TETRA TECH

PITT-04-19-052

April 25, 2019

Project Number 212IC-BF-00037

Via E-mail and overnight Fed Ex
Mr. John Hohenstein
Pennsylvania Department of Environmental Protection
Waterways and Wetlands Program
Southeast Regional Office
2 East Main Street
Norristown, Pennsylvania 19401

Re: Sunoco Pipeline L.P. – Pennsylvania Pipeline Project (Mariner East II)
Chapter 102 Permit No. ESG0100015001 – Major Modification
Modification Request Installation Method Change at 0620 HDD
Middletown Township, Delaware County, PA

Dear Mr. Hohenstein:

On behalf of Sunoco Pipeline L.P. (SPLP), please accept the enclosed revised permit modification to the referenced Chapter 102 permit. The original Chapter 105 major modification and 102 minor modification package was submitted to PADEP on March 25, 2019. PADEP requested that the Chapter 102 minor modification be updated to a major modification. This modification is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad.

During installation of the permitted 16-inch HDD through this area, several inadvertent returns (IRs) occurred. This required the implementation of IR corrective actions/responses and an extended period of work through this area. In addition, groundwater was encountered at the eastern end of the HDD near Stream S-I2, resulting in additional construction issues. As a result, SPLP has elected to abandon the previously-proposed HDD through this area and has identified the open cut trenching method as an alternate installation method in this area that eliminates potential IR impacts to Waters of the Commonwealth and facilitates restoration of areas where IR containment measures remain.

In accordance with the Chapter 102 major permit amendment requirements, the following information is provided for your information/review and files:

- Preface I-Delaware County Review Application
- 1-NOI Check List
- 2-NOI Application
- 3-Erosion and Sediment Control Plan
- 4-Act 14 Letters
- 5-Act 167 Consistency Verification Report
- 6-PNDI
- 7-Site Restoration and Post Construction Stormwater Management Plan
- 9-Compliance History Table

Tetra Tech
661 Andersen Drive, Suite 200, Pittsburgh, PA 15220-2700
Tel 412.921.7090 Fax 412.921.4040 www.tetratech.com

- 10-Aquatic Resources Report

Enclosed are two (2) hard copies of the modification request to facilitate your review. The Chapter 102 major modification review and disturbance fee of $1000 is enclosed. Please note that the Delaware County Conservation District will also be provided a copy of this request and attachments.

SPLP appreciates your timely review of this modification request. Should you have questions regarding this correspondence, please do not hesitate to contact me at 412-921-8163 or via e-mail at Robert.Simcik@tetratech.com.

Sincerely,

Robert F. Simcik, P.E.
Project Manager
Tetra Tech, Inc.

RFS/clm

Enclosures: 1 original, 1 copy

cc: File 212IC-PB-00387
C. Smith, PADEP Southeast Region
M. Wheeler, Delaware County Conservation District
M. Gordon, Sunoco Pipeline L.P.
C. Embry, Sunoco Pipeline L.P.
M. Styles, Sunoco Pipeline L.P.
L. Gremminger, Energy Transfer
B. Schaeffer, Tetra Tech

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PREFACE I: CONSERVATION DISTRICT APPLICATIONS, FEES, AND CHECKS

Delaware County Conservation District **Revised : 2015 – FORM**
Rose Tree Park - Hunt Club
1521 N. Providence Road Telephone Number : (610) 892-9484
Media, PA 19063 Fax Number : (610)892-9489

EROSION AND SEDIMENT POLLUTION CONTROL PLAN REVIEW APPLICATION

PROJECT NAME : Sunoco PPP-620 HDD Major Modification **TOTAL ACREAGE :** 5.32 **DISTURBED ACREAGE :** 5.32 **WATERSHED :** Chester Creek

MUNICIPALITY : Middletown **APPLICANT :** Sunoco Pipeline L.P.

APPLICANTS PHONE # : 412-670-3200 **ADDRESS :** 535 Fritztowns Road

POST OFFICE : Sinking Spring **ZIP :** 19608 ***E-Mail :** matthew.gordon@energytransfer.com

PLAN PREPARER INFORMATION

FIRM : Tetra Tech Inc **PHONE # :** 412-921-8163 **FAX#:** 412-921-4040

CONTACT : Robert Simcik **ADDRESS :** 661 Andersen Drive

Foster Plaza 7, Suite 200

MAIL REVIEW LETTER TO : X **- APPLICANT**
OR (NOT BOTH): ___ **- ENGINEER**

***E-Mail :** Robert.Simcik@tetratech.com

Pittsburgh, PA 15220

SUBMISSION INFORMATION : Projects requiring an NPDES Permit should submit all information required by the permit. Projects not requiring an NPDES permit should submit 1 copy of plans, narratives, and calculations. (See Reverse Side for Service Fee Information)

_____ **- PRELIMINARY** X **- FIRST SUBMISSION** _____ **- SECOND SUBMISSION**

___ **- THIRD OR MORE……..……$** 1,120.00 **- AMOUNT OF CHECK** ____ **- N/A**
(Fee May be Required Check latest District Comment Letter)

___ **- EMERGENCY REVIEW ……..** **$** _____ **- AMOUNT OF CHECK** ____**- N/A**

NPDES CONSTRUCTION PERMIT : _____ **- GENERAL** ___ **- INDIVDUAL** X **- N/A**

CHAPTER 105 - Please Check the following : _____ **- Enclosed** _____ **- Will be submitted**

___ **- G.P. #3** ___**- G.P.#4** ___ **- G.P.#5** ___ **- G.P. #7** ___ **- G.P. #8** **OTHER G.P. # -** _____

The applicant agrees to implement the attached plan during construction, which was developed to satisfy the requirements of Title 25 - Chapter 102 Erosion Control. The Applicant also authorizes the D.C.C.D. to make inspections as necessary.

Signature of Applicant

Matthew Gordon
Print Name of Applicant

Date : 4/23/19

*** - By providing E-mail your name could be added to Our E-mail distribution list for District Updates.**

Checks for above made payable to :
"Delaware County Conservation District"

NPDES Base Fee should be made payable to :
"Delaware County Clean Water Fund"

NPDES Disturbed Acre Fee should be made payable to: "Commonwealth of PA Clean Water Fund"

EROSION AND SEDIMENT POLLUTION CONTROL PLAN REVIEW FEE SCHEDULE

Waiver of Fees

Fees will be waived only for an application filed under the name of a local municipality or the Commonwealth of Pennsylvania. School District and separate authorities are no longer exempt. This exemption also does not apply to any private, or non-profit organization.

Project Area Delineation

The **entire parcel controlled by the Developer will represent the project area. Open space areas are to be included in the total project area. Additional development on an already improved site will be determined by estimating the necessary area to build the new improvements. Example : A college campus proposing to add a new dormitory. The project area would not be the entire college campus, but only the area needed to construct the new dormitory.**

Applicability of Fee Schedule

The fee schedule below will apply whenever the application and Erosion and Sediment Pollution Control Plan are submitted for an adequacy determination. Each resubmission of a different project on the same tract of land will be charged an additional fee. The fee charged will cover the cost of an initial review plus one follow-up revision submitted in response to the first review letter (if necessary). To qualify for this provision, a cover letter based on the review letter, which details specifically the corrections made, must be included with the resubmitted plan. All changes (revisions) made on the resubmitted plan sets will be distinguished by using highlighting.

Plans which receive a letter of adequacy, and are resubmitted with minor revisions will be subject to a $150.00 processing fee only. Plans which require more than a second review, and have more than minor review comments will be subject to a review fee of 50% of the original fee. The Conservation District plan reviewer will notify the applicant of the need for additional fees in the second review letter.

Plans which are resubmitted with major revisions (such as lot layout, road layout, drainage design, etc.), but primary Erosion and Sediment Control BMP's remain unchanged shall be subject to a review fee of 50% of the original fee.

Emergency Review Provision

The applicant will pay a fee twice the normal review fee. The applicant will submit two checks. The normal fee will be deposited in the Delaware County General Fund. The additional charge will be deposited in the Conservation District's Affiliate Membership Fund. Prior approval from the Conservation District Manager must be obtained to start this process. 10 days will be the normal review time for the first submittals. For projects that require an NPDES Construction Permit the emergency review process will remain available, but will not be initiated until a complete permit package is submitted and found administratively complete.

The emergency review fee like the normal review fee will cover the cost of an initial review plus one follow-up revision submitted in response to the first review letter (if necessary).

The emergency review may be initiated after the conservation district's first review with the submission of a fee equal to 50% of the original review fee. This procedure is subject to all of the provisions of the standard review. This provision does not apply to those plans, which upon initial review are found to be either incomplete or insufficient. For those plans initiation of the emergency review process will require submittal of a fee equal to the total amount of the original review fee.

FEE SCHEDULE

Project Acres	Fee	Project Acres	Fee	Project Acres	Fee
0 - 0.99	$490.00	20 - 29.99	$1,705.00	75 - 99.99	$3,215.00
1 - 4.99	$780.00	30 - 39.99	$2,050.00	100 - above	$3,215.00
5 - 9.99	$1,120.00	40 - 49.99	$2,240.00	Plus $20.00 /acre over	
10 –19.99	$1,510.00	50 - 74.99	$2,730.00	100 acres	

* $150.00 will be charged to review a minimum earth disturbance activity such as: one residential unit, encroachment E&S Pollution Control Plan not associated with other construction and low hazard activities.

1. NOTICE OF INTENT CHECKLIST

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS
OFFICE OF OIL AND GAS MANAGEMENT

NOTICE OF INTENT (NOI) ADMINISTRATIVE COMPLETENESS CHECKLIST EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

Please check the following list to make sure that you have included all the required information. Place a check mark in the column provided for all items completed and/or provided. Failure to provide all of the requested information will delay the processing of the application, may preclude the use of the Expedited Review, and may result in the application being placed ON HOLD with NO ACTION, or being considered withdrawn and the application file closed.

THIS CHECKLIST MUST BE COMPLETED AND ENCLOSED WITH YOUR GENERAL PERMIT NOI

✓CHECKLIST FOR EROSION AND SEDIMENT CONTROL GENERAL PERMIT NOI

☐ **NEW NOI** ☐ **RENEWAL** ☐ **PHASED** ☒ **MAJOR MODIFICATION**

If a Renewal, Phased or Major Modification, identify ESCGP Authorization # ESG0100015001

Minor revisions are not required to be submitted to the regional office for review.

CLIENT NAME Sunoco Pipeline LP

PROJECT and PHASE NAME Pennsylvania Pipeline Project (If applicable)

				Applicant Check ✓ if Included	Official Use Only
1.	Fully completed, properly signed and notarized Notice of Intent form (1 original and 2 copies for paper application). (Not required for subsequent phases)			☒	☐
2.	Is expedited review requested? If yes, complete items (a) and (b) below. If no, proceed to section 3 of this checklist.			☐ Yes	☒ No
	a. Expedited review eligibility has been completed and determined.	Location: _____	Page: _____	☐	☐
	b. Expedited review process related questions have fully been answered.	Location: _____	Page: _____	☐	☐
3.	Complete **Erosion and Sediment Control (E&S) Plans.** (1 original and 2 copies for paper application) NOTE: Identify locations as Drawings (D), Narrative (N). (Identify Not Applicable as "N/A") The E & S Plan must contain, at a minimum, the following:			☒ Yes	☐ No
	a. Topographic Features Existing topographic features of the project site and immediate surrounding area. Include the project area outlined on an 8 ½" x 11" photocopy of the U.S.G.S. topo map area. The map must include the name of the appropriate 1:24,000 scale U.S.G.S. 7.5 minute series quadrangle map where the project is located.	Location: Section 3; N	Page: Attachment 1	☒	☐
	b. Soil Characteristics Types, depth, slope, locations and limitations of the soils including methods for resolution of all soil limitations.	Location: Section 3; N	Page: Attachment 5	☒	☐
	c. Earth Disturbance Activity The characteristics of the earth disturbance activity, including the past, present and proposed land uses and proposed alteration to the project site.	Location: Section 3; N	Page: 1-1	☒	☐
	d. Project Site Runoff The Volume and rate of runoff from the project site and its upstream watershed area. Runoff impact analysis on downstream watercourse, design computations for protective measures if applicable, discharge analysis for non-surface water discharges.	Location: Section 3; N	Page: 2-3	☒	☐

	e.	**Surface Water Classification** The Location of all surface waters of this Commonwealth which may receive runoff within or from the project site including their classification under Chapter 93 and status as siltation-impaired water. All streams, springs, wetlands, and floodways within, adjacent or receiving water from the project site must be shown on drawings with proper identification of special protection waters and existing uses.	Location: Section 3; N & D	Page: Table 1, Attachment 2	☒	☐
	f.	**BMP Description Narrative** A narrative description of the location and type of perimeter and onsite BMPs used before, during, and after the earth disturbance activity.	Location: Section 3; N	Page: 3-6	☒	☐
	g.	**BMP Installation Sequence Narrative** A sequence of BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities that ensures proper functioning of BMPs.	Location: Section 3; N & D	Page: 3-7, Attachment 2	☒	☐
	h.	**Supporting Calculations and Measurements** All BMP design calculations and information must be attached with the E&S plans.	Location: Section 3, N	Page: Attachment 4	☒	☐
	i.	**Plan Drawings** Plan drawings must include locations of proposed BMPs and a legend for all symbols used on the drawing. Construction details, notes, and specifications must be included to explain the drawings.	Location: Section 3; D	Page: Attachment 2	☒	☐
	j.	**Maintenance Program** A maintenance program which provides for the operation and maintenance of BMPs and the inspection of BMPs on a weekly basis and after each stormwater event, including the repair or replacement of BMPs to ensure effective and efficient operation. The program must provide for completion of a written report documenting each inspection and all BMP repair, or replacement and maintenance activities.	Location: Section 3; N	Page: 3-22	☒	☐
	k.	**Material Recycling and Disposal** Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be undertaken in accordance with this title.	Location: Section 3; N	Page: 3-19	☒	☐
	l.	**Naturally Occurring Geologic Formations and Soil Conditions** Identify naturally occurring geologic formations or soil conditions that may have the potential to cause pollution during earth disturbance activities and include the locations on plan drawings. Include BMPs to avoid or minimize potential pollution and its impacts from the formations. If the applicant suspects substantial possibility of potential slope failure, include a geotechnical report prepared by a geotechnical engineer.	Location: Section 3; N	Page: Attachment 13	☒	☐
	m.	**Thermal Impacts** Identification of potential thermal impacts to surface waters of this Commonwealth from the earth disturbance activity including BMPs to avoid, minimize or mitigate potential pollution from thermal impacts.	Location: Section 3; N	Page: 3-20	☒	☐

	n.	**E&S Plan and PCSM/SR Plan Consistency** The E&S Plan shall be planned, designed and implemented to be consistent with the PCSM Plan under § 102.8. Unless otherwise approved by the Department, the E&S Plan must be separate from the PCSM Plan and labeled "E&S" or "Erosion and Sediment Control Plan" and be the final plan for construction.	Location: Section 3; D	Page: Attachment 2	☒	☐
	o.	**Riparian Forest Buffers** Identification of existing and proposed riparian forest buffers should be included on the plan drawings if incorporated into the project site.	Location: Section 3; N	Page: 3-21	☒	☐
	p.	**Antidegradation Requirements** Satisfy antidegradation implementation requirements for special protection water and siltation-impaired waters including evaluation of nondischarge alternatives and ABACT.	Location: Section 3; N	Page: 3-24	☒	☐
4.		**Permit NOI Filing Fees** of $500 to the appropriate Clean Water Fund plus $100/Acre of earth disturbance payable to the Commonwealth of PA Clean Water Fund ($500 filing fee not required for subsequent phases) is required. For NOIs submitted to delegated county conservation districts, the administrative fee of $500 must be paid to the conservation district and disturbed acreage fee to the Commonwealth of PA (two checks).	Location: Provided separate from D & N	Page: _____	☒	☐
5.		**Municipal Notification:** (3 copies) Not required for subsequence phases.			☐	☐
	a.	Act 14 Municipal Notifications to the local municipality and county governments that specify that the application is for Erosion and Sediment Control General Permit for Earth Disturbance Associated with Oil and Gas Activities. A "sample" notification letter is provided as Attachment C of the instructions. **Proof or Receipt** of municipal notifications: copies of certified mail receipts, proof of deliver from a commercial carrier or acknowledgment letters from the local municipality and county government.	Location: Provided separate from D & N	Page: Section 4	☒	☐
	b.	Pennsylvania Inventory of Historical Places and the National Register of Historical Places: When conducting earth disturbance activities, the permittee shall protect archaeological specimens and historic resources in accordance with applicable State and Federal laws. For permitted activities on lands of the Allegheny National Forest (ANF) or other federal lands, the permittee should coordinate with the appropriate ANF Ranger or other appropriate federal agency on the protection of historic properties.	Location: Provided separate from D & N	Page: Section 6	☒	☐
6.		**Pennsylvania Natural Heritage Program (PNHP).** Include PNDI receipt, PNDI clearance and other information depending on the permit application option. (3 copies for paper application).	Location: Provided separate from D & N	Page: Section 6	☒	☐
7.		**Complete PCSM/SR Plans.** (1 Original, 2 copies) NOTE: Identify location(s) as Drawing (D), Narrative (N). (Identify Not Applicable as "N/A".) The PCSM/SR Plan must contain, at a minimum, the following:			☒	☐
	a.	**Topographic Features** The existing topographic features of the project site and immediate surrounding area must be shown plan drawings. The name of the USGS quadrangle map must be included.	Location: Section 7; D	Page: Attachment 1	☒	☐

	b.	**Characteristics of Naturally Occurring Geologic Formations and Soil Conditions** The types, depth, slope, locations and limitations of the soils and geologic formations.	Location: Section 7; N	Page: 3, Attachment 2	☒	☐
	c.	**Earth Disturbance Activity Characterization** The characteristics of the project site, including the past, present and proposed land uses Limit of Disturbance (LOD), areas of cuts and fill, proposed impervious areas, locations of roads, proposed contours of project area and the proposed alteration of the project site.	Location: Section 7; N	Page: 2	☒	☐
	d.	**Net Change in Volume and Rate of Runoff** An identification of the net change in volume and rate of stormwater from preconstruction hydrology to post construction hydrology for the entire project site and each drainage area. Include pre-development and post-development drainage area map. Post-development drainage area map must show Point of Discharge(s) (PODs) from PCSM BMPs.	Location: Section 7; N	Page: 15	☒	☐
	e.	**Surface Water Classification** An identification and location of surface waters of this Commonwealth, which may receive runoff within or from the project site and their classification under Chapter 93.	Location: Section 7; N & D	Page: 4	☒	☐
	f.	**BMP Description Narrative** A written description of the location and type of PCSM/Site Restoration BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations.	Location: Section 7; N	Page: 5, 18	☒	☐
	g.	**BMP Installation Sequence Narrative** A sequence of PCSM/Site Restoration BMP implementation or installation in relation to earth disturbance activities of the project site and a schedule of inspections for critical stages of PCSM/Site Restoration BMP installation.	Location: Section 7; N	Page: 5, 18	☒	☐
	h.	**Supporting calculations** All design information and calculations must be included with the PCSM/SR plan. Include verification of PCSM/SR plan consistency with the Act 167 plan, if a current and DEP approved Act 167 plan exists. Include summary of bio-infiltration BMPs used for the project using Attachment E of the NOI instructions.	Location: N/A	Page: _____	☐	☐
	i.	**Plan Drawings** The locations of BMPs with tributaries must be shown on the drawings. Notes, specifications, any constructions details, and any other supporting information needed to explain the drawings must also be included.	Location: N/A	Page: _____	☐	☐
	j.	**Long Term Operation and Maintenance Schedule** A long-term operation and maintenance schedule, which provides for inspection of PCSM/Site Restoration BMPs, including the repair, replacement or other routine maintenance of the PCSM/Site Restoration BMPs to ensure proper function and operation. The program must provide for completion of a written report documenting each inspection and all BMP repair and maintenance activities and how access to the PCSM/Site Restoration BMPs will be provided.	Location: N/A	Page: _____	☐	☐

	k.	**Material Recycling and Disposal** Procedures which ensure that the proper measures for recycling or disposal of materials associated with or from the PCSM/Site Restoration BMPs are in accordance with Department laws, regulations and requirements.	Location: Section 7; N	Page: 18	☒	☐
	l.	**Addressing Impacts from Naturally Occurring Geologic Formations and Soil Conditions** An identification of naturally occurring geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance activities are completed and PCSM/Site Restoration BMPs are operational and development of a management plan to avoid or minimize potential pollution and its impacts.	Location: Section 7; N	Page: 3	☒	☐
	m.	**Thermal Impacts** An Identification of potential thermal impacts from post construction stormwater to surface water of this Commonwealth including BMPs to avoid, minimize or mitigate potential thermal pollution from thermal impacts.	Location: Section 7; N	Page: 11	☒	☐
	n.	**Riparian Forest Buffer Management Plan** A riparian forest buffer management plan when required under § 102.14.	Location: Section 7; N	Page: 12	☒	☐
	o.	**Antidegradation Requirements** A demonstration of compliance with antidegradation implementation requirements including evaluation of nondischarge alternatives and ABACT for where activities will be conducted in special protection waters or siltation impaired waters.	Location: Section 7; N	Page: 14	☒	☐
8.	**PCSM Plan Stormwater Analysis** Do the regulated activities require site restoration or reclamation? If Yes, skip to Item 9. If No, provide the following information:			☒ Yes ☐ No	☒	☐
	a.	**Site Characterization and Assessment** Predevelopment site characterization and assessment of soil and geology including infiltration and geotechnical studies that identify location and depths of test sites and methods used.	Location: Section 7; N	Page: 2	☒	☐
	b.	**Volume Reduction and Water Quality Requirements** Analysis demonstrating that the PCSM BMPs will meet the volume reduction and water quality requirement specified in an applicable Department approved and current Act 167 stormwater management watershed plan; **or** manage the net change for storms up to and including the 2-year/24-hour storm event when compared to preconstruction runoff volume and water quality.	Location: N/A	Page: _____	☐	☐
	c.	**Rate Requirements** Analyses demonstrating that the PCSM BMPs will meet the rate requirements specified in an applicable Department approved and current Act 167 stormwater management watershed plan; **or** manage the net change in peak rate for the 2-, 10-, 50-, and 100-year/24-hour storm event in a manner not to exceed preconstruction rates.	Location: N/A	Page: _____	☐	☐
	d.	**Calculation Methodologies** Identification of the methodologies for calculating total runoff volume and peak rate of runoff and provide supporting documentation and calculations.	Location: N/A	Page: _____	☐	☐

	e.	**Construction Techniques** Identification of construction techniques or special consideration to address soil and geologic limitations.	Location: N/A	Page: _____	☐	☐
	f.	**Antidegradation Requirements** Demonstration of compliance with antidegradation implementation requirements including evaluation of nondischarge alternatives and ABACT for where activities will be conducted in special protection waters or siltation impaired waters.	Location: Section 7; N	Page: 14	☒	☐
9.	**Phased Projects** Is the activity being conducted as a phased project? ☐ Yes ☒ No If yes, all of the following must be completed:				☐	☐
	a.	Initial Phase - Is the master plan included? ☐ Yes ☐ No				
	b.	Subsequent Phase(s) – Is(are) the subsequent phase(s) identified in the master plan? ☐ Yes ☐ No				
10.	**Preparedness, Prevention and Contingency (PPC) Plan** Will fuels, chemicals, solvents, other hazardous materials be used or stored on site during earth disturbance activities? ☒ Yes ☐ No If yes, a PPC Plan must be maintained on the site during earth disturbance.				☐	☐
11.	**Subsequent Phase Certification for Expedited Reviews** Is the activity being conducted as a phased project? ☐ Yes ☒ No Is an expedited review being requested for subsequent phase? ☐ Yes ☒ No If yes, all of the following must be completed:				☐	☐

I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plan are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature	Professional Seal
Company	
Address	
Phone	
Most Recent DEP Training Attended Location _____ Date _____	
e-Mail Address	

EXPEDITED REVIEW PROCESS

In addition to the certification required above, applicants using the expedited permit review process must attach an E&S and PCSM/Site Restoration Plan developed and sealed by a licensed professional engineer, landscape architect, surveyor or professional geologist. The plans shall contain the following certification:

I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plan and Post Construction BMPs are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

12.	**Permit Renewal** Is a permit renewal being requested? ☐ Yes ☒ No If yes, all of the following must be completed:		☐	☐
	a.	Administratively complete, signed, and notarized Notice of Intent Form, including Items 1-8. (1 signed original and 2 copies of the NOI/application for paper application)	☐	☐
	b.	Permit filing fee of $500 payable to the appropriate clean water fund plus $100/Acre of earth disturbance payable to the Commonwealth of PA Clean Water Fund.	☐	☐

2. NOTICE OF INTENT APPLICATION

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS
OFFICE OF OIL AND GAS MANAGEMENT

OFFICIAL USE ONLY
ID #
Date Received
AUTH
SITE
CLNT
APS
Fee
Check No.
Check Date

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

READ THE INSTRUCTIONS PROVIDED IN THIS PERMIT APPLICATION PACKAGE BEFORE COMPLETING THIS FORM. PLEASE PRINT OR TYPE INFORMATION IN BLACK OR BLUE INK.

SECTION A. APPLICATION TYPE

Check one:

NEW ☐ **RENEWAL** ☐ **MAJOR MODIFICATIONS (Provide ESCGP number)** ☒ ESG0100015001

PHASED ☐ (check only if applicable; *note: Most projects are not submitted as phased projects*)

Check one: EXPEDITED ☐ **STANDARD** ☒

If an Expedited Review Process being requested, be advised that the Expedited Review is not available for all projects. Refer to Section D - Expedited Review Process of the ESCGP-3 NOI Instructions to determine if the project is eligible.

SECTION B. CLIENT INFORMATION

Applicant's Last Name (If applicable)	First Name	MI	Telephone No. 610-670-3200
Gordon	Matthew	L	

Organization Name or Registered Fictitious Name	Telephone No.
Sunoco Pipeline, L.P.	

DEP Client ID No.

Headquarters Mailing Address	City	State	ZIP Code
535 Fritztown Road	Sinking Spring	PA	19608

Email Address matthew.gordon@energytransfer.com

Co-Applicant's Last Name (If applicable)	First Name	MI	Telephone No. (920) 539-0872
Fye	Jamye		

Organization Name or Registered Fictitious Name	Telephone No. (920) 924-4300
Michels Pipeline, A Division of Michels Corporation	

Address	City	State	ZIP Code
817 Main Street	Brownsville	WI	53006

Email Address jfye@michels.us

SECTION C. SITE INFORMATION					
Is there an existing ESCGP associated with this site? ☒ Yes ☐ No If yes, Permit No. ESG0100015001					
Has a well permit application been submitted for this site? ☐ Yes ☒ No If yes, Permit No. _____ Does this site have a 911 address? ☐ Yes ☒ No If yes, provide site location address.					
Site Name Pennsylvania Pipeline Project					
Site Location Chester and Delaware Counties		Site No. (if another permit has been issued for the site)			
Site Location – City Elverson Township, Chester County to Upper Chichester Township, Delaware County			State PA	ZIP Code	
Detailed Written Directions to Site See Directions in Attachment 1					
Primary Location	County Chester and Delaware	Municipality See Municipal Table in Attachment 2. The Major Modification is located in Middletown Township, Delaware County	City ☐	Boro ☒	Twp. ☒

SECTION D. EXPEDITED REVIEW	
I. Expedited Review Eligibility	
1. Is any part of the project in the watershed of a surface water with an existing or designated use of exceptional value or high quality pursuant to Chapter 93 (relating to water quality standards), in an exceptional value wetland in accordance with 25 Pa. Code § 105.17, or in the watershed of an impaired surface water where the cause of the impairment is identified as siltation?	☒ Yes ☐ No
2. Will the project in which the well pad will be constructed be in or on a floodplain?	☐ Yes ☒ No
3. Is any earth disturbance located or proposed to be located on land known to be contaminated by the release of regulated substances as defined in Section 103 of Act 2, 35 P.S. § 6026.103?	☐ Yes ☒ No
4. Will naturally occurring geologic formations or soil conditions provide hazards to the project or surrounding environment or have the potential to cause or contribute to pollution when disturbed?	☒ Yes ☐ No
5. Do any unresolved non-compliance issues exist with the applicant or the facility?	☒ Yes ☐ No
6. Is the project a transmission project?	☒ Yes ☐ No

If yes to any of the above questions the project is not eligible for Expedited Review; If the project is eligible for Expedited Review, all the following items must be completed.	
II. Expedited Review Process	
1. Is the technically and administratively complete and accurate NOI package prepared and certified by a licensed professional?	☐ Yes ☐ No
2. Are E&S and PCSM/Site Restoration Plan drawings and narrative prepared and sealed by a licensed professional? *(Include interim restoration details when needed)*	☐ Yes ☐ No
3. Include a Resource Delineation Report and answer the following questions: (If the answer to question a. is "Yes" then skip to #4. If the answer to a. is "No" the applicant must answer "Yes" to at least one of the questions, b. through d. to be eligible for expedited review.)	
a. Were all wetland resources delineated during the growing season?	☐ Yes ☐ No
b. If not during the growing season, was a follow-up visit conducted during the growing season to verify/adjust boundaries and look for potentially missed resources?	☐ Yes ☐ No
c. Was a quality assurance field review conducted at a later date by an independent qualified wetland professional to verify boundaries and look for potentially missed resources? (If yes, attach Quality Assurance Field Review Report)	☐ Yes ☐ No
d. Was a Jurisdictional Determination (JD) or Preliminary JD conducted by the US Army Corps of Engineers on the whole project? (If yes, attach Preliminary or Jurisdictional Determination Report)	☐ Yes ☐ No
4. If applicable, have you included PNDI clearance letters or other documentation from applicable resource agencies?	☐ Yes ☐ No
5. If the project site contains, is along, or within 100 feet of a river, stream, creek, lake, pond or reservoir, will you establish new or preserve existing riparian forest buffer at least 100 feet in width between the top of streambank or normal pool elevation of a lake, pond or reservoir and areas of earth disturbances. If no, will a waiver be obtained? ☐ Yes ☐ No	☐ Yes ☐ No
6. Name of Licensed Professional Company	
Address	
Phone	

SECTION E. PROJECT INFORMATION			
1. Total Project Area/Project Site (Ac):	278	Total Disturbed Area (Ac):	278
Increased disturbed acreage *(for permit modification only)*			5.32
Fee: ***(For additional information regarding fees, refer to NOI Instructions #3 Permit NOI Filing Fees.)***			$ 1000

2. Project Name: Pennsylviana Pipeline Project

3. Project Type (Check all that apply)

- ☐ Oil/Gas Well [1]
- ☐ Gathering Facility
- ☐ Treatment Facility
- ☐ Compressor Station
- ☒ Pipeline
- ☐ Storage Field Facility
- ☐ Other
- ☐ Transmission Facility
- ☐ Processing Facility
- ☐ Well Development Impoundment
- ☒ Non-FERC regulated Transmission Facility
- ☐ Ground/Surface Water Withdrawal Site

[1] If Oil/Gas Well; is the well conventional or unconventional? ☐ Conventional ☐ Unconventional

Project Description

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL). The project involves the installation of approximately two parallel pipelines within a 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. The majority of the new ROW will be co-located adjacent to existing utility corridors, including approximately 230 miles of pipeline that will be co-located in the existing SPLP Mariner East pipeline system. The 20-inch pipeline will be installed first, followed by the 16-inch line. Any temporary stabilization required will be implemented in accordance with the project's Erosion and Sediment (E&S) Plans. For a conventional lay, the pipelines would be installed within the same disturbance to the maximum extent practicable. For safety purposes, the installation would be staggered by what is estimated to be no more than 60 days. At some HDDs with longer drills, however, the time period between installation of the two pipelines may exceed 60 days. Any temporary stabilization required would be implemented in accordance with project's E&S Plans. Any permanent or temporary impacts associated with the second pipeline installation will be similar to the first installation, as described in more detail in the Application and the balance of these responses.

Construction activities will involve clearing and grubbing, trenching, pipe installation, site restoration, and access road construction/improvement. Erosion and sediment controls will be in place during earth disturbance activities. Following completion of pipeline installation, the area will be returned to the general grade present prior to pipeline installation in order to maintain preconstruction elevations and drainage patterns. Disturbed areas will be seeded and mulched. Erosion and sedimentation control devices will be maintained until site work is complete and revegetation is successful.

The Major Modification is is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad.

The project will be constructed for 35 miles in the PADEP South East Region. The project disturbance by county is as follows:

Chester County: 175 Acres previously approved, Minor Modifications 0.52 (Pending Approval), (Total 176)
Delaware County: 94 Acres previsouly approved, Twin Oaks Pump Station Expansion 2.39 acres, 620 Major Modification 5.32 acres (Total 102 acres)

Provide the date of pre-application meeting (if conducted with the Department)

4. Provide the latitude and longitude coordinates for the center of the project. The coordinates should be in Decimal degrees and North American Datum 1983. The coordinates must meet the current DEP policy regarding locational accuracy. For linear projects provide the project's termini.

   Latitude (DD) 40.1556 Longitude (DD) - 75.8429

   Latitude (DD) 39.8445 Longitude (DD) - 75.4186

   Horizontal Collection Method: ☐ GPS ☒ Interpolated from U.S.G.S. Topographic Map ☐ DEP's eMAP

5. U.S.G.S. 7.5 min. topographic quadrangle Name Cresson, Hollidaysburg, Frankstown, Williamsburg, Cassville, Entriken, Huntingdon, Butler Knob, Aughwick, Blairs Mills, Blain, Andersonburg, Newburg, Newville, Landisburg, Plainfield, Carlisle, Shermans Dale, Mechanicsburg, Wetzville, Lemoyne, Steelton, Middletown, Elizabethtown, Hershey, Lebanon, Palmyra, Richland, Womelsdorf, Sinking Spring, Terre Hill, Reading, Morgantown, Elverson, and Washington.

   (*Include a copy of the project area on the 7.5 min quad map)*

6. Will the project be conducted as a phased permit project? ☐ Yes ☒ No

   If Yes, Include Master Site Plan Estimated Timetable for Phased Projects. ☐ Additional sheet(s) attached.

Phase No. or Name	Description	Total Area	Disturbed Area	Start Date	End Date

7. List existing and previous land use for a minimum of the previous 5 years. Forested/agricultural/rural residential

8. Other Pollutants: Will the stormwater discharge contain pollutional substances other than sediment? ☐ Yes ☒ No

   If yes, explain and provide any available quantitative data.

9. Will fuels, chemicals, solvents, other hazardous waste or materials be used or stored on site during earth disturbance activities or will Horizontal Directional Drilling (HDD) activities be conducted?

   Yes ☒ No ☐ ***(If yes, Preparedness, Prevention and Contingency (PPC) Plan must be maintained on site during earth disturbance. See NOI Instructions, E.9 PPC Plan Guidance for further information.)***

10. Is the project in the watershed of an impaired surface water where the cause of the impairment is identified as siltation?

    Yes ☒ No ☐ ***(If yes, show how the project will not result in a net change in volume, rate or water quality. See section I below, and E.10 of NOI instructions.)***

11. Are there potentially hazardous naturally occurring geological or soil conditions in any portion of the project or surrounding area? Yes ☒ No ☐

    If yes, do the potentially hazardous geologic or soil conditions have the potential to cause or contribute to pollution as a result of the proposed earth disturbance activities?

    If no, provide an explanation.

    If yes, Geologic Hazard Mitigation Plan must be attached and explain where in this application details are provided.

12. Has the Act 14 Municipal Notification and proof of receipt of notification been attached to the NOI?

    Yes ☒ No ☐ ***(If not, the NOI is not complete, see E.12 and #4 Municipal Notification in the NOI Instructions for additional guidance.)***

13. Has the PNDI receipt been attached to the NOI?

    Yes ☒ No ☐ ***(If not, the NOI is not complete, see E.13 and #5 PNHP in the NOI Instructions for additional guidance.)***

14. Have the E&S Plan and PCSM/SR Plan been planned and designed to be consistent?

    Yes ☒ No ☐

15. Have existing and/or proposed Riparian Forest Buffers been identified?
Yes ☒ N/A ☐ ***(If yes, they must be shown on the E&S Plan as well as the PCSM/SR Plans.)***

16. Have antidegradation implementation requirements for special protection waters been addressed?
Yes ☒ No ☐ N/A ☐ ***(If yes, antidegradation requirements must be included in the plan.)***

17. Has the seasonal high groundwater level been identified and 20-inch separation established at all excavation locations for pits for conventional operations and Well Development Impoundments for unconventional operations?
Yes ☐ No ☐ N/A ☒

18. Receiving Waters	Chapter 93, Designated Use Stream Classification	Chapter 93, Existing Use Stream Classification
See Attachment 3	☒ HQ ☐ EV ☒ Other WWF, CWF, TSF ☒ Siltation-impaired	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired
HDD 620 Major Modification: Chester Creek	☐ HQ ☐ EV ☐ Other TSF ☐ Siltation-impaired	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired
_____	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired
_____	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired	☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired

Secondary Receiving Water	Secondary Chapter 93, Designated Use	Secondary Existing Use
See Attachment 3		

Name of Municipal or Private Separate Storm Sewer Operator, if applicable.
See Attachment 4

Non-Surface Receiving Water: (include off-site discharges)

SECTION F. EROSION AND SEDIMENT CONTROL (E&S) PLAN

See the attached Instructions for additional guidance with E&S Plans

Erosion and Sediment Control Plan BMPs should be designed to minimize accelerated erosion and sedimentation through limiting the extent and duration of earth disturbance, protection of existing drainage and vegetation, limiting soil compaction and controlling the generation of increased runoff. The Department recommends the use of the *Pennsylvania Erosion & Sedimentation Pollution Control Program Manual (E&S Manual)* (363-2134-008) to achieve this goal. The E&S Plan must meet the requirements of Pa. Code § 102.4(b) and submitted with the NOI. Also, see section 2. of the NOI instruction for detailed information on completing the E&S plan and additional requirements.

a. E&S Plan Summary

Provide a summary of proposed E&S BMPs and their performance to manage E&S for the project.

Provide a summary of proposed E&S BMPs and their performance to manage E&S for the project.

Compost Filter Socks - This temporary sedimentation control measure consists of wood or metal posts driven through a compost filled mesh tube. Filter socks will be located as needed on side-slope and down-slope boundaries of disturbed areas. Compost filter socks will be sized using the DEP Construction Detail.

Tarpaulin Covers - Tarpaulin covers may be used, as necessary, to protect topsoil storage stockpiles from wind and precipitation erosion. Stockpile slopes will be 2:1 or less. A minimal amount of soil will be stockpiled so that the height of the stockpile is less than 35 feet.

Rock Construction Entrance – Temporary access routes will be established on and proximate to the site to facilitate construction activities. The use of access routes will help confine truck and equipment traffic to specific corridors thus minimizing land disturbance and protecting vegetation. Site traffic during wet weather will be limited. No vehicles will be permitted in streams or rivers.

Wash Racks – Wash racks will be used at rock construction entrances and will be designed to accommodate anticipated vehicular traffic. A water supply will be made available at wash racks to wash the wheels of vehicles exiting the site.

Pumped Water Filter Bag – Pumped water filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. Compost filter socks shall be installed within 50 feet of any receiving surface water or where grassy area is not available.

Erosion Control Blanket - A manufactured erosion control blanket shall be installed on all slopes 3:1 (H:V) or steeper and within 100 feet of stream banks, where applicable. The blanket shall be biodegradable but capable of providing protection for two growing seasons. Straw or similar fiber material shall be placed between two biodegradable nets. The top net shall be heavyweight and UV stabilized; the bottom net shall be a lightweight netting. Erosion control blankets shall be anchored and stapled in place in accordance with the manufacturer's recommendations and the detail on the construction drawings. For slopes between 3:1 and 1:1 (H:V) use erosion control blanket SC 150 as manufactured by North American Green or Owner approved equal material or equal method.

Waterbars – Waterbars shall be installed across the right-of-way on all slopes greater than 5%. Waterbars should be constructed at a slope of 2% and discharge to a well-vegetated area. Waterbars should not discharge into an open trench. Waterbars should be oriented so that the discharge does not flow back onto the right-of-way. Obstructions (e.g. compost filter socks etc.) should not be placed in any waterbars. Where needed, they should be located below the discharge end of the waterbar.

Trench Plugs - To be used to prevent piping along the pipeline.

b. E&S Plan BMP Design

Check those that apply:

☒ E&S Plan is designed using BMPs in the *E&S Manual*.

☐ E&S Plan is designed using an alternative BMP or design standard approved by DEP.

Note: NOI packages submitted with alternate BMPs not approved by the Department will be returned to the Applicant.

c. Do you have any information regarding riparian buffer which differs from Section G, Riparian Buffer?

Yes ☐ No ☒

Explain:

d. Thermal Impacts Analysis

Explain how thermal impacts associated with this project were avoided, minimized, or mitigated. Potential thermal impacts to surface waters will be minimized by minimizing clearing and retaining existing vegetation where possible. The disturbed areas will be reseeded as soon as practicable following construction

e. Off-Site Discharge Analysis

Does the activity propose any off-site discharges to areas other than surface waters? ☒ Yes ☐ No

If yes, it is the applicant's responsibility to ensure that they have legal authority for any off-site discharge to neighboring properties.

The applicant must provide a demonstration in both E&S and PCSM/SR plans that the discharge will not cause erosion, damage, or a nuisance to off-site properties.

SECTION G. RIPARIAN BUFFER

1. Will you be protecting, converting or establishing a voluntary riparian forest buffer as part of this project? ☒ Yes ☐ No
   If yes, as part of the PCSM/SR Plan, provide a Buffer Management Plan.
2. Will proposed earth disturbance activities be conducted in an EV or HQ watershed AND within 150 feet of a perennial or intermittent river, stream, or creek, or lake, pond, or reservoir? ☒ Yes ☐ No

   If no, proceed to the next section/module.
3. Does this project qualify for an exception (see § 102.14(d)(1))? ☒ Yes ☐ No

   If yes, indicate below the type of project for which the exception applies by marking the appropriate box.

   ☐ Oil and gas activities for which site reclamation or restoration is part of the permit authorization in Chapter 78 and 78a.

   ☐ Road maintenance activities.

   ☐ The repair or maintenance of existing pipelines and utilities.

   ☒ Other (see §102.14(d)(1))

   If exceptions are checked, explain how existing riparian buffer will be undisturbed to the extent practicable. Provide a demonstration that the requirements of §102.14(b) are met, or provide the necessary information to request a riparian buffer waiver.
4. Are you requesting a riparian buffer waiver for this project (see § 102.14(d)(2))? ☒ Yes ☐ No

   If yes, indicate below the type of project for which you are requesting a waiver by marking the appropriate box.

   ☒ Linear project that may include pipelines, public roadways, rail lines, or utility lines.

   ☐ Project is of a temporary nature where the site will be fully restored to its preexisting conditions during the ESCGP permit term.

   ☐ Project where compliance with mandatory riparian buffers is not appropriate or feasible due to site characteristics or existing structures at the project site.

   ☐ Other (see §102.14(d)(2)):

   If waivers are checked, explain how existing riparian buffers will be undisturbed to the extent practicable.

   Note: If “Yes” to #2 **AND** “No” to #3 and #4, provide an attachment to demonstrate how the requirements of §102.14 are met.

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) AND/OR SITE RESTORATION(SR) PLAN

See NOI Instructions for additional guidance with PCSM Plans

PCSM/SR BMPs should be designed to use natural measures to eliminate pollution, infiltrate runoff, not require extensive construction/maintenance, promote pollutant reduction, and preserve the integrity of stream channels. All PCSM/SR BMPs proposed in the PCSM/SR Plan must be designed in accordance with Ch. 102, Ch. 78a for unconventional operations, Ch. 78 for conventional operations and the *Pennsylvania Stormwater Best Management Practices Manual (Stormwater BMP Manual)* (363-0300-002). If alternate design criteria are utilized for the proposed project, they must have prior approval by the Department, or the NOI Application will be returned to the Applicant.

After construction is completed, how much of the entire disturbed area will be restored to meadow in good condition or better, or existing conditions? ☐ All ☒ Partial ☐ None

Include PCSM narrative and drawings for remaining impervious area. Also include a map showing the proposed contours of the site restoration plan.

If there are additional stages of the project prior to permit termination or expiration, list the stages and provide the documents required by subsection 'a' to section 'g' for each stage (e.g. partial restoration or changes to the amount of compacted areas, gravel, and/or impervious areas). Upload a narrative for each additional stage in addition to the drawings.

EXAMPLE

Stage No	Stage Name	PCSM Plan	SR Plan
Stage 1		☐	☐
Stage 2		☐	☐
Stage 3		☐	☐
Stage 4		☐	☐

Act 167 Consistency. Check those that apply.

Is there an Act 167 Plan? ☐ Yes ☐ No

☐ The attached PCSM/SR Plan is consistent with an applicable approved Act 167 Plan.

Complete the following for all approved Act 167 Stormwater Management Plans. (Use additional sheets if necessary)

Act 167 Plan Name	Date Adopted	
		Consistency Letter Included ☐
See Attachment 5		Verification Report Included ☒

Note: A consistency letter is not required if a verification report is provided. See NOI Instructions. The PCSM/SR Plan must satisfy either sub paragraph 1, 2, or 3 below. Check those that apply.

1. ☒ Act 167 Plan approvals on or after January 2005 – The attached PCSM/SR Plan, in its entirety, is consistent with all requirements pertaining to rate, volume, and water quality from an Act 167 Stormwater Management Plan approved by DEP on or after January 2005. Box 1 must be checked if a current, DEP approved Act 167 plan exists.

2. ☒ The PCSM/SR Plan meets the standard design criteria from sections 102.8(g)(2) and (3) and the *Stormwater BMP Manual*. For projects involving oil and gas activities authorized by a permit issued under Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure, post construction stormwater management requirements are met for all areas that are restored to preconstruction conditions or to a condition of meadow in good condition or better. *[Note: PCSM plans must meet both the volume and rate requirements in the regulations, which are provided in the 2 sections mentioned in this paragraph].*

3. ☐ Alternative Design Standard – The attached PCSM/SR Plan was developed using approaches as provided in 102.8(g)(2)(iv) and 102.8(g)(3)(iii). Demonstrate/explain in the space provided below how this standard will be either more protective than what is required in 102.8(g)(2) and 102.8(g)(3) or will maintain and protect existing water quality and existing and designated uses.

PCSM/SR BMP Alternative Standards:

Has the alternative BMP or design standard been approved by the Department?

☐ Yes

☐ No – Do not submit the ESCGP-3 application and see Section (H) of the NOI Instructions concerning the alternative BMP approval process.

Water Quality Compliance:

Does the PCSM/SR plan comply with requirements for volume control? ☒ Yes ☐ No

If yes, is at least 90% of the disturbed area controlled by a PCSM BMP? ☒ Yes ☐ No

If yes, do you have the Standard PCSM Worksheet # 10 attached to show water quality compliance has achieved?
☒ Yes ☐ No

If no, attach Standard PCSM Worksheets # 12 and #13 to show water quality compliance has achieved.

If PCSM/SR plan is not complying with the requirements for volume control, attach Standard PCSM Worksheets # 11, # 12 and #13 to show water quality compliance has achieved.

a. PCSM/SR Plan Summary

Provide a summary of proposed BMPs and their performance to manage PCSM/SR for the project.

The right-of-way and the area where the major modification will take place will be returned to meadow in good condition. Areas where PCSM BMPs were required have not changed with the major modification and information regarding PCSM PMPs can be found in the original Permit NOI (ESG0100015001).

Check all that apply ☐ PCSM BMPs ☐ SR BMPs

b. Do you have any information regarding riparian buffer which differs from what was submitted in the Section G, Riparian Buffer?

☐ Yes ☒ No

Explain:

c. Thermal Impacts Analysis

Explain how thermal impacts associated with this project were avoided, minimized, or mitigated. Explain how thermal impacts associated with this project were avoided, minimized, or mitigated. Potential themal impacts to surface waters will be minimized by minimizing clearing and retaining existing vegetation where possible. Permanent seeding will occur as soon as practicable during germinating months.

d. Off-Site Discharge Analysis.

Does the activity propose any off-site discharges to areas other than surface waters? ☒ Yes ☐ No

If yes, it is the applicant's responsibility to ensure that they have legal authority for any off-site discharge to neighboring properties.

The Applicant must provide a demonstration in both the E&S and PCSM/SR Plans that the discharge will not cause erosion, damage, or a nuisance to off-site properties.

e. Summary Table for Supporting Calculation and Measurement Data
(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: No change for major modification, see original permit NOI, permit # ESG0100015001

Volume Control design storm frequency _____ Rainfall amount _____ inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)			
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs			
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs			
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour			
2) 10-Year/24-Hour			
3) 50-year/24-Hour			
4) 100-year/24-Hour			

f. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY ☒ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☒ VC ☒ RC ☒ WQ	_____	_____
Bio-infiltration areas ☐ Infiltration Trench ☐ Infiltration Bed ☐ Infiltration Basin ☐ Rain Garden/ Bioretention ☐ Infiltration Berm	Infiltration/Recharge	 ☐ VC ☐ RC ☐ WQ ☐ VC ☐ RC ☐ WQ ☐ VC ☐ RC ☐ WQ ☐ VC ☐ RC ☐ WQ ☐ VC ☐ RC ☐ WQ	 _____ _____ _____ _____ _____	 _____ _____ _____ _____

Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Pre-Construction Drainage Pattern Intact		☒ VC ☒ RC ☒ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wet Ponds		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

g. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

Refer to the original permit NOI for Permit #ESG0100015001

SECTION I. ANTIDEGRADATION ANALYSIS

This section must be completed where earth disturbance activities will be conducted in the watershed of a surface water with an existing or designated use of exceptional value or high quality pursuant to Chapter 93 (relating to water quality standards), projects where any part is located in an exceptional value wetland in accordance with 25 Pa. Code § 105.17, and projects where any part is located in the watershed of an impaired surface water where the cause of impairment is identified as siltation.

Part 1 - NONDISCHARGE ALTERNATIVES EVALUATION

The applicant must consider and describe any and all non-discharge alternatives for the entire project area which are environmentally sound and will**:**

- Minimize accelerated erosion and sedimentation during the earth disturbance activity
- Achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in water quality

E & S Plan	PCSM/SR Plan
Check off the environmentally sound nondischarge Best Management Practices (BMPs) listed below to be used prior to, during, and after earth disturbance activities that have been incorporated into your E & S Plan based on the site analysis. For non-discharge BMPs not checked, provide an explanation of why they were not utilized. Also for BMPs checked, provide an explanation of why they were utilized. (Provide the analysis and attach additional sheets if necessary) The best possible pipeline route was selected based on landowner agreements, and minimization of environmental impacts, and engineering/constructibiliy factors. The project's disturbed area will be limited to the area required for construction, and the duration of construction will be minimized to the extent practicable. Riparian forest buffers will be protected to the extent practicable during construcion activities at stream crossings.	Check off the environmentally sound nondischarge Best Management Practices (BMPs) listed below to be used after construction that have been incorporated into the PCSM/SR Plan based on your site analysis. For non-discharge BMPs not checked, provide an explanation of why they were not utilized. Also for BMPs checked, provide an explanation of why they were utilized. (Provide the analysis and attach additional sheets if necessary) The best possible pipeline route was selected based on landowner agreements, and minimization of environmental impacts, and engineering/constructibility factors. The pipeline right of way will be restored to a meadow condition at original contours to maintain the pre-construction drainage patterns. Riparian forest buffers will be protected to the extent practicable.
Nondischarge BMPs ☐ Alternative Siting ☐ Alternative location ☐ Alternative configuration ☐ Alternative location of discharge ☒ Limited Disturbed Area ☒ Limiting Extent & Duration of Disturbance (Phasing, Sequencing) ☐ Riparian Buffers (150 ft. min.) ☐ Riparian Forest Buffer (150 ft. min.) ☐ Other _____	**Nondischarge BMPs** ☐ Alternative Siting ☐ Alternative location ☐ Alternative configuration ☐ Alternative location of discharge ☐ Low Impact Development (LID / BSD) ☐ Riparian Buffers (150 ft. min.) ☐ Riparian Forest Buffer (150 ft. min.) ☒ Infiltration ☐ Water Reuse ☒ Other re-construction drainage pattern intact within the right-of-way
Will the non-discharge alternative BMPs eliminate the net change in rate, volume and quality during construction? ☐ Yes ☒ No If yes, antidegradation analysis is complete. If no, proceed to Part 2.	Will the non-discharge alternative BMPs eliminate the net change in rate, volume and quality after construction? ☐ Yes ☒ No If yes, antidegradation analysis is complete. If no, proceed to Part 2.

PART 2 - ANTIDEGRADATION BEST AVAILABLE COMBINATION OF TECHNOLOGIES (ABACT)

If the net change in stormwater discharge from or after construction is not fully managed by nondischarge BMPs, the applicant must utilize ABACT BMPs to manage the difference. The Applicant must specify whether the discharge will occur during construction, post-construction or both, and identify the technologies that will be used to ensure that the discharge will be a non-degrading discharge. ABACT BMPs include but are not limited to:

E & S Plan

☒ **Treatment BMPs:**
- ☐ Sediment basin with skimmer
- ☐ Sediment basin ratio of 4:1 or greater (flow length to basin width)
- ☐ Sediment basin with 4-7 day detention
- ☐ Flocculants
- ☒ Compost Filter Socks
- ☐ Compost Filter Sock Sediment Basin
- ☒ RCE w/ Wash Rack

☐ **Land disposal:**
- ☐ Vegetated filters
- ☐ Riparian buffers <150ft.
- ☐ Riparian Forest Buffer <150ft.
- ☐ Immediate stabilization

☒ **Pollution prevention:**
- ☒ PPC Plans
- ☐ Street sweeping
- ☐ Channels, collectors and diversions lined with permanent vegetation, rock, geotextile or other non-erosive materials

☐ **Stormwater reuse technologies:**
- ☐ Sediment basin water for dust control
- ☐ Sediment basin water for irrigation

☒ **Other** **Rock construction entrances with wash rocks, compost filter sock, and erosion control blanket,placed within 100 feet of streams.**

Are the ABACT BMPs selected sufficient to minimize E&S discharges to the extent that existing or designated surface water uses are protected?

☒ Yes ☐ No

If yes, Antidegradation analysis is complete.
If no, NOI Application will be returned to the Applicant.

PCSM/SR Plan

☒ **Treatment BMPs:**
- ☒ Infiltration Practices
- ☐ Wet ponds
- ☐ Created wetland treatment systems
- ☐ Vegetated swales
- ☐ Manufactured devices
- ☐ Bio-retention/infiltration
- ☐ Green Roofs

☐ **Land disposal:**
- ☐ Vegetated filters
- ☐ Riparian Buffers <150ft.
- ☐ Riparian Forest Buffer <150ft.
- ☐ Disconnection of roof drainage
- ☐ Bio-retention/bio-infiltration

☒ **Pollution prevention:**
- ☐ Street sweeping
- ☐ Nutrient, pesticide, herbicide or other chemical application plan alternatives
- ☒ PPC Plans
- ☐ Non-structural Practices
- ☒ Restoration BMPs

☐ **Stormwater reuse technologies:**
- ☐ Divert rainwater into impoundment
- ☐ Underground storage

☐ Spray/Drip Irrigation

☐ **Other** _____

Are the ABACT BMPs selected sufficient to achieve no net change and assure that existing or designated surface water uses are protected?

☒ Yes ☐ No

If yes, Antidegradation analysis is complete.
If no, NOI Application will be returned to the Applicant.

SECTION J. COMPLIANCE HISTORY REVIEW

Is/was the applicant(s) in violation of any Department regulation, order, schedule of compliance or permit or in violation of any department regulated activities within the past five years?

☒ Yes ☐ No

If yes, provide the permit number or facility name, a brief description of the violation, the compliance schedule (including dates and steps to achieve compliance) and the current compliance status. (Attach additional information on a separate sheet, when necessary)

Permit Program or Activity: See Attachment 9 **Permit Number (if applicable):** _____

Brief Description of non-compliance:

Steps taken to achieve compliance	Date(s) compliance achieved

Current Compliance Status: ☐ In-Compliance ☐ In Non-Compliance

If in non-compliance, attach schedule for achieving compliance.

SECTION K. CERTIFICATION BY PERSON PREPARING E&S AND PCSM/SR PLANS

I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plans are true and correct, represent actual field conditions, and are in accordance with the 25 Pa. Code Chapters 78/78a and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Print Name Robert Simcik	Signature	Professional Seal
Company Tetra Tech, Inc.		
Address 661 Andersen Drive, Suite 200, Pittsburgh, PA 15220		
Phone 412-921-8163		
Most Recent DEP Training Attended	Location: Greensburg, PA	Date: 04/03/2014
e-Mail Address robert.simcik@tetratech.com		

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ROBERT F. SIMCIK
ENGINEER
PE-050435-E

EXPEDITED REVIEW PROCESS

In addition to the certification required above, applicants using the expedited permit review process must attach an E&S and PCSM/Site Restoration Plans developed and sealed by a licensed professional engineer, surveyor or professional geologist. The plans shall contain the following certification:

I do hereby certify to the best of my knowledge, information, and belief, that the E & S Control and PCSM/SR BMPs are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 / 78a and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SECTION L. APPLICANT CERTIFICATION

Applicant Certification

I certify under penalty of law, as provided by 18 Pa. C.S.A. § 4904, that this application and all related attachments were prepared by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my own knowledge and on inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. The responsible official's signature also verifies that the activity is eligible to participate in the ESCGP, and that the applicant agrees to abide by the terms and conditions of the permit. BMP's, E&S Plan, PPC Plan, PCSM Plan, and other controls are being or will be, implemented to ensure that water quality standards and effluent limits are attained.

I grant permission to the agencies responsible for the permitting of this work, or their duly authorized representative to enter the project site for inspection purposes. I will abide by the conditions of the permit if issued and will not begin work prior to permit issuance.

(For individuals no indication of title is necessary, choose the box below. All others proceed to the next paragraph)

☐ **Individual; proceed to signature portion.**

I hereby certify under penalty of law, as provided by 18 Pa. C.S.A. § 4904, that I am the person who is responsible for decision-making regarding environmental compliance functions for Enter Entity name, the manager of one or more manufacturing, production, or operating facilities of the applicant and am authorized to make management decisions which govern the operation of regulated facility including having explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure the applicant's long term environmental compliance with environmental laws and regulations; and I am responsible for ensuring that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements.

(choose one of the following; not applicable for individuals):

☐ The responsible corporate officer ☐ president ☐ vice president ☐ secretary
☐ treasure of _____ Corporation/Company
Entity name

☒ The ☐ member or ☒ manager of Energy Transfer _____ LLC
Entity name

☐ The general partner of _____ partnership/LP/LLP
Entity name

☐ The principal executive officer or ranking elected official of _____ Municipality/State/Federal/other public agency
Entity name

☐ Power of Attorney/delegation of contractual authority (documentation supporting delegation of contracting authority must be provided) for _____
Entity name

Matthew Gordon, Senior Director
Print Name and Title of Applicant

Signature of Applicant

4/22/2019
Date Application Signed

Jayme Fye, Project Manager
Print Name and Title of Co-Applicant (if applicable)

Signature of Co-Applicant

Date Application Signed

Notarization
Sworn to and subscribed to before me this
22ND day of APRIL, 2019

Ronald J. Furman
Notary Public

Commonwealth of Pennsylvania
County of _____

My Commission expires _____

AFFIX SEAL

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Ronald J. Furman, Notary Public
Spring Twp., Berks County
My Commission Expires April 4, 2020
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

(choose one of the following; not applicable for individuals):

☐ The responsible corporate officer ☐ president ☐ vice president ☐ secretary
☐ treasure of _____ Corporation/Company
Entity name

☒ The ☐ member or ☒ manager of Michels Pipeline LLC
Entity name

☐ The general partner of _____ partnership/LP/LLP
Entity name

☐ The principal executive officer or ranking elected official of _____ Municipality/State/Federal/other public agency
Entity name

☐ Power of Attorney/delegation of contractual authority (documentation supporting delegation of contracting authority must be provided) for _____
Entity name

Matthew Gordon, Senior Director
Print Name and Title of Applicant

_____
Signature of Applicant

_____
Date Application Signed

Jayme Fye, Project Manager
Print Name and Title of Co-Applicant (if applicable)

_____
Signature of Co-Applicant

4/24/19
Date Application Signed

Notarization
Sworn to and subscribed to before me this

_____ day of _____, 20_____

_____
Notary Public

AFFIX SEAL

Commonwealth of Pennsylvania

County of CHESTER

My Commission expires 10/28/2022

Commonwealth of Pennsylvania - Notary Seal
Michael J. Gaydosh, Notary Public
Indiana County
My commission expires October 28, 2022
Commission number 1227953
Member, Pennsylvania Association of Notaries

SECTION M. ADDITIONAL CONTACT INFORMATION				
Contact's Last Name	First Name	MI	Phone	412-921-8163
Simcik	Robert	F	FAX	412-921-4040
Mailing Address	City		State	ZIP + 4
661 Andersen Drive, Suite 200	Pittsburgh		PA	15220
e-Mail Address Robert.Simcik@tetratech.com				

ATTACHMENT 1:

Site Directions

Detailed Written Directions to the Site

Chester County

From the DEP South East Regional Office to Exton Junction Block Valve site (approximately 500 Lancaster Pike, Exton, PA 19341)

Head northwest on E Main St toward Swede St (0.3 mi). Turn left onto Markley St (0.1 mi). Continue onto US-202 S/William F. Dannehower Memorial Bridge (14.3 mi). Take the US-30 W exit toward Downingtown/Coatesville (0.2 mi). Keep left, follow signs for US-30 E/US-30 BUS/Exton/Frazer (0.3 mi). Turn right onto US-30 BUS/Lancaster Pike/Lincoln Hwy E. The drive for the Exton Junction Block Valve (500 Lancaster Pike) will be on the left approximately 1.6 miles down the road.

Delaware County

620 HDD Major Modification

From the DEP South East Regional Office to PA-453, Media, PA 19063

Turn right on East Main Street (1.1 mi), continue onto Ridge Pike (1.5 mi), merge onto I-476 S. Take I-476S (13.1 mi). Take Exit 5 onto US-1S (3.9 mi). Turn left onto PA-452S, the project is located on the east side of the road (1.1 mi).

From the DEP South East Regional Office to West Baltimore Pike Block Valve site (approximately 219 Lenni Road, Glen Riddle, PA 19063)

Head southeast on E Main St toward Strawberry Alley (1.6 mi). Continue onto E Ridge Pike (0.2 mi). Continue onto E Main St (0.2 mi). Continue onto Ridge Pike (0.7 mi). Slight right to merge onto I-476 S (0.2 mi). Merge onto I-476 S (13.2 mi). Take exit 5 to merge onto U.S. 1 S/Media Bypass (0.7 mi). Merge onto U.S. 1 S/Media Bypass (3.3 mi). U.S. 1 S/Media Bypass turns slightly right and becomes U.S. 1 S/W Baltimore Pike (1.0 mi). Turn left onto PA-452 S (0.6 mi). Slight right onto Lenni Rd. The entrance to the West Baltimore Pike Block Valve site will be on the right approximately 500 feet down the road.

ATTACHMENT 2:

Municipalities Table

Section didn't change as a result of the Major Modification

Municipalities

Pennsylvania Pipeline Project

SouthEast Region

County	Muncipality
Chester	Elverson Borough
	West Nantmeal Township
	East Nantmeal Township
	Wallace Township
	Upper Uwchlan Township
	Uwchlan Township
	West Whiteland Township
	East Whiteland Township
	West Goshen Township
	East Goshen Township
	Westtown Township
Delaware	Thornbury Township
	Edgmont Township
	Middletown Township
	Aston Township
	Brookhaven Borough
	Chester Township
	Upper Chichester Township

ATTACHMENT 3:

Water/Watershed Table

Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

Siltation Impairment highlighted

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Conestoga River	Chester	West Nantmeal	WARM WATER FISHES	WWF	Yes	Agriculture- Nutrients; Other- Nutrients; Other- Organic Enrichment/Low D.O.; Source Uknown- Pathogens	Yes	Nutrients; Organic Enrichment/Low D.O.
UNT to South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
UNT to Marsh Creek	Chester	West Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	East Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Wallace	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Wallace	WARM WATER FISHES	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	No	N/A
UNT to Valley Creek	Chester	Uwchlan	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
East Branch Chester Creek	Chester	West Whiteland	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
East Branch Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	West Goshen	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Chester	Westtown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	Westtown	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Ridley Creek	Delaware	Thornbury	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Thornbury	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation	No	N/A
Chrome Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Delaware River	Delaware	Aston	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Brookhaven	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Chester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Upper Chichester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Upper Chichester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Recieving Wetlands
Pennsylvania Pipeline Project
South-East Region

Municipality	Receiving Water	Number of Wetlands	Number of EV Wetlands (Classification)
CHESTER COUNTY			
West Nantmeal	UNT to South Branch French Creek	9	7 (EV Stream)
West Nantmeal	UNT to Marsh Creek	1	0
East Nantmeal	UNT to Marsh Creek	2	0
Wallace	UNT to Marsh Creek	6	0
Upper Uwchlan	UNT to Marsh Creek	18	0
Upper Uwchlan	UNT to Black Horse Creek	4	2 (Wild Trout/Bog Turtle)
Uwchlan	UNT to Shamona Creek	5	1 (Wild Trout)
West Whiteland	UNT to Valley Creek	17	0
West Whiteland	UNT to Chester Creek	2	0
West Goshen	UNT to Chester Creek	1	0
East Goshen	UNT to Chester Creek	2	0
Westtown	UNT to Chester Creek	1	0
DELAWARE COUNTY			
Edgmont	UNT to Chester Creek	6	0
Middletown	UNT to Chester Creek	18	2 (PuWS)
Middletown	UNT to Rocky Run	4	1 (Wild Trout)
Middletown	UNT to Chrome Creek	1	
Aston	UNT to Chester Creek	1	0
Aston	UNT to Baldwin Run	3	0
Chester	UNT to Baldwin Run	12	0
Chester	UNT to Chester Creek	2	0
Upper Chichester	UNT to Baldwin Run	14	0

ATTACHMENT 4:

Storm Sewer Operator Table

Section didn't change as a result of the Major Modification

Municipal Separate Storm Sewer Operators

Pennsylvania Pipeline Project

Southeast Region

MUNICIPALITY	TYPE	COUNTY	STATUS	PERMIT NUMBER	APPROVED
WEST WHITELAND	Township	Chester	Individual	PAI130530	2/18/2004
EAST GOSHEN	Township	Chester	Individual	PAI130520	2/23/2004
WEST GOSHEN	Township	Chester	Individual	PAI130532	2/13/2004
UPPER UWCHLAN	Township	Chester	Individual	PAI130527	2/19/2004
UWCHLAN	Township	Chester	Individual	PAI130505	2/19/2004
WALLACE	Township	Chester	Individual	PAI130529	2/18/2004
WESTTOWN	Township	Chester	Individual	PAI130528	2/23/2004
BROOKHAVEN	Borough	Delaware	General	PAG130125	2/10/2004
ASTON	Township	Delaware	General	PAG130122	2/23/2004
MIDDLETOWN	Township	Delaware	Individual	PAI130510	2/4/2004
THORNBURY	Township	Delaware	Individual	PAI130517	2/27/2004
EDGMONT	Township	Delaware	Individual	PAI130522	2/23/2004
UPPER CHICHESTER	Township	Delaware	General	PAG130082	1/28/2004
CHESTER	Township	Delaware	General	PAG130089	1/31/2004

ATTACHMENT 5:

Act 167 Tracking Table

Section didn't change as a result of the Major Modification

102-1 Block Valve and Pump Station PCSM Design Standard

Region	Site	Designed to meet regulator standards within 102.8(g)(2) and 102.8(g)(3) or Act 167	Act 167 compliance	Summary of Design Standard within Act 167 Plan
Block valve				
SWRO	Koontz Road	102.8(g)(2) and 102.8(g)(3)	Westmoreland County does not have an approved Act 167 Stormwater Management Plan	N/A
	Bush Road	102.8(g)(2) and 102.8(g)(3)	Westmoreland County does not have an approved Act 167 Stormwater Management Plan	N/A
	Newport Road	102.8(g)(2) and 102.8(g)(3)	Indiana County does not have an approved Act 167 Stormwater Management Plan	N/A
	Cooney Road	102.8(g)(2) and 102.8(g)(3)	Cambria County does not have an approved Act 167 Stormwater Management Plan	N/A
SCRO	Charger Highway	102.8(g)(2) and 102.8(g)(3)	Blair County does not have an approved Act 167 Stormwater Management Plan	N/A
	Valley Forge Road	102.8(g)(2) and 102.8(g)(3)	Blair County does not have an approved Act 167 Stormwater Management Plan	N/A
	Locke Mountain Road	102.8(g)(2) and 102.8(g)(3)	Blair County does not have an approved Act 167 Stormwater Management Plan	N/A
	High Street	102.8(g)(2) and 102.8(g)(3)	Blair County does not have an approved Act 167 Stormwater Management Plan	N/A
	Shade Valley Road	102.8(g)(2) and 102.8(g)(3)	Huntingdon County does not have an approved Act 167 Stormwater Management Plan	N/A
	Creek Road	Act 167	Cumberland County has a County-wide Act 167 with specific requirement for Lower Conodoguinet Creek watershed, where the block valve is located. The PCSM design at the Creek Road block valve has been designed for consistency with Cumberland County's approved Act 167 Plan. For more detail see the Cumberland County Act 167 verification report in Tab 5.	The Lower Conodoguinet Creek watershed has a 100% release rate. All design standards within Cumberland County's approved Act 167 Plan are met.
	Gates Road	Act 167	Dauphin County has a County-wide Act 167 plan with specific requirements for Spring Creek (East), where the block valve is located. The PCSM design at the Gates Road block valve site has been designed for consistency with Dauphin County's approved Act 167 Plan. For more detail see the Dauphin County Act 167 verification report in Tab 5.	This plan requires a 90% post development release rate for the 2, 10, and 25-year storm events. All design standards within Dauphin County's approved Act 167 Plan are met.
Pump Stations				
SWRO	Houston Injection	102.8(g)(2) and 102.8(g)(3)	N/A	N/A
	Delmont	102.8(g)(2) and 102.8(g)(3)	Westmoreland County does not have an approved Act 167 Stormwater Management Plan	N/A
	Ebensburg	102.8(g)(2) and 102.8(g)(3)	Cambria County does not have an approved Act 167 Stormwater Management Plan	N/A
SCRO	Mt. Union	102.8(g)(2) and 102.8(g)(3)	Huntingdon County does not have an approved Act 167 Stormwater Management Plan	N/A
	Doylesburg	102.8(g)(2) and 102.8(g)(3)	Perry County does not have an approved Act 167 Stormwater Management Plan	N/A
	Middletown	102.8(g)(2) and 102.8(g)(3)	N/A	N/A
	Beckersville	102.8(g)(2) and 102.8(g)(3)	Berks County does not have an approved Act 167 Stormwater Management Plan	N/A
SERO	Twin Oaks	102.8(g)(2) and 102.8(g)(3)	Delaware County does not have an approved Act 167 Stormwater Management Plan	N/A

ATTACHMENT 6:

RIPARIAN BUFFER WAIVER REQUEST INFORMATION

Attachment 6 - Riparian Buffer Waiver Request

Pennsylvania Pipeline Project -

South East Region: Spread 6

Major Modification-HDD 620

March 2019

Prepared for:

Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA

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

PENNSYLVANIA PIPELINE PROJECT - RIPARIAN BUFFER WAIVER REQUEST

The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. Since the LOD is not located in a special protection watershed the Riparian Forest Buffer requirements is not applicable.

ATTACHMENT 7: DOA for Matthew Gordon

Section didn't change as a result of the Major Modification

Delegated Individual: **Matthew L. Gordon, Principal Engineer**
Project: **Sunoco Pipeline L.P. – Mariner East Pipeline**

I, David R. Chalson, Vice President of Sunoco Logistics Partners Operations GP LLC, the General Partner of Sunoco Pipeline L.P. hereby delegate to the above listed individual, authority to sign air quality permit applications and reports, that are submitted to government agencies regarding operations for the Mariner East Pipeline Project. Such government agencies include, but are not limited to, the Pennsylvania Department of Environmental Protection and the U. S. Environmental Protection Agency.

David R. Chalson
Vice President
Sunoco Logistics Partners Operations GP LLC

(air)

Delegated Individual: **Matthew L. Gordon, Principal Engineer**
Project: **Sunoco Pipeline L.P. – Mariner East Pipeline**

I, David R. Chalson, Vice President of Sunoco Logistics Partners Operations GP LLC, the General Partner of Sunoco Pipeline L.P. hereby delegate to the above listed individual, authority to sign water quality permit applications and reports including Discharge Monitoring Reports that are submitted to government agencies regarding operations for the Mariner East Pipeline Project. Such government agencies include, but are not limited to, the Pennsylvania Department of Environmental Protection and the U. S. Environmental Protection Agency.

David R. Chalson
Vice President
Sunoco Logistics Partners Operations GP LLC

(water)

ATTACHMENT 8:
OFF SITE DISCHARGE ANALYSIS

Attachment 8 –Off Site Discharge Analysis

Pennsylvania Pipeline Project -

South East Region: Spreads 6

Major Modification-HDD 620

April 2019

Prepared for:

Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA

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

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1 Table 1 – Off-Site Discharge to Non Surface Water Locations

LIST OF ACRONYMS

ACRONYM	MEANING
BMP	Best Management Practice
E&SC	Erosion and Sediment Control
LOD	Limit of Disturbance
PCSM	Post-Construction Stormwater Management
ROW	Right of way

PENNSYLVANIA PIPELINE PROJECT – OFF-SITE DISCHARGES OF STOMRWATER TO AREAS THAT ARE NOT SURFACE WATERS

The Pennsylvania Pipeline Project involves the installation of two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, PA to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255 miles. Spread 6 (South East Region) of this project are cross through Chester and Delaware Counties, PA.

The HDD 620 Major Modification consists of a change in installation method for the 16 and 20-inch diameter pipeline previously permitted as Horizontal Directional Drill (HDD) 620. The permit request is to convert the installation method of both the 20-inch and portions of the 16-inch diameter pipelines from a HDD to a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad, conventional auger bore under Glen Riddle Road, and conventional open trench construction through Wetland WL-I1 and Stream S-I2. The change in methodology is to minimize impacts to Waters of the Commonwealth.

Throughout the length of the pipeline there are areas which propose to discharge stormwater to off-site areas other than a surface water. All of these discharges will be non-erosive to adjacent property owners and is detailed in the E&SC and PCSM plans per DEP Document No. 3140-FS-DEP4124. The locations of these discharges are detailed below.

PUMP STATIONS

The Major Modification contains no pump stations.

BLOCK VALVES

The Major Modification contains no block valves.

MAINLINE

There are several locations along the Major Modification length of the pipeline which have off-site discharges to areas other than surface waters and a list of these locations can be found in table 1. All of these discharges are from waterbars installed throughout the length of the pipeline installation. These water bars are designed in accordance with the PADEP's Erosion and Sediment Pollution Control Program Manual (363-2134-008) and the Pennsylvania Stormwater Best Management Practices manual (363-0300-002) and is a non-erosive discharge. Details of these measures can be found in the E&SC plan.

3. E&S REPORT AND ATTACHMENTS

Erosion and Sediment Control Plan

Pennsylvania Pipeline Project – Southeast Region: Spread 6

Major Modification-HDD 620

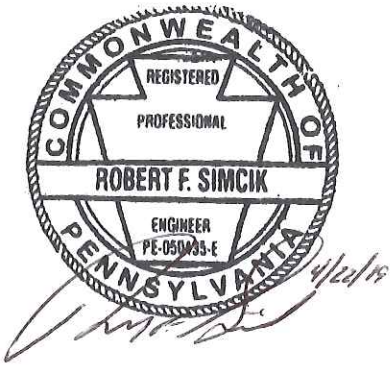
April 2019

Prepared for:

Sunoco Pipeline, L.P.
535 Fritztown Road
Sinking Spring, PA 19608

Prepared by:

Tetra Tech, Inc.
661 Andersen Drive
Pittsburgh, PA 15220



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9 Access Road Summary Table

10 Antidegradation Analysis

11 Planting Plans for Wetland Restoration

12 Geohazard Report

LIST OF ACRONYMS

ACRONYM	MEANING
% CCE	Calcium carbonate equivalent
% ENV	Effective neutralizing value
ABACT	Antidegradation Best Available Combination of Technologies
BMPs	Best management practices
CWF	Cold water fisheries
DELCORA	Delaware County Regional Water Quality Control Authority
E&S	Erosion and sediment
E&SC	Erosion and sediment control
EV	Exceptional value

FEMA	Federal Emergency Management Agency
HDD	Horizontal directional drill
HQ	High quality
LOD	Limit of disturbance
NGL	Natural gas liquid
OSHA	Occupational Safety and Health Administration
PA	Pennsylvania
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Access
PCSM	Post Construction Stormwater Management
PWS	Public water source
Pls	Pure live seed
ROW	Right of way
SPLP	Sunoco Pipeline, L.P.
SPPP	Sunoco Pennsylvania Pipeline Project
SWS	Surface water source
Tt	Tetra Tech, Inc.
TSF	Trout stock fishery
UNT	Unnamed tributary
USGS	United States Geological Survey
WWF	Warm water fisheries

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Erosion & Sediment Control (E&SC) Plan for Sunoco Pipeline, L.P. (SPLP) – Pennsylvania Pipeline Project, South East Region: Spread 6. Spread 6 (South East Region) of this project is located in Chester and Delaware Counties, Pennsylvania (PA). The plan addresses activities associated with a Major Modification to the Sunoco Pennsylvania Pipeline Project (SPPP) installation. The 620 HDD modification is located in Middletown Township, Delaware County. Site location maps are provided in Attachment 1. This E&SC Plan, if properly implemented, will provide for effective E&SCs throughout construction.

1.1 PROJECT DESCRIPTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL). The project involves the installation of approximately two parallel pipelines within a 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. The majority of the new ROW will be co-located adjacent to existing utility corridors, including approximately 230 miles of pipeline that will be co-located in the existing SPLP Mariner East pipeline system. The 20-inch pipeline will be installed first, followed by the 16-inch line. Any temporary stabilization required will be implemented in accordance with this Erosion and Sediment (E&S) Plan. Both pipelines will be installed within the same limit of disturbance (LOD) and in the same construction period. This E&S Plan specifically relates to impacts associated with the South East Region, Construction Spread 6.

Fifty feet will be maintained as permanent ROW. In addition, temporary use areas or extra workspaces will be required at some stream and road/railroad crossings; these will typically expand the construction ROW by 25 feet where needed. Construction activities will involve tree removal, clearing and grubbing within the ROW, trenching, pipe installation, and site restoration. The total LOD in the South East Region will be approximately 278 acres. Acres disturbed by county will be as follows: Chester County with 176 acres disturbed and Delaware County with 102 acres disturbed.

The HDD 620 Major Modification is is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad. Stream SC-I2 and wetland WL-I1 will be crossed in accordance with Chapter 105 Joint

Permit Application major modification, utilizing one of the approved open-trench excavation methods for installation of the pipeline across waterbodies. The modification includes an additional 5.32 acres of LOD. This E&S plan specifically relates to impacts associated with the proposed 620 Major Modification.

For a conventional lay, the pipelines would be installed within the same disturbance to the maximum extent practicable. For safety purposes, the installation would be staggered by what is estimated to be no more than 60 days. At some HDDs with longer drills, however, the time period between installation of the two pipelines may exceed 60 days. Any temporary stabilization required would be implemented in accordance with project's E&S Plans. Any permanent or temporary impacts associated with the second pipeline installation will be similar to the first installation.

There are locations where the Project lines (16" and 20") share the ROW with another Sunoco 8" line, and in some cases, the Project line will cross the Sunoco 8" line. The new lines are still expected to be installed underneath the existing line. If for some reason, the Project lines must cross over top of the Sunoco 8" line while still maintaining the minimum necessary cover, Sunoco will be able to stop flow through any line, as necessary, to facilitate safe access to their crossed line.

Past and present land use of the project area and surrounding area is agricultural and forested land. Future land use will be a maintained vegetated natural gas pipeline ROW and agricultural land and forested land. Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the gas line alignment are indicated on the plans, where applicable.

1.2 APPROACH AND OVERVIEW

This E&SC Plan was developed using Pennsylvania Department of Environmental Protection (PADEP) guidance documents and sound engineering judgment. When implemented properly, the E&SC practices identified herein will minimize uncontrolled surface water runoff from disturbed areas and minimize the migration of construction-generated sediment. The following general principals apply:

- Planning. Site topography, soil types, and potential effects of construction-related activities on E&S migration have been considered in developing this E&SC Plan. Areas of steep, erodible slopes and erodible soils, if encountered during construction activities, will not be disturbed without instituting proper engineering controls to minimize these concerns.

- Minimize Land Disturbance. To the extent possible and practical, disturbed areas and the duration of exposure to erosion elements will be minimized. Clearing of vegetation will be limited to only those areas of the site to be disturbed. To the extent possible and practical, existing vegetation will be retained and protected.

- Installation of Erosion and Sediment Controls. E&SC best management practices (BMPs) will be constructed, stabilized, and functional before earth disturbance activities begin within the tributary areas of those BMPs.

- Maintenance of Erosion and Sediment Controls. Until the site is stabilized, E&SCs will be properly maintained. Maintenance will entail inspections of E&SC features on a weekly basis and after runoff events. Preventative and corrective maintenance work, including clean out, repair, replacement, regrading, reseeding, and remulching will be performed as soon as practical. If E&SCs fail to perform as expected, replacements or modifications of those installed will be required.

- Stabilization of Disturbed Areas. If a cessation of earth disturbance activities lasts 4 days or longer, the site will be immediately seeded, mulched, or otherwise protected from accelerated E&S. BMPs will remain in place and be maintained until permanent stabilization is achieved. Disturbed areas will be stabilized as soon as is practical, including areas disturbed during the removal of BMPs. Temporary and permanent vegetation, mulch, gravel cover, repaving or a combination of these measures, will be employed immediately following the completion of backfilling and final grading activities. Any areas adversely impacted while acquiring access to the dig sites will be repaired to previous conditions.

- Floodplain. (See 25 Pa. Code § 105.1) – The lands adjoining a river or stream that have been or may be expected to be inundated by flood waters in a 100-year frequency flood. Unless otherwise specified, the boundary of the floodplain is as indicated on maps and flood insurance studies provided by Federal Emergency Management Agency (FEMA). In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodplain, it is assumed absent evidence to the contrary, that the floodplain extends from (1) any perennial stream to 100 feet horizontally from the top of the bank, and (2) from any intermittent stream to 50 feet horizontally from the top of the bank of such intermittent stream.

- Floodway – The channel of the watercourse and portions of the adjoining floodplains which are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet from the top of the bank of the stream (See 25 Pa. Code § 105.1). The FEMA boundary is shown on the E&S Sheets (Attachment 2), when this information is available. When this information is not available, the floodway is shown as defined above for perennial and intermittent streams only.

2.0 SITE DESCRIPTION

The South East Region of SPPP will involve the installation of a 20-inch and a 16-inch diameter NGL pipeline approximately 35 miles long, primarily across agricultural and forested areas from the western border of Chester County to the eastern portion of Delaware County. Past and present land use of the project area and surrounding area is agricultural and forested land. The 620 HDD Major Modification consists of a change in installation method of both the 20-inch and portions of the 16-inch diameter pipelines from a HDD to one conventional bore, two direct pipe bores, and open cut installation. The modificationincludes an additional 5.32 acres of LOD. Future land use will be a vegetated, maintained pipeline ROW and agricultural land and forested land.

Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the gas line alignment are indicated on the E&S plans, where applicable (Attachment 2). The E&S Plan Sheets also provide information regarding the typical controls and construction sequence to be followed. The construction details provided in Attachment 4 are the standard E&SCs to be used.

2.1 TOPOGRAPHY

The work zone is located on ground of varying elevations. Site elevations vary from 23 feet (Chester Creek in Delaware County) to 741 feet (western border of Chester County) above mean sea level based on the Pennsylvania Spatial Data Access (PASDA). The construction plans show the topography of the site and the surrounding area.

2.2 GEOLOGY AND SOILS

The soils and geologic formations surrounding the project are shown on the figures provided in Attachment 5. Attachment 5 also provides the soil descriptions and properties of the soils found at the site. Attachment 5 also provides the Void Mitigation Plan for Karst Terrain and Underground Mining. Attachment 12 is a geohazard evaluation of the HDD 620 Major Modification reroute which details and provides mitigation recommendations for documented and suspected landslides, steep slopes, karst features, and soils that are prone to slope failure. In general, the following actions will be taken to counteract soil limitations:

- E&S BMPs will be in place and functional prior to earth disturbance to counteract erodible soils. Prompt stabilization practices will be implemented.
- Cut slopes will be stabilized as soon as possible with seed and mulch or erosion control blanket to prevent sliding. Cut slopes are not designed to exceed 3:1.
- The pipeline being installed will be coated steel.

- If a high groundwater table is encountered, water will be drained away from disturbed areas to a well vegetated area or a placed compost filter sock prior to being discharged off the site. If dewatering is required during construction activities or diversion of a stream is required, the water will be pumped through a pumped water filter bag in accordance with the details provided. Saturated soils are to be dried prior to being used on site.
- Soils will be evaluated throughout the construction process to determine whether additional measures will need to be taken to make the soil suitable for its intended use on site.
- Where necessary, trench plugs will be used to prevent piping.
- Soil amendments will be added to site soils to promote vegetative growth.
- A wetland delineation and stream investigation has been conducted to determine the presence and location of hydric soils.
- If a sinkhole is encountered, repair should be done under the direct observation and supervision of a professional geologist or licensed geotechnical engineer. Site specific sinkhole repairs should be developed on a case by case basis.

In accordance with PADEP's guidance for avoiding and handling acid-producing rock formations encountered during site development, this plan has been prepared to address acid-producing rock formations which may be present at the Pennsylvania pipeline project. USGS topographic mapping shows that the pipeline traverses through areas that were previously strip mined.

PADEP recommends two strategies for handling acid-producing rock formations – avoidance and handling. Acid-producing rock formations will be avoided to the maximum extent practicable at the site. If coal or other acid-producing rock is encountered at the project site, the acid producing rock will either be removed from the site or handled onsite. If coal or other acid-producing rock must be handled on site is should be sampled and analyzed for total percent sulfur. The percent sulfur can be used to predict if the material is acid-producing and can also provide the ability to develop remedial strategies, such as using neutralizing agents and encapsulating with a layer of low permeability clay. Determination of percent sulfur shall be conducted in accordance with PADEP's guidance.

Soil Maps were generated and the soil types are shown on the Limiting Soil Characteristics Table of Attachment 5. **Detailed descriptions of the soil types are presented in Attachment 5.**

To prevent sediment from leaving the site, E&SCs will be in place and functional prior to earth disturbances, and stabilization practices will be implemented in disturbed areas as soon as practical. Geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance were not observed during field activities.

2.3 SURFACE WATER HYDROLOGY

The SPPP area surface water runoff drains to surface waters and unnamed tributaries (UNT's) designated as high quality (HQ), warm water fisheries (WWF), exceptional value (EV), cold water fisheries (CWF), and trout stock fisheries (TSF) under Pa. Code 25 Chapter 93. The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. This E&S plan contains Antidegradation Best Available Combination of Technologies (ABACT) BMPs to maintain the designated use of the receiving waters. The locations of the receiving waters relative to the project area can be seen on the USGS location map in Attachment 1 and the plan drawings in Attachment 2.

The proposed pipeline route has been designed to maximize the use of existing utility corridors, and minimize the number and linear footage of crossings of all surface waters, including those classified as High Quality (HQ) or Exceptional Value (EV). The Trenchless Construction Feasibility Study sets forth an analysis of the possible implementation of trenchless construction methods at each stream or wetland crossing, and indicates the use of trenchless crossing installation methods where feasible. For those surface water crossings crossed by the open cut installation method, the E&S Plan identifies and incorporates ABACT E&S best management practices (BMPs).

Descriptions of the Primary Receiving Waters are presented in Table 1.

3.0 EROSION AND SEDIMENT CONTROL PRACTICES

Two general types of E&SCs will be used on site during construction: stabilization controls and structural controls. Stabilization controls are implemented as needed to preserve existing vegetation or disturbed areas. Structural controls are used to divert or convey runoff, prevent sediment migration, and reduce the erosive runoff forces. For the purposes of this plan, structural controls are mainly temporary; however, some of the controls may be permanent. The following sections describe the construction sequence and the E&SCs.

3.1 CONSTRUCTION SEQUENCE

Refer to the E&SC plan drawings for the location of the proposed work and the associated BMPs. A generalized construction sequence is provided below. 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 soil erosion and sedimentation controls. Necessary parts 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 this report show detailed information on methods and materials. The contractor will comply with all requirements listed in this section. The contractor may be required to alter controls based on effectiveness of controls or differing conditions encountered in the field. A preconstruction meeting is required prior to the start of any construction activity. The PADEP, contractors, the landowner, appropriate municipal officials, and the E&S plan preparer must be invited to this meeting at least seven days in advance.

This E&SC Plan does not outline specific steps for the protocols for the construction of pipelines in regards to Health and Safety. A Site-Specific Health and Safety Plan should be developed and followed during the construction of the pipeline; however, general guidelines are attached as follows:

- **Attachment 6 includes OSHA Trenching and Shoring Tables and Construction Sequence.**
- **Attachment 7 includes OSHA Construction Standard 1926 Subpart P – Excavations**.

1. Make all appropriate modifications as indicated in general notes on plan sheet ES-0.01.
2. Flag or fence project limits of disturbance and approved access. Sign and flag wetland boundaries and streams.
3. Orange construction fence will be provided and installed at wetland areas adjacent to the LOD and not planned to be impacted to identify and deter construction equipment, vehicles and personnel from entering wetland.
4. Locate staging areas and access points including construction entrances. Install compost filter socks down slope of these areas.

5. Install rock construction entrances as needed. Refer to the rock construction entrance detail on plan sheet ES-0.05.

6. Construct the proposed access roads and implement temporary improvements as identified in access road summary table and detailed on the plan sheets.

7. Install compost filter socks as shown on the construction drawings. Installations sizing, and spacing must conform to the chart and details provided on plan sheet ES-0.05. Install temporary upslope diversions and temporary slope pipes as shown on plan sheets and details.

8. Clearing, grubbing, and topsoil stripping shall commence along the pipeline route and be limited to those areas described in each stage of the construction sequence. General site clearing, grubbing and topsoil stripping may not commence in any stage or phase of the project until the E&S BMPs specified by the bmp sequence for that stage or phase have been installed and are functioning as described in this E&S plan. For clearing, grubbing, and topsoil removal in all stream, river, wetland or other water body crossings, refer to construction sequence notes below. Topsoil will be segregated at locations throughout the project where topsoil exists.

9. Temporary waterbars or approved interceptor dykes will be installed along the alignment prior to pipe installation at the end of each work day. During the periods of time where pipe trench is open contractors will provide positive control of all storm water on site, temporary waterbars will be constructed by the end the work day, or during each work day if required contractor will install compost filter sock to control erosion until 70% vegetation growth has been achieved.

10. Minimize total area of disturbance. Maintain temporary soil stockpiles within existing soil erosion and sediment controls. Should excavation enter streams, follow specific details for these areas shown on the drawings and include the steps detailed in the specific sections below. Pullback areas for HDDs will be cleared and prepared as needed to support staging, welding and testing of the HDD pipe sections. Areas not utilized for construction activities should be avoided to minimize impacts.

11. Install pipe and trench plugs in accordance with details on plan sheet ES-0.07. When open cutting driveways and access roads, contractor shall have road plates available to maintain access for landowners. The 20-inch pipeline will be installed first, followed by the 16-inch line. Any temporary stabilization required between the two installations will be implemented in accordance with this E&S Plan. Both pipelines will be installed within the same limit of disturbance and in the same construction period.

12. For open-cut areas, the length of time required to clear and grade the area, excavate the trench, install the pipelines, backfill the trench and begin stabilization of disturbed areas will not exceed 30 calendar days for most installations. Longer time periods may be approved on a case-by-case basis.

13. Backfill excavated area and cover with topsoil (where topsoil was segregated).

14. Before restoration of grade, the second 16-inch pipeline will be installed. All temporary BMPs will be implemented between the two installations in accordance with the notes and details for temporary seeding and cover.

15. Restore grade to original surface elevations as soon as practicable following completion of installation of pipes. Install permanent waterbars in accordance with plan sheet ES-0.08. Immediately seed and mulch disturbed areas or prepare for paving in roadway areas.

16. Install erosion control blanket on all slopes 3:1 or greater and all areas, regardless of slope and within 100 feet of special protection waters or 50 feet of non-special protection surface waters. Locations are shown on plan sheets.

17. In areas that used stone or timber mats for temporary stabilization and/or access, the stone or mats will be removed and, if needed, the soil will be scarified or ripped to a depth of 8-12 inches to de-compact the soil. After reestablishing preconstruction contours, topsoil will be replaced to a minimum depth of 4-8 inches and seeded and mulched. Vehicular traffic after site restoration should be restricted from areas to prevent soil compaction.

18. Maintain erosion and sedimentation control devices until site work is complete and a uniform 70% perennial vegetative cover is established. Remove soil and erosion sediment control measures upon establishment of a uniform 70% perennial vegetative coverage over the disturbed area. Re-grade and revegetate areas disturbed during the removal of the soil erosion and sediment controls.

19. As part of the ongoing storm water bmp inspection and maintenance program any structural bmp recorded on this project will be inspected maintained, and repaired in accordance with the plan filed with the deed.

20. In accordance with 25 Pa code 102.7, upon completion of all steps in the construction sequence, a notice of termination form will be submitted to terminate the authorization of coverage indicating all activities under this permit have been completed.

21. For all EV wetland and stream crossings, SPLP will install the second pipeline immediately following the installation of the first pipeline, as long as no unanticipated, extraneous circumstances or safety issues are encountered. The two pipes will be installed in a single disturbance that will not require interim temporary stabilization/restoration.

For stream, river, wetlands or other water body utility crossings that will be open cut:

1. No work shall commence through a stream, river, wetlands or other water body during inclement weather.

2. A utility line crossing of a stream channel 10 feet in bottom width or less shall be completed within 24 hours from start to finish including trench backfill, stabilization of stream banks and stabilization of the area 50 feet back from the top of each stream bank.

3. A utility line crossing of a stream channel between 10 feet and 100 feet in bottom width shall be completed within 48 hours from start to finish including trench backfill, stabilization of stream banks and stabilization of the area 50 feet back from the top of each stream bank.

4. Wetland crossings are to be completed along with the mainline installation and will be dependent upon the length of the crossing.

5. Facilities for removing sediment from pumped water should be available at the stream crossing site before trenching commences and maintained until trench backfilling is completed. Assembly areas, temporary equipment and non-hazardous material storage areas shall be located at least 50 feet back from the top of any bank.

6. Install temporary equipment crossings at streams and temporary timber mats at wetland crossings in accordance with notes and details.

7. For dry stream crossings install pump bypass, dry flume, or cofferdam in accordance with notes and details.

8. Dewatering work area. Water from the excavation shall be pumped to a sediment filter bag. Where possible, excavation shall be from the top of the stream bank, where technically feasible.

9. Stabilize channel excavation and stream banks prior to redirecting stream flow.

For conventional and HDD bore crossings:

<u>Conventional bores</u>

1. Conventional bores will be conducted along with main line installation to limit the time of disturbance in those areas.

2. Install compost filter socks downgradient of the bore and receiving pits.

3. Excavate pits as shown in the typical stream crossing detail on plan sheet ES-0.17

4. Bore beneath streams where indicated on the construction drawings.

5. Water from the bore pits and work areas shall be pumped to a pumped water filter bag in accordance with detail on plan sheet ES-0.07.

6. Upon completion, backfill all pits.

HDD bores

1. Install compost filter socks at staging and pullback areas in accordance with E&S plan sheets. Where applicable temporary grading of staging areas is provided on plan sheets.

2. Bore and pullback areas shall be located a minimum of 50 feet back from each top of stream bank unless authorized by PADEP.

3. The HDD bore alignment shall be monitored for inadvertent returns. An inadvertent return plan has been developed for this project. This plan is to be reviewed, onsite, and implemented for each drill conducted.

4. Upon completion of HDD bore, restore bore and pullback areas to pre-construction conditions in accordance with E&S plans and details.

See Attachment 3 for the HDD Plans and Profiles.

For working within a wetland area:

1. Locate staging areas and access points. Staging areas should be located at least 50 feet from the edge of the wetland. Install sediment barriers down slope of these areas.

2. Install rock construction entrance as needed. Refer to the rock construction entrance detail on drawings for suggested dimensions.

3. Install orange flagging around perimeter of wetland and sediment barriers along the perimeters of the site as shown on the construction drawings.

4. Mats, pads, or similar devices shall be used during the crossings of wetlands. Original grades through wetlands must be restored after trenching and backfilling. Any excess fill materials must be removed from the wetland and not spread on-site.

5. Soil excavated from wetland areas shall be carefully removed with the roots intact. This soil should be placed in a separate stockpile to be reused during the wetland surface restitution.

6. Dewater work area; water from the excavation shall be pumped to a sediment trap or a filter bag.

7. Install pipe.

8. Install trench plugs in wetland areas to prevent the trench from draining the wetland or changing its hydrology.

9. Backfill pipe trench. Backfill the top 12-inches of the excavated trench with the stockpiled wetland soil to match original surface grades.

10. No soil amendments such as agricultural lime, fertilizer, etc. Will be used within wetland areas.

11. Compact backfill and grade the surface of the trench area to allow for positive drainage to soil erosion and sediment controls and to prepare disturbed areas for permanent trench restoration.

12. Maintain all erosion and sedimentation control devices until site work is complete and a uniform 70% perennial vegetative cover is established.

13. Remove all soil and erosion sediment control measures upon establishment of a uniform 70% vegetative cover over the disturbed area. Re-grade and revegetate areas disturbed during the removal of the soil erosion and sediment controls.

For temporary stream and wetland crossings:

1. Install temporary equipment crossings and temporary timber mat wetland crossings in accordance with plan sheet ES-0.10.

2. Temporary stream crossings shall be inspected on a daily basis. Damaged crossings shall be repaired within 24 hours of the inspection and before any subsequent use. Sediment deposits on the crossing or its approaches shall be removed within 24 hours of the inspection.

3. As soon as the temporary crossing is no longer needed, remove temporary crossing. All materials shall be disposed of properly and disturbed areas stabilized. Remove all soil and erosion sediment control measures upon establishment of a uniform 70% vegetation cover over the disturbed area.

3.2 BEST MANAGEMENT PRACTICES

An effective method to minimize E&S migration is to promote and implement BMPs. BMPs are relatively simple, inexpensive, and cost-effective protocols to prevent E&S migration. The basic BMPs that are anticipated to be employed during the construction activities include:

- Minimizing disturbances to site areas, especially those currently covered with pavement or vegetation.
- Minimize the time that soil is exposed.
- Prevent the runoff from flowing across disturbed areas (divert the flow to vegetated areas).
- Stabilize disturbed soils as soon as possible.

- Slow down the runoff flowing across the site.
- Remove sediment from surface water runoff before it leaves the site.

3.3 SEQUENCE OF BMP INSTALLATION

General stabilization and structural controls will be used in E&SC practices to (1) divert stormwater flows away from exposed areas, (2) convey runoff, (3) prevent sediments from moving off-site, and (4) reduce the erosive forces of runoff waters. Compost filter socks and other structural controls that will be utilized during construction activities will include the following:

Vegetative Stabilization Controls

Grounds disturbed by any of the operations necessary to complete the work for this project are to be permanently seeded, or if specified, sodded, unless occupied by structures or paved. A temporary cessation of earth disturbance activities that lasts for four days or longer requires temporary stabilization. Disturbed areas, which are at final grade, will be seeded and mulched immediately.

If seeding cannot be completed immediately after the area reaches final grade due to weather conditions, the disturbed area will be stabilized and mulched with straw at the rate of 3 tons per acre. This straw will be anchored using a method described under Mulching of this narrative.

Structural Controls

Temporary control facilities to be used during construction include the use of compost filter socks and rock construction entrances. Other structural controls as described below may also be used as deemed necessary based on conditions encountered in the field. Installation guidelines and locations for the below devices are as shown on standard drawings and plans. The temporary control measures that will be used on this project include, but are not limited to:

- Compost Filter Socks - This temporary sedimentation control measure consists of wood or metal posts driven through a compost filled mesh tube. Filter socks will be located as needed on side-slope and down-slope boundaries of disturbed areas. Both ends of each compost filter sock should be extended at least 8 feet upslope. Compost filter socks will be sized using the PADEP Construction Detail provided in Attachment 4. Compost filter socks will be used in drainage areas with HQ and EV waters.
- Rock Filter Outlet – Rock filter outlets will be used, as necessary, to address problems of concentrated flows to sediment barriers. In the event of unanticipated concentrated flow and sediment barrier failure, install a rock filter outlet unless the concentrated flow can be diverted away from the barrier. Rock filter outlets used in drainage areas with HQ and EV waters need a 6” layer of compost installed on the upslope side of the rock.

- Rock Filter – Rock filters are proposed to trap sediment in a newly constructed channel, diversion of channels, and at the inlet of pipe diversions.

- Compost Sock Sediment Trap - This temporary sedimentation control measure is useful in controlling runoff from access roads and may also be used at other locations where a temporary sediment trap is appropriate. The minimum base width will be equivalent to the height of the trap and sediment accumulation will not exceed 1/3 the total height of the trap. Ends of the trap will be a minimum of 1 foot higher in elevation that the mid-section, which will be located at the point of discharge. Compost sock sediment trap will be sized using the PADEP Construction Detail provided in Attachment 4. Compost sock sediment traps can be used in drainage areas with HQ and EV waters.

- Tarpaulin Covers - Tarpaulin covers will be used, as necessary, to protect topsoil storage stockpiles from wind and precipitation erosion. Stockpile slopes will be 2:1 or less. A minimal amount of soil will be stockpiled so that the height of the stockpile is less than 35 feet. Compost filter sock is also proposed to protect sediment runoff from stockpile areas.

- Rock Construction Entrance – Temporary access routes will be established on and proximate to the site to facilitate construction activities. The use of access routes will help confine truck and equipment traffic to specific corridors thus minimizing land disturbance and protecting vegetation. Site traffic during wet weather will be limited. No vehicles will be permitted in streams or rivers.

- Wash Racks – Wash racks will be used at rock construction entrances and will be designed to accommodate anticipated vehicular traffic. A water supply will be made available at wash racks to wash the wheels of vehicles exiting the site. Reasonable methods which are sanctioned by the PADEP as alternatives to installation of tire wash stations on public road access points for gathering pipeline projects in EV/HQ or siltation impaired watersheds include:

    1. For paved surface public roads: use of a vacuum truck sweeper or sweeper with a catch bin attachment.

    2. For dirt or gravel surface public roads: rigorous manual removal of mud/dirt from vehicle/equipment tires prior to exiting construction site, supplemented by immediate recover, by manual or mechanical means, of soil which may become discharged onto public roadways. Dust control and/or compaction via rolling of the dirt public road surface will be implemented as needed.

    A predicate for utilizing alternative 1 and 2 above is that the rock pad construction entrance must be extended to a minimum total length of 100 feet and will be constantly maintained including structure thickness to insure its effectiveness remains intact at all times.

Frequency of mechanical and/or manual controls will be dependent upon construction traffic intensity, weather, and soil moisture conditions. At a minimum for paved roads – any day in which construction traffic is exiting the rock construction entrance, the vacuum truck sweeper or sweeper with a catch bin attachment will clean the roadway at the end of the work day and prior to any forecasted rain event. The requirement is to not introduce sediment load from construction traffic onto public road surfaces and into road ditches which will flow into the EV/HQ or siltation impaired water resources which are the subject of the increased protection measures.

- Pumped Water Filter Bag – Pumped water filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. Compost filter socks will be installed within 50 feet of any receiving surface water or where grassy area is not available. Filter bags will be installed according to the details shown in the PADEP Construction Detail provided in Attachment 4.

- Erosion Control Blanket - A manufactured erosion control blanket will be installed on all slopes 3:1 or steeper and within 50 feet of surface water or 100 feet of special protected water. The blanket will be biodegradable but capable of providing protection for two growing seasons. Straw or similar fiber material will be placed between two biodegradable nets. The top net will be heavyweight and UV stabilized; the bottom net will be a lightweight netting. Erosion control blankets will be anchored and stapled in place in accordance with the manufacturer's recommendations and the detail on the construction drawings. For slopes between 3:1 and 1:1 use erosion control blanket SC 150 as manufactured by North American Green or Owner approved equal material or equal method. In areas where livestock is kept use erosion control blanket BioNet SC150BN as manufactured by North American Green or Owner approved equal material or equal method

- Waterbars – Waterbars will be installed across the ROW on all slopes greater than 5 percent. Waterbars will be constructed at a slope of 2 percent and discharge to a well-vegetated area. Waterbars will not discharge into an open trench. Waterbars will be oriented so that the discharge does not flow back onto the ROW. Obstructions (e.g. compost filter socks etc.) will not be placed in any waterbars. Where needed, they will be located below the discharge end of the waterbar. Waterbars will be installed in accordance with the detail provided in Attachment 4.

- Trench Plugs – Impervious trench plugs are required for all stream, river, wetland, or other water body crossings. Trench plugs are also used on slope run spacing. See drawings.

- Upslope Diversion Berms – Diversion berms are proposed to divert clean water runoff around the disturbed area for the project.

- Slope Pipes – Slope pipes are proposed to convey the water from the upslope diversion berms through the disturbed area. The slope pipes will outlet to a triple stack of compost filter sock to act as a level spreader to minimize outlet velocities so that they are non-erosive and dissipate flows.

- Water Deflectors – Water deflectors are proposed to direct runoff off of rock construction entrances and temporary access roads to discharge to stabilized vegetated areas. Compost filter socks can also be used at the outlet ends to trap sediment and minimize velocities.

- Public Rights of Way - In an effort to reduce the tracking of sediment onto public ROW, stabilized construction entrances of crushed stone located at points where traffic will be entering or leaving the site will be installed. Mud and soil accumulating on roadways, as a result of construction activities, will be removed with hand tools, such as shovels, and disposed of properly. The contractor will check the road a minimum of twice daily to verify cleanliness at road crossings and take necessary corrective action. Gravel will be used to limit dust and erodability.

- Restoration - All improved areas disturbed by construction will be restored.

- Additional Requirements – Any additional requirements to adequately control E&S pollution will be the responsibility of the contractor and will be considered incidental to construction activities.

3.4 PRIMARY CONSTRUCTION ACTIVITIES

Clearing and Grubbing

When required, brush, scrub growth, saplings and trees so directed to be cut and removed will be completely removed from the site of the work. The contractor will remove stumps and large roots and refill the depressions with suitable compacted earth fill where necessary to bring the grade back to its original elevation or final design grade. The contractor will protect exposed bare earth by mulch, or other appropriate measures if clearing and grubbing operations are completed more than two days prior to pipeline installation.

Vegetation clearing, grubbing, or removal within the permanent ROW is not anticipated to occur as part of the operations and maintenance of the pipelines to be installed via an HDD or bore except in the areas within the LOD, which is depicted in the plan drawings. However, in instances where the LOD extends into wetlands, floodplains, and floodways, no maintenance clearing, cutting, removal, or other alteration will occur. Instead, alternative methods of inspections (e.g., foot patrol) will be employed to maintain the pipeline ROW in wetlands, floodplains, and floodways.

Grading and Topsoil Stockpiling

Before beginning excavation and/or filling work, the topsoil from all areas to be affected will be stripped and stockpiled in a separate stockpile from the other excavated soil material. After completion of the major construction work, the topsoil will then be replaced as the upper layer of backfill. In general, all topsoil stockpiles will be located within the LOD away from nearby streams and/or drainage ditches or watercourses. Temporary erosion protection devices such as compost filter socks will be used to protect

all stockpiled topsoil from being carried into nearby water courses by the action of any overland runoff water.

As topsoil stockpiles become completely depleted, the disturbed areas will be graded and revegetated. The compost filter socks will be removed only after a uniform 70-percent perennial vegetative coverage has been established across the disturbed area.

Topsoil will not be placed when the subgrade is frozen or when it is excessively wet or dry, and will not be handled when in a frozen or muddy condition.

Vegetation

Grounds disturbed by any of the operations necessary to complete the work for this project are to be permanently seeded, unless occupied by structures or paved. *The disturbed areas will be restored to meadow conditions or to the pre-existing condition (residential lawn or previously existing paved, gravel, or dirt roads).* Any temporary cessation of earth disturbance activities which lasts for four days or longer requires temporary stabilization. Disturbed areas, which are at final grade, will be seeded and mulched immediately.

If seeding cannot be completed immediately after the area reaches final grade due to weather conditions, the disturbed area will be stabilized and mulched with straw at the rate of 3 tons per acre. This straw will be anchored using a method described under Mulching of this narrative.

Seeded areas will be inspected weekly and after each runoff event. Necessary repairs will be made by the end of the week.

Permanent Seeding

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SLOPES AND BANKS (NOT MOWED) WELL-DRAINED VARIABLE DRAINAGE	 1 PLUS 1 PLUS	 3, 5, 8, OR 12 (1) 3 OR 7
SLOPES AND BANKS (MOWED) WELL-DRAINED SLOPES AND BANKS (GRAZED/HAY) WELL-DRAINED	1 PLUS 1 PLUS	2 OR 10 2,3, OR 13

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
GULLIES AND ERODED AREAS EROSION CONTROL FACILITIES (BMPS)	1 PLUS	3, 5, 7, OR 12 (1)
SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS	1 PLUS	2, 3, OR 4
DRAINAGE DITCHES		
SHALLOW, LESS THAN THREE FEET DEEP	1 PLUS	2, 3, OR 4
DEEP, NOT MOWED	1 PLUS	5 OR 7
POND BANKS, DIKES, LEVEES, DAMS, DIVERSION CHANNELS, AND OCCASIONAL WATER FLOW AREAS		
MOWED AREAS	1 PLUS	2 OR 3
NON-MOWED AREAS	1 PLUS	5 OR 7
FOR HAY OR SILAGE ON DIVERSION CHANNELS AND OCCASIONAL WATER FLOW AREAS	1 PLUS	3 OR 13
HIGHWAYS (2)		
NON-MOWED AREAS		
WELL-DRAINED	1 PLUS	5, 7, 8, 9, OR 10
VARIABLE DRAINED	1 PLUS	3 OR 7
POORLY DRAINED	1 PLUS	3 OR 9
AREAS MOWED SEVERAL TIMES PER YEAR	1 PLUS	2, 3, OR 10
UTILITY ROW		
WELL-DRAINED	1 PLUS	5, 8, OR 12 (1)
VARIABLE DRAINED	1 PLUS	3 OR 7
WELL-DRAINED AREAS FOR GRAZING/HAY	1 PLUS	2, 3, OR 13
EFFLUENT DISPOSAL AREAS	1 PLUS	3 OR 4
SANITARY LANDFILLS	1 PLUS	3, 5, 7, 11 (1), OR 12 (1)
SURFACE MINES		
SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST)	1 PLUS	3, 4, 5, 7, 8, 9,11 (1) OR 12(1)
SEVERELY DISTURBED AREAS FOR GRAZING/HAY	1 PLUS	3 OR 13

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	SPECIES	SEEDING RATES – PLS (1)	
		MOST SITES	ADVERSE SITES
1 (2)	spring oats (spring), or 64 96	64	96
	annual ryegrass (spring or fall), or	10	15
	winter wheat (fall), or	90	120
	winter rye (fall)	56	112
2 (3)	tall fescue, or 75	60	75
	fine fescue, or 40	35	40
	kentucky bluegrass, plus 25 30	25	30
	redtop(4), or	3	3
	perennial ryegrass	15	20
3	birdsfoot trefoil, plus 6 10	6	10
	tall fescue	30	35
4	birdsfoot trefoil, plus	6	10
	reed canarygrass	10	15
5 (5)	Big Bluestem, plus	10	15
	tall fescue, or	20	25
	perennial ryegrass	20	25
6 (5,6)	Big Bluestem, plus	10	15

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	**SPECIES**	**SEEDING RATES – PLS (1)**	
		MOST SITES	ADVERSE SITES
	annual ryegrass	20	25
7 (5)	birdsfoot trefoil, plus	20	30
	Big Bluestem, plus	20	30
	tall fescue	20	25
8	flatpea, plus	20	30
	tall fescue, or	20	30
	perennial ryegrass	20	25
9 (7)	serecia lespedeza, plus	10	20
	tall fescue, plus	20	25
	redtop(4)	3	3
10	tall fescue, plus	40	60
	fine fescue	10	15
11	deertongue, plus	15	20
	birdsfoot trefoil	6	10
12(8)	switchgrass, or	15	20
	big bluestem, plus	15	20
	birdsfoot trefoil	6	10
13	orchardgrass, or	20	30
	smooth bromegrass, plus	25	35
	birdsfoot trefoil	6	10

1. Pure live seed (pls) is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds pls shown on the seed tag. Thus, if the pls content of a given seed lot is 35 percent, divide 12 pls by 0.35 to obtain 34.3 pounds of seed required to plant one-acre. All mixtures in this table are shown in terms of pls.

2. If high-quality seed is used, for most sites seed spring oats at a rate of two bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at one bushel per acre. If germination is below 90 percent, increase these suggested seeding rates by 0.5 bushel per acre.

3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.

4. Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.

5. Use for highway slopes and similar sites where the desired species after establishment is Big Bluestem.

6. Use only in extreme southeastern or extreme southwestern PA. Serecia lespedeza is not well adapted to most of PA.

7. Do not mow shorter than 9 to 10 inches.

8. If liming, fertilization, and preparation of seedbed are properly done and if care is taken to drill and cover the seed (or mulch applied), the rate for "most sites" should suffice. However, on eroded or coarse and poorly prepared seedbeds, particularly if the soil is very acidic or infertile, the rate for "adverse sites" should be used.

9. For seed mixtures 11 and 12, only use spring oats or weeping lovegrass (included in mix) as nurse crop.

In lawn areas, permanent cover will be established using the following PENNDOT seed mixture:

PENNDOT FORMULA B				
Seeding Rate	3 lbs. per 1,000 square feet			
Species	**% by Weight**	**Purity %**	**Minimum % Germination**	**Maximum % Weed Seed**
Kentucky Bluegrass	50	98	80	0.20
Perennial Rye	20	98	90	0.15
Red Fescue	30	98	85	0.15

PEM WETLAND SEED MIX		
ERNST CONSERVATION SEED MIX NO. ERNMX-122 FACW Meadow Mix		
Seeding Rate	20 lb per acre, or ½ lb per 1,000 sq ft	
Mix Type	Wet Meadow & Wetland Sites	
Species List	31%	Fox Sedge (Carex vulpinoidea)
	20%	Virginia Wildrye (Elymus virginicus)
	14%	Lurid (Shallow) Sedge (Carex lurida)
	5%	Green Bulrush (Scipus atrovirens)
	4%	Blue Vervain (Verbena hastate)
	3.5%	Wood Reedgrass (Cinna arundinacea)
	3%	Soft Rush (Juncus effuses)
	3%	Blunt Broom Sedge (Carex scoparia)
	3%	Hop Sedge (Carex luputina)
	2%	Sensitive Fern (Onoclea sensibilis)
	2%	Oxeye Sunflower (Heliopsis helianthoides)
	1%	Rattlesnake Grass (Glyceria Canadensis)
	1%	Woolgrass (Scirpus cyperinus)
	1%	Swamp Milkweed (Asclepias incarnata)
	1%	New England Aster (Aster novae-angliae (Symphyotrichum n.))
	1%	Flat Topped White Aster (Aster umbellatus (Doellingeria umbellate))
	0.5%	Joe Pye Weed (Eupatorium fistulosum)
	0.5%	Boneset (Eupatorium perfoliatum)
	0.5%	Ditch Stonecrop (Penthorum sedoides)
	0.5%	Narrowleaf Blue Eyed Grass (sisyrinchlum angustifolium)
	0.5%	Seedbox (Ludwigia alternifolia)

0.5%	Great Blue Lobelia (Lobelia siphilitica)
0.5%	Mud Plantain (Water Plantain) (Alisma subcordatum (A. plantago-aquatica))
0.5%	Square Stemmed Monkeyflower (Mimulus ringens)
0.4%	Bladder (Star) Sedge (Carex intumescens)
0.1%	Slender Mountainmint (Pycnanthemum tenuifolium)
Total 100%	

Planting Specifications for PFO or PSS Wetland Restoration Areas (see ES-0.17 for restoration detail)

Vegetation Planting Type	Size	Species [a]		Wetland Status [b]
Shrub Species	Two to three-foot whip[c]	*Alnus serrulata*	Smooth Alder	OBL
		Cornus amomum	Silky Dogwood	FACW
		Lindera benzoin	Spicebush	FAC
		Viburnum dentatum	Northern arrow-wood	FAC
Tree Species	Containerized (1-inch DBH)[c]	*Acer rubrum*	Red maple	FAC
		Betula alleghaniensis	Yellow Birch	FAC
		Platanus occidentalis	American Sycamore	FACW
		Quercus bicolor	Swamp White Oak	FACW
		Salix nigra	Black Willow	OBL

a – If the listed species is unavailable during planting, a comparable native substitute will be used.

b - USACE Eastern Mountains and Piedmont Wetland Status Trees and shrubs will be planted at a density of at least 400 plants/trees per acre in accordance with USACE guidance.

c - DBH = Diameter at breast height

Liming Rates

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

in regular lime. Note: When a soil test requires more than 8,000 pounds of lime per acre, the lime must be mixed into the top 6 inches of soil.

Fertilization Rates

Apply 10-20-20 at 600 pounds/acre, if top dressed or 1,000 pounds/ac, if incorporated, unless the soil test determines that the rate can be less than these minimums.

SOIL AMENDMENT APPLICATION RATE EQUIVALENTS				
Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yds.	
AGRICULTURAL LIME	6 TONS	240 LBS.	240 LBS.	or as per soil test; may not be required in agricultural fields
10-20-20 FERTILIZER	1,000 LBS.	25 LBS.	25 LBS.	or as per soil test; may not be required in agricultural fields

Temporary Seeding

Temporary grass cover will be established in the following areas:

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

2. Where vegetative filters must be established below filter bags, a minimum distance of 10 feet will be seeded down slope of the trap outlet.

Temporary Cover - Seed mixture for temporary cover will consist of 100-percent annual ryegrass. Seed will be applied at the rate of 40 lb per acre or as recommended by a local recognized seed supplier approved by the owner's representative. Prior to seeding, apply 1 ton of agricultural grade limestone per acre plus 10-10-10 fertilizer at the rate of 500 lb. per acre and work into soil.

Mulching

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

1. Straw mulch will be applied at the rate of three tons per acre. Chemically treated or salted straw is not acceptable as mulch.

2. Straw mulch will be anchored immediately after application by at least one of the following methods.

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

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

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

    D. Lightweight plastic, fiber, or paper nets may be stapled over the mulch according to the manufacturer's recommendations.

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

Protection of Streams and Wetlands

If a stream or wetland crossing or encroachment is required, work will be in accordance with all PADEP permits. Refer to E&SC detail sheets for stream and wetland crossing details for diversion of stream channel flow and protection of wetlands.

1. Contractor will minimize construction area through and along streams. When wetland areas are temporarily disturbed, isolate and stockpile soil for replacement after grading is completed.
2. Native stream bed material will be separated from other spoil for reinstallation after restoration (see the E&S Plan provided in Attachment 2). An evaluation was completed for sheer stress of stream flow against restored native stream bed material. If the evaluation indicated that the stream will not be stable with native material, then rip rap will be used. Site specific waterbody crossing and restoration plans providing direction for the installation of rip rap at these streams are included within the E&S Plans provided in Attachment 2. In these cases where rip rap is used and the stream bed is composed of rock, cobble, or gravel, then the native stone will be used for the top six inches of rip rap. Every effort will be made to segregate the entire top layer of native stone in streams with less than six inches of native stone where rip rap is proposed.

Furthermore, stream restoration will involve the application of rip rap for bank stabilization must comply with site specific drawings included within the E&S Plan provided in Attachment 2. Rip rap will be used to the minimum extent necessary to stabilize the stream bank, which is typically no more than 12 inches above the normal flow depth often evidenced by a lack of vegetation or a strand line. Stream banks above this elevation will be stabilized with erosion control blanket and revegetated.

3. Immediately upon completion of encroachment or crossing, stabilize stream bed and banks (i.e. seeding, erosion blanket, and native substrate material) prior to removal of temporary E&SC devices.
4. Should excavation extend to within 50 feet of the stream bank, construct compost filter socks (Standard Details on construction plans) parallel to the stream, a minimum of 1 foot beyond disturbed earth, to protect the stream. Disturbed areas within 50 feet of a stream or wetland will be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized. Seed and mulch all disturbed areas.

Temporary Stream and Wetland Equipment Crossings

No vehicular traffic will be permitted in the streams at any time during construction.

If crossing a stream by vehicles is required to facilitate construction, a temporary stream crossing will be installed for this purpose. Work will be in accordance with PADEP Permit Requirements.

Travel Lanes

Portions of the project LOD have been identified as travel lanes. These areas exist along the project ROW and will be used for travel between HDD workspaces. Some of these areas will also be mechanically-cleared of trees and brush to improve travel and/or line-of-sight for HDD activities. For travel lanes involving mechanical clearing, the LOD limits have been sighted outside of wetlands and most floodplains and floodways. For any portions of the travel lanes that are crossing resources, an equipment bridge/working platform will be installed per details provided in the E&S Plan Sheets (Attachment 2).

Travel lanes have also been labeled on the E&S Plan Sheets and designated as either “ROW-Travel LOD” (temporary impacts) or “ROW-Travel and Clearing LOD” (permanent impacts). Necessary E&S control have been added as well.

Minimization of Soil Compaction

Pre-construction planning and final design has reduced the LOD, and therefore the area subjected to compaction, to the maximum extent while allowing safe installation of the pipeline. During construction, all land disturbance is limited to the defined LOD. Within the LOD, contractors are to minimize land disturbance to the maximum extent. Repeated travel is restricted to travel lanes and travel throughs are limited to those

necessary to complete the work. Implementation of construction sequencing ensures the number of passes with equipment and duration of the project is minimized. In wetlands and other sensitive areas, the installation of timber mats (or equal such as composite matting), and limiting equipment and vehicle travel, ensures compaction is minimized. In addition, top soil segregation and restoration BMPs offer significant protection to the layer most vulnerable to compaction. Upon completion of pipeline installation and trench backfill, replace segregated topsoil to pre-construction grades. Contractor is to take every precaution to minimize compaction during placement of topsoil. Provide surface roughening in accordance with PADEP E&S Pollution Control Program Manual. Surface roughing is the practice of providing a rough soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. During the preparation for seeding on slopes 3H:1V or steeper, unless a stable rock face is provided, surface roughening is to be conducted by tracking the slopes by running tracked equipment (with blades up) across the surface as to leave track marks parallel to the contour. Any area where stone and/or timber mats are used for temporary stabilization, soil will be decompacted through multiple passes using tracked equipment to roughen the surface. The tracking method can be used elsewhere to aid in the decompaction of soils as deemed necessary to facilitate successful restoration. This tracking method can be used on the subsoil before topsoil replacement and/or on the topsoil prior to seeding. In agricultural areas, severely compacted areas are to be plowed with a harrow, paraplow, paratill or other equipment before subsoil replacement. Vehicular traffic is to be restricted from areas that are ready to be seeded.

A note consistent with the Department's Manual will be included on all construction plans which states that any area that used stone and/or timber mats for temporary stabilization and/or access will be completely removed, soil will be decompacted by using tracked equipment making multiple passes over area, reestablish preconstruction contours, and replace topsoil to a minimum of 4-8 inches deep and seed and mulch areas. Vehicular traffic should be restricted from areas to prevent soil compaction.

Waste Considerations

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with the PADEP's solid waste management regulations at 25 Pa. Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. Expected construction wastes will consist of packaging material and sediment cleaned from BMPs. Packaging from the materials brought on site will be disposed of by a licensed hauler. Sediment removed from BMPs will either be spread in a protected area to dry and then recycled as fill material or disposed of off-site. In cases where disposal is necessary, waste materials are to be disposed of at an approved PADEP waste disposal site.

Thermal Impacts

Thermal impacts are most commonly associated with urbanization (i.e., increased impervious surfaces) that results in heated stormwater runoff flowing into receiving waters where it mixes, and potentially increases the base temperature of the surface water in streams. However, another contributing factor for stream temperature is solar exposure (radiant energy input) to the surface water, typically ponded, standing waters. The amount of heat transferred, and the degree of thermal pollution is of importance for fisheries management and the ecological integrity of receiving waters. Among the attributes that determine the contribution of solar energy to thermal impacts are the presence of riparian vegetation, as well as stream width, depth, flow regime (perennial, intermittent, ephemeral), and orientation. However, a singular linear crossing of minimal width and vegetation clearing is not considered a contributing factor to thermal impacts.

Potential pollution to surface waters from thermal impacts will be minimized by minimizing the clearing of riparian vegetation at stream crossings along the ROW and avoiding the addition/creation of impervious surfaces in riparian areas, The Project does not have thermal impacts. Following construction, permanent seeding will occur as soon as practicable to facilitate vegetative growth during germinating months.

Specifically, thermal impacts will be avoided by implementing the following:

- Siting parallel to and overlapping with existing ROWs to minimize vegetation clearing at stream crossings;
- Reducing the construction ROW width and additional temporary workspaces at stream crossings;
- No grubbing, grading, or clearing of trees will occur within 50 feet of the top of stream bank until pipeline construction/installation is ready to proceed through that area.
- Restoring (seeding) disturbed areas/ROW as soon as practicable and /or directing runoff to vegetated areas to reduce the temperature of runoff prior to discharge into the streams; and,
- Restoring the stream banks and seeding/planting as soon as practicable to facilitate vegetative growth along the stream channel.

Riparian Forest Buffers

A separate waiver request has been prepared and is provided as Attachment 6 to the NOI application. The following summarizes that request. The Pennsylvania Pipeline Project qualifies for an exemption of the riparian forest buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area. Existing riparian forest buffers within the project area are identified on the E&S plan drawings in Attachment 2 of the E&S Plan.

In addition to the exemption, we are requesting a waiver under 102.14(d)(2)(ii) for areas within 150' of surface waters that are outside of the Chapter 105 permit area.

Demonstration of Waiver Necessity

A riparian forest buffer waiver is necessary to complete the intended scope of the pipeline project. The project is from Houston to Delmont, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. The project crosses through Chester County for approximately 23.6 miles, and Delaware County for approximately 11.4 miles. Due to the linear nature of the project and the surrounding topography, riparian forest buffers could not be avoided altogether.

Alternatives Analysis

Impacts to environmental resources, including riparian forest buffers, were evaluated during the pipeline routing phase of the project. Field teams were deployed to evaluate alternate routes based on environmental and constructability constraints. The final route that was selected minimizes environmental impacts to the maximum extent practicable while still maintaining the project's overall constructability and ensuring a safe working environment while also taking landowner constraints into consideration. Additionally, several variations of horizontal direction drill profiles were evaluated to minimize pullback areas, additional workspaces, and overall disturbance within riparian forest buffers.

Demonstration of Minimizing Impacts

All disturbance activities, including those which impact riparian forest buffers, have been reduced to the maximum extent practicable. The LOD has been reduced to 50 feet wide at all stream crossings within the riparian forest buffer area where possible adjacent to the stream area required for crossing and construction. In areas where it is not practicable to reduce the LOD throughout the entire extent of the riparian forest buffer, the LOD has been reduced to 50 feet wide within 10 feet of the stream banks to limit the proximity of the work areas as per the stream crossing detail from the PADEP manual. The operations within the LOD near stream crossings typically includes a topsoil stockpile, a stockpile for pipe trench excavation material, a pipe trench, a travel lane, a work area for equipment operation and pipeline welding outside the trench, and an area to install the erosion control BMPs. In addition, site conditions such as steep slopes, varying depths of topsoil, and other on-site conditions limit the amount of work area. Reducing the LOD to a greater extent could potentially result in unsafe working conditions and would hinder the ability to complete the stream crossing within the required time frame of 24 hours or less. Workspaces that provide additional space for stream crossing activities have been placed outside of riparian forest buffers where possible.

Meeting Requirements of Chapter 102

All other requirements of Chapter 102 to minimize impacts to riparian buffers are being met in the project's Erosion and Sediment Control Plan and Site Restoration/Post-Construction Stormwater Management Plans which have been designed in accordance with Chapter 102 and in HQ/EV watersheds to implement ABACT controls where non discharge alternatives do not exist. In accordance with Chapter 102, and E&S plan has been developed to minimize the sediment entering the buffer areas through the use of properly designed E&S bmp's such as, but not limited to, waterbars, compost filter sock, diversion berms, slope pipes and erosion control blanket. A site restoration plan is proposed to revegetate the buffer areas within the right of way. The post construction stormwater management plan has been designed to control runoff rate and volume at permanent above ground facilities through infiltration practices.

Stormwater Runoff Analysis

The pre-construction drainage patterns surrounding the project will be maintained. All disturbed areas within the Major Modification LOD will be restored to a meadow in good condition or lawn where required by landowners. As a result of restoring the pipeline ROW and associated workspaces associated with the Major Modification to a meadow in good condition and maintaining pre-construction drainage patterns, there will be no increase in stormwater runoff rate or volume attributed to those areas.

3.5 MAINTENANCE AND INSPECTION PROCEDURES

Maintenance to the temporary E&SC structures will be performed by the contractor during the construction period. A log or written report showing dates that E&S bmp's were inspected as well as any deficiencies found and the date they were corrected shall be maintained on the site and be made available to regulatory agency officials at the time of inspection.

Compost Filter Socks

- Accumulated sediment will be removed as required, and in all cases where uniform accumulations are half the above ground height of the filter sock. Any accumulated earth behind the filter sock will be disposed of by the contractor in such a manner that the removed earth will not be excessively eroded and transported into a waterbody.

- The filter sock/silt fence installation will be inspected weekly and after every runoff event. Loosened support stakes will be removed and new stakes driven. Filter socks will be maintained and repaired as per manufacturer specifications.

- Temporary E&SCs will be removed by the contractor only after a uniform 70-percent perennial vegetative coverage has been established across the disturbed area. Temporary E&SCs will be disposed of by the contractor at an approved PADEP waste disposal facility.

Rock Construction Entrances

- Rock construction entrance thickness will be constantly maintained to the specified dimensions by adding rock. A stockpile will be maintained on site for this purpose.

Access Road

- The proposed access roads will be inspected weekly and after runoff events. Additional aggregate will be applied to the road as needed to maintain an adequate thickness, and ruts will be smoothed to prevent channelizing flow.

Water bars

- Water bars will be inspected weekly, daily on active roads, and after each runoff event.
- Damaged or eroded water bars will be restored to original dimensions within 24 hours of inspection.
- Maintenance of water bars will be provided until roadway, skid trail or ROW has achieved permanent stabilization.

Pumped Water Filter Bags

- Filter bags will be replaced when they become half full of sediment.
- Filter bags will be inspected daily. If any problem is detected, pumping will cease immediately and not resume until the problem is corrected.

Vegetation

Seeded areas will be inspected weekly and after each runoff event. Necessary repairs will be made immediately.

Mulch

Mulched areas will be checked periodically and after severe storms for damage until the desired purpose of the mulching is achieved. Damaged portions of the mulch or tie-down material will be repaired upon discovery.

Inspection and Maintenance

Until the site is stabilized, E&SC BMP's will be maintained properly. Preventative and corrective maintenance work, including clean-out, repair, replacement, regarding, reseeding, mulching, and reknitting will be performed as soon as practical. If E&SC BMP's fail to perform as expected, replacement BMP's, or modifications to those installed will be required. The following inspection and maintenance practices will be used to maintain E&SCs on-site during activities.

- E&SC measures will be in-place and inspected at the end of the workday. E&SC measures will also be inspected after each runoff event. The contractor will immediately repair any deficiencies.
- Maintenance and inspection of sediment control facilities will conform to PADEP Chapter 102 and 105 rules and regulations.
- Sediment will be removed when it accumulates half the aboveground height of the compost filter sock. All undercutting of erosion of the toe anchor will be repaired with compacted backfill material. The contractor will adhere to the manufacturer's recommendations for replacing filter socks due to weathering.
- Sediment removed from filter socks and any other control devices will be mixed in with the other waste soil on the construction site and properly disposed of as discussed in Section 3.4.
- Sediment will be removed from the sediment removal facilities associated with wash racks as necessary. Sediment deposited on paved roadways will be removed and returned to the construction site daily, at a minimum.
- Re-vegetated areas will be inspected for bare spots, washouts, and healthy growth during the construction. Identified bare spots and washouts will be repaired as soon as practical.
- All soil stockpiles that are to remain more than 4 days will be seeded with temporary grass, as noted in the seeding specification on the construction drawings.
- The contractor will make certain that all runoff is directed to the sedimentation control devices.
- All sedimentation control measures will remain in place until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established. Any area not achieving a 70-percent vegetative cover will be re-seeded and mulched within 24 hours of detection.

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

3.6 ANTIDEGRADATION

The Major Modification LOD is not located in a special protection watershed; therefore, the antidegradation analysis is not required. Non-discharge alternatives were evaluated to minimize accelerated E&S and achieve zero net change in runoff between the pre- and post-construction conditions. Non–discharge alternatives exist when the existing land use is re-vegetated and grade is restored, and therefore no increase in runoff rate or volume from pre- to post-construction results. Other non-discharge alternatives implemented are limiting and minimizing the extent of disturbed areas and limiting the extent and duration

of disturbance (phasing and sequencing), then stabilizing disturbed areas as soon as practicable. ABACT BMPs will be used onsite to protect and maintain the existing water quality of receiving waters also in areas where non-discharge alternatives exist.

4.0 SITE RESTORATION PRACTICES

Following completion of pipeline installation and trench backfilling, the pipeline right of way, associated workspaces, and temporary access roads shall be returned to the general grade present prior to pipeline installation to maintain pre-construction drainage patterns. After completion of major construction work, topsoil that was stockpiled during construction will be placed along the ROW. Grounds disturbed by any of the operations necessary to complete the work for this project within the ROW are to be permanently seeded, or if specified, sodded, unless occupied by structures, paved, or designated as a permanent access road. Disturbed areas, which are at final grade, shall be seeded and mulched once final grades are achieved. The permanent seed mixture will restore disturbed areas to a meadow in good condition or better. If seeding cannot be completed within a four (4) day period due to weather conditions, the disturbed area will be mulched with straw at the rate of three (3) tons per acre. This straw will be anchored using a method described in Section 3.4.

4.1 BMP DESCRIPTION AND CONSTRUCTION SEQUENCE

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action to conform to the applicable regulatory agency requirements for restoration and post-construction stormwater management of the site. Necessary steps for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. The contractor will comply with all requirements listed in this section. The contractor may be required to alter controls based on the effectiveness of controls or differing conditions encountered in the field. The appropriate county conservation district and DEP shall be contacted and must approve any deviation to the authorized plans.

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

General Construction Sequence

1. Grade surface to finished grade elevations as soon as practicable following completion of pipe installation.

2. Surface roughening will be utilized to rough the soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are

recommended. Surface roughening shall be accomplished using dozers affixed with grouser tracked equipment. Dozers shall run up and down the slopes leaving horizontal grooves perpendicular to the slope. Dozer blades shall be raised and not used during surface roughening. Where compaction does occur, contractor shall scarifiy the soil or provide additional roughening such as deep ripping or chisel ripping to restore the area to a minimal compacted state. In areas of proposed infiltration, soils shall be amended to 2' below grade. See Soil Amendment and Restoration construction sequence below.

3. Place topsoil from topsoil stockpiles as the upper layer of backfill. Topsoil shall not be placed when the subgrade is frozen or when it is excessively wet or dry and shall not be handled when in a frozen or muddy condition.

4. Remove gravel and geotextile from the temporary access roads and scarify the soil. Refer to step 2 of this sequence to address compaction at access roads. After addressing compaction concerns, place topsoil that was stripped prior to installation of the access roads.

5. Immediately seed and mulch disturbed areas in accordance with the permanent seeding schedule once final grade is established and topsoil is placed.

6. Maintain erosion and sedimentation control devices until site work is complete and a uniform 70-percent perennial vegetative cover is established. Regrade and revegetate areas disturbed during the removal of the erosion and sediment controls.

Soil Amendment and Restoration Construction Sequence

1. Grade surface to finished grade elevations as soon as practicable following completion of pipe installation.

2. In the designated soil amendment area, till the ground and mix in the compost at a ratio of 2:1 (soil:compost) to a depth of 24 inches.

3. Immediately seed and mulch disturbed areas once final grade is established in accordance with the permanent seeding schedule.

4. Maintain erosion and sedimentation control devices until site work is complete and a uniform 70% perennial vegetative cover is established.

5.0 HYDROSTATIC TESTING AND ASSOCIATED PERMITTING

There are no hydrostatic testing locations impacted as a result of the HDD 620 Major Modification.

6.0 REFERENCES

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

Stormwater Management for Construction Activities - Developing Pollution Prevention Plans and Best Management Practices, United States Environmental Protection Agency, Office of Water, 1993.

Pennsylvania Stormwater Best Management Practices Manual Draft, Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, October 2009.

Downingtown, Elverson, Pottstown, Wagontown, Malvern, West Chester, and Media Quadrangles, Pennsylvania – Chester County, Geological Survey, United States Department of Interior.

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

DCNR, 2016. *Invasive Plants in Pennsylvania, Crown Vetch,* Coronilla varia. Accessed October 25, 2016. http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010284.pdf.

TABLE 1:

Receiving Waters

Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

Siltation Impairment highlighted

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Conestoga River	Chester	West Nantmeal	WARM WATER FISHES	WWF	Yes	Agriculture- Nutrients; Other- Nutrients; Other- Organic Enrichment/Low D.O.; Source Uknown- Pathogens	Yes	Nutrients; Organic Enrichment/Low D.O.
UNT to South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
UNT to Marsh Creek	Chester	West Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	East Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Wallace	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Wallace	WARM WATER FISHES	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	No	N/A
UNT to Valley Creek	Chester	Uwchlan	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
East Branch Chester Creek	Chester	West Whiteland	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
East Branch Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	West Goshen	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Chester	Westtown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	Westtown	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Ridley Creek	Delaware	Thornbury	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Thornbury	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation	No	N/A
Chrome Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Delaware River	Delaware	Aston	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Brookhaven	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

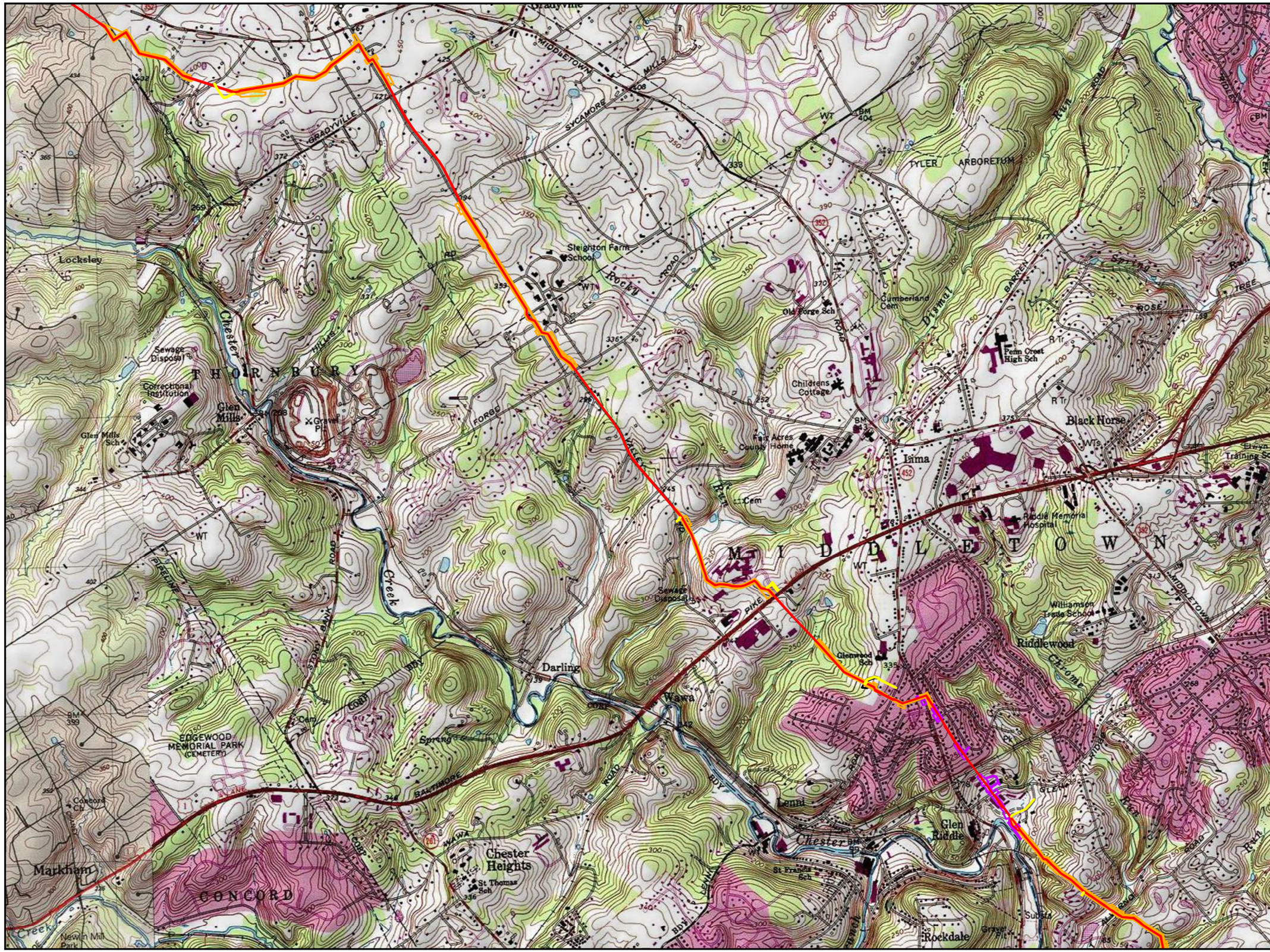
Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Chester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Upper Chichester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Upper Chichester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Recieving Wetlands
Pennsylvania Pipeline Project
South-East Region

Municipality	Receiving Water	Number of Wetlands	Number of EV Wetlands (Classification)
CHESTER COUNTY			
West Nantmeal	UNT to South Branch French Creek	9	7 (EV Stream)
West Nantmeal	UNT to Marsh Creek	1	0
East Nantmeal	UNT to Marsh Creek	2	0
Wallace	UNT to Marsh Creek	6	0
Upper Uwchlan	UNT to Marsh Creek	18	0
Upper Uwchlan	UNT to Black Horse Creek	4	2 (Wild Trout/Bog Turtle)
Uwchlan	UNT to Shamona Creek	5	1 (Wild Trout)
West Whiteland	UNT to Valley Creek	17	0
West Whiteland	UNT to Chester Creek	2	0
West Goshen	UNT to Chester Creek	1	0
East Goshen	UNT to Chester Creek	2	0
Westtown	UNT to Chester Creek	1	0
DELAWARE COUNTY			
Edgmont	UNT to Chester Creek	6	0
Middletown	UNT to Chester Creek	18	2 (PuWS)
Middletown	UNT to Rocky Run	4	1 (Wild Trout)
Middletown	UNT to Chrome Creek	1	
Aston	UNT to Chester Creek	1	0
Aston	UNT to Baldwin Run	3	0
Chester	UNT to Baldwin Run	12	0
Chester	UNT to Chester Creek	2	0
Upper Chichester	UNT to Baldwin Run	14	0

ATTACHMENT 1:

USGS Location Maps

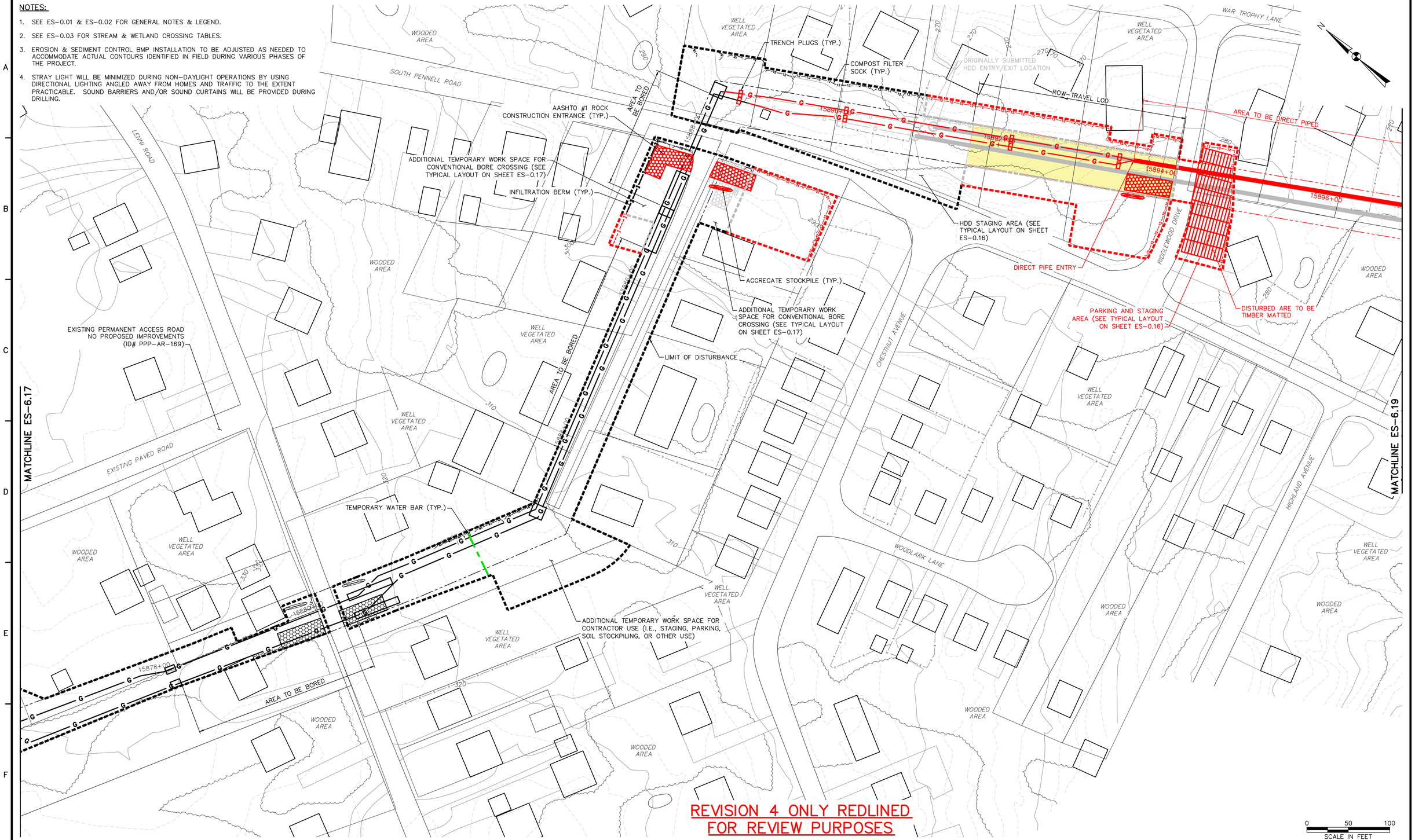

Legend
Access Road
Major Modification LOD
Previously Approved LOD
Alignment Centerline
Block Valve/Station
Sheet Identifier
Feet
0
1,000
2,000
Meters
0
300
600
N
PROJECT LOCATION MAP
ATTACHMENT 1-5
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY,
PENNSYLVANIA
TETRA TECH
Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangle(s) displayed are Media, West Chester.
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESC\GP\PENNPIPELINE_60\MAJORMOD_ESCGP_USGS.MXD 04/18/19 TT
Middletown
Lima
Black Horse
Riddlewood
Glen Riddle
Rockdale
Chester Heights
Darling
Wawa
Lenni
Chester
Glen Mills
Thornbury
Concord
Markham
Edgewood Memorial Park (Cemetery)
Tyler Arboretum
Chester Creek
Sewage Disposal
Correctional Institution
Sleighton Farm School
Old Forge Sch
Cumberland Cem
Childrens Cottage
Fair Acres County Home
Penn Crest High Sch
Riddle Memorial Hospital
Williamson Trade School
Glenwood Sch
St Thomas Sch
St Francis Sch
Elwyn Training Sch
Locksley
Broomall
Ardmore
West Chester
Kennett Square
Hockessin
Wilmington

ATTACHMENT 2:

E&S Plan Sheets

NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
4. STRAY LIGHT WILL BE MINIMIZED DURING NON-DAYLIGHT OPERATIONS BY USING DIRECTIONAL LIGHTING ANGLED AWAY FROM HOMES AND TRAFFIC TO THE EXTENT PRACTICABLE. SOUND BARRIERS AND/OR SOUND CURTAINS WILL BE PROVIDED DURING DRILLING.



REVISION 4 ONLY REDLINED FOR REVIEW PURPOSES

TETRA TECH

www.tetratech.com

661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	8/16/18	16" HDD MODIFICATION
4	RS	3/11/19	HDD CONVERTED TO DIRECT PIPE. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ROBERT F. SIMCIK
ENGINEER
PE-084485-E
2/6/17

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 18 OF 35

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

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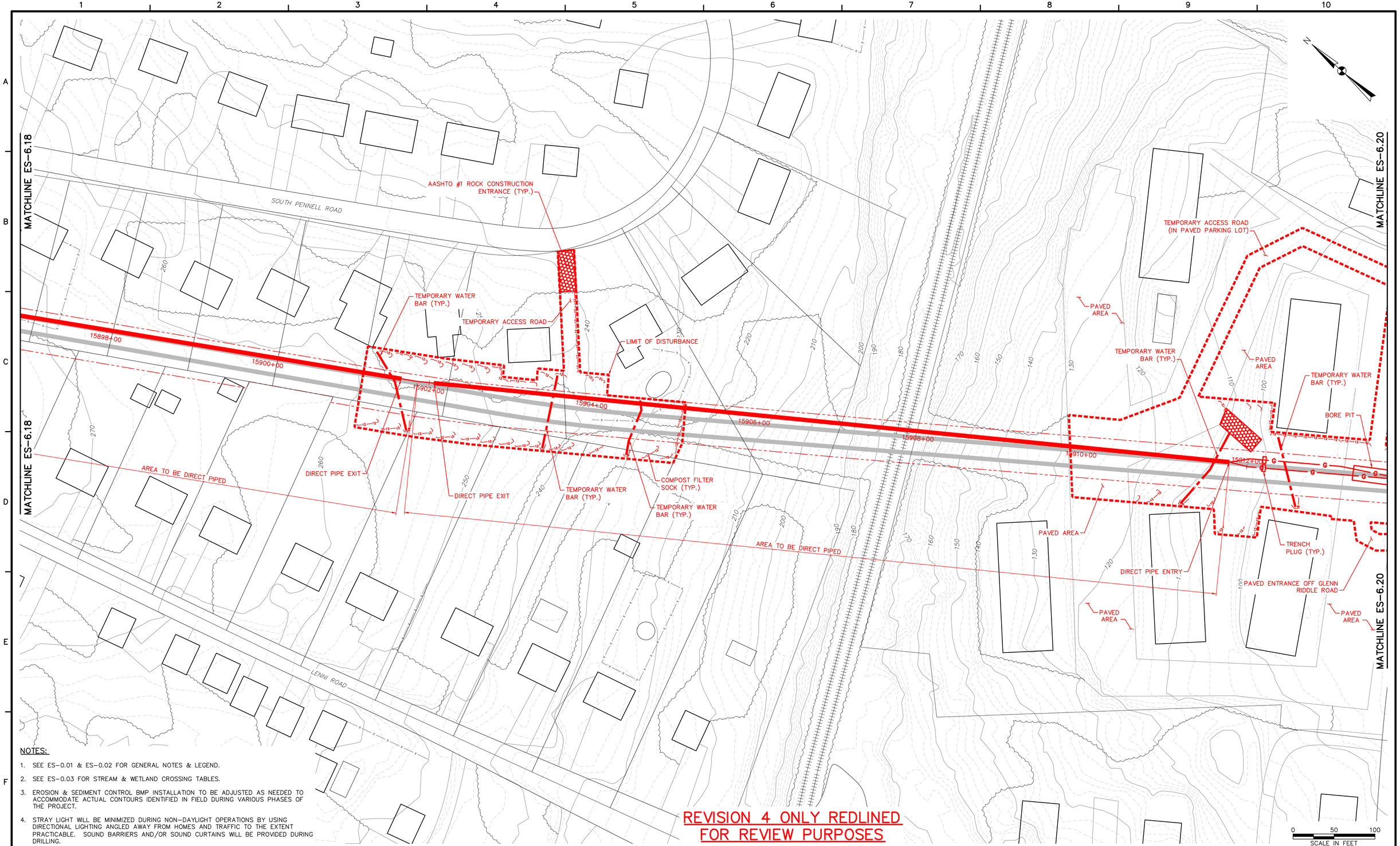
ES-6.18
SHEET 6.18 OF 60

R:_Marcellus Shale Projects\Sunoco\5958 - Penn Pipeline Project\18 - Delaware\E&S\Drill 620 - Option 2\E&S\5958ES006.18 (2).dwg PIT NICHOLE.NAJESKI 4/19/2019 9:55:08 AM



NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
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www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	8/16/18	16" HDD MODIFICATION
4	RS	3/11/19	HDD CONVERTED TO DIRECT PIPE. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER ROBERT F. SIMCIK 4/11/19

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 19 OF 35

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

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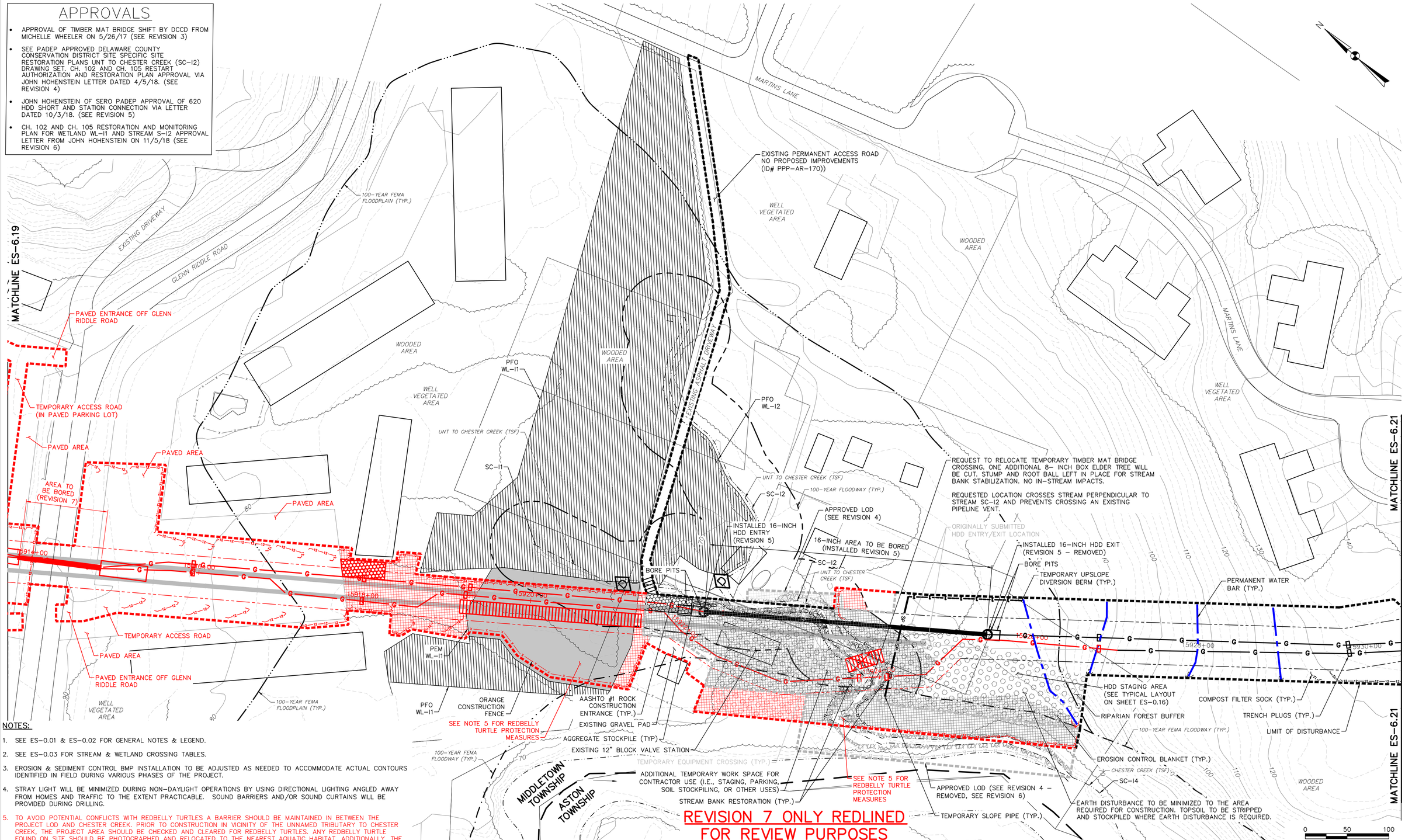
ES-6.19
SHEET 6.19 OF 60

R:_Marcellus Shale Projects\Sunoco\5958 - Penn Pipeline Project\18 - Delaware\E&S\Drill 620 - Option 2\E&S\5958ES006.19 (2).dwg PIT NICHOLE.NAJESKI 4/19/2019 9:57:43 AM

APPROVALS

- APPROVAL OF TIMBER MAT BRIDGE SHIFT BY DCCD FROM MICHELLE WHEELER ON 5/26/17 (SEE REVISION 3)
- SEE PADEP APPROVED DELAWARE COUNTY CONSERVATION DISTRICT SITE SPECIFIC SITE RESTORATION PLANS UNT TO CHESTER CREEK (SC-I2) DRAWING SET. CH. 102 AND CH. 105 RESTART AUTHORIZATION AND RESTORATION PLAN APPROVAL VIA JOHN HOHENSTEIN LETTER DATED 4/5/18. (SEE REVISION 4)
- JOHN HOHENSTEIN OF SERO PADEP APPROVAL OF 620 HDD SHORT AND STATION CONNECTION VIA LETTER DATED 10/3/18. (SEE REVISION 5)
- CH. 102 AND CH. 105 RESTORATION AND MONITORING PLAN FOR WETLAND WL-I1 AND STREAM S-I2 APPROVAL LETTER FROM JOHN HOHENSTEIN ON 11/5/18 (SEE REVISION 6)



REVISION 7 ONLY REDLINED FOR REVIEW PURPOSES

NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
4. STRAY LIGHT WILL BE MINIMIZED DURING NON-DAYLIGHT OPERATIONS BY USING DIRECTIONAL LIGHTING ANGLED AWAY FROM HOMES AND TRAFFIC TO THE EXTENT PRACTICABLE. SOUND BARRIERS AND/OR SOUND CURTAINS WILL BE PROVIDED DURING DRILLING.
5. TO AVOID POTENTIAL CONFLICTS WITH REDBELLY TURTLES A BARRIER SHOULD BE MAINTAINED IN BETWEEN THE PROJECT LOD AND CHESTER CREEK. PRIOR TO CONSTRUCTION IN VICINITY OF THE UNNAMED TRIBUTARY TO CHESTER CREEK, THE PROJECT AREA SHOULD BE CHECKED AND CLEARED FOR REDBELLY TURTLES. ANY REDBELLY TURTLE FOUND ON SITE SHOULD BE PHOTOGRAPHED AND RELOCATED TO THE NEAREST AQUATIC HABITAT. ADDITIONALLY, THE PFBC MUST BE CONTACTED WITHIN 48 HOURS OF THE FIND.

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	5/26/17	TIMBER BRIDGE SHIFT
4	RS	1/31/18	ADDITIONAL LOD AND E&S CONTROLS ADDED-SEE SITE SPECIFIC DRAWING SET
5	RS	8/16/18	16" HDD MODIFICATION AND BYPASS CONNECTION
6	RS	9/1/18	WETLAND AND STREAM RESTORATION UPDATE
7	RS	2/8/19	HDD CONVERTED TO CONVENTIONAL BORES & OPEN TRENCH. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT F. SIMCIK
2/8/17

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 20 OF 35

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

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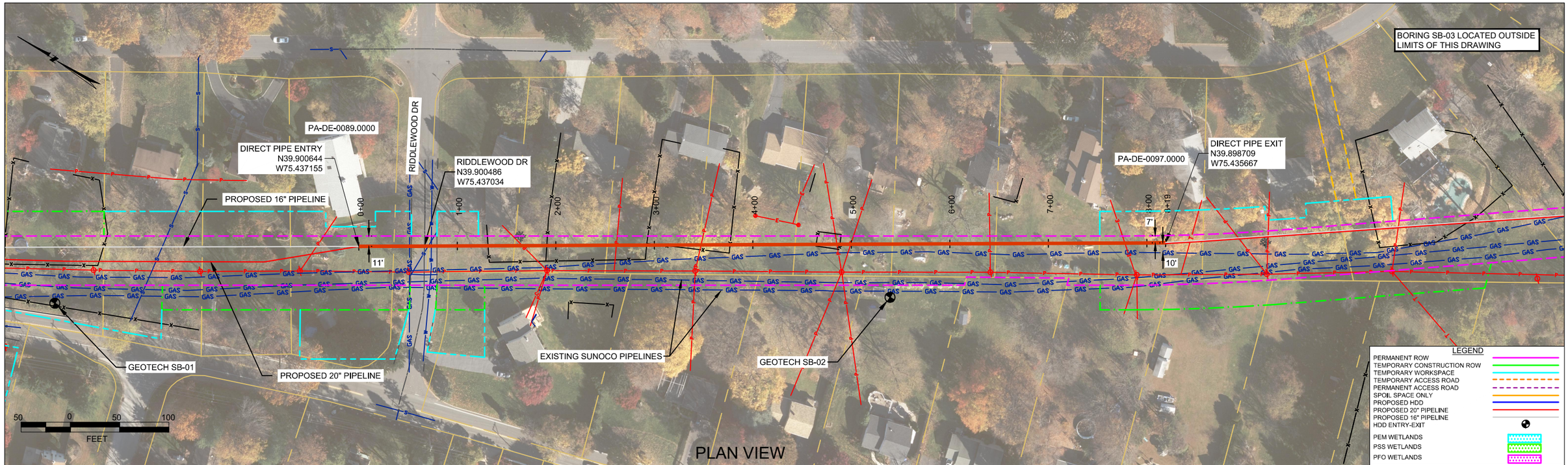
ES-6.20
SHEET 6.20 OF 60

R:_Marcellus Shale Projects\Sunoco\5958 - Penn Pipeline Project\18 - Delaware\E&S\Drill 620 - Option 2\E&S\5958ES006.20 (2).dwg PIT NICHOLE.NAJESKI 3/22/2019 1:44:43 PM

ATTACHMENT 3:

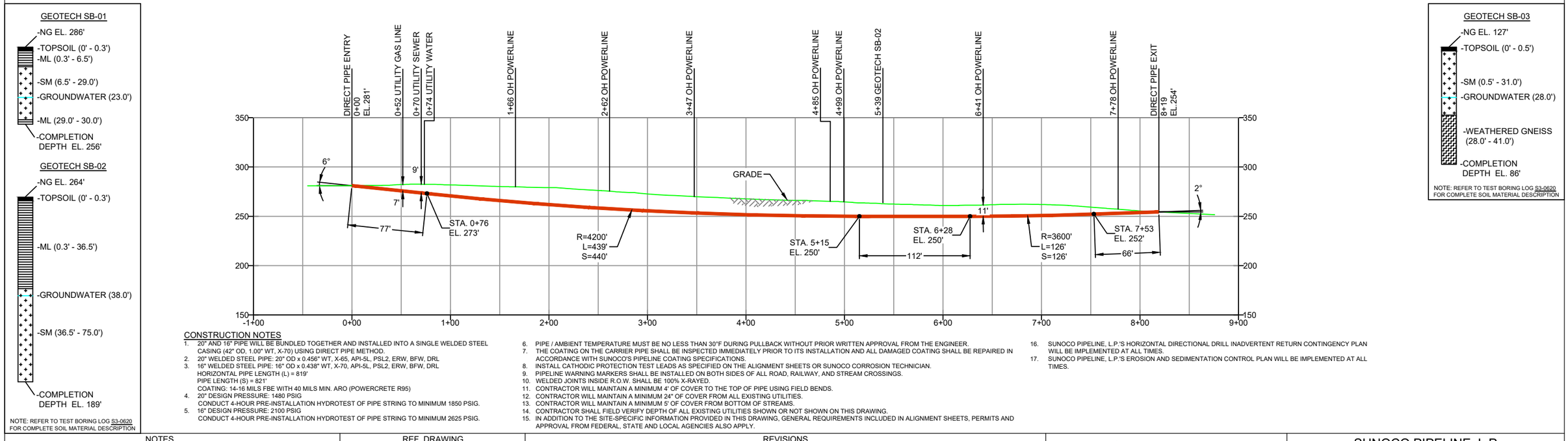
HDD Plans, Profiles and Auger Bore Drawings



PLAN VIEW

DELAWARE COUNTY, PENNSYLVANIA - UPPER CHICHESTER TOWNSHIP

PROFILE VIEW



CONSTRUCTION NOTES

1. 20" AND 16" PIPE WILL BE BUNDLED TOGETHER AND INSTALLED INTO A SINGLE WELDED STEEL CASING (42" OD, 1.00" WT, X-70) USING DIRECT PIPE METHOD.
2. 20" WELDED STEEL PIPE: 20" OD x 0.456" WT, X-65, API-5L, PSL2, ERW, BFW, DRL
3. 16" WELDED STEEL PIPE: 16" OD x 0.438" WT, X-70, API-5L, PSL2, ERW, BFW, DRL
   HORIZONTAL PIPE LENGTH (L) = 819'
   PIPE LENGTH (S) = 821'
   COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
4. 20" DESIGN PRESSURE: 1480 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 1850 PSIG.
5. 16" DESIGN PRESSURE: 2100 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 2625 PSIG.
6. PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
7. THE COATING ON THE CARRIER PIPE SHALL BE INSPECTED IMMEDIATELY PRIOR TO ITS INSTALLATION AND ALL DAMAGED COATING SHALL BE REPAIRED IN ACCORDANCE WITH SUNOCO'S PIPELINE COATING SPECIFICATIONS.
8. INSTALL CATHODIC PROTECTION TEST LEADS AS SPECIFIED ON THE ALIGNMENT SHEETS OR SUNOCO CORROSION TECHNICIAN.
9. PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
10. WELDED JOINTS INSIDE R.O.W. SHALL BE 100% X-RAYED.
11. CONTRACTOR WILL MAINTAIN A MINIMUM 4' OF COVER TO THE TOP OF PIPE USING FIELD BENDS.
12. CONTRACTOR WILL MAINTAIN A MINIMUM 24" OF COVER FROM ALL EXISTING UTILITIES.
13. CONTRACTOR WILL MAINTAIN A MINIMUM 5' OF COVER FROM BOTTOM OF STREAMS.
14. CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
15. IN ADDITION TO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING, GENERAL REQUIREMENTS INCLUDED IN ALIGNMENT SHEETS, PERMITS AND APPROVAL FROM FEDERAL, STATE AND LOCAL AGENCIES ALSO APPLY.
16. SUNOCO PIPELINE, L.P.'S HORIZONTAL DIRECTIONAL DRILL INADVERTENT RETURN CONTINGENCY PLAN WILL BE IMPLEMENTED AT ALL TIMES.
17. SUNOCO PIPELINE, L.P.'S EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED AT ALL TIMES.

NOTES

1. ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
2. STATIONING IS BASED ON HORIZONTAL DISTANCES.
3. ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP ARE NOT RESPONSIBLE FOR LOCATION OF FOREIGN UTILITIES SHOWN IN PLOT PLAN OR PROFILE. THE INFORMATION SHOWN HEREON IS FURNISHED WITHOUT LIABILITY ON THE PART OF ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP, FOR ANY DAMAGES RESULTING FROM ERRORS OR OMISSIONS THEREIN.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES. CONTACT ONE CALL AT 811 PRIOR TO DIGGING.
5. SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REF. DRAWING

DWG NO		DWG NO	DESCRIPTION
ES-6.18	TO	ES-6.20	EROSION & SEDIMENT PLAN
SHEET 12	TO	SHEET 13	AERIAL SITE PLAN

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
0	ISSUED FOR CONSTRUCTION	MRS	03/08/19	RMB	03/08/19	AMC	03/08/19

Sunoco Logistics Partners L.P.

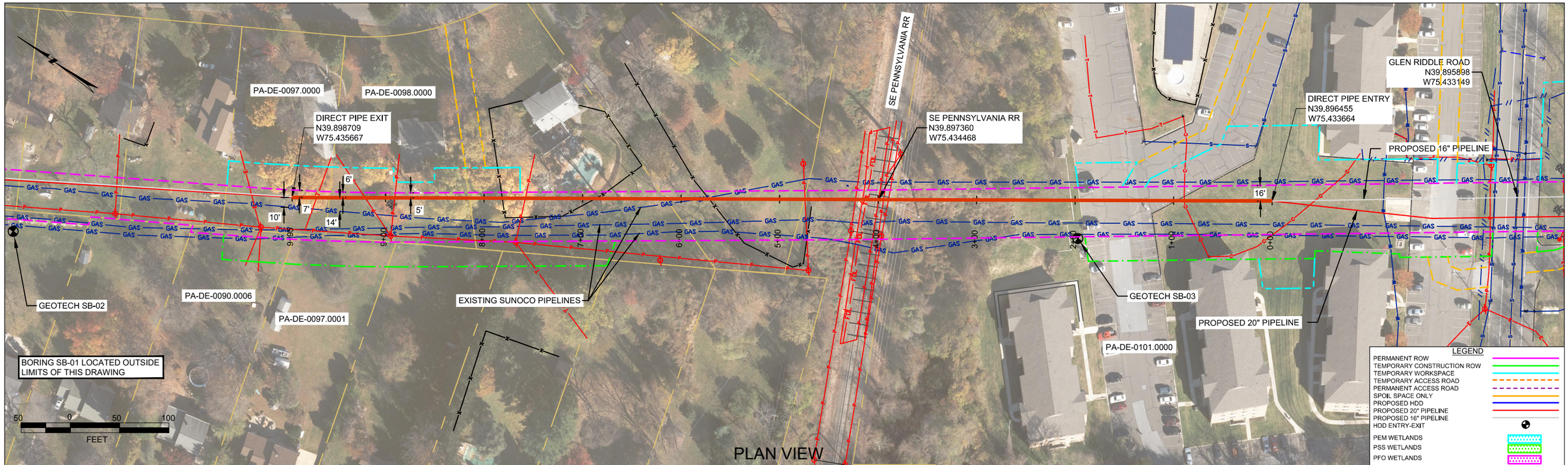
TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

DIRECT PIPE
RIDDLEWOOD DR
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=100'

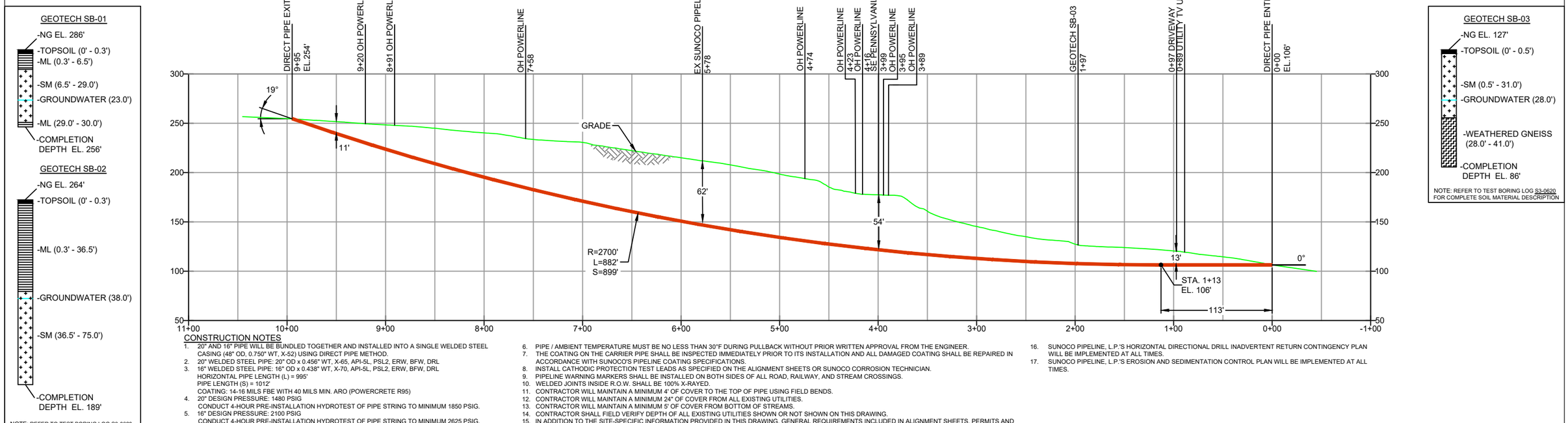
DWG. NO: PA-DE-0089.0000-RD



PLAN VIEW

DELAWARE COUNTY, PENNSYLVANIA - UPPER CHICHESTER TOWNSHIP

PROFILE VIEW



CONSTRUCTION NOTES

1. 20" AND 16" PIPE WILL BE BUNDLED TOGETHER AND INSTALLED INTO A SINGLE WELDED STEEL CASING (48" OD. 0.750" WT, X-52) USING DIRECT PIPE METHOD.
2. 20" WELDED STEEL PIPE: 20" OD x 0.456" WT, X-65, API-5L, PSL2, ERW, BFW, DRL
3. 16" WELDED STEEL PIPE: 16" OD x 0.438" WT, X-70, API-5L, PSL2, ERW, BFW, DRL
   HORIZONTAL PIPE LENGTH (L) = 995'
   PIPE LENGTH (S) = 1012'
   COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
4. 20" DESIGN PRESSURE: 1480 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 1850 PSIG.
5. 16" DESIGN PRESSURE: 2100 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 2625 PSIG.
6. PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
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10. WELDED JOINTS INSIDE R.O.W. SHALL BE 100% X-RAYED.
11. CONTRACTOR WILL MAINTAIN A MINIMUM 4' OF COVER TO THE TOP OF PIPE USING FIELD BENDS.
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NOTES

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5. SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REF. DRAWING

DWG NO		DWG NO	DESCRIPTION
ES-6.18	TO	ES-6.20	EROSION & SEDIMENT PLAN
SHEET 12	TO	SHEET 13	AERIAL SITE PLAN

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
0	ISSUED FOR CONSTRUCTION	MRS	03/08/19	RMB	03/08/19	AMC	03/08/19

Sunoco Logistics Partners L.P.

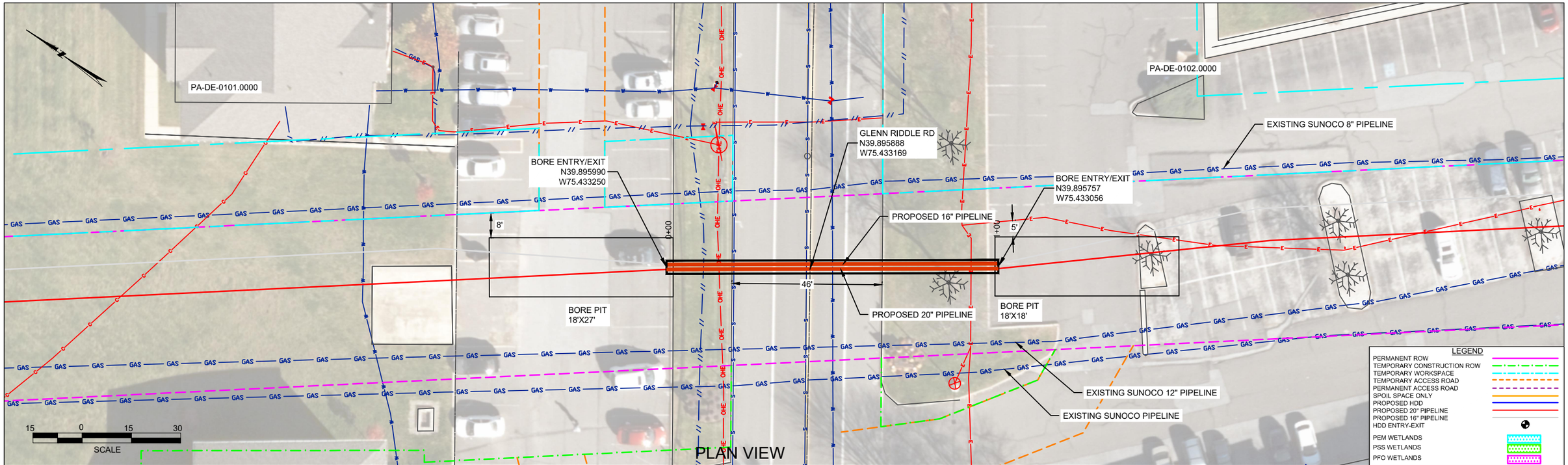
TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

DIRECT PIPE
SEPTA RAILROAD
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=100'

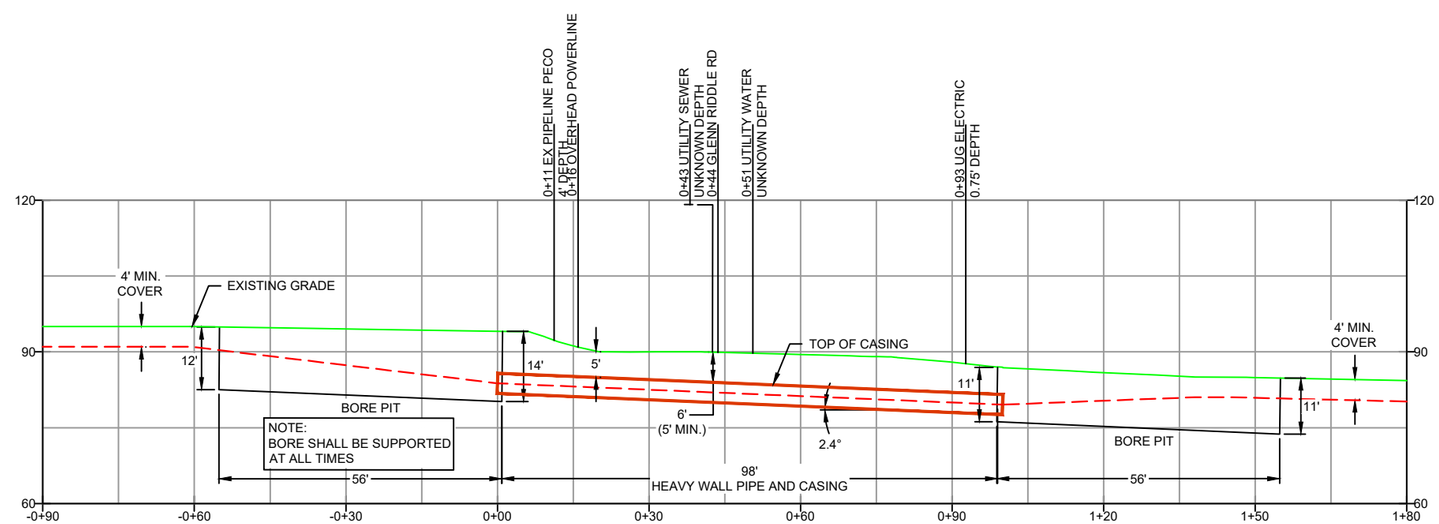
DWG. NO: PA-DE-0100.0000-RR



PLAN VIEW

DELAWARE COUNTY, PENNSYLVANIA - UPPER CHICHESTER TOWNSHIP

PROFILE VIEW



CONSTRUCTION NOTES

1. 20" AND 16" PIPE WILL BE BUNDLED TOGETHER AND INSTALLED INTO 48" x 0.750" W.T. x X-52 CASING USING AUGER BORE METHOD.
2. HORIZONTAL PIPE LENGTH (L) = 98'
   PIPE LENGTH (S) = 98'
3. 20" WELDED STEEL PIPE: 20" OD x 0.456" WT, X-65, API-5L, PSL2, ERW, BFW, DRL COATING 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
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4. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES. CONTACT ONE CALL AT 811 PRIOR TO DIGGING.
5. SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REF. DRAWING

DWG NO		DWG NO	DESCRIPTION
ES-6.18	TO	ES-6.18	EROSION & SEDIMENT PLAN
SHEET 12	TO	SHEET 12	AERIAL SITE PLAN

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
0	ISSUED FOR CONSTRUCTION	LKR	02/11/19	RMB	02/11/19	AMC	02/11/19

Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

AUGER BORE (CASED)
GLENN RIDDLE DRIVE
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=30'

DWG. NO.: PA-DE-0101.0000-RD

ATTACHMENT 4:

Design Calculations and Construction Details

STANDARD E&S WORKSHEET #1

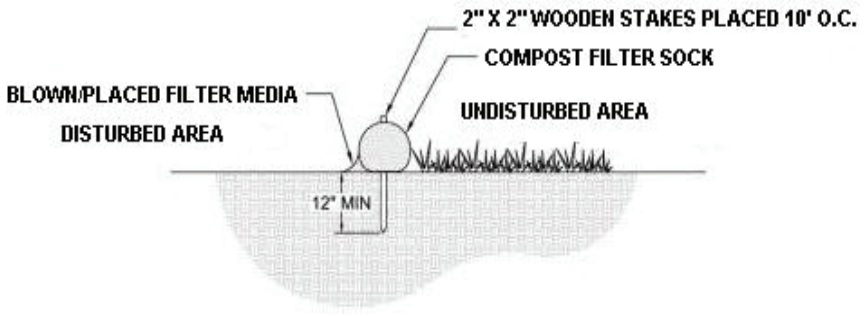
Compost Filter Socks

PROJECT NAME: Mariner East Pennslvania Pipeline Project (ME2)

LOCATION: Glenn Riddle HDD 620; Middletown Township, Delaware County, PA

PREPARED BY: Emily Zapinski DATE: 4/16/2019

CHECKED BY: Robert Simcik DATE: 4/17/2019



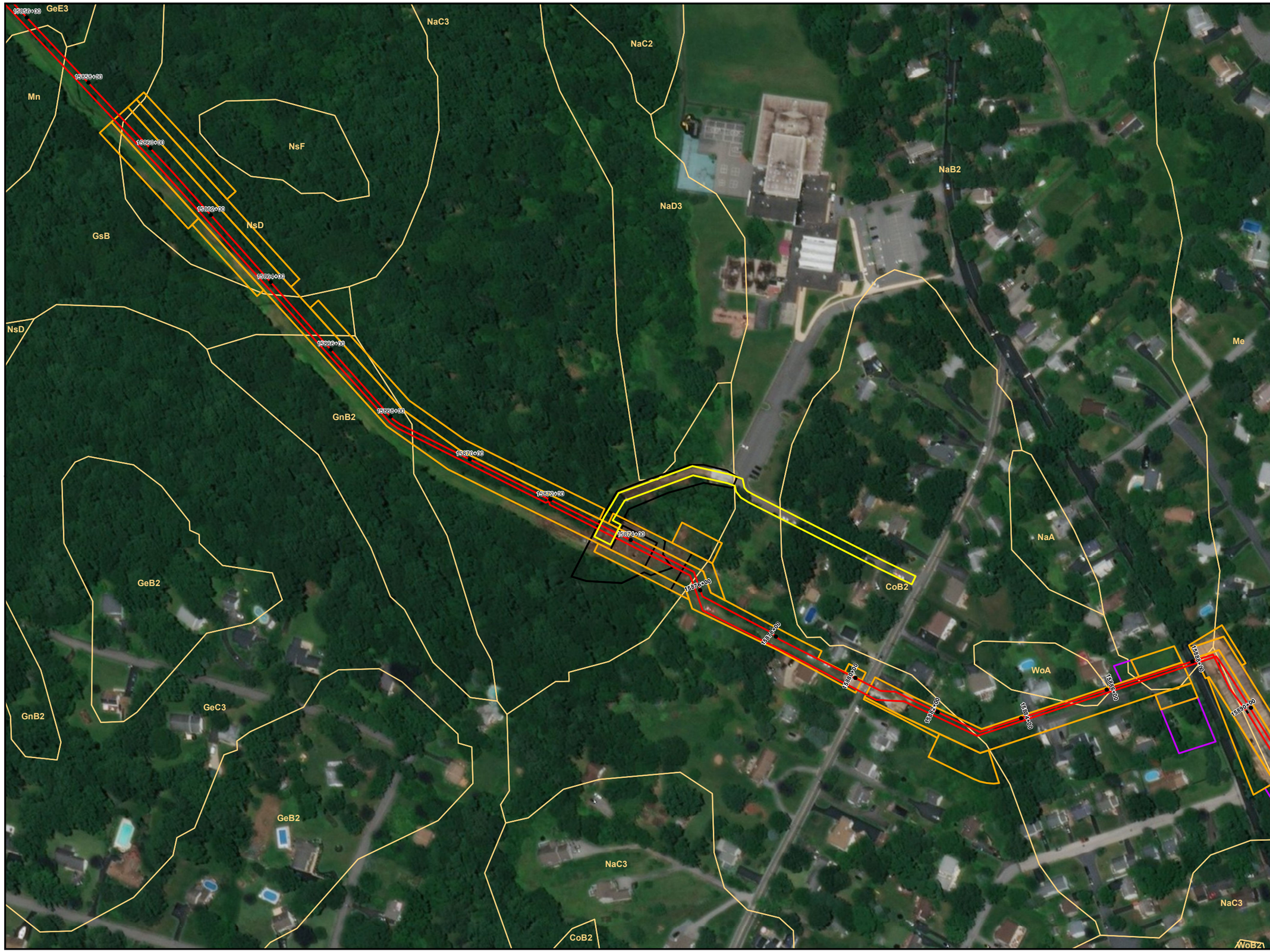
SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)	ELEVATION CHANGE ACROSS FULL SLOPE LENGTH (FT)
1	12	15887 to 15888	8.0	100	8
2	12	15891 to 15894 (north side)	12.0	100	12
3	12	15894 (south side)	6.0	100	6
4	12	15901 to 15903+50	9.6	125	12
5	12	15903+50 to 15904+50	12.3	65	8
6	12	15903+50 (temporary access road)	6.4	125	8
7	12	15904+50 to 15906	10.0	60	6
8	12	15910 to 15911+50	10.0	120	12
9	12	15911+50 to 15912+50	13.3	60	8
10	12	15912+50 to 15914	8.0	100	8
11	12	15914 to 15915+50	6.0	100	6
12	12	15915+50 to 15918	5.0	100	5
13	12	15918 to 15919	6.7	75	5
14	12	15919 to 15922	5.0	100	5
15	12	15922 to 15926+50	4.0	125	5

ATTACHMENT 5:

Limiting Soil Characteristics Table, Soil Descriptions,

Soil and Geological Maps, KARST Plan

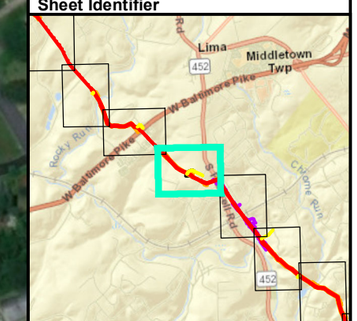
Soils Maps



Legend

- Stationing
- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



N

Feet: 0 100 200

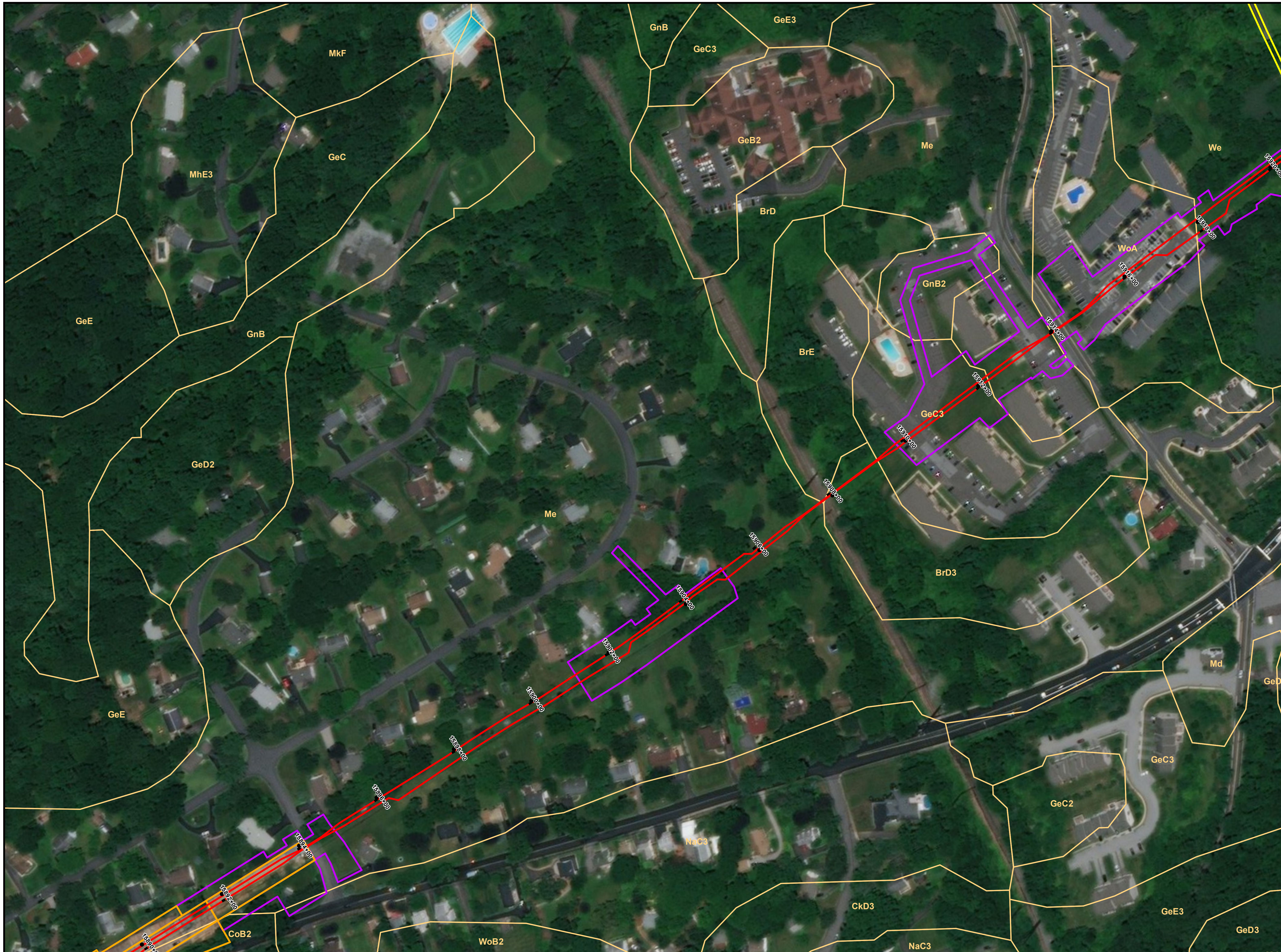
Meters: 0 30.48 60.96

NRCS SOILS MAP
ATTATCHMENT 5-53
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

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

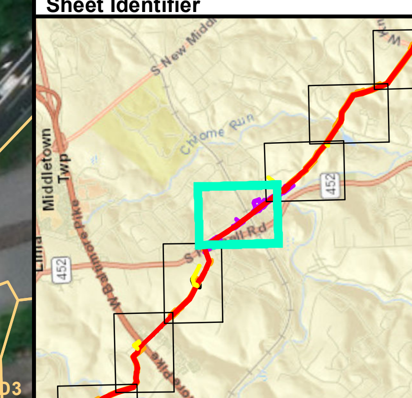
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESC\GP\PENNPIPELINE_620MAJOR\MOD_ESCGP_SOILS.MXD 04/18/19 TT



Legend

- Stationing
- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



Feet: 0 100 200

Meters: 0 30.48 60.96

NRCS SOILS MAP
ATTATCHMENT 5-54
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
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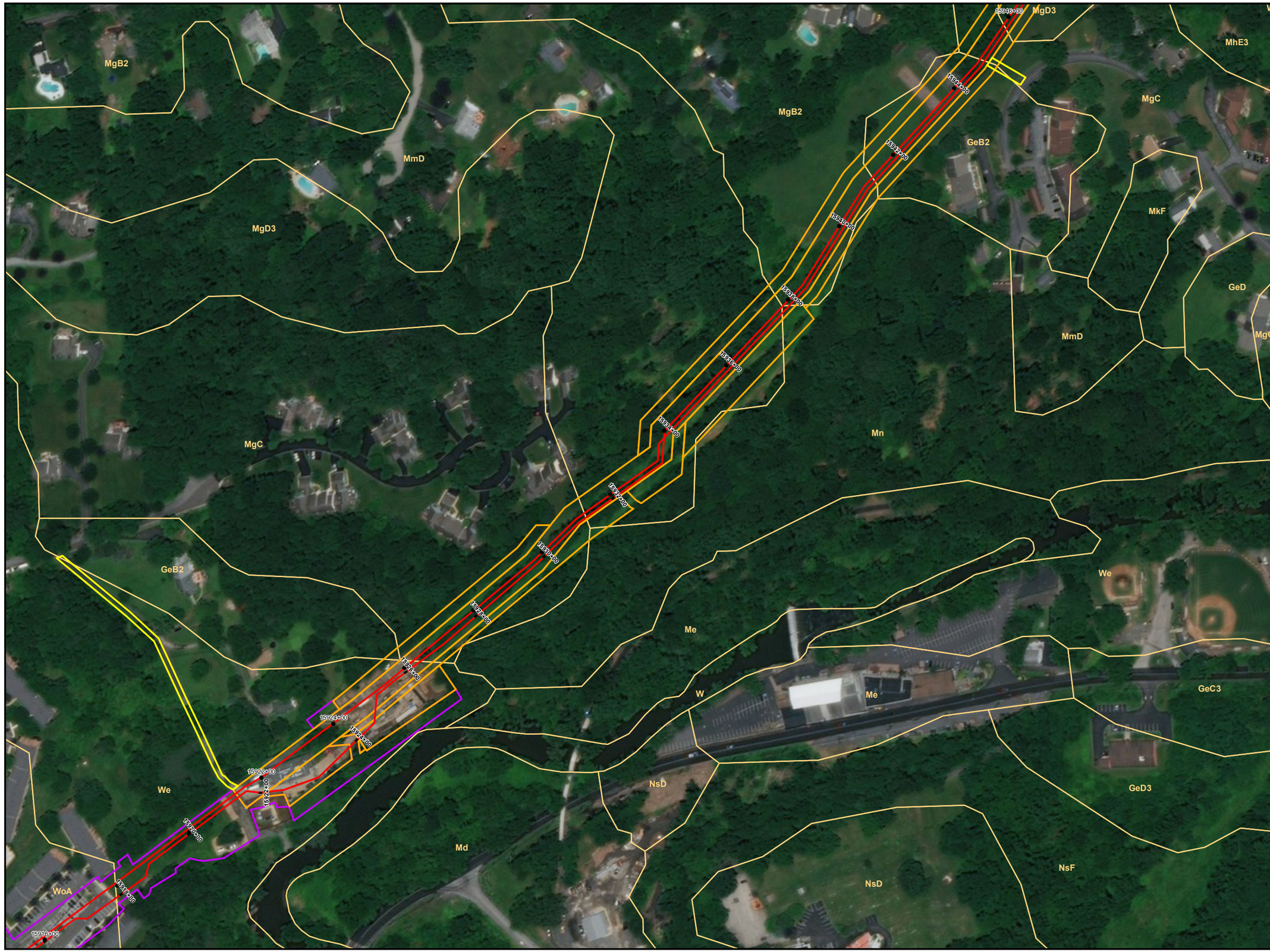
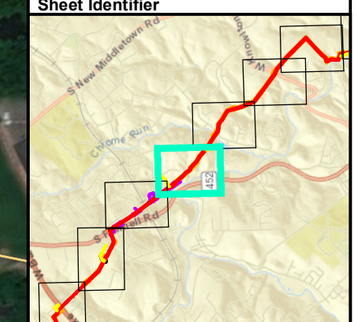
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESCGP\PENNPIPELINE_620MAJORMOD_ESCGP_SOILS.MXD 04/18/19 TT



Legend

- Stationing
- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



Feet: 0 100 200

Meters: 0 30.48 60.96

NRCS SOILS MAP
ATTATCHMENT 5-55
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
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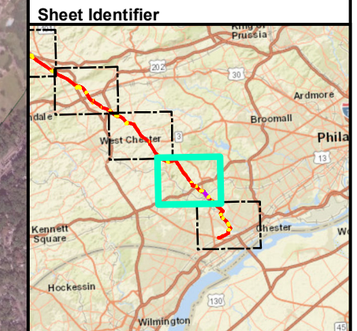
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PP ESC\GP\PENNPIPELINE_020MAJORMOD_ESCGP_SOILS.MXD 04/18/19 TT

Formations Maps

Legend

- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- "Glenarm Wissahickon" formation (Xgw)
- Bryn Mawr Formation (Tbm)
- Diabase (Jd)
- Felsic and intermediate gneiss (fgh)
- Felsic gneiss (fgp)
- Granitic gneiss and granite (Xgr)
- Mafic gneiss (Xmgh)
- Mafic gneiss (mgh)
- Ultramafic rocks (Xu)
- Wissahickon Formation (Xw)

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

GEOLOGIC UNIT MAP
ATTACHMENT 5-5
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY,
PENNSYLVANIA

TETRA TECH

Notes:
Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2013 ESRI and its data suppliers).

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESC\GP\PENNPIPELINE_60\MAJORMOD_ESC\GP_GEOLOGY.MXD 04/18/19 TT

ATTACHMENT 12:

Geohazard Evaluation

TETRA TECH

MEMO

To:	Rob Simcik, PE, Tetra Tech
Cc:	Megan Carson, Tetra Tech
From:	Bill Smith, PE, Tetra Tech
Date:	4/18/2019
Subject:	**PPP 620 Major Modification - Geohazard Evaluation**

Tetra Tech performed a desktop geotechnical review of the proposed 620 Major Modification using publicly available information to identify areas of potential concern along the proposed alignment and access roads with respect to potential geologic hazards. References included the following:

- PASDA, LiDAR topography, 2006 (UTM NAD83 Zone 17 Feet).
- PASDA, Karst features, PADCNR, 2007.
- PADCNR Scans of USGS Landslide Inventory Maps for various quadrangles in PA. PADCNR 8/29/2017.
- NCRS Soil Survey for Delaware County, PA, Web Soil Survey.
- Delaware County 2011 Hazard Mitigation Plan. Delaware County Planning Department, 2011.
- PADEP (2018) https://www.dep.pa.gov/Citizens/My-Water/PublicDrinkingWater/Pages/Arsenic-in-Drinking-Water.aspx
- PADEP (2016) Technology Enhanced Naturally Occurring Radioactive Materials (TENORM) Study Report
- http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=5815&DocName=01%20PENNSYLVANIA%20DEPARTMENT%20OF%20ENVIRONMENTAL%20PROTECTION%20TENORM%20STUDY%20REPORT%20REV%201.PDF%20
- US Geological Survey (2006). Arsenic in Coal. Fact Sheet 2005-3152
- US Geological Survey (2013). Arsenic Concentrations, Related Environmental Factors, and the Predicted Probability of Elevated Arsenic in Groundwater in Pennsylvania. Scientific Investigations Report 2012-5257.

Figure 1 depicts the pipeline right-of-way and the 600' study corridor for the geohazard evaluation. This figure shows documented and suspected landslides, steep slopes, karst features, and soils that are prone to slipping.

A separate coal and mining review was conducted and is included as Attachment A.

Tetra Tech, Inc.
661 Andersen Drive, Pittsburgh, PA 15220-2700
Tel 412.921.7090 Fax 412.921.4040 www.tetratech.com

USGS Landslide Inventory Review

The Major Modification alignment does not intersect any areas of old landslides or active or recently active landslides as designated by USGS. The Delaware County 2001 Hazard Mitigation Plan rates landslide incidence in the vicinity of the major modification as low and the future occurrence of landslides as unlikely.

Topographic Review for Recent Landslides

2006 PASDA LiDAR topography was reviewed for evidence of suspected landslides or earthflow. The Major Modification alignment does not intersect any suspected landslides based on topographic review.

Steep Slopes

Steep slopes (greater than 2 horizontal to 1 vertical) were evaluated along the pipeline alignment. No significant steep slopes are present along the pipeline alignment. A very small, short slope at the edge of the LOD near Sta. 15911+00 is steeper than 2:1, but does not present a geohazard to the construction.

Soil Type Review

The soil types were assessed to ascertain which types intersected the pipeline and access roads. Each soil type and the corresponding Soil Slippage Potential, as designated by NCRS, are listed below. The soil slippage potential is the hazard that a mass of soil will slip when vegetation is removed, soil water is at or near saturation, and other normal practices are applied.

Soils along the 620 Major Modification include:

Soil Symbol	Map Unit Name	Slippage Rating
CoB2	Conowingo silt loam, 3 to 8 percent slopes, moderately eroded	NR
GeC3	Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded	NR
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	NR
Me	Made land, schist and gneiss materials	NR
NaB2	Neshaminy gravelly silt loam, 3 to 8 percent slopes, moderately eroded	NR
NaC3	Neshaminy gravelly silt loam, 8 to 15 percent slopes, severely eroded	NR
We	Wehadkee silt loam	NR
WoA	Worsham silt loam, 0 to 3 percent slopes	NR

NR = No Rating

Soil types are overlaid on the alignment on Figure 1. There are no soils that have a soil slippage rating along the pipeline LOD.

Karst/Sinkhole Formations

There are no PA DCNR karst features in the major modification alignment.

Coal and Mining Review

The coal and mining review is provided in Attachment A and summarized here.

There are no coal seams or coal bearing units in Delaware County. Research of available published information indicates no deep, underground or surface mining has occurred or is permitted along the modification route

In the Piedmont physiographic province, dark shales, sulfide mineralized areas, fractured rocks and rocks with little calcareous material have the potential to produce acidic discharges; however, according to PGS (2005), ultramafic and mafic gneiss are not noted as acid-producing.

If coal or black shales are encountered during excavation for the project, the potential impact from acid producing minerals is expected to be minimal due to the shallow excavation and most of these shallow areas would not contain pollution-forming minerals as the material is expected to be highly weathered. BMPs will be used to mitigate potential impacts from encountering acid-producing rock formations.

Radiation

Most soils and rocks contain low-levels of naturally occurring radioactive material (NORM). This material can be concentrated through physical or chemical processing resulting in technologically enhanced NORM called TENORM. Examples of TENORM containing materials include fire brick, water and wastewater treatment residuals, coal ash and decorative polished rock commonly used in building or home construction. The three primary naturally radioactive elements are potassium, thorium, and uranium. Both potassium and thorium are typically found in insoluble minerals and unlikely to present any issues. Uranium is common in marine, organic-rich, black shales, which are the primary radioactive mineral bearing formations, but sometimes occurs in non-marine, organic-rich, black shales.

Formations designated by the PADEP that pose a high radioactive risk include the Antes Formation (Utica), Mandata Formation, Marcellus Formation, Burket Member of the Harrell Formation, and Lockatong Formation. None of these formations are found near the surface in the project area, and this project will not involve well drill cuttings or flowback fluids from these formations.

Arsenic

Arsenic occurs naturally in trace amounts in soil, water, rocks, including coal (within the pyrite and organic portions), and can be in mine drainage. While coal and associated trace mineral Arsenic, is prevalent throughout southwest Pennsylvania and the project area, the project is not crossing any known mining waste areas which may have elevated levels of arsenic.

Conclusions/Recommendations

Based on this geohazard evaluation, the 620 Major Modification does not intersect any known or suspected geohazards and mitigation measures are not warranted.

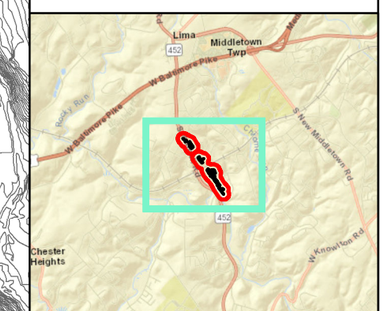
*** End ***

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\620_MAJORMODIFICATION_GEOHAZARD.MXD 04/18/19 PD

Legend

- PA State Road
- PA Local Road
- Limit of Disturbance
- 300ft Buffer
- Soil Boundary
- Centerline
- Stream
- DCNR Karst Feature
- Cove Underlain by Clay Layer, USGS
- Active or Recently Active Landslide, USGS
- Old Landslide, USGS
- Suspected Landslide Area, Topographic Review
- PEM Wetland
- Slope>2:1
- 2' Contour
- 0+00 Pipe Station

Sheet Identifier



Feet: 0 250 500

Meters: 0 76.2 152.4

FIGURE 1
GEOHAZARD EVALUATION
PENNSYLVANIA PIPELINE PROJECT
620 MAJOR MODIFICATION
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PENNSYLVANIA

TETRA TECH

PASDA LIDAR TOPOGRAPHY, 2006
(UTM NAD83 ZONE 17 FEET).

Attachment A

Coal and Mining Review

PPP 620 Major Modification

TETRA TECH

MEMO

To:	Rob Simcik, PE, Tetra Tech
Cc:	Megan Carson, Tetra Tech
From:	Bill Smith, PE, Tetra Tech
Date:	4/18/2019
Subject:	**PPP 620 Major Modification - Geohazard Evaluation**

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WILLIAM C. SMITH
ENGINEER
088102E
4/18/19

Tetra Tech performed a desktop geotechnical review of the proposed 620 Major Modification using publicly available information to identify areas of potential concern along the proposed alignment and access roads with respect to potential geologic hazards. References included the following:

- PASDA, LiDAR topography, 2006 (UTM NAD83 Zone 17 Feet).
- PASDA, Karst features, PADCNR, 2007.
- PADCNR Scans of USGS Landslide Inventory Maps for various quadrangles in PA. PADCNR 8/29/2017.
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- Delaware County 2011 Hazard Mitigation Plan. Delaware County Planning Department, 2011.
- PADEP (2018) https://www.dep.pa.gov/Citizens/My-Water/PublicDrinkingWater/Pages/Arsenic-in-Drinking-Water.aspx
- PADEP (2016) Technology Enhanced Naturally Occurring Radioactive Materials (TENORM) Study Report
- http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=5815&DocName=01%20PENNSYLVANIA%20DEPARTMENT%20OF%20ENVIRONMENTAL%20PROTECTION%20TENORM%20STUDY%20REPORT%20REV%201.PDF%20
- US Geological Survey (2006). Arsenic in Coal. Fact Sheet 2005-3152
- US Geological Survey (2013). Arsenic Concentrations, Related Environmental Factors, and the Predicted Probability of Elevated Arsenic in Groundwater in Pennsylvania. Scientific Investigations Report 2012-5257.

Figure 1 depicts the pipeline right-of-way and the 600' study corridor for the geohazard evaluation. This figure shows documented and suspected landslides, steep slopes, karst features, and soils that are prone to slipping.

A separate coal and mining review was conducted and is included as Attachment A.

Tetra Tech, Inc.
661 Andersen Drive, Pittsburgh, PA 15220-2700
Tel 412.921.7090 Fax 412.921.4040 www.tetratech.com

No coal-bearing rocks or AMD discharges are noted within the project area on eMAP. According to PGS (2005), ultramafic and mafic gneiss are not noted as acid-producing.

Measures to Prevent or Mitigate Acidic Discharges

If the trench excavation encounters an acidic discharge, changes to the volume or chemistry are not anticipated. The trenching would not increase or decrease the volume of acidic discharges because the volume is controlled by precipitation and hydro-geologic parameters. The chemistry of acidic discharges is not anticipated to change due to the shallow excavation into weathered material.

Several measures will be implemented to reduce the potential and mitigate for pollution from trench excavation activities that encounter coal, black shale, or acidic discharges. These measures are as follows:

- When coal, black shale, or other acid-forming material is encountered during the excavation, the excavated material will be covered with tarps, mats, or blankets. Water is to be directed away from the temporary stockpiled material and the trench until the material is returned to the trench.
- If water accumulates in the trench within the areas of excavated acid-forming material, use a field pH meter to test the pH of the water. If the pH is between 6.0 to 9.0 standard units, inclusive, pump water that accumulates in the trench through a filter bag and slowly discharge to a well vegetated area. If the water pH is not within 6.0 to 9.0 range, collect the water and transfer to an approved treatment facility.
- Backfill the trench with the removed material and conduct alkaline addition by following PADEP's *How to Avoid and Handle Acid-Producing Rock Formations Encountered during Well Site Development*. Fact Sheet 5600-FS-DEP4284.
- Additional trench plugs may be needed to limit water encountering the coal material along the sides of the trench. Trench plugs to seal off the acid-forming material should consist of clay.
- Perform immediate stabilization of the pipe ROW after installation of the pipe by returning the area to original topographic grade.
- Prepare the disturbed area for permanent seeding with the use of lime and fertilizer. It is recommended to test the soil in areas of past surface/strip mines, or where coal or black shale are near the surface to determine the optimum liming rate. In the absence of testing, apply at 6 tons/acre. Limestone is applied to neutralize the acidity in soil. Blending of soils is recommended to mix potentially acidic materials with materials that have buffering capacity.
- Immediately mulch and seed all disturbed areas with the temporary and/or permanent seed mixture. PADEP and Penn State University have identified seed mixes that are more suited to acidic conditions and should be applied when acid-forming materials are near the surface.
- Monitor the areas until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established.
- If acid-forming material is to be hauled offsite, waste materials are to be disposed of at an approved DEP waste site (permitted coal refuse area or landfill).

TETRA TECH

Closing

If you have any questions or comments, please feel free to contact me at 412-921-8051 or heather.trexler@tetratech.com.

Sincerely,

Heather Trexler

Heather Trexler, P.G.
Project Manager, Energy and Natural Resources Department

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
HEATHER ANNE TREXLER
GEOLOGIST
PG004798

Enclosures

References

Pennsylvania Department of Conservation and Natural Resources. 2019. Pennsylvania Geologic Data Exploration (PaGEODE) http://www.gis.dcnr.state.pa.us/geology/index.html

Pennsylvania Department of Environmental Protection. 2019. eMapPA http://www.depgis.state.pa.us/emappa/

Pennsylvania Department of Environmental Protection (PADEP). 2014. How to avoid and handle acid-producing rock formations encountered during well site development. Fact Sheet 5600-FS-DEP4284

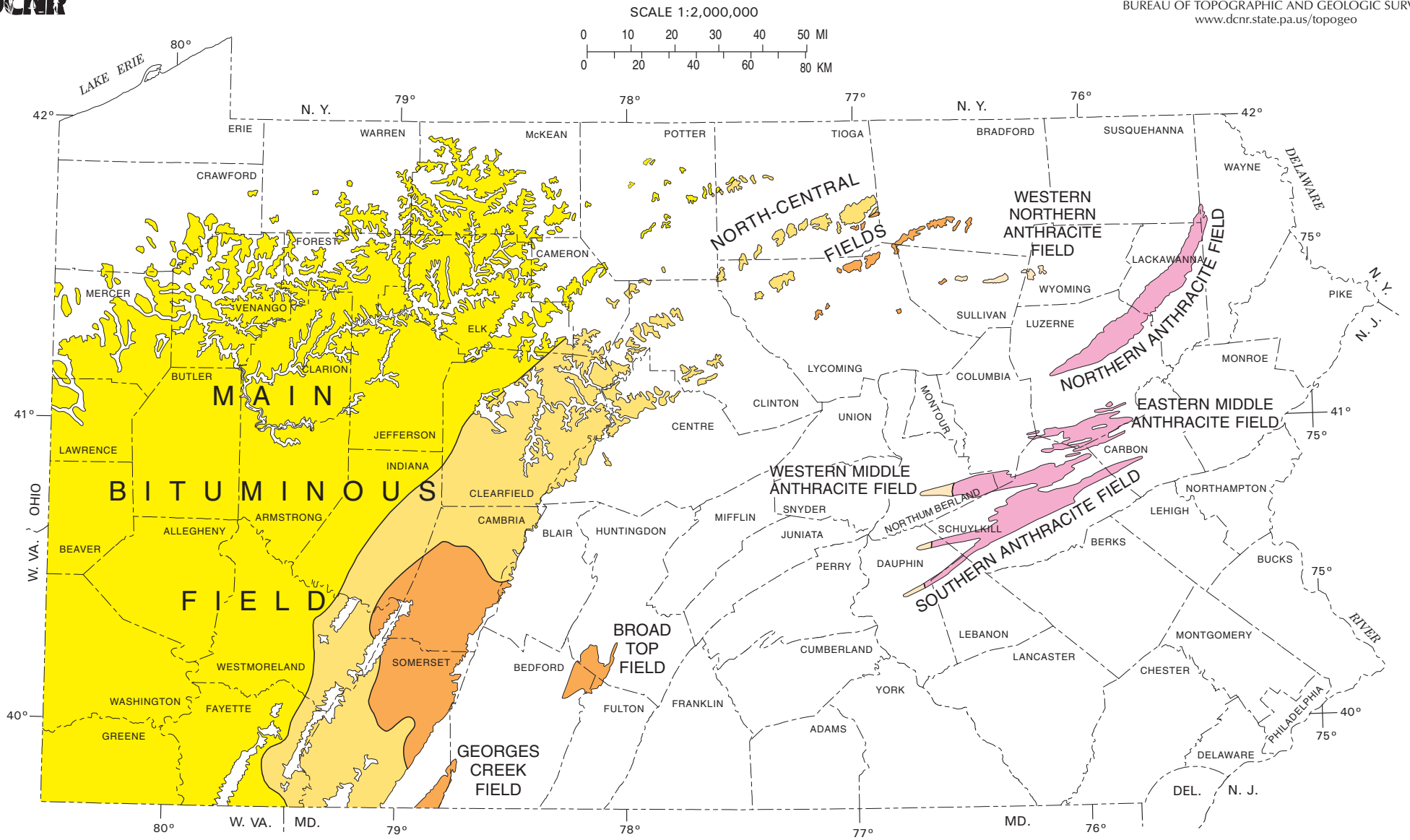
Pennsylvania Geologic Society (PGS). 2005. Geologic units containing potentially significant acid-producing sulfide minerals. Pennsylvania Geological Survey. 4th Ser. Open-File Report OFMI 05-01.1.

Figures

MAP 11

DISTRIBUTION OF PENNSYLVANIA COALS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF
CONSERVATION AND NATURAL RESOURCES
BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY
www.dcnr.state.pa.us/topogeo



EXPLANATION

BITUMINOUS FIELDS

- High-volatile bituminous coal
- Medium-volatile bituminous coal
- Low-volatile bituminous coal

ANTHRACITE FIELDS

- Semi-anthracite
- Anthracite

Prepared by Bureau of Topographic and Geologic Survey.
Third Edition, Revised, 2000; Third Printing, 2008.

2200–MP–DCNR0855
Printed on Recycled Paper

4. ACT 14 NOTIFICATIONS AND RECEIPTS

TETRA TECH

PITT-04-19-033
April 16, 2019
Project Number 212IC-PB-00037

Delaware County
Government Center, Room 202
201 West Front Street
Media, Pennsylvania 19063

Reference: Sunoco Pipeline, L.P. (SPLP)
Pennsylvania Pipeline Project
Major Modification-HDD 620

To Whom It May Concern:

This municipal notice, under the requirements of Acts 14, 67, 68, and 127, is to inform you that our client, Sunoco Pipeline, L.P. (SPLP), is applying for coverage under the Erosion and Sediment Control General Permit (ESCGP-3) for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing or Treatment Operations or Transmission Facilities.

Project Name: Pennsylvania Pipeline Project
Major Modification-HDD 620

Applicant Name: Sunoco Pipeline, L.P.
525 Fritztown Road
Sinking Spring, PA 19608

Project Description: This modification is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad.

Site Location: The Major Modification is location in Middletown Township, Delaware County.

Enclosed is a copy of the Notice of Intent (NOI) application for an ESCGP-3 and Location map of the proposed major modification route. Please submit any comments concerning this project within 30 days from date of receipt of this letter to:

Pennsylvania Department of Environmental Protection (PA DEP)
2 East Main Street
Norristown, PA 19401
Phone: (484) 250-5900

Should you have questions regarding this correspondence, please do not hesitate to contact me at 412-921-8163 or via e-mail at Robert.Simcik@tetratech.com.

Sincerely,

Robert F. Simcik, P.E.
E&S Task Manager

RFS/clm

Enclosure: Site Location Maps; Notice of Intent
cc: File 212IC-PB-00037

Tetra Tech
661 Andersen Drive, Suite 200, Pittsburgh, PA 15220-2700
Tel 412.921.7090 Fax 412.921.4040 www.tetratech.com

April 19,2019

Dear Customer:

The following is the proof-of-delivery for tracking number **774988745730**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Shipping/Receiving
Signed for by:	D.WHITTAKER	**Delivery location:**	201 W FRONT ST MEDIA, PA 19063
Service type:	FedEx Priority Overnight	**Delivery date:**	Apr 17, 2019 10:00
Special Handling:	Deliver Weekday Adult Signature Required		

Shipping Information:

Tracking number:	774988745730	**Ship date:**	Apr 16, 2019
		Weight:	0.5 lbs/0.2 kg

Recipient:
TO WHOM IT MAY CONCERN
DELAWARE COUNTY
201 WEST FRONT STREET
GOVERNMENT CENTER, ROOM 202
MEDIA, PA 19063 US

Shipper:
ADMIN OFFICE
Tetra Tech, Inc.
Foster Plaza Building 7
661 Andersen Drive, Suite 200
Pittsburgh, PA 15220 US

Reference
212IC-BF-00037.500

Purchase order number:
SIMCIK/MORRIS

Thank you for choosing FedEx.

TETRA TECH

PITT-04-19-032
April 16, 2019
Project Number 212IC-PB-00037

Middletown Township
27 North Pennell Road
Lima, Pennsylvania 19037

Reference: Sunoco Pipeline, L.P. (SPLP)
Pennsylvania Pipeline Project
Major Modification-HDD 620

To Whom It May Concern:

This municipal notice, under the requirements of Acts 14, 67, 68, and 127, is to inform you that our client, Sunoco Pipeline, L.P. (SPLP), is applying for coverage under the Erosion and Sediment Control General Permit (ESCGP-3) for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing or Treatment Operations or Transmission Facilities.

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Major Modification-HDD 620

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525 Fritztown Road
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Pennsylvania Department of Environmental Protection (PA DEP)
2 East Main Street
Norristown, PA 19401
Phone: (484) 250-5900

Should you have questions regarding this correspondence, please do not hesitate to contact me at 412-921-8163 or via e-mail at Robert.Simcik@tetratech.com.

Sincerely,

Robert F. Simcik, P.E.
E&S Task Manager

RFS/clm

Enclosure: Site Location Maps; Notice of Intent

cc: File 212IC-PB-00037

Tetra Tech
661 Andersen Drive, Suite 200, Pittsburgh, PA 15220-2700
Tel 412.921.7090 Fax 412.921.4040 www.tetratech.com

April 19,2019

Dear Customer:

The following is the proof-of-delivery for tracking number **774988768580**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	H.MITCHELL	**Delivery location:**	27 N PENNELL RD LIMA, PA 19037
Service type:	FedEx Priority Overnight	**Delivery date:**	Apr 17, 2019 10:50
Special Handling:	Deliver Weekday Adult Signature Required		

Shipping Information:

Tracking number:	774988768580	**Ship date:**	Apr 16, 2019
		Weight:	0.5 lbs/0.2 kg

Recipient:
TO WHOM IT MAY CONCERN
MIDDLETOWN TOWNSHIP
27 NORTH PENNELL ROAD
LIMA, PA 19037 US

Shipper:
ADMIN OFFICE
Tetra Tech, Inc.
Foster Plaza Building 7
661 Andersen Drive, Suite 200
Pittsburgh, PA 15220 US

Reference
212IC-BF-00037.500

Purchase order number:
SIMCIK/MORRIS

Thank you for choosing FedEx.

5. ACT 167 VERIFICATION REPORT

ACT 167 STORMWATER CONSISTENCY VERIFICATION REPORT

SUNOCO PENNSYLVANIA PIPELINE PROJECT

DELAWARE COUNTIES, PENNSYLVANIA

620 Major Modification

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ROBERT F. SIMCIK
ENGINEER
PE-050435-E

4/22/19

ACT 167 STORMWATER CONSISTENCY VERIFICATION REPORT FOR DELAWARE COUNTY

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Act 167 Stormwater Consistency Verification Report. The report verifies consistency between the provisions of the Chester Creek, Ridley Creek, Crum Creek, and Marcus Hook Creek Watershed Act 167 Plans and the Pennsylvania Pipeline Project. The 620 HDD Major Modification is located in Middletown Township. The pipeline will traverse through seven townships in Delaware County: Aston, Brookhaven, Chester, Edgmont, Middletown, Thornbury, and Upper Chichester Townships. Delaware County does not have a Countywide Act 167 Stormwater Management Plan; instead, the county is subdivided into Watershed Study Areas. Thornbury, Edgmont, Chester, Aston, Middletown, and Brookhaven Townships are located within the Chester Creek Watershed Study Area and follow the provisions of the Chester Creek Act 167 Plan Volume I and Volume II. Edgmont and Thornbury Townships are located in the Ridley Creek Watershed Study Area and follow the provisions of the Ridley Creek Act 167 Plan.

2.0 PROJECT DESCRIPTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL). The project involves the installation of approximately two parallel pipelines within a 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. The majority of the new ROW will be co-located adjacent to existing utility corridors, including approximately 230 miles of pipeline that will be co-located in the existing SPLP Mariner East pipeline system. The 20-inch pipeline will be installed first, followed by the 16-inch line. Any temporary stabilization required will be implemented in accordance with this Erosion and Sediment (E&S) Plan. Both pipelines will be installed within the same limit of disturbance (LOD) and in the same construction period. Construction activities will involve the installation of access roads, block valve pads, tree removal, clearing and grubbing within the right of way, trenching, pipe installation, and site restoration. The total LOD will be 97 acres in Delaware County.

The HDD 620 Major Modification is is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad. Stream SC-I2 and wetland WL-I1 will be crossed in accordance with Chapter 105 Joint Permit Application major modification, utilizing one of the approved open-trench excavation methods for installation of the pipeline across waterbodies.

Fifty feet will be maintained as permanent ROW. In addition, temporary use areas or extra workspaces will be required at some stream and road/railroad crossings; these will typically expand the construction ROW by 25 feet where needed. Construction activities will involve the installation of 2 block valve pads, expansion activities at a pump station, tree removal, clearing and grubbing within the ROW, trenching, pipe installation, and site restoration.

In Delaware County, Pennsylvania, the Pennsylvania Pipeline Project traverses 11.5 linear miles through the municipalities of Aston, Brookhaven, Chester, Edgmont, Middletown, Thornbury, and Upper Chichester and spans the Media, Marcus Hook, West Chester, and Bridgeport USGS Quadrangles. A USGS location map showing the proposed alignment can be found in Attachment 1 of the E&S report. Past and present land use of the project area and surrounding area is agricultural and forested land. Future land use will be a maintained vegetated natural gas pipeline ROW and agricultural land.

The project area surface water runoff drains to surface waters and unnamed tributaries (UNTs) designated as warm water fisheries (WWF), trout stock fisheries (TSF), high quality (HQ), and cold water fisheries (CWF) under PA Code 25 Chapter 93 including UNT to Ridley Creek (TSF), Rocky Run (HQ-CWF), UNT to Rocky Run (HQ-CWF), UNT to Chester Creek (TSF), Chrome Run (TSF), Crum Run (TSF), UNT to Crum Run (TSF), Chester Creek (TSF), Chester Creek (WWF), UNT to Delaware River (WWF), Baldwin Run (WWF), and UNT to Baldwin Run (WWF). The 620 Major Modification surface water runoff drains to surface waters designated as TSF under PA Code 25 Chapter 93.

The E&S plan contains Antidegradation Best Available Combination of Technologies (ABACT) best management practices (BMPs) to maintain the designated use of the receiving waters. The basic BMPs that are anticipated to be employed during the construction activities include:

- Minimizing disturbances to site areas, especially those currently covered with pavement or vegetation.
- Minimizing the time that soil is exposed.
- Preventing the runoff from flowing across disturbed areas (divert the flow to vegetated areas).
- Stabilizing disturbed soils as soon as possible.
- Slowing down the runoff flowing across the site.
- Removing sediment from surface water runoff before it leaves the site.

3.0 SITE RESTORATION

Following completion of pipeline installation and trench backfilling, the area shall be returned to the general grade present prior to pipeline installation in order to maintain preconstruction drainage patterns. After completion of major construction work, topsoil that was stockpiled during construction will be placed along the ROW. Grounds disturbed by any of the operations necessary to complete the work for this project are to be permanently seeded, or if specified, sodded, unless occupied by structures, paved or designated as a permanent access road. Disturbed areas, which are at final grade, shall be seeded and mulched as soon as practical. The permanent seed mixture will restore disturbed areas to a meadow in good condition or better.

Within Delaware County, all disturbed areas within the pipeline right of way, additional temporary workspaces, and temporary access roads will be restored to a meadow in good condition or better. The pre-construction drainage patterns surrounding the project will be maintained for the areas of the project within the township. As a result of restoring the pipeline right of way, additional temporary workspaces, and temporary access roads to a meadow condition and maintaining pre-construction drainage patterns in accordance with 25 Pa Code § 102.8(n), there will be no increase in stormwater runoff rate or volume attributed to these locations, and a quantitative stormwater analysis is not required for the pipeline ROW. Where an existing lawn condition exists and the property owner specifies, the area will be restored to a lawn condition instead of meadow.

4.0 STORMWATER MANAGEMENT

The construction and restoration practices for the proposed pipeline have been designed to meet the provisions of the Chester/Ridley Creek Watershed Stormwater Management District – Middletown Township Stormwater Ordinance and PADEP Chapter 102 regulations. In the area of the Major Modification, the pre-construction drainage patterns surrounding the project will be maintained, and all disturbed areas within the pipeline ROW will be restored to a meadow in good condition. As a result of restoring all disturbed areas to a meadow condition, the project will not result in increased stormwater runoff rate or volume within the proposed pipeline ROW.

5.0 ACT 167 COMPLIANCE

Delaware County does not have an approved Act 167 Stormwater Management Plan. As a result, stormwater runoff rate and volume requirements are met site per PADEP's 25 Pa Code § 102.8(n). By following the requirements of PADEP's 25 Pa Code § 102.8(n) the Sunoco Pipeline project meets the criteria for Delaware County.

6. PNDI

1. PROJECT INFORMATION

Project Name: **HDD S3-0620 Conversion**
Date of Review: **2/12/2019 09:33:49 AM**
Project Category: **Energy Storage, Production, and Transfer, Energy Transfer, Pipeline (e.g., gas, oil) -- NEW (construction of new line in a new location)**
Project Area: **8.63 acres**
County(s): **Delaware**
Township/Municipality(s): **MIDDLETOWN**
ZIP Code: **19063**
Quadrangle Name(s): **MEDIA**
Watersheds HUC 8: **Lower Delaware**
Watersheds HUC 12: **Chester Creek**
Decimal Degrees: **39.897534, -75.434575**
Degrees Minutes Seconds: **39° 53' 51.1232" N, 75° 26' 4.4692" W**

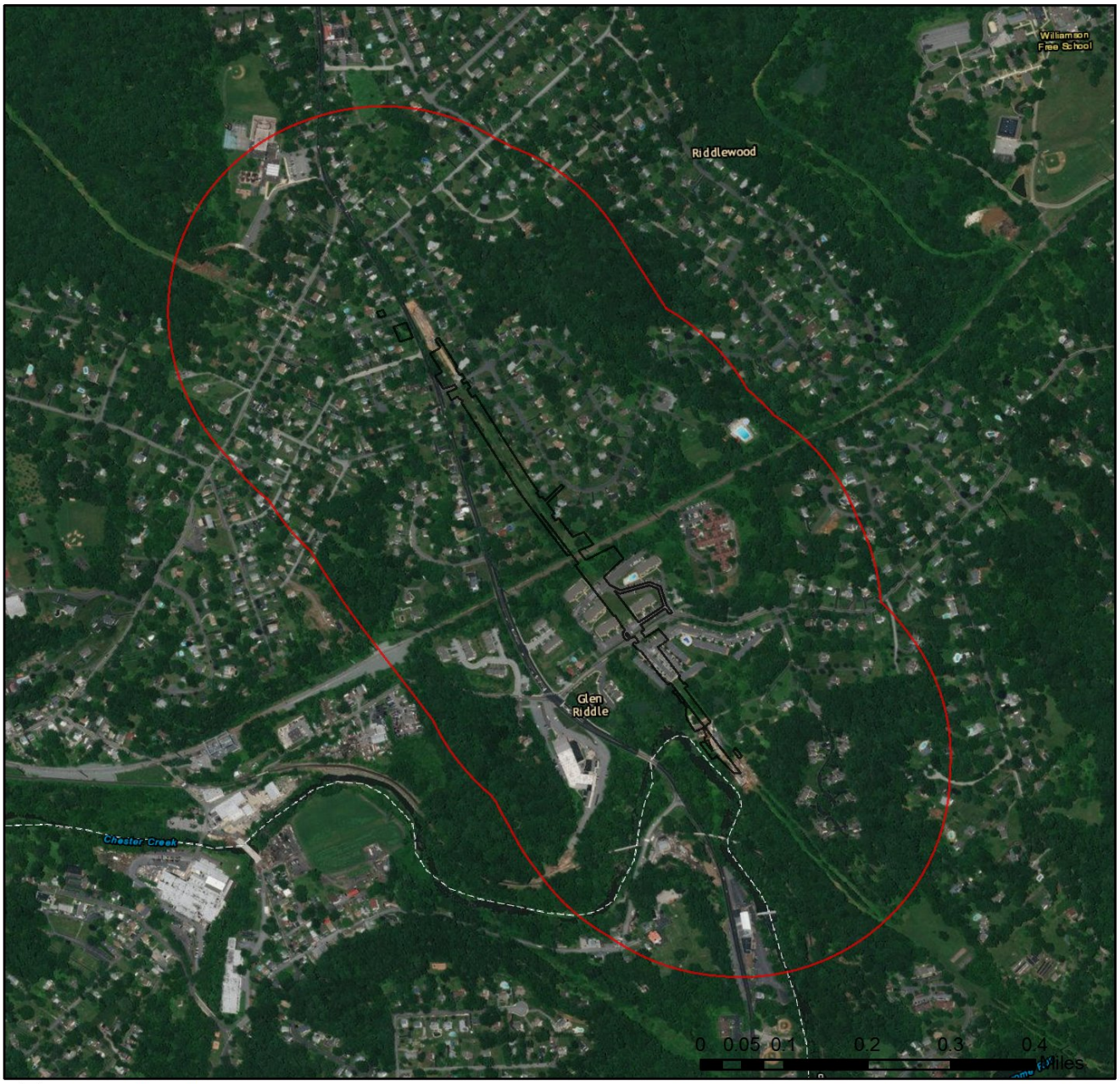
2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 must comply with the bog turtle habitat screening requirements of the PASPGP.

HDD S3-0620 Conversion

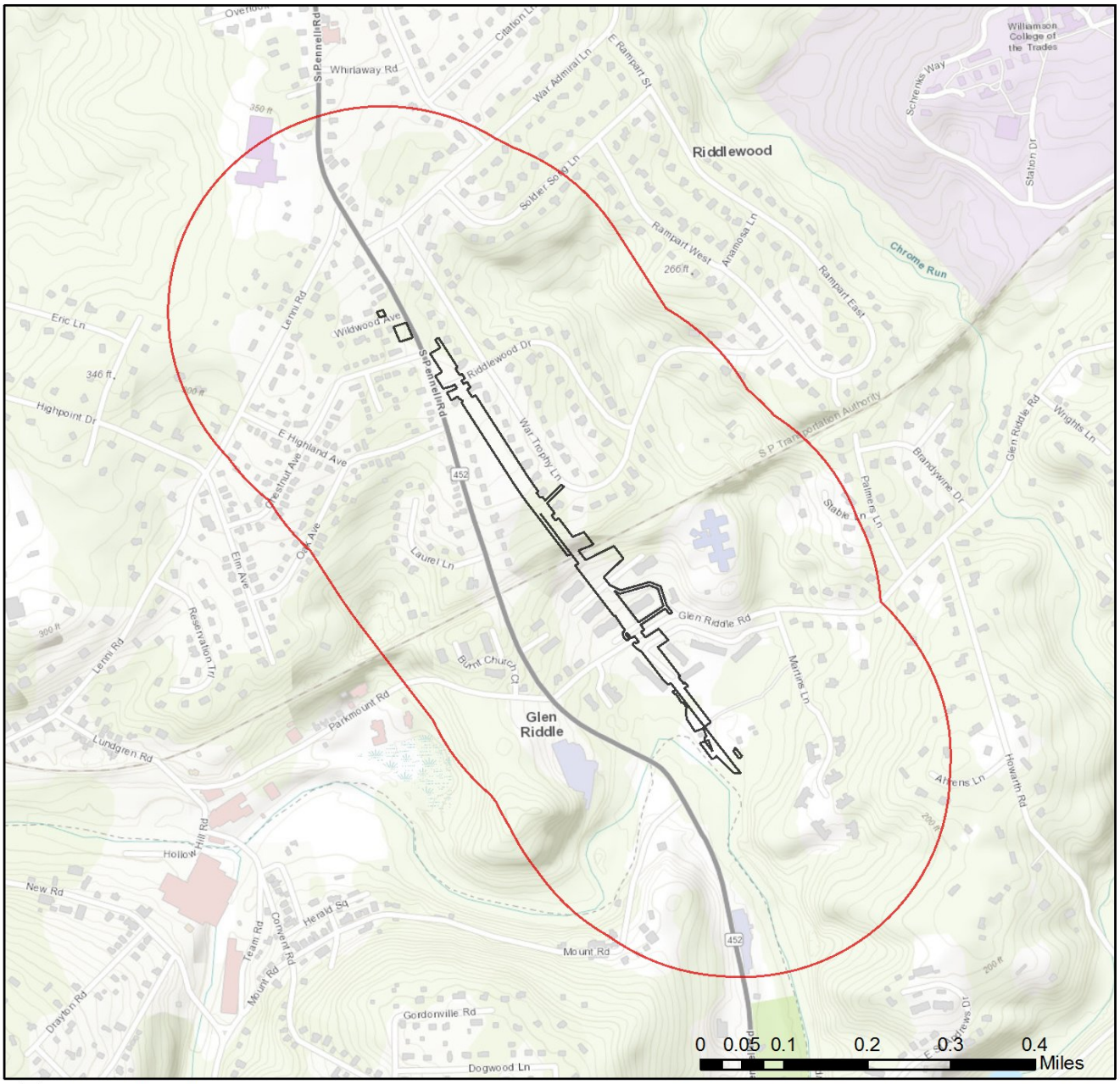


Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

HDD S3-0620 Conversion



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,

RESPONSE TO QUESTION(S) ASKED

Q1: Accurately describe what is known about wetland presence in the project area or on the land parcel. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from the wetland specialist, and detailed project maps should document this.)

Q2: The proposed project is in the range of the Indiana bat. Describe how the project will affect bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this. Round acreages up to the nearest acre (e.g., 0.2 acres = 1 acre).
Your answer is: The project will affect 1 to 39 acres of forests, woodlots and trees.

Q3: Aquatic habitat (stream, river, lake, pond, etc.) is located on or adjacent to the subject property and project activities (including discharge) may occur within 300 feet of these habitats?
Your answer is: Yes

Q4: Is tree removal, tree cutting or forest clearing of 40 acres or more necessary to implement all aspects of this project?
Your answer is: No

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PFBC Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

Scientific Name	Common Name	Current Status
Sensitive Species**		Threatened

U.S. Fish and Wildlife Service
RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).
***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Kevin Berend
Company/Business Name: Tetra Tech
Address: 301 Ellicott St.
City, State, Zip: Buffalo, NY 14203
Phone: (716) 849-9419 Fax: (716) 849-9420
Email: kevin.berend@tetratech.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

2/12/19
date

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Gas Section
595 E Rolling Ridge Dr.
Bellefonte, PA 16823

March 6, 2019

IN REPLY REFER TO
SIR# 50801

Tetra Tech
Kevin Berend
301 Ellicott Street
Buffalo, New York 14203

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 677014_1
HDD S3-0620 Conversion
DELAWARE County: Middletown Township

Dear Kevin Berend:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the PNDI database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

Eastern Redbelly Turtle (*Pseudemys rubriventris*, PA threatened)

A field view by the Pennsylvania Fish and Boat Commission, along with a company representative, was conducted on February 27, 2019 to view current conditions following construction and restoration of the project area near the unnamed tributary to Chester Creek. To avoid potential conflicts with turtles a barrier should be maintained in between the project LOD and Chester Creek. Prior to construction in vicinity of the unnamed tributary to Chester Creek, the project area should be checked and cleared for turtles. Any turtle found on site should be photographed and relocated to the nearest aquatic habitat. Additionally, the PFBC must be contacted within 48 hours of the find.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information.

Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Greg Lech at 610-847-8772 and refer to the SIR # 50801. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Greg Lech
Natural Gas Section

GPL/dn

TETRA TECH

February 13, 2019

Mr. Greg Lech, Fisheries Biologist
Pennsylvania Fish and Boat Commission
Division of Environmental Services
P.O. Box 356
Revere, PA 18953

RE: Additional Coordination on PNDI File Number 677014
Mariner East II: Pennsylvania Pipeline Project
Modification to Convert HDD to Open Cut Installation
Delaware County, Pennsylvania

Dear Mr. Lech:

On behalf of Sunoco Pipeline, L.P. (SPLP), Tetra Tech, Inc. (Tetra Tech) is submitting supplemental materials in response to a Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review (receipt number 677014) for the SPLP Pennsylvania Pipeline Project (Project). The PNDI indicated no impact anticipated from the Pennsylvania (PA) Game Commission, PA Department of Conservation and Natural Resources (PADCNR), and the U.S. Fish and Wildlife Service (USFWS), however, the PA Fish and Boat Commission (PAFBC) required further review to determine the potential impact to a sensitive species.

SPLP is requesting a major Chapter 105 permit modification from the Pennsylvania Department of Environmental Protection (PADEP) for a change in the installation method for the 20-inch and portions of the 16-inch diameter pipelines in Middletown Township, Delaware County. This area was previously reviewed for protected species as a Horizontal Directional Drill (HDD). This permit modification is to convert the planned HDD to conventional open trench construction for most of the route, and supplement with conventional auger bores under roads and railroads.

Project Description and Minimization Efforts

The new installation method will involve the open cut of wetland I1 to install both pipes and an open cut to install the 20-inch pipe across stream S-I2. Stream S-I2 will be crossed via an open trench method for the 20-inch pipeline with the appropriate dam and pump bypass installed to convey stream flow across the workspace and outlet downstream within the permitted limit-of-disturbance (LOD), such that work will be conducted in a dry stream channel. After the stream bypass is in place, the trench will be excavated, and the pipe will be installed. In order to efficiently complete all construction activities and minimize resource impacts for the 20-inch pipe, SPLP is proposing a 50-foot-wide LOD across stream S-I2. Measures to minimize and/or eliminate any scour of the streambank such as using geotextile at the outlet pump or flume will be used. Most stream crossings happen within 12-24 hours, sometimes exceeding that timeframe due to presence of rock or the size of the stream.

Timber mats and bridges will be placed within the travel lane where the wetland and stream are crossed to avoid soil compaction, allow for trench excavation, segregation of the wetland topsoil and stream substrate material, and stockpiling of excavated materials in adjacent upland areas. Once the pipes and appropriate trench plugs are installed, the trench will be backfilled, and restored per the approved Erosion and Sediment Control Plans approved by PADEP, including returning the area to pre-existing elevations and hydrology, and revegetated.

Appropriate Best Management Practices (BMPs) for Erosion and Sediment Control, including processes and control devices (e.g. silt fence, filter sock) will be used to avoid any sediment leaving the workspace areas. The revised Erosion and Sediment Control Plan of the proposed open cut crossing is provided as Attachment C.

Project Information Provided
The location of the Project site and scope of the proposed change to be reviewed is provided in the revised Chapter 105 aerial site plan (Attachment A). The PNDI receipt generated for this request is provided in Attachment B, and the proposed Erosion and Sediment control design and installation method is provided in Attachment C.

SPLP appreciates your timely review of this request for the PAFBC's clearance to change the installation method of the Project at this wetland/stream complex crossing. PADEP requires SPLP coordinate with PAFBC to support the modification to SPLP's received PADEP Chapter 105 Water Encroachment and Obstruction permit and U.S. Army Corps of Engineers Section 404 permit. Please contact me by telephone at 716-541-9217 or by e-mail at pat.green@tetratech.com with any questions you may have.

Sincerely,

Tetra Tech, Inc.

Pat Green
Ecological Services Manager

Enclosures: Attachments

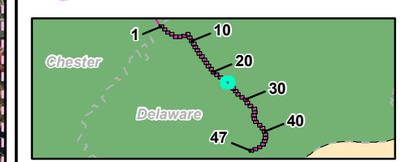
cc:
M. Gordon, SPLP
M. Styles, SPLP
B. Schaeffer, Tetra Tech
R. Dingle, Tetra Tech

Attachment A

Revised PADEP Chapter 105 Site Plan Sheets

Legend

- Sheet Boundary
- PPP 1
- PPP 2
- PPP 1, Bore
- PPP 1, HDD
- PPP 2, Bore
- PPP 2, HDD
- Pullback String
- Permanent Easement (no surface disturbance)
- Permanent ROW
- Temporary ROW
- ATWS
- Permanent Access Road
- Temporary Access Road
- ROW-Travel LOD
- ROW-Travel and Clearing LOD
- Existing Block Valve
- New Block Valve
- Block Valve Setting LOD
- Station LOD
- Bore Pits
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Pond
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Chapter 105 Floodway
- Waived Floodway
- Ch. 106 Floodplain Fringe



N

0 25 50 100 150 200

1 inch = 100 feet

Site Plan for the Sunoco Pennsylvania Pipeline Project, Delaware County, PA.
Sheet 24 of 47

Prepared By: TETRA TECH

Date: 02/2019

Base Map; SPLP 2014-2016, Roads from NRCS Geo-spatial Data Giveaway, 100-Year Floodplain from FEMA NFHL, downloaded 9/2016. Aquatics, TT 2013-2016.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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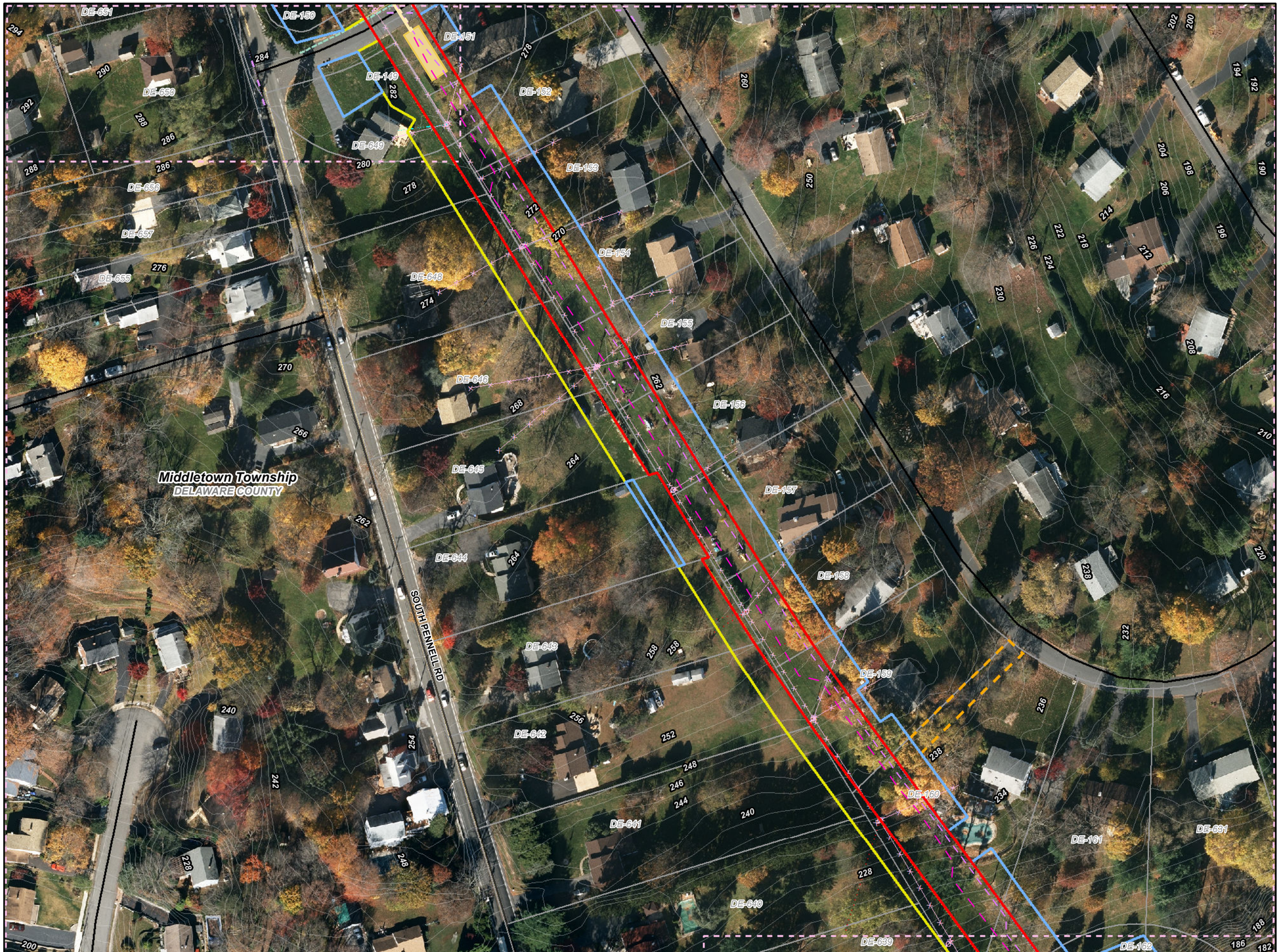

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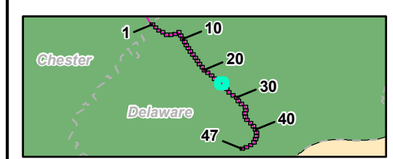

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1 inch = 100 feet

Site Plan for the Sunoco Pennsylvania Pipeline Project, Delaware County, PA.
Sheet 25 of 47

Prepared By: TETRA TECH

Date: 02/2019

Base Map; SPLP 2014-2016, Roads from NRCS Geo-spatial Data Giveaway, 100-Year Floodplain from FEMA NFHL, downloaded 9/2016. Aquatics, TT 2013-2016.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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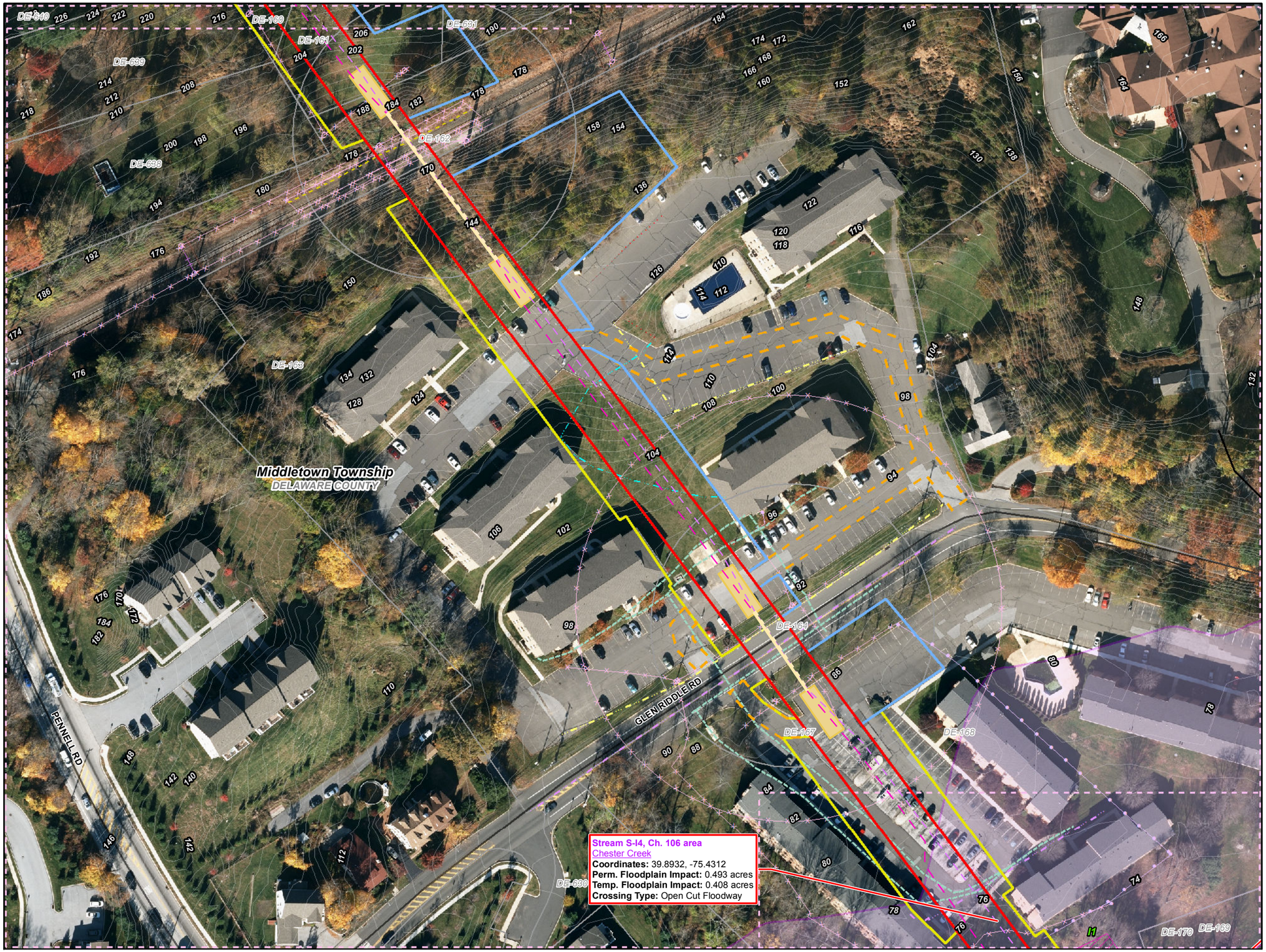

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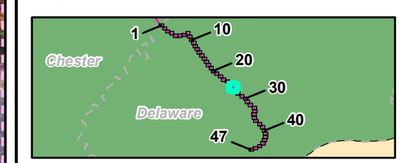

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1 inch = 100 feet

Site Plan for the Sunoco Pennsylvania Pipeline Project, Delaware County, PA.
Sheet 26 of 47

Prepared By: TETRA TECH

Date: 02/2019

Base Map; SPLP 2014-2016, Roads from NRCS Geo-spatial Data Giveaway, 100-Year Floodplain from FEMA NFHL, downloaded 9/2016. Aquatics, TT 2013-2016.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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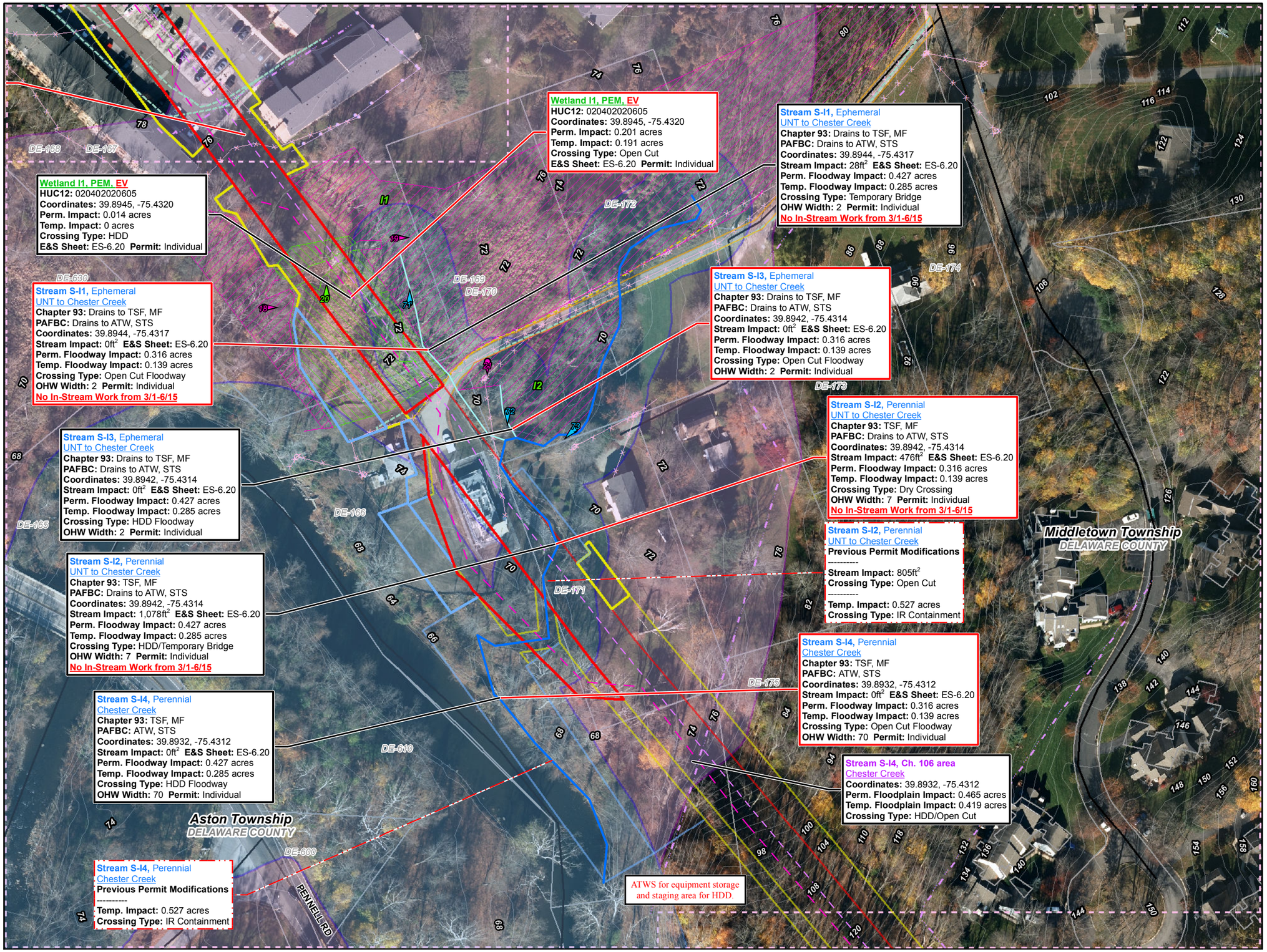

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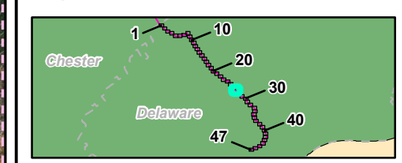

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1 inch = 100 feet

Site Plan for the Sunoco Pennsylvania Pipeline Project, Delaware County, PA.
Sheet 27 of 47

Prepared By: TETRA TECH

Date: 02/2019

Base Map; SPLP 2014-2016, Roads from NRCS Geo-spatial Data Giveaway, 100-Year Floodplain from FEMA NFHL, downloaded 9/2016. Aquatics, TT 2013-2016.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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Attachment B

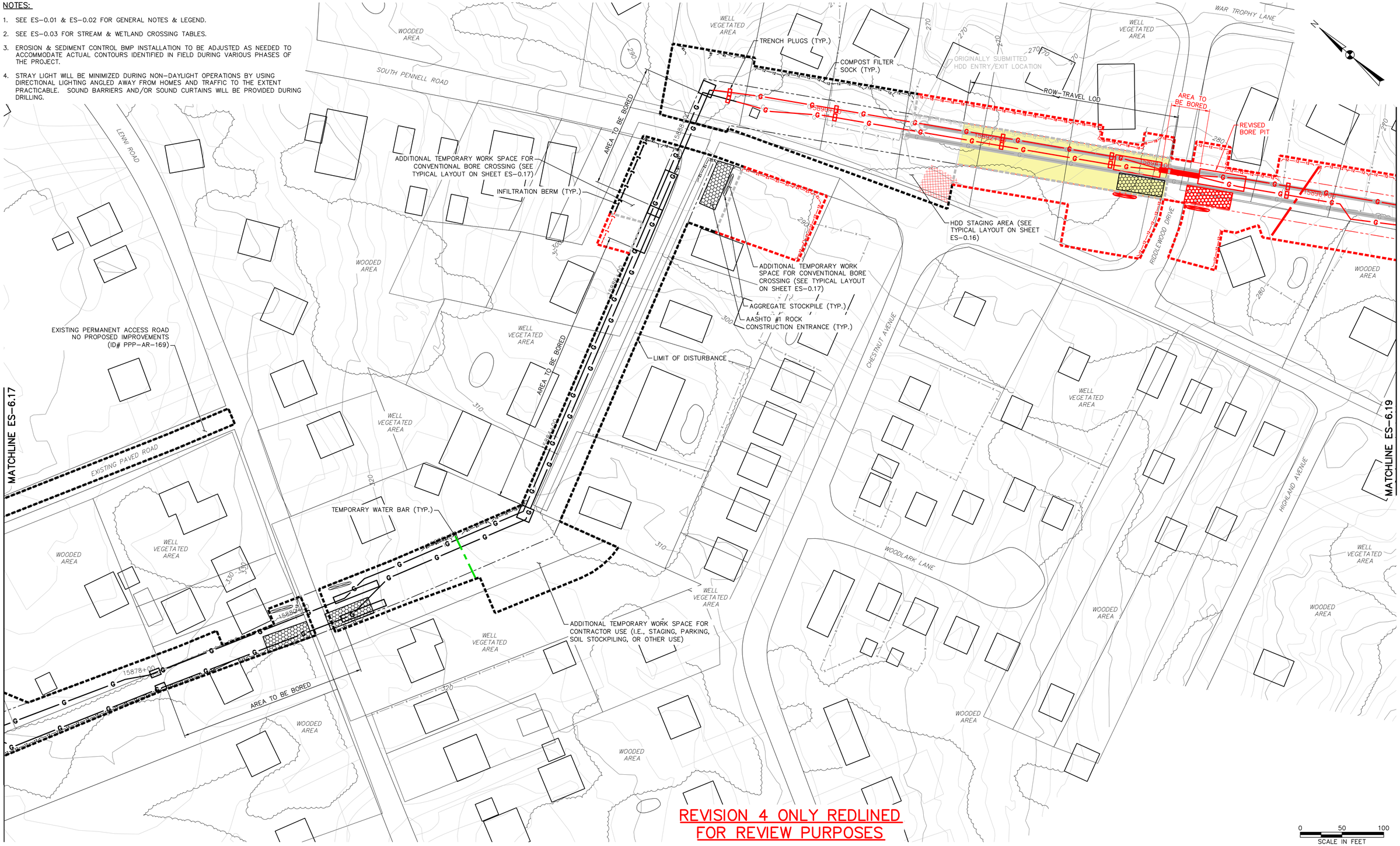
PNDI Receipt

Attachment C

Revised Erosion and Sediment Control Plan Sheets

NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
4. STRAY LIGHT WILL BE MINIMIZED DURING NON-DAYLIGHT OPERATIONS BY USING DIRECTIONAL LIGHTING ANGLED AWAY FROM HOMES AND TRAFFIC TO THE EXTENT PRACTICABLE. SOUND BARRIERS AND/OR SOUND CURTAINS WILL BE PROVIDED DURING DRILLING.



REVISION 4 ONLY REDLINED FOR REVIEW PURPOSES

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	8/16/18	16" HDD MODIFICATION
4	RS	2/8/19	HDD CONVERTED TO CONVENTIONAL BORES. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER ROBERT F. SIMCIK

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 18 OF 35

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

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ES-6.18
SHEET 6.18 OF 60

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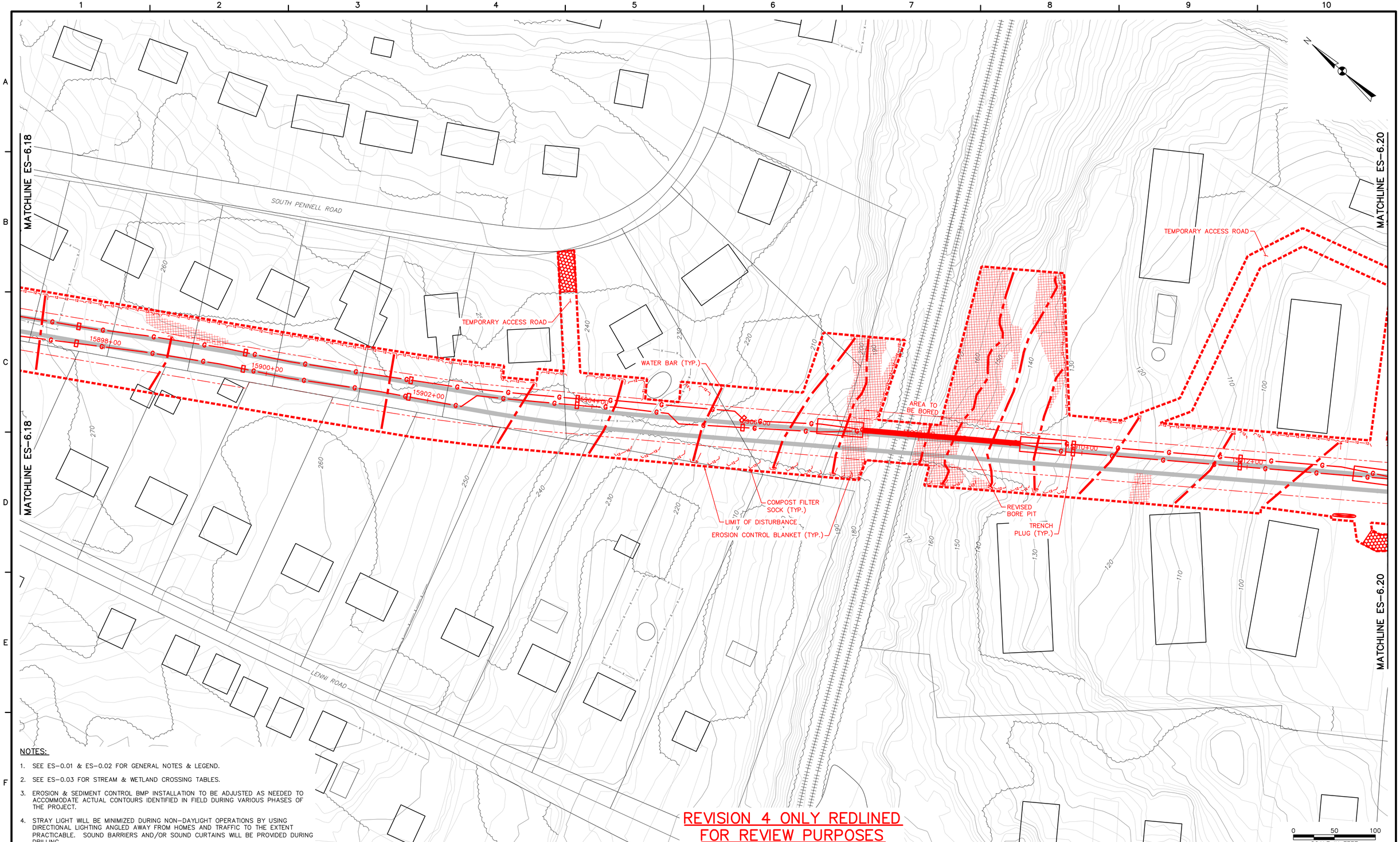

REVISION 4 ONLY REDLINED FOR REVIEW PURPOSES

NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
4. STRAY LIGHT WILL BE MINIMIZED DURING NON-DAYLIGHT OPERATIONS BY USING DIRECTIONAL LIGHTING ANGLED AWAY FROM HOMES AND TRAFFIC TO THE EXTENT PRACTICABLE. SOUND BARRIERS AND/OR SOUND CURTAINS WILL BE PROVIDED DURING DRILLING.

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	8/16/18	16" HDD MODIFICATION
4	RS	2/8/19	HDD CONVERTED TO CONVENTIONAL BORES. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT F. SIMCIK
2/8/19

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 19 OF 35

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

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ES-6.19
SHEET 6.19 OF 60

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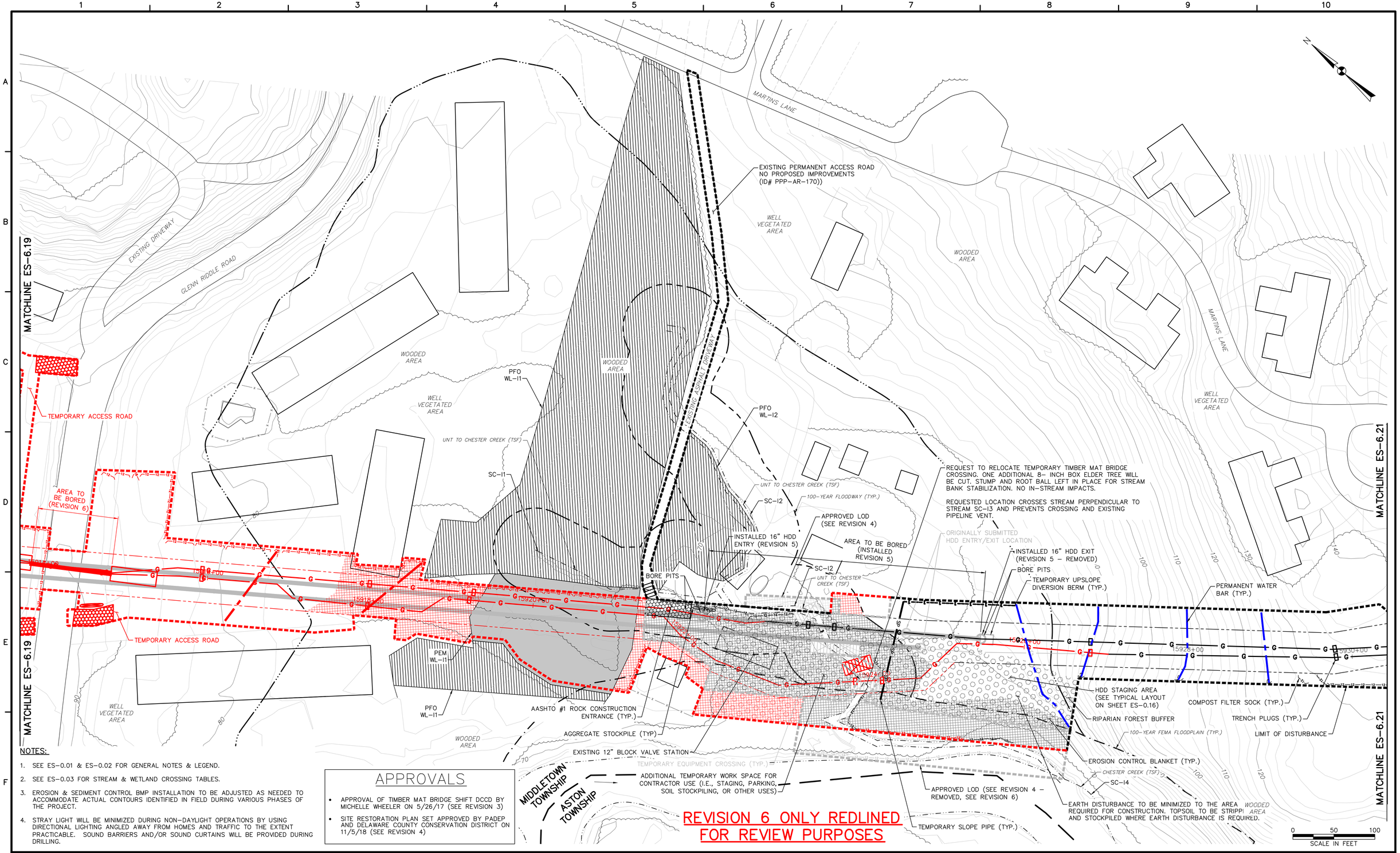

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APPROVALS

- APPROVAL OF TIMBER MAT BRIDGE SHIFT DCCD BY MICHELLE WHEELER ON 5/26/17 (SEE REVISION 3)
- SITE RESTORATION PLAN SET APPROVED BY PADEP AND DELAWARE COUNTY CONSERVATION DISTRICT ON 11/5/18 (SEE REVISION 4)

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

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2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	5/26/17	TIMBER BRIDGE SHIFT
4	RS	1/31/18	ADDITIONAL LOD AND E&S CONTROLS ADDED-SEE SITE SPECIFIC DRAWING SET
5	RS	8/16/18	16" HDD MODIFICATION
6	RS	2/8/19	HDD CONVERTED TO CONVENTIONAL BORES. ADDITIONAL LOD ADDED

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT F. SIMCIK
2/8/19

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 20 OF 35

DATE:	2/6/17
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7. POST-CONSTRUCTION STORMWATER MANAGEMENT AND SITE RESTORATION PLAN

Site Restoration and Post-Construction Stormwater Management Plan

Pennsylvania Pipeline Project - South East Region: Spread 6

Major Modification-HDD 620

April 2019

Prepared for:
Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA 19608

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

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ROBERT F. SIMCIK
ENGINEER
PE-050035-E
4/22/19

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Receiving Wetlands

Block Valve and Pump Station PCSM Design Standard Table

LIST OF ATTACHMENTS

1 USGS Location Map

2 Soils Map, Soil Descriptions, Geologic Formations Map, Sinkhole Repair Plan

3 Construction Details

4 Stormwater Calculations

5 Infiltration test results

6. PCSM Plan Drawings

7 Geosystems Correspondence

LIST OF ACRONYMS

ACRONYM	MEANING
% CCE	Calcium carbonate equivalent
% ENV	Effective neutralizing value
ABACT	Antidegradation Best Available Combination of Technologies
BMP	Best Management Practice
E&SC	Erosion and Sediment Control
EV	Exceptional value
HDD	Horizontal directional drilling

HDPE	High-density polyethylene
HQ	High quality
NGL	Natural gas liquids
PA	Pennsylvania
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Access
PCSM	Post-Construction Stormwater Management
PIs	Pure live seed
ROW	Right of way
SPPP	Sunoco Pennsylvanian Pipeline Project
SR	Site Restoration
TSF	Trout stock fisheries
Tt	Tetra Tech, Inc.
UNT	Unnamed tributary
WWF	Warm water fisheries

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Site Restoration and Post-Construction Stormwater Management (PCSM) Plan (Plan) for Sunoco Pipeline, L.P. (SPLP) – Pennsylvania Pipeline Project, South East Region: Spread 6. The Plan addresses activities associated with the Sunoco Pennsylvania Pipeline Project (SPPP) installation. Spread 6 (South East Region) of this project is located in Chester and Delaware Counties, Pennsylvania (PA). The plan addresses activities associated with a major modification to the Sunoco Pennsylvania Pipeline Project (SPPP) installation. The 620 HDD Major Modification is located in Middletown, Delaware County. Site location maps are provided in Attachment 1.

2.0 SITE DESCRIPTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL). The project involves the installation of approximately two parallel pipelines within a 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. The majority of the new ROW will be co-located adjacent to existing utility corridors, including approximately 230 miles of pipeline that will be co-located in the existing SPLP Mariner East pipeline system. The 20-inch pipeline will be installed first, followed by the 16-inch line. Any temporary stabilization required will be implemented in accordance with this Erosion and Sediment (E&S) Plan. Both pipelines will be installed within the same limit of disturbance (LOD) and in the same construction period. This SR and Post Construction Stormwater Management Plan specifically relates to impacts associated with the South East Region, Construction Spread 6.

Fifty feet will be maintained as permanent ROW. In addition, temporary use areas or extra workspaces will be required at some stream and road/railroad crossings; these will typically expand the construction ROW by 25 feet where needed. Construction activities will involve tree removal, clearing and grubbing within the ROW, trenching, pipe installation, and SR. The total LOD in the South East Region will be approximately 278 acres. Acres disturbed by county will be as follows: Chester County with 176 acres disturbed, and Delaware County with 102 acres disturbed.

The HDD 620 Major Modification is is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad. Stream SC-I2 and wetland WL-I1 will be crossed in accordance with Chapter 105 Joint Permit Application major modification, utilizing one of the approved open-trench excavation methods for installation of the pipeline across waterbodies. The modification includes an additional 5.32 acres of LOD.

Past and present land use of the project area and surrounding area is agricultural and forested land. Future land use will be a maintained vegetated natural gas pipeline ROW and agricultural land and forested land. Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the gas line alignment are indicated on the plans, where applicable.

2.1 TOPOGRAPHY

The work zone is located on ground of varying elevations. Site elevations vary from 23 feet (Chester Creek in Delaware County) to 741 feet (western border of Chester County) above mean sea level based on the Pennsylvania Spatial Data Access (PASDA). The construction plans show the topography of the site and the surrounding area.

2.2 GEOLOGY AND SOILS

The soils and geologic formations surrounding the site are shown on the figures provided in Attachment 2. Attachment 2 also provides soil descriptions and properties of the soils found at the site. In general, the following actions will be taken to counteract soil limitations:

1. Erodible Soils - Prompt stabilization practices will be implemented to minimize the risk of erosion. PCSM facilities have been designed to minimize point-source discharges which increase the likelihood of downstream erosion.

2. Cut Banks Caves - Almost all Pennsylvania soils are susceptible to caving of cut banks. Cut slopes will be stabilized as soon as possible with seed and mulch to prevent sliding. Slopes are designed to not exceed 2H:1V.

3. Corrosive to Concrete or Steel Pipe - Pipes to be used on site shall be either HDPE or coated steel.

4. High Water Table - A seasonal high groundwater determination was conducted at the proposed block valve sites. PCSM facilities that infiltrate have been designed to maintain a 20" separation from the seasonal high groundwater table.

5. Low Strength - Most of Pennsylvania soils (73%) have relatively low strength. Precautions will be taken to prevent slope failures due to improper construction practices. Soils will be evaluated during construction of block valve sites and PCSM facilities to determine whether additional measures will need to be taken.

6. Piping Tendencies -Piping is the erosion by percolating waters or seepage in layer of subsoil resulting in caving and the formation of tunnels or pipes thorough which the soluble or granular material is removed. Where necessary, anti-seep collars will be used to prevent piping.

7. Poor Topsoil -Soil amendments will be added to site soils to promote vegetative growth.

8. Potentially Hydric -A wetland delineation has been performed to determine the presence of wetlands.

9. Potential Sinkhole - Should a sinkhole be encountered during construction, repair should be done under the direct observation and supervision of a professional geologist or licensed geotechnical engineer. Site specific sinkhole repairs should be developed on a case by case basis. Block valves located within karst

topography have been identified, and infiltration practices have been designed to minimize the risk of sinkholes.

To prevent sediment from leaving the site, stabilization practices will be implemented in disturbed areas as soon as practical. Geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance were not observed during field activities. Infiltration tests are being performed and results are being evaluated for the design of the proposed post construction stormwater BMPs.

2.3 SURFACE WATER HYDROLOGY

The receiving waters for the 620 HDD Major Modification LOD is UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. Descriptions of the Primary Receiving Waters can be found in Table 1.

The plan contains Antidegradation Best Available Combination of Technologies (ABACT) BMPs to maintain the designated use of the receiving waters and prevent additional siltation from polluting the streams. The locations of the receiving waters relative to the project area can be seen on the USGS location map in Attachment 1.

3.0 SITE RESTORATION PRACTICES

Section 3.0 addresses restoration of the mainline pipeline, temporary workspaces, temporary access roads, and the block valve sites which will be vegetated. Following completion of pipeline installation and trench backfilling, the pipeline ROW, associated workspaces, and temporary access roads shall be returned to the general grade present prior to pipeline installation in order to maintain preconstruction drainage patterns. After completion of major construction work, topsoil that was stockpiled during construction will be placed along the ROW. Grounds disturbed by any of the operations necessary to complete the work for this project within the ROW are to be permanently seeded, or if specified, sodded, unless occupied by structures, paved, or designated as a permanent access road. Disturbed areas, which are at final grade, shall be seeded and mulched once final grades are achieved. The permanent seed mixture will restore disturbed areas to a meadow in good condition or better. If seeding cannot be completed within a 4 day period due to weather conditions, the disturbed area will be mulched with straw at the rate of 3 tons per acre. This straw will be anchored using a method described in Section 3.4.

3.1 BMP DESCRIPTION AND CONSTRUCTION SEQUENCE

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action to conform to the applicable regulatory agency requirements for restoration and post-construction stormwater management of the site. Necessary steps for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. The contractor will comply with all requirements listed in this section. The contractor may be required to alter controls based on the effectiveness of controls or differing conditions encountered in the field. The appropriate county conservation district and DEP shall be contacted and must approve any deviation to the authorized plans.

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

General Construction Sequence

1. Grade surface to finished grade elevations as soon as practicable following completion of pipe installation.

2. Surface roughening will be utilized to rough the soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces

within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended. Surface roughening shall be accomplished using dozers affixed with grouser tracked equipment. Dozers shall run up and down the slopes leaving horizontal grooves perpendicular to the slope. Dozer blades shall be raised and not used during surface roughening. Where compaction does occur, contractor shall scarifiy the soil or provide additional roughening such as deep ripping or chisel ripping to restore the area to a minimal compacted state. In areas of proposed infiltration, soils shall be amended to 2' below grade. See Soil Amendment and Restoration construction sequence below.

3. Place topsoil from topsoil stockpiles as the upper layer of backfill. Topsoil shall not be placed when the subgrade is frozen or when it is excessively wet or dry and shall not be handled when in a frozen or muddy condition.

4. Remove gravel and geotextile from the temporary access roads and scarify the soil. Refer to step 2 of this sequence to address compaction at access roads. After addressing compaction concerns, place topsoil that was stripped prior to installation of the access roads.

5. Immediately seed and mulch disturbed areas in accordance with the permanent seeding schedule once final grade is established and topsoil is placed.

6. Maintain erosion and sedimentation control devices until site work is complete and a uniform 70-percent perennial vegetative cover is established. Regrade and revegetate areas disturbed during the removal of the erosion and sediment controls.

Permanent Seeding

Site preparation and establishment of permanent cover in areas other than lawns will be conducted according to the following guidelines:

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SLOPES AND BANKS (NOT MOWED) WELL-DRAINED VARIABLE DRAINAGE	 1 PLUS 1 PLUS	 3, 5, 8, OR 12 (1) 3 OR 7
SLOPES AND BANKS (MOWED) WELL-DRAINED **SLOPES AND BANKS (GRAZED/HAY)** WELL-DRAINED	1 PLUS 1 PLUS	2 OR 10 2,3, OR 13
GULLIES AND ERODED AREAS	1 PLUS	3, 5, 7, OR 12 (1)
EROSION CONTROL FACILITIES (BMPS) SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS DRAINAGE DITCHES	1 PLUS	2, 3, OR 4

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SHALLOW, LESS THAN THREE FEET DEEP	1 PLUS	2, 3, OR 4
DEEP, NOT MOWED	1 PLUS	5 OR 7
POND BANKS, DIKES, LEVEES, DAMS, DIVERSION CHANNELS, AND OCCASIONAL WATER FLOW AREAS		
MOWED AREAS	1 PLUS	2 OR 3
NON-MOWED AREAS	1 PLUS	5 OR 7
FOR HAY OR SILAGE ON DIVERSION CHANNELS AND OCCASIONAL WATER FLOW AREAS	1 PLUS	3 OR 13
HIGHWAYS		
NON-MOWED AREAS		
WELL-DRAINED	1 PLUS	5, 7, 8, OR 10
VARIABLE DRAINED	1 PLUS	3 OR 7
POORLY DRAINED	1 PLUS	3
AREAS MOWED SEVERAL TIMES PER YEAR	1 PLUS	2, 3, OR 10
UTILITY ROW		
WELL-DRAINED	1 PLUS	5, 8, OR 12 (1)
VARIABLE DRAINED	1 PLUS	3 OR 7
WELL-DRAINED AREAS FOR GRAZING/HAY	1 PLUS	2, 3, OR 13
EFFLUENT DISPOSAL AREAS	1 PLUS	3 OR 4
SANITARY LANDFILLS	1 PLUS	3, 5, 7, 11 (1), OR 12 (1)
SURFACE MINES		
SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST)	1 PLUS	3, 4, 5, 7, 8, 11 (1) OR 12(1)
SEVERELY DISTURBED AREAS FOR GRAZING/HAY	1 PLUS	3 OR 13
LAWN	1 PLUS	PENNDOT Formula B

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	**SPECIES**	**SEEDING RATES – PLS (1)**	
		MOST SITES	ADVERSE SITES (8)
1 (2)	spring oats (spring), or 64 96	64	96
	annual ryegrass (spring or fall), or	10	15
	winter wheat (fall), or	90	120
	winter rye (fall)	56	112
2 (3)	tall fescue, or 75	60	75
	fine fescue, or 40	35	40
	kentucky bluegrass, plus 25 30	25	30
	redtop(4), or	3	3
	perennial ryegrass	15	20
3	birdsfoot trefoil, plus 6 10	6	10
	tall fescue	30	35
4	birdsfoot trefoil, plus	6	10
	reed canarygrass	10	15
5 (5)	Big Bluestem, plus	10	15
	tall fescue, or	20	25
	perennial ryegrass	20	25

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	**SPECIES**	**SEEDING RATES – PLS (1)**	
		MOST SITES	ADVERSE SITES (8)
6 (5,6)	Big Bluestem, plus	10	15
	annual ryegrass	20	25
7 (5)	birdsfoot trefoil, plus	20	30
	Big Bluestem, plus	20	30
	tall fescue	20	25
8	flatpea, plus	20	30
	tall fescue, or	20	30
	perennial ryegrass	20	25
9	Not applicable to project	N/A	N/A
10	tall fescue, plus	40	60
	fine fescue	10	15
11	deertongue, plus	15	20
	birdsfoot trefoil	6	10
12(7)	switchgrass, or	15	20
	big bluestem, plus	15	20
	birdsfoot trefoil	6	10
13	orchardgrass, or	20	30
	smooth bromegrass, plus	25	35
	birdsfoot trefoil	6	10

1. Pure live seed (pls) is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds pls shown on the seed tag. Thus, if the pls content of a given seed lot is 35 percent, divide 12 pls by 0.35 to obtain 34.3 pounds of seed required to plant one-acre. All mixtures in this table are shown in terms of pls.

2. If high-quality seed is used, for most sites seed spring oats at a rate of two bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at one bushel per acre. If germination is below 90 percent, increase these suggested seeding rates by 0.5 bushel per acre.

3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.

4. Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.

5. Use for highway slopes and similar sites where the desired species after establishment is Big Bluestem.

6. Use only in extreme southeastern or extreme southwestern PA. Serecia lespedeza is not well adapted to most of PA.

7. Do not mow shorter than 9 to 10 inches.

8. If liming, fertilization, and preparation of seedbed are properly done and if care is taken to drill and cover the seed (or mulch applied), the rate for "most sites" should suffice. However, on eroded or coarse and poorly prepared seedbeds, particularly if the soil is very acidic or infertile, the rate for "adverse sites" should be used.

9. For seed mixtures 11 and 12, only use spring oats or weeping lovegrass (included in mix) as nurse crop.

In lawn areas, permanent cover will be established using the following PENNDOT seed mixture:

PENNDOT FORMULA B				
Seeding Rate	3 lbs. per 1,000 square feet			
Species	**% by Weight**	**Purity %**	**Minimum % Germination**	**Maximum % Weed Seed**
Kentucky Bluegrass	50	98	80	0.20
Perennial Rye	20	98	90	0.15
Red Fescue	30	98	85	0.15

Liming Rates

Minimum 6 tons per acre at 100% effective neutralizing value (% ENV), unless the soil test determines that a lesser amount is needed. To determine the actual amount of regular lime to apply, divide the amount called for by the soil test by the % ENV for the product used. For example, if 6 tons per acre is needed and the %ENV for the lime used is 88%, divide 6 by 0.88 resulting in 6.8 tons needing to be applied. For dolomitic lime, which has a significant amount of magnesium in it, divide the amount called for by the soil test by the % calcium carbonate equivalent (% CCE) listed for the product instead of the % ENV. The % CCE may be above 100% which accounts for the fact that magnesium has a greater effect per pound than the calcium in regular lime. Note: When a soil test requires more than 8,000 pounds of lime per acre, the lime must be mixed into the top 6 inches of soil.

Fertilization Rates

Apply 10-20-20 at 600 pounds/acre, if top dressed or 1,000 pounds/ac, if incorporated, unless the soil test determines that the rate can be less than these minimums.

SOIL AMENDMENT APPLICATION RATE EQUIVALENTS				
Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yds.	
AGRICULTURAL LIME	6 TONS	240 LBS.	240 LBS.	or as per soil test; may not be required in agricultural fields
10-20-20 FERTILIZER	1,000 LBS.	25 LBS.	25 LBS.	or as per soil test; may not be required in agricultural fields

Temporary Seeding

Temporary grass cover will be established in the following areas where soil stockpiles are exposed for a period greater than 4 days. The seed mixture for temporary cover will consist of 100% annual ryegrass. Seed will be applied at the rate of 40 pounds per acre or as recommended by a local recognized seed supplier approved by the Owner's representative. Prior to seeding, apply 1 ton of agricultural grade limestone per acre plus 10-10-10 fertilizer at the rate of 500 pounds per acre and work into the soil.

Mulching

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

1. Straw mulch will be applied at the rate of 3 tons per acre. Chemically treated or salted straw is not acceptable as mulch.

2. Straw mulch will be anchored immediately after application by at least one of the following methods:

   A. "Crimped" into the soil using tractor-drawn equipment (straight-bladed coulter or similar).

      This method is limited to slopes no steeper than 3:1. Machinery should be operated on the contour. (Crimping of hay or straw by running it over with tracked machinery is not recommended.)

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

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

D. Lightweight plastic, fiber, or paper nets may be stapled over the mulch according to the manufacturer's recommendations.

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

3.2 MATERIAL RECYCLING AND DISPOSAL

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 Pennsylvania Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. Expected construction wastes during site restoration will consist of packaging material and sediment cleaned from E&SC BMPs. Packaging from materials brought on site will be disposed of by a licensed hauler. Sediment removed from BMPs will either be spread in a protected area to dry and then recycled as fill material prior to permanent seeding or disposed of off-site. In cases where disposal is necessary, waste materials will be disposed of at an approved PADEP waste site.

3.3 THERMAL IMPACTS

Thermal impacts are most commonly associated with urbanization (i.e., increased impervious surfaces) that results in heated stormwater runoff flowing into receiving waters where it mixes, and potentially increases the base temperature of the surface water in streams. However, another contributing factor for stream temperature is solar exposure (radiant energy input) to the surface water, typically ponded, standing waters. The amount of heat transferred, and the degree of thermal pollution is of importance for fisheries management and the ecological integrity of receiving waters. Among the attributes that determine the contribution of solar energy to thermal impacts are the presence of riparian vegetation, as well as stream width, depth, flow regime (perennial, intermittent, ephemeral), and orientation.

Thermal impacts have been minimized by limiting the disturbed area to the maximum extent practicable. By minimizing the extent of the disturbed area, vegetative clearing, including forested areas, has been minimized. Vegetated block valve sites will be restored to a meadow in good condition or better, and no impervious surface will be created at those sites. Following installation of the pipelines, existing grades along the pipeline right of way, additional temporary workspaces, and temporary access roads will be restored, permanent seeding will

occur as soon as practicable to facilitate vegetative growth during germinating months, and the addition/creation of impervious surfaces in riparian areas has been avoided. By returning these areas to their existing grades, stormwater is unlikely to pond in these locations therefore minimizing the potential for ponded water to result in significant contributions to thermal impacts in receiving waters. In addition, thermal impacts will be minimized during site restoration by facilitating permanent seeding as soon as practicable to encourage vegetative growth. Although shade cover will be reduced in areas that were previously forested, there is no anticipated adverse effect to the receiving watersheds because the project will only clear a narrow corridor of vegetation within each respective watershed. The Project does not have thermal impacts. Specifically, thermal impacts will be avoided by implementing the following:

- Siting parallel to and overlapping with existing ROWs to minimize vegetation clearing at stream crossings;
- Reducing the construction ROW width and additional temporary workspaces at stream crossings;
- No grubbing, grading, or clearing of trees will occur within 50 feet of the top of stream bank until pipeline construction/installation is ready to proceed through that area.
- Restoring (seeding) disturbed areas/ROW as soon as practicable and /or directing runoff to vegetated areas to reduce the temperature of runoff prior to discharge into the streams; and,
- Restoring the stream banks and seeding/planting as soon as practicable to facilitate vegetative growth along the stream channel.

3.4 RIPARIAN FOREST BUFFERS

Pennsylvania Pipeline Project - Riparian Forest Buffer Waiver Request

The Pennsylvania Pipeline Project qualifies for an exception of the riparian forest buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area. Existing riparian forest buffers within the project area are identified on the E&S plan drawings in Attachment 2 of the E&S Plan.

In addition to the exception, we are requesting a waiver under 102.14(d)(2)(ii) for areas within 150' of surface waters that are outside of the Chapter 105 permit area. A detailed riparian buffer waiver request has been prepared as an attachment to the ESCGP-3 Notice of Intent.

The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. Since the LOD is not located in a special protection watershed the Riparian Forest Buffer requirements is not applicable.

Demonstration of Waiver Necessity

A riparian forest buffer waiver is necessary to complete the intended scope of the pipeline project. The project involves the installation of approximately two parallel pipelines within a 306-mile, 50-foot-wide ROW from Houston, Washington County, PA to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255 miles. Spread 6 (South East Region) of this project crosses through Chester and Delaware Counties, PA. Due to the linear nature of the project and the surrounding topography, riparian forest buffers could not be avoided altogether.

Alternatives Analysis

Impacts to environmental resources, including riparian forest buffers, were evaluated during the pipeline routing phase of the project. Field teams were deployed to evaluate alternate routes based on environmental and constructability constraints. The final route that was selected minimizes environmental impacts to the maximum extent practicable while still maintaining the project's overall constructability and ensuring a safe working environment while also taking landowner constraints into consideration. Additionally, several variations of horizontal direction drill profiles were evaluated to minimize pullback areas, additional workspaces, and overall disturbance within riparian forest buffers. Permanent features, such as access roads and block valves, were evaluated to locate the features outside of the riparian forest buffer, where possible.

Demonstration of Minimizing Impacts

All disturbance activities, including those which impact riparian forest buffers, have been reduced to the maximum extent practicable. The LOD has been reduced to 50 feet wide at all stream crossings within the riparian forest buffer area where possible adjacent to the stream area required for crossing and construction. In areas where it is not practicable to reduce the LOD throughout the entire extent of the riparian forest buffer, the LOD has been reduced to 50 feet wide within 10 feet of the stream banks to limit the proximity of the work areas as per the stream crossing detail from the 2012 PADEP Erosion and Sediment Control Program Manual. The operations within the LOD near stream crossings typically includes a topsoil stockpile, a stockpile for pipe trench excavation material, a pipe trench, a travel lane, a work area for equipment operation and pipeline welding outside the trench, and an area to install the erosion control BMPs. In addition, site conditions such as steep slopes, varying depths of topsoil, and other on-site conditions limit the amount of work area. Reducing the LOD to a greater extent could potentially result in unsafe working conditions and would hinder the ability to complete the stream crossing within the required time frame of 24 hours or less. Workspaces that provide

additional space for stream crossing activities have been placed outside of riparian forest buffers where possible.

Meeting Requirements of Chapter 102

All other aspects of Chapter 102 are being met. The project's E&SC Plan and SR/Post-Construction Stormwater Management Plan have been designed in accordance with Chapter 102. In accordance with Chapter 102, and E&S plan has been developed to minimize the sediment entering the buffer areas. A SR plan is proposed to revegetate the areas adjacent to the buffers within the ROW.

3.5 INSPECTION AND MAINTENANCE PROCEDURES

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

All sedimentation control measures will remain in place until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established. Any area not achieving a 70-percent vegetative cover will be reseeded and mulched within 24 hours of detection. If BMPs are found to be inoperative or ineffective during an inspection, PADEP should be contacted within 24 hours, followed by submission of a written noncompliance report to PADEP within 5 days of the initial contact.

Long-Term Maintenance

Long-term maintenance of the pipeline ROW will include periodic visual inspections for sufficient vegetative growth and cover. Insufficient vegetative cover is defined as any area not achieving a uniform 70-percent perennial vegetative cover. Bare spots and areas with insufficient vegetative cover will be reseeded and mulched within 24 hours of discovery. The ROW will be inspected for signs of erosion, especially on steep slopes. Corrective measures will be taken, as needed. If there is evidence of trench settling, the area will be regraded to maintain pre-construction drainage patterns, mulched, and seeded. A written report is required for each inspection and for each repair or maintenance activity, and the report should specify how to access the site. SPLP is responsible for maintaining the ROW under the provisions of this permit.

3.6 ANTIDEGRADATION REQUIREMENTS

The 620 Major Modification LOD is not located in a special protection watershed; therefore, the antidegradation analysis is not required.

3.7 STORMWATER RUNOFF ANALYSIS

The pre-construction drainage patterns surrounding the project will be maintained. All disturbed areas within the 280 HDD Major Modification LOD will be restored to a meadow in good condition or lawn where required by landowners. As a result of restoring the pipeline ROW and associated workspaces associated with the Major Modification to a meadow in good condition and maintaining pre-construction drainage patterns, there will be no increase in stormwater runoff rate or volume attributed to those areas. There are no proposed permanent access roads or block valves associated with this major modification.

All disturbed areas within the pipeline right of way, additional temporary workspaces, and temporary access roads will be restored to a meadow in good condition or better or a lawn condition. The pre-construction drainage patterns surrounding the project will be maintained for the areas of the project covered under this section. As a result of restoring the pipeline right of way, additional temporary workspaces, and temporary access roads to a meadow condition and maintaining pre-construction drainage patterns in accordance with 25 Pa Code § 102.8(n), there will be no increase in stormwater runoff rate or volume attributed to these locations, and a quantitative stormwater analysis is not required.

The proposed mainline pipeline will be restored in accordance with 102.8(n) and meet the requirements outlined in §§ 102.8(b), (c), (e), (f), (h), (i), (l), and (m).

In accordance with § 102.8(b), the following principles have been incorporated into the project design in accordance with the numbering in § 102.8(b): (1) The integrity of stream channels and the physical, biological, and chemical qualities of the receiving waters will remain unchanged. The site restoration principles will protect the existing and designated uses of the receiving waters. BMPs will be maintained until the site achieves stabilization during site restoration to ensure that runoff which leaves the project site will have no short-term adverse effects on the physical, biological, or chemical qualities of downstream receiving waters. The permanent seed mixture will restore the majority of the right of way to a meadow condition. Those areas which are not restored to a meadow condition will be restored to a lawn condition or forest. As a result of restoring the pipeline right of way as specified in the restoration plan, there will be no long-term effects to the physical, biological, or chemical qualities of downstream receiving waters. (2) The mainline pipeline will be restored to original grade so flow paths will not be altered. The right of way will be restored to achieve a meadow in good condition or better, with the exception of areas that will be returned to lawn or forest. In addition, the pipeline right of way accounts for only a narrow corridor of development within each drainage area to the nearest receiving water. As a result, post-development runoff rates to the nearest receiving water will not increase. (3) The right of way will be restored to a meadow in good condition or better in most areas, with the exception of specified locations where the right of way will be restored to the equivalent of its predevelopment land cover (lawn or forest). As a result, any potential increase in stormwater runoff volume has been minimized to the maximum extent practicable. (4) There are no proposed, permanent impervious features associated with the

mainline pipeline. Temporary access roads will be restored to a vegetated condition following installation of the pipeline. (5) Existing drainage features and vegetation will be protected by restoring the project area back to its original grade. As a result, drainage features and existing vegetation surrounding the project area will be preserved. (6) Land clearing and grading will be minimized because the project area has been limited to the area required to safely install the natural gas pipelines. The pipeline right of way will be returned to original grade following installation of the pipelines. (7) Soil compaction will be minimized by utilizing travel lanes within the pipeline right of way. Following construction, areas that have been compacted will be scarified or ripped, or soil amendments will be incorporated prior to backfilling topsoil and seeding. After initiating restoration, vehicular traffic will be restricted to prevent soil compaction. (8) As demonstrated in 102.8(2) and 102.8(3), potential increases in post development stormwater runoff has been minimized to the maximum extent practicable utilizing nonstructural restoration BMPs.

In accordance with § 102.8(c), the mainline Site Restoration and Post Construction Stormwater Management Plan has been planned and designed and will be implemented in consistency with the E&S Plan.

In accordance with § 102.8(e), the Site Restoration and Post Construction Stormwater Management Plan has been prepared by Robert F. Simcik, P.E. who is trained and experienced in PCSM design methods and techniques applicable to the size and scope of the proposed pipeline project.

In accordance with § 102.8(f), the Site Restoration and Post Construction Stormwater Management Plan contains drawings and a narrative consistent with the requirements of Chapter 102. The Plan has been designed to minimize the threat to human health, safety, and the environment to the greatest extent practicable. The Plan includes the required information as outlined in § 102.8(f)(1) through § 102.8(f)(15).

In accordance with § 102.8(h), nondischarge alternatives for Special Protection waters are evaluated in the Antidegradation section of the Site Restoration and Post Construction Stormwater Management Plan. The Plan includes ABACT BMPs where nondischarge alternatives do not exist for the project.

In accordance with § 102.8(i), the applicant has submitted the Site Restoration and Post Construction Stormwater Management Plan to the applicable county conservation districts and Department of Environmental Protection for review and approval. Upon complaint or site inspection, the Plan will be available for subsequent review and inspection by the reviewing agencies.

In accordance with § 102.8(l), the permittee will include with the notice of termination “Record Drawings” with a final certification statement from a licensed professional, which reads as follows:

“I (name) do hereby certify pursuant to the penalties of 18 Pa.C.S.A. § 4904 to the best of my knowledge, information and belief, that the accompanying record drawings accurately reflect the as-built conditions, are true and correct, and are in conformance with Chapter 102 of the rules and regulations of the Department of

Environmental Protection and that the project site was constructed in accordance with the approved PCSM Plan, all approved plan changes and accepted construction practices."

In accordance with § 102.8(m), the Site Restoration and Post Construction Stormwater Management Plan identifies that the permittee shall be responsible for long-term operation and maintenance of PCSM BMPs associated with permanent surface sites. However, there are no PCSM BMPs proposed as part of the mainline pipeline.

There are no proposed permanent gravel access roads and block valve pads in the South East Region.

4.0 POST-CONSTRUCTION STORMWATER MANAGEMENT ANALYSIS

The construction and restoration practices for the proposed major modification have been designed to meet the provisions PADEP Chapter 102 regulations. No new impervious area is proposed with the Major Modification. In general, the pre-construction drainage patterns surrounding the project will be maintained, and all disturbed areas within the pipeline ROW will be restored to a meadow in good condition. As a result of restoring all disturbed areas within the pipeline ROW to a meadow condition, the project will not result in increased stormwater runoff rate or volume.

4.1 BMP DESCRIPTION NARRATIVE AND CONSTRUCTION SEQUENCE

There are no proposed PCSM BMPs for the 620 HDD Major Modification.

4.2 MATERIAL RECYCLING AND DISPOSAL

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 Pennsylvania Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. In cases where disposal is necessary, waste materials will be disposed of at an approved PADEP waste site.

4.3 THERMAL IMPACTS

Thermal impacts are most commonly associated with urbanization (i.e., increased impervious surfaces) that results in heated stormwater runoff flowing into receiving waters where it mixes, and potentially increases the base temperature of the surface water in streams. However, another contributing factor for stream temperature is solar exposure (radiant energy input) to the surface water, typically ponded, standing waters. The amount of heat transferred, and the degree of thermal pollution is of importance for fisheries management and the ecological integrity of receiving waters. Among the attributes that determine the contribution of solar energy to thermal impacts are the presence of riparian vegetation, as well as stream width, depth, flow regime (perennial, intermittent, ephemeral), and orientation.

4.4 RIPARIAN FOREST BUFFERS

Pennsylvania Pipeline Project - Riparian Forest Buffer Waiver Request

The Pennsylvania Pipeline Project qualifies for an exception of the riparian forest buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area. Existing riparian forest buffers within the project area are identified on the E&S plan drawings in Attachment 2 of the E&S Plan.

In addition to the exception, we are requesting a waiver under 102.14(d)(2)(ii) for areas within 150' of surface waters that are outside of the Chapter 105 permit area. A detailed riparian buffer waiver request has also been prepared and is included as an attachment to the ESCGP-3 Notice of Intent.

The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. Since the LOD is not located in a special protection watershed the Riparian Forest Buffer requirements is not applicable.

Demonstration of Waiver Necessity

A riparian forest buffer waiver is necessary to complete the intended scope of the pipeline project. The project involves the installation of approximately two parallel pipelines within a 306-mile, 50-foot-wide ROW from Houston, Washington County, PA to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255 miles. Spreads 3, 4, and 5 (South Central Region) of this project are cross through Blair, Huntingdon, Juniata, Perry, Cumberland, York, Dauphin, Lebanon, Lancaster, and Berks Counties, PA. Due to the linear nature of the project and the surrounding topography, riparian forest buffers could not be avoided altogether.

Alternatives Analysis

Impacts to environmental resources, including riparian forest buffers, were evaluated during the pipeline routing phase of the project. Field teams were deployed to evaluate alternate routes based on environmental and constructability constraints. The final route that was selected minimizes environmental impacts to the maximum extent practicable while still maintaining the project's overall constructability and ensuring a safe working environment while also taking landowner constraints into consideration. Additionally, several variations of horizontal direction drill profiles were evaluated to minimize pullback areas, additional workspaces, and overall disturbance within riparian forest buffers. Permanent features, such as access roads and block valves, were evaluated to locate the features outside of the riparian forest buffer, where possible.

Demonstration of Minimizing Impacts

All disturbance activities, including those which impact riparian forest buffers, have been reduced to the maximum extent practicable. The LOD has been reduced to 50 feet wide at all stream crossings within the riparian forest buffer area where possible adjacent to the stream area required for crossing and construction. In areas where it is not practicable to reduce the LOD throughout the entire extent of the riparian forest buffer, the LOD has been reduced to 50 feet wide within 10 feet of the stream banks to limit the proximity of the work areas as per the stream crossing detail from the 2012 PADEP Erosion and Sediment Pollution Control Program

Manual. The operations within the LOD near stream crossings typically includes a topsoil stockpile, a stockpile for pipe trench excavation material, a pipe trench, a travel lane, a work area for equipment operation and pipeline welding outside the trench, and an area to install the erosion control BMPs. In addition, site conditions such as steep slopes, varying depths of topsoil, and other on-site conditions limit the amount of work area. Reducing the LOD to a greater extent could potentially result in unsafe working conditions and would hinder the ability to complete the stream crossing within the required time frame of 24 hours or less. Workspaces that provide additional space for stream crossing activities have been placed outside of riparian forest buffers where possible. The post construction stormwater management infiltration berms and trenches are not located within riparian forested buffers.

Meeting Requirements of Chapter 102

All other aspects of Chapter 102 are being met. The project's E&SC Plan and SR/Post-Construction Stormwater Management Plan have been designed in accordance with Chapter 102. In accordance with Chapter 102, and E&S plan has been developed to minimize the sediment entering the buffer areas. The post construction stormwater management plan has been design to control runoff rate and volume which may be discharge through riparian buffer areas.

4.5 INSPECTION AND MAINTENANCE PROCEDURES

Long-term maintenance of the pipeline ROW will include periodic visual inspections for sufficient vegetative growth and cover. Insufficient vegetative cover is defined as any area not achieving a uniform 70-percent perennial vegetative cover. Bare spots and areas with insufficient vegetative cover will be reseeded and mulched within 24 hours of discovery. The ROW will be inspected for signs of erosion, especially on steep slopes. Corrective measures will be taken, as needed. If there is evidence of trench settling, the area will be regraded to maintain pre-construction drainage patterns, mulched, and seeded. A written report is required for each inspection and for each repair or maintenance activity, and the report should specify how to access the site. SPLP is responsible for maintaining the ROW under the provisions of this permit.

Inspection and maintenance procedures for permanent post-construction stormwater management facilities and stormwater conveyance BMPs are summarized below. If any post-construction stormwater management facilities are constructed prior to stabilization of upslope contributory drainage areas, inspections shall occur weekly and after runoff events until the surrounding area achieves stabilization. Sites located within karst terrain require more frequent long-term inspections, as specified in the Sinkhole Repair Plan in Attachment 2.

4.6 ANTIDEGRADATION REQUIREMENTS

The 620 HDD Major Modification earth disturbance activities are not located in a special protection watershed; therefore, the antidegradation analysis is not required.

4.7 STORMWATER RUNOFF ANALYSIS

The pre-construction drainage patterns surrounding the project will be maintained. All disturbed areas within the 620 HDD Major Modification LOD will be restored to a meadow in good condition or lawn where required by landowners. As a result of restoring the pipeline ROW and associated workspaces associated with the Major Modification to a meadow in good condition and maintaining pre-construction drainage patterns, there will be no increase in stormwater runoff rate or volume attributed to those areas.

5.0 REFERENCES

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

Stormwater Management for Construction Activities - Developing Pollution Prevention Plans and Best Management Practices, United States Environmental Protection Agency, Office of Water, 1993.

Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, December 2006.

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Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

Siltation Impairment highlighted

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Conestoga River	Chester	West Nantmeal	WARM WATER FISHES	WWF	Yes	Agriculture- Nutrients; Other- Nutrients; Other- Organic Enrichment/Low D.O.; Source Uknown- Pathogens	Yes	Nutrients; Organic Enrichment/Low D.O.
UNT to South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
South Branch French Creek	Chester	West Nantmeal	EXCEPTIONAL VALUE	EV	Yes	Source Unknown- Pathogens	No	N/A
UNT to Marsh Creek	Chester	West Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	East Nantmeal	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Wallace	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Wallace	WARM WATER FISHES	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Marsh Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Black Horse Creek	Chester	Upper Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Shamona Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
UNT to Upper East Branch Brandywine Creek	Chester	Uwchlan	HIGH QUALITY-TROUT STOCKING	HQ	No	N/A	No	N/A
UNT to Valley Creek	Chester	Uwchlan	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
Valley Creek	Chester	West Whiteland	COLD WATER FISHES	CWF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation	Yes	Cause Uknown; Pesticides; Nutrients; Siltation; Organic Enrichment/Low D.O.; Suspended Solids
East Branch Chester Creek	Chester	West Whiteland	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
East Branch Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Chester	West Goshen	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	West Goshen	HIGH QUALITY-TROUT STOCKING	HQ	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Chester	Westtown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Chester	Westtown	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Ridley Creek	Delaware	Thornbury	HIGH QUALITY-TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Thornbury	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A
UNT to Ridley Creek	Delaware	Edgmont	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Cause Unknow	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers-Water/Flow Variability; Urban Runoff/Storm Sewers-Siltation; Habitat Modification- Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Rocky Run	Delaware	Middletown	HIGH QUALITY-COLD WATER FISHES	HQ	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Agriculture - Cause Unknown	No	N/A
UNT to Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation	No	N/A
Chrome Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Crum Run	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Middletown	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	TROUT STOCKING	TSF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table
Pennsylvania Pipeline Project
Southeast Region

Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Delaware River	Delaware	Aston	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Aston	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Chester Creek	Delaware	Brookhaven	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
Baldwin Run	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Receiving Waters Table

Pennsylvania Pipeline Project

Southeast Region

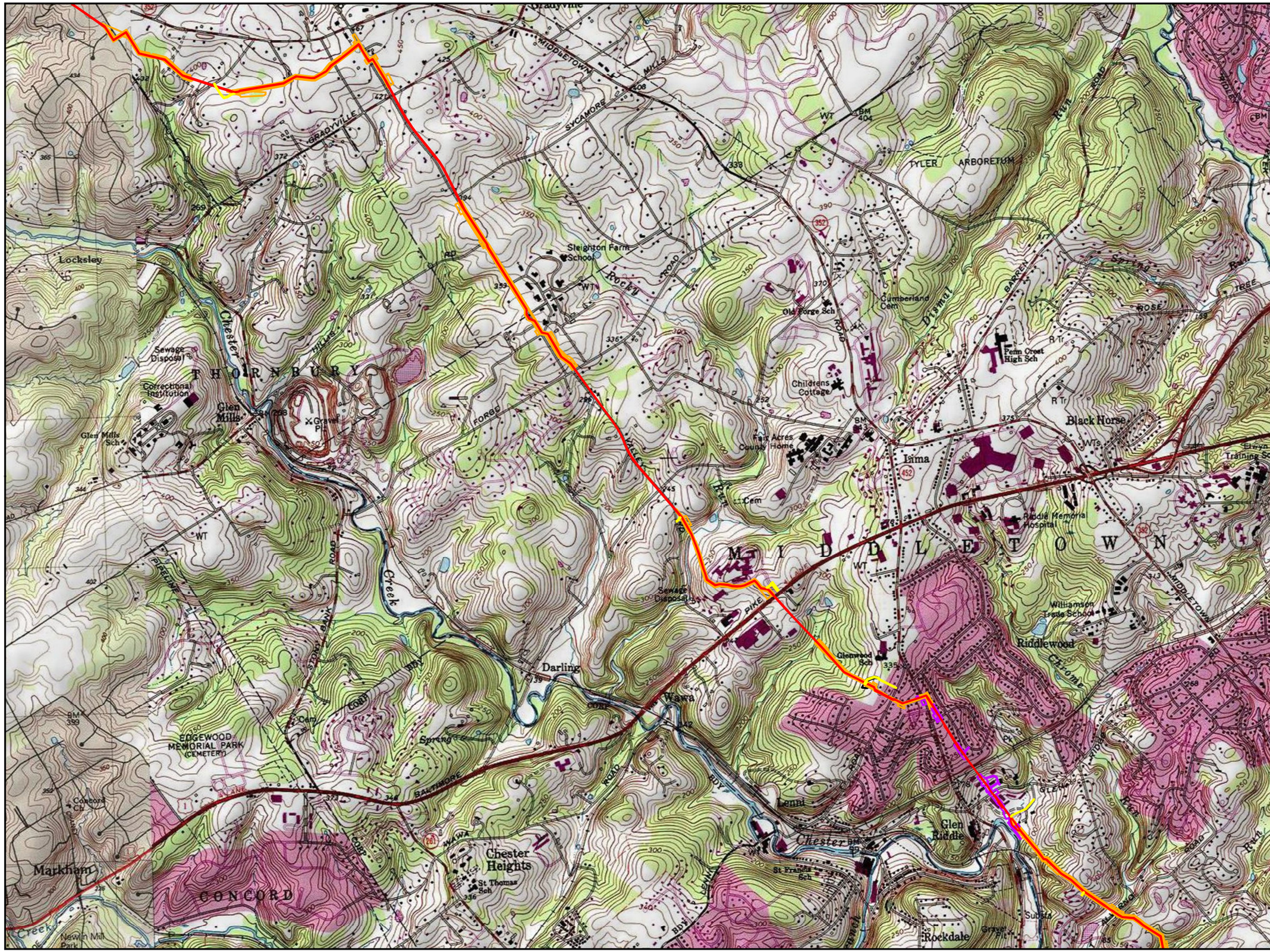
Stream Name	County	Township	Chapter 93 Designated Use (Existing Use, if applicable)	Chapter 93 Code	Impaired	Impairment	TMDL	TMDL Limits
UNT to Chester Creek	Delaware	Chester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Chester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Baldwin Run	Delaware	Upper Chichester	WARM WATER FISHES	WWF	Yes	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A
UNT to Delaware River	Delaware	Upper Chichester	WARM WATER FISHES	WWF	No	Urban Runoff/Storm Sewers - Cause Unknown ; Urban Runoff/Storm Sewers - Water/Flow Variability ; Urban Runoff/Storm Sewers - Siltation ; Habitat Modification - Other Habitat Alterations	No	N/A

Recieving Wetlands
Pennsylvania Pipeline Project
South-East Region

Municipality	Receiving Water	Number of Wetlands	Number of EV Wetlands (Classification)
CHESTER COUNTY			
West Nantmeal	UNT to South Branch French Creek	9	7 (EV Stream)
West Nantmeal	UNT to Marsh Creek	1	0
East Nantmeal	UNT to Marsh Creek	2	0
Wallace	UNT to Marsh Creek	6	0
Upper Uwchlan	UNT to Marsh Creek	18	0
Upper Uwchlan	UNT to Black Horse Creek	4	2 (Wild Trout/Bog Turtle)
Uwchlan	UNT to Shamona Creek	5	1 (Wild Trout)
West Whiteland	UNT to Valley Creek	17	0
West Whiteland	UNT to Chester Creek	2	0
West Goshen	UNT to Chester Creek	1	0
East Goshen	UNT to Chester Creek	2	0
Westtown	UNT to Chester Creek	1	0
DELAWARE COUNTY			
Edgmont	UNT to Chester Creek	6	0
Middletown	UNT to Chester Creek	18	2 (PuWS)
Middletown	UNT to Rocky Run	4	1 (Wild Trout)
Middletown	UNT to Chrome Creek	1	
Aston	UNT to Chester Creek	1	0
Aston	UNT to Baldwin Run	3	0
Chester	UNT to Baldwin Run	12	0
Chester	UNT to Chester Creek	2	0
Upper Chichester	UNT to Baldwin Run	14	0

ATTACHMENT 1:

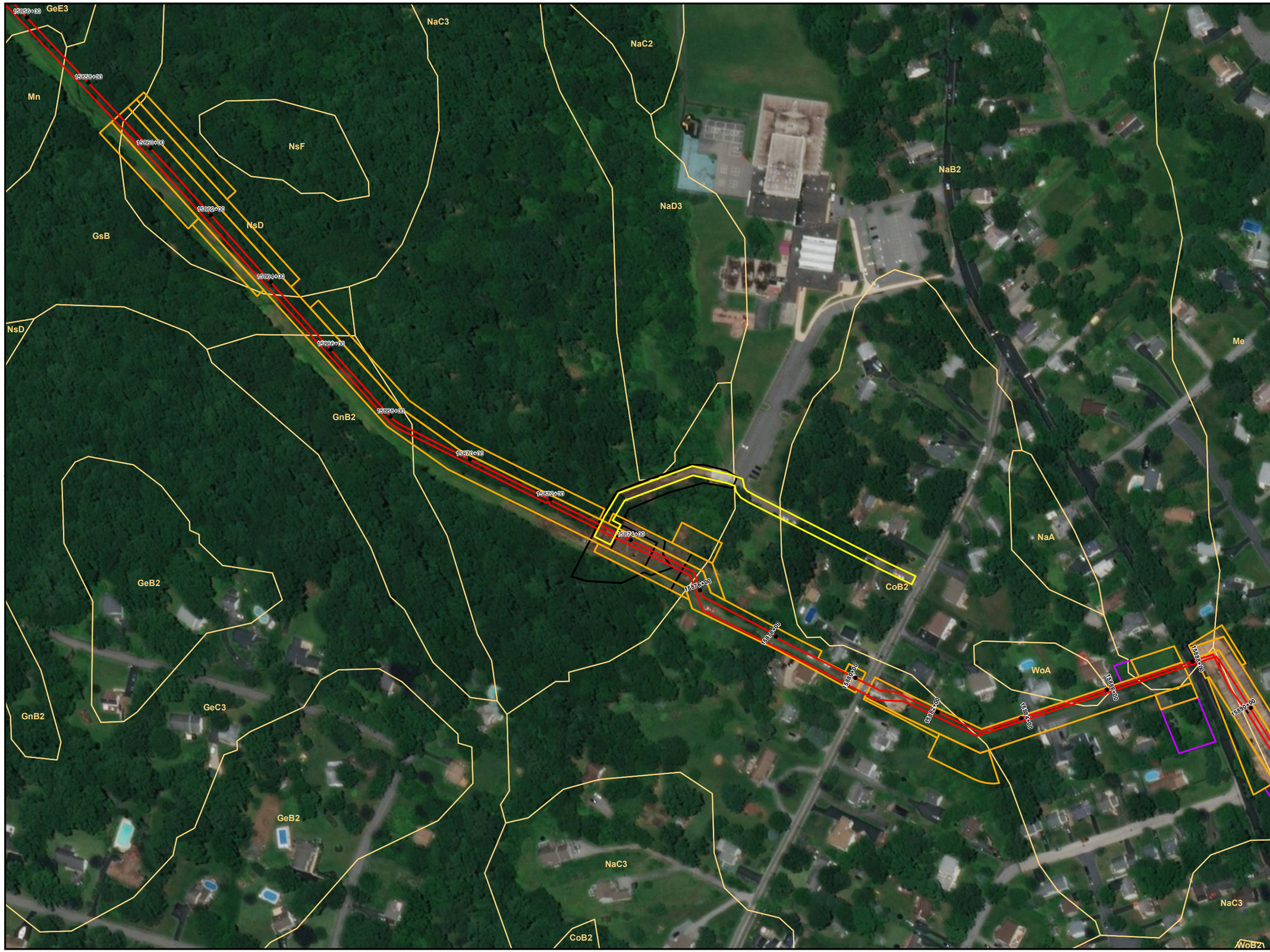
USGS Location Maps


Legend
Access Road
Major Modification LOD
Previously Approved LOD
Alignment Centerline
Block Valve/Station
Sheet Identifier
Feet
0
1,000
2,000
Meters
0
300
600
N
PROJECT LOCATION MAP
ATTACHMENT 1-5
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY,
PENNSYLVANIA
TETRA TECH
Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangle(s) displayed are Media, West Chester.
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP ESC\GP\PENNPIPELINE_60\MAJORMOD_ESCGP_USGS.MXD 04/18/19 TT
Middletown
Lima
Black Horse
Riddlewood
Glen Riddle
Rockdale
Chester Heights
Darling
Wawa
Lenni
Chester
Glen Mills
Thornbury
Concord
Markham
Edgewood Memorial Park (Cemetery)
Tyler Arboretum
Chester Creek
Sewage Disposal
Correctional Institution
Sleighton Farm School
Old Forge Sch
Cumberland Cem
Childrens Cottage
Fair Acres County Home
Penn Crest High Sch
Riddle Memorial Hospital
Williamson Trade School
Glenwood Sch
St Thomas Sch
St Francis Sch
Elwyn Training Sch
Locksley
Broomall
Ardmore
West Chester
Kennett Square
Hockessin
Wilmington

ATTACHMENT 2:

Limiting Soil Characteristics Table, Soil Descriptions,

Soil and Geological Maps, KARST Plan



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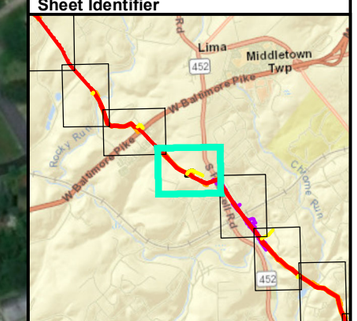
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



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Feet: 0 100 200

Meters: 0 30.48 60.96

NRCS SOILS MAP
ATTATCHMENT 5-53
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
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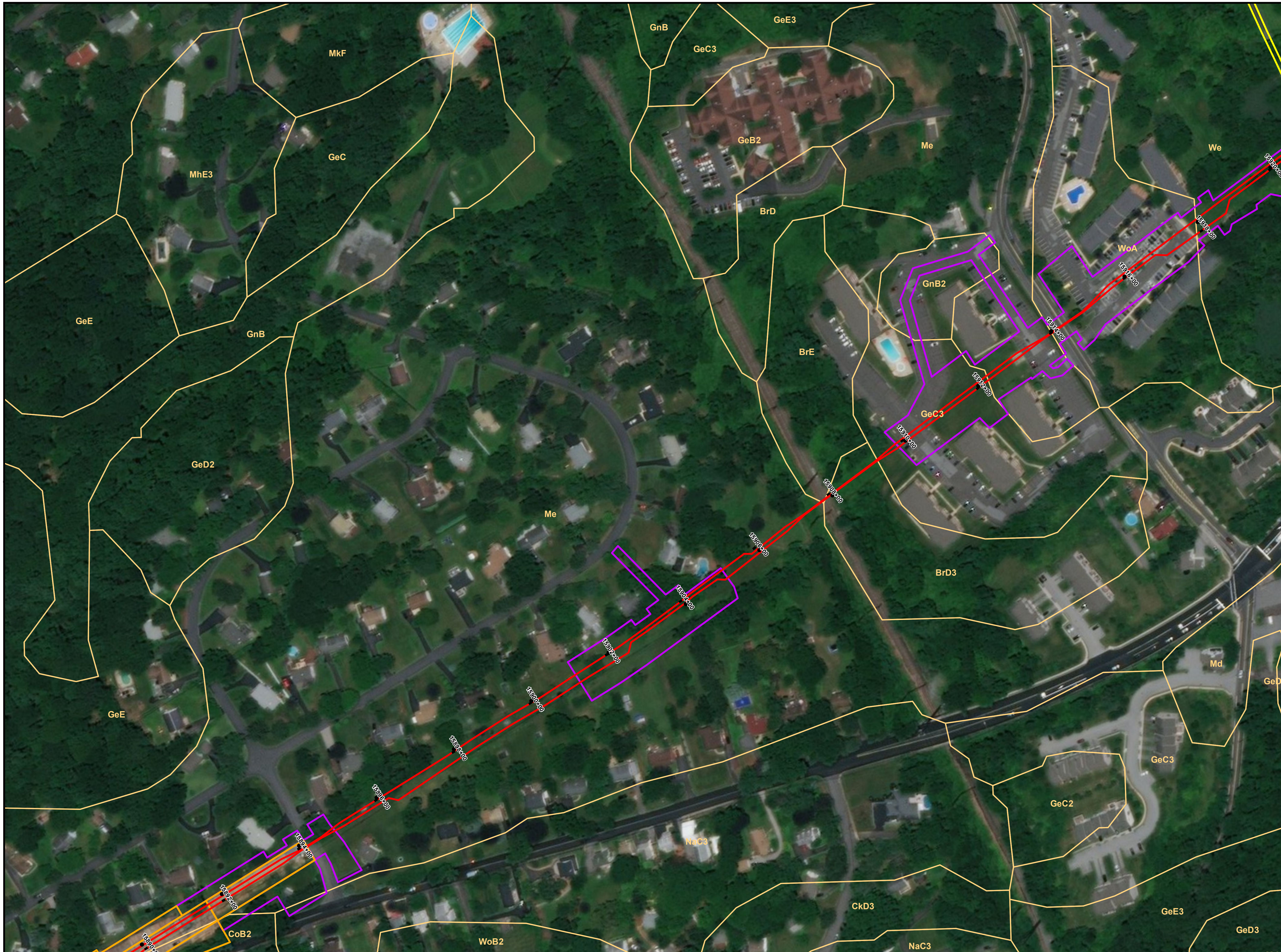
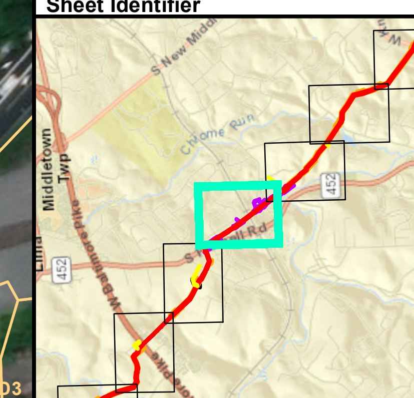


Legend

- Stationing
- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



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Meters: 0, 30.48, 60.96

NRCS SOILS MAP
ATTATCHMENT 5-54
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

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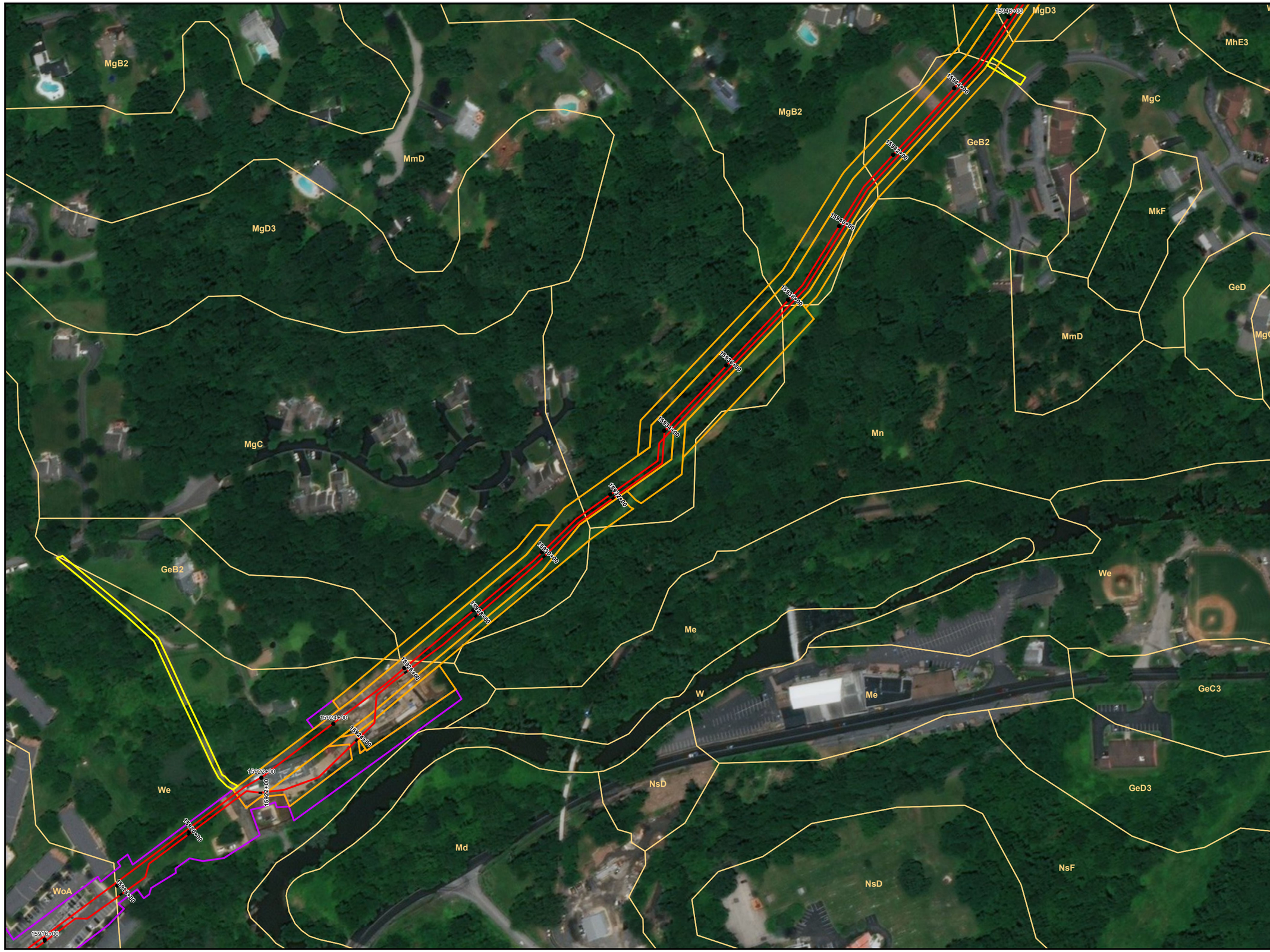
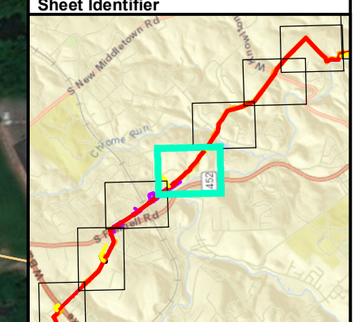


Legend

- Stationing
- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- NRCS Soils and Codes

Sheet Identifier



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Meters: 0 30.48 60.96

NRCS SOILS MAP
ATTATCHMENT 5-55
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

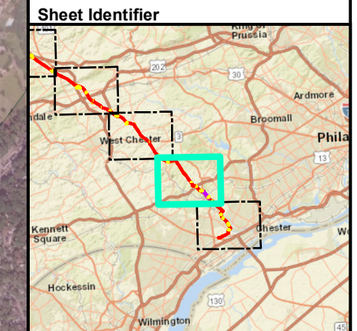
Notes:
Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PP ESC\GP\PENNPIPELINE_020MAJORMOD_ESCGP_SOILS.MXD 04/18/19 TT

Legend

- Access Road
- Major Modification LOD
- Previously Approved LOD
- Alignment Centerline
- Block Valve/Station
- "Glenarm Wissahickon" formation (Xgw)
- Bryn Mawr Formation (Tbm)
- Diabase (Jd)
- Felsic and intermediate gneiss (fgh)
- Felsic gneiss (fgp)
- Granitic gneiss and granite (Xgr)
- Mafic gneiss (Xmgh)
- Mafic gneiss (mgh)
- Ultramafic rocks (Xu)
- Wissahickon Formation (Xw)

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

GEOLOGIC UNIT MAP
ATTACHMENT 5-5
PENNSYLVANIA PIPELINE PROJECT
JANUARY 18, 2019 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY,
PENNSYLVANIA

TETRA TECH

Notes:
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9. NOV'S

SUNOCO PIPELINE L.P.
COMPLIANCE HISTORY

Permit Number	HDD/Bore ID	Township	County	Status	Incident Date	Date Resolved
E21-449 ESG030015002	PA-CU-0062.0000-WX-HDD	Lower Frankford	Cumberland	Resolved	2/28/2018 6:00	2/27/2018 0:00
E38-194 ESG030015002	PA-LE-0055.0000-RD-HDD	West Cornwall	Lebanon	Resolved	3/16/2018 6:00	6/9/2018 0:00
E07-459 ESG030015002	PA-BL-0001.0094-WX-HDD	Frankstown	Blair	Resolved	3/16/2018 6:00	Drilling resumed on 3/31/2018.
E07-459 ESG030015002	HDD PA-BL-0122.0000-WX	Frankstown	Blair	Resolved	3/19/2018 6:00	HDD abandoned for Direct Pipe Method following submission of a Minor Mod. 4/22/2018
E31-234 ESG030015002	PA-HU-0106.0000-RD-HDD	Shirley	Huntingdon	Resolved	3/26/2018 6:00	4/9/2018 0:00
E50-258, ESG0300015002	PA-PE-0002.0000-RD-HDD	Toboyne	Perry	Resolved	3/29/2018 0:00	4/3/2018 0:00
E07-459 ESG030015002	PA-BL-0001.0094-WX-HDD	Frankstown	Blair	Resolved	4/6/2018 6:00	Restart approved. Setup changes on 4/20/2018 and ream resumed on 4/21/2018.
E07-459 ESG030015002	PA-BL-0001.0048-RR-HDD	Blair	Blair	Resolved	4/10/2018 6:00	Restart approval received on 5/25/2018.
E38-194 ESG030015002	PA-LE-0055.0000-RD-HDD	West Cornwall	Lebanon	Resolved	4/20/2018 6:00	8/21/2018 0:00
E23-524 ESG0100015001	PA-DE-0100.0000-RR-HDD	Middletown	Delaware	Resolved	5/3/2018 6:00	IR(s) were contained and cleaned up on the dates that they occurred (4/18/18, 4/19/18(emerged with in containment), and 4/20/18. Restoration of this area was completed on 10/19/18.
E11-352 ESG0500015001	PA-CA-0023.0000-RD-HDD	Jackson	Cambria	Resolved	5/8/2018 16:30	5/8/2018 20:00:00 PM
E11-352 ESG0500015001	PA-CA-0016.0000-RD	Jackson	Cambria	Resolved	5/15/2018 6:00	1/7/2019 restoration
E63-674 ESG0500015001	PA-WA1-0127.0000-RD	Nottingham	Washington	Resolved	5/15/2018 0:00	9/1/2018 0:00
E38-194 ESG030015002	PA-LE-0055.0000-RD-HDD	West Cornwall	Lebanon	Resolved	6/1/2018 6:00	8/21/2018 0:00
E38-194 ESG030015002	PA-LE-0055.0000-RD-HDD	West Cornwall	Lebanon	Resolved	6/11/2018 6:00	8/21/2018 0:00
E23-524 ESG0100015001	PA-DE-0104.0008-WX-HDD	Middletown	Delaware	Resolved	6/14/2018 6:00	6/10/2018 0:00
E07-459 ESG030015002	PA-BL-0001.0048-RR-HDD	Blair	Blair	Resolved	6/15/2018 6:00	7/6/2018 0:00
E65-973 ESG0500015001	PA-WM1-0023.0000-RD-HDD	West Newton	Westmoreland	Resolved	6/19/2018 6:00	6/18/2019 1830
E11-352 ESG0500015001	PA-CA-0023.0000-RD-HDD	Jackson	Cambria	Resolved	6/21/2018 0:00	6/21/2018 0:00

SUNOCO PIPELINE L.P.
COMPLIANCE HISTORY

Permit Number	HDD/Bore ID	Township	County	Status	Incident Date	Date Resolved
E38-194 ESG030015002	PA-LE-0055.0000-RD-HDD	West Cornwall	Lebanon	Resolved	6/28/2018 6:00	8/21/2018 0:00
E06-701 ESG0300015002	PA-BR-0181.0000-RD-HDD	Caernarvon	Berks	Resolved	6/28/2018 6:00	7/31/2019 0:00
E63-674 ESG0500015001	PA-WA-0127.0000-RR-HDD	Nottingham	Washington	Resolved	5/29/2018 6:00	5/25/2018 0:00
E21-449 ESG030015002	PA-CU-0136.0002-WX	Middlesex	Cumberland	Resolved	7/7/2018 6:00	8/1/2018 0:00
E63-674 ESG0500015001	PA-WA-0119.0000-RD-HDD	North Strabane	Washington	Resolved	7/16/2018 6:00	7/30/18 with completion of anomaly repair. No drilling was occurring when this instance occurred.
E23-524 ESG0100015001	PA-DE-0100.0000-RR-16	Middletown	Delaware	Restoration Pending	7/18/2018 23:00	IR was contained and cleaned up on 7/14/18. Currently waiting on soil approval from PADEP to complete restoration of wetland WL-I1.
E11-352 ESG0500015001	PA-CA-0016.0000-RD	Jackson	Cambria	Resolved	7/23/2018 23:00	Stream impact ended on 07/22/2018. 7/25/2018 17:00:00 PM recovery of the turbid water from the spring house was completed.
E21-449 ESG0300015002	PA-CU-0136.0002-WX	Middlesex	Cumberland	Resolved	7/24/2018 23:00	7/25/2018 0:00
E23-524 ESG0100015001	PA-DE-0100.0000-RR-16	Middletown	Delaware	Resolved	7/24/2018 23:00	IR was contained and cleaned up on 7/20/18 at each location. Restoration of storm drain outlet containment area was completed on 10/6/18.
E23-524 ESG0100015001	PA-DE-0100.0000-RR-16	Middletown	Delaware	Resolved	7/30/2018 23:00	IR was contained and cleaned up on 7/30/18. Upland restoration completed on 10/19/18. Storm drain outlet restoration completed on 10/6/18. Parking lot restoration completed on 11/2/18.
E23-524 ESG0100015001	PA-DE-0104.0008-WX-HDD (or possibly PA-DE-0104.0015-RD-HDD?)	Aston	Delaware	Resolved	8/8/2018 23:00	Repairs were made on 7/9/18
E63-674 ESG0500015001	PA-WA1-0127.0000-RD	Nottingham	Washington	Resolved	8/12/2018 23:00	8/30/2018 0:00
E11-352 ESG0500015001	PA-CA-0069.0000-RD	Munster	Cambria	Resolved	8/12/2018 23:00	Remediation of the 08/03/2018 IR site was completed on 08/03/2018. Remediation of the 08/04 IR site was completed in 08/06/2018.
E38-194 ESG0300015002	PA-LE-0055.0000-RD	West Cornwall	Lebanon	Resolved	8/15/2018 23:00	8/21/2018 0:00
E23-524 ESG0100015001	PA-DE-0100.0000-RR-16	Middletown	Delaware	Resolved	8/28/2018 23:00	IR was contained and cleaned up on 8/22/18 and 8/26/18. Upland restoration was completed on 10/19/18.

SUNOCO PIPELINE L.P.
COMPLIANCE HISTORY

Permit Number	HDD/Bore ID	Township	County	Status	Incident Date	Date Resolved
E11-352 ESG0500015001	PA-CA-0023.0000-RD	Jackson	Cambria	Resolved	8/25/2018 0:00	IR containment and recovery completed on 08/25/2018. Relief well drilled on 09/23 as indicated on the restart procedures issued by PADEP.
E21-449 ESG0300015002	PA-CU-0136.0002-WX	Middlesex	Cumberland	Resolved	9/13/2018 23:00	9/3/2018 0:00
E06-701 ESG0300015002	PA-BR-0181.0000-RD	Caernarvon	Berks	Resolved	9/16/2018 23:00	9/18/2018 0:00
E11-352 ESG0500015001	PA-CA-0016.0000-RD-HDD	Munster	Cambria	Resolved	9/17/2018 23:00	10/25/2018 0:00
E11-352 ESG0500015001	PA-CA-0016.0000-RD-HDD	Jackson	Cambria	Resolved	9/17/2018 23:00	Drilling fluid recovery completed on 09/14 following 09/12 IR. IR recovery completed on 09/15 IR event. Relief well completed on 10/07/2018.
E06-701 ESG0300015002	PA-BR-0181.0000-RD-HDD	Caernarvon	Berks	Resolved	9/17/2018 23:00	1/15/119
E07-459 ESG0300015002	PA-BL-0126.0000-RD-HDD	Woodbury	Blair	Resolved	10/2/2018 23:00	Restart Report submitted on 10/4/2018 with DEP approval on 10/6/2018.
E07-459 ESG0300015002	PA-BL-0126.0000-RD-HDD	Woodbury	Blair	Resolved	10/8/2018 23:00	Restart Report submitted on 10/8/2018 with DEP approval on 10/9/2018.
E07-459 ESG0300015002	PA-BL-0126.0000-RD-HDD	Woodbury	Blair	Resolved	10/10/2018 23:00	Bore hole grouted on 10/11/2018.
E07-459 ESG0300015002	PA-BL-0126.0000-RD	Woodbury	Blair	Resolved	10/15/2018 23:00	12/23/2018 0:00
E07-459 ESG030015002	PA-BL-0001.0078-WX-FlexBore	Blair	Blair	Resolved	10/17/2018 23:00	Restart approval received on 10/26/2018.
PAG103570	Not Applicable	Multiple	Cumberland, Huntingdon, Juniata	Pending Resolution	10/22/2018 23:00	Pending Resolution

10. AQUATIC RESOURCE REPORT

Excerpts from the Aquatic Resources Report (August 2015)

& Supplemental Aquatic Resources Report (March 2016)

Aquatic Resource Report for the Pennsylvania Pipeline Project, Southeast Region, Delaware County, Pennsylvania

Prepared By:

Tetra Tech, Inc. For

Sunoco Pipeline L.P.

525 Fritztown Road

Sinking Spring, PA

NOTE: This Aquatic Resources Report excerpts information relevant to the major permit modification for the Glen Riddle/SEPTA HDD and previously submitted information by Sunoco Pipeline L.P. as part of the approved PPP Chapter 105 Joint Permit (E23-524. APS 879354)]

August 2015

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2.0 METHODOLOGY **2-1**

3.0 RESULTS **3-1**
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ACRONYMS

1987 Manual	Corps of Engineers Wetland Delineation Manual
Corps Regional Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GIS	Geographic Information Systems
GPS	Global Positioning System
HQ-CWF	High Quality Cold Water Fishes
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
PEM	Palustrine Emergent
PFO	Palustrine Forested
Project	Southeastern Region, Pennsylvania Pipeline Project
PSS	Palustrine Scrub Shrub
ROW	Right-of-Way
SF	Square Feet
SPLP	Sunoco Pipeline, LP
TSF	Trout Stocking
UNT	Unnamed Tributary
UPL	Upland
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWF	Warm Water Fishes

1.0 INTRODUCTION

This Aquatic Resources Report for Delaware County, located within the Southeastern Region of the Pennsylvania Pipeline Project (Project) has been prepared by Tetra Tech, Inc. on behalf of Sunoco Pipeline, LP (SPLP). Wetland areas were delineated on site using methodology enumerated in the United States Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory, 1987) (1987 Manual), as amended by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, April 2012 (Corps Regional Supplement).

The subject of this report is a wetland delineation and stream identification field investigation for a proposed natural gas pipeline right-of-way (ROW), associated access roads, and workspaces located across southern Pennsylvania.

The Project study area drains to Chester Creek along with its unnamed tributaries (UNT), Chrome Run, Crum Run along with its UNTs, which are all listed as Trout Stocking (TSF), as designated in Chapter 93 of Title 25 of the PA Code. The study area drains to Rocky Run, which are listed as High Quality Cold Water Fishes (HQ-CWF), as designated in Chapter 93 of Title 25 of the PA Code. Additionally, the study area drains into Baldwin Run, which is listed as Warm Water Fishes (WWF), as designated in Chapter 93 of Title 25 of the PA Code.

The content of this report presents the methodology, results, and conclusions of wetland delineation and stream identification activities completed for the proposed Project.

2.0 METHODOLOGY

USACE requires the use of the procedures enumerated in the *1987 Manual* (Environmental Laboratory, 1987) and the *Corps Regional Supplement* (Environmental Laboratory, 2012) for making jurisdictional determinations. According to the *1987 Manual*, an area is defined as a wetland if, under normal circumstances, it meets all three of the following criteria:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Wetlands identified in the field were classified in accordance with the U.S. Fish and Wildlife Service's (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Wetland classifications are as follows: palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). Dominant vegetation was identified and classified according to The National Wetland Plant List: 2014 Update of Wetland Ratings (Lichvar, 2014). Plant classifications are as follows:

Obligate (OBL) - essentially always found in wetlands; estimated probability >99%

Facultative Wetland (FACW) - usually found in wetlands; estimated probability 67%-99%

Facultative (FAC) - equally likely to occur in wetlands and non-wetlands;
estimated probability 34%-66%

Facultative Upland (FACU) - usually occurs in non-wetlands; estimated probability 1%-33%

Upland (UPL) - essentially always found in non-wetlands; estimated probability >99%

The field investigations for the proposed pipeline Project were performed during numerous field visits from November 2013 through July 2015. The study area was preliminarily limited to a 200-foot wide corridor along a proposed center line. Once the proposed pipeline ROW, access roads, and workspaces were finalized any additional areas that extended beyond the preliminary study area were investigated for potential wetlands and streams. The final study area is illustrated on the project mapping. Preliminary site reconnaissance of the study area was conducted through a

review of available Geographic Information Systems (GIS) resources. Existing information reviewed included the following:

- United States Geological Survey (USGS) topographic mapping (Figures 1-1 to 1-3)
- Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey (Figure 2-1 to 2-3)
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Mapping (Figure 3-1 to 3-3)

The delineation consisted of establishment of the wetland/upland margin with flagging hung at intervals that accurately depicted the outline of the boundary. The individual flags were then located using a Global Positioning System (GPS) receiver and later added to the project area mapping. Wetland flagging was limited to the bounds of the investigated study area and wetlands are shown as closed or partially closed systems on the detail map (Figure 4-1 to 4-23).

Data concerning soils, hydrology, and vegetation were collected and recorded on USACE Wetland Determination Data Forms at wetlands and upland point locations associated with wetlands, which are provided in Appendix A. Photographs depicting wetland topography and vegetation are included in Appendix B. Stream data sheets detailing stream characteristics are provided in Appendix C. Appendix D contains photographs of streams located within the study area. Appendix E provides a list of hydric soils known to occur within the counties of the study area. Resumes of project personnel are included in Appendix F.

3.0 RESULTS

The field investigations identified 33 areas within the proposed Pennsylvania Pipeline Project study area that met the wetland criteria outlined in the 1987 Manual, as amended by the Corps Regional Supplement. Additionally, 51 streams were identified within the Project study area. A narrative summary of field data collected for these systems is presented below. The detail maps provided as Figures 4-1 to 4-23 illustrate the wetland and watercourse locations in relation to the project LOD and study area.

3.1 WETLAND IDENTIFICATION AND DELINEATION

Hydric soils and soils with hydric components are often associated with wetlands. A review of the NRCS Soil Survey and hydric soil list (Appendix E) indicated that there are 17 soils mapped within the study area classified as hydric or containing hydric components. These soils can be found in Table 2, Mapped Hydric Soils in Study Area. The NRCS soil survey maps are included as Figures 2-1 to 2-3. Confirmation of the soil mapping units was not performed during this site evaluation.

Two NWI wetlands are mapped within the Project study area (Figure 3-3). Both of these wetlands are palustrine, unconsolidated bottom, permanently flooded, excavated wetlands.

Based on field evidence and best professional judgment, it was determined that 33 wetlands are present within the study area. The areas demonstrated the presence of all three wetland parameters required by the 1987 Manual and the Regional Supplement. The vegetative community was dominated by hydrophytic plant species or had a prevalence index ≤ 3, the soils exhibited hydric characteristics, and the areas contained wetland hydrology indicators.

USACE wetland determination data forms that detail the existing vegetation, soil characteristics, and hydrology were prepared for each wetland and its associated upland point (Appendix A).

Wetland B37

Wetland B37 (W-B37) is a 607-square foot (SF) palustrine emergent (PEM) wetland (Figure 4-2). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, and a positive FAC-neutral test. Dominant vegetation consists Northern spicebush (*Lindera benzoin*) and skunk-cabbage (*Symplocarpus foetidus*). The soil between 0 and 8 inches exhibits a low-chroma matrix (7.5YR 2.5/1) with a muck texture. The soil below 8 inches exhibits refusal coarse fragments.

Wetland I1 PFO (1)

Wetland I1 PFO (1) (W-I1 PFO (1)) is a 10,454-SF PFO wetland (Figure 4-13). Indicators of wetland hydrology include water-stained leaves, drainage patterns, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), red osier (*Cornus alba*), twinsisters (*Lonicera tatarica*), and common reed (*Phragmites australis*). The soil between 0 and 12 inches exhibits a low-chroma matrix (10YR 4/2) with a clay loam texture that contains redoximorphic features (7.5YR 4/4).

Wetland I1 PFO (2)

Wetland I1 PFO (2) (W-I1 PFO (2)) is a 26,887-SF PFO wetland (Figure 4-13). Indicators of wetland hydrology include water-stained leaves, drainage patterns, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), slippery elm (*Ulmus rubra*), red osier (*Cornus alba*), twinsisters (*Lonicera tatarica*), and Japanese stilt grass (*Microstegium vimineum*). The soil between 0 and 8 inches exhibits a low-chroma matrix (2.5Y 4/2) with a silt loam texture that contains redoximorphic features (7.5YR 4/4).

Wetland I1 PEM

Wetland I1 PEM (W-I1 PEM) is a 21,537-SF PEM wetland (Figure 4-13). Indicators of wetland hydrology include drainage patterns, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), Japanese stilt grass (*Microstegium vimineum*), dark-green bulrush (*Scirpus atrovirens*), and lamp rush (*Juncus effusus*). The soil between 0 and 12 inches exhibits a low-chroma matrix (10YR 4/2) with a clay loam texture that contains redoximorphic features (7.5YR 4/4).

Wetland I2

Wetland I2 (W-I2) is a 9,500-SF PFO wetland (Figure 4-13). Indicators of wetland hydrology include water-stained leaves, standing dead vegetation, drainage patterns, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of reed canary grass red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), common reed (*Phragmites australis*), and an unidentified grape vine (*Vitis* sp.) The soil between 0 and 12 inches exhibits a low-chroma matrix (2.5Y 4/2) with a silt loam texture that contains redoximorphic features (7.5YR 4/4).

Wetland H34 PEM (1)

Wetland H34 PEM (W-H34 PEM (1)) is a 2,535-SF PEM wetland (Figure 4-14). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, water-stained leaves, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of reed canary grass (*Phalaris arundinacea*), dark-green bulrush (*Scirpus*

Wetland I6

Wetland I6 (W-I6) is a 6,197-SF PEM wetland (Figure 4-23). Indicators of wetland hydrology include surface water, a high water table, saturation within the upper 12 inches of the soil profile, oxidized rhizospheres on living roots, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of dark-green bulrush (*Scirpus atrovirens*), lamp rush (*Juncus effusus*), and lesser poverty rush (*Juncus tenuis*). The soil between 0 and 10 inches exhibits a low-chroma matrix (10YR 4/2) with a gravelly clay loam texture that contains redoximorphic features (5YR 4/4).

Wetland I5

Wetland I5 (W-I5) is a PEM wetland greater than 532,450-SF (Figure 4-23). Indicators of wetland hydrology include surface water, a high water table, saturation within the upper 12 inches of the soil profile, and oxidized rhizospheres on living roots, and a positive FAC-neutral test. Dominant vegetation consists of common rush (*Juncus effusus*), common reed (*Phragmites australis*), and chufa (*Cyperus esculentus*). The soil between 0 and 5 inches exhibits a low-chroma matrix (10YR 4/2) with a silt loam texture that contains redoximorphic features (5YR 4/4). The soil between 5 and 12 inches exhibits a low-chroma matrix (2.5Y 5/1) with a silt loam texture that contains redoximorphic features (7.5YR 4/6 and 2.5YR 6/1).

3.2 STREAM IDENTIFICATION AND EVALUATION

Based on field evidence and best professional judgment, it was determined that 51 streams were identified within the evaluated study area. A data sheet that details the bank and channel characteristics, substrate composition, aquatic habitat, and hydrology was prepared for each of the streams (Appendix C).

Stream B36

Stream B36 (S-B36) is an ephemeral tributary to Chester Creek (Figure 4-2). The stream bank is approximately 4 feet in width. The bank height is 2 feet. The stream bed contains a boulder and cobble substrate. At the time of the field investigation, the stream exhibited an average water depth of 5 inches.

Stream B37

Stream B37 (S-B37) is an ephemeral tributary to Chester Creek (Figure 4.2). The stream bank is approximately 6 feet in width. The bank height is 1 foot. The stream bed contains a boulder,

Stream I1

Stream I1 (S-I1) is an ephemeral tributary to Chester Creek (Figure 4-13). The stream bank is approximately 2 feet in width. The bank height is 2 feet. The stream bed contains a silt and organic substrate. At the time of the field investigation, the stream exhibited an average water depth of 1 inch.

Stream I3

Stream I3 (S-I3) is an ephemeral tributary to Chester Creek (Figure 4-13). The stream bank is approximately 2 feet in width. The bank height is 1.5 feet. The stream bed contains a sand, silt, and organic substrate. At the time of the field investigation, the stream exhibited an average water depth of 3 inches.

Stream I2

Stream I2 (S-I2) is a perennial tributary to Chester Creek (Figure 4-13). The stream bank is approximately 7 feet in width. The left bank height is 3 feet. The right bank height is 5 feet. The stream bed contains a boulder, cobble, gravel, and sand substrate. At the time of the field investigation, the stream exhibited an average water depth of 11 inches.

Stream I6

Stream I6 (S-I6) is an ephemeral tributary to Chester Creek (Figure 4-13). The stream bank is approximately 5 feet in width. The bank height is 4 feet. The stream bed contains a cobble, gravel, and organic substrate. The stream exhibited no flow at the time of the field investigation.

Stream I5

Stream I5 (S-I5) is an intermittent tributary to Chester Creek (Figure 4-13). The stream bank is approximately 6 feet in width. The left bank height is 8 feet. The right bank height is 12 feet. The stream bed contains a cobble, gravel, sand, silt, and organic substrate. At the time of the field investigation, the stream exhibited an average water depth of 3 inches.

Stream H29

Stream H29 (S-H29) is Chrome Run, a perennial tributary to Chester Creek (Figure 4-14). The stream bank is approximately 18 feet in in width. The bank height is 3 feet. The stream bed contains a boulder, cobble, gravel, and sand substrate. At the time of the field investigation, the stream exhibited an average water depth of 7 inches.

4.0 CONCLUSIONS

During the field investigations in Delaware County, located within the Southeastern Region of the proposed Pennsylvania Pipeline Project, 33 areas were identified within the evaluated study area which exhibited all three criteria necessary to be classified as a jurisdictional wetland in accordance with the 1987 Manual and the Regional Supplement:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Additionally, 51 streams were identified within the evaluated study area.

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TABLE

Table 1
Wetland and Stream Summary
Pennsylvania Pipeline Project

Water Resource	Dominant Plant Community/Flow Regime	Bank Full Width	Water Depth	Channel Depth	Wetland Size (Square Feet)	Wetland Size (Acres)	Associated Water Resource
Wetlands							
W- B37	PEM	-	-	-	607	0.01	S-B37, S-B38
W- B51	PEM	-	-	-	7569	0.17	S-B52, S-B54
W- B51	PFO (1)	-	-	-	24727	0.57	S-B52, S-B54
W- B51	PFO (2)	-	-	-	6419	0.15	S-B52, S-B54
W- B52	PFO	-	-	-	26662	0.61	S-B56, S-B57
W- B53	PFO	-	-	-	10948	0.25	S-B58
W- B54	PEM	-	-	-	4252	0.10	N/A
W- C21	PFO	-	-	-	4303	0.10	N/A
W- C20	PEM	-	-	-	3873	0.09	N/A
W- C19	PEM	-	-	-	18693	0.43	N/A
W- C18	PEM	-	-	-	3443	0.08	S-C40, S-C41
W- C24	PEM	-	-	-	1777	0.04	N/A
W-BA1	PEM	-	-	-	757	0.02	S-C45
W- C23	PEM	-	-	-	195874	4.50	S-C44, S-C45
W- C10	PEM	-	-	-	2430	0.06	S-C23
W- C10	PSS (1)	-	-	-	6047	0.14	S-C23
W- C10	PSS (2)	-	-	-	3556	0.08	S-C23
W- I1	PFO (1)	-	-	-	10454	0.24	S-I1, S-I4
W- I1	PFO (2)	-	-	-	26887	0.62	S-I4
W- I1	PEM	-	-	-	21537	0.49	S-I1, S-I4
W- I2	PFO	-	-	-	9500	0.22	S-I1, S-I3
W- H34	PEM (1)	-	-	-	2535	0.06	S-H29
W- H34	PEM (2)	-	-	-	394	0.01	S-H29
W- H34	PFO (1)	-	-	-	8685	0.20	S-H29
W- H34	PFO (2)	-	-	-	1601	0.04	S-H29
W- H33	PEM	-	-	-	513	0.01	N/A
W- H32	PEM	-	-	-	2948	0.07	N/A
W-Q62	PSS	-	-	-	2803	0.06	S-H36
W- H37	PSS	-	-	-	1135	0.03	N/A
W- H39	PEM	-	-	-	1079	0.02	S-H41
W- H40	PEM	-	-	-	8091	0.19	S-H44
W-BB131	PEM	-	-	-	288	0.01	N/A
W- H41	PEM	-	-	-	4048	0.09	S-H47
W- I14	PFO	-	-	-	16719	0.38	N/A
W-BA4	PEM	-	-	-	843	0.02	N/A
W- I15	PFO	-	-	-	16309	0.37	N/A

* = See Data Sheet for Channel Depth - Right and Left Bank Measurements Differ.
' = Feet
" = Inches

Table 1
Wetland and Stream Summary
Pennsylvania Pipeline Project

Water Resource	Dominant Plant Community/Flow Regime	Bank Full Width	Water Depth	Channel Depth	Wetland Size (Square Feet)	Wetland Size (Acres)	Associated Water Resource
W- I16	PFO (1)	-	-	-	134503	3.09	S-I18
W- I16	PEM	-	-	-	32396	0.74	S-I18
W- I16	PFO (2)	-	-	-	133838	3.07	S-I18
W-BA7	PEM	-	-	-	2641	0.06	N/A
W-BA5	PFO	-	-	-	1312	0.03	N/A
W-BA6	PFO	-	-	-	14977	0.34	N/A
W- I6	PEM	-	-	-	6197	0.14	N/A
W- I5	PEM	-	-	-	532450	12.22	S-I10, S-I11
Streams							
S-B36	Ephemeral	4'	5"	2'	-	-	N/A
S-B37	Ephemeral	6'	5"	1'	-	-	S-B38, W-B37
S-B38	Perennial	10'	1'	2'	-	-	S-B38, W-B37, S-B39
S-B39	Ephemeral	1.5'	3"	6"	-	-	S-B38
S-B55	Ephemeral	2'	1"	5"	-	-	S-B54
S-B51	Ephemeral	1'	1"	6"	-	-	S-B52, W-B51
S-B52	Intermittent	1.5'	4"	1'	-	-	S-B51, S-B54, W-B51
S-B53	Intermittent	2'	8"	1.5'	-	-	S-B52, S-B54, W-B51
S-B54	Perennial	3.5'	8"	1.5'	-	-	S-B51, S-B52, W-B51
S-B56	Intermittent	4'	3"	1'	-	-	W-B52
S-C43	Ephemeral	1'	0.5"	5"	-	-	N/A
S-C42	Intermittent	5'	2"	4'	-	-	N/A
S-C40	Intermittent	3'	3"	10"	-	-	S-C41, S-C39, W-C18
S-C41	Ephemeral	2.5'	0"	10"	-	-	S-C40, W-C18
S-C39	Ephemeral	2'	0"	10"	-	-	S-C40, W-C18
S-C45	Intermittent	5'	2"	15"	-	-	S-C44, W-BA1, W-C23
S-C44	Perennial	20'	12"	4"	-	-	S-C45, W-C23
S-C26	Ephemeral	4'	3"	1'	-	-	N/A
S-C24	Ephemeral	1.5'	2"	3'	-	-	S-C25
S-C25	Ephemeral	1'	2"	1'	-	-	S-C24
S-C23	Perennial	10'	9"	4'	-	-	W-C10
S-C17	Perennial	16'	7"	2'	-	-	S-C16
S-C16	Perennial	8'	6"	2.5'	-	-	S-C17, S-C16, S-C15
S-C22	Intermittent	7'	5"	5'	-	-	S-C16
S-C15	Ephemeral	2'	1"	6"	-	-	S-C16
S-C20	Ephemeral	2'	3"	6"	-	-	N/A
S-I1	Ephemeral	2'	1"	2'	-	-	S-I2, W-I1
S-I3	Ephemeral	2'	3"	1.5'	-	-	S-I2

* = See Data Sheet for Channel Depth - Right and Left Bank Measurements Differ.
' = Feet
" = Inches

Table 1
Wetland and Stream Summary
Pennsylvania Pipeline Project

Water Resource	Dominant Plant Community/Flow Regime	Bank Full Width	Water Depth	Channel Depth	Wetland Size (Square Feet)	Wetland Size (Acres)	Associated Water Resource
S-I2	Perennial	7'	11"	*	-	-	S-I1, S-I3
S-I6	Ephemeral	5'	0"	4'	-	-	S-I5
S-I5	Intermittent	6'	3"	*	-	-	S-I6
S-H29	Perennial	18'	7"	3'	-	-	W-H34
S-H28	Perennial	15'	8"	*	-	-	N/A
S-H27	Perennial	12'	4"	1.5'	-	-	N/A
S-H35	Perennial	7'	5"	2'	-	-	S-H36, W-Q62
S-H36	Intermittent	3'	4"	5'	-	-	S-H35, W-Q62
S-H34	Intermittent	8'	2"	5'	-	-	N/A
S-H37	Perennial	100'	2'	6'	-	-	S-H37
S-H38	Intermittent	8'	3"	*	-	-	S-H38
S-H39	Ephemeral	8"	0"	8"	-	-	N/A
S-H40	Ephemeral	5.5'	0"	2'	-	-	N/A
S-H41	Perennial	100'	4'	*	-	-	N/A
S-H42	Ephemeral	0.5'	0.5"	2"	-	-	N/A
S-H44	Ephemeral	4'	4"	4"	-	-	S-H43, W-H40
S-H43	Perennial	20'	6"	4'	-	-	S-H44
S-H47	Ephemeral	8'	1"	3'	-	-	W-H41
S-H48	Ephemeral	2'	0"	4"	-	-	N/A
S-I17	Ephemeral	4'	1"	3'	-	-	W-I16
S-I19	Ephemeral	5'	2"	6"	-	-	S-I20, S-I18
S-I20	Ephemeral	3'	2"	8"	-	-	S-I19
S-I18	Perennial	13'	2'	1'	-	-	W-I16

* = See Data Sheet for Channel Depth - Right and Left Bank Measurements Differ.
' = Feet
" = Inches

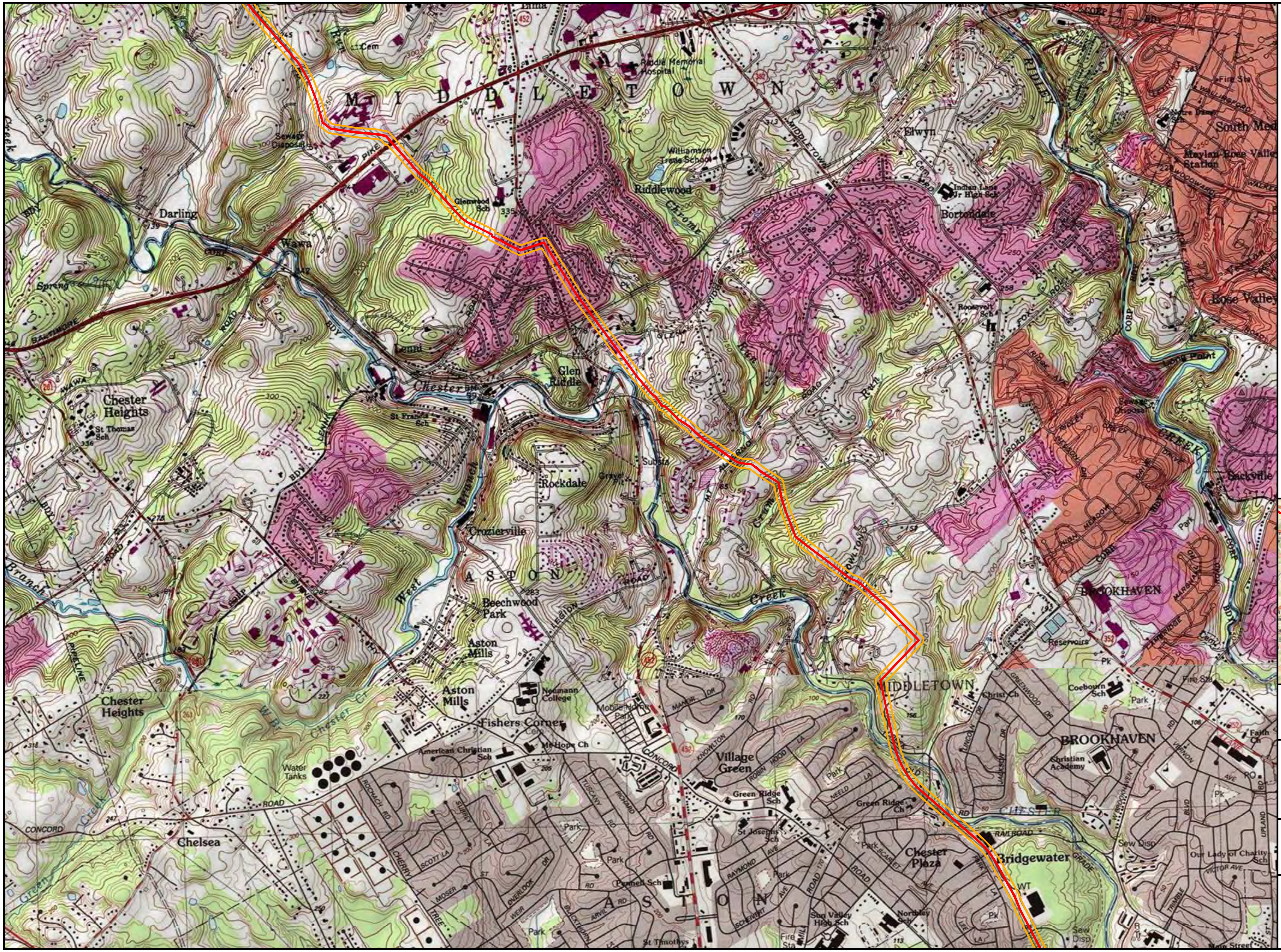
Table 2
Mapped Hydric Soils in Study Area
Pennsylvania Pipeline Project, Delaware County

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
BeA	Beltsville silt loam, 0 to 3 percent slopes	Othello	5	
BeB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	
ByA	Butlertown silt loam, 0 to 3 percent slopes	Othello	5	
ByB2	Butlertown silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	
Ch	Chewacla silt loam	Wehadkee	5	
GnA	Glenville silt loam 0 to 3 percent slopes	Baile	5	
GnB	Glenville silt loam, 3 to 8 percent slopes	Baile	5	
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	Worsham	7	
Me	Made land, schist and gneiss materials	Hatboro	1	
MgB2	Manor loam, 3 to 8 percent slopes, moderately eroded	Hatboro	2	
Mn	Melvin silt loam	Melvin	85	
NsD	Neshaminy very stony silt loam, 8 to 25 percent slopes	Towhee, extremely stony	3	
NsF	Neshaminy very stony silt loam, 25 to 45 percent slopes	Towhee, extremely stony	3	
OtA	Othello silt loam	Othello	90	

Table 2
Mapped Hydric Soils in Study Area
Pennsylvania Pipeline Project, Delaware County

OtA	Othello silt loam	Nanticoke	2	
WoA	Worsham silt loam, 0 to 3 percent slopes	Worsham	85	
WsB	Worsham very stony silt loam, 0 to 8 percent slopes	Worsham	85	
Modified from Hydric Soils of the United States (NRCS 2014)				

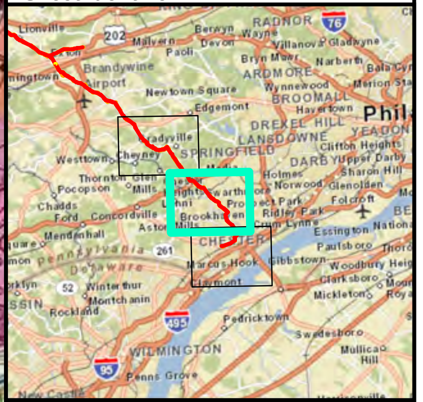
FIGURES



Legend

- Access Road
- Alignment Centerline
- Study Area
- County Boundary

Sheet Identifier



0 1,000 2,000 Feet

0 300 600 Meters

USGS PROJECT LOCATION MAP
FIGURE 1-2
PENNSYLVANIA PIPELINE PROJECT
AUGUST 19, ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

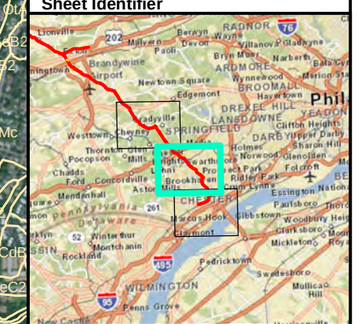
Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangles being displayed are Media, Marcus Hook

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP WETLANDS SE\PENNPIPELINE_SOUTHEAST_USGS_DELAWARECO.MXD 08/20/15 JN

Legend

- Access Road
- Alignment Centerline
- Study Area
- County Boundary
- NRCS Soils and Codes

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

NRCS SOILS MAP
FIGURE 2-2
PENNSYLVANIA PIPELINE PROJECT
AUGUST 19, ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

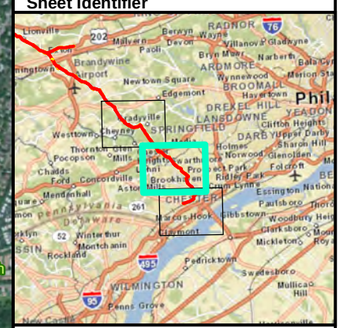
Notes:
Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PIPP WETLANDS SEPEENINPIPELINE_SOUTHEAST_SOILS_DELAWARECO.MXD 08/20/15 JN

Legend

- Access Road
- Alignment Centerline
- Study Area
- County Boundary
- NWI Wetlands and Codes

Sheet Identifier



N

0 1,000 2,000 Feet

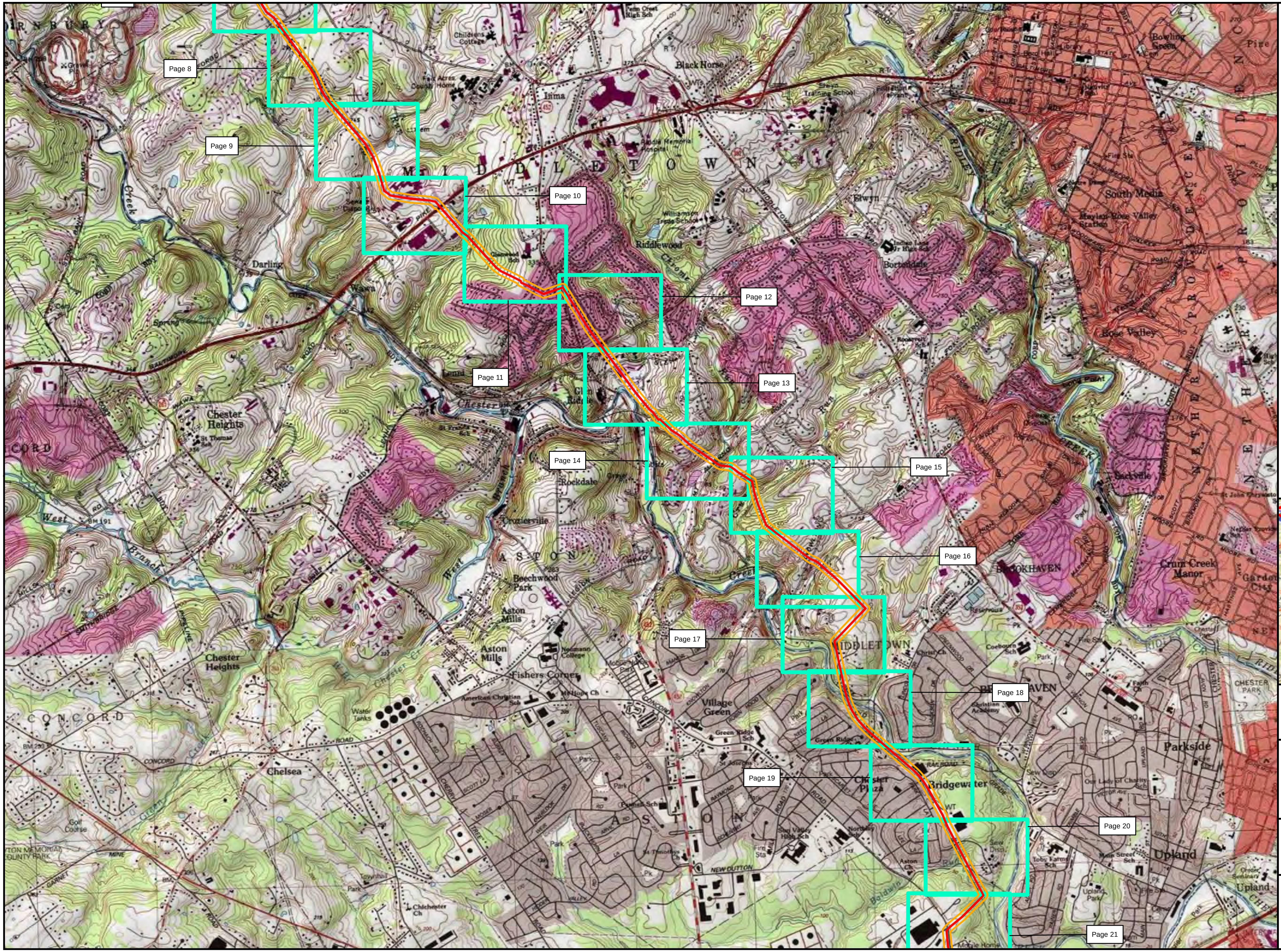
0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-2
PENNSYLVANIA PIPELINE PROJECT
AUGUST 19, ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

PGH: P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP WETLANDS SE\PENNPIPELINE_SOUTHEAST_NWI_DELAWARECO.MXD 08/20/15 JN



Legend

- Access Road
- Alignment Centerline
- Study Area
- County Boundary
- Index

Sheet Identifier

Feet: 0 1,000 2,000

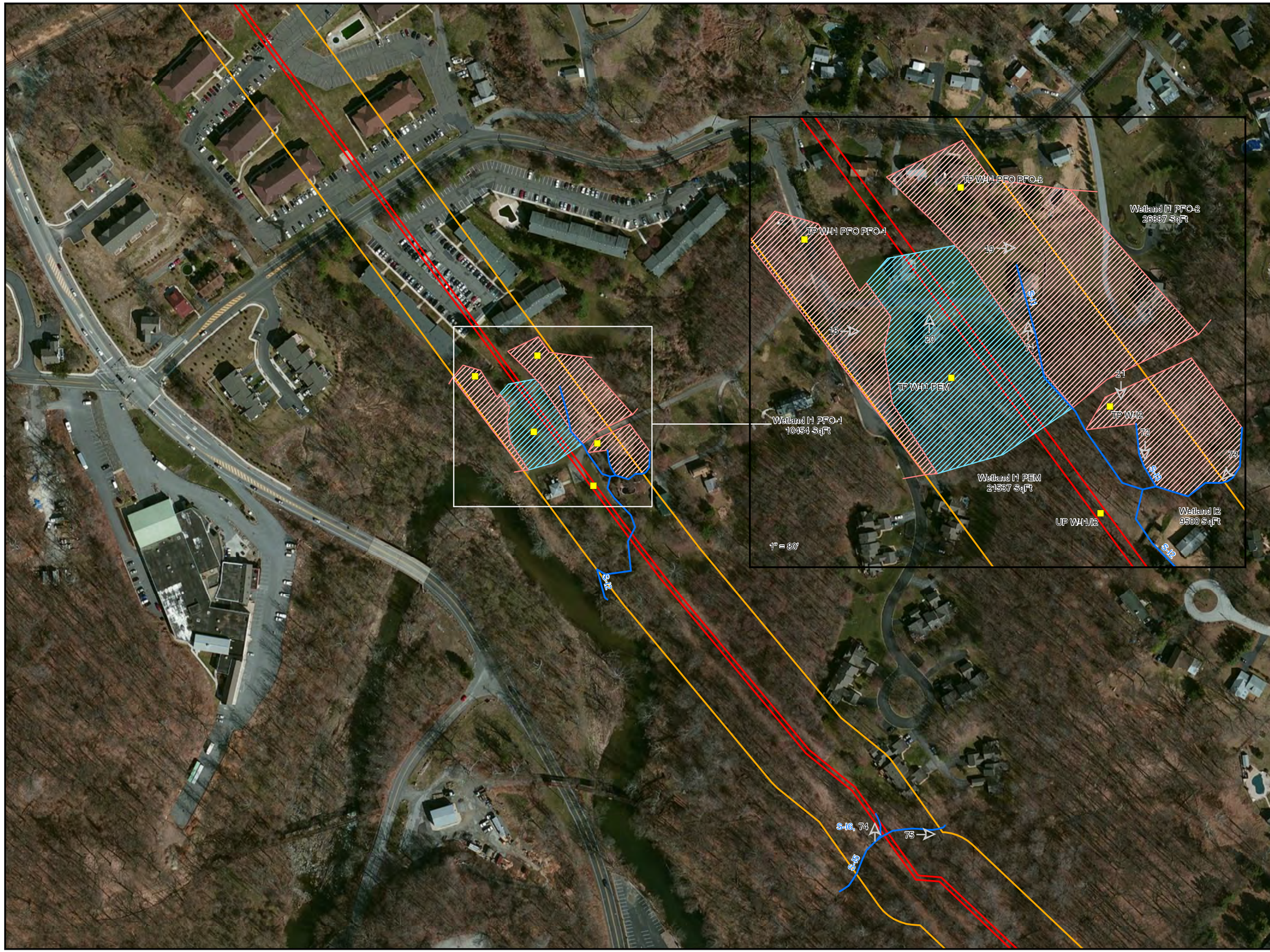
Meters: 0 300 600

USGS PROJECT LOCATION MAP
FIGURE 4-INDEX-2
PENNSYLVANIA PIPELINE PROJECT
AUGUST 19, ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

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

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP WETLANDS SE\PENNPIPELINE_SOUTHEAST_INDEX_DELAWARECO.MXD 08/20/15 JN



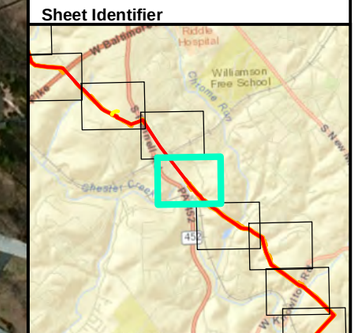
Legend

- Access Roads
- Alignment Centerline
- Study Area
- County Boundary
- Culvert
- Sample Location
- Photo Location
- Drainage Feature
- Stream

Wetland

- PEM
- PFO
- PSS
- PuB

Sheet Identifier



N

Feet: 0 100 200

Meters: 0 30.45 60.9

DETAIL MAP
FIGURE 4-13
PENNSYLVANIA PIPELINE PROJECT
AUGUST 19, 2015 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).
2) Map insets are at a scale of 1 inch = 50 feet unless otherwise noted.

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP WETLANDS SEPEN\PIPELINE_DELAWARE\CO_DETAIL.MXD 8/31/2015 JN

APPENDIX A

USACE DATA SHEETS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/24/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I1 PFO (1)

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Middletown

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.894647 Long: -75.432381 Datum: NAD 83

Soil Map Unit Name: Wehadkee silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** **Yes ✔ No ____**
Hydric Soil Present?	Yes ✔	No ____	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:
Cowardin Code: PFO
HGM: Riverine
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ____	No ✔	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✔	Depth (inches): ____

Wetland Hydrology Present? **Yes ✔ No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I1 PFO (1)

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	30	✔	FAC
2. Fraxinus pennsylvanica	25	✔	FACW
3. Platanus occidentalis	5		FACW
4. Ulmus rubra	5		FAC
5.			
6.			
7.			
	65 = Total Cover		
50% of total cover: 32.5	20% of total cover: 13		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus alba	10	✔	FACW
2. Lonicera tatarica	10	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		

Herb Stratum (Plot size: 5')			
1. Phragmites australis	70	✔	FACW
2. Carex vulpinoidea	10		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: W-I1 PFO (1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/2	85	7.5YR 4/4	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/24/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I1 PFO (2)

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Middletown

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.894707 Long: -75.431693 Datum: NAD 83

Soil Map Unit Name: Wehadkee silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Cowardin Code: PFO
HGM: Riverine
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W-I1 PFO (2)

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	40	✔	FAC
2. Fraxinus pennsylvanica	20	✔	FACW
3. Ulmus rubra	20	✔	FAC
4. Platanus occidentalis	10		FACW
5.			
6.			
7.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus alba	15	✔	FACW
2. Lonicera tatarica	10	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Herb Stratum (Plot size: 5')			
1. Microstegium vimineum	10	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W-I1 PFO (2)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8"	2.5Y 4/2	95	7.5YR 4/4	5	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Deleware Sampling Date: 03/24/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I1 PEM

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Middletown

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.894491 Long: -75.431984 Datum: NAD 83

Soil Map Unit Name: Wehadkee silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Cowardin: PEM
HGM: Riverine
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I1 PEM

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	15	✔	FAC
2. Fraxinus pennsylvanica	10	✔	FACW
3.			
4.			
5.			
6.			
7.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Herb Stratum (Plot size: 5')			
1. Microstegium vimineum	35	✔	FAC
2. Scirpus atrovirens	30	✔	OBL
3. Juncus effusus	20	✔	FACW
4. Phalaris arundinacea	10		FACW
5. Boehmeria cylindrica	5		FACW
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		

Woody Vine Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Trees located in the middle of the R.O.W.

SOIL

Sampling Point: W-I1 PEM

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/2	85	7.5YR 4/4	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/24/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I1, W-I2 UPL

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Middletown

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.894112 Long: -75.431548 Datum: NAD 83

Soil Map Unit Name: Wehadkee silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✔

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:
Upland

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ____	No ✔	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✔	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I1, W-I2 UPL

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Herb Stratum (Plot size: 5')			
1. Dactylis glomerata	70	✔	FACU
2. Alopecurus sp.	20	✔	ND
3. Microstegium vimineum	10		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1* (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

ND - Not determined

*Vegetation not ID'd down to the species level not included in dominance test.

SOIL

Sampling Point: W-I1, W-I2 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

APPENDIX B

WETLAND PHOTOGRAPHS

Photograph Number:	17	**Feature Name:**	W-C10	**Date:**	01/15/2014
Direction:	N	**Plant Community:**	PSS (2)	**Remarks:**	N/A

Photograph Number:	18	**Feature Name:**	W-I1	**Date:**	03/24/2014
Direction:	E	**Plant Community:**	PFO (1)	**Remarks:**	N/A

Photograph Number:	19	**Feature Name:**	W-I1	**Date:**	03/24/2014
Direction:	E	**Plant Community:**	PFO (2)	**Remarks:**	N/A

Photograph Number:	20	**Feature Name:**	W-I1	**Date:**	03/24/2014
Direction:	N	**Plant Community:**	PEM	**Remarks:**	N/A

APPENDIX C

STREAM DATA SHEETS

Tetra Tech Stream Data Sheet

Surveyors: J. McGuirk, D. Quinn Date: 03/24/2014 Resource ID Number: S-I1
Project: PPP State: PA County: Delaware
Photo Number (s): _____ Canopy Cover: 30 % Location: 39.894402°, -75.431664°

Flow Direction: S **Bank Width:** 2 Feet **Water Width:** 1 Feet
High Water Depth: 3 Inches **Water Depth:** 1.00 Inches **Turbidity:** Low
Flow Stage: Low
Flow Regime: [ ] Perennial [ ] Intermittent [✔] Ephemeral [ ] Flowing Ditch [ ] Dry/Stagnant Ditch

Sinuosity:
[✔] Low
[ ] Medium
[ ] High

Features:
[✔] Riffles [ ] Sand/Mud Bar [✔] Run/Glide
[✔] Pools [ ] Gravel Bar [ ] Braided
[ ] Rapids [ ] Aquatic Vegetation [ ] Other _____

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[ ] Cobble/Gravel ___%
[ ] Sand ___%
[✔] Silt/Clay 50 %
[✔] Organic 50 %

Bank Substrate:
Height: Left 2' Right 2'

[ ]	Bedrock	[ ]
[ ]	Boulder	[ ]
[ ]	Gravel	[ ]
[ ]	Sand	[ ]
[✔]	Silt/Clay	[✔]
[✔]	Organic	[✔]

Floodplain Width:

Left		Right
[ ]	<10 feet	[ ]
[ ]	<25 feet	[ ]
[ ]	<50 feet	[ ]
[ ]	<100 feet	[ ]
[✔]	>100 feet	[✔]

Dominant Vegetation:
[✔] Forested
Species: Acer rubrum, Fraxinus pennsylvanica
[✔] Shrub
Species: Cornus alba, Lonicera tatarica
[✔] Herbaceous
Species: Phragmites australis

Wildlife Observed/Notes:

Sketch:
See Attached Figure.

Tetra Tech Stream Data Sheet

Surveyors: J. McGuirk, D. Quinn Date: 03/24/2014 Resource ID Number: S-I3
Project: PPP State: PA County: Delaware
Photo Number (s): _____ Canopy Cover: 60 % Location: 39.894245°, -75.431416°

Flow Direction: S **Bank Width:** 2 Feet **Water Width:** 2 Feet
High Water Depth: 3 Feet **Water Depth:** 3.00 Inches **Turbidity:** Low
Flow Stage: Moderate
Flow Regime: [ ] Perennial [ ] Intermittent [✔] Ephemeral [ ] Flowing Ditch [ ] Dry/Stagnant Ditch

Sinuosity:
[ ] Low
[✔] Medium
[ ] High

Features:
[✔] Riffles [ ] Sand/Mud Bar [✔] Run/Glide
[✔] Pools [ ] Gravel Bar [ ] Braided
[ ] Rapids [ ] Aquatic Vegetation [ ] Other _____

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[ ] Cobble/Gravel ___%
[✔] Sand 20 %
[✔] Silt/Clay 30 %
[✔] Organic 50 %

Bank Substrate:
Height: Left 1.5' Right 1.5'

[ ]	Bedrock	[ ]
[ ]	Boulder	[ ]
[ ]	Gravel	[ ]
[✔]	Sand	[✔]
[ ]	Silt/Clay	[ ]
[✔]	Organic	[✔]

Floodplain Width:

Left		Right
[ ]	<10 feet	[ ]
[ ]	<25 feet	[ ]
[ ]	<50 feet	[ ]
[ ]	<100 feet	[ ]
[✔]	>100 feet	[✔]

Dominant Vegetation:
[✔] Forested
Species: Acer rubrum, Fraxinus pennsylvanica
[✔] Shrub
Species: Cornus alba, Lonicera tatarica
[✔] Herbaceous
Species: Phragmites australis

Wildlife Observed/Notes:

Sketch:
See Attached Figure.

Tetra Tech Stream Data Sheet

Surveyors: J. McGuirk, D. Quinn Date: 03/24/2014 Resource ID Number: S-I2
Project: PPP State: PA County: Delaware
Photo Number (s): _____ Canopy Cover: 60 % Location: 39.893884°, -75.431238°

Flow Direction: S **Bank Width:** 7 Feet **Water Width:** 5 Feet
High Water Depth: 3 Feet **Water Depth:** 11.00 Inches **Turbidity:** Low
Flow Stage: Moderate
Flow Regime: [✔] Perennial [ ] Intermittent [ ] Ephemeral [ ] Flowing Ditch [ ] Dry/Stagnant Ditch

Sinuosity:
[ ] Low
[ ] Medium
[✔] High

Features:
[✔] Riffles [ ] Sand/Mud Bar [ ] Run/Glide
[✔] Pools [ ] Gravel Bar [ ] Braided
[ ] Rapids [ ] Aquatic Vegetation [ ] Other _____

Substrate:
[ ] Bedrock ___%
[✔] Boulder 20 %
[✔] Cobble/Gravel 30 %
[✔] Sand 50 %
[ ] Silt/Clay ___%
[ ] Organic ___%

Bank Substrate:
Height: Left 3' Right 5'

[ ]	Bedrock	[ ]
[ ]	Boulder	[ ]
[ ]	Gravel	[ ]
[✔]	Sand	[✔]
[ ]	Silt/Clay	[ ]
[✔]	Organic	[✔]

Floodplain Width:

Left		Right
[ ]	<10 feet	[ ]
[ ]	<25 feet	[ ]
[ ]	<50 feet	[ ]
[ ]	<100 feet	[ ]
[✔]	>100 feet	[✔]

Dominant Vegetation:
[✔] Forested
Species: Acer rubrum, Fraxinus pennsylvanica
[✔] Shrub
Species: Cornus alba, Lonicera tatarica
[✔] Herbaceous
Species: Phragmites australis

Wildlife Observed/Notes:

Sketch:
See Attached Figure.

APPENDIX D

STREAM PHOTOGRAPHS

Photograph Number:	71	**Feature Name:**	S-I1	**Date:**	03/24/2014
Direction:	N, Downstream	**Flow Regime:**	Ephemeral	**Remarks:**	N/A

Photograph Number:	72	**Feature Name:**	S-I3	**Date:**	03/24/2014
Direction:	S, Upstream	**Flow Regime:**	Ephemeral	**Remarks:**	N/A

Photograph Number:	73	**Feature Name:**	S-I2	**Date:**	03/24/2014
Direction:	SW, Upstream	**Flow Regime:**	Perennial	**Remarks:**	N/A

Photograph Number:	74	**Feature Name:**	S-I6	**Date:**	03/24/2014
Direction:	N, Downstream	**Flow Regime:**	Ephemeral	**Remarks:**	N/A

APPENDIX E

HYDRIC SOILS LIST

Hydric Soils List
Delaware County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AgB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded	Calvert	7	valleys
BeA	Beltsville silt loam, 0 to 3 percent slopes	Othello	5	terraces
BeB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	terraces
ByA	Butlertown silt loam, 0 to 3 percent slopes	Othello	5	terraces
ByB2	Butlertown silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	terraces
CaA	Calvert silt loam, 0 to 3 percent slopes	Calvert	85	depressions
CaB	Calvert silt loam, 3 to 8 percent slopes	Calvert	85	valleys
CaB2	Calvert silt loam, 3 to 8 percent slopes, moderately eroded	Calvert	100	valleys
CaaA	Califon loam, 0 to 3 percent slopes	Holly	4	flood plains
CaaA	Califon loam, 0 to 3 percent slopes	Baile	3	depressions
CaaA	Califon loam, 0 to 3 percent slopes	Fluvaquents	3	flood plains
Ch	Chewacla silt loam	Wehadkee	5	flood plains
Cm	Codorus silt loam	Hatboro	8	flood plains

Cm	Codorus silt loam	Baile	3	depressions
Cn	Congaree silt loam	Holly	8	flood plains
GdB	Gladstone gravelly loam, 3 to 8 percent slopes	Cokesbury	3	depressions
GdC	Gladstone gravelly loam, 8 to 15 percent slopes	Cokesbury	5	depressions
GnA	Glenville silt loam 0 to 3 percent slopes	Baile	5	depressions
GnB	Glenville silt loam, 3 to 8 percent slopes	Baile	5	depressions
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	Worsham	7	depressions
Ha	Hatboro silt loam	Hatboro	95	flood plains
Ma	Made land, gravelly materials	Croton	1	depressions
Me	Made land, schist and gneiss materials	Hatboro	1	flood plains
Mf	Made land, sanitary land fill	Croton	2	depressions
MgB2	Manor loam, 3 to 8 percent slopes, moderately eroded	Hatboro	2	flood plains
MgC	Manor loam, 8 to 15 percent slopes	Hatboro	2	flood plains
Mn	Melvin silt loam	Melvin	85	flood plains
MoB2	Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded	Watchung	5	depressions
NaD	Neshaminy gravelly silt loam, 15 to 25 percent slopes	Towhee	5	depressions
NsB	Neshaminy very stony silt loam, 0 to 8 percent slopes	Towhee, extremely stony	5	depressions

Hydric Soil List – Delaware County, Pennsylvania

NsD	Neshaminy very stony silt loam, 8 to 25 percent slopes	Towhee, extremely stony	3	depressions
NsF	Neshaminy very stony silt loam, 25 to 45 percent slopes	Towhee, extremely stony	3	depressions
OtA	Othello silt loam	Othello	90	terraces
OtA	Othello silt loam	Nanticoke	2	tidal flats
UrlB	Urban land-Gladstone complex, 0 to 8 percent slopes	Cokesbury	5	depressions
UrlD	Urban land-Gladstone complex, 8 to 25 percent slopes	Cokesbury	5	depressions
UugB	Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes	Baile	1	depressions
UugD	Urban land-Udorthents, schist and gneiss complex, 8 to 25 percent slopes	Baile	1	depressions
WaA	Watchung silt loam, 0 to 3 percent slopes	Watchung, silt loam	86	depressions
WaA	Watchung silt loam, 0 to 3 percent slopes	Towhee	9	depressions
WcB	Watchung very stony silt loam, 0 to 8 percent slopes	Watchung	85	depressions
WoA	Worsham silt loam, 0 to 3 percent slopes	Worsham	85	drainageways
WoB	Worsham silt loam, 3 to 8 percent slopes	Worsham	85	drainageways
WoB2	Worsham silt loam, 3 to 8 percent slopes, moderately eroded	Worsham	85	drainageways
WsB	Worsham very stony silt loam, 0 to 8 percent slopes	Worsham	85	drainageways
Modified from Hydric Soils of the United States (NRCS 2014)				

Aquatic Resource Report Addendum for the Pennsylvania Pipeline Project, Southeast Region, Delaware County, Pennsylvania

Prepared By:

Tetra Tech, Inc. For

Sunoco Pipeline, LP

525 Fritztown Road

Sinking Spring, PA

NOTE: This Aquatic Resources Report excerpts information relevant to the major permit modification for the Glen Riddle/SEPTA HDD and previously submitted information by Sunoco Pipeline L.P. as part of the approved PPP Chapter 105 Joint Permit (E23-524. APS 879354)]

March 2016

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ACRONYMS

1987 Manual	Corps of Engineers Wetland Delineation Manual
Corps Regional Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GIS	Geographic Information Systems
GPS	Global Positioning System
LOD	Limit of Disturbance
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
PA	Pennsylvania
PEM	Palustrine Emergent
PFO	Palustrine Forested
Project	Southeastern Region, Pennsylvania Pipeline Project
PSS	Palustrine Scrub Shrub
ROW	Right-of-Way
SPLP	Sunoco Pipeline, LP
UNT	Unnamed Tributary
UPL	Upland
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

On behalf of Sunoco Pipeline, LP (SPLP), Tetra Tech, Inc. (Tetra Tech), has prepared this Aquatic Resource Addendum Report for Delaware County to support the Pennsylvania Pipeline Project (Project). Additional aquatic resource surveys were determined to be necessary to accommodate additional Project area changes. This report is an addendum to the original Aquatic Resource Report prepared for Delaware County and dated August 2015. The two reports provide a comprehensive delineation of aquatic resources to be or likely to be impacted by the proposed Project. Wetland areas were delineated onsite using methodology outlined within the United States Army Corps of Engineers (USACE) *Wetland Delineation Manual* (Environmental Laboratory, 1987; *1987 Manual*), as amended by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*, April 2012 (Environmental Laboratory, 2012; *Corps Regional Supplement*).

The content of this report presents the methodology, results, and conclusions of wetland delineation and stream identification activities completed for Addendum Study Areas. This report provides additional baseline, existing environment information in regards to aquatic resources so that proper avoidance and minimization measures can be implemented. This report does not reference a detailed project description or present impacts, or discuss Clean Water Act jurisdiction.

2.0 METHODOLOGY

USACE requires the use of the procedures enumerated in the *1987 Manual* (Environmental Laboratory, 1987) and the *Corps Regional Supplement* (Environmental Laboratory, 2012) for making jurisdictional determinations. According to the *1987 Manual*, an area is defined as a wetland if, under normal circumstances, it meets all three of the following criteria:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Wetlands identified in the field were classified in accordance with the U.S. Fish and Wildlife Service's (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Wetland classifications are as follows: palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). Dominant vegetation was identified and classified according to The National Wetland Plant List: 2014 Update of Wetland Ratings (Lichvar, 2014). Plant classifications are as follows:

Obligate (OBL) - essentially always found in wetlands; estimated probability >99%

Facultative Wetland (FACW) - usually found in wetlands; estimated probability 67%-99%

Facultative (FAC) - equally likely to occur in wetlands and non-wetlands;
estimated probability 34%-66%

Facultative Upland (FACU) - sometimes occurs in wetlands; estimated probability 1%-33%

Upland (UPL) - rarely occurs in wetlands; estimated probability <1%

The field investigations for modifications to the proposed pipeline Project were performed during numerous field visits from November 2013 through March 2016. The study area was limited to the modification areas illustrated on the Project mapping. Preliminary site reconnaissance of the study area was conducted through a review of available Geographic Information Systems (GIS) resources. Existing information reviewed included the following:

- United States Geological Survey (USGS) topographic mapping (Figures 1-1 to 1-3; USGS, 2009)
- Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey (Figure 2-1 to 2-3; NRCS, 2014)
- USFWS National Wetland Inventory (NWI) Mapping (Figure 3-1 to 3-3; USFWS, 2009)

The delineation consisted of the establishment of the wetland/upland margin with flagging hung at intervals that accurately depicted the outline of the boundary. The individual flags were then located using a Global Positioning System (GPS) receiver and later added to the Project area mapping. Wetland flagging was limited to the bounds of the investigated study area and wetlands are shown as closed or partially closed systems on the detail map (Figure 4-1 to 4-10).

Stream data sheets detailing stream characteristics are provided in Appendix A. Appendix B contains photographs of streams located within the study area. Appendix C provides a list of hydric soils known to occur within Delaware County. Resumes of project personnel are included in Appendix D.

3.0 RESULTS

The field investigations did not identify any areas within Delaware County, PA, located within the Southeast Region of the proposed Pennsylvania Pipeline Project Addendum Study Area, that met the wetland criteria outlined in the *1987 Manual*, as amended by the *Corps Regional Supplement*. Two streams were identified within the Project study area. A narrative summary of field data collected for this system is presented below. The detail maps provided as Figures 4-1 to 4-10 illustrate stream locations in relation to the Addendum Study Area.

3.1 WETLAND IDENTIFICATION AND DELINEATION

Hydric soils and soils with hydric components are often associated with wetlands. The NRCS Soil Survey hydric soil list for Delaware County, PA is included in Appendix C. The NRCS soil survey maps are included as Figures 2-1 to 2-3. Confirmation of the soil mapping units was not performed during this site evaluation.

See Figures 3-1 to 3-3 for NWI wetlands that fall within the Addendum Study Area.

Based on field evidence and best professional judgment, it was determined that no wetlands were present within the study area. Wetland areas would have demonstrated the presence of all three wetland parameters required by the *1987 Manual* and the *USACE Regional Supplement*.

3.2 STREAM IDENTIFICATION AND EVALUATION

Based on field evidence and best professional judgment, it was determined that two streams were identified within the evaluated study area. A data sheet that details the bank and channel characteristics, substrate composition, aquatic habitat, and hydrology was prepared for one stream (Appendix A).

Stream C19

Stream C19 (S-C19) is an ephemeral unnamed tributary (UNT) to Chester Creek (Figure 4-3). The stream bank is approximately 9 feet in width. The bank height is 6 feet. The stream bed contains a gravel, sand, silt, clay, and organic substrate. At the time of the field investigation, the stream exhibited an average water depth of 3 inches.

Stream I2

S-I2 is a previously identified stream that was extended into the Addendum Study Area (Figure 4-4). No new data was collected for this stream extension.

3.3 STREAMS WITH FLOODWAY IMPACTS OUTSIDE THE STUDY AREA

Streams with floodway impacts that extend within the Project limit of disturbance (LOD), but are outside of the study area, are described on Table 2 and shown on Figures 4-1 to 4-10. There are seven streams within Delaware County with floodways that extend into the Project LOD.

4.0 CONCLUSIONS

During the field investigations in Delaware County, PA, located within the Southeast Region of the proposed Pennsylvania Pipeline Project, no areas were identified within the Addendum Study Area which exhibited all three criteria necessary to be classified as a jurisdictional wetland in accordance with the *1987 Manual and the Regional Supplement*:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Two streams were identified within the evaluated study area.

There are seven streams within Delaware County with floodways that extend into the Project LOD.

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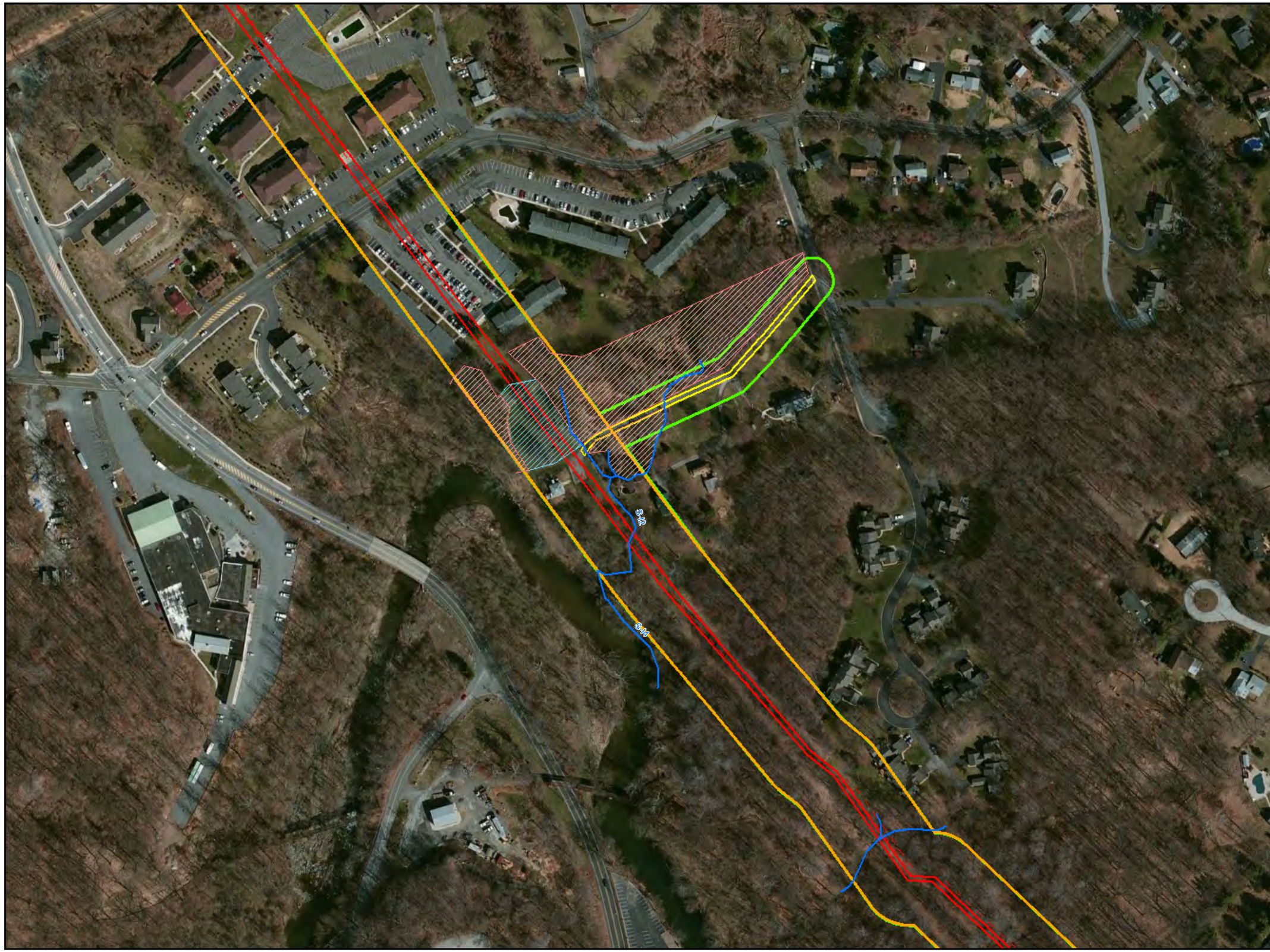
FIGURES



Legend

- Culvert
- Sample Location
- Photo Location
- Drainage Feature
- Stream

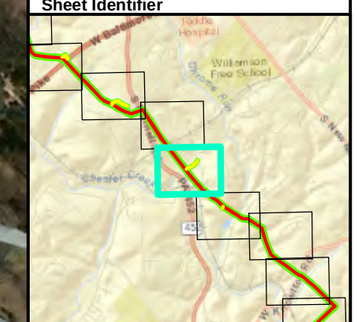
Wetland

- PEM
- PFO
- PSS
- PuB

New Wetland

- PEM
- PFO
- PSS
- PuB
- Access Road
- Alignment Centerline
- Study Area
- Access Road (8/19/15)
- Alignment Centerline (8/19/15)
- Study Area (8/19/15)

Sheet Identifier



N

0 100 200 Feet

0 30.45 60.9 Meters

ADDENDUM WETLANDS DETAIL MAP
FIGURE 4-4
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).
2) Map insets are at a scale of 1 inch = 50 feet unless otherwise noted.

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PPP WETLANDS SEPENN\PIPELINE_DELAWARE\CO_ADDENDUM\DETAIL.MXD 03/23/16 JN

Site Restoration and Post-Construction Stormwater Management Plan

Pennsylvania Pipeline Project - South East Region: Spread 6

Major Modification-HDD 620

April 2019

Prepared for:
Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA 19608

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

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2 Soils Map, Soil Descriptions, Geologic Formations Map, Sinkhole Repair Plan

3 Construction Details

4 Stormwater Calculations

5 Infiltration test results

6. PCSM Plan Drawings

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LIST OF ACRONYMS

ACRONYM	MEANING
% CCE	Calcium carbonate equivalent
% ENV	Effective neutralizing value
ABACT	Antidegradation Best Available Combination of Technologies
BMP	Best Management Practice
E&SC	Erosion and Sediment Control
EV	Exceptional value
HDD	Horizontal directional drilling

HDPE	High-density polyethylene
HQ	High quality
NGL	Natural gas liquids
PA	Pennsylvania
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Access
PCSM	Post-Construction Stormwater Management
PIs	Pure live seed
ROW	Right of way
SPPP	Sunoco Pennsylvanian Pipeline Project
SR	Site Restoration
TSF	Trout stock fisheries
Tt	Tetra Tech, Inc.
UNT	Unnamed tributary
WWF	Warm water fisheries

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Site Restoration and Post-Construction Stormwater Management (PCSM) Plan (Plan) for Sunoco Pipeline, L.P. (SPLP) – Pennsylvania Pipeline Project, South East Region: Spread 6. The Plan addresses activities associated with the Sunoco Pennsylvania Pipeline Project (SPPP) installation. Spread 6 (South East Region) of this project is located in Chester and Delaware Counties, Pennsylvania (PA). The plan addresses activities associated with a major modification to the Sunoco Pennsylvania Pipeline Project (SPPP) installation. The 620 HDD Major Modification is located in Middletown, Delaware County. Site location maps are provided in Attachment 1.

2.0 SITE DESCRIPTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL). The project involves the installation of approximately two parallel pipelines within a 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines Fifty feet will be maintained as permanent ROW. In addition, temporary use areas or extra workspaces will be required at some stream and road/railroad crossings; these will typically expand the construction ROW by 25 feet where needed. Construction activities will involve tree removal, clearing and grubbing within the ROW, trenching, pipe installation, and site restoration. This SR and Post Construction Stormwater Management Plan specifically relates to impacts associated with the South East Region, Construction Spread 6.

Fifty feet will be maintained as permanent ROW. In addition, temporary use areas or extra workspaces will be required at some stream and road/railroad crossings; these will typically expand the construction ROW by 25 feet where needed. Construction activities will involve tree removal, clearing and grubbing within the ROW, trenching, pipe installation, and SR. The total LOD in the South East Region will be approximately 278 acres. Acres disturbed by county will be as follows: Chester County with 176 acres disturbed, and Delaware County with 102 acres disturbed.

The HDD 620 Major Modification is is being requested for a change in the horizontal directional drill (HDD) installation method for the 20-inch and portions of the 16-inch diameter pipelines to a conventional open trench construction through Wetland WL-I1 and Stream S-I2, conventional auger bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad. Stream SC-I2 and wetland WL-I1 will be crossed in accordance with Chapter 105 Joint Permit Application major modification, utilizing one of the approved open-trench excavation methods for installation of the pipeline across waterbodies. The modification includes an additional 5.32 acres of LOD.

Past and present land use of the project area and surrounding area is agricultural and forested land. Future land use will be a maintained vegetated natural gas pipeline ROW and agricultural land and forested land. Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the gas line alignment are indicated on the plans, where applicable.

2.1 TOPOGRAPHY

The work zone is located on ground of varying elevations. Site elevations vary from 23 feet (Chester Creek in Delaware County) to 741 feet (western border of Chester County) above mean sea level based on the Pennsylvania Spatial Data Access (PASDA). The construction plans show the topography of the site and the surrounding area.

2.2 GEOLOGY AND SOILS

The soils and geologic formations surrounding the site are shown on the figures provided in Attachment 2. Attachment 2 also provides soil descriptions and properties of the soils found at the site. In general, the following actions will be taken to counteract soil limitations:

1. Erodible Soils - Prompt stabilization practices will be implemented to minimize the risk of erosion. PCSM facilities have been designed to minimize point-source discharges which increase the likelihood of downstream erosion.

2. Cut Banks Caves - Almost all Pennsylvania soils are susceptible to caving of cut banks. Cut slopes will be stabilized as soon as possible with seed and mulch to prevent sliding. Slopes are designed to not exceed 2H:1V.

3. Corrosive to Concrete or Steel Pipe - Pipes to be used on site shall be either HDPE or coated steel.

4. High Water Table - A seasonal high groundwater determination was conducted at the proposed block valve sites. PCSM facilities that infiltrate have been designed to maintain a 20" separation from the seasonal high groundwater table.

5. Low Strength - Most of Pennsylvania soils (73%) have relatively low strength. Precautions will be taken to prevent slope failures due to improper construction practices. Soils will be evaluated during construction of block valve sites and PCSM facilities to determine whether additional measures will need to be taken.

6. Piping Tendencies -Piping is the erosion by percolating waters or seepage in layer of subsoil resulting in caving and the formation of tunnels or pipes thorough which the soluble or granular material is removed. Where necessary, anti-seep collars will be used to prevent piping.

7. Poor Topsoil -Soil amendments will be added to site soils to promote vegetative growth.

8. Potentially Hydric -A wetland delineation has been performed to determine the presence of wetlands.

9. Potential Sinkhole - Should a sinkhole be encountered during construction, repair should be done under the direct observation and supervision of a professional geologist or licensed geotechnical engineer. Site specific sinkhole repairs should be developed on a case by case basis. Block valves located within karst topography have been identified, and infiltration practices have been designed to minimize the risk of sinkholes.

To prevent sediment from leaving the site, stabilization practices will be implemented in disturbed areas as soon as practical. Geologic formations or soil conditions that may have the potential to cause pollution after

earth disturbance were not observed during field activities. Infiltration tests are being performed and results are being evaluated for the design of the proposed post construction stormwater BMPs.

2.3 SURFACE WATER HYDROLOGY

The receiving waters for the 620 HDD Major Modification LOD is UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. Chester Creek is also listed as siltation impaired. Descriptions of the Primary Receiving Waters can be found in Table 1.

The plan contains Antidegradation Best Available Combination of Technologies (ABACT) BMPs to maintain the designated use of the receiving waters and prevent additional siltation from polluting the streams. The locations of the receiving waters relative to the project area can be seen on the USGS location map in Attachment 1.

3.0 SITE RESTORATION PRACTICES

Section 3.0 addresses restoration of the mainline pipeline, temporary workspaces, temporary access roads, and the block valve sites which will be vegetated. Following completion of pipeline installation and trench backfilling, the pipeline ROW, associated workspaces, and temporary access roads shall be returned to the general grade present prior to pipeline installation in order to maintain preconstruction drainage patterns. After completion of major construction work, topsoil that was stockpiled during construction will be placed along the ROW. Grounds disturbed by any of the operations necessary to complete the work for this project within the ROW are to be permanently seeded, or if specified, sodded, unless occupied by structures, paved, or designated as a permanent access road. Disturbed areas, which are at final grade, shall be seeded and mulched once final grades are achieved. The permanent seed mixture will restore disturbed areas to a meadow in good condition or better. If seeding cannot be completed within a 4 day period due to weather conditions, the disturbed area will be mulched with straw at the rate of 3 tons per acre. This straw will be anchored using a method described in Section 3.4.

3.1 BMP DESCRIPTION AND CONSTRUCTION SEQUENCE

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action to conform to the applicable regulatory agency requirements for restoration and post-construction stormwater management of the site. Necessary steps for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. The contractor will comply with all requirements listed in this section. The contractor may be required to alter controls based on the effectiveness of controls or differing conditions encountered in the field. The appropriate county conservation district and DEP shall be contacted and must approve any deviation to the authorized plans.

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

General Construction Sequence

1. Grade surface to finished grade elevations as soon as practicable following completion of pipe installation.

2. Surface roughening will be utilized to rough the soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces

within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended. Surface roughening shall be accomplished using dozers affixed with grouser tracked equipment. Dozers shall run up and down the slopes leaving horizontal grooves perpendicular to the slope. Dozer blades shall be raised and not used during surface roughening. Where compaction does occur, contractor shall scarifiy the soil or provide additional roughening such as deep ripping or chisel ripping to restore the area to a minimal compacted state. In areas of proposed infiltration, soils shall be amended to 2' below grade. See Soil Amendment and Restoration construction sequence below.

3. Place topsoil from topsoil stockpiles as the upper layer of backfill. Topsoil shall not be placed when the subgrade is frozen or when it is excessively wet or dry and shall not be handled when in a frozen or muddy condition.

4. Remove gravel and geotextile from the temporary access roads and scarify the soil. Refer to step 2 of this sequence to address compaction at access roads. After addressing compaction concerns, place topsoil that was stripped prior to installation of the access roads.

5. Immediately seed and mulch disturbed areas in accordance with the permanent seeding schedule once final grade is established and topsoil is placed.

6. Maintain erosion and sedimentation control devices until site work is complete and a uniform 70-percent perennial vegetative cover is established. Regrade and revegetate areas disturbed during the removal of the erosion and sediment controls.

Permanent Seeding

Site preparation and establishment of permanent cover in areas other than lawns will be conducted according to the following guidelines:

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SLOPES AND BANKS (NOT MOWED) WELL-DRAINED VARIABLE DRAINAGE	 1 PLUS 1 PLUS	 3, 5, 8, OR 12 (1) 3 OR 7
SLOPES AND BANKS (MOWED) WELL-DRAINED **SLOPES AND BANKS (GRAZED/HAY)** WELL-DRAINED	1 PLUS 1 PLUS	2 OR 10 2,3, OR 13
GULLIES AND ERODED AREAS	1 PLUS	3, 5, 7, OR 12 (1)
EROSION CONTROL FACILITIES (BMPS) SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS DRAINAGE DITCHES	1 PLUS	2, 3, OR 4

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SHALLOW, LESS THAN THREE FEET DEEP	1 PLUS	2, 3, OR 4
DEEP, NOT MOWED	1 PLUS	5 OR 7
POND BANKS, DIKES, LEVEES, DAMS, DIVERSION CHANNELS, AND OCCASIONAL WATER FLOW AREAS		
MOWED AREAS	1 PLUS	2 OR 3
NON-MOWED AREAS	1 PLUS	5 OR 7
FOR HAY OR SILAGE ON DIVERSION CHANNELS AND OCCASIONAL WATER FLOW AREAS	1 PLUS	3 OR 13
HIGHWAYS		
NON-MOWED AREAS		
WELL-DRAINED	1 PLUS	5, 7, 8, OR 10
VARIABLE DRAINED	1 PLUS	3 OR 7
POORLY DRAINED	1 PLUS	3
AREAS MOWED SEVERAL TIMES PER YEAR	1 PLUS	2, 3, OR 10
UTILITY ROW		
WELL-DRAINED	1 PLUS	5, 8, OR 12 (1)
VARIABLE DRAINED	1 PLUS	3 OR 7
WELL-DRAINED AREAS FOR GRAZING/HAY	1 PLUS	2, 3, OR 13
EFFLUENT DISPOSAL AREAS	1 PLUS	3 OR 4
SANITARY LANDFILLS	1 PLUS	3, 5, 7, 11 (1), OR 12 (1)
SURFACE MINES		
SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST)	1 PLUS	3, 4, 5, 7, 8, 11 (1) OR 12(1)
SEVERELY DISTURBED AREAS FOR GRAZING/HAY	1 PLUS	3 OR 13
LAWN	1 PLUS	PENNDOT Formula B

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	**SPECIES**	**SEEDING RATES – PLS (1)**	
		MOST SITES	ADVERSE SITES (8)
1 (2)	spring oats (spring), or 64 96	64	96
	annual ryegrass (spring or fall), or	10	15
	winter wheat (fall), or	90	120
	winter rye (fall)	56	112
2 (3)	tall fescue, or 75	60	75
	fine fescue, or 40	35	40
	kentucky bluegrass, plus 25 30	25	30
	redtop(4), or	3	3
	perennial ryegrass	15	20
3	birdsfoot trefoil, plus 6 10	6	10
	tall fescue	30	35
4	birdsfoot trefoil, plus	6	10
	reed canarygrass	10	15
5 (5)	Big Bluestem, plus	10	15
	tall fescue, or	20	25
	perennial ryegrass	20	25

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	**SPECIES**	**SEEDING RATES – PLS (1)**	
		MOST SITES	ADVERSE SITES (8)
6 (5,6)	Big Bluestem, plus	10	15
	annual ryegrass	20	25
7 (5)	birdsfoot trefoil, plus	20	30
	Big Bluestem, plus	20	30
	tall fescue	20	25
8	flatpea, plus	20	30
	tall fescue, or	20	30
	perennial ryegrass	20	25
9	Not applicable to project	N/A	N/A
10	tall fescue, plus	40	60
	fine fescue	10	15
11	deertongue, plus	15	20
	birdsfoot trefoil	6	10
12(7)	switchgrass, or	15	20
	big bluestem, plus	15	20
	birdsfoot trefoil	6	10
13	orchardgrass, or	20	30
	smooth bromegrass, plus	25	35
	birdsfoot trefoil	6	10

1. Pure live seed (pls) is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds pls shown on the seed tag. Thus, if the pls content of a given seed lot is 35 percent, divide 12 pls by 0.35 to obtain 34.3 pounds of seed required to plant one-acre. All mixtures in this table are shown in terms of pls.

2. If high-quality seed is used, for most sites seed spring oats at a rate of two bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at one bushel per acre. If germination is below 90 percent, increase these suggested seeding rates by 0.5 bushel per acre.

3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.

4. Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.

5. Use for highway slopes and similar sites where the desired species after establishment is Big Bluestem.

6. Use only in extreme southeastern or extreme southwestern PA. Serecia lespedeza is not well adapted to most of PA.

7. Do not mow shorter than 9 to 10 inches.

8. If liming, fertilization, and preparation of seedbed are properly done and if care is taken to drill and cover the seed (or mulch applied), the rate for "most sites" should suffice. However, on eroded or coarse and poorly prepared seedbeds, particularly if the soil is very acidic or infertile, the rate for "adverse sites" should be used.

9. For seed mixtures 11 and 12, only use spring oats or weeping lovegrass (included in mix) as nurse crop.

In lawn areas, permanent cover will be established using the following PENNDOT seed mixture:

PENNDOT FORMULA B				
Seeding Rate	3 lbs. per 1,000 square feet			
Species	**% by Weight**	**Purity %**	**Minimum % Germination**	**Maximum % Weed Seed**
Kentucky Bluegrass	50	98	80	0.20
Perennial Rye	20	98	90	0.15
Red Fescue	30	98	85	0.15

Liming Rates

Minimum 6 tons per acre at 100% effective neutralizing value (% ENV), unless the soil test determines that a lesser amount is needed. To determine the actual amount of regular lime to apply, divide the amount called for by the soil test by the % ENV for the product used. For example, if 6 tons per acre is needed and the %ENV for the lime used is 88%, divide 6 by 0.88 resulting in 6.8 tons needing to be applied. For dolomitic lime, which has a significant amount of magnesium in it, divide the amount called for by the soil test by the % calcium carbonate equivalent (% CCE) listed for the product instead of the % ENV. The % CCE may be above 100% which accounts for the fact that magnesium has a greater effect per pound than the calcium in regular lime. Note: When a soil test requires more than 8,000 pounds of lime per acre, the lime must be mixed into the top 6 inches of soil.

Fertilization Rates

Apply 10-20-20 at 600 pounds/acre, if top dressed or 1,000 pounds/ac, if incorporated, unless the soil test determines that the rate can be less than these minimums.

SOIL AMENDMENT APPLICATION RATE EQUIVALENTS				
Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yds.	
AGRICULTURAL LIME	6 TONS	240 LBS.	240 LBS.	or as per soil test; may not be required in agricultural fields
10-20-20 FERTILIZER	1,000 LBS.	25 LBS.	25 LBS.	or as per soil test; may not be required in agricultural fields

Temporary Seeding

Temporary grass cover will be established in the following areas where soil stockpiles are exposed for a period greater than 4 days. The seed mixture for temporary cover will consist of 100% annual ryegrass. Seed will be applied at the rate of 40 pounds per acre or as recommended by a local recognized seed supplier approved by the Owner's representative. Prior to seeding, apply 1 ton of agricultural grade limestone per acre plus 10-10-10 fertilizer at the rate of 500 pounds per acre and work into the soil.

Mulching

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

1. Straw mulch will be applied at the rate of 3 tons per acre. Chemically treated or salted straw is not acceptable as mulch.

2. Straw mulch will be anchored immediately after application by at least one of the following methods:

   A. "Crimped" into the soil using tractor-drawn equipment (straight-bladed coulter or similar).

      This method is limited to slopes no steeper than 3:1. Machinery should be operated on the contour. (Crimping of hay or straw by running it over with tracked machinery is not recommended.)

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

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

D. Lightweight plastic, fiber, or paper nets may be stapled over the mulch according to the manufacturer's recommendations.

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

3.2 MATERIAL RECYCLING AND DISPOSAL

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 Pennsylvania Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. Expected construction wastes during site restoration will consist of packaging material and sediment cleaned from E&SC BMPs. Packaging from materials brought on site will be disposed of by a licensed hauler. Sediment removed from BMPs will either be spread in a protected area to dry and then recycled as fill material prior to permanent seeding or disposed of off-site. In cases where disposal is necessary, waste materials will be disposed of at an approved PADEP waste site.

3.3 THERMAL IMPACTS

Thermal impacts are most commonly associated with urbanization (i.e., increased impervious surfaces) that results in heated stormwater runoff flowing into receiving waters where it mixes, and potentially increases the base temperature of the surface water in streams. However, another contributing factor for stream temperature is solar exposure (radiant energy input) to the surface water, typically ponded, standing waters. The amount of heat transferred, and the degree of thermal pollution is of importance for fisheries management and the ecological integrity of receiving waters. Among the attributes that determine the contribution of solar energy to thermal impacts are the presence of riparian vegetation, as well as stream width, depth, flow regime (perennial, intermittent, ephemeral), and orientation.

Thermal impacts have been minimized by limiting the disturbed area to the maximum extent practicable. By minimizing the extent of the disturbed area, vegetative clearing, including forested areas, has been minimized. Vegetated block valve sites will be restored to a meadow in good condition or better, and no impervious surface will be created at those sites. Following installation of the pipelines, existing grades along the pipeline right of way, additional temporary workspaces, and temporary access roads will be restored, permanent seeding will

occur as soon as practicable to facilitate vegetative growth during germinating months, and the addition/creation of impervious surfaces in riparian areas has been avoided. By returning these areas to their existing grades, stormwater is unlikely to pond in these locations therefore minimizing the potential for ponded water to result in significant contributions to thermal impacts in receiving waters. In addition, thermal impacts will be minimized during site restoration by facilitating permanent seeding as soon as practicable to encourage vegetative growth. Although shade cover will be reduced in areas that were previously forested, there is no anticipated adverse effect to the receiving watersheds because the project will only clear a narrow corridor of vegetation within each respective watershed. The Project does not have thermal impacts. Specifically, thermal impacts will be avoided by implementing the following:

- Siting parallel to and overlapping with existing ROWs to minimize vegetation clearing at stream crossings;
- Reducing the construction ROW width and additional temporary workspaces at stream crossings;
- No grubbing, grading, or clearing of trees will occur within 50 feet of the top of stream bank until pipeline construction/installation is ready to proceed through that area.
- Restoring (seeding) disturbed areas/ROW as soon as practicable and /or directing runoff to vegetated areas to reduce the temperature of runoff prior to discharge into the streams; and,
- Restoring the stream banks and seeding/planting as soon as practicable to facilitate vegetative growth along the stream channel.

3.4 RIPARIAN FOREST BUFFERS

Pennsylvania Pipeline Project - Riparian Forest Buffer Waiver Request

The 620 HDD Major Modification qualifies for the exemption of the riparian buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area where the pipeline corridor crosses perpendicular to the riparian area. Existing riparian forest buffers will be protected to the extent practicable by reducing the limit of disturbance at stream crossings and minimizing the number of stream crossings. The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. No waiver is required as the project is not located in a special protection watershed.

3.5 INSPECTION AND MAINTENANCE PROCEDURES

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

All sedimentation control measures will remain in place until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established. Any area not achieving a 70-percent vegetative cover will be reseeded and mulched within 24 hours of detection. If BMPs are found to be inoperative or ineffective during an inspection, PADEP should be contacted within 24 hours, followed by submission of a written noncompliance report to PADEP within 5 days of the initial contact.

Long-Term Maintenance

Long-term maintenance of the pipeline ROW will include periodic visual inspections for sufficient vegetative growth and cover. Insufficient vegetative cover is defined as any area not achieving a uniform 70-percent perennial vegetative cover. Bare spots and areas with insufficient vegetative cover will be reseeded and mulched within 24 hours of discovery. The ROW will be inspected for signs of erosion, especially on steep slopes. Corrective measures will be taken, as needed. If there is evidence of trench settling, the area will be regraded to maintain pre-construction drainage patterns, mulched, and seeded. A written report is required for each inspection and for each repair or maintenance activity, and the report should specify how to access the site. SPLP is responsible for maintaining the ROW under the provisions of this permit.

3.6 ANTIDEGRADATION REQUIREMENTS

The Glen Riddle HDD S3-0620 Major Modification reroute is located within a Siltation Impaired watershed. A combination of non-discharge alternatives and the use of ABACT BMPs will be implemented during construction to protect and maintain the existing water quality of the receiving waters.

Non-discharge alternatives were evaluated to minimize accelerated erosion and sedimentation and achieve zero net change in runoff between the pre and post-construction conditions. The extent of the disturbed area will be minimized, and the duration of disturbance will be minimized by stabilizing disturbed areas as soon as practicable. ABACT BMPs will be used onsite to protect and maintain the existing water quality of receiving waters.

The following ABACT Site Restoration BMPs will be used onsite:

- Pre-construction drainage pattern intact
- Minimizing the disturbed area
- No direct discharge to surface waters
- Prompt site restoration
- Proper vegetative cover techniques

3.7 STORMWATER RUNOFF ANALYSIS

The pre-construction drainage patterns surrounding the project will be maintained. All disturbed areas within the 280 HDD Major Modification LOD will be restored to a meadow in good condition or lawn where required by landowners. As a result of restoring the pipeline ROW and associated workspaces associated with the Major Modification to a meadow in good condition and maintaining pre-construction drainage patterns, there will be no increase in stormwater runoff rate or volume attributed to those areas. There are no proposed permanent access roads or block valves associated with this major modification.

All disturbed areas within the pipeline right of way, additional temporary workspaces, and temporary access roads will be restored to a meadow in good condition or better or a lawn condition. The pre-construction drainage patterns surrounding the project will be maintained for the areas of the project covered under this section. As a result of restoring the pipeline right of way, additional temporary workspaces, and temporary access roads to a meadow condition and maintaining pre-construction drainage patterns in accordance with 25 Pa Code § 102.8(n), there will be no increase in stormwater runoff rate or volume attributed to these locations, and a quantitative stormwater analysis is not required.

The proposed mainline pipeline will be restored in accordance with 102.8(n) and meet the requirements outlined in §§ 102.8(b), (c), (e), (f), (h), (i), (l), and (m).

In accordance with § 102.8(b), the following principles have been incorporated into the project design in accordance with the numbering in § 102.8(b): (1) The integrity of stream channels and the physical, biological, and chemical qualities of the receiving waters will remain unchanged. The site restoration principles will protect the existing and designated uses of the receiving waters. BMPs will be maintained until the site achieves stabilization during site restoration to ensure that runoff which leaves the project site will have no short-term adverse effects on the physical, biological, or chemical qualities of downstream receiving waters. The permanent seed mixture will restore the majority of the right of way to a meadow condition. Those areas which are not restored to a meadow condition will be restored to a lawn condition or forest. As a result of restoring the pipeline right of way as specified in the restoration plan, there will be no long-term effects to the physical, biological, or chemical qualities of downstream receiving waters. (2) The mainline pipeline will be restored to original grade so flow paths will not be altered. The right of way will be restored to achieve a meadow in good condition or better, with the exception of areas that will be returned to lawn or forest. In addition, the pipeline right of way accounts for only a narrow corridor of development within each drainage area to the nearest receiving water. As a result, post-development runoff rates to the nearest receiving water will not increase. (3) The right of way will be restored to a meadow in good condition or better in most areas, with the exception of specified locations where the right of way will be restored to the equivalent of its predevelopment land cover (lawn or forest). As a result, any potential increase in stormwater runoff volume has been minimized to the maximum extent practicable. (4) There are no proposed, permanent impervious features associated with the

mainline pipeline. Temporary access roads will be restored to a vegetated condition following installation of the pipeline. (5) Existing drainage features and vegetation will be protected by restoring the project area back to its original grade. As a result, drainage features and existing vegetation surrounding the project area will be preserved. (6) Land clearing and grading will be minimized because the project area has been limited to the area required to safely install the natural gas pipelines. The pipeline right of way will be returned to original grade following installation of the pipelines. (7) Soil compaction will be minimized by utilizing travel lanes within the pipeline right of way. Following construction, areas that have been compacted will be scarified or ripped, or soil amendments will be incorporated prior to backfilling topsoil and seeding. After initiating restoration, vehicular traffic will be restricted to prevent soil compaction. (8) As demonstrated in 102.8(2) and 102.8(3), potential increases in post development stormwater runoff has been minimized to the maximum extent practicable utilizing nonstructural restoration BMPs.

In accordance with § 102.8(c), the mainline Site Restoration and Post Construction Stormwater Management Plan has been planned and designed and will be implemented in consistency with the E&S Plan.

In accordance with § 102.8(e), the Site Restoration and Post Construction Stormwater Management Plan has been prepared by Robert F. Simcik, P.E. who is trained and experienced in PCSM design methods and techniques applicable to the size and scope of the proposed pipeline project.

In accordance with § 102.8(f), the Site Restoration and Post Construction Stormwater Management Plan contains drawings and a narrative consistent with the requirements of Chapter 102. The Plan has been designed to minimize the threat to human health, safety, and the environment to the greatest extent practicable. The Plan includes the required information as outlined in § 102.8(f)(1) through § 102.8(f)(15).

In accordance with § 102.8(h), nondischarge alternatives for Special Protection waters are evaluated in the Antidegradation section of the Site Restoration and Post Construction Stormwater Management Plan. The Plan includes ABACT BMPs where nondischarge alternatives do not exist for the project.

In accordance with § 102.8(i), the applicant has submitted the Site Restoration and Post Construction Stormwater Management Plan to the applicable county conservation districts and Department of Environmental Protection for review and approval. Upon complaint or site inspection, the Plan will be available for subsequent review and inspection by the reviewing agencies.

In accordance with § 102.8(l), the permittee will include with the notice of termination “Record Drawings” with a final certification statement from a licensed professional, which reads as follows:

“I (name) do hereby certify pursuant to the penalties of 18 Pa.C.S.A. § 4904 to the best of my knowledge, information and belief, that the accompanying record drawings accurately reflect the as-built conditions, are true and correct, and are in conformance with Chapter 102 of the rules and regulations of the Department of

Environmental Protection and that the project site was constructed in accordance with the approved PCSM Plan, all approved plan changes and accepted construction practices."

In accordance with § 102.8(m), the Site Restoration and Post Construction Stormwater Management Plan identifies that the permittee shall be responsible for long-term operation and maintenance of PCSM BMPs associated with permanent surface sites. However, there are no PCSM BMPs proposed as part of the mainline pipeline.

There are no proposed permanent gravel access roads and block valve pads in the South East Region.

4.0 POST-CONSTRUCTION STORMWATER MANAGEMENT ANALYSIS

The construction and restoration practices for the proposed major modification have been designed to meet the provisions PADEP Chapter 102 regulations. No new impervious area is proposed with the Major Modification. In general, the pre-construction drainage patterns surrounding the project will be maintained, and all disturbed areas within the pipeline ROW will be restored to a meadow in good condition. As a result of restoring all disturbed areas within the pipeline ROW to a meadow condition, the project will not result in increased stormwater runoff rate or volume.

4.1 BMP DESCRIPTION NARRATIVE AND CONSTRUCTION SEQUENCE

There are no proposed PCSM BMPs for the 620 HDD Major Modification.

4.2 MATERIAL RECYCLING AND DISPOSAL

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 Pennsylvania Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. In cases where disposal is necessary, waste materials will be disposed of at an approved PADEP waste site.

4.3 THERMAL IMPACTS

Thermal impacts are most commonly associated with urbanization (i.e., increased impervious surfaces) that results in heated stormwater runoff flowing into receiving waters where it mixes, and potentially increases the base temperature of the surface water in streams. However, another contributing factor for stream temperature is solar exposure (radiant energy input) to the surface water, typically ponded, standing waters. The amount of heat transferred, and the degree of thermal pollution is of importance for fisheries management and the ecological integrity of receiving waters. Among the attributes that determine the contribution of solar energy to thermal impacts are the presence of riparian vegetation, as well as stream width, depth, flow regime (perennial, intermittent, ephemeral), and orientation.

4.4 RIPARIAN FOREST BUFFERS

The 620 HDD Major Modification qualifies for the exemption of the riparian buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area where the pipeline corridor crosses perpendicular to the riparian area. Existing riparian forest buffers will be protected to the extent practicable by reducing the limit of disturbance at stream crossings and minimizing the number of stream crossings. The receiving waters for the 620 HDD Major Modification LOD is a UNT to Chester Creek, which is designated as TSF in Pa. Code 25 Chapter 93. No waiver is required as the project is not located in a special protection watershed.

4.5 INSPECTION AND MAINTENANCE PROCEDURES

Long-term maintenance of the pipeline ROW will include periodic visual inspections for sufficient vegetative growth and cover. Insufficient vegetative cover is defined as any area not achieving a uniform 70-percent perennial vegetative cover. Bare spots and areas with insufficient vegetative cover will be reseeded and mulched within 24 hours of discovery. The ROW will be inspected for signs of erosion, especially on steep slopes. Corrective measures will be taken, as needed. If there is evidence of trench settling, the area will be regraded to maintain pre-construction drainage patterns, mulched, and seeded. A written report is required for each inspection and for each repair or maintenance activity, and the report should specify how to access the site. SPLP is responsible for maintaining the ROW under the provisions of this permit.

Inspection and maintenance procedures for permanent post-construction stormwater management facilities and stormwater conveyance BMPs are summarized below. If any post-construction stormwater management facilities are constructed prior to stabilization of upslope contributory drainage areas, inspections shall occur weekly and after runoff events until the surrounding area achieves stabilization. Sites located within karst terrain require more frequent long-term inspections, as specified in the Sinkhole Repair Plan in Attachment 2.

4.6 ANTIDEGRADATION REQUIREMENTS

The Glen Riddle HDD S3-0620 Major Modification reroute is located within a Siltation Impaired watershed. A combination of non-discharge alternatives and the use of ABACT BMPs will be implemented during construction to protect and maintain the existing water quality of the receiving waters.

Non-discharge alternatives were evaluated to minimize accelerated erosion and sedimentation and achieve zero net change in runoff between the pre and post-construction conditions. The extent of the disturbed area will be minimized, and the duration of disturbance will be minimized by stabilizing disturbed areas as soon as practicable. ABACT BMPs will be used onsite to protect and maintain the existing water quality of receiving waters.

The following ABACT Site Restoration BMPs will be used onsite:

- Pre-construction drainage pattern intact
- Minimizing the disturbed area
- No direct discharge to surface waters
- Prompt site restoration
- Proper vegetative cover techniques

4.7 STORMWATER RUNOFF ANALYSIS

The pre-construction drainage patterns surrounding the project will be maintained. All disturbed areas within the 620 HDD Major Modification LOD will be restored to a meadow in good condition or lawn where required

by landowners. As a result of restoring the pipeline ROW and associated workspaces associated with the Major Modification to a meadow in good condition and maintaining pre-construction drainage patterns, there will be no increase in stormwater runoff rate or volume attributed to those areas.

5.0 REFERENCES

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

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Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, December 2006.

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