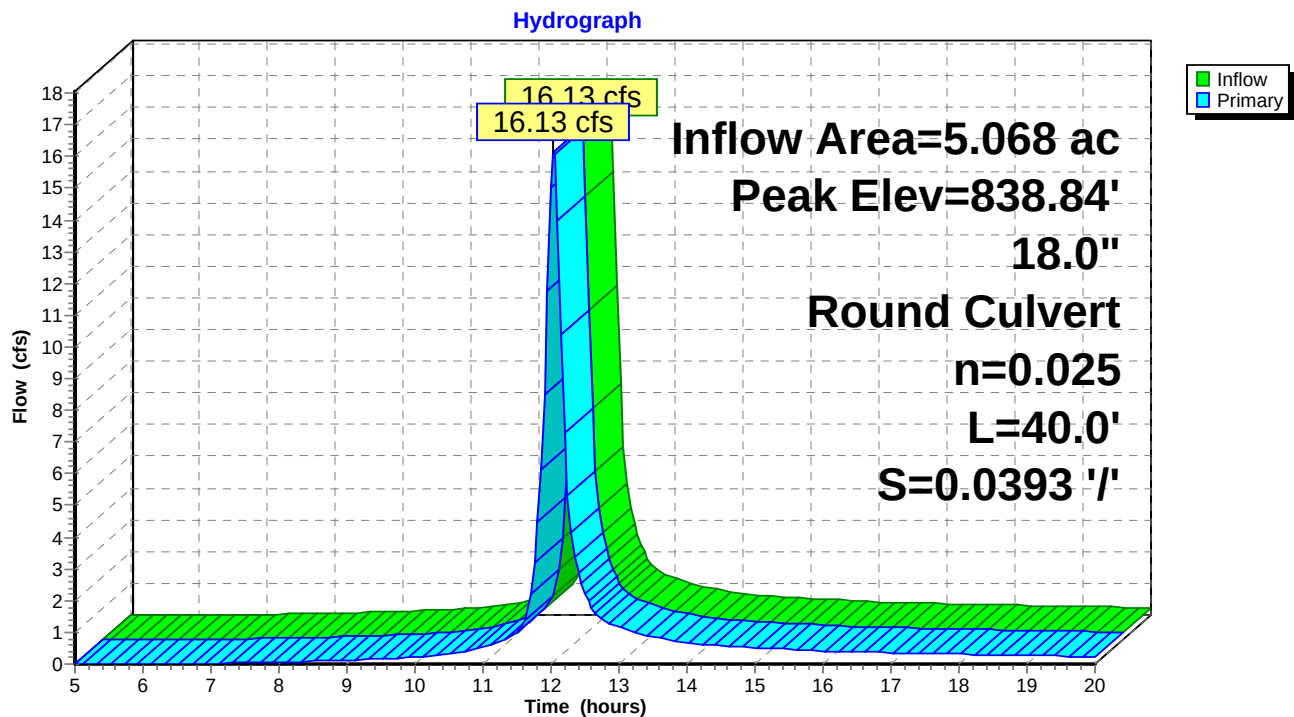
Peak Elev= 838.84' @ 12.04 hrs

Flood Elev= 835.11'

Device	Routing	Invert	Outlet Devices
#1	Primary	832.33'	18.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 832.33' / 830.76' S= 0.0393 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=15.91 cfs @ 12.04 hrs HW=838.69' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 15.91 cfs @ 9.01 fps)

Pond 10P: Catch Basin - 2

Summary for Pond 11P: Catch Basin - 3

Inflow Area = 6.701 ac, 41.10% Impervious, Inflow Depth > 2.20" for 10-yr event
 Inflow = 21.95 cfs @ 12.03 hrs, Volume= 1.230 af
 Outflow = 21.95 cfs @ 12.03 hrs, Volume= 1.230 af, Atten= 0%, Lag= 0.0 min
 Primary = 21.95 cfs @ 12.03 hrs, Volume= 1.230 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

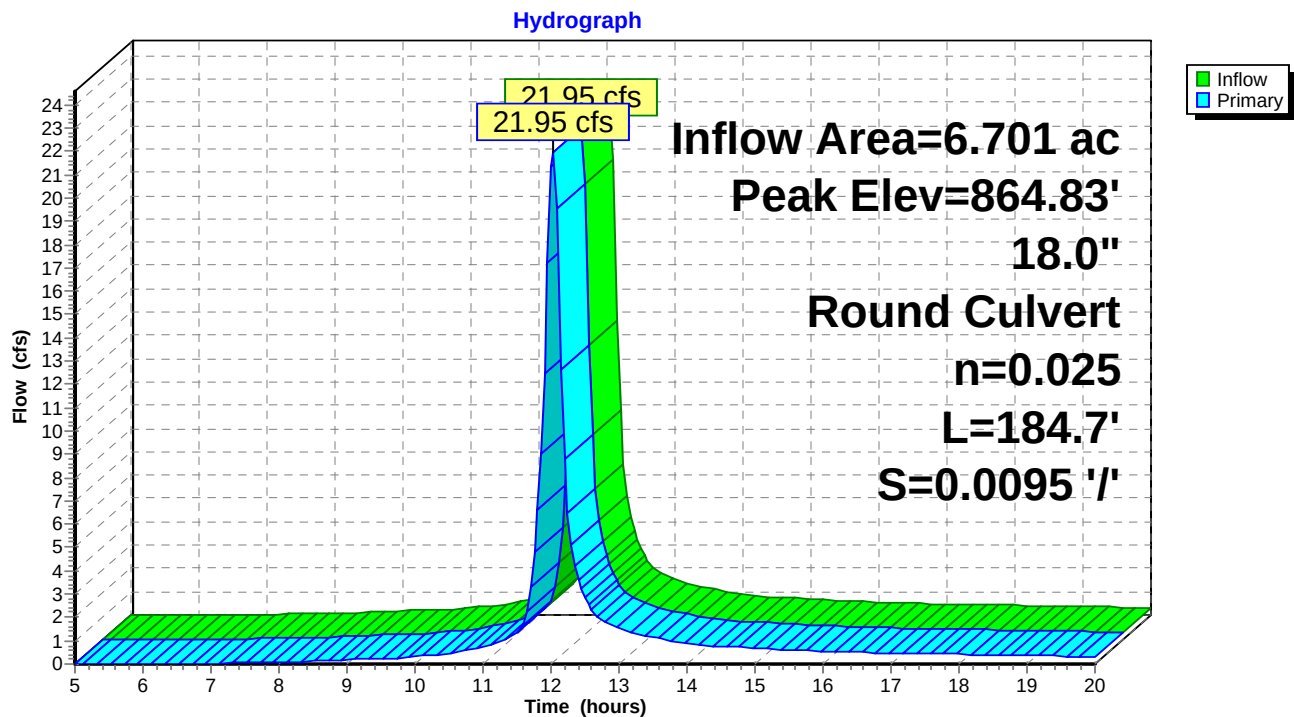
Peak Elev= 864.83' @ 12.03 hrs

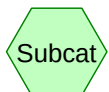
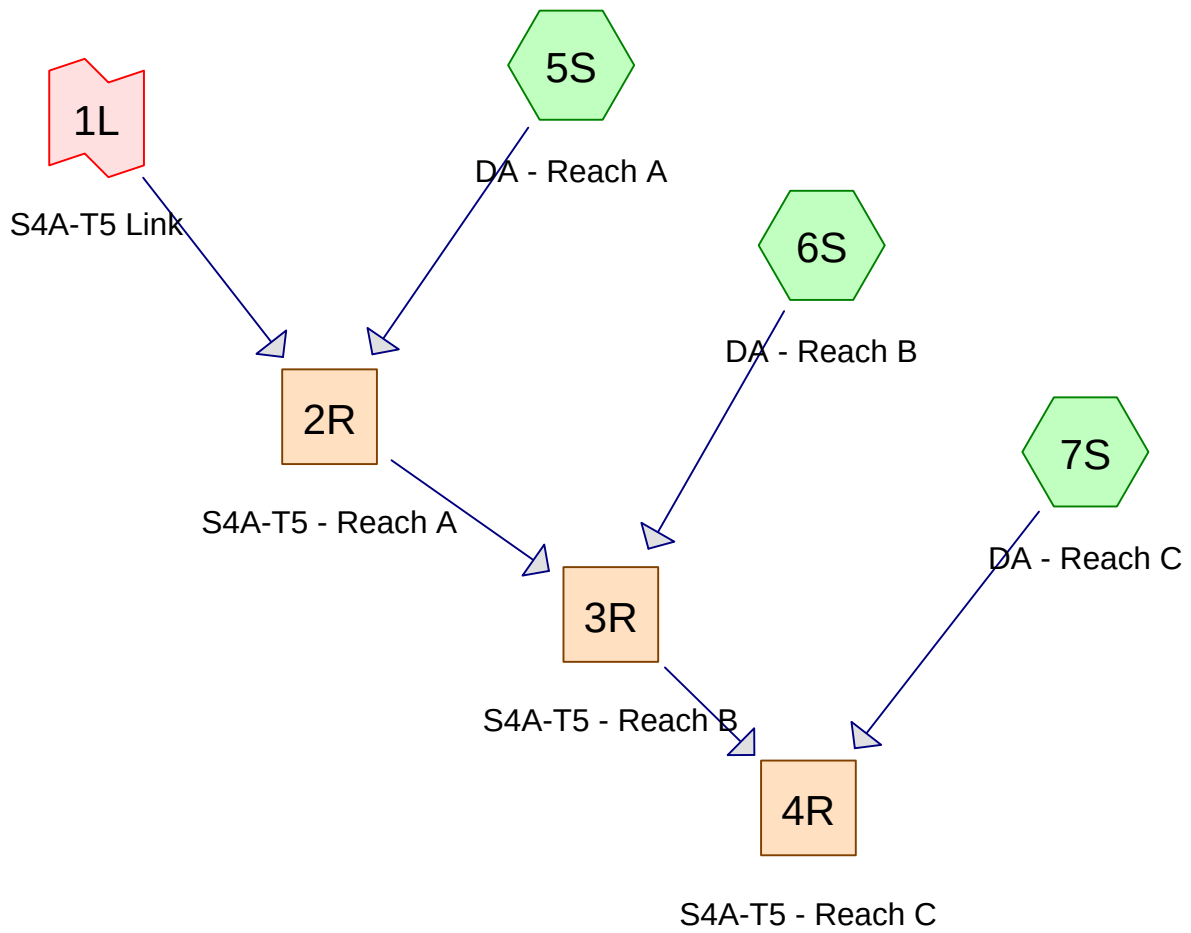
Flood Elev= 835.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	830.76'	18.0" Round Culvert L= 184.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 830.76' / 829.00' S= 0.0095 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=21.44 cfs @ 12.03 hrs HW=863.39' (Free Discharge)

1=Culvert (Barrel Controls 21.44 cfs @ 12.13 hrs)

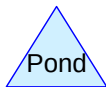
Pond 11P: Catch Basin - 3



Subcat



Reach



Pond



Link

Routing Diagram for REL_Laflin_S4A-T5 - (Reach A-C)
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REL_Laflin_S4A-T5 - (Reach A-C)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.156	98	Impervious (5S, 6S, 7S)
0.484	71	Meadow, non-grazed, HSG C (5S, 6S, 7S)
0.035	78	Meadow, non-grazed, HSG D (5S, 6S, 7S)
0.098	36	Woods, Fair, HSG A (5S, 6S, 7S)
0.833	73	Woods, Fair, HSG C (5S, 6S, 7S)
1.606	73	TOTAL AREA

REL_Laflin_S4A-T5 - (Reach A-C)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.098	HSG A	5S, 6S, 7S
0.000	HSG B	
1.317	HSG C	5S, 6S, 7S
0.035	HSG D	5S, 6S, 7S
0.156	Other	5S, 6S, 7S
1.606		TOTAL AREA

REL_Laflin_S4A-T5 - (Reach A-C)

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.156	0.156	Impervious	5S, 6S, 7S
0.000	0.000	0.484	0.035	0.000	0.519	Meadow, non-grazed	5S, 6S, 7S
0.098	0.000	0.833	0.000	0.000	0.931	Woods, Fair	5S, 6S, 7S
0.098	0.000	1.317	0.035	0.156	1.606	TOTAL AREA	

REL_Laflin_S4A-T5 - (Reach A-C)*Type II 24-hr 10-yr Rainfall=3.74"*

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

Subcatchment5S: DA - Reach A Runoff Area=48,750 sf 10.23% Impervious Runoff Depth>1.28"
Flow Length=275' Tc=5.6 min CN=74 Runoff=2.75 cfs 0.119 af

Subcatchment6S: DA - Reach B Runoff Area=14,301 sf 4.90% Impervious Runoff Depth>0.88"
Flow Length=300' Tc=5.5 min CN=67 Runoff=0.55 cfs 0.024 af

Subcatchment7S: DA - Reach C Runoff Area=6,904 sf 15.90% Impervious Runoff Depth>1.16"
Flow Length=334' Tc=6.8 min CN=72 Runoff=0.34 cfs 0.015 af

Reach 2R: S4A-T5 - Reach A Avg. Flow Depth=0.87' Max Vel=4.83 fps Inflow=24.21 cfs 1.349 af
n=0.038 L=140.0' S=0.0286 '/' Capacity=68.50 cfs Outflow=23.79 cfs 1.348 af

Reach 3R: S4A-T5 - Reach B Avg. Flow Depth=0.65' Max Vel=5.88 fps Inflow=24.19 cfs 1.372 af
n=0.057 L=65.0' S=0.1231 '/' Capacity=79.05 cfs Outflow=24.08 cfs 1.372 af

Reach 4R: S4A-T5 - Reach C Avg. Flow Depth=0.54' Max Vel=7.32 fps Inflow=24.36 cfs 1.387 af
n=0.061 L=15.0' S=0.2667 '/' Capacity=108.73 cfs Outflow=24.34 cfs 1.387 af

Link 1L: 10-yr Primary Outflow Imported from REL_Laflin_S4A-T5~Pond 11P.hce Inflow=21.95 cfs 1.230 af
Area= 6.701 ac 41.10% Imperv. Primary=21.95 cfs 1.230 af

Total Runoff Area = 1.606 ac Runoff Volume = 0.159 af Average Runoff Depth = 1.19"
90.30% Pervious = 1.450 ac 9.70% Impervious = 0.156 ac

REL_Laflin_S4A-T5 - (Reach A-C)

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Type II 24-hr 10-yr Rainfall=3.74"

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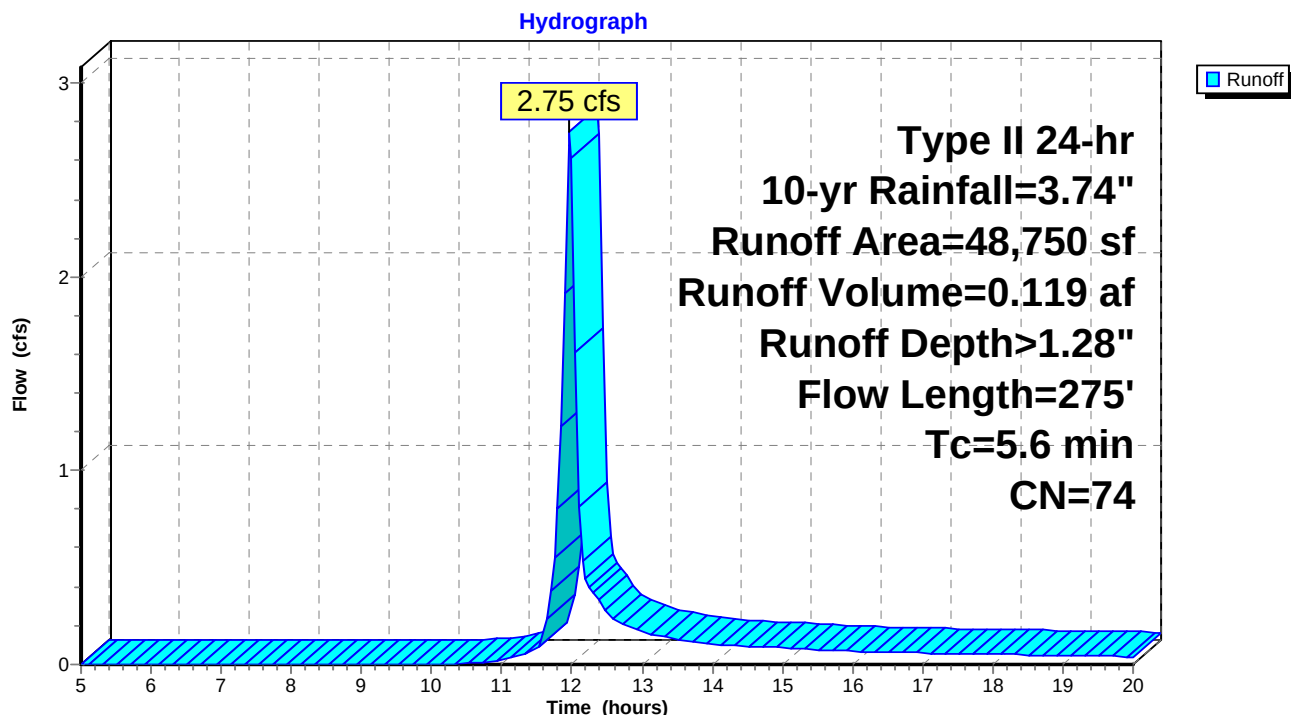
Summary for Subcatchment 5S: DA - Reach A

Runoff = 2.75 cfs @ 11.97 hrs, Volume= 0.119 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
813	36	Woods, Fair, HSG A
26,936	73	Woods, Fair, HSG C
15,221	71	Meadow, non-grazed, HSG C
791	78	Meadow, non-grazed, HSG D
* 4,989	98	Impervious
48,750	74	Weighted Average
43,761		89.77% Pervious Area
4,989		10.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	78	0.0770	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.4	197	0.2640	8.27		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.6	275	Total			

Subcatchment 5S: DA - Reach A

REL_Laflin_S4A-T5 - (Reach A-C)

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Type II 24-hr 10-yr Rainfall=3.74"

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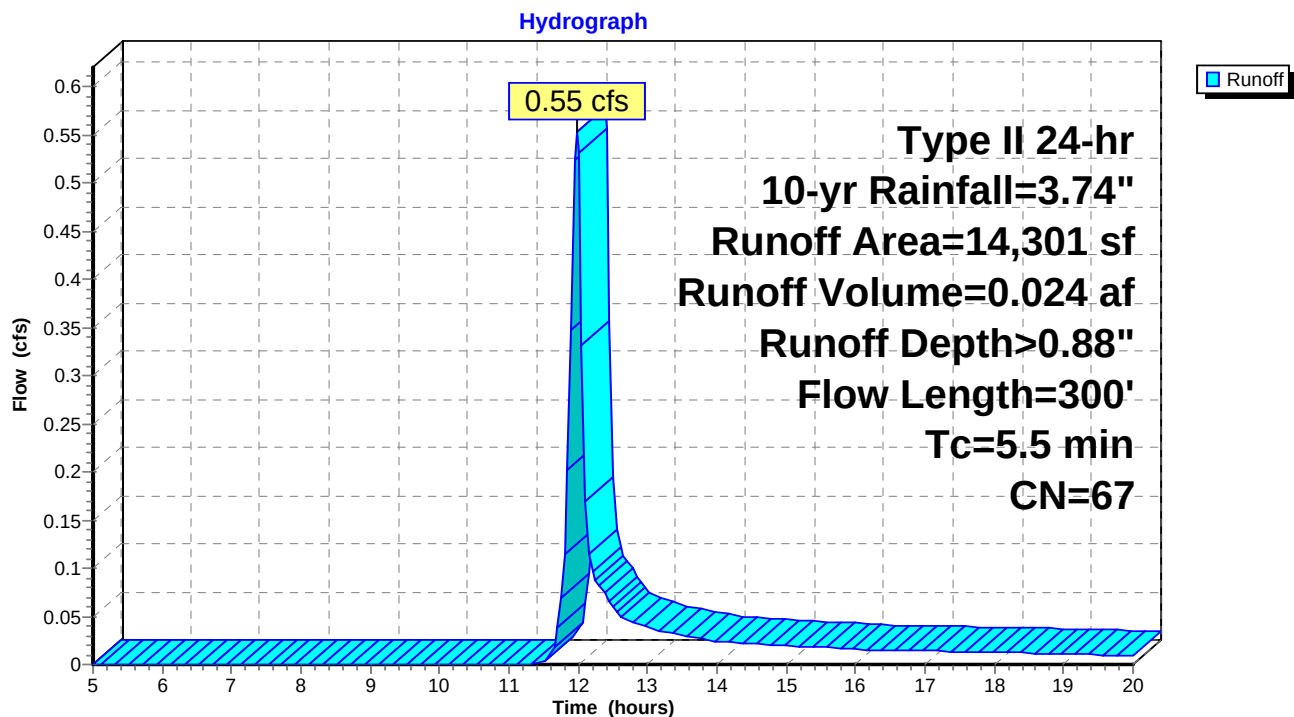
Summary for Subcatchment 6S: DA - Reach B

Runoff = 0.55 cfs @ 11.98 hrs, Volume= 0.024 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
2,585	36	Woods, Fair, HSG A
7,482	73	Woods, Fair, HSG C
3,292	71	Meadow, non-grazed, HSG C
241	78	Meadow, non-grazed, HSG D
* 701	98	Impervious
14,301	67	Weighted Average
13,600		95.10% Pervious Area
701		4.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	81	0.0860	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.4	219	0.2920	8.70		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.5	300	Total			

Subcatchment 6S: DA - Reach B

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Summary for Subcatchment 7S: DA - Reach C

Runoff = 0.34 cfs @ 11.99 hrs, Volume= 0.015 af, Depth> 1.16"

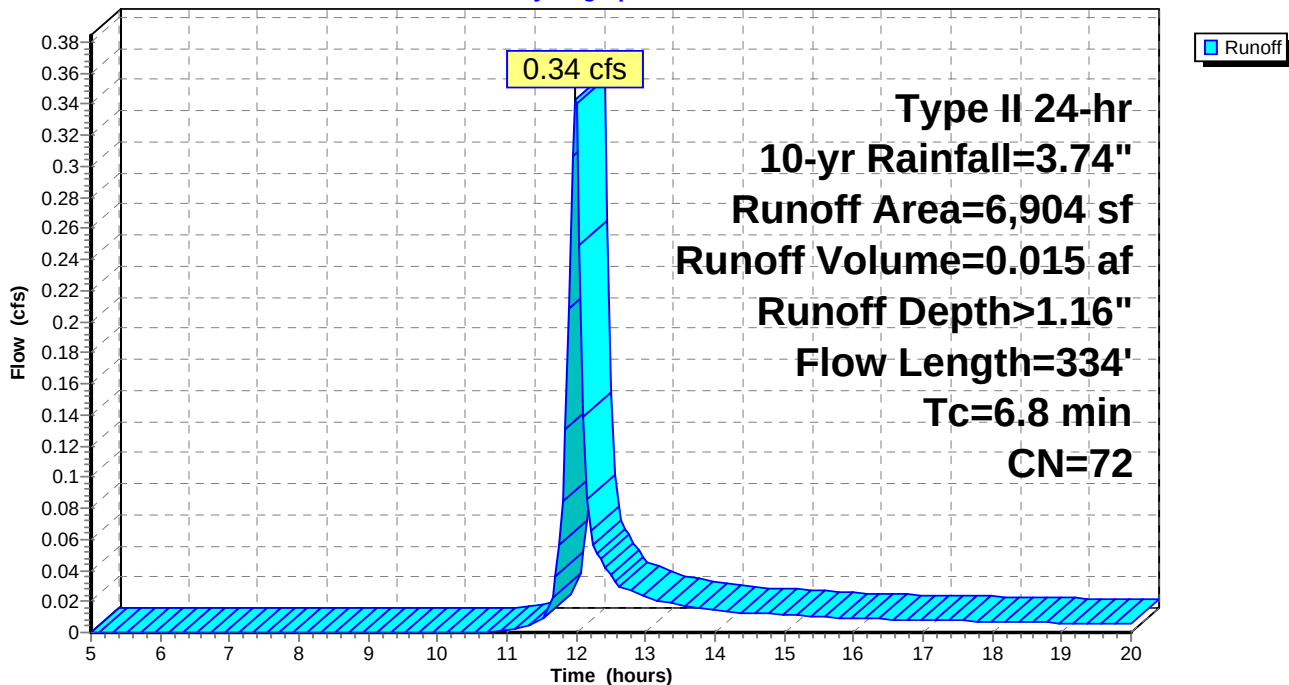
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
863	36	Woods, Fair, HSG A
1,869	73	Woods, Fair, HSG C
2,587	71	Meadow, non-grazed, HSG C
487	78	Meadow, non-grazed, HSG D
* 1,098	98	Impervious
6,904	72	Weighted Average
5,806		84.10% Pervious Area
1,098		15.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0780	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.5	234	0.2860	8.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.8	334	Total			

Subcatchment 7S: DA - Reach C

Hydrograph



REL_Laflin_S4A-T5 - (Reach A-C)

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Type II 24-hr 10-yr Rainfall=3.74"

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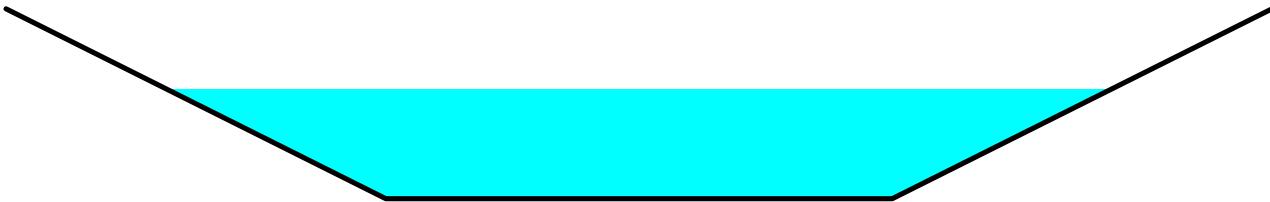
Summary for Reach 2R: S4A-T5 - Reach A

Inflow Area = 7.820 ac, 36.68% Impervious, Inflow Depth > 2.07" for 10-yr event
Inflow = 24.21 cfs @ 12.02 hrs, Volume= 1.349 af
Outflow = 23.79 cfs @ 12.03 hrs, Volume= 1.348 af, Atten= 2%, Lag= 0.9 min

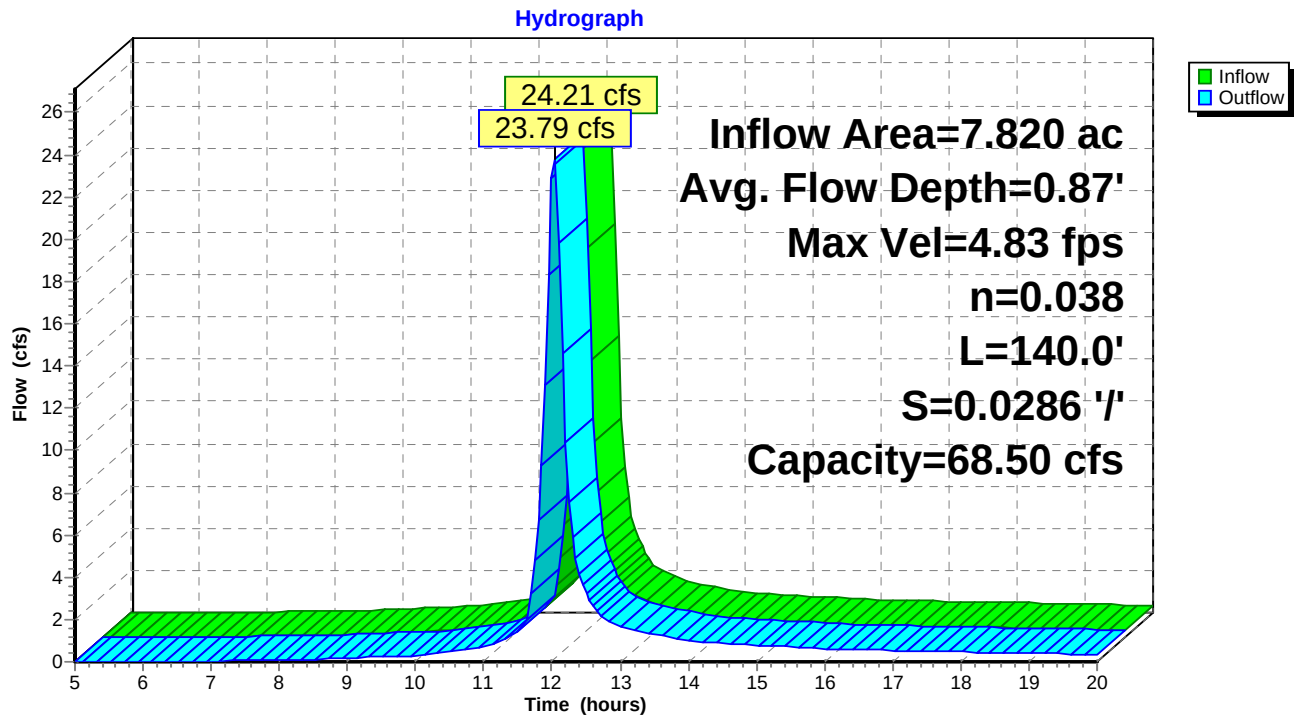
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.83 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 1.7 min

Peak Storage= 695 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.87'
Bank-Full Depth= 1.50' Flow Area= 10.5 sf, Capacity= 68.50 cfs

4.00' x 1.50' deep channel, n= 0.038
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 140.0' Slope= 0.0286 '/'
Inlet Invert= 810.00', Outlet Invert= 806.00'



Reach 2R: S4A-T5 - Reach A



REL_Laflin_S4A-T5 - (Reach A-C)

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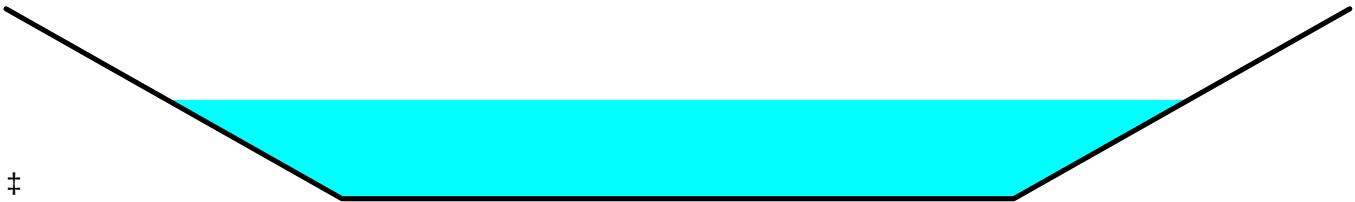
Summary for Reach 3R: S4A-T5 - Reach B

Inflow Area = 8.149 ac, 35.40% Impervious, Inflow Depth > 2.02" for 10-yr event
Inflow = 24.19 cfs @ 12.03 hrs, Volume= 1.372 af
Outflow = 24.08 cfs @ 12.04 hrs, Volume= 1.372 af, Atten= 0%, Lag= 0.3 min

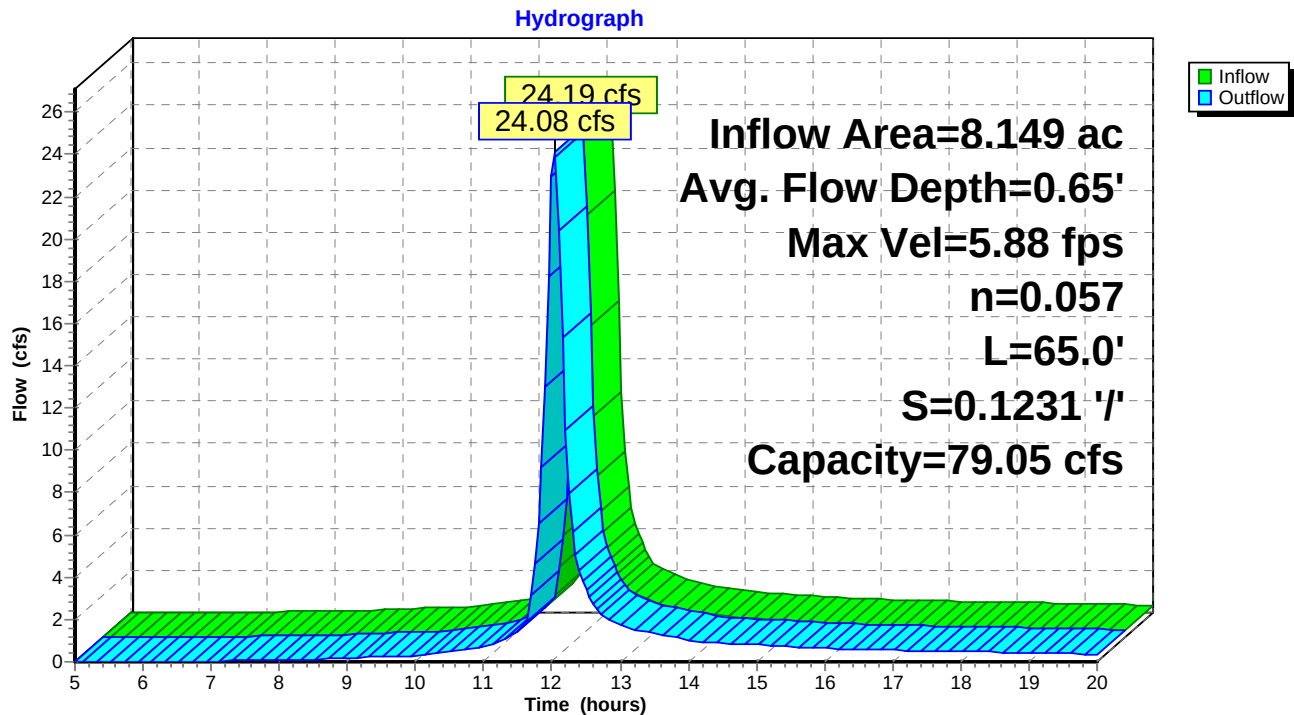
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.88 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 1.56 fps, Avg. Travel Time= 0.7 min

Peak Storage= 267 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.25' Flow Area= 9.4 sf, Capacity= 79.05 cfs

5.00' x 1.25' deep channel, n= 0.057
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 65.0' Slope= 0.1231 '/'
Inlet Invert= 806.00', Outlet Invert= 798.00'



Reach 3R: S4A-T5 - Reach B



REL_Laflin_S4A-T5 - (Reach A-C)

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Summary for Reach 4R: S4A-T5 - Reach C

Inflow Area = 8.307 ac, 35.03% Impervious, Inflow Depth > 2.00" for 10-yr event
Inflow = 24.36 cfs @ 12.03 hrs, Volume= 1.387 af
Outflow = 24.34 cfs @ 12.04 hrs, Volume= 1.387 af, Atten= 0%, Lag= 0.1 min

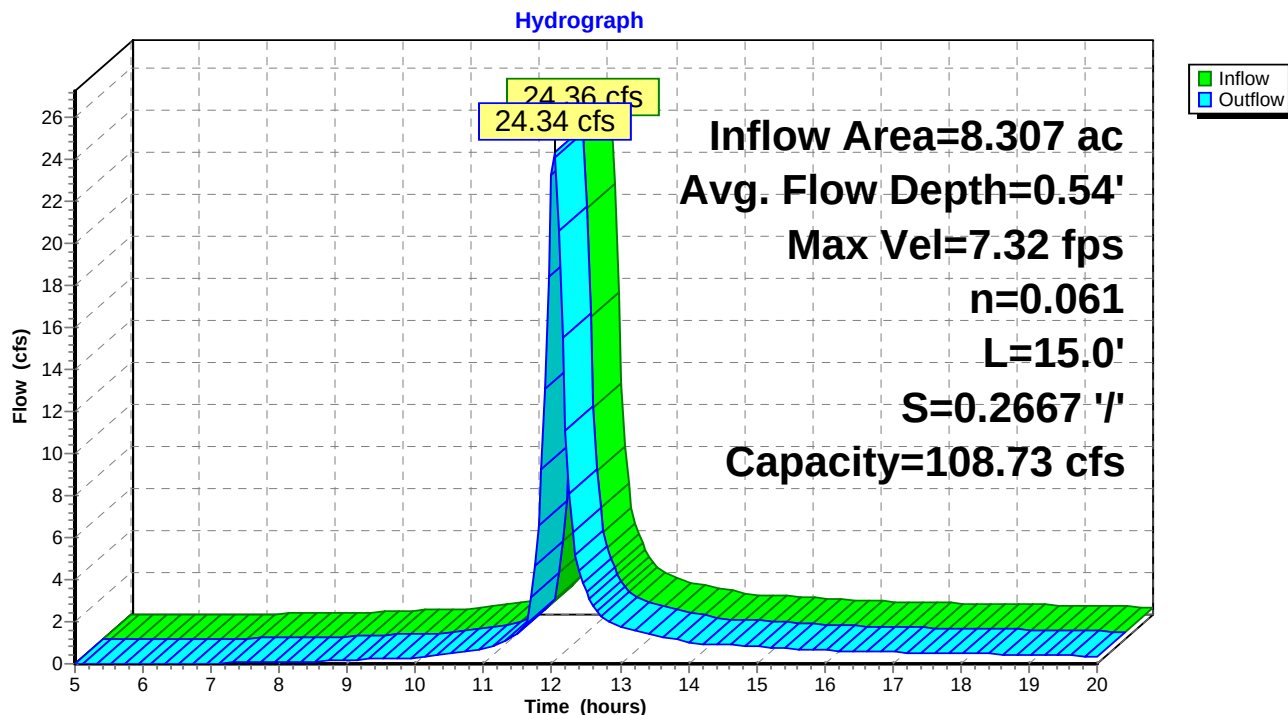
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.32 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 1.92 fps, Avg. Travel Time= 0.1 min

Peak Storage= 50 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.25' Flow Area= 9.4 sf, Capacity= 108.73 cfs

5.00' x 1.25' deep channel, n= 0.061
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 15.0' Slope= 0.2667 '/'
Inlet Invert= 798.00', Outlet Invert= 794.00'



Reach 4R: S4A-T5 - Reach C



REL_Laflin_S4A-T5 - (Reach A-C)

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Type II 24-hr 10-yr Rainfall=3.74"

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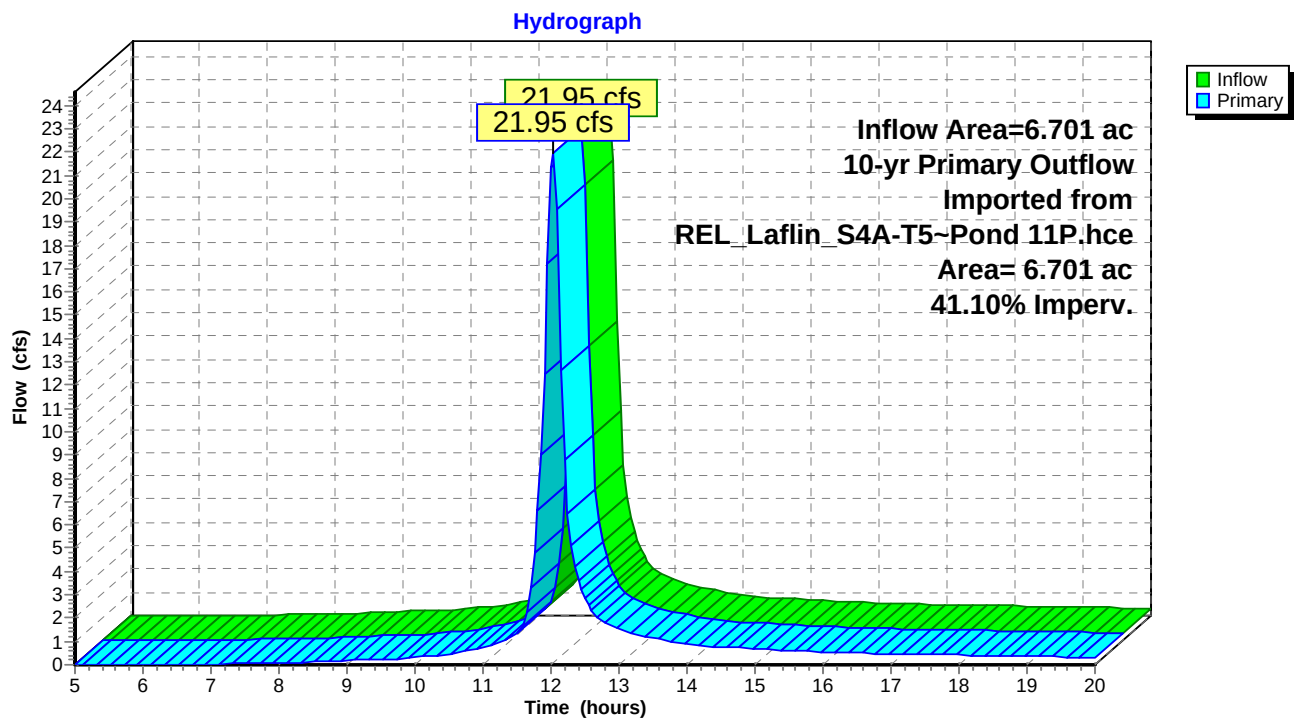
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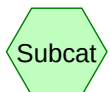
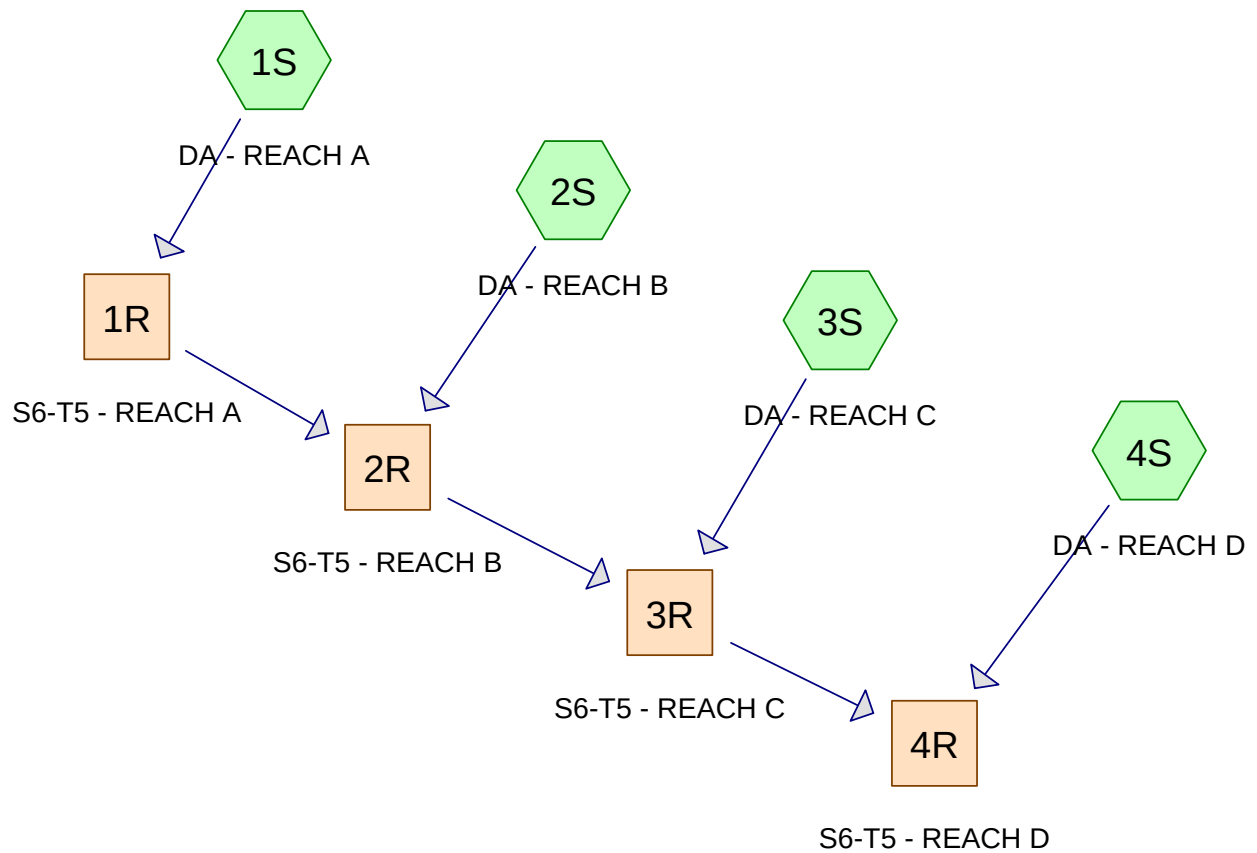
Inflow Area = 6.701 ac, 41.10% Impervious, Inflow Depth > 2.20" for 10-yr event
Inflow = 21.95 cfs @ 12.03 hrs, Volume= 1.230 af
Primary = 21.95 cfs @ 12.03 hrs, Volume= 1.230 af, Atten= 0%, Lag= 0.0 min

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

10-yr Primary Outflow Imported from REL_Laflin_S4A-T5~Pond 11P.hce

Link 1L: S4A-T5 Link

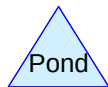




Subcat



Reach



Pond



Link

Routing Diagram for REL_Lafflin_S6-T5 (Reach A-D)

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REL_Laflin_S6-T5 (Reach A-D)

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,359	98	Impervious (1S, 2S, 3S, 4S)
6,976	71	Meadow, non-grazed, HSG C (1S, 2S, 3S, 4S)
15,301	73	Woods, Fair, HSG C (1S, 2S, 3S, 4S)
28,636	78	TOTAL AREA

REL_Laflin_S6-T5 (Reach A-D)

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
22,277	HSG C	1S, 2S, 3S, 4S
0	HSG D	
6,359	Other	1S, 2S, 3S, 4S
28,636		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	0	6,359	6,359	Impervious	
0	0	6,976	0	0	6,976	Meadow, non-grazed	
0	0	15,301	0	0	15,301	Woods, Fair	
0	0	22,277	0	6,359	28,636	TOTAL AREA	

REL_Laflin_S6-T5 (Reach A-D)*Type II 24-hr 10-yr Rainfall=3.74"*

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

Subcatchment1S: DA - REACH A	Runoff Area=11,404 sf 10.74% Impervious Runoff Depth>1.34" Flow Length=232' Tc=9.5 min CN=75 Runoff=0.59 cfs 1,274 cf
Subcatchment2S: DA - REACH B	Runoff Area=4,018 sf 44.97% Impervious Runoff Depth>1.98" Flow Length=260' Tc=9.6 min CN=84 Runoff=0.30 cfs 664 cf
Subcatchment3S: DA - REACH C	Runoff Area=7,611 sf 23.69% Impervious Runoff Depth>1.61" Flow Length=307' Tc=9.7 min CN=79 Runoff=0.47 cfs 1,020 cf
Subcatchment4S: DA - REACH D	Runoff Area=5,603 sf 27.20% Impervious Runoff Depth>1.61" Flow Length=295' Tc=9.7 min CN=79 Runoff=0.35 cfs 751 cf
Reach 1R: S6-T5 - REACH A	Avg. Flow Depth=0.07' Max Vel=2.08 fps Inflow=0.59 cfs 1,274 cf n=0.064 L=23.0' S=0.3043 '/' Capacity=61.06 cfs Outflow=0.59 cfs 1,273 cf
Reach 2R: S6-T5 - REACH B	Avg. Flow Depth=0.08' Max Vel=2.56 fps Inflow=0.89 cfs 1,937 cf n=0.064 L=22.0' S=0.3636 '/' Capacity=66.75 cfs Outflow=0.88 cfs 1,937 cf
Reach 3R: S6-T5 - REACH C	Avg. Flow Depth=0.14' Max Vel=2.24 fps Inflow=1.35 cfs 2,957 cf n=0.064 L=72.0' S=0.1458 '/' Capacity=42.27 cfs Outflow=1.32 cfs 2,953 cf
Reach 4R: S6-T5 - REACH D	Avg. Flow Depth=0.10' Max Vel=3.84 fps Inflow=1.66 cfs 3,704 cf n=0.064 L=4.0' S=0.6250 '/' Capacity=87.51 cfs Outflow=1.66 cfs 3,704 cf

Total Runoff Area = 28,636 sf Runoff Volume = 3,709 cf Average Runoff Depth = 1.55"
77.79% Pervious = 22,277 sf 22.21% Impervious = 6,359 sf

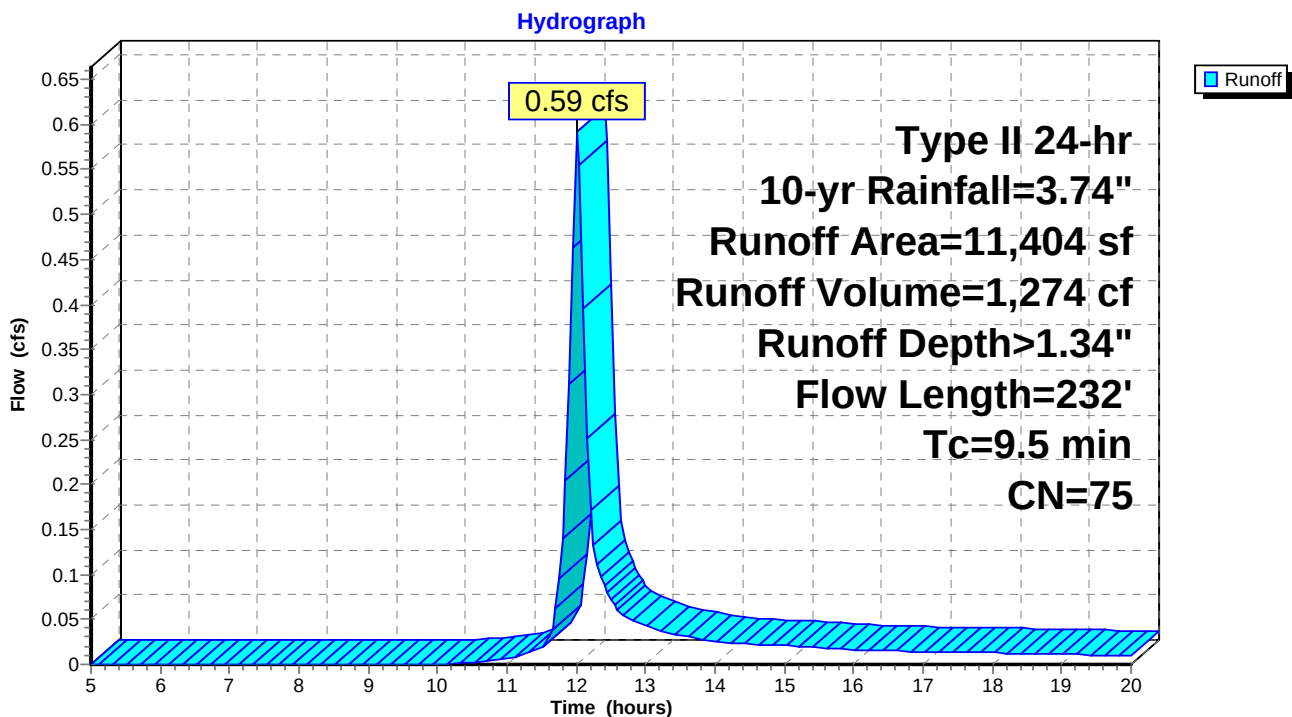
Summary for Subcatchment 1S: DA - REACH A

Runoff = 0.59 cfs @ 12.01 hrs, Volume= 1,274 cf, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
6,877	73	Woods, Fair, HSG C
3,302	71	Meadow, non-grazed, HSG C
* 1,225	98	Impervious
11,404	75	Weighted Average
10,179		89.26% Pervious Area
1,225		10.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0300	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.2	132	0.3200	9.11		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.5	232	Total			

Subcatchment 1S: DA - REACH A

REL_Laflin_S6-T5 (Reach A-D)

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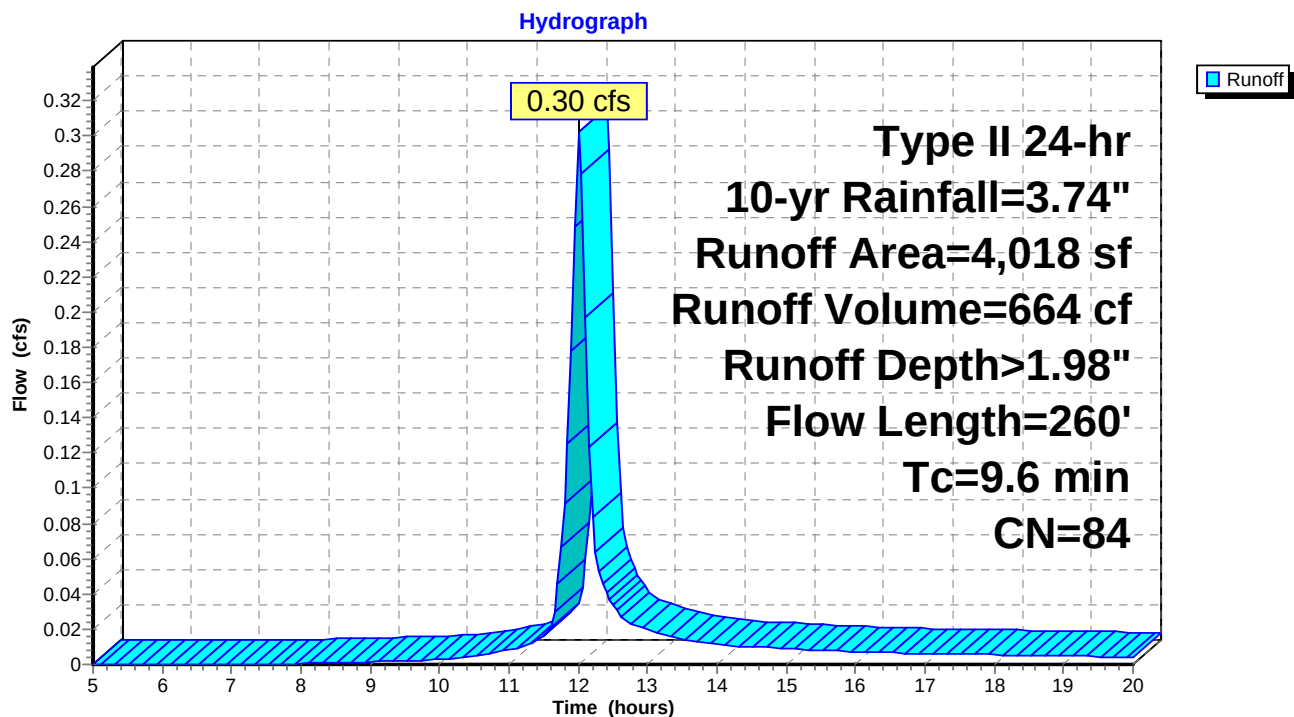
Summary for Subcatchment 2S: DA - REACH B

Runoff = 0.30 cfs @ 12.01 hrs, Volume= 664 cf, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
1,786	73	Woods, Fair, HSG C
425	71	Meadow, non-grazed, HSG C
* 1,807	98	Impervious
4,018	84	Weighted Average
2,211		55.03% Pervious Area
1,807		44.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0300	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.3	160	0.3100	8.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.6	260	Total			

Subcatchment 2S: DA - REACH B

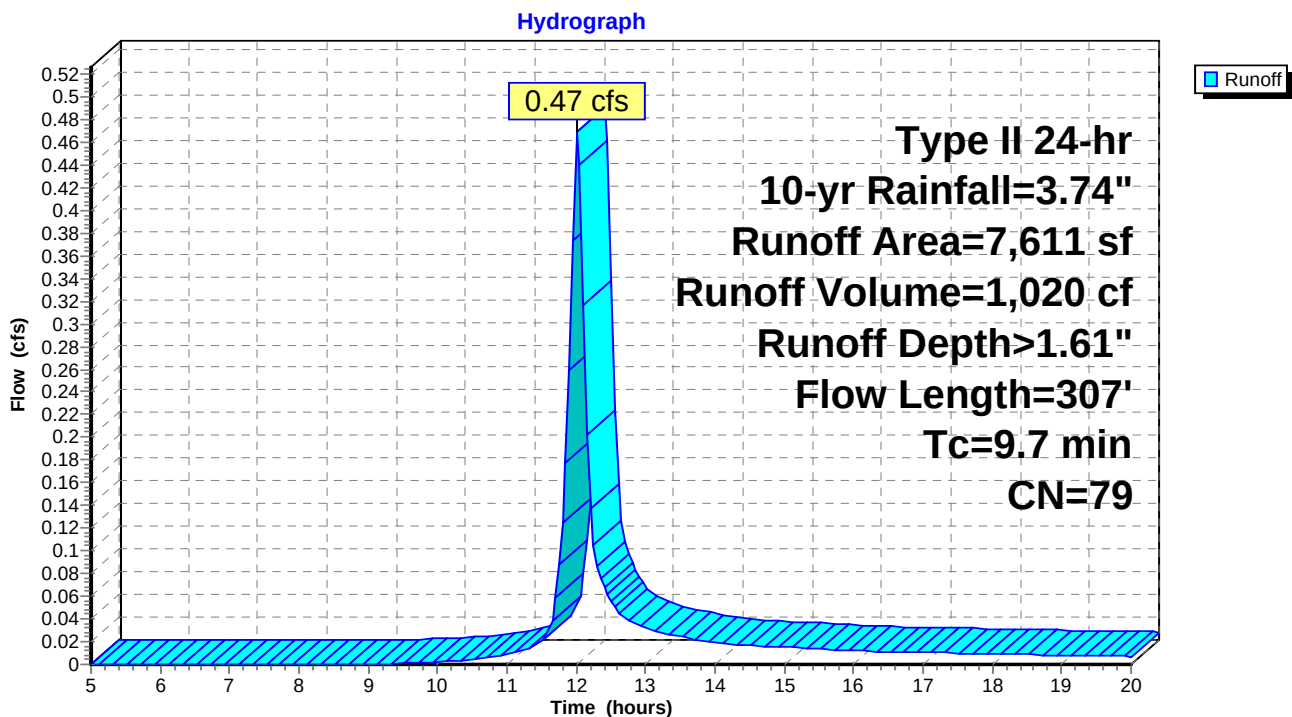
Summary for Subcatchment 3S: DA - REACH C

Runoff = 0.47 cfs @ 12.01 hrs, Volume= 1,020 cf, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
4,863	73	Woods, Fair, HSG C
945	71	Meadow, non-grazed, HSG C
* 1,803	98	Impervious
7,611	79	Weighted Average
5,808		76.31% Pervious Area
1,803		23.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0300	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.4	207	0.3100	8.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.7	307	Total			

Subcatchment 3S: DA - REACH C

REL_Laflin_S6-T5 (Reach A-D)

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Type II 24-hr 10-yr Rainfall=3.74"

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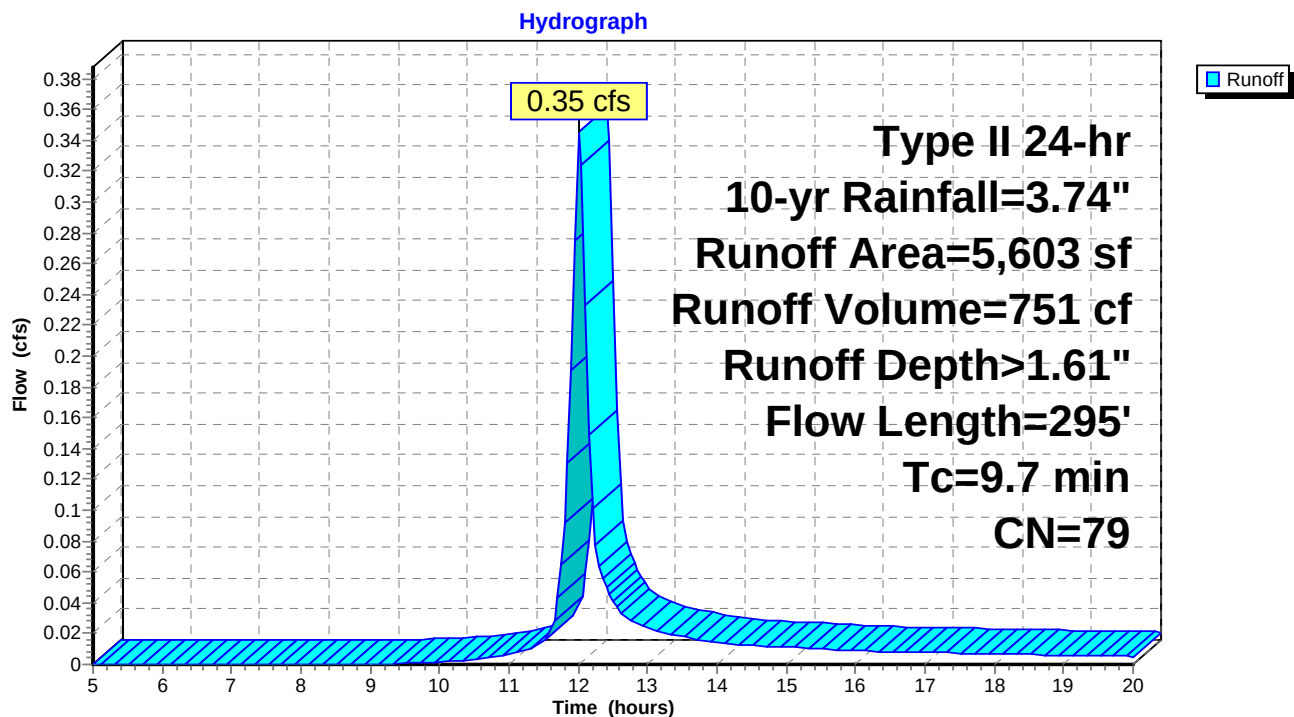
Summary for Subcatchment 4S: DA - REACH D

Runoff = 0.35 cfs @ 12.01 hrs, Volume= 751 cf, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
1,775	73	Woods, Fair, HSG C
2,304	71	Meadow, non-grazed, HSG C
* 1,524	98	Impervious
5,603	79	Weighted Average
4,079		72.80% Pervious Area
1,524		27.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0300	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.4	195	0.3000	8.82		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.7	295	Total			

Subcatchment 4S: DA - REACH D

REL_Laflin_S6-T5 (Reach A-D)

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 1R: S6-T5 - REACH A

Inflow Area = 11,404 sf, 10.74% Impervious, Inflow Depth > 1.34" for 10-yr event
Inflow = 0.59 cfs @ 12.01 hrs, Volume= 1,274 cf
Outflow = 0.59 cfs @ 12.02 hrs, Volume= 1,273 cf, Atten= 1%, Lag= 0.3 min

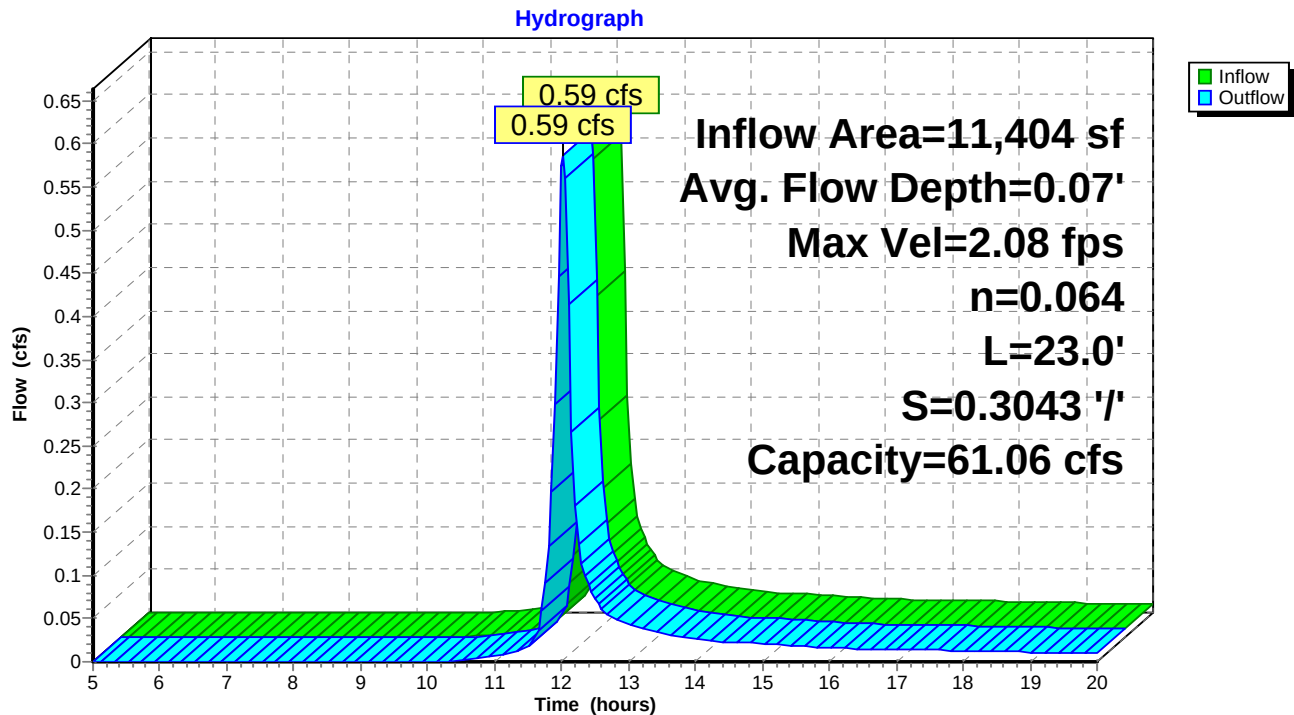
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 0.68 fps, Avg. Travel Time= 0.6 min

Peak Storage= 7 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 61.06 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 23.0' Slope= 0.3043 '/'
Inlet Invert= 796.00', Outlet Invert= 789.00'



Reach 1R: S6-T5 - REACH A



REL_Laflin_S6-T5 (Reach A-D)

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Summary for Reach 2R: S6-T5 - REACH B

Inflow Area = 15,422 sf, 19.66% Impervious, Inflow Depth > 1.51" for 10-yr event
Inflow = 0.89 cfs @ 12.02 hrs, Volume= 1,937 cf
Outflow = 0.88 cfs @ 12.02 hrs, Volume= 1,937 cf, Atten= 1%, Lag= 0.2 min

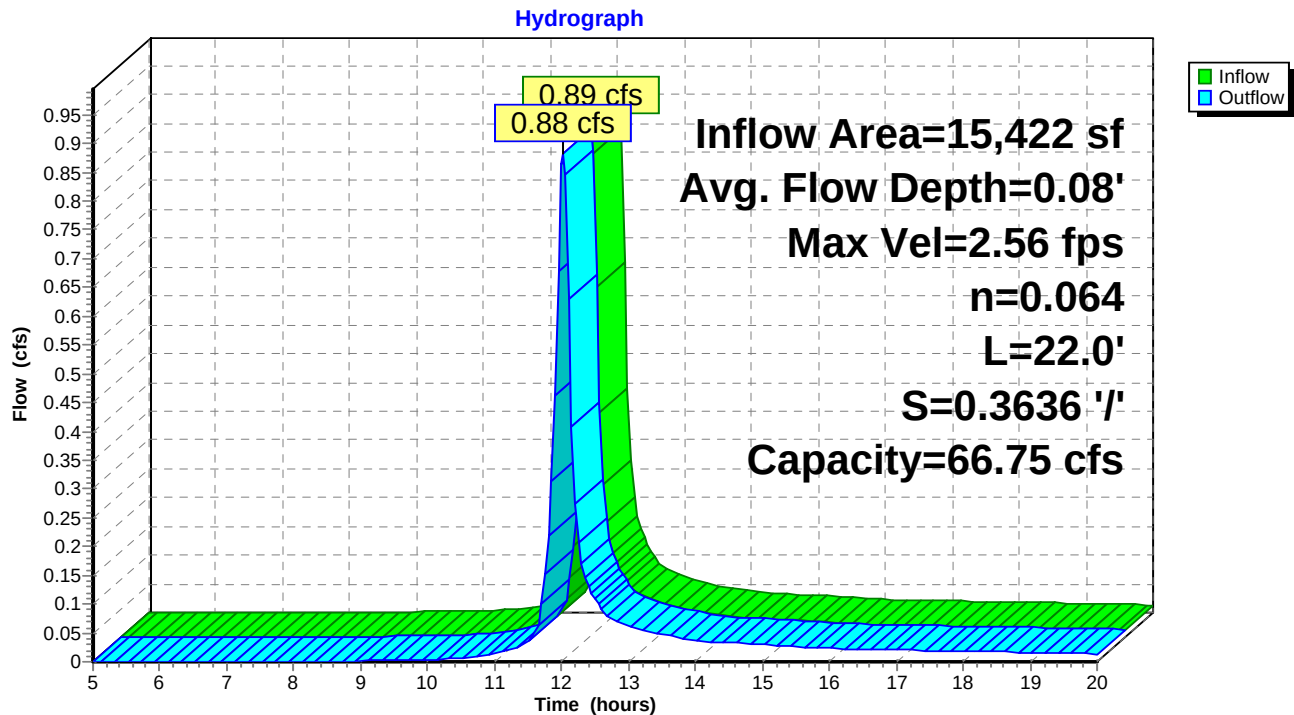
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.56 fps, Min. Travel Time= 0.1 min
Avg. Velocity= 0.76 fps, Avg. Travel Time= 0.5 min

Peak Storage= 8 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 66.75 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 22.0' Slope= 0.3636 '/'
Inlet Invert= 789.00', Outlet Invert= 781.00'



Reach 2R: S6-T5 - REACH B



REL_Laflin_S6-T5 (Reach A-D)

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 3R: S6-T5 - REACH C

Inflow Area = 23,033 sf, 20.99% Impervious, Inflow Depth > 1.54" for 10-yr event
Inflow = 1.35 cfs @ 12.02 hrs, Volume= 2,957 cf
Outflow = 1.32 cfs @ 12.03 hrs, Volume= 2,953 cf, Atten= 2%, Lag= 1.0 min

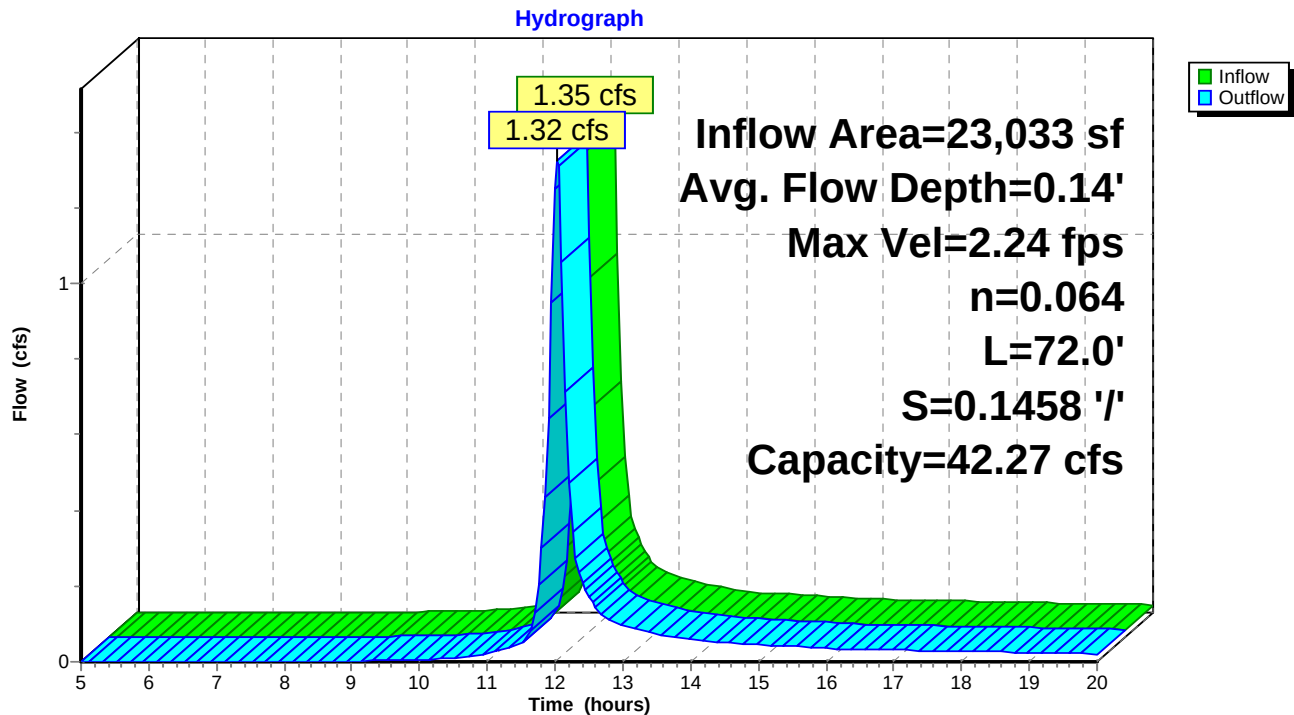
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 2.0 min

Peak Storage= 43 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.27 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 72.0' Slope= 0.1458 '/'
Inlet Invert= 781.00', Outlet Invert= 770.50'



Reach 3R: S6-T5 - REACH C



REL_Laflin_S6-T5 (Reach A-D)

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 4R: S6-T5 - REACH D

Inflow Area = 28,636 sf, 22.21% Impervious, Inflow Depth > 1.55" for 10-yr event
Inflow = 1.66 cfs @ 12.03 hrs, Volume= 3,704 cf
Outflow = 1.66 cfs @ 12.03 hrs, Volume= 3,704 cf, Atten= 0%, Lag= 0.0 min

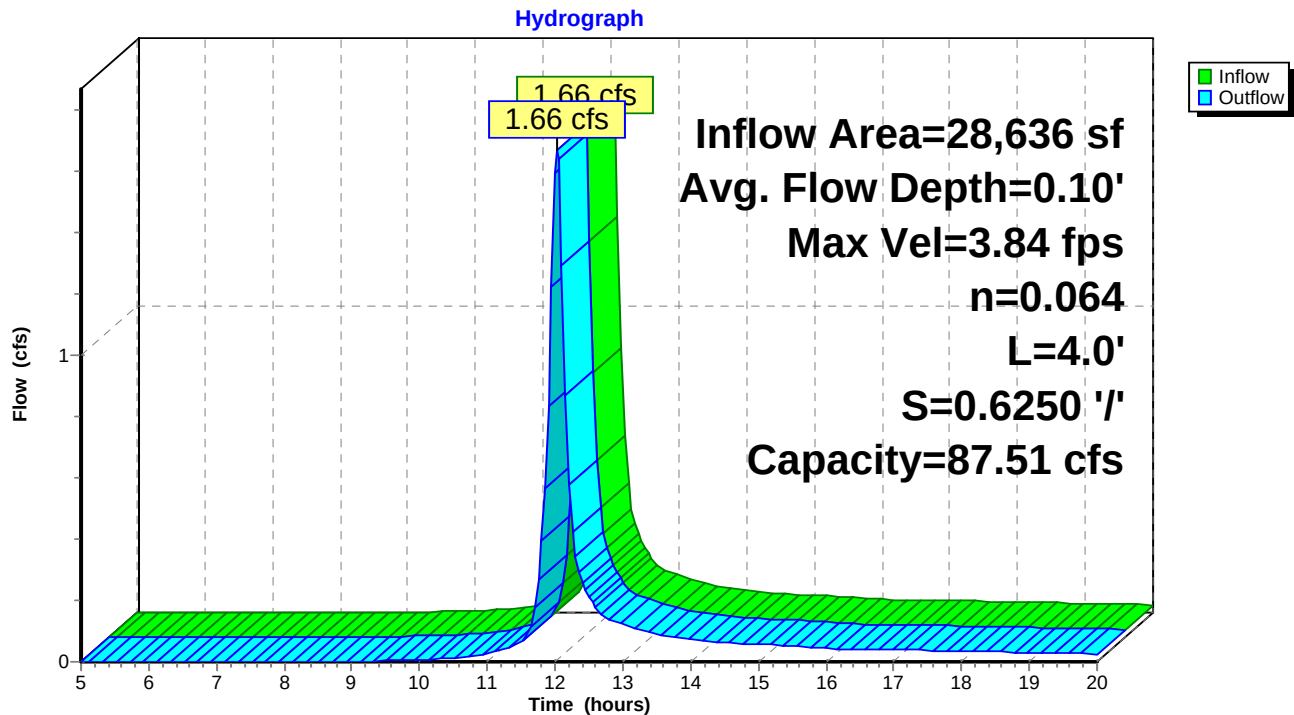
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 1.08 fps, Avg. Travel Time= 0.1 min

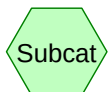
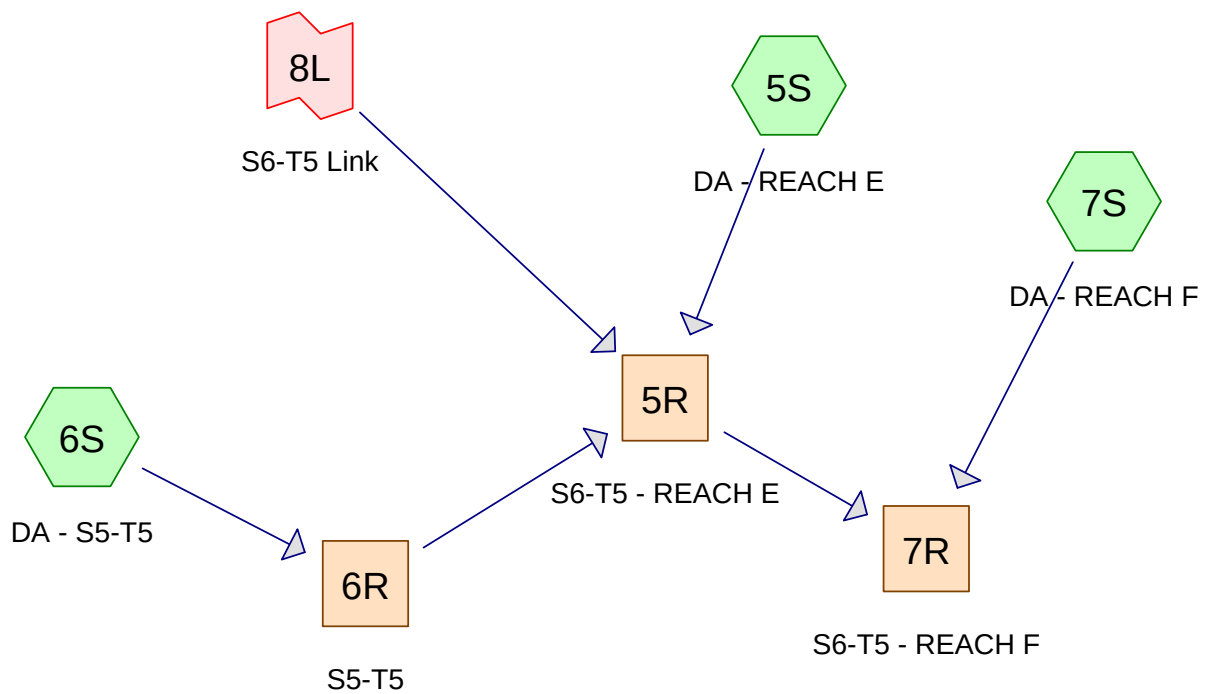
Peak Storage= 2 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 87.51 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 4.0' Slope= 0.6250 '/'
Inlet Invert= 770.50', Outlet Invert= 768.00'



Reach 4R: S6-T5 - REACH D

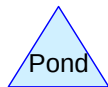




Subcat



Reach



Pond



Link

Routing Diagram for REL_Laflin_S6-T5 (Reach E-F) AND S5-T5
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REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,327	98	Impervious (5S, 6S, 7S)
41,356	71	Meadow, non-grazed, HSG C (5S, 6S, 7S)
3,162	78	Meadow, non-grazed, HSG D (6S)
21,654	73	Woods, Fair, HSG C (5S, 6S, 7S)
1,109	79	Woods, Fair, HSG D (6S)
71,608	74	TOTAL AREA

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
63,010	HSG C	5S, 6S, 7S
4,271	HSG D	6S
4,327	Other	5S, 6S, 7S
71,608		TOTAL AREA

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	0	4,327	4,327	Impervious	
0	0	41,356	3,162	0	44,518	Meadow, non-grazed	
0	0	21,654	1,109	0	22,763	Woods, Fair	
0	0	63,010	4,271	4,327	71,608	TOTAL AREA	

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5*Type II 24-hr 10-yr Rainfall=3.74"*

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

Subcatchment5S: DA - REACH E

Runoff Area=12,174 sf 2.21% Impervious Runoff Depth>1.22"
Flow Length=391' Tc=9.3 min CN=73 Runoff=0.58 cfs 1,234 cf

Subcatchment6S: DA - S5-T5

Runoff Area=49,978 sf 6.60% Impervious Runoff Depth>1.28"
Flow Length=356' Tc=6.6 min CN=74 Runoff=2.76 cfs 5,328 cf

Subcatchment7S: DA - REACH F

Runoff Area=9,456 sf 8.04% Impervious Runoff Depth>1.27"
Flow Length=557' Tc=15.5 min CN=74 Runoff=0.38 cfs 1,004 cf

Reach 5R: S6-T5 - REACH E

Avg. Flow Depth=0.22' Max Vel=5.08 fps Inflow=4.88 cfs 10,263 cf
n=0.064 L=42.0' S=0.4286 '/ Capacity=72.46 cfs Outflow=4.84 cfs 10,260 cf

Reach 6R: S5-T5

Avg. Flow Depth=0.23' Max Vel=2.74 fps Inflow=2.76 cfs 5,328 cf
n=0.064 L=25.0' S=0.1200 '/ Capacity=38.34 cfs Outflow=2.74 cfs 5,325 cf

Reach 7R: S6-T5 - REACH F

Avg. Flow Depth=0.28' Max Vel=4.03 fps Inflow=5.14 cfs 11,264 cf
n=0.064 L=30.0' S=0.2000 '/ Capacity=49.50 cfs Outflow=5.11 cfs 11,261 cf

Link 8L: 10-yr Outflow Imported from REL_Laflin_S6-T5 (Reach A-D)-Reach 4R.hce Inflow=1.66 cfs 3,704 cf
Area= 28,636 sf 22.21% Imperv. Primary=1.66 cfs 3,704 cf

Total Runoff Area = 71,608 sf Runoff Volume = 7,566 cf Average Runoff Depth = 1.27"
93.96% Pervious = 67,281 sf 6.04% Impervious = 4,327 sf

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

Type II 24-hr 10-yr Rainfall=3.74"

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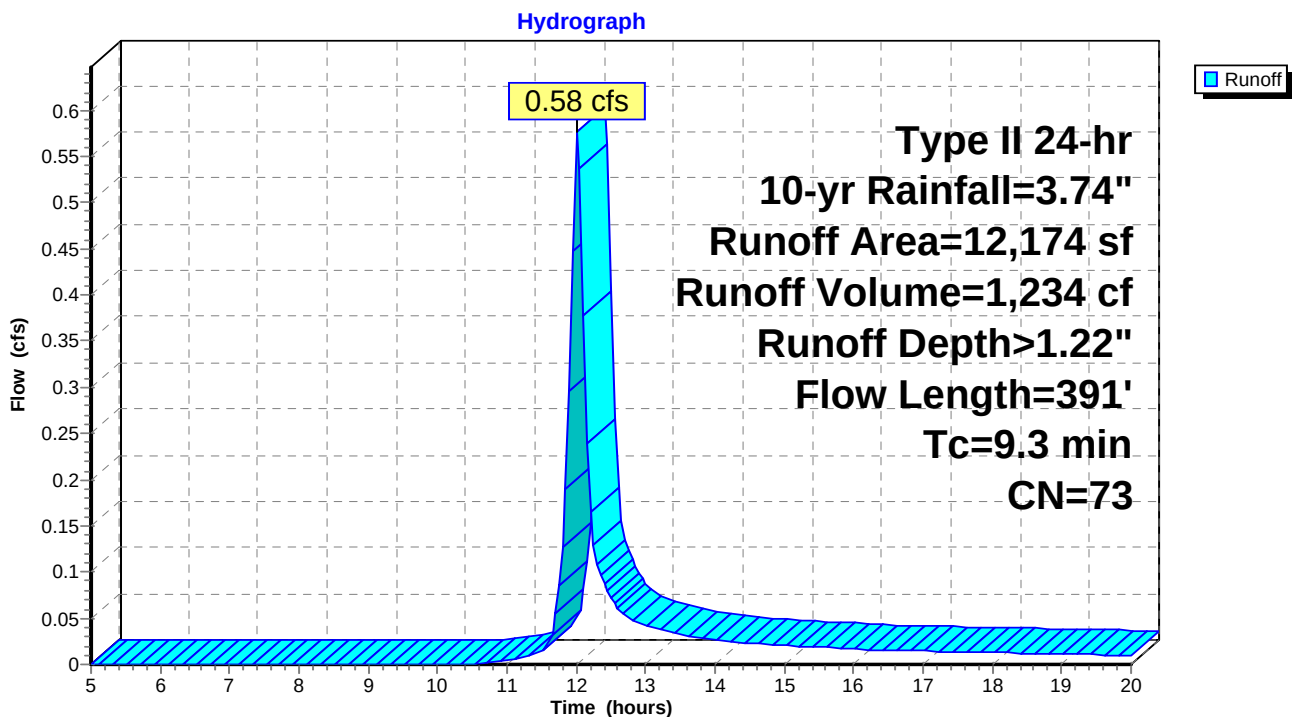
Summary for Subcatchment 5S: DA - REACH E

Runoff = 0.58 cfs @ 12.01 hrs, Volume= 1,234 cf, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
7,703	73	Woods, Fair, HSG C
4,202	71	Meadow, non-grazed, HSG C
* 269	98	Impervious
12,174	73	Weighted Average
11,905		97.79% Pervious Area
269		2.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0350	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.6	291	0.2780	8.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.3	391	Total			

Subcatchment 5S: DA - REACH E

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Type II 24-hr 10-yr Rainfall=3.74"

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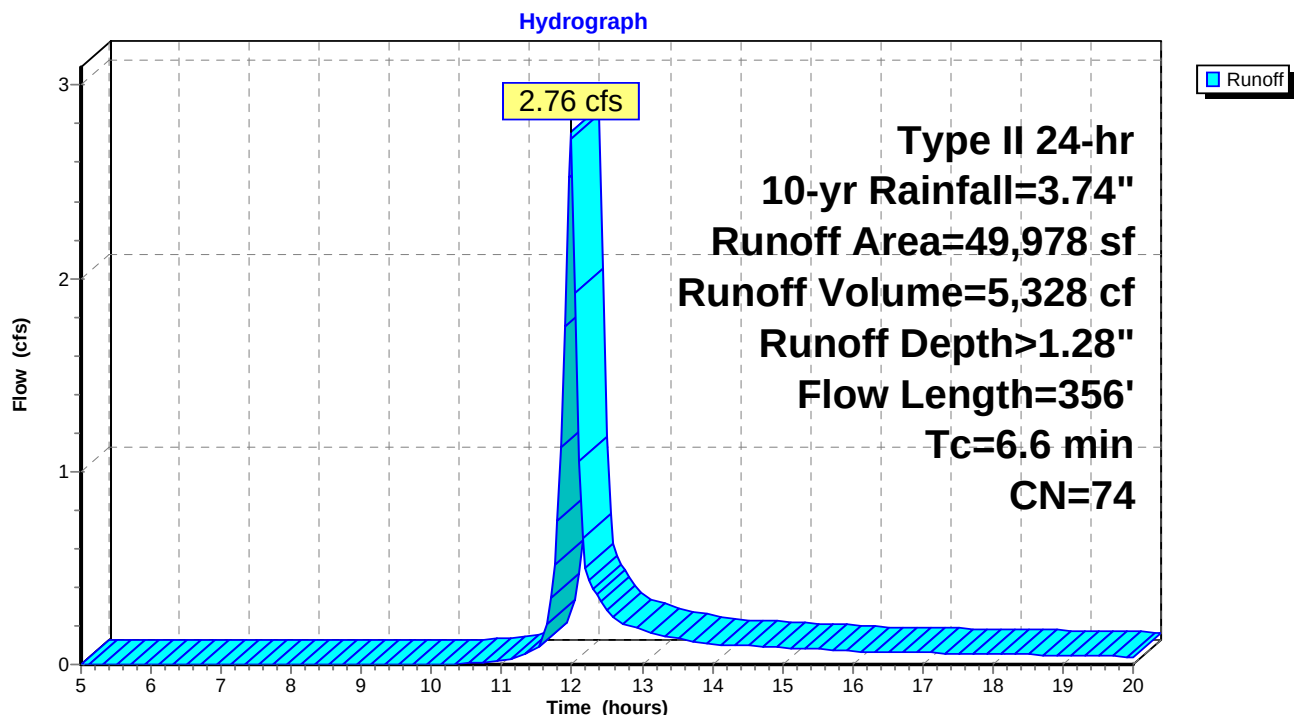
Summary for Subcatchment 6S: DA - S5-T5

Runoff = 2.76 cfs @ 11.98 hrs, Volume= 5,328 cf, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
12,070	73	Woods, Fair, HSG C
1,109	79	Woods, Fair, HSG D
30,339	71	Meadow, non-grazed, HSG C
3,162	78	Meadow, non-grazed, HSG D
* 3,298	98	Impervious
49,978	74	Weighted Average
46,680		93.40% Pervious Area
3,298		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	88	0.0680	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
0.6	268	0.2160	7.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.6	356	Total			

Subcatchment 6S: DA - S5-T5

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

Type II 24-hr 10-yr Rainfall=3.74"

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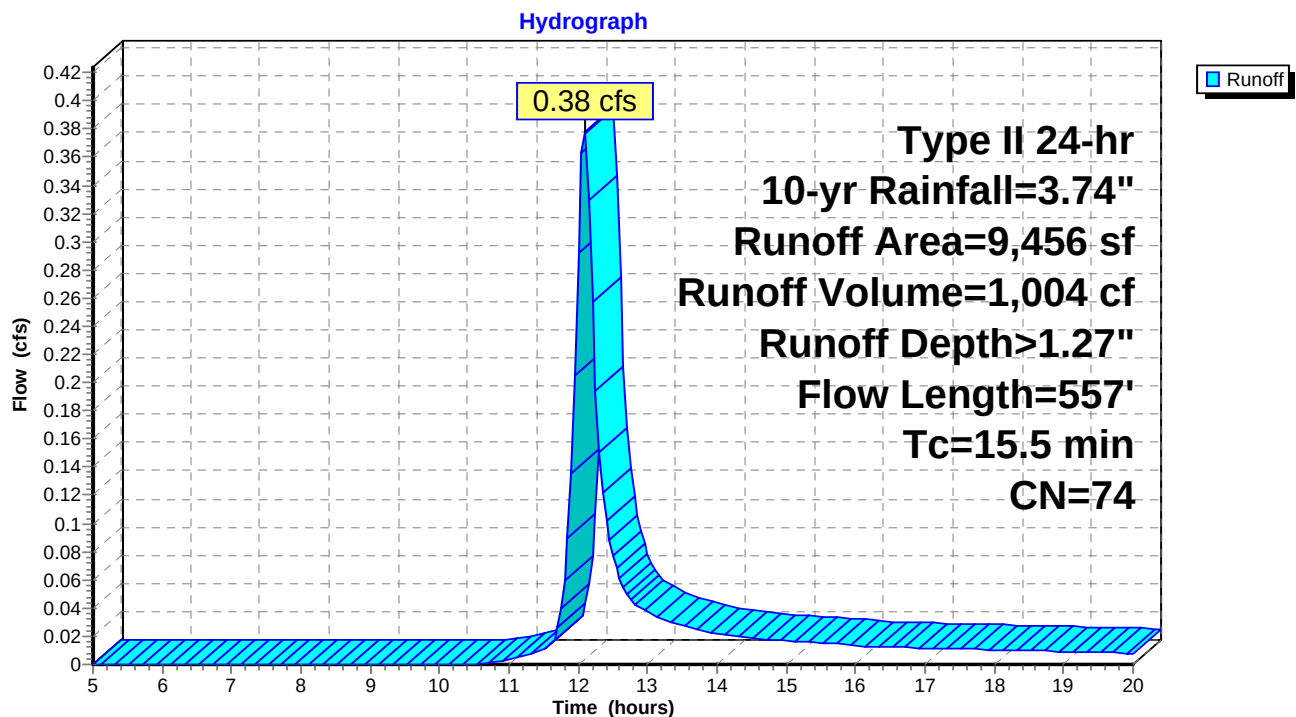
Summary for Subcatchment 7S: DA - REACH F

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,004 cf, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.74"

Area (sf)	CN	Description
1,881	73	Woods, Fair, HSG C
6,815	71	Meadow, non-grazed, HSG C
* 760	98	Impervious
9,456	74	Weighted Average
8,696		91.96% Pervious Area
760		8.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	100	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 2.58"
1.1	457	0.1750	6.74		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.5	557	Total			

Subcatchment 7S: DA - REACH F

REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 5R: S6-T5 - REACH E

Inflow Area = 90,788 sf, 10.93% Impervious, Inflow Depth > 1.36" for 10-yr event
Inflow = 4.88 cfs @ 12.00 hrs, Volume= 10,263 cf
Outflow = 4.84 cfs @ 12.00 hrs, Volume= 10,260 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.08 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.31 fps, Avg. Travel Time= 0.5 min

Peak Storage= 40 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.22'

Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 72.46 cfs

4.00' x 1.00' deep channel, n= 0.064

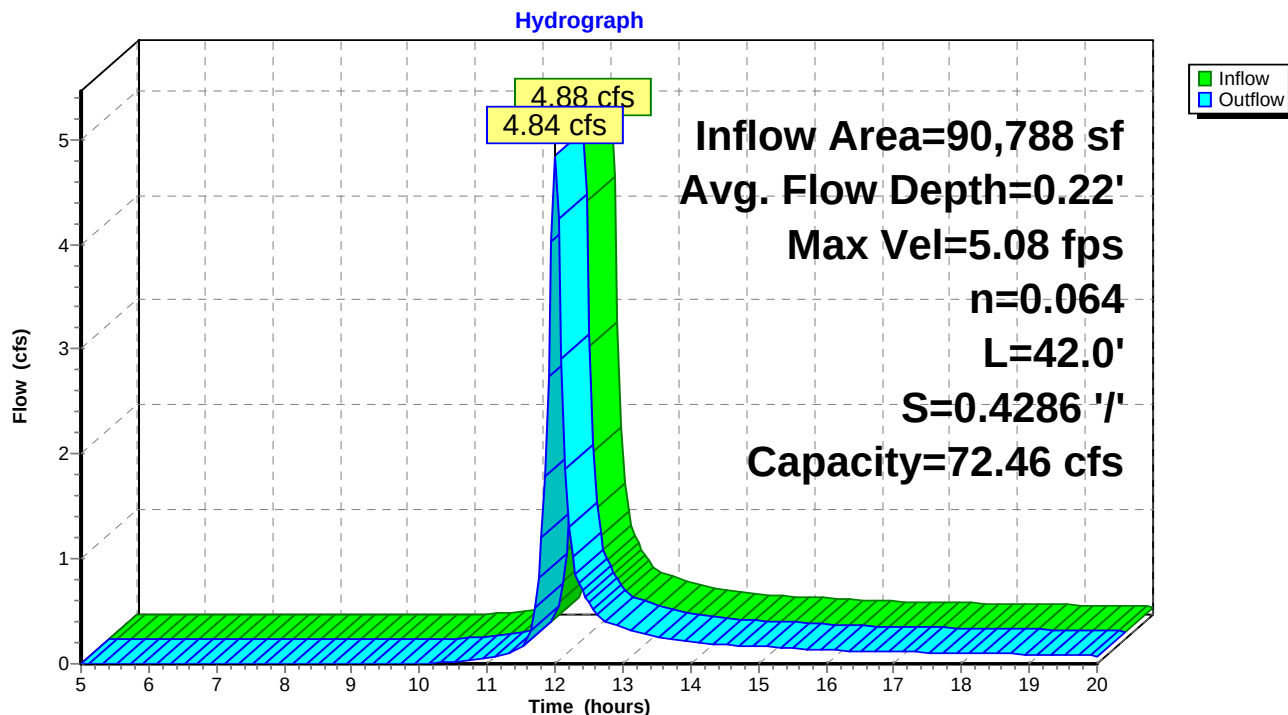
Side Slope Z-value= 2.0 '/' Top Width= 8.00'

Length= 42.0' Slope= 0.4286 '/'

Inlet Invert= 768.00', Outlet Invert= 750.00'



Reach 5R: S6-T5 - REACH E



REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 6R: S5-T5

Inflow Area = 49,978 sf, 6.60% Impervious, Inflow Depth > 1.28" for 10-yr event
Inflow = 2.76 cfs @ 11.98 hrs, Volume= 5,328 cf
Outflow = 2.74 cfs @ 11.99 hrs, Volume= 5,325 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.74 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 0.78 fps, Avg. Travel Time= 0.5 min

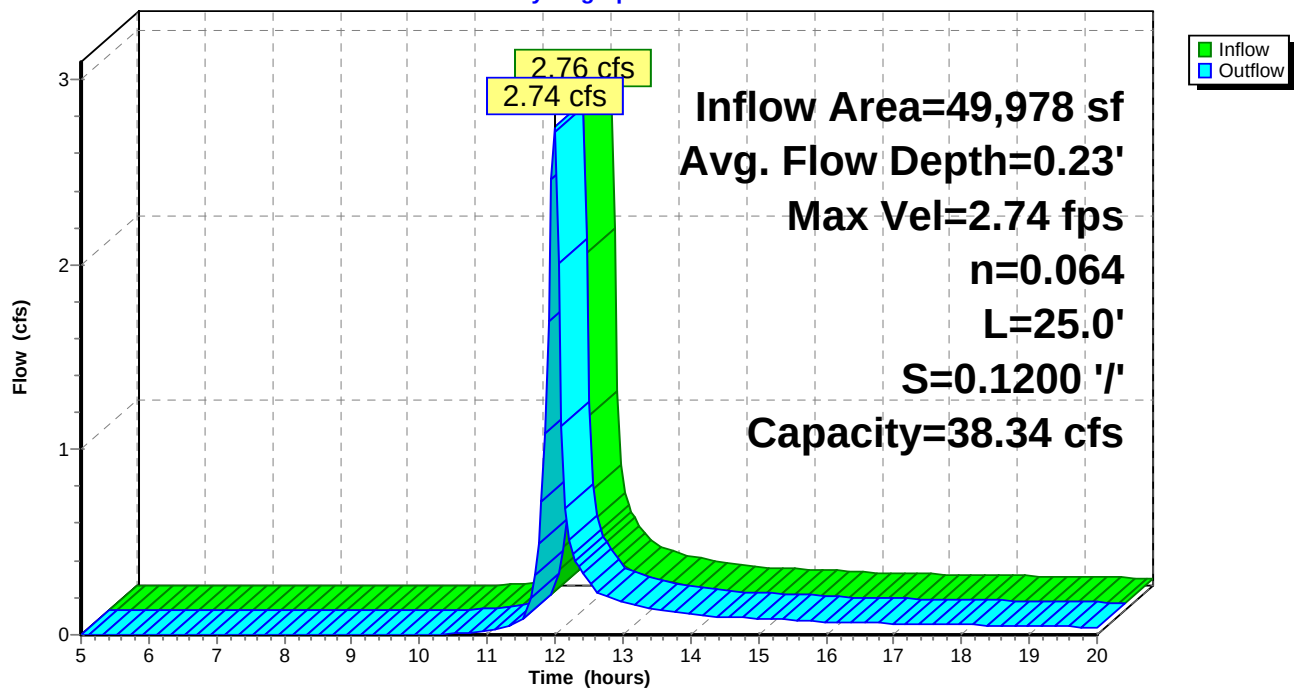
Peak Storage= 25 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 38.34 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 25.0' Slope= 0.1200 '/'
Inlet Invert= 776.00', Outlet Invert= 773.00'



Reach 6R: S5-T5

Hydrograph



REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

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Type II 24-hr 10-yr Rainfall=3.74"

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Summary for Reach 7R: S6-T5 - REACH F

Inflow Area = 100,244 sf, 10.66% Impervious, Inflow Depth > 1.35" for 10-yr event
Inflow = 5.14 cfs @ 12.01 hrs, Volume= 11,264 cf
Outflow = 5.11 cfs @ 12.01 hrs, Volume= 11,261 cf, Atten= 1%, Lag= 0.2 min

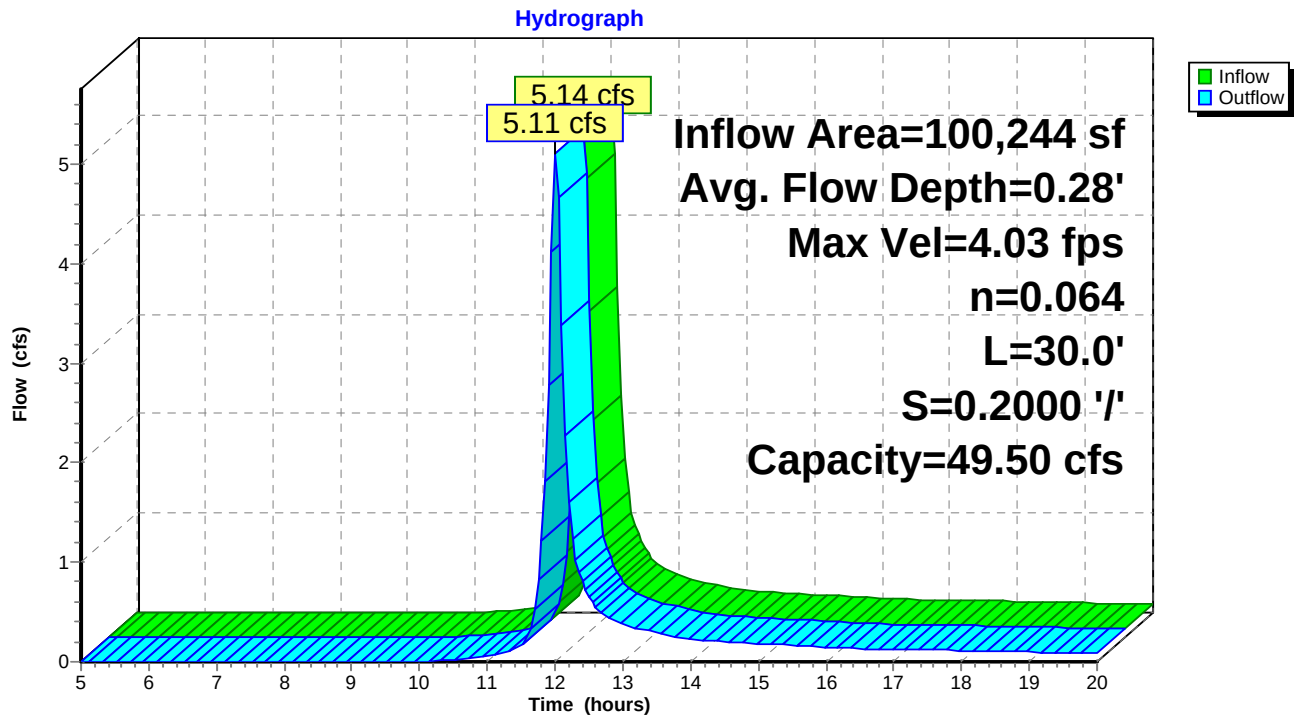
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity= 1.05 fps, Avg. Travel Time= 0.5 min

Peak Storage= 38 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 49.50 cfs

4.00' x 1.00' deep channel, n= 0.064
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 30.0' Slope= 0.2000 '/'
Inlet Invert= 750.00', Outlet Invert= 744.00'



Reach 7R: S6-T5 - REACH F



REL_Laflin_S6-T5 (Reach E-F) AND S5-T5

Type II 24-hr 10-yr Rainfall=3.74"

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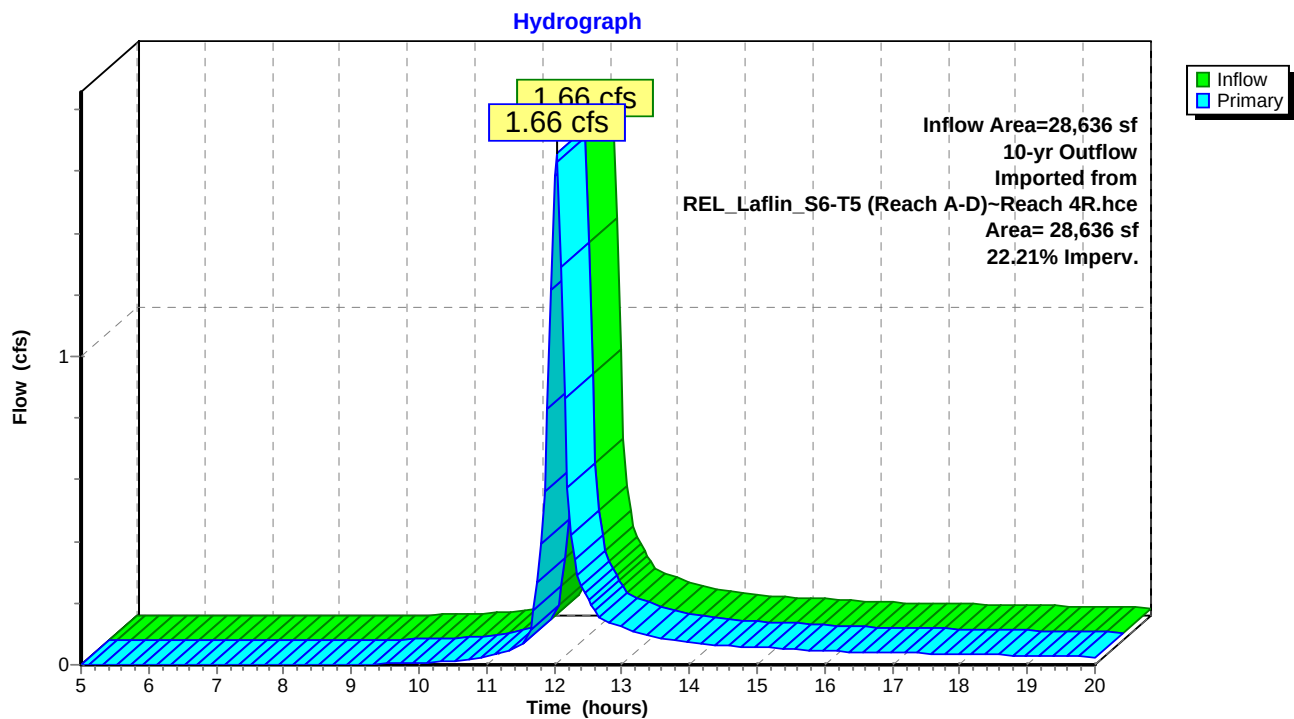
Summary for Link 8L: S6-T5 Link

Inflow Area = 28,636 sf, 22.21% Impervious, Inflow Depth > 1.55" for 10-yr event
Inflow = 1.66 cfs @ 12.03 hrs, Volume= 3,704 cf
Primary = 1.66 cfs @ 12.03 hrs, Volume= 3,704 cf, Atten= 0%, Lag= 0.0 min

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

10-yr Outflow Imported from REL_Laflin_S6-T5 (Reach A-D)~Reach 4R.hce

Link 8L: S6-T5 Link



ATTACHMENT 4
OFFSITE DISCHARGE REPORT

TABLE OF CONTENTS

Attachment 4

- 4.1 Offsite Discharge Report – MLV-515RA20
- 4.2 Offsite Discharge Report – MLV-515RA30
- 4.3 Offsite Discharge Report – Carverton Tie-in
- 4.4 Offsite Discharge Report – Lower Demunds REL Tie-in and
Hildebrandt Tie-in/MLV-515RA40

ATTACHMENT 4.1
OFFSITE DISCHARGE REPORT –
MLV-515RA20



Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Regional Energy Lateral

MLV-515RA20

April 2021
(Revised July 2022)

1.0 Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., is proposing the Regional Energy Lateral (Project). The mainline valve, MLV-515RA20, is proposed as part of the overall Project. MLV-515RA20 is located along the REL in Bear Creek Township, Luzerne County at Milepost 7.54. It is proposed as a means to isolate gas flows along sections of a pipeline. Pig launchers/receivers and communication equipment may be located at the MLV facility. The facility will include a 104 foot long gravel access road, 55 ft x 90 ft gravel pad, various diversion channels and an infiltration berm PCSM BMP. This facility will require Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Best Management Practices (BMPs) to manage stormwater runoff during and after construction.

Transco has developed an Offsite Discharge Report for the discharges associated with the proposed BMPs. An Offsite Discharge Report is performed to ensure that no offsite erosion will occur downstream of the proposed activities. The analysis conducted for this project followed the sequence outlined in PaDEP's factsheet for offsite discharges (Document #3930-FS-DEP4124).

2.0 Conveyance Best Management Practices

Erosion and Sediment Control and Post Construction Stormwater Management BMPs are proposed to manage stormwater runoff during and after construction. PCSM channels collect and direct stormwater from the gravel pad and access road toward an infiltration berm on the west side of the mainline valve yard. The infiltration berm will manage the net increase in volume between the pre- and post-development 2-year storm events and mitigate the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events. Stormwater collected by the infiltration berm is discharged offsite via a level spreader and riprap apron. A clean water diversion channel, PCSM Diversion Channel DC-D1 flows to an earthen level spreader and diverts the stormwater as sheet flow along a vegetative flow path.

2.1 Infiltration Berm and Outlet Protection (OP) 2, 3 and 4

The infiltration berm will utilize ten (10) - 3 inch outlet pipes, which discharge to a structural level spreader and riprap apron during larger storm events. During larger storm events some water will overtop the berm and discharge to the same area as the level spreader and riprap apron. The flow from the pipes and berm flows into the adjacent

forested area located west of the Limits of Disturbance. The stormwater is discharged as sheet flow and travels along a vegetative flow path until it reaches a Bald Mountain Road culvert and then a delineated stream, S83-T2. The flow path is depicted on Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 1.

Table 1 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
VrB	$K_f = 0.28$

The soil erodibility factor is shown in Table 1. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. VrB soils have a moderate susceptibility to erosion (0.28). Photos were taken around the site, including along the flow path of the downstream area to show the vegetative cover.



Photo 1: Adjacent to the proposed pad and diversion channel.



Photo 2: Area Downgradient of the Proposed OP 2 and 3



Photo 3: Area Downgradient of the Proposed OP 4

Photo 1 shows the existing condition of the site adjacent to the proposed gravel pad and channel (DC-D1, described in Section 2.2). Photo 2 shows the infiltration berm area and portions down gradient of OP 2 and 3. Photo 3 shows the areas downgradient of the proposed level spreader and riprap apron (OP4) and berm, which is over 90% vegetated. This area is also downgradient of the isolated delineated stream channel S76-T2. At this location, sheet flow from the S76-T2 flows toward the delineated S83-T2. S76-T2 is discussed further in Section 2.2. as it relates to Diversion Channel DC-D1 and earthen level spreader.

In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the

discharge velocities at the proposed structural level spreader and riprap apron (OP-4) is 0.72 feet per second for the 100 year, 24-hour storm event.

2.2 PCSM Diversion Channel DC-D1 and Earthen Level Spreader

The Diversion Channel DC-D1 discharges water through an earthen level spreader. The stormwater is discharged as sheet flow and travels along a vegetative and rocky flow path until it reaches delineated stream, S76-T2. S76-T2 is an isolated delineated stream channel. S76-T2 maintains concentrated flow for approximately 150'. The downstream portions of this channel change from concentrated flow to sheet flow, and meet with the flow path described in Section 2.1 downstream of the infiltration berm and OP-4, where it travels to delineated stream channel S83-T2. The flow path is depicted on Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 2.

The soil erodibility factor is shown in Table 1 above. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. VrB soils have a moderate susceptibility to erosion (0.28). Photos were taken along the flow path of the downstream area to show the vegetative cover.



Photo 4: Area Downgradient of the Proposed Level Spreader



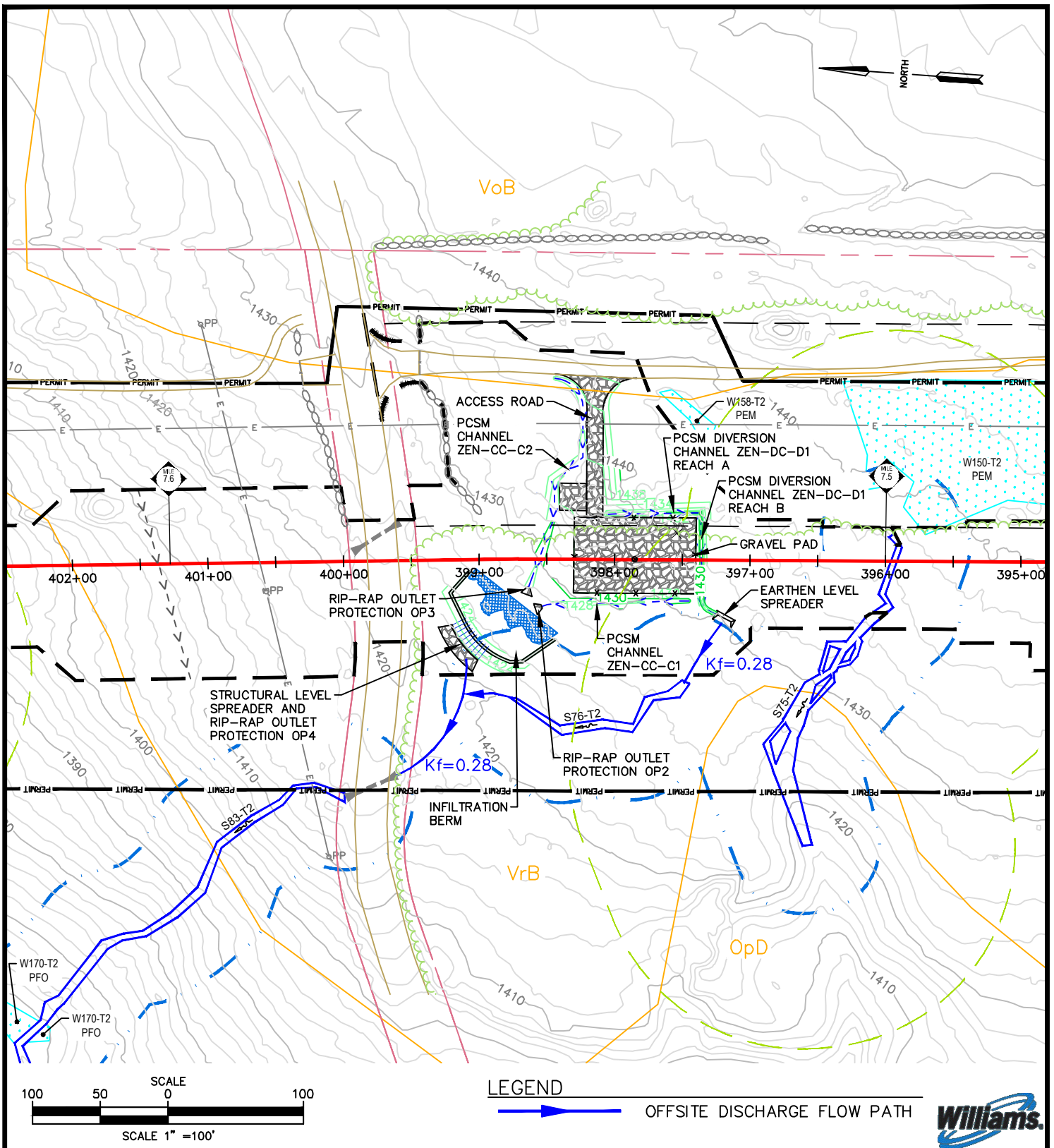
Photo 5: Area Downgradient of S76-T2

Photo 4 shows the existing condition immediately downstream where the earthen level spreader is proposed. Photo 5 shows the area immediately down gradient of S76-T2 where sheet flow begins. Both photos represent the forested vegetated conditions of the site.

In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed earthen level spreader is 1.35 feet per second for the for the 100 year, 24-hour storm event.

3.0 Conclusion

Based on the existing vegetative conditions, low discharge velocities from the BMPs, and reduced peak flow rates and volumes from the site, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



366 WALKER DRIVE, SUITE 300
STATE COLLEGE, PA 16801

TELEPHONE: (814)-689-1650

FAX: (814)-689-1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
MLV-515RA20

EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

BEAR CREEK TWP

LUZERNE COUNTY

PENNSYLVANIA

DATE:

06/29/22

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RHM

CHECKED:

PW

WHM DRAWING NO:

FLOW PATH

EXHIBIT 1.0

ATTACHMENT 4.2
OFFSITE DISCHARGE REPORT –
MLV-515RA30



Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Regional Energy Lateral

MLV-515RA30

April 2021

(Revised March 2022)

1.0 Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., is proposing the Regional Energy Lateral (Project). The mainline valve, MLV515-RA30, is proposed as part of the overall Project. MLV-515RA30 is located along the REL in Wyoming Borough, Luzerne County at Milepost 14.84. It is proposed as a means to isolate gas flows along sections of a pipeline. This new facility will require Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Best Management Practices (BMP's) to manage stormwater runoff during and after construction.

Transco has developed an Offsite Discharge Report for the discharges associated with the proposed BMP's. An Offsite Discharge Report is performed to ensure that no offsite erosion will occur downstream of the proposed activities. The analysis conducted for this project followed the sequence outlined in PaDEP's factsheet for offsite discharges (Document #3930-FS-DEP4124).

2.0 Conveyance Best Management Practices

Erosion and Sediment Control and Post Construction Stormwater Management BMP's are proposed to manage stormwater runoff during and after construction. An infiltration berm will also be installed to manage the net increase in volume between the pre and post development 2-year storm events and mitigate the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events.

2.1 Infiltration Berm

The infiltration berm does not discharge any water during any storm event mentioned above. If it were to discharge water, the water would overtop the berm and flow into the adjacent wetland and agricultural areas located southwest of the Limits of Disturbance. If the berm were to discharge, the stormwater would be discharged as sheet flow and travel along a vegetative flow path until it reached Abrahams Creek, upstream of the Susquehanna River. The flow path is depicted on Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 1.

Table 1 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
Ho	$K_f = 0.28$
Ps	$K_f = 0.43$

The soil erodibility factors are shown in Table 1. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. Ho and Ps soils have a moderate susceptibility to erosion (0.28, 0.43). Photos were taken along the flow path of the downstream area to show the vegetative cover.



Photo 1: Existing Area near proposed Infiltration Berm.

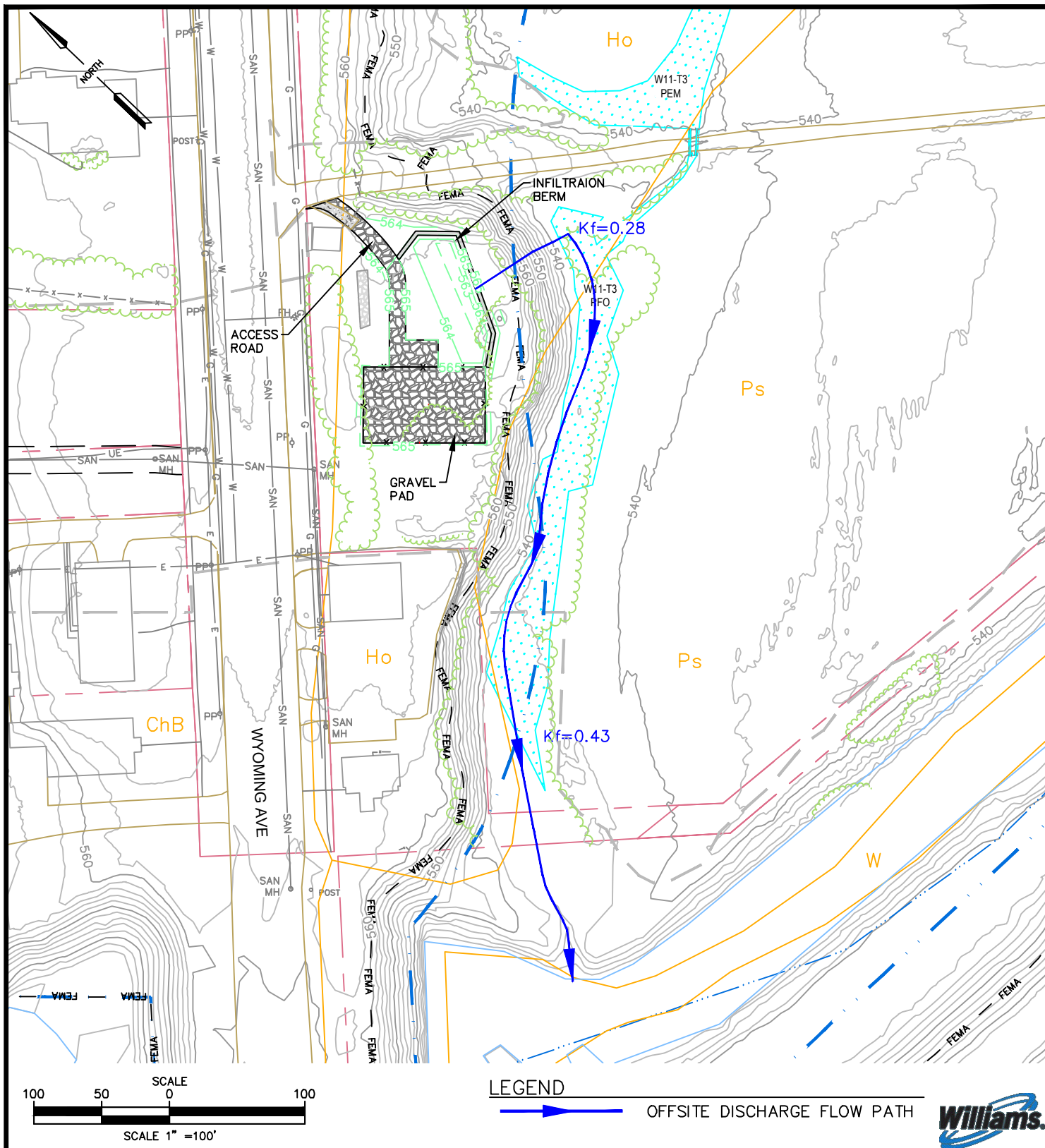


Photo 2: Area Downgradient of the Proposed Infiltration Berm

Photo 1 shows the existing conditions at the approximate location of the infiltration berm. Photo 2 shows the areas downgradient of the site, which is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity over the berm is 0.0 feet per second for the 100 year, 24-hour storm event.

3.0 Conclusion

Based on the existing vegetative conditions, low discharge velocities from the BMPs, and reduced peak flow rates and volumes from the site, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



366 WALKER DRIVE, SUITE 300
STATE COLLEGE, PA 16801

TELEPHONE: (814) 689-1650

FAX: (814) 689-1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
MLV-515RA30
EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

WYOMING BOROUGH

LUZERNE COUNTY

PENNSYLVANIA

DATE:

02/22/22

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PW

WHM DRAWING NO:

FLOW PATH

EXHIBIT 1.0

ATTACHMENT 4.3
OFFSITE DISCHARGE REPORT –
CARVERTON TIE-IN



Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Regional Energy Lateral

Carverton Tie-in

April 2021

(Revised March 2022)

1.0 Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., is proposing the Regional Energy Lateral (Project). The Carverton Tie-in is proposed as part of the overall Project. The Carverton Tie-in is a receipt Tie-in proposed in West Wyoming Borough, Luzerne County at Milepost 16.8. Proposed is the installation of new tie-in piping into the proposed REL, valves, and aboveground tie-in piping for an annubar meter. The facility will include a 55 ft x 90 ft gravel pad, and an infiltration berm PCSM BMP. The new facility will require Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Best Management Practices (BMP's) to manage stormwater runoff during and after construction.

Transco has developed an Offsite Discharge Report for the discharges associated with the proposed BMP's. An Offsite Discharge Report is performed to ensure that no offsite erosion will occur downstream of the proposed activities. The analysis conducted for this project followed the sequence outlined in PaDEP's factsheet for offsite discharges (Document #3930-FS-DEP4124).

2.0 Conveyance Best Management Practices

Erosion and Sediment Control and Post Construction Stormwater Management BMP's are proposed to manage stormwater runoff during and after construction. An infiltration berm will be installed to convey the net increase in volume between the pre- and post-development 2-year storm events and mitigate the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events. The infiltration berm, which allows water to flow to an offsite area, is proposed as the discharge structure at this location.

2.1 Infiltration Berm

The infiltration berm discharges water, and it flows into the adjacent forested area located east of the Limits of Disturbance. The stormwater is being discharged as sheet flow and travels along a vegetative flow path until it reaches an unnamed blue line stream. The flow path is depicted on Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 1.

*Regional Energy Lateral
Carverton Tie-in
Transcontinental Gas Pipe Line Company, LLC
Offsite Discharge Report*

Table 1 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
ArD	$K_f = N/a$
OXF	$K_f = 0.10$
OpD	$K_f = 0.10$

The soil erodibility factors are shown in Table 1. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. Soil erodibility data is not provided for ArD soils. OXF and OpD soils have a low susceptibility to erosion (0.10). Photos were taken along the flow path of the downstream area to show the vegetative cover.



Photo 1: Existing Area at Proposed Infiltration Berm

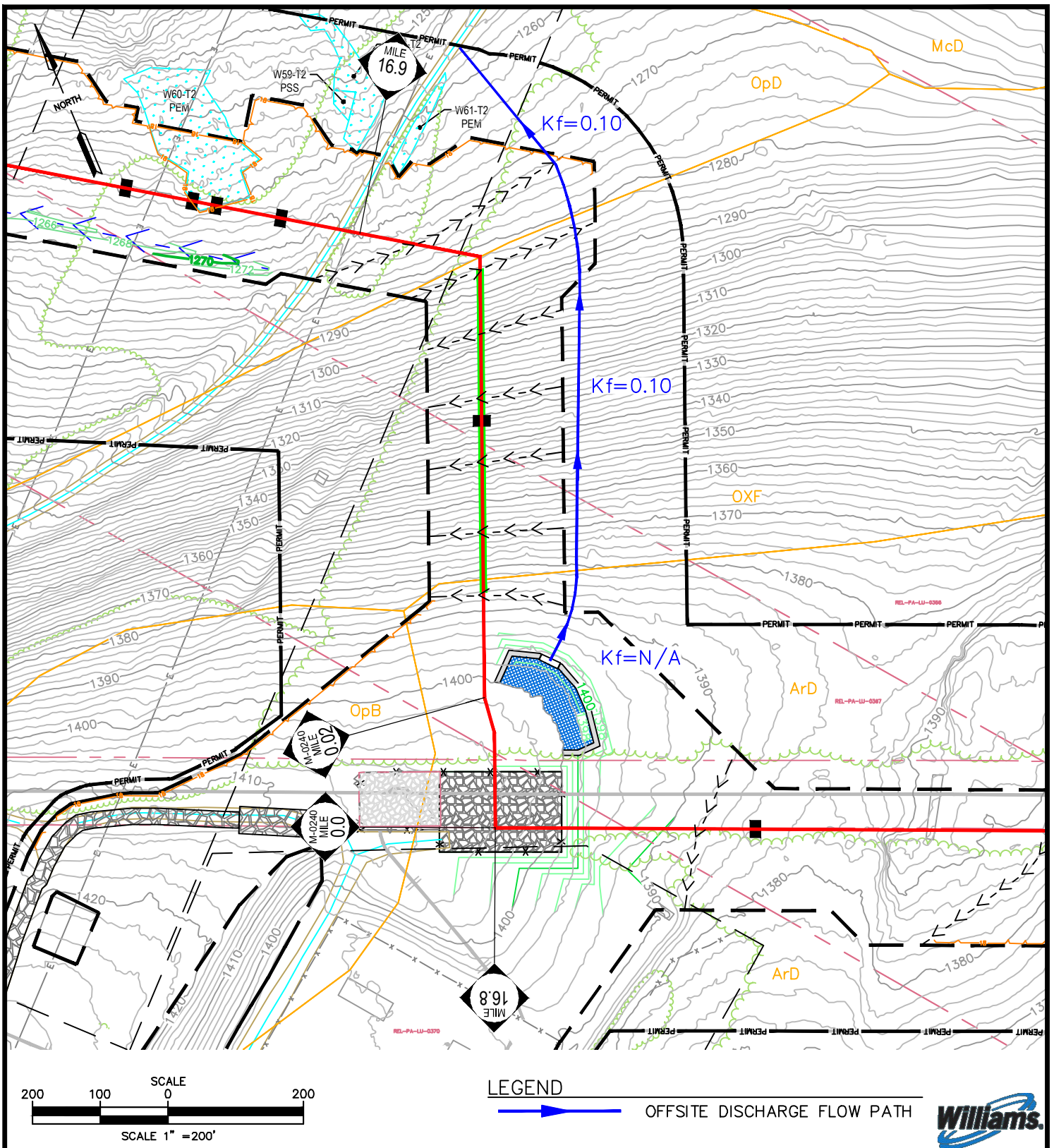


Photo 2: Area Downgradient of the Proposed Infiltration Berm

Photo 1 shows the existing condition where the infiltration berm is proposed. The area will be graded to facilitate the installation of the infiltration berm and revegetated. Photo 2 shows the areas downgradient of the proposed infiltration berm, which is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed infiltration berm is 0.97 feet per second for the 100 year, 24-hour storm event.

3.0 Conclusion

Based on the existing vegetative conditions, low discharge velocities from the BMPs, reduced peak flow rates and volumes from the site, and the low soil erodibility values associated with the property, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



366 WALKER DRIVE, SUITE 300
STATE COLLEGE, PA 16801

TELEPHONE: (814) 689-1650

FAX: (814) 689-1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
CARVERTON TIE-IN
EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

WEST WYOMING BOROUGH

LUZERNE COUNTY

PENNSYLVANIA

DATE:

02/23/22

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RWS

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PW

WHM DRAWING NO:

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EXHIBIT 1.0

ATTACHMENT 4.4
OFFSITE DISCHARGE REPORT –
LOWER DEMUNDS REL TIE-IN AND
HILDEBRANDT TIE-IN/MLV-515RA40



Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Regional Energy Lateral

Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40

April 2021
(Revised March 2022)

1.0 Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., is proposing the Regional Energy Lateral (Project). The Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40 are proposed as part of the overall Project. These new facilities will require Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Best Management Practices (BMP's) to manage stormwater runoff during and after construction.

The Lower Demunds REL Tie-in is located in Dallas Township, Luzerne County near the terminus of the Regional Energy Lateral at Milepost 22.1. Proposed is the installation of approximately 400 feet of new 20-inch-diameter tie-in piping from Transco's existing Leidy Line A tie-in site to the new proposed REL tie-in site, valves, and new aboveground tie-in piping for an annubar meter. The facility will include a 74.5 ft x 84 ft gravel pad. With limited run-on to the pad area due to construction of upgradient diversion channels, stormwater management will be accomplished by infiltration within the pad area itself.

The Hildebrandt Tie-in/MLV-515RA40 is a receipt Tie-in located in Dallas Township, Luzerne County, at the terminus of the Regional Energy Lateral at Milepost 22.34. Proposed is the installation of new aboveground tie-in piping, valves, and aboveground piping for an annubar meter, and associated pig trap. The facility will include an 80 ft x 140 ft gravel pad. With run-on to the pad area diverted by an upgradient channel, stormwater management will be accomplished by infiltration within the pad area itself.

Transco has developed an Offsite Discharge Report for the discharges associated with the proposed BMP's. An Offsite Discharge Report is performed to ensure that no offsite erosion will occur downstream of the proposed activities. The analysis conducted for this project followed the sequence outlined in PaDEP's factsheet for offsite discharges (Document #3930-FS-DEP4124).

2.0 Conveyance Best Management Practices

Erosion and Sediment Control and Post Construction Stormwater Management BMPs are proposed to manage stormwater runoff during and after construction. At both Lower Demunds REL Tie-in and Hildebrandt Ties-in sites, a subsurface infiltration bed lays beneath each gravel pad where water accumulates and flows away from the pads. At the Lower Demunds Tie-in, a diversion berm will prevent run-on drainage, and there will be a berm around the exterior of the

pad to retain stormwater for infiltration. An overflow spillway will be used to discharge excess flow to a riprap apron on the east side of the pad. At the Hildebrandt Tie-in, the pad will be bermed around the exterior to retain stormwater for infiltration. An overflow spillway on the east side of the pad will be used to discharge excess flow to the diversion channel. The water will then be directed northwest to a level spreader. These subsurface infiltration beds will be installed to manage the net increase in volumes between the pre- and post-development 2-year storm events and mitigate the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events. Level spreaders, which allow water to flow to an offsite area, are proposed as the discharge structures at these locations. The runoff rates have been reduced by 40% of the pre-construction flow rates.

2.1 Subsurface Infiltration Bed – Lower Demunds REL Tie-in

The subsurface infiltration bed releases water to an overflow spillway which discharges the excess flow to a riprap apron on the east side of the pad and flows into a wetland complex southeast of the site and Limits of Disturbance. The stormwater is being discharged as sheet flow and travels along a vegetative flow path until it reaches a wetland complex and ultimately to stream S1-T11. The flow path is depicted in Exhibit 1.0A. Soil types and the erodibility factors within the flow path are shown in Table 1.

Table 1 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
WiB	$K_f = 0.20$
WiC	$K_f = 0.20$

The soil erodibility factors are shown in Table 1. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. WiB and WiC soils have a low susceptibility to erosion (0.20). Photos were taken along the flow path of the downstream area to show the vegetative cover.

*Regional Energy Lateral
Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40
Transcontinental Gas Pipe Line Company, LLC
Offsite Discharge Report*



Photo 1: Existing Area at Proposed Riprap Apron



Photo 2: Area Downgradient of the Proposed Riprap Apron

Photo 1 shows the existing condition where the riprap apron is proposed. The area will be graded to facilitate the installation of the riprap apron and revegetated. Photo 2 shows the areas downgradient of the proposed riprap apron, which is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed riprap apron is 1.3 feet per second for the for the 25 year, 24-hour storm event.

2.2 Subsurface Infiltration Bed – Hildebrandt Tie-in/MLV-515RA40

The subsurface infiltration bed releases water through the overflow spillway and it flows into a level spreader via a diversion channel on the east side of the pad where it is discharged and flows into the adjacent wetland complex and forested area west of the Limits of Disturbance. The stormwater is being discharged as sheet flow and travels along a vegetative flow path until it reaches an unnamed blueline stream. The flow path is depicted in Exhibit 1.0B. Soil types and the erodibility factors within the flow path are shown in Table 2.

Table 2 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
WiB	$K_f = 0.20$
MoB	$K_f = 0.24$
CiA	$K_f = 0.32$

The soil erodibility factors are shown in Table 2. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. The soils in the flow path are considered moderately erodible (0.20, 0.24, 0.32). Photos were taken along the flow path of the downstream area to show the vegetative cover.

*Regional Energy Lateral
Lower Demunds REL Tie-in and Hildebrandt Tie-in/MLV-515RA40
Transcontinental Gas Pipe Line Company, LLC
Offsite Discharge Report*



Photo 3: Existing Area adjacent to the Proposed Level Spreader

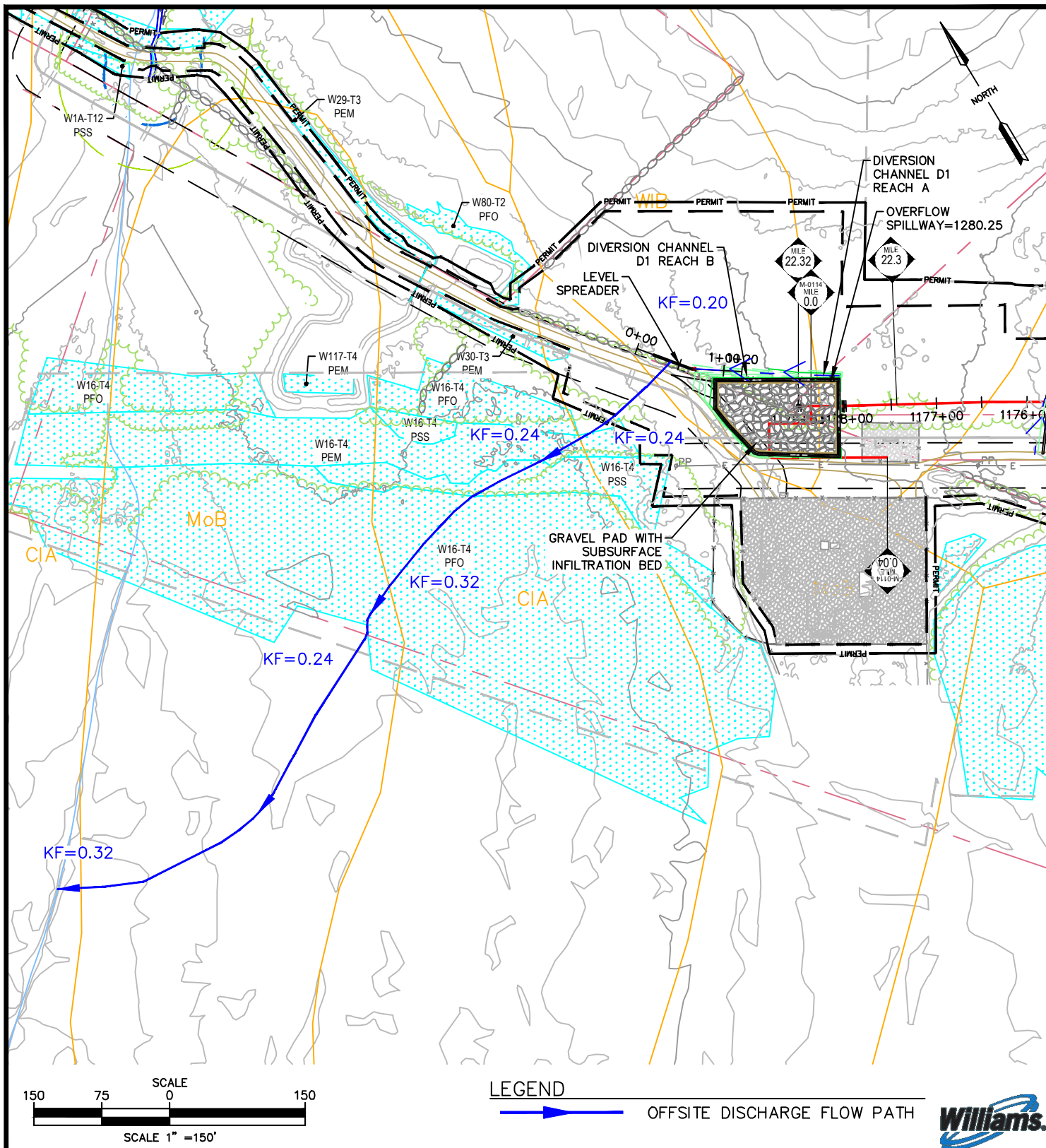


Photo 4: Area Downgradient of the Proposed Level Spreader

Photo 3 shows the existing condition where the level spreader is proposed in the vegetated area to the right of the existing road. The area will be graded to facilitate the installation of the level spreader and revegetated. Photo 4 shows the areas downgradient of the proposed level spreader, which is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed level spreader is 0.95 feet per second for the for the 25 year, 24-hour storm event.

3.0 Conclusion

Based on the existing vegetative conditions, low discharge velocities from the BMPs, and reduced peak flow rates and volumes from the site, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



366 WALKER DRIVE, SUITE 300
STATE COLLEGE, PA 16801

TELEPHONE: (814)-689-1650

FAX: (814)-689-1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
HILDEBRANT TIE-IN/ MLV-515RA40
EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

DALLAS TWP

LUZERNE COUNTY

PENNSYLVANIA

DATE:

02/22/22

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RWS

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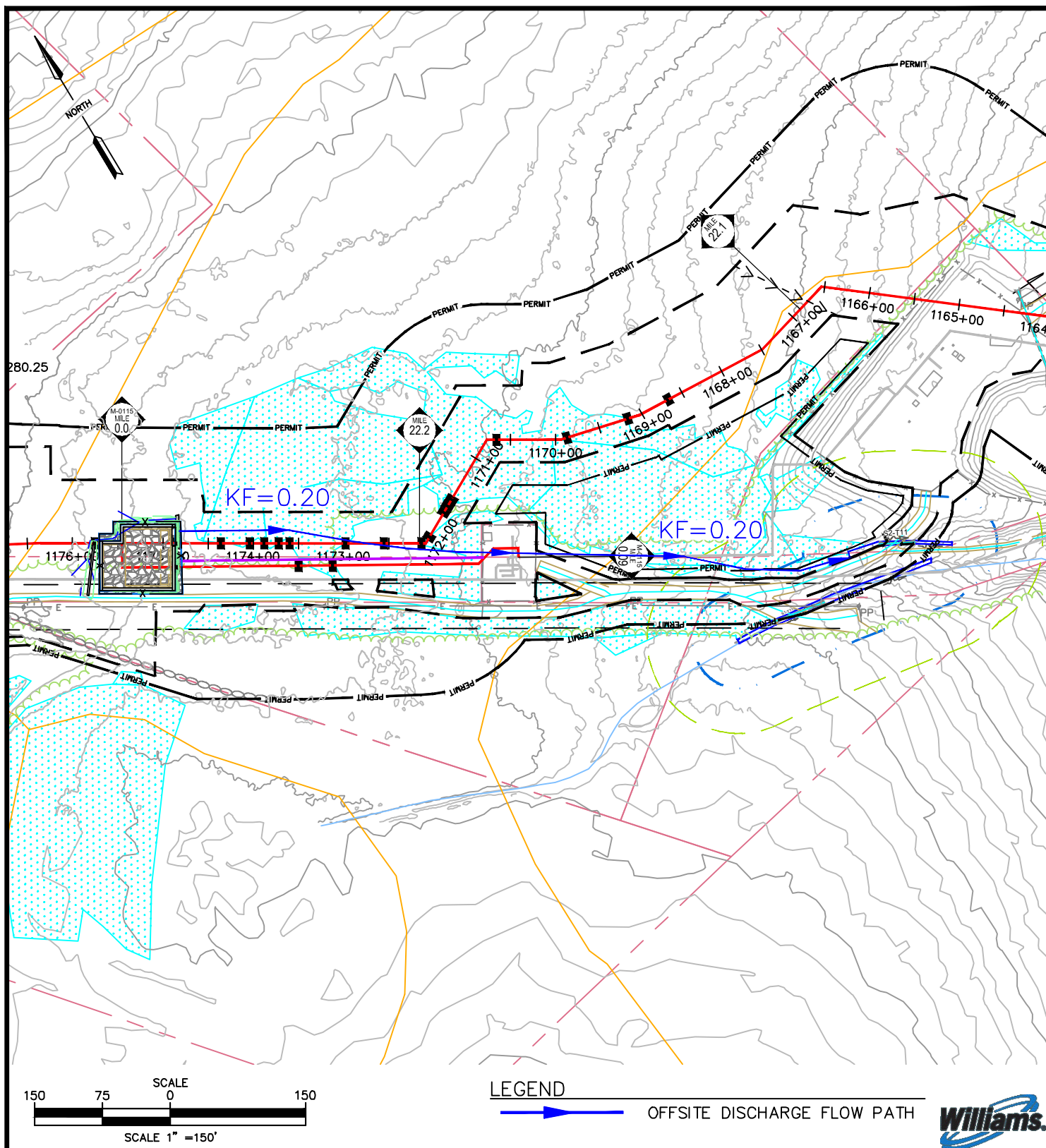
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EXHIBIT 1.0A





366 WALKER DRIVE, SUITE 300
STATE COLLEGE, PA 16801

TELEPHONE: (814)-689-1650

FAX: (814)-689-1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
LOWER DEMUNDS REL TIE-IN
EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

DALLAS TWP

LUZERNE COUNTY

PENNSYLVANIA

DATE:

02/22/22

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RWS

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PW

WHM DRAWING NO:

FLOW PATH

EXHIBIT 1.0B

SECTION 2.1.2
DRAWINGS