SUNOCO PIPELINE
An ENERGY TRANSFER Company

535 Fritztown Road
Sinking Spring, PA 19608

September 17, 2019

Mr. John F. Hohenstein P.E
Environmental Program Manager
Southeast Regional Office
Pennsylvania Department of Environmental Protection;
2 East Main Street
Norristown, Pennsylvania 19401-4915

Re: Response to DEP Comments for Hydrogeological HDD Re-Evaluation Report
SPLP HDD No. S3-0400 Exton Bypass Crossing
PADEP Section 105 Permit No.: E15-862
West Whiteland Township, Chester County

Dear Mr. Hohenstein,

On May 30, 2019, Sunoco Pipeline, L.P (SPLP) submitted for public review and comment a Re-Evaluation of the permitted Horizontal Direction Drill (HDD) and proposed replacement construction plans for a segment of the Mariner East II Pipeline Project (Mariner II) known as the Exton Bypass Crossing, S3-0400, as referenced above. SPLP received emailed comments from the Department dated August 13, 2019, requesting additional information concerning the Direct Pipe Bore replacement construction plan. Please accept this letter as a response to your request for further information. Below you will find your specific request bolded, followed by SPLP's response.

1. **It is requested that Sunoco exhibits, in a figure, the location of the fill areas and where the Direct Pipe bore HDD will emerge from the surface. DEP would like to see that these fill areas remain undisturbed at depth.**

   The attached Figure 1 has been enhanced to show the locations of the subsidence fill locations. As shown, neither the direct bore profile, nor the receiving pit intrudes into the fill locations.

2. **DEP believes that a resistivity survey of the proposed Direct Pipe installation area should be performed to delineate fill areas which may have irregular, unpredictable morphologies at depth.**

   The attached report prepared by Gannett Fleming/Quantum Geophysics presents and discusses the existing geophysics data and geotechnical data available at the Direct Bore location. The 16-Inch pipeline grout program completed occurs where the direct pipe will exit and the open cut starts. It lies at a subsurface horizon from approximately 70 foot below ground surface (bgs) and extends upward. The grouting terminates approximately at 15-20 foot bgs. Based on the latest profile design, the grouting zones occur below the anticipated elevations of the direct pipe and open cut activities.

3. **DEP believes contingencies should be developed should fill material from earthen collapses be encountered in borehole cuttings.**

   The cuttings from the direct bore are collected at a mud recycling plant that is the same as the units used during a horizontal directional drill. All cuttings from the recycling plant are collected in a roll off box and disposed of at a licensed disposal facility.

4. **The ground surface along the entire length of the HDD-400, 16-inch FlexBor should be continuously monitored during all Direct Pipe boring and trenching activities in this area.**

   Continuous monitoring of the Exton Bypass Direct Pipe Bore will be performed by Professional Geologists (PG), Environmental Inspectors, and Construction Inspectors and will include as necessary:

   - Documenting the progress of the bore;
   - Documenting the subsurface characteristics by examination of the cuttings on 5 foot intervals as the bore progresses;
   - Fluid use, materials (water, bentonite), and
   - Reconnaissance for any signs of inadvertent returns during boring.

Additionally, SPLP Inspection staff and the assigned PG will inspect the excavation of the Direct Bore receiving pit and continuing open trench towards the crossing of Lynntree Drive to observe the excavated areas for any sign of the previously placed flowable fill and grout to ensure that areas prone to collapse have been backfilled appropriately; document that the materials used are adequately dense, in place, to assure the structural integrity of the new 20-inch pipeline, and to document that no void spaces exist immediately adjacent to the new 20-inch pipeline and that it is safe for construction to proceed. Any detection of the grout backfill or injected grout material encountered will be reported to Pennsylvania Public Utility Commission and the Department.

SPLP submits that we have been, and are, in complete compliance with the agreed terms and analysis requirements of the Order, as agreed to by the Department, and that no further analysis is required for the Department to consent to SPLP's evaluation and negative conclusions for this permitted horizontal directional drill. SPLP therefore requests that the Department approve the Reevaluation Report for Exton Bypass Horizontal Directional Drill (S3-400) as soon as possible.

Sincerely,

Larry J. Gremminger, CWB
Vice-President – Environmental, Health & Safety
Energy Transfer Partners
Mariner East 2 Pipeline Project

PA-CH-0246.0000

PA-CH-0247.0000-RD
PENN DOT ROAD ROW

WB EXTON BYPASS
N40.023095
W75.613704

EB EXTON BYPASS
N40.022937
W75.613603

PA-CH-0248.0000-RR
NORFOLK SOUTHERN
RAILROAD ROW

PA-CH-0249.0000-RR
AMTRAK RAILROAD ROW

PA-CH-0250.0000

PA-CH-0251.0000

GEOTECH SB-01

GUARD RAIL

W-K18

EXISTING SUNOCO 8" PIPELINE

ENTRY PIT
90'X20'X18'

RAILROAD ROW

RAILROAD ROW

DIRECT PIPE EXIT
N40.021624
W75.612755

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 8+16

9' 11' 4' 12' 14' 14'

W-K21

AREAS OF GROUND SUBSIDENCE

EXIT PIT
60'X20'X19'

ROW FENCE

DIRECT PIPE ENTRY
N40.023632
W75.614049

AS-BUILT 16" PIPELINE

PROPOSED 20" PIPELINE

RAILROAD ROW

WEST WHITELAND TWP
SANITARY SEWER

EXISTING SUNOCO 12" PIPELINE

EXISTING SUNOCO 8" & 12" PIPELINES

EXISTING SUNOCO 8" & 12" PIPELINES

PA-CH-0249.0001

GEOTECH SB-02
LOCATION APPROXIMATE

PA-CH-0247.0000

W-K19

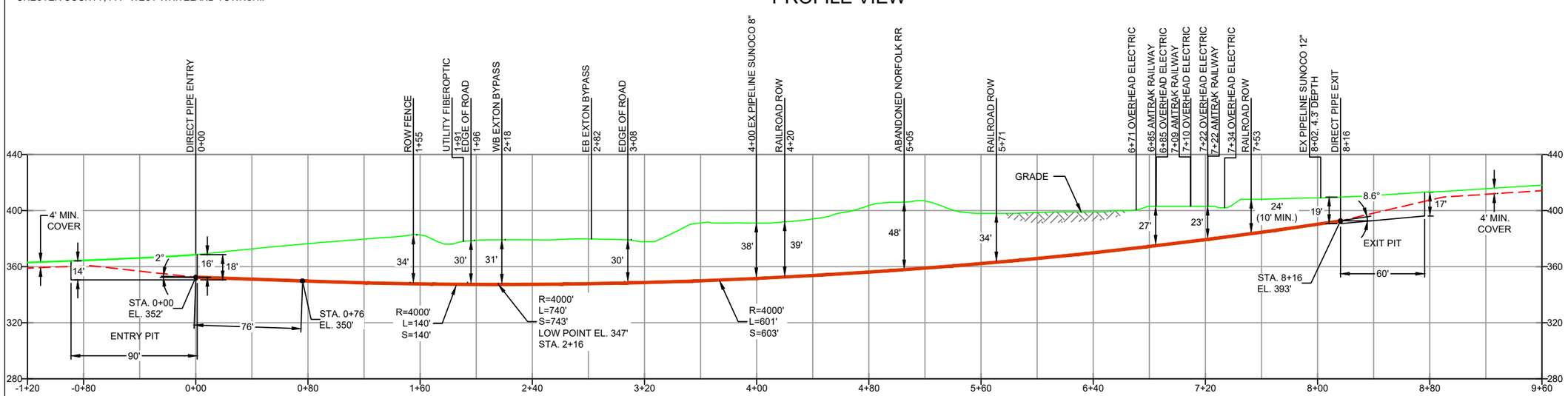
40 0 40 80
SCALE

PLAN VIEW

LEGEND
PERMANENT ROW
TEMPORARY CONSTRUCTION ROW
TEMPORARY WORKSPACE
TEMPORARY ACCESS ROAD
PERMANENT ACCESS ROAD
SPOIL SPACE ONLY
PROPOSED HDD
PROPOSED 20" PIPELINE
AS-BUILT 16" PIPELINE
HDD ENTRY-EXIT
PEM WETLANDS
PSS WETLANDS
PFO WETLANDS

CHESTER COUNTY, PA - WEST WHITELAND TOWNSHIP

PROFILE VIEW



GEOTECH SB-01
-NG EL. 375'
-TOPSOIL (0' - 0.5')
-ML (0.5' - 6.5')
-SM (6.5' - 11.5')
-SM/ML (11.5' - 30.0')
-GROUNDWATER (27.0')
-COMPLETION DEPTH EL. 345'

GEOTECH SB-02
-NG EL. 427'
-TOPSOIL (0' - 0.2')
-ML (0.2' - 57.0')
-GROUNDWATER (38.0')
-ML (57.0' - 74.4')
-COMPLETION DEPTH EL. 353'

NOTE: REFER TO TEST BORING LOG S3-0400 FOR COMPLETE SOIL MATERIAL DESCRIPTION

CONSTRUCTION NOTES

1. 20" PIPE WILL BE INSTALLED INTO A SINGLE WELDED STEEL CASING (42" OD, 1.00" WT, X-70) USING DIRECT PIPE METHOD.
2. 20" WELDED STEEL PIPE: 20" OD x 0.456" WT, X-65, API-5L, PSL2, ERW, BFW, DRL
   HORIZONTAL PIPE LENGTH (L) = 816'
   PIPE LENGTH (S) = 819'
   COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
3. 20" DESIGN PRESSURE: 1480 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 1850 PSIG.
4. PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
5. THE COATING ON THE CARRIER PIPE SHALL BE INSPECTED IMMEDIATELY PRIOR TO ITS INSTALLATION AND ALL DAMAGED COATING SHALL BE REPAIRED IN ACCORDANCE WITH SUNOCO'S PIPELINE COATING SPECIFICATIONS.
6. INSTALL CATHODIC PROTECTION TEST LEADS AS SPECIFIED ON THE ALIGNMENT SHEETS OR SUNOCO CORROSION TECHNICIAN.
7. PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
8. WELDED JOINTS INSIDE R.O.W. SHALL BE 100% X-RAYED.
9. CONTRACTOR WILL MAINTAIN A MINIMUM 4' OF COVER TO THE TOP OF PIPE USING FIELD BENDS.
10. CONTRACTOR WILL MAINTAIN A MINIMUM 24" OF COVER FROM ALL EXISTING UTILITIES.
11. CONTRACTOR WILL MAINTAIN A MINIMUM 5' OF COVER FROM BOTTOM OF STREAMS.
12. CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
13. IN ADDITION TO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING, GENERAL REQUIREMENTS INCLUDED IN ALIGNMENT SHEETS, PERMITS AND APPROVAL FROM FEDERAL, STATE AND LOCAL AGENCIES ALSO APPLY.
14. SUNOCO PIPELINE, L.P.'S HORIZONTAL DIRECTIONAL DRILL INADVERTENT RETURN CONTINGENCY PLAN WILL BE IMPLEMENTED AT ALL TIMES.
15. SUNOCO PIPELINE, L.P.'S EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED AT ALL TIMES.

Figure 1. Direct Bore Plan and Profile with Subsidence Locations

NOTES

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

REF. DRAWING

DWG NO		DWG NO	DESCRIPTION
ES-6.49	TO	ES-6.50	EROSION & SEDIMENT PLAN
SHEET 33	TO	SHEET 34	AERIAL SITE PLAN

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
2	ADDED GROUND SUBSIDENCE AREAS ON PLAN VIEW	MRS	08/26/19	RMB	08/26/19	AMC	08/26/19
1	UPDATED DIRECT PIPE CASING SPEC PER CONTRACTOR	MRS	07/24/19	RMB	07/24/19	AMC	07/24/19
0	ISSUED FOR CONSTRUCTION	MRS	05/03/19	RMB	05/03/19	AMC	05/03/19

Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

DIRECT PIPE
EXTON BYPASS / AMTRAK RAILWAY
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=80'

DWG. NO.: PA-CH-0249.0000-RR

Gannett Fleming
Quantum Geophysics

September 9, 2019

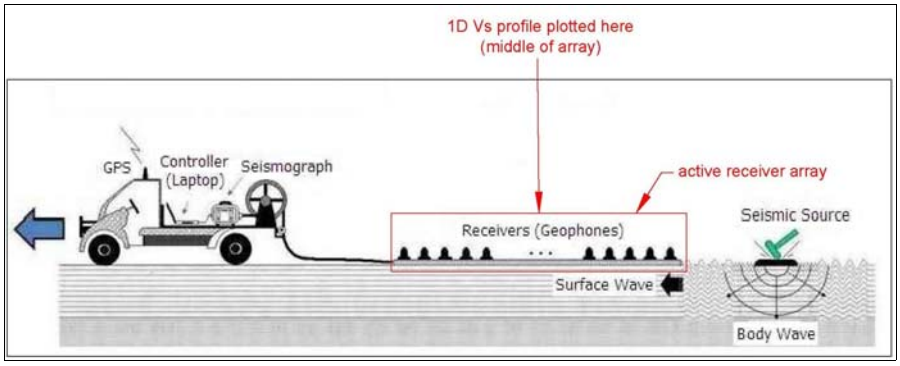
Larry Gremminger
VP- Environmental
ETP
Larry.Gremminger@energyTransfer.com
979-270-9131

Re: Letter Report
HDD400
Direct Push
Exton, Pennsylvania

Dear Mr. Gremminger:

As requested, we laid-in the MASW-derived V_s profiles from our September 25-28, 2017 geophysical investigation onto the HDD400 direct push plan sheet and profile recently provided by Tetra Tech (see attached). The profiles show a 2-layer case of soil and rock. The rock is most likely weathered. Top of rock is interpreted and may actually be deeper near the entry pit as suggested by Geotech Boring SB-1. The boring is located 50 +/- ft to the east and was terminated at 30 ft bgs without encountering rock.

The V_s profiles appear “shorter” than the section being investigated and that is because of how MASW works and site conditions. Once an active receiver array is laid-out, a shot record is obtained and that shot record is inverted into a 1D V_s profile. The 1D V_s profile is plotted in the middle of the active array (illustrated below) because it is assumed that the profile is representative of subsurface conditions beneath the active array.



Adapted from WWW.MASW.com.

Additional shot records are collected at a predetermined interval as the array is moved progressively along a survey line. The 1D V_s profile from each shot record is plotted in the middle of each respective active receiver array location. Interpolation of the 1D V_s profiles produces a 2D V_s profile along the survey line.

The V_s profiles are “short” in the plan and profile drawing because obstructions such as fencing, staged materials, drilling operations, heavy equipment, the US 30 By-Pass, and railroad ROWs prevented laying-out the active receiver array before the start of a section and extending the array past the end of each section.

It is our understanding that DEP is requesting the use of the electrical resistivity method to identify subsurface conditions. While electrical resistivity would provide better spatial coverage than MASW, the electrical resistivity method is susceptible to interference from buried metal, including the existing 8" and 12" pipelines in the ROW. Buried metal impacts electrical resistivity data because it attracts electrical current. Crossing a pipe with an electrical resistivity line is known to cause an anomaly that looks much like that caused by a fracture or shear zone. It’s not real, an “artifact” that can also mask the response of real features (e.g., voids). Running near and parallel to a pipe represents a worst-case scenario because the pipe can make top of rock look deeper than it really is, and mask features the full length of the profile.

The attached “white-paper” by AGI (Advanced Geosciences, Inc.) offers guidance in how to avoid interference from buried metal, including pipes. AGI is the manufacturer of the SuperSting earth resistivity system which we (and others) have used on ETP HDD sites. The max depth of the direct push path is 48 ft bgs. This would require laying-out a 240-foot long electrical resistivity line (max. depth of exploration is approximately 20% the length of the electrical resistivity line) and the line would have to be offset at least 48 ft from existing pipelines. Not only would this put the offset outside the ROW, but subsurface conditions identified along the offset may not necessarily be representative of conditions along the direct push path.

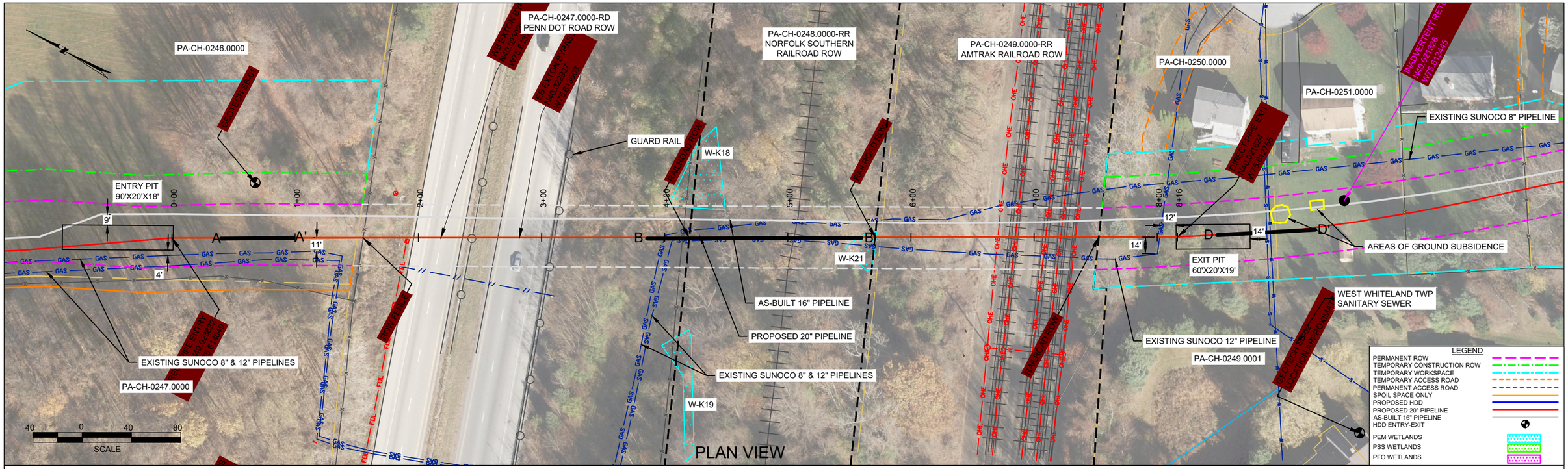
Please let me know if there are any questions or comments.

Sincerely,

Quantum Geophysics

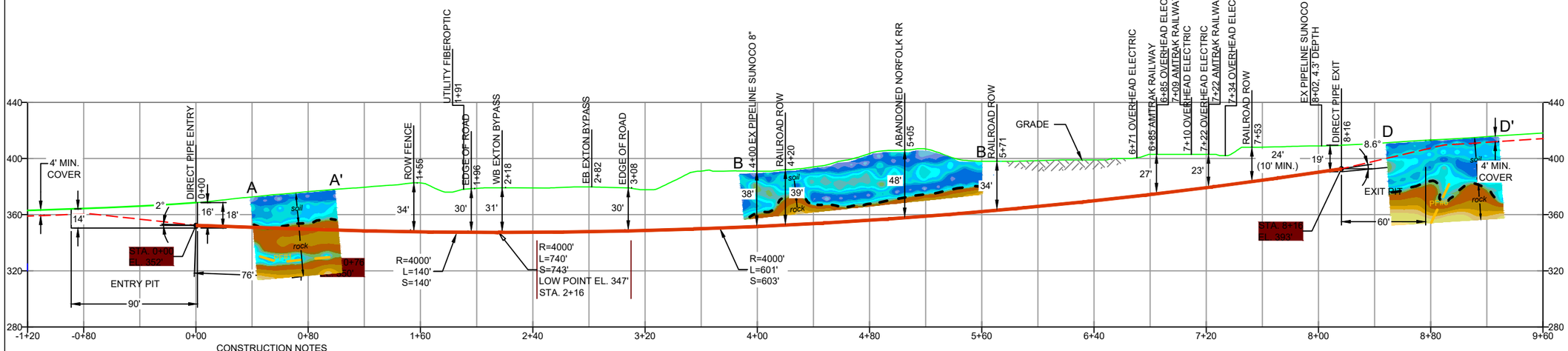
Richard K. Lee

Richard Lee, P.G., R.GP.
President and Principal Geophysicist
RKL/jas



CHESTER COUNTY, PA - WEST WHITELAND TOWNSHIP

PROFILE VIEW



CONSTRUCTION NOTES

1. 20" PIPE WILL BE INSTALLED INTO A SINGLE WELDED STEEL CASING (42" OD, 1.00" WT, X-70) USING DIRECT PIPE METHOD.
2. 20" WELDED STEEL PIPE: 20" OD x 0.456" WT, X-65, API-5L, PSL2, ERW, BFW, DRL
   HORIZONTAL PIPE LENGTH (L) = 816'
   PIPE LENGTH (S) = 819'
   COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
3. 20" DESIGN PRESSURE: 1480 PSIG
   CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF PIPE STRING TO MINIMUM 1850 PSIG.
4. PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
5. THE COATING ON THE CARRIER PIPE SHALL BE INSPECTED IMMEDIATELY PRIOR TO ITS INSTALLATION AND ALL DAMAGED COATING SHALL BE REPAIRED IN ACCORDANCE WITH SUNOCO'S PIPELINE COATING SPECIFICATIONS.
6. INSTALL CATHODIC PROTECTION TEST LEADS AS SPECIFIED ON THE ALIGNMENT SHEETS OR SUNOCO CORROSION TECHNICIAN.
7. PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
8. WELDED JOINTS INSIDE R.O.W. SHALL BE 100% X-RAYED.
9. CONTRACTOR WILL MAINTAIN A MINIMUM 4' OF COVER TO THE TOP OF PIPE USING FIELD BENDS.
10. CONTRACTOR WILL MAINTAIN A MINIMUM 24" OF COVER FROM ALL EXISTING UTILITIES.
11. CONTRACTOR WILL MAINTAIN A MINIMUM 5' OF COVER FROM BOTTOM OF STREAMS.
12. CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
13. IN ADDITION TO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING, GENERAL REQUIREMENTS INCLUDED IN ALIGNMENT SHEETS, PERMITS AND APPROVAL FROM FEDERAL, STATE AND LOCAL AGENCIES ALSO APPLY.
14. SUNOCO PIPELINE, L.P.'S HORIZONTAL DIRECTIONAL DRILL INADVERTENT RETURN CONTINGENCY PLAN WILL BE IMPLEMENTED AT ALL TIMES.
15. SUNOCO PIPELINE, L.P.'S EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED AT ALL TIMES.

Shear Wave Velocity (ft/sec)
400 750 1100 1450 1800 2150 2500 2850

GEOTECH SB-01
-NG EL. 375'
-TOPSOIL (0' - 0.5')
-ML (0.5' - 6.5')
-SM (6.5' - 11.5')
-SM/ML (11.5' - 30.0')
-GROUNDWATER (27.0')
-COMPLETION DEPTH EL. 345'

GEOTECH SB-02
-NG EL. 427'
-TOPSOIL (0' - 0.2')
-ML (0.2' - 57.0')
-GROUNDWATER (38.0')
-ML (57.0' - 74.4')
-COMPLETION DEPTH EL. 353'

NOTE: REFER TO TEST BORING LOG S3-0400 FOR COMPLETE SOIL MATERIAL DESCRIPTION

NOTES

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

REF. DRAWING

DWG NO		DWG NO	DESCRIPTION
ES-6.49	TO	ES-6.50	EROSION & SEDIMENT PLAN
SHEET 33	TO	SHEET 34	AERIAL SITE PLAN

REVISIONS

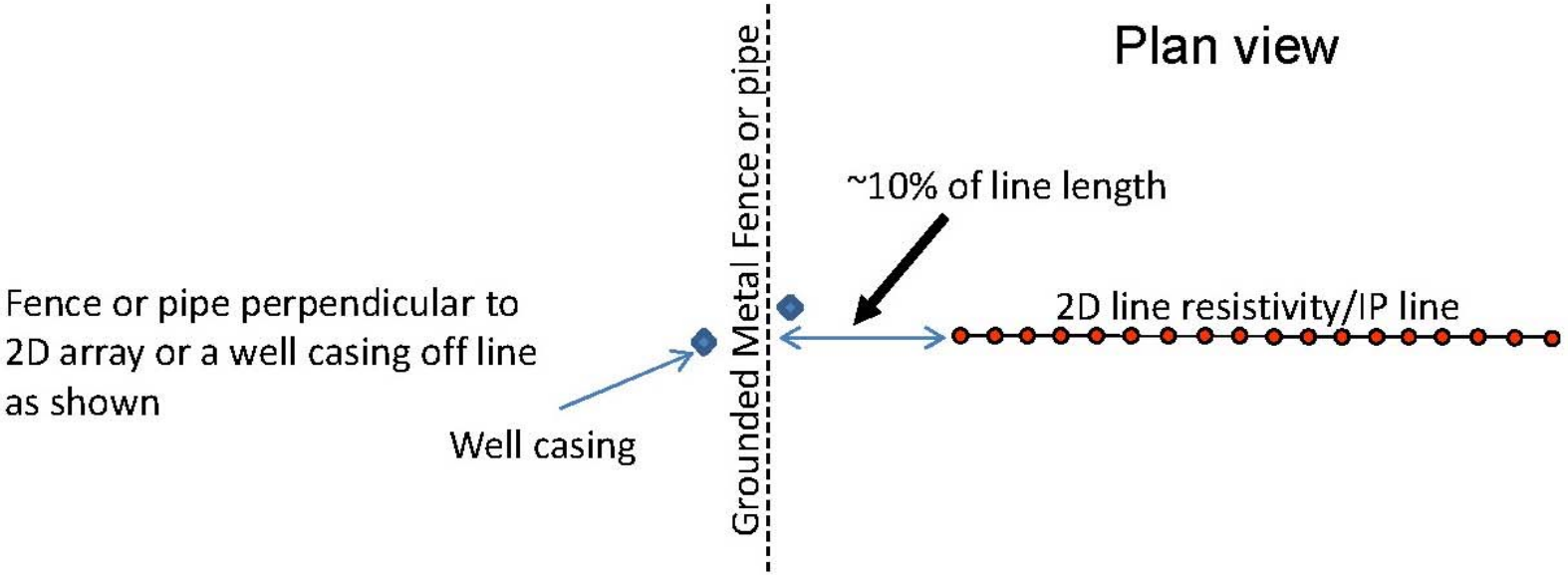
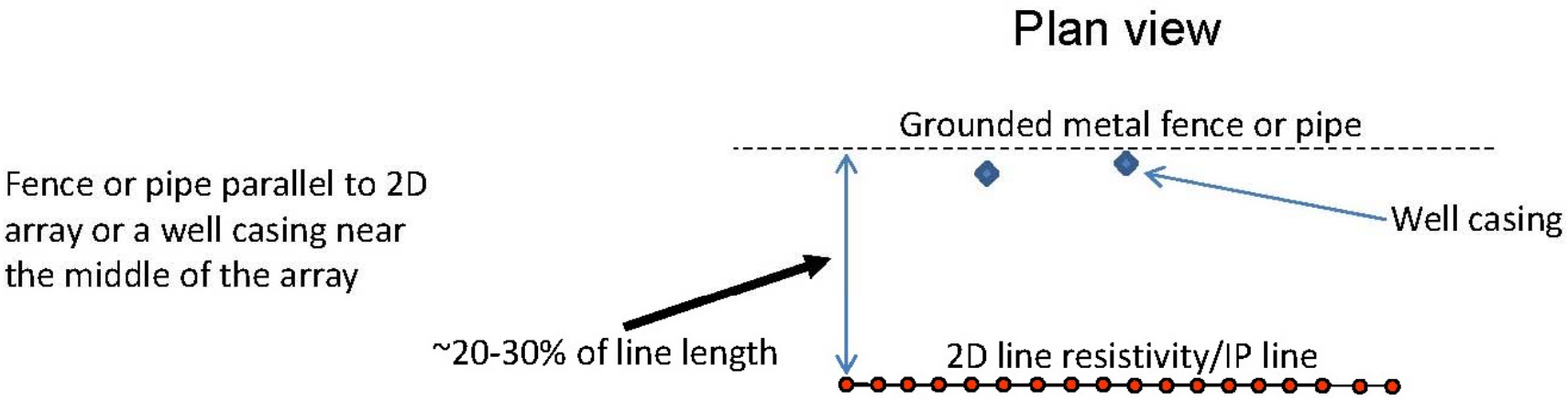
NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
2	ADDED GROUND SUBSIDENCE AREAS AND IR INFORMATION ON PLAN VIEW	MRS	08/26/19	RMB	08/26/19	AMC	08/26/19
1	UPDATED DIRECT PIPE CASING SPEC PER CONTRACTOR	MRS	07/24/19	RMB	07/24/19	AMC	07/24/19
0	ISSUED FOR CONSTRUCTION	MRS	05/03/19	RMB	05/03/19	AMC	05/03/19

Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

DIRECT PIPE
EXTON BYPASS / AMTRAK RAILWAY
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=80' | DWG. NO.: PA-CH-0249.0000-RR

Avoiding influence of buried metallic objects