

Lancaster County HDD Plans and Profiles

HDD Wire Guided Waterway Crossing ATON Plan

Cocalico Creek (S-K35)

Mariner East Phase 2 Pipeline Project

Prepared for:

Sunoco Pipeline, L.P.

535 Friztown Road

Sinking Spring, PA 19608

Prepared by:

Tetra Tech, Inc.

301 Ellicott Street

Buffalo, NY 14203

(716) 849-9419

November 14, 2016

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2	SITE MAP OF WORK AREA (Closeup Quadrangle)
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PROPOSED ATON SIGNAGE

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1.0 INTRODUCTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project (Project or PPP) that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation of up to 700,000 barrels per day. The Project involves the installation of two parallel pipelines within an approximately 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline will 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, Pennsylvania 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.

As part of the work, several water crossings are required. Horizontal directional drilling (HDD) is proposed to install the pipeline segments underneath the waterways being crossed. To direct the drilling a 4 – 6 gauge (direct current) or 10 -14 gauge (alternating current) coated wire is placed at ground surface (beneath the water surface). The wire conducts an electrical current producing a magnetic field that the drill steering tube can reference to direct the position of the drill bit as it drills a boring under the ground surface.

The primary purpose of this ATON plan is to insure the safety of recreational boaters who may attempt to travel through or near an area impacted by this construction project. The waterway crossing has been determined to have a potential impact on recreational boating by the Pennsylvania Fish and Boat Commission. As required for potentially impacted waterways, this Aid to Navigation (ATON) Plan has been prepared to address the specific equipment to be used in the waterway during the drilling, restrictions placed on boating during the conduct of the work, and navigational aids to be used to communicate hazards and restrictions to boating during the conduct of the work.

2.0 PROJECT SPECIFIC FEATURES

The following sections outline specific features of the waterway crossing for Cocalico Creek (S-K35).

2.1 WATERWAY CROSSING LOCATION

The waterway of concern for this crossing is Cocalico Creek (stream identification S-K35) a perennial drainage located in Lancaster County near the township of Cocalico. The latitude and longitude of the crossing, respectively, are 40.280301, -76.206782. The creek width is 12 feet. Figure 1 presents a site location map of the waterway crossing and surrounding area. Figures 2 and 3 present a close up of a quadrangle map and an aerial photograph of the crossing for the two pipelines.

2.2 SCOPE OF WORK

Prior to drilling underneath the waterway the wire guidance system is setup from the HDD staging areas on either side of the waterway. Signs and buoys, as required for each crossing, will be setup as described in Section 2.4 of this plan. The procedure for installing the wire guidance system will include the following:

- Wire spools will be delivered to the site at the HDD entry side. Several smaller coils may be used and spliced together in the field to create the loop.
- The wire will be hand laid on top of the ground and stream bed and spliced together along the HDD path using a small crew of workers. Splices that will end up in the waterway will be made on land prior to installing the cable. If water levels allow, the cable will be laid by hand in the stream bed by workers without the use of a boat. If water levels require, a small boat will be used to lay the cable. At this time, no special anchoring is anticipated to be required. If the cable needs to be anchored small weights (5 pounds) will be placed on the cable to immobilize it.
- The centerline wire is surveyed by a surveyor on foot or in a small boat using typical hand held field survey equipment to verify its position. Small floating buoys may be attached to the wire to aid in the surveying of its location.
- After the HDD is complete, the wires will be removed from the waterway by hand using the same small crew of workers.

Two separate HDD drills will be constructed at this location. To accommodate each drill, a centerline wire will be run directly over the intended boring location. A return loop will be laid in the water and offset from the centerline wire by approximately 40 feet. Two wires will be in the water at any one time for the active drill location. The centerline wire will be repositioned for the second drill following completion of the first drill. Figures 2 and 3 present the wire locations.

Passage of recreational boaters will be accommodated during the drilling operation. During initial placement, repositioning of the centerline wire, and removal of the wires, passage in the river may be temporarily and briefly obstructed. During this activity a portage route will be provided to boaters on the downstream looking river left bank.

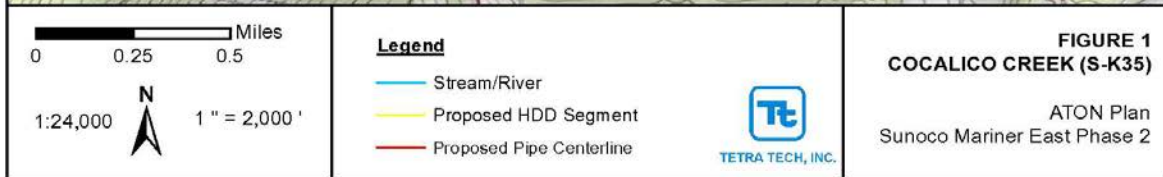
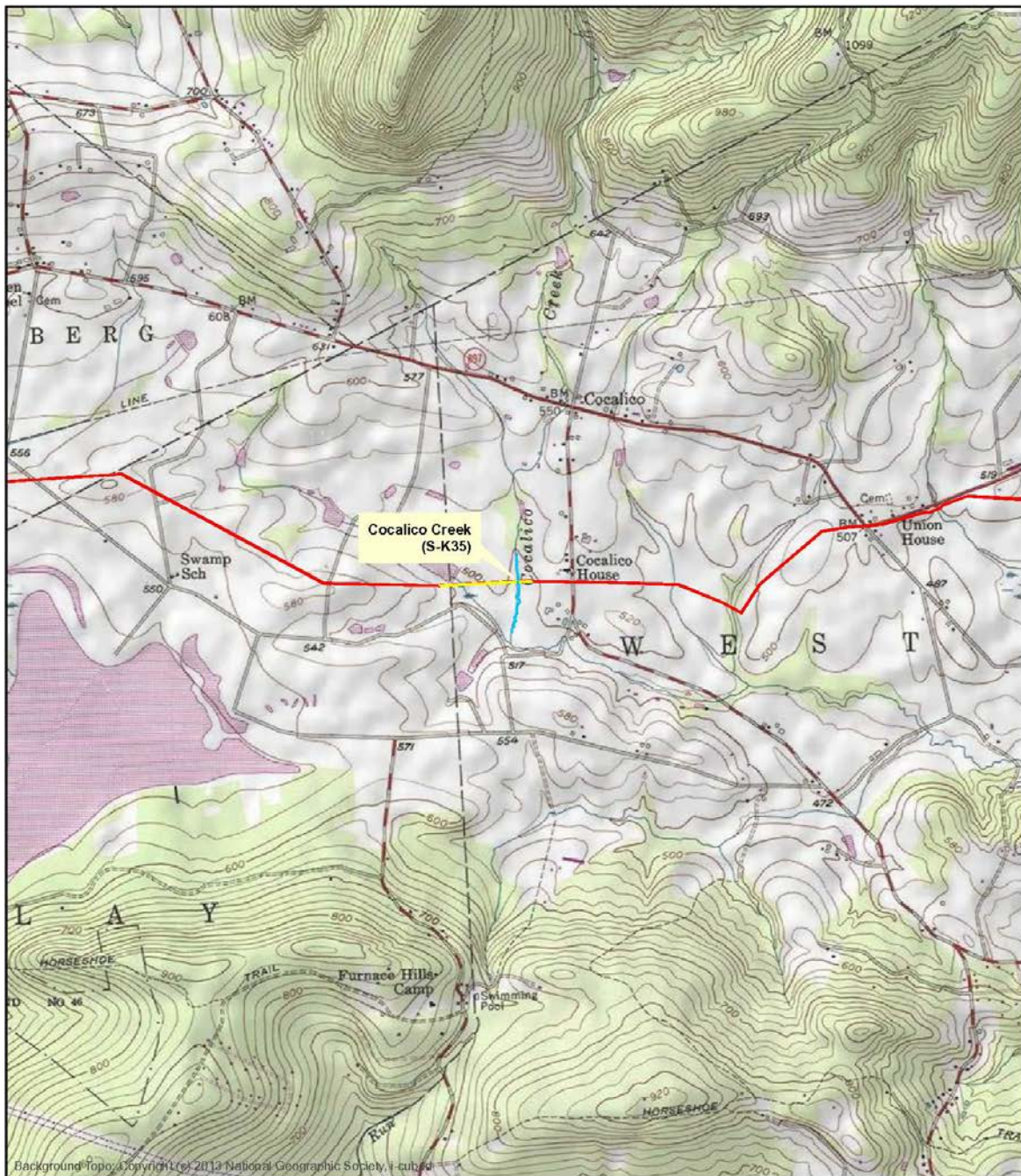
2.3 ESTIMATED DATES OF CONSTRUCTION

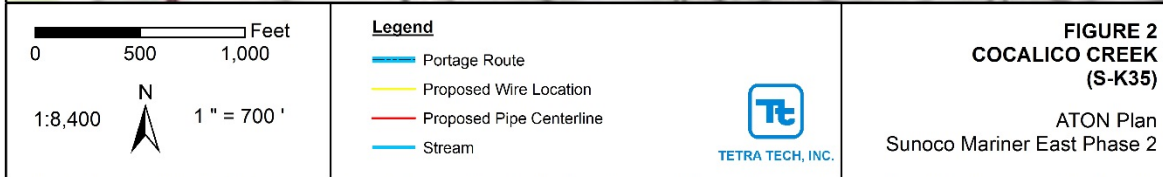
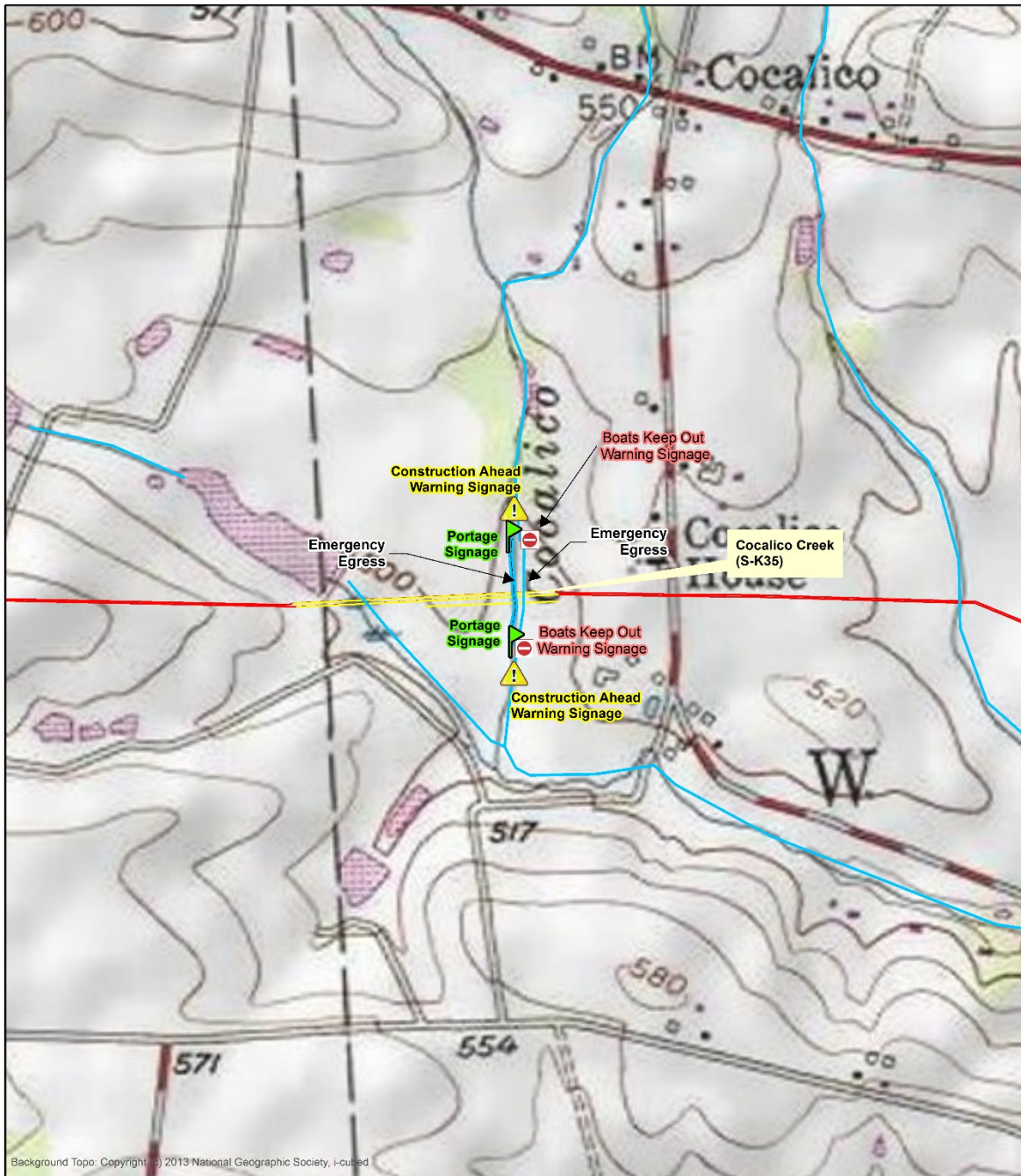
The work is anticipated to begin during January 2017. The approximate dates of the work at this location will be sent to the PFBC when it is more clearly known.

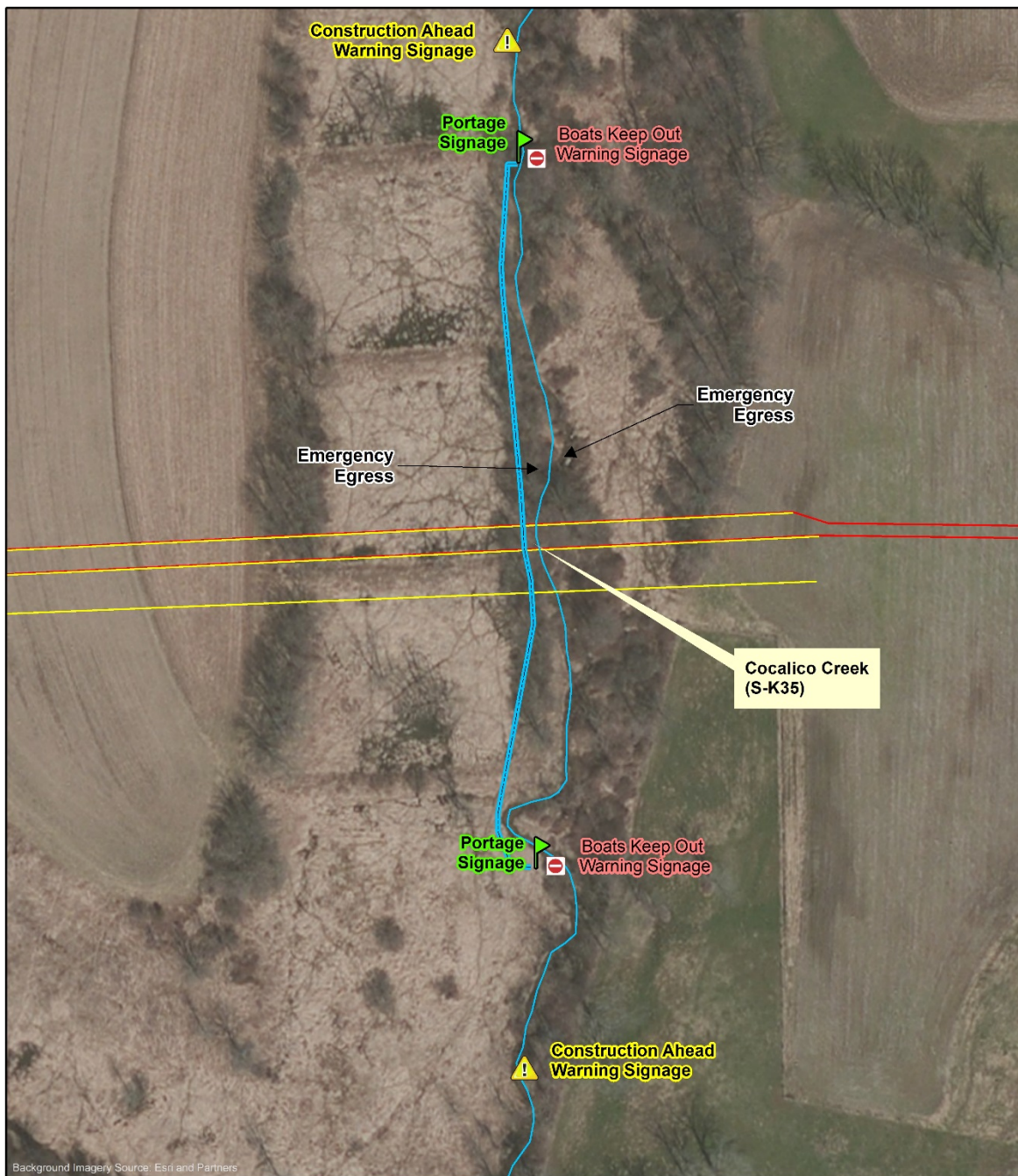
2.4 DESCRIPTION OF ATON PLAN

Cocalico Creek appears to be utilized by non-powered craft and is 12 feet or less in width. Based on this, land based signs are proposed for the crossing. The signs will include two construction warning signs located at least 200 feet above and below the work zone that will be in place during activities in the waterway. During the time that the wire will be installed, repositioned, and removed, portage signs will be placed both upstream and downstream of the work zone. The portage will be located on river left of the downstream moving boater and will allow for a short portage. An emergency egress for boaters that have passed the portage take out/put on will be positioned on the right and left banks just upstream of the work area. Figures 2 and 3 present the location of the signage and portages for the project. The attached Appendix presents the proposed ATON signage.

FIGURES







Background Imagery Source: Esri and Partners

0 80 160 Feet

1:1,250



1" = 104'

Legend

- Portage Route
- Proposed Wire Location
- Proposed Pipe Centerline
- Stream



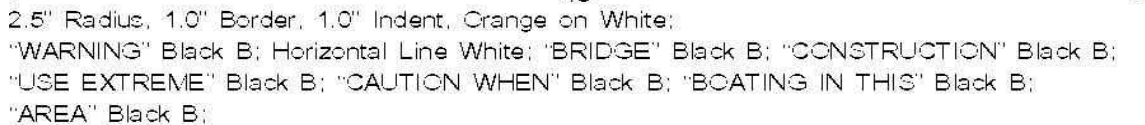
**FIGURE 3
COCALICO CREEK
(S-K35)**

ATON Plan
Sunoco Mariner East Phase 2

APPENDIX

Proposed ATON Signage

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Drawing is excerpted from PFBC ATON Guidance Document and will be modified to say “Warning – Pipeline Construction Use Extreme Caution When Boating In This Area”.

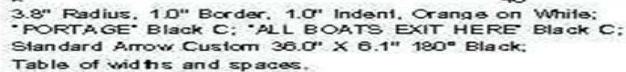
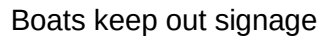


Diagram of a rectangular sign with rounded corners. The sign has an orange border and contains the text "PORTAGE" in large bold letters, "ALL BOATS EXIT HERE" in smaller bold letters, and a large black arrow pointing right. Dimensions are provided for the sign and its components.

Component	Width (ft)	Height (ft)
Sign (Overall)	14.3	3.4
Sign (Inner)	10.1	2.4
Text "PORTAGE"	19.4	0.8
Text "ALL BOATS EXIT HERE"	14.3	0.6
Arrow	14.3	0.6

3.8" Radius, 1.0" Border, 1.0" Indent, Orange on White;
 *PORTAGE Black C; *ALL BOATS EXIT HERE* Black C;
 Standard Arrow Custom 36.0" X 6.1" 0° Black;
 Table of widths and spaces.

14.3	P	2.2	0.7	0	2.3	0.9	R	2.1	0.7	T	2.0	0.3	A	2.5	0.6	G	2.2	0.9	E	2.0	14.3		
4.1	A	1.9	0.5	L	1.5	0.5	L	1.5	3.0	B	1.7	0.5	O	1.7	0.5	A	1.9	0.2	T	1.5	0.5	S	1.6

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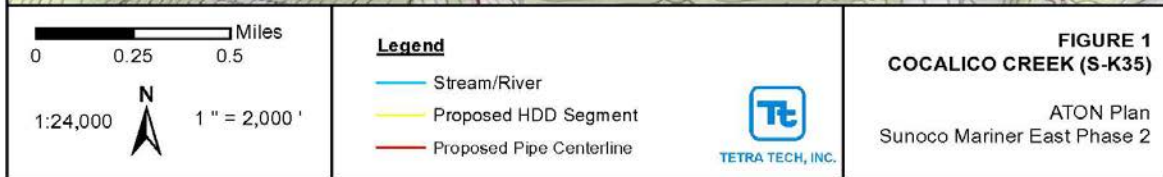
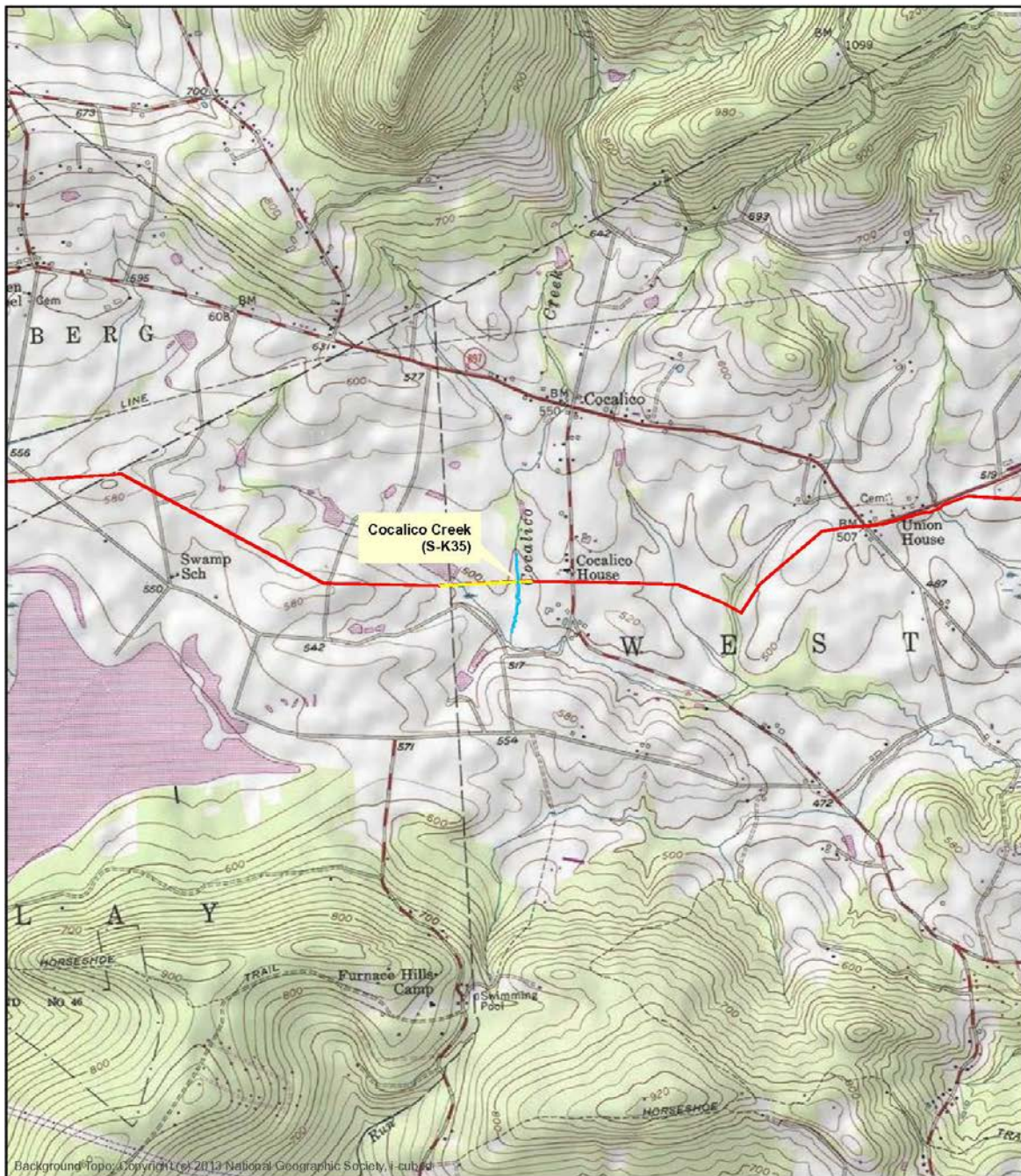
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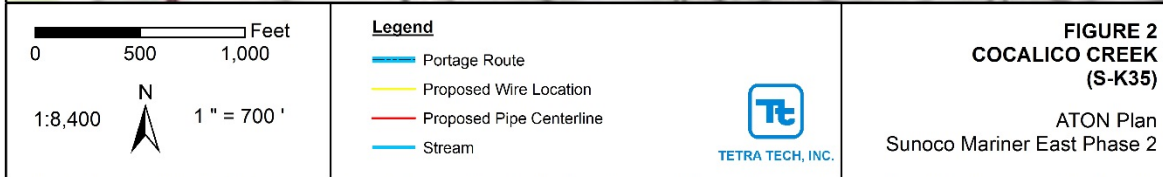
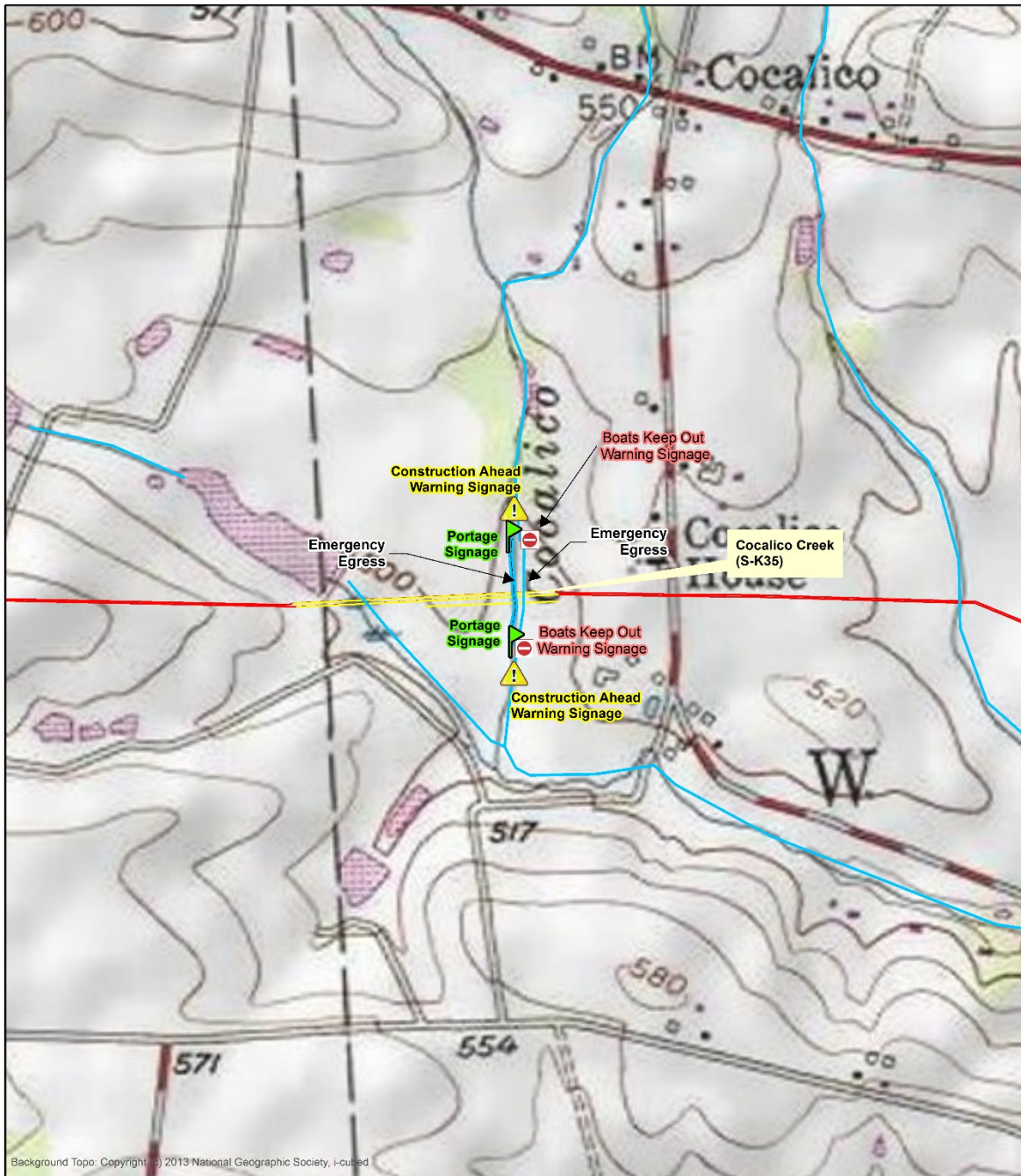
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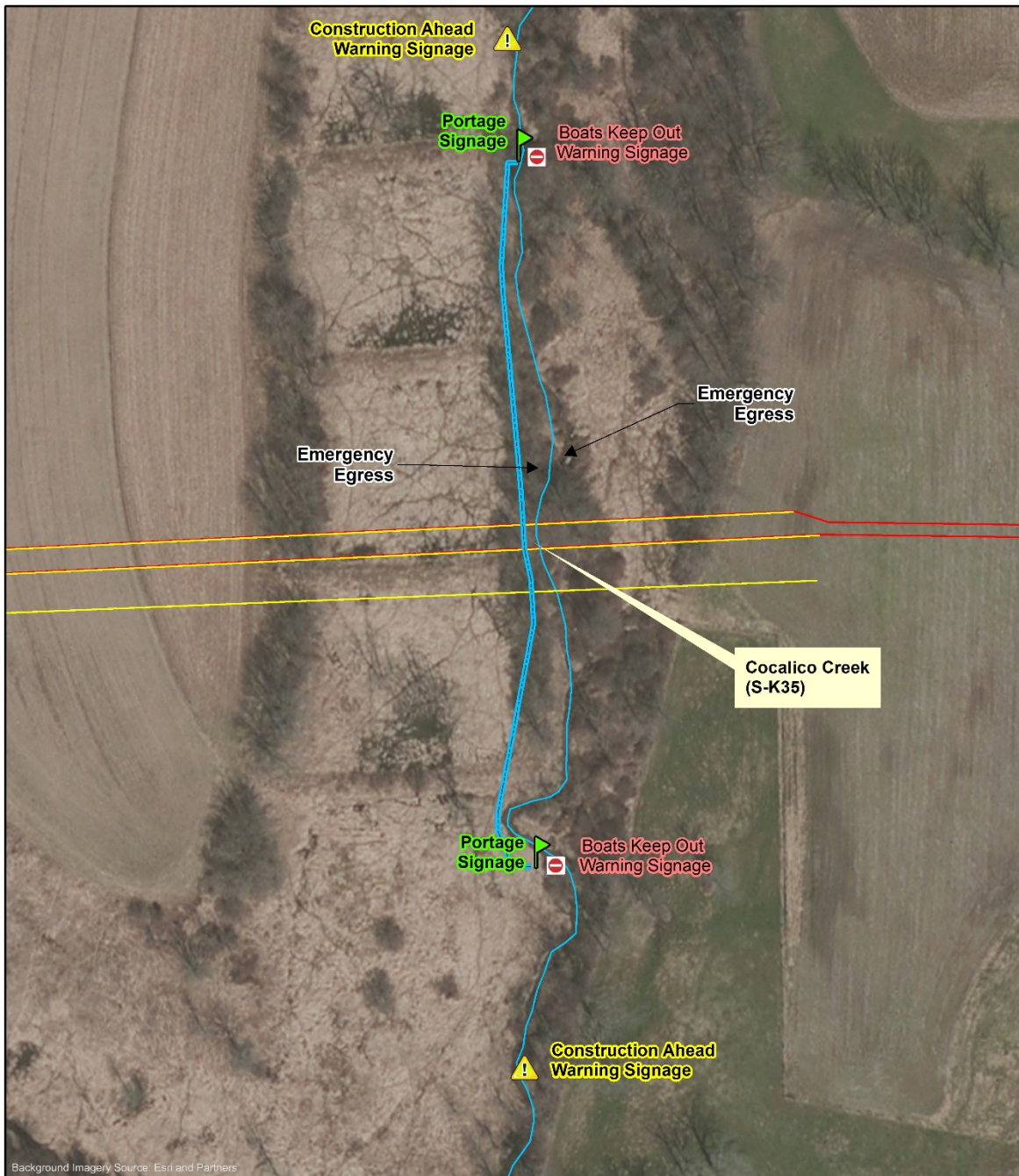
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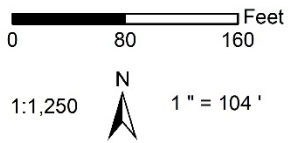
FIGURES







Background Imagery Source: Esri and Partners



Legend

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- Proposed Wire Location
- Proposed Pipe Centerline
- Stream



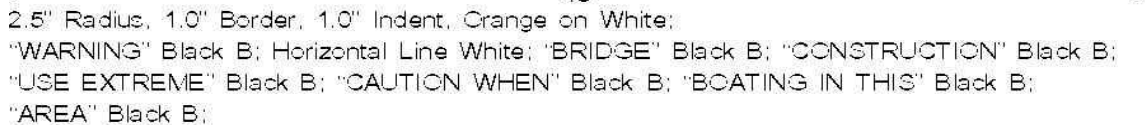
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(S-K35)

ATON Plan
Sunoco Mariner East Phase 2

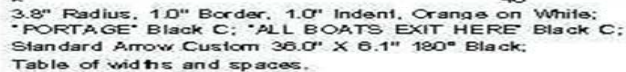
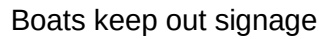
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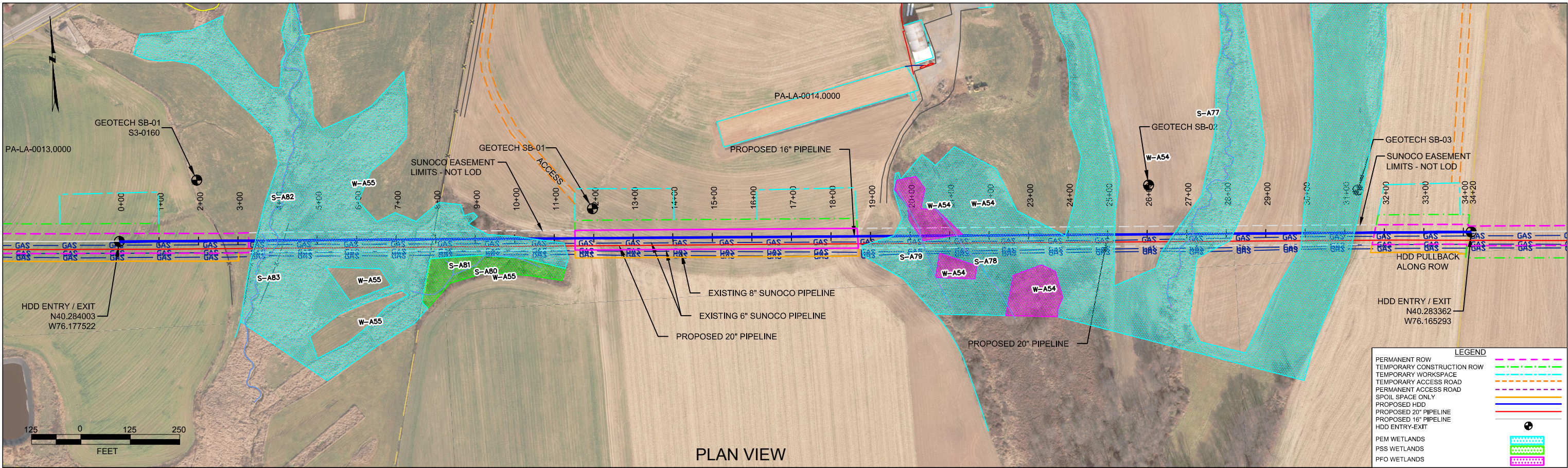
PORTAGE
ALL BOATS EXIT HERE

A large black arrow points to the right.

Dimensions (in inches):
Overall width: 78.0
Overall height: 36.0
Text area width: 69.0
Text area height: 24.0
Arrow length: 54.0
Arrow height: 12.0
Sign thickness: 1.0

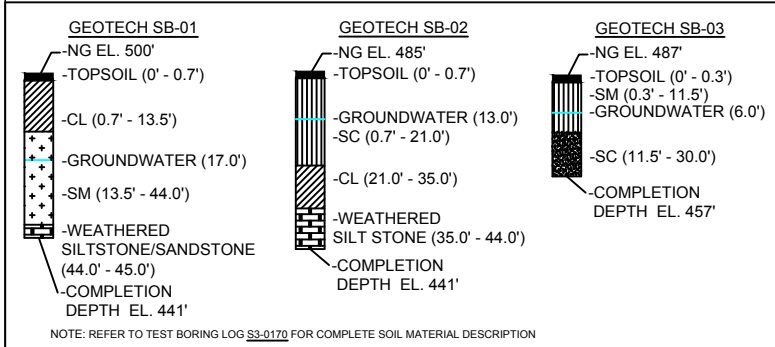
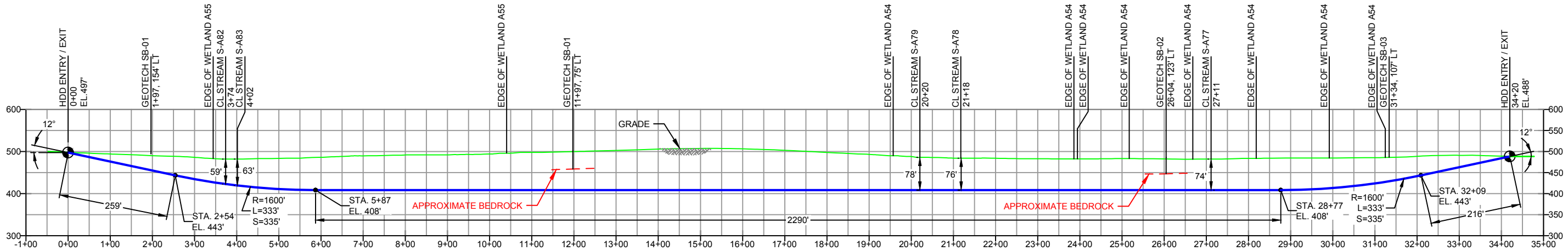
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 *PORTAGE Black C; *ALL BOATS EXIT HERE* Black C;
 Standard Arrow Custom 36.0" X 6.1" 0° Black;
 Table of widths and spaces.

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4.1	A	1.9	0.5	L	1.5	0.5	L	1.5	3.0	B	1.7	0.5	O	1.7	0.5	A	1.9	0.2	T	1.5	0.5	S	1.6



LANCASTER COUNTY, PENNSYLVANIA - WEST COCALICO TOWNSHIP
S3-0161-16

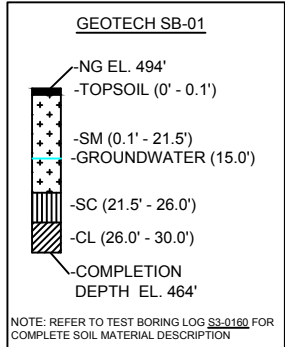
PLAN VIEW
PROFILE VIEW



DESIGN AND CONSTRUCTION:

- CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
- THE MINIMUM SEPARATION DISTANCE FROM EXISTING SUBSURFACE UTILITIES SHALL NOT BE LESS THAN 10 FEET AS MEASURED FROM THE OUTSIDE EDGE OF THE UTILITY TO OUTSIDE OF PROPOSED PIPELINE.
- DESIGNED IN ACCORDANCE WITH CFR 49 195 & ASME B31.4
- CROSSING PIPE SPECIFICATION:
HDD HORZ. LENGTH (L): 3170'
HDD PIPE LENGTH (S): 3177'
16" x 0.438" W.T., X-70, API5L, PSL2, ERW, BFW
COATING: 14-16 MILS FBE WITH 30-35 MIL ARO (POWERCRETE R95)

- INTERNAL DESIGN PRESSURE 1480 PSIG (SEAM FACTOR 1.0, DESIGN FACTOR 0.50).
- INSTALLATION METHOD: HORIZONTAL DIRECTIONAL DRILL (HDD).
- PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
- CARRIER PIPE NOT ENCASED.
- PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
- CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF HDD PIPE STRING TO MINIMUM 1850 PSIG.
- SEE SUNOCO PENNSYLVANIA PIPELINE PROJECT ESRI WEBMAP FOR ACCESS ROAD ALIGNMENT.
- SUNOCO PIPELINE, L.P.'S HORIZONTAL DIRECTIONAL DRILL INADVERTENT RETURN CONTINGENCY PLAN WILL BE IMPLEMENTED AT ALL TIMES.
- SUNOCO PIPELINE, L.P.'S EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED AT ALL TIMES.



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

REF. DRAWING		REVISIONS	
ES-4.11	TO ES-4.13	EROSION & SEDIMENT PLAN	
SHEET 6	TO SHEET 8	AERIAL SITE PLAN	
		EP2	REVISED PER PADEP COMMENTS RECEIVED 09-06-16
		EP1	REVISED PER PADEP COMMENTS
		EP	
		1	DESIGN CHANGE
		0	ISSUED FOR CONSTRUCTION
DWG NO	DWG NO	DESCRIPTION	NO.



**Sunoco Logistics
Partners L.P.**



TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.	
16-INCH HORIZONTAL DIRECTIONAL DRILL WETLAND A54 & A55 PENNSYLVANIA PIPELINE PROJECT	
SCALE: 1"=250'	DWG. NO: PA-LA-0014.0000-SR-16