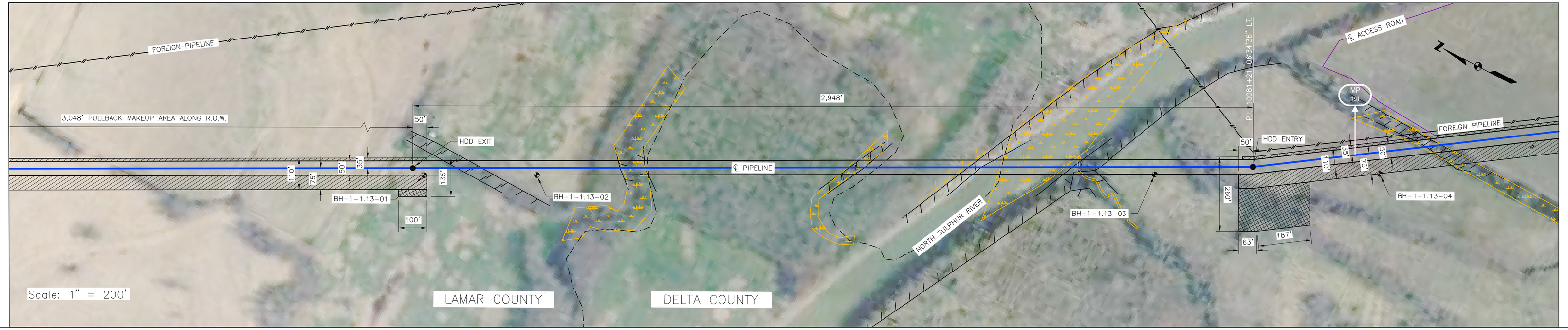
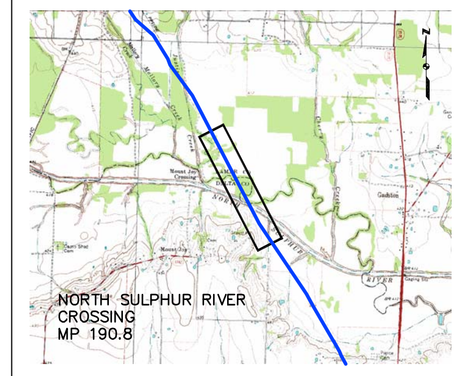
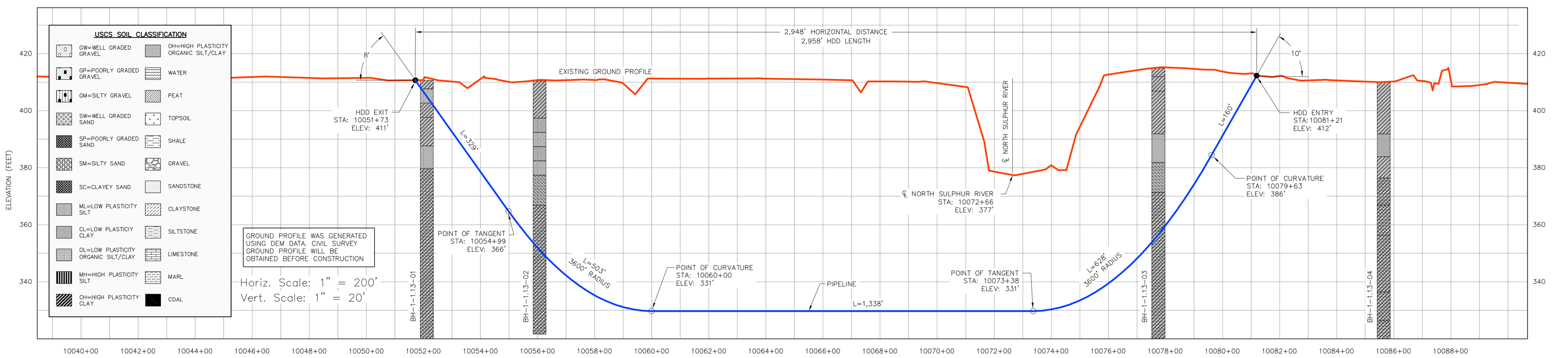



## INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRANMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.

9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

## LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

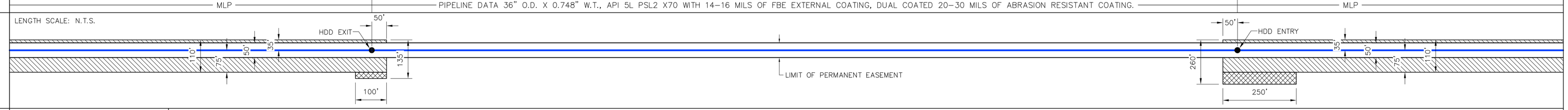
**CROSSING INFORMATION (ESTIMATED STATIONING)**

10051+73 HDD EXIT
10052+13 BH-1-1.13-01
10054+99 PT OF TANGENT
10056+08 BH-1-1.13-02
10060+00 PT OF CURVATURE
10072+66 ℄ NORTH SULPHUR RIVER
10073+38 PT OF TANGENT
10077+76 BH-1-1.13-03
10079+63 PT OF CURVATURE
10081+21 HDD ENTRY P.I.: 06°34'36" LT
10085+60 BH-1-1.13-04

**PIPELINE DATA**

MLP — PIPELINE DATA 36" O.D. X 0.748" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

**CONSTRUCTION WORKSPACE**




**ENVIRONMENTAL MITIGATION/RECLAMATION**

- TOPSOIL SALVAGE METHOD
- STREAMS
- WETLANDS
- TIMING CONSRAINTS
- MILEPOST
- MONITORING
- RECLAMATION
- SPECIAL CONSIDERATIONS

TO BE DETERMINED

### REFERENCE DRAWINGS

| DRAWING No | TITLE |
|---|---|
| 11042 HDD XREF_15 | 11042 HDD XREF_15.dwg |
| TC_UD_BR_UEI | TC_UD_BR_UEI.dwg |
| NOTES-LEGEND | NOTES-LEGEND.dwg |

### REVISION / APPROVAL

| REV No | DATE | DESCRIPTION | PROJECT CODE | DRAFTER | DRAFTING CHECKER | DESIGNER | DESIGN CHECKER | PROJECT MANAGER | COMPANY |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 03.15.10 | ISSUED FOR CONTRACT PRE-AWARD | 11042 | UEI | UEI | DW | JW | JH | UEI |
| 5 | 09.08.09 | ISSUED FOR RFP PACKAGE | 11042 | UEI | UEI | BM | JW | JH | UEI |
| 4 | 07.27.09 | ISSUED FOR BID REVIEW | 11042 | UEI | UEI | BM | JW | JH | UEI |
| 3 | 06.22.09 | ISSUED FOR BID REVIEW | 11042 | UEI | UEI | BM | JW | JH | UEI |
| 2 | 05.13.09 | ISSUED FOR J.D. HAIR REVIEW | 11042 | UEI | UEI | DW | JW | JH | UEI |
| 1 | 03.19.09 | ISSUED FOR TROW REVIEW | 11042 | UEI | UEI | DW | JW | JH | UEI |
| 0 | 11.19.08 | ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL) | 11042 | UEI | UEI | RB | JW | JH | UEI |

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC.

TransCanada — In business to deliver

FIA # 4381 | CHAINAGE: M.P. 190.8 | DISCIPLINE # 03

# NORTH SULPHUR RIVER HDD INSTALLATION
# KEYSTONE XL PROJECT
# LAMAR & DELTA COUNTIES, TEXAS

SCALE AS SHOWN | DRAWING No 4381-03-ML-03-003 | REV 6

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)