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Erosion & Sediment Control Plan and Site Restoration Plan Narrative

Atlantic Sunrise Project

Temporary and Permanent Access Roads
Lenox Township
Susquehanna County
Pennsylvania

Prepared For:

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

2800 Post Oak Blvd
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GENERAL INFORMATION

Project Description

The following erosion and sediment control (E&SC) and site restoration (SR) narrative describes the E&SC and SR designs for the temporary and permanent access roads to be constructed within Susquehanna County (County), Pennsylvania as part of the Transcontinental Gas Pipe Line Company, LLC (Transco) Atlantic Sunrise Project ("Project").

The Project includes modifications to the existing Transco Mainline system to reverse the direction of flow, enabling new north-to-south capabilities (bi-directional flow) to transport this new source of natural gas to existing markets. In Susquehanna County, the main Project improvements that the temporary and permanent access roads will support include ***installation of a*** 30-inch-diameter greenfield pipeline referred to as the Central Penn Line (CPL) North pipeline.

Where possible, existing public and private roads will be utilized to provide access to the pipeline ROW during and after construction. ***During construction, E&SC BMPs will be installed along all access roads as shown on the road-specific Soil Erosion Control Plans included in the Erosion & Sediment Control and Layout Plans for Access Roads in Section 2 of the Erosion and Sediment Control General Permit 2 (ESCGP-2) Notice of Intent (NOI).***

Temporary access roads will be installed and maintained for the duration of construction. When no longer needed, the road materials will be removed and the impacted areas will be restored to pre-construction conditions as shown on the ***road-specific Site Restoration Plans included in the*** Erosion & Sediment Control and Layout Plans for Access Roads in ***Section 2 of the Erosion and Sediment Control General Permit 2 (ESCGP-2) Notice of Intent (NOI).***

Permanent gravel access roads will be installed to provide access to select portions of the pipeline right of way (ROW) not accessible by existing roads, ***for pipeline maintenance and inspections*** in accordance with applicable regulatory guidelines. ***The proposed increase in impervious area for the permanent access roads to the pipeline ROW is temporary. Similar to temporary access roads, upon construction completion, the proposed road materials will be removed and the impacted areas will be restored to pre-construction conditions. Transco operations will use the restored road surface to access the ROW as necessary in the future. Typically, pickup trucks will be used to perform routine maintenance and inspections and the trucks are capable of driving over grassy areas similar to the pipeline ROW.***

There are no proposed access roads to main line valve (MLV) sites in Susquehanna County.

References

E&SC Best Management Practices (E&SC BMPs), in accordance with the standards and specifications in the Pennsylvania Department of Environmental Protection's (PADEP's) "Erosion and Sediment Pollution Control Program Manual," Technical Guidance No. 363-2134-008, as amended and updated (E&SC Manual) will be used during the construction phase of the project. The proposed practices are designed to achieve the regulatory standard of minimizing the potential for accelerated erosion and sedimentation associated with temporary earth disturbance activities. The E&SC BMPs will remain in place until the surrounding area has reached final stabilization. An area shall be considered to have achieved final stabilization when it has a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristic sufficient to resist sliding and other movements.

Impacts to wetlands, streams or waterbodies will be avoided to the maximum extent practicable. Refer to the Wetland Delineation Report provided as **Section 5 of the ESCGP-2 NOI** for information supporting wetland mapping shown on the E&SC Plans (**Section 2 of the ESCGP-2 NOI**).

Temporary and Permanent Access Roads

The following access roads are proposed to be constructed in Susquehanna County to support the CPL North pipeline:

Temporary/ Permanent	Access Road	Mile Post (MP)	Major River Basin	Receiving Water	Existing Use	Chapter 93 Designated Use	Designated Use	Impairment	Total Maximum Daily Load
Temporary	SU-044	MP 52.0	Susquehanna River	Willow Brook	None	CWF, MF	CWF, MF	None	None
	SU-045	MP 52.8	Susquehanna River	UNT to Tower Branch	None	CWF, MF	CWF, MF	None	None
Permanent	SU-041	MP 50.6	Susquehanna River	UNT to Tunkhannock Creek	None	CWF, MF	CWF, MF	None	None
	SU-046	MP 56.3	Susquehanna River	Tower Branch	None	CWF, MF	CWF, MF	None	None

1.0 COMMON INFORMATION

1.1 Topographic Features

See the **Appendices E through H** for road-specific United States Geological Survey (USGS) mapping.

1.2 Soil Characteristics

AECOM prepared the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Custom Soil Resource Report for the counties crossed by the CPL North pipeline. The NRCS Custom Soil Resource Report for Susquehanna County, Pennsylvania and the Soil Association Maps prepared by Wood Group Mustang Inc. are included in **Appendix C**. County-specific soil type and use limitations are presented in Table 1.2.1 below.

Table 1.2.1

Soil Type and Use Limitations for Susquehanna County

Map Symbol	Soil Name	Slope	Cut Banks Cave	Corrosive to Concrete or Steel	Droughty	Easily Erodible	Flooding	High Water Table	Hydric/Hydric Inclusions	Low Strength	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink-Swell	Potential Sinkhole	Ponding	Wetness
Hw	Holly silt loam		X	C/S			X	X	X	X	X	X	X	X			X	X
LkB2	Lordstown and Oquaga Channery silt loams, moderately eroded	3-12%	X	C	X	X			X	X	X	X		X				
LoB	Lordstown and Oquaga Flaggy silt loams	3-12%	X	C	X	X			X	X	X	X		X				
LsB LsD LsF	Lordstown and Oquaga very stony silt Loams	0-12% 12-30% 30-70%	X	C	X	X			X	X	X	X		X				
McB2	Mardin Channery silt loam, eroded	3-8%	X	S	X	X		X	X	X	X	X		X				X
MgB MgD	Mardin Channery silt loam	0-8% 8-25%	X	S	X	X		X	X	X	X	X		X				X
MoB2	Morris Channery silt loam, eroded	3-8%	X	C/S	X	X		X	X	X	X		X	X				X
MrD2	Morris Flaggy silt loam, eroded	15-25%	X	C/S	X	X		X	X	X	X		X	X				X

Map Symbol	Soil Name	Slope	Cut Banks Cave	Corrosive to Concrete or Steel	Droughty	Easily Erodible	Flooding	High Water Table	Hydric/Hydric Inclusions	Low Strength	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink-Swell	Potential Sinkhole	Ponding	Wetness
NcB	Norwich and Chippewa Soils	3-8%	X	C/S	X	X		X	X	X	X	X	X	X	X		X	X
VcB2 VcC2	Volusia Channery silt loam, eroded	3-8% 8-15%	X	C/S	X	X		X	X	X	X	X	X	X				
VsB	Volusia Channery silt loam, extremely stony	0-8%	X	C/S	X	X		X	X	X	X	X	X	X				
WeB2	Wellsboro Channery silt loam, moderately eroded	3-8%	X	C/S	X	X		X	X	X	X	X		X				X
WeC2	Wellsboro Channery silt loam, eroded	8-15%	X	C/S	X	X		X	X	X	X	X		X				X
WIC2	Wellsboro flaggy silt loam, moderately eroded	8-15%	X	C/S	X	X		X	X	X	X	X		X				X

Source: Appendix E, Table E-1, PADEP, *Erosion and Sediment Pollution Control Program Manual*, Technical Guidance Number 363-2134-008.

Table 1.2.2

Soil Use Limitations Resolutions

Limitation	Resolution
Slopes	Excavations should be stabilized to prevent erosion and contractor should employ proper construction techniques to ensure safety on steep slope areas.
Cut Banks Cave	Excavations will be properly supported by sheeting and shoring to prevent caves.
Corrosive to Concrete or Steel	No concrete or steel piping is proposed without appropriate coatings and protection.
Droughty	Existing suitable topsoil and soil amendments will be used during construction as necessary.
Easily Erodible	Temporary and permanent E&SC BMPs will be employed throughout the construction and operation of the access roads.
Flooding	Ensure that the access roads have has proper drainage and no obstructions within floodway/floodplain.
High Water Table	A geotechnical investigation was conducted to minimize conflicts with saturated zones.
Hydric/Hydric Inclusions	A wetland investigation was completed. Impacts to wetlands have been minimized by modifying the access road alignment to avoid wetlands and/or protecting wetlands with E&SC BMPs where existing roads are adjacent to wetlands.
Low Strength	A maximum of 3:1 slopes area proposed.
Slow Percolation	A field investigation of percolation rates at the infiltration areas will be performed to verify the soils percolation capacity.
Piping	Watertight pipe, antiseep collars, clay cores through basin berms, and concrete endwalls will be used to minimize water movement via pipe bedding.
Poor Source of Topsoil	Existing topsoil, which has proven to be suitable, will be reused on the site.
Frost Action	Gravel specified in lieu of pavement to minimize frost effects.
Shrink-Swell	Gravel specified in lieu of pavement.
Potential Sinkhole	Geotechnical Engineer of record recommendations will be followed for any potential occurrences.
Ponding	Surface grading and drainage facilities will be provided to minimize ponding affects.
Wetness	Wet weather construction recommendations, per the Geotechnical Engineer's recommendations, will be employed to minimize the effects of wetness during construction, surface grading. Surface grading and drainage will be provided to minimize wetness affects after construction.

1.3 Earth Disturbance Activity

The proposed temporary and permanent access roads are located in grassy, woodland, and agriculture areas. Portions of the roads are located along existing dirt, gravel, or paved roads. The proposed land use is temporary or permanent access roads intended

to provide a means of ingress/egress to/from the pipeline ROW for construction personel and inspectors. The proposed alteration of the land includes modifying the existing access road ROW to accommodate a 14 foot wide gravel access road, typically. Installing the access roads may require grading activity to widen existing roads or to construct new portions of road. See the Access Road E&SC Plans in **Section 2 of the ESCGP-2 NOI**.

Characterization of Land Use

The characterization of land use within the proposed CPL North project areas is based on interpretation of aerial photographs taken in the spring of 2014 and information gathered from field surveys conducted during 2014 and 2015. Transco classified land uses within the proposed Project areas into the following eight broad types:

1. Agricultural Land – land associated with active cultivation of ROW and field crops; areas of grasses planted for livestock grazing or for the production of hay crops; orchards; and specialty crops, including vineyards, Christmas trees, and fruits and vegetables.

2. Upland Forest/Woodland – includes upland deciduous forest, evergreen forest, and mixed (deciduous and evergreen) forest, but does not include forested wetlands.

3. Industrial/Commercial Land – land used for mines or quarries and associated processing plants; manufacturing or other industrial facilities; and land developed for commercial or retail uses, including malls, strip plazas, business parks, and medical facilities.

4. Transportation Land – land used for transportation purposes, including interstate highways; state, county, and local highways and roads; and railroad lines.

5. Residential Land – residential areas, including yards of individual residences.

6. Open Land – non-forested and undeveloped land not classified for another use, including land maintained as utility ROWs for overhead and underground electric transmission, natural gas transmission, and oil transmission facilities.

7. Wetlands – includes wetlands covered with emergent, scrub-shrub, and forested vegetation.

8. Open Water – include rivers, streams, creeks, canals, and other linear waterbodies, as well as lakes, ponds, and other non-flowing waterbodies.

Area Types

The access road construction ROW is comprised of the following area types:

- Limit of Disturbance (LOD) Area – The LOD area is the construction ROW for the access roads. For most roads, this area is 50 feet wide and centered on the centerline of the access road. In areas where grading and/or E&SC BMPs require more room, the LOD has been expanded to encompass the proposed improvement area.
- ESCGP-2 Permit Boundary/Site Area – The ESCGP-2 Permit Boundary/Site Area is the area to be permitted for improvements with the Chapter 102 Application. This area is slightly larger than the LOD area. The limit of the ESCGP-2 Permit Boundary/Site Area is typically offset 5 feet from the LOD limit for access roads.

  Future changes made to the LOD area that are still within the ESCGP-2 Permit Boundary/ Site Area would likely be considered a minor modification to the Project's Chapter 102 Permit. However, future changes to the LOD area that are outside the ESCGP-2 Permit Boundary/Site Area may require a major modification to the Permit.
- Area of Minimum Disturbance/Reduced Grading – The Area of Minimum Disturbance/Reduced Grading is the area within the LOD area that is outside the proposed grading area. Disturbances within the Area of Minimum Disturbance/Reduced Grading will be minimal.
- LOD Area within Floodway/Floodplain – The LOD Area within Floodway/Floodplain is the area within the LOD that is within a FEMA (Federal Emergency Management Agency) designated Floodplain or an assumed floodway that extends approximately 50 feet from the top of bank of a stream landward. The LOD Area within Floodway/Floodplain have been coordinated with the Chapter 105 Permit application. For most of the access roads, where the LOD crosses a floodway/floodplain, the LOD area has been minimized and the existing road will be used. Where the existing road cannot support the intended traffic loads, timber matting will be installed to provide an adequate driving surface.

1.4 Minimize Soil Compaction in Disturbed Areas

The impacts associated with the temporary and permanent access roads related to soil compaction in disturbed areas will be minimized to the maximum extent practicable. The following categories describe the different levels of compaction experienced by soils within the project limits and the measures required to mitigate the impacts of compaction in the disturbed areas. See the attached

access road appendices of this document for the specific measures implemented on each individual access road.

- ***Minimal Disturbance Areas: The minimal disturbance areas are depicted as AREA OF MINIMUM DISTURBANCE/REDUCED GRADING on the E&SC plans. Specifically, this area is located between the limit of grading and the access road right of way. Construction traffic is prohibited from these areas outside of existing roadway areas. The impacts associated with soil compaction are minimized by making this area as large as possible within the access road ROW.***
- ***Construction Traffic Areas: Construction traffic will be limited to the 14' wide access road. Existing roads will be used wherever possible. The width of the access roads has been reduced as much as possible to maximize the minimal disturbance areas while still providing safe travel to the anticipated construction vehicles. The use of existing roads and the restoration plan will ensure the impacts associated with soil compaction will be minimized to the maximum extent practicable.***
- ***Stockpile and Storage Areas: The locations of the stockpile and storage areas will be subject to a restoration plan. The restoration of the storage areas will act to minimize the impacts associated with soil compaction to the maximum extent practicable.***
- ***Topsoil Quality and Placement: Topsoil stripped and stockpiled for the construction of the temporary roads and permanent roads that provide access to the pipeline ROW will be utilized for the restoration of the area upon completion of construction. Utilizing this topsoil will enhance the revegetation process due to the presence of the native soil organisms. The use of the native soils and the proper placement of the soil will act to minimize the impacts associated with soil compaction to the maximum extent practicable.***

1.5 Project Site Runoff

The E&SC BMPs for the access roads are sized using E&S Worksheets 1 and 11 of the PADEP E&SC Manual. These worksheets take into consideration the slope length above the sediment barrier and the drainage area contributing to the channel, respectively. (See **Appendices E through H** for road-specific worksheets.)

For temporary access roads ***and permanent access roads that provide access to the pipeline ROW***, no permanent increase in impervious area is proposed. Disturbed areas will be restored to pre-construction conditions or meadow in good condition.

Susquehanna County has not adopted any Act 167 Plans.

1.6 Surface Water Classification

The locations and Chapter 93 designation of the streams and wetlands near the LOD for the temporary and permanent access roads are shown on the ***Best Management Practices and Quantities (BMP) Plan*** Set (**Section 2 of the ESCGP-2 NOI**).

1.7 BMP Description Narrative

E&SC BMPs, consistent with the PADEP E&SC Manual, are planned to be used along the temporary and permanent access roads before, during, and after earth disturbance activities. E&SC BMPs will be installed prior to disturbance. Installation and maintenance guidelines, as well as E&SC and SR BMP locations are as shown on the E&SC Plans (**Section 2 of the ESCGP-2 NOI**) and the Best Management Practices and Quantities Plan ***Set***. The E&SC and SR BMPs that will be used for the temporary and permanent access roads include the following:

E&SC BMPs

- Rock Construction Entrances: Rock Construction Entrances (RCEs) shall be installed from any public road, as shown on the E&SC Plans (**Section 2 of the ESCGP-2 NOI**) and the detail provided in the Best Management Practices and Quantities Plan. Upon access road ROW stabilization, the RCEs shall be removed and the area restored.
- Rock Construction Entrance with Wash Rack: RCEs with wash racks shall be installed in High Quality (HQ), Exceptional Value (EV), ***or siltation impaired watersheds*** as shown on the E&SC Plans and Detail Sheets (provided in Section 2 of the ESCGP-2 NOI). Upon Site stabilization, the RCEs shall be removed and the area restored.

  A stabilized construction entrance will be provided on each access road to reduce the vehicle tracking of sediments off-site. The adjacent off-site road to which the access road connects will be inspected daily during active use of the access road and maintained as necessary to remove any excess mud, dirt, or rock tracked from the access road. Additionally, the access road LOD, including existing roads used as part of the access road will be inspected daily during active use of the access road and maintained as necessary to remove any excess mud, dirt, or rock tracked from the access road.
- Vacuum Sweeping: Vacuum Sweeping may be used to mitigate the spread of sediment beyond the RCEs. RCEs will be inspected daily for sediment tracking onto public roadways. The roadway shall be vacuum swept ***upon discovery of sediment***. ***Any large clumps of dirt that accumulate on the road surface will need to be hand cleared before vacuum sweeping.*** All vehicles leaving the

RCE shall be inspected for large clumps of debris. If debris, larger than ***4***" diameter is observed, it shall be manually removed from the vehicle. Dirt roads shall be inspected weekly for rutting. ***There shall be no more than a maximum of 4" of rutting on access roads.*** If rutting in excess of 4" is observed, the road shall be rolled as soon as feasible.

- Compost Filter Sock: Compost Filter Sock (CFS) shall be installed in accordance with the detail provided in the Best Management Practices and Quantities Plan to filter sediment-laden sheet flow runoff from the LOD. Upon access road ROW stabilization, ***stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.***
- Silt Fence: Silt Fence (SF), Reinforced Silt Fence (RSF), or Super Silt Fence (SSF) shall be installed in accordance with the detail provided in the Best Management Practices and Quantities Plan to filter sediment-laden sheet flow runoff from the LOD. Upon access road ROW stabilization, SF, RSF, and/or SSF shall be removed and the area restored.
- Compost Filter Sock Diversions: Compost Filter Sock Diversions (FSD) will be designed to convey clean water around disturbed areas or may be designed to convey sediment-laden water to E&SC BMPs. Upon access road ROW stabilization, Compost Filter Sock Diversions shall be removed and the area restored or converted to final grades.
- Broad-based Dips: Broad-based Dips may be used to direct runoff from active access roads to well-vegetated areas or sediment removal E&SC BMPs. Broad-based Dips are easily traversed by most construction equipment and typically require less maintenance to ensure their integrity. Broad-based Dips, will not be constructed on roads with grades exceeding 10%.
- Construction Fence: Construction Fence shall be installed at the limits of all streams, wetlands, stormwater management facilities, and public roads to be protected from construction vehicle access. Upon access road ROW stabilization, the Construction Fence shall be removed.
- Erosion Control Blankets: Erosion Control Blankets (ECB) shall be installed in the following areas of disturbance:
    - Areas within 50 feet of a stream or wetland (DS75, as manufactured by North American Green or approved equal).
    - Areas within 100 feet of HQ or EV streams and wetlands (DS75, as manufactured by North American Green or approved equal).
    - Slopes ***equal to 3:1 or greater*** (SC150, as manufactured by North American Green or approved equal).

North American Green product data is included in **Appendix D**.

- Temporary Vegetative Stabilization: Upon temporary cessation of an earth disturbance activity or any stage or phase of an activity where a cessation of earth disturbance activities will exceed four days, the access road ROW shall be immediately seeded, mulched, or otherwise protected from accelerated erosion.

1.8 BMP Installation Sequence Narrative

Refer to the E&SC Plans (**Section 2 of the ESCGP-2 NOI**) for the location of the proposed work and the associated E&SC BMPs. The construction sequence is intended to provide a general course of action in order to conform to the applicable regulatory agency requirements for temporary and permanent ***BMPs***. ***Detailed road specific sequences are provided on the E&SC plans and within the road specific appendices.*** Necessary procedures for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the Contractor. It is not intended that the drawings and ***road-specific construction sequence*** show every detailed piece of material or equipment.

1.9 Supporting Calculations and Measurements

Supporting calculations for each access road E&SC design are provided in **Appendices E through H**.

1.10 Plan Drawings

Full size copies of the permanent access road E&SC Plans have been provided under separate cover in **Section 2 of the ESCGP-2 NOI**.

Preparer Qualifications are included in **Appendix D**.

1.11 Maintenance Program

E&SC BMPs shall be maintained properly throughout Project construction. The following inspection and maintenance shall be implemented to maintain E&SC BMPs.

- Maintenance and inspection of E&SC BMPs shall conform to the following:
    - Federal Energy Regulatory Commission (FERC) regulations;
    - Transco's project-specific Upland Erosion Control, Revegetation, and Maintenance Plan (Transco Plan) included as **Attachment 17 to the Environmental Construction Plan (ECP) provided as Section 4 of the ESCGP-2 NOI**;

  - Transco's project-specific Wetland and Waterbody Construction and Mitigation Procedures, and Procedures (Transco Procedures) included as **Attachment 18 to the ECP provided as Section 4 of the ESCGP-2 NOI**; and
  - PA Code Chapter 102 and 105 regulations, including all conditions of the ESCGP-2.

- Until an access road is stabilized, the associated E&SC BMPs shall be maintained properly. Maintenance shall include inspections of E&SC BMPs after each runoff event and on a weekly basis. Preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, reseeding, re-mulching, and re-netting must be initiated immediately. If the E&SC BMPs fail to perform as expected, replacement E&SC BMPs, or modifications of those installed will be required.
- Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the Contractor shall implement appropriate E&SC BMPs to minimize the potential for erosion and sediment pollution and notify the local CCD and/or the regional office of the PADEP.
- A log showing dates that E&SC BMPs were inspected as well as any deficiencies found and the date they were corrected shall be maintained with the Environmental Inspectors records for the associated Construction Spread and be made available to regulatory agency officials at the time of inspection.
- The reviewing agency (PADEP or local CCD) shall be notified of any changes to the approved E&SC Plans (**Section 2 of the ESCGP-2 NOI**) prior to implementation of those changes. The reviewing agency may require a written submittal of those changes for review and approval at its discretion.
- Refer to the E&SC BMP details provided in the Best Management Practices and Quantities Plan ***Set*** for inspection and maintenance procedures specific to each E&SC BMP.
- Sediment removed from E&SC BMPs shall be properly disposed of off-site in accordance with applicable regulations or placed within the access road ROW up gradient of E&SC BMPs.
- RCEs will be inspected on a daily basis for evidence of off-site tracking of mud. The Contractor shall clean streets and roads of mud and/or dust and keep the streets and roads in a clean and dust-free condition in accordance with the Fugitive Dust Control Plan included as **Attachment 1 to the ECP provided as Section 4 of the ESCGP-2 NOI**.
- Access road gravel thickness shall be constantly maintained. A stockpile shall be maintained nearby the access road within the pipeline ROW for this purpose.
- E&SC BMPs shall remain functional as such until all areas tributary to them are

permanently stabilized or until they are replaced by another BMP approved by the local CCD or PADEP.

- Permanent stabilization is defined as a minimum uniform, perennial 70% vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated erosion. Cut and fill slopes shall be capable of resisting failure due to slumping, sliding, or other movements. Any area not achieving a minimum uniform 70% perennial vegetative cover shall be reseeded and mulched within 24 hours of detection.

1.12 Material Recycling and Disposal

The restoration of the temporary access roads and of the permanent access roads that provide access to the pipeline right-of-way will require the removal of the temporary materials. The temporary materials include, but may not be limited to, the stone surface of the road and associated geotextiles. The contractors are required to dispose of the materials at suitable disposal or recycling sites in compliance with local, state and federal regulations.

Transco has prepared a Spill Plan for Oil and Hazardous Materials to assist in prevention of any spills that may occur during the Project and to respond to any spills that do occur. The Contractor will be required to become familiar with the Spill Plan for Oil and Hazardous Materials and its contents prior to commencing any construction-related activities. The Spill Plan for Oil and Hazardous Materials is included as Attachment 9 to the ECP provided as **Section 4 of the ESCGP-2 NOI**. The Spill Plan for Oil and Hazardous Materials will be available on-site as the Preparedness, Prevention, and Contingency (PPC) Plan. For the access roads, “on-site” refers to the access road ROW or the office trailer that is serving the appropriate construction spread for each access road.

The Contractors are required to inventory and manage their construction on-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.

Materials Covered

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)
- Hydro seeding mixtures
- Petroleum based products
- Sanitary wastes
- Soil stabilization additives
- Solder
- Solvents
- Other (list here): _____

These materials must be stored as appropriate and shall not contact storm or non-stormwater discharges. The Contractor shall provide a weather proof container to store chemicals or erodible substances that must be kept on- site. The Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of safety data sheets (SDS).

Material Management Practices

The following are material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

1. Good Housekeeping Practices

The following good housekeeping practices will be followed during construction:

- Store only enough material required to do the job.
- Store materials in a neat, orderly manner.
- Store chemicals in watertight containers or in a storage shed, under a roof, completely enclosed, with appropriate secondary containment to prevent spill or leakage. Drip pans shall be provided under dispensers.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Manufacturer's recommendations for proper use and disposal will be followed.
- Inspections will be performed to ensure proper use and disposal of materials.
- Cover and berm loose stockpiled construction materials that are not actively being used (i.e. Soil, spoils, aggregate, etc.).
- Minimize exposure of construction materials to precipitation.
- Minimize the potential for off-site tracking of loose construction and landscape materials.

2. Hazardous Products

These practices will be used to reduce the risks associated with hazardous materials. SDS will be posted in the immediate area where a substance with hazardous properties is stored and/or used and another copy of the SDS will be maintained in a file at the construction spread trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of SDS and the specific information in the applicable SDS for the product he/she is using, particularly regarding spill control techniques. The following measures will be implemented:

- Products will be kept in original containers with the original labels in legible condition.
- Original labels and SDSs will be produced and used for each material.
- If surplus product must be disposed of, manufacturers or local/state/federal recommended methods for proper disposal will be followed.

3. Hazardous Wastes

Hazardous waste materials will be disposed of by the Contractor in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products.

4. Concrete and Other Wash Waters

Prevent disposal of rinse, wash waters, or materials on impervious or pervious surfaces, into streams, wetlands or other water bodies.

Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water within the permanent access road LOD, but only in either (1) specifically designated diked areas which have been prepared to prevent contact between the concrete and/or washout and soil and stormwater having the potential to be discharged from the access roads; or (2) in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

The hardened residue from the concrete washout diked areas will be disposed of in the same manner as other non-hazardous construction waste materials or may be broken up and used on-site as deemed appropriate by the Contractor and Geotechnical Engineer. The Contractor will be responsible for seeing that these procedures are followed.

Concrete washout areas will be located in an area where the likelihood of the area contributing to stormwater discharge is negligible. If required, additional E&SC BMPs

must be implemented to prevent concrete wastes from contributing to stormwater discharges. The location of the concrete washout area(s) must be identified, by the Contractor, on the on-site copy of the E&SC Plans (**Section 2 of the ESCGP-2 NOI**).

5. Sanitary Wastes

Sanitary waste units will be located in an area where the likelihood of the unit contributing to stormwater discharges is negligible. Additional E&SC BMPs must be implemented, such as containment trays (typically provided by the rental company) or special containment created with 2"x4" lumber, impervious plastic, and gravel. The location of the sanitary waste units must be identified, by the Contractor, on the on-site copy of the E&SC Plans (**Section 2 of the ESCGP-2 NOI**).

6. Solid and Construction Wastes

Waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will comply with all local and state solid waste management regulations. The dumpster/container lids shall be closed at the end of every business day and during rain events. Appropriate measures shall be taken to prevent discharges from waste disposal containers to the receiving water.

7. Construction Access

A stabilized RCE will be provided to help reduce vehicle tracking of sediments. The paved roads adjacent to the RCEs will be inspected daily and ***maintained*** as necessary to remove any excess mud, dirt, or rock tracked from the LOD. Dump trucks hauling material from the access roads will be covered with a tarpaulin as necessary.

8. Petroleum products

Construction vehicles will be monitored for leaks and receive regular preventative maintenance. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Petroleum storage tanks will have a dike or berm containment structure constructed around it to contain spills which may occur (containment volume to be 110% of volume stored). The dike or bermed area shall be lined with an impervious material such as a heavy duty plastic sheet. Drip pans shall be provided for all dispensers.

9. Fertilizers and landscape materials

Where permitted, fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to minimize the potential for exposure to stormwater. Storage will be under cover. The contents of any

partially used bags of fertilizer will be transferred to a sealable plastic bin to minimize the potential for spills. The bin shall be labeled appropriately.

10. Paints, Paint Solvents and Cleaning Solvents

Containers will be tightly sealed and stored when not in use. Excess paint and solvents will be properly disposed of according to manufacturer's instructions or local/state/federal regulations.

11. Contaminated Soils

Contaminated soils (resulting from spills of materials with hazardous properties) which may result from construction activities will be contained and cleaned up immediately in accordance with the Spill Plan for Oil and Hazardous Materials included as **Attachment 9 to the ECP provided as Section 4 of the ESCGP-2 NOI**.

1.13 Soil Conditions and Geologic Formations

AECOM conducted a review of the proposed CPL North pipeline for the potential of geologic formation which may cause pollution if disturbed or exposed during construction.

Karst Bedrock Formations

As identified by AECOM, naturally–occurring bedrock formations and soils types that may cause pollution are present along portions of the CPL North construction ROW. Bedrock formations that may cause pollution are associated with karst or acid-forming conditions include the following:

- Conestoga Formation
- Vintage Formation
- Buffalo Springs Formation
- Ledger Formation
- Zooks Corner Formation
- Snitz Creek Formation
- Millbach Formation
- Stonehenge Formation
- Epler Formation
- Richenbach Formation
- Ontelaunee Formation
- Annville Formation
- Hershey-Myerstown Formation
- Keyser-Tonoloway Formation

There are two bedrock formations that do not form significant karst terrain along the proposed CPL North pipelines, which include Hamburg Sequence/limestone unit and Hamilton Group/Tully limestone unit.

Acid-Producing Sulfide Bedrock Formations

In the review of the NRCS data for the proposed CPL North pipeline route, several acid-producing sulfide bedrock formations are located along the proposed route. These formations are as follows:

- Pottsville Formation (anthracite coal-bearing)
- Llewelyn Formation (anthracite coal bearing)

Formations containing variable amounts of pyrite or other sulfide minerals that may only locally be acid-producing are found along the proposed CPL North pipeline. These formations can be determined only by site-specific acid-drainage investigation, and are identified as follows:

- Octoraro schist
- Conestoga phyllite
- Antietam-Harpers schist
- Kinzers shale
- Cocalico shale
- Hamburg/Martinsburg shale

Table 6 in the Best Management Practices and Quantities Plan provides the locations of the acidic bedrock.

Acidic Soils

For the proposed CPL North pipeline, based on review of the attached NRCS Custom Soil Resource Report provided in **Appendix C**, ***acidity levels of the soils*** found along the proposed CPL North route ***do not fall within the pH range that is considered to be a potential source of pollution that must be mitigated. Should acidic soils with a pH of 4.0 or lower be encountered during the construction of the temporary and permanent access roads, the following Acid Producing Soils and Bedrock Control Plan shall be implemented.*** Table 5 in the Best Management Practices and Quantities Plan provides the locations of soils and their respective acidity levels. ***A road specific Soil Acidity Table is included for each road in the road specific appendices attached to this document***.

Acid Producing Soils and Bedrock Control Plan

The following acid producing soils control plan was developed to identify BMPs and procedures for minimizing the potential for pollution associated with the disturbance of the areas associated with the construction of the temporary and permanent access roads that contain acid-producing soils with a pH less than 4.0.

1. ***Contractor shall limit the excavation area and exposure time when high acid-producing soils are encountered. Locations where acidic soils are anticipated to be present along the access roads are provided in the road specific narratives included in this document and on the E&SC plans included in Section 2 of the ESCGP-2 NOI.***

2. ***Contractor shall separately store topsoil stripped from the site away from temporarily stockpiled high acid-producing soils and bedrock.***

3. ***Contractor shall stockpile high acid-producing soils and bedrock material on level ground to minimize its movement, especially when these materials have a high clay content.***

4. ***Contractor shall cover temporarily stockpiled high acid-producing soil and bedrock material to be exposed more than 7 days with properly anchored, heavy-grate sheets of polyethylene, where possible. If not possible, stockpiles shall be covered with a minimum of three to six inches of wood chips to minimize erosion of the stockpile. In addition, the contractor shall install silt fence at the toe of the stockpile slope to contain movement of material. Contractor shall not apply topsoil to the high acid-producing soil or bedrock stockpiles to prevent topsoil contamination.***

5. ***Contractor shall ultimately dispose of high acid-producing soils or bedrock with a pH of four or less, or containing iron sulfide (including borrow from cuts) by placing the material combined with limestone at the rate of 6 tons per acre (or 275 pounds per 1,000 square feet of surface area) and covering the mixture with a minimum of 12 inches of settled soils with a pH of five or more except as follows:***

    a. ***In the areas where trees or shrubs are to be planted, the contractor shall cover the limestone/soil mixture with a minimum of 24 inches of soils with a pH of five or more.***

    b. ***Contractor shall not locate any disposal area within 24 inches of any surface of a slope or bank, such as berms, stream banks, ditches, and other surface waters to prevent potential lateral leaching damages.***

6. ***At the end of each day, contractor shall clean all equipment used to handle high acid-producing soils or bedrock to prevent spreading of high-acid materials to other parts of the proposed right-of-way, into streams, or stormwater conveyances, and to protect machinery from accelerated corrosion.***

7. ***Contractor shall provide and install non-vegetative erosion controls (stone tracking pads, strategically-place limestone check dams, silt fences, wood chips) to limit the movement of high acid-producing soils from, around, or off areas disturbed for access road construction.***

8. ***Following the burial or removal of high acid-producing soils and bedrock, top soiling, and seeding of the areas restored after the removal of the temporary access roads and permanent access roads that provide access to the pipeline right-of-way, Transco shall monitor the site for approximately six to 12 months to assure there is adequate stabilization and that no high-acid soil or bedrock problems emerge. Contractor shall correct any problems that are discovered within this time period.***

9. ***If problems occur where high acid-producing soils or bedrock have been placed or buried, the applicant shall monitor these areas for at least two years to assure there is no migration of potential acid leachate.***

1.14 Thermal Impacts

Thermal impacts associated with access roads will be avoided to the maximum extent practicable by implementing the following measures:

- Limit removal of vegetation, especially tree cover, to only that necessary for construction;
- Minimize permanent impervious surfaces; and
- Install a gravel surface for access roads rather than asphalt.

See the road-specific narratives for a road-specific discussion on thermal impacts.

1.15 E&SC Plan and SR Plan Consistency

The E&SC Plans (**Section 2 of the ESCGP-2 NOI**) and this E&SC ***narrative*** have been designed and will be constructed to be consistent with the SR Plans.

1.16 Riparian Buffer Waiver

A comprehensive Riparian Buffer narrative is provided in the "Erosion and Sediment Control Plan Narrative" for the portion of the CPL North pipeline located in Susquehanna County (**Section 3 of the ESCGP-2 NOI*****). *No access roads within Susquehanna County require a riparian buffer waiver.***

1.17 Antidegradation Requirements

No access roads within Susquehanna County are located within special protection or siltation impaired watersheds.

1.18 TMDL

ABACT E&SC BMPs shall be used on the access roads that discharge to a stream with a Total Maximum Daily Load (TMDL). Road-specific TMDL discussions are provided in the road-specific narratives.

APPENDIX A

Intentionally Omitted by Applicant

APPENDIX B

Intentionally Omitted by Applicant

APPENDIX C

United States Department of Agriculture Natural Resources Conservation Service Custom Soil Resource Report

United States Department of Agriculture

NRCS

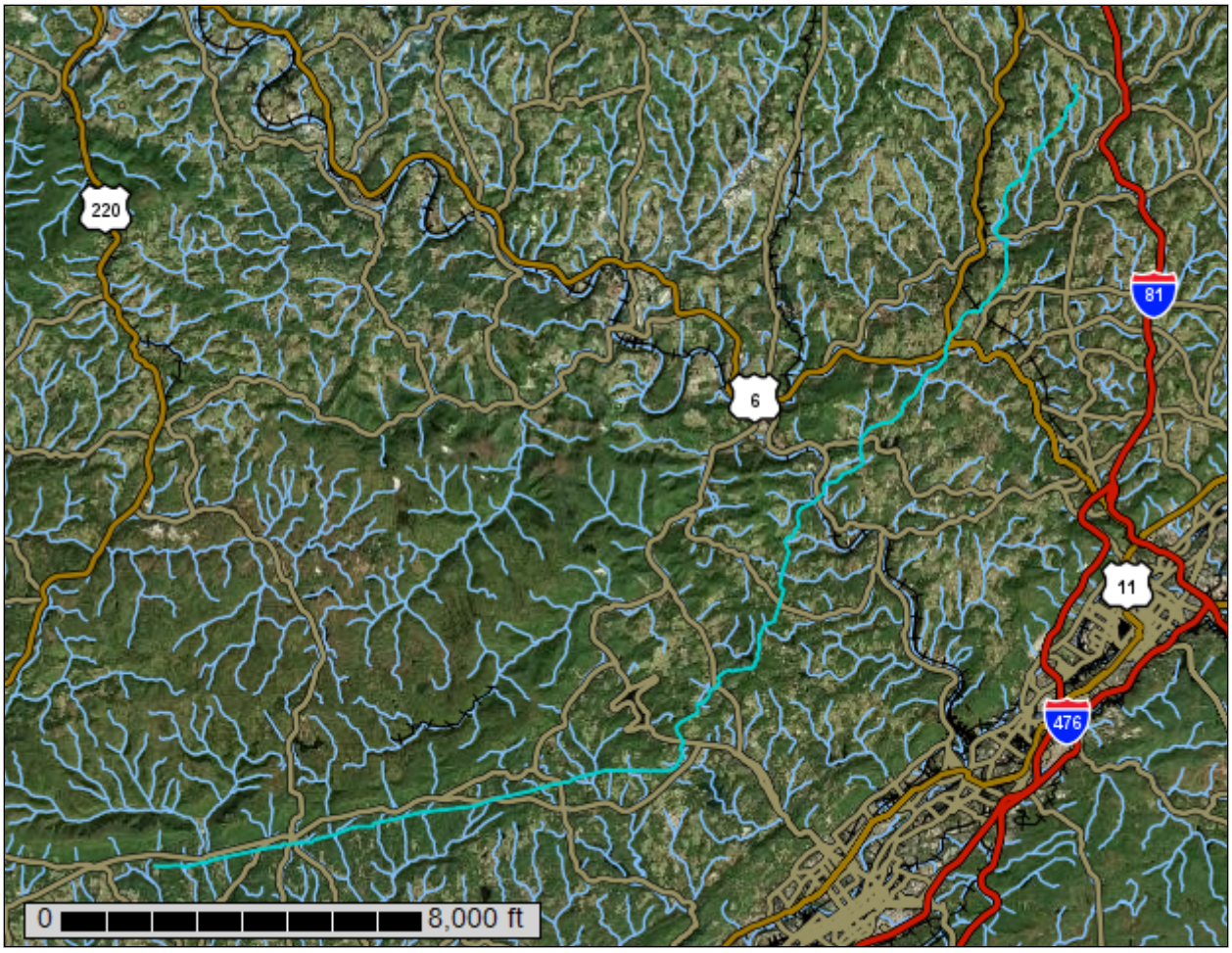
Natural Resources Conservation Service

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 ~~Columbia County, Pennsylvania, Luzerne County, Pennsylvania,~~ Susquehanna County, Pennsylvania, ~~and Wyoming County, Pennsylvania~~

CPLN

NOTE: REPORT HAS BEEN MODIFIED TO INCLUDE INFORMATION FOR SUSQUEHANNA COUNTY ONLY TO CONSERVE PAPER.



August 18, 2016

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 (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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

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

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

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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.

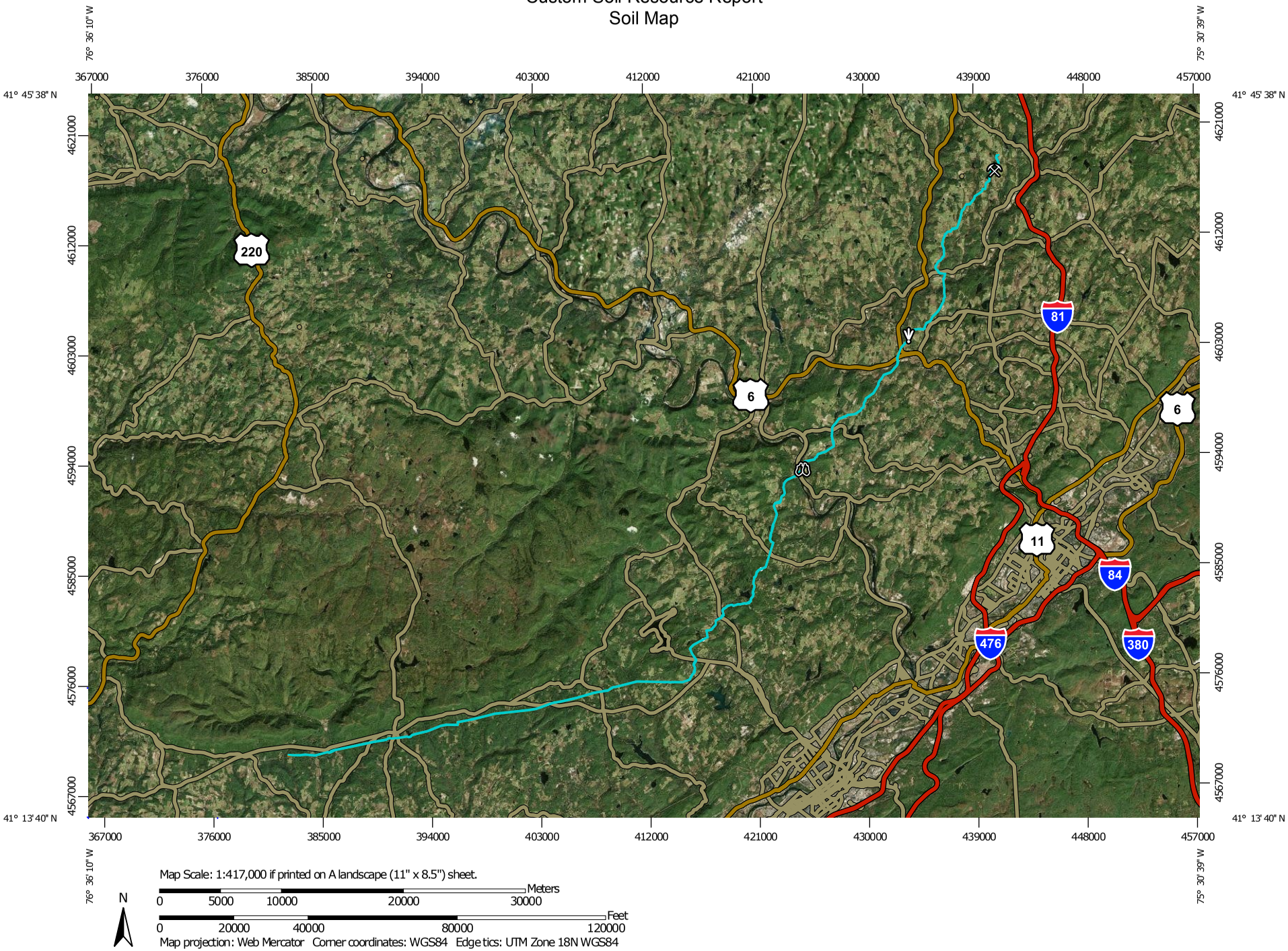
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Columbia County, Pennsylvania
Survey Area Data: Version 9, Nov 16, 2015

Soil Survey Area: Luzerne County, Pennsylvania
Survey Area Data: Version 8, Nov 16, 2015

Soil Survey Area: Susquehanna County, Pennsylvania
Survey Area Data: Version 10, Nov 16, 2015

Soil Survey Area: Wyoming County, Pennsylvania
Survey Area Data: Version 9, Nov 16, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

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

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

Susquehanna County, Pennsylvania (PA115)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bc	Basher silt loam	0.7	0.1%
BfC2	Bath flaggy loam, 12 to 20 percent slopes, moderately eroded	0.0	0.0%
BfD2	Bath flaggy loam, 20 to 30 percent slopes, moderately eroded	1.9	0.1%
BsD	Bath very stony loam, 12 to 30 percent slopes	1.9	0.1%
CnB2	Chenango gravelly silt loam, 3 to 12 percent slopes, moderately eroded	0.1	0.0%
LkB2	Lordstown and Oquaga channery silt loams, 3 to 12 percent slopes, moderately eroded	2.4	0.2%
LkC2	Lordstown and Oquaga channery silt loams, 12 to 20 percent slopes, moderately eroded	3.7	0.3%
LoB	Lordstown and Oquaga flaggy silt loams, 3 to 12 percent slopes	6.9	0.5%
LoC2	Lordstown and Oquaga flaggy silt loams, 12 to 20 percent slopes, moderately eroded	0.8	0.1%
LsB	Lordstown and Oquaga very stony silt loams, 0 to 12 percent slopes	0.9	0.1%
LsD	Lordstown and Oquaga very stony silt loams, 12 to 30 percent slopes	4.7	0.3%
LsF	Lordstown and Oquaga very stony silt loams, 30 to 70 percent slopes	0.6	0.0%
McB2	Mardin channery silt loam, 3 to 8 percent slopes, eroded	11.6	0.8%
McC2	Mardin channery silt loam, 8 to 15 percent slopes, eroded	9.5	0.7%
MfC2	Mardin flaggy sllt loam, 8 to 15 percent slopes, eroded	7.7	0.5%
MgB	Mardin channery silt loam, 0 to 8 percent slopes, very stony	2.0	0.1%
MgD	Mardin channery silt loam, 8 to 25 percent slopes, very stony	2.1	0.1%

Susquehanna County, Pennsylvania (PA115)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
MgF	Mardin channery silt loam, 25 to 50 percent slopes, very stony	0.4	0.0%
Mn	Mixed alluvial land	2.5	0.2%
MoB2	Morris channery silt loam, 3 to 8 percent slopes, eroded	5.9	0.4%
MoC2	Morris channery silt loam, 8 to 15 percent slopes, eroded	13.4	0.9%
MrB2	Morris flaggy silt loam, 3 to 8 percent slopes, eroded	0.7	0.0%
MrC2	Morris flaggy silt loam, 8 to 15 percent slopes, eroded	3.2	0.2%
VcB2	Volusia channery silt loam, 3 to 8 percent slopes, eroded	13.2	0.9%
VcC2	Volusia channery silt loam, 8 to 15 percent slopes, eroded	6.8	0.5%
VcD2	Volusia channery silt loam, 15 to 25 percent slopes, eroded	2.0	0.1%
VfB	Volusia flaggy silt loam, 3 to 8 percent slopes	7.9	0.6%
VfC	Volusia flaggy silt loam, 8 to 15 percent slopes	0.8	0.1%
VsB	Volusia channery silt loam, 0 to 8 percent slopes, extremely stony	9.7	0.7%
VsD	Volusia channery silt loam, 8 to 25 percent slopes, extremely stony	0.2	0.0%
WeB2	Wellsboro channery silt loam, 3 to 8 percent slopes, eroded	9.4	0.7%
WeC2	Wellsboro channery silt loam, 8 to 15 percent slopes, eroded	2.5	0.2%
WeD2	Wellsboro channery silt loam, 15 to 25 percent slopes, eroded	3.3	0.2%
WlB2	Wellsboro flaggy silt loam, 3 to 8 percent slopes, eroded	0.9	0.1%
WlC2	Wellsboro flaggy silt loam, 8 to 15 percent slopes, eroded	14.1	1.0%
WlD2	Wellsboro flaggy silt loam, 15 to 25 percent slopes, eroded	1.2	0.1%
WsB	Wellsboro channery silt loam, 0 to 8 percent slopes, very stony	1.1	0.1%
WsD	Wellsboro channery silt loam, 8 to 25 percent slopes, very stony	3.4	0.2%
Wy	Wyalusing silt loam	3.3	0.2%
Subtotals for Soil Survey Area		**163.8**	**11.5%**
Totals for Area of Interest		**1,418.8**	**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.

Susquehanna County, Pennsylvania

Bc—Basher silt loam

Map Unit Setting

National map unit symbol: 9z2b
Elevation: 400 to 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: All areas are prime farmland

Map Unit Composition

Basher and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basher

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 37 inches: silt loam
H3 - 37 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

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

Minor Components

Wyalusing

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

BfC2—Bath flaggy loam, 12 to 20 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z2g
Elevation: 800 to 1,800 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Bath

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 8 inches: flaggy loam
H2 - 8 to 27 inches: channery silt loam
H3 - 27 to 60 inches: very flaggy sandy loam
H4 - 60 to 64 inches: very channery loam

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 21 to 38 inches to fragipan
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 21 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

BfD2—Bath flaggy loam, 20 to 30 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z2h
Elevation: 800 to 1,800 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Bath

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 8 inches: flaggy loam
H2 - 8 to 27 inches: channery silt loam
H3 - 27 to 60 inches: very flaggy sandy loam
H4 - 60 to 64 inches: very channery loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 21 to 38 inches to fragipan
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 21 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

BsD—Bath very stony loam, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: 9z2k
Elevation: 800 to 1,800 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Bath

Setting

Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 8 inches: channery loam
H2 - 8 to 27 inches: channery silt loam
H3 - 27 to 60 inches: very flaggy sandy loam
H4 - 60 to 64 inches: very channery loam

Properties and qualities

Slope: 12 to 30 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 21 to 38 inches to fragipan
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 21 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

CnB2—Chenango gravelly silt loam, 3 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z2n
Elevation: 600 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: All areas are prime farmland

Map Unit Composition

Chenango and similar soils: 100 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: Convex, linear
Parent material: Gravelly outwash

Typical profile

H1 - 0 to 5 inches: gravelly silt loam
H2 - 5 to 35 inches: gravelly silt loam
H3 - 35 to 85 inches: very gravelly sandy loam

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural 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 storage in profile: Low (about 4.6 inches)

Interpretive groups

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

LkB2—Lordstown and Oquaga channery silt loams, 3 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z33
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

LkC2—Lordstown and Oquaga channery silt loams, 12 to 20 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z34
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Very low (about 2.7 inches)

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

LoB—Lordstown and Oquaga flaggy silt loams, 3 to 12 percent slopes

Map Unit Setting
National map unit symbol: 9z36
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

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

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

Properties and qualities
Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

LoC2—Lordstown and Oquaga flaggy silt loams, 12 to 20 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 9z37
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

LsB—Lordstown and Oquaga very stony silt loams, 0 to 12 percent slopes

Map Unit Setting
National map unit symbol: 9z39
Elevation: 700 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

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

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

Properties and qualities
Slope: 0 to 12 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 12 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

LsD—Lordstown and Oquaga very stony silt loams, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: 9z3b
Elevation: 700 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 30 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 12 to 30 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

LsF—Lordstown and Oquaga very stony silt loams, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: 9z3c
Elevation: 700 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 50 percent
Lordstown and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting

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

Typical profile

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

Properties and qualities

Slope: 30 to 70 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Description of Oquaga

Setting

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

Typical profile

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

Properties and qualities

Slope: 30 to 70 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

McB2—Mardin channery silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2srht
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Mardin, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: channery silt loam
BE - 8 to 10 inches: channery silt loam
Bw1 - 10 to 14 inches: channery silt loam
Bw2 - 14 to 18 inches: channery silt loam
Bx1 - 18 to 34 inches: channery silt loam
Bx2 - 34 to 55 inches: channery silt loam
C - 55 to 72 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

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

Minor Components

Lordstown

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

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Bath, eroded

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

McC2—Mardin channery silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2srhv
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

Mardin, eroded, and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: channery silt loam
BE - 8 to 10 inches: channery silt loam
Bw1 - 10 to 14 inches: channery silt loam
Bw2 - 14 to 18 inches: channery silt loam
Bx1 - 18 to 34 inches: channery silt loam
Bx2 - 34 to 55 inches: channery silt loam
C - 55 to 72 inches: channery silt loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

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

Minor Components

Bath, eroded

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

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
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
Down-slope shape: Linear, concave
Across-slope shape: Linear
Hydric soil rating: No

MfC2—Mardin flaggy sllt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v30c
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

Mardin, eroded, and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: flaggy silt loam
BE - 8 to 10 inches: channery silt loam
Bw1 - 10 to 14 inches: channery silt loam
Bw2 - 14 to 18 inches: channery silt loam
Bx1 - 18 to 34 inches: channery silt loam
Bx2 - 34 to 55 inches: channery silt loam
C - 55 to 72 inches: channery silt loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Volusia
Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

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

MgB—Mardin channery silt loam, 0 to 8 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2srj0
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Mardin, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

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

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Volusia, very stony

Percent of map unit: 10 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Bath, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Hydric soil rating: No

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

Map Unit Setting

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

Map Unit Composition

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

Description of Mardin, Very Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Bath, very stony

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

Lordstown, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Linear, concave
Across-slope shape: Linear
Hydric soil rating: No

Volusia, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

MgF—Mardin channery silt loam, 25 to 50 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2v2zv
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Mardin, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

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

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Bath, very stony

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

Wellsboro, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains

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

Lordstown, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Mn—Mixed alluvial land

Map Unit Setting

National map unit symbol: 9z3p
Elevation: 200 to 1,000 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Fluvents, Mixed Alluvium

Setting

Landform: Flood-plain steps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: gravelly sandy loam
H2 - 6 to 60 inches: very cobbly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 12 to 60 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

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

Minor Components

Wyalusing

Percent of map unit: 20 percent
Landform: Depressions
Hydric soil rating: Yes

MoB2—Morris channery silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vxd5
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Morris, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 12 inches: channery silt loam
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: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Minor Components

Wellsboro

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

Norwich

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

MoC2—Morris channery silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vxd6
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morris, eroded, and similar soils: 85 percent

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

Description of Morris, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 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: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Minor Components

Wellsboro

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

Oquaga

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

Norwich

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

MrB2—Morris flaggy silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vxd7
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: 100 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Morris, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: flaggy silt loam
Bw - 8 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: flaggy loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Minor Components

Wellsboro

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

Norwich

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

Fluvaquents

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Udifluvents

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

MrC2—Morris flaggy silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vxdb

Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Morris, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: flaggy silt loam
Bw - 8 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: flaggy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Minor Components

Wellsboro

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

Norwich

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

Lackawanna

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

VcB2—Volusia channery silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2srfz
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Volusia, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: channery silt loam
Eg - 9 to 13 inches: loam
Bx1 - 13 to 21 inches: channery loam
Bx2 - 21 to 31 inches: channery loam
Bx3 - 31 to 43 inches: channery loam
Bx4 - 43 to 60 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.3 inches)

Interpretive groups

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

Minor Components

Chippewa

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

Mardin, eroded

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

VcC2—Volusia channery silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2srg0
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Volusia, eroded, and similar soils: 90 percent

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

Description of Volusia, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: channery silt loam
Eg - 9 to 13 inches: loam
Bx1 - 13 to 21 inches: channery loam
Bx2 - 21 to 31 inches: channery loam
Bx3 - 31 to 43 inches: channery loam
Bx4 - 43 to 60 inches: channery silt loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.3 inches)

Interpretive groups

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

Minor Components

Mardin, eroded

Percent of map unit: 6 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chippewa

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

Hydric soil rating: Yes

VcD2—Volusia channery silt loam, 15 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2srg1
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Volusia, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: channery silt loam
Eg - 9 to 13 inches: loam
Bx1 - 13 to 21 inches: channery loam
Bx2 - 21 to 31 inches: channery loam
Bx3 - 31 to 43 inches: channery loam
Bx4 - 43 to 60 inches: channery silt loam

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural 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 storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Mardin, eroded

Percent of map unit: 7 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chippewa

Percent of map unit: 3 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

VfB—Volusia flaggy silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2srgb
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Volusia

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: flaggy silt loam
Bw - 9 to 15 inches: channery silt loam
Eg - 15 to 17 inches: channery silt loam

Bx1 - 17 to 29 inches: channery loam
Bx2 - 29 to 54 inches: channery loam
C - 54 to 72 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

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

Minor Components

Chippewa

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

Mardin

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

VfC—Volusia flaggy silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2srgc
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Volusia

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

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

Minor Components

Mardin

Percent of map unit: 6 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chippewa

Percent of map unit: 4 percent

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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

Map Unit Setting

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

Map Unit Composition

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

Description of Volusia, Extremely Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

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

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 7.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

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

Minor Components

Chippewa, extremely stony

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

Mardin, extremely stony

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

VsD—Volusia channery silt loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

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

Map Unit Composition

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

Description of Volusia, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Concave

Across-slope shape: Linear
Parent material: Loamy till derived from interbedded sedimentary rock

Typical profile

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

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 7.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

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

Minor Components

Mardin, extremely stony

Percent of map unit: 6 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chippewa, extremely stony

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

WeB2—Wellsboro channery silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vckv
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Wellsboro

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Lackawanna

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

Morris

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

Oquaga

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

WeC2—Wellsboro channery silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vckw
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

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

Description of Wellsboro

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Lackawanna

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

Morris

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

WeD2—Wellsboro channery silt loam, 15 to 25 percent slopes, eroded

Map Unit Setting

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

Map Unit Composition

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

Description of Wellsboro

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Oquaga

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

Morris

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

Lackawanna

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

WlB2—Wellsboro flaggy silt loam, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vcky
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Wellsboro, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Oquaga

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

Morris

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

Lackawanna

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

WlC2—Wellsboro flaggy silt loam, 8 to 15 percent slopes, eroded

Map Unit Setting

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

Map Unit Composition

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

Description of Wellsboro, Eroded

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Oquaga

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

Morris

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

Lackawanna

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

WlD2—Wellsboro flaggy silt loam, 15 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vcl0
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Wellsboro

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope

Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

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

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Oquaga

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

Morris

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

Lackawanna

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

WsB—Wellsboro channery silt loam, 0 to 8 percent slopes, very stony

Map Unit Setting

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

Map Unit Composition

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

Description of Wellsboro, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

A - 0 to 4 inches: channery silt loam
Bw - 4 to 22 inches: channery silt loam
Bx - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Morris, very stony
Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lackawanna, very stony
Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Oquaga, very stony
Percent of map unit: 5 percent
Landform: Till plains
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

WsD—Wellsboro channery silt loam, 8 to 25 percent slopes, very stony

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

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

Description of Wellsboro, Very Stony

Setting
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, head slope

Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

A - 0 to 4 inches: channery silt loam
Bw - 4 to 22 inches: channery silt loam
Bx - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

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

Minor Components

Morris, very stony

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

Oquaga, extremely stony

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

Lackawanna, very stony

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

Wy—Wyalusing silt loam

Map Unit Setting

National map unit symbol: 9z4r
Elevation: 400 to 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

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

Description of Wyalusing

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 34 inches: fine sandy loam
H3 - 34 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

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

Soil Information for All Uses

Soil Properties and Qualities

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

Soil Chemical Properties

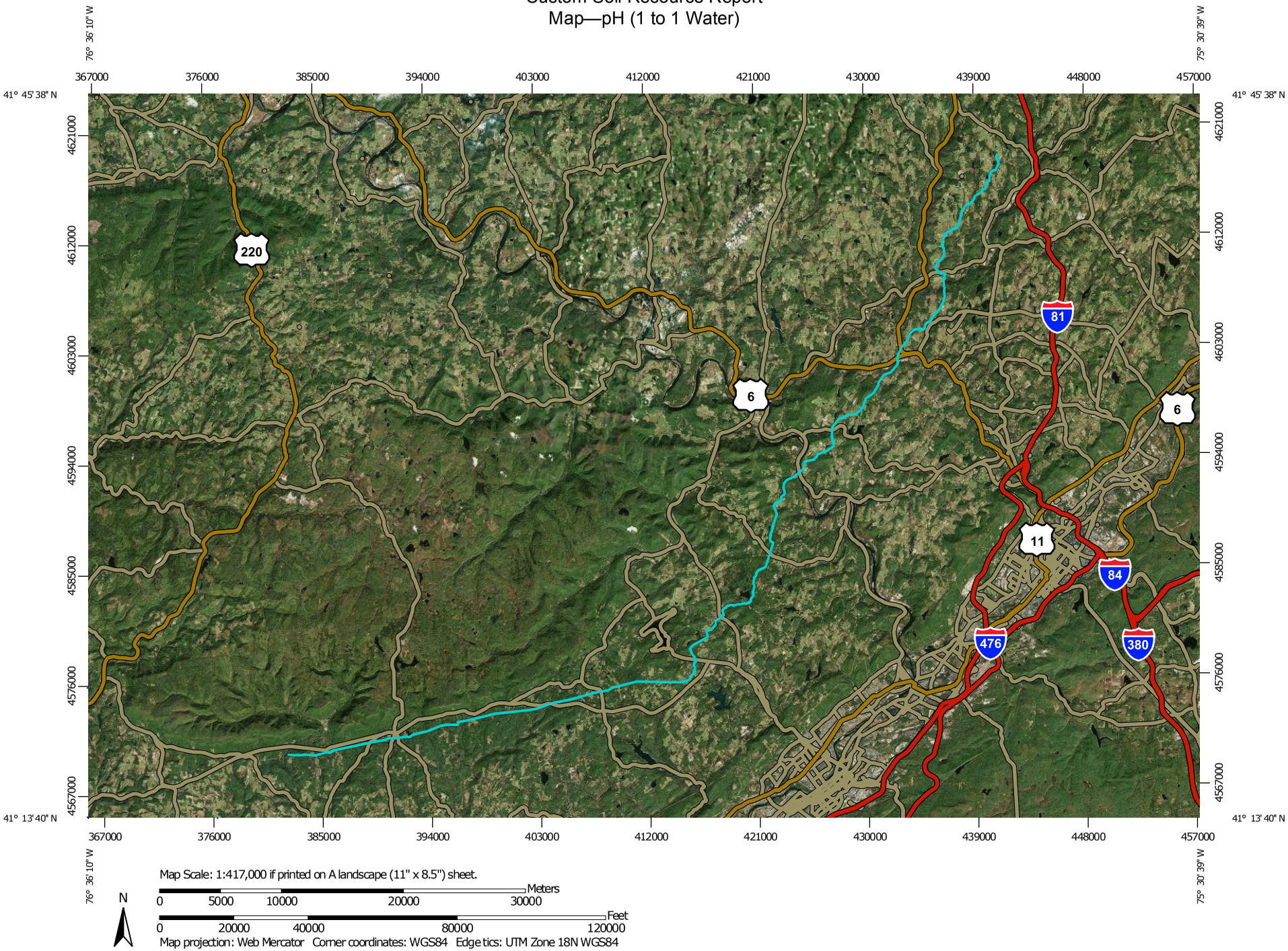
Soil Chemical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

pH (1 to 1 Water)

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion. In general, soils that are either highly alkaline or highly acid are likely to be very corrosive to steel. The most common soil laboratory measurement of pH is the 1:1 water method. A crushed soil sample is mixed with an equal amount of water, and a measurement is made of the suspension.

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

Custom Soil Resource Report
Map—pH (1 to 1 Water)



Map Scale: 1:417,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5000 10000 20000 30000

Feet
0 20000 40000 80000 120000

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Lines

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Points

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Columbia County, Pennsylvania
Survey Area Data: Version 9, Nov 16, 2015

Soil Survey Area: Luzerne County, Pennsylvania
Survey Area Data: Version 8, Nov 16, 2015

Soil Survey Area: Susquehanna County, Pennsylvania
Survey Area Data: Version 10, Nov 16, 2015

Soil Survey Area: Wyoming County, Pennsylvania
Survey Area Data: Version 9, Nov 16, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

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

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

pH (1 to 1 Water)— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Bc	Basher silt loam	5.1	0.7	0.1%
BfC2	Bath flaggy loam, 12 to 20 percent slopes, moderately eroded	5.5	0.0	0.0%
BfD2	Bath flaggy loam, 20 to 30 percent slopes, moderately eroded	5.5	1.9	0.1%
BsD	Bath very stony loam, 12 to 30 percent slopes	5.5	1.9	0.1%
CnB2	Chenango gravelly silt loam, 3 to 12 percent slopes, moderately eroded	6.0	0.1	0.0%
LkB2	Lordstown and Oquaga channery silt loams, 3 to 12 percent slopes, moderately eroded	5.4	2.4	0.2%
LkC2	Lordstown and Oquaga channery silt loams, 12 to 20 percent slopes, moderately eroded	5.4	3.7	0.3%
LoB	Lordstown and Oquaga flaggy silt loams, 3 to 12 percent slopes	5.4	6.9	0.5%

pH (1 to 1 Water)— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LoC2	Lordstown and Oquaga flaggy silt loams, 12 to 20 percent slopes, moderately eroded	5.4	0.8	0.1%
LsB	Lordstown and Oquaga very stony silt loams, 0 to 12 percent slopes	5.4	0.9	0.1%
LsD	Lordstown and Oquaga very stony silt loams, 12 to 30 percent slopes	5.4	4.7	0.3%
LsF	Lordstown and Oquaga very stony silt loams, 30 to 70 percent slopes	5.4	0.6	0.0%
McB2	Mardin channery silt loam, 3 to 8 percent slopes, eroded	5.4	11.6	0.8%
McC2	Mardin channery silt loam, 8 to 15 percent slopes, eroded	5.4	9.5	0.7%
MfC2	Mardin flaggy sllt loam, 8 to 15 percent slopes, eroded	5.4	7.7	0.5%
MgB	Mardin channery silt loam, 0 to 8 percent slopes, very stony	5.4	2.0	0.1%
MgD	Mardin channery silt loam, 8 to 25 percent slopes, very stony	5.4	2.1	0.1%
MgF	Mardin channery silt loam, 25 to 50 percent slopes, very stony	5.4	0.4	0.0%
Mn	Mixed alluvial land	5.5	2.5	0.2%
MoB2	Morris channery silt loam, 3 to 8 percent slopes, eroded	5.4	5.9	0.4%
MoC2	Morris channery silt loam, 8 to 15 percent slopes, eroded	5.4	13.4	0.9%
MrB2	Morris flaggy silt loam, 3 to 8 percent slopes, eroded	5.4	0.7	0.0%
MrC2	Morris flaggy silt loam, 8 to 15 percent slopes, eroded	5.4	3.2	0.2%
VcB2	Volusia channery silt loam, 3 to 8 percent slopes, eroded	5.7	13.2	0.9%
VcC2	Volusia channery silt loam, 8 to 15 percent slopes, eroded	5.7	6.8	0.5%
VcD2	Volusia channery silt loam, 15 to 25 percent slopes, eroded	5.7	2.0	0.1%

pH (1 to 1 Water)— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
VfB	Volusia flaggy silt loam, 3 to 8 percent slopes	5.8	7.9	0.6%
VfC	Volusia flaggy silt loam, 8 to 15 percent slopes	5.8	0.8	0.1%
VsB	Volusia channery silt loam, 0 to 8 percent slopes, extremely stony	5.8	9.7	0.7%
VsD	Volusia channery silt loam, 8 to 25 percent slopes, extremely stony	5.8	0.2	0.0%
WeB2	Wellsboro channery silt loam, 3 to 8 percent slopes, eroded	5.3	9.4	0.7%
WeC2	Wellsboro channery silt loam, 8 to 15 percent slopes, eroded	5.3	2.5	0.2%
WeD2	Wellsboro channery silt loam, 15 to 25 percent slopes, eroded	5.3	3.3	0.2%
WlB2	Wellsboro flaggy silt loam, 3 to 8 percent slopes, eroded	5.3	0.9	0.1%
WlC2	Wellsboro flaggy silt loam, 8 to 15 percent slopes, eroded	5.3	14.1	1.0%
WlD2	Wellsboro flaggy silt loam, 15 to 25 percent slopes, eroded	5.3	1.2	0.1%
WsB	Wellsboro channery silt loam, 0 to 8 percent slopes, very stony	5.3	1.1	0.1%
WsD	Wellsboro channery silt loam, 8 to 25 percent slopes, very stony	5.3	3.4	0.2%
Wy	Wyalusing silt loam	5.8	3.3	0.2%
Subtotals for Soil Survey Area			**163.8**	**11.5%**
Totals for Area of Interest			**1,418.8**	**100.0%**

Rating Options—pH (1 to 1 Water)

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

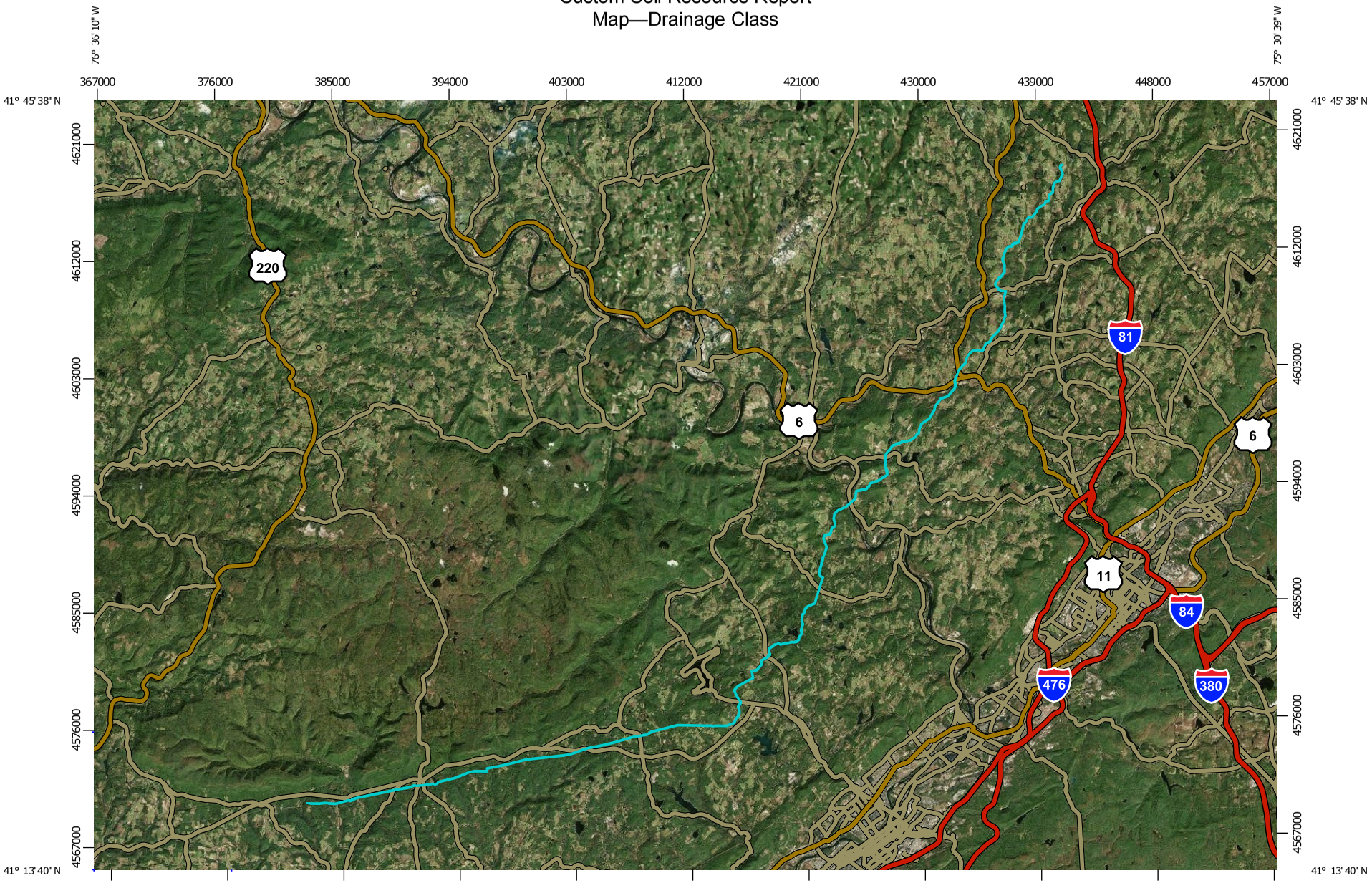
Soil Qualities and Features

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

Drainage Class

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Custom Soil Resource Report
Map—Drainage Class



Map Scale: 1:417,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5000 10000 20000 30000

Feet
0 20000 40000 80000 120000

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Soil Rating Lines

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Soil Rating Points

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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Survey Area Data: Version 8, Nov 16, 2015

Soil Survey Area: Susquehanna County, Pennsylvania
Survey Area Data: Version 10, Nov 16, 2015

Soil Survey Area: Wyoming County, Pennsylvania
Survey Area Data: Version 9, Nov 16, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

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

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

Drainage Class— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Bc	Basher silt loam	Moderately well drained	0.7	0.1%
BfC2	Bath flaggy loam, 12 to 20 percent slopes, moderately eroded	Well drained	0.0	0.0%
BfD2	Bath flaggy loam, 20 to 30 percent slopes, moderately eroded	Well drained	1.9	0.1%
BsD	Bath very stony loam, 12 to 30 percent slopes	Well drained	1.9	0.1%
CnB2	Chenango gravelly silt loam, 3 to 12 percent slopes, moderately eroded	Well drained	0.1	0.0%
LkB2	Lordstown and Oquaga channery silt loams, 3 to 12 percent slopes, moderately eroded	Well drained	2.4	0.2%
LkC2	Lordstown and Oquaga channery silt loams, 12 to 20 percent slopes, moderately eroded	Well drained	3.7	0.3%
LoB	Lordstown and Oquaga flaggy silt loams, 3 to 12 percent slopes	Well drained	6.9	0.5%

Drainage Class— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LoC2	Lordstown and Oquaga flaggy silt loams, 12 to 20 percent slopes, moderately eroded	Well drained	0.8	0.1%
LsB	Lordstown and Oquaga very stony silt loams, 0 to 12 percent slopes	Well drained	0.9	0.1%
LsD	Lordstown and Oquaga very stony silt loams, 12 to 30 percent slopes	Well drained	4.7	0.3%
LsF	Lordstown and Oquaga very stony silt loams, 30 to 70 percent slopes	Well drained	0.6	0.0%
McB2	Mardin channery silt loam, 3 to 8 percent slopes, eroded	Moderately well drained	11.6	0.8%
McC2	Mardin channery silt loam, 8 to 15 percent slopes, eroded	Moderately well drained	9.5	0.7%
MfC2	Mardin flaggy sllt loam, 8 to 15 percent slopes, eroded	Moderately well drained	7.7	0.5%
MgB	Mardin channery silt loam, 0 to 8 percent slopes, very stony	Moderately well drained	2.0	0.1%
MgD	Mardin channery silt loam, 8 to 25 percent slopes, very stony	Moderately well drained	2.1	0.1%
MgF	Mardin channery silt loam, 25 to 50 percent slopes, very stony	Moderately well drained	0.4	0.0%
Mn	Mixed alluvial land	Moderately well drained	2.5	0.2%
MoB2	Morris channery silt loam, 3 to 8 percent slopes, eroded	Somewhat poorly drained	5.9	0.4%
MoC2	Morris channery silt loam, 8 to 15 percent slopes, eroded	Somewhat poorly drained	13.4	0.9%
MrB2	Morris flaggy silt loam, 3 to 8 percent slopes, eroded	Somewhat poorly drained	0.7	0.0%
MrC2	Morris flaggy silt loam, 8 to 15 percent slopes, eroded	Somewhat poorly drained	3.2	0.2%
VcB2	Volusia channery silt loam, 3 to 8 percent slopes, eroded	Somewhat poorly drained	13.2	0.9%
VcC2	Volusia channery silt loam, 8 to 15 percent slopes, eroded	Somewhat poorly drained	6.8	0.5%
VcD2	Volusia channery silt loam, 15 to 25 percent slopes, eroded	Somewhat poorly drained	2.0	0.1%

Drainage Class— Summary by Map Unit — Susquehanna County, Pennsylvania (PA115)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
VfB	Volusia flaggy silt loam, 3 to 8 percent slopes	Somewhat poorly drained	7.9	0.6%
VfC	Volusia flaggy silt loam, 8 to 15 percent slopes	Somewhat poorly drained	0.8	0.1%
VsB	Volusia channery silt loam, 0 to 8 percent slopes, extremely stony	Somewhat poorly drained	9.7	0.7%
VsD	Volusia channery silt loam, 8 to 25 percent slopes, extremely stony	Somewhat poorly drained	0.2	0.0%
WeB2	Wellsboro channery silt loam, 3 to 8 percent slopes, eroded	Moderately well drained	9.4	0.7%
WeC2	Wellsboro channery silt loam, 8 to 15 percent slopes, eroded	Moderately well drained	2.5	0.2%
WeD2	Wellsboro channery silt loam, 15 to 25 percent slopes, eroded	Moderately well drained	3.3	0.2%
WlB2	Wellsboro flaggy silt loam, 3 to 8 percent slopes, eroded	Moderately well drained	0.9	0.1%
WlC2	Wellsboro flaggy silt loam, 8 to 15 percent slopes, eroded	Moderately well drained	14.1	1.0%
WlD2	Wellsboro flaggy silt loam, 15 to 25 percent slopes, eroded	Moderately well drained	1.2	0.1%
WsB	Wellsboro channery silt loam, 0 to 8 percent slopes, very stony	Moderately well drained	1.1	0.1%
WsD	Wellsboro channery silt loam, 8 to 25 percent slopes, very stony	Moderately well drained	3.4	0.2%
Wy	Wyalusing silt loam	Poorly drained	3.3	0.2%
Subtotals for Soil Survey Area			**163.8**	**11.5%**
Totals for Area of Interest			**1,418.8**	**100.0%**

Rating Options—Drainage Class

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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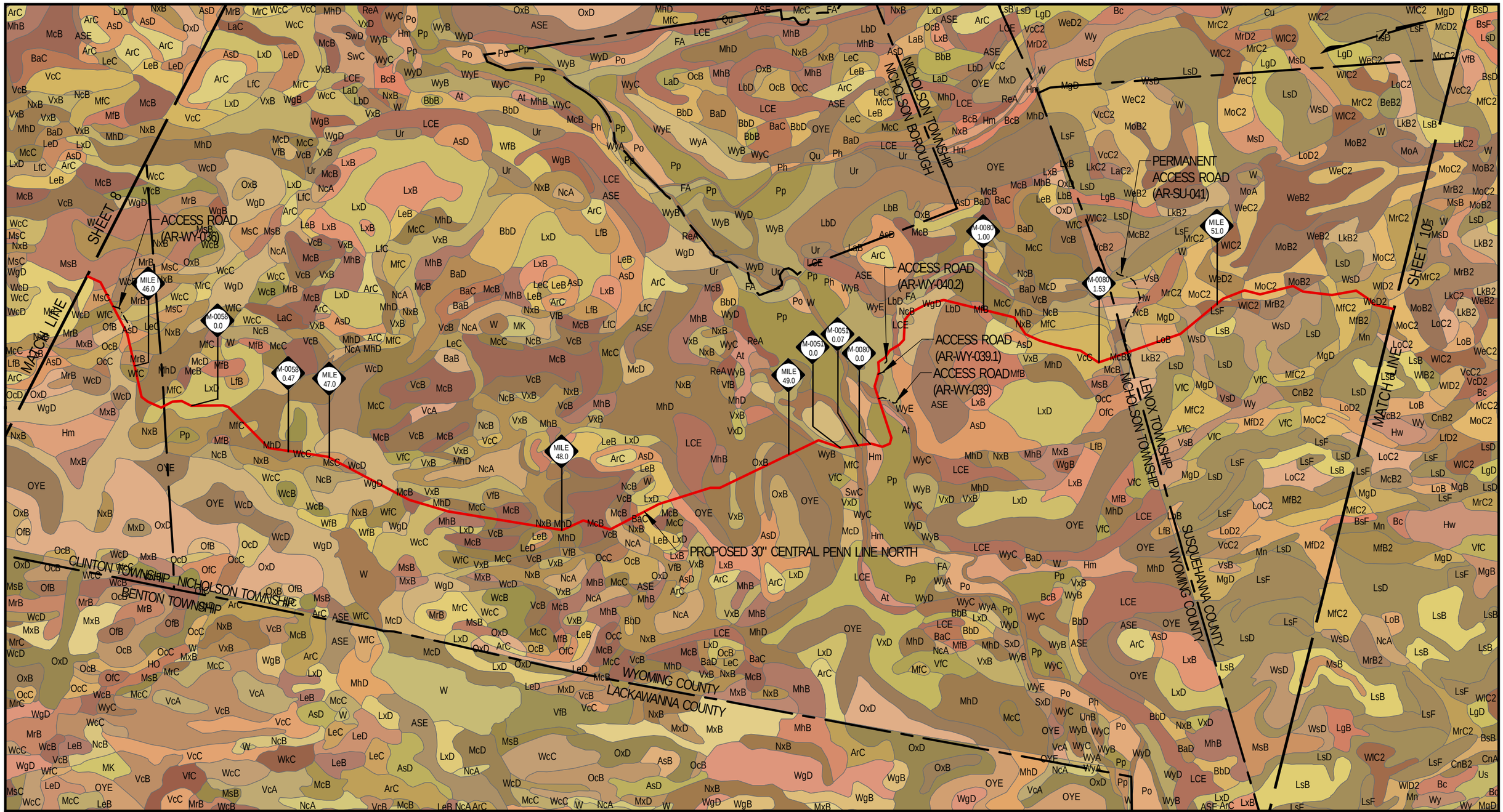

LEGEND

- PROPOSED 30" CENTRAL PENN LINE NORTH
- PROPOSED 42" CENTRAL PENN LINE SOUTH
- EXISTING PIPELINE
- FENCE LINE
- ACCESS ROADS
- COUNTY/TOWNSHIP BOUNDARY
- CONTRACTOR STAGING AREA
- CONTRACTOR YARD/PIPE YARD

NOTES:
SOIL GEOGRAPHIC
DATABASE BY USDA

0 2,000 4,000 6,000
SCALE IN FEET

WOOD GROUP MUSTANG

DRAWING NO.	REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
SOIL ASSOCIATION MAP
ATLANTIC SUNRISE PROJECT
PROPOSED 30" CENTRAL PENN LINE NORTH
M-0115 M.P. 0.00 TO M-0119 M.P. 0.01
WYOMING & SUSQUEHANNA COUNTIES, PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
0	3/31/15	JTN	ISSUED FOR REVIEW	1161481	DP	MJH
1	5/26/15	JTN	ISSUED FOR SUPPLEMENTAL FILING #1	1161481	CLR	MJH
2	12/19/15	JTN	ISSUED FOR SUPPLEMENTAL FILING #3	1161481	CLR	MJH
3	09/23/16	JTN	EXHIBITS FOR PADEP	1161481	CLR	MJH

DRAWN BY: JHD	DATE: 9/22/14	ISSUED FOR BID:	SCALE: 1"=2,000'
CHECKED BY: EL	DATE: 10/3/14	ISSUED FOR CONSTRUCTION:	REVISION: 3
APPROVED BY: MJH	DATE: 10/3/14	DRAWING NUMBER: F-FS-CPLN-A-01	SHEET 9 OF 11
WO: 1161481		8:32 AM 9/2/2016	

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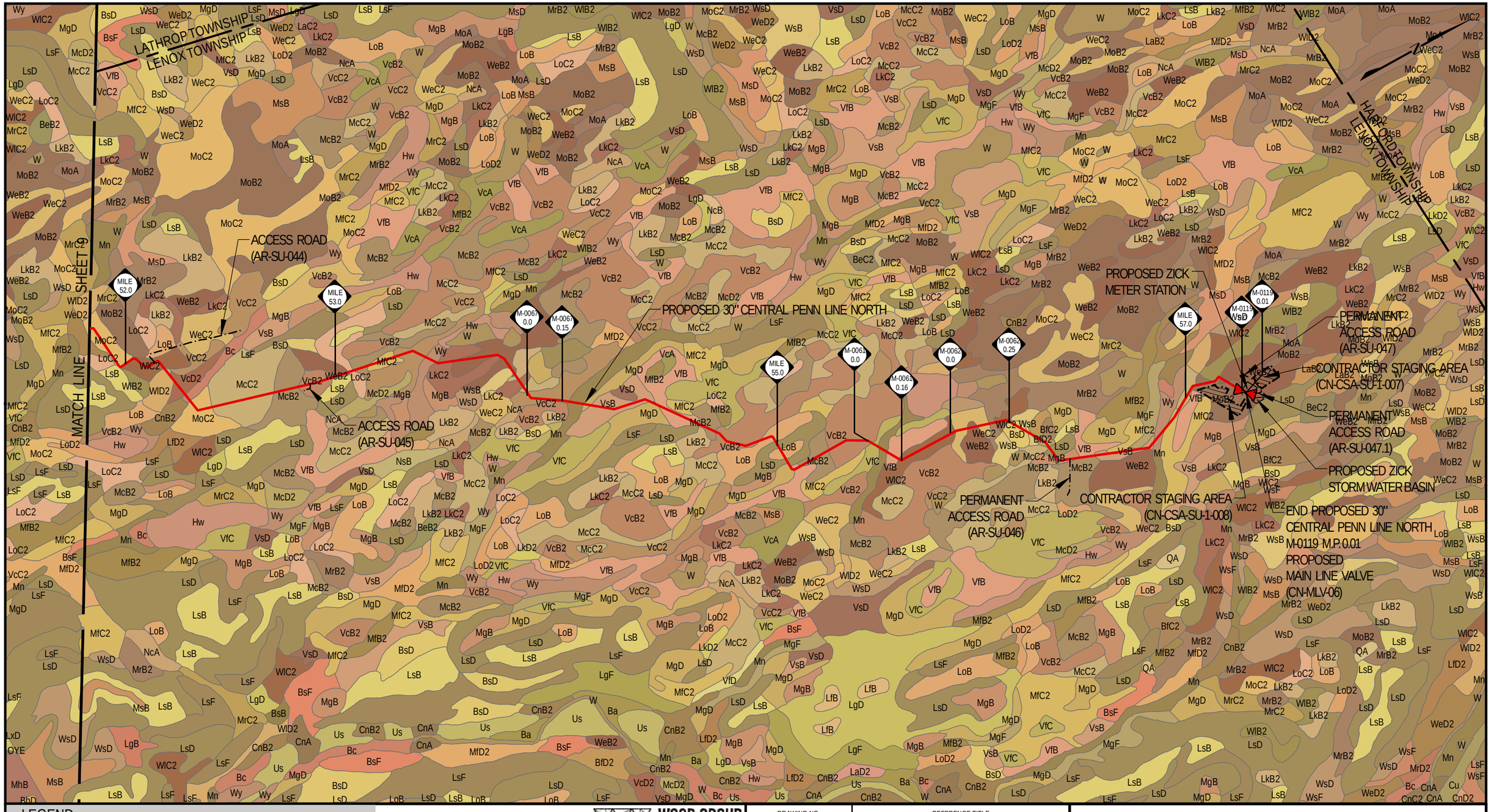

LEGEND

- PROPOSED 30" CENTRAL PENN LINE NORTH
- PROPOSED 42" CENTRAL PENN LINE SOUTH
- EXISTING PIPELINE
- FENCE LINE
- ACCESS ROADS
- COUNTY/TOWNSHIP BOUNDARY
- CONTRACTOR STAGING AREA
  CONTRACTOR YARD/PIPE YARD

NOTES:
SOIL GEOGRAPHIC
DATABASE BY USDA

WOOD GROUP MUSTANG

0 2,000 4,000 6,000
SCALE IN FEET

DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
0	3/31/15	JTN	ISSUED FOR REVIEW	1161481	DP	MJH
1	5/26/15	JTN	ISSUED FOR SUPPLEMENTAL FILING #1	1161481	CLR	MJH
2	12/18/15	JTN	ISSUED FOR SUPPLEMENTAL FILING #3	1161481	CLR	MJH
3	09/23/16	JTN	EXHIBITS FOR PADEP	1161481	CLR	MJH

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
SOIL ASSOCIATION MAP
ATLANTIC SUNRISE PROJECT
PROPOSED 30" CENTRAL PENN LINE NORTH
M-0115 M.P. 0.00 TO M-0119 M.P. 0.01
SUSQUEHANNA COUNTY, PENNSYLVANIA

Williams

DRAWN BY: JHD	DATE: 9/22/14	ISSUED FOR BID:	SCALE: 1"=2,000'
CHECKED BY: EL	DATE: 10/3/14	ISSUED FOR CONSTRUCTION:	REVISION: 3
APPROVED BY: MJH	DATE: 10/3/14	DRAWING NUMBER: F-FS-CPLN-A-01	SHEET 10 OF 11
WO: 1161481		9:58 AM 9/2/2016	

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APPENDIX D

Supporting Information

Appendix D.1 – Preparer Qualifications
Appendix D.2 – North American Green Product Data

Appendix D.1 – Preparer Qualifications

STANDARD E&S WORKSHEET # 22
PLAN PREPARER RECORD OF TRAINING AND EXPERIENCE IN EROSION AND SEDIMENT POLLUTION CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Suzanne Marie King, PE

FORMAL EDUCATION:

Name of College or Technical Institute: Roger Williams University / Stanford University

Curriculum or Program: General Engineering / Structural Engineering

Dates of Attendance: **From:** RWU: 9/1998 / SU: 9/2002 **To:** RWU: 5/2002 / SU: 5/2003

Degree Received RWU: Bachelor of Science - General Engineering
SU: Masters of Science - Structural Engineering

OTHER TRAINING:

Name of Training:		
Presented By:		
Date:		

EMPLOYMENT HISTORY:

Current Employer:	BL Companies	
Telephone:	781-619-9500	
Former Employer:	Woodard & Curran	BKF Engineers
Telephone:	401-273-1007	650-482-6300

RECENT E&S PLANS PREPARED:

Name of Project:	Treasure Island Redevelopment	Canal Street Improvements	Beechwood Museum
County:	San Francisco	Essex	Newport
Municipality:	San Francisco, CA	Salem, MA	Newport, RI
Permit Number:	N/A	N/A	N/A
Approving Agency:	Treasure Island Development Authority (TIDA)	City of Salem & Massachusetts Emergency Management Agency	City of Newport & Coastal Resources Management Council

Appendix D.2 – North American Green Product Data

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ DS75™ Erosion Control Blanket

DESCRIPTION

The ultra short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 45 days. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a polypropylene netting having an approximate 0.50 x 0.50 (1.27 x 1.27 cm) mesh with photodegradable accelerators to provide breakdown of the netting within approximately 45 days, depending upon geographical location and elevation. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The DS75 shall meet Type 1.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Top side only, lightweight photodegradable with photo accelerators	1.5 lb/1000 sq ft (0.73 g/sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 (2.03 m)	8.0 ft (2.4 m)	16 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	40 lbs (18.14 kg)	50 lbs (22.68 kg)	96 lbs (43.54 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.5 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.45 in. (11.43 mm)
Resiliency	ECTC Guidelines	78.8%
Water Absorbency	ASTM D1117	375%
Mass/Unit Area	ASTM 6475	8.57 oz/sy (291 g/sm)
Swell	ECTC Guidelines	15%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.31 oz-in
Light Penetration	ASTM D6567	10%
Tensile Strength - MD	ASTM D6818	105.6 lbs/ft (1.57 kN/m)
Elongation - MD	ASTM D6818	34%
Tensile Strength - TD	ASTM D6818	42.0 lbs/ft (0.62 kN/m)
Elongation - TD	ASTM D6818	25.2%
Biomass Improvement	ASTM D7322	286%

Design Permissible Shear Stress	
Unvegetated Shear Stress	1.55 psf (74 Pa)
Unvegetated Velocity	5.00 fps (1.52 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.029	N/A	N/A
20-50 ft	0.11	N/A	N/A
≥ 50 ft (15.2 m)	0.19	N/A	N/A

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.055
0.50 – 2.0 ft	0.055-0.021
≥ 2.0 ft (0.60 m)	0.021

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ C125® Erosion Control Blanket

DESCRIPTION

The long-term double net erosion control blanket shall be a machine-produced mat of 100% coconut fiber with a functional longevity of up to 36 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.63 x 0.63 in (1.59 x 1.59 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The C125 shall meet Type 4 specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Coconut Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Heavyweight photodegradable with UV additives	3 lbs/1000 sq ft (1.47 g/sm)
Thread	Black polypropylene	

Standard Roll Sizes		
Width	6.67 (2.03 m)	8 ft (2.44 m)
Length	108 ft (32.92 m)	112 ft (35.14 m)
Weight ± 10%	44 lbs (19.95 kg)	56.25 (25.5 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.22 in. (5.59 mm)
Resiliency	ECTC Guidelines	82%
Water Absorbency	ASTM D1117	167%
Mass/Unit Area	ASTM 6475	7.73 oz/sy (262.8 g/sm)
Swell	ECTC Guidelines	13%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	0.75 oz-in
Light Penetration	ASTM D6567	16.6%
Tensile Strength - MD	ASTM D6818	472.8 lbs/ft (7.01 kN/m)
Elongation - MD	ASTM D6818	25.6%
Tensile Strength - TD	ASTM D6818	225.6 lbs/ft (3.35 kN/m)
Elongation - TD	ASTM D6818	33.9%
Biomass Improvement	ASTM 7322	257%

Design Permissible Shear Stress	
Unvegetated Shear Stress	2.25 psf (108 Pa)
Unvegetated Velocity	10.0 fps (3.05 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.029	0.082
20-50 ft	0.036	0.060	0.096
≥ 50 ft (15.2 m)	0.070	0.090	0.110

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.022
0.50 – 2.0 ft	0.022-0.014
≥ 2.0 ft (0.60 m)	0.014

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ S75® Erosion Control Blanket

DESCRIPTION

The short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a lightweight photodegradable polypropylene netting having an approximate 0.50 x 0.50 in. (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The S75 shall meet Type 2.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Top side only, lightweight photodegradable	1.5 lb/1000 sq ft (0.73 kg/100 sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 ft (2.03 m)	8.0 ft (2.4 m)	16 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	40 lbs (18.14 kg)	50 lbs (22.68 kg)	96 lbs (43.54 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.5 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.50 in. (12.7 mm)
Resiliency	ECTC Guidelines	78.8%
Water Absorbency	ASTM D1117	301%
Mass/Unit Area	ASTM D6475	9.76 oz/sy (332 g/sm)
Swell	ECTC Guidelines	15%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.31 oz-in
Light Penetration	ASTM D6567	6.0%
Tensile Strength - MD	ASTM D6818	122.4 lbs/ft (1.81 kN/m)
Elongation - MD	ASTM D6818	36.1%
Tensile Strength - TD	ASTM D6818	79.2 lbs/ft (1.17 kN/m)
Elongation - TD	ASTM D6818	26.8%
Biomass Improvement	ASTM D7322	301%

Design Permissible Shear Stress	
Unvegetated Shear Stress	1.55 psf (74 Pa)
Unvegetated Velocity	5.00 fps (1.52 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.029	N/A	N/A
20-50 ft	0.11	N/A	N/A
≥ 50 ft (15.2 m)	0.19	N/A	N/A

NTPEP Large-Scale Slope Testing
ASTM D6459 - C-factor = 0.012

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.055
0.50 – 2.0 ft	0.055-0.021
≥ 2.0 ft (0.60 m)	0.021

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ SC150® Erosion Control Blanket

DESCRIPTION

The extended-term double net erosion control blanket shall be a machine-produced mat of 70% agricultural straw and 30% coconut fiber with a functional longevity of up to 24 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.63 x 0.63 in (1.59 x 1.59 cm) mesh, and on the bottom side with a lightweight photodegradable polypropylene netting with an approximate 0.50 x 0.50 (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The SC150 shall meet Type 3.B specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	70% Straw Fiber 30% Coconut Fiber	0.35 lbs/sq yd (0.19 kg/sm) 0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top: Heavyweight photodegradable with UV additives	3 lbs/1000 sq ft (1.47 kg/100 sm)
	Bottom: lighweight photodegradable	1.5 lb/1000 sq ft (0.73 kg/100 sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 ft (2.03 m)	8 ft (2.4 m)	16.0 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	44 lbs (19.95 kg)	55 lbs (24.95 kg)	105.6 lbs (47.9 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.6 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.35 in. (8.89 mm)
Resiliency	ECTC Guidelines	75%
Water Absorbency	ASTM D1117	342%
Mass/Unit Area	ASTM D6475	7.87 oz/sy (267.6 g/sm)
Swell	ECTC Guidelines	30%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	1.11 oz-in
Light Penetration	ASTM D6567	6.2%
Tensile Strength - MD	ASTM D6818	362.4 lbs/ft (5.37 kN/m)
Elongation - MD	ASTM D6818	29.4%
Tensile Strength - TD	ASTM D6818	136.8 lbs/ft (2.03 kN/m)
Elongation - TD	ASTM D6818	27.6%
Biomass Improvement	ASTM D7322	481%

Design Permissible Shear Stress	
Unvegetated Shear Stress	2.00 psf (96 Pa)
Unvegetated Velocity	8.0 fps (2.44 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.048	0.100
20-50 ft	0.051	0.079	0.145
≥ 50 ft (15.2 m)	0.10	0.110	0.190

NTPEP Large-Scale Slope
ASTM D6459 - C-factor = 0.031

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.050
0.50 – 2.0 ft	0.050-0.018
≥ 2.0 ft (0.60 m)	0.018

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – BioNet® SC150BN™ Erosion Control Blanket

DESCRIPTION

The extended-term double net erosion control blanket shall be a machine-produced mat of 70% agricultural straw and 30% coconut fiber with a functional longevity of up to 18 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a 100% biodegradable woven natural organic fiber netting. The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as Leno weave) to form an approximate 0.50 x 1.0 in. (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The SC150BN shall meet Type 3.B specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	70% Straw Fiber	0.35 lbs/sq yd (0.19 kg/sm)
	30% Coconut Fiber	0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top: Leno woven 100% biodegradable jute	9.35 lb/1000 sq ft (4.5 kg/100 sm)
	Bottom: 100% biodegradable organic jute	7.7 lb/1000 sq ft (3.76 kg/100 sm)
Thread	Biodegradable	

Standard Roll Sizes			
Width	6.67 ft (2.03 m)	8.0 ft (2.4 m)	15.5 ft (4.72 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	90 ft (27.43 m)
Weight ± 10%	52.22 lbs (23.69 kg)	65.28 lbs (29.61 kg)	101.2 lbs (45.9 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	155 sq yd (129.6 sm)
	Leno weave top only	Leno top and bottom	Leno top and bottom

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.25 in. (6.35 mm)
Resiliency	ECTC Guidelines	86%
Water Absorbency	ASTM D1117	311%
Mass/Unit Area	ASTM D6475	8.32 oz/sy (282.9 g/sm)
Swell	ECTC Guidelines	46%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	0.42 oz-in
Light Penetration	ASTM D6567	7.6%
Tensile Strength - MD	ASTM D6818	201.6 lbs/ft (2.99 kN/m)
Elongation - MD	ASTM D6818	13.4%
Tensile Strength - TD	ASTM D6818	164.4 lbs/ft (2.44 kN/m)
Elongation - TD	ASTM D6818	14.2%
Biomass Improvement	ASTM D7322	641 %

Design Permissible Shear Stress	
Unvegetated Shear Stress	2.10 psf (100 Pa)
Unvegetated Velocity	8.00 fps (2.44 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.029	0.063
20-50 ft	0.051	0.055	0.092
≥ 50 ft (15.2 m)	0.10	0.080	0.120

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.050
0.50 – 2.0 ft	0.050-0.018
≥ 2.0 ft (0.60 m)	0.018

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – VMax® P550® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 100% UV stable polypropylene fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a ultra heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an ultra heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The P550 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	100% UV stable polypropylene fiber	0.5 lb/sy (0.27 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	52 lbs (23.59 kg)
Area	40 sy (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.72 in. (18.29 mm)
Resiliency	ASTM 6524	95%
Density	ASTM D792	0.892 g/cm^3
Mass/Unit Area	ASTM 6566	21.25 oz/sy (723 g/sm)
UV Stability	ASTM D4355/ 1000 HR	100%
Porosity	ECTC Guidelines	96%
Stiffness	ASTM D1388	366.3 oz-in.
Light Penetration	ASTM D6567	16.5%
Tensile Strength – MD	ASTM D6818	1421 lbs/ft (21.07 kN/m)
Elongation – MD	ASTM D6818	40.5%
Tensile Strength – TD	ASTM D6818	1191.6 lbs/ft (17.67 kN/m)
Elongation – TD	ASTM D6818	28.8%
Biomass Improvement	ASTM D7322	378%

Design Permissible Shear Stress	Short Duration	Long Duration
Phase 1: Unvegetated	4.0 psf (191 Pa)	3.25 psf (156 Pa)
Phase 2: Partially Veg.	12.0 psf (576 Pa)	12.0 psf (576 Pa)
Phase 3: Fully Veg.	14.0 psf (672 Pa)	12.0 psf (576 Pa)
Unvegetated Velocity	12.5 fps (3.8 m/s)	
Vegetated Velocity	25 fps (7.6 m/s)	

NTPEP ASTM D6460 Large Scale Channel	
Vegetated Shear Stress	>13.2 psf (632 Pa)
Vegetated Velocity	>24.5 fps (7.47 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.0005	0.015	0.043
20-50 ft	0.0173	0.031	0.050
≥ 50 ft (15.2 m)	0.035	0.047	0.057

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.041
0.50 – 2.0 ft	0.040-0.013
≥ 2.0 ft (0.60 m)	0.013

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ROLLMAX™
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Specification Sheet – VMax® SC250® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The SC250 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	70% Straw Fiber	0.35 lb/sq yd (0.19 kg/sm)
	30% Coconut Fiber	0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	5 lb/1000 sq ft (2.44 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	34 lbs (15.42 kg)
Area	40 sq yd (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.62 in. (15.75 mm)
Resiliency	ASTM 6524	95.2%
Density	ASTM D792	0.891 g/cm^3
Mass/Unit Area	ASTM 6566	16.13 oz/sy (548 g/sm)
UV Stability	ASTM D4355/ 1000 HR	100%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D1388	222.65 oz-in.
Light Penetration	ASTM D6567	4.1%
Tensile Strength – MD	ASTM D6818	709 lbs/ft (10.51 kN/m)
Elongation – MD	ASTM D6818	23.9%
Tensile Strength – TD	ASTM D6818	712 lbs/ft (10.56 kN/m)
Elongation – TD	ASTM D6818	36.9%
Biomass Improvement	ASTM D7322	441%

Design Permissible Shear Stress		
	Short Duration	**Long Duration**
Phase 1: Unvegetated	3.0 psf (144 Pa)	2.5 psf (120 Pa)
Phase 2: Partially Veg.	8.0 psf (383 Pa)	8.0 psf (383 Pa)
Phase 3: Fully Veg.	10.0 psf (480 Pa)	8.0 psf (383 Pa)
Unvegetated Velocity	9.5 fps (2.9 m/s)	
Vegetated Velocity	15 fps (4.6 m/s)	

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.0010	0.0209	0.0507
20-50 ft	0.0081	0.0266	0.0574
≥ 50 ft (15.2 m)	0.0455	0.0555	0.081

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.040
0.50 – 2.0 ft	0.040-0.012
≥ 2.0 ft (0.60 m)	0.011

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ROLLMAX™
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Specification Sheet – VMax® W3000™ High-Performance Turf Reinforcement Mat

DESCRIPTION

The VMax® W3000™ high performance turf reinforcement mat (HPTRM) is a machine-produced mat of 100% UV-stabilized high denier poly yarns woven into permanent, high strength three-dimensional turf reinforcement matting. The mat consists of a woven bottom layer integrally interlaced into a woven corrugated middle layer, with poly tendons on the top side spanning the entire machine direction. The mat is designed to provide sufficient thickness, optimum open area and three-dimensionality for effective erosion control and vegetation reinforcement against high flow induced shear forces. The mat has high tensile strength providing excellent damage resistance and increased bearing capacity of vegetated soils subject to heavy loads from maintenance equipment and other vehicular traffic. The corrugated structure provides a highly frictional surface to prevent sod slippage when sod is installed over the mat. When used as surface protection without sod overlay, the corrugated structure encapsulates the seed and soil in place while promoting self-soil infilling of the system.

Material Content		
Bottom	100% UV stable poly fiber weave	Black/Green
Corrugated Middle	100% UV stable poly fiber weave	Black/Green
Top	100% UV stable Poly Tendons	Green

Standard Roll Sizes	
Width	10 ft (3.05 m)
Length	90 ft (27.4 m)
Weight ± 10%	90 lbs (41.0 kg)
Area	100 sy (83.6 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.40 in. (10.2 mm)
Resiliency	ASTM D6524	98%
Mass/Unit Area	ASTM 6566	14.7oz/sy (495 g/m2)
Tensile Strength - MD	ASTM D6818	3600 lbs/ft (52.6 kN/m)
Elongation - MD	ASTM D6818	35%*
Tensile Strength - TD	ASTM D6818	3800 lbs/ft (55.5 kN/m)
Elongation - TD	ASTM D6818	20%*
Light Penetration	ASTM D6567	12%
UV Stability	ASTM D4355	>80% @3000 hrs

** Measured on fabric prior to corrugation for true measurement of base fabric elongation*

Design Permissible Shear Stress*	
Vegetated Shear Stress	16 psf (766 Pa)
Vegetated Velocity	25 fps (7.6 m/s)

**Values extrapolated through ASTM D6460 testing*

ASTM D6460 Large Scale Channel	
Vegetated Shear Stress	>13.2 psf (632 Pa)
Vegetated Velocity	>24.5 fps (7.47 m/s)

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APPENDIX E

AR-SU-041 Specific Narrative and Calculations

E.1 Site Specific Narrative
- a. Narrative
- ***b. TMDL Discussion***
- ***c. Minimized Soil Compaction***
- ***d. Thermal Impact Analysis***
- ***e. Acidic Soil Management Plan***
- ***f. Road Specific Construction Sequence***
- ***g. Worksheet 1. General Site Information***

E.2 Location Map

E.3 Sediment Barrier Table
- a. E&S Worksheet 1

E.1 Site Specific Narrative

a. Narrative
b. TMDL Discussion
c. Minimized Soil Compaction
d. Thermal Impact Analysis
e. Acidic Soil Management Plan
f. Road Specific Construction Sequence
g. Worksheet 1. General Site Information

ACCESS ROAD: AR-SU-041

ACT 167 PLAN: None

TMDL: None

NARRATIVE:

AR-SU-041 is a proposed permanent access road (PAR) located in Lenox Township, Susquehanna County, Pennsylvania. The intent of this PAR is ***to provide temporary construction access and*** permanent maintenance and operational access to the proposed 30" Central Penn Line North Pipeline right-of-way. ***The improvements described below will be installed temporarily and will be utilized during the construction process. Upon completion of the construction activities, the disturbed areas will be restored to pre-construction conditions (existing dirt road) and a permanent easement will be recorded along the restored access road corridor to provide maintenance and operational access to the.***

The PAR begins at Station Hill Road and terminates at the pipeline right-of-way at approximate mile post ***50.7***. The PAR is approximately ***2,060*** feet long. For the first ***1,580*** feet the road follows an existing drive, no improvements are proposed over this portion of the road. The remaining **480** feet of road is to be new ***temporary*** construction over ***an existing dirt road***

Compost filter socks have been proposed to clean runoff leaving the area disturbed due to construction of the PAR and subsequent restoration. A temporary rock construction entrance with compost filter sock is proposed where the PAR diverts from the existing driveway.

TMDL DISCUSSION:

The watershed and sub-basin where this road is located as well as the nearest surface waters to receive runoff from this road, are not subject to any TMDL restrictions.

MINIMIZED SOIL COMPACTION:

The Project seeks to minimize soils compaction impacts associated with access roads to the maximum extent practicable. AR-SU-041 is a proposed permanent access road. All construction and operations traffic will utilize the proposed road. The permanent access road utilizes 1,580 feet of existing road reducing the area of impact. The roadway width has also been minimized to 14 feet.

Temporary construction over undisturbed land will be restored with native topsoil to enhance the revegetation process.

THERMAL IMPACT ANALYSIS:

Thermal impacts associated with AR-SU-041 will be avoided to the maximum extent practicable. The following measures have been implemented to minimize thermal impacts:

- ***AR-SU-041 is approximately 2,060 linear feet; however, it follows an existing gravel road for approximately 1,580 linear feet. No improvements are necessary to use the existing gravel road. Utilizing the existing gravel road minimizes the potential thermal impact of this road.***

- ***The use of an existing road corridor eliminates the need for additional tree removal. The ability to use this road without the removal of additional trees acts to minimize the thermal impact of this road.***

- ***During the construction phase of this project compost filter socks will be placed downgradient of the proposed access road. The compost filter socks will promote infiltration of runoff from the proposed temporary impervious surfaces. Infiltration of runoff prior to entering of receiving waters allows for runoff to assimilate to ground water temperatures which are minimally influenced by seasonal temperature changes, minimizing the thermal impact of this road.***

- ***The proposed gravel surfacing is temporary in nature and the disturbed areas will be returned to pre-development conditions upon completion of the construction of the pipeline. There are no new permanent impervious surfaces as a result of the use of this road due to the removal of the temporary gravel surface. Therefore, there are no permanent thermal impacts as a result of the use of this road for the construction and maintenance of the pipeline.***

ACIDIC SOIL MANAGEMENT PLAN:

AR-SU-041 Soil Acidity Table		
Soil Map Symbol	Soil Name	pH
MoB2	Morris channery silt loam, 3 to 8 percent slopes, eroded	5.4
McB2	Mardin channery silt loam, 3 to 8 percent slopes, eroded	5.4
LkB2	Lordstown and Oquaga channery silt loams, 3 to 12 percent slopes, moderatly eroded	5.4
MgD	Mardin channery silt loam, 8 to 25 percent slopes, very stony	5.4
NcB	Norwich and Chippewa channery silt loames, 3 to 8 percent slopes	5.7

An Acid Producing Soils Control Plan is included as part of this application. The plan identifies the measures to be used to control pollution associated with construction of access roads that contain acid-producing soils. The plan requires that these measures be applied only for soils with a pH less than 4.0 as recommended by the Natural Resources Conservation Service (NRCS). The table above depicts the soil types present on this road as well as the acidity of the soils. The pH of the soils on this road are outside the threshold established by the Acid Producing Soils Control Plan; therefore, the measures prescribed in the plan do not need to be implemented for this road.

ROAD SPECIFIC CONSTRUCTION SEQUENCE:
ACCESS ROAD: AR-SU-041

1. ***At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, Environmental Inspectors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan, and a representative from the local conservation district to an on-site preconstruction meeting.***

2. ***At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.***

3. ***Hold pre-construction conference with the Environmental Inspectors, local County Conservation District (CCD), PADEP, and Design Engineer.***

4. ***Survey crews locate and stake all special areas of concern (e.g., wetlands, streams, culverts, other utilities, etc.), edge of proposed access road, and field locate the limit of disturbance.***

5. ***Install orange construction fence around areas to be preserved.***

6. ***Locate staging areas and access points including rock construction entrance. Install sediment barriers (compost filter sock) down slope of these areas.***

7. ***Perform tree cutting where required. (Areas with tree cutting will be restored to meadow in good condition.)***

8. ***Install rock construction entrance.***

9. ***Install construction mats over culverts at locations noted on plans.***

10. ***Remove brush to effectively install perimeter controls, level side cuts to grant access for vehicles and workers to safely perform the installation of sediment barriers on the Site as shown on the construction drawings.***

11. ***Install perimeter E&SC BMPs as depicted on the E&SC Drawings.***

12. ***Apply stabilization measures immediately to any disturbed areas due to the initial clearing and installation of E&SC BMPs.***

13. *The Compliance Manager shall provide PADEP at least three days' notice prior to bulk earth disturbance and upon completed installation of perimeter E&SC BMPs.*

14. *If applicable, install security fence. The necessity of a security fence will be at the discretion of the Contractor.*

15. *Proceed with major clearing and grubbing.*

16. *Begin construction staking for layout of access road.*

17. *Begin grading and strip and stockpile topsoil; install E&SC BMPs around stockpiles. Soil stockpile areas to support the access roads shall be located within the area of minimum disturbance/reduced grading for the same access road that the topsoil was stripped, or within the pipeline ROW. Stockpiled soil shall not exceed 35 feet in height, have maximum side slopes of 2:1, and be surrounded by 12" compost filter sock or silt fence. All existing excavated material that is not to be reused in the work is to be immediately removed from the site and properly disposed of at an approved facility or permitted waste area.*

18. *Grade the access road as shown on the E&SC Plans (Section 2 of the ESCGP-2 NOI). Add AASHTO #57 stone to the portion of the existing road to remain in areas where existing gravel is thinning or bare to create a uniform travel surface. Continue adding AASHTO #57* stone to *rutted or thinning areas as necessary during active use of the access road.*

19. *Immediately stabilize the access road with geotextile and gravel surfacing where indicated in the E&SC Plans.*

20. *Upon temporary cessation of an earth disturbance activity or any stage of an activity where the cessation of earth disturbance activities will exceed four days, disturbed areas shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth disturbance activities. For an earth disturbance activity or any stage of an activity to be considered temporarily stabilized, the disturbed areas shall be covered with one of the following: a minimum uniform coverage of mulch and seed, with a density capable of resisting accelerated erosion and sedimentation, or an acceptable E&SC BMP, which temporarily minimizes accelerated erosion and sedimentation. Temporary stabilization will not occur on active vehicular travel ways within the right of way. The on-site environmental inspector will log daily activity within the limits of disturbance and notify the Contractor of areas requiring temporary stabilization (i.e., areas where work has ceased for at least four days).*

21. ***Once the temporary improvements to the permanent access road are no longer necessary, remove all gravel and geotextile fabric from the temporarily improved portions of the road and dispose of the materials at a suitable disposal or recycling site, in compliance with local, state, and federal regulations. Restore pre-construction grades. Immediately seed and stabilize disturbed areas, including areas used to stockpile topsoil. E&SC BMPs will remain in place and functional.***

22. ***Loosen and de-compact topsoil throughout the temporarily improved section of the access road to match preconstruction conditions. Immediately fertilize, seed and stabilize areas at finished grade. Maintain E&SC control devices until access road work is complete and uniform 70% perennial vegetative cover is established.***

23. ***Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for an inspection prior to the removal of the E&SC BMPs. Vegetated areas must achieve a minimum uniform 70% perennial cover over the entire disturbed area to be considered stabilized. Roadways and parking areas should have at least a clean subbase in place to be considered stabilized.***

24. ***Upon local CCD and Transco approval of stabilization and re-vegetation, remove temporary E&SC BMPs and stabilize areas disturbed by removal including the perimeter sediment barrier. Properly dispose/recycle E&SC BMPs. Remove orange construction fencing and, if necessary, security fence.***

25. ***Complete access road limit of disturbance stabilization, including seed application and mulching in areas disturbed by E&SC BMP removal.***

26. ***Upon completion of all earth disturbance activities, removal of all temporary E&SC BMPs and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for a final inspection.***

Worksheet 1. General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date: 3/23/2015, ***revised 3/02/2016***

Project Name: Atlantic Sunrise Pipeline AR-SU-041

Municipality: Lenox Township

County: Susquehanna

Total Area (acres): ***1.92***

Major River Basin: Susquehanna River

http://www.dep.state.pa.us/dep/depupdate/watermgt/wc/default.htm#newtopics

Watershed: Tunkhannock Creek

Sub-Basin: Upper Susquehanna River

Nearest Surface Water(s) to Receive Runoff: UNT to Millard Creek

Chapter 93 - Designated Water Use: CWF,MF

http://www.pacode.com/secure/data/025/chapter93/chap93toc.html

Impaired according to Chapter 303(d) List?

http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/303d-Report.htm

Yes	
No	X

List Causes of Impairment:

Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/GeneralPermits/default.htm

Yes	
No	X

Existing or planned drinking water supply?

Yes	
No	X

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/Approved_1.html

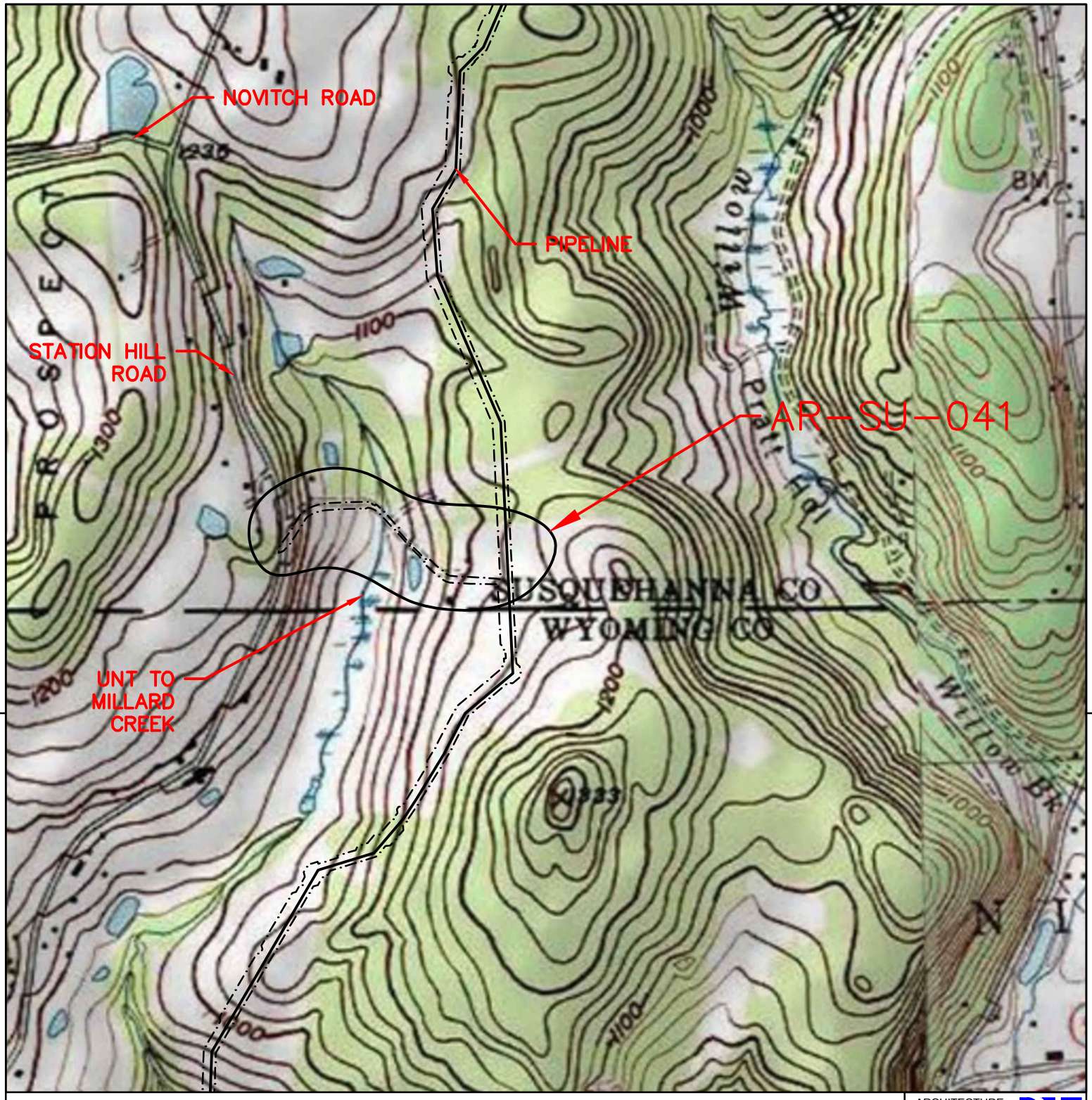
Yes	
No	X

Existing River Conservation Plan?

http://www.dcnr.state.pa.us/brc/rivers/riversconservation/planningprojects/

Yes	X
No	

E.2 Location Map



HOP BOTTOM QUADRANGLE

ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING

BL Companies

N

GRAPHIC SCALE

1,000 500 0 1,000

SCALE IN FEET

ATLANTIC SUNRISE

PROPOSED 30" NATURAL GAS PIPELINE

USGS LOCATION MAP
TEMPORARY AR-SU-041
LENOX TOWNSHIP
SUSQUEHANNA COUNTY, PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
				1161481		

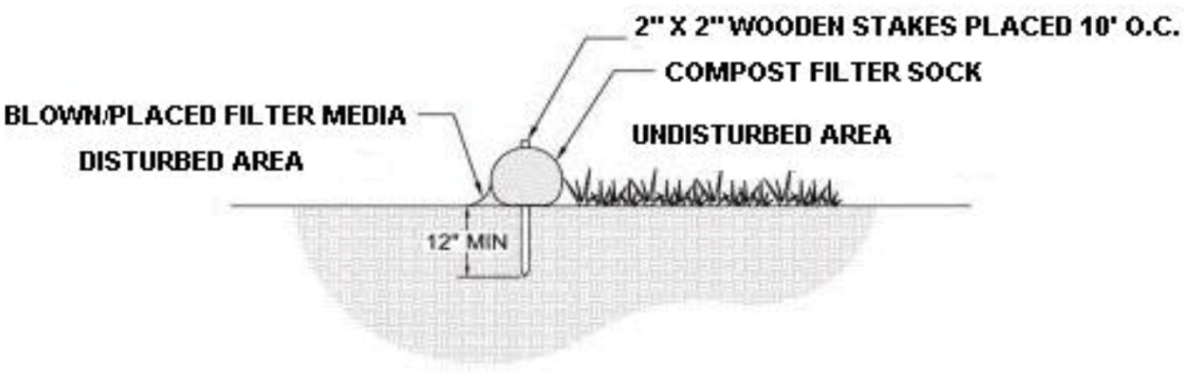
DRAWN BY: CLM	DATE: 11/11/15	ISSUED FOR BID:	SCALE: 1"=1,000'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 24-1601-70-28-A/ 1683_3-AR-SU-041	SHEET 1 OF 1
WO: 1161481			

E.*3* Sediment Barrier Table

a. E&S Worksheet 1

E&S WORKSHEET #1
Compost Filter Sock

PROJECT NAME: Atlantic Sunrise
LOCATION: AR-SU-041
PREPARED BY: JMS, ***OLC, RMR*** DATE: 5/11/15, ***Rev. 9/27/16, Rev.11/19/16***
CHECKED BY: BJP, ***SMK*** DATE: 5/11/15, ***Rev. 9/27/16, Rev. 11/19/16***



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)	SOCK LENGTH
1-13	*18*	*STA 0+75 to STA 5+00*	*7*	*287*	*148*
STOCKPILE					
SP 1	*12*	*STA 1+90 to STA 3+00*	*2:1 (MAX)*	*25 (MAX)*	*252*
SP2	*12*	*STA 3+00 to STA 6+00*	*2:1 (MAX)*	*25 (MAX)*	*497*
SP3	*12*	*STA 3+10 -STA 4+10*	*2:1 (MAX)*	*25 (MAX)*	*200*

SOURCE: Pennsylvania Erosion and Sediment Pollution Control Manual, Page 372

APPENDIX F

AR-SU-044 Specific Narrative and Calculations

F.1 Site Specific Narrative

a. Narrative

b. TMDL Discussion

c. Minimized Soil Compaction

d. Thermal Impact Analysis

e. Acidic Soil Management Plan

f. Road Specific Construction Sequence

g. Worksheet 1. General Site Information

F.2 Location Map

F.1 Site Specific Narrative

a. Narrative
b. TMDL Discussion
c. Minimized Soil Compaction
d. Thermal Impact Analysis
e. Acidic Soil Management Plan
f. Road Specific Construction Sequence
g. Worksheet 1. General Site Information

ACCESS ROAD: AR-SU-044

ACT 167 PLAN: None

TMDL: None

NARRATIVE:

AR-SU-044 is a proposed temporary access road (TAR) located in Lenox Township, Susquehanna County, Pennsylvania. The intent of this road is to provide temporary construction access to the proposed 30" Central Penn Line North Pipeline. The road begins at Cross Country Road and terminates at the pipeline right-of-way at approximate mile post 52.1. This TAR is approximately 2,215 feet long. The TAR follows an existing road from School House Road until the last 150 feet of the road. The last 150 feet of the road will be constructed over undeveloped land and will be constructed as a rock construction entrance and driveway apron. Temporary equipment matting is proposed over the existing pipeline at approximate station 2+10 in order to disperse anticipated construction vehicle loads evenly. There are no proposed ***earth disturbing*** improvements over the first 2,065 feet of road; therefore, ***no sediment barriers are proposed along this portion of the road***. Upon completion of the pipeline construction, the disturbed areas will be restored to pre-construction conditions.

TMDL DISCUSSION:

The nearest surface waters to receive runoff from this road are not subject to any TMDL restrictions.

MINIMIZED SOIL COMPACTION:

The Project seeks to minimize soils compaction impacts associated with access roads to the maximum extent practicable. AR-SU-044 will utilize an existing road for 2,065 feet. The remaining 150 feet will follow a rock construction entrance and driveway apron to the pipeline right-of-way. All construction traffic will utilize the existing unimproved road. Soil compaction impacts have been minimized by the use of the existing road. The small amount of new road (Sta. 90+00 to 2+40) connecting the existing road to the pipeline right of way will be restored to pre-construction conditions with native topsoil to enhance the revegetation process.

THERMAL IMPACT ANALYSIS:

Thermal impacts associated with AR-SU-044 will be avoided to the maximum extent practicable. The following measures have been implemented to ensure that thermal impacts have been avoided, minimized or mitigated:

- ***AR-SU-044 is approximately 2,215 linear feet. The TAR follows an existing road for approximately 2,065 linear feet. No improvements are necessary to use the existing road. Utilizing the existing gravel road for approximately 90% of the road minimizes the potential thermal impact of this road.***

- ***The remaining 150 linear feet of road is adjacent to an existing pipeline right of way. The use of an existing pipeline right of way eliminates the need for additional tree removal. The ability to use this road without the removal of additional trees acts to minimize the thermal impact of this road.***

- ***Temporary improvements for this road are limited to equipment mats over an existing pipeline, a driveway apron and rock construction entrance. Runoff from these temporary improvements is directed to stabilized, well vegetated areas that will promote infiltration of the runoff. Infiltration of runoff prior to entering of receiving waters allows for runoff to assimilate to ground water temperatures which are minimally influenced by seasonal temperature changes, minimizing the thermal impact of this road.***

- ***The proposed improvements are temporary in nature and the disturbed areas will be restored to pre-construction conditions upon completion of the construction of the pipeline. There are no new permanent impervious surfaces as a result of the use of this road due to the removal of the temporary gravel surface. Therefore, there are no permanent thermal impacts as a result of the use of this road for the construction of the pipeline.***

ACIDIC SOIL MANAGEMENT PLAN:

AR-SU-044 Soil Acidity Table		
Soil Map Symbol	Soil Name	PH
MoB2	Morris channery silt loam, 3 to 8 percent slopes, eroded	5.4
LoB	Lordstown and Oquaga flaggy silt loams, 3 to 12 percent slopes	5.4
WlC2	Wellsboro flaggy silt loam, 8 to 15 percent slopes, eroded	5.3
VcC2	Volusia channery silt loam, 8 to 15 percent slopes, eroded	5.5
WeC2	Wellsboro channery silt loam, 8 to 15 percent slopes, eroded	5.3

An Acid Producing Soils Control Plan is included as part of this application. The plan identifies the measures to be used to control pollution associated with construction of access roads that contain acid-producing soils. The plan requires that these measures be applied only for soils with a pH less than 4.0, as recommended by the Natural Resources Conservation Service (NRCS). The table above depicts the soil types present on this road as well as the acidity of the soils. The pH of the soils on this road are outside the threshold established by the Acid Producing Soils Control Plan. Therefore, the measures prescribed in the plan do not need to be implemented for this road.

ROAD SPECIFIC CONSTRUCTION SEQUENCE:
ACCESS ROAD: AR-SU-044

1. ***At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, Environmental Inspectors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan, and a representative from the local conservation district to an on-site preconstruction meeting.***

2. ***At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.***

3. ***Hold pre-construction conference with the Environmental Inspectors, local County Conservation District (CCD), PADEP and Design Engineer.***

4. ***Survey crews locate and stake all special areas of concern (e.g., wetlands, streams, culverts, other utilities, etc.), edge of proposed access road, and field locate the limit of disturbance.***

5. ***Locate staging areas and access points including rock construction entrance.***

6. ***Perform tree cutting where required. (Areas with tree cutting will be restored to meadow in good condition.)***

7. ***Install rock construction entrance with gravel driveway apron.***

8. ***Install construction mats over existing pipeline crossing in the location shown on plans***

9. ***Install construction mats over culvert at location noted on plans.***

10. ***Add AASHTO #57 stone to the portion of the existing road to remain in areas where existing gravel is thinning or bare to create a uniform travel surface. Continue adding AASHTO #57 stone to rutted or thinning areas as necessary during active use of the access road.***

11. ***Immediately stabilize the Site with geotextile and gravel surfacing where indicated in the E&SC Plans.***

12. ***Upon temporary cessation of an earth disturbance activity or any stage of an activity where the cessation of earth disturbance activities will exceed four days, disturbed areas shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth disturbance activities. For an earth disturbance activity or any stage of an activity to be considered temporarily stabilized, the disturbed areas shall be covered with one of the following: a minimum uniform coverage of mulch and seed, with a density capable of resisting accelerated erosion and sedimentation, or an acceptable E&SC BMP, which temporarily minimizes accelerated erosion and sedimentation. Temporary stabilization will not occur on active vehicular travel ways within the right of way. The on-site environmental inspector will log daily activity within the limits of disturbance and notify the Contractor of areas requiring temporary stabilization (i.e., areas where work has ceased for at least four days).***

13. ***Once the temporary access road is no longer necessary, remove all gravel and geotextile fabric from the temporarily improved portion of the road and dispose of the materials at a suitable disposal or recycling site in compliance with local, state, and federal regulations. Restore pre-construction grades. Immediately seed and stabilize disturbed areas.***

14. ***Loosen and de-compact topsoil throughout the temporarily improved section of the access road to match preconstruction conditions. Immediately fertilize, seed and stabilize areas at finished grade. Maintain E&SC BMPs until Site work is complete and uniform 70% perennial vegetative cover is established. After the access road LOD is permanently stabilized and upon local CCD and Transco approval of stabilization and re-vegetation, remove temporary E&SC BMPs and stabilize areas disturbed by removal including the perimeter sediment barrier and temporary diversions.***

15. ***Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for an inspection prior to the removal of the temporary E&SC BMPs. Properly dispose/recycle E&SC BMPs. Remove orange construction fencing and if necessary, security fence.***

16. ***Complete access road limit of distrubance stabilization, including seed application and mulching in areas disturbed by E&SC BMP removal.***

17. ***Upon completion of all earth disturbance activities, removal of all temporary E&SC BMPs and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for a final inspection.***

Worksheet 1. General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date: 23-Mar-15

Project Name: Atlantic Sunrise Pipeline AR-SU-044

Municipality: Lenox Township

County: Susquehanna

Total Area (acres): 2.57

Major River Basin: Susquehanna River

http://www.dep.state.pa.us/dep/depupdate/watermgt/wc/default.htm#newtopics

Watershed: Willow Brook

Sub-Basin: Upper Central Susquehanna River

Nearest Surface Water(s) to Receive Runoff: Willow Brook

Chapter 93 - Designated Water Use: CWF,MF

http://www.pacode.com/secure/data/025/chapter93/chap93toc.html

Impaired according to Chapter 303(d) List?

http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/303d-Report.htm

Yes	
No	X

List Causes of Impairment:

Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/GeneralPermits/default.htm

Yes	
No	X

Existing or planned drinking water supply?

Yes	
No	X

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/Approved_1.html

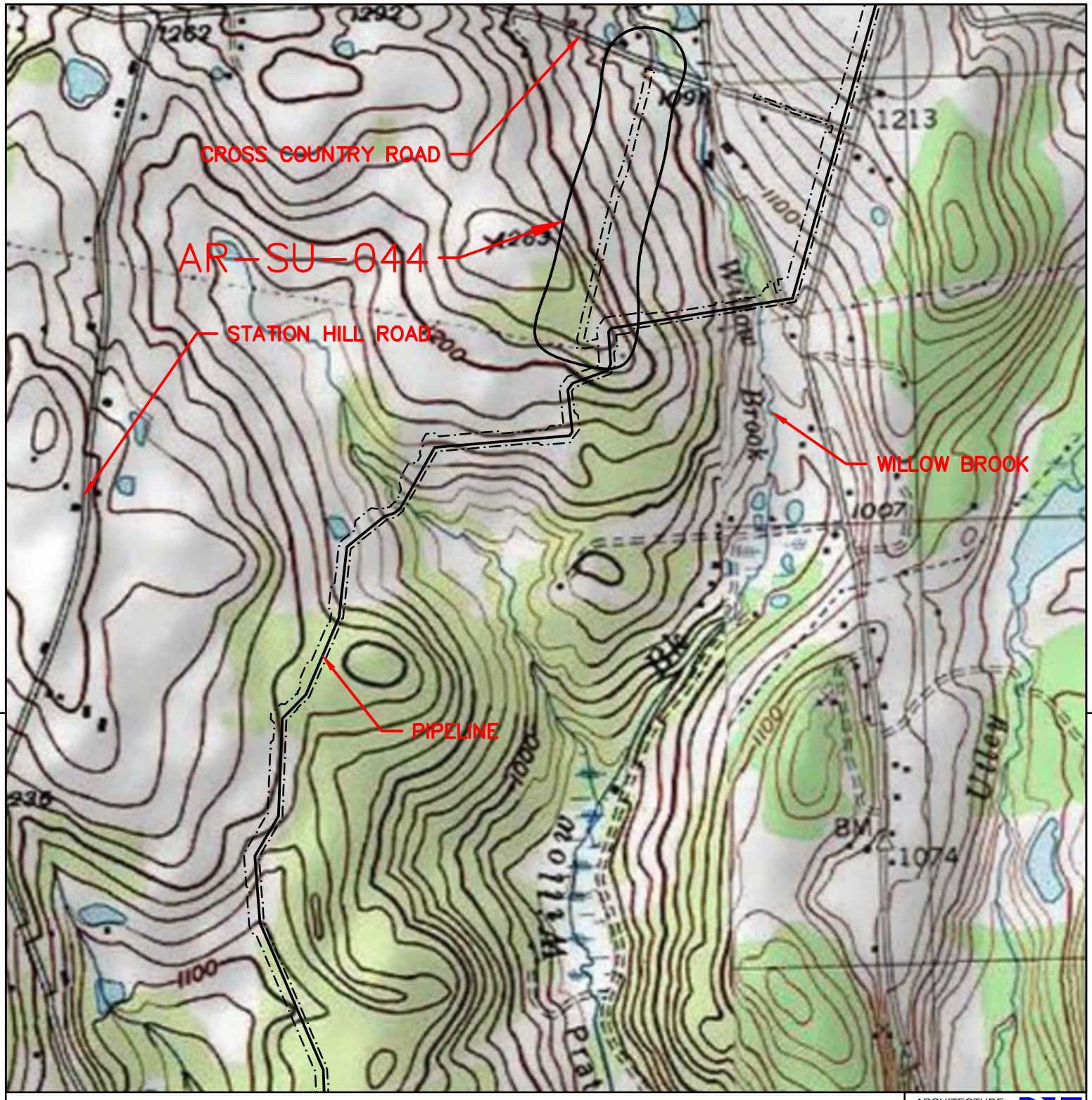
Yes	
No	X

Existing River Conservation Plan?

http://www.dcnr.state.pa.us/brc/rivers/riversconservation/planningprojects/

Yes	X
No	

F.2 Location Map



HOP BOTTOM QUADRANGLE

ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING
BL Companies

N

GRAPHIC SCALE

1,000 500 0 1,000

SCALE IN FEET

ATLANTIC SUNRISE

PROPOSED 30" NATURAL GAS PIPELINE

USGS LOCATION MAP
TEMPORARY AR-SU-044
LENOX TOWNSHIP
SUSQUEHANNA COUNTY, PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
				1161481		

DRAWN BY: CLM	DATE: 11/11/15	ISSUED FOR BID:	SCALE: 1"=1,000'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 24-1601-70-28-A/ 1683_3-AR-SU-044	SHEET 1 OF 1
WO: 1161481			

APPENDIX G

AR-SU-045 Specific Narrative and Calculations

G.1 Site Specific Narrative

a. Narrative

b. TMDL Discussion

c. Minimized Soil Compaction

d. Thermal Impact Analysis

e. Acidic Soil Management Plan

f. Road Specific Construction Sequence

g. Worksheet 1. General Site Information

G.2 Location Map

G.3 Sediment Barrier Table

a. E&S Worksheet 1

G.1 Site Specific Narrative

a. Narrative
b. TMDL Discussion
c. Minimized Soil Compaction
d. Thermal Impact Analysis
e. Acidic Soil Management Plan
f. Road Specific Construction Sequence
g. Worksheet 1. General Site Information

ACCESS ROAD: AR-SU-045

ACT 167 PLAN: None

TMDL: None

NARRATIVE:

AR-SU-045 is a proposed temporary access road (TAR) located in Lenox Township, Susquehanna County, Pennsylvania. The intent of this road is to provide temporary construction access to the proposed 30" Central Penn Line North Pipeline. The road begins at Wickwire Road and terminates at the pipeline right-of-way at approximate mile post 52.9. This TAR is approximately 170 feet long, and follows an existing gravel road for the first 100 feet; the access road follows a construction entrance and timber matting for the remaining 70 feet. Temporary equipment matting is proposed over the existing pipeline at approximate station 0+50 in order to disperse anticipated construction vehicle loads evenly. Due to the relatively short length of the road the entire road will be constructed as a rock construction entrance ***with compost filter sock***. Upon completion of the pipeline construction, the disturbed areas will be restored to pre-construction conditions.

TMDL DISCUSSION:

The nearest surface waters to receive runoff from this road are not subject to any TMDL restrictions.

MINIMIZED SOIL COMPACTION:

The Project seeks to minimize soils compaction impacts associated with access roads to the maximum extent practicable. AR-SU-045 is an existing gravel road. Additional temporary widening and rock construction entrance will be utilized throughout construction. Soil compaction impacts have been minimized by use of the existing road. Improvements made for construction activities will be restored to pre-construction conditions with native topsoil to enhance revegetation.

THERMAL IMPACT ANALYSIS:

Thermal impacts associated with AR-SU-045 will be avoided to the maximum extent practicable. The following measures have been implemented to minimize thermal impacts:

- ***AR-SU-045 is approximately 170 linear feet; however, it follows an existing gravel road for approximately 100 linear feet. No improvements are***

necessary to use the existing gravel road. Utilizing the existing gravel road for approximately 60% of the road minimizes the potential thermal impact of this road.

- ***The remaining 70 linear feet of road is within an existing pipeline right of way. The use of an existing pipeline right of way eliminates the need for additional tree removal. The ability to use this road without the removal of additional trees acts to minimize the thermal impact of this road.***

- ***Temporary improvements for this road are limited to equipment mats over an existing pipeline and rock construction entrance. Runoff from these temporary improvements is directed to a stabilized, well vegetated areas that will promote infiltration of the runoff. Infiltration of runoff prior to entering of receiving waters allows for runoff to assimilate to ground water temperatures which are minimally influenced by seasonal temperature changes, minimizing the thermal impact of this road.***

- ***The proposed improvements are temporary in nature and the disturbed areas will be returned to pre-development conditions upon completion of the construction of the pipeline. There are no new permanent impervious surfaces as a result of the use of this road due to the removal of the temporary improvements. Therefore, there are no permanent thermal impacts as a result of the use of this road for the construction of the pipeline.***

ACIDIC SOIL MANAGEMENT PLAN:

AR-SU-045 Soil Acidity Table		
Soil Map Symbol	Soil Name	PH
VcB2	Volusia channery silt loam, 3 to 8 percent slopes	5.7

An Acid Producing Soils Control Plan is included as part of this application. The plan identifies the measures to be used to control pollution associated with construction of access roads that contain acid-producing soils. The plan requires that these measures be applied only for soils with a pH less than 4.0 as recommended by the Natural Resources Conservation Service (NRCS). The table above depicts the soil types present on this road as well as the acidity of the soils. The pH of the soils on this road are outside the threshold established by the Acid Producing Soils Control Plan. Therefore, the measures prescribed in the plan do not need to be implemented for this road.

ROAD SPECIFIC CONSTRUCTION SEQUENCE:
ACCESS ROAD: AR-SU-045

1. ***At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, Environmental Inspectors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan, and a representative from the local conservation district to an on-site preconstruction meeting.***

2. ***At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.***

3. ***Hold pre-construction conference with the Environmental Inspectors, local County Conservation District (CCD), PADEP and Design Engineer.***

4. ***Survey crews locate and stake all special areas of concern (e.g., wetlands, streams, culverts, other utilities, etc.), edge of proposed access road, and field locate the limit of disturbance.***

5. ***Install orange construction fence around areas to be preserved.***

6. ***Locate staging areas and access points including rock construction entrance. Install sediment barriers (compost filter sock) down slope of these areas.***

7. ***Perform tree cutting where required.***

8. ***Install rock construction entrance.***

9. ***Install construction mats over existing pipeline crossing in the location shown on plans.***

10. ***Immediately stabilize the access road with geotextile and gravel surfacing where indicated in the E&SC Plans.***

11. ***Upon temporary cessation of an earth disturbance activity or any stage of an activity where the cessation of earth disturbance activities will exceed four days, the Site shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth***

disturbance activities. For an earth disturbance activity or any stage of an activity to be considered temporarily stabilized, the disturbed areas shall be covered with one of the following: a minimum uniform coverage of mulch and seed, with a density capable of resisting accelerated erosion and sedimentation, or an acceptable E&SC BMP, which temporarily minimizes accelerated erosion and sedimentation. Temporary stabilization will not occur on active vehicular travel ways within the right of way. The on-site environmental inspector will log daily activity within the limits of disturbance and notify the Contractor of areas requiring temporary stabilization (i.e., areas where work has ceased for at least four days).

12. ***Once the temporary access road is no longer necessary, remove all gravel and geotextile fabric from the temporarily improved portion of the road and dispose of the materials at a suitable disposal or recycling sites in compliance with local, state, and federal regulations. Restore pre-construction grades. Immediately seed and stabilize disturbed areas.***

13. ***Loosen and de-compact topsoil throughout the temporarily improved access road to match preconstruction conditions. Immediately fertilize, seed and stabilize areas at finished grade. Maintain E&SC BMPs until Site work is complete and uniform 70% perennial vegetative cover is established.***

14. ***Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for an inspection prior to the removal of the E&SC BMPs. Vegetated areas must achieve a minimum uniform 70% perennial cover over the entire disturbed area to be considered stabilized. Roadways and parking areas should have at least a clean subbase in place to be considered stabilized.***

15. ***Upon local CCD and Transco approval of stabilization and re-vegetation, remove temporary E&SC BMPs and stabilize areas disturbed by removal including the perimeter sediment barrier and temporary diversions. Properly dispose/recycle E&SC BMPs. Remove orange construction fencing and, if necessary, security fence.***

16. ***Complete access road limit of disturbance stabilization, including soil treatment, seed application and mulching in areas disturbed by E&SC BMP removal.***

17. ***Upon completion of all earth disturbance activities, removal of all temporary E&SC BMPs and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for a final inspection.***

Worksheet 1. General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date: 23-Mar-15

Project Name: Atlantic Sunrise Pipeline AR-SU-045

Municipality: Lenox Township

County: Susquehanna

Total Area (acres): 0.20

Major River Basin: Susquehanna River

http://www.dep.state.pa.us/dep/depupdate/watermgt/wc/default.htm#newtopics

Watershed: Tunkhannock Creek

Sub-Basin: Upper Susquehanna River

Nearest Surface Water(s) to Receive Runoff: Utley Brook

Chapter 93 - Designated Water Use: CWF,MF

http://www.pacode.com/secure/data/025/chapter93/chap93toc.html

Impaired according to Chapter 303(d) List?

http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/303d-Report.htm

Yes	
No	X

List Causes of Impairment:

Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/GeneralPermits/default.htm

Yes	
No	X

Existing or planned drinking water supply?

Yes	
No	X

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan?

http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/Approved_1.html

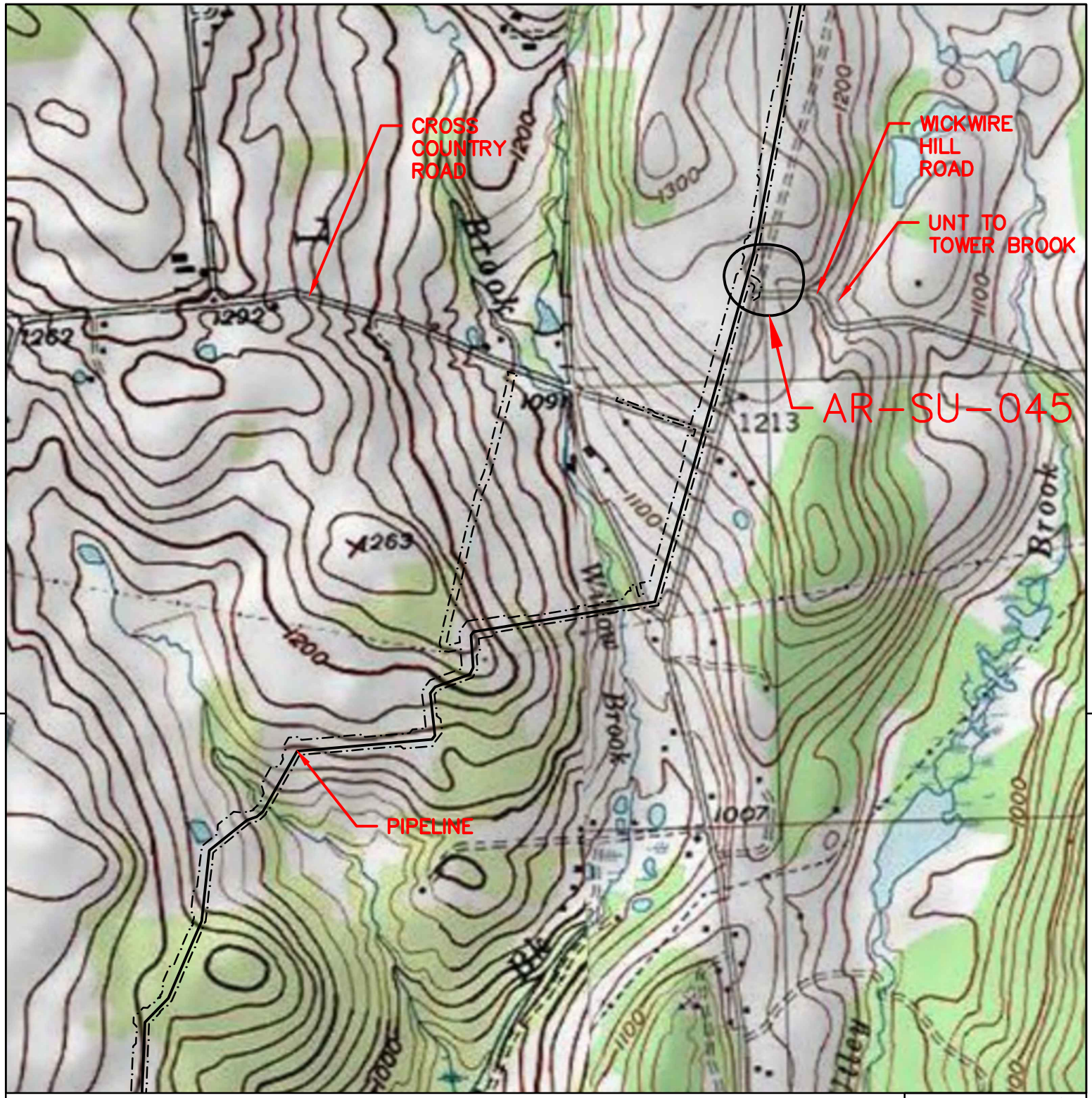
Yes	
No	X

Existing River Conservation Plan?

http://www.dcnr.state.pa.us/brc/rivers/riversconservation/planningprojects/

Yes	X
No	

G.2 Location Map



LENOXVILLE QUADRANGLE

ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING
BL Companies

N

GRAPHIC SCALE

1,000 500 0 1,000

SCALE IN FEET

ATLANTIC SUNRISE

PROPOSED 30" NATURAL GAS PIPELINE

USGS LOCATION MAP
TEMPORARY AR-SU-045
LENOX TOWNSHIP
SUSQUEHANNA COUNTY, PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
				1161481		

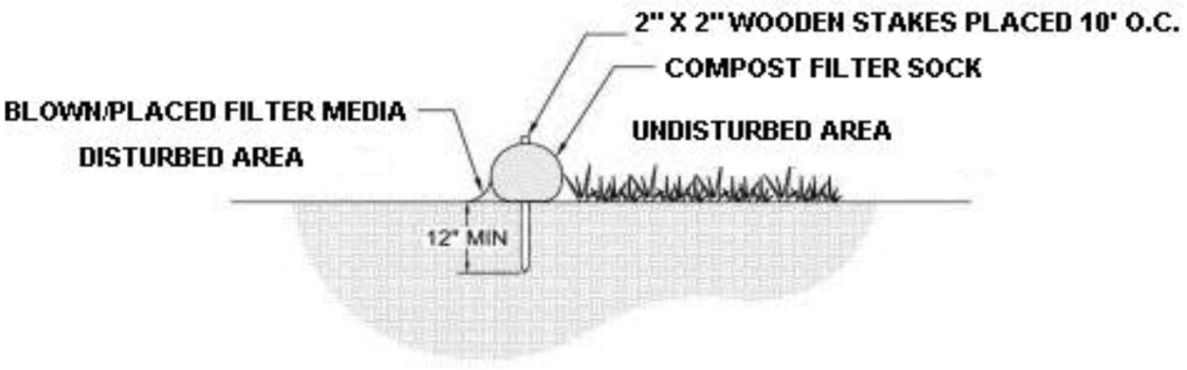
DRAWN BY: CLM	DATE: 11/11/15	ISSUED FOR BID:	SCALE: 1"=1,000'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 24-1601-70-28-A/ 1683_3-AR-SU-045	SHEET 1 OF 1
WO: 1161481			

G.3 Sediment Barrier Table

a. E&S Worksheet 1

E&S WORKSHEET #1
Compost Filter Sock

PROJECT NAME: Atlantic Sunrise
LOCATION: AR-SU-045
PREPARED BY: EAW DATE: 9/21/16,
CHECKED BY: BJP, ***SMK*** DATE: 9/21/16,



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)	SOCK LENGTH
1-2	18	STA 0+75 to STA 1+40	14	140	66

SOURCE: Pennsylvania Erosion and Sediment Pollution Control Manual, Page 372

APPENDIX H

AR-SU-046 Specific Narrative and Calculations

H.1 Site Specific Narrative
- a. Narrative
- ***b. TMDL Discussion***
- ***c. Minimized Soil Compaction***
- ***d. Thermal Impact Analysis***
- ***e. Acidic Soil Management Plan***
- ***f. Road Specific Construction Sequence***
- ***g. Worksheet 1. General Site Information***

H.2 Location Map

H.3 Sediment Barrier Table
- a. E&S Worksheet 1

H.1 Site Specific Narrative

a. Narrative
b. TMDL Discussion
c. Minimized Soil Compaction
d. Thermal Impact Analysis
e. Acidic Soil Management Plan
f. Road Specific Construction Sequence
g. Worksheet 1. General Site Information

ACCESS ROAD: AR-SU-046

ACT 167 PLAN: None

TMDL: None

NARRATIVE:

AR-SU-046 is a proposed permanent access road (PAR) located in Lenox Township, Susquehanna County, Pennsylvania. The intent of this PAR is to provide temporary construction access and permanent maintenance and operational access to the proposed 30" Central Penn Line North Pipeline right-of-way. ***The improvements described below will be installed temporarily and will be utilized during the construction process. Upon completion of the construction activities, the disturbed areas will be restored to pre-construction conditions and a permanent easement will be recorded along the restored access road corridor to provide maintenance and operational access to the pipeline.***

The PAR begins at West Lenox Church Road and terminates at the pipeline right-of-way at approximate mile post 56.4. The PAR is approximately 750 feet long over undeveloped land.

Compost filter socks have been proposed to filter runoff leaving the area disturbed due to construction of the PAR and subsequent restoration. A temporary rock construction entrance and driveway apron is proposed at the intersection of the PAR with the public road.

TMDL DISCUSSION:

The nearest surface waters to receive runoff from this road are not subject to any TMDL restrictions.

MINIMIZED SOIL COMPACTION:

The Project seeks to minimize soils compaction impacts associated with access roads to the maximum extent practicable. AR-SU-046 is permanent access road that will utilize 750 feet of newly constructed access road. Soil compaction impacts have been minimized by the use of the existing driveway and minimizing the road width to 14 feet. The newly constructed road will be removed and restored to pre-construction conditions with native topsoil to enhance revegetation.

THERMAL IMPACT ANALYSIS:

Thermal impacts associated with AR-SU-046 will be avoided to the maximum extent practicable. The following measures have been implemented to minimize thermal impacts:

- ***AR-SU-046 is approximately 750 linear feet through an existing field. The siting of this road within an existing field eliminates the need for additional tree removal. The ability to use this road without the removal of additional trees acts to minimize the thermal impact of this road.***

- ***During the construction phase of this project compost filter socks will be placed downgradient of the proposed access road. The compost filter socks will promote infiltration of runoff from the proposed temporary impervious surfaces. Infiltration of runoff prior to entering of receiving waters allows for runoff to assimilate to ground water temperatures which are minimally influenced by seasonal temperature changes, minimizing the thermal impact of this road.***

- ***The proposed gravel surfacing is temporary in nature and the disturbed areas will be returned to pre-development conditions upon completion of the construction of the pipeline. There are no new permanent impervious surfaces as a result of the use of this road due to the removal of the temporary gravel surface. Therefore, there are no permanent thermal impacts as a result of the use of this road for the construction and maintenance of the pipeline.***

ACIDIC SOIL MANAGEMENT PLAN:

AR-SU-046 Soil Acidity Table		
Soil Map Symbol	Soil Name	PH
McB2	Mardin channery silt loam, 3 to 8 percent slopes, eroded	5.4

An Acid Producing Soils Control Plan is included as part of this application. The plan identifies the measures to be used to control pollution associated with construction of access roads that contain acid-producing soils. The plan requires that these measures be applied only for soils with a pH less than 4.0 as recommended by the Natural Resources Conservation Service (NRCS). The table above depicts the soil types present on this road as well as the acidity of the soils. The pH of the soils on this road are outside the threshold established by the Acid Producing Soils Control Plan. Therefore, the measures prescribed in the plan do not need to be implemented for this road.

ROAD SPECIFIC CONSTRUCTION SEQUENCE:
ACCESS ROAD: AR-SU-046

1. ***At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, Environmental Inspectors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan, and a representative from the local conservation district to an on-site preconstruction meeting.***

2. ***At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.***

3. ***Hold pre-construction conference with the Environmental Inspectors, local County Conservation District (CCD), PADEP and Design Engineer.***

4. ***Survey crews locate and stake all special areas of concern (e.g., wetlands, streams, culverts, other utilities, etc.), edge of proposed access road, and field locate the limit of disturbance.***

5. ***Install orange construction fence around areas to be preserved.***

6. ***Locate staging areas and access points including rock construction entrance. Install E&SC BMPs down slope of these areas.***

7. ***Install rock construction entrance with gravel driveway apron.***

8. ***Remove brush to effectively install perimeter controls, level side cuts to grant access for vehicles and workers to safely perform the installation of sediment barriers on the Site as shown on the construction drawings.***

9. ***Install perimeter E&SC BMPs as depicted on the E&SC Plan.***

10. ***Apply stabilization measures immediately to any disturbed areas due to the initial clearing and installation of E&SC BMPs.***

11. ***The Compliance Manager shall provide PADEP at least three days' notice prior to bulk earth disturbance and upon completed installation of perimeter E&SC BMPs***

12. ***If applicable, install security fence. The necessity of a security fence will be at the discretion of the Contractor.***

13. ***Proceed with major clearing and grubbing.***

14. ***Begin construction staking for layout of access road.***

15. ***Begin grading and strip and stockpile topsoil; install E&SC BMPs around stockpiles. Soil stockpile areas to support the access roads shall be located within the area of minimum disturbance/reduced grading for the same access road that the topsoil was stripped, or within the pipeline ROW. Stockpiled soil shall not exceed 35 feet in height, have maximum side slopes of 2:1, and be surrounded by 12" compost filter sock or silt fence. All existing excavated material that is not to be reused in the work is to be immediately removed from the site and properly disposed of at an approved facility or permitted waste area.***

16. ***Grade the access road as shown on the E&SC Plans (Section 2 of the ESCGP-2 NOI).***

17. ***Immediately stabilize the access road with geotextile and gravel surfacing where indicated in the E&SC Plans.***

18. ***Upon temporary cessation of an earth disturbance activity or any stage of an activity where the cessation of earth disturbance activities will exceed four days, disturbed areas shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth disturbance activities. For an earth disturbance activity or any stage of an activity to be considered temporarily stabilized, the disturbed areas shall be covered with one of the following: a minimum uniform coverage of mulch and seed, with a density capable of resisting accelerated erosion and sedimentation, or an acceptable BMP, which temporarily minimizes accelerated erosion and sedimentation. Temporary stabilization will not occur on active vehicular travel ways within the right of way. The on-site environmental inspector will log daily activity within the limits of disturbance and notify the Contractor of areas requiring temporary stabilization (i.e., areas where work has ceased for at least four days).***

19. ***Once the temporary improvements to the access road are no longer necessary, remove all gravel and geotextile fabric from the temporarily improved portion of the road and dispose of the materials at a suitable disposal or recycling site in compliance with local, state, and federal regulations. Restore pre-construction grades. Immediately seed and stabilize disturbed areas, including areas used to stockpile topsoil. BMPs will remain in place and functional.***

20. ***Loosen and de-compact topsoil throughout the temporarily improved section of the access road to match preconstruction conditions. Immediately fertilize, seed and stabilize areas at finished grade. Maintain E&SC BMPs until Site work is complete and uniform 70% perennial vegetative cover is established.***

21. ***Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for an inspection prior to the removal of the E&SC BMPs. Vegetated areas must achieve a minimum uniform 70% perennial cover over the entire disturbed area to be considered stabilized. Roadways and parking areas should have at least a clean subbase in place to be considered stabilized.***

22. ***Upon local CCD and Transco approval of stabilization and re-vegetation, remove temporary E&SC BMPs and stabilize areas disturbed by removal including the perimeter sediment barrier and temporary diversions. Properly dispose/recycle E&SC BMPs. Remove orange construction fencing and, if necessary, security fence. Repair and permanently stabilize areas disturbed during E&SC BMP removal.***

23. ***Complete access road ROW stabilization, including soil treatment, seed application and mulching in areas disturbed by E&SC BMP removal.***

24. ***Upon completion of all earth disturbance activities, removal of all temporary E&SC BMPs and permanent stabilization of all disturbed areas, the Owner shall contact the local CCD for a final inspection.***

Worksheet 1. General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date: 5/6/2015, ***Revised 3/2/2016***

Project Name: Atlantic Sunrise Pipeline AR-SU-046

Municipality: Lenox Township

County: Susquehanna

Total Area (acres): ***0.88***

Major River Basin: Susquehanna River

http://www.dep.state.pa.us/dep/depupdate/watermgt/wc/default.htm#newtopics

Watershed: Tunkhannock Creek

Sub-Basin: Upper Central Susquehanna River

Nearest Surface Water(s) to Receive Runoff: Tower Branch

Chapter 93 - Designated Water Use: CWF,MF

http://www.pacode.com/secure/data/025/chapter93/chap93toc.html

Impaired according to Chapter 303(d) List?	Yes	
http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/303d-Report.htm	No	X

List Causes of Impairment:

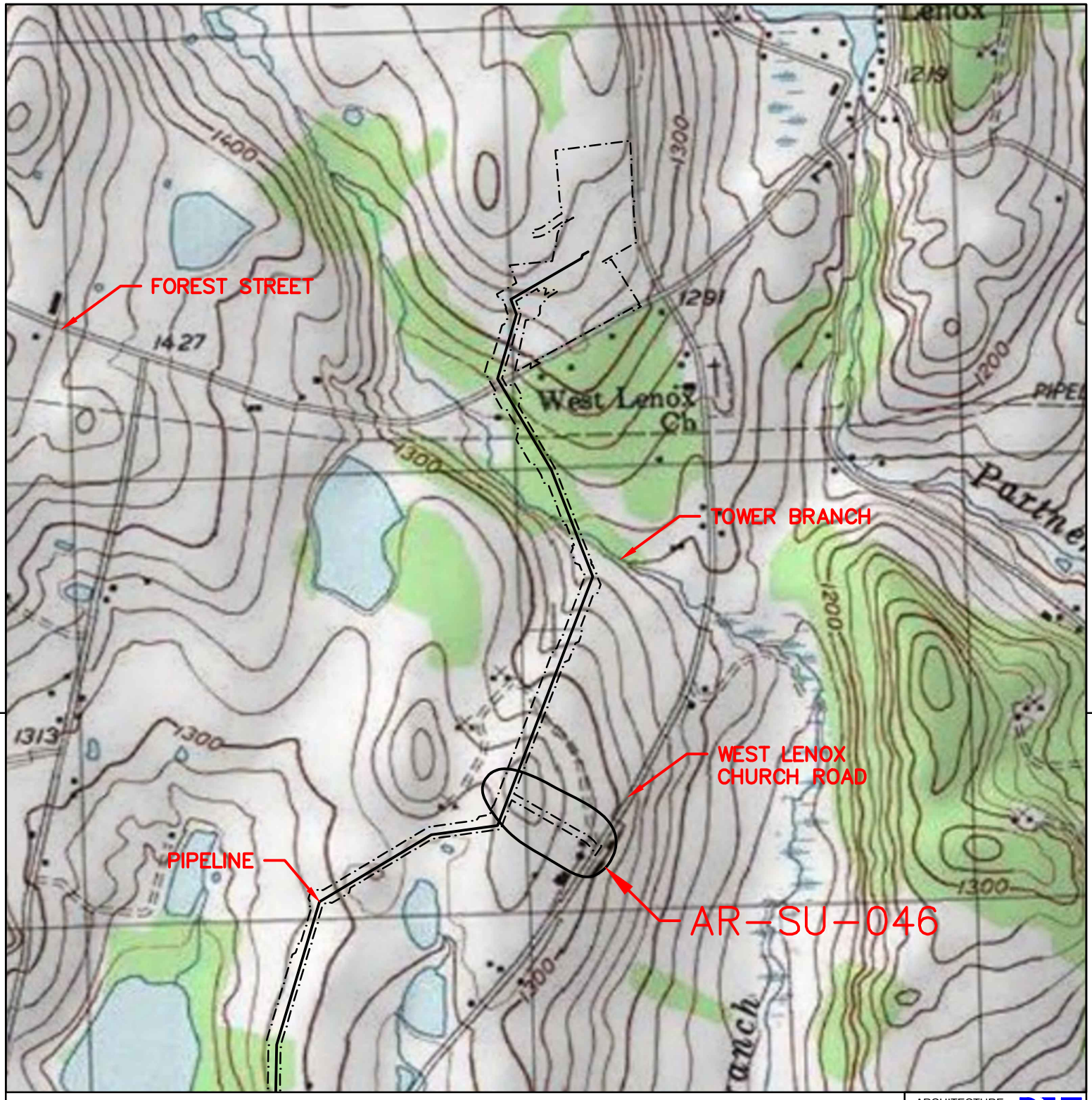
Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements?	Yes	
http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/GeneralPermits/default.htm	No	X
Existing or planned drinking water supply?	Yes	
	No	X

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan?	Yes	
http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/StormwaterManagement/Approved_1.html	No	X
Existing River Conservation Plan?	Yes	X
http://www.dcnr.state.pa.us/brc/rivers/riversconservation/planningprojects/	No	

H.2 Location Map



LENOXVILLE QUADRANGLE

ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING
BL Companies

N

GRAPHIC SCALE

1,000 500 0 1,000

SCALE IN FEET

ATLANTIC SUNRISE

PROPOSED 30" NATURAL GAS PIPELINE

USGS LOCATION MAP
TEMPORARY AR-SU-046
LENOX TOWNSHIP
SUSQUEHANNA COUNTY, PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
				1161481		

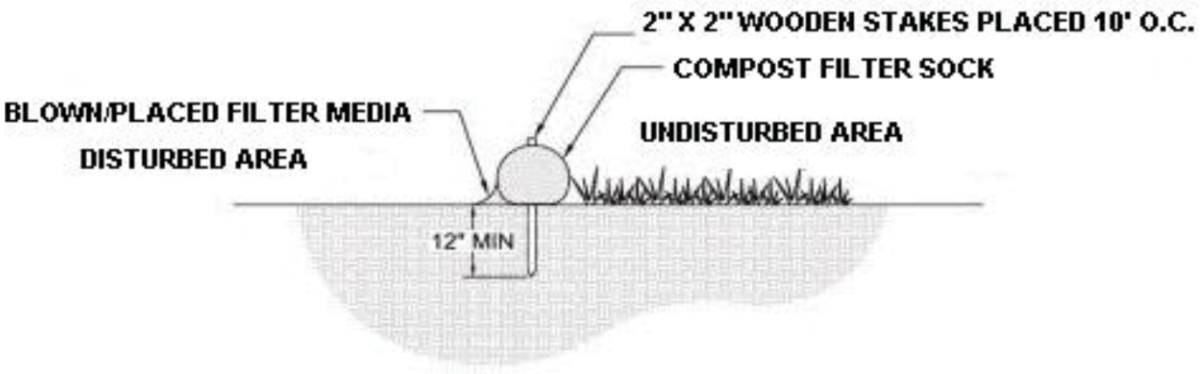
DRAWN BY: CLM	DATE: 11/11/15	ISSUED FOR BID:	SCALE: 1"=1,000'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 24-1601-70-28-A/ 1683_3-AR-SU-046	SHEET 1 OF 1
WO: 1161481			

H.3 Sediment Barrier Table

a. E&S Worksheet 1

E&S WORKSHEET #1
Compost Filter Sock

PROJECT NAME: Atlantic Sunrise
LOCATION: AR-SU-046
PREPARED BY: JMS DATE: 5/08/15
CHECKED BY: BJP DATE: 5/08/15



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)	SOCK LENGTH
1-4	12	STA 0+50 to STA 3+50	9	135	245
5	18	STA 4+00	10	195	40
6	24	STA 4+75	10	260	40
7	32	STA 5+25	10	320	35
8-9	18	STA 6+00 to STA 7+50	10	145	60
10-12	32	STA 5+60 to STA 6+60	20	215	60
STOCKPILE					
SP 1	***12***	***STA 0+25 to STA 3+10***	***N/A***	***N/A***	***600***
SP 2	***12***	***STA 0+50 to STA 1+60***	***N/A***	***N/A***	***229***
SP 3	***12***	***STA 1+75 to STA 3+10***	***N/A***	***N/A***	***286***
SP 4	***12***	***STA 3+10 to STA 4+50***	***N/A***	***N/A***	***288***

SOURCE: Pennsylvania Erosion and Sediment Pollution Control Manual, Page 372