Transcontinental Gas Pipe Line Company, LLC

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

Regional Energy Access Expansion Project – Effort Loop

April 2021
(Revised July 2021)
(Revised March 2022)

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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 Effort Loop component of the Project will consist of approximately 13.8 miles of 42-inch pipeline co-located with existing Transco Leidy Lines between Mileposts 43.72 and 57.50 in Ross, Chestnuthill and Tunkhannock Townships, Monroe County. The new pipeline will tie-in to the existing 42-in Leidy Line "D" on both ends, completing the segment. With the segment completed, the existing pig traps (industry term for manifolds that launch or receive in-line inspection tools) at both tie-ins will no longer be needed and will therefore be removed, while the existing mainline valves will remain. Transco will be installing a new mainline valve and appurtenant equipment at Milepost 49.6 off of Sugar Hollow Road. The valve installation is a means to isolate gas flows. One Contractor Yard is proposed at the east end of the pipeline at MP 43.72 (CY-MO-001). One remote anode groundbed is proposed at MP 43.72.

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 Effort Loop Pipeline will be approximately 262.2 acres. 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-505LD86

The mainline valve site, MLV-505LD86, is located at milepost 49.6 on the Effort Loop Pipeline. During construction of the Effort Loop Pipeline, two temporary freshwater storage tanks will be placed adjacent to the valve. These tanks will provide water for hydrostatic testing of the pipeline before it is placed into service. The overall temporary earth disturbance at the site is approximately 8.64 acres. Upon completion of construction activities, the majority of the site will be restored to original conditions.

Proposed E&S Best Management Practices (BMPs) for MLV-505LD86 include rock construction entrances, compost filter socks, diversion and collection channels, sediment traps, and level spreaders. E&S BMPs have been designed in accordance with the PaDEP E&S BMP Manual. Design calculations, where needed, are provided in this document as attachments. E&S BMPs are depicted in the Effort Loop E&S Plans.

Upon completion of construction, the increased impervious area of MLV-505LD86 site will utilize several PCSM BMPs to control stormwater runoff, attenuate peak flow rate and volume, and provide infiltration. Excess stormwater runoff will be directed to the basin, berms, and subsurface infiltration beds via a series of collection channels for infiltration and controlled discharge. BMP design calculations and drawings are provided in Attachment 4 and the PCSM Plan set.

1.2 Contractor Yards

One contractor yard, CY-MO-001, is proposed for the Effort Loop Pipeline project. It is located at the east end of Effort Loop Pipeline at MP 43.72. The yard is a temporary facility with an approximate disturbance of 51 acres.

Proposed E&S BMPs include rock construction entrances, compost filter socks, and compost filter sock sediment traps. E&S BMPs have been designed in accordance with the PaDEP E&S BMP Manual. Design calculations, where needed, are provided in this document as attachments. E&S BMPs are depicted in the Effort Loop E&S Plans.

Upon completion of construction, CY-MO-001 will be restored to original conditions. No permanent features are proposed at the yard.

2. Topographic Features of the Area

A Project Location Map for the Effort Loop 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 Blakeslee, Brodheadsville, Pocono Pines, and Saylorsburg, Pennsylvania quadrangles.

3. Receiving Surface Waters

The following table (Table 1) list each watershed located Effort Loop 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	Stream Restriction
Lake Creek	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
Princess Run	CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
Weir Creek	CWF, MF	-	Class A Wild Trout	Oct 1 – Apr 1
UNT to McMichael Creek	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
UNT to McMichael Creek	EV, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
UNT to Weir Creek	CWF, MF	-	Class A Wild Trout	Oct 1 – Apr 1
UNT to Pohopoco Creek	CWF, MF	HQ-CWF, MF	Class A Wild Trout	Oct 1 – Apr 1
Sugar Hollow Creek	CWF, MF	HQ-CWF, MF	Class A Wild Trout	Oct 1 – Apr 1
Poplar Creek	CWF, MF	EV, MF	Class A Wild Trout	Oct 1 – Apr 1
UNT to Poplar Creek	CWF, MF	EV, MF	Class A Wild Trout	Oct 1 – Apr 1
Mud Run	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
UNT to Mud Pond Run	HQ-CWF, MF	EV, MF	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
Long Pond to Tunkhannock Creek	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
UNT to Tunkhannock Creek (Keiper Run)	HQ-CWF, MF	-	Naturally Producing Wild Trout Stream	Oct 1- Dec 31
EV: Exceptional Value, MF: Migratory Fishes, HQ-CWF: High Quality- Cold Water Fishes, CWF: 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 55 soil mapping units located within the LOD, see Table 2 below:

Table 2 – Soils mapping units within the LOD

Soil Mapping Unit	Soil Series
AnB	Allenwood gravelly silt loam, 3 to 8 percent slopes
AwB	Alvira and Watson very stony loams, 0 to 12 percent slopes
BbC	Bath channery silt loam, 8 to 25 percent slopes, extremely stony
BrA	Braceville gravelly loam, 0 to 3 percent slopes
BrB	Braceville gravelly loam, 3 to 8 percent slopes
BxB	Buchanan channery loam, 8 to 25 percent slopes, rubbly
BxC	Buchanan channery loam, 8 to 25 percent slopes, rubbly
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
CnB	Chippewa and Norwich soils, 0 to 8 percent slopes, extremely stony
CpA	Clymer loam, 0 to 3 percent slopes
CxB	Clymer extremely stony loam, 0 to 8 percent slopes
Cy	Cut and fill land
DxB	Dekalb channery loam, 0 to 8 percent slopes, rubbly
DxC	Dekalb very channery loam, 8 to 25 percent slopes, extremely stony
DxE	Dekalb very stony loam, 25 to 100 percent slopes, very stony
GP	Pit, Shale, and Gravel
HaB	Hartleton channery silt loam, 2 to 8 percent slopes
HaC	Hartleton channery silt loam, 8 to 20 percent slopes
Hy	Holly silt loam
KaB	Kedron silt loam, 2 to 8 percent slopes
KvB	Klinesville channery silt loam, 3 to 8 percent slopes
KvC	Klinesville channery silt loam, 8 to 15 percent slopes
KvD	Klinesville channery silt loam, 15 to 25 percent slopes
LgB	Laidig extremely stony loam, 0 to 8 percent slopes
LgC	Laidig extremely stony loam, 8 to 25 percent slopes
LkB	Leck kill channery silt loam, 2 to 8 percent slopes
LkC	Leck kill channery silt loam, 8 to 15 percent slopes
LkD	Leck kill channery silt loam, 15 to 25 percent slopes
LsC	Lordstown channery silt loam, 8 to 15 percent slopes
LxC	Lordstown channery silt loam, 8 to 25 percent slopes, rubbly
MeB	Meckesville gravelly loam, 3 to 8 percent slopes
MeC	Meckesville gravelly loam, 8 to 15 percent slopes
MfB	Meckesville very stony loam, 0 to 8 percent slopes
MoB	Morris channery silt loam, 0 to 8 percent slopes

Pp	Pope silt loam, high bottom
ReA	Rexford gravelly silt loam, 0 to 3 percent slopes
SpB	Shelmadine very stony silt loam, 0 to 8 percent slopes
VaE	Very stony land and Rock outcrops, steep
W	Water
WaB	Watson silt loam, 2 to 8 percent slopes
Wb	Wayland silt clay loam
WeB3	Weikert channery silt loam, 3 to 8 percent slopes, eroded
WeC3	Weikert channery silt loam, 8 to 15 percent slopes, eroded
WeD3	Weikert channery silt loam, 15 to 25 percent slopes, eroded
WhB	Weiker-Hartleton channery silt loams, 3 to 8 percent slopes
WhC	Weikert-Hartleton channery silt loams, 8 to 15 percent slopes
WhD	Weikert-Hartleton channery silt loams, 15 to 25 percent slopes
WKE	Weikert and Klinesville soils, steep
WyA	Wyoming gravelly sandy loam, 0 to 3 percent slopes
WyB	Wyoming gravelly sandy loam, 3 to 8 percent slopes
WyC	Wyoming gravelly sandy loam, 8 to 15 percent slopes
WyD	Wyoming gravelly sandy loam, 15 to 25 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 Effort Loop Pipeline and resolutions were identified in Section 4.1.

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
Allenwood	AnB	X	C/S					X	X	X	X	X	X				
Alvira	AwB	X	C/S	X	X		X	X	X	X	X	X	X				X
Bath	BbC	X	C/S				X	X		X		X	X				
Braceville	BrA, BrB	X	C/S	X	X		X	X	X	X	X	X	X				X
Buchanan	BxB, BxC	X	C/S	X	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
Chenango	ChA, ChB, ChC	X	C	X		X	X	X		X	X	X	X				
Chippewa	CnB	X	C/S	X	X		X	X	X	X	X		X	X		X	
Clymer	CpA, CxB	X	C	X	X			X	X	X	X	X	X				X
Cut and Fill*	Cy																
Dekalb	DxB, DxC, DxE	X	C	X					X	X	X	X	X				
Pit, Shale and Gravel*	GP																
Hartleton	HaB, HaC	X	C	X					X	X	X	X	X				
Holly	Hy	X	C/S			X	X	X	X	X	X	X	X			X	X
Kedron	KaB	X	C/S				X	X	X	X	X	X	X				X
Klinesville	KvB, KvC, KvD	X	C/S	X	X			X		X		X	X				
Laidig	LgB, LgC	X	C/S	X	X		X	X	X	X	X	X	X				
Leck Kill	LkB, LkC, LkD	X	C						X	X	X	X	X				X
Lordstown	LsC, LxC	X	C	X	X				X	X	X		X				
Meckesville	MeB, MeC, MfB	X	C/S				X		X	X	X	X	X				X
Morris	MoB	X	C/S	X	X		X	X	X	X		X	X				X
Pope	Pp	X	C/S		X	X		X	X	X	X	X	X				
Rexford	ReA	X	C/S	X		X	X	X	X	X	X	X	X				X
Shelmadine	SpB	X	C/S	X			X	X	X	X	X	X	X				
Very Stony*	VaE																
Water	W																
Watson	WaB	X	C/S	X			X	X	X	X	X		X	X			
Wayland	Wb	X	S		X	X	X	X	X	X	X	X	X			X	X
Weikert	WeB3, WeC3, WeD3, WhB, WhC, WhD, WKE	X	C/S	X				X	X	X	X	X	X				
Wyoming	WyA, WyB, WyC, WyD	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 retained Civil & Environmental Consultants, Inc. (CEC) of Pittsburgh, PA to perform a geohazard assessment, the following is provided from their 2020 report. Transco utilized United States Geological Survey (USGS), Geologic Map of Pennsylvania - Map 1, dated 1980 (online), to evaluate geologic hazards on the Project. The desktop analysis completed for the Project by CEC revealed that the Effort Loop Pipeline does not cross any known, mapped, or inferred faults. No mines or Karst formations were identified in the site vicinity. However, the analysis outlined that Effort Loop Pipeline lies within a zone of moderate to high landslide incidence and susceptibility.

Due to the moderate to high landslide incidence and susceptibility, 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

The Effort Loop Pipeline will consist of approximately 13.8 miles of 42-inch pipeline co-located with existing Transco Leidy Lines between Mileposts 43.72 and 57.50 in Ross, Chestnuthill and Tunkhannock Townships, Monroe County. The new pipeline will tie-in to the existing 42-in Leidy Line “D” on both ends, completing the segment. With the segment completed, the existing pig traps (industry term for manifolds that launch or receive in-line inspection tools) at both tie-ins will no longer be needed and will therefore be removed, while the existing mainline valves will remain. Transco will be installing a new mainline valve and appurtenant equipment at Milepost 49.6 off Sugar Hollow Road. The valve installation is a means to isolate gas flows. One Contractor Yard is proposed at the east end of the pipeline at MP 43.72 (CY-MO-001).

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 contactor yard consists of an agricultural field. Disturbed areas within these temporary workspaces will be restored to the original contours. Transco will use and implement the practices, measures, and details to control soil erosion and off-site sedimentation during construction. Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (https://www.mrlc.gov/viewer/), it appears that the Effort Loop Pipeline site has been an existing and maintained gas pipeline right-of-way for the past 20 years and will continue to be an existing and maintained gas pipeline right-of-way once the Project is complete. 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.

6. Erosion and Sediment Control Best Management Practices

Various erosion and sediment control measures will be used during the construction of the Effort Loop Pipeline. BMPs proposed to be used at the Site to control soil erosion and sediment pollution are listed below. Details of BMPs proposed to be used 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.

Compost Filter Sock Sediment Trap

Runoff may be directed into the Compost Filter Sock Sediment Traps of sheet flow into the trap. Compost sock sediment traps shall not exceed three socks in height and shall be stacked in pyramidal form. Minimum trap height is one 24” diameter sock. Additional storage may be provided by means of an excavated sump 12” deep extending 1 to 3 feet upslope of the socks along the lower side of the trap. The maximum tributary drainage area is 5.0 acres. Since compost socks are “flow-through,” no spillway is required. Installation of an excavated sump immediately above the socks may increase trap efficiency where soil conditions permit their construction.

Earthen Sediment Trap

At MLV-505LD086, runoff will be directed into an earthen Sediment Trap. The maximum tributary drainage area is 5.0 acres. The sediment trap is designed with a minimum sediment storage capacity of 700 cf/acre, and 1,300 cf/ acre of dewatering storage. The sediment trap will dewater through a perforated riser pipe.

Broad Based Dips

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 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.

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 any streams along the pipeline installation. The bridge equipment crossing will utilize geotextile material, timber mats, and a timber or metal bridge with side rails any 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, all 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 workspace to prevent water from entering the maintenance area. A pump shall be placed to move any 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 the phases of construction.

Siltron Pollution Prevention Fence

Siltron 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 ½ 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.

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).

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.

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. 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 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

Due to the overall nature of the Project, thermal impacts to surface waters are not anticipated. The pipeline installation activities will primarily take place within an existing cleared and maintained pipeline right-of-way. There will be no increase in stormwater discharge. The primary means to address thermal impacts on this Project is to limit the size and duration of exposed earth. Revegetation procedures and the Sequence of Construction outline disturbed areas being immediately revegetated.

Stormwater runoff associated with the installation of the MLV's will be routed through the 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 Effort Loop 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 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 Effort Loop 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.

The MLV-505LD86 site 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 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 has completed surveys, as required by the appropriate agency, and is still coordinating with these agencies. 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.

The cumulative effect of the Project will not result in the impairment of the Commonwealth's "Exceptional Value" and "Other" wetland resources. A review of the Section 303(d) list of the Clean Water Act indicated that no surface waters crossed by the Project are classified as impaired waterbodies. 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 Chapter 102 permit. The wetland impacts are isolated to their disturbance area. The Project has been collocated with Transco's existing gas pipeline system, to avoid fragmentation and to minimize resource impacts. 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 4
Wetland Resource Classification

Milepost or Access Road	Wetland ID	Chapter 105.17 Classification	HGM Classification	Cowardin Classification	Palustrine Community Classification
45.23	W1-T5	EV	Depression Seasonal	PEM	Mixed Forb - Graminoid Wet Meadow
45.83	W4-T6	EV	Depression Seasonal	PEM, PSS	Bluejoint - Reed Canary - grass marsh, Circumneutral Mixed Shrub Wetland
46.09	W1-T2	EV	Depression Seasonal	PEM	Mixed Forb Marsh
46.31	W2-T2	Other	Depression Seasonal	PSS	Mixed Forb - Graminoid Wet Meadow, Circumneutral Mixed Shrub Wetland, Oak – Mixed Hardwood Palustrine Forest
49.43	W1-T1	EV	Riverine Floodplain Complex	PEM, PSS	Floodplain Meadow, Alder – Dogwood Floodplain Thicket
52.66	W2-T1	EV	Riverine Floodplain Complex	PEM	Floodplain Meadow
53.65	W9-T2	EV	Riverine Floodplain Complex	PEM, PFO	Mixed Forb - Graminoid Wet Meadow, Red maple – Highbush Blueberry Palustrine Woodland
55.20	W12-T2	EV	Depression Temporary	PEM, PFO	Mixed Forb - Graminoid Wet Meadow, Red maple – Highbush Blueberry Palustrine Woodland
56.57	W14-T2	EV	Depression Temporary	PEM	Mixed Forb - Graminoid Wet Meadow
56.62	W4-T3	EV	Depression Temporary	PEM, PFO	Mixed Forb - Graminoid Wet Meadow, Red maple – Highbush Blueberry Palustrine Woodland
56.90	W3-T1	EV	Riverine Floodplain Complex	PEM, PFO	Mixed Forb - Graminoid Wet Meadow, Red maple – Highbush Blueberry Palustrine Woodland
56.91	W15-T2	EV	Depression Temporary	PFO	Red maple – Highbush Blueberry Palustrine Woodland
56.99	W3A-T1	Other	Riverine Floodplain Complex	PFO	Red maple – Highbush Blueberry Palustrine Woodland
57.1	W4-T1	EV	Depression Seasonal	PEM	Mixed Forb - Graminoid Wet Meadow
57.23	W4A-T1	EV	Depression Seasonal	PEM	Cat-tail Marsh
57.27	W6-T1	EV	Depression Temporary	PEM	Mixed Forb - Graminoid Wet Meadow
57.44	W8-T1	EV	Riverine Floodplain Complex	PEM, PSS	Mixed Forb - Graminoid Wet Meadow, Red Maple - Mixed Shrub Palustrine Woodland
57.45	W10-T1	EV	Depression Seasonal	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 are conventional dry open-cut and 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 eighteen PEM, PSS and PFO wetlands. Permanent functional conversion impacts (PFO/PSS to PEM) of wetlands located within the proposed maintained pipeline ROW will occur to nine wetlands, for a total of 0.29 acres. Temporary functional conversion impacts of wetlands located within the temporary workspace will occur to ten wetlands, for a total of 0.53 acres. Wetlands outlined as temporary functional conversion impacted wetlands will be replanted onsite. 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 are discussed below.

Water Quantity, Stream Flow and Sources

Transco will cross waterbodies with flowing water present at the time of construction using primarily dry-ditch construction methodology. One wetland resource (W2-T2) will be conventionally bored as it is adjacent to a state highway and the highway bore will also include the boring of this resource. The trenchless construction methodology proposed would not result in effects to water quantity, stream flow and sources. 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. Once complete, the stream banks and streambed will be restored to pre-construction contours. To stabilize the banks, stream banks and riparian areas will be revegetated using approved seed mixes and/or erosion control blankets or matting.

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.

With the exception of the new main line valve at MP 49.6, no new impervious areas are required. The valve settings will have some impervious area, however, stormwater impacts will be mitigated for through a stormwater management design, which will promote infiltration at the site. All areas associated with the pipeline installation will be restored to approximate pre-construction contours to preserve the existing condition. This restoration shall limit the pipeline 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 to drainage patterns, flushing characteristics and flow currents to wetlands and waterbodies during construction with no long-term impacts anticipated.

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. Transco will restore pipeline facility workspaces to pre-construction contours.

Stormwater and Floodwater Storage and Control

The proposed Project will have minimal impacts to stormwater and floodwater storage and control during construction, with no long-term impacts anticipated. Aboveground facilities are located outside of Federal Emergency Management Agency (FEMA) Floodplains, FEMA Floodways and 50-foot floodways.

Restoration of pre-construction contours along the Effort Loop will preserve the existing condition of the FEMA floodplains, 50-foot floodways, and wetlands. This restoration shall limit the pipeline facilities from having adverse effects on flood-storage capacity or stormwater control. With the exception of the Main Line Valve at MP 49.6, no impervious areas are to be added as a result of the pipeline component of the Project. The Main Line Valve site will have impervious area and will include a stormwater management design that promotes infiltration at the site.

Hydrodynamics

Stream and wetland crossings will be restored to pre-existing conditions. Natural streambed materials will be replaced in the streambed and the pre-existing stream alignment should be restored to pre-construction alignments. 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. However, the Project does not involve any addition of structures or impervious surfaces in the wetlands. 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 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 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 pipeline co-location. Habitat fragmentation has been minimized through the use of pipeline collocation. 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%. 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.

At MLV-505LD86, where permanent increase in impervious area is proposed, Sugar Hollow Creek recently changed from CWF to HQ-CWF. Trees are proposed to be cleared along Sugar Hollow Road; which is within the 150 buffer. Transco will apply for the waiver for earth disturbance needed to improve the sight distance as a public health or safety issue in accordance with §102.14(d)(2)(i). Installation of the driveway and storm pipe work would be considered an allowable activity in accordance with 102.14(f)(2)(i) if these activities are located within the buffer. Section 1-7 - Riparian Buffer Waiver Request has been revised to include this updated information.

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-505LD86 site, where increase in the impervious area is 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 MLV site. Absent controls, 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-505LD86

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)
14,876	17,783	12,329	-2,547

DA-1: Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.01	0.15	0.83	2.00	3.90

DA-1: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.02	0.07	1.36	3.57	6.23	10.01

DA-1: Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.13	0.64	1.54	3.58

DA-1: Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.00	-0.01	-0.02	-0.19	-0.46	-0.32

DA-2: Pre-Construction Peak Discharge Rates(cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.38	0.93	3.22	5.40	7.61	10.45

DA-2: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
1.06	1.76	4.01	5.91	7.75	10.03

DA-2: Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.27	0.39	1.80	4.28	5.94	7.82

DA-2: Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.11	-0.54	-1.42	-1.12	-1.67	-2.63

DA-3: Pre-Construction Peak Discharge Rates(cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.05	0.33	1.25	3.12

DA-3: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.05	0.33	1.25	3.12

12. Offsite Discharge Analysis

The stormwater BMPs being constructed at the MLV-505LD86 site 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-505LD86

The MLV-505LD86 Yard site utilizes two infiltration berms, an infiltration basin and two subsurface infiltration beds. A series of PCSM channels along the access road will direct stormwater to discharge locations on both the north and south sides of the access road. On the south side of the access road, stormwater from the PCSM channels enters Infiltration Berm 1, flows into Infiltration Berm 2 and discharges to a wooded area near the southeastern part of the MLV-505LD86 site. The remainder of PCSM channels direct stormwater water into two subsurface infiltration beds south of the access road and an infiltration basin that is north of the access road. The Infiltration Basin has an outlet that discharges into an 24” diameter pipe which directs stormwater to the Sugar Hollow Road ditch. Infiltration Bed #1 and Infiltration Bed #2 discharge below the access road and flow into the Sugar Hollow Road ditch. Stormwater from the Sugar Hollow Road ditch leaves the site via an 18” Sugar Hollow Road PennDOT culvert.

The infiltration berms discharge water as sheet flow which travels along a vegetative flow path, eventually entering Sugar Hollow Creek. The area downstream of the outfall 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 2 is 1.31 fps 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.

The infiltration basin discharges stormwater to a basin riser pipe outlet. Infiltration Bed #1 has a 4” outlet pipe and Infiltration Bed #2 has a 6” outlet pipe which discharge upgradient of the Sugar Hollow Road ditch. The stormwater from these BMPs is discharged as sheet flow and travels along a vegetative flow path until it enters a Sugar Hollow Roadside ditch near the site entrance and then a PennDOT culvert south of the Limits of Disturbance. The area downstream of the outfall 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 Basin outlet is 0.0 feet per second for the for the 25 year, 24-hour storm event. The discharge velocity from subsurface Infiltration Bed #1 is 1.61 feet per second and the discharge velocity from Infiltration Bed #2 is 1.88 feet per second 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 sites are primarily existing and maintained pipeline right-of-way in meadow condition with a forested fringe. Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (https://www.mrlc.gov/viewer/), it appears that the Effort Loop has been an existing and maintained gas pipeline right-of-way for the past 20 years and will continue to be an existing and maintained gas pipeline right-of-way once the Project is complete. 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 Effort Loop Pipeline will consist of approximately 13.8 miles of 42-inch pipeline co-located with existing Transco Leidy Lines between Mileposts 43.72 and 57.50 in Ross, Chestnuthill and Tunkhannock Townships, Monroe County. The new pipeline will tie-in to the existing 42-in Leidy Line “D” on both ends, completing the segment. With the segment completed, the existing pig traps (industry term for manifolds that launch or receive in-line inspection tools) at both tie-ins will no longer be needed and will therefore be removed, while the existing mainline valves will remain. Transco will be installing a new mainline valve, MLV-505LD86, and appurtenant equipment at Milepost 49.6 off Sugar Hollow Road. The valve installation is a means to isolate gas flows. One Contractor Yard is proposed at the east end of the pipeline at MP 43.72 (CY-MO-001).

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 contactor 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 Effort Loop 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). It will be ensured that disturbed areas permanently revegetate.

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 Chapter 105 permit.

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.

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 of 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.

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 of any year 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/collection 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 sedimentation basin 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.

Post-Construction Wetland and Watercourse Monitoring shall occur annually for a period of five years following construction and include wetlands and watercourses impacted by the Project, and a monitoring report submitted thereafter. Each monitoring report will include, at a minimum, the following information:

- Information describing the presence or absence of hydrology at the time of inspection and a narrative comparison to hydrology present in the wetland or watercourse during pre-permitting field investigation(s);
- Photographic Documentation;

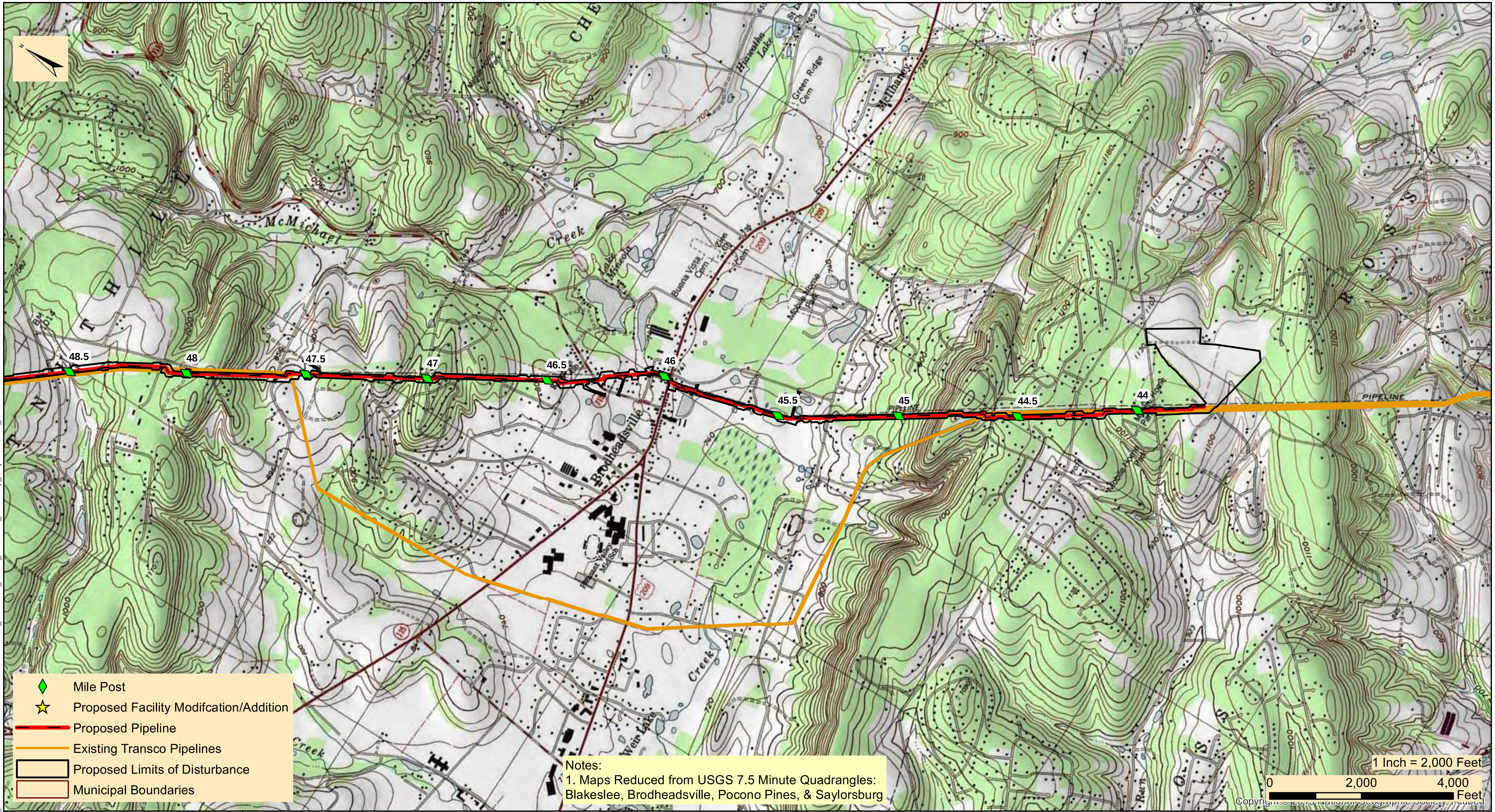
- Vegetation data including inventory of plant species, percent coverage of native hydrophytic species (wetlands), and stem counts survival; and
- Identification of any problems or concerns that require remedial measures, including loss of hydrology, and a plan to address the deficiencies.

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 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



Williams®

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

REGIONAL ENERGY ACCESS EXPANSION PROJECT

PROPOSED 42" LEIDY D EFFORT LOOP

PROJECT LOCATION MAP

CHESTNUT HILL & ROSS TOWNSHIP | MONROE COUNTY | PENNSYLVANIA

Date: 2/10/2022

Drawn By: FTN

Figure Number: EL-1

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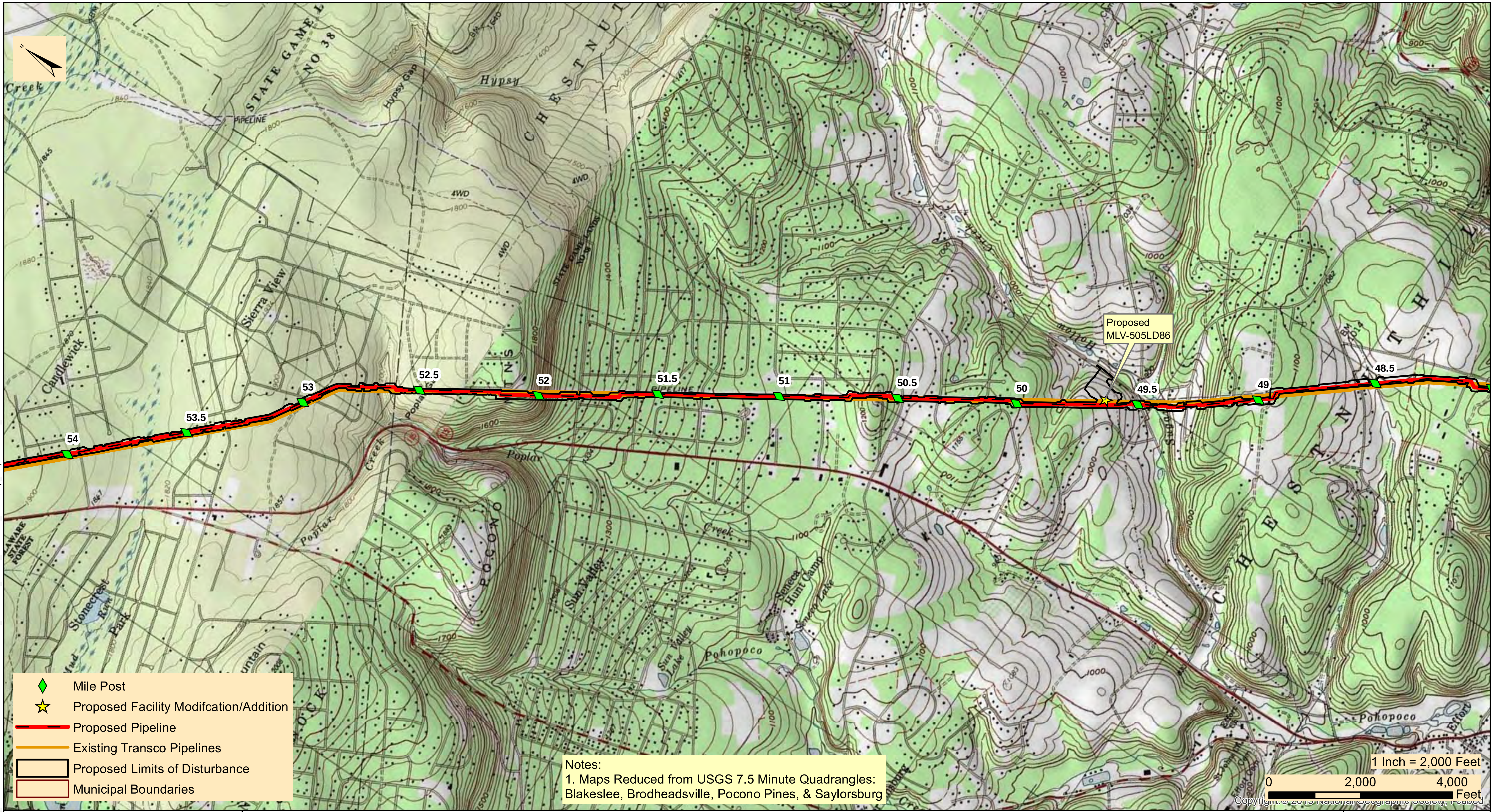

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 42" LEIDY D EFFORT LOOP

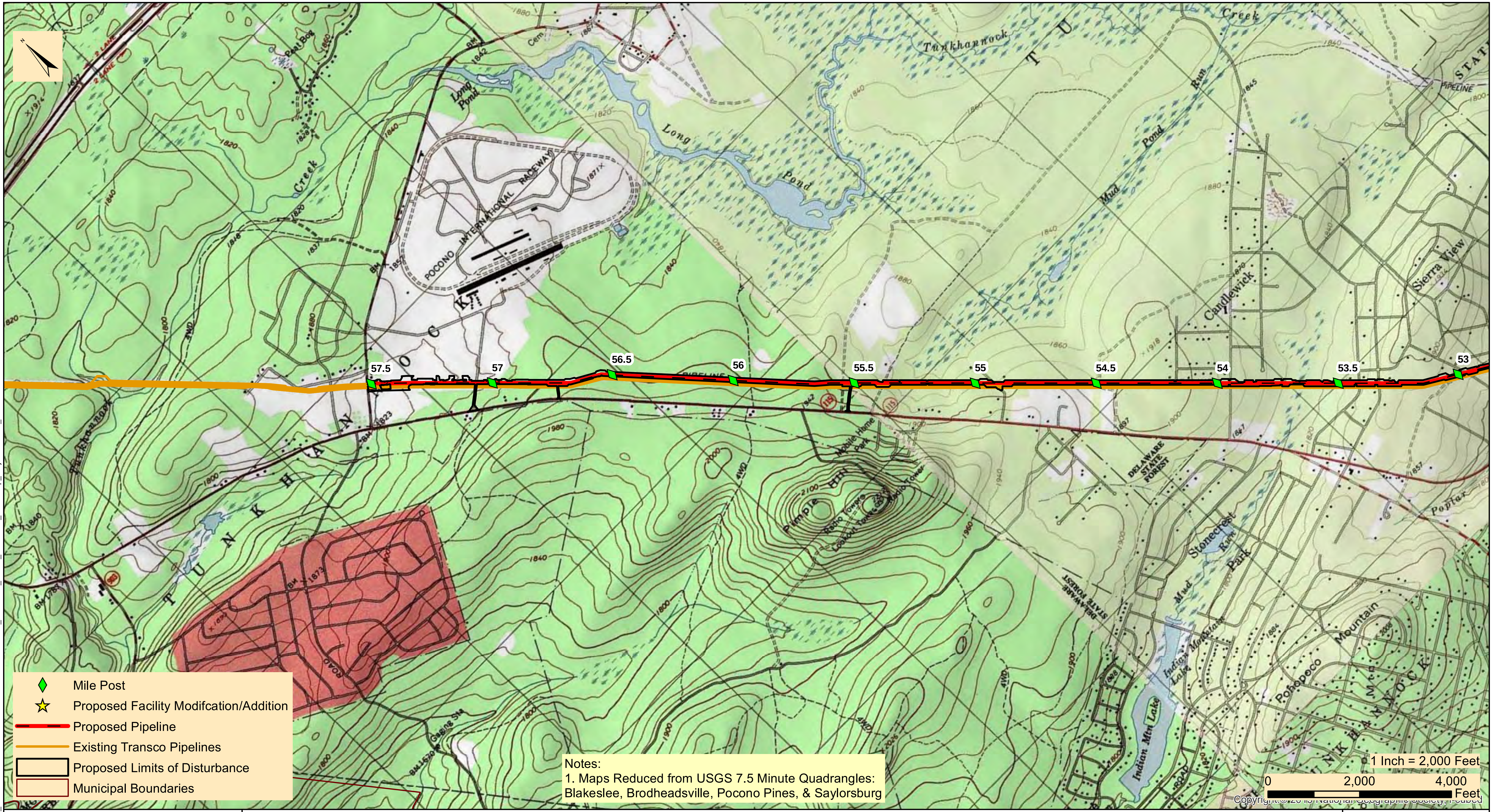
PROJECT LOCATION MAP

CHESTNUT HILL & TUNKHANNOCK TOWNSHIP | MONROE COUNTY | PENNSYLVANIA

Date: 2/10/2022

Drawn By: FTN

Figure Number: EL-2



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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

REGIONAL ENERGY ACCESS EXPANSION PROJECT

PROPOSED 42" LEIDY D EFFORT LOOP

PROJECT LOCATION MAP

TUNKHANNOCK TOWNSHIP | MONROE COUNTY | PENNSYLVANIA

Date: 2/10/2022

Drawn By: FTN

Figure Number: EL-3

ATTACHMENT 2
SOILS MAP AND REPORT

United States Department of Agriculture

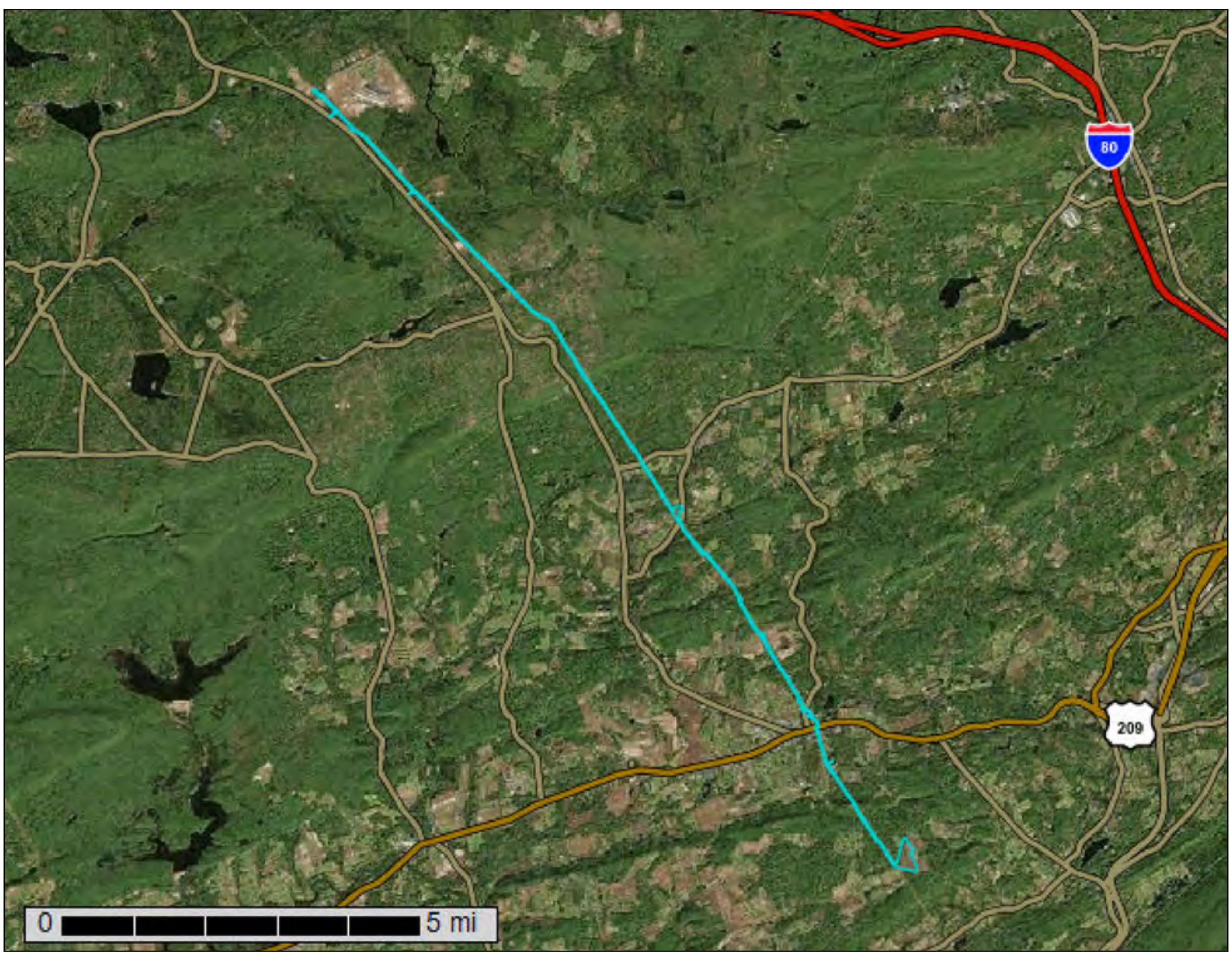
NRCS

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

Monroe 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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

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.

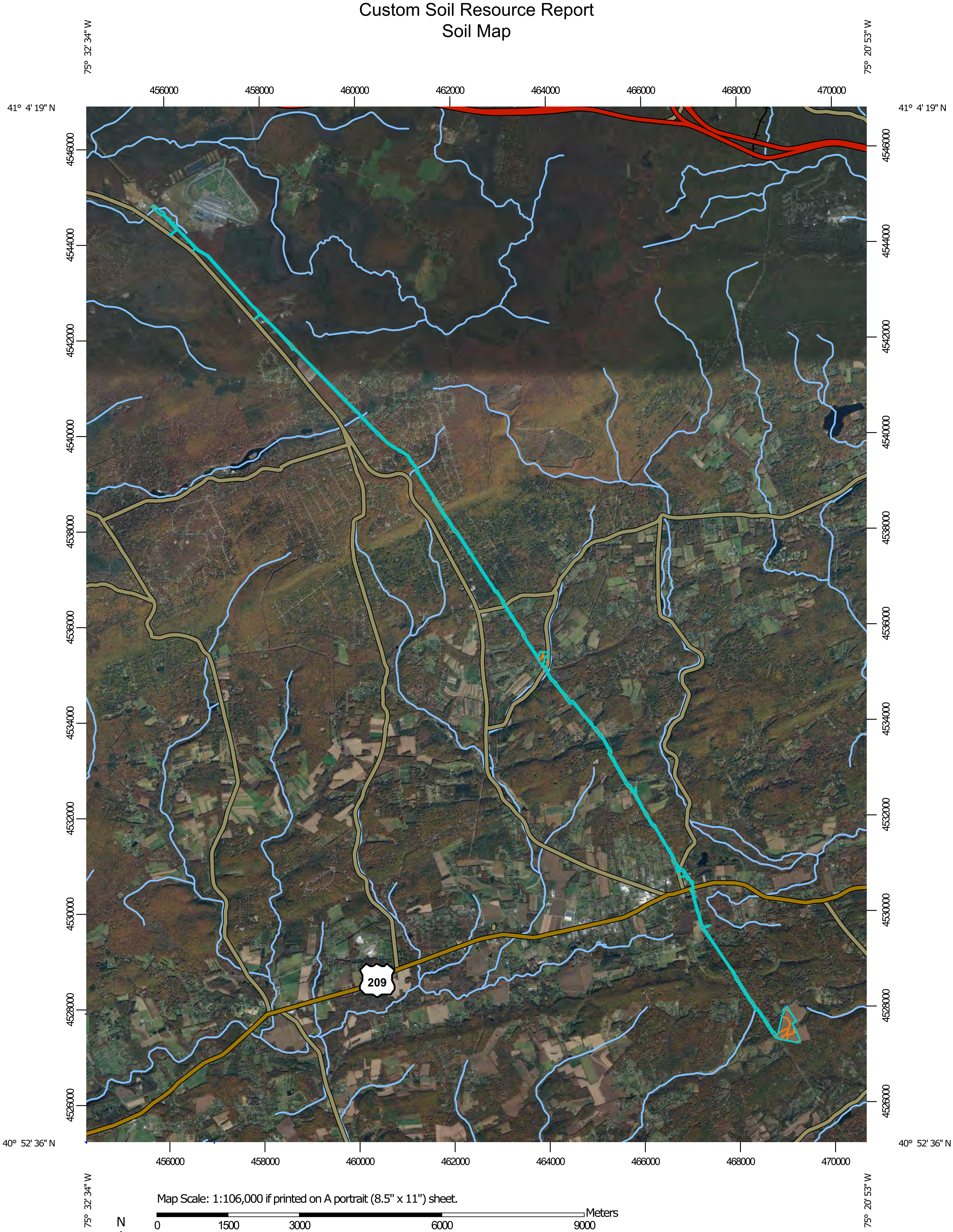
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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 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.

Soil Map



Map Scale: 1:106,000 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 1500 3000 6000 9000

Feet: 0 5000 10000 20000 30000

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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: Monroe County, Pennsylvania
Survey Area Data: Version 16, Sep 1, 2021

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

Date(s) aerial images were photographed: Jul 26, 2020—Nov 5, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnB	Allenwood gravelly silt loam, 3 to 8 percent slopes	0.2	0.1%
AwB	Alvira and Watson very stony loams, 0 to 12 percent slopes	3.6	1.4%
BbC	Bath channery silt loam, 8 to 25 percent slopes, extremely stony	1.0	0.4%
BrA	Braceville gravelly loam, 0 to 3 percent slopes	2.7	1.0%
BrB	Braceville gravelly loam, 3 to 8 percent slopes	1.4	0.5%
BxB	Buchanan extremely stony loam, 0 to 8 percent slopes	16.9	6.5%
BxC	Buchanan channery loam, 8 to 25 percent slopes, rubbly	0.3	0.1%
ChA	Chenango gravelly loam, 0 to 3 percent slopes	2.4	0.9%
ChB	Chenango gravelly loam, 3 to 8 percent slopes	3.0	1.1%
ChC	Chenango gravelly loam, 8 to 15 percent slopes	0.0	0.0%
CnB	Chippewa and Norwich soils, 0 to 8 percent slopes, extremely stony	1.4	0.5%
CpA	Clymer loam, 0 to 3 percent slopes	4.3	1.6%
CxB	Clymer extremely stony loam, 0 to 8 percent slopes	16.2	6.2%
Cy	Cut and fill land	8.2	3.2%
DxB	Dekalb channery loam, 0 to 8 percent slopes, rubbly	2.9	1.1%
DxC	Dekalb very channery loam, 8 to 25 percent slopes, extremely stony	8.6	3.3%
DxE	Dekalb very stony loam, 25 to 100 percent slopes, very stony	3.7	1.4%
GP	Pit, Shale, and Gravel	0.3	0.1%
HaB	Hartleton channery silt loam, 2 to 8 percent slopes	18.1	6.9%
HaC	Hartleton channery silt loam, 8 to 20 percent slopes	4.8	1.8%
Hy	Holly silt loam	0.6	0.2%
KaB	Kedron silt loam, 2 to 8 percent slopes	1.6	0.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KvB	Klinesville channery silt loam, 3 to 8 percent slopes	11.4	4.4%
KvC	Klinesville channery silt loam, 8 to 15 percent slopes	2.1	0.8%
KvD	Klinesville channery silt loam, 15 to 25 percent slopes	1.0	0.4%
LgB	Laidig extremely stony loam, 0 to 8 percent slopes	11.8	4.5%
LgC	Laidig extremely stony loam, 8 to 25 percent slopes	5.6	2.1%
LkB	Leck kill channery silt loam, 2 to 8 percent slopes	23.0	8.8%
LkC	Leck kill channery silt loam, 8 to 15 percent slopes	7.6	2.9%
LkD	Leck kill channery silt loam, 15 to 25 percent slopes	4.2	1.6%
LsC	Lordstown channery silt loam, 8 to 15 percent slopes	1.1	0.4%
LxC	Lordstown channery silt loam, 8 to 25 percent slopes, rubbly	3.0	1.2%
MeB	Meckesville gravelly loam, 3 to 8 percent slopes	9.4	3.6%
MeC	Meckesville gravelly loam, 8 to 15 percent slopes	1.0	0.4%
MfB	Meckesville very stony loam, 0 to 8 percent slopes	9.4	3.6%
MoB	Morris channery silt loam, 0 to 8 percent slopes, extremely stony	0.9	0.3%
Pp	Pope silt loam, high bottom	0.6	0.2%
ReA	Rexford gravelly silt loam, 0 to 3 percent slopes	1.8	0.7%
SpB	Shelmadine very stony silt loam, 0 to 8 percent slopes	1.2	0.5%
VaE	Very stony land and Rock outcrops, steep	0.5	0.2%
W	Water	0.4	0.2%
WaB	Watson silt loam, 2 to 8 percent slopes	1.5	0.6%
Wb	Wayland silty clay loam	1.2	0.5%
WeB3	Weikert channery silt loam, 3 to 8 percent slopes, eroded	0.4	0.2%
WeC3	Weikert channery silt loam, 8 to 15 percent slopes, eroded	0.4	0.1%
WeD3	Weikert channery silt loam, 15 to 25 percent slopes, eroded	0.7	0.3%
WhB	Weikert-Hartleton channery silt loams, 3 to 8 percent slopes	25.6	9.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WhC	Weikert-Hartleton channery silt loams, 8 to 15 percent slopes	14.1	5.4%
WhD	Weikert-Hartleton channery silt loams, 15 to 25 percent slopes	2.5	1.0%
WKE	Weikert and Klinesville soils, steep	6.7	2.6%
WyA	Wyoming gravelly sandy loam, 0 to 3 percent slopes	0.0	0.0%
WyB	Wyoming gravelly sandy loam, 3 to 8 percent slopes	6.6	2.5%
WyC	Wyoming gravelly sandy loam, 8 to 15 percent slopes	2.5	0.9%
WyD	Wyoming gravelly sandy loam, 15 to 25 percent slopes	0.5	0.2%
Totals for Area of Interest		**260.8**	**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 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.

Monroe County, Pennsylvania

AnB—Allenwood gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y90
Elevation: 490 to 1,130 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: All areas are prime farmland

Map Unit Composition

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

Description of Allenwood

Setting

Landform: Valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Old till derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 59 inches: gravelly silty clay loam
H3 - 59 to 72 inches: very gravelly clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 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: Moderate (about 8.5 inches)

Interpretive groups

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

AwB—Alvira and Watson very stony loams, 0 to 12 percent slopes

Map Unit Setting

National map unit symbol: 9y94
Elevation: 660 to 1,940 feet
Mean annual precipitation: 34 to 56 inches
Mean annual air temperature: 40 to 54 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Alvira and similar soils: 55 percent
Watson and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvira

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Till

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 21 inches: gravelly silt loam
H3 - 21 to 60 inches: very gravelly silt loam

Properties and qualities

Slope: 0 to 12 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 15 to 28 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 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

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

Description of Watson

Setting

Landform: Valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old till derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 27 inches: gravelly silty clay loam
H3 - 27 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 12 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 18 to 32 inches to fragipan
Drainage class: Moderately well 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 18 to 36 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): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Shelmadine

Percent of map unit: 10 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

BbC—Bath channery silt loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2v31v
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

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

Description of Bath, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, nose slope, side slope
Down-slope shape: Convex, 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: 8 to 25 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

Swartswood, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear

Across-slope shape: Linear, convex
Hydric soil rating: No

Mardin, extremely stony

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

BrA—Braceville gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9y9f
Elevation: 160 to 1,970 feet
Mean annual precipitation: 36 to 56 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 145 to 175 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Braceville and similar soils: 90 percent
Minor components: 10 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: Convex, linear
Across-slope shape: Concave, 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: 0 to 3 percent
Depth to restrictive feature: 18 to 30 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
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): 2w
Hydrologic Soil Group: C
Ecological site: F140XY020NY - Dense Outwash
Hydric soil rating: No

Minor Components

Rexford, pd

Percent of map unit: 10 percent
Landform: Depressions
Hydric soil rating: Yes

BrB—Braceville gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y9g
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: All areas are prime farmland

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: 3 to 8 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): 2w
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

BxB—Buchanan extremely stony loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y9j
Elevation: 600 to 2,500 feet
Mean annual precipitation: 34 to 55 inches
Mean annual air temperature: 40 to 57 degrees F
Frost-free period: 100 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Buchanan

Setting

Landform: Valley sides, mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 4 inches: channery loam
H2 - 4 to 25 inches: gravelly loam
H3 - 25 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 20 to 36 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 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

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

Minor Components

Shelmadine

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

Hazleton

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

BxC—Buchanan channery loam, 8 to 25 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2z1nb
Elevation: 430 to 2,220 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 177 days

Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Buchanan

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: channery loam
BE - 4 to 12 inches: channery loam
Bt1 - 12 to 20 inches: channery loam
Bt2 - 20 to 29 inches: channery loam
Btx1 - 29 to 35 inches: channery loam
Btx2 - 35 to 50 inches: channery loam
C - 50 to 71 inches: very channery loam
R - 71 to 81 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 25.0 percent
Depth to restrictive feature: 24 to 30 inches to fragipan; 60 to 79 inches to lithic bedrock
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 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

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

Minor Components

Andover

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Convex

Across-slope shape: Linear, convex
Hydric soil rating: Yes

Laidig

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Shelmadine

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: Yes

ChA—Chenango gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9y9l
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
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: 9y9m
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
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: 9y9n
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: 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

CnB—Chippewa and Norwich soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2vcjj
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: 41 percent
Norwich, extremely stony, and similar soils: 39 percent
Minor components: 20 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: channery silt loam
Eg - 5 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 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

Description of Norwich, 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 reddish sandstone, siltstone and shale fragments

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: channery silt loam
Eg - 5 to 10 inches: channery silt loam
Bg - 10 to 16 inches: channery silt loam
Bgx - 16 to 46 inches: channery silt loam
C - 46 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 24 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
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: D

Ecological site: F140XY016NY - Mineral Wetlands
Hydric soil rating: Yes

Minor Components

Chippewa, extremely stony, very poorly drained
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

Volusia, extremely 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

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

Norwich, extremely stony, very poorly drained
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

CpA—Clymer loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 9y9r
Elevation: 670 to 1,950 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: All areas are prime farmland

Map Unit Composition

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

Description of Clymer

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 49 inches: loam
H3 - 49 to 72 inches: channery clay loam

Properties and qualities

Slope: 0 to 3 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
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

CxB—Clymer extremely stony loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y9v
Elevation: 800 to 2,900 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

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

Description of Clymer

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 9 inches: very channery loam
H2 - 9 to 49 inches: loam
H3 - 49 to 72 inches: channery clay loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 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
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

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

Cy—Cut and fill land

Map Unit Setting

National map unit symbol: 9y9x
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: 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

Parent material: Man made and altered materials from mixed rock types

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Depth to water table: About 12 to 72 inches
Frequency of flooding: None
Frequency of ponding: None

DxB—Dekalb channery loam, 0 to 8 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2xvd8
Elevation: 790 to 1,950 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Dekalb

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 4 inches: channery loam
E - 4 to 6 inches: very channery sandy loam
Bw - 6 to 19 inches: very channery loam
C - 19 to 24 inches: extremely channery sandy loam
R - 24 to 34 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 25.0 percent
Depth to restrictive feature: 20 to 32 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 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 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Other vegetative classification: Dry Uplands (DU2)
Hydric soil rating: No

Minor Components

Hazleton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Weikert

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Lordstown

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

DxC—Dekalb very channery loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2x8wh
Elevation: 530 to 2,200 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

Dekalb and similar soils: 90 percent
Minor components: 10 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): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 4 inches: very channery loam
E - 4 to 7 inches: very channery 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: 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 (0.57 to 5.95 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: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes on mountains

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

DxE—Dekalb very stony loam, 25 to 100 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w6nl
Elevation: 370 to 2,070 feet
Mean annual precipitation: 39 to 43 inches
Mean annual air temperature: 50 to 53 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Dekalb

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, linear
Across-slope shape: 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: very channery loam
E - 4 to 7 inches: very channery 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: 25 to 100 percent
Surface area covered with cobbles, stones or boulders: 1.6 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 (0.57 to 5.95 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 2.5 inches)

Interpretive groups

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

Minor Components

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Clymer

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

GP—Pit, Shale, and Gravel

Map Unit Setting

National map unit symbol: bqyf
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

HaB—Hartleton channery silt loam, 2 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9yb2
Elevation: 500 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 175 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Hartleton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hartleton

Setting
Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 37 inches: very channery silt loam
H3 - 37 to 50 inches: very channery loam
R - 50 to 54 inches: weathered bedrock

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: 40 to 80 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 4.1 inches)

Interpretive groups

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

HaC—Hartleton channery silt loam, 8 to 20 percent slopes

Map Unit Setting

National map unit symbol: 9yb3
Elevation: 500 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 175 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Hartleton

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 37 inches: very channery silt loam
H3 - 37 to 50 inches: very channery loam
R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 8 to 20 percent
Depth to restrictive feature: 40 to 80 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 4.1 inches)

Interpretive groups

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

Hy—Holly silt loam

Map Unit Setting

National map unit symbol: 9yb6
Elevation: 800 to 840 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 133 to 187 days
Farmland classification: Not prime farmland

Map Unit Composition

Holly and similar soils: 100 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 8 inches: silt loam
H2 - 8 to 28 inches: very fine sandy loam
H3 - 28 to 41 inches: loam
H4 - 41 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: Very 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: About 0 to 6 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

KaB—Kedron silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yb7
Elevation: 520 to 1,100 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: All areas are prime farmland

Map Unit Composition

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

Description of Kedron

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Colluvium and/or till derived from sandstone, siltstone, and shale

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 24 inches: silt loam
H3 - 24 to 60 inches: gravelly loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 32 inches to fragipan
Drainage class: Moderately well 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 6 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

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

Minor Components

Shelmadine

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

KvB—Klinesville channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ybb
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Klinesville, Frost Churned

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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 40 inches: channers
R - 40 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
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

KvC—Klinesville channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ybc
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Klinesville, Frost Churned

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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 40 inches: channers
R - 40 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
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): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

KvD—Klinesville channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ybd
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Klinesville, Frost Churned

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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 40 inches: channers
R - 40 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively 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): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

LgB—Laidig extremely stony loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ybm
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 120 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Laidig

Setting

Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Colluvium derived from sandstone and siltstone

Typical profile

H1 - 0 to 6 inches: very gravelly loam
H2 - 6 to 33 inches: gravelly loam
H3 - 33 to 65 inches: very gravelly loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.02 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

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

LgC—Laidig extremely stony loam, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ybn
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 120 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Laidig

Setting

Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Colluvium derived from sandstone and siltstone

Typical profile

H1 - 0 to 6 inches: very gravelly loam
H2 - 6 to 33 inches: gravelly loam
H3 - 33 to 65 inches: very gravelly loam

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.02 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

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

LkB—Leck kill channery silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ybq
Elevation: 500 to 1,500 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Leck Kill

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish residuum derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 27 inches: channery silty clay loam
H3 - 27 to 48 inches: very channery silt loam
R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 5.2 inches)

Interpretive groups

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

LkC—Leck kill channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ybr
Elevation: 500 to 1,500 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Leck Kill

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish residuum derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 27 inches: channery silty clay loam
H3 - 27 to 48 inches: very channery silt loam
R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 5.2 inches)

Interpretive groups

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

LkD—Leck kill channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ybs
Elevation: 300 to 2,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Leck Kill

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 43 inches: channery silt loam
H3 - 43 to 58 inches: very channery silt loam
R - 58 to 62 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 40 to 80 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 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: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Calvin

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

Klinesville

Percent of map unit: 5 percent
Hydric soil rating: No

Meckesville

Percent of map unit: 5 percent
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

LsC—Lordstown channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wzl1
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

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

Description of Lordstown

Setting

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
Parent material: Loamy till derived from sandstone and siltstone

Typical profile

Ap - 0 to 9 inches: channery silt loam
Bw1 - 9 to 17 inches: channery silt loam
Bw2 - 17 to 24 inches: very channery silt loam
C - 24 to 30 inches: extremely channery silt loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well 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: 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

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

Arnot

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop, interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

LxC—Lordstown channery silt loam, 8 to 25 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2wzm9
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

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

Description of Lordstown, Rubbly

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Loamy till derived from sandstone and siltstone

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: channery highly organic silt loam
Bw1 - 5 to 17 inches: channery silt loam
Bw2 - 17 to 24 inches: very channery silt loam
C - 24 to 30 inches: extremely channery silt loam
2R - 30 to 40 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: 20 to 40 inches to lithic bedrock
Drainage class: Well 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: Low (about 4.1 inches)

Interpretive groups

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

Minor Components

Arnot, very stony

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

Cadosia, extremely stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Bath, rubbly

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

MeB—Meckesville gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yc5
Elevation: 600 to 2,800 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 130 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Meckesville

Setting

Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandstone, siltstone and shale colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: gravelly loam
H2 - 9 to 36 inches: channery loam
H3 - 36 to 60 inches: channery loam
H4 - 60 to 64 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 25 to 48 inches to fragipan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

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

MeC—Meckesville gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9yc6
Elevation: 600 to 2,800 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 130 to 190 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Meckesville

Setting

Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandstone, siltstone and shale colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: gravelly loam
H2 - 9 to 36 inches: channery loam
H3 - 36 to 60 inches: channery loam
H4 - 60 to 64 inches: very channery loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 25 to 48 inches to fragipan

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

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

MfB—Meckesville very stony loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yc7
Elevation: 600 to 2,800 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 130 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Meckesville

Setting

Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandstone, siltstone and shale colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: gravelly loam
H2 - 9 to 36 inches: channery loam
H3 - 36 to 60 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 25 to 48 inches to fragipan
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

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

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

Pp—Pope silt loam, high bottom

Map Unit Setting
National map unit symbol: 9ycp
Elevation: 590 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: 90 percent
Minor components: 10 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 30 inches: silt loam
H3 - 30 to 60 inches: loamy very fine sand

Properties and qualities

Slope: 0 to 3 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: About 48 to 72 inches
Frequency of flooding: RareNone
Frequency of ponding: None
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: 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

ReA—Rexford gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9ycq
Elevation: 590 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

Rexford, somewhat poorly drained, and similar soils: 50 percent
Rexford, poorly drained, and similar soils: 40 percent
Minor components: 10 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
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

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: Convex, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

SpB—Shelmadine very stony silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ycx
Elevation: 480 to 2,150 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 44 to 59 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Shelmadine

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Loamy till

Typical profile

H1 - 0 to 7 inches: channery silt loam
H2 - 7 to 24 inches: silty clay loam
H3 - 24 to 50 inches: channery loam
H4 - 50 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 18 to 30 inches to fragipan
Drainage class: 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 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Buchanan

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

Alvira

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Watson

Percent of map unit: 5 percent
Hydric soil rating: No

VaE—Very stony land and Rock outcrops, steep

Map Unit Setting

National map unit symbol: 9yd3
Elevation: 1,100 to 2,500 feet
Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Dystrochrepts, Very Stony

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Typical profile

H1 - 0 to 6 inches: very channery loam
H2 - 6 to 32 inches: very channery loam
H3 - 32 to 56 inches: extremely channery loam
H4 - 56 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 99 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
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: Low (about 4.1 inches)

Interpretive groups

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

W—Water

Map Unit Setting

National map unit symbol: 9ydz
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

Water: 100 percent

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

WaB—Watson silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9yd8

Elevation: 430 to 1,850 feet

Mean annual precipitation: 36 to 46 inches

Mean annual air temperature: 40 to 60 degrees F

Frost-free period: 130 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Watson and similar soils: 80 percent

Minor components: 20 percent

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

Description of Watson

Setting

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Old till derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: silt loam

H2 - 9 to 27 inches: gravelly silty clay loam

H3 - 27 to 45 inches: gravelly clay loam

H4 - 45 to 61 inches: channery loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

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 33 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): 2e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Allenwood

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

Shelmadine

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

Alvira

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Wb—Wayland silty clay loam

Map Unit Setting

National map unit symbol: 9yd9
Elevation: 200 to 1,500 feet
Mean annual precipitation: 30 to 40 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: 100 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 9 inches: silty clay loam
H2 - 9 to 41 inches: silty clay loam
H3 - 41 to 60 inches: very gravelly 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: NoneFrequent
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

WeB3—Weikert channery silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 9ydb
Elevation: 500 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: 100 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock

Drainage class: Somewhat excessively drained
Runoff class: Low
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

WeC3—Weikert channery silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 9ydc
Elevation: 500 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: 100 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low

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): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

WeD3—Weikert channery silt loam, 15 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 9ydd
Elevation: 500 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: 100 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively 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): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

WhB—Weikert-Hartleton channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ydf
Elevation: 300 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Weikert and similar soils: 50 percent
Hartleton and similar soils: 40 percent
Minor components: 10 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
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

Description of Hartleton

Setting
Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 37 inches: very channery silt loam
H3 - 37 to 50 inches: very channery loam
R - 50 to 54 inches: weathered bedrock

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
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 4.1 inches)

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

Minor Components

Klinesville, frost churned
Percent of map unit: 5 percent
Landform: Valleys, ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Leck kill
Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

WhC—Weikert-Hartleton channery silt loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ydg
Elevation: 300 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Weikert and similar soils: 55 percent
Hartleton and similar soils: 35 percent
Minor components: 10 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
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): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Hartleton

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 37 inches: very channery silt loam
H3 - 37 to 50 inches: very channery loam
R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
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 4.1 inches)

Interpretive groups

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

Minor Components

Klinesville, frost churned

Percent of map unit: 5 percent
Landform: Valleys, ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Leck kill

Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

WhD—Weikert-Hartleton channery silt loams, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ydh
Elevation: 300 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 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
Hartleton and similar soils: 30 percent
Minor components: 10 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively 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): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Hartleton

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 37 inches: very channery silt loam
H3 - 37 to 50 inches: very channery loam
R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 40 to 80 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 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 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Leck kill

Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Klinesville, frost churned

Percent of map unit: 5 percent
Landform: Valleys, ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

WKE—Weikert and Klinesville soils, steep

Map Unit Setting

National map unit symbol: 9yd7
Elevation: 300 to 2,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 50 percent
Klinesville, frost churned, and similar soils: 30 percent
Minor components: 20 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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 80 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively 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): 7e
Hydrologic Soil Group: D

Hydric soil rating: No

Description of Klinesville, Frost Churned

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 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 80 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively 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): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Leck kill

Percent of map unit: 8 percent
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hartleton

Percent of map unit: 8 percent
Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Meckesville

Percent of map unit: 4 percent
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

WyA—Wyoming gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9ydt
Elevation: 400 to 1,800 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: Farmland of statewide importance

Map Unit Composition

Wyoming and similar soils: 90 percent
Minor components: 10 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

Typical profile

H1 - 0 to 7 inches: gravelly sandy loam
H2 - 7 to 25 inches: very gravelly sandy loam
H3 - 25 to 60 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
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 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
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: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unadilla

Percent of map unit: 5 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

WyB—Wyoming gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ydv
Elevation: 400 to 1,800 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: Farmland of statewide importance

Map Unit Composition

Wyoming and similar soils: 90 percent
Minor components: 10 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

Typical profile

H1 - 0 to 7 inches: gravelly sandy loam
H2 - 7 to 25 inches: very gravelly sandy loam
H3 - 25 to 60 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
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 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
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: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unadilla

Percent of map unit: 5 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

WyC—Wyoming gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ydw
Elevation: 400 to 1,800 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: Farmland of statewide importance

Map Unit Composition

Wyoming and similar soils: 90 percent
Minor components: 10 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

Typical profile

H1 - 0 to 7 inches: gravelly sandy loam
H2 - 7 to 25 inches: very gravelly sandy loam
H3 - 25 to 60 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
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 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
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: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unadilla

Percent of map unit: 5 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

WyD—Wyoming gravelly sandy loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ydx
Elevation: 400 to 1,800 feet
Mean annual precipitation: 30 to 50 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

Wyoming and similar soils: 95 percent
Minor components: 5 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

Typical profile

H1 - 0 to 7 inches: gravelly sandy loam
H2 - 7 to 25 inches: very gravelly sandy loam
H3 - 25 to 60 inches: extremely gravelly loamy coarse 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 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unadilla

Percent of map unit: 5 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

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ATTACHMENT 3

E&SC AND SR PLAN BMP DESIGN WORKSHEETS AND CALCULATIONS

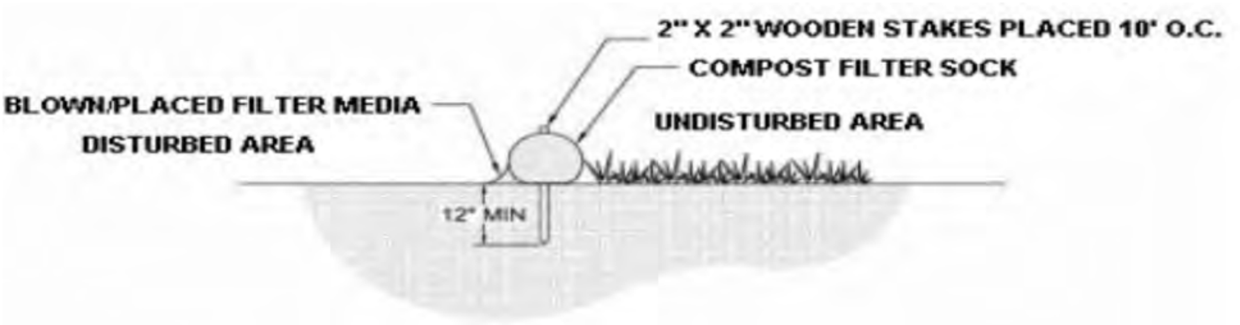
TABLE OF CONTENTS

Attachment 3

ATTACHMENT 3.1
COMPOST FILTER SOCK WORKSHEETS

STANDARD E&S WORKSHEET #1
Compost Filter Socks

PROJECT NAME: Williams REAE – Effort Loop
LOCATION: Ross, Chestnuthill, and Tunkhannock Townships, Monroe County, Pennsylvania
PREPARED BY: CD DATE: 03/01/2021
CHECKED BY: KCC DATE: 03/01/2021



SOCK NO.	Dia. (In.)	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
EL-CFS-CY-001	24	SEE MAP, CY001	4%	611
EL-CFS-CY-002	24	SEE MAP, CY001	4%	611
EL-CFS-CY-003	24	SEE MAP, CY001	4%	611
EL-CFS-CY-004	32	SEE MAP, CY001	3%	986
EL-CFS-CY-005	32	SEE MAP, CY001	3%	986
EL-CFS-CY-006	32	SEE MAP, CY001	3%	986
EL-CFS-CY-007	32	SEE MAP, CY001	3%	897
EL-CFS-CY-008	32	SEE MAP, CY001	3%	897
EL-CFS-CY-009	32	SEE MAP, CY001	3%	897
EL-CFS-CY-010	32	SEE MAP, CY001	3%	897
EL-CFS-CY-011	24	SEE MAP, CY001	3%	811
EL-CFS-CY-012	24	SEE MAP, CY001	3%	811
EL-CFS-CY-013	18	SEE MAP, CY001	2%	630
EL-CFS-CY-014	12	SEE MAP, CY001	3%	462
EL-CFS-CY-015	12	SEE MAP, CY001	3%	462
EL-CFS-CY-016	12	SEE MAP, CY001	3%	462
EL-CFS-CY-017	12	SEE MAP, CY001	3%	462
EL-CFS-CY-018	12	SEE MAP, CY001	3%	462
EL-CFS-CY-019	12	SEE MAP, CY001	2%	246
EL-CFS-CY-020	32	SEE MAP, CY001	3%	1011
EL-CFS-CY-021	32	SEE MAP, CY001	3%	1011
EL-CFS-CY-022	32	SEE MAP, CY001	3%	1011
EL-CFS-CY-023	12	SEE MAP, CY001	5%	242
EL-CFS-CY-024	12	SEE MAP, CY001	5%	242
EL-CFS-CY-025	12	SEE MAP, CY001	5%	242
EL-CFS-CY-026	12	SEE MAP, CY001	5%	242

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-CY-027	32	SEE MAP, CY001	6%	487
EL-CFS-CY-028	32	SEE MAP, CY001	6%	487
EL-CFS-CY-029	32	SEE MAP, CY001	6%	487
EL-CFS-CY-030	32	SEE MAP, CY001	6%	487
EL-CFS-CY-031	32	SEE MAP, CY001	6%	487
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EL-CFS-CY-042	24	SEE MAP, CY001	5%	466
EL-CFS-CY-043	24	SEE MAP, CY001	5%	466
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EL-CFS-CY-046	18	SEE MAP, CY001	3%	574
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EL-CFS-CY-062	32	SEE MAP, CY001	2%	1276
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EL-CFS-CY-068	32	SEE MAP, CY001	2%	1276
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STANDARD E&S WORKSHEET #1
Compost Filter Socks

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EL-CFS-043-003	24	SEE MAP	4%	648
EL-CFS-043-004	24	SEE MAP	4%	648
EL-CFS-043-005	24	SEE MAP	4%	648
EL-CFS-043-006	24	SEE MAP	4%	648
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STANDARD E&S WORKSHEET #1
Compost Filter Socks

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STANDARD E&S WORKSHEET #1
Compost Filter Socks

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STANDARD E&S WORKSHEET #1
Compost Filter Socks

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EL-CFS-044-117	12	SEE MAP	6%	110
EL-CFS-044-118	24	SEE MAP	8%	406

STANDARD E&S WORKSHEET #1
Compost Filter Socks

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STANDARD E&S WORKSHEET #1
Compost Filter Socks

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EL-CFS-044-171	32	SEE MAP	52%	50
EL-CFS-044-172	32	SEE MAP	52%	50
EL-CFS-044-173	32	SEE MAP	52%	50
EL-CFS-044-174	32	SEE MAP	52%	50
EL-CFS-044-175	32	SEE MAP	48%	46
EL-CFS-044-176	32	SEE MAP	48%	46
EL-CFS-044-177	32	SEE MAP	48%	46
EL-CFS-044-178	32	SEE MAP	48%	46
EL-CFS-044-179	32	SEE MAP	48%	46
EL-CFS-044-180	32	SEE MAP	48%	46
EL-CFS-044-181	32	SEE MAP	48%	46
EL-CFS-044-182	32	SEE MAP	48%	46
EL-CFS-044-183	32	SEE MAP	48%	46
EL-CFS-044-184	32	SEE MAP	48%	46
EL-CFS-044-185	24	SEE MAP	46%	48
EL-CFS-044-186	24	SEE MAP	46%	48
EL-CFS-044-187	24	SEE MAP	46%	48
EL-CFS-044-188	24	SEE MAP	46%	48
EL-CFS-044-189	24	SEE MAP	46%	48
EL-CFS-044-190	24	SEE MAP	46%	48
EL-CFS-044-191	24	SEE MAP	46%	48
EL-CFS-044-192	24	SEE MAP	46%	48
EL-CFS-044-193	24	SEE MAP	46%	48
EL-CFS-044-194	24	SEE MAP	46%	48
EL-CFS-044-195	18	SEE MAP	40%	50
EL-CFS-044-196	18	SEE MAP	40%	50
EL-CFS-044-197	18	SEE MAP	40%	50
EL-CFS-044-198	18	SEE MAP	40%	50
EL-CFS-044-199	18	SEE MAP	40%	50
EL-CFS-044-200	18	SEE MAP	40%	50
EL-CFS-044-201	18	SEE MAP	40%	50
EL-CFS-044-202	18	SEE MAP	40%	50
EL-CFS-044-203	18	SEE MAP	40%	50
EL-CFS-044-204	18	SEE MAP	40%	50

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-044-205	18	SEE MAP	34%	50
EL-CFS-044-206	18	SEE MAP	34%	50
EL-CFS-044-207	18	SEE MAP	34%	50
EL-CFS-044-208	18	SEE MAP	34%	50
EL-CFS-044-209	18	SEE MAP	34%	50
EL-CFS-044-210	18	SEE MAP	34%	50
EL-CFS-044-211	18	SEE MAP	34%	50
EL-CFS-044-212	18	SEE MAP	34%	50
EL-CFS-044-213	12	SEE MAP	27%	48
EL-CFS-044-214	12	SEE MAP	27%	48
EL-CFS-044-215	12	SEE MAP	27%	48
EL-CFS-044-216	12	SEE MAP	27%	48
EL-CFS-044-217	12	SEE MAP	27%	48
EL-CFS-044-218	12	SEE MAP	27%	48
EL-CFS-044-219	18	SEE MAP	20%	96
EL-CFS-044-220	18	SEE MAP	20%	96
EL-CFS-044-221	18	SEE MAP	20%	96
EL-CFS-044-222	18	SEE MAP	20%	96
EL-CFS-044-223	18	SEE MAP	20%	96
EL-CFS-044-224	18	SEE MAP	20%	96
EL-CFS-044-225	18	SEE MAP	20%	96
EL-CFS-044-226	18	SEE MAP	20%	96
EL-CFS-044-227	18	SEE MAP	20%	96
EL-CFS-044-228	18	SEE MAP	19%	101
EL-CFS-044-229	18	SEE MAP	19%	101
EL-CFS-044-230	18	SEE MAP	19%	101
EL-CFS-044-231	18	SEE MAP	19%	101
EL-CFS-044-232	18	SEE MAP	19%	101
EL-CFS-044-233	18	SEE MAP	19%	101
EL-CFS-044-234	18	SEE MAP	19%	101
EL-CFS-044-235	18	SEE MAP	19%	101
EL-CFS-044-236	18	SEE MAP	19%	101
EL-CFS-044-237	18	SEE MAP	19%	99
EL-CFS-044-238	18	SEE MAP	19%	99
EL-CFS-044-239	18	SEE MAP	19%	99
EL-CFS-044-240	18	SEE MAP	19%	99
EL-CFS-044-241	18	SEE MAP	19%	99
EL-CFS-044-242	18	SEE MAP	19%	99
EL-CFS-044-243	18	SEE MAP	19%	99
EL-CFS-044-244	18	SEE MAP	19%	99
EL-CFS-044-245	18	SEE MAP	19%	99
EL-CFS-044-246	12	SEE MAP	9%	33
EL-CFS-044-247	12	SEE MAP	9%	33

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-044-248	18	SEE MAP	16%	162
EL-CFS-045-001	12	SEE MAP	9%	74
EL-CFS-045-002	12	SEE MAP	9%	74
EL-CFS-045-003	12	SEE MAP	8%	145
EL-CFS-045-004	12	SEE MAP	8%	145
EL-CFS-045-005	12	SEE MAP	8%	145
EL-CFS-045-006	12	SEE MAP	8%	145
EL-CFS-045-007	12	SEE MAP	5%	192
EL-CFS-045-008	REMOVED			
EL-CFS-045-009	12	SEE MAP	26%	35
EL-CFS-045-010	12	SEE MAP	26%	35
EL-CFS-045-011	12	SEE MAP	26%	35
EL-CFS-045-012	12	SEE MAP	23%	30
EL-CFS-045-013	12	SEE MAP	23%	30
EL-CFS-045-014	12	SEE MAP	23%	30
EL-CFS-045-015	REMOVED			
EL-CFS-045-016	12	SEE MAP	16%	63
EL-CFS-045-017	12	SEE MAP	42%	12
EL-CFS-045-018	12	SEE MAP	42%	12
EL-CFS-045-019	12	SEE MAP	3%	147
EL-CFS-045-020	12	SEE MAP	6%	139
EL-CFS-045-021	12	SEE MAP	6%	139
EL-CFS-045-022	12	SEE MAP	10%	89
EL-CFS-045-023	12	SEE MAP	10%	89
EL-CFS-045-024	18	SEE MAP	6%	257
EL-CFS-045-025	18	SEE MAP	6%	257
EL-CFS-045-026	18	SEE MAP	6%	257
EL-CFS-045-027	18	SEE MAP	6%	257
EL-CFS-045-028	12	SEE MAP	3%	124
EL-CFS-045-029	12	SEE MAP	4%	209
EL-CFS-045-030	12	SEE MAP	6%	32
EL-CFS-045-031	12	SEE MAP	6%	32
EL-CFS-045-032	12	SEE MAP	3%	284
EL-CFS-045-033	18	SEE MAP	16%	162
EL-CFS-045-034	18	SEE MAP	16%	162
EL-CFS-045-035	18	SEE MAP	16%	162
EL-CFS-045-036	18	SEE MAP	16%	162
EL-CFS-045-037	18	SEE MAP	16%	162
EL-CFS-045-038	18	SEE MAP	16%	162
EL-CFS-045-039	18	SEE MAP	16%	162
EL-CFS-045-040	18	SEE MAP	16%	162
EL-CFS-045-041	18	SEE MAP	16%	162
EL-CFS-045-042	18	SEE MAP	16%	162

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-045-043	18	SEE MAP	16%	162
EL-CFS-045-044	12	SEE MAP	19%	53
EL-CFS-045-045	12	SEE MAP	19%	53
EL-CFS-045-046	12	SEE MAP	19%	53
EL-CFS-045-047	12	SEE MAP	19%	53
EL-CFS-045-048	12	SEE MAP	19%	53
EL-CFS-045-049	12	SEE MAP	4%	211
EL-CFS-045-050	12	SEE MAP	4%	211
EL-CFS-045-051	12	SEE MAP	11%	135
EL-CFS-045-052	12	SEE MAP	11%	135
EL-CFS-045-053	12	SEE MAP	11%	135
EL-CFS-045-054	12	SEE MAP	11%	135
EL-CFS-045-055	12	SEE MAP	11%	135
EL-CFS-045-056	12	SEE MAP	11%	135
EL-CFS-045-057	12	SEE MAP	11%	135
EL-CFS-045-058	12	SEE MAP	11%	135
EL-CFS-045-059	12	SEE MAP	11%	142
EL-CFS-045-060	12	SEE MAP	11%	142
EL-CFS-045-061	12	SEE MAP	11%	142
EL-CFS-045-062	12	SEE MAP	11%	142
EL-CFS-045-063	12	SEE MAP	11%	142
EL-CFS-045-064	12	SEE MAP	11%	142
EL-CFS-045-065	12	SEE MAP	11%	142
EL-CFS-045-066	12	SEE MAP	11%	142
EL-CFS-045-067	12	SEE MAP	13%	107
EL-CFS-045-068	12	SEE MAP	13%	107
EL-CFS-045-069	12	SEE MAP	13%	107
EL-CFS-045-070	12	SEE MAP	13%	107
EL-CFS-045-071	12	SEE MAP	13%	107
EL-CFS-045-072	12	SEE MAP	13%	107
EL-CFS-045-073	12	SEE MAP	10%	90
EL-CFS-045-074	12	SEE MAP	10%	90
EL-CFS-045-075	12	SEE MAP	10%	90
EL-CFS-045-076	12	SEE MAP	10%	90
EL-CFS-045-077	18	SEE MAP	11%	166
EL-CFS-045-078	18	SEE MAP	11%	166
EL-CFS-045-079	18	SEE MAP	11%	166
EL-CFS-045-080	18	SEE MAP	11%	166
EL-CFS-045-081	18	SEE MAP	11%	166
EL-CFS-045-082	18	SEE MAP	11%	166
EL-CFS-045-083	18	SEE MAP	11%	166
EL-CFS-045-084	18	SEE MAP	11%	166
EL-CFS-045-085	18	SEE MAP	11%	166

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-045-086	18	SEE MAP	11%	166
EL-CFS-045-087	18	SEE MAP	11%	166
EL-CFS-045-088	12	SEE MAP	4%	135
EL-CFS-045-089	12	SEE MAP	4%	135
EL-CFS-045-090	12	SEE MAP	4%	135
EL-CFS-045-091	12	SEE MAP	4%	135
EL-CFS-045-092	24	SEE MAP	14%	253
EL-CFS-045-093	12	SEE MAP	wetland	
EL-CFS-045-094	24	SEE MAP	12%	287
EL-CFS-045-095	18	SEE MAP	6%	260
EL-CFS-045-096	18	SEE MAP	6%	260
EL-CFS-045-097	12	SEE MAP	5%	223
EL-CFS-045-098	12	SEE MAP	5%	192
EL-CFS-045-099	12	SEE MAP	5%	192
EL-CFS-045-100	12	SEE MAP	5%	192
EL-CFS-045-101	12	SEE MAP	5%	192
EL-CFS-045-102	12	SEE MAP	5%	192
EL-CFS-045-103	12	SEE MAP	5%	192
EL-CFS-045-104	18	SEE MAP	21%	131
EL-CFS-045-105	18	SEE MAP	21%	131
EL-CFS-045-106	18	SEE MAP	21%	131
EL-CFS-045-107	18	SEE MAP	21%	131
EL-CFS-045-108	18	SEE MAP	21%	131
EL-CFS-045-109	18	SEE MAP	21%	131
EL-CFS-045-110	18	SEE MAP	21%	131
EL-CFS-045-111	18	SEE MAP	21%	131
EL-CFS-045-112	18	SEE MAP	21%	131
EL-CFS-045-113	18	SEE MAP	21%	131
EL-CFS-045-114	18	SEE MAP	21%	131
EL-CFS-045-115	18	SEE MAP	21%	131
EL-CFS-045-116	18	SEE MAP	21%	131
EL-CFS-045-117	12	SEE MAP	11%	141
EL-CFS-045-118	12	SEE MAP	11%	141
EL-CFS-045-119	12	SEE MAP	11%	141
EL-CFS-045-120	12	SEE MAP	11%	141
EL-CFS-045-121	12	SEE MAP	11%	141
EL-CFS-045-122	12	SEE MAP	11%	141
EL-CFS-045-123	12	SEE MAP	11%	141
EL-CFS-045-124	12	SEE MAP	11%	141
EL-CFS-045-125	12	SEE MAP	6%	218
EL-CFS-045-126	12	SEE MAP	6%	218
EL-CFS-045-127	12	SEE MAP	6%	218
EL-CFS-045-128	12	SEE MAP	6%	218

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-045-129	12	SEE MAP	6%	218
EL-CFS-045-130	12	SEE MAP	6%	218
EL-CFS-045-131	12	SEE MAP	6%	218
EL-CFS-045-132	12	SEE MAP	4%	155
EL-CFS-045-133	12	SEE MAP	4%	155
EL-CFS-045-134	12	SEE MAP	4%	155
EL-CFS-045-135	12	SEE MAP	4%	155
EL-CFS-045-136	12	SEE MAP	3%	36
EL-CFS-045-137	12	SEE MAP	3%	36
EL-CFS-045-138	12	SEE MAP	15%	73
EL-CFS-045-139	12	SEE MAP	15%	73
EL-CFS-045-140	12	SEE MAP	2%	154
EL-CFS-045-141	12	SEE MAP	2%	224
EL-CFS-045-142	12	SEE MAP	4%	307
EL-CFS-045-143	12	SEE MAP	4%	307
EL-CFS-045-144	12	SEE MAP	4%	206
EL-CFS-045-145	12	SEE MAP	3%	298
EL-CFS-045-146	12	SEE MAP	3%	298
EL-CFS-045-147	12	SEE MAP	3%	146
EL-CFS-045-148	12	SEE MAP	3%	146
EL-CFS-045-149	12	SEE MAP	3%	146
EL-CFS-045-150	12	SEE MAP	10%	100
EL-CFS-045-151	12	SEE MAP	10%	100
EL-CFS-045-152	12	SEE MAP	10%	100
EL-CFS-045-153	12	SEE MAP	19%	48
EL-CFS-045-154	12	SEE MAP	19%	48
EL-CFS-045-155	12	SEE MAP	6%	213
EL-CFS-045-156	12	SEE MAP	6%	213
EL-CFS-045-157	12	SEE MAP	6%	213
EL-CFS-045-158	12	SEE MAP	6%	213
EL-CFS-045-159	18	SEE MAP	4%	403
EL-CFS-045-160	18	SEE MAP	4%	403
EL-CFS-045-161	18	SEE MAP	4%	403
EL-CFS-045-162	18	SEE MAP	4%	403
EL-CFS-045-163	18	SEE MAP	4%	403
EL-CFS-045-164	18	SEE MAP	4%	403
EL-CFS-045-165	18	SEE MAP	4%	403
EL-CFS-045-166	12	SEE MAP	wetland	
EL-CFS-045-167	18	SEE MAP	4%	412
EL-CFS-045-168	18	SEE MAP	4%	412
EL-CFS-045-169	18	SEE MAP	4%	412
EL-CFS-045-170	18	SEE MAP	4%	412
EL-CFS-045-171	18	SEE MAP	4%	412

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-045-172	12	SEE MAP	1%	106
EL-CFS-045-600	12	SEE MAP	5%	192
EL-CFS-045-601	12	SEE MAP	wetland	
EL-CFS-045-602	12	SEE MAP	wetland	
EL-CFS-046-001	12	SEE MAP	3%	284
EL-CFS-046-002	12	SEE MAP	3%	284
EL-CFS-046-003	12	SEE MAP	3%	284
EL-CFS-046-004	12	SEE MAP	3%	284
EL-CFS-046-005	12	SEE MAP	3%	284
EL-CFS-046-006	12	SEE MAP	3%	284
EL-CFS-046-007	12	SEE MAP	6%	18
EL-CFS-046-008	12	SEE MAP	9%	87
EL-CFS-046-009	REMOVED			
EL-CFS-046-010	18	SEE MAP	13%	136
EL-CFS-046-011	18	SEE MAP	13%	136
EL-CFS-046-012	12	SEE MAP	wetland	
EL-CFS-046-013	18	SEE MAP	15%	123
EL-CFS-046-014	18	SEE MAP	15%	123
EL-CFS-046-015	REMOVED			
EL-CFS-046-016				
EL-CFS-046-017	12	SEE MAP	3%	335
EL-CFS-046-018	12	SEE MAP	3%	92
EL-CFS-046-019	18	SEE MAP	7%	260
EL-CFS-046-020	18	SEE MAP	7%	260
EL-CFS-046-021	18	SEE MAP	7%	260
EL-CFS-046-022	18	SEE MAP	7%	260
EL-CFS-046-023	12	SEE MAP	4%	420
EL-CFS-046-024	12	SEE MAP	4%	420
EL-CFS-046-025	12	SEE MAP	4%	420
EL-CFS-046-026	12	SEE MAP	4%	420
EL-CFS-046-027	12	SEE MAP	4%	420
EL-CFS-046-028	12	SEE MAP	3%	234
EL-CFS-046-029	12	SEE MAP	3%	234
EL-CFS-046-030	12	SEE MAP	3%	234
EL-CFS-046-031	12	SEE MAP	3%	234
EL-CFS-046-032	12	SEE MAP	5%	64
EL-CFS-046-033	REMOVED			
EL-CFS-046-034	12	SEE MAP	5%	64
EL-CFS-046-035	12	SEE MAP	wetland	
EL-CFS-046-036	12	SEE MAP	4%	136
EL-CFS-046-037	12	SEE MAP	4%	136
EL-CFS-046-038	12	SEE MAP	4%	136
EL-CFS-046-039	12	SEE MAP	4%	136

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-046-040	12	SEE MAP	8%	13
EL-CFS-046-041	12	SEE MAP	5%	85
EL-CFS-046-042	12	SEE MAP	5%	85
EL-CFS-046-043	12	SEE MAP	5%	85
EL-CFS-046-044	12	SEE MAP	29%	17
EL-CFS-046-045	12	SEE MAP	29%	17
EL-CFS-046-046	12	SEE MAP	29%	17
EL-CFS-046-047	12	SEE MAP	5%	176
EL-CFS-046-048	12	SEE MAP	5%	176
EL-CFS-046-049	12	SEE MAP	5%	176
EL-CFS-046-050	24	SEE MAP	5%	386
EL-CFS-046-051	24	SEE MAP	5%	386
EL-CFS-046-052	24	SEE MAP	5%	386
EL-CFS-046-053	24	SEE MAP	5%	386
EL-CFS-046-054	24	SEE MAP	5%	386
EL-CFS-046-055	12	SEE MAP	4%	112
EL-CFS-046-056	12	SEE MAP	4%	112
EL-CFS-046-057	12	SEE MAP	9%	167
EL-CFS-046-058	12	SEE MAP	7%	112
EL-CFS-046-059	18	SEE MAP	17%	137
EL-CFS-046-060	18	SEE MAP	17%	137
EL-CFS-046-061	18	SEE MAP	17%	137
EL-CFS-046-062	18	SEE MAP	17%	137
EL-CFS-046-063	18	SEE MAP	17%	137
EL-CFS-046-064	18	SEE MAP	17%	137
EL-CFS-046-065	18	SEE MAP	17%	137
EL-CFS-046-066	18	SEE MAP	17%	137
EL-CFS-046-067	18	SEE MAP	17%	137
EL-CFS-046-068	18	SEE MAP	17%	137
EL-CFS-046-069	18	SEE MAP	17%	137
EL-CFS-046-070	18	SEE MAP	17%	137
EL-CFS-046-071	12	SEE MAP	9%	150
EL-CFS-046-072	12	SEE MAP	9%	150
EL-CFS-046-073	12	SEE MAP	9%	150
EL-CFS-046-074	12	SEE MAP	9%	150
EL-CFS-046-075	12	SEE MAP	9%	150
EL-CFS-046-076	12	SEE MAP	9%	150
EL-CFS-046-077	12	SEE MAP	9%	150
EL-CFS-046-078	24	SEE MAP	4%	74
EL-CFS-046-079	24	SEE MAP	4%	74
EL-CFS-046-080	24	SEE MAP	4%	74
EL-CFS-046-081	12	SEE MAP	11%	127
EL-CFS-046-082	12	SEE MAP	11%	127

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-046-083	12	SEE MAP	11%	127
EL-CFS-046-084	12	SEE MAP	11%	127
EL-CFS-046-085	12	SEE MAP	11%	127
EL-CFS-046-086	12	SEE MAP	11%	127
EL-CFS-046-087	12	SEE MAP	11%	127
EL-CFS-046-088	18	SEE MAP	7%	251
EL-CFS-046-089	18	SEE MAP	7%	251
EL-CFS-046-090	18	SEE MAP	7%	251
EL-CFS-046-091	18	SEE MAP	7%	251
EL-CFS-046-092	12	SEE MAP	6%	239
EL-CFS-046-093	12	SEE MAP	6%	239
EL-CFS-046-094	12	SEE MAP	6%	239
EL-CFS-046-095	12	SEE MAP	6%	239
EL-CFS-046-096	12	SEE MAP	6%	239
EL-CFS-046-097	18	SEE MAP	15%	124
EL-CFS-046-098	18	SEE MAP	15%	124
EL-CFS-046-099	18	SEE MAP	15%	124
EL-CFS-046-100	18	SEE MAP	15%	124
EL-CFS-046-101	18	SEE MAP	15%	124
EL-CFS-046-102	18	SEE MAP	15%	124
EL-CFS-046-103	18	SEE MAP	15%	124
EL-CFS-046-104	18	SEE MAP	15%	124
EL-CFS-046-105	18	SEE MAP	15%	124
EL-CFS-046-106	12	SEE MAP	33%	27
EL-CFS-046-107	18	SEE MAP	19%	135
EL-CFS-046-108	18	SEE MAP	19%	135
EL-CFS-046-109	18	SEE MAP	8%	239
EL-CFS-046-110	18	SEE MAP	8%	239
EL-CFS-046-111	18	SEE MAP	8%	239
EL-CFS-046-112	18	SEE MAP	8%	239
EL-CFS-046-113	12	SEE MAP	11%	136
EL-CFS-046-114	12	SEE MAP	11%	136
EL-CFS-046-115	12	SEE MAP	wetland	
EL-CFS-046-116	18	SEE MAP	21%	104
EL-CFS-046-117	18	SEE MAP	21%	104
EL-CFS-046-118	18	SEE MAP	21%	104
EL-CFS-046-119	18	SEE MAP	20%	87
EL-CFS-046-120	18	SEE MAP	20%	87
EL-CFS-046-121	18	SEE MAP	20%	87
EL-CFS-046-122	18	SEE MAP	20%	87
EL-CFS-046-123	18	SEE MAP	24%	89
EL-CFS-046-124	18	SEE MAP	24%	89
EL-CFS-046-125	REMOVED			

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-046-126				
EL-CFS-046-127				
EL-CFS-046-128				
EL-CFS-046-129				
EL-CFS-046-130				
EL-CFS-046-131				
EL-CFS-046-132				
EL-CFS-046-133	12	SEE MAP	8%	104
EL-CFS-046-134	12	SEE MAP	8%	104
EL-CFS-046-135	12	SEE MAP	8%	104
EL-CFS-046-136	12	SEE MAP	5%	81
EL-CFS-046-137	12	SEE MAP	5%	74
EL-CFS-046-138	12	SEE MAP	6%	52
EL-CFS-046-139	12	SEE MAP	6%	52
EL-CFS-046-140	12	SEE MAP	wetland	
EL-CFS-046-141	12	SEE MAP	4%	157
EL-CFS-046-142	12	SEE MAP	4%	157
EL-CFS-046-143	12	SEE MAP	4%	157
EL-CFS-046-144	REMOVED			
EL-CFS-046-145	12	SEE MAP	7%	96
EL-CFS-046-146	12	SEE MAP	7%	96
EL-CFS-046-147	12	SEE MAP	3%	262
EL-CFS-046-148	12	SEE MAP	3%	262
EL-CFS-046-149	12	SEE MAP	3%	262
EL-CFS-046-150	12	SEE MAP	3%	88
EL-CFS-046-151	12	SEE MAP	3%	88
EL-CFS-046-152	12	SEE MAP	3%	88
EL-CFS-046-153	12	SEE MAP	5%	288
EL-CFS-046-154	12	SEE MAP	5%	288
EL-CFS-046-155	12	SEE MAP	5%	253
EL-CFS-046-156	12	SEE MAP	5%	253
EL-CFS-046-157	12	SEE MAP	5%	253
EL-CFS-046-158	24	SEE MAP	17%	18
EL-CFS-046-159	24	SEE MAP	17%	18
EL-CFS-046-160	24	SEE MAP	17%	18
EL-CFS-046-161	12	SEE MAP	7%	89
EL-CFS-046-162	12	SEE MAP	7%	89
EL-CFS-046-163	12	SEE MAP	7%	89
EL-CFS-046-164	12	SEE MAP	14%	43
EL-CFS-046-165	12	SEE MAP	14%	43
EL-CFS-046-166	12	SEE MAP	14%	43
EL-CFS-046-167	12	SEE MAP	14%	43
EL-CFS-046-168	12	SEE MAP	19%	52

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-046-169	12	SEE MAP	19%	52
EL-CFS-046-170	18	SEE MAP	21%	96
EL-CFS-046-171	18	SEE MAP	21%	96
EL-CFS-046-172	18	SEE MAP	21%	96
EL-CFS-046-173	18	SEE MAP	21%	96
EL-CFS-046-174	18	SEE MAP	21%	96
EL-CFS-046-175	18	SEE MAP	21%	96
EL-CFS-046-176	12	SEE MAP	9%	99
EL-CFS-046-177	12	SEE MAP	9%	99
EL-CFS-046-178	12	SEE MAP	9%	99
EL-CFS-046-600	18	SEE MAP	24%	89
EL-CFS-046-601	18	SEE MAP	24%	89
EL-CFS-046-602	18	SEE MAP	24%	89
EL-CFS-047-001	12	SEE MAP	9%	85
EL-CFS-047-002	12	SEE MAP	6%	94
EL-CFS-047-003	12	SEE MAP	6%	94
EL-CFS-047-004	12	SEE MAP	6%	94
EL-CFS-047-005	12	SEE MAP	6%	94
EL-CFS-047-006	12	SEE MAP	6%	94
EL-CFS-047-007	18	SEE MAP	16%	104
EL-CFS-047-008	18	SEE MAP	16%	104
EL-CFS-047-009	18	SEE MAP	16%	104
EL-CFS-047-010	18	SEE MAP	16%	104
EL-CFS-047-011	18	SEE MAP	16%	104
EL-CFS-047-012	18	SEE MAP	16%	104
EL-CFS-047-013	18	SEE MAP	16%	104
EL-CFS-047-014	18	SEE MAP	16%	104
EL-CFS-047-015	18	SEE MAP	21%	92
EL-CFS-047-016	18	SEE MAP	21%	92
EL-CFS-047-017	18	SEE MAP	21%	92
EL-CFS-047-018	12	SEE MAP	25%	24
EL-CFS-047-019	12	SEE MAP	25%	24
EL-CFS-047-020	12	SEE MAP	25%	24
EL-CFS-047-021	18	SEE MAP	39%	49
EL-CFS-047-022	18	SEE MAP	39%	49
EL-CFS-047-023	18	SEE MAP	39%	49
EL-CFS-047-024	18	SEE MAP	39%	49
EL-CFS-047-025	18	SEE MAP	39%	49
EL-CFS-047-026	18	SEE MAP	39%	49
EL-CFS-047-027	18	SEE MAP	39%	49
EL-CFS-047-028	18	SEE MAP	39%	49
EL-CFS-047-029	18	SEE MAP	39%	49
EL-CFS-047-030	18	SEE MAP	27%	81

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-031	18	SEE MAP	27%	81
EL-CFS-047-032	18	SEE MAP	27%	81
EL-CFS-047-033	18	SEE MAP	27%	81
EL-CFS-047-034	18	SEE MAP	27%	81
EL-CFS-047-035	12	SEE MAP	23%	48
EL-CFS-047-036	12	SEE MAP	23%	48
EL-CFS-047-037	12	SEE MAP	23%	48
EL-CFS-047-038	12	SEE MAP	23%	48
EL-CFS-047-039	12	SEE MAP	23%	48
EL-CFS-047-040	18	SEE MAP	15%	170
EL-CFS-047-041	18	SEE MAP	15%	170
EL-CFS-047-042	18	SEE MAP	15%	170
EL-CFS-047-043	18	SEE MAP	15%	170
EL-CFS-047-044	18	SEE MAP	15%	170
EL-CFS-047-045	18	SEE MAP	15%	170
EL-CFS-047-046	18	SEE MAP	15%	170
EL-CFS-047-047	12	SEE MAP	14%	22
EL-CFS-047-048	12	SEE MAP	11%	71
EL-CFS-047-049	12	SEE MAP	11%	71
EL-CFS-047-050	12	SEE MAP	11%	71
EL-CFS-047-051	12	SEE MAP	11%	71
EL-CFS-047-052	12	SEE MAP	14%	28
EL-CFS-047-053	12	SEE MAP	8%	142
EL-CFS-047-054	12	SEE MAP	9%	155
EL-CFS-047-055	12	SEE MAP	9%	155
EL-CFS-047-056	12	SEE MAP	8%	78
EL-CFS-047-057	12	SEE MAP	8%	78
EL-CFS-047-058	12	SEE MAP	8%	78
EL-CFS-047-059	12	SEE MAP	10%	60
EL-CFS-047-060	12	SEE MAP	10%	60
EL-CFS-047-061	12	SEE MAP	10%	60
EL-CFS-047-062	18	SEE MAP	6%	237
EL-CFS-047-063	18	SEE MAP	6%	237
EL-CFS-047-064	18	SEE MAP	6%	237
EL-CFS-047-065	18	SEE MAP	6%	237
EL-CFS-047-066	18	SEE MAP	6%	237
EL-CFS-047-067	18	SEE MAP	6%	237
EL-CFS-047-068	18	SEE MAP	6%	237
EL-CFS-047-069	18	SEE MAP	6%	238
EL-CFS-047-070	12	SEE MAP	12%	76
EL-CFS-047-071	12	SEE MAP	11%	44
EL-CFS-047-072	32	SEE MAP	12%	340
EL-CFS-047-073	32	SEE MAP	12%	340

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-074	32	SEE MAP	12%	340
EL-CFS-047-075	32	SEE MAP	12%	340
EL-CFS-047-076	32	SEE MAP	12%	340
EL-CFS-047-077	18	SEE MAP	17%	150
EL-CFS-047-078	24	SEE MAP	58%	38
EL-CFS-047-079	24	SEE MAP	58%	38
EL-CFS-047-080	24	SEE MAP	58%	38
EL-CFS-047-081	24	SEE MAP	58%	38
EL-CFS-047-082	24	SEE MAP	58%	38
EL-CFS-047-083	24	SEE MAP	58%	38
EL-CFS-047-084	32	SEE MAP	60%	47
EL-CFS-047-085	32	SEE MAP	60%	47
EL-CFS-047-086	32	SEE MAP	60%	47
EL-CFS-047-087	12	SEE MAP	10%	100
EL-CFS-047-088	12	SEE MAP	10%	100
EL-CFS-047-089	12	SEE MAP	10%	100
EL-CFS-047-090	12	SEE MAP	10%	100
EL-CFS-047-091	12	SEE MAP	10%	100
EL-CFS-047-092	18	SEE MAP	19%	81
EL-CFS-047-093	18	SEE MAP	19%	81
EL-CFS-047-094	18	SEE MAP	19%	81
EL-CFS-047-095	18	SEE MAP	19%	81
EL-CFS-047-096	18	SEE MAP	19%	81
EL-CFS-047-097	18	SEE MAP	19%	81
EL-CFS-047-098	18	SEE MAP	19%	81
EL-CFS-047-099	18	SEE MAP	28%	68
EL-CFS-047-100	18	SEE MAP	28%	68
EL-CFS-047-101	18	SEE MAP	28%	68
EL-CFS-047-102	18	SEE MAP	28%	68
EL-CFS-047-103	18	SEE MAP	28%	68
EL-CFS-047-104	18	SEE MAP	28%	68
EL-CFS-047-105	18	SEE MAP	28%	68
EL-CFS-047-106	18	SEE MAP	28%	68
EL-CFS-047-107	18	SEE MAP	28%	68
EL-CFS-047-108	18	SEE MAP	28%	68
EL-CFS-047-109	12	SEE MAP	5%	140
EL-CFS-047-110	REMOVED			
EL-CFS-047-111	12	SEE MAP	5%	140
EL-CFS-047-112	12	SEE MAP	16%	32
EL-CFS-047-113	12	SEE MAP	11%	45
EL-CFS-047-114	12	SEE MAP	11%	45
EL-CFS-047-115	12	SEE MAP	11%	45
EL-CFS-047-116	12	SEE MAP	11%	45

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-117	12	SEE MAP	11%	45
EL-CFS-047-118	12	SEE MAP	11%	45
EL-CFS-047-119	32	SEE MAP	5%	576
EL-CFS-047-120	32	SEE MAP	5%	576
EL-CFS-047-121	32	SEE MAP	5%	576
EL-CFS-047-122	32	SEE MAP	5%	576
EL-CFS-047-123	32	SEE MAP	7%	513
EL-CFS-047-124	12	SEE MAP	9%	99
EL-CFS-047-125	12	SEE MAP	9%	99
EL-CFS-047-126	12	SEE MAP	11%	47
EL-CFS-047-127	12	SEE MAP	11%	47
EL-CFS-047-128	12	SEE MAP	11%	47
EL-CFS-047-129	12	SEE MAP	2%	146
EL-CFS-047-130	12	SEE MAP	2%	146
EL-CFS-047-131	12	SEE MAP	4%	227
EL-CFS-047-132	12	SEE MAP	4%	227
EL-CFS-047-133	12	SEE MAP	4%	227
EL-CFS-047-134	12	SEE MAP	4%	227
EL-CFS-047-135	12	SEE MAP	6%	88
EL-CFS-047-136	12	SEE MAP	6%	88
EL-CFS-047-137	12	SEE MAP	6%	88
EL-CFS-047-138	12	SEE MAP	11%	44
EL-CFS-047-139	12	SEE MAP	11%	44
EL-CFS-047-140	12	SEE MAP	14%	107
EL-CFS-047-141	12	SEE MAP	14%	107
EL-CFS-047-142	12	SEE MAP	14%	107
EL-CFS-047-143	12	SEE MAP	14%	107
EL-CFS-047-144	12	SEE MAP	14%	107
EL-CFS-047-145	12	SEE MAP	14%	107
EL-CFS-047-146	12	SEE MAP	14%	107
EL-CFS-047-147	18	SEE MAP	14%	153
EL-CFS-047-148	18	SEE MAP	14%	153
EL-CFS-047-149	18	SEE MAP	14%	153
EL-CFS-047-150	18	SEE MAP	14%	153
EL-CFS-047-151	18	SEE MAP	14%	153
EL-CFS-047-152	18	SEE MAP	14%	153
EL-CFS-047-153	18	SEE MAP	14%	153
EL-CFS-047-154	18	SEE MAP	14%	153
EL-CFS-047-155	18	SEE MAP	14%	153
EL-CFS-047-156	12	SEE MAP	10%	39
EL-CFS-047-157	12	SEE MAP	10%	39
EL-CFS-047-158	12	SEE MAP	10%	39
EL-CFS-047-159	12	SEE MAP	11%	142

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-160	12	SEE MAP	11%	142
EL-CFS-047-161	18	SEE MAP	10%	142
EL-CFS-047-162	24	SEE MAP	14%	241
EL-CFS-047-163	24	SEE MAP	14%	241
EL-CFS-047-164	24	SEE MAP	14%	241
EL-CFS-047-165	24	SEE MAP	14%	241
EL-CFS-047-166	24	SEE MAP	14%	241
EL-CFS-047-167	24	SEE MAP	14%	241
EL-CFS-047-168	24	SEE MAP	14%	241
EL-CFS-047-169	24	SEE MAP	14%	241
EL-CFS-047-170	18	SEE MAP	15%	157
EL-CFS-047-171	18	SEE MAP	15%	157
EL-CFS-047-172	18	SEE MAP	15%	157
EL-CFS-047-173	18	SEE MAP	15%	157
EL-CFS-047-174	18	SEE MAP	15%	157
EL-CFS-047-175	18	SEE MAP	17%	149
EL-CFS-047-176	18	SEE MAP	17%	149
EL-CFS-047-177	18	SEE MAP	17%	149
EL-CFS-047-178	18	SEE MAP	13%	196
EL-CFS-047-179	18	SEE MAP	13%	196
EL-CFS-047-180	18	SEE MAP	13%	196
EL-CFS-047-181	18	SEE MAP	13%	196
EL-CFS-047-182	18	SEE MAP	13%	196
EL-CFS-047-183	12	SEE MAP	28%	39
EL-CFS-047-184	12	SEE MAP	28%	39
EL-CFS-047-185	12	SEE MAP	28%	39
EL-CFS-047-186	12	SEE MAP	28%	39
EL-CFS-047-187	12	SEE MAP	28%	39
EL-CFS-047-188	12	SEE MAP	21%	39
EL-CFS-047-189	12	SEE MAP	21%	39
EL-CFS-047-190	12	SEE MAP	21%	39
EL-CFS-047-191	12	SEE MAP	21%	39
EL-CFS-047-192	18	SEE MAP	22%	120
EL-CFS-047-193	18	SEE MAP	22%	120
EL-CFS-047-194	18	SEE MAP	22%	120
EL-CFS-047-195	18	SEE MAP	22%	120
EL-CFS-047-196	18	SEE MAP	22%	120
EL-CFS-047-197	18	SEE MAP	22%	120
EL-CFS-047-198	18	SEE MAP	22%	120
EL-CFS-047-199	18	SEE MAP	22%	120
EL-CFS-047-200	18	SEE MAP	22%	120
EL-CFS-047-201	18	SEE MAP	22%	120
EL-CFS-047-202	18	SEE MAP	22%	120

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-203	18	SEE MAP	38%	40
EL-CFS-047-204	18	SEE MAP	38%	40
EL-CFS-047-205	18	SEE MAP	38%	40
EL-CFS-047-206	18	SEE MAP	38%	40
EL-CFS-047-207	18	SEE MAP	38%	40
EL-CFS-047-208	18	SEE MAP	38%	40
EL-CFS-047-209	18	SEE MAP	38%	40
EL-CFS-047-210	12	SEE MAP	37%	30
EL-CFS-047-211	12	SEE MAP	37%	30
EL-CFS-047-212	12	SEE MAP	37%	30
EL-CFS-047-213	12	SEE MAP	37%	30
EL-CFS-047-214	12	SEE MAP	37%	30
EL-CFS-047-215	24	SEE MAP	40%	53
EL-CFS-047-216	24	SEE MAP	40%	53
EL-CFS-047-217	24	SEE MAP	40%	53
EL-CFS-047-218	24	SEE MAP	40%	53
EL-CFS-047-219	24	SEE MAP	40%	53
EL-CFS-047-220	24	SEE MAP	40%	53
EL-CFS-047-221	24	SEE MAP	40%	53
EL-CFS-047-222	24	SEE MAP	40%	53
EL-CFS-047-223	24	SEE MAP	40%	53
EL-CFS-047-224	24	SEE MAP	40%	53
EL-CFS-047-225	32	SEE MAP	46%	57
EL-CFS-047-226	32	SEE MAP	46%	57
EL-CFS-047-227	32	SEE MAP	46%	57
EL-CFS-047-228	32	SEE MAP	46%	57
EL-CFS-047-229	32	SEE MAP	46%	57
EL-CFS-047-230	32	SEE MAP	46%	57
EL-CFS-047-231	32	SEE MAP	46%	57
EL-CFS-047-232	32	SEE MAP	46%	57
EL-CFS-047-233	32	SEE MAP	46%	57
EL-CFS-047-234	32	SEE MAP	46%	57
EL-CFS-047-235	32	SEE MAP	46%	57
EL-CFS-047-236	32	SEE MAP	46%	57
EL-CFS-047-237	12	SEE MAP	44%	25
EL-CFS-047-238	12	SEE MAP	44%	25
EL-CFS-047-239	12	SEE MAP	44%	25
EL-CFS-047-240	12	SEE MAP	44%	25
EL-CFS-047-241	12	SEE MAP	44%	25
EL-CFS-047-242	24	SEE MAP	44%	52
EL-CFS-047-243	24	SEE MAP	44%	52
EL-CFS-047-244	24	SEE MAP	44%	52
EL-CFS-047-245	24	SEE MAP	44%	52

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-246	24	SEE MAP	44%	52
EL-CFS-047-247	24	SEE MAP	44%	52
EL-CFS-047-248	24	SEE MAP	44%	52
EL-CFS-047-249	24	SEE MAP	44%	52
EL-CFS-047-250	24	SEE MAP	44%	52
EL-CFS-047-251	24	SEE MAP	44%	52
EL-CFS-047-252	24	SEE MAP	44%	52
EL-CFS-047-253	24	SEE MAP	50%	36
EL-CFS-047-254	24	SEE MAP	50%	36
EL-CFS-047-255	24	SEE MAP	50%	36
EL-CFS-047-256	24	SEE MAP	50%	36
EL-CFS-047-257	24	SEE MAP	50%	36
EL-CFS-047-258	24	SEE MAP	50%	36
EL-CFS-047-259	24	SEE MAP	50%	36
EL-CFS-047-260	24	SEE MAP	50%	36
EL-CFS-047-261	24	SEE MAP	50%	36
EL-CFS-047-262	18	SEE MAP	44%	32
EL-CFS-047-263	18	SEE MAP	44%	32
EL-CFS-047-264	18	SEE MAP	44%	32
EL-CFS-047-265	18	SEE MAP	44%	32
EL-CFS-047-266	18	SEE MAP	44%	32
EL-CFS-047-267	18	SEE MAP	44%	32
EL-CFS-047-268	18	SEE MAP	44%	32
EL-CFS-047-269	18	SEE MAP	29%	55
EL-CFS-047-270	18	SEE MAP	29%	55
EL-CFS-047-271	18	SEE MAP	29%	55
EL-CFS-047-272	18	SEE MAP	29%	55
EL-CFS-047-273	18	SEE MAP	29%	55
EL-CFS-047-274	18	SEE MAP	29%	55
EL-CFS-047-275	18	SEE MAP	29%	55
EL-CFS-047-276	12	SEE MAP	3%	105
EL-CFS-047-277	12	SEE MAP	3%	105
EL-CFS-047-278	32	SEE MAP	6%	560
EL-CFS-047-279	32	SEE MAP	6%	560
EL-CFS-047-280	32	SEE MAP	6%	560
EL-CFS-047-281	32	SEE MAP	6%	560
EL-CFS-047-282	32	SEE MAP	6%	560
EL-CFS-047-283	32	SEE MAP	7%	513
EL-CFS-047-284	32	SEE MAP	7%	513
EL-CFS-047-285	32	SEE MAP	7%	513
EL-CFS-047-286	12	SEE MAP	4%	90
EL-CFS-047-600	12	SEE MAP	9%	111
EL-CFS-047-601	12	SEE MAP	9%	111

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-047-602	12	SEE MAP	8%	78
EL-CFS-048-001	12	SEE MAP	5%	100
EL-CFS-048-002	12	SEE MAP	5%	100
EL-CFS-048-003	12	SEE MAP	5%	100
EL-CFS-048-004	12	SEE MAP	8%	40
EL-CFS-048-005	12	SEE MAP	8%	40
EL-CFS-048-006	12	SEE MAP	4%	269
EL-CFS-048-007	12	SEE MAP	4%	269
EL-CFS-048-008	12	SEE MAP	2%	137
EL-CFS-048-009	REMOVED			
EL-CFS-048-010	12	SEE MAP	2%	279
EL-CFS-048-011	12	SEE MAP	2%	279
EL-CFS-048-012	12	SEE MAP	3%	308
EL-CFS-048-013	18	SEE MAP	9%	248
EL-CFS-048-014	18	SEE MAP	9%	248
EL-CFS-048-015	12	SEE MAP	8%	146
EL-CFS-048-016	12	SEE MAP	8%	146
EL-CFS-048-017	12	SEE MAP	9%	118
EL-CFS-048-018	12	SEE MAP	9%	119
EL-CFS-048-019	12	SEE MAP	9%	119
EL-CFS-048-020	12	SEE MAP	9%	119
EL-CFS-048-021	12	SEE MAP	9%	119
EL-CFS-048-022	12	SEE MAP	9%	119
EL-CFS-048-023	12	SEE MAP	9%	119
EL-CFS-048-024	18	SEE MAP	14%	197
EL-CFS-048-025	18	SEE MAP	14%	197
EL-CFS-048-026	18	SEE MAP	14%	197
EL-CFS-048-027	18	SEE MAP	14%	197
EL-CFS-048-028	18	SEE MAP	14%	197
EL-CFS-048-029	18	SEE MAP	14%	197
EL-CFS-048-030	18	SEE MAP	14%	197
EL-CFS-048-031	18	SEE MAP	14%	197
EL-CFS-048-032	18	SEE MAP	14%	197
EL-CFS-048-033	18	SEE MAP	14%	197
EL-CFS-048-034	12	SEE MAP	18%	67
EL-CFS-048-035	12	SEE MAP	18%	67
EL-CFS-048-036	12	SEE MAP	18%	67
EL-CFS-048-037	12	SEE MAP	18%	67
EL-CFS-048-038	12	SEE MAP	18%	67
EL-CFS-048-039	12	SEE MAP	18%	67
EL-CFS-048-040	12	SEE MAP	18%	67
EL-CFS-048-041	24	SEE MAP	8%	310
EL-CFS-048-042	24	SEE MAP	8%	310

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-048-043	12	SEE MAP	6%	142
EL-CFS-048-044	12	SEE MAP	6%	142
EL-CFS-048-045	12	SEE MAP	6%	142
EL-CFS-048-046	12	SEE MAP	6%	142
EL-CFS-048-047	12	SEE MAP	6%	142
EL-CFS-048-048	12	SEE MAP	8%	122
EL-CFS-048-049	12	SEE MAP	8%	122
EL-CFS-048-050	12	SEE MAP	8%	122
EL-CFS-048-051	12	SEE MAP	8%	122
EL-CFS-048-052	12	SEE MAP	8%	83
EL-CFS-048-053	12	SEE MAP	8%	83
EL-CFS-048-054	12	SEE MAP	8%	83
EL-CFS-048-055	12	SEE MAP	4%	117
EL-CFS-048-056	12	SEE MAP	4%	117
EL-CFS-048-057	12	SEE MAP	4%	117
EL-CFS-048-058	12	SEE MAP	7%	126
EL-CFS-048-059	12	SEE MAP	7%	126
EL-CFS-048-060	12	SEE MAP	7%	126
EL-CFS-048-061	12	SEE MAP	7%	126
EL-CFS-048-062	12	SEE MAP	7%	126
EL-CFS-048-063	12	SEE MAP	8%	154
EL-CFS-048-064	12	SEE MAP	8%	154
EL-CFS-048-065	12	SEE MAP	8%	154
EL-CFS-048-066	12	SEE MAP	8%	154
EL-CFS-048-067	12	SEE MAP	8%	154
EL-CFS-048-068	12	SEE MAP	8%	154
EL-CFS-048-069	12	SEE MAP	9%	144
EL-CFS-048-070	12	SEE MAP	9%	144
EL-CFS-048-071	12	SEE MAP	9%	144
EL-CFS-048-072	12	SEE MAP	9%	144
EL-CFS-048-073	12	SEE MAP	9%	144
EL-CFS-048-074	12	SEE MAP	9%	144
EL-CFS-048-075	12	SEE MAP	9%	144
EL-CFS-048-076	12	SEE MAP	8%	133
EL-CFS-048-077	12	SEE MAP	8%	133
EL-CFS-048-078	12	SEE MAP	8%	133
EL-CFS-048-079	12	SEE MAP	8%	133
EL-CFS-048-080	12	SEE MAP	8%	133
EL-CFS-048-081	18	SEE MAP	5%	403
EL-CFS-048-082	18	SEE MAP	5%	403
EL-CFS-048-083	18	SEE MAP	5%	403
EL-CFS-048-084	REMOVED			
EL-CFS-048-085	12	SEE MAP	5%	340

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-048-086	12	SEE MAP	5%	340
EL-CFS-048-087	12	SEE MAP	5%	340
EL-CFS-048-088	12	SEE MAP	4%	271
EL-CFS-048-089	24	SEE MAP	5%	426
EL-CFS-048-090	24	SEE MAP	5%	426
EL-CFS-048-091	24	SEE MAP	5%	426
EL-CFS-048-092	12	SEE MAP	4%	90
EL-CFS-048-093	12	SEE MAP	4%	90
EL-CFS-048-094	12	SEE MAP	2%	115
EL-CFS-048-095	12	SEE MAP	2%	115
EL-CFS-048-096	12	SEE MAP	4%	271
EL-CFS-048-097	12	SEE MAP	3%	330
EL-CFS-048-098	12	SEE MAP	11%	49
EL-CFS-048-099	12	SEE MAP	11%	72
EL-CFS-048-100	12	SEE MAP	11%	72
EL-CFS-048-101	12	SEE MAP	11%	72
EL-CFS-048-102	12	SEE MAP	5%	100
EL-CFS-048-103	12	SEE MAP	5%	100
EL-CFS-048-104	REMOVED			
EL-CFS-048-105	12	SEE MAP	4%	256
EL-CFS-048-106	REMOVED			
EL-CFS-048-107	12	SEE MAP	4%	256
EL-CFS-048-108	12	SEE MAP	3%	308
EL-CFS-048-109	12	SEE MAP	12%	57
EL-CFS-048-110	12	SEE MAP	12%	57
EL-CFS-048-111	12	SEE MAP	13%	62
EL-CFS-048-112	12	SEE MAP	13%	62
EL-CFS-048-113	12	SEE MAP	13%	62
EL-CFS-048-114	12	SEE MAP	13%	62
EL-CFS-048-115	12	SEE MAP	17%	53
EL-CFS-048-116	12	SEE MAP	17%	53
EL-CFS-048-117	12	SEE MAP	17%	53
EL-CFS-048-118	12	SEE MAP	17%	53
EL-CFS-048-119	12	SEE MAP	17%	53
EL-CFS-048-120	12	SEE MAP	41%	27
EL-CFS-048-121	12	SEE MAP	41%	27
EL-CFS-048-122	12	SEE MAP	41%	27
EL-CFS-048-123	12	SEE MAP	41%	27
EL-CFS-048-124	12	SEE MAP	41%	27
EL-CFS-048-125	12	SEE MAP	18%	67
EL-CFS-048-126	24	SEE MAP	8%	310
EL-CFS-048-127	18	SEE MAP	10%	260
EL-CFS-048-128	18	SEE MAP	10%	260

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-048-129	18	SEE MAP	10%	260
EL-CFS-048-130	12	SEE MAP	6%	131
EL-CFS-048-131	12	SEE MAP	6%	131
EL-CFS-048-132	24	SEE MAP	10%	321
EL-CFS-048-133	24	SEE MAP	10%	321
EL-CFS-048-134	12	SEE MAP	5%	242
EL-CFS-048-135	12	SEE MAP	5%	242
EL-CFS-048-136	12	SEE MAP	5%	242
EL-CFS-048-137	12	SEE MAP	5%	242
EL-CFS-048-138	12	SEE MAP	5%	242
EL-CFS-048-139	12	SEE MAP	5%	242
EL-CFS-048-140	12	SEE MAP	4%	24
EL-CFS-048-141	12	SEE MAP	4%	24
EL-CFS-049-001	24	SEE MAP	5%	426
EL-CFS-049-002	12	SEE MAP	8%	143
EL-CFS-049-003	12	SEE MAP	8%	143
EL-CFS-049-004	12	SEE MAP	8%	143
EL-CFS-049-005	12	SEE MAP	8%	143
EL-CFS-049-006	12	SEE MAP	8%	143
EL-CFS-049-007	12	SEE MAP	8%	195
EL-CFS-049-008	12	SEE MAP	8%	195
EL-CFS-049-009	12	SEE MAP	8%	195
EL-CFS-049-010	12	SEE MAP	8%	195
EL-CFS-049-011	12	SEE MAP	8%	195
EL-CFS-049-012	18	SEE MAP	13%	210
EL-CFS-049-013	18	SEE MAP	13%	210
EL-CFS-049-014	18	SEE MAP	13%	210
EL-CFS-049-015	18	SEE MAP	13%	210
EL-CFS-049-016	18	SEE MAP	13%	210
EL-CFS-049-017	18	SEE MAP	13%	210
EL-CFS-049-018	12	SEE MAP	10%	81
EL-CFS-049-019	12	SEE MAP	10%	81
EL-CFS-049-020	12	SEE MAP	10%	81
EL-CFS-049-021	12	SEE MAP	10%	81
EL-CFS-049-022	12	SEE MAP	10%	81
EL-CFS-049-023	12	SEE MAP	10%	81
EL-CFS-049-024	12	SEE MAP	10%	81
EL-CFS-049-025	12	SEE MAP	10%	81
EL-CFS-049-026	12	SEE MAP	10%	81
EL-CFS-049-027	12	SEE MAP	10%	145
EL-CFS-049-028	12	SEE MAP	10%	145
EL-CFS-049-029	12	SEE MAP	10%	145
EL-CFS-049-030	12	SEE MAP	3%	73

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-031	18	SEE MAP	29%	70
EL-CFS-049-032	18	SEE MAP	29%	70
EL-CFS-049-033	18	SEE MAP	29%	70
EL-CFS-049-034	18	SEE MAP	29%	70
EL-CFS-049-035	18	SEE MAP	29%	70
EL-CFS-049-036	18	SEE MAP	29%	70
EL-CFS-049-037	18	SEE MAP	29%	70
EL-CFS-049-038	18	SEE MAP	29%	70
EL-CFS-049-039	12	SEE MAP	9%	109
EL-CFS-049-040	12	SEE MAP	5%	148
EL-CFS-049-041	12	SEE MAP	5%	148
EL-CFS-049-042	12	SEE MAP	5%	148
EL-CFS-049-043	12	SEE MAP	5%	148
EL-CFS-049-044	12	SEE MAP	5%	148
EL-CFS-049-045	12	SEE MAP	wetland	
EL-CFS-049-046	12	SEE MAP	wetland	
EL-CFS-049-047	12	SEE MAP	3%	76
EL-CFS-049-048	12	SEE MAP	3%	76
EL-CFS-049-049	12	SEE MAP	3%	76
EL-CFS-049-050	18	SEE MAP	15%	104
EL-CFS-049-051	18	SEE MAP	22%	115
EL-CFS-049-052	REMOVED			
EL-CFS-049-053	18	SEE MAP	19%	124
EL-CFS-049-054	18	SEE MAP	19%	124
EL-CFS-049-055	18	SEE MAP	19%	124
EL-CFS-049-056	18	SEE MAP	19%	124
EL-CFS-049-057	18	SEE MAP	19%	124
EL-CFS-049-058	18	SEE MAP	19%	124
EL-CFS-049-059	18	SEE MAP	19%	124
EL-CFS-049-060	18	SEE MAP	19%	124
EL-CFS-049-061	18	SEE MAP	19%	124
EL-CFS-049-062	12	SEE MAP	11%	88
EL-CFS-049-063	12	SEE MAP	11%	88
EL-CFS-049-064	12	SEE MAP	11%	88
EL-CFS-049-065	12	SEE MAP	11%	88
EL-CFS-049-066	12	SEE MAP	11%	88
EL-CFS-049-067	12	SEE MAP	16%	37
EL-CFS-049-068	12	SEE MAP	16%	37
EL-CFS-049-069	12	SEE MAP	16%	37
EL-CFS-049-070	12	SEE MAP	17%	66
EL-CFS-049-071	12	SEE MAP	17%	66
EL-CFS-049-072	12	SEE MAP	17%	66
EL-CFS-049-073	12	SEE MAP	17%	66

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-074	12	SEE MAP	17%	66
EL-CFS-049-075	12	SEE MAP	17%	66
EL-CFS-049-076	18	SEE MAP	5%	340
EL-CFS-049-077	18	SEE MAP	18%	138
EL-CFS-049-078	18	SEE MAP	18%	138
EL-CFS-049-079	18	SEE MAP	18%	138
EL-CFS-049-080	18	SEE MAP	18%	138
EL-CFS-049-081	18	SEE MAP	18%	138
EL-CFS-049-082	18	SEE MAP	18%	138
EL-CFS-049-083	18	SEE MAP	18%	138
EL-CFS-049-084	18	SEE MAP	18%	138
EL-CFS-049-085	18	SEE MAP	18%	138
EL-CFS-049-086	18	SEE MAP	18%	138
EL-CFS-049-087	18	SEE MAP	18%	138
EL-CFS-049-088	18	SEE MAP	18%	138
EL-CFS-049-089	24	SEE MAP	17%	210
EL-CFS-049-090	24	SEE MAP	17%	210
EL-CFS-049-091	24	SEE MAP	17%	210
EL-CFS-049-092	24	SEE MAP	17%	210
EL-CFS-049-093	24	SEE MAP	17%	210
EL-CFS-049-094	24	SEE MAP	17%	210
EL-CFS-049-095	24	SEE MAP	17%	210
EL-CFS-049-096	24	SEE MAP	17%	210
EL-CFS-049-097	24	SEE MAP	17%	210
EL-CFS-049-098	24	SEE MAP	17%	210
EL-CFS-049-099	24	SEE MAP	17%	210
EL-CFS-049-100	24	SEE MAP	17%	210
EL-CFS-049-101	12	SEE MAP	9%	74
EL-CFS-049-102	12	SEE MAP	9%	74
EL-CFS-049-103	12	SEE MAP	9%	74
EL-CFS-049-104	12	SEE MAP	9%	74
EL-CFS-049-105	18	SEE MAP	9%	254
EL-CFS-049-106	18	SEE MAP	9%	254
EL-CFS-049-107	18	SEE MAP	9%	254
EL-CFS-049-108	18	SEE MAP	9%	254
EL-CFS-049-109	18	SEE MAP	9%	254
EL-CFS-049-110	18	SEE MAP	9%	254
EL-CFS-049-111	18	SEE MAP	9%	254
EL-CFS-049-112	18	SEE MAP	9%	254
EL-CFS-049-113	18	SEE MAP	9%	254
EL-CFS-049-114	18	SEE MAP	9%	254
EL-CFS-049-115	18	SEE MAP	9%	254
EL-CFS-049-116	18	SEE MAP	9%	254

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-117	18	SEE MAP	9%	254
EL-CFS-049-118	18	SEE MAP	8%	229
EL-CFS-049-119	18	SEE MAP	8%	229
EL-CFS-049-120	18	SEE MAP	8%	229
EL-CFS-049-121	18	SEE MAP	8%	229
EL-CFS-049-122	12	SEE MAP	10%	81
EL-CFS-049-123	12	SEE MAP	10%	81
EL-CFS-049-124	24	SEE MAP	26%	104
EL-CFS-049-125	24	SEE MAP	26%	104
EL-CFS-049-126	24	SEE MAP	26%	104
EL-CFS-049-127	24	SEE MAP	26%	104
EL-CFS-049-128	24	SEE MAP	26%	104
EL-CFS-049-129	24	SEE MAP	26%	104
EL-CFS-049-130	24	SEE MAP	26%	104
EL-CFS-049-131	24	SEE MAP	26%	104
EL-CFS-049-132	24	SEE MAP	26%	104
EL-CFS-049-133	24	SEE MAP	26%	104
EL-CFS-049-134	24	SEE MAP	26%	104
EL-CFS-049-135	24	SEE MAP	26%	104
EL-CFS-049-136	24	SEE MAP	30%	99
EL-CFS-049-137	24	SEE MAP	30%	99
EL-CFS-049-138	24	SEE MAP	30%	99
EL-CFS-049-139	24	SEE MAP	30%	99
EL-CFS-049-140	24	SEE MAP	30%	99
EL-CFS-049-141	24	SEE MAP	30%	99
EL-CFS-049-142	24	SEE MAP	30%	99
EL-CFS-049-143	24	SEE MAP	30%	99
EL-CFS-049-144	24	SEE MAP	30%	99
EL-CFS-049-145	24	SEE MAP	30%	99
EL-CFS-049-146	24	SEE MAP	30%	99
EL-CFS-049-147	24	SEE MAP	30%	99
EL-CFS-049-148	24	SEE MAP	30%	99
EL-CFS-049-149	24	SEE MAP	30%	99
EL-CFS-049-150	24	SEE MAP	30%	99
EL-CFS-049-151	24	SEE MAP	27%	96
EL-CFS-049-152	24	SEE MAP	27%	96
EL-CFS-049-153	24	SEE MAP	27%	96
EL-CFS-049-154	24	SEE MAP	27%	96
EL-CFS-049-155	24	SEE MAP	27%	96
EL-CFS-049-156	24	SEE MAP	27%	96
EL-CFS-049-157	24	SEE MAP	27%	96
EL-CFS-049-158	24	SEE MAP	27%	96
EL-CFS-049-159	24	SEE MAP	27%	96

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-160	24	SEE MAP	27%	96
EL-CFS-049-161	24	SEE MAP	27%	96
EL-CFS-049-162	24	SEE MAP	27%	96
EL-CFS-049-163	24	SEE MAP	27%	96
EL-CFS-049-164	18	SEE MAP	35%	60
EL-CFS-049-165	18	SEE MAP	35%	60
EL-CFS-049-166	18	SEE MAP	35%	60
EL-CFS-049-167	18	SEE MAP	35%	60
EL-CFS-049-168	18	SEE MAP	35%	60
EL-CFS-049-169	18	SEE MAP	35%	60
EL-CFS-049-170	18	SEE MAP	35%	60
EL-CFS-049-171	18	SEE MAP	35%	60
EL-CFS-049-172	18	SEE MAP	35%	60
EL-CFS-049-173	18	SEE MAP	25%	92
EL-CFS-049-174	18	SEE MAP	25%	92
EL-CFS-049-175	18	SEE MAP	25%	92
EL-CFS-049-176	18	SEE MAP	25%	92
EL-CFS-049-177	18	SEE MAP	25%	92
EL-CFS-049-178	18	SEE MAP	25%	92
EL-CFS-049-179	18	SEE MAP	10%	229
EL-CFS-049-180	18	SEE MAP	10%	229
EL-CFS-049-181	18	SEE MAP	10%	229
EL-CFS-049-182	18	SEE MAP	10%	229
EL-CFS-049-183	18	SEE MAP	10%	229
EL-CFS-049-184	18	SEE MAP	10%	229
EL-CFS-049-185	18	SEE MAP	10%	229
EL-CFS-049-186	18	SEE MAP	10%	229
EL-CFS-049-187	18	SEE MAP	10%	229
EL-CFS-049-188	18	SEE MAP	10%	229
EL-CFS-049-189	18	SEE MAP	10%	229
EL-CFS-049-190	12	SEE MAP	7%	174
EL-CFS-049-191	12	SEE MAP	6%	97
EL-CFS-049-192	12	SEE MAP	6%	97
EL-CFS-049-193	12	SEE MAP	wetland	
EL-CFS-049-194	12	SEE MAP	wetland	
EL-CFS-049-195	12	SEE MAP	2%	94
EL-CFS-049-196	12	SEE MAP	2%	94
EL-CFS-049-197	18	SEE MAP	13%	127
EL-CFS-049-198	18	SEE MAP	22%	115
EL-CFS-049-199	18	SEE MAP	22%	115
EL-CFS-049-200	18	SEE MAP	22%	115
EL-CFS-049-201	18	SEE MAP	22%	115
EL-CFS-049-202	18	SEE MAP	22%	115

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-203	18	SEE MAP	22%	115
EL-CFS-049-204	18	SEE MAP	22%	115
EL-CFS-049-205	18	SEE MAP	22%	115
EL-CFS-049-206	18	SEE MAP	22%	115
EL-CFS-049-207	18	SEE MAP	22%	115
EL-CFS-049-208	18	SEE MAP	29%	55
EL-CFS-049-209	18	SEE MAP	29%	55
EL-CFS-049-210	18	SEE MAP	29%	55
EL-CFS-049-211	18	SEE MAP	5%	340
EL-CFS-049-212	12	SEE MAP	10%	20
EL-CFS-049-213	12	SEE MAP	7%	145
EL-CFS-049-214	12	SEE MAP	7%	145
EL-CFS-049-215	12	SEE MAP	7%	145
EL-CFS-049-216	12	SEE MAP	7%	145
EL-CFS-049-217	12	SEE MAP	7%	145
EL-CFS-049-218	12	SEE MAP	15%	82
EL-CFS-049-219	12	SEE MAP	15%	82
EL-CFS-049-220	12	SEE MAP	15%	82
EL-CFS-049-221	12	SEE MAP	15%	82
EL-CFS-049-222	12	SEE MAP	15%	82
EL-CFS-049-223	12	SEE MAP	15%	82
EL-CFS-049-224	18	SEE MAP	13%	186
EL-CFS-049-225	18	SEE MAP	13%	186
EL-CFS-049-226	18	SEE MAP	13%	186
EL-CFS-049-227	18	SEE MAP	13%	186
EL-CFS-049-228	18	SEE MAP	13%	186
EL-CFS-049-229	12	SEE MAP	9%	150
EL-CFS-049-230	12	SEE MAP	9%	150
EL-CFS-049-231	REMOVED			
EL-CFS-049-232	18	SEE MAP	17%	132
EL-CFS-049-233	REMOVED			
EL-CFS-049-234	18	SEE MAP	17%	132
EL-CFS-049-235	18	SEE MAP	17%	132
EL-CFS-049-236	18	SEE MAP	17%	132
EL-CFS-049-237	18	SEE MAP	17%	132
EL-CFS-049-238	18	SEE MAP	17%	115
EL-CFS-049-239	18	SEE MAP	15%	115
EL-CFS-049-240	18	SEE MAP	15%	115
EL-CFS-049-241	18	SEE MAP	15%	115
EL-CFS-049-242	18	SEE MAP	15%	115
EL-CFS-049-243	18	SEE MAP	15%	115
EL-CFS-049-244	18	SEE MAP	15%	115
EL-CFS-049-245	18	SEE MAP	15%	115

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-049-246	18	SEE MAP	15%	115
EL-CFS-049-247	18	SEE MAP	15%	115
EL-CFS-049-248	18	SEE MAP	15%	115
EL-CFS-049-249	18	SEE MAP	15%	115
EL-CFS-049-250	18	SEE MAP	29%	62
EL-CFS-049-251	12	SEE MAP	5%	150
EL-CFS-049-252	12	SEE MAP	5%	150
EL-CFS-049-253	12	SEE MAP	14%	7
EL-CFS-049-254	18	SEE MAP	8%	216
EL-CFS-049-255	18	SEE MAP	8%	216
EL-CFS-049-256	18	SEE MAP	8%	216
EL-CFS-049-257	18	SEE MAP	8%	216
EL-CFS-050-001	32	SEE MAP	5%	531
EL-CFS-050-002	32	SEE MAP	5%	531
EL-CFS-050-003	24	SEE MAP	4%	456
EL-CFS-050-004	24	SEE MAP	4%	456
EL-CFS-050-005	24	SEE MAP	4%	456
EL-CFS-050-006	12	SEE MAP	3%	173
EL-CFS-050-007	12	SEE MAP	3%	109
EL-CFS-050-008	12	SEE MAP	2%	373
EL-CFS-050-009	12	SEE MAP	2%	373
EL-CFS-050-010	12	SEE MAP	2%	373
EL-CFS-050-011	12	SEE MAP	3%	112
EL-CFS-050-012	12	SEE MAP	4%	193
EL-CFS-050-013	12	SEE MAP	4%	193
EL-CFS-050-014	12	SEE MAP	4%	193
EL-CFS-050-015	12	SEE MAP	4%	193
EL-CFS-050-016	12	SEE MAP	6%	97
EL-CFS-050-017	12	SEE MAP	6%	97
EL-CFS-050-018	12	SEE MAP	6%	97
EL-CFS-050-019	12	SEE MAP	6%	97
EL-CFS-050-020	12	SEE MAP	8%	72
EL-CFS-050-021	12	SEE MAP	8%	72
EL-CFS-050-022	12	SEE MAP	8%	72
EL-CFS-050-023	12	SEE MAP	16%	38
EL-CFS-050-024	12	SEE MAP	16%	38
EL-CFS-050-025	18	SEE MAP	14%	174
EL-CFS-050-026	18	SEE MAP	14%	174
EL-CFS-050-027	18	SEE MAP	14%	174
EL-CFS-050-028	18	SEE MAP	14%	174
EL-CFS-050-029	18	SEE MAP	14%	174
EL-CFS-050-030	18	SEE MAP	14%	174
EL-CFS-050-031	18	SEE MAP	14%	174

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-050-032	18	SEE MAP	14%	174
EL-CFS-050-033	18	SEE MAP	14%	174
EL-CFS-050-034	18	SEE MAP	14%	174
EL-CFS-050-035	18	SEE MAP	14%	174
EL-CFS-050-036	18	SEE MAP	14%	174
EL-CFS-050-037	18	SEE MAP	14%	174
EL-CFS-050-038	18	SEE MAP	24%	109
EL-CFS-050-039	18	SEE MAP	24%	109
EL-CFS-050-040	18	SEE MAP	28%	36
EL-CFS-050-041	18	SEE MAP	28%	36
EL-CFS-050-042	18	SEE MAP	28%	36
EL-CFS-050-043	18	SEE MAP	28%	36
EL-CFS-050-044	18	SEE MAP	22%	97
EL-CFS-050-045	18	SEE MAP	22%	97
EL-CFS-050-046	18	SEE MAP	22%	97
EL-CFS-050-047	18	SEE MAP	22%	97
EL-CFS-050-048	18	SEE MAP	22%	97
EL-CFS-050-049	18	SEE MAP	22%	97
EL-CFS-050-050	12	SEE MAP	20%	20
EL-CFS-050-051	12	SEE MAP	20%	20
EL-CFS-050-052	12	SEE MAP	10%	102
EL-CFS-050-053	12	SEE MAP	10%	102
EL-CFS-050-054	12	SEE MAP	10%	102
EL-CFS-050-055	12	SEE MAP	10%	102
EL-CFS-050-056	12	SEE MAP	9%	146
EL-CFS-050-057	12	SEE MAP	9%	146
EL-CFS-050-058	12	SEE MAP	9%	146
EL-CFS-050-059	12	SEE MAP	9%	146
EL-CFS-050-060	12	SEE MAP	5%	232
EL-CFS-050-061	12	SEE MAP	5%	232
EL-CFS-050-062	12	SEE MAP	5%	232
EL-CFS-050-063	12	SEE MAP	5%	232
EL-CFS-050-064	12	SEE MAP	4%	204
EL-CFS-050-065	12	SEE MAP	4%	204
EL-CFS-050-066	REMOVED			
EL-CFS-050-067	12	SEE MAP	4%	204
EL-CFS-050-068	24	SEE MAP	4%	523
EL-CFS-050-069	12	SEE MAP	3%	36
EL-CFS-050-070	REMOVED			
EL-CFS-050-071	12	SEE MAP	9%	44
EL-CFS-050-072	12	SEE MAP	9%	44
EL-CFS-050-073	12	SEE MAP	3%	118
EL-CFS-050-074	12	SEE MAP	3%	118

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-050-075	12	SEE MAP	2%	152
EL-CFS-050-076	12	SEE MAP	2%	152
EL-CFS-050-077	24	SEE MAP	4%	506
EL-CFS-050-078	18	SEE MAP	4%	346
EL-CFS-050-079	18	SEE MAP	4%	346
EL-CFS-050-080	18	SEE MAP	4%	346
EL-CFS-050-081	18	SEE MAP	4%	346
EL-CFS-050-082	24	SEE MAP	4%	569
EL-CFS-050-083	24	SEE MAP	4%	569
EL-CFS-050-084	24	SEE MAP	4%	569
EL-CFS-050-085	24	SEE MAP	4%	569
EL-CFS-050-086	24	SEE MAP	4%	569
EL-CFS-050-087	24	SEE MAP	4%	569
EL-CFS-050-088	12	SEE MAP	3%	173
EL-CFS-050-089	12	SEE MAP	3%	173
EL-CFS-050-090	12	SEE MAP	3%	173
EL-CFS-050-091	12	SEE MAP	3%	173
EL-CFS-050-092	12	SEE MAP	3%	109
EL-CFS-050-093	18	SEE MAP	4%	406
EL-CFS-050-094	18	SEE MAP	4%	406
EL-CFS-050-095	18	SEE MAP	4%	406
EL-CFS-050-096	18	SEE MAP	4%	406
EL-CFS-050-097	18	SEE MAP	4%	406
EL-CFS-050-098	18	SEE MAP	4%	406
EL-CFS-050-099	18	SEE MAP	4%	406
EL-CFS-050-100	12	SEE MAP	5%	177
EL-CFS-050-101	12	SEE MAP	7%	90
EL-CFS-050-102	12	SEE MAP	7%	90
EL-CFS-050-103	12	SEE MAP	14%	42
EL-CFS-050-104	24	SEE MAP	12%	244
EL-CFS-050-105	24	SEE MAP	18%	191
EL-CFS-050-106	24	SEE MAP	18%	191
EL-CFS-050-107	32	SEE MAP	15%	357
EL-CFS-050-108	32	SEE MAP	15%	357
EL-CFS-050-109	32	SEE MAP	15%	357
EL-CFS-050-110	12	SEE MAP	5%	63
EL-CFS-050-111	12	SEE MAP	5%	63
EL-CFS-050-112	12	SEE MAP	9%	103
EL-CFS-050-113	12	SEE MAP	9%	103
EL-CFS-050-114	12	SEE MAP	9%	103
EL-CFS-050-115	12	SEE MAP	9%	103
EL-CFS-050-116	18	SEE MAP	17%	92
EL-CFS-050-117	18	SEE MAP	17%	92

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-050-118	18	SEE MAP	17%	92
EL-CFS-050-119	18	SEE MAP	17%	92
EL-CFS-050-120	18	SEE MAP	17%	92
EL-CFS-050-121	18	SEE MAP	17%	92
EL-CFS-050-122	18	SEE MAP	17%	92
EL-CFS-050-123	18	SEE MAP	17%	92
EL-CFS-050-124	18	SEE MAP	14%	123
EL-CFS-050-125	18	SEE MAP	14%	123
EL-CFS-050-126	18	SEE MAP	14%	123
EL-CFS-050-127	18	SEE MAP	14%	123
EL-CFS-050-128	18	SEE MAP	14%	123
EL-CFS-050-129	18	SEE MAP	14%	123
EL-CFS-050-130	12	SEE MAP	9%	129
EL-CFS-050-131	12	SEE MAP	9%	129
EL-CFS-050-132	12	SEE MAP	9%	129
EL-CFS-050-133	REMOVED			
EL-CFS-050-134	12	SEE MAP	5%	130
EL-CFS-050-135	12	SEE MAP	3%	36
EL-CFS-050-136	12	SEE MAP	2%	116
EL-CFS-050-137	12	SEE MAP	4%	179
EL-CFS-050-138	12	SEE MAP	2%	340
EL-CFS-050-139	12	SEE MAP	2%	340
EL-CFS-050-140	12	SEE MAP	2%	340
EL-CFS-050-141	12	SEE MAP	2%	340
EL-CFS-050-142	12	SEE MAP	3%	216
EL-CFS-050-143	12	SEE MAP	3%	216
EL-CFS-050-144	12	SEE MAP	3%	216
EL-CFS-050-600	24	SEE MAP	4%	456
EL-CFS-051-001	12	SEE MAP	4%	48
EL-CFS-051-002	12	SEE MAP	6%	100
EL-CFS-051-003	12	SEE MAP	15%	20
EL-CFS-051-004	12	SEE MAP	6%	149
EL-CFS-051-005	12	SEE MAP	6%	149
EL-CFS-051-006	12	SEE MAP	6%	149
EL-CFS-051-007	12	SEE MAP	6%	149
EL-CFS-051-008	12	SEE MAP	7%	128
EL-CFS-051-009	12	SEE MAP	7%	128
EL-CFS-051-010	12	SEE MAP	7%	27
EL-CFS-051-011	12	SEE MAP	7%	82
EL-CFS-051-012	12	SEE MAP	7%	82
EL-CFS-051-013	12	SEE MAP	8%	26
EL-CFS-051-014	12	SEE MAP	8%	26
EL-CFS-051-015	12	SEE MAP	10%	142

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-016	12	SEE MAP	10%	142
EL-CFS-051-017	12	SEE MAP	10%	142
EL-CFS-051-018	12	SEE MAP	10%	142
EL-CFS-051-019	12	SEE MAP	10%	142
EL-CFS-051-020	12	SEE MAP	5%	62
EL-CFS-051-021	12	SEE MAP	5%	62
EL-CFS-051-022	12	SEE MAP	5%	62
EL-CFS-051-023	12	SEE MAP	9%	108
EL-CFS-051-024	12	SEE MAP	9%	108
EL-CFS-051-025	12	SEE MAP	9%	108
EL-CFS-051-026	12	SEE MAP	9%	108
EL-CFS-051-027	12	SEE MAP	9%	108
EL-CFS-051-028	12	SEE MAP	9%	139
EL-CFS-051-029	12	SEE MAP	9%	139
EL-CFS-051-030	12	SEE MAP	9%	139
EL-CFS-051-031	12	SEE MAP	9%	139
EL-CFS-051-032	12	SEE MAP	9%	139
EL-CFS-051-033	REMOVED			
EL-CFS-051-034	12	SEE MAP	9%	139
EL-CFS-051-035	12	SEE MAP	7%	15
EL-CFS-051-036	12	SEE MAP	10%	130
EL-CFS-051-037	12	SEE MAP	10%	130
EL-CFS-051-038	12	SEE MAP	10%	130
EL-CFS-051-039	12	SEE MAP	10%	130
EL-CFS-051-040	12	SEE MAP	10%	130
EL-CFS-051-041	12	SEE MAP	10%	130
EL-CFS-051-042	18	SEE MAP	11%	207
EL-CFS-051-043	18	SEE MAP	11%	207
EL-CFS-051-044	18	SEE MAP	11%	207
EL-CFS-051-045	18	SEE MAP	11%	207
EL-CFS-051-046	18	SEE MAP	11%	207
EL-CFS-051-047	18	SEE MAP	11%	207
EL-CFS-051-048	18	SEE MAP	11%	207
EL-CFS-051-049	18	SEE MAP	11%	207
EL-CFS-051-050	18	SEE MAP	11%	207
EL-CFS-051-051	18	SEE MAP	11%	207
EL-CFS-051-052	18	SEE MAP	11%	207
EL-CFS-051-053	18	SEE MAP	12%	133
EL-CFS-051-054	18	SEE MAP	12%	133
EL-CFS-051-055	18	SEE MAP	12%	133
EL-CFS-051-056	18	SEE MAP	12%	133
EL-CFS-051-057	18	SEE MAP	12%	133
EL-CFS-051-058	18	SEE MAP	12%	147

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-059	18	SEE MAP	12%	147
EL-CFS-051-060	18	SEE MAP	12%	147
EL-CFS-051-061	18	SEE MAP	12%	147
EL-CFS-051-062	18	SEE MAP	12%	147
EL-CFS-051-063	18	SEE MAP	12%	147
EL-CFS-051-064	18	SEE MAP	12%	147
EL-CFS-051-065	18	SEE MAP	12%	147
EL-CFS-051-066	18	SEE MAP	13%	171
EL-CFS-051-067	18	SEE MAP	13%	171
EL-CFS-051-068	18	SEE MAP	13%	171
EL-CFS-051-069	18	SEE MAP	13%	171
EL-CFS-051-070	18	SEE MAP	13%	171
EL-CFS-051-071	18	SEE MAP	13%	171
EL-CFS-051-072	18	SEE MAP	13%	171
EL-CFS-051-073	18	SEE MAP	13%	171
EL-CFS-051-074	12	SEE MAP	14%	98
EL-CFS-051-075	REMOVED			
EL-CFS-051-076	12	SEE MAP	14%	98
EL-CFS-051-077	12	SEE MAP	14%	98
EL-CFS-051-078	12	SEE MAP	14%	98
EL-CFS-051-079	12	SEE MAP	14%	98
EL-CFS-051-080	12	SEE MAP	14%	98
EL-CFS-051-081	18	SEE MAP	18%	88
EL-CFS-051-082	18	SEE MAP	18%	88
EL-CFS-051-083	18	SEE MAP	18%	88
EL-CFS-051-084	18	SEE MAP	18%	88
EL-CFS-051-085	18	SEE MAP	18%	88
EL-CFS-051-086	18	SEE MAP	18%	88
EL-CFS-051-087	18	SEE MAP	18%	88
EL-CFS-051-088	18	SEE MAP	18%	88
EL-CFS-051-089	12	SEE MAP	19%	73
EL-CFS-051-090	12	SEE MAP	19%	73
EL-CFS-051-091	12	SEE MAP	19%	73
EL-CFS-051-092	12	SEE MAP	19%	73
EL-CFS-051-093	12	SEE MAP	19%	73
EL-CFS-051-094	12	SEE MAP	19%	73
EL-CFS-051-095	12	SEE MAP	19%	73
EL-CFS-051-096	24	SEE MAP	23%	117
EL-CFS-051-097	24	SEE MAP	23%	117
EL-CFS-051-098	24	SEE MAP	23%	117
EL-CFS-051-099	24	SEE MAP	23%	117
EL-CFS-051-100	24	SEE MAP	23%	117
EL-CFS-051-101	24	SEE MAP	23%	117

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-102	24	SEE MAP	23%	117
EL-CFS-051-103	24	SEE MAP	23%	117
EL-CFS-051-104	24	SEE MAP	23%	117
EL-CFS-051-105	24	SEE MAP	23%	117
EL-CFS-051-106	24	SEE MAP	23%	117
EL-CFS-051-107	24	SEE MAP	23%	117
EL-CFS-051-108	24	SEE MAP	23%	117
EL-CFS-051-109	18	SEE MAP	37%	54
EL-CFS-051-110	18	SEE MAP	37%	54
EL-CFS-051-111	18	SEE MAP	37%	54
EL-CFS-051-112	18	SEE MAP	37%	54
EL-CFS-051-113	18	SEE MAP	37%	54
EL-CFS-051-114	18	SEE MAP	37%	54
EL-CFS-051-115	18	SEE MAP	37%	54
EL-CFS-051-116	18	SEE MAP	37%	54
EL-CFS-051-117	18	SEE MAP	37%	54
EL-CFS-051-118	18	SEE MAP	37%	54
EL-CFS-051-119	24	SEE MAP	53%	34
EL-CFS-051-120	24	SEE MAP	53%	34
EL-CFS-051-121	24	SEE MAP	53%	34
EL-CFS-051-122	24	SEE MAP	53%	34
EL-CFS-051-123	24	SEE MAP	53%	34
EL-CFS-051-124	24	SEE MAP	53%	34
EL-CFS-051-125	24	SEE MAP	53%	34
EL-CFS-051-126	24	SEE MAP	53%	34
EL-CFS-051-127	32	SEE MAP	56%	43
EL-CFS-051-128	32	SEE MAP	56%	43
EL-CFS-051-129	32	SEE MAP	56%	43
EL-CFS-051-130	32	SEE MAP	56%	43
EL-CFS-051-131	32	SEE MAP	56%	43
EL-CFS-051-132	32	SEE MAP	56%	43
EL-CFS-051-133	32	SEE MAP	56%	43
EL-CFS-051-134	32	SEE MAP	56%	43
EL-CFS-051-135	32	SEE MAP	56%	43
EL-CFS-051-136	32	SEE MAP	56%	43
EL-CFS-051-137	32	SEE MAP	56%	43
EL-CFS-051-138	32	SEE MAP	56%	43
EL-CFS-051-139	32	SEE MAP	52%	52
EL-CFS-051-140	32	SEE MAP	52%	52
EL-CFS-051-141	32	SEE MAP	52%	52
EL-CFS-051-142	32	SEE MAP	52%	52
EL-CFS-051-143	32	SEE MAP	52%	52
EL-CFS-051-144	32	SEE MAP	52%	52

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-145	32	SEE MAP	52%	52
EL-CFS-051-146	32	SEE MAP	52%	52
EL-CFS-051-147	32	SEE MAP	52%	52
EL-CFS-051-148	32	SEE MAP	52%	52
EL-CFS-051-149	32	SEE MAP	52%	52
EL-CFS-051-150	32	SEE MAP	52%	52
EL-CFS-051-151	32	SEE MAP	52%	52
EL-CFS-051-152	32	SEE MAP	61%	44
EL-CFS-051-153	32	SEE MAP	61%	44
EL-CFS-051-154	32	SEE MAP	61%	44
EL-CFS-051-155	32	SEE MAP	61%	44
EL-CFS-051-156	32	SEE MAP	61%	44
EL-CFS-051-157	32	SEE MAP	61%	44
EL-CFS-051-158	32	SEE MAP	61%	44
EL-CFS-051-159	32	SEE MAP	61%	44
EL-CFS-051-160	32	SEE MAP	61%	44
EL-CFS-051-161	32	SEE MAP	61%	44
EL-CFS-051-162	32	SEE MAP	61%	44
EL-CFS-051-163	32	SEE MAP	61%	44
EL-CFS-051-164	32	SEE MAP	61%	44
EL-CFS-051-165	32	SEE MAP	61%	49
EL-CFS-051-166	32	SEE MAP	61%	49
EL-CFS-051-167	32	SEE MAP	61%	49
EL-CFS-051-168	32	SEE MAP	61%	49
EL-CFS-051-169	32	SEE MAP	61%	49
EL-CFS-051-170	32	SEE MAP	61%	49
EL-CFS-051-171	32	SEE MAP	61%	49
EL-CFS-051-172	32	SEE MAP	61%	49
EL-CFS-051-173	32	SEE MAP	61%	49
EL-CFS-051-174	32	SEE MAP	61%	49
EL-CFS-051-175	32	SEE MAP	61%	49
EL-CFS-051-176	32	SEE MAP	61%	49
EL-CFS-051-177	32	SEE MAP	61%	49
EL-CFS-051-178	32	SEE MAP	61%	49
EL-CFS-051-179	32	SEE MAP	61%	49
EL-CFS-051-180	32	SEE MAP	64%	47
EL-CFS-051-181	32	SEE MAP	64%	47
EL-CFS-051-182	32	SEE MAP	64%	47
EL-CFS-051-183	32	SEE MAP	64%	47
EL-CFS-051-184	32	SEE MAP	64%	47
EL-CFS-051-185	32	SEE MAP	64%	47
EL-CFS-051-186	32	SEE MAP	64%	47
EL-CFS-051-187	32	SEE MAP	64%	47

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-188	32	SEE MAP	64%	47
EL-CFS-051-189	32	SEE MAP	64%	47
EL-CFS-051-190	32	SEE MAP	64%	47
EL-CFS-051-191	32	SEE MAP	64%	47
EL-CFS-051-192	32	SEE MAP	64%	47
EL-CFS-051-193	32	SEE MAP	64%	47
EL-CFS-051-194	32	SEE MAP	54%	54
EL-CFS-051-195	32	SEE MAP	54%	54
EL-CFS-051-196	32	SEE MAP	54%	54
EL-CFS-051-197	32	SEE MAP	54%	54
EL-CFS-051-198	32	SEE MAP	54%	54
EL-CFS-051-199	32	SEE MAP	54%	54
EL-CFS-051-200	32	SEE MAP	54%	54
EL-CFS-051-201	32	SEE MAP	54%	54
EL-CFS-051-202	32	SEE MAP	54%	54
EL-CFS-051-203	32	SEE MAP	54%	54
EL-CFS-051-204	32	SEE MAP	54%	54
EL-CFS-051-205	32	SEE MAP	54%	54
EL-CFS-051-206	32	SEE MAP	54%	54
EL-CFS-051-207	32	SEE MAP	54%	54
EL-CFS-051-208	32	SEE MAP	45%	65
EL-CFS-051-209	32	SEE MAP	45%	65
EL-CFS-051-210	32	SEE MAP	45%	65
EL-CFS-051-211	32	SEE MAP	45%	65
EL-CFS-051-212	32	SEE MAP	45%	65
EL-CFS-051-213	32	SEE MAP	45%	65
EL-CFS-051-214	32	SEE MAP	45%	65
EL-CFS-051-215	32	SEE MAP	45%	65
EL-CFS-051-216	32	SEE MAP	45%	65
EL-CFS-051-217	12	SEE MAP	3%	232
EL-CFS-051-218	12	SEE MAP	3%	232
EL-CFS-051-219	12	SEE MAP	3%	232
EL-CFS-051-220	12	SEE MAP	2%	168
EL-CFS-051-221	12	SEE MAP	2%	168
EL-CFS-051-222	12	SEE MAP	3%	112
EL-CFS-051-223	18	SEE MAP	5%	318
EL-CFS-051-224	18	SEE MAP	5%	318
EL-CFS-051-225	18	SEE MAP	5%	318
EL-CFS-051-226	18	SEE MAP	5%	318
EL-CFS-051-227	18	SEE MAP	5%	318
EL-CFS-051-228	18	SEE MAP	5%	318
EL-CFS-051-229	18	SEE MAP	5%	318
EL-CFS-051-230	18	SEE MAP	5%	318

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-051-231	12	SEE MAP	2%	122
EL-CFS-051-232	12	SEE MAP	2%	122
EL-CFS-051-233	12	SEE MAP	6%	67
EL-CFS-051-234	12	SEE MAP	8%	97
EL-CFS-051-235	12	SEE MAP	8%	97
EL-CFS-051-236	12	SEE MAP	8%	97
EL-CFS-051-237	12	SEE MAP	13%	120
EL-CFS-051-238	12	SEE MAP	13%	120
EL-CFS-051-239	12	SEE MAP	13%	120
EL-CFS-051-240	12	SEE MAP	13%	120
EL-CFS-051-241	12	SEE MAP	13%	120
EL-CFS-051-242	12	SEE MAP	11%	88
EL-CFS-051-243	12	SEE MAP	11%	88
EL-CFS-051-244	12	SEE MAP	11%	88
EL-CFS-051-245	12	SEE MAP	11%	88
EL-CFS-051-246	12	SEE MAP	11%	88
EL-CFS-052-001	12	SEE MAP	35%	40
EL-CFS-052-002	12	SEE MAP	35%	40
EL-CFS-052-003	12	SEE MAP	35%	40
EL-CFS-052-004	12	SEE MAP	35%	40
EL-CFS-052-005	12	SEE MAP	35%	40
EL-CFS-052-006	12	SEE MAP	35%	40
EL-CFS-052-007	24	SEE MAP	43%	54
EL-CFS-052-008	24	SEE MAP	43%	54
EL-CFS-052-009	24	SEE MAP	43%	54
EL-CFS-052-010	24	SEE MAP	43%	54
EL-CFS-052-011	24	SEE MAP	43%	54
EL-CFS-052-012	24	SEE MAP	43%	54
EL-CFS-052-013	24	SEE MAP	43%	54
EL-CFS-052-014	24	SEE MAP	43%	54
EL-CFS-052-015	24	SEE MAP	43%	54
EL-CFS-052-016	24	SEE MAP	43%	54
EL-CFS-052-017	24	SEE MAP	43%	54
EL-CFS-052-018	24	SEE MAP	41%	51
EL-CFS-052-019	24	SEE MAP	41%	51
EL-CFS-052-020	24	SEE MAP	41%	51
EL-CFS-052-021	24	SEE MAP	41%	51
EL-CFS-052-022	24	SEE MAP	41%	51
EL-CFS-052-023	24	SEE MAP	41%	51
EL-CFS-052-024	24	SEE MAP	41%	51
EL-CFS-052-025	24	SEE MAP	41%	51
EL-CFS-052-026	24	SEE MAP	41%	51
EL-CFS-052-027	24	SEE MAP	41%	51

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-028	18	SEE MAP	42%	38
EL-CFS-052-029	18	SEE MAP	42%	38
EL-CFS-052-030	18	SEE MAP	42%	38
EL-CFS-052-031	18	SEE MAP	42%	38
EL-CFS-052-032	18	SEE MAP	42%	38
EL-CFS-052-033	18	SEE MAP	42%	38
EL-CFS-052-034	18	SEE MAP	42%	38
EL-CFS-052-035	18	SEE MAP	42%	38
EL-CFS-052-036	12	SEE MAP	35%	23
EL-CFS-052-037	12	SEE MAP	35%	23
EL-CFS-052-038	12	SEE MAP	35%	23
EL-CFS-052-039	12	SEE MAP	35%	23
EL-CFS-052-040	32	SEE MAP	15%	336
EL-CFS-052-041	32	SEE MAP	15%	336
EL-CFS-052-042	32	SEE MAP	15%	336
EL-CFS-052-043	32	SEE MAP	15%	336
EL-CFS-052-044	32	SEE MAP	15%	336
EL-CFS-052-045	32	SEE MAP	22%	224
EL-CFS-052-046	32	SEE MAP	22%	224
EL-CFS-052-047	32	SEE MAP	22%	224
EL-CFS-052-048	32	SEE MAP	22%	224
EL-CFS-052-049	32	SEE MAP	22%	224
EL-CFS-052-050	32	SEE MAP	22%	224
EL-CFS-052-051	32	SEE MAP	22%	224
EL-CFS-052-052	32	SEE MAP	22%	224
EL-CFS-052-053	32	SEE MAP	22%	224
EL-CFS-052-054	32	SEE MAP	16%	283
EL-CFS-052-055	32	SEE MAP	16%	283
EL-CFS-052-056	32	SEE MAP	16%	283
EL-CFS-052-057	32	SEE MAP	16%	283
EL-CFS-052-058	32	SEE MAP	16%	283
EL-CFS-052-059	32	SEE MAP	16%	283
EL-CFS-052-060	32	SEE MAP	16%	283
EL-CFS-052-061	32	SEE MAP	16%	283
EL-CFS-052-062	18	SEE MAP	10%	160
EL-CFS-052-063	18	SEE MAP	10%	160
EL-CFS-052-064	18	SEE MAP	10%	160
EL-CFS-052-065	18	SEE MAP	10%	160
EL-CFS-052-066	18	SEE MAP	9%	176
EL-CFS-052-067	18	SEE MAP	9%	176
EL-CFS-052-068	18	SEE MAP	9%	176
EL-CFS-052-069	12	SEE MAP	11%	142
EL-CFS-052-070	12	SEE MAP	11%	142

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-071	12	SEE MAP	11%	142
EL-CFS-052-072	12	SEE MAP	11%	142
EL-CFS-052-073	12	SEE MAP	11%	142
EL-CFS-052-074	12	SEE MAP	11%	142
EL-CFS-052-075	18	SEE MAP	13%	122
EL-CFS-052-076	18	SEE MAP	13%	122
EL-CFS-052-077	18	SEE MAP	13%	122
EL-CFS-052-078	12	SEE MAP	11%	133
EL-CFS-052-079	12	SEE MAP	11%	133
EL-CFS-052-080	12	SEE MAP	11%	133
EL-CFS-052-081	12	SEE MAP	11%	133
EL-CFS-052-082	12	SEE MAP	11%	133
EL-CFS-052-083	12	SEE MAP	11%	133
EL-CFS-052-084	12	SEE MAP	4%	192
EL-CFS-052-085	12	SEE MAP	4%	192
EL-CFS-052-086	12	SEE MAP	4%	192
EL-CFS-052-087	12	SEE MAP	6%	194
EL-CFS-052-088	12	SEE MAP	6%	194
EL-CFS-052-089	12	SEE MAP	6%	194
EL-CFS-052-090	18	SEE MAP	8%	274
EL-CFS-052-091	18	SEE MAP	8%	274
EL-CFS-052-092	18	SEE MAP	8%	274
EL-CFS-052-093	18	SEE MAP	8%	274
EL-CFS-052-094	24	SEE MAP	7%	287
EL-CFS-052-095	24	SEE MAP	7%	287
EL-CFS-052-096	24	SEE MAP	7%	287
EL-CFS-052-097	18	SEE MAP	9%	190
EL-CFS-052-098	18	SEE MAP	9%	190
EL-CFS-052-099	18	SEE MAP	9%	190
EL-CFS-052-100	18	SEE MAP	9%	190
EL-CFS-052-101	18	SEE MAP	9%	190
EL-CFS-052-102	18	SEE MAP	9%	190
EL-CFS-052-103	12	SEE MAP	8%	164
EL-CFS-052-104	12	SEE MAP	8%	164
EL-CFS-052-105	12	SEE MAP	8%	164
EL-CFS-052-106	12	SEE MAP	8%	164
EL-CFS-052-107	18	SEE MAP	10%	187
EL-CFS-052-108	18	SEE MAP	10%	187
EL-CFS-052-109	18	SEE MAP	10%	187
EL-CFS-052-110	18	SEE MAP	10%	187
EL-CFS-052-111	18	SEE MAP	12%	156
EL-CFS-052-112	18	SEE MAP	12%	156
EL-CFS-052-113	18	SEE MAP	12%	156

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-114	18	SEE MAP	12%	156
EL-CFS-052-115	18	SEE MAP	12%	156
EL-CFS-052-116	18	SEE MAP	12%	156
EL-CFS-052-117	18	SEE MAP	12%	156
EL-CFS-052-118	12	SEE MAP	6%	146
EL-CFS-052-119	12	SEE MAP	6%	146
EL-CFS-052-120	12	SEE MAP	6%	146
EL-CFS-052-121	12	SEE MAP	12%	93
EL-CFS-052-122	12	SEE MAP	12%	93
EL-CFS-052-123	12	SEE MAP	12%	93
EL-CFS-052-124	12	SEE MAP	12%	66
EL-CFS-052-125	12	SEE MAP	12%	66
EL-CFS-052-126	12	SEE MAP	12%	66
EL-CFS-052-127	18	SEE MAP	17%	95
EL-CFS-052-128	18	SEE MAP	17%	95
EL-CFS-052-129	18	SEE MAP	17%	95
EL-CFS-052-130	18	SEE MAP	17%	95
EL-CFS-052-131	18	SEE MAP	17%	95
EL-CFS-052-132	18	SEE MAP	17%	95
EL-CFS-052-133	18	SEE MAP	17%	95
EL-CFS-052-134	12	SEE MAP	30%	33
EL-CFS-052-135	12	SEE MAP	30%	33
EL-CFS-052-136	12	SEE MAP	30%	33
EL-CFS-052-137	18	SEE MAP	28%	57
EL-CFS-052-138	18	SEE MAP	28%	57
EL-CFS-052-139	18	SEE MAP	28%	57
EL-CFS-052-140	18	SEE MAP	28%	57
EL-CFS-052-141	18	SEE MAP	28%	57
EL-CFS-052-142	18	SEE MAP	28%	57
EL-CFS-052-143	18	SEE MAP	28%	57
EL-CFS-052-144	18	SEE MAP	28%	57
EL-CFS-052-145	24	SEE MAP	38%	58
EL-CFS-052-146	24	SEE MAP	38%	58
EL-CFS-052-147	24	SEE MAP	38%	58
EL-CFS-052-148	24	SEE MAP	38%	58
EL-CFS-052-149	12	SEE MAP	50%	18
EL-CFS-052-150	12	SEE MAP	50%	18
EL-CFS-052-151	12	SEE MAP	50%	18
EL-CFS-052-152	12	SEE MAP	50%	18
EL-CFS-052-153	32	SEE MAP	44%	59
EL-CFS-052-154	32	SEE MAP	48%	54
EL-CFS-052-155	12	SEE MAP	57%	7
EL-CFS-052-156	32	SEE MAP	57%	56

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-157	32	SEE MAP	57%	56
EL-CFS-052-158	32	SEE MAP	57%	56
EL-CFS-052-159	32	SEE MAP	57%	56
EL-CFS-052-160	32	SEE MAP	57%	56
EL-CFS-052-161	32	SEE MAP	57%	56
EL-CFS-052-162	32	SEE MAP	57%	56
EL-CFS-052-163	32	SEE MAP	57%	56
EL-CFS-052-164	32	SEE MAP	57%	56
EL-CFS-052-165	32	SEE MAP	57%	56
EL-CFS-052-166	32	SEE MAP	50%	40
EL-CFS-052-167	32	SEE MAP	50%	40
EL-CFS-052-168	32	SEE MAP	50%	40
EL-CFS-052-169	32	SEE MAP	50%	40
EL-CFS-052-170	32	SEE MAP	50%	40
EL-CFS-052-171	32	SEE MAP	50%	40
EL-CFS-052-172	32	SEE MAP	50%	40
EL-CFS-052-173	32	SEE MAP	50%	40
EL-CFS-052-174	24	SEE MAP	39%	54
EL-CFS-052-175	24	SEE MAP	39%	54
EL-CFS-052-176	24	SEE MAP	39%	54
EL-CFS-052-177	24	SEE MAP	39%	54
EL-CFS-052-178	24	SEE MAP	39%	54
EL-CFS-052-179	24	SEE MAP	39%	54
EL-CFS-052-180	24	SEE MAP	39%	54
EL-CFS-052-181	18	SEE MAP	29%	48
EL-CFS-052-182	18	SEE MAP	14%	48
EL-CFS-052-183	18	SEE MAP	14%	48
EL-CFS-052-184	18	SEE MAP	14%	48
EL-CFS-052-185	18	SEE MAP	14%	48
EL-CFS-052-186	18	SEE MAP	14%	48
EL-CFS-052-187	18	SEE MAP	14%	122
EL-CFS-052-188	18	SEE MAP	14%	122
EL-CFS-052-189	18	SEE MAP	14%	122
EL-CFS-052-190	18	SEE MAP	14%	122
EL-CFS-052-191	18	SEE MAP	14%	122
EL-CFS-052-192	18	SEE MAP	14%	122
EL-CFS-052-193	18	SEE MAP	14%	122
EL-CFS-052-194	12	SEE MAP	18%	57
EL-CFS-052-195	12	SEE MAP	18%	57
EL-CFS-052-196	12	SEE MAP	11%	99
EL-CFS-052-197	12	SEE MAP	11%	99
EL-CFS-052-198	12	SEE MAP	11%	99
EL-CFS-052-199	12	SEE MAP	7%	153

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-200	12	SEE MAP	7%	153
EL-CFS-052-201	12	SEE MAP	7%	153
EL-CFS-052-202	12	SEE MAP	7%	153
EL-CFS-052-203	12	SEE MAP	3%	121
EL-CFS-052-204	12	SEE MAP	3%	121
EL-CFS-052-205	12	SEE MAP	3%	175
EL-CFS-052-206	12	SEE MAP	3%	175
EL-CFS-052-207	12	SEE MAP	4%	135
EL-CFS-052-208	12	SEE MAP	4%	135
EL-CFS-052-209	12	SEE MAP	9%	22
EL-CFS-052-210	12	SEE MAP	4%	214
EL-CFS-052-211	12	SEE MAP	4%	214
EL-CFS-052-212	12	SEE MAP	4%	214
EL-CFS-052-213	32	SEE MAP	48%	54
EL-CFS-052-214	32	SEE MAP	48%	54
EL-CFS-052-215	32	SEE MAP	48%	54
EL-CFS-052-216	32	SEE MAP	48%	54
EL-CFS-052-217	32	SEE MAP	44%	59
EL-CFS-052-218	32	SEE MAP	44%	59
EL-CFS-052-219	32	SEE MAP	44%	59
EL-CFS-052-220	32	SEE MAP	44%	59
EL-CFS-052-221	32	SEE MAP	44%	59
EL-CFS-052-222	32	SEE MAP	44%	59
EL-CFS-052-223	32	SEE MAP	44%	59
EL-CFS-052-224	32	SEE MAP	44%	59
EL-CFS-052-225	32	SEE MAP	44%	59
EL-CFS-052-226	32	SEE MAP	44%	59
EL-CFS-052-227	32	SEE MAP	44%	59
EL-CFS-052-228	32	SEE MAP	44%	59
EL-CFS-052-229	32	SEE MAP	44%	59
EL-CFS-052-230	32	SEE MAP	44%	59
EL-CFS-052-231	32	SEE MAP	44%	59
EL-CFS-052-232	32	SEE MAP	48%	54
EL-CFS-052-233	32	SEE MAP	50%	60
EL-CFS-052-234	32	SEE MAP	50%	60
EL-CFS-052-235	32	SEE MAP	50%	60
EL-CFS-052-236	32	SEE MAP	50%	60
EL-CFS-052-237	32	SEE MAP	50%	60
EL-CFS-052-238	32	SEE MAP	50%	60
EL-CFS-052-239	32	SEE MAP	50%	60
EL-CFS-052-240	32	SEE MAP	50%	60
EL-CFS-052-241	32	SEE MAP	50%	60
EL-CFS-052-242	32	SEE MAP	50%	60

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-052-243	32	SEE MAP	50%	60
EL-CFS-052-244	12	SEE MAP	10%	103
EL-CFS-052-245	12	SEE MAP	10%	103
EL-CFS-052-246	12	SEE MAP	6%	98
EL-CFS-052-247	12	SEE MAP	13%	31
EL-CFS-052-248	12	SEE MAP	13%	31
EL-CFS-052-249	12	SEE MAP	13%	31
EL-CFS-052-250	12	SEE MAP	12%	121
EL-CFS-052-251	12	SEE MAP	12%	121
EL-CFS-052-252	12	SEE MAP	12%	121
EL-CFS-052-253	12	SEE MAP	12%	121
EL-CFS-052-254	12	SEE MAP	12%	121
EL-CFS-052-255	12	SEE MAP	12%	121
EL-CFS-052-256	12	SEE MAP	12%	121
EL-CFS-052-257	12	SEE MAP	4%	113
EL-CFS-052-258	12	SEE MAP	4%	113
EL-CFS-052-259	12	SEE MAP	4%	113
EL-CFS-053-001	12	SEE MAP	4%	214
EL-CFS-053-002	12	SEE MAP	4%	214
EL-CFS-053-003	12	SEE MAP	6%	229
EL-CFS-053-004	12	SEE MAP	6%	229
EL-CFS-053-005	12	SEE MAP	6%	229
EL-CFS-053-006	12	SEE MAP	6%	229
EL-CFS-053-007	12	SEE MAP	6%	229
EL-CFS-053-008	12	SEE MAP	6%	229
EL-CFS-053-009	32	SEE MAP	7%	421
EL-CFS-053-010	32	SEE MAP	7%	421
EL-CFS-053-011	32	SEE MAP	7%	421
EL-CFS-053-012	32	SEE MAP	7%	421
EL-CFS-053-013	32	SEE MAP	7%	421
EL-CFS-053-014	24	SEE MAP	6%	430
EL-CFS-053-015	24	SEE MAP	6%	430
EL-CFS-053-016	24	SEE MAP	6%	430
EL-CFS-053-017	24	SEE MAP	6%	430
EL-CFS-053-018	24	SEE MAP	6%	430
EL-CFS-053-019	24	SEE MAP	6%	430
EL-CFS-053-020	24	SEE MAP	3%	821
EL-CFS-053-021	24	SEE MAP	3%	821
EL-CFS-053-022	24	SEE MAP	3%	821
EL-CFS-053-023	24	SEE MAP	3%	821
EL-CFS-053-024	24	SEE MAP	3%	821
EL-CFS-053-025	12	SEE MAP	2%	235
EL-CFS-053-026	12	SEE MAP	4%	131

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-053-027	12	SEE MAP	4%	131
EL-CFS-053-028	12	SEE MAP	4%	131
EL-CFS-053-029	12	SEE MAP	4%	131
EL-CFS-053-030	13	SEE MAP	4%	132
EL-CFS-053-031	12	SEE MAP	wetland	
EL-CFS-053-032	12	SEE MAP	wetland	
EL-CFS-053-033	12	SEE MAP	2%	161
EL-CFS-053-034	12	SEE MAP	wetland	
EL-CFS-053-035	12	SEE MAP	wetland	
EL-CFS-053-036	12	SEE MAP	wetland	
EL-CFS-053-037	12	SEE MAP	wetland	
EL-CFS-053-038	12	SEE MAP	3%	72
EL-CFS-053-039	12	SEE MAP	3%	72
EL-CFS-053-040	12	SEE MAP	3%	72
EL-CFS-053-041	12	SEE MAP	6%	163
EL-CFS-053-042	12	SEE MAP	6%	163
EL-CFS-053-043	12	SEE MAP	6%	163
EL-CFS-053-044	12	SEE MAP	6%	163
EL-CFS-053-045	12	SEE MAP	4%	245
EL-CFS-053-046	12	SEE MAP	4%	245
EL-CFS-053-047	18	SEE MAP	5%	269
EL-CFS-053-048	18	SEE MAP	5%	269
EL-CFS-053-049	18	SEE MAP	5%	269
EL-CFS-053-050	18	SEE MAP	5%	269
EL-CFS-053-051	12	SEE MAP	5%	86
EL-CFS-053-052	12	SEE MAP	5%	86
EL-CFS-053-053	12	SEE MAP	4%	174
EL-CFS-053-054	12	SEE MAP	4%	337
EL-CFS-053-055	12	SEE MAP	4%	337
EL-CFS-053-056	12	SEE MAP	4%	337
EL-CFS-053-057	12	SEE MAP	4%	337
EL-CFS-053-058	12	SEE MAP	4%	337
EL-CFS-053-059	12	SEE MAP	4%	337
EL-CFS-053-060	12	SEE MAP	6%	31
EL-CFS-053-061	12	SEE MAP	6%	31
EL-CFS-053-062	12	SEE MAP	4%	166
EL-CFS-053-063	12	SEE MAP	4%	166
EL-CFS-053-064	18	SEE MAP	11%	176
EL-CFS-053-065	18	SEE MAP	11%	176
EL-CFS-053-066	18	SEE MAP	11%	176
EL-CFS-053-067	18	SEE MAP	11%	176
EL-CFS-053-068	18	SEE MAP	11%	176
EL-CFS-053-069	18	SEE MAP	11%	176

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-053-070	18	SEE MAP	11%	176
EL-CFS-053-071	12	SEE MAP	4%	175
EL-CFS-053-072	12	SEE MAP	4%	175
EL-CFS-053-073	12	SEE MAP	4%	175
EL-CFS-053-074	12	SEE MAP	4%	175
EL-CFS-053-075	12	SEE MAP	5%	124
EL-CFS-053-076	12	SEE MAP	5%	124
EL-CFS-053-077	12	SEE MAP	5%	124
EL-CFS-053-078	12	SEE MAP	5%	124
EL-CFS-053-079	12	SEE MAP	5%	124
EL-CFS-053-080	12	SEE MAP	5%	124
EL-CFS-053-081	18	SEE MAP	4%	395
EL-CFS-053-082	18	SEE MAP	4%	395
EL-CFS-053-083	18	SEE MAP	4%	395
EL-CFS-053-084	18	SEE MAP	4%	395
EL-CFS-053-085	18	SEE MAP	4%	395
EL-CFS-053-086	18	SEE MAP	4%	395
EL-CFS-053-087	18	SEE MAP	4%	395
EL-CFS-053-088	18	SEE MAP	4%	395
EL-CFS-053-089	18	SEE MAP	4%	395
EL-CFS-053-090	12	SEE MAP	3%	201
EL-CFS-053-091	12	SEE MAP	3%	201
EL-CFS-053-092	12	SEE MAP	4%	145
EL-CFS-053-093	12	SEE MAP	wetland	
EL-CFS-053-094	12	SEE MAP	wetland	
EL-CFS-053-095	12	SEE MAP	3%	270
EL-CFS-053-096	12	SEE MAP	5%	187
EL-CFS-053-097	12	SEE MAP	5%	187
EL-CFS-053-098	12	SEE MAP	5%	65
EL-CFS-053-099	12	SEE MAP	5%	65
EL-CFS-053-100	12	SEE MAP	5%	235
EL-CFS-053-101	12	SEE MAP	5%	235
EL-CFS-053-102	12	SEE MAP	5%	235
EL-CFS-053-103	12	SEE MAP	14%	7
EL-CFS-053-104	12	SEE MAP	14%	7
EL-CFS-053-105	12	SEE MAP	3%	150
EL-CFS-053-106	12	SEE MAP	3%	202
EL-CFS-053-107	12	SEE MAP	3%	202
EL-CFS-053-108	12	SEE MAP	8%	78
EL-CFS-053-109	12	SEE MAP	8%	78
EL-CFS-053-600	12	SEE MAP	wetland	
EL-CFS-053-601	12	SEE MAP	wetland	
EL-CFS-053-602	12	SEE MAP	wetland	

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-053-603	12	SEE MAP	wetland	
EL-CFS-054-001	12	SEE MAP	2%	187
EL-CFS-054-002	12	SEE MAP	2%	187
EL-CFS-054-003	12	SEE MAP	1%	288
EL-CFS-054-004	12	SEE MAP	1%	288
EL-CFS-054-005	12	SEE MAP	2%	637
EL-CFS-054-006	12	SEE MAP	2%	637
EL-CFS-054-007	12	SEE MAP	2%	637
EL-CFS-054-008	12	SEE MAP	2%	637
EL-CFS-054-009	12	SEE MAP	2%	637
EL-CFS-054-010	12	SEE MAP	5%	322
EL-CFS-054-011	12	SEE MAP	5%	322
EL-CFS-054-012	12	SEE MAP	5%	322
EL-CFS-054-013	12	SEE MAP	5%	322
EL-CFS-054-014	12	SEE MAP	5%	322
EL-CFS-054-015	12	SEE MAP	1%	236
EL-CFS-054-016	12	SEE MAP	2%	712
EL-CFS-054-017	12	SEE MAP	2%	712
EL-CFS-054-018	12	SEE MAP	2%	712
EL-CFS-054-019	12	SEE MAP	2%	712
EL-CFS-054-020	12	SEE MAP	2%	712
EL-CFS-054-021	12	SEE MAP	2%	713
EL-CFS-054-022	12	SEE MAP	2%	260
EL-CFS-054-023	12	SEE MAP	2%	261
EL-CFS-054-024	12	SEE MAP	2%	261
EL-CFS-054-025	12	SEE MAP	2%	454
EL-CFS-054-026	12	SEE MAP	2%	454
EL-CFS-054-027	12	SEE MAP	2%	454
EL-CFS-054-028	12	SEE MAP	2%	454
EL-CFS-054-029	12	SEE MAP	3%	244
EL-CFS-054-030	12	SEE MAP	3%	244
EL-CFS-054-031	12	SEE MAP	3%	244
EL-CFS-054-032	12	SEE MAP	4%	332
EL-CFS-054-033	12	SEE MAP	4%	332
EL-CFS-054-034	12	SEE MAP	4%	332
EL-CFS-054-035	12	SEE MAP	4%	332
EL-CFS-054-036	24	SEE MAP	3%	938
EL-CFS-054-037	24	SEE MAP	3%	938
EL-CFS-054-038	24	SEE MAP	3%	938
EL-CFS-054-039	24	SEE MAP	3%	938
EL-CFS-054-040	24	SEE MAP	3%	938
EL-CFS-054-041	18	SEE MAP	5%	376
EL-CFS-054-042	12	SEE MAP	5%	322

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-054-043	12	SEE MAP	5%	322
EL-CFS-054-044	18	SEE MAP	5%	352
EL-CFS-054-045	18	SEE MAP	5%	352
EL-CFS-054-046	18	SEE MAP	5%	352
EL-CFS-054-047	18	SEE MAP	5%	352
EL-CFS-054-048	12	SEE MAP	5%	174
EL-CFS-054-049	12	SEE MAP	5%	174
EL-CFS-054-050	12	SEE MAP	5%	174
EL-CFS-054-051	12	SEE MAP	5%	174
EL-CFS-055-001	12	SEE MAP	5%	111
EL-CFS-055-002	12	SEE MAP	5%	148
EL-CFS-055-003	12	SEE MAP	5%	148
EL-CFS-055-004	12	SEE MAP	5%	121
EL-CFS-055-005	12	SEE MAP	5%	121
EL-CFS-055-006	12	SEE MAP	5%	121
EL-CFS-055-007	12	SEE MAP	5%	133
EL-CFS-055-008	12	SEE MAP	5%	133
EL-CFS-055-009	12	SEE MAP	5%	120
EL-CFS-055-010	12	SEE MAP	5%	120
EL-CFS-055-011	12	SEE MAP	5%	78
EL-CFS-055-012	12	SEE MAP	5%	78
EL-CFS-055-013	12	SEE MAP	5%	77
EL-CFS-055-014	12	SEE MAP	3%	108
EL-CFS-055-015	12	SEE MAP	3%	108
EL-CFS-055-016	12	SEE MAP	3%	108
EL-CFS-055-017	12	SEE MAP	3%	108
EL-CFS-055-018	12	SEE MAP	3%	108
EL-CFS-055-019	12	SEE MAP	4%	216
EL-CFS-055-020	12	SEE MAP	4%	216
EL-CFS-055-021	12	SEE MAP	4%	216
EL-CFS-055-022	12	SEE MAP	3%	104
EL-CFS-055-023	12	SEE MAP	4%	51
EL-CFS-055-024	32	SEE MAP	6%	561
EL-CFS-055-025	32	SEE MAP	6%	561
EL-CFS-055-026	32	SEE MAP	6%	561
EL-CFS-055-027	18	SEE MAP	9%	180
EL-CFS-055-028	18	SEE MAP	9%	180
EL-CFS-055-029	18	SEE MAP	9%	180
EL-CFS-055-030	18	SEE MAP	9%	180
EL-CFS-055-031	18	SEE MAP	9%	180
EL-CFS-055-032	18	SEE MAP	9%	180
EL-CFS-055-033	12	SEE MAP	6%	68
EL-CFS-055-034	12	SEE MAP	6%	68

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-055-035	12	SEE MAP	6%	68
EL-CFS-055-036	24	SEE MAP	6%	333
EL-CFS-055-037	24	SEE MAP	6%	333
EL-CFS-055-038	24	SEE MAP	6%	333
EL-CFS-055-039	24	SEE MAP	6%	333
EL-CFS-055-040	24	SEE MAP	6%	333
EL-CFS-055-041	24	SEE MAP	6%	333
EL-CFS-055-042	24	SEE MAP	6%	333
EL-CFS-055-043	18	SEE MAP	5%	392
EL-CFS-055-044	18	SEE MAP	5%	392
EL-CFS-055-045	18	SEE MAP	5%	392
EL-CFS-055-046	18	SEE MAP	5%	392
EL-CFS-055-047	12	SEE MAP	4%	163
EL-CFS-055-048	12	SEE MAP	4%	163
EL-CFS-055-049	12	SEE MAP	4%	163
EL-CFS-055-050	12	SEE MAP	4%	163
EL-CFS-055-051	12	SEE MAP	5%	128
EL-CFS-055-052	12	SEE MAP	5%	128
EL-CFS-055-053	12	SEE MAP	4%	108
EL-CFS-055-054	12	SEE MAP	4%	108
EL-CFS-055-055	12	SEE MAP	3%	183
EL-CFS-055-056	12	SEE MAP	3%	183
EL-CFS-055-057	12	SEE MAP	3%	183
EL-CFS-055-058	12	SEE MAP	3%	183
EL-CFS-055-059	12	SEE MAP	5%	276
EL-CFS-055-060	12	SEE MAP	5%	276
EL-CFS-055-061	12	SEE MAP	5%	276
EL-CFS-055-062	12	SEE MAP	5%	276
EL-CFS-055-063	12	SEE MAP	5%	276
EL-CFS-055-064	12	SEE MAP	3%	239
EL-CFS-055-065	12	SEE MAP	3%	239
EL-CFS-055-066	12	SEE MAP	3%	179
EL-CFS-055-067	12	SEE MAP	3%	179
EL-CFS-055-068	12	SEE MAP	3%	179
EL-CFS-055-069	12	SEE MAP	4%	244
EL-CFS-055-070	12	SEE MAP	4%	244
EL-CFS-055-071	12	SEE MAP	4%	244
EL-CFS-055-072	12	SEE MAP	4%	141
EL-CFS-055-073	12	SEE MAP	4%	141
EL-CFS-055-074	12	SEE MAP	4%	141
EL-CFS-055-075	24	SEE MAP	4%	651
EL-CFS-055-076	24	SEE MAP	4%	651
EL-CFS-055-077	24	SEE MAP	4%	648

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-055-078	24	SEE MAP	4%	648
EL-CFS-055-079	24	SEE MAP	4%	648
EL-CFS-055-080	24	SEE MAP	4%	648
EL-CFS-055-600	12	SEE MAP	5%	121
EL-CFS-055-601	12	SEE MAP	5%	78
EL-CFS-055-602	12	SEE MAP	wetland	
EL-CFS-056-001	24	SEE MAP	3%	590
EL-CFS-056-002	24	SEE MAP	3%	590
EL-CFS-056-003	24	SEE MAP	3%	590
EL-CFS-056-004	24	SEE MAP	3%	590
EL-CFS-056-005	24	SEE MAP	3%	590
EL-CFS-056-006	24	SEE MAP	3%	590
EL-CFS-056-007	24	SEE MAP	3%	590
EL-CFS-056-008	24	SEE MAP	3%	590
EL-CFS-056-009	24	SEE MAP	3%	590
EL-CFS-056-010	24	SEE MAP	3%	590
EL-CFS-056-011	18	SEE MAP	3%	519
EL-CFS-056-012	18	SEE MAP	3%	519
EL-CFS-056-013	REMOVED			
EL-CFS-056-014				
EL-CFS-056-015	12	SEE MAP	wetland	
EL-CFS-056-016	12	SEE MAP	wetland	
EL-CFS-056-017	12	SEE MAP	wetland	
EL-CFS-056-018	12	SEE MAP	wetland	
EL-CFS-056-019	12	SEE MAP	wetland	
EL-CFS-056-020	12	SEE MAP	wetland	
EL-CFS-056-021	12	SEE MAP	wetland	
EL-CFS-056-022	12	SEE MAP	wetland	
EL-CFS-056-023	12	SEE MAP	wetland	
EL-CFS-056-024	12	SEE MAP	wetland	
EL-CFS-056-025	12	SEE MAP	wetland	
EL-CFS-056-026	12	SEE MAP	wetland	
EL-CFS-056-027	12	SEE MAP	wetland	
EL-CFS-056-028	12	SEE MAP	wetland	
EL-CFS-056-029	12	SEE MAP	wetland	
EL-CFS-056-030	12	SEE MAP	wetland	
EL-CFS-056-031	12	SEE MAP	wetland	
EL-CFS-056-032	12	SEE MAP	wetland	
EL-CFS-056-033	12	SEE MAP	wetland	
EL-CFS-056-034	24	SEE MAP	4%	704
EL-CFS-056-035	24	SEE MAP	4%	704
EL-CFS-056-036	24	SEE MAP	4%	704
EL-CFS-056-037	24	SEE MAP	4%	704

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-056-038	24	SEE MAP	4%	704
EL-CFS-056-039	24	SEE MAP	4%	653
EL-CFS-056-040	24	SEE MAP	4%	653
EL-CFS-056-041	24	SEE MAP	4%	653
EL-CFS-056-042	24	SEE MAP	4%	653
EL-CFS-056-043	24	SEE MAP	4%	653
EL-CFS-056-044	24	SEE MAP	4%	653
EL-CFS-056-045	24	SEE MAP	4%	653
EL-CFS-056-046	24	SEE MAP	4%	653
EL-CFS-056-047	24	SEE MAP	4%	653
EL-CFS-056-048	24	SEE MAP	4%	653
EL-CFS-056-049	24	SEE MAP	4%	653
EL-CFS-056-050	24	SEE MAP	4%	653
EL-CFS-056-051	24	SEE MAP	3%	876
EL-CFS-056-052	24	SEE MAP	3%	876
EL-CFS-056-053	24	SEE MAP	3%	876
EL-CFS-056-054	24	SEE MAP	3%	876
EL-CFS-056-055	24	SEE MAP	3%	876
EL-CFS-056-056	24	SEE MAP	3%	567
EL-CFS-056-057	24	SEE MAP	3%	567
EL-CFS-056-058	24	SEE MAP	3%	567
EL-CFS-056-059	24	SEE MAP	4%	638
EL-CFS-056-060	24	SEE MAP	4%	638
EL-CFS-056-061	24	SEE MAP	4%	638
EL-CFS-056-062	24	SEE MAP	4%	638
EL-CFS-056-063	24	SEE MAP	4%	638
EL-CFS-056-064	24	SEE MAP	4%	638
EL-CFS-056-065	24	SEE MAP	4%	574
EL-CFS-056-066	24	SEE MAP	4%	574
EL-CFS-056-067	12	SEE MAP	4%	253
EL-CFS-056-068	12	SEE MAP	4%	253
EL-CFS-056-069	12	SEE MAP	4%	253
EL-CFS-056-070	12	SEE MAP	4%	253
EL-CFS-056-071	12	SEE MAP	6%	180
EL-CFS-056-072	12	SEE MAP	6%	180
EL-CFS-056-073	12	SEE MAP	6%	180
EL-CFS-056-074	12	SEE MAP	6%	180
EL-CFS-056-075	12	SEE MAP	4%	226
EL-CFS-056-076	12	SEE MAP	4%	226
EL-CFS-056-077	12	SEE MAP	4%	226
EL-CFS-056-078	12	SEE MAP	4%	226
EL-CFS-056-079	12	SEE MAP	4%	226
EL-CFS-056-080	12	SEE MAP	4%	226

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-056-081	12	SEE MAP	4%	226
EL-CFS-056-082	12	SEE MAP	4%	226
EL-CFS-056-083	12	SEE MAP	4%	275
EL-CFS-056-084	12	SEE MAP	4%	275
EL-CFS-056-085	12	SEE MAP	5%	281
EL-CFS-056-086	12	SEE MAP	5%	281
EL-CFS-056-087	24	SEE MAP	5%	358
EL-CFS-056-088	24	SEE MAP	5%	358
EL-CFS-056-089	24	SEE MAP	5%	358
EL-CFS-056-600	24	SEE MAP	3%	590
EL-CFS-056-601	24	SEE MAP	3%	590
EL-CFS-056-602	12	SEE MAP	wetland	
EL-CFS-056-603	12	SEE MAP	wetland	
EL-CFS-056-604	12	SEE MAP	wetland	
EL-CFS-056-605	12	SEE MAP	wetland	
EL-CFS-056-606	12	SEE MAP	wetland	
EL-CFS-056-607	12	SEE MAP	wetland	
EL-CFS-056-608	12	SEE MAP	4%	226
EL-CFS-057-001	24	SEE MAP	5%	380
EL-CFS-057-002	24	SEE MAP	5%	380
EL-CFS-057-003	24	SEE MAP	5%	380
EL-CFS-057-004	24	SEE MAP	5%	380
EL-CFS-057-005	24	SEE MAP	5%	380
EL-CFS-057-006	24	SEE MAP	4%	650
EL-CFS-057-007	24	SEE MAP	4%	650
EL-CFS-057-008	12	SEE MAP	2%	513
EL-CFS-057-009	12	SEE MAP	2%	513
EL-CFS-057-010	12	SEE MAP	2%	513
EL-CFS-057-011	12	SEE MAP	2%	513
EL-CFS-057-012	12	SEE MAP	2%	513
EL-CFS-057-013	12	SEE MAP	2%	513
EL-CFS-057-014	12	SEE MAP	4%	388
EL-CFS-057-015	12	SEE MAP	4%	388
EL-CFS-057-016	12	SEE MAP	4%	388
EL-CFS-057-017	12	SEE MAP	4%	388
EL-CFS-057-018	12	SEE MAP	4%	388
EL-CFS-057-019	12	SEE MAP	2%	447
EL-CFS-057-020	12	SEE MAP	2%	447
EL-CFS-057-021	12	SEE MAP	2%	447
EL-CFS-057-022	12	SEE MAP	2%	447
EL-CFS-057-023	12	SEE MAP	2%	447
EL-CFS-057-024	12	SEE MAP	2%	447
EL-CFS-057-025	12	SEE MAP	2%	89

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-057-026	12	SEE MAP	2%	89
EL-CFS-057-027	12	SEE MAP	2%	89
EL-CFS-057-028	12	SEE MAP	2%	89
EL-CFS-057-029	12	SEE MAP	2%	89
EL-CFS-057-030	12	SEE MAP	2%	89
EL-CFS-057-031	18	SEE MAP	2%	583
EL-CFS-057-032	18	SEE MAP	2%	583
EL-CFS-057-033	18	SEE MAP	2%	583
EL-CFS-057-034	24	SEE MAP	5%	380
EL-CFS-057-035	24	SEE MAP	5%	380
EL-CFS-057-036	24	SEE MAP	5%	380
EL-CFS-057-037	24	SEE MAP	5%	380
EL-CFS-057-038	24	SEE MAP	5%	380
EL-CFS-057-039	24	SEE MAP	5%	380
EL-CFS-057-040	24	SEE MAP	5%	380
EL-CFS-057-041	24	SEE MAP	5%	380
EL-CFS-057-042	24	SEE MAP	4%	650
EL-CFS-057-043	24	SEE MAP	4%	650
EL-CFS-057-044	24	SEE MAP	4%	650
EL-CFS-057-045	12	SEE MAP	2%	169
EL-CFS-057-046	12	SEE MAP	2%	313
EL-CFS-057-047	12	SEE MAP	2%	313
EL-CFS-057-048	12	SEE MAP	2%	313
EL-CFS-057-049	12	SEE MAP	2%	313
EL-CFS-057-050	12	SEE MAP	2%	313
EL-CFS-057-051	12	SEE MAP	2%	313
EL-CFS-057-052	12	SEE MAP	2%	313
EL-CFS-057-053	12	SEE MAP	2%	313
EL-CFS-057-054	12	SEE MAP	2%	313
EL-CFS-057-055	12	SEE MAP	2%	431
EL-CFS-057-056	12	SEE MAP	2%	431
EL-CFS-057-057	12	SEE MAP	2%	431
EL-CFS-057-058	12	SEE MAP	2%	431
EL-CFS-057-059	12	SEE MAP	2%	513
EL-CFS-057-060	12	SEE MAP	2%	513
EL-CFS-057-061	12	SEE MAP	2%	513
EL-CFS-057-062	12	SEE MAP	2%	513
EL-CFS-057-063	12	SEE MAP	4%	388
EL-CFS-057-064	12	SEE MAP	4%	388
EL-CFS-057-065	12	SEE MAP	4%	388
EL-CFS-057-066	12	SEE MAP	4%	388
EL-CFS-057-067	12	SEE MAP	4%	388
EL-CFS-057-068	12	SEE MAP	4%	388

STANDARD E&S WORKSHEET #1
Compost Filter Socks

EL-CFS-057-069	12	SEE MAP	4%	388
EL-CFS-057-070	12	SEE MAP	4%	388
EL-CFS-057-071	12	SEE MAP	3%	211
EL-CFS-057-072	12	SEE MAP	3%	211
EL-CFS-057-073	12	SEE MAP	3%	211
EL-CFS-057-074	12	SEE MAP	3%	211
EL-CFS-057-075	12	SEE MAP	3%	211
EL-CFS-057-076	12	SEE MAP	3%	211
EL-CFS-057-077	12	SEE MAP	3%	211
EL-CFS-057-078	12	SEE MAP	2%	447
EL-CFS-057-079	12	SEE MAP	2%	447
EL-CFS-057-080	12	SEE MAP	2%	447
EL-CFS-057-081	12	SEE MAP	2%	447
EL-CFS-057-082	12	SEE MAP	2%	264
EL-CFS-057-083	12	SEE MAP	1%	501
EL-CFS-057-084	12	SEE MAP	1%	501
EL-CFS-057-085	12	SEE MAP	1%	501
EL-CFS-057-086	REMOVED			
EL-CFS-057-087				
EL-CFS-057-088	12	SEE MAP	1%	501
EL-CFS-057-089	12	SEE MAP	1%	501
EL-CFS-057-090	12	SEE MAP	8%	12
EL-CFS-057-091	12	SEE MAP	4%	135
EL-CFS-057-092	12	SEE MAP	4%	135
EL-CFS-057-093	12	SEE MAP	4%	135
EL-CFS-057-094	12	SEE MAP	4%	135
EL-CFS-057-095	12	SEE MAP	4%	135
EL-CFS-057-096	12	SEE MAP	4%	135
EL-CFS-057-600	12	SEE MAP	wetland	
EL-CFS-057-601	12	SEE MAP	wetland	
EL-CFS-057-602	12	SEE MAP	wetland	
EL-CFS-057-603	12	SEE MAP	wetland	
EL-CFS-057-604	12	SEE MAP	wetland	
EL-CFS-057-605	12	SEE MAP	wetland	
EL-CFS-057-606	12	SEE MAP	wetland	
EL-CFS-057-607	12	SEE MAP	2%	264
EL-CFS-057-608	12	SEE MAP	wetland	
EL-CFS-057-609	12	SEE MAP	wetland	
EL-CFS-057-610	12	SEE MAP	wetland	

ATTACHMENT 3.2

CN TABLE – EFFORT LOOP

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
Fully developed urban areas (vegetation established)					
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 weed barrier, 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
Developing urban areas					
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 ≥ 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 – EFFORT LOOP

STANDARD E&S WORKSHEET # 9
Time of Concentration

PROJECT NAME: Williams REAE- Effort Loop Pipeline
LOCATION: Monroe County, PA
PREPARED BY: CD DATE: 02/28/2022
CHECKED BY: PW DATE: 02/28/2022

OVERLAND FLOW:

Path Number	Length (ft)	"n" Value	Average Slope (ft/ft)	Time (min)
DC-EL-1	100	0.15	0.04	7.4
DC-EL-2	100	0.4	0.02	21.3
DC-EL-3	100	0.05	0.04	3.1
DC-EL-4	100	0.15	0.02	9.7
DC-EL-5	100	0.4	0.04	16.2
DC-EL-6	100	0.05	0.05	2.8
DC-EL-7	100	0.4	0.05	14.7
DC-EL-8	100	0.4	0.06	13.7
DC-EL-9	100	0.4	0.03	18.1

$$T_{c\,(\,sheet\ flow)} = \left[\frac{2(L)(n)}{3(S)^{0.5}}\right]^{0.4673}$$

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 (ft/ft)	Velocity (ft/sec)	Time (min)
DC-EL-1	571 1,272	Pasture Woodland	0.0315 0.0306	7 5	7.7 24.2
DC-EL-2	1,806	Woodland	0.026	5	37.3
DC-EL-3	157	Nearly Bare & Untilled	0.096	10	0.8
DC-EL-4	199 202 70 371	Pasture Pasture Pasture Woodland	0.04 0.089 0.243 0.102	7 7 7 5	2.4 1.6 0.3 3.9
DC-EL-5	390 193 407 165 371	Woodland Woodland Woodland Woodland Woodland	0.069 0.166 0.079 0.152 0.102	5 5 5 5 5	4.9 1.6 4.8 1.4 3.9
DC-EL-6	423	Nearly Bare & Untilled	0.05	10	3.2
DC-EL-7	564 117	Woodland Woodland	0.03 0.094	5 5	10.9 1.3
DC-EL-8	458 288 782	Woodland Woodland Woodland	0.057 0.083 0.063	5 5 5	6.4 3.3 10.4
DC-EL-9	353 861 241 246	Woodland Woodland Woodland Woodland	0.04 0.084 0.166 0.077	5 5 5 5	5.9 9.9 2.0 3.0

CHANNEL FLOW:

Path Number	Length (ft)	Flow Area (sq. ft.)	Average Slope (ft/ft)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Manning's "n"	Velocity (ft/sec)	Channel Time (min)	Tc (min)
DC-EL-1	37	4.7	0.01	7.0	0.673	0.038	3	0.2	39.5
DC-EL-2	19	1.6	0.01	4.4	0.371	0.047	1.6	0.2	58.8
DC-EL-3	362	1.2	0.044	3.9	0.313	0.05	2.9	2.1	6
DC-EL-4	42	1.6	0.048	4.4	0.371	0.045	3.7	0.2	18.1
DC-EL-5	45	1.21	0.044	3.9	0.313	0.05	2.9	0.2	33.0
DC-EL-6	782	2.7	0.01	5.4	0.501	0.039	2.4	5.4	11.4
DC-EL-7	111	0.4	0.063	2.8	0.151	0.05	2.1	0.9	27.8
DC-EL-8	29	1.3	0.067	4.1	0.331	0.05	3.7	0.1	33.9
DC-EL-9	32	0.5	0.063	2.9	0.173	0.05	2.3	0.2	39.1

CHANNEL DIMENSIONS:

Path Number	Bottom Width (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Total Depth (ft)	Top Width (ft)
DC-EL-1	2	2	2	2.00	10
DC-EL-2	2	2	2	1.25	7
DC-EL-3	2	2	2	1.00	6
DC-EL-4	2	2	2	1.25	7
DC-EL-5	2	2	2	1.00	6
DC-EL-6	2	2	2	1.75	9
DC-EL-7	2	2	2	0.75	5
DC-EL-8	2	2	2	1.00	6
DC-EL-9	2	2	2	0.75	5

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Williams REAE – Effort Loop
LOCATION: Monroe County, PA
PREPARED BY: CD DATE: 02/28/2022
CHECKED BY: PW DATE: 02/28/2022

CHANNEL OR CHANNEL SECTION		DC-EL-001	DC-EL-001	DC-EL-002	DC-EL-002	DC-EL-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)	31.2	31.2	11.44	11.44	1.42
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	14.06	14.06	2.64	2.64	3.51
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	14.06	14.09	2.65	2.65	3.54
PROTECTIVE LINING[2]		SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT)[2]		0.038	0.066	0.047	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)	3.0	2.0	1.6	1.1	1.8
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)	0.7	0.9	0.3	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)	1.75	2.00	1.25	1.25	1.00
CHANNEL TOP WIDTH @ D	(FT)	9.00	10.00	7.00	7.00	6.00
d (CALCULATED FLOW DEPTH)	(FT)	1.11	1.44	0.53	0.70	0.43
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	6.44	7.76	4.12	4.80	3.72
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	1.80	1.39	3.77	2.86	4.65
d_{50} STONE SIZE	(IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	4.684	7.027	1.622	2.380	1.230
R (HYDRAULIC RADIUS)	(FT)	0.673	0.833	0.371	0.464	0.313
S (BED SLOPE)[3]	(FT/FT)	0.010	0.010	0.010	0.010	0.044
S_c (CRITICAL SLOPE)	(FT/FT)	0.026	0.072	0.047	0.129	0.056
$.7S_c$	(FT/FT)	0.018	0.051	0.033	0.090	0.040
$1.3S_c$	(FT/FT)	0.034	0.094	0.062	0.167	0.073
STABLE FLOW?	(Y/N)	Y	Y	Y	Y	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	-	-	-	0.57
FREEBOARD BASED ON STABLE FLOW	(FT)	0.64	0.56	0.72	0.55	-
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		DC-EL-003	DC-EL-004	DC-EL-004	DC-EL-005	DC-EL-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)	1.42	4.75	4.75	10.97	10.97
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	3.51	6.04	6.04	3.41	3.41
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	3.54	6.06	6.06	3.54	3.54
PROTECTIVE LINING[2]		Vegetated	SC150BN	Vegetated	SC150BN	Vegetated
n (MANNING'S COEFFICIENT)[2]		0.050	0.045	0.045	0.050	0.050
V_a (ALLOWABLE VELOCITY)	(FPS)	8.0	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	1.8	3.7	3.7	2.9	2.9
T_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.1	2.1	8.0	2.1	8.0
T_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.5	1.6	1.6	1.2	1.2
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.00	1.25	1.25	1.00	1.00
CHANNEL TOP WIDTH @ D	(FT)	6.00	7.00	7.00	6.00	6.00
d (CALCULATED FLOW DEPTH)	(FT)	0.43	0.53	0.53	0.43	0.43
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	3.72	4.12	4.12	3.72	3.72
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	4.65	3.77	3.77	4.65	4.65
d_{50} STONE SIZE	(IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.230	1.622	1.622	1.230	1.230
R (HYDRAULIC RADIUS)	(FT)	0.313	0.371	0.371	0.313	0.313
S (BED SLOPE)[3]	(FT/FT)	0.044	0.048	0.048	0.044	0.044
S_c (CRITICAL SLOPE)	(FT/FT)	0.056	0.044	0.044	0.056	0.056
$.7S_c$	(FT/FT)	0.040	0.030	0.030	0.040	0.040
$1.3S_c$	(FT/FT)	0.073	0.057	0.057	0.073	0.073
STABLE FLOW?	(Y/N)	N	N	N	N	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.57	0.72	0.72	0.57	0.57
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

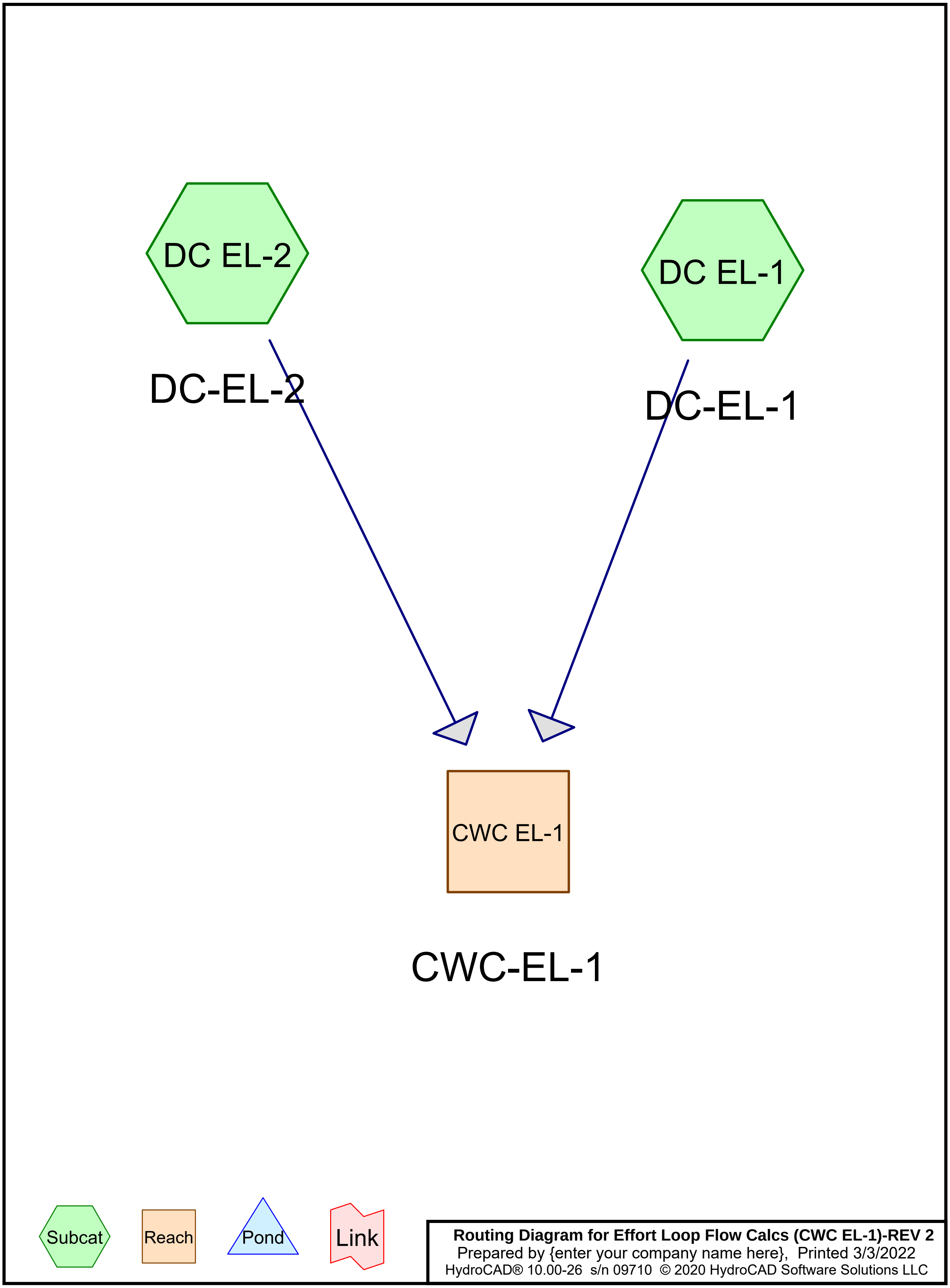
1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel 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		DC-EL-006	DC-EL-006	DC-EL-007	DC-EL-007	DC-EL-008
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)	7.49	7.49	0.35	0.35	15.85
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	6.42	6.42	0.83	0.83	4.93
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	6.55	6.42	0.90	0.87	4.95
PROTECTIVE LINING[2]		SC150BN	Vegetated	SC150BN	Vegetated	SC150BN
n (MANNING'S COEFFICIENT)[2]		0.039	0.070	0.050	0.057	0.050
V_a (ALLOWABLE VELOCITY)	(FPS)	8.0	15.0	8.0	15.0	8.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.4	1.6	2.1	1.9	3.7
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)	0.5	0.6	0.7	0.7	1.9
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.50	1.75	0.75	0.75	1.00
CHANNEL TOP WIDTH @ D	(FT)	8.00	9.00	5.00	5.00	6.00
d (CALCULATED FLOW DEPTH)	(FT)	0.77	1.02	0.18	0.19	0.46
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	5.08	6.08	2.72	2.76	3.84
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	2.60	1.96	11.11	10.53	4.35
d_{50} STONE SIZE	(IN)	-	-	-	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	2.726	4.121	0.425	0.452	1.343
R (HYDRAULIC RADIUS)	(FT)	0.501	0.628	0.151	0.159	0.331
S (BED SLOPE)[3]	(FT/FT)	0.010	0.010	0.063	0.063	0.067
S_c (CRITICAL SLOPE)	(FT/FT)	0.030	0.090	0.070	0.090	0.056
$.7S_c$	(FT/FT)	0.021	0.063	0.049	0.063	0.039
$1.3S_c$	(FT/FT)	0.039	0.117	0.091	0.117	0.072
STABLE FLOW?	(Y/N)	Y	Y	N	Y	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	-	0.57	-	0.54
FREEBOARD BASED ON STABLE FLOW	(FT)	0.73	0.73	-	0.56	-
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		DC-EL-008	DC-EL-009	DC-EL-009		
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T		
DESIGN STORM	(2, 5, OR 10 YR)	2 YR	2 YR	2 YR		
ACRES	(AC)	15.85	17.15	17.15		
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A		
Q_r (REQUIRED CAPACITY)	(CFS)	4.93	1.13	1.13		
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	4.95	1.18	1.19		
PROTECTIVE LINING[2]		Vegetated	SC150BN	Vegetated		
n (MANNING'S COEFFICIENT)[2]		0.046	0.050	0.058		
V_a (ALLOWABLE VELOCITY)	(FPS)	15.0	8.0	15.0		
V (CALCULATED AT FLOW DEPTH d)	(FPS)	3.9	2.3	2.1		
T_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	8.0	2.1	8.0		
T_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	1.8	0.8	0.9		
CHANNEL BOTTOM WIDTH	(FT)	2	2	2		
CHANNEL SIDE SLOPES	(H:V)	2	2	2		
D (TOTAL DEPTH)	(FT)	1.00	0.75	0.75		
CHANNEL TOP WIDTH @ D	(FT)	6.00	5.00	5.00		
d (CALCULATED FLOW DEPTH)	(FT)	0.44	0.21	0.23		
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	3.76	2.84	2.92		
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	4.55	9.52	8.70		
d_{50} STONE SIZE	(IN)	-	-	-		
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.267	0.508	0.566		
R (HYDRAULIC RADIUS)	(FT)	0.319	0.173	0.187		
S (BED SLOPE)[3]	(FT/FT)	0.067	0.063	0.063		
S_c (CRITICAL SLOPE)	(FT/FT)	0.048	0.068	0.089		
$.7S_c$	(FT/FT)	0.033	0.047	0.062		
$1.3S_c$	(FT/FT)	0.062	0.088	0.115		
STABLE FLOW?	(Y/N)	Y	N	N		
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	0.54	0.52		
FREEBOARD BASED ON STABLE FLOW	(FT)	0.56	-	-		
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.



Routing Diagram for Effort Loop Flow Calcs (CWC EL-1)-REV 2
Prepared by {enter your company name here}, Printed 3/3/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.332	98	Impervious (DC EL-1, DC EL-2)
1.120	30	Meadow, non-grazed, HSG A (DC EL-1)
3.633	58	Meadow, non-grazed, HSG B (DC EL-1, DC EL-2)
1.295	78	Meadow, non-grazed, HSG D (DC EL-1)
0.874	36	Woods, Fair, HSG A (DC EL-1)
19.081	60	Woods, Fair, HSG B (DC EL-1, DC EL-2)
2.865	73	Woods, Fair, HSG C (DC EL-1, DC EL-2)
11.441	79	Woods, Fair, HSG D (DC EL-1)
42.641	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.994	HSG A	DC EL-1
22.714	HSG B	DC EL-1, DC EL-2
2.865	HSG C	DC EL-1, DC EL-2
12.737	HSG D	DC EL-1
2.332	Other	DC EL-1, DC EL-2
42.641		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.332	2.332	Impervious	DC EL-1, DC EL-2
1.120	3.633	0.000	1.295	0.000	6.048	Meadow, non-grazed	DC EL-1, DC EL-2
0.874	19.081	2.865	11.441	0.000	34.261	Woods, Fair	DC EL-1, DC EL-2
1.994	**22.714**	**2.865**	**12.737**	**2.332**	**42.641**	**TOTAL AREA**	

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	CWC EL-1	1,071.50	1,067.00	165.4	0.0272	0.020	18.0	0.0	0.0

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 DC EL-1: DC-EL-1 Runoff Area=1,358,943 sf 6.01% Impervious Runoff Depth>0.66"
Flow Length=1,980' Tc=39.5 min CN=68 Runoff=14.02 cfs 1.708 af

Subcatchment DC EL-2: DC-EL-2 Runoff Area=498,504 sf 3.99% Impervious Runoff Depth>0.49"
Flow Length=1,925' Tc=58.8 min CN=64 Runoff=2.63 cfs 0.465 af

Reach CWC EL-1: CWC-EL-1 Avg. Flow Depth=0.93' Max Vel=6.91 fps Inflow=15.87 cfs 2.173 af
18.0" Round Pipe x 2.00 n=0.020 L=165.4' S=0.0272 '/' Capacity=22.52 cfs Outflow=15.85 cfs 2.171 af

Total Runoff Area = 42.641 ac Runoff Volume = 2.173 af Average Runoff Depth = 0.61"
94.53% Pervious = 40.310 ac 5.47% Impervious = 2.332 ac

Summary for Subcatchment DC EL-1: DC-EL-1

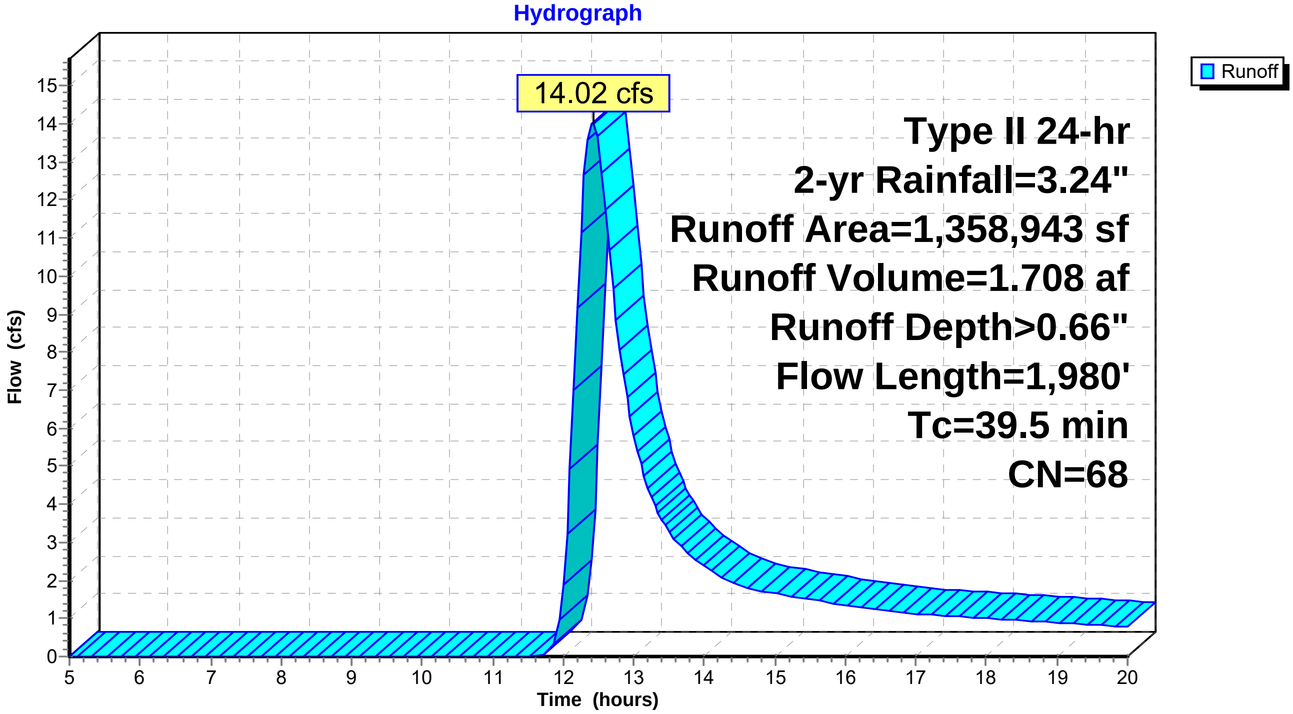
Runoff = 14.02 cfs @ 12.42 hrs, Volume= 1.708 af, Depth> 0.66"

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=3.24"

	Area (sf)	CN	Description
*	81,655	98	Impervious
	147,881	58	Meadow, non-grazed, HSG B
	48,787	30	Meadow, non-grazed, HSG A
	56,413	78	Meadow, non-grazed, HSG D
	38,052	36	Woods, Fair, HSG A
	498,389	79	Woods, Fair, HSG D
	27,477	73	Woods, Fair, HSG C
*	460,289	60	Woods, Fair, HSG B
	1,358,943	68	Weighted Average
	1,277,288		93.99% Pervious Area
	81,655		6.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
7.7	571	0.0315	1.24		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.2	1,272	0.0306	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	37	0.0100	3.00	14.09	**Channel Flow,** Area= 4.7 sf Perim= 7.0' r= 0.67' n= 0.038
39.5	1,980	Total			

Subcatchment DC EL-1: DC-EL-1



Summary for Subcatchment DC EL-2: DC-EL-2

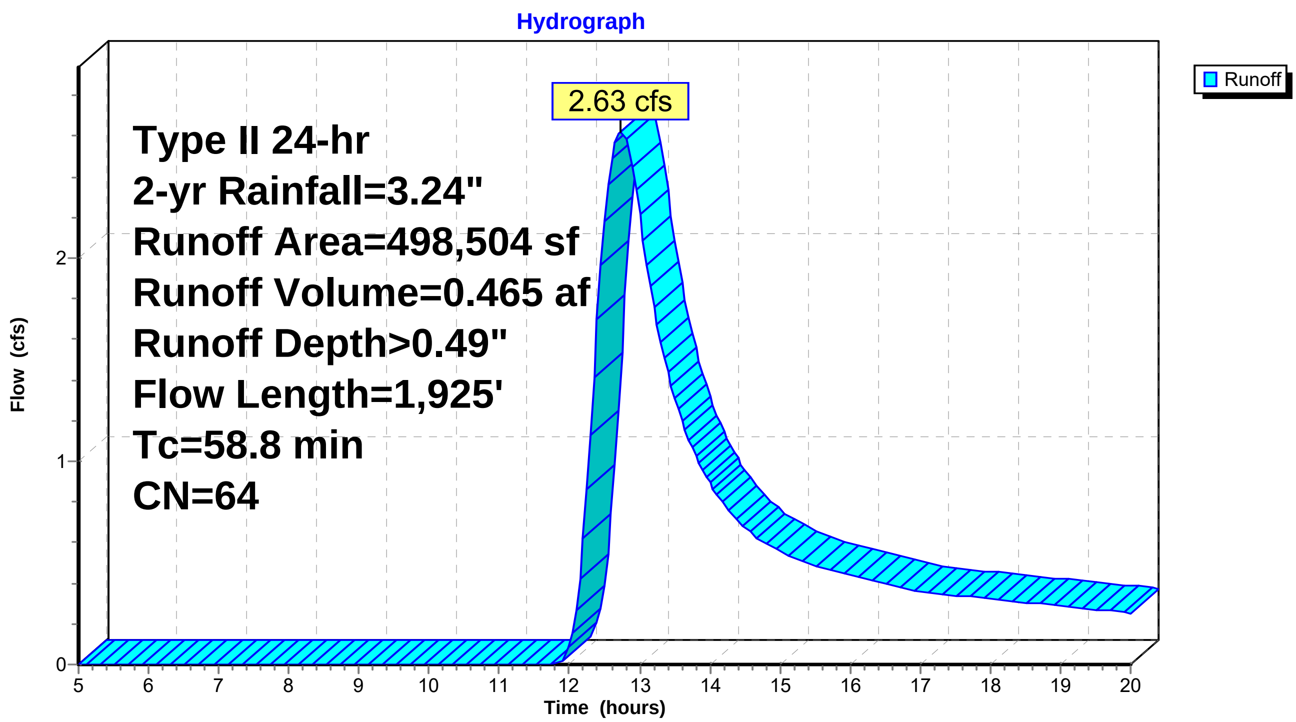
Runoff = 2.63 cfs @ 12.74 hrs, Volume= 0.465 af, Depth> 0.49"

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=3.24"

	Area (sf)	CN	Description
*	19,908	98	Impervious
	10,389	58	Meadow, non-grazed, HSG B
	370,881	60	Woods, Fair, HSG B
	97,326	73	Woods, Fair, HSG C
	498,504	64	Weighted Average
	478,596		96.01% Pervious Area
	19,908		3.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.24"
37.3	1,806	0.0260	0.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.0100	1.61	2.58	**Channel Flow,** Area= 1.6 sf Perim= 4.4' r= 0.36' n= 0.047
58.8	1,925	Total			

Subcatchment DC EL-2: DC-EL-2



Summary for Reach CWC EL-1: CWC-EL-1

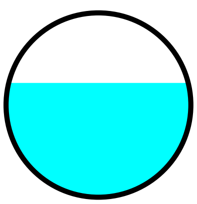
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 42.641 ac, 5.47% Impervious, Inflow Depth > 0.61" for 2-yr event
Inflow = 15.87 cfs @ 12.45 hrs, Volume= 2.173 af
Outflow = 15.85 cfs @ 12.46 hrs, Volume= 2.171 af, Atten= 0%, Lag= 0.8 min

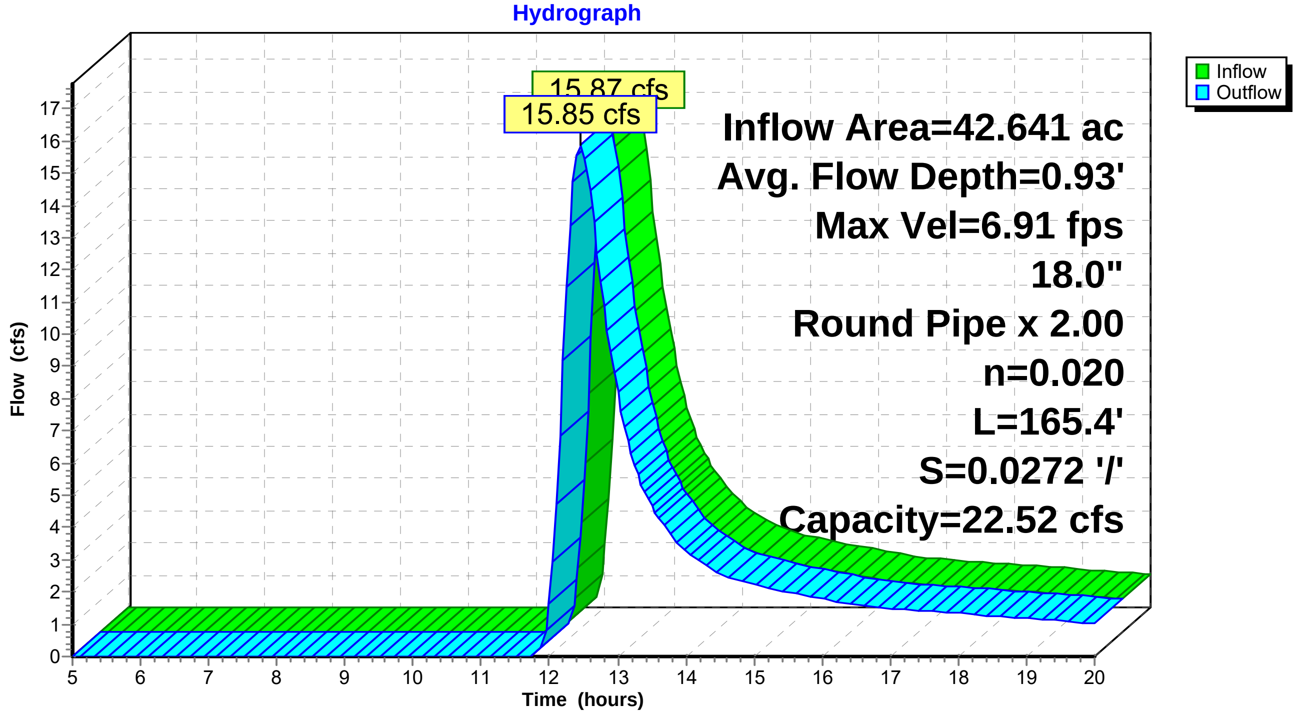
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.91 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 4.07 fps, Avg. Travel Time= 0.7 min

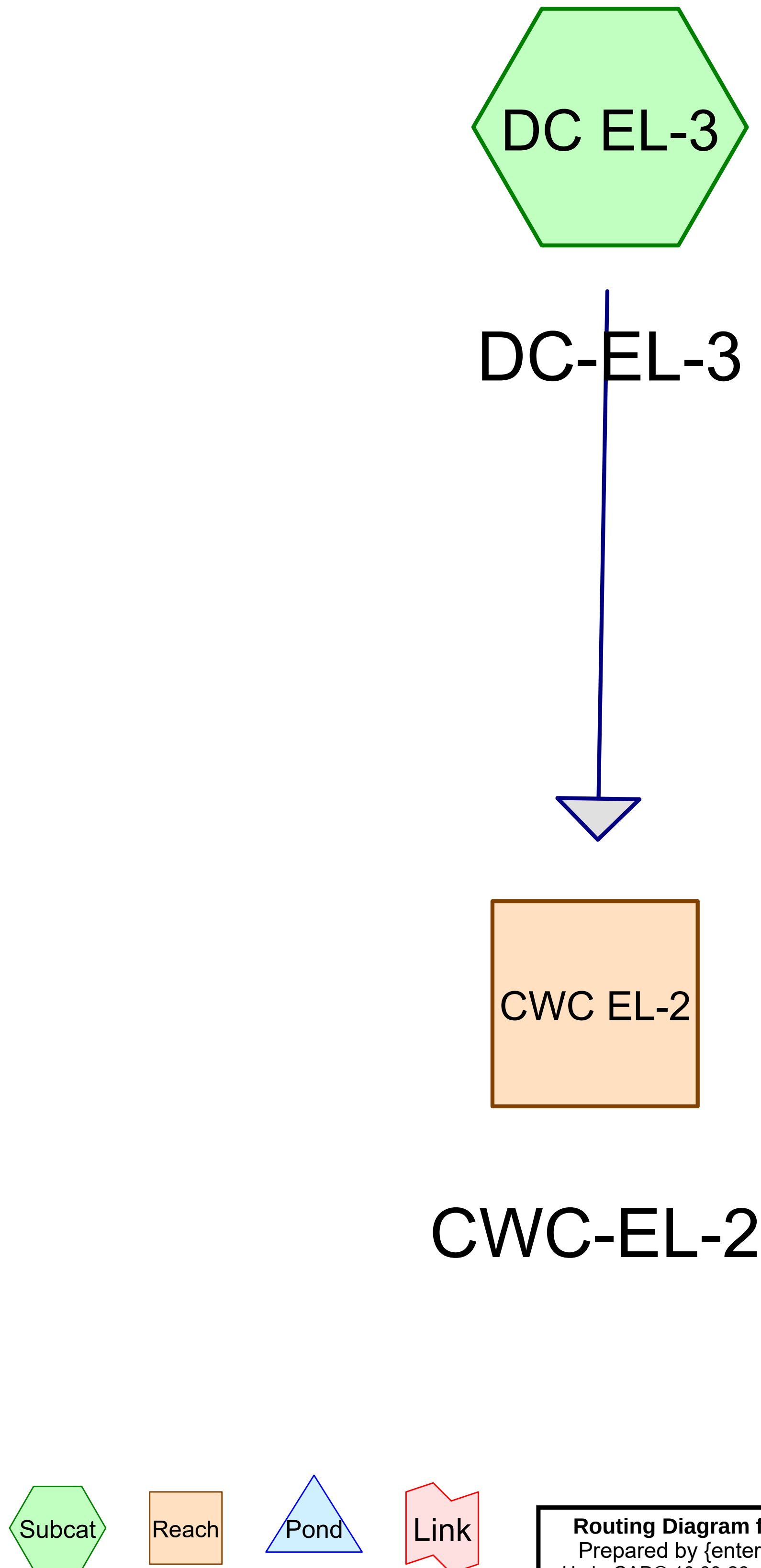
Peak Storage= 380 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.93'
Bank-Full Depth= 1.50' Flow Area= 3.5 sf, Capacity= 22.52 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
18.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 165.4' Slope= 0.0272 '/'
Inlet Invert= 1,071.50', Outlet Invert= 1,067.00'



Reach CWC EL-1: CWC-EL-1





Routing Diagram for Effort Loop Flow Calcs (CWC EL-2)-REV 1
Prepared by {enter your company name here}, Printed 3/3/2022
HydroCAD® 10.00-26 s/n 09710 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.421	78	Meadow, non-grazed, HSG D (DC EL-3)
1.421	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.421	HSG D	DC EL-3
0.000	Other	
1.421		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.421	0.000	1.421	Meadow, non-grazed	DC EL-3
0.000	**0.000**	**0.000**	**1.421**	**0.000**	**1.421**	**TOTAL AREA**	

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	CWC EL-2	918.00	900.00	129.7	0.1388	0.020	12.0	0.0	0.0

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 DC EL-3: DC-EL-3 Runoff Area=61,890 sf 0.00% Impervious Runoff Depth>1.19"
Flow Length=619' Tc=6.0 min CN=78 Runoff=3.22 cfs 0.141 af

Reach CWC EL-2: CWC-EL-2 Avg. Flow Depth=0.42' Max Vel=10.11 fps Inflow=3.22 cfs 0.141 af
12.0" Round Pipe n=0.020 L=129.7' S=0.1388 '/' Capacity=8.63 cfs Outflow=3.19 cfs 0.141 af

Total Runoff Area = 1.421 ac Runoff Volume = 0.141 af Average Runoff Depth = 1.19"
100.00% Pervious = 1.421 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DC EL-3: DC-EL-3

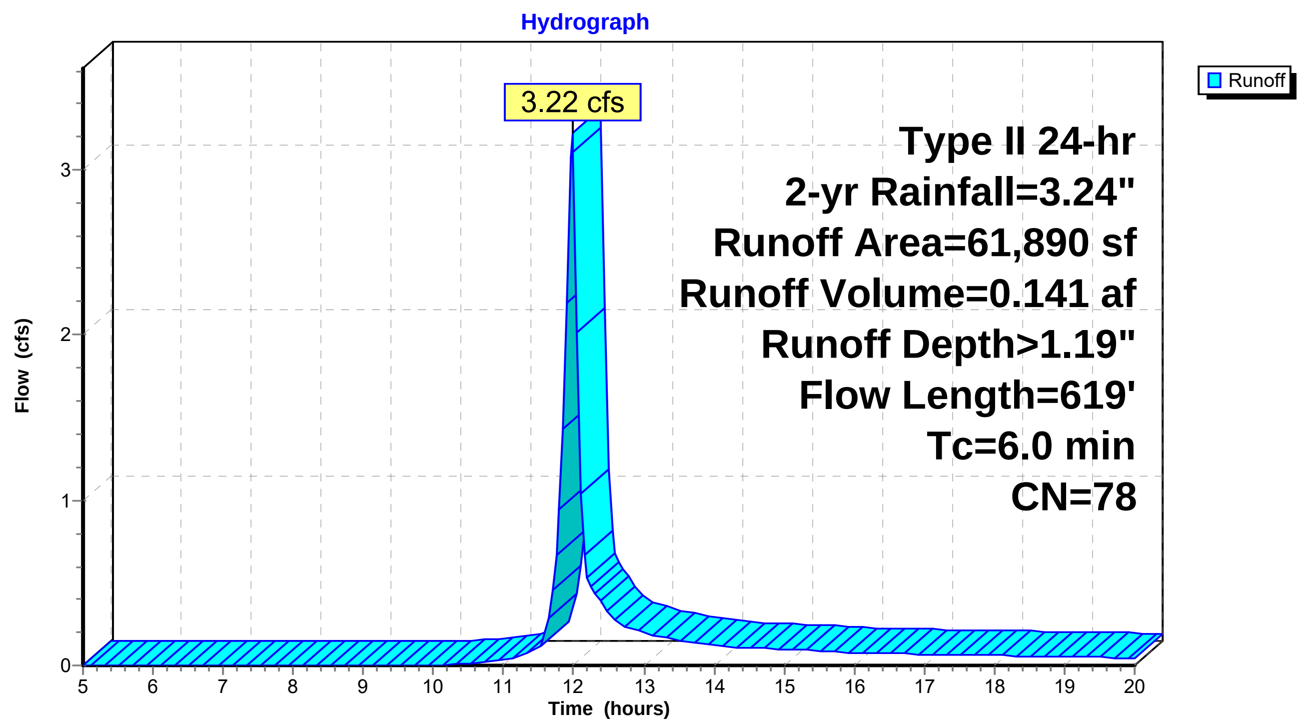
Runoff = 3.22 cfs @ 11.98 hrs, Volume= 0.141 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (sf)	CN	Description
43,889	78	Meadow, non-grazed, HSG D
18,001	78	Meadow, non-grazed, HSG D
61,890	78	Weighted Average
61,890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.0400	0.54		**Sheet Flow,** Fallow n= 0.050 P2= 3.24"
0.8	157	0.0960	3.10		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.1	362	0.0440	2.84	3.41	**Channel Flow,** Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.050
6.0	619	Total			

Subcatchment DC EL-3: DC-EL-3



Summary for Reach CWC EL-2: CWC-EL-2

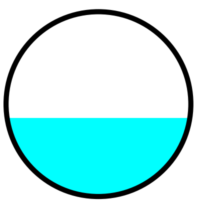
[52] Hint: Inlet/Outlet conditions not evaluated

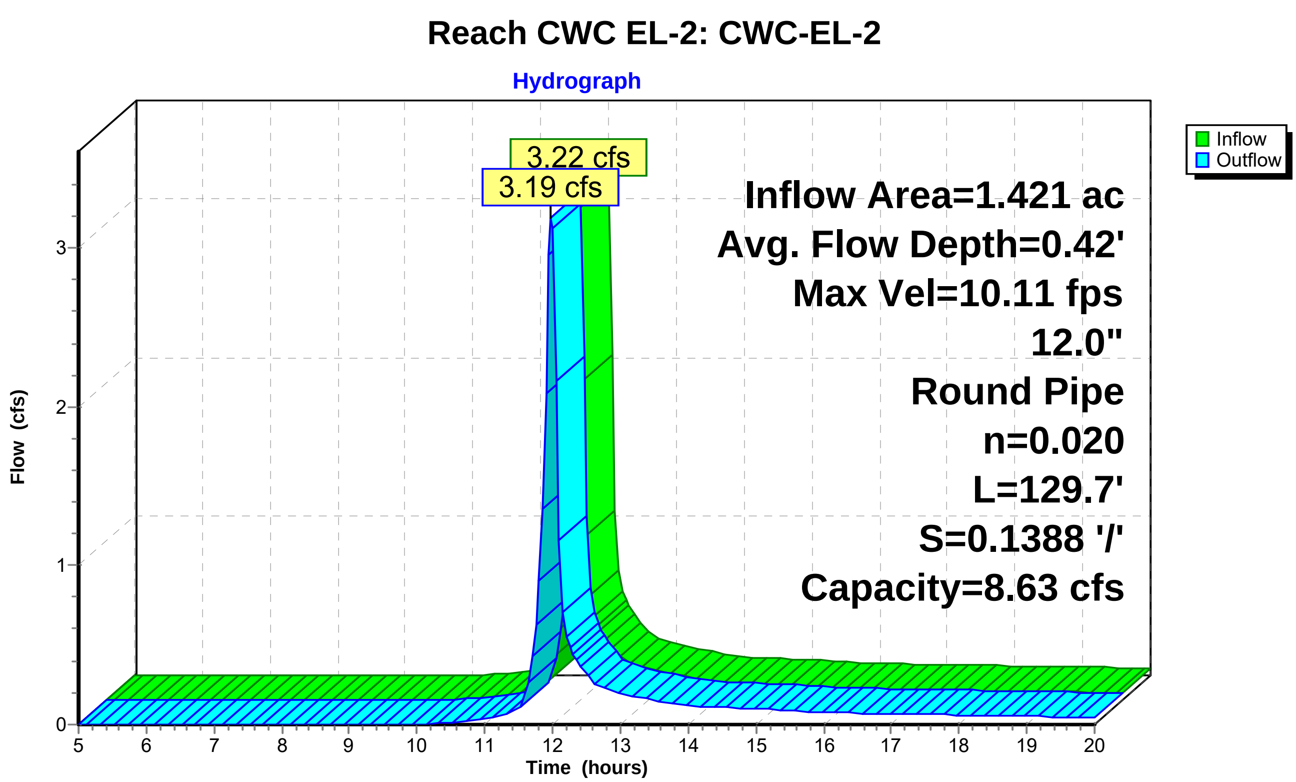
Inflow Area = 1.421 ac, 0.00% Impervious, Inflow Depth > 1.19" for 2-yr event
Inflow = 3.22 cfs @ 11.98 hrs, Volume= 0.141 af
Outflow = 3.19 cfs @ 11.98 hrs, Volume= 0.141 af, Atten= 1%, Lag= 0.4 min

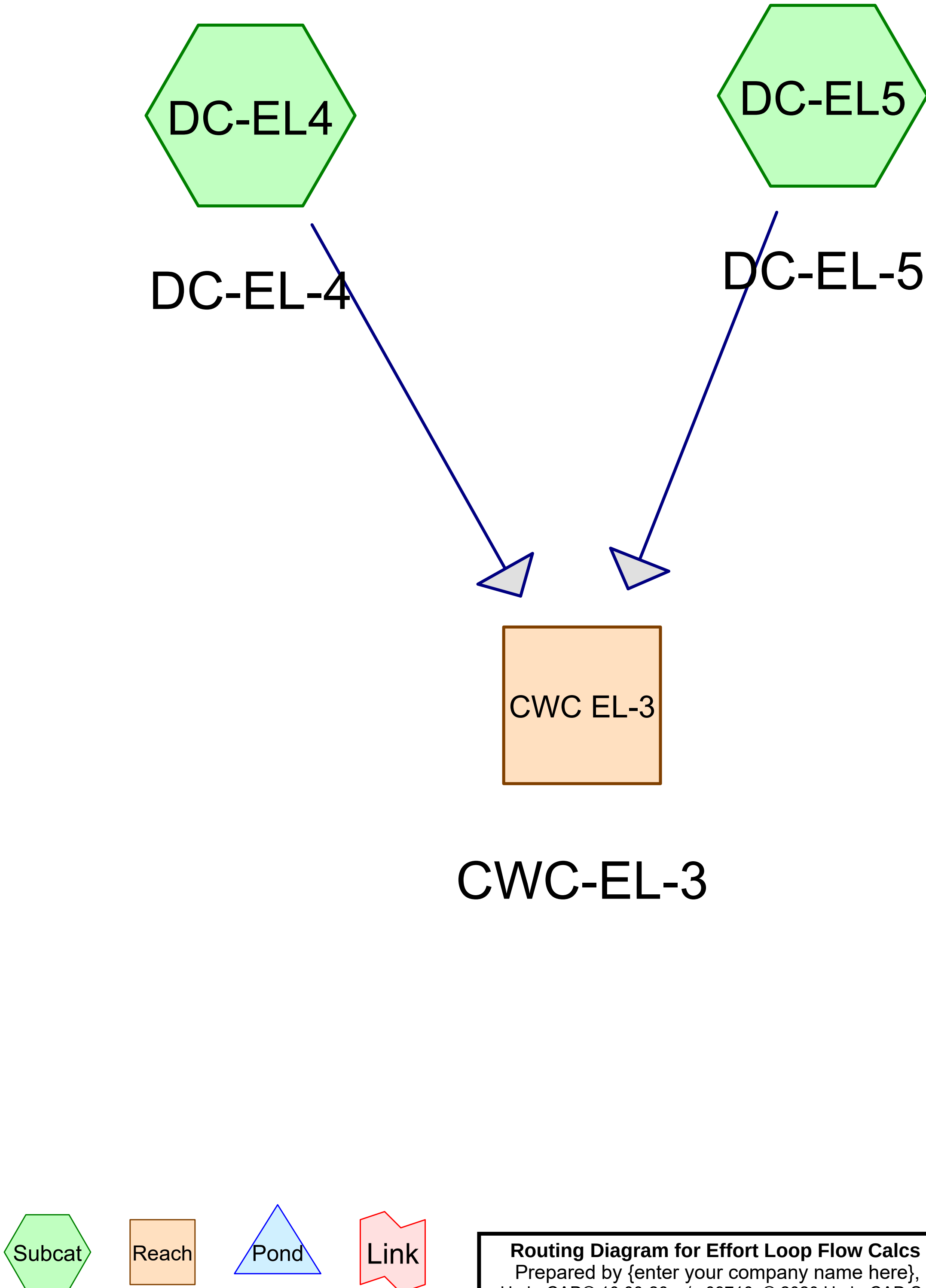
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.11 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.64 fps, Avg. Travel Time= 0.6 min

Peak Storage= 41 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.63 cfs

12.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 129.7' Slope= 0.1388 '/'
Inlet Invert= 918.00', Outlet Invert= 900.00'







Routing Diagram for Effort Loop Flow Calcs (CWC EL-3)-REV 2
Prepared by {enter your company name here}, Printed 3/3/2022
HydroCAD® 10.00-26 s/n 09710 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.135	78	Meadow, non-grazed, HSG D (DC-EL4)
10.393	60	Woods, Fair, HSG B (DC-EL4, DC-EL5)
0.033	73	Woods, Fair, HSG C (DC-EL4, DC-EL5)
2.153	79	Woods, Fair, HSG D (DC-EL4, DC-EL5)
15.713	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.393	HSG B	DC-EL4, DC-EL5
0.033	HSG C	DC-EL4, DC-EL5
5.288	HSG D	DC-EL4, DC-EL5
0.000	Other	
15.713		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	3.135	0.000	3.135	Meadow, non-grazed	DC-EL4
0.000	10.393	0.033	2.153	0.000	12.578	Woods, Fair	DC-EL4, DC-EL5
0.000	**10.393**	**0.033**	**5.288**	**0.000**	**15.713**	**TOTAL AREA**	

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	CWC EL-3	870.00	860.00	123.6	0.0809	0.020	18.0	0.0	0.0

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 DC-EL4: DC-EL-4 Runoff Area=206,791 sf 0.00% Impervious Runoff Depth>1.01"
Flow Length=984' Tc=18.1 min CN=75 Runoff=6.00 cfs 0.399 af

Subcatchment DC-EL5: DC-EL-5 Runoff Area=477,679 sf 0.00% Impervious Runoff Depth>0.46"
Flow Length=1,671' Tc=33.0 min CN=63 Runoff=3.39 cfs 0.420 af

Reach CWC EL-3: CWC-EL-3 Avg. Flow Depth=0.66' Max Vel=10.38 fps Inflow=7.79 cfs 0.819 af
18.0" Round Pipe n=0.020 L=123.6' S=0.0809 '/' Capacity=19.42 cfs Outflow=7.78 cfs 0.819 af

Total Runoff Area = 15.713 ac Runoff Volume = 0.819 af Average Runoff Depth = 0.63"
100.00% Pervious = 15.713 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DC-EL4: DC-EL-4

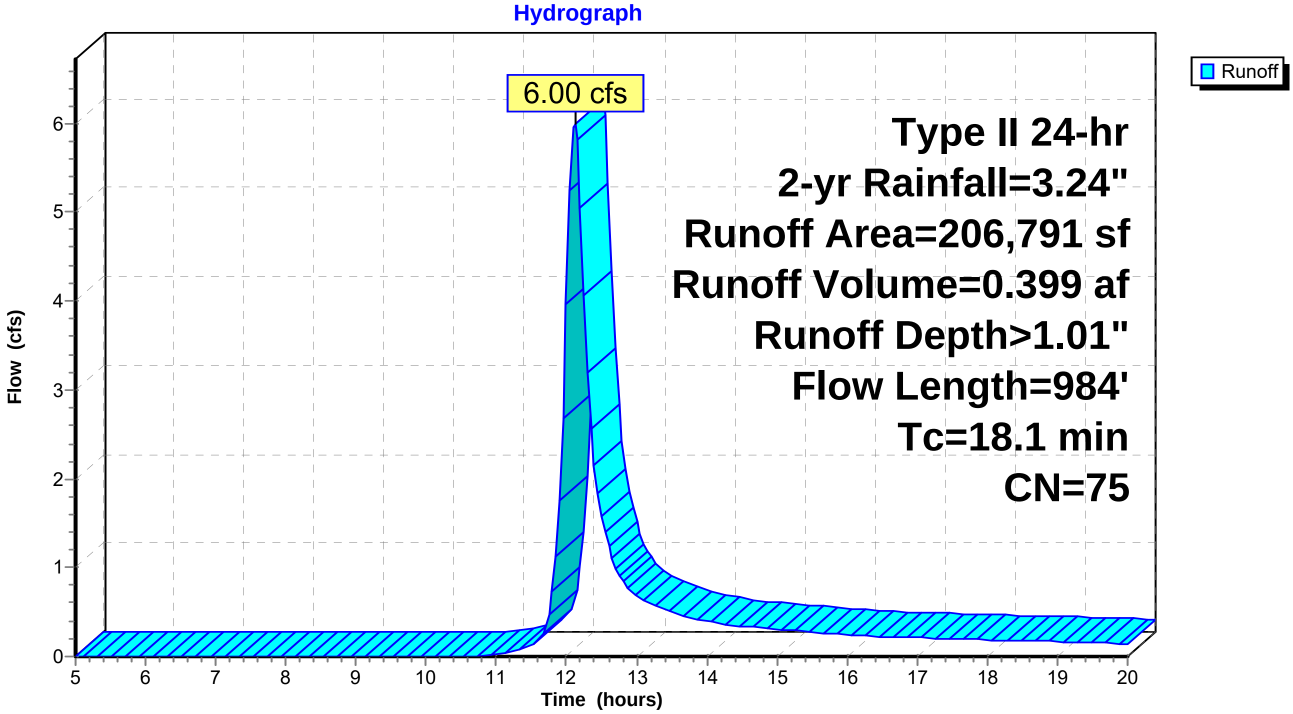
Runoff = 6.00 cfs @ 12.12 hrs, Volume= 0.399 af, Depth> 1.01"

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=3.24"

Area (sf)	CN	Description
69,903	78	Meadow, non-grazed, HSG D
66,651	78	Meadow, non-grazed, HSG D
31,135	79	Woods, Fair, HSG D
4	73	Woods, Fair, HSG C
24,452	60	Woods, Fair, HSG B
14,646	60	Woods, Fair, HSG B
206,791	75	Weighted Average
206,791		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.24"
2.4	199	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	202	0.0890	2.09		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	70	0.2430	3.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.9	371	0.1020	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	42	0.0480	3.69	5.90	**Channel Flow,** Area= 1.6 sf Perim= 4.4' r= 0.36' n= 0.045
18.1	984	Total			

Subcatchment DC-EL4: DC-EL-4



Summary for Subcatchment DC-EL5: DC-EL-5

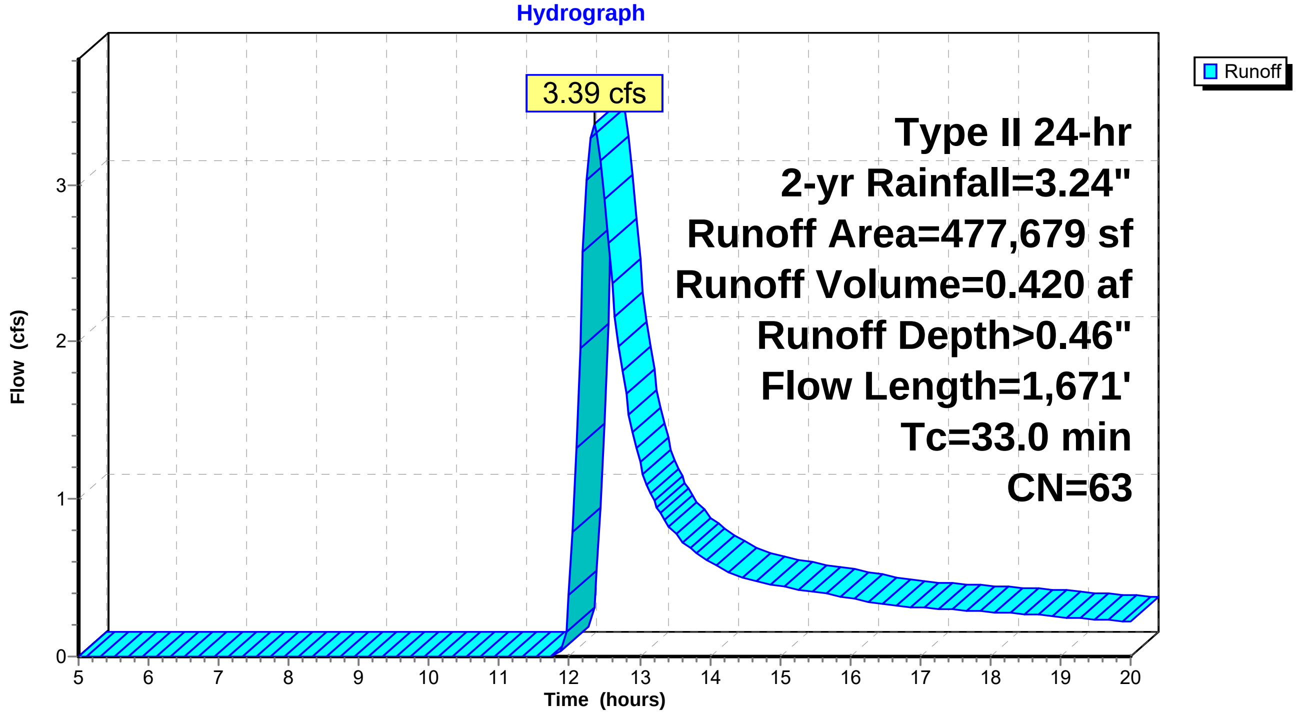
Runoff = 3.39 cfs @ 12.35 hrs, Volume= 0.420 af, Depth> 0.46"

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=3.24"

Area (sf)	CN	Description
62,427	79	Woods, Fair, HSG D
217	79	Woods, Fair, HSG D
105,262	60	Woods, Fair, HSG B
232,129	60	Woods, Fair, HSG B
76,230	60	Woods, Fair, HSG B
1,414	73	Woods, Fair, HSG C
477,679	63	Weighted Average
477,679		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= 3.24"
4.9	390	0.0690	1.31		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	193	0.1660	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.8	407	0.0790	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	165	0.1520	1.95		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.9	371	0.1020	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	45	0.0440	3.23	3.87	**Channel Flow,** Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.044
33.0	1,671	Total			

Subcatchment DC-EL5: DC-EL-5



Summary for Reach CWC EL-3: CWC-EL-3

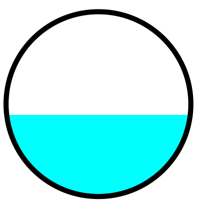
[52] Hint: Inlet/Outlet conditions not evaluated

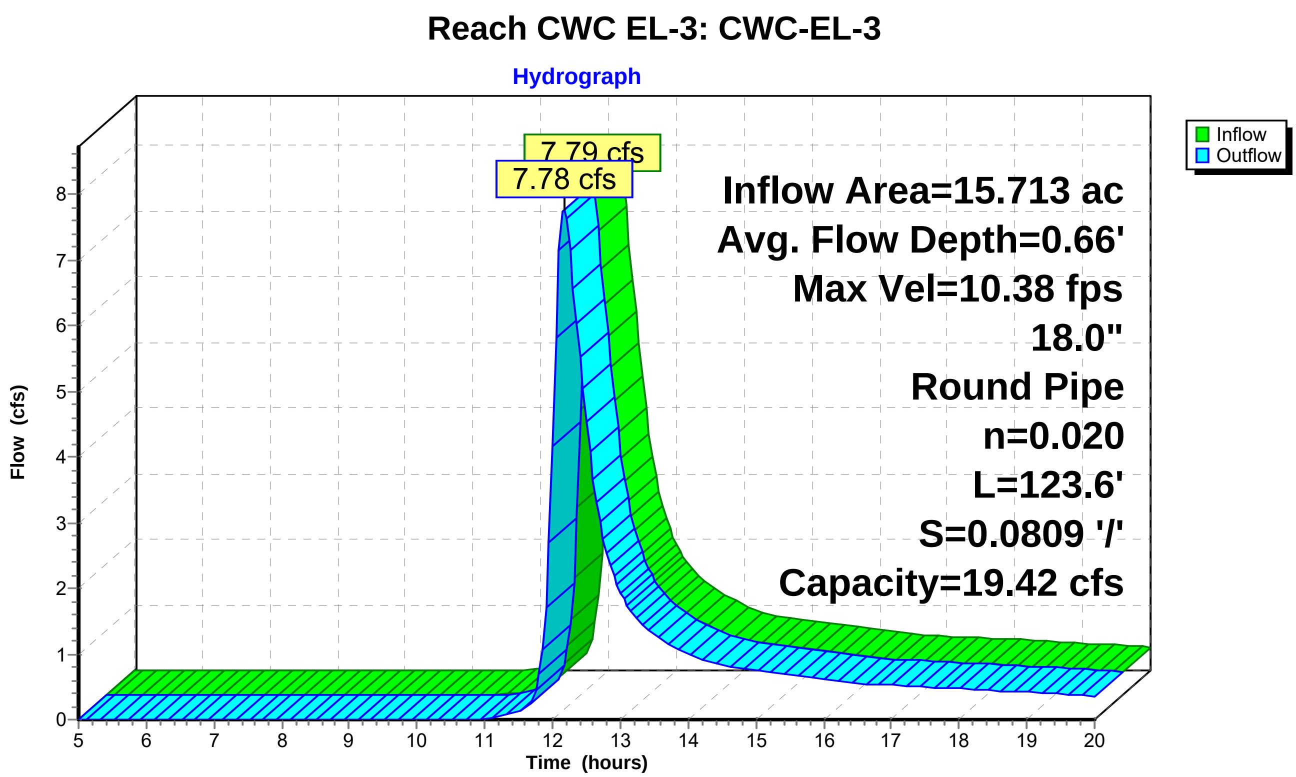
Inflow Area = 15.713 ac, 0.00% Impervious, Inflow Depth > 0.63" for 2-yr event
Inflow = 7.79 cfs @ 12.16 hrs, Volume= 0.819 af
Outflow = 7.78 cfs @ 12.17 hrs, Volume= 0.819 af, Atten= 0%, Lag= 0.3 min

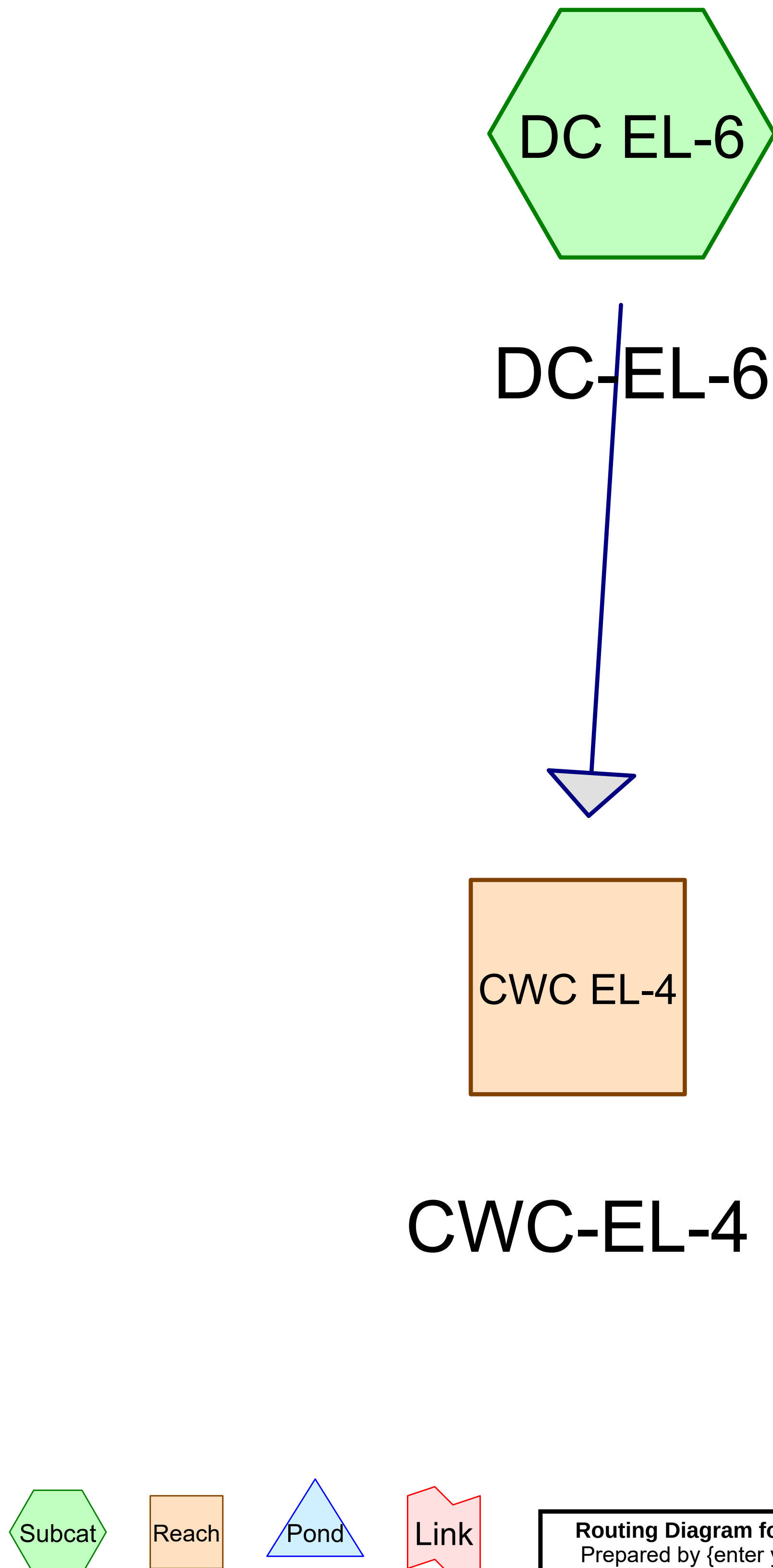
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.38 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.19 fps, Avg. Travel Time= 0.4 min

Peak Storage= 93 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.66'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 19.42 cfs

18.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 123.6' Slope= 0.0809 '/'
Inlet Invert= 870.00', Outlet Invert= 860.00'







Routing Diagram for Effort Loop Flow Calcs (CWC EL-4)-REV 1
Prepared by {enter your company name here}, Printed 3/3/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.258	30	Meadow, non-grazed, HSG A (DC EL-6)
3.235	78	Meadow, non-grazed, HSG D (DC EL-6)
7.493	**51**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.258	HSG A	DC EL-6
0.000	HSG B	
0.000	HSG C	
3.235	HSG D	DC EL-6
0.000	Other	
7.493		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
4.258	0.000	0.000	3.235	0.000	7.493	Meadow, non-grazed	DC EL-6
4.258	**0.000**	**0.000**	**3.235**	**0.000**	**7.493**	**TOTAL AREA**	

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	CWC EL-4	999.00	991.00	174.9	0.0457	0.020	18.0	0.0	0.0

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 DC EL-6: DC-EL-6 Runoff Area=326,390 sf 0.00% Impervious Runoff Depth>0.54"
Flow Length=1,305' Tc=11.4 min CN=51 Runoff=4.83 cfs 0.337 af

Reach CWC EL-4: CWC-EL-4 Avg. Flow Depth=0.59' Max Vel=7.36 fps Inflow=4.83 cfs 0.337 af
18.0" Round Pipe n=0.020 L=174.9' S=0.0457 '/' Capacity=14.60 cfs Outflow=4.67 cfs 0.337 af

Total Runoff Area = 7.493 ac Runoff Volume = 0.337 af Average Runoff Depth = 0.54"
100.00% Pervious = 7.493 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DC EL-6: DC-EL-6

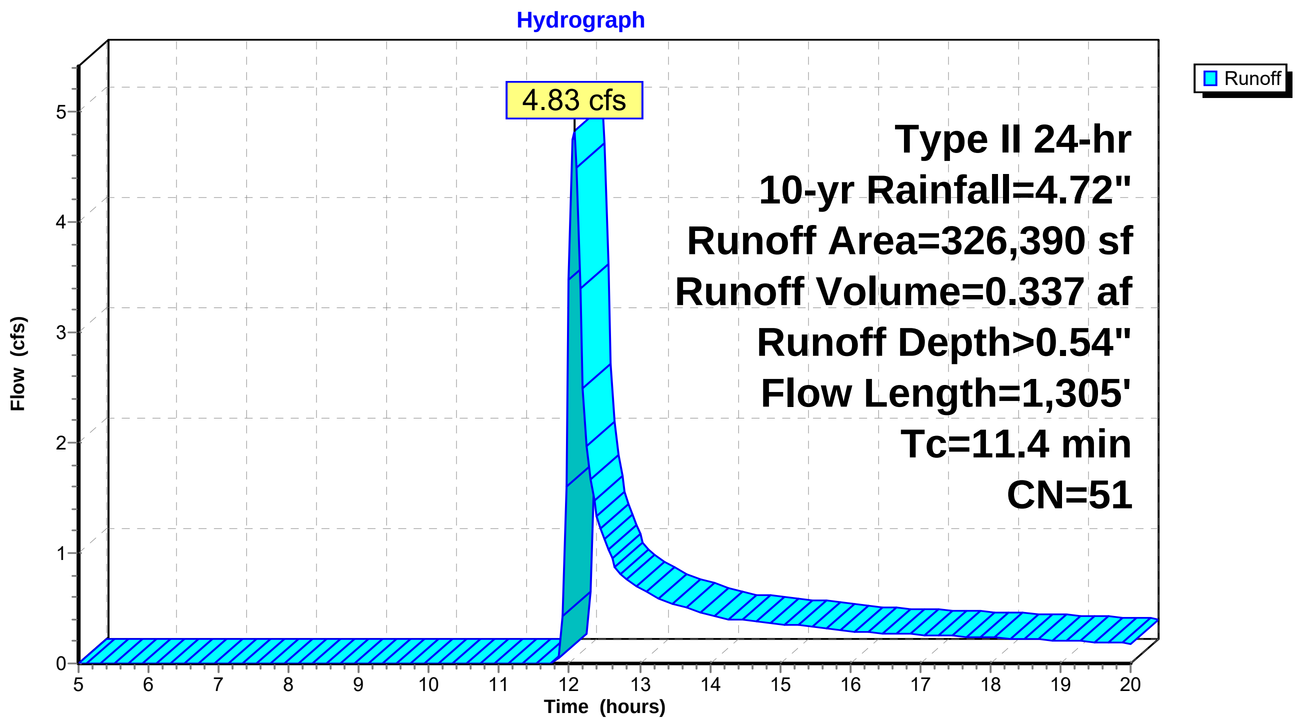
Runoff = 4.83 cfs @ 12.07 hrs, Volume= 0.337 af, Depth> 0.54"

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=4.72"

Area (sf)	CN	Description
78,271	78	Meadow, non-grazed, HSG D
62,644	78	Meadow, non-grazed, HSG D
185,475	30	Meadow, non-grazed, HSG A
326,390	51	Weighted Average
326,390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	100	0.0500	0.59		**Sheet Flow,** Fallow n= 0.050 P2= 3.24"
3.2	423	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
5.4	782	0.0100	2.40	6.48	**Channel Flow,** Area= 2.7 sf Perim= 5.4' r= 0.50' n= 0.039
11.4	1,305	Total			

Subcatchment DC EL-6: DC-EL-6



Summary for Reach CWC EL-4: CWC-EL-4

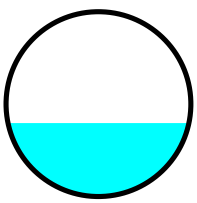
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 7.493 ac, 0.00% Impervious, Inflow Depth > 0.54" for 10-yr event
Inflow = 4.83 cfs @ 12.07 hrs, Volume= 0.337 af
Outflow = 4.67 cfs @ 12.08 hrs, Volume= 0.337 af, Atten= 3%, Lag= 0.8 min

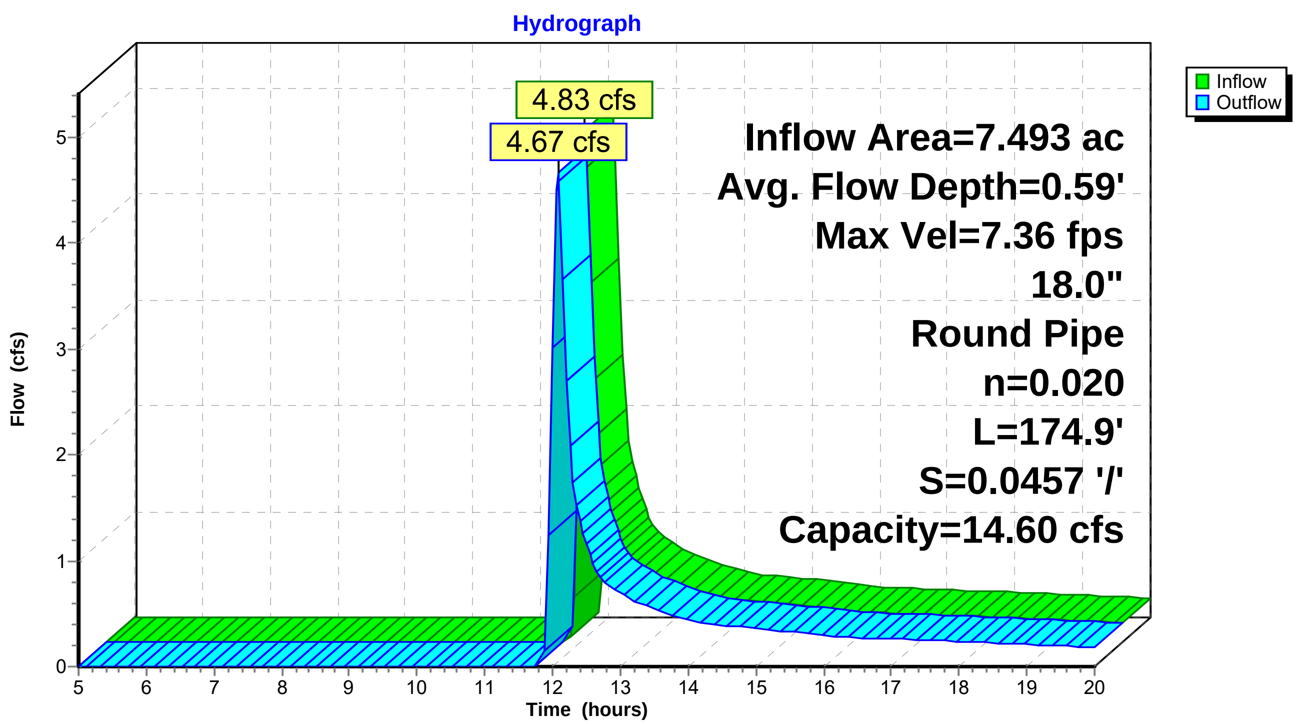
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.36 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.54 fps, Avg. Travel Time= 0.8 min

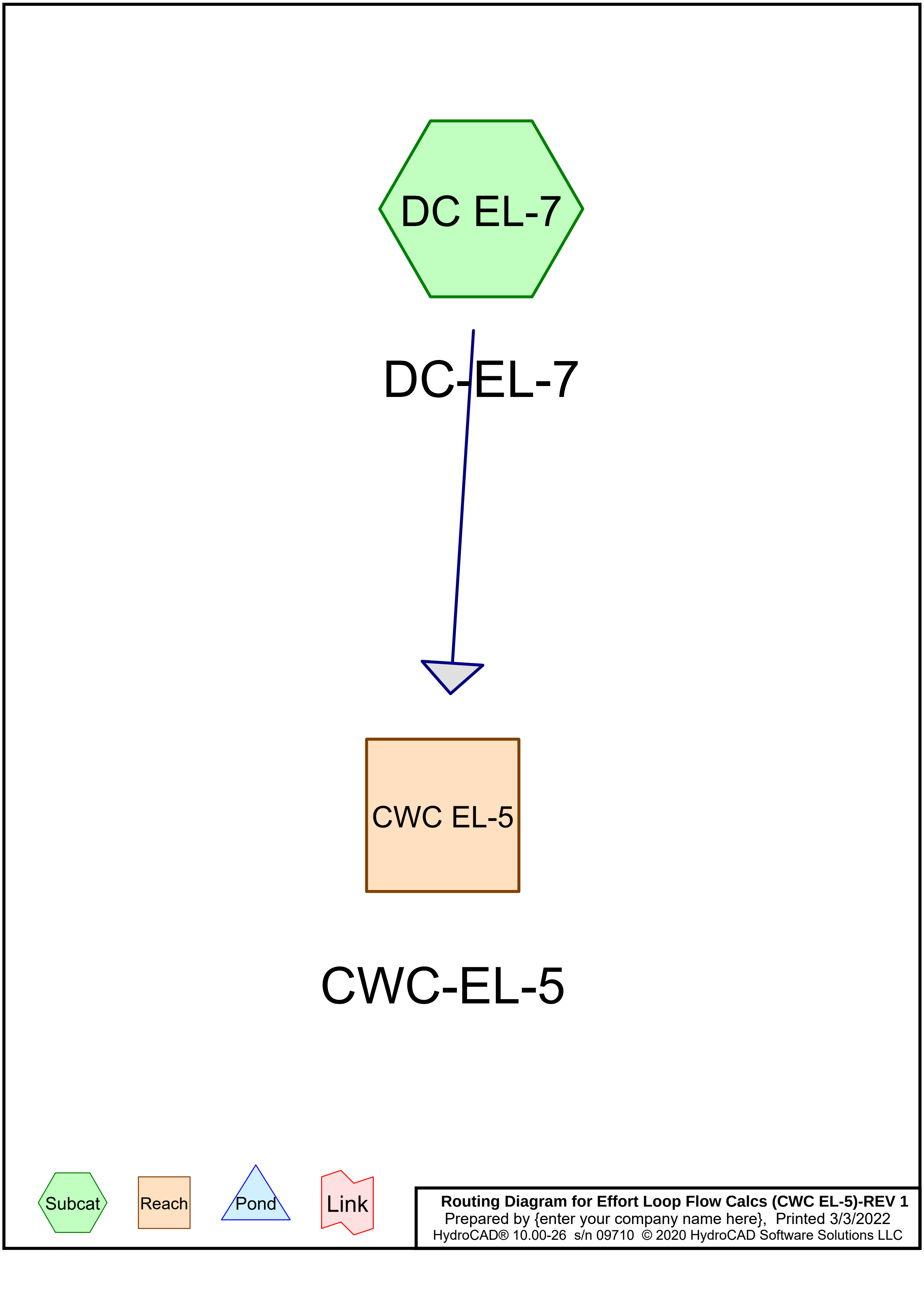
Peak Storage= 114 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 14.60 cfs

18.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 174.9' Slope= 0.0457 '/'
Inlet Invert= 999.00', Outlet Invert= 991.00'



Reach CWC EL-4: CWC-EL-4





Routing Diagram for Effort Loop Flow Calcs (CWC EL-5)-REV 1
Prepared by {enter your company name here}, Printed 3/3/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.347	79	Woods, Fair, HSG D (DC EL-7)
0.347	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.347	HSG D	DC EL-7
0.000	Other	
0.347		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.347	0.000	0.347	Woods, Fair	DC EL-7
0.000	**0.000**	**0.000**	**0.347**	**0.000**	**0.347**	**TOTAL AREA**	

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	CWC EL-5	1,041.00	1,036.00	102.2	0.0489	0.020	12.0	0.0	0.0

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 DC EL-7: DC-EL-7 Runoff Area=15,127 sf 0.00% Impervious Runoff Depth>2.37"
Flow Length=892' Tc=27.8 min CN=79 Runoff=0.82 cfs 0.069 af

Reach CWC EL-5: CWC-EL-5 Avg. Flow Depth=0.27' Max Vel=4.76 fps Inflow=0.82 cfs 0.069 af
12.0" Round Pipe n=0.020 L=102.2' S=0.0489 '/' Capacity=5.12 cfs Outflow=0.81 cfs 0.069 af

Total Runoff Area = 0.347 ac Runoff Volume = 0.069 af Average Runoff Depth = 2.37"
100.00% Pervious = 0.347 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DC EL-7: DC-EL-7

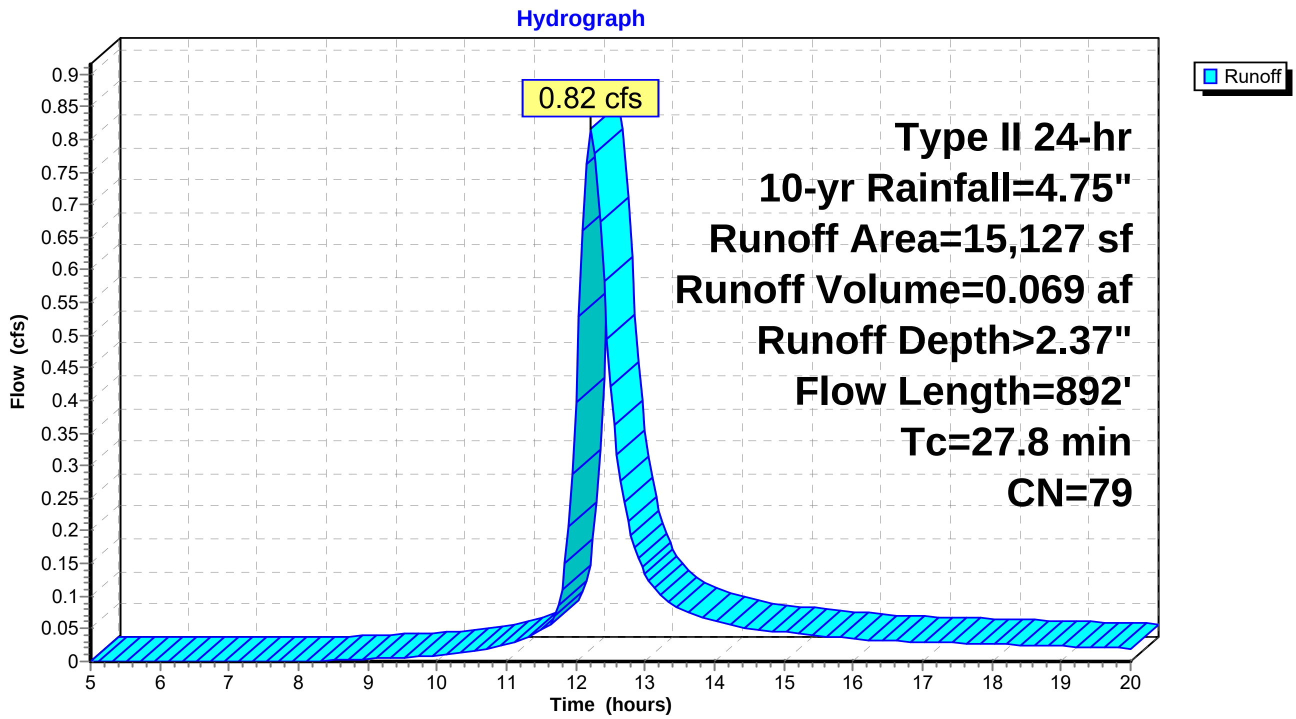
Runoff = 0.82 cfs @ 12.22 hrs, Volume= 0.069 af, Depth> 2.37"

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=4.75"

Area (sf)	CN	Description
4,580	79	Woods, Fair, HSG D
10,547	79	Woods, Fair, HSG D
15,127	79	Weighted Average
15,127		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.26"
10.9	564	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	117	0.0940	1.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	111	0.0630	2.04	0.82	**Channel Flow,** Area= 0.4 sf Perim= 2.8' r= 0.14' n= 0.050
27.8	892	Total			

Subcatchment DC EL-7: DC-EL-7



Summary for Reach CWC EL-5: CWC-EL-5

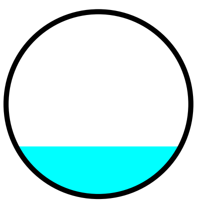
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.347 ac, 0.00% Impervious, Inflow Depth > 2.37" for 10-yr event
Inflow = 0.82 cfs @ 12.22 hrs, Volume= 0.069 af
Outflow = 0.81 cfs @ 12.23 hrs, Volume= 0.069 af, Atten= 1%, Lag= 0.6 min

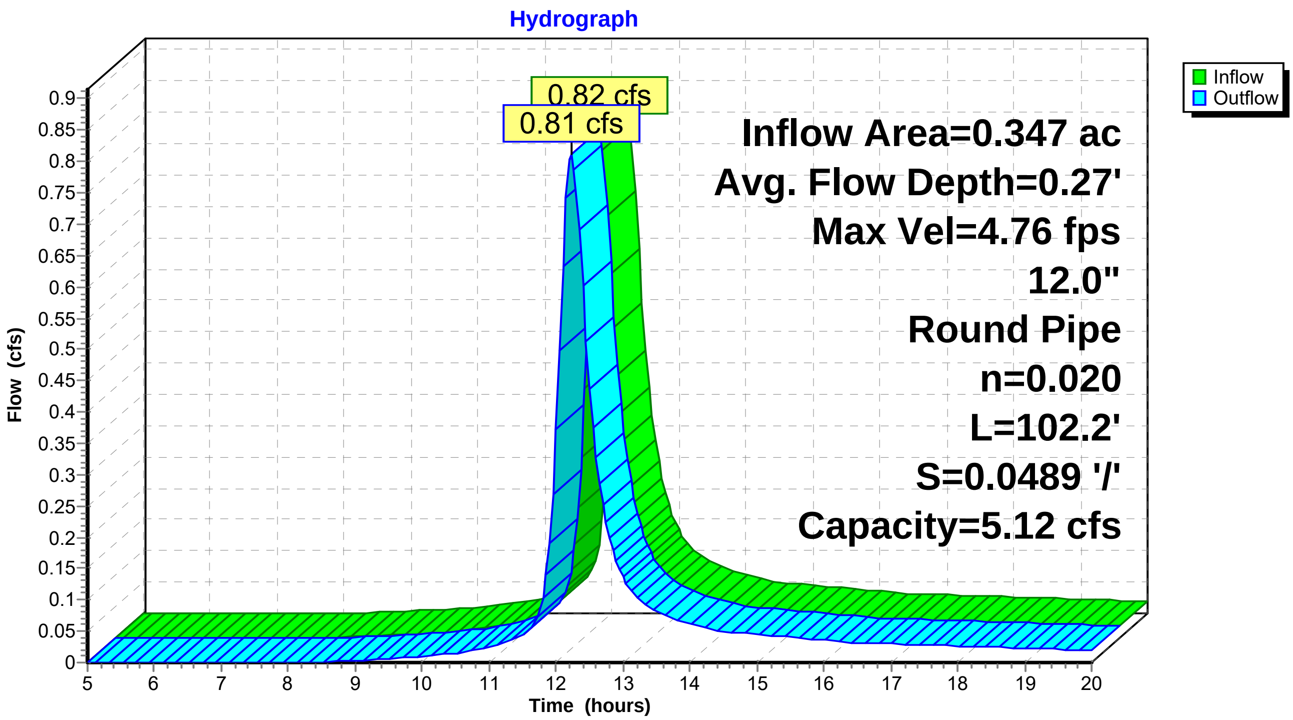
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.76 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 0.9 min

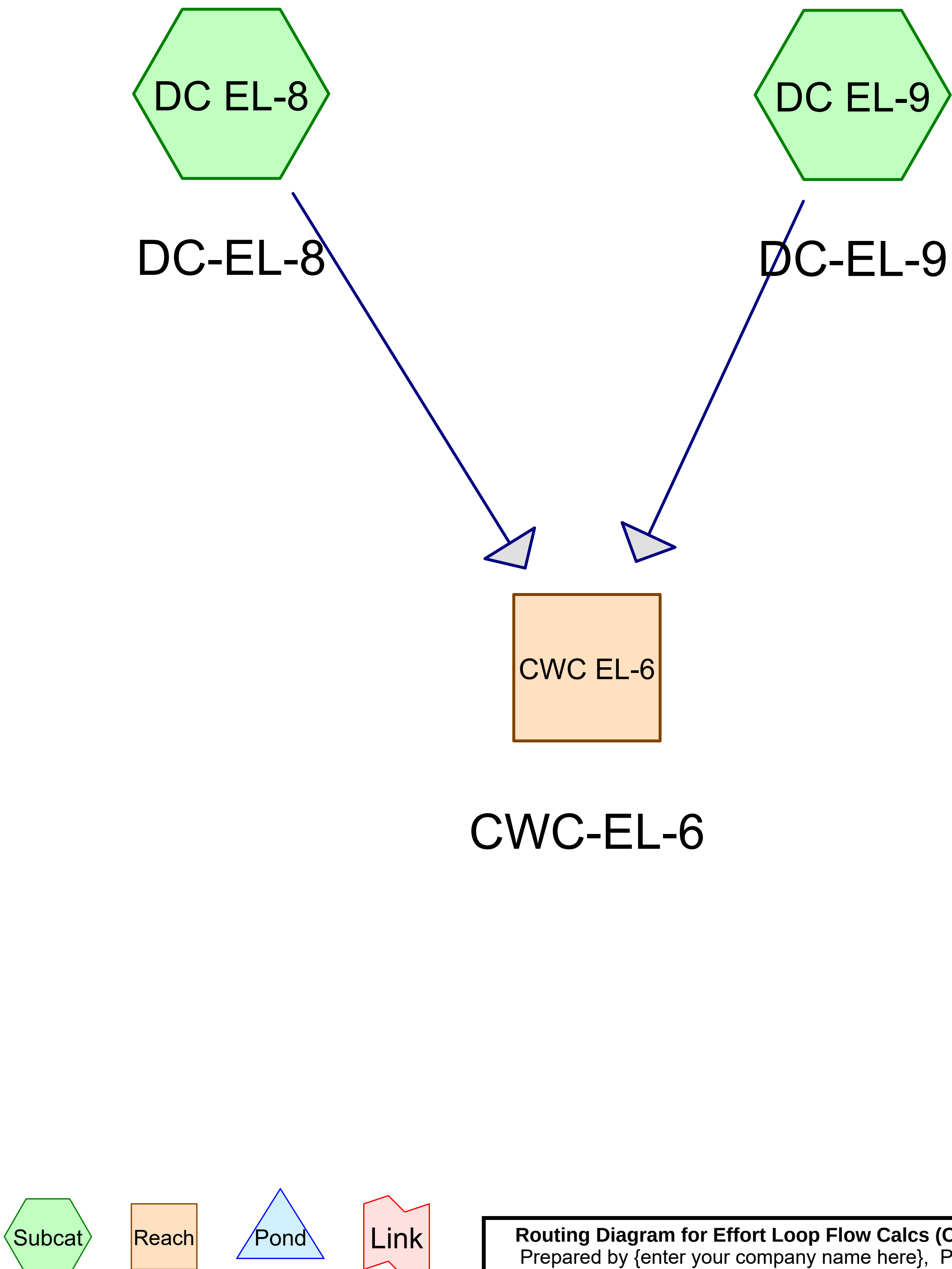
Peak Storage= 17 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.12 cfs

12.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 102.2' Slope= 0.0489 '/'
Inlet Invert= 1,041.00', Outlet Invert= 1,036.00'



Reach CWC EL-5: CWC-EL-5





Routing Diagram for Effort Loop Flow Calcs (CWC EL-6)-REV 2
Prepared by {enter your company name here}, Printed 3/3/2022
HydroCAD® 10.00-26 s/n 09710 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
15.948	36	Woods, Fair, HSG A (DC EL-8, DC EL-9)
17.057	79	Woods, Fair, HSG D (DC EL-8, DC EL-9)
33.005	**58**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
15.948	HSG A	DC EL-8, DC EL-9
0.000	HSG B	
0.000	HSG C	
17.057	HSG D	DC EL-8, DC EL-9
0.000	Other	
33.005		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
15.948	0.000	0.000	17.057	0.000	33.005	Woods, Fair	DC EL-8, DC EL-9
15.948	**0.000**	**0.000**	**17.057**	**0.000**	**33.005**	**TOTAL AREA**	

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	CWC EL-6	987.00	979.00	140.0	0.0571	0.020	18.0	0.0	0.0

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 DC EL-8: DC-EL-8 Runoff Area=690,551 sf 0.00% Impervious Runoff Depth>0.47"
Flow Length=1,657' Tc=33.9 min CN=63 Runoff=4.91 cfs 0.617 af

Subcatchment DC EL-9: DC-EL-9 Runoff Area=747,140 sf 0.00% Impervious Runoff Depth>0.19"
Flow Length=1,833' Tc=39.1 min CN=54 Runoff=1.13 cfs 0.273 af

Reach CWC EL-6: CWC-EL-6 Avg. Flow Depth=0.62' Max Vel=8.46 fps Inflow=5.83 cfs 0.890 af
18.0" Round Pipe n=0.020 L=140.0' S=0.0571 '/' Capacity=16.32 cfs Outflow=5.82 cfs 0.889 af

Total Runoff Area = 33.005 ac Runoff Volume = 0.890 af Average Runoff Depth = 0.32"
100.00% Pervious = 33.005 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DC EL-8: DC-EL-8

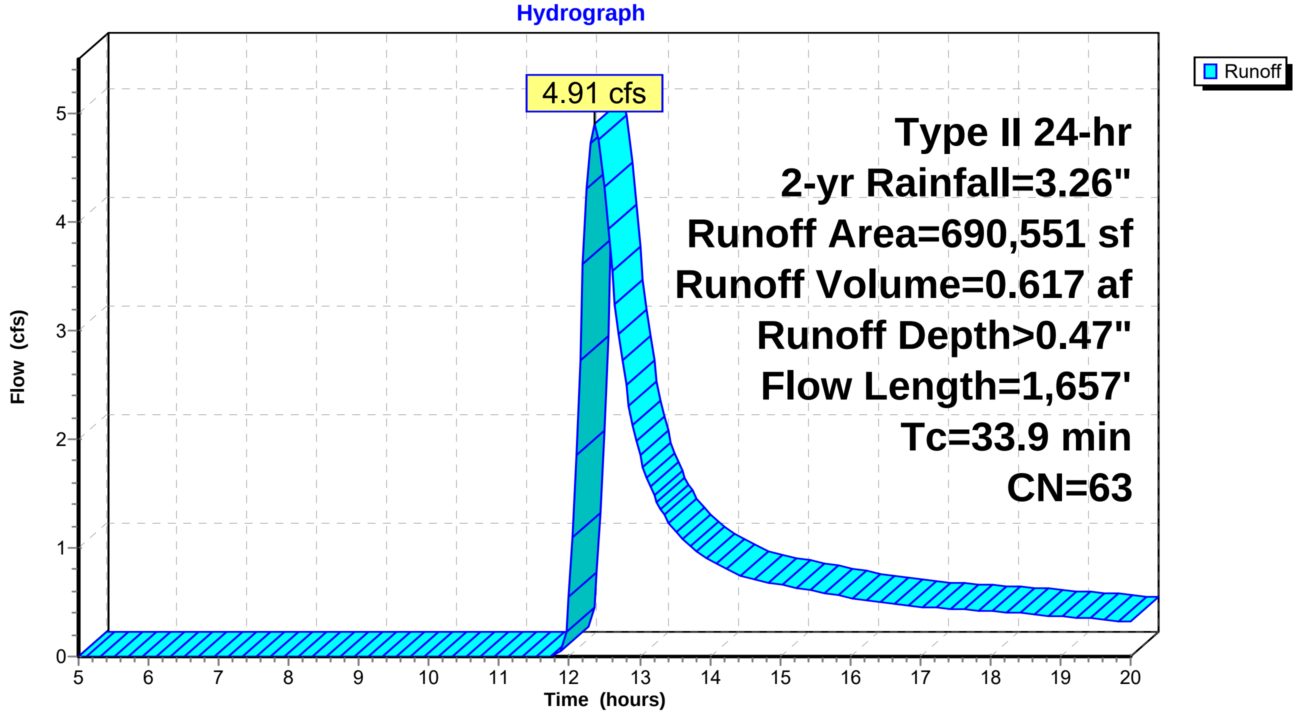
Runoff = 4.91 cfs @ 12.37 hrs, Volume= 0.617 af, Depth> 0.47"

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=3.26"

Area (sf)	CN	Description
201,226	79	Woods, Fair, HSG D
90,340	79	Woods, Fair, HSG D
143,520	79	Woods, Fair, HSG D
255,465	36	Woods, Fair, HSG A
690,551	63	Weighted Average
690,551		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0600	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.26"
6.4	458	0.0570	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.3	288	0.0830	1.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	782	0.0630	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	29	0.0670	3.58	4.65	**Channel Flow,** Area= 1.3 sf Perim= 4.1' r= 0.32' n= 0.050
33.9	1,657	Total			

Subcatchment DC EL-8: DC-EL-8



Summary for Subcatchment DC EL-9: DC-EL-9

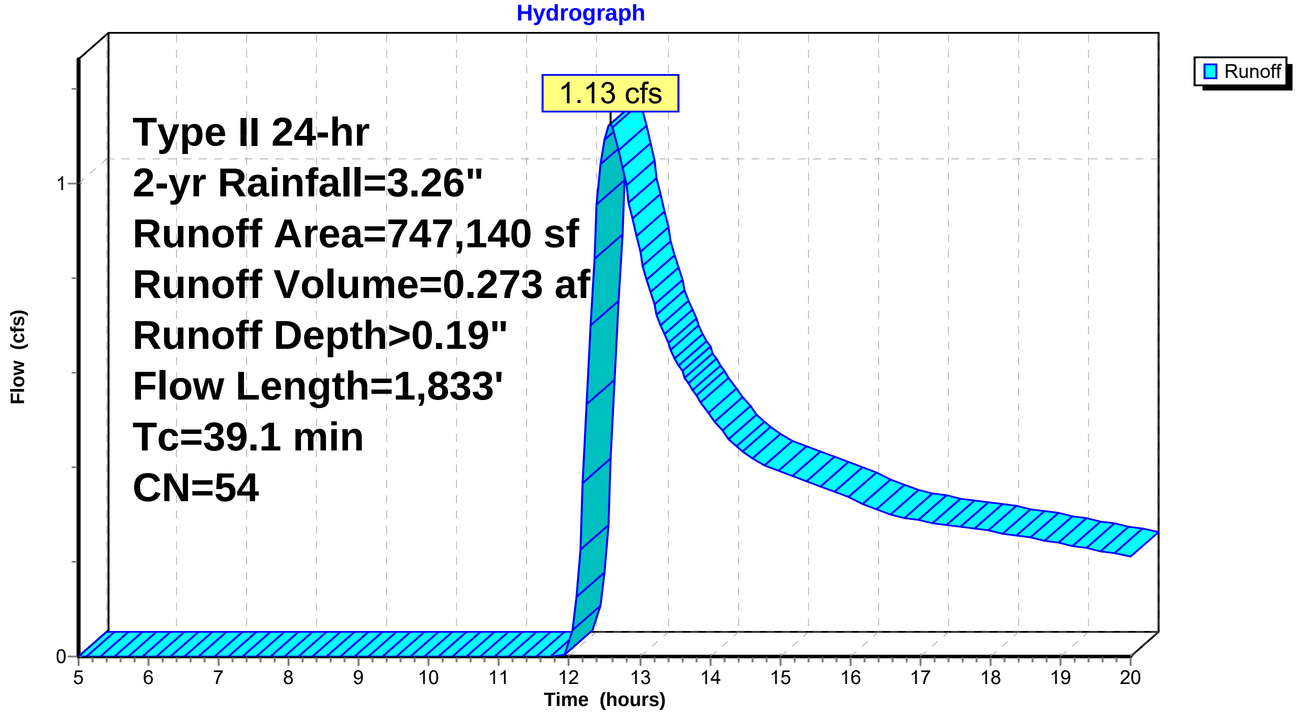
Runoff = 1.13 cfs @ 12.59 hrs, Volume= 0.273 af, Depth> 0.19"

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=3.26"

Area (sf)	CN	Description
49,963	79	Woods, Fair, HSG D
213,226	79	Woods, Fair, HSG D
44,736	79	Woods, Fair, HSG D
439,215	36	Woods, Fair, HSG A
747,140	54	Weighted Average
747,140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.26"
5.9	353	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	861	0.0840	1.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	241	0.1660	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	246	0.0770	1.39		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	32	0.0630	2.31	1.16	**Channel Flow,** Area= 0.5 sf Perim= 2.9' r= 0.17' n= 0.050
39.1	1,833	Total			

Subcatchment DC EL-9: DC-EL-9



Summary for Reach CWC EL-6: CWC-EL-6

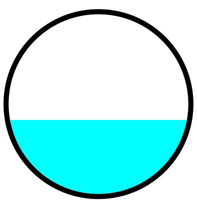
[52] Hint: Inlet/Outlet conditions not evaluated

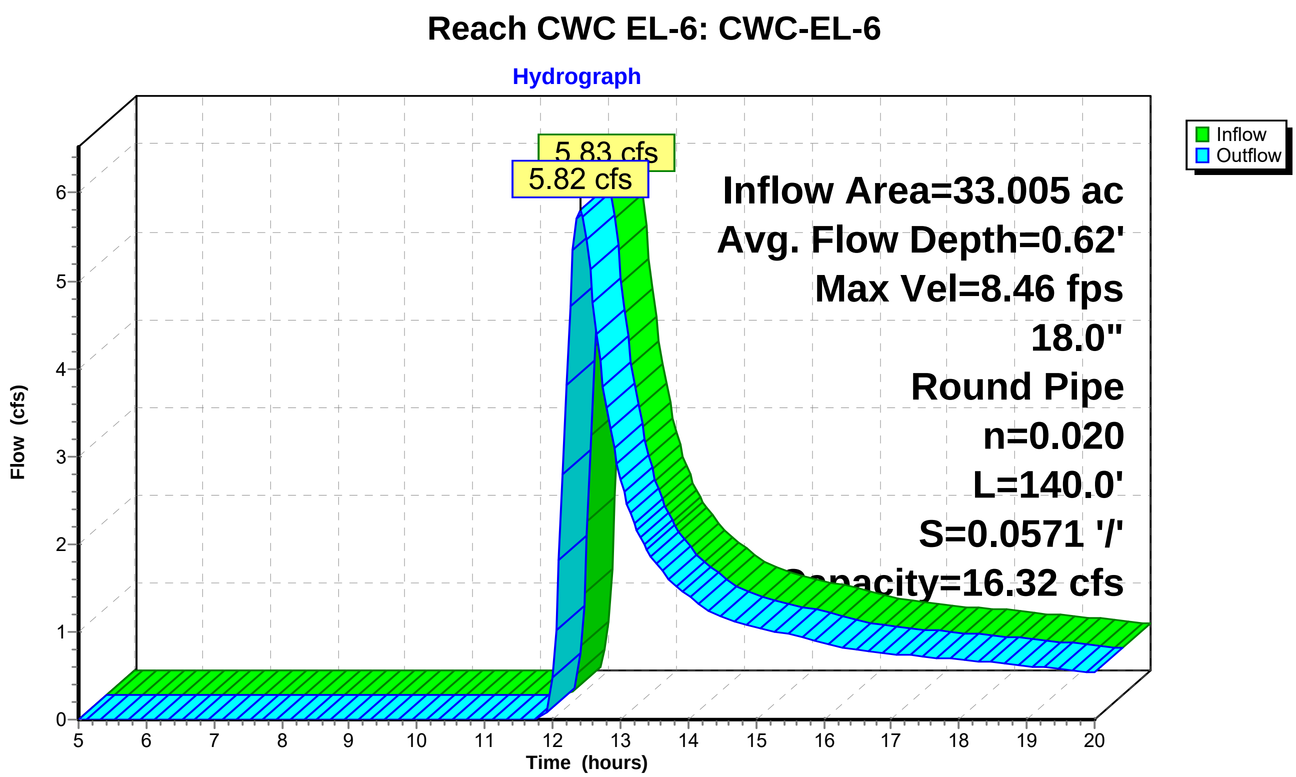
Inflow Area = 33.005 ac, 0.00% Impervious, Inflow Depth > 0.32" for 2-yr event
Inflow = 5.83 cfs @ 12.39 hrs, Volume= 0.890 af
Outflow = 5.82 cfs @ 12.40 hrs, Volume= 0.889 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.46 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.19 fps, Avg. Travel Time= 0.4 min

Peak Storage= 96 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.32 cfs

18.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 140.0' Slope= 0.0571 '/'
Inlet Invert= 987.00', Outlet Invert= 979.00'



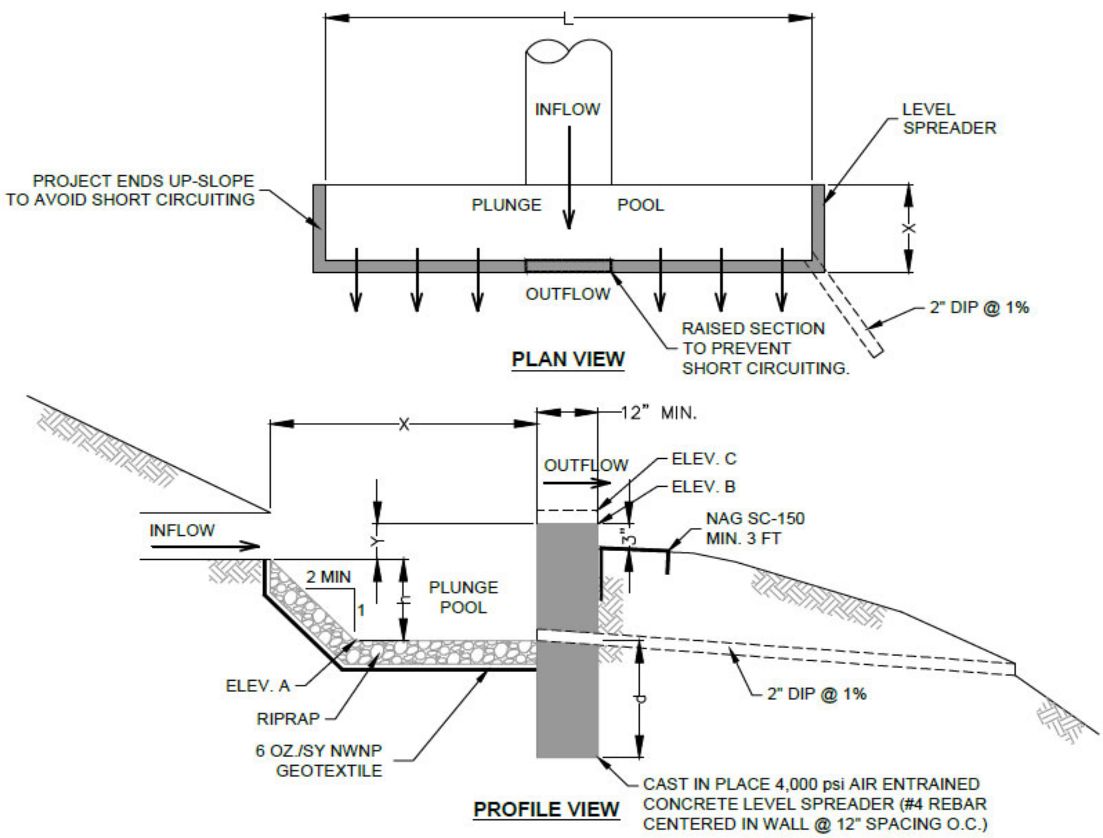


ATTACHMENT 3.4
LEVEL SPREADER DESIGN WORKSHEET

Williams REAE - Effort Loop

Level Spreader Design

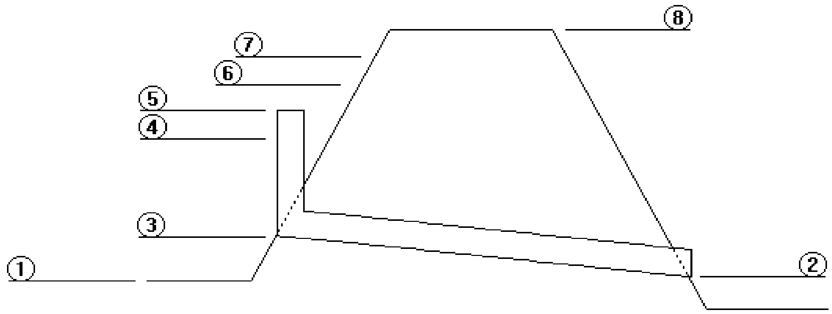
Level Spreader No.	Riprap	Dimension					Elev. A (ft)	Elev. B (ft)	Elev. C (ft)	Min Depth (ft)
	Size (R-__)	Rt	Y (ft)	H (ft)	X (ft)	L (ft)				
MLV-505LD86 (Sugar Hollow)										
1	R-1	3	0.5	1	3	26	990.5	992	992.25	1



ATTACHMENT 3.5
SEDIMENT TRAP WORKSHEET

STORM WATER MGMT & E&S CONTROL	By: JCR	Date: 2/28/2022
SEDIMENT TRAP 1	Ch: PW	Date: 2/28/2022

SEDIMENT TRAP DESIGN
TRAP DATA SHEET



(1) Elevation @ Floor of Basin .... 922.5 ft

(2) Elevation @ Barrel Outlet .... 918.0 ft

(3) Elevation @ Sediment Clean-Out Level .... 924.5 ft

(4) Elevation @ Top Row of Perforations .... 925.5 ft

(5) Elevation @ Riser Crests .... 926.5 ft

(6) Elevation @ Emergency Spillway Crest .... 927.0 ft

(7) Elevation @ Flow thru Spillway .... 927.0 ft

(8) Elevation @ Top of Dam .... 928.0 ft

DAM

INSIDE SLOPES: 3:1   OUTSIDE SLOPES: 3:1   TOP WIDTH: 5 ft

PRINCIPAL SPILLWAY

RISER DIAMETER 24"   BARREL DIAMETER: 18"   BARREL LENGTH: 50 ft

PERFORATION STYLE: _X_ ROUND ___ SQUARE

PERFORATIONS: 2 total - 1 at EL 924.5 and 925.5   PERFORATION DIAMETER: 1 in

EMERGENCY SPILLWAY

WEIR DEPTH: 1.0 ft   FLOW DEPTH: 0.0 ft   BOTTOM WIDTH: 25.0 ft

SIDE SLOPES: 3:1   TOP WIDTH: 31.0 ft   LINING: Grass

STORM WATER MGMT & E&S CONTROL	By: JCR	Date: 2/28/2022
SEDIMENT TRAP 1	Ch: PW	Date: 2/28/2022

SEDIMENT TRAP DESIGN
REQUIRED STORAGE VOLUMES

Sediment Trap 1 is designed for approximately 4.4 acres upgradient.
Trap Capacity at Top of Sedimentation Zone Elevation (924.5 ft): 4,854 cf
Trap Capacity at Top of Dewatering Zone Elevation (926.5 ft): 12,437 cf
Required Sediment Storage Capacity: 4.4 ac x 700 cf/ac = 3,080 cf
Drainage Area able to be handled by Dewatering Zone: (12,437 - 4,854) / 1,300 cf/ac = 5.8 ac.

Distrubed Drainage Area able to be handled by Sediment Storage Zone: 4,854 / 700 cf/ac = 6.9 ac.

Therefore, Sediment Trap 1 has capacity to control 5.8 acres of drianage area, all which may be disturbed.

SEDIMENT TRAP DESIGN
EMERGENCY SPILLWAY ANALYSIS

From BASIN DATA SHEET:

Elev @ Em Spwy Crest, EL6	=	927.0 ft
Elev @ Flow thru Spwy, EL7	=	927.0 ft
Elev @ Top of Dam, EL8	=	928.0 ft
Weir Bottom Width, B	=	25.0 ft

Find head on broad-crested weir, H:

H = (EL7) - (EL6) = (927.0 ft) - (927.0 ft)
H = 0.0 ft

Check freeboard, FB. Freeboard must be at least one foot:

FB = (EL8) - (EL7) = (928.0 ft) - (927.0 ft)
FB = 1.0 ft OKAY

From STAGE-DISCHARGE DATA table, the pr spwy has a capacity of 6.96 cfs when flow thru em spwy is 927.0 ft.
The required pr spwy must be capable of safely conveying 1.5 cfs/acre.

Thus, the required flow thru the pr spwy is:

Q = (1.5 cfs/acre) (4.4 acres)
Q = 6.6 cfs < 6.96 cfs OKAY

REGIONAL ENERGY ACCESS EXPANSION PROJECT
SUGAR HOLLOW

STORM WATER MGMT & E&S CONTROL	By: JCR	Date: 2/28/2022
SEDIMENT TRAP 1	Ch: PW	Date: 2/28/2022

SEDIMENT TRAP DESIGN
STAGE-STORAGE DATA

STAGE (ft/MSL)	AREA (sq ft)	AVERAGE AREA (sq ft)	DELTA STAGE (ft)	STORAGE VOLUME DELTA VOLUME (cu ft)	STORAGE VOLUME DELTA VOLUME (ac.ft)	STORAGE VOLUME TOTAL VOLUME (cu ft)	STORAGE VOLUME TOTAL VOLUME (ac.ft)
922.5	2,016.0					0	0.00000
		2,222	1.0	2,222	0.05100		
923.5	2,427.0					2,222	0.05100
		2,633	1.0	2,633	0.06043		
924.5	2,838.0					4,854	0.11143
		3,311	1.0	3,311	0.07601		
925.5	3,784.0					8,165	0.18744
		4,022	0.5	2,011	0.04617		
926	4,260.0					10,176	0.23361
		4,522	0.5	2,261	0.05190		
926.5	4,783.0					12,437	0.28551
		5,045	0.5	2,522	0.05790		
927	5,306.0					14,959	0.34341
		5,829	1.0	5,829	0.13382		
928	6,352.0					20,788	0.47723

REGIONAL ENERGY ACCESS EXPANSION PROJECT
SUGAR HOLLOW

STORM WATER MGMT & E&S CONTROL	By:	JCR	Date:	2/28/2022
SEDIMENT TRAP 1	Ch:	PW	Date:	2/28/2022

SEDIMENT TRAP DESIGN
STAGE-DISCHARGE DATA

Centerline Elev. of Barrel O/Let:	918		Holes/Row:	1	
Length of Barrel:	50	feet	Diameter/Hole:	1	inches
Inside Diameter of Barrel:	18	inches	Riser Diameter:	24	inches
Manning's 'n' of Barrel	0.012	*	Top of Riser:	926.5	

	PERFORATIONS ORIFICE FLOW		RISER ORIFICE/WEIR FLOW			BARREL PIPE FLOW		TOTAL DISCHARGE
STAGE (ft/MSL)	HEAD (ft)	Q (cfs)	HEAD (ft)	Q (cfs)		HEAD (ft)	Q (cfs)	Q (cfs)
924.50	0.0	0.00	- - -	- - -		6.50	23.1	0.00
925.50	1.0	0.03	- - -	- - -		7.50	24.8	0.03
926.50	2.0	0.06	0.00	0.00	W	8.50	26.4	0.06
927.00	2.5	0.07	0.50	6.89	W	9.00	27.2	6.96
928.00	3.5	0.09	1.50	18.53	O	10.00	28.7	18.62

W: Riser under weir flow control
O: Riser under orifice flow control

REGIONAL ENERGY ACCESS EXPANSION PROJECT

SUGAR HOLLOW

STORM WATER MGMT & E&S CONTROL	By: JCR	Date: 2/28/2022
SEDIMENTATION BASIN 1	Ch: PW	Date: 2/28/2022

SEDIMENTATION BASIN DESIGN

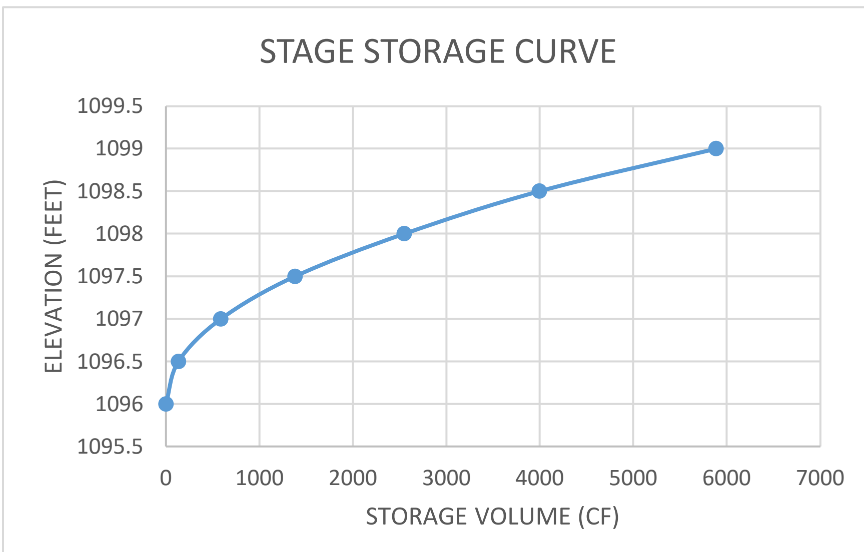
DEWATERING TIME

STAGE (ft/MSL)	VOLUME STORED (cu ft)	DELTA VOLUME (cu ft)	DISCHARGE Q (cfs)	AVERAGE DISCHGE (cfs)	DELTA TIME (hr)	TOTAL TIME (hr)	TOTAL TIME (days)
926.50	12,437		0.063			0.00	0.000
		4,272		0.045	26.468		
925.50	8,165		0.026			26.47	1.103
		3,311		0.013	70.043		
924.50	4,854		0.000			96.51	4.021

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #1
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1096	0	0	0
1096.5	531.02	132.76	132.76
1097	1173.50	454.00	586.75
1097.5	1841.37	794.28	1381.03
1098	2548.09	1167.06	2548.09
1098.5	3195.77	1446.62	3994.71
1099	3923.55	1890.61	5885.33

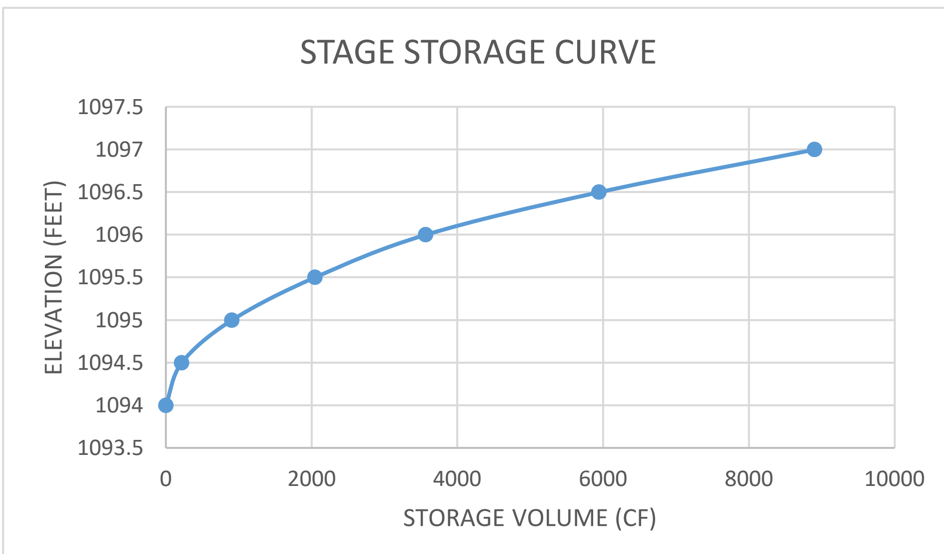


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
59944.44	1.38	2752.65

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #2
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1094	0	0	0
1094.5	867.50	216.88	216.88
1095	1809.52	687.89	904.76
1095.5	2724.62	1138.71	2043.47
1096	3562.01	1518.55	3562.01
1096.5	4753.62	2380.02	5942.03
1097	5932.80	2957.18	8899.20

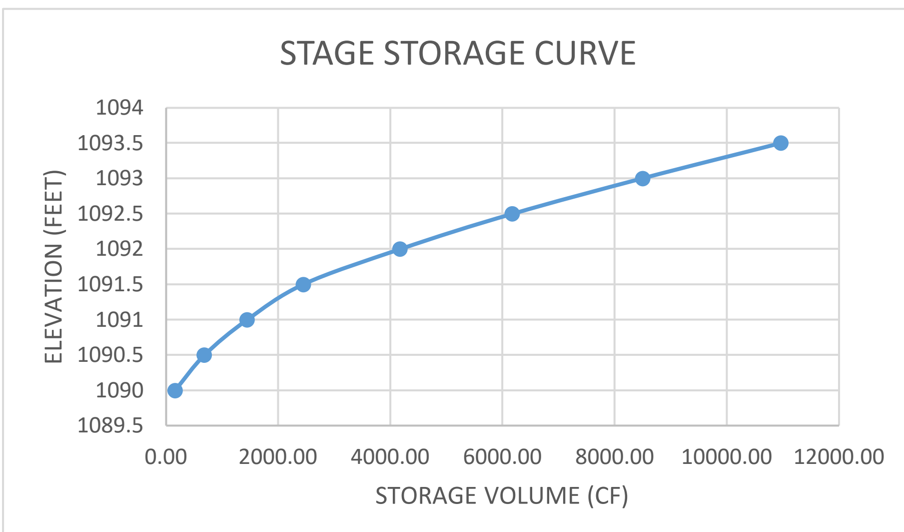


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
127145.53	2.92	5838.52

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #3
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1090	0	0	0
1090.5	658.29	164.57	164.57
1091	1371.47	521.16	685.74
1091.5	1929.37	761.29	1447.03
1092	2450.53	1003.50	2450.53
1092.5	3340.72	1725.37	4175.90
1093	4117.97	2001.06	6176.96
1093.5	4857.15	2323.06	8500.01
1094	5481.79	2463.57	10963.58

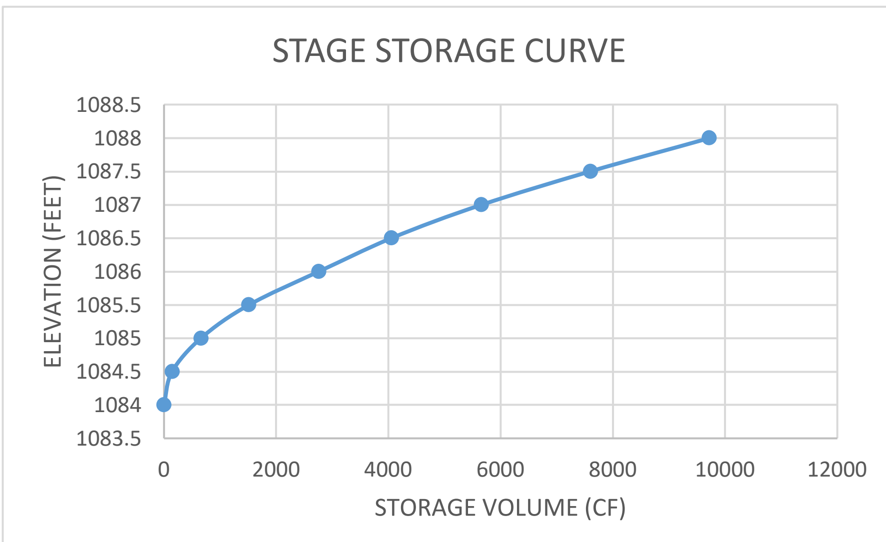


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
152390.39	3.50	6997.77

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAMI REAE- Effort Loop
LOCATION: CY- Sediment Trap #4
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1084	0	0	0
1084.5	583.02	145.76	145.76
1085	1316.66	512.58	658.33
1085.5	2013.30	851.65	1509.98
1086	2759.43	1249.46	2759.43
1086.5	3242.03	1293.11	4052.54
1087	3770.75	1603.59	5656.13
1087.5	4342.49	1943.23	7599.36
1088	4859.56	2119.76	9719.12

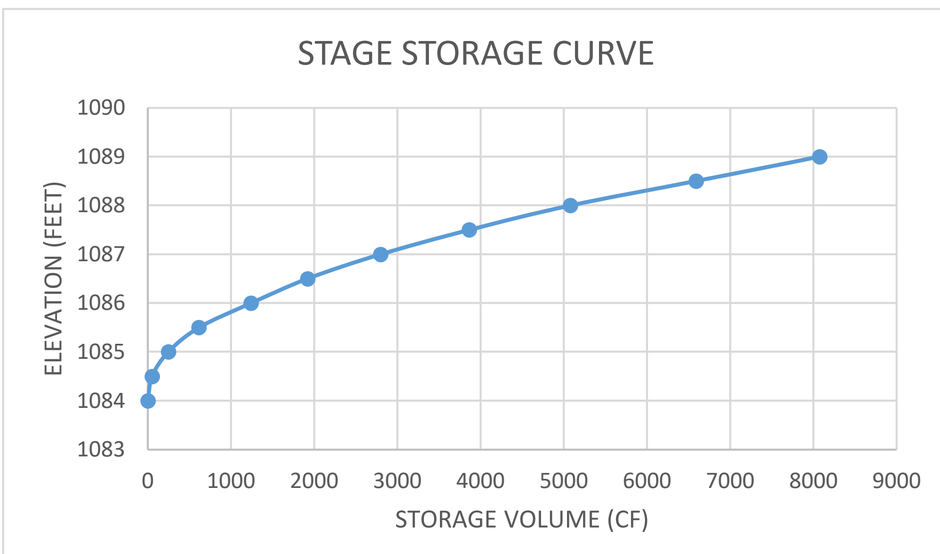


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
149853.42	3.44	6881.27

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #5
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1084	0	0	0
1084.5	203.16	50.79	50.79
1085	491.47	194.95	245.74
1085.5	817.41	367.32	613.06
1086	1238.74	625.68	1238.74
1086.5	1535.84	681.06	1919.80
1087	1865.74	878.81	2798.61
1087.5	2208.20	1065.74	3864.35
1088	2537.98	1211.61	5075.96
1088.5	2928.78	1513.80	6589.76
1089	3230.07	1485.42	8075.18

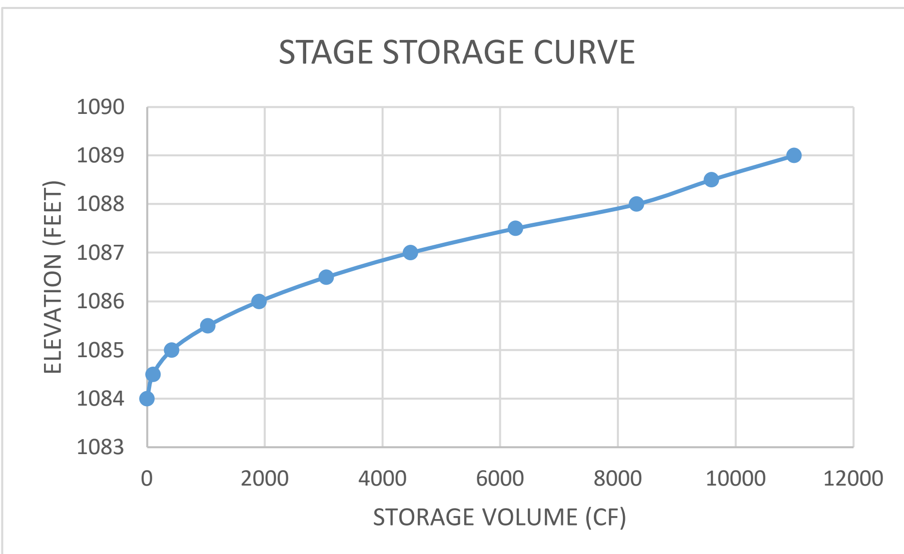


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
141263.55	3.24	6486.82

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #6
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1084	0	0	0
1084.5	403.35	100.84	100.84
1085	832.49	315.41	416.25
1085.5	1377.34	616.76	1033.01
1086	1905.14	872.14	1905.14
1086.5	2437.18	1141.34	3046.48
1087	2983.11	1428.19	4474.67
1087.5	3576.83	1784.79	6259.45
1088	4158.78	2058.11	8317.56
1088.5	4262.20	1272.39	9589.95
1089	4397.24	1403.15	10993.10

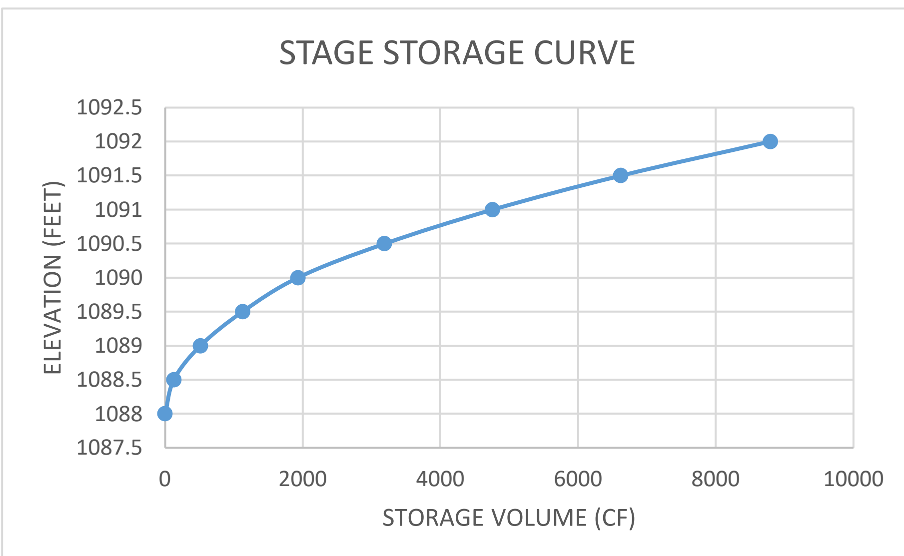


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
191014.33	4.39	8771.38

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #7
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1088	0	0	0
1088.5	506.94	126.74	126.74
1089	1026.53	386.53	513.27
1089.5	1500.13	611.83	1125.10
1090	1931.05	805.95	1931.05
1090.5	2549.26	1255.53	3186.58
1091	3171.55	1570.75	4757.33
1091.5	3782.38	1861.84	6619.17
1092	4396.11	2173.06	8792.22

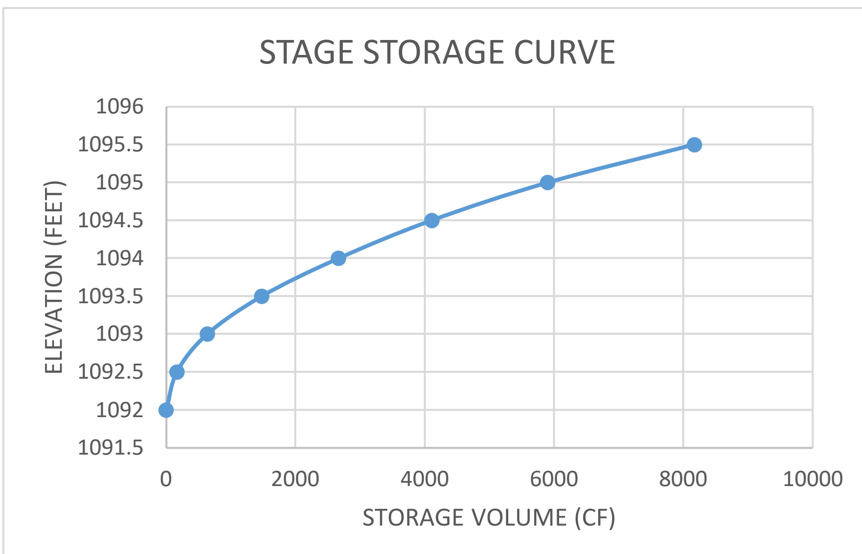


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
128337.23	2.95	5893.25

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #8
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1092	0	0	0
1092.5	661.85	165.46	165.46
1093	1273.33	471.20	636.67
1093.5	1974.48	844.20	1480.86
1094	2667.61	1186.75	2667.61
1094.5	3287.27	1441.48	4109.09
1095	3934.31	1792.38	5901.47
1095.5	4668.66	2268.69	8170.16

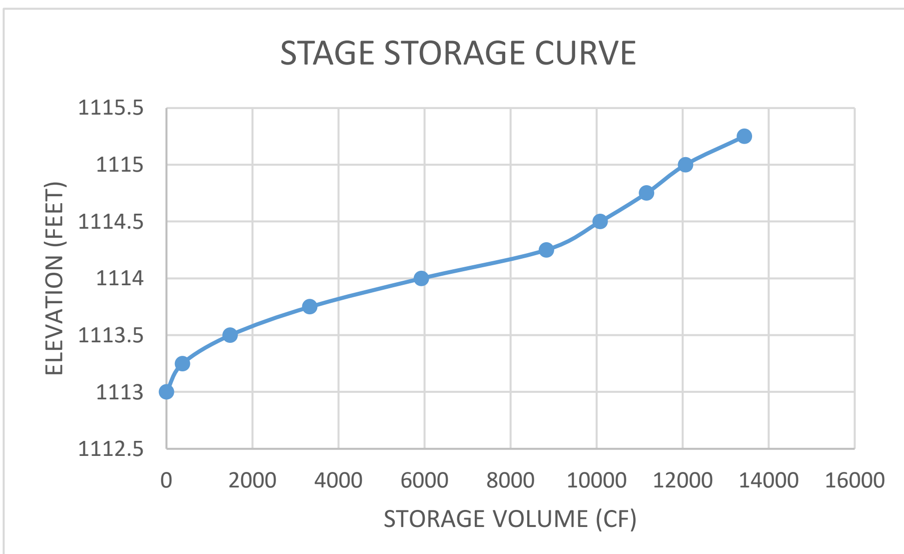


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
108541.62	2.49	4984.23

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #9
PREPARED BY: CJE DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1113	0	0	0
1113.25	2963.50	370.44	370.44
1113.5	5927.00	1111.31	1481.75
1113.75	8890.50	1852.19	3333.94
1114	11854	2593.06	5927.00
1114.25	14129.5	2903.94	8830.94
1114.5	13441.5	1250.19	10081.13
1114.75	12753.5	1078.19	11159.31
1115	12065.5	906.19	12065.50
1115.25	11946.375	1374.17	13439.67

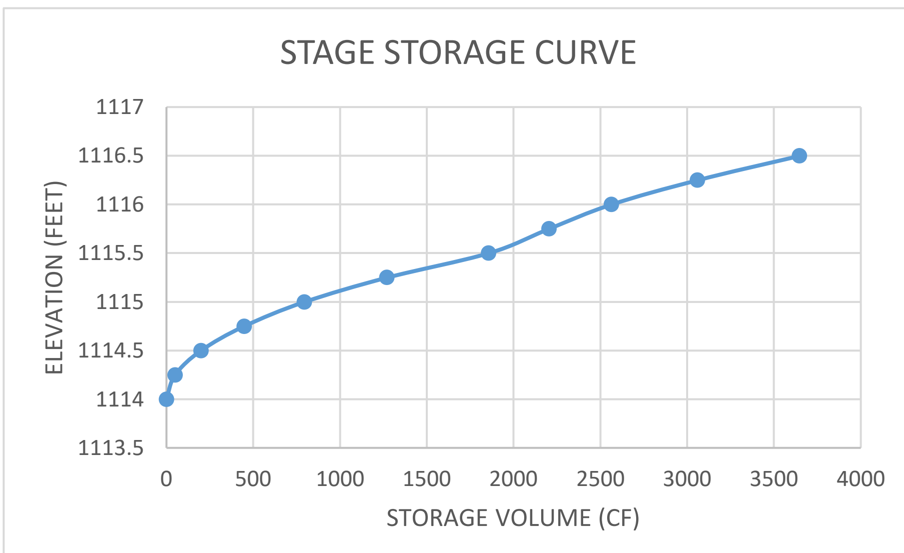


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
158122.80	3.63	7260.00

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #10
PREPARED BY: CJE DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1114	0	0	0
1114.25	397.40	49.68	49.68
1114.5	794.80	149.03	198.70
1114.75	1192.20	248.38	447.08
1115	1589.6	347.73	794.80
1115.25	2031.73	475.03	1269.83
1115.5	2473.86	585.56	1855.40
1115.75	2518.59	348.37	2203.77
1116	2563.32	359.55	2563.32
1116.25	2718.5825	495.09	3058.41
1116.5	2917.2825	588.20	3646.60

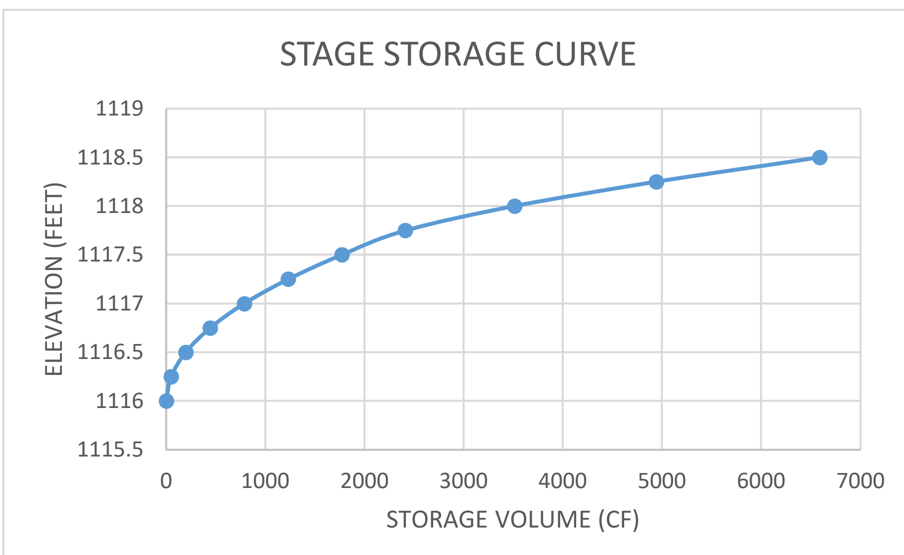


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
59241.60	1.36	2720.00

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Effort Loop
LOCATION: CY- Sediment Trap #11
PREPARED BY: CJE DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
1116	0	0	0
1116.25	393.50	49.19	49.19
1116.5	787.00	147.56	196.75
1116.75	1180.50	245.94	442.69
1117	1574	344.31	787.00
1117.25	1967.5	442.69	1229.69
1117.5	2361	541.06	1770.75
1117.75	2754.5	639.44	2410.19
1118	3514	1103.81	3514.00
1118.25	4392.5	1427.56	4941.56
1118.5	5271.00	1647.19	6588.75

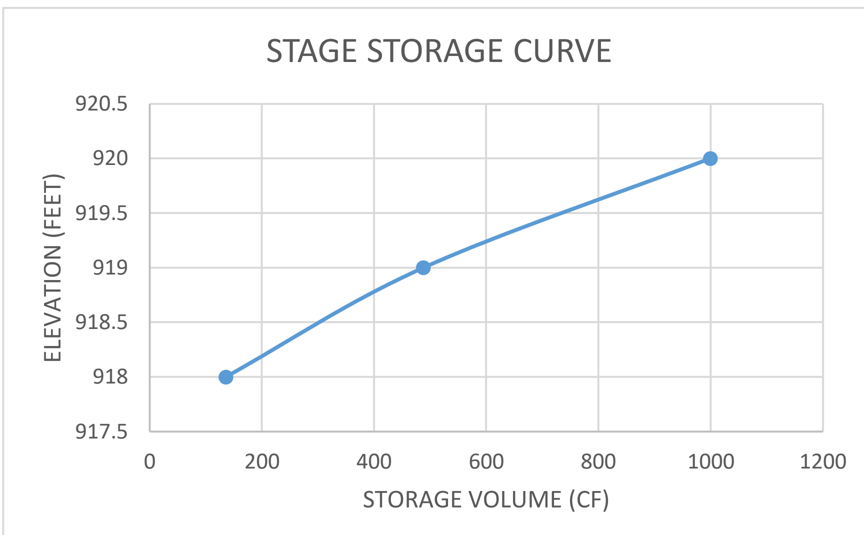


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
54450.00	1.25	2500.00

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Sugar Hollow
LOCATION: CFS Sediment Trap #12
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
918	0	0	0
919	272.00	136.00	136.00
920	432.00	352.00	488.00
921	592.00	512.00	1000.00

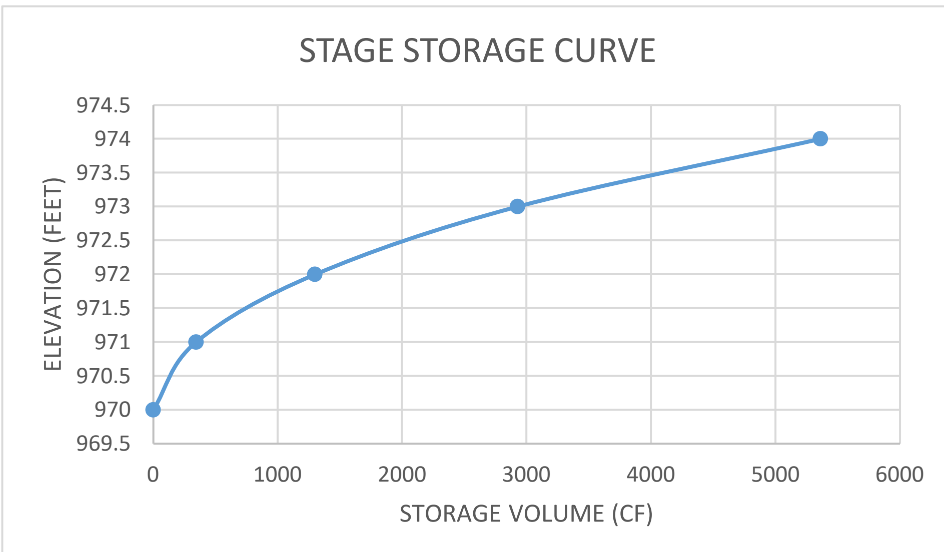


Area (sq ft)	Area (ac)	Required Volume Capacity (2,000 CF/AC)
10,018.80	0.23	460.00

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: REAE- Sugar Hollow
LOCATION: CFS Sediment Trap #13
PREPARED BY: JB DATE: 3/2021
CHECKED BY: KCC DATE: 3/2021

Water Surface Elevation ft	Total Area sq ft	Incremental Storage Volume cubic ft	Total Storage Volume cubic ft
970	0	0	0
971	690.00	345.00	345.00
972	1220.00	955.00	1300.00
973	2035.00	1627.50	2927.50
974	2832.00	2433.50	5361.00



Area (sq ft)	**Area (ac)**	**Required Volume Capacity (2,000 CF/AC)**
63597.60	1.46	2920.00

ATTACHMENT 3.6

CHANNEL DESIGN WORKSHEET –
MLV-505LD86

STANDARD E&S WORKSHEET # 9
Time of Concentration

PROJECT NAME: Williams REAE – MLV-505LD86
LOCATION: Monroe County, PA
PREPARED BY: CD DATE: 02/27/2022
CHECKED BY: PW DATE: 02/27/2022

TIME OF CONCENTRATION:

PATH NUMBER	Tc (min)	METHOD
SH - DC - 001	5	Direct
SH - CC - 002	5	Direct
SH - CC - 003	5	Direct
SH - CC - 004	5	Direct
SH - CC - 005	5	Direct
SH - CC - 006	5	Direct
SH - CC - 007	5	Direct
SH - CC - 008	5	Direct
SH - CC - 009	5	Direct
SH - CC - 010	5	Direct

$$T_{c\,(sheet\ flow)} = \left[\frac{2 \cdot (n)}{3 \cdot {}^{0.5}}\right]^{0.4673}$$

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)

CHANNEL DIMENSIONS:

PATH NUMBER	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
SH - DC - 001	2	2	2	1	6
SH - CC - 002	2	2	2	0.75	5
SH - CC - 003	2	2	2	1	6
SH - CC - 004	4	2	2	0.75	7
SH - CC - 005	2	2	2	1	6
SH - CC - 006	3	2	2	1	7
SH - CC - 007	1	2	2	1	5
SH - CC - 008	2	2	2	1	6
SH - CC - 009	1	2	2	0.75	4
SH - CC - 010	1	2	2	0.75	4

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Williams REAE – MLV-505LD86
LOCATION: Monroe County, PA
PREPARED BY: CD DATE: 02/21/2022
CHECKED BY: PW DATE: 02/21/2022

CHANNEL OR CHANNEL SECTION		SH-DC-001			
TEMPORARY OR PERMANENT?	(T OR P)	T	P		
DESIGN STORM	(2, 5, OR 10 YR)	10	10		
ACRES	(AC)	3.68	3.68		
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A		
Q_r (REQUIRED CAPACITY)	(CFS)	0.11	0.11		
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	0.34	0.22		
PROTECTIVE LINING[2]		SC150BN	ECM w/ VEG.		
n (MANNING'S COEFFICIENT)[2]		0.050	0.080		
V_a (ALLOWABLE VELOCITY)	(FPS)	8.0	15.0		
V (CALCULATED AT FLOW DEPTH d)	(FPS)	0.9	0.6		
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)	0.1	0.1		
CHANNEL BOTTOM WIDTH	(FT)	1	1		
CHANNEL SIDE SLOPES	(H:V)	2	2		
D (TOTAL DEPTH)	(FT)	0.75	0.75		
CHANNEL TOP WIDTH @ D	(FT)	4	4		
d (CALCULATED FLOW DEPTH)	(FT)	0.25	0.25		
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	2	2		
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	4.0	4.0		
d_{50} STONE SIZE	(IN)	-	-		
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.375	0.375		
R (HYDRAULIC RADIUS)	(FT)	0.177	0.177		
S (BED SLOPE)[3]	(FT/FT)	0.010	0.010		
S_c (CRITICAL SLOPE)	(FT/FT)	0.069	0.176		
$.7S_c$	(FT/FT)	0.048	0.123		
$1.3S_c$	(FT/FT)	0.089	0.228		
STABLE FLOW?	(Y/N)	Y	Y		
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	-		
FREEBOARD BASED ON STABLE FLOW	(FT)	0.5	0.5		
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.

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Williams REAE – MLV-505LD86
LOCATION: Monroe County, PA
PREPARED BY: BM DATE: 02/21/2022
CHECKED BY: PW DATE: 02/21/2022

CHANNEL OR CHANNEL SECTION		SH-CC-002		SH-CC-003	
TEMPORARY OR PERMANENT?	(T OR P)	T	P	T	P
DESIGN STORM	(2, 5, OR 10 YR)	10	10	10	10
ACRES	(AC)	0.09	0.09	0.57	0.57
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	0.42	0.42	1.58	1.58
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	0.77	0.64	2.08	1.65
PROTECTIVE LINING[2]		SC150BN	ECM w/ veg.	SC150BN	ECM w/ veg.
n (MANNING'S COEFFICIENT)[2]		0.050	0.055	0.050	0.063
V_a (ALLOWABLE VELOCITY)	(FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	1.7	1.5	2.4	1.9
T_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	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	0.8	0.8
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2
D (TOTAL DEPTH)	(FT)	0.75	0.75	1.0	1.0
CHANNEL TOP WIDTH @ D	(FT)	5	5	6	6
d (CALCULATED FLOW DEPTH)	(FT)	0.19	0.18	0.33	0.33
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	2.76	2.72	4.64	4.64
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	10.53	11.11	25.00	25.00
d_{50} STONE SIZE	(IN)	-	-	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.452	0.425	0.878	0.878
R (HYDRAULIC RADIUS)	(FT)	0.159	0.151	0.253	0.253
S (BED SLOPE)[3]	(FT/FT)	0.038	0.038	0.040	0.040
S_c (CRITICAL SLOPE)	(FT/FT)	0.069	0.085	0.060	0.097
$.7S_c$	(FT/FT)	0.049	0.060	0.042	0.068
$1.3S_c$	(FT/FT)	0.090	0.111	0.078	0.126
STABLE FLOW?	(Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW	(FT)	0.56	0.57	0.67	0.67
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 OR CHANNEL SECTION		SH-CC-004		SH-CC-005	
TEMPORARY OR PERMANENT?	(T OR P)	T	P	T	P
DESIGN STORM	(2, 5, OR 10 YR)	10	10	10	10
ACRES	(AC)	0.62	0.62	1.46	1.46
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	1.78	1.78	3.82	3.82
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	1.89	1.89	4.03	3.99
PROTECTIVE LINING[2]		SC150BN	ECM w/ veg.	SC150BN	ECM w/ veg.
n (MANNING'S COEFFICIENT)[2]		0.050	0.050	0.050	0.045
V_a (ALLOWABLE VELOCITY)	(FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.7	2.7	3.6	3.8
T_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.1	8.0	2.1	8.0
T_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	1.1	1.1	1.7	1.6
CHANNEL BOTTOM WIDTH	(FT)	4	4	3	3
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2
D (TOTAL DEPTH)	(FT)	0.75	0.75	1.0	1.0
CHANNEL TOP WIDTH @ D	(FT)	7	7	7	7
d (CALCULATED FLOW DEPTH)	(FT)	0.16	0.16	0.31	0.29
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	4.64	4.64	4.24	4.16
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	25.0	25.0	9.68	10.34
d_{50} STONE SIZE	(IN)	-	-	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.691	0.691	1.122	1.038
R (HYDRAULIC RADIUS)	(FT)	0.147	0.147	0.256	0.242
S (BED SLOPE)[3]	(FT/FT)	0.110	0.110	0.090	0.090
S_c (CRITICAL SLOPE)	(FT/FT)	0.070	0.070	0.059	0.049
$.7S_c$	(FT/FT)	0.049	0.049	0.042	0.034
$1.3S_c$	(FT/FT)	0.091	0.091	0.077	0.064
STABLE FLOW?	(Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW	(FT)	0.59	0.59	0.69	0.71
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

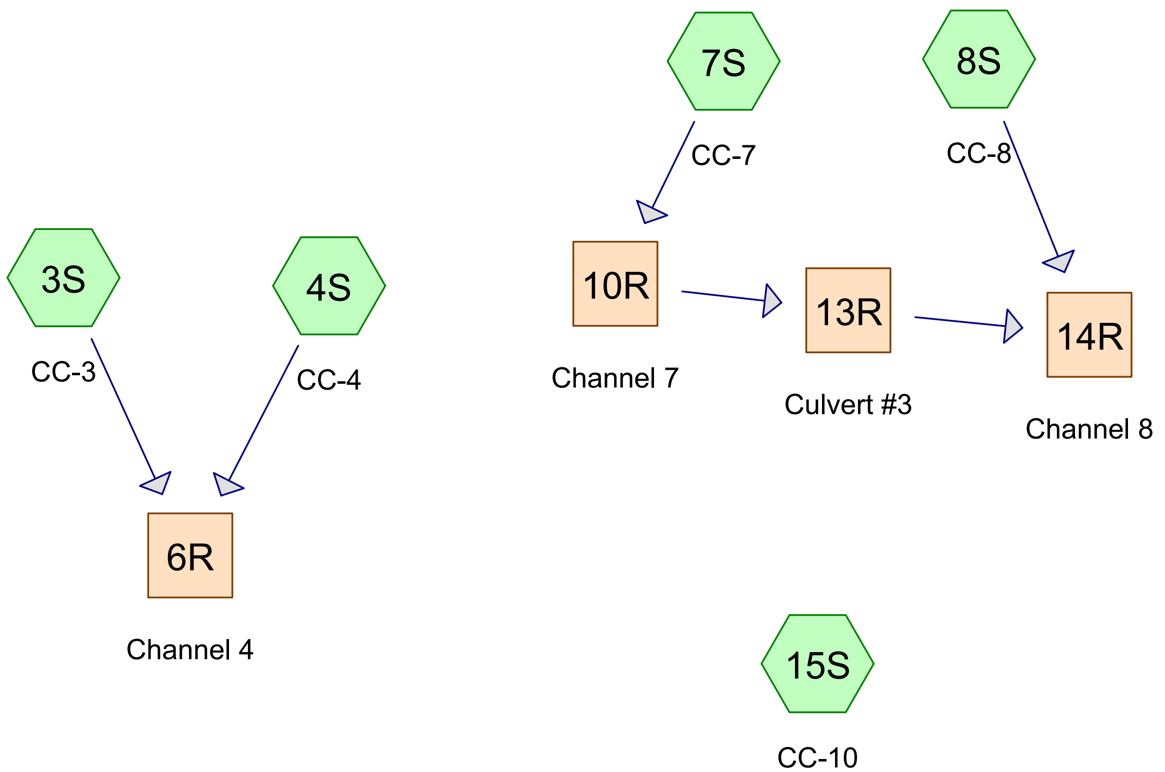
1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel 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.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.

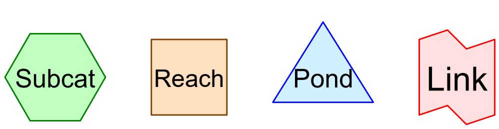
CHANNEL OR CHANNEL SECTION		SH-CC-006	SH-CC-007	SH-CC-008	
TEMPORARY OR PERMANENT?	(T OR P)	P	P	T	P
DESIGN STORM	(2, 5, OR 10 YR)	10	10	10	10
ACRES	(AC)	1.81	1.93	1.98	1.98
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	4.12	5.06	4.60	4.60
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	4.2	6.3	5.58	5.10
PROTECTIVE LINING[2]		R-4 Riprap	R-4 Riprap	SC150BN	ECM w veg.
n (MANNING'S COEFFICIENT)[2]		0.070	0.64	0.050	0.045
V_a (ALLOWABLE VELOCITY)	(FPS)	9.0	9.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	3.5	4.2	3.7	3.9
T_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.1	8.0
T_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.0	1.1	2.0	1.8
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.0	1.0	1.0	1.0
CHANNEL TOP WIDTH @ D	(FT)	6	6	6	6
d (CALCULATED FLOW DEPTH)	(FT)	0.42	0.50	0.50	0.45
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	3.68	4.00	4.00	3.80
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	4.76	4.00	4.00	4.44
d_{50} STONE SIZE	(IN)	6	6	-	-
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.193	1.500	1.500	1.305
R (HYDRAULIC RADIUS)	(FT)	0.308	0.354	0.354	0.325
S (BED SLOPE)[3]	(FT/FT)	0.130	0.130	0.063	0.063
S_c (CRITICAL SLOPE)	(FT/FT)	0.111	0.088	0.054	0.045
$.7S_c$	(FT/FT)	0.078	0.062	0.038	0.032
$1.3S_c$	(FT/FT)	0.14	0.11	0.071	0.059
STABLE FLOW?	(Y/N)	N	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.58	-	0.5	-
FREEBOARD BASED ON STABLE FLOW	(FT)	-	0.5	-	0.55
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.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.

CHANNEL OR CHANNEL SECTION	SH-CC-009		SH-CC-010	
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM (2, 5, OR 10 YR)	10	10	10	10
ACRES (AC)	0.06	0.06	0.12	0.12
MULTIPLIER (1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY) (CFS)	0.22	0.22	0.5	0.5
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.25	0.23	0.89	0.81
PROTECTIVE LINING[2]	SC150BN	ECM w veg.	SC150BN	ECM w veg.
n (MANNING'S COEFFICIENT)[2]	0.050	0.055	0.050	0.055
V_a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.1	1.9	3.2	2.9
T_a (MAX ALLOWABLE SHEAR STRESS) (LB/FT^2)	2.1	8.0	2.1	8.0
T_d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT^2)	0.9	0.9	1.8	1.8
CHANNEL BOTTOM WIDTH (FT)	1	1	1	1
CHANNEL SIDE SLOPES (H:V)	2	2	2	2
D (TOTAL DEPTH) (FT)	0.75	0.75	0.75	0.75
CHANNEL TOP WIDTH @ D (FT)	4	4	4	4
d (CALCULATED FLOW DEPTH) (FT)	0.1	0.1	0.2	0.2
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	1.4	1.4	1.8	1.8
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	10	10	5	5
d_{50} STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.120	0.120	0.280	0.280
R (HYDRAULIC RADIUS) (FT)	0.083	0.083	0.148	0.148
S (BED SLOPE)[3] (FT/FT)	0.139	0.139	0.148	0.148
S_c (CRITICAL SLOPE) (FT/FT)	0.086	0.104	0.072	0.088
$.7S_c$ (FT/FT)	0.060	0.073	0.051	0.061
$1.3S_c$ (FT/FT)	0.112	0.136	0.094	0.114
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.65	0.65	0.55	0.55
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.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.





Routing Diagram for MLV 505LD86_Channels REV 2 Phase 1
Prepared by {enter your company name here}, Printed 3/4/2022
HydroCAD® 10.00-26 s/n 09710 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
39,721	30	Meadow, non-grazed, HSG A (3S, 7S, 8S, 15S)
57,397	78	Meadow, non-grazed, HSG D (3S, 4S, 7S, 15S)
12,302	98	Paved parking, HSG A (3S, 7S, 15S)
9,065	98	Paved parking, HSG D (3S, 7S, 15S)
118,485	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
52,023	HSG A	3S, 7S, 8S, 15S
0	HSG B	
0	HSG C	
66,462	HSG D	3S, 4S, 7S, 15S
0	Other	
118,485		**TOTAL AREA**

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	Subcatc Numbers
39,721	0	0	57,397	0	97,118	Meadow, non-grazed	
12,302	0	0	9,065	0	21,367	Paved parking	
52,023	**0**	**0**	**66,462**	**0**	**118,485**	**TOTAL AREA**	

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	927.00	926.50	26.0	0.0192	0.012	12.0	0.0	0.0

Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 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 3S: CC-3 Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=1.55"
Tc=5.0 min CN=66 Runoff=1.58 cfs 3,214 cf

Subcatchment 4S: CC-4 Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=2.49"
Tc=5.0 min CN=78 Runoff=0.21 cfs 422 cf

Subcatchment 7S: CC-7 Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=1.48"
Tc=5.0 min CN=65 Runoff=5.06 cfs 10,370 cf

Subcatchment 8S: CC-8 Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf

Subcatchment 15S: CC-10 Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=2.24"
Tc=5.0 min CN=75 Runoff=0.50 cfs 1,003 cf

Reach 6R: Channel 4 Avg. Flow Depth=0.51' Max Vel=2.77 fps Inflow=1.78 cfs 3,636 cf
n=0.067 L=63.0' S=0.0800 '/' Capacity=3.42 cfs Outflow=1.74 cfs 3,636 cf

Reach 10R: Channel 7 Avg. Flow Depth=0.31' Max Vel=3.37 fps Inflow=5.06 cfs 10,370 cf
n=0.055 L=395.0' S=0.0910 '/' Capacity=38.86 cfs Outflow=4.60 cfs 10,370 cf

Reach 13R: Culvert #3 Avg. Flow Depth=0.71' Max Vel=7.63 fps Inflow=4.60 cfs 10,370 cf
12.0" Round Pipe n=0.012 L=26.0' S=0.0192 '/' Capacity=5.35 cfs Outflow=4.58 cfs 10,370 cf

Reach 14R: Channel 8 Avg. Flow Depth=0.45' Max Vel=3.50 fps Inflow=4.58 cfs 10,370 cf
n=0.050 L=88.0' S=0.0630 '/' Capacity=21.64 cfs Outflow=4.51 cfs 10,370 cf

Total Runoff Area = 118,485 sf Runoff Volume = 15,009 cf Average Runoff Depth = 1.52"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

Summary for Subcatchment 3S: CC-3

[49] Hint: Tc<2dt may require smaller dt

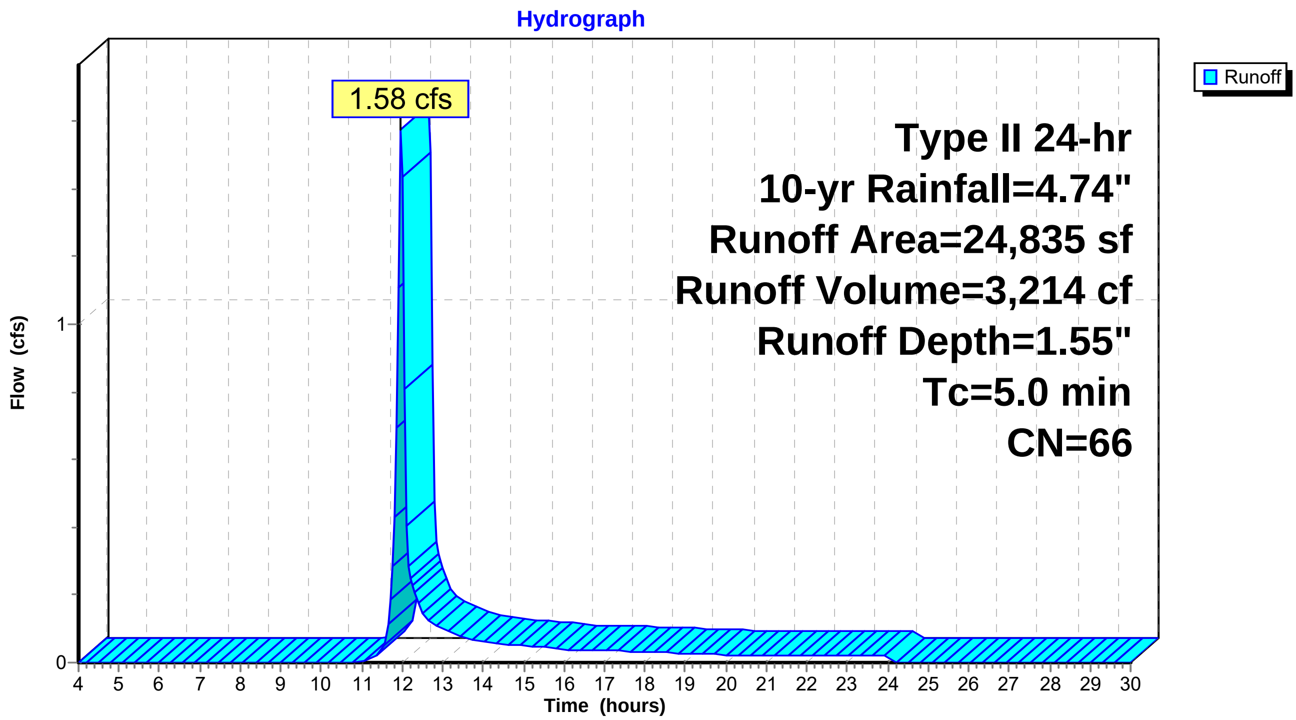
Runoff = 1.58 cfs @ 11.96 hrs, Volume= 3,214 cf, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 3S: CC-3



Summary for Subcatchment 4S: CC-4

[49] Hint: Tc<2dt may require smaller dt

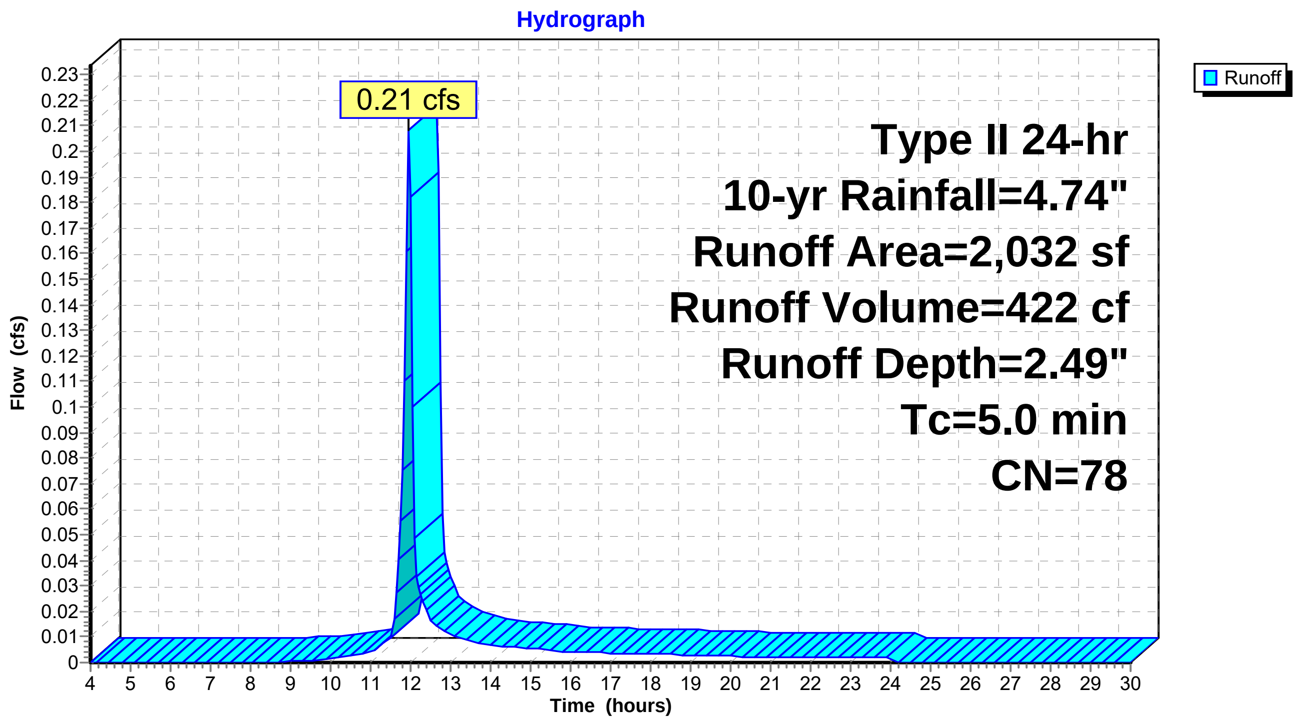
Runoff = 0.21 cfs @ 11.96 hrs, Volume= 422 cf, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 4S: CC-4



Summary for Subcatchment 7S: CC-7

[49] Hint: Tc<2dt may require smaller dt

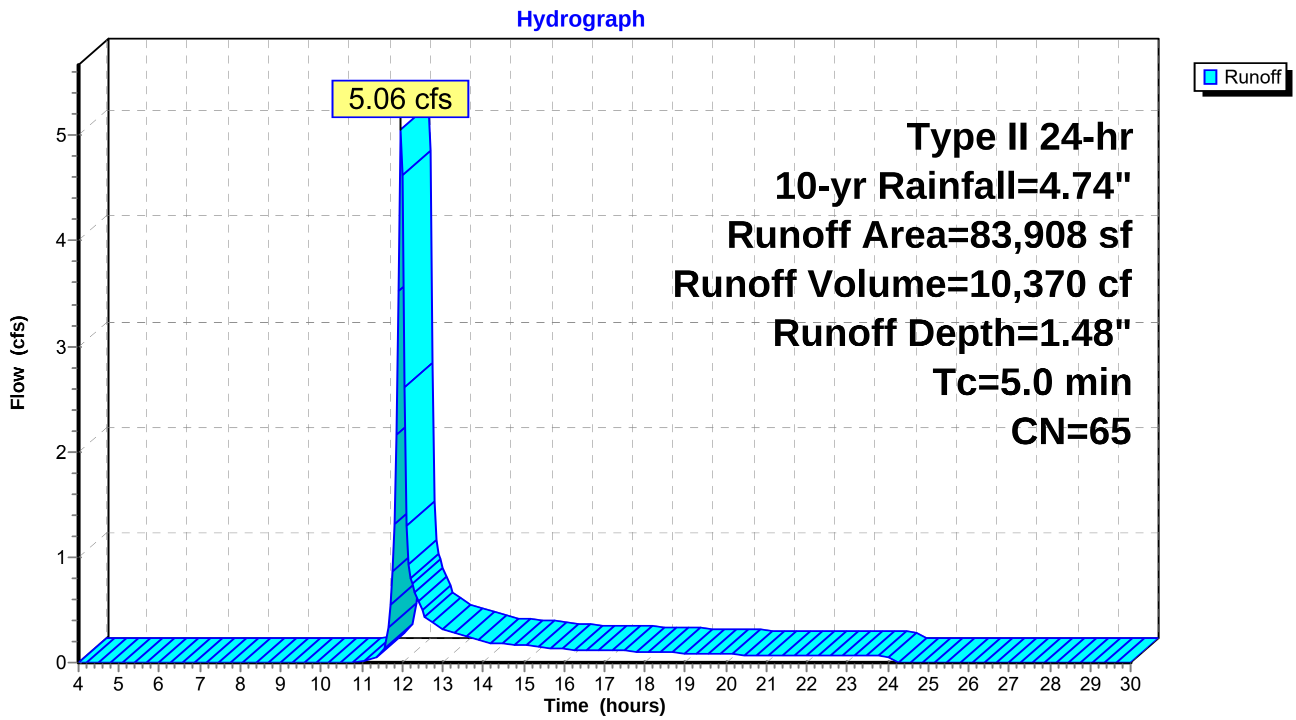
Runoff = 5.06 cfs @ 11.97 hrs, Volume= 10,370 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 7S: CC-7



Summary for Subcatchment 8S: CC-8

[49] Hint: Tc<2dt may require smaller dt

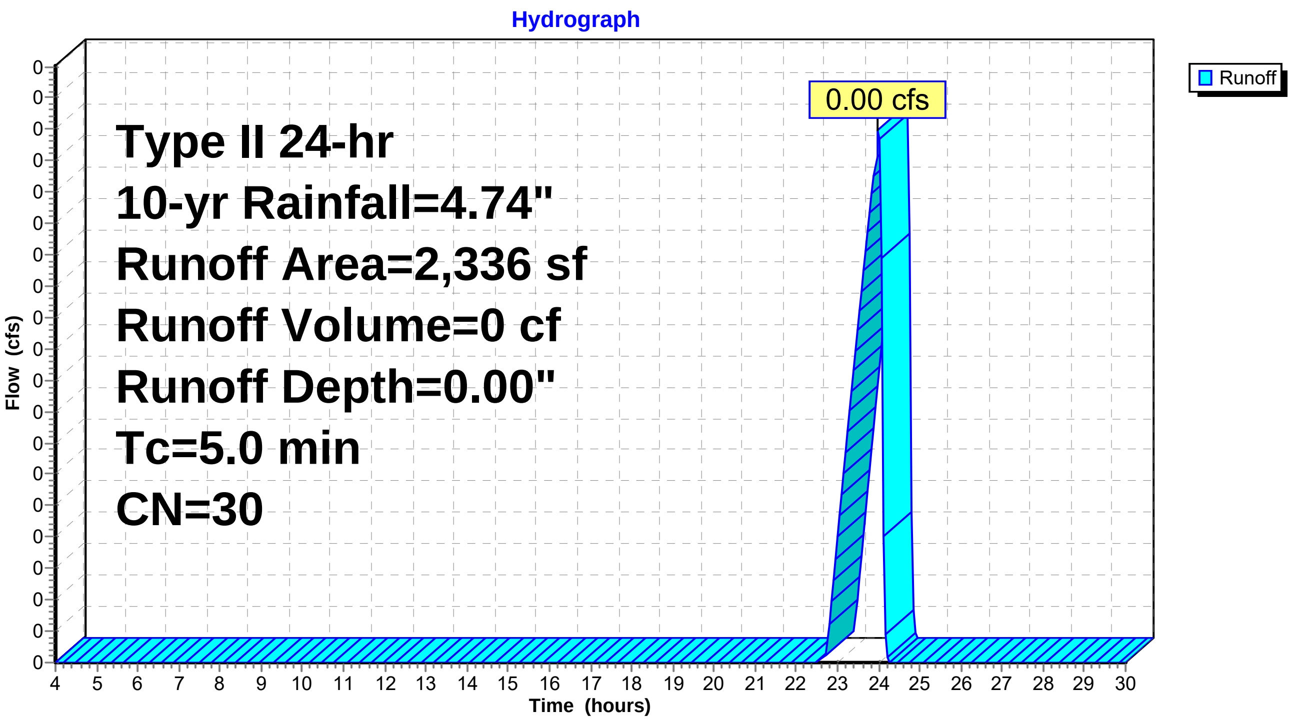
Runoff = 0.00 cfs @ 23.98 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 8S: CC-8



Summary for Subcatchment 15S: CC-10

[49] Hint: Tc<2dt may require smaller dt

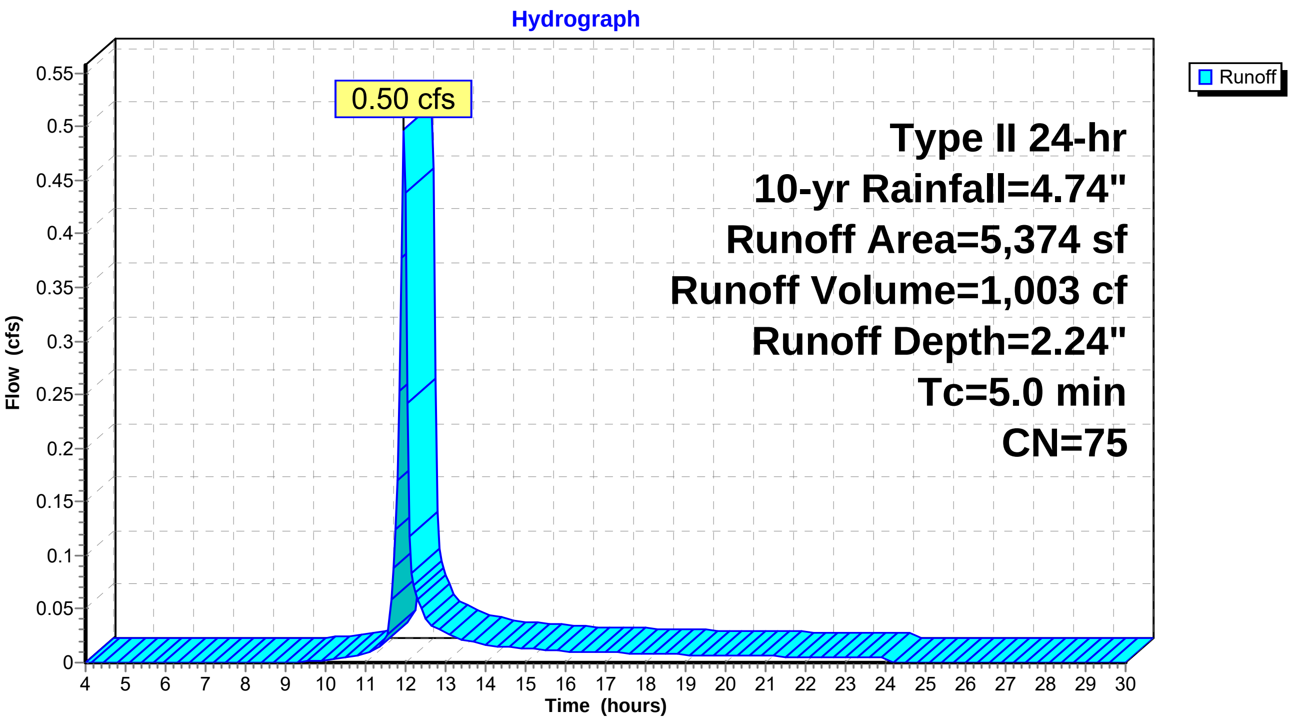
Runoff = 0.50 cfs @ 11.96 hrs, Volume= 1,003 cf, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 15S: CC-10



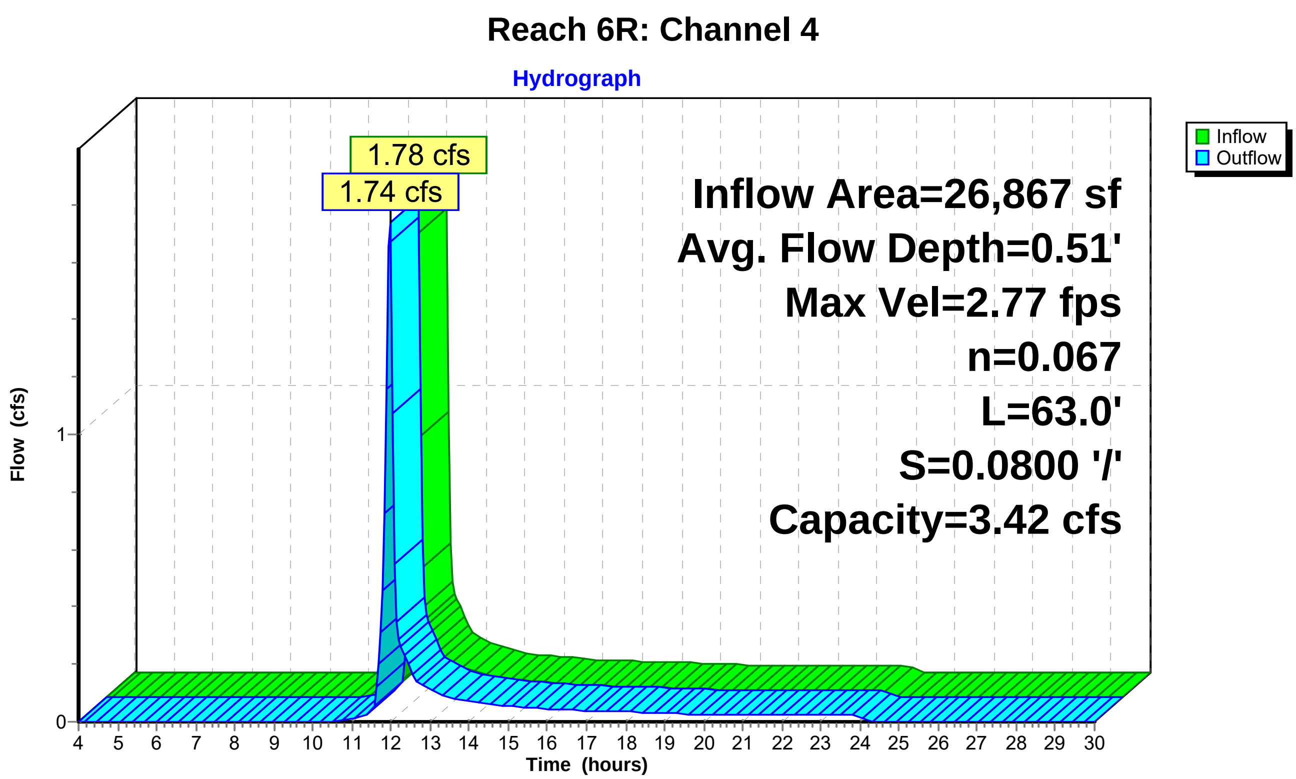
Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 1.62" for 10-yr event
Inflow = 1.78 cfs @ 11.96 hrs, Volume= 3,636 cf
Outflow = 1.74 cfs @ 11.98 hrs, Volume= 3,636 cf, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 1.4 min

Peak Storage= 40 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 0.75' Flow Area= 1.0 sf, Capacity= 3.42 cfs

1.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 0.5 '/' Top Width= 1.75'
Length= 63.0' Slope= 0.0800 '/'
Inlet Invert= 977.00', Outlet Invert= 971.96'



Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 5.06 cfs @ 11.97 hrs, Volume= 10,370 cf
Outflow = 4.60 cfs @ 12.02 hrs, Volume= 10,370 cf, Atten= 9%, Lag= 3.4 min

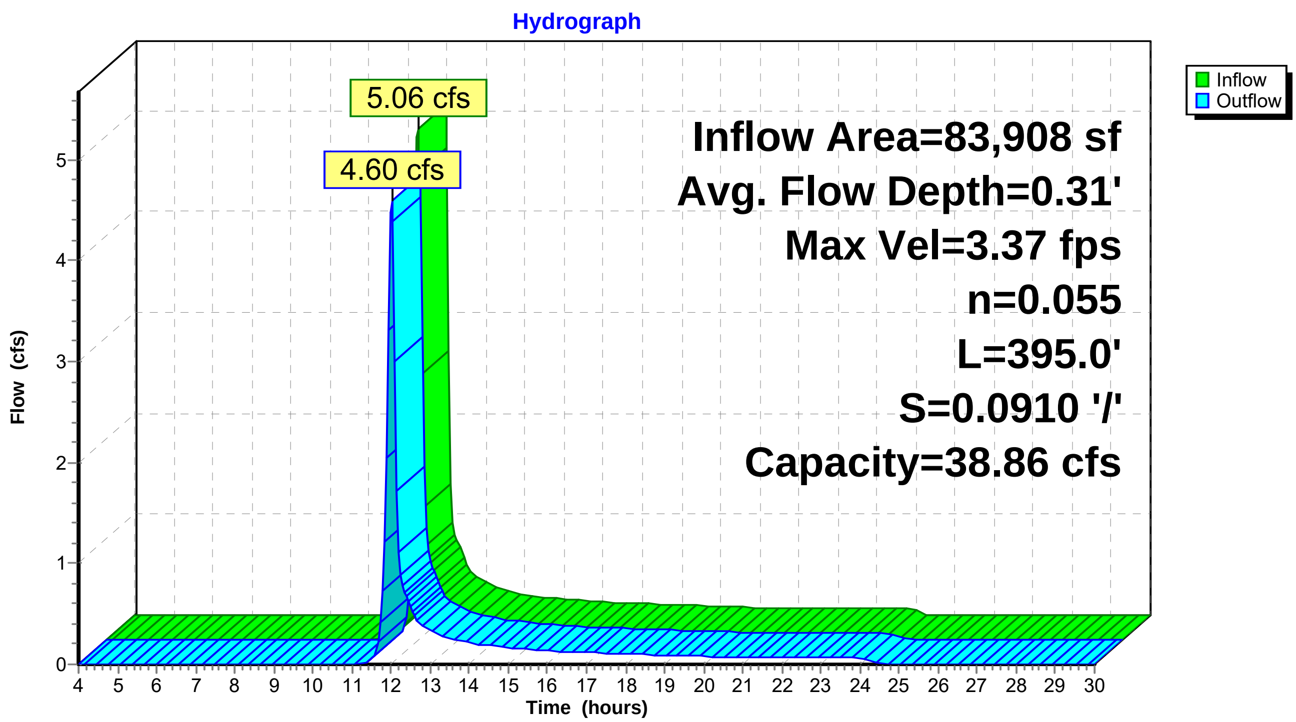
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.37 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 7.8 min

Peak Storage= 570 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 38.86 cfs

4.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 395.0' Slope= 0.0910 '/'
Inlet Invert= 0.00', Outlet Invert= -35.95'

‡

Reach 10R: Channel 7



Summary for Reach 13R: Culvert #3

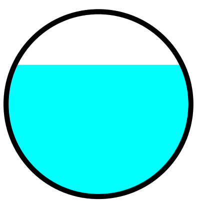
[52] Hint: Inlet/Outlet conditions not evaluated

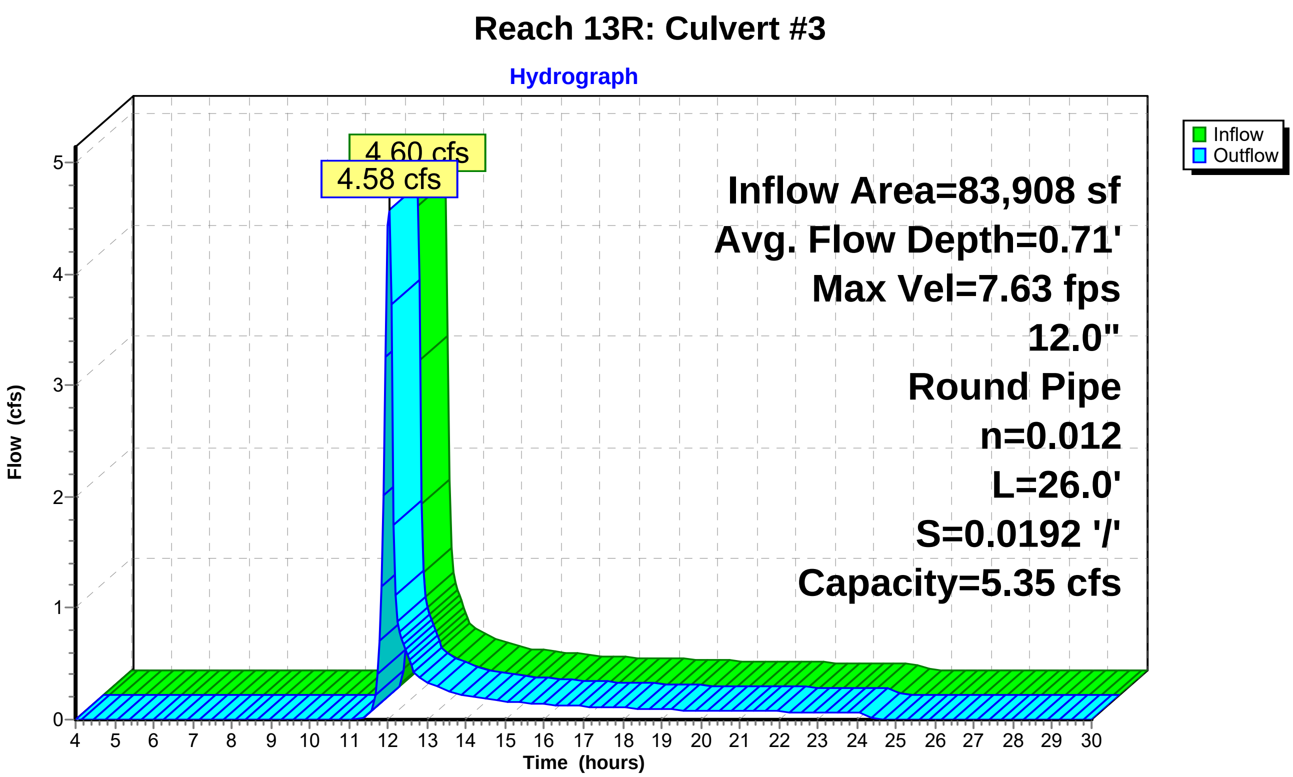
Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 4.60 cfs @ 12.02 hrs, Volume= 10,370 cf
Outflow = 4.58 cfs @ 12.02 hrs, Volume= 10,370 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.63 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.64 fps, Avg. Travel Time= 0.2 min

Peak Storage= 16 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.35 cfs

12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0192 '/'
Inlet Invert= 927.00', Outlet Invert= 926.50'





Summary for Reach 14R: Channel 8

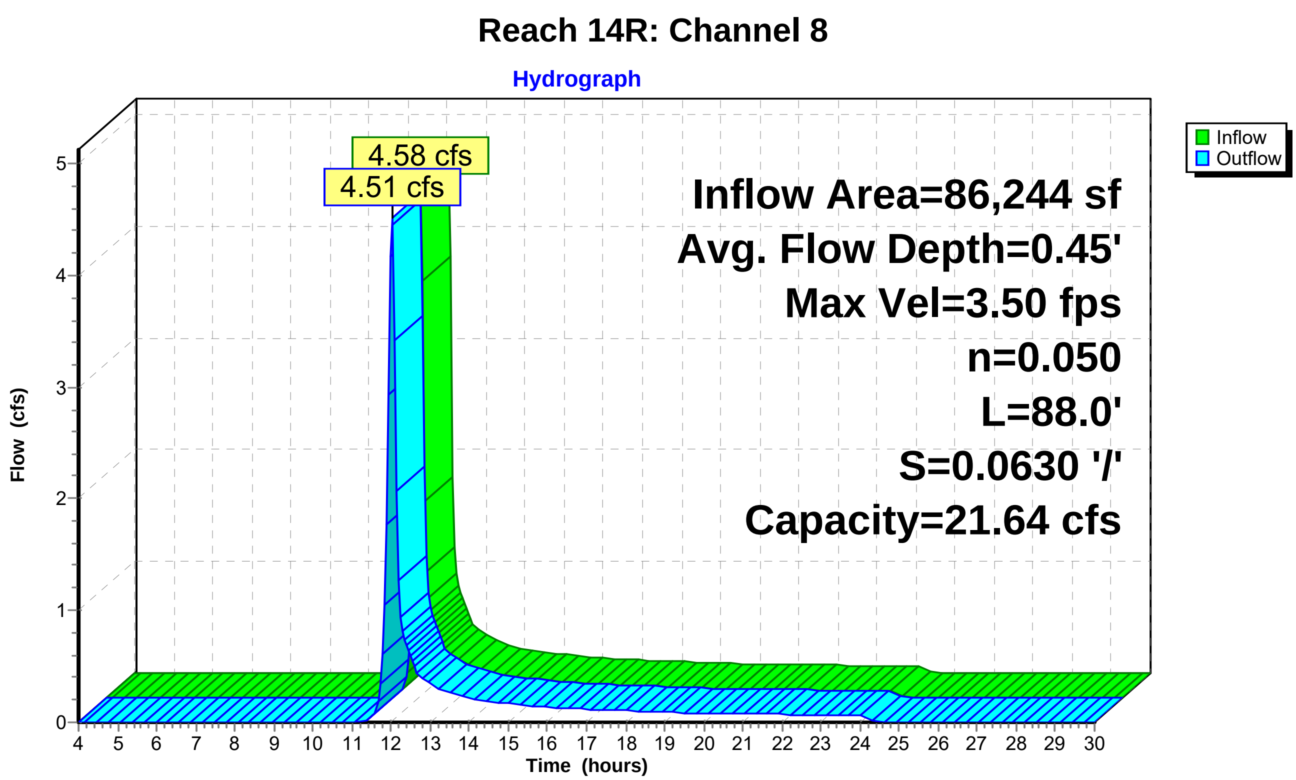
[65] Warning: Inlet elevation not specified

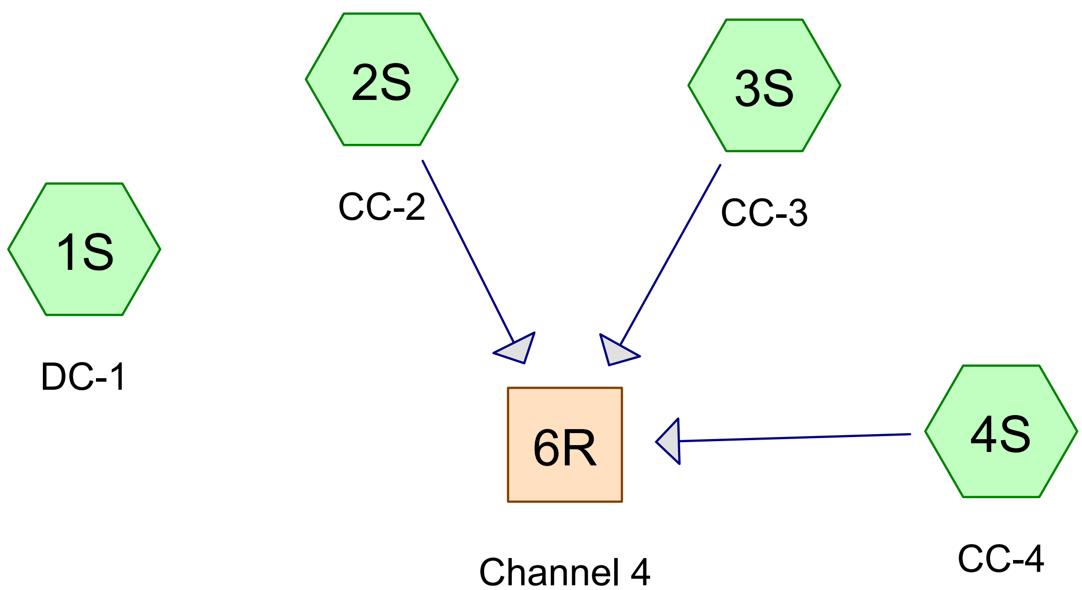
Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 1.44" for 10-yr event
Inflow = 4.58 cfs @ 12.02 hrs, Volume= 10,370 cf
Outflow = 4.51 cfs @ 12.04 hrs, Volume= 10,370 cf, Atten= 1%, Lag= 0.7 min

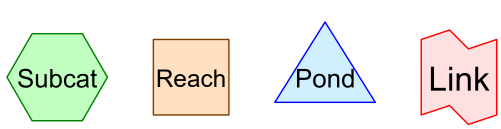
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 1.5 min

Peak Storage= 115 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.64 cfs

2.00' x 1.00' deep channel, n= 0.050
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 88.0' Slope= 0.0630 '/'
Inlet Invert= 0.00', Outlet Invert= -5.54'







Routing Diagram for MLV 505LD86_Channels 1-4 REV 2
Prepared by {enter your company name here}, Printed 3/4/2022

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
104,226	30	Meadow, non-grazed, HSG A (1S, 3S)
13,199	78	Meadow, non-grazed, HSG D (1S, 2S, 3S, 4S)
5,051	98	Paved parking, HSG A (3S)
1,251	98	Paved parking, HSG D (2S, 3S)
30,585	30	Woods, Good, HSG A (1S)
32,717	77	Woods, Good, HSG D (1S)
187,029	**44**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
139,862	HSG A	1S, 3S
0	HSG B	
0	HSG C	
47,167	HSG D	1S, 2S, 3S, 4S
0	Other	
187,029		**TOTAL AREA**

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	Subcatc Numbers
104,226	0	0	13,199	0	117,425	Meadow, non-grazed	
5,051	0	0	1,251	0	6,302	Paved parking	
30,585	0	0	32,717	0	63,302	Woods, Good	
139,862	**0**	**0**	**47,167**	**0**	**187,029**	**TOTAL AREA**	

Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 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: DC-1 Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.18"
Tc=5.0 min CN=40 Runoff=0.11 cfs 2,414 cf

Subcatchment 2S: CC-2 Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=2.58"
Tc=5.0 min CN=79 Runoff=0.42 cfs 854 cf

Subcatchment 3S: CC-3 Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=1.35"
Tc=5.0 min CN=63 Runoff=1.13 cfs 2,341 cf

Subcatchment 4S: CC-4 Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=2.49"
Tc=5.0 min CN=78 Runoff=0.21 cfs 422 cf

Reach 6R: Channel 4 Avg. Flow Depth=0.50' Max Vel=2.76 fps Inflow=1.76 cfs 3,617 cf
n=0.067 L=63.0' S=0.0800 '/' Capacity=3.42 cfs Outflow=1.72 cfs 3,617 cf

Total Runoff Area = 187,029 sf Runoff Volume = 6,031 cf Average Runoff Depth = 0.39"
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

Summary for Subcatchment 1S: DC-1

[49] Hint: Tc<2dt may require smaller dt

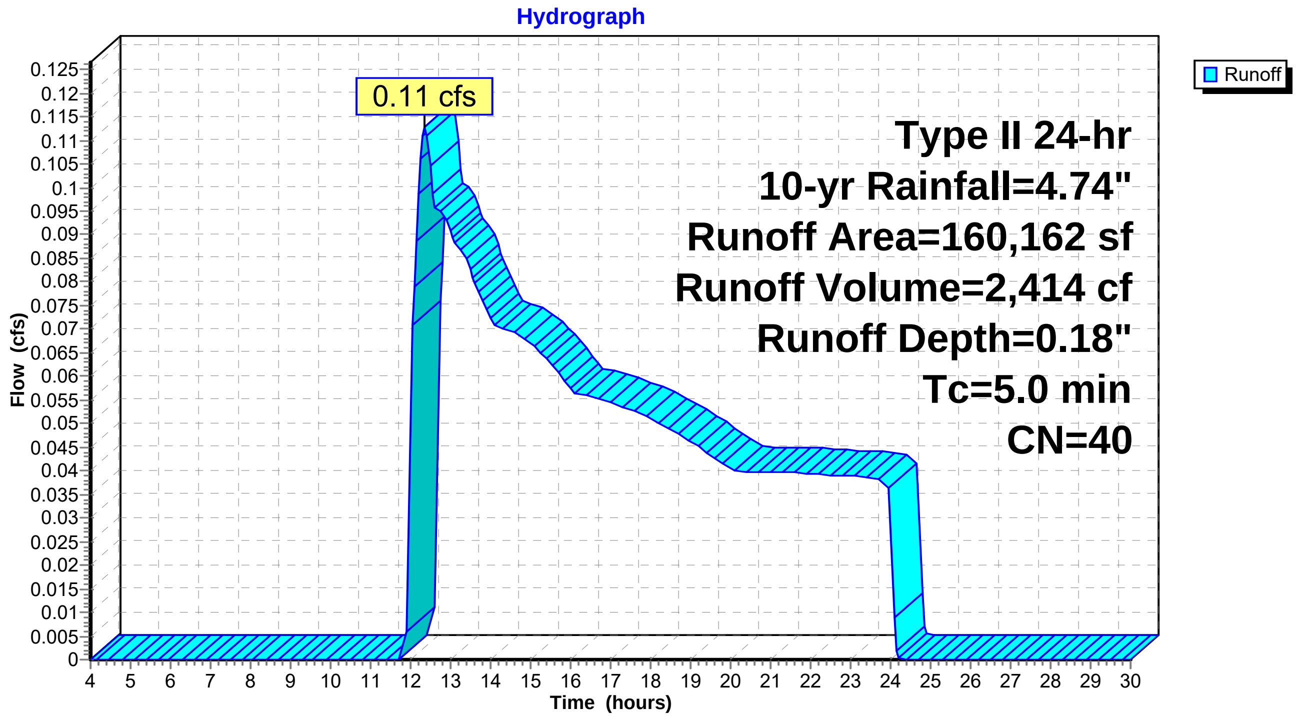
Runoff = 0.11 cfs @ 12.36 hrs, Volume= 2,414 cf, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 1S: DC-1



Summary for Subcatchment 2S: CC-2

[49] Hint: Tc<2dt may require smaller dt

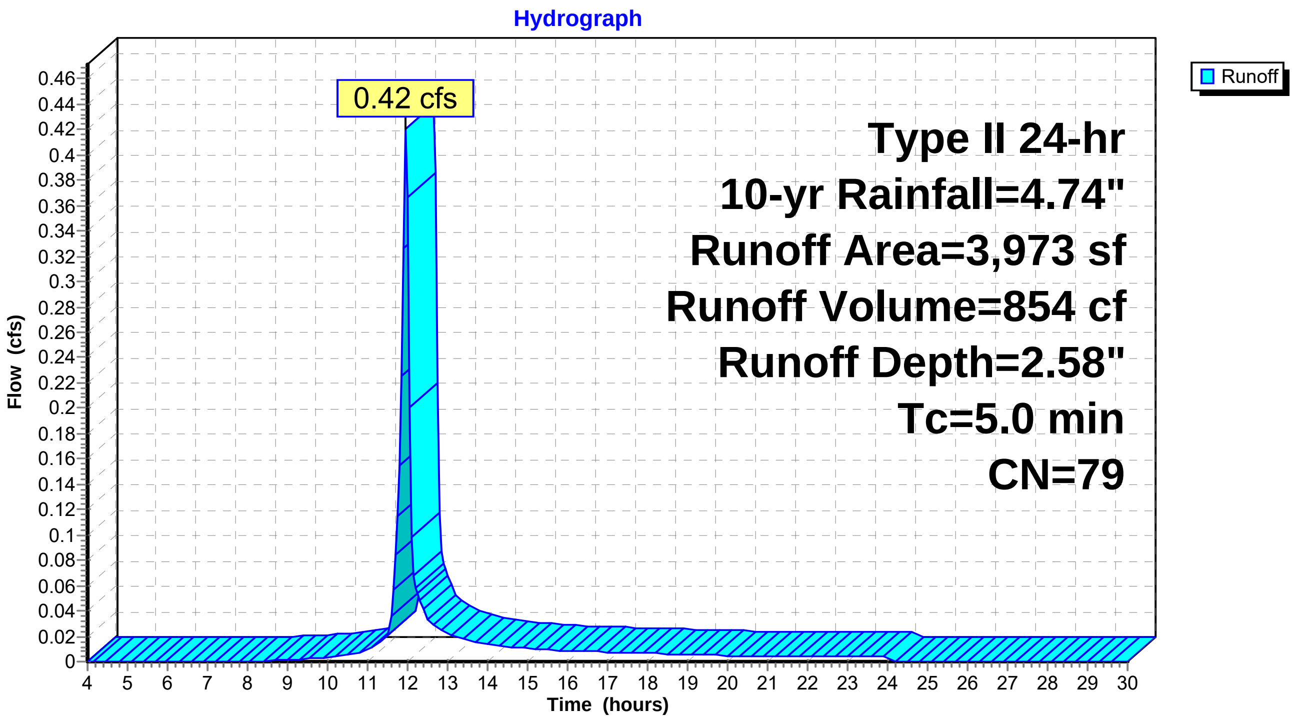
Runoff = 0.42 cfs @ 11.96 hrs, Volume= 854 cf, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 2S: CC-2



Summary for Subcatchment 3S: CC-3

[49] Hint: Tc<2dt may require smaller dt

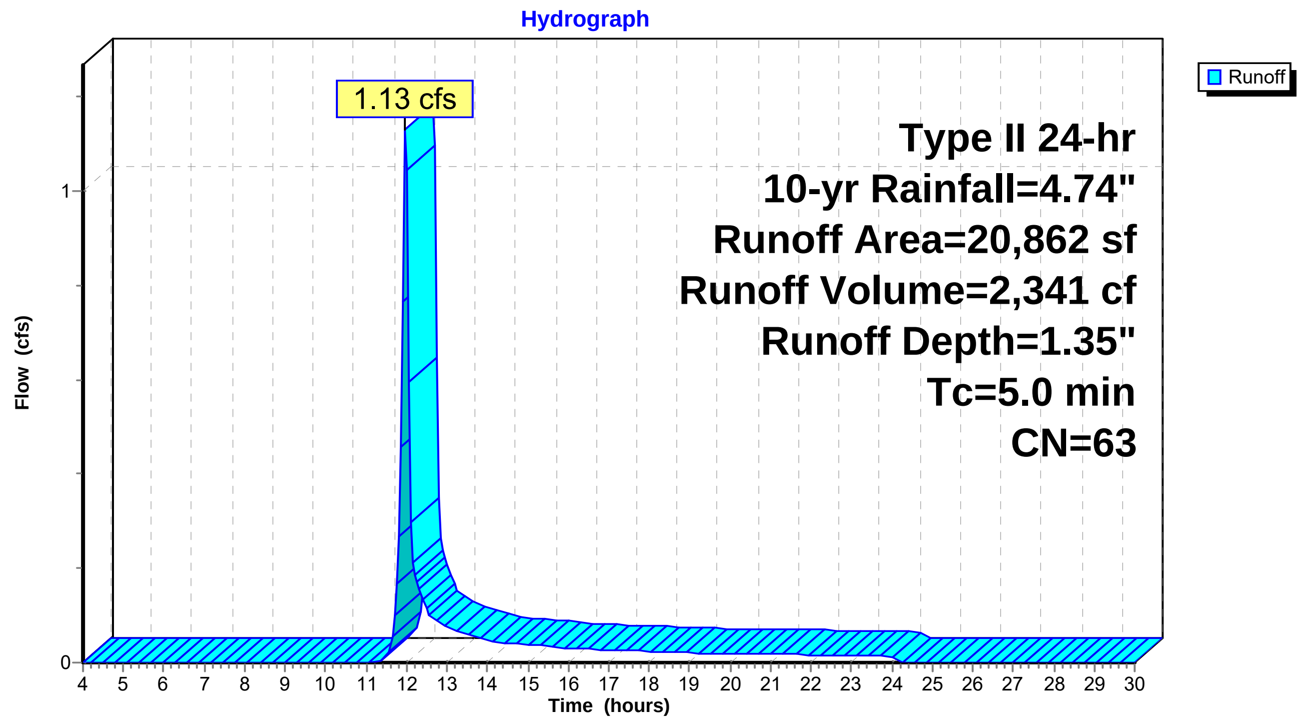
Runoff = 1.13 cfs @ 11.97 hrs, Volume= 2,341 cf, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 3S: CC-3



Summary for Subcatchment 4S: CC-4

[49] Hint: Tc<2dt may require smaller dt

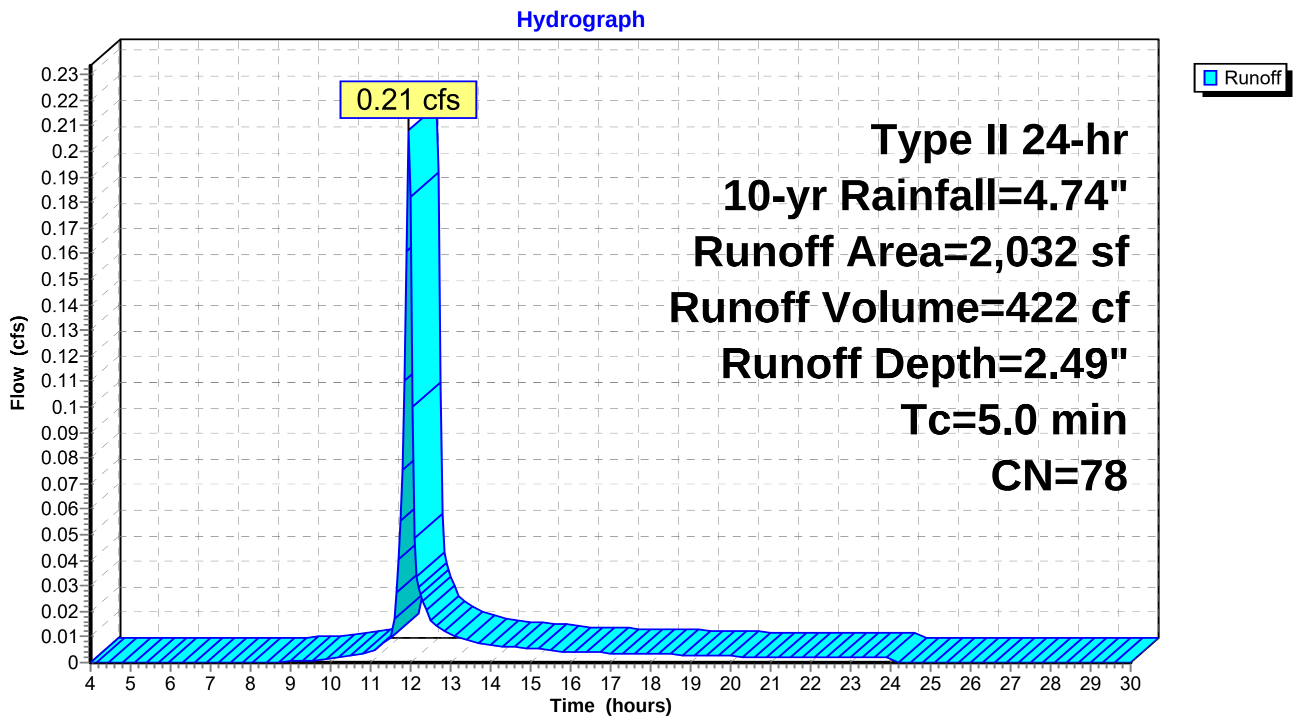
Runoff = 0.21 cfs @ 11.96 hrs, Volume= 422 cf, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 4S: CC-4



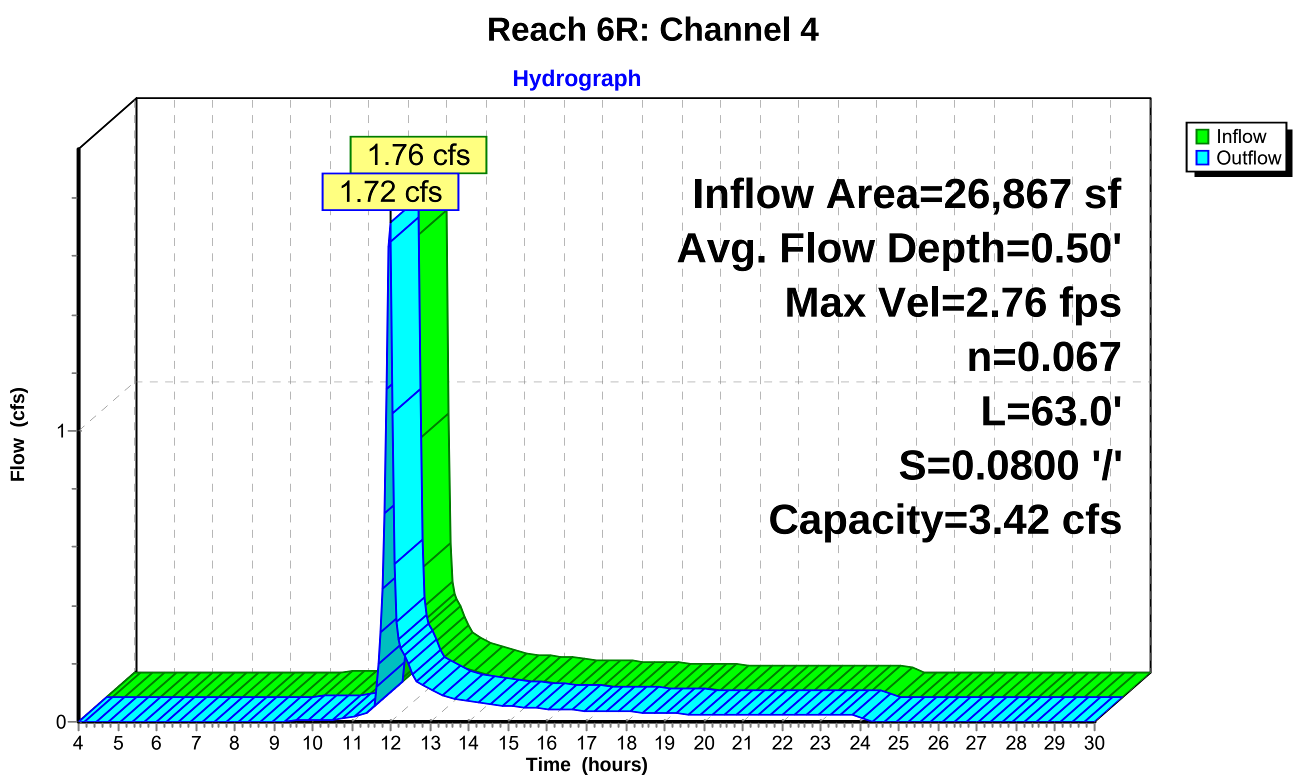
Summary for Reach 6R: Channel 4

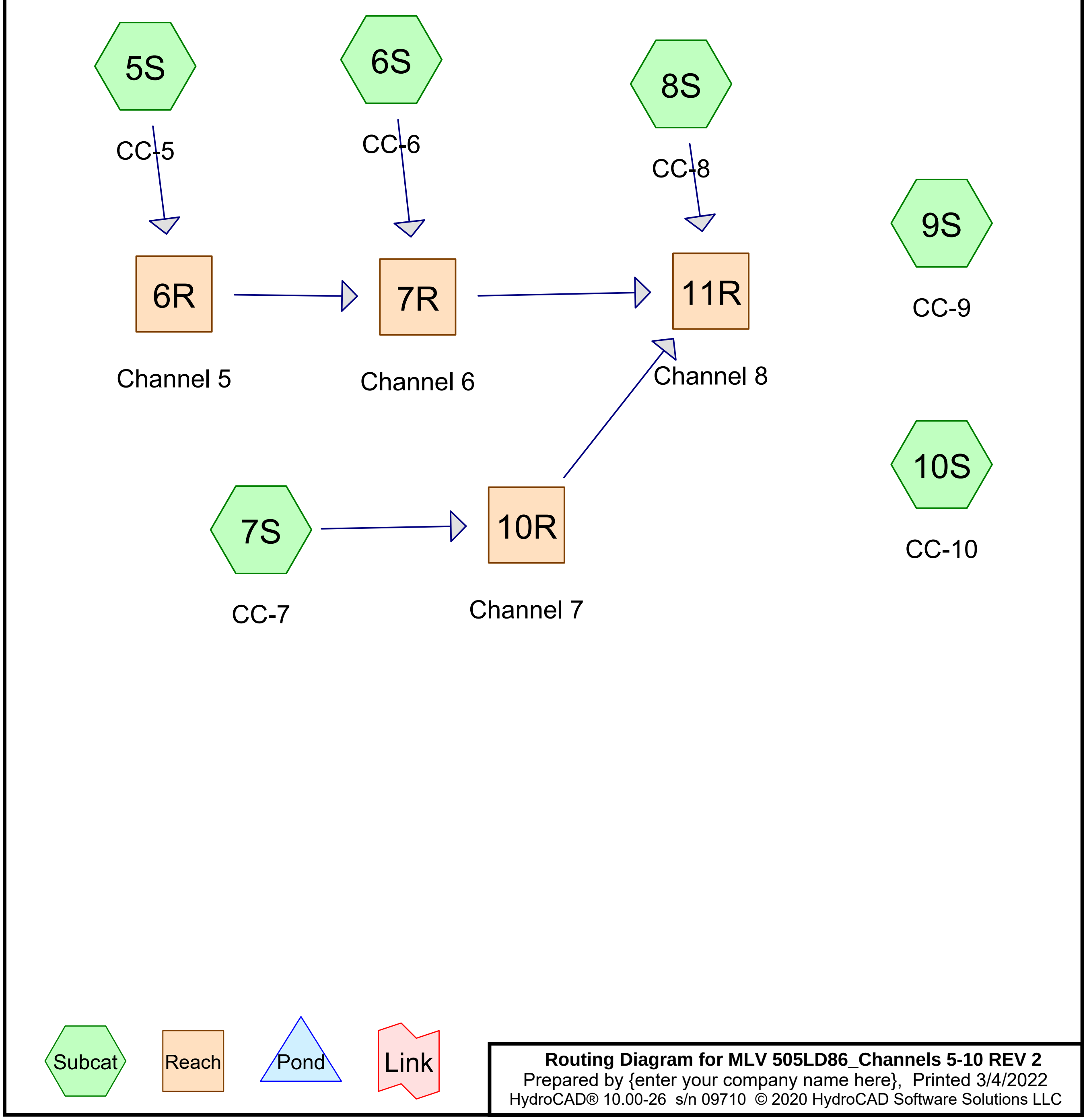
Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 1.62" for 10-yr event
Inflow = 1.76 cfs @ 11.96 hrs, Volume= 3,617 cf
Outflow = 1.72 cfs @ 11.98 hrs, Volume= 3,617 cf, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.76 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 1.4 min

Peak Storage= 39 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.75' Flow Area= 1.0 sf, Capacity= 3.42 cfs

1.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 0.5 '/' Top Width= 1.75'
Length= 63.0' Slope= 0.0800 '/'
Inlet Invert= 977.00', Outlet Invert= 971.96'





Routing Diagram for MLV 505LD86_Channels 5-10 REV 2
Prepared by {enter your company name here}, Printed 3/4/2022
HydroCAD® 10.00-26 s/n 09710 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
31,356	30	Meadow, non-grazed, HSG A (5S, 6S, 7S, 8S, 9S, 10S)
48,216	78	Meadow, non-grazed, HSG D (5S, 6S, 7S, 9S, 10S)
6,772	98	Paved parking, HSG A (5S, 6S, 7S, 9S, 10S)
4,611	98	Paved parking, HSG D (5S, 6S, 7S, 10S)
783	98	Water Surface, HSG D (9S)
91,738	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
38,128	HSG A	5S, 6S, 7S, 8S, 9S, 10S
0	HSG B	
0	HSG C	
53,610	HSG D	5S, 6S, 7S, 9S, 10S
0	Other	
91,738		**TOTAL AREA**

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	Subcatc Numbers
31,356	0	0	48,216	0	79,572	Meadow, non-grazed	
6,772	0	0	4,611	0	11,383	Paved parking	
0	0	0	783	0	783	Water Surface	
38,128	**0**	**0**	**53,610**	**0**	**91,738**	**TOTAL AREA**	

Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 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 5S: CC-5 Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=1.48"
Tc=5.0 min CN=65 Runoff=3.82 cfs 7,831 cf

Subcatchment 6S: CC-6 Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=0.91"
Tc=5.0 min CN=56 Runoff=0.53 cfs 1,175 cf

Subcatchment 7S: CC-7 Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=2.67"
Tc=5.0 min CN=80 Runoff=0.57 cfs 1,152 cf

Subcatchment 8S: CC-8 Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf

Subcatchment 9S: CC-9 Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=2.16"
Tc=5.0 min CN=74 Runoff=0.22 cfs 451 cf

Subcatchment 10S: CC-10 Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=2.32"
Tc=5.0 min CN=76 Runoff=0.27 cfs 555 cf

Reach 6R: Channel 5 Avg. Flow Depth=0.67' Max Vel=4.17 fps Inflow=3.82 cfs 7,831 cf
n=0.050 L=257.0' S=0.0780 '/' Capacity=7.46 cfs Outflow=3.61 cfs 7,831 cf

Reach 7R: Channel 6 Avg. Flow Depth=0.64' Max Vel=4.89 fps Inflow=4.12 cfs 9,006 cf
n=0.054 L=127.0' S=0.1300 '/' Capacity=8.91 cfs Outflow=4.02 cfs 9,006 cf

Reach 10R: Channel 7 Avg. Flow Depth=0.20' Max Vel=2.34 fps Inflow=0.57 cfs 1,152 cf
n=0.055 L=395.0' S=0.0910 '/' Capacity=7.32 cfs Outflow=0.52 cfs 1,152 cf

Reach 11R: Channel 8 Avg. Flow Depth=0.75' Max Vel=4.37 fps Inflow=4.50 cfs 10,157 cf
n=0.045 L=88.0' S=0.0630 '/' Capacity=4.52 cfs Outflow=4.40 cfs 10,157 cf

Total Runoff Area = 91,738 sf Runoff Volume = 11,163 cf Average Runoff Depth = 1.46"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

Summary for Subcatchment 5S: CC-5

[49] Hint: Tc<2dt may require smaller dt

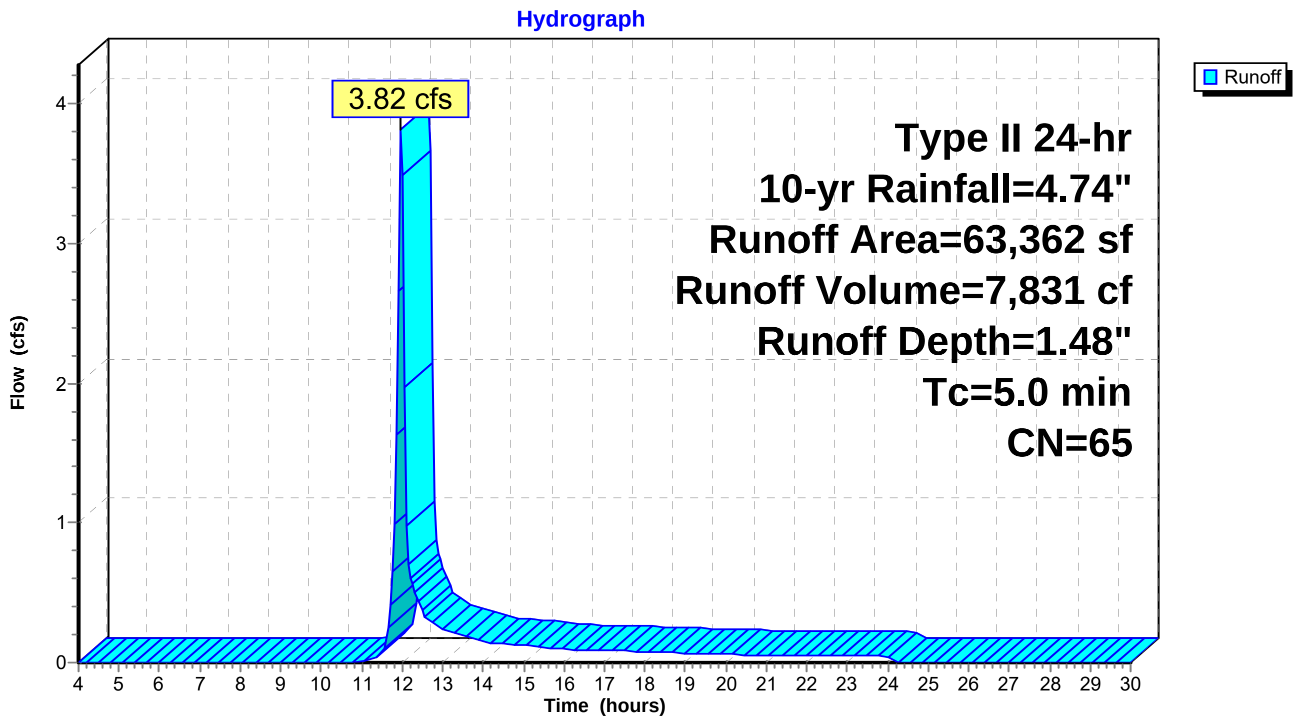
Runoff = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 5S: CC-5



Summary for Subcatchment 6S: CC-6

[49] Hint: Tc<2dt may require smaller dt

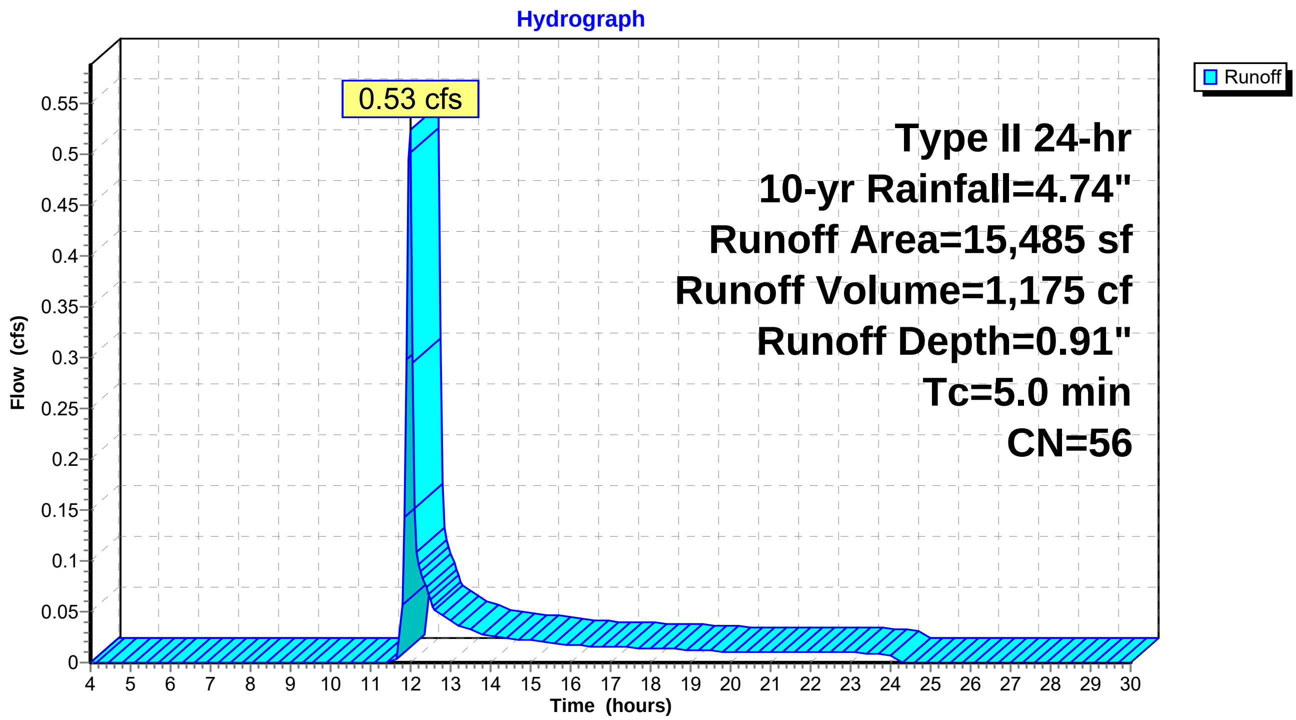
Runoff = 0.53 cfs @ 11.98 hrs, Volume= 1,175 cf, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 6S: CC-6



Summary for Subcatchment 7S: CC-7

[49] Hint: Tc<2dt may require smaller dt

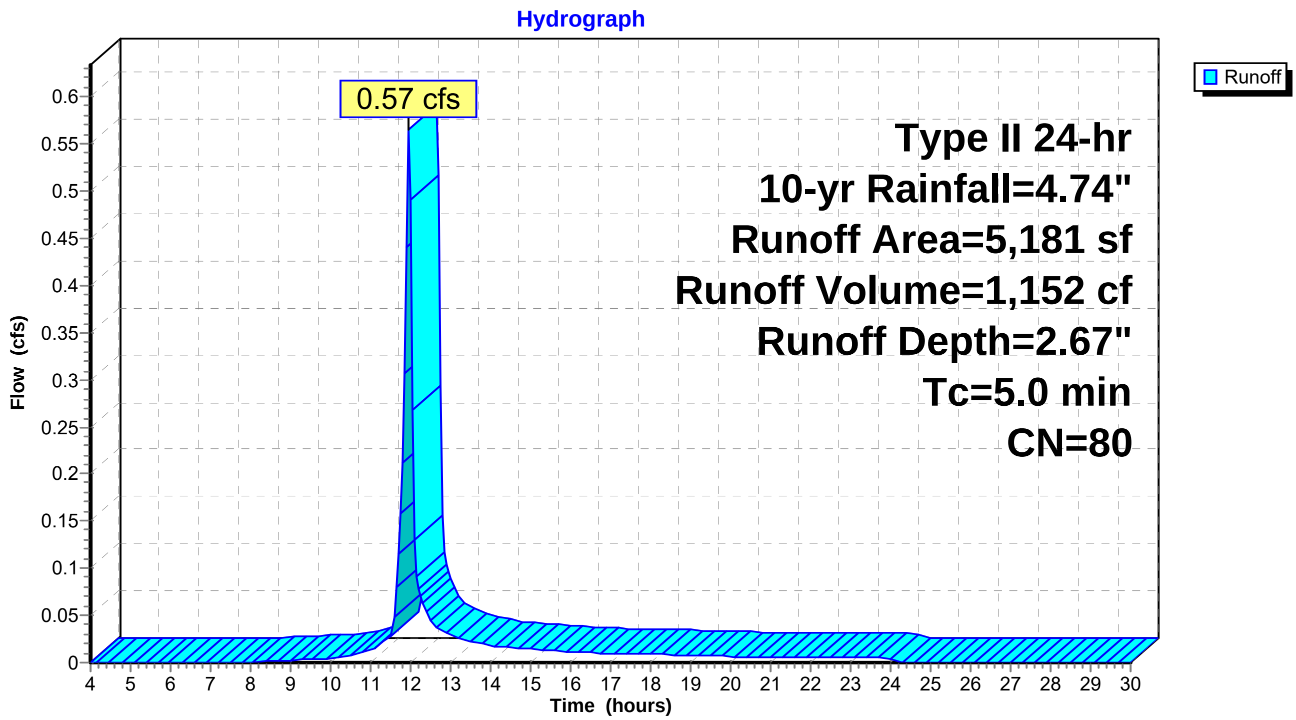
Runoff = 0.57 cfs @ 11.96 hrs, Volume= 1,152 cf, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 7S: CC-7



Summary for Subcatchment 8S: CC-8

[49] Hint: Tc<2dt may require smaller dt

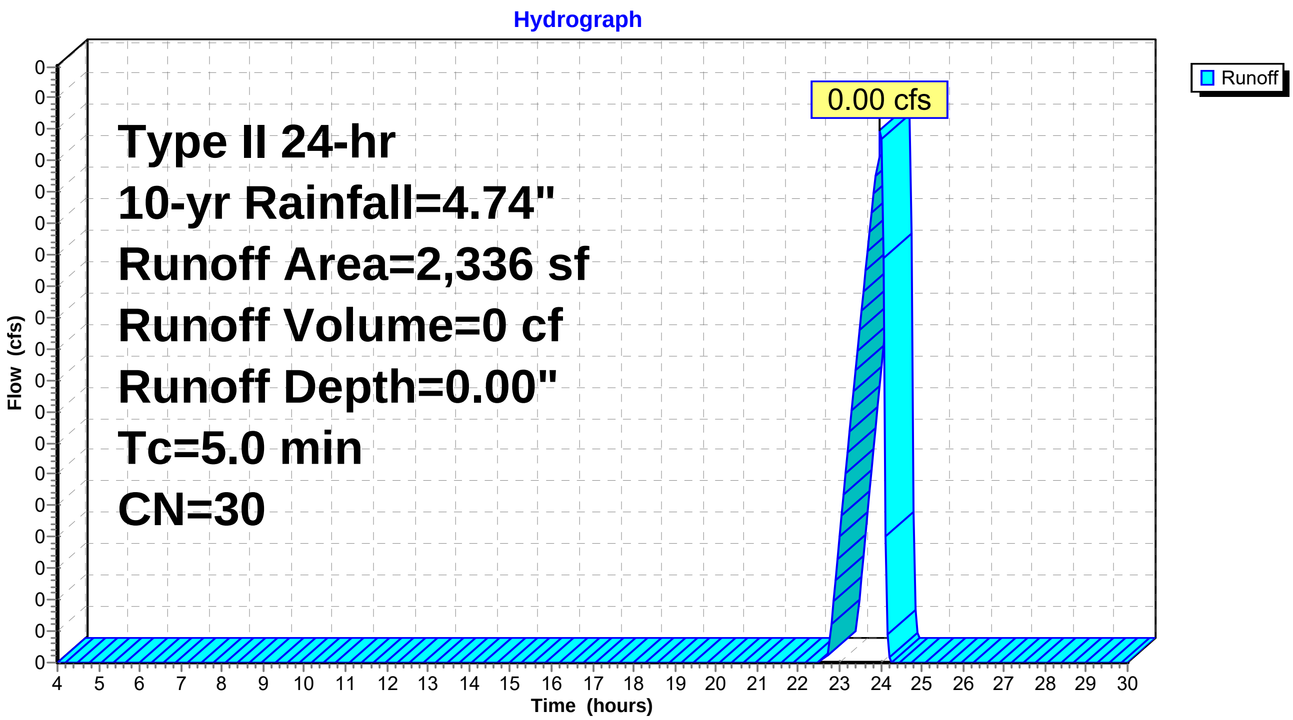
Runoff = 0.00 cfs @ 23.98 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 8S: CC-8



Summary for Subcatchment 9S: CC-9

[49] Hint: Tc<2dt may require smaller dt

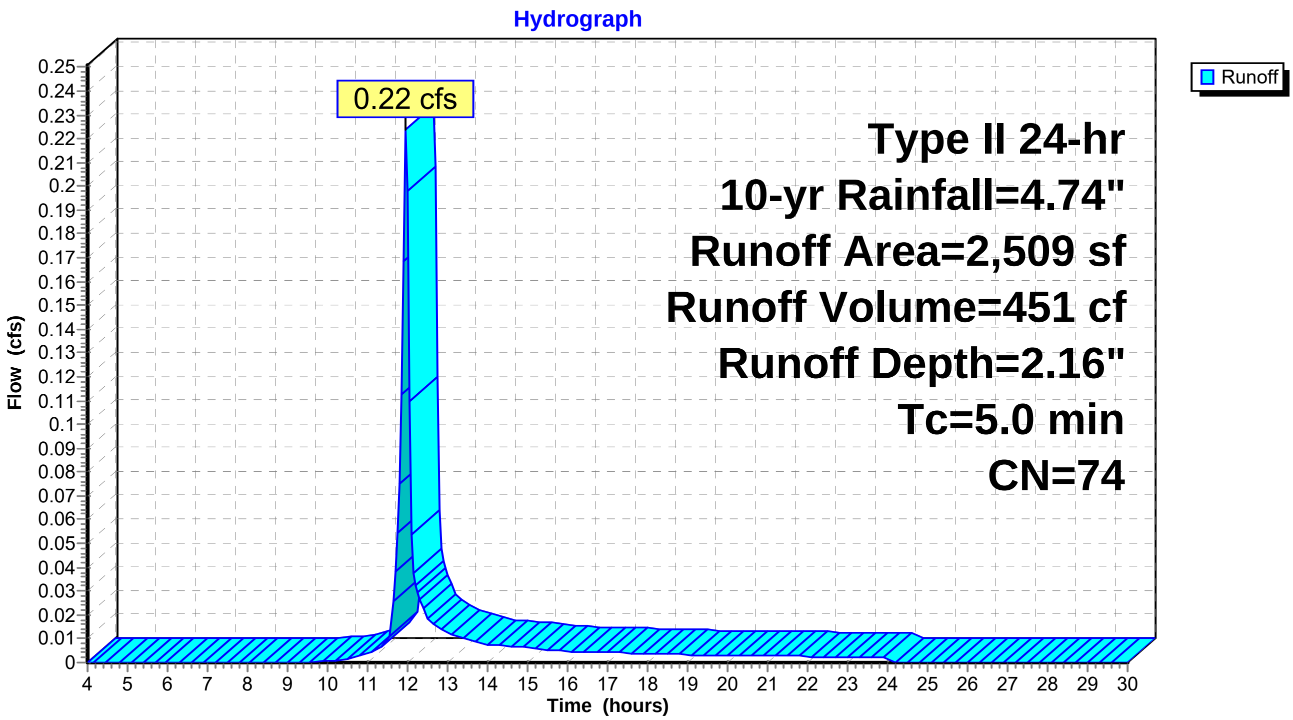
Runoff = 0.22 cfs @ 11.96 hrs, Volume= 451 cf, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 9S: CC-9



Summary for Subcatchment 10S: CC-10

[49] Hint: Tc<2dt may require smaller dt

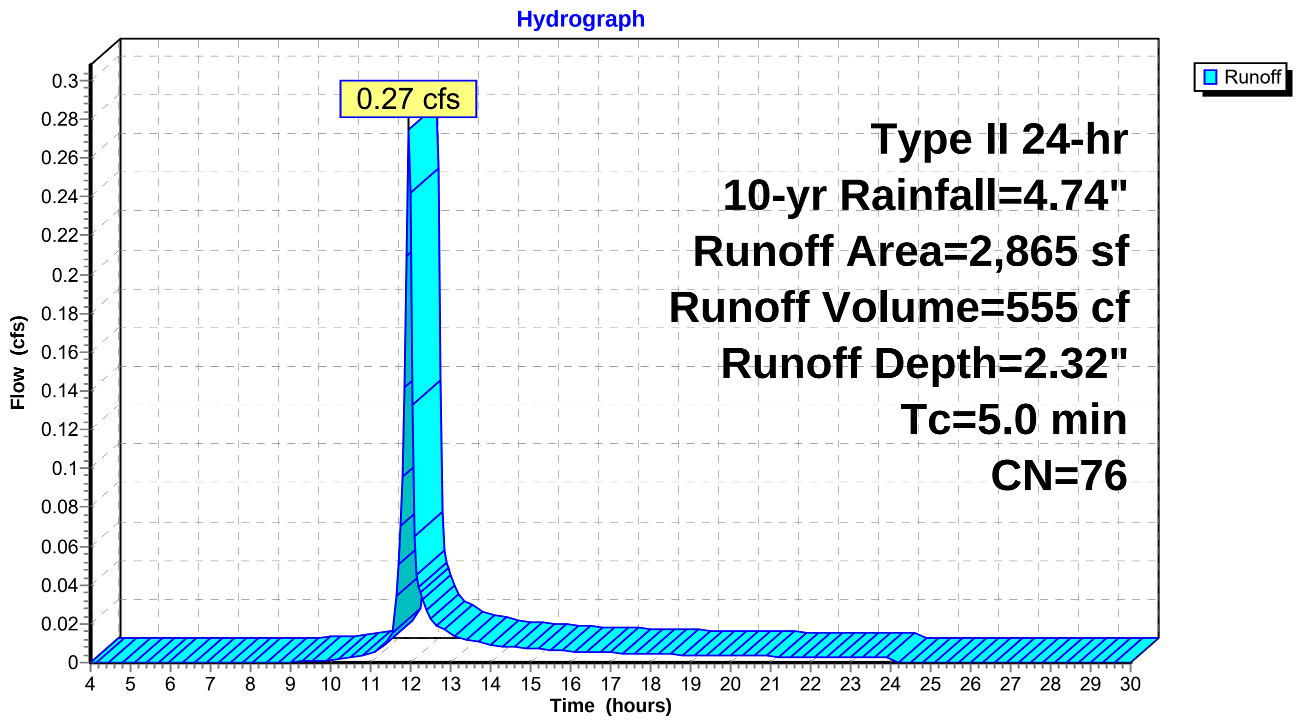
Runoff = 0.27 cfs @ 11.96 hrs, Volume= 555 cf, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Assumed**

Subcatchment 10S: CC-10



Summary for Reach 6R: Channel 5

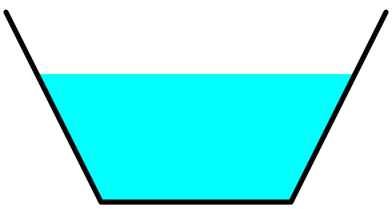
[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf
Outflow = 3.61 cfs @ 12.00 hrs, Volume= 7,831 cf, Atten= 6%, Lag= 1.8 min

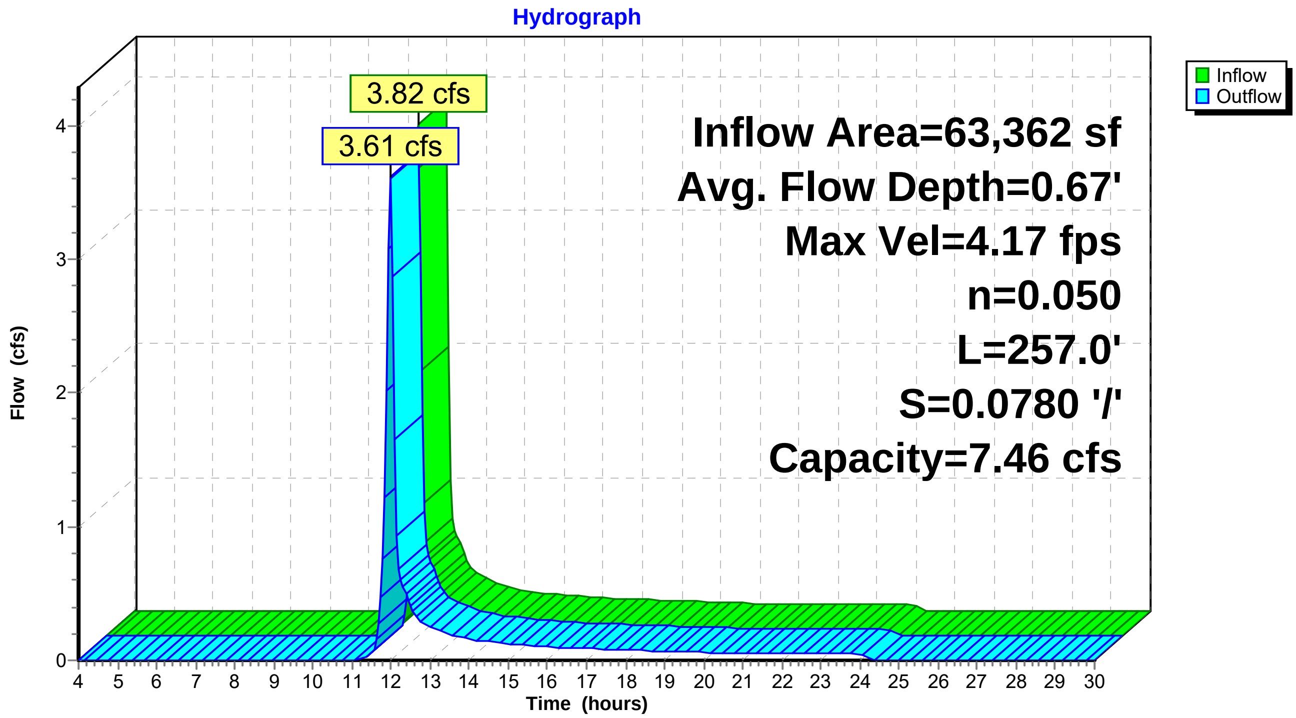
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 3.4 min

Peak Storage= 231 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 1.00' Flow Area= 1.5 sf, Capacity= 7.46 cfs

1.00' x 1.00' deep channel, n= 0.050
Side Slope Z-value= 0.5 '/' Top Width= 2.00'
Length= 257.0' Slope= 0.0780 '/'
Inlet Invert= 0.00', Outlet Invert= -20.05'



Reach 6R: Channel 5



Summary for Reach 7R: Channel 6

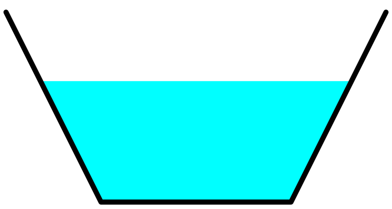
[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 1.37" for 10-yr event
Inflow = 4.12 cfs @ 11.99 hrs, Volume= 9,006 cf
Outflow = 4.02 cfs @ 12.00 hrs, Volume= 9,006 cf, Atten= 3%, Lag= 0.6 min

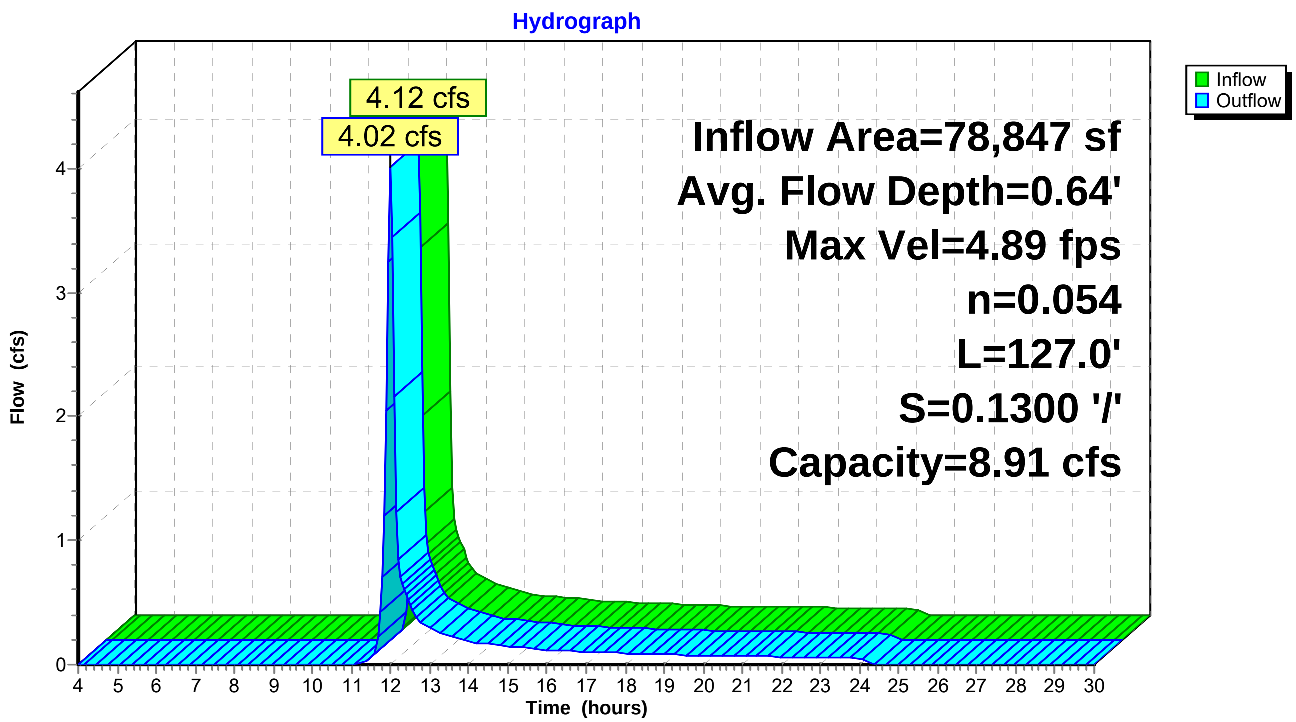
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.89 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 1.4 min

Peak Storage= 107 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.00' Flow Area= 1.5 sf, Capacity= 8.91 cfs

1.00' x 1.00' deep channel, n= 0.054
Side Slope Z-value= 0.5 '/' Top Width= 2.00'
Length= 127.0' Slope= 0.1300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.51'



Reach 7R: Channel 6



Summary for Reach 10R: Channel 7

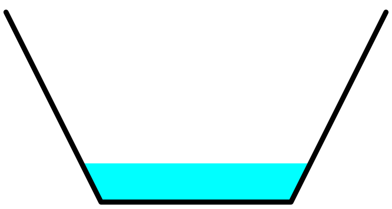
[65] Warning: Inlet elevation not specified

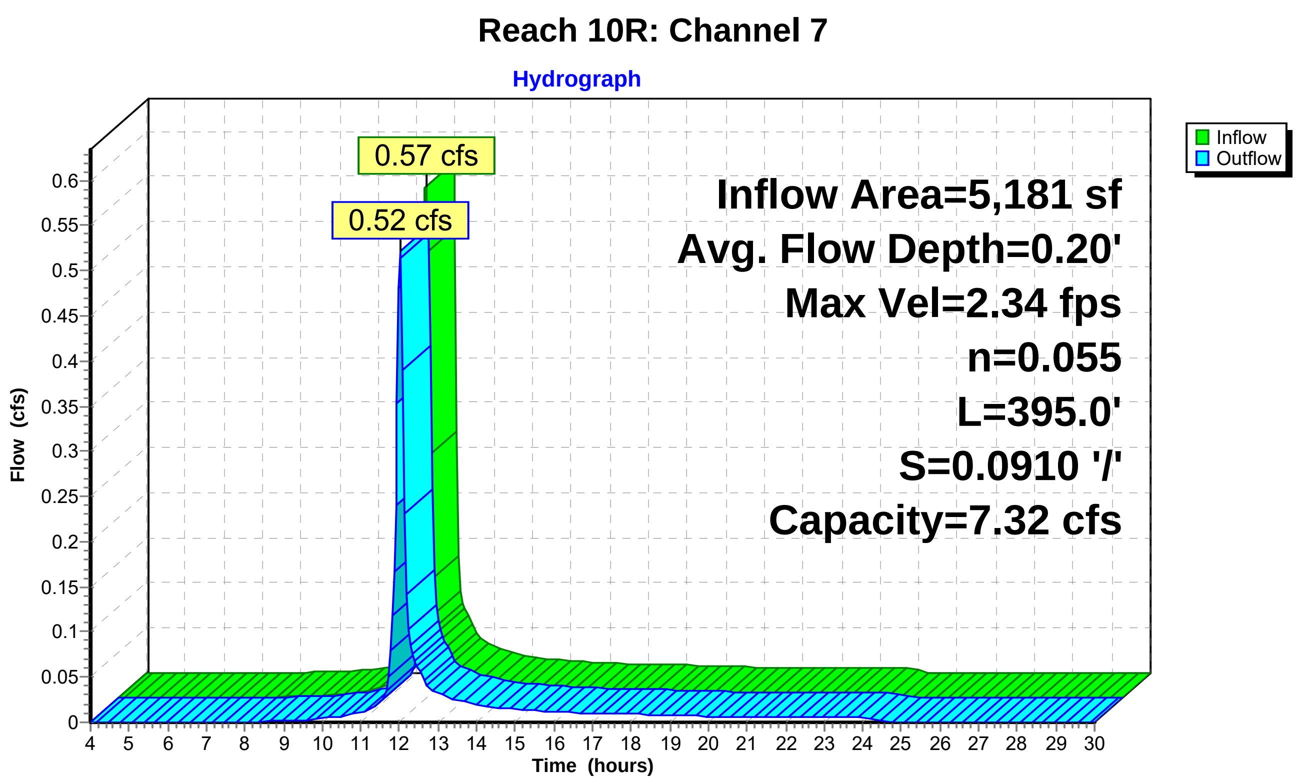
Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 2.67" for 10-yr event
Inflow = 0.57 cfs @ 11.96 hrs, Volume= 1,152 cf
Outflow = 0.52 cfs @ 12.04 hrs, Volume= 1,152 cf, Atten= 8%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.34 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 11.5 min

Peak Storage= 89 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 1.5 sf, Capacity= 7.32 cfs

1.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 0.5 '/' Top Width= 2.00'
Length= 395.0' Slope= 0.0910 '/'
Inlet Invert= 0.00', Outlet Invert= -35.95'





Summary for Reach 11R: Channel 8

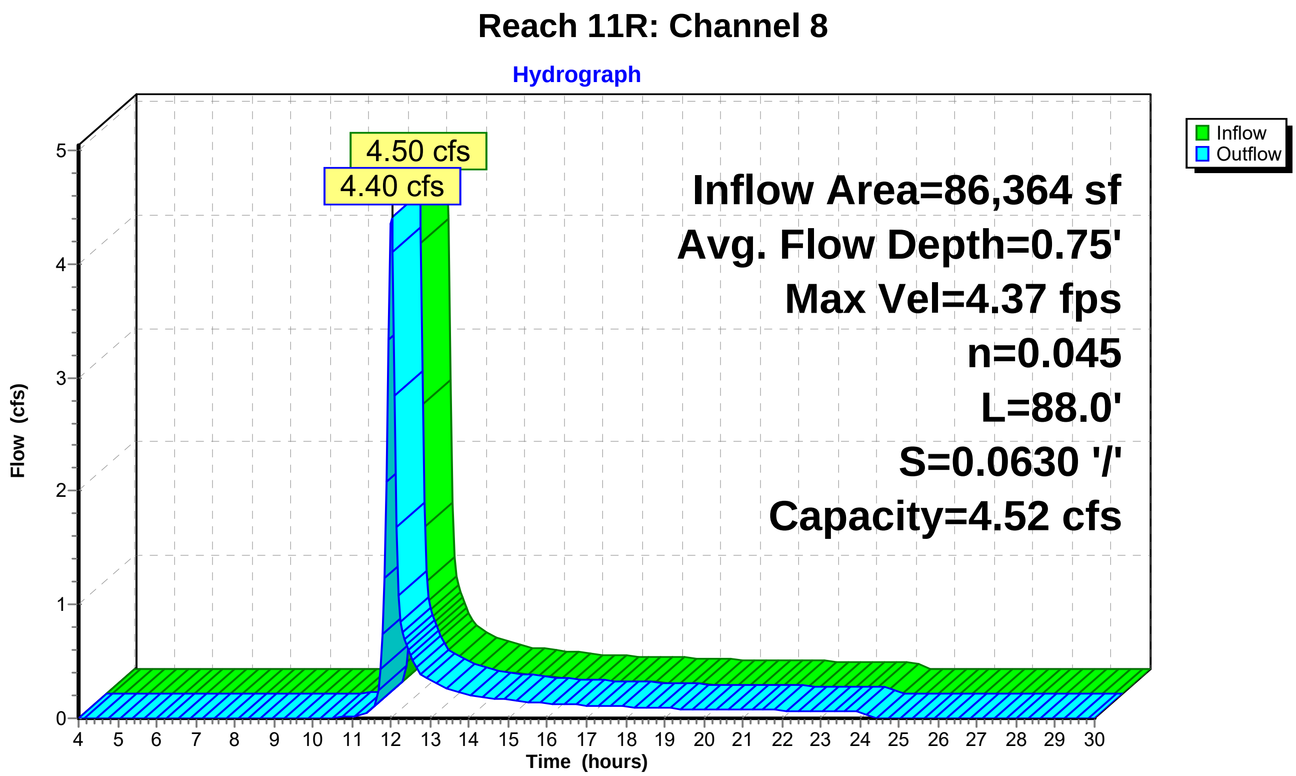
[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 1.41" for 10-yr event
Inflow = 4.50 cfs @ 12.01 hrs, Volume= 10,157 cf
Outflow = 4.40 cfs @ 12.02 hrs, Volume= 10,157 cf, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 1.2 min

Peak Storage= 90 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 0.75' Flow Area= 1.0 sf, Capacity= 4.52 cfs

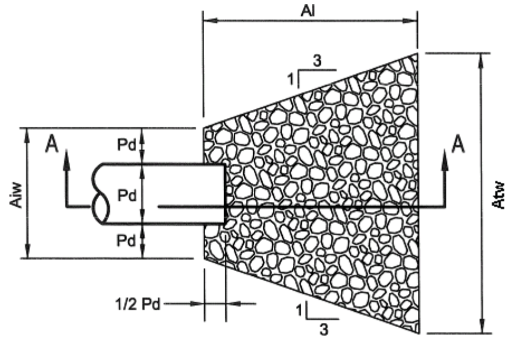
1.00' x 0.75' deep channel, n= 0.045
Side Slope Z-value= 0.5 '/' Top Width= 1.75'
Length= 88.0' Slope= 0.0630 '/'
Inlet Invert= 0.00', Outlet Invert= -5.54'



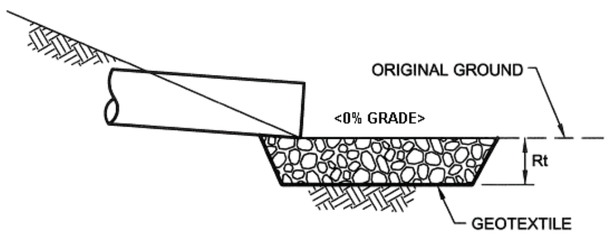
ATTACHMENT 3.7
RIPRAP APRON DESIGN WORKSHEET

STANDARD E&S WORKSHEET # 20
Riprap Apron Outlet Protection

PROJECT NAME: Williams REAE – MLV-505LD86
LOCATION: Monroe County, PA
PREPARED BY: CD DATE: 02/17/2022
CHECKED BY: PW DATE: 02/17/2022



PLAN VIEW

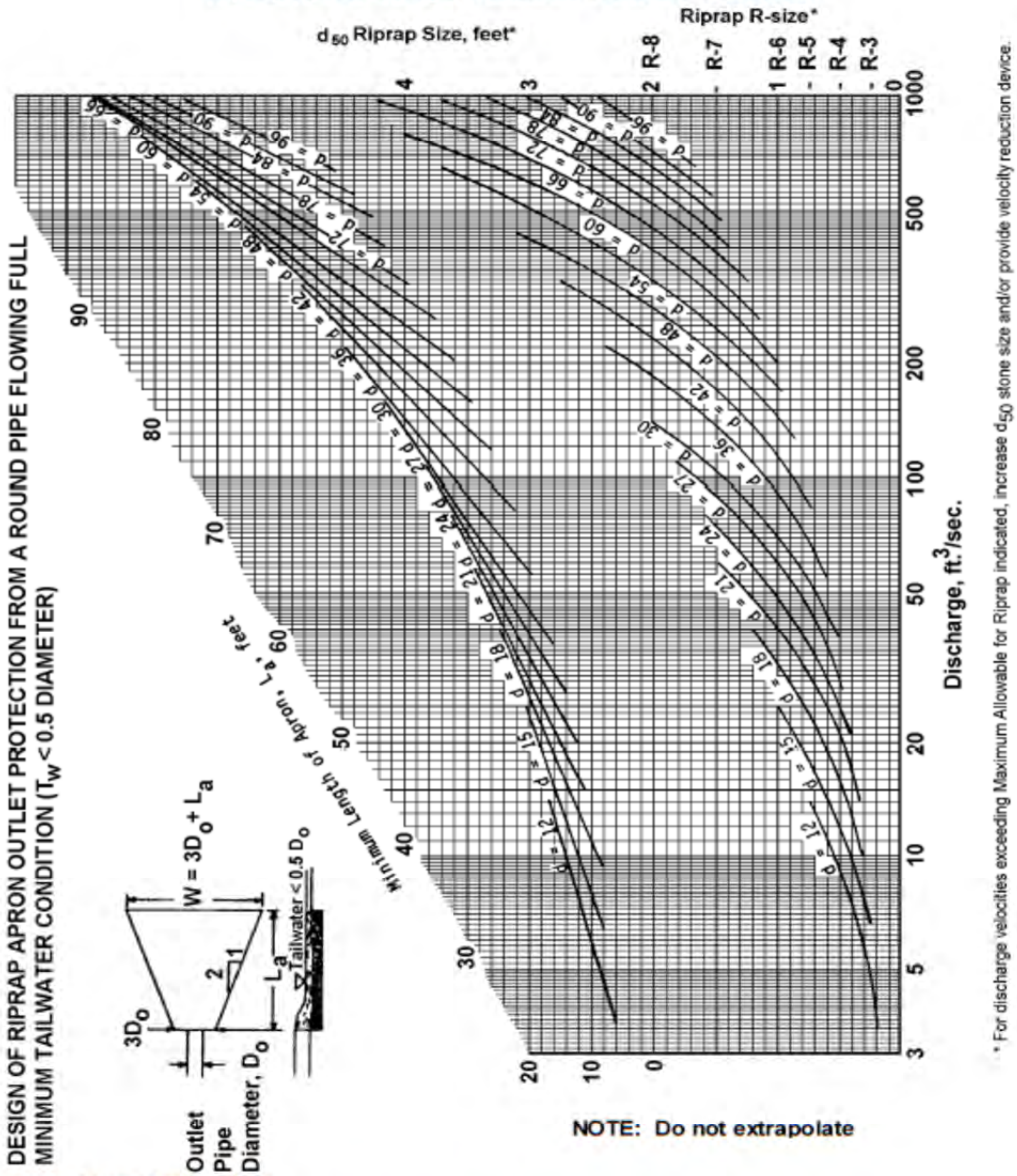


SECTION A - A

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)
1	12	Min	0.012	0.017	1.55	5.87	R-3	9	6	3	9
2	48	Min	0.050	0.110	1.76	3.74	R-3	9	6	12	18
3	18	Min	0.012	0.010	3.82	5.99	R-3	9	6	4.5	10.5
4	36	Min	0.070	0.110	4.12	3.82	R-3	9	6	9	15
5	24	Min	0.050	0.063	4.50	4.26	R-3	9	6	6	12
6	18	Min	0.012	0.17	6.96	3.93	R-3	9	8	4.5	12.5
7	18	Min	0.012	0.025	1.93	2.71	R-3	9	6	4.5	10.5
8	4	Min	0.012	0.063	0.38	4.38	R-3	9	6	1	7
9	6	Min	0.012	0.067	0.46	2.36	R-3	9	6	1.5	7
10	18	Min	0.012	0.025	5.85	3.20	R-3	9	6	4.5	10.5

***: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 $\geq$ 0.05 ft/ft.**

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



Adapted from USDA - NRCS

Not to be used for Box Culverts

ATTACHMENT 3.8
EROSION CONTROL BLANKET REPORTS

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SLOPE ANALYSIS

> > > STA 805+61 to 806+10

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	49
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.227
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 49 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	4.656	STABLE	C
Estb. Veg.	1.0 in	0.0 in	N/A in	N/A in	0.03 in	3.868	STABLE	--

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SLOPE ANALYSIS

> > > STA 808+10 to 808+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)	2.428
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	0.8 in	0.0 in	1.4 in	0.1 in	0.25 in	4.876	STABLE	C
Estb. Veg.	0.9 in	0.0 in	N/A in	N/A in	0.03 in	4.055	STABLE	--

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SLOPE ANALYSIS
> > > STA 873+75 to 874+37

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	62
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	4.133
Soil Type	Sandy Loam
K Factor	0.19

Reach 1
Start: 0ft End: 62 ft
Vegetation Type: 65-79%

Material	ASL bare	ASL mat	MSL bare	MSL mat	Soil Loss Tolerance	SF	Remarks	Staple / App Rate
SC150BN	0.3 in	0.0 in	0.6 in	0.0 in	0.25 in	>10	STABLE	D
Estb. Veg.	0.4 in	0.0 in	N/A in	N/A in	0.03 in	>10	STABLE	--

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SLOPE ANALYSIS

> > > STA 912+29 to 912+76

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)	3.133
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	0.6 in	0.0 in	1.1 in	0.0 in	0.25 in	7.072	STABLE	C
Estb. Veg.	0.7 in	0.0 in	N/A in	N/A in	0.03 in	5.267	STABLE	--

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SLOPE ANALYSIS
> > > STA 956+00 to 956+67

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	67
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.481
Soil Type	Silt Loam
K Factor	0.33

Reach 1
Start: 0ft End: 67 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	1.7 in	0.1 in	0.25 in	3.704	STABLE	C
Estb. Veg.	1.0 in	0.0 in	N/A in	N/A in	0.03 in	3.581	STABLE	--

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SLOPE ANALYSIS
> > > STA 957+62 to 958+29

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	79
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	3.591
Soil Type	Silt Loam
K Factor	0.33

Reach 1
Start: 0ft End: 79 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	4.928	STABLE	C
Estb. Veg.	0.8 in	0.0 in	N/A in	N/A in	0.03 in	4.657	STABLE	--

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SLOPE ANALYSIS

> > > STA 961+88 to 962+18

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	43
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.72
Soil Type	Silt Loam
K Factor	0.33

Reach 1

Start: 0ft End: 43 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	4.271	STABLE	C
Estb. Veg.	1.1 in	0.0 in	N/A in	N/A in	0.03 in	3.474	STABLE	--

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SLOPE ANALYSIS

> > > STA 1053+39 to 1053+69

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	30
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	1.875
Soil Type	Loam
K Factor	0.25

Reach 1

Start: 0ft End: 30 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	9.528	STABLE	C
Estb. Veg.	0.6 in	0.0 in	N/A in	N/A in	0.03 in	5.891	STABLE	--

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SLOPE ANALYSIS

> > > STA 1184+00 to 1184+50

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)	1.666
Soil Type	Loam
K Factor	0.25

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	0.8 in	0.0 in	1.4 in	0.0 in	0.25 in	5.106	STABLE	C
Estb. Veg.	0.9 in	0.0 in	N/A in	N/A in	0.03 in	4.139	STABLE	--

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SLOPE ANALYSIS

> > > STA 1219+20 to 1219+91

Country	United States
State/Region	Pennsylvania
City	Scranton
Annual R Factor	100.00
Adjusted R Factor	100.00
Total Slope Length	71
Protection Type	Permanent
Protection Period	12
Beginning Month	May
Slope Gradient (H:1)	2.535
Soil Type	Loam
K Factor	0.25

Reach 1

Start: 0ft End: 71 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	0.0 in	0.25 in	5.171	STABLE	C
Estb. Veg.	0.8 in	0.0 in	N/A in	N/A in	0.03 in	4.672	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-1

Name	DC-EL-1
Discharge	14.06
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)

S150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
S150BN Unvegetated	Straight	14.06 cfs	3 ft/s	1.11 ft	0.038	1.9 lbs/ft2	0.69 lbs/ft2	2.74	STABLE	D
Underlying Substrate	Straight	14.06 cfs	3 ft/s	1.11 ft	0.038	1.39 lbs/ft2	0.42 lbs/ft2	3.32	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	14.06 cfs	3 ft/s	1.11 ft	0.038	4 lbs/ft2	0.69 lbs/ft2	5.78	STABLE	--
Underlying Substrate	Straight	14.06 cfs	3 ft/s	1.11 ft	0.038	3.95 lbs/ft2	0.42 lbs/ft2	9.41	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-2

Name	DC-EL-2
Discharge	2.65
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)

S150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
S150BN Unvegetated	Straight	2.65 cfs	1.63 ft/s	0.53 ft	0.047	1.9 lbs/ft2	0.33 lbs/ft2	5.74	STABLE	D
Underlying Substrate	Straight	2.65 cfs	1.63 ft/s	0.53 ft	0.047	1.39 lbs/ft2	0.23 lbs/ft2	6.01	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	2.65 cfs	1.63 ft/s	0.53 ft	0.047	4 lbs/ft2	0.33 lbs/ft2	12.09	STABLE	--
Underlying Substrate	Straight	2.65 cfs	1.63 ft/s	0.53 ft	0.047	4 lbs/ft2	0.23 lbs/ft2	17.27	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-3

Name	DC-EL-3
Discharge	3.54
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)

S150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
S150BN Unvegetated	Straight	3.54 cfs	2.88 ft/s	0.43 ft	0.05	1.9 lbs/ft2	1.18 lbs/ft2	1.61	STABLE	D
Underlying Substrate	Straight	3.54 cfs	2.88 ft/s	0.43 ft	0.05	1.39 lbs/ft2	0.86 lbs/ft2	1.62	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	3.54 cfs	2.88 ft/s	0.43 ft	0.05	4 lbs/ft2	1.18 lbs/ft2	3.39	STABLE	--
Underlying Substrate	Straight	3.54 cfs	2.88 ft/s	0.43 ft	0.05	4 lbs/ft2	0.86 lbs/ft2	4.65	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-4

Name	DC-EL-4
Discharge	6.06
Channel Slope	0.048
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	6.06 cfs	3.73 ft/s	0.53 ft	0.045	2 lbs/ft2	1.59 lbs/ft2	1.26	STABLE	D
Underlying Substrate	Straight	6.06 cfs	3.73 ft/s	0.53 ft	0.045	1.47 lbs/ft2	1.11 lbs/ft2	1.32	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	6.06 cfs	3.73 ft/s	0.53 ft	0.045	4 lbs/ft2	1.59 lbs/ft2	2.52	STABLE	--
Underlying Substrate	Straight	6.06 cfs	3.73 ft/s	0.53 ft	0.045	4 lbs/ft2	1.11 lbs/ft2	3.6	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-5

Name	DC-EL-5
Discharge	3.54
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	3.54 cfs	2.88 ft/s	0.43 ft	0.05	2 lbs/ft2	1.18 lbs/ft2	1.69	STABLE	D
Underlying Substrate	Straight	3.54 cfs	2.88 ft/s	0.43 ft	0.05	1.47 lbs/ft2	0.86 lbs/ft2	1.7	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	3.54 cfs	2.88 ft/s	0.43 ft	0.05	4 lbs/ft2	1.18 lbs/ft2	3.39	STABLE	--
Underlying Substrate	Straight	3.54 cfs	2.88 ft/s	0.43 ft	0.05	4 lbs/ft2	0.86 lbs/ft2	4.65	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-6

Name	DC-EL-6
Discharge	6.55
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	6.55 cfs	2.4 ft/s	0.77 ft	0.039	2 lbs/ft2	0.48 lbs/ft2	4.17	STABLE	D
Underlying Substrate	Straight	6.55 cfs	2.4 ft/s	0.77 ft	0.039	1.47 lbs/ft2	0.31 lbs/ft2	4.69	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	6.55 cfs	2.4 ft/s	0.77 ft	0.039	4 lbs/ft2	0.48 lbs/ft2	8.34	STABLE	--
Underlying Substrate	Straight	6.55 cfs	2.4 ft/s	0.77 ft	0.039	4 lbs/ft2	0.31 lbs/ft2	12.82	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-7

Name	DC-EL-7
Discharge	0.9
Channel Slope	0.063
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	0.9 cfs	2.12 ft/s	0.18 ft	0.05	2 lbs/ft2	0.71 lbs/ft2	2.83	STABLE	D
Underlying Substrate	Straight	0.9 cfs	2.12 ft/s	0.18 ft	0.05	1.47 lbs/ft2	0.59 lbs/ft2	2.47	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	0.9 cfs	2.12 ft/s	0.18 ft	0.05	4 lbs/ft2	0.71 lbs/ft2	5.67	STABLE	--
Underlying Substrate	Straight	0.9 cfs	2.12 ft/s	0.18 ft	0.05	4 lbs/ft2	0.59 lbs/ft2	6.73	STABLE	--

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CHANNEL ANALYSIS

> > > DC-EL-008

Name	DC-EL-008
Discharge	4.95
Channel Slope	0.067
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	4.95 cfs	3.68 ft/s	0.46 ft	0.05	2 lbs/ft2	1.92 lbs/ft2	1.04	STABLE	D
Underlying Substrate	Straight	4.95 cfs	3.68 ft/s	0.46 ft	0.05	1.47 lbs/ft2	1.38 lbs/ft2	1.06	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	4.95 cfs	3.68 ft/s	0.46 ft	0.05	4 lbs/ft2	1.92 lbs/ft2	2.08	STABLE	--
Underlying Substrate	Straight	4.95 cfs	3.68 ft/s	0.46 ft	0.05	4 lbs/ft2	1.38 lbs/ft2	2.89	STABLE	--

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CHANNEL ANALYSIS

> > >DC-EL-9

Name	DC-EL-9
Discharge	1.18
Channel Slope	0.063
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	1.18 cfs	2.32 ft/s	0.21 ft	0.05	2 lbs/ft2	0.83 lbs/ft2	2.42	STABLE	D
Underlying Substrate	Straight	1.18 cfs	2.32 ft/s	0.21 ft	0.05	1.47 lbs/ft2	0.68 lbs/ft2	2.15	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	1.18 cfs	2.32 ft/s	0.21 ft	0.05	4 lbs/ft2	0.83 lbs/ft2	4.84	STABLE	--
Underlying Substrate	Straight	1.18 cfs	2.32 ft/s	0.21 ft	0.05	4 lbs/ft2	0.68 lbs/ft2	5.88	STABLE	--

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CHANNEL ANALYSIS

> > > SH-DC-001

Name	SH-DC-001
Discharge	0.11
Channel Slope	0.01
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	0.11 cfs	0.66 ft/s	0.13 ft	0.05	2 lbs/ft2	0.08 lbs/ft2	24.41	STABLE	D
Underlying Substrate	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	1.47 lbs/ft2	0.07 lbs/ft2	22.48	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	0.11 cfs	0.66 ft/s	0.13 ft	0.05	4 lbs/ft2	0.08 lbs/ft2	48.81	STABLE	--
Underlying Substrate	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	4 lbs/ft2	0.07 lbs/ft2	61.36	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-002

Name	SH-CC-002
Discharge	0.42
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	0.42 cfs	1.38 ft/s	0.13 ft	0.05	2 lbs/ft2	0.32 lbs/ft2	6.31	STABLE	D
Underlying Substrate	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	1.47 lbs/ft2	0.28 lbs/ft2	5.29	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	0.42 cfs	1.38 ft/s	0.13 ft	0.05	4 lbs/ft2	0.32 lbs/ft2	12.61	STABLE	--
Underlying Substrate	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	4 lbs/ft2	0.28 lbs/ft2	14.45	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-003

Name	SH-CC-003
Discharge	1.58
Channel Slope	0.04
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	1.58 cfs	2.51 ft/s	0.25 ft	0.041	2 lbs/ft2	0.63 lbs/ft2	3.19	STABLE	D
Underlying Substrate	Straight	1.58 cfs	2.51 ft/s	0.25 ft	0.041	1.47 lbs/ft2	0.5 lbs/ft2	2.92	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	1.58 cfs	1.97 ft/s	0.31 ft	0.058	4 lbs/ft2	0.76 lbs/ft2	5.24	STABLE	--
Underlying Substrate	Straight	1.58 cfs	1.97 ft/s	0.31 ft	0.058	4 lbs/ft2	0.59 lbs/ft2	6.75	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-004

Name	SH-CC-004
Discharge	1.78
Channel Slope	0.11
Channel Bottom Width	4
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	1.78 cfs	3.3 ft/s	0.13 ft	0.036	2 lbs/ft2	0.87 lbs/ft2	2.3	STABLE	D
Underlying Substrate	Straight	1.78 cfs	3.3 ft/s	0.13 ft	0.036	1.47 lbs/ft2	0.81 lbs/ft2	1.81	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	1.78 cfs	2.76 ft/s	0.15 ft	0.048	4 lbs/ft2	1.03 lbs/ft2	3.88	STABLE	--
Underlying Substrate	Straight	1.78 cfs	2.76 ft/s	0.15 ft	0.048	4 lbs/ft2	0.95 lbs/ft2	4.21	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-005

Name	SH-CC-005
Discharge	3.82
Channel Slope	0.09
Channel Bottom Width	3
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	3.82 cfs	3.53 ft/s	0.3 ft	0.05	2 lbs/ft2	1.69 lbs/ft2	1.19	STABLE	D
Underlying Substrate	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	1.47 lbs/ft2	1.4 lbs/ft2	1.05	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	3.82 cfs	3.53 ft/s	0.3 ft	0.05	4 lbs/ft2	1.69 lbs/ft2	2.37	STABLE	--
Underlying Substrate	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	4 lbs/ft2	1.4 lbs/ft2	2.86	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-006

Name	SH-CC-006
Discharge	4.12
Channel Slope	0.13
Channel Bottom Width	3
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)

Rock Riprap

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Rock Riprap Unvegetated	Straight	4.12 cfs	5.5 ft/s	0.22 ft	0.032	2 lbs/ft2	1.53 lbs/ft2	1.31	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-007

Name	SH-CC-007
Discharge	5.06
Channel Slope	0.13
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)

Rock Riprap

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Rock Riprap Unvegetated	Straight	5.06 cfs	6.39 ft/s	0.3 ft	0.032	2 lbs/ft2	1.91 lbs/ft2	1.05	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-008

Name	SH-CC-008
Discharge	4.6
Channel Slope	0.063
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	4.6 cfs	4.68 ft/s	0.36 ft	0.033	2 lbs/ft2	1.42 lbs/ft2	1.41	STABLE	D
Underlying Substrate	Straight	4.6 cfs	4.68 ft/s	0.36 ft	0.033	1.47 lbs/ft2	1.07 lbs/ft2	1.37	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	4.6 cfs	3.89 ft/s	0.42 ft	0.044	4 lbs/ft2	1.64 lbs/ft2	2.44	STABLE	--
Underlying Substrate	Straight	4.6 cfs	3.89 ft/s	0.42 ft	0.044	4 lbs/ft2	1.2 lbs/ft2	3.33	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-009

Name	SH-CC-009
Discharge	0.22
Channel Slope	0.139
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	0.22 cfs	2 ft/s	0.09 ft	0.05	2 lbs/ft2	0.8 lbs/ft2	2.52	STABLE	D
Underlying Substrate	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	1.47 lbs/ft2	0.67 lbs/ft2	2.2	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	0.22 cfs	2 ft/s	0.09 ft	0.05	4 lbs/ft2	0.8 lbs/ft2	5.03	STABLE	--
Underlying Substrate	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	4 lbs/ft2	0.67 lbs/ft2	5.99	STABLE	--

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CHANNEL ANALYSIS

> > > SH-CC-010

Name	SH-CC-010
Discharge	0.5
Channel Slope	0.148
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	0.5 cfs	3.4 ft/s	0.12 ft	0.035	2 lbs/ft2	1.09 lbs/ft2	1.83	STABLE	D
Underlying Substrate	Straight	0.5 cfs	3.4 ft/s	0.12 ft	0.035	1.47 lbs/ft2	0.88 lbs/ft2	1.66	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	0.5 cfs	2.81 ft/s	0.14 ft	0.047	4 lbs/ft2	1.29 lbs/ft2	3.11	STABLE	--
Underlying Substrate	Straight	0.5 cfs	2.81 ft/s	0.14 ft	0.047	4 lbs/ft2	1.01 lbs/ft2	3.95	STABLE	--

ATTACHMENT 4
OFFSITE DISCHARGE REPORTS

Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Effort Loop

MLV-505LD86

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 Access Expansion Project – Effort Loop (Project). MLV-505LD86 is proposed as part of the overall Project. The MLV-505LD86 site will utilize several PCSM BMPs to control stormwater runoff, attenuate peak flow rate and volume, and provide infiltration. Excess stormwater runoff will be directed to the basin, berms and subsurface beds, via a series of collection channels, for infiltration and controlled discharge. The new MLV 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. A series of PCSM channels along the access road will direct stormwater to discharge locations on both the north and south sides of the access road. On the south side of the access road, stormwater from the PCSM channels enters Infiltration Berm 1, flows into Infiltration Berm 2 and discharges water to a wooded area east of the berms. The remainder of PCSM channels direct stormwater water into two subsurface infiltration beds south of the access road and an infiltration basin that is north of the access road. The Infiltration Basin has an outlet that discharges into an 18” diameter pipe which directs stormwater to the Sugar Hollow Road ditch. Infiltration Bed #1 and Infiltration Bed #2 discharge below the access road and flow into the Sugar Hollow Road ditch. Stormwater from the Sugar Hollow Road ditch leaves the site via an 18” Sugar Hollow Road PennDOT culvert. These BMPs will be installed to mitigate both the net increase in volume between the pre- and post-development 2-year storm events and the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events.

2.1 Infiltration Berm 1 and Infiltration Berm 2

Infiltration Berm 1 flows into Infiltration Berm 2 which discharges stormwater toward the adjacent forested area located east of the Limits of Disturbance. The stormwater is discharged as sheet flow and travels along a vegetative flow path until it reaches the Sugar Hollow Road ditch and then crosses Sugar Hollow Road via a PennDOT culvert, eventually entering Sugar Hollow Creek. 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**
KvB	**K_f = 0.15**
WKE	**K_f = 0.05**
Pp	**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. KvB and WKE soils have a low susceptibility to erosion (0.15, 0.05) and Pp soils have a moderate susceptibility to erosion (0.43). Photos were taken along the flow path of the downstream area to show the vegetative cover.

Photo 1: Existing Area at Proposed Infiltration Berm 2

Photo 2: Area Downgradient of the Proposed Infiltration Berm 2

Photo 1 shows the existing condition where Infiltration Berm 2 is proposed. The area will be graded to facilitate the installation of Infiltration Berm 1 and Infiltration Berm 2 and then revegetated. Photo 2 shows the areas downgradient of the proposed Infiltration Berm 2, 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 2 is 1.31 feet per second for the 25 year, 24-hour storm event.

2.2 Infiltration Basin, Subsurface Infiltration Bed #1 and Subsurface Infiltration Bed #2

The infiltration basin discharges stormwater to a basin riser pipe outlet which travels through a culvert that crosses beneath the site entrance and then continues along the Sugar Hollow Road ditch near the site entrance. Infiltration Bed #1 has a 4” outlet pipe and Infiltration Bed #2 has a 6” outlet pipe which discharge upgradient of the Sugar Hollow

Road ditch. Stormwater in the Sugar Hollow ditch leaves the site via an 18” PennDOT culvert which goes beneath Sugar Hollow Road and eventually enters Sugar Hollow Creek. The flow path is depicted in Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 2.

Table 2 – Soils Mapped within Flow Path	
Soil Mapping Unit	**Soil Erodibility Factor, K_f**
WKE	**K_f = 0.05**
Pp	**K_f = 0.43**

The soil erodibility factor is 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 soil in the flow path is considered moderately erodible (0.05, 0.43). Photos were taken along the flow path of the downstream area to show the vegetative cover.

Photo 3: Existing Area at Proposed Basin Outlet

Photo 4: Area Downgradient of the Proposed Basin Outlet

Photo 5: Existing Area and Area Downgradient Proposed Subsurface Infiltration Beds

Photo 6: Existing PennDOT Culvert Inlet

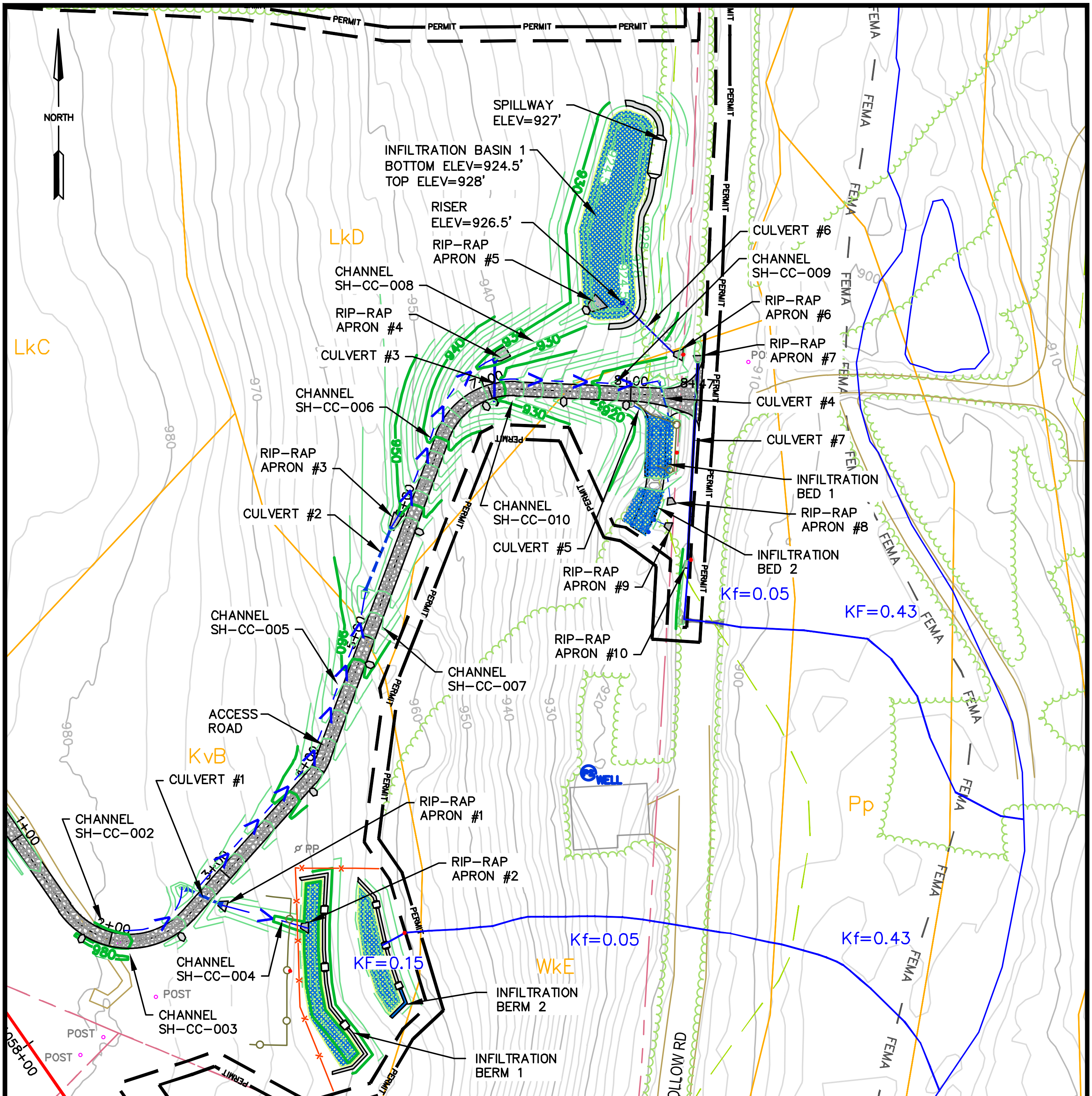
Photo 7: Existing Area Downgradient of PennDOT Culvert

Photo 3 shows the existing condition where the basin outlet is proposed. The area will be graded to facilitate the installation of the infiltration basin and basin outlet then revegetated. Photo 4 shows the areas downgradient of the proposed basin outlet, which is over 90% vegetated. Photo 5 shows the area existing conditions where the subsurface infiltration beds are proposed as well as the area downgradient of the beds. Photo 6 shows the inlet area of the PennDOT 18” diameter culvert. Construction activities and installation of BMPs will not increase flows to or overwhelm this culvert. Photo 7 shows the existing area downstream of the PennDOT culvert.

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 Basin outlet is 0.0 feet per second for the for the 25 year, 24-hour storm event. The discharge velocity from subsurface Infiltration Bed #1 is 1.61 feet per second and the discharge velocity from Infiltration Bed #2 is 1.88 feet per second for the 25 year, 24-hour storm event. Overall, stormwater volumes and rates will be reduced and discharge from the basin and infiltration beds will not promote erosion to downstream areas.

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 to moderate soil erodibility values associated with the property, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



SCALE

100 50 0 100

SCALE 1" =100'

LEGEND

OFFSITE DISCHARGE FLOW PATH

Williams.

WHM consulting, INC.

designs, permits, resolutions

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-505LD86

EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

CHESTNUTHILL TWP MONROE COUNTY PENNSYLVANIA

DATE: **02/22/22**

DRAWN BY: **RWS**

CHECKED: **PW**

WHM DRAWING NO: **FLOW PATH**

EXHIBIT 1.0

SECTION 2.2.2

DRAWINGS