



PITT-04-20-024

April 8, 2020

Mr. Chris Smith
Construction Permits Section
Department of Environmental Protection
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 – HDD 0620
Middletown Township, Delaware County, PA**

Dear Mr. Smith:

On behalf of Sunoco Pipeline LP (SPLP), Tetra Tech, Inc. provides the following responses to the Pennsylvania Department of Environmental Protection (Department) Technical Deficiency letter dated March 11, 2020, regarding the above-referenced Chapter 102 Major Modification. The supporting attachments represent additional information to be added to the original modification request. For ease of your review, each Department comment is set forth verbatim below, followed by a narrative response with supporting attachments where necessary.

Technical Deficiencies

- 1. Comment:** The recent submission to address technical deficiencies only consisted of revised sheets. The original major permit modification was submitted April 26, 2019. We need three copies of the entire major permit amendment plan and calculation packages to process the permit.

Response: *Three copies of the entire major permit amendment plan (Full E&S Plan Set) with calculation section will be sent to the address provided by the CCD per DEP direction.*

- 2. Comment:** Sheet ES-0.02 was not revised to reflect open cut of stream S-12. This table exists as a sheet and also in the Erosion Control Narrative.

Response: *Sheet ES-0.02 has been revised to reflect the change in crossing method at stream S-12 to show the 16-inch-diameter pipeline previously installed as a horizontal directional drill and the 20-inch-diameter pipeline will be installed as an open cut crossing. The table was also updated to show wetland I1 as an open cut crossing. The revised plans are provided in Attachment A. The Project Description has also been updated in the narrative of the Erosion and Sediment Control Plan provided in Attachment B.*

- 3. Comment:** Please clarify the rip-rap streambank symbol the entire width on length of S-12 through the L.O.D. on sheet ES-6.20. This was not part of the original permit. Was it added as part of the inadvertent return issues? Has it been done, or will it be done as part of the open cut?

Response: *Sheet ES-6.20 has been updated to better depict the riprap installation along the banks of stream S-12. Riprap was installed as part of the restoration efforts that occurred as a result of the inadvertent return mitigation plan. An insert box has been added to ES-6.20 to better depict*

Mr. Chris Smith
PADEP SERO
April 8, 2020

the existing extent of the riprap (in black). This area is either to remain or to be restored after the 20-inch-diameter pipeline installation. These areas are labeled as "Existing Riprap" or "Existing Riprap to be Restored After 20-inch Installation". The areas that were proposed during the IR mitigation plan and were not installed because the area was not disturbed have been shaded (light gray) and labeled as "Previously Proposed Riprap, No Longer Planned". The revised sheet is provided in Attachment A.

Enclosed are two (2) hard copies of the modification request are provided to facilitate your review of the requested modification. Attachment A includes the revised E&S drawings. Attachment B contains the revised Project Description narrative in the Erosion and Sediment Control Plan.

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@tetrattech.com.

Sincerely,



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

Enclosures: 1 original, 1 copy

cc: File 112IC05958
M. Wheeler, Delaware County Conservation District (2 copies)
J. Hohenstein, SERO DEP
N. Bryan, Energy Transfer
M. Gordon, Energy Transfer
M. Styles, Energy Transfer
C. Embry, Energy Transfer
B. Schaeffer, Tetra Tech

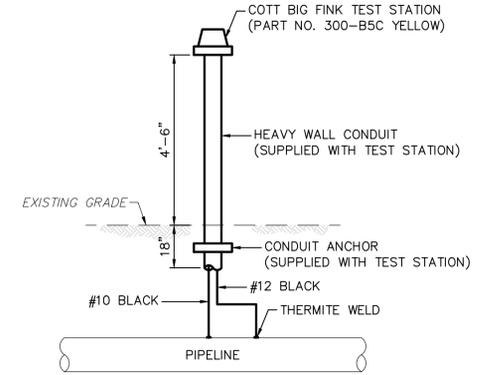
Attachment A

STREAM & WETLANDS CROSSING TABLES

Stream ID	Stream Name	Coordinates	Flow Regime	Bank to Bank Width (feet)	Crossing Method	PAFBC Stream Designation	Siltation Impaired	E&S Plan Sheet Number
S-B36	UNT to Chester Creek	39.9437, -75.502	Ephemeral	4	Dry Crossing	Drains to STS, ATW	Yes	ES - 6.03
S-B37	UNT to Chester Creek	39.9421, -75.4981	Ephemeral	6	Dry Crossing	Drains to STS, ATW	Yes	ES - 6.03, 6.04
S-B38	UNT to Chester Creek	39.9418, -75.4974	Perennial	10	Dry Crossing	Drains to STS, ATW	Yes	ES - 6.03, 6.04
S-B39	UNT to Chester Creek	39.9421, -75.4972	Ephemeral	2	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.04
S-B51	UNT to Chester Creek	39.9407, -75.4945	Ephemeral	1	HDD Open Cut Floodway	Drains to STS, ATW	Yes	ES - 6.04
S-B52	UNT to Chester Creek	39.9408, -75.4943	Intermittent	1.5	HDD Open Cut Floodway	Drains to STS, ATW	Yes	ES - 6.04
S-B53	UNT to Chester Creek	39.9407, -75.494	Intermittent	2	HDD Open Cut Floodway	Drains to STS, ATW	Yes	ES - 6.04
S-B54	UNT to Chester Creek	39.9405, -75.4942	Perennial	2	HDD Open Cut Floodway	Drains to STS, ATW	Yes	ES - 6.04
S-B55	UNT to Chester Creek	39.9405, -75.4946	Ephemeral	2	HDD Open Cut Floodway	Drains to STS, ATW	Yes	ES - 6.04
S-B56	UNT to Chester Creek	39.9401, -75.4904	Intermittent	4	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.05
S-B57	UNT to Chester Creek	39.9402, -75.4906	Ephemeral	1	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.05
S-C15	UNT to Chester Creek	39.9031, -75.4442	Ephemeral	2	Dry Crossing Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C16	UNT to Chester Creek	39.9042, -75.4454	Perennial	8	Dry Crossing Temporary Bridge	Drains to STS, ATW	Yes	ES - 6.17
S-C17	UNT to Chester Creek	39.9042, -75.446	Perennial	16	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C18	UNT to Chester Creek	39.9037, -75.4455	Perennial	7	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C19	UNT to Chester Creek	39.9030, -75.4444	Ephemeral	9	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C20	UNT to Chester Creek	39.9029, -75.4442	Ephemeral	2	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C21	UNT to Chester Creek	39.9038, -75.4455	Ephemeral	3	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C22	UNT to Chester Creek	39.9042, -75.4448	Intermittent	7	Open Cut Floodway Floodway Only	Drains to STS, ATW	Yes	ES - 6.17
S-C23	UNT to Chester Creek	39.9054, -75.4489	Perennial	10	HDD Clearing Only	Drains to STS, ATW	Yes	ES - 6.16
S-C24	UNT to Chester Creek	39.9066, -75.448	Ephemeral	2	HDD Clearing Only	Drains to STS, ATW	Yes	ES - 6.16
S-C25	UNT to Chester Creek	39.9065, -75.448	Ephemeral	1	HDD Clearing Only	Drains to STS, ATW	Yes	ES - 6.16
S-C26	UNT to Rocky Run	39.9077, -75.4505	Ephemeral	4	HDD	Drains to TNR	Yes	ES - 6.15, 6.16
S-C39	UNT to Chester Creek	39.9155, -75.4595	Ephemeral	2	HDD Floodway	Drains to STS, ATW	Yes	ES - 6.13
S-C40	UNT to Chester Creek	39.9156, -75.5494	Intermittent	3	HDD	Drains to STS, ATW	Yes	ES - 6.13
S-C41	UNT to Chester Creek	39.9159, -75.4595	Ephemeral	2.5	HDD Floodway	Drains to STS, ATW	Yes	ES - 6.13
S-C42	UNT to Chester Creek	39.9206, -75.4637	Intermittent	5	HDD	Drains to STS, ATW	Yes	ES - 6.12
S-C43	UNT to Chester Creek	39.9275, -75.47	Ephemeral	1	Dry Crossing	Drains to STS, ATW	Yes	ES - 6.10
S-C44	Rocky Run	39.9102, -75.457	Perennial	20	Dry Crossing	TNR	Yes	ES - 6.14
S-C45	UNT to Rocky Run	39.9122, -75.4568	Intermittent	5	Open Cut Floodway Floodway Only	Drains to TNR	Yes	ES - 6.14
S-H27	UNT to Crum Run	39.8843, -75.4194	Perennial	12	Dry Crossing	-	Yes	ES - 6.23
S-H28	Crum Run	39.8861, -75.4198	Perennial	16	Dry Crossing	-	Yes	ES - 6.23
S-H29	Chrome Run	39.8884, -75.4239	Perennial	18	Dry Crossing	-	Yes	ES - 6.22
S-H34	UNT to Chester Creek	39.8737, -75.4124	Intermittent	8	Dry Crossing	Drains to STS, ATW n/a	Yes	ES - 6.26
S-C58	Chester Creek	39.8733, -75.413	Perennial	80	Floodway Only	n/a	Yes	ES 6.28
S-H35	UNT to Chester Creek	39.8801, -75.4135	Perennial	7	Dry Crossing	Drains to STS, ATW n/a	Yes	ES - 6.24
S-H36	UNT to Chester Creek	39.8803, -75.4131	Intermittent	3	Dry Crossing	Drains to STS, ATW n/a	Yes	ES - 6.24
S-H37	Chester Creek	39.8700, -75.4111	Perennial	100	HDD	ATW, STS	Yes	ES - 6.26, 6.27
S-H38	UNT to Chester Creek	39.8700, -75.4117	Intermittent	8	HDD Floodway	Drains to STS, ATW	Yes	ES - 6.27
S-H39	UNT to Chester Creek	39.8687, -75.4104	Ephemeral	8	HDD Clearing LOD	Drains to STS, ATW	Yes	ES - 6.27
S-H40	UNT to Chester Creek	39.8670, -75.408	Ephemeral	5.5	HDD Floodway Clearing LOD	Drains to STS, ATW	Yes	ES - 6.28
S-H41	Chester Creek	39.8659, -75.4069	Perennial	100	HDD	ATW, STS	Yes	ES - 6.28
S-H42	UNT to Chester Creek	39.8627, -75.4031	Ephemeral	6	HDD Floodway	Drains to STS, ATW	Yes	ES - 6.29
S-H43	Baldwin Run	39.8575, -75.4006	Perennial	20	HDD Clearing LOD	n/a	Yes	ES - 6.30
S-H44	UNT to Baldwin Run	39.8573, -75.4001	Ephemeral	4	HDD Clearing LOD	n/a	Yes	ES - 6.30
S-H47	UNT to Chester Creek	39.8543, -75.3989	Ephemeral	8	Open Cut Floodway Floodway Only	Drains to STS, ATW n/a	Yes	ES - 6.31
S-11	UNT to Chester Creek	39.8944, -75.4317	Ephemeral	2	Open Cut Floodway Temp-Crossing	Drains to STS, ATW	Yes	ES - 6.20
S-12	UNT to Chester Creek	39.8939, -75.4312	Perennial	7	16-inch HDD 20-inch Open Cut	Drains to STS, ATW	Yes	ES - 6.20
S-13	UNT to Chester Creek	39.8942, -75.4314	Ephemeral	2	Floodway only	Drains to STS, ATW	Yes	ES - 6.20

Stream ID	Stream Name	Coordinates	Flow Regime	Bank to Bank Width (feet)	Crossing Method	PAFBC Stream Designation	Siltation Impaired	E&S Plan Sheet Number	
S-14	Chester Creek	39.8932, -75.4312	Perennial	70	Open Cut Floodway Temp-Crossing Floodway Only	STS, ATW	Yes	ES - 6.20	
S-15	UNT to Chester Creek	39.8919, -75.4293	Intermittent	6	Dry Crossing/Temporary Bridge	Drains to STS, ATW	Yes	ES - 6.21	
S-16	UNT to Chester Creek	39.8920, -75.4293	Ephemeral	5	Crossing/Temporary Bridge	Drains to STS, ATW	Yes	ES - 6.21	
S-17	UNT to Baldwin Run	39.8452, -75.4181	Ephemeral	1	Tw in Oaks Station	n/a	Yes	ES - 6.35	
S-117	UNT to Baldwin Run	39.8452, -75.4181	Ephemeral	4	HDD HDD Floodway	n/a	Yes	ES - 6.33	
S-118	UNT to Baldwin Run	39.8478, -75.4114	Ephemeral	13	HDD	n/a	Yes	ES - 6.33	
S-119	UNT to Baldwin Run	39.8478, -75.4114	Perennial	5	HDD HDD Floodway	n/a	Yes	ES - 6.32, 6.33	
S-120	UNT to Baldwin Run	39.8481, -75.4057	Ephemeral	3	HDD HDD Floodway	n/a	Yes	ES - 6.33	
					57 Streams				

Wetland ID	USFWS Cowardin Classification	Coordinates	Crossing Method	Exceptional Value	E&S Plan Sheet Number
BA5	FFO	39.8466, -75.4103	HDD	n/a	ES - 6.34
BA6	PFO	39.8465, -75.4107	HDD	n/a	ES - 6.34
C10	PEM	39.9053, -75.4468	Drive-Through HDD	n/a RWWS	ES - 6.16
	PSS	39.9055, -75.4467	HDD	n/a RWWS	ES - 6.16, 6.17
C23	PEM	39.9107, -75.4566	Open Cut	Wild Trout	ES - 6.14
H41	PEM	39.8542, -75.3993	Open Cut	n/a	ES - 6.31
I1	PEM	39.8945, -75.4320	HDD Open Cut	n/a RWWS	ES - 6.20
I5	PEM	39.8460, -75.4139	Open Cut/ Temporary Matting	n/a	ES - 6.34
I16	PEM	39.8491, -75.4039	HDD	n/a	ES - 6.32, 6.33
	PFO	39.8485, -75.4035	HDD	n/a	ES - 6.32, 6.33
C21	PFO	39.9214, -75.4642	HDD	n/a	ES - 6.12
			9 Wetlands		



NOTES:

- TEST WIRES SHALL BE STRANDED COPPER WITH THW OR MTW INSULATION.
- TEST WIRES SHALL BE OF THE GAUGE INDICATED AND PROVIDED WITH WIRE LABELS (WITHIN TEST STATION) TO IDENTIFY THE PIPELINE ATTACHMENT LOCATION. THE NO. 1 TEST WIRE SHALL BE ATTACHED TO THE PIPELINE AT THE LOWER STATION NO. WITH THE ADDITIONAL TEST WIRE ATTACHED AT THE SPACING INDICATED AND IN ORDER OF ADVANCING STATION NOS.
- TEST WIRES ARE TO BE CONNECTED USING THE THERMITE WELD PROCESS.
- COAT THERMITE WELD CONNECTION & ALL BELOW GRADE EXPOSED COPPER AS SPECIFIED FOR EXISTING PIPELINE COATING OR AS SPECIFIED FOR BARE PIPE.
- INSTALL TEST WIRES WITHIN PIPE TRENCH AT THE FIVE OR SEVEN O'CLOCK POSITION OF THE PIPE. TEST WIRES SHALL NOT BE IN IMMEDIATE CONTACT WITH THE PIPE.
- BACK-FILL AROUND WIRES MUST BE FREE OF SHARP MATERIALS WHICH COULD DAMAGE THE TEST WIRE INSULATION.

TYPICAL CATHODIC PROTECTION TEST STATION
NOT TO SCALE

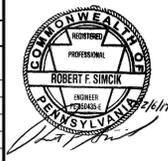
AVOIDANCE MEASURES TABLE

Species or Area	Agency	Water	County/AOC/Survey Area	Population	Pre-Construction, Construction and Restoration, Post-Construction Activity	Clearance Letter	Conservation Plan	Primary Condition
Eastern Redbelly Turtle	PAFBC	Pond A4 and Wetland I2	A4 (Chester), W I2 (Delaware)	NA	Construction	10/26/15	NA	1. Pond A4 is adjacent to the workspaces. Wetland I2 is adjacent and will be crossed underneath via HDD. Wetland I2 will have no direct impact. A silt fence barrier will be placed at the edge of the LOD, between water and work areas, to prevent turtles from accessing active work zones at these two locations. The fence will be installed during inactive period (October 15-April 15) 2. Any turtle found on the site will be relocated to nearest aquatic habitat and the PAFBC will be contacted within 48 hours. [PAFBC letter dated 10/26/2015]



661 ANDERSEN DRIVE - FOSTER PLAZA 7
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NO.		BY	DATE	REVISIONS	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		4/5/18	UPDATED STREAM AND WETLAND CROSSING TABLE	
4	RS		2/24/20	CORRECTED STREAM AND WETLAND CROSSING TABLE	
5	RS		4/2/20	ADDITIONAL CORRECTIONS TO CROSSING TABLE	



SUNOCO PIPELINE LP
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 6

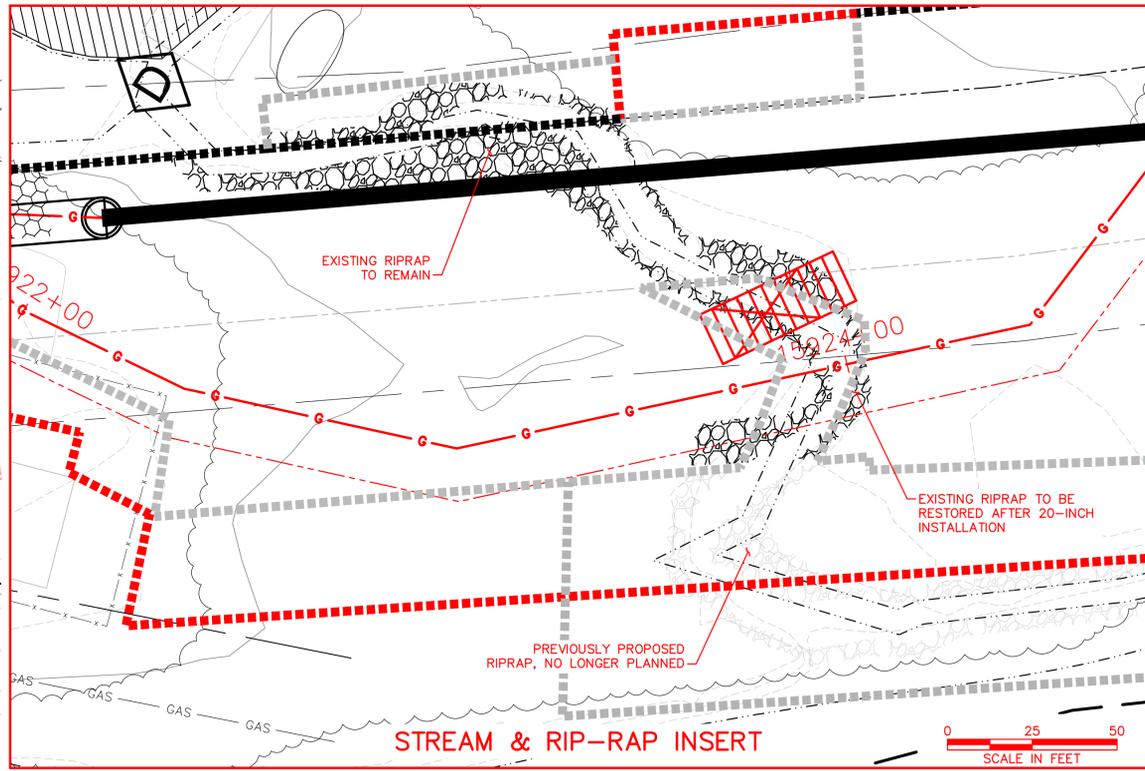
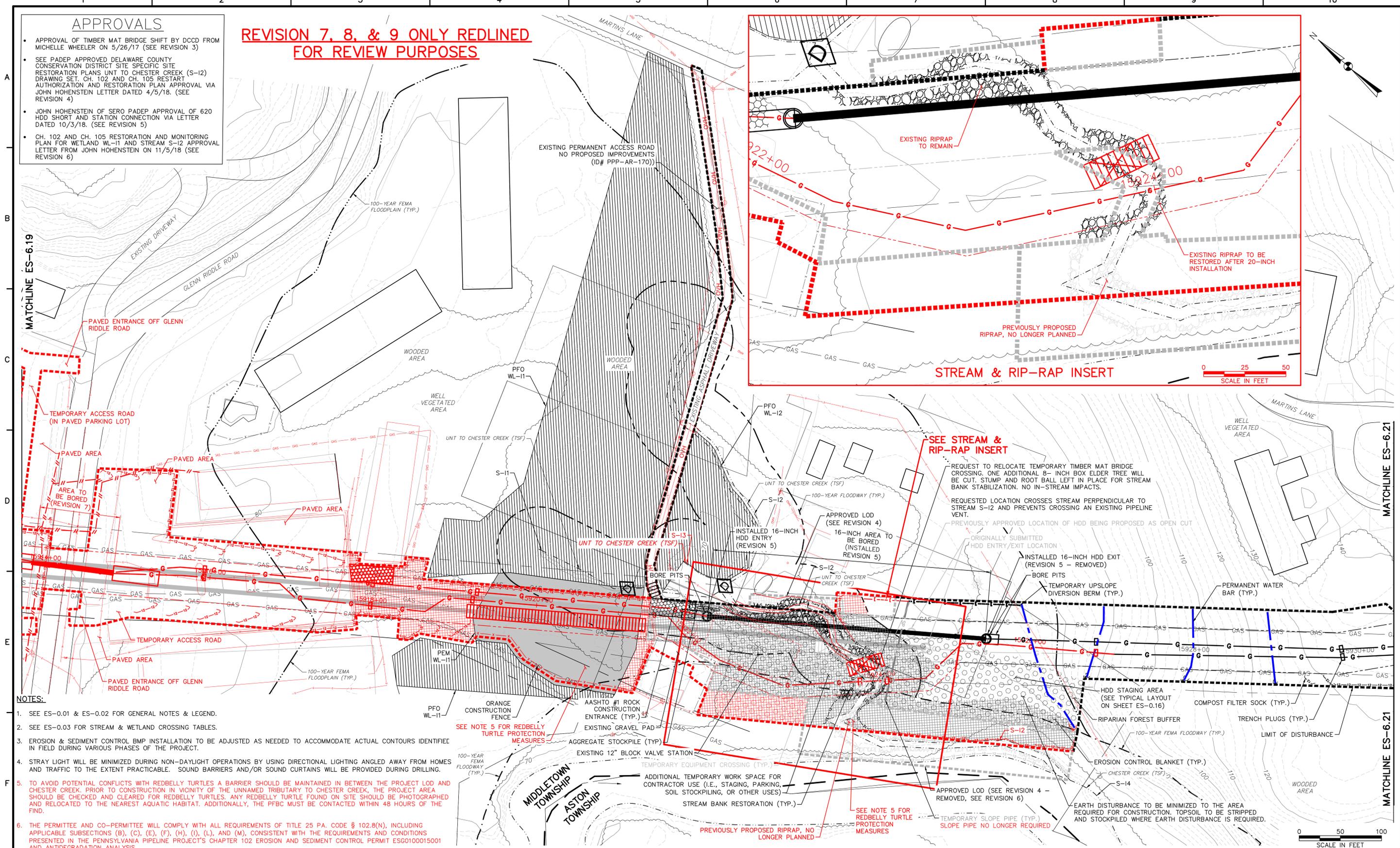
1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES
DELAWARE COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
NOTES & DETAILS

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS
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ES-0.02	
SHEET 0.02 OF 60	

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 UNIT TO CHESTER CREEK (S-12) 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-11 AND STREAM S-12 APPROVAL LETTER FROM JOHN HOHENSTEIN ON 11/5/18 (SEE REVISION 6)

REVISION 7, 8, & 9 ONLY REDLINED FOR REVIEW PURPOSES



SEE STREAM & RIP-RAP INSERT

REQUEST TO RELOCATE TEMPORARY TIMBER MAT BRIDGE CROSSING. ONE ADDITIONAL 8-INCH BOX ELDER TREE WILL BE CUT. STUMP AND ROOT BALL LEFT IN PLACE FOR STREAM BANK STABILIZATION. NO IN-STREAM IMPACTS.

REQUESTED LOCATION CROSSES STREAM PERPENDICULAR TO STREAM S-12 AND PREVENTS CROSSING AN EXISTING PIPELINE VENT.

PREVIOUSLY APPROVED LOCATION OF HDD BEING PROPOSED AS OPEN CUT

- NOTES:**
- SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
 - SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
 - EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.
 - 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.
 - 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.
 - THE PERMITTEE AND CO-PERMITTEE WILL COMPLY WITH ALL REQUIREMENTS OF TITLE 25 PA. CODE § 102.8(N), INCLUDING APPLICABLE SUBSECTIONS (B), (C), (E), (F), (H), (I), (L), AND (M), CONSISTENT WITH THE REQUIREMENTS AND CONDITIONS PRESENTED IN THE PENNSYLVANIA PIPELINE PROJECT'S CHAPTER 102 EROSION AND SEDIMENT CONTROL PERMIT ESG0100015001 AND ANTI-DEGRADATION ANALYSIS.

REVISIONS

NO.	BY	DATE	REMARKS
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
8	RS	1/24/20	ADDED FIELD SURVEY
9	RS	4/2/20	ADDED RIP-RAP INSERT



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	

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Attachment B

Erosion and Sediment Control Plan

Pennsylvania Pipeline Project – Southeast Region: Spread 6 Major Modification-HDD 620

April 2020

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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Table 3-Trout Instream Restrictions

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- 1 USGS Location Map
- 2 E&S Plan Sheets
- 3 HDD Plans, Profiles and Auger Bore Drawings
- 4 Compost Filter Sock Worksheets and Construction Details
- 5 Limiting Soil Characteristics Table, Soil Descriptions, Soil and Geological Maps
- 6 OSHA Trenching and Shoring Tables and Construction Sequence
- 7 OSHA Construction Standard 1926 Subpart P – Excavations
- 8 Temporary Stream Crossing Profiles
- 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 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. A portion of the 16-inch pipeline was installed via a short HDD that crossed stream S-12. The 20-inch pipeline will be installed via open trench through stream S-12. The remainder of the installation of the 16-inch pipeline and the 20-inch pipeline will be installed via conventional open trench construction through Wetland I1, conventional auger

bore under Glen Riddle Road, and a direct pipe under Riddlewood Drive and the Southeast Pennsylvania Transportation Authority's (SEPTA) Railroad. Stream S-12 and wetland 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 mulching 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 modification includes 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:

Conventional bores

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 than 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	1 PLUS	2 OR 10
SLOPES AND BANKS (GRAZED/HAY) WELL-DRAINED	1 PLUS	2,3, OR 13

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
GULLIES AND ERODED AREAS	1 PLUS	3, 5, 7, OR 12 (1)
EROSION CONTROL FACILITIES (BMPS)	1 PLUS	2, 3, OR 4
SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS	1 PLUS	2, 3, OR 4
DRAINAGE DITCHES	1 PLUS	2, 3, OR 4
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	1 PLUS	2 OR 3
MOWED AREAS	1 PLUS	5 OR 7
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	1 PLUS	3, 4, 5, 7, 8, 9, 11 (1) OR 12(1)
RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST)		
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
3	perennial ryegrass	15	20
	birdsfoot trefoil, plus 6 10	6	10
4	tall fescue	30	35
	birdsfoot trefoil, plus	6	10
5 (5)	reed canarygrass	10	15
	Big Bluestem, plus	10	15
	tall fescue, or	20	25
6 (5,6)	perennial ryegrass	20	25
	Big Bluestem, plus	10	15

RECOMMENDED SEED MIXTURES			
MIXTURE NO.	SPECIES	SEEDING RATES – PLS (1)	
		MOST SITES	ADVERSE SITES
7 (5)	annual ryegrass	20	25
	birdsfoot trefoil, plus	20	30
	Big Bluestem, plus	20	30
8	tall fescue	20	25
	flatpea, plus	20	30
	tall fescue, or	20	30
9 (7)	perennial ryegrass	20	25
	serecia lespedeza, plus	10	20
	tall fescue, plus	20	25
10	redtop(4)	3	3
	tall fescue, plus	40	60
	fine fescue	10	15
11	deertongue, plus	15	20
	birdsfoot trefoil	6	10
	switchgrass, or	15	20
12(8)	big bluestem, plus	15	20
	birdsfoot trefoil	6	10
	orchardgrass, or	20	30
13	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 (<i>Carex vulpinoidea</i>)
	20%	Virginia Wildrye (<i>Elymus virginicus</i>)
	14%	Lurid (Shallow) Sedge (<i>Carex lurida</i>)
	5%	Green Bulrush (<i>Scirpus atrovirens</i>)
	4%	Blue Vervain (<i>Verbena hastata</i>)
	3.5%	Wood Reedgrass (<i>Cinna arundinacea</i>)
	3%	Soft Rush (<i>Juncus effuses</i>)
	3%	Blunt Broom Sedge (<i>Carex scoparia</i>)
	3%	Hop Sedge (<i>Carex lupulina</i>)
	2%	Sensitive Fern (<i>Onoclea sensibilis</i>)
	2%	Oxeye Sunflower (<i>Heliopsis helianthoides</i>)
	1%	Rattlesnake Grass (<i>Glyceria Canadensis</i>)
	1%	Woolgrass (<i>Scirpus cyperinus</i>)
	1%	Swamp Milkweed (<i>Asclepias incarnata</i>)
	1%	New England Aster (<i>Aster novae-angliae</i> (<i>Symphotrichum</i> n.))
	1%	Flat Topped White Aster (<i>Aster umbellatus</i> (<i>Doellingeria umbellate</i>))
	0.5%	Joe Pye Weed (<i>Eupatorium fistulosum</i>)
	0.5%	Boneset (<i>Eupatorium perfoliatum</i>)
	0.5%	Ditch Stonecrop (<i>Penthorum sedoides</i>)
	0.5%	Narrowleaf Blue Eyed Grass (<i>sisyrinchlum angustifolium</i>)
	0.5%	Seedbox (<i>Ludwigia alternifolia</i>)

0.5%	Great Blue Lobelia (<i>Lobelia siphilitica</i>)
0.5%	Mud Plantain (Water Plantain) (<i>Alisma subcordatum</i> (<i>A. plantago-aquatica</i>))
0.5%	Square Stemmed Monkeyflower (<i>Mimulus ringens</i>)
0.4%	Bladder (Star) Sedge (<i>Carex intumescens</i>)
0.1%	Slender Mountainmint (<i>Pycnanthemum tenuifolium</i>)
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	<i>Alnus serrulata</i>	Smooth Alder	OBL
		<i>Cornus amomum</i>	Silky Dogwood	FACW
		<i>Lindera benzoin</i>	Spicebush	FAC
		<i>Viburnum dentatum</i>	Northern arrow-wood	FAC
Tree Species	Containerized (1-inch DBH) ^c	<i>Acer rubrum</i>	Red maple	FAC
		<i>Betula alleghaniensis</i>	Yellow Birch	FAC
		<i>Platanus occidentalis</i>	American Sycamore	FACW
		<i>Quercus bicolor</i>	Swamp White Oak	FACW
		<i>Salix nigra</i>	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 or as per soil test; may not be required in agricultural fields
10-20-20 FERTILIZER	1,000 LBS.	25 LBS.	25 LBS.	

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 shear 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 scarify 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.

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