

October 12, 2017

Mr. Scott Williamson
Waterways and Wetlands Program
Southcentral Regional Office
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue, Harrisburg, Pennsylvania 17110-8200

**Additional Information Submittal
Hydrogeological Re-Evaluation
Aughwick Creek Horizontal Directional Drill (S2-0153)
Application No. E31-234
Shirley Township, Huntingdon County**

Dear Mr. Williamson:

Sunoco Pipeline, L.P. (SPLP) provides the following information and attachments, as referenced, in response to your letter of October 3, 2017 requesting additional information regarding the horizontal directional drill (HDD) re-evaluation referenced above.

1. *No cross-sections or profiles of the HDD were provided.*

After further study by the drilling contractor and SPLP HDD specialists the HDD profiles for the crossing of Aughwick Creek have been revised. Copies of the revised profiles are included with this response as Attachment 1.

As noted on these profiles, the angle of entry on the east side of the HDD, which will be the drilling rig setup and entry side has been increased to 17 degrees for both HDDs. The increased angle of entry will sharpen the rate of descent to horizontal depth following the allowable pipe curvature radius. As a result the new 20-inch depth of crossing under the first channel of Aughwick Creek will be 29 ft (versus 18 ft), 49 ft (versus 32 ft) under the second channel, and 65 ft (versus 40) under the third channel. The 16-inch channel crossing depths are 32 ft, 55 ft, and 73 ft respectively.

2. *No analysis or discussion of the geologic strength or overburden strength at profile depth has been provided as per the requirement of paragraph 4 (ii) of the EHB corrected and stipulated order.*

Information regarding the geologic strength or overburden strength at profile depth is included at Page 4 of the Hydrogeological Re-Evaluation report prepared by Rettew and previously submitted to the Department.

As shown graphically on the geotechnical core for Core B2-B provided with the Hydrogeological Re-Evaluation report, the underlying geology consists of fine-grained, massive sandstone. Rock recoveries were very poor to excellent (0% to 100%) and rock quality designations (RQD) were poor to excellent (0% to 98%). The lowest RQD's were observed from 52 to 74.5 feet where voids and weathered sandstone were observed. A fine grained limestone was observed from 74.5 feet to the completion of the core at 100 feet. Vertical fractures were observed in the limestone from 87 to 97 feet, rock recoveries were (50% to 100%), and RQD's were poor to fair (18% to 74%).

In core SB-02, limestone was encountered from 27.7 to 36.9 feet. Rock recoveries were fair to good (55% to 83%) and RQD's were fair to good (27% to 44%). Fractures ranging from generally horizontal to high angle were recorded in the core logs.

This data indicates vertically transitioning layers of geologic strength and weakness regardless of depth. As a result there is no strategic consolidated geologic strata that can be targeted to drill through or under. Accordingly, SPLP HDD specialists recommended sharpening the angle of entry and exit and to maximize the design depth of the HDD to mitigate IR potential.

3. *Published geologic data and site –specific drill logs indicate the presence of carbonate lithologies and voids, however, contrary to paragraph 4 (ii) of the EHB corrected and stipulated order, no geophysical surveys or explanation as to why they were not performed has been provided.*

The use of geophysical surveys was considered and but not performed at this HDD location because the results of the survey methods will not produce additional information that will reduce the risk of an IR. Based on the geotechnical core data indicating fractured and solution prone rock, a conceptual understanding of the geology, and occurrence of the previous IR, SPLP is aware that the Aughwick Creek HDD is susceptible to an IR. Engineering controls and drilling best management practices will be used to reduce the risk of an IR. Additional geophysical survey data will not affect the selection or application of engineering controls or the implementation of drilling best management practices.

For example, the drilling contractor plans to install casing at the HDD entry as far into the profile as can be achieved. Based upon the torque and rate of progress while drilling, in combination with monitoring returns and fluid use, a constant program of loss control material (LCM) or cement grouting, will be injected into the formation as the pilot hole advances. While there is a risk of IR during casing installation, once installed, casing can provide a long-term solution to control fluids and returns back to the point of entry. A LCM or grouting program coordinated with the advancement of the pilot hole can also mitigate the movement of drilling fluids and returns away from the profile, as well as stabilize the geology surrounding the profile.

4. *No analysis or discussion of pipe stress radius has been provided as per the requirement set forth in paragraph 4 (ii) of the EHB corrected and stipulated order.*

PIPE INFORMATION

20-Inch: 0.456 wall thickness; X-65

16-Inch: 0.438 wall thickness; X-70

Pipe stress allowances are an integral part of the design calculations performed for each HDD.

Sunoco Pipeline, L.P. appreciates you and your staff's continued time and efforts to review this information.

Sincerely,



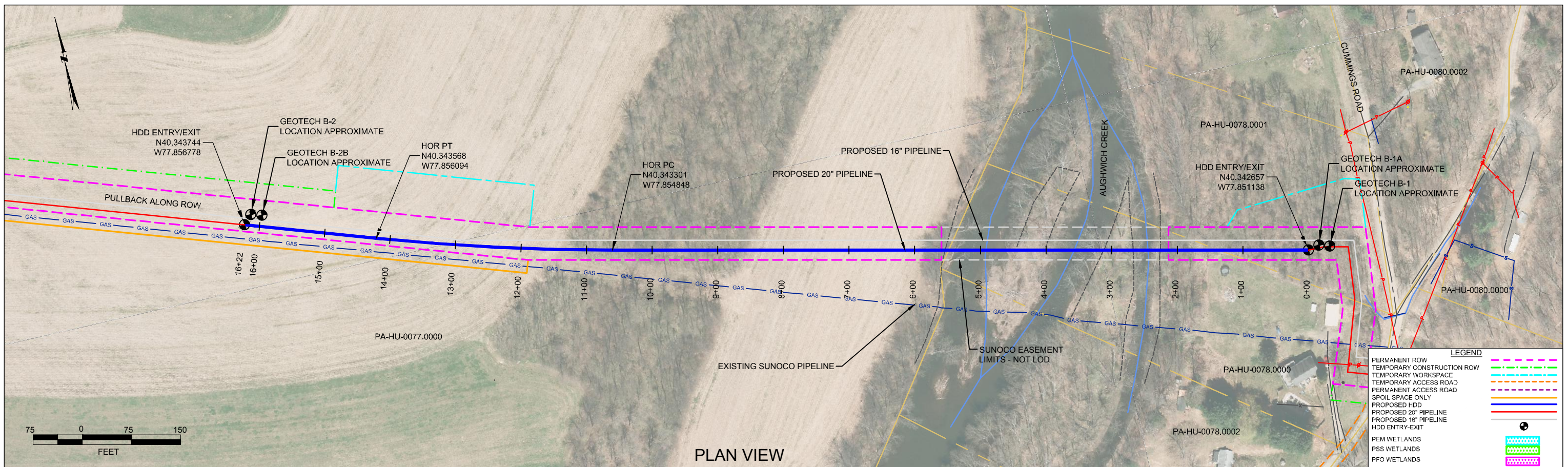
Matthew Gordon
Principal Engineer



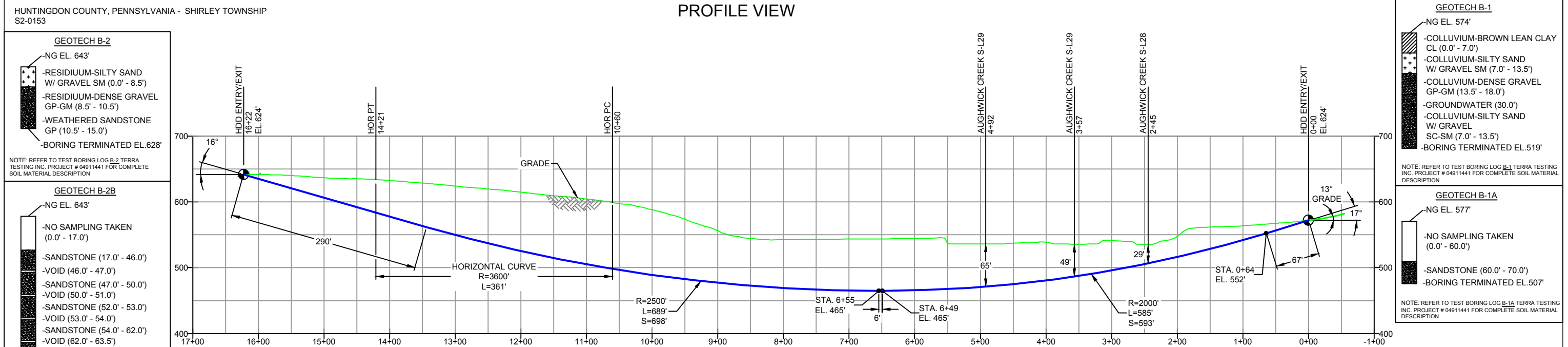
SUNOCO PIPELINE
An ENERGY TRANSFER Company

SUNOCO PIPELINE
535 Fritztown Road
Sinking Spring, PA 19308

ATTACHMENT 1
HORIZONTAL DIRECTIONAL DRILL PLAN AND PROFILES



PLAN VIEW



PROFILE VIEW

HUNTINGDON COUNTY, PENNSYLVANIA - SHIRLEY TOWNSHIP
S2-0153

GEOTECH B-2
-NG EL. 643'
-RESIDIUM-SILTY SAND W/ GRAVEL SM (0.0' - 8.5')
-RESIDIUM-DENSE GRAVEL GP-GM (8.5' - 10.5')
-WEATHERED SANDSTONE GP (10.5' - 15.0')
-BORING TERMINATED EL.628'

NOTE: REFER TO TEST BORING LOG B-2 TERRA TESTING INC. PROJECT # 04911441 FOR COMPLETE SOIL MATERIAL DESCRIPTION

GEOTECH B-2B
-NG EL. 643'
-NO SAMPLING TAKEN (0.0' - 17.0')
-SANDSTONE (17.0' - 46.0')
-VOID (46.0' - 47.0')
-SANDSTONE (47.0' - 50.0')
-VOID (50.0' - 51.0')
-SANDSTONE (52.0' - 53.0')
-VOID (53.0' - 54.0')
-SANDSTONE (54.0' - 62.0')
-VOID (62.0' - 63.5')
-WEATHERED SANDSTONE (63.5' - 66.0')
-VOID (66.0' - 72.0')
-WEATHERED SANDSTONE (72.0' - 74.0')
-VOID (74.0' - 74.5')
-LIMESTONE (74.5' - 100.0')
-BORING TERMINATED EL.543'

NOTE: REFER TO TEST BORING LOG B-2B TERRA TESTING INC. PROJECT # 04911441 FOR COMPLETE SOIL MATERIAL DESCRIPTION

GEOTECH B-1
-NG EL. 574'
-COLLUVIUM-BROWN LEAN CLAY CL (0.0' - 7.0')
-COLLUVIUM-SILTY SAND W/ GRAVEL SM (7.0' - 13.5')
-COLLUVIUM-DENSE GRAVEL GP-GM (13.5' - 18.0')
-GROUNDWATER (30.0')
-COLLUVIUM-SILTY SAND W/ GRAVEL SC-SM (7.0' - 13.5')
-BORING TERMINATED EL.519'

NOTE: REFER TO TEST BORING LOG B-1 TERRA TESTING INC. PROJECT # 04911441 FOR COMPLETE SOIL MATERIAL DESCRIPTION

GEOTECH B-1A
-NG EL. 577'
-NO SAMPLING TAKEN (0.0' - 60.0')
-SANDSTONE (60.0' - 70.0')
-BORING TERMINATED EL.507'

NOTE: REFER TO TEST BORING LOG B-1A TERRA TESTING INC. PROJECT # 04911441 FOR COMPLETE SOIL MATERIAL DESCRIPTION

- 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=): 1622'
HDD PIPE LENGTH (S=): 1654'
20" x 0.456" W.T., X-65, API5L, PSL2, ERW, BFW
COATING: 14-16 MILS FBE WITH 30-35 MIL ARO (POWERCRETE OR ENGINEER APPROVED EQUAL)
 - 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.

PRELIMINARY DESIGN ONLY

Revised 20-Inch HDD Plan and Profile

NOTES

- ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
- STATIONING IS BASED ON HORIZONTAL DISTANCES.
- 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.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES. CONTACT ONE CALL AT 811 PRIOR TO DIGGING.
- SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
3	DESIGN CHANGE - RELOCATED DRILL ENTRY / EXIT PER CONTRACTOR DESIGN	MRS	09/12/17	RMB	09/12/17	CAG	09/12/17
2	REVISED PROFILE WITH 2017 LIDAR	MRS	03/21/17	RMB	03/21/17	CAG	03/21/17
1	REVISED PER ENGINEERING COMMENTS	MRS	08/26/16	RMB	08/26/16	MRS	08/26/16
0	ISSUED FOR CONSTRUCTION	MRS	12/22/15	RMB	12/22/15	AAW	12/22/15

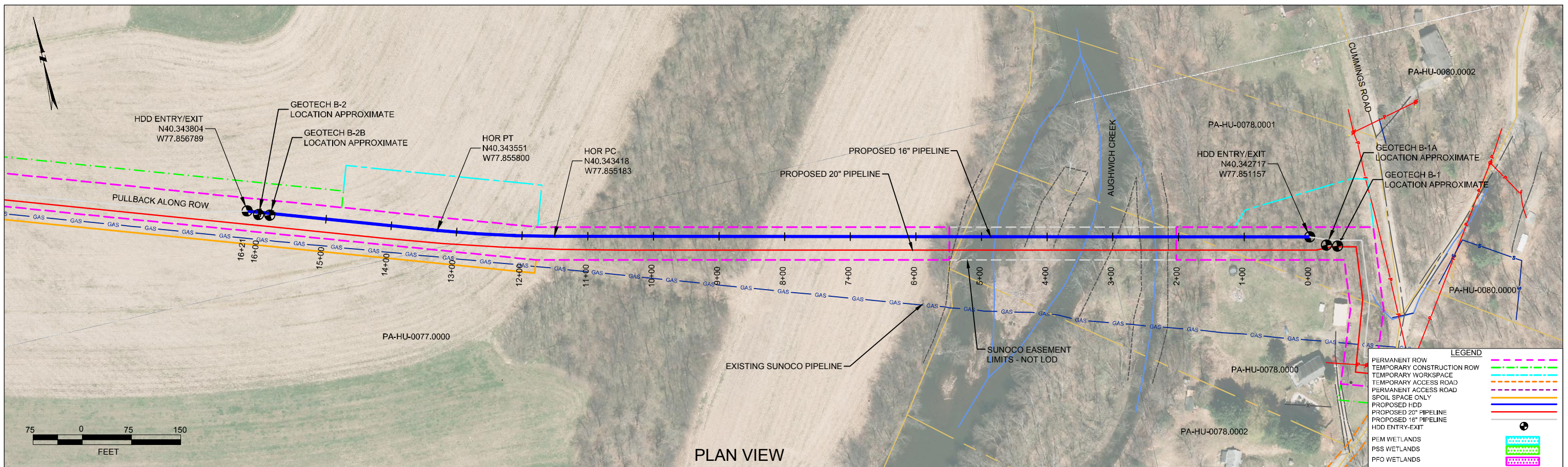
Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

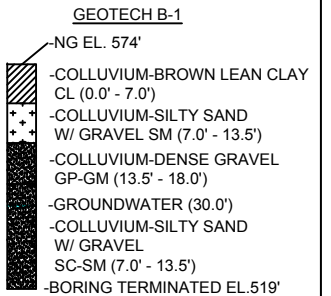
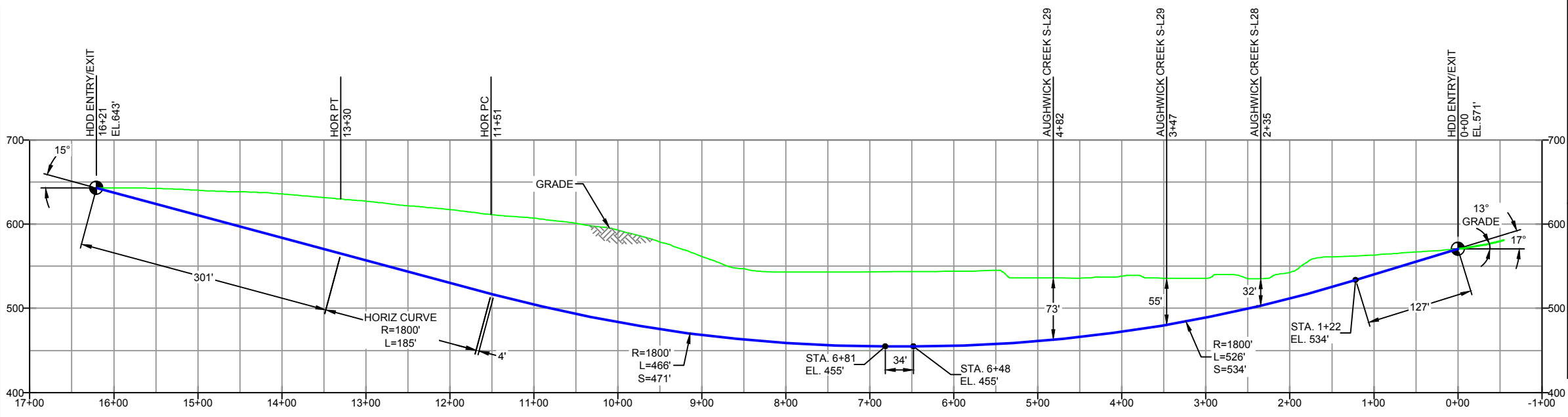
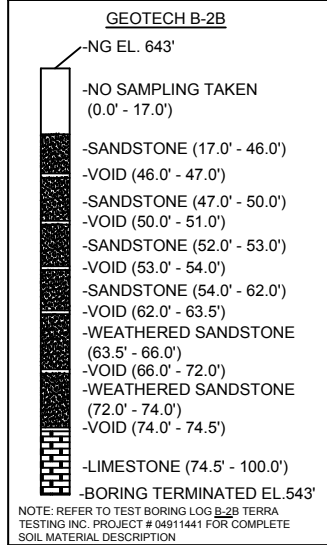
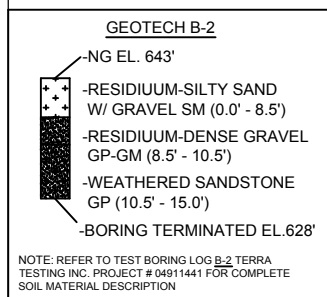
HORIZONTAL DIRECTIONAL DRILL
AUGHWICK CREEK
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=150'
DWG. NUMBER: PA-HU-0078.0000-WX

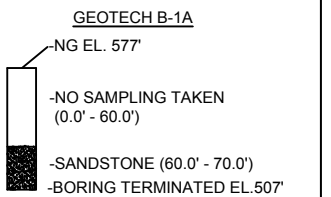


PLAN VIEW
PROFILE VIEW

HUNTINGDON COUNTY, PENNSYLVANIA - SHIRLEY TOWNSHIP
S2-0153



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PRELIMINARY DESIGN ONLY

Revised 16-Inch HDD Plan and Profile

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SUNOCO PIPELINE, L.P.

HORIZONTAL DIRECTIONAL DRILL
AUGHWICK CREEK
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=150'
DWG. NUMBER: PA-HU-0078.0000-WX-16