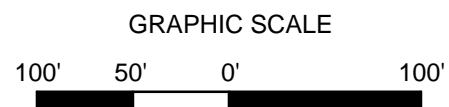


DELAWARE RIVER HDD PLAN VIEW  
SCALE: 1" = 100'



CROSSING SPECIFIC HDD NOTES:

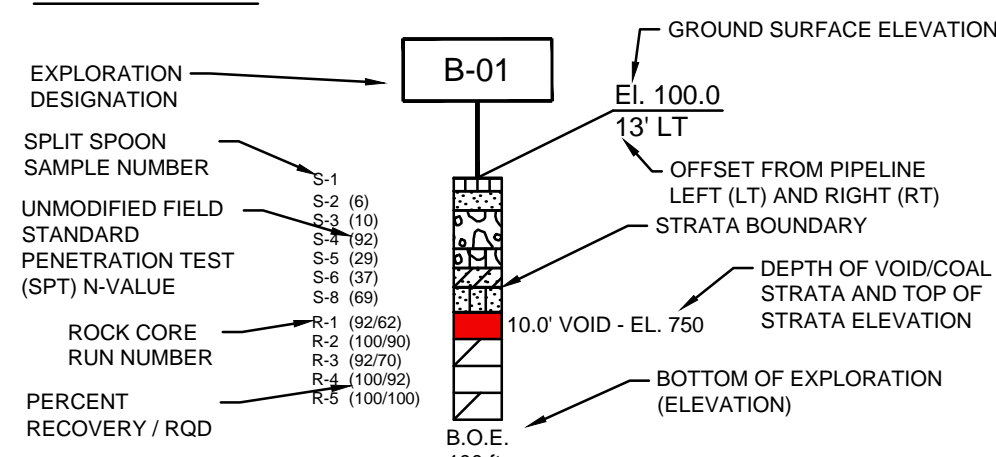
- ALL DIMENSIONS AND ELEVATIONS ARE IN FEET, UNLESS OTHERWISE SPECIFIED.
- ALL CHANGES ARE HORIZONTAL.
- CONTRACTOR SHALL DETERMINE FINAL LOCATIONS AND DIMENSIONS OF ALL MUD PITS NECESSARY TO ACCOMMODATE THEIR MEANS AND METHODS.
- CONTRACTOR TO STAGE ALL PERSONNEL AND EQUIPMENT WITHIN THE PERMITTED LIMIT OF DISTURBANCE AS DEPICTED ON THIS DRAWING, UNLESS OTHERWISE AUTHORIZED BY THE CLIENT.
- CONTRACTOR SHALL DETERMINE DIAMETER, GRADE, WALL THICKNESS AND ADDITIONAL LENGTH OF TEMPORARY CONDUCTOR CASINGS IF DEEMED NECESSARY BY THE CONTRACTOR. ANY INSTALLED TEMPORARY CONDUCTOR CASING SHALL BE FULLY REMOVED UPON COMPLETION OF PULLBACK OPERATIONS.
- THE MINIMUM ALLOWABLE DRILLING RADIUS SHALL BE 2,600 FEET BASED ON A 3-JOINT AVERAGE.
- EXISTING UTILITY LOCATIONS AND DEPTHS, INCLUDING PRIVATE SERVICES, ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION OPERATIONS. PENNSYLVANIA LAW REQUIRES AT LEAST 48 HOURS AND NO MORE THAN TEN (10) WORKING DAYS NOTICE BEFORE EXCAVATION OR DEMOLITION.
- HDD OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
- DOWNHOLE ANNUAL DRILLING FLUID PRESSURES SHALL BE MONITORED AT ALL TIMES DURING THE PILOT BORE DRILLING PROCESS. LOCATION OF MONITORING SHALL BE AS CLOSE TO THE DRILL BIT AS POSSIBLE.
- HDD CONTRACTOR SHALL BE PREPARED TO PUMP A CEMENT GROUT DOWNHOLE TO HELP SEAL LARGE PREFERENTIAL FLOW PATHWAYS AND RESTORE DRILLING FLUID FLOW WITHIN THE HDD BORE IN THE EVENT KARST FEATURES ARE ENCOUNTERED AND EXCESSIVE DRILLING FLUID LOSSES OCCUR.
- PILOT BORE SHALL BE CONTINUOUSLY TRACKED AT ALL TIMES. CONTRACTOR SHALL USE A GYROSCOPIC GUIDANCE SYSTEM TO COMPLETE THE PILOT BORE INSTALLATION. NO BLIND SECTIONS SHALL BE PERMITTED, EVEN WHEN THE DRILL BIT IS UNDER WATER.
- IF THE CONTRACTOR ENCOUNTERS AN OBSTRUCTION THAT PREVENTS THE INSTALLATION ACCORDING TO THE PROJECT SPECIFICATIONS, THE CONTRACTOR SHALL PLACE A CEMENT BASED GROUT WITHIN THE BORE. WORK SHALL NOT RESUME UNTIL REVISED PLANS AND PROCEDURES HAVE BEEN SUBMITTED TO AND ACCEPTED BY THE OWNER.

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:

Item	Tolerance
Riser entry angle	Increase angle up to 1° (theater), but no decrease in angle allowed.
Riser entry location	As indicated by Owner. No change without Owner approval.
Riser exit angle	Decrease angle up to 2° (theater), but no increase in exit angle allowed.
Riser exit location	Up to ten (10) feet shorter or longer.
Riser depth	Up to three (3) feet shallower depth allowed; up to ten (10) feet increase in pipe string depth (excepted) allowed.
Riser alignment	Up to ten (10) feet left or right of the Owner survey centerline but not within five (5) feet of the right-of-way/encroachment boundary or any below grade utility or structure.

- CROSS SECTIONS PRESENTS SUMMARY BOREHOLE LOG GRAPHICS, SEE FULL BOREHOLE LOG FOR DETAILS.
- SUMMARY GEOPHYSICAL PROFILE DISPLAYED. SEE FULL REPORT FOR DETAILS. ANY INTERPRETATION DISPLAYED UPON GEOPHYSICAL PROFILES WAS PERFORMED BY GEOPHYSICAL SUBCONSULTANT.

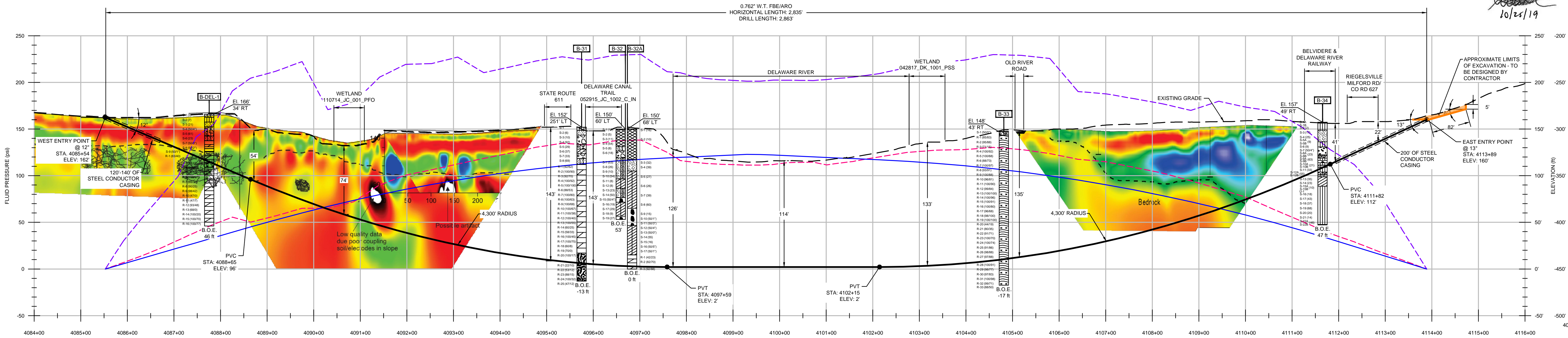
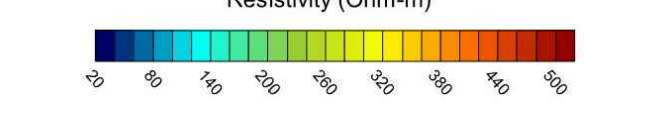
BORING LEGEND



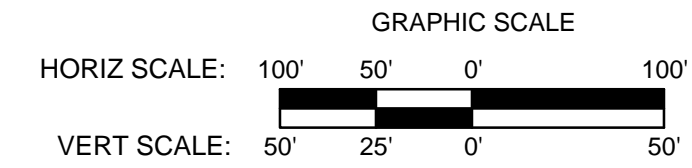
SOIL AND ROCK STRATAGRAPHIC LEGEND:

ASPHALT	SM	BOULDERS
CL	SC	CH
ML	SP	FILL
DECOMPOSED ROCK	TOPSOIL	GNEISS
QUARTZITE	MARBLE	PEGMATITE
GRANOFELS	DOLOMITE	VOID

GEOTECHNICAL NOTE: MASW GEOPHYSICS CONDUCTED OFF CENTERLINE.



DELAWARE RIVER HDD PROFILE  
HORIZONTAL SCALE: 1" = 100'  
VERTICAL SCALE: 1" = 50'



- NOTES:
- THE CONTOURS AND IMAGERY SHOWN WERE PROVIDED BY PICTOMETRY, 2015. ADDITIONAL CONTOURS AND IMAGERY SUPPLEMENTED FROM PA&A.
  - EXISTING FEATURE SURVEYED PERFORMED BY MOTT MACDONALD 2015 THRU 2018. ADDITIONAL FEATURES DIGITIZED FROM IMAGERY. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY CONTRACTOR.
  - PROPERTY LINES DEPICTED ON THIS PLAN ARE BASED ON GIS TAX MAP DATA AND RECTIFIED PROPERTY LINES AND ARE NOT THE RESULT OF A BOUNDARY SURVEY.
  - WATERBODY INFORMATION PROVIDED BY AECOM 2015 THRU 2018.

REFERENCE DRAWINGS		REVISIONS			APPROVALS		
DWG. NO.	TITLE	DATE	DRAWN	CK	APPR	DRAWN BY	DATE
000-03-01-155	ALIGNMENT SHEET	10/2018	JL (MM)	AJD (MM)	MJD (MM)	RJP (MM)	10/15/2018
000-03-01-156	ALIGNMENT SHEET	10/2019	AJD (MM)	MMM (MM)	MJD (MM)	CHEK BY	DATE
000-03-03-056	ACCESS ROAD DETAIL					CAF (MM)	10/15/2018
						ENG. APPROVAL	DATE
						MDN (MM)	10/15/2018
						P.M. APPROVAL	DATE
						MAW (MM)	10/15/2018

PREPARED FOR

PENNEAST PIPELINE PROJECT  
SOIL EROSION AND SEDIMENT CONTROL PLAN  
PROPOSED 36" PIPELINE  
HDD EXHIBIT PLAN AND PROFILE  
DELAWARE RIVER HDD  
BUCKS COUNTY, PENNSYLVANIA  
HUNTERDON COUNTY, NEW JERSEY

SCALE	DRAWING NO.	REVISION
AS SHOWN	00-03-07-007	A

G:\PENNEAST\030754\_PENNEAST\_PIPELINE\_EPCC\DATA\PROD\_STATE\_PERMIT\WORK\PA\DRAWING\SEDIMENT\_CONTROL\_PLAN\HDD\_DETAILS\000-03-07-007.DWG DIM64749