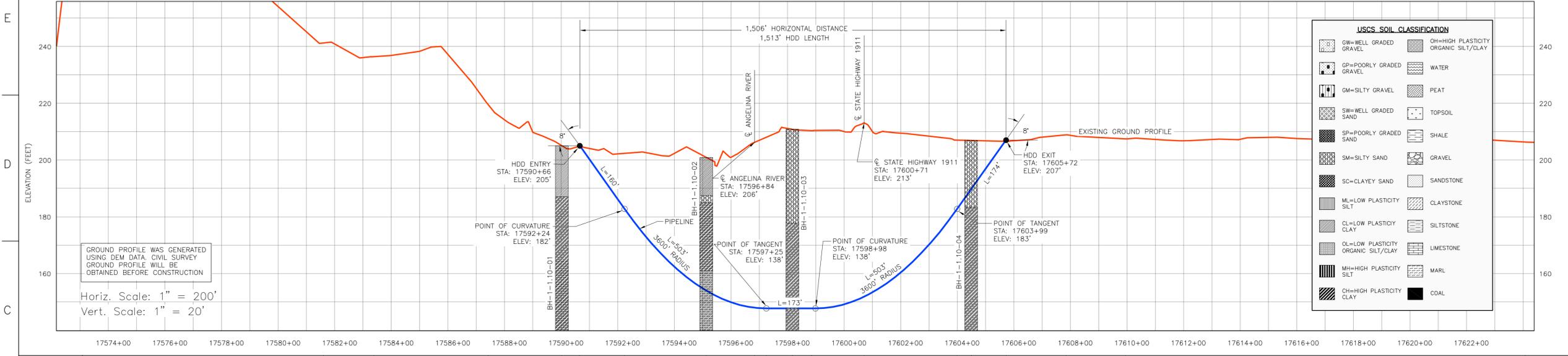


- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
  - VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
  - WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING 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).
  - 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 ENTRANCE 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.
  - 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.
  - 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.
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  - TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
  - PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
  - 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.
  - 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 INADEQUATELY 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.
  - CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONDITIONS. DISTURBED AREAS SHALL BE SEEDDED AS SPECIFIED IN PROJECT DOCUMENTS.
  - 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.



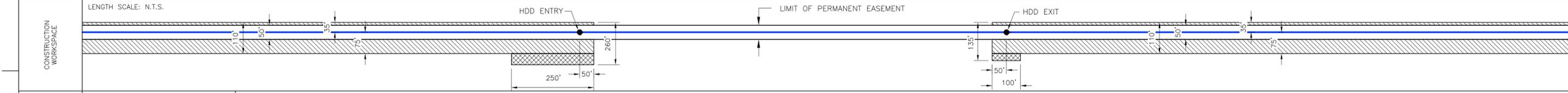
**USCS SOIL CLASSIFICATION**

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICITY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

- LEGEND**
- POINT OF INTERSECTION (P.I.)
  - ENTRY OR EXIT POINT
  - ⊕ GEOTECHNICAL BOREHOLE
  - ⊙ POWERPOLE
  - MLP MAINLINE PIPE
  - PIPELINE
  - FOREIGN PIPELINE
  - EDGE OF WATER
  - PRIVATE ACCESS SHOULDER ROAD
  - COUNTY BOUNDARY
  - WATER LEVEL
  - ⊕ USACE CONSTRUCTION REFERENCE POINT
  - WETLANDS
  - PERMANENT EASEMENT
  - TEMPORARY EASEMENT
  - EXTRA WORKSPACE

**CROSSING INFORMATION (ESTIMATED DIMENSIONS)**

17581+46 P.I. 105052" RT.	17583+30 P.I. 082116" RT.	17587+35 P.I. 175922" RT.	17590+03 BH-1-1.10-01 P.I. 150820" LT. 17590+66 HDD ENTRY	17592+24 PT. OF CURVATURE	17594+13 BH-1-1.10-02	17596+84 ANGELINA RIVER	17597+25 PT. OF TANGENT 17598+17 BH-1-1.10-03 17598+98 PT. OF CURVATURE	17600+71 STATE HIGHWAY 1911	17603+99 PT. OF TANGENT 17604+49 BH-1-1.10-04 17605+72 HDD EXIT	17607+88 P.I. 040142" RT.	17609+97 P.I. 012654" RT.	17624+12 P.I. 040338" LT.
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**ENVIRONMENTAL MITIGATION/RECLAMATION**

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
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**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
DATE	DATE

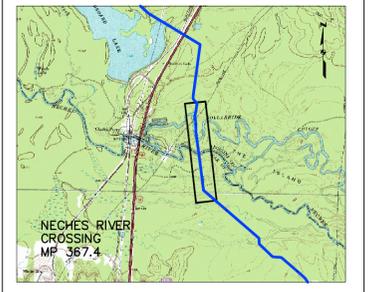
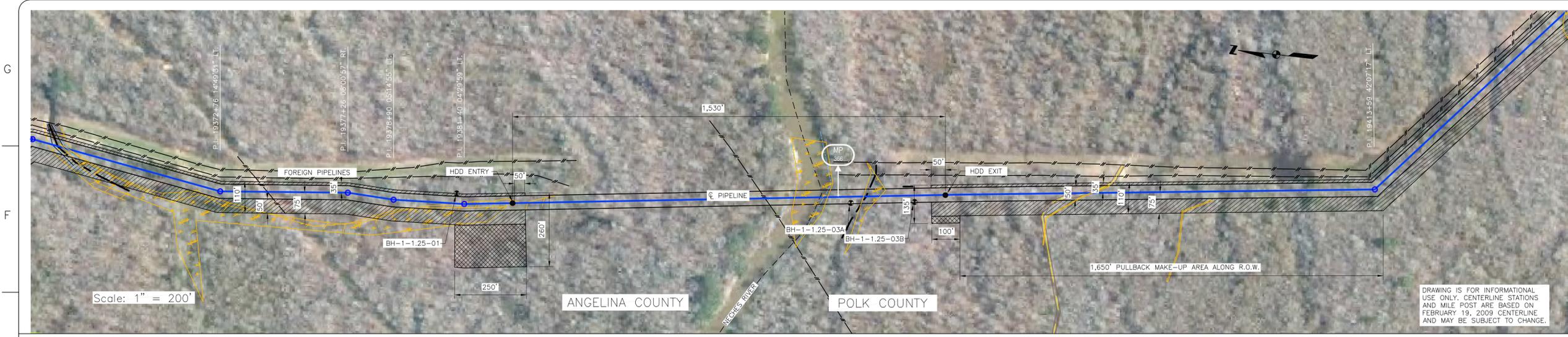
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4384 CHAINAGE: M.P. 333.3 DISCIPLINE # 03

ANGELINA RIVER HDD INSTALLATION  
KEYSTONE XL PROJECT  
NACOGDOCHES & CHEROKEE COUNTIES, TEXAS

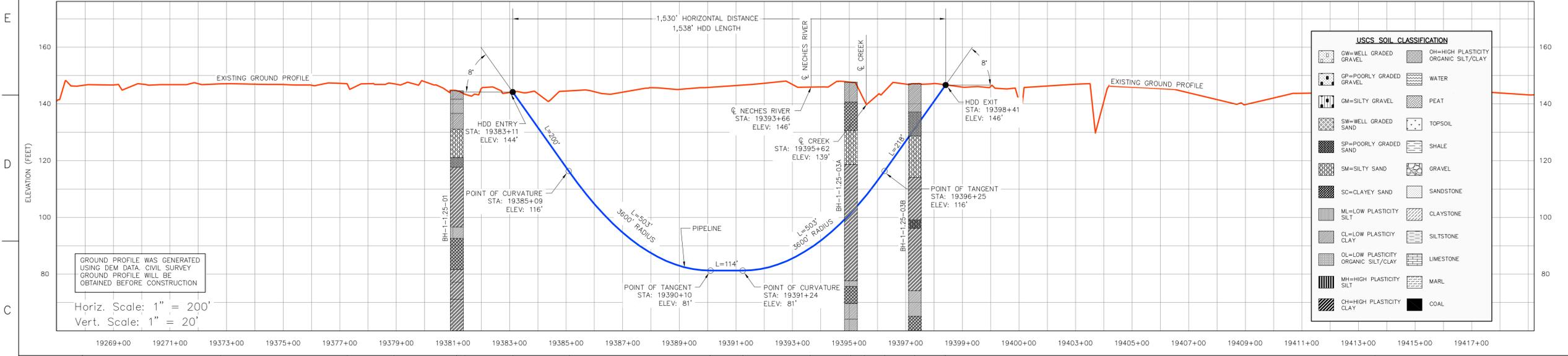
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**PRELIMINARY**



**INSTALLATION NOTES**

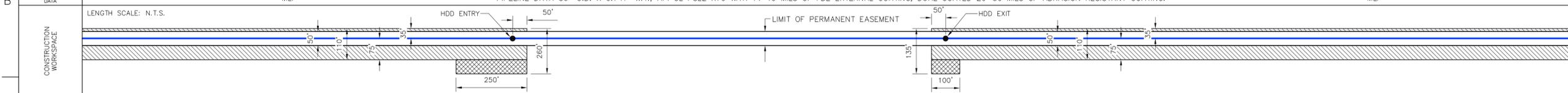
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- NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



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CROSSING INFORMATION (ESTIMATED SPACING)	19372+76 P.I. 14.49.31° LT.	19377+26 P.I. 08.00.57° RT.	19378+90 P.I. 05.14.55° LT.	19381+14 BH-1-1.25-01 P.I. 04.29.59° LT.	19381+40 BH-1-1.25-01 P.I. 04.29.59° LT.	19383+11 HDD ENTRY	19385+09 PT OF CURVATURE	19390+10 PT OF TANGENT	19391+24 PT OF CURVATURE	19393+66 NECHES RIVER	19395+06 BH-1-1.25-03A	19395+62 & CREEK	19396+25 PT OF TANGENT	19397+32 BH-1-1.25-03B	19398+41 HDD EXIT	19413+59 P.I. 52.07.17° LT.
PIPELINE DATA	MLP PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. MLP															



ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	
	STREAMS	
	WETLANDS	
	TIMING CONSTRAINTS	
	MILEPOST	
	MONITORING	
	RECLAMATION	
	SPECIAL CONSIDERATIONS	

**LEGEND**

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

**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**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

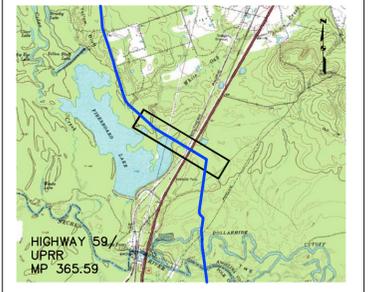
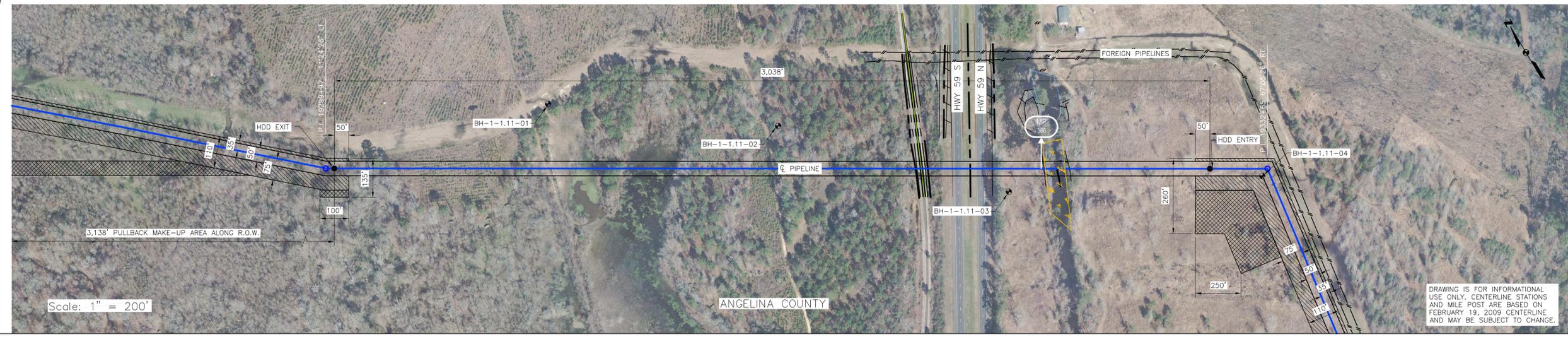
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4385 CHAINAGE: M.P. 367.4 DISCIPLINE # 03

NECHES RIVER HDD INSTALLATION  
KEYSTONE XL PROJECT  
ANGELINA & POLK COUNTIES, TEXAS

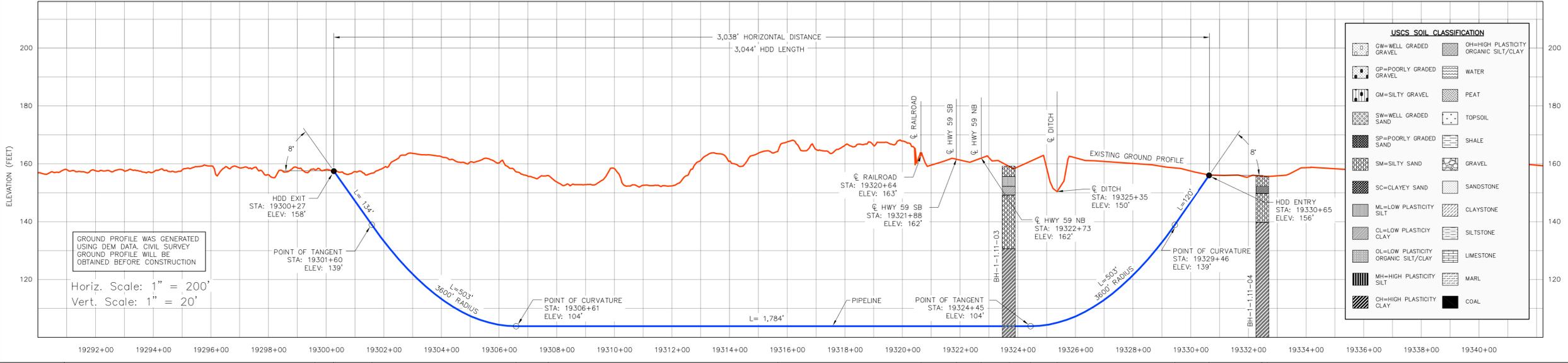
SCALE AS SHOWN DRAWING No 4385-03-ML-03-001 REV 2

**PRELIMINARY**

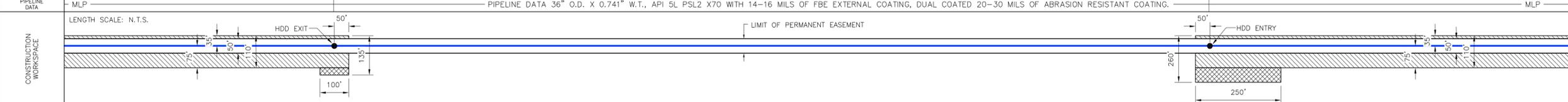


**INSTALLATION NOTES**

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CROSSING INFORMATION (ESTIMATED SPANNING)	PIPELINE DATA
19299+97 P.L. 1124.26° LT. 19300+27 HDD EXIT	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.
19301+60 PT. OF TANGENT	
19306+61 PT. OF CURVATURE	
19307+71 BH-1-1.11-01	
19315+70 BH-1-1.11-02	
19320+64 RAILROAD	
19321+68 HWY 59 SB	
19322+73 HWY 59 NB	
19324+70 BH-1-1.11-03	
19324+45 PT. OF TANGENT	
19325+35 DITCH	
19329+46 PT. OF CURVATURE	
19330+65 HDD ENTRY	
19337+50 BH-1-1.11-04 P.L. 67.05.26° RT	



ENVIRONMENTAL MITIGATION/RECLAMATION	ENVIRONMENTAL MITIGATION/RECLAMATION
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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- ▭ TEMPORARY EASEMENT
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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

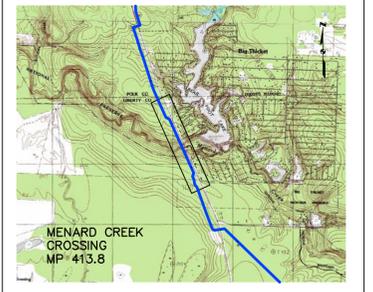
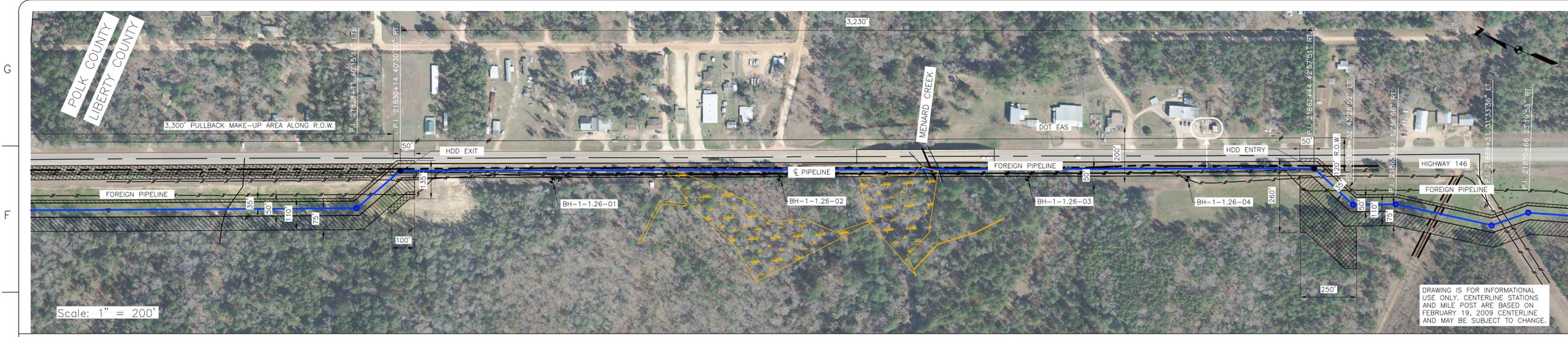
REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
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PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
<b>PRELIMINARY</b>	DATE
REV. NO.	DATE
	PERMIT NUMBER:

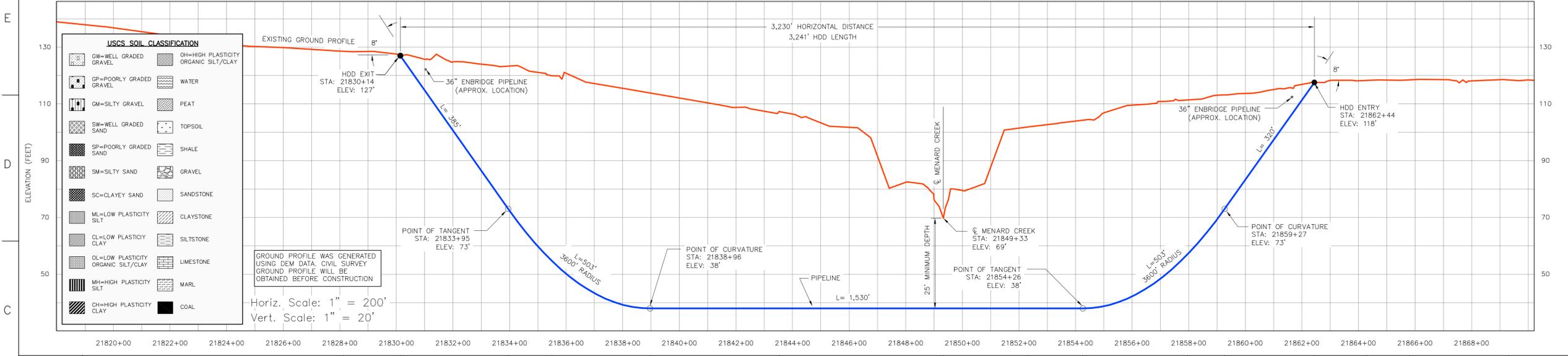
UNIVERSAL ENSCO, INC.

in business to deliver

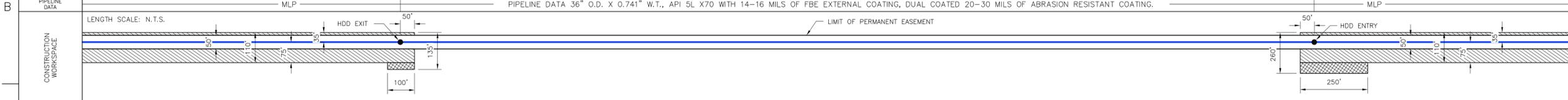
FIA #	4385	CHAINAGE:	365.59	DISCIPLINE #	03
HIGHWAY 59/ UPRR HDD INSTALLATION KEYSTONE XL PROJECT ANGELINA COUNTY, TEXAS					
SCALE	AS SHOWN	DRAWING No	4385-03-ML-03-202	REV	2



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  - 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 ENTRAPMENT 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.
  - 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.
  - 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 FUELING 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.
  - 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.
  - TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
  - PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
  - 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.
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  - CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE NEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
  - 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.



CROSSING INFORMATION (ESTIMATED SPANNING)	PIPELINE DATA
21829+11 P.I. 40°15'16" LT.	MLP PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. MLP
21830+14 HDD EXIT P.I. 40°30'30" RT.	
21833+95 PT OF TANGENT	
21835+50 BH-1-1.26-01	
21838+96 PT OF CURVATURE	
21843+54 BH-1-1.26-02	
21849+33 MENARD CREEK	
21852+37 BH-1-1.26-03	
21854+26 PT OF TANGENT	
21857+96 BH-1-1.26-04	
21859+27 PT OF CURVATURE	
21862+44 P.I. 42°37'51" RT.	
21864+32 P.I. 43°28'52" LT.	
21865+82 P.I. 12°56'56" RT.	
21869+31 P.I. 31°33'36" LT.	



ENVIRONMENTAL MITIGATION/RECLAMATION	TO BE DETERMINED
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

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

**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**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

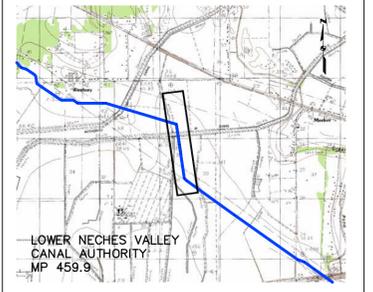
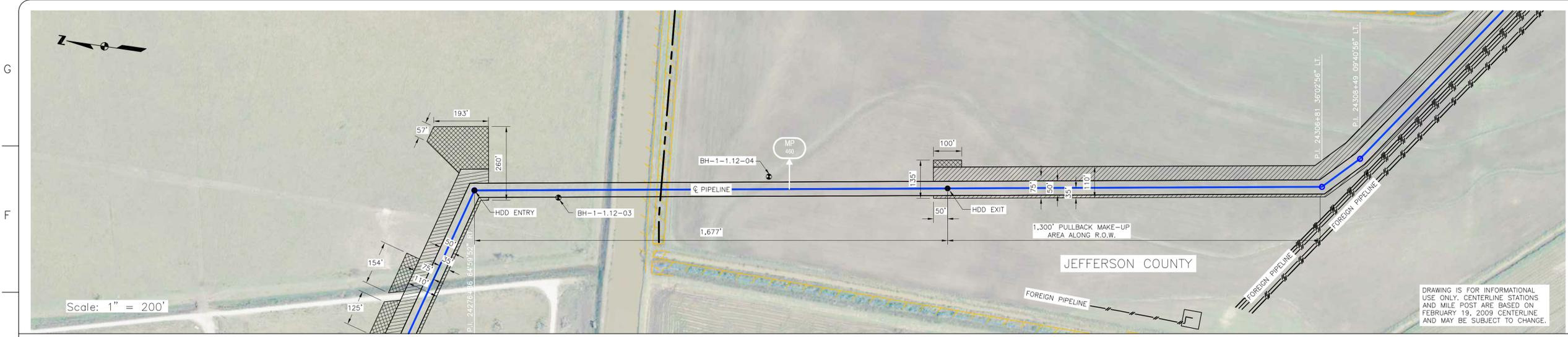
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**  
in business to deliver

FIA # 4386 CHAINAGE: M.P. 413.8 DISCIPLINE # 03

**MENARD CREEK HDD INSTALLATION**  
KEYSTONE XL PROJECT  
LIBERTY COUNTY, TEXAS

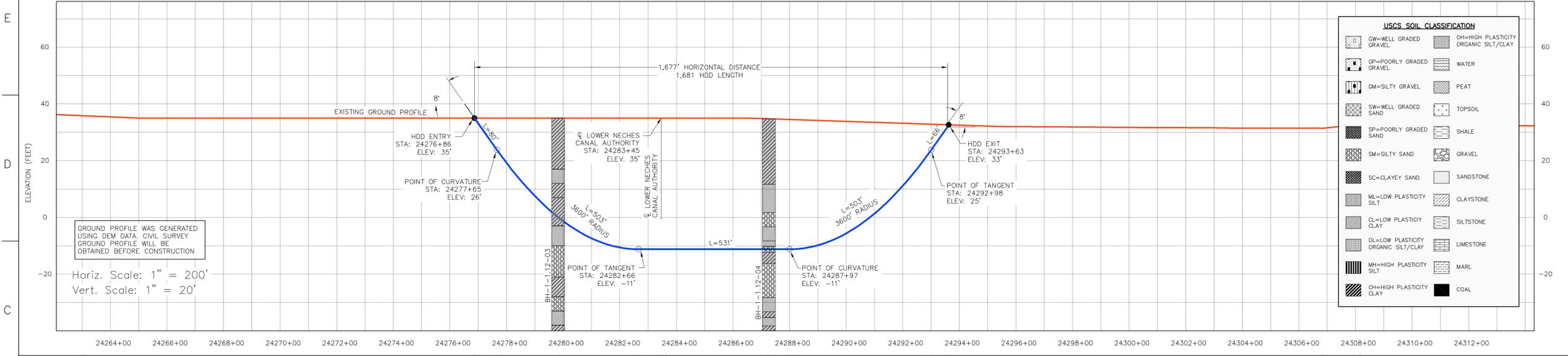
SCALE AS SHOWN DRAWING No 4386-03-ML-03-001 REV 2

**PRELIMINARY**



**INSTALLATION NOTES**

- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
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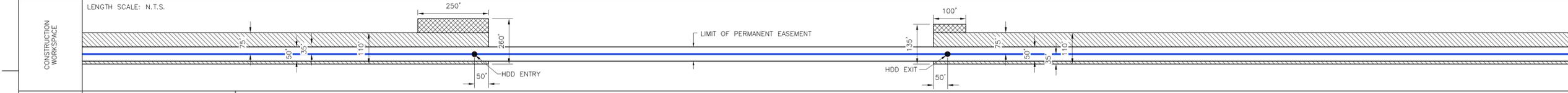
**USCS SOIL CLASSIFICATION**

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICITY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

**CROSSING INFORMATION (ESTIMATED SPANNING)**

24276+86 HDD ENTRY P.I. 643932 RT.	24277+65 PT OF CURVATURE	24279+82 BH-1-1.12-03	24283+45 PT OF TANGENT LOWER NECHES CANAL AUTHORITY	24287+97 BH-1-1.12-04 PT OF CURVATURE	24292+98 PT OF TANGENT	24293+63 HDD EXIT	24306+81 P.I. 3610256* LT.	24308+49 P.I. 094056* LT.
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**PIPELINE DATA** — MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



**ENVIRONMENTAL MITIGATION/RECLAMATION**

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

**LEGEND**

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

**TO BE DETERMINED**

**REFERENCE DRAWINGS**

DRAWING No	TITLE
11042 HDD_XREF_15	11042 HDD_XREF_15.dwg
TC_UD_BR_UI	TC_UD_BR_UI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

**REVISION**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
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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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

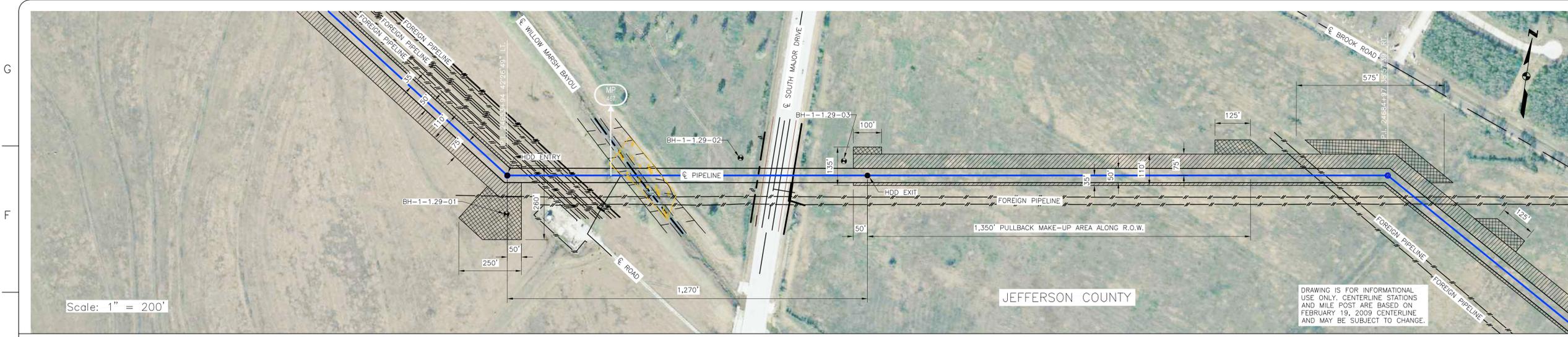
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4387 CHAINAGE: 459.9 DISCIPLINE # 03

**LOWER NECHES VALLEY CANAL AUTHORITY HDD INSTALLATION**  
**KEYSTONE XL PROJECT**  
**JEFFERSON COUNTY, TEXAS**

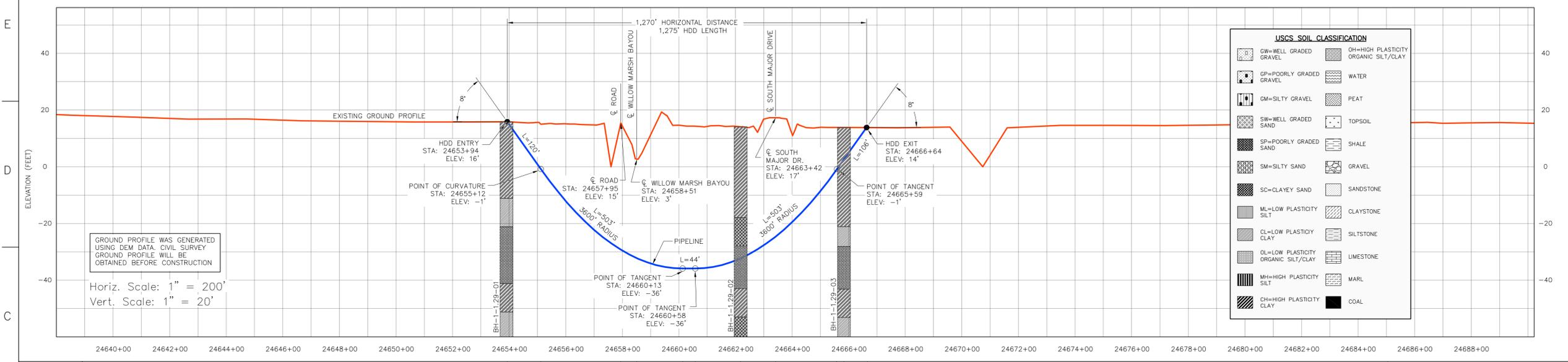
SCALE AS SHOWN DRAWING No 4387-03-ML-03-04 REV 2

**PRELIMINARY**



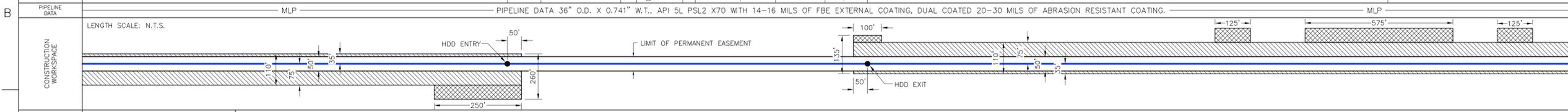
**INSTALLATION NOTES**

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GROUND PROFILE WAS GENERATED USING DEM DATA. CIVIL SURVEY GROUND PROFILE WILL BE OBTAINED BEFORE CONSTRUCTION  
 Horiz. Scale: 1" = 200'  
 Vert. Scale: 1" = 20'

CROSSING INFORMATION (ESTIMATED SPACING)	PIPELINE DATA
24653+94 HDD ENTRY P.L. 42°26'48" L.T. BH-1-1.29-01	MLP
24655+12 PT OF CURVATURE	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.
24657+95 E. ROAD	MLP
24658+51 E. WILLOW MARSH BAYOU	
24660+13 PT OF TANGENT	
24660+58 PT OF CURVATURE	
24662+18 BH-1-1.29-02	
24663+42 E. SOUTH MAJOR DRIVE	
24665+59 PT OF TANGENT	
24665+88 BH-1-1.29-03	
24666+64 HDD EXIT	
24684+97 P.L. 35°57'39" RT.	



ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

**LEGEND**

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
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- PIPELINE
- FOREIGN PIPELINE
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- PRIVATE ACCESS SHOULDER ROAD
- COUNTY BOUNDARY
- WATER LEVEL
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- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

TO BE DETERMINED

REFERENCE DRAWINGS	
DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UI	TC_UD_BR_UI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION		APPROVAL							
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
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PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

UNIVERSAL ENSCO, INC.

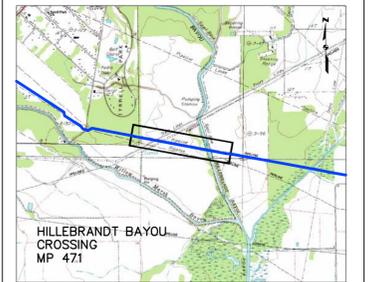
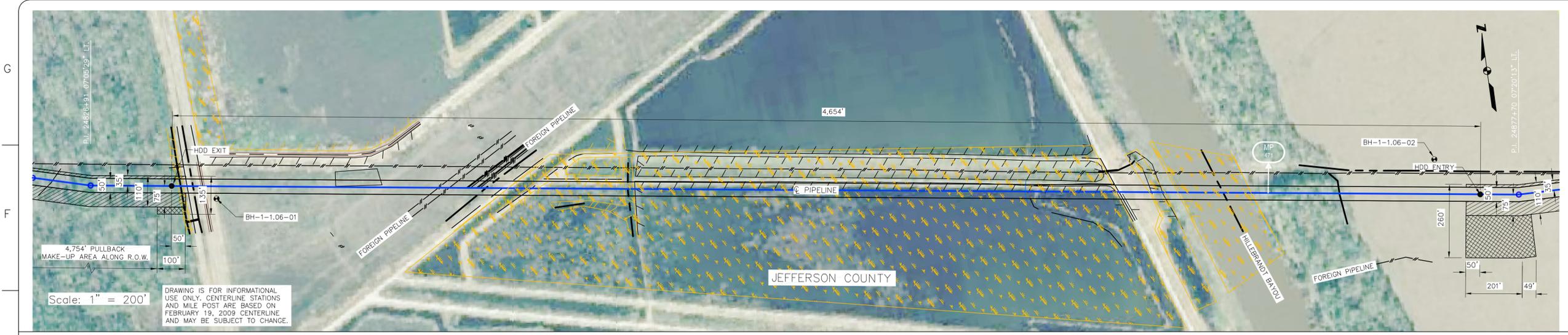
ConocoPhillips

TransCanada  
in business to deliver

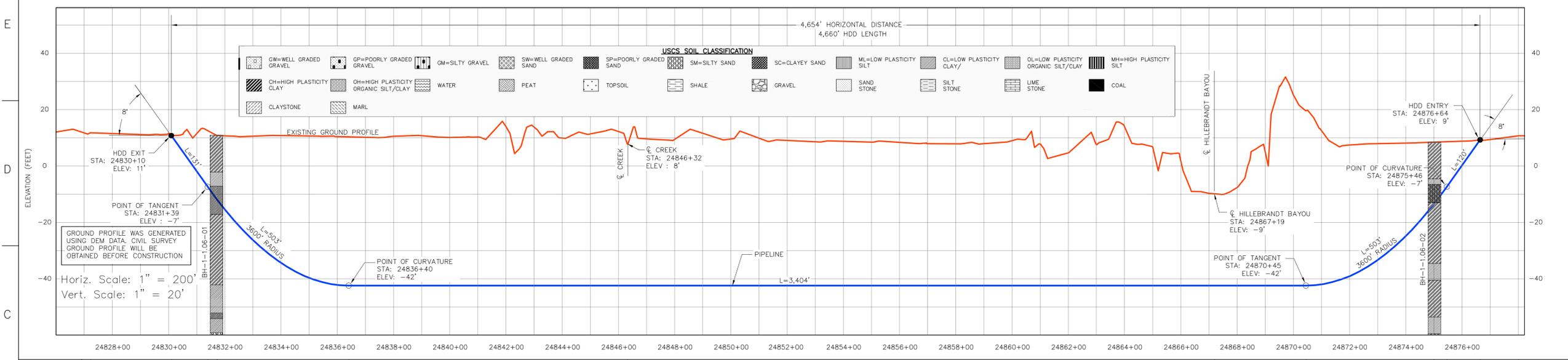
FIA # 4387 CHAINAGE: M.P. 467.0 DISCIPLINE # 03

WILLOW MARSH BAYOU HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

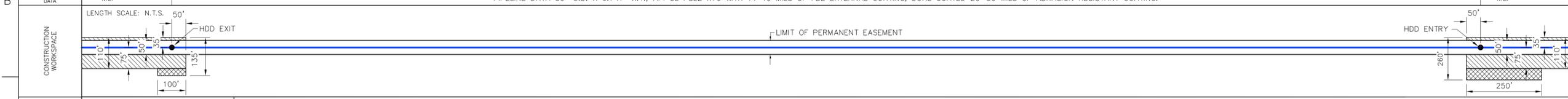
SCALE AS SHOWN DRAWING No 4387-03-ML-03-005 REV 2



- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
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  - 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.
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  - TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
  - PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
  - 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.
  - 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 INCONVENIENTLY 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.
  - CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEED AS SPECIFIED IN PROJECT DOCUMENTS.
  - 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.



CROSSING INFORMATION (ESTIMATED SHOWN)	24828+91 P.I. 070529' LT	24830+10 HDD EXIT	24831+39 PT OF TANGENT	24831+71 BH-1-1.06-01	24836+40 PT OF CURVATURE	24846+32 CREEK	24867+19 HILLEBRANDT BAYOU	24870+45 PT OF TANGENT	24875+46 BH-1-1.06-02	24876+64 HDD ENTRY	24877+70 P.I. 072013' LT
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP										



ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	
	STREAMS	
	WETLANDS	
	TIMING CONSTRAINTS	
	MILEPOST	
	MONITORING	
	RECLAMATION	
	SPECIAL CONSIDERATIONS	

- LEGEND**
- POINT OF INTERSECTION (P.I.)
  - ENTRY OR EXIT POINT
  - ⊕ GEOTECHNICAL BOREHOLE
  - ⊙ POWERPOLE
  - MAINLINE PIPE
  - PIPELINE
  - - - FOREIGN PIPELINE
  - - - EDGE OF WATER
  - - - PRIVATE ACCESS SHOULDER ROAD
  - - - COUNTY BOUNDARY
  - WATER LEVEL
  - ▽ USACOE CONSTRUCTION REFERENCE POINT
  - WETLANDS
  - PERMANENT EASEMENT
  - TEMPORARY EASEMENT
  - EXTRA WORKSPACE

TO BE DETERMINED

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NOTES-LEGEND	NOTES-LEGEND.dwg

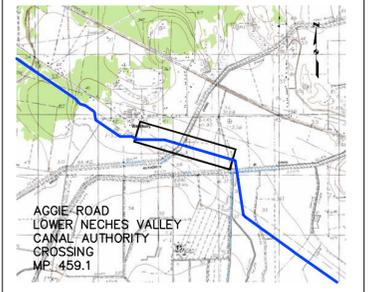
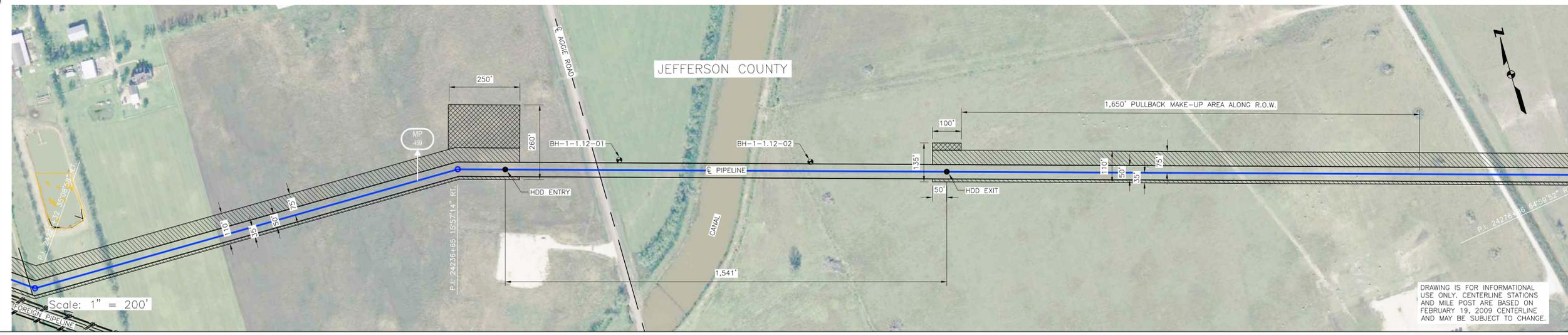
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1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL	
	DATE	
<b>PRELIMINARY</b>		
REV. NO.	DATE	PERMIT NUMBER:

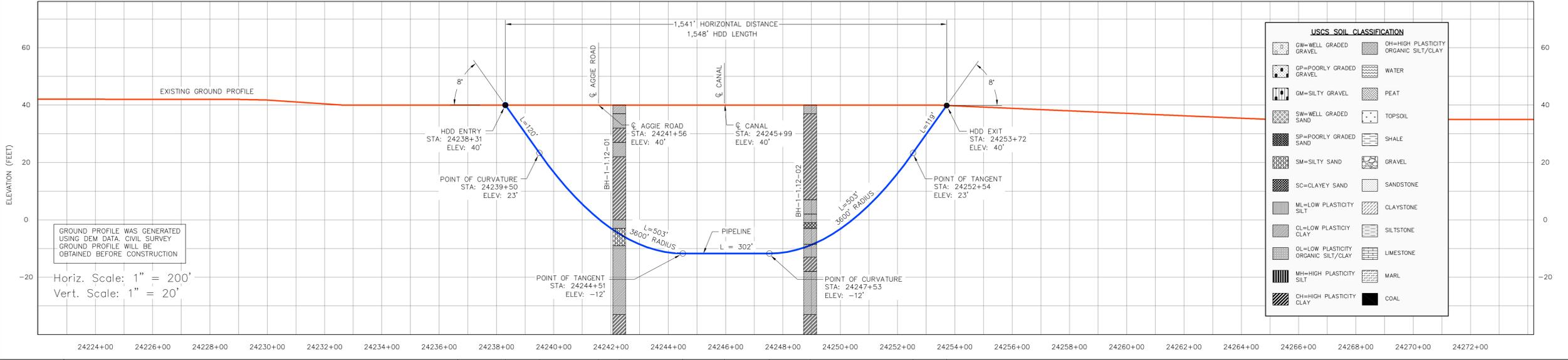
FIA # 4387 CHAINAGE: M.P. 471 DISCIPLINE # 03

HILLEBRANDT BAYOU HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

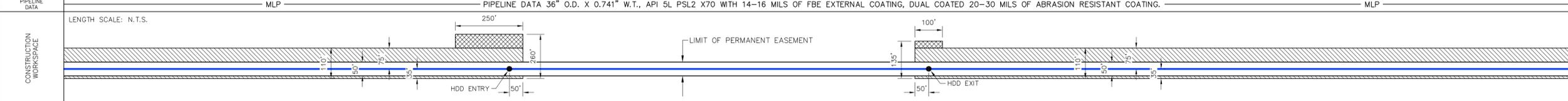
SCALE AS SHOWN DRAWING No 4387-03-ML-03-006 REV 2



- INSTALLATION NOTES**
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CROSSING INFORMATION (ESTIMATED SPACING)	24236+00	24238+31	24239+50	24241+56	24244+51	24245+99	24247+53	24248+96	24252+54	24253+72
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP									



ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	
	STREAMS	
	WETLANDS	
	TIMING CONSTRAINTS	
	MILEPOST	
	MONITORING	
RECLAMATION		
SPECIAL CONSIDERATIONS		

**REFERENCE DRAWINGS**

DRAWING No	TITLE
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TC_UD_BR_UIE	TC_UD_BR_UIE.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

**REVISION**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

**LEGEND**

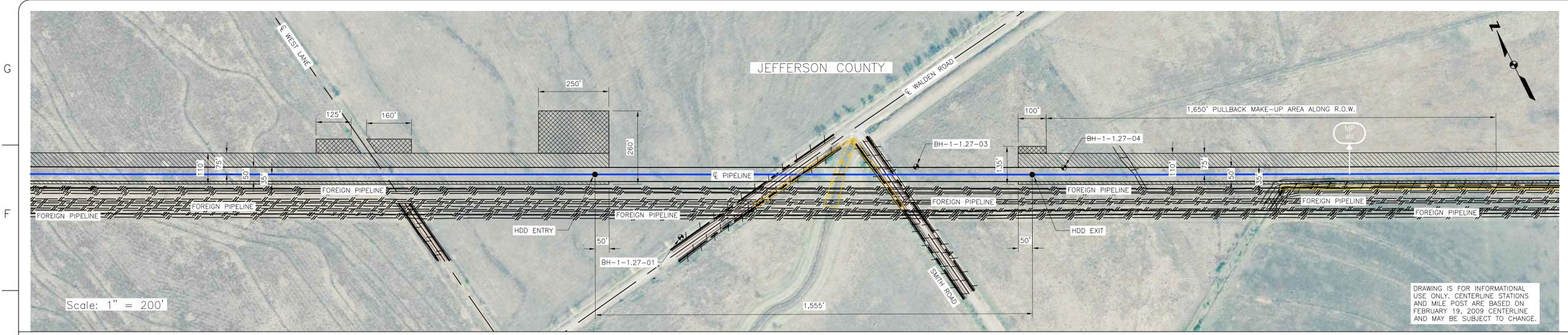
- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- ⊕ GEOTECHNICAL BOREHOLE
- ⊙ POWERPOLE
- MLP MAINLINE PIPE
- PIPELINE
- - - FOREIGN PIPELINE
- · - · - EDGE OF WATER
- · - · - PRIVATE ACCESS SHOULDER ROAD
- - - COUNTY BOUNDARY
- ▽ WATER LEVEL
- ▽ USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
-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

**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4387 CHAINAGE: M.P. 459.1 DISCIPLINE # 03

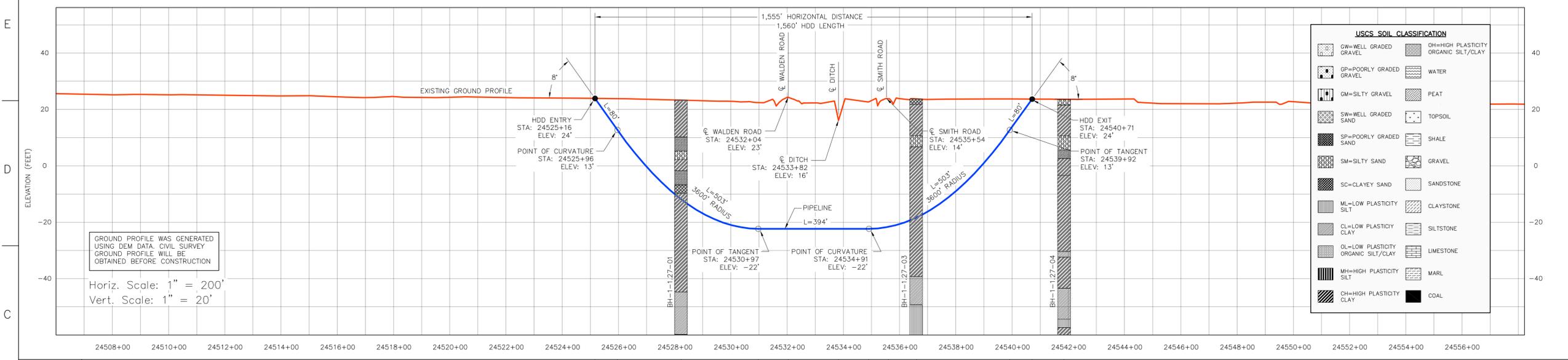
AGGIE ROAD LOWER NECHES VALLEY CANAL AUTHORITY HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

SCALE AS SHOWN DRAWING No 4387-03-ML-03-103 REV 2

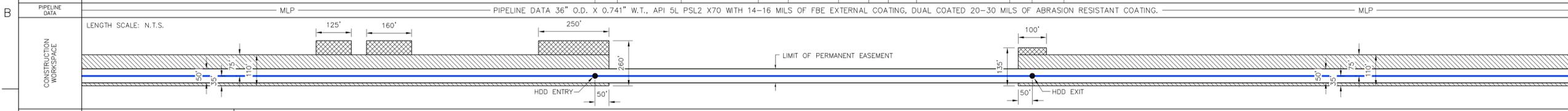


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CROSSING INFORMATION (ESTIMATED SPANNING)	24525+16 HDD ENTRY	24525+96 PT OF CURVATURE	24528+22 BH-1-1.27-01	24530+97 PT OF TANGENT	24532+04 WALDEN ROAD	24533+82 C DITCH	24534+91 PT OF CURVATURE	24535+54 C SMITH ROAD	24536+59 BH-1-1.27-03	24539+92 PT OF TANGENT	24540+71 HDD EXIT	24541+85 BH-1-1.27-04
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ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	STREAMS	WETLANDS	TIMING CONSTRAINTS	MILEPOST	MONITORING	RECLAMATION	SPECIAL CONSIDERATIONS

**LEGEND**

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

TO BE DETERMINED

**REFERENCE DRAWINGS**

DRAWING No	TITLE
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TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

**REVISION**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

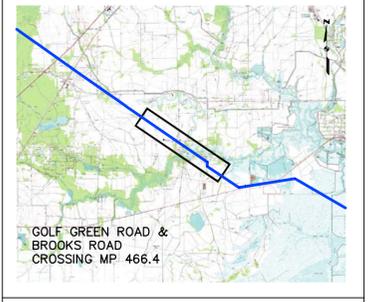
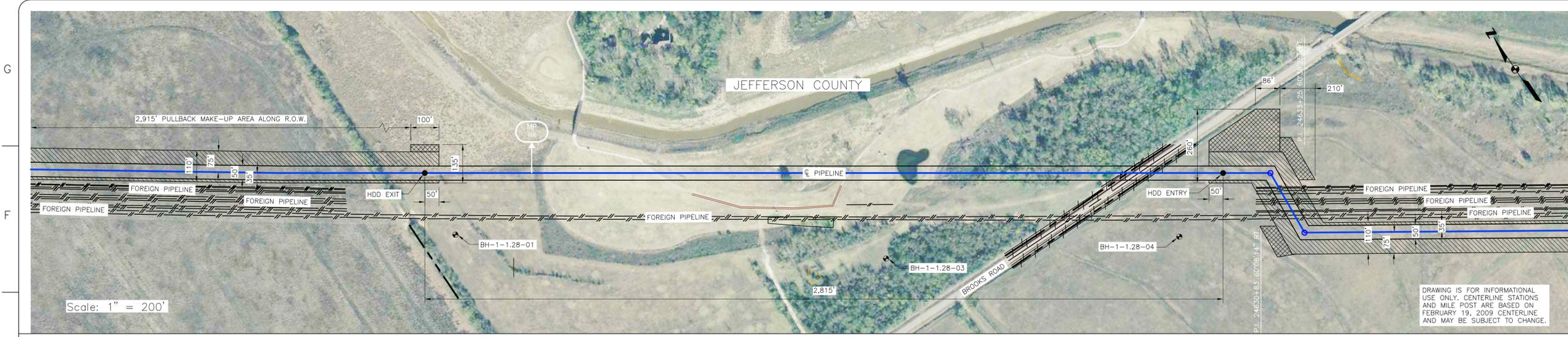
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4387 CHAINAGE: M.P. 46.6 DISCIPLINE # 03

WALDEN ROAD & SMITH ROAD HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

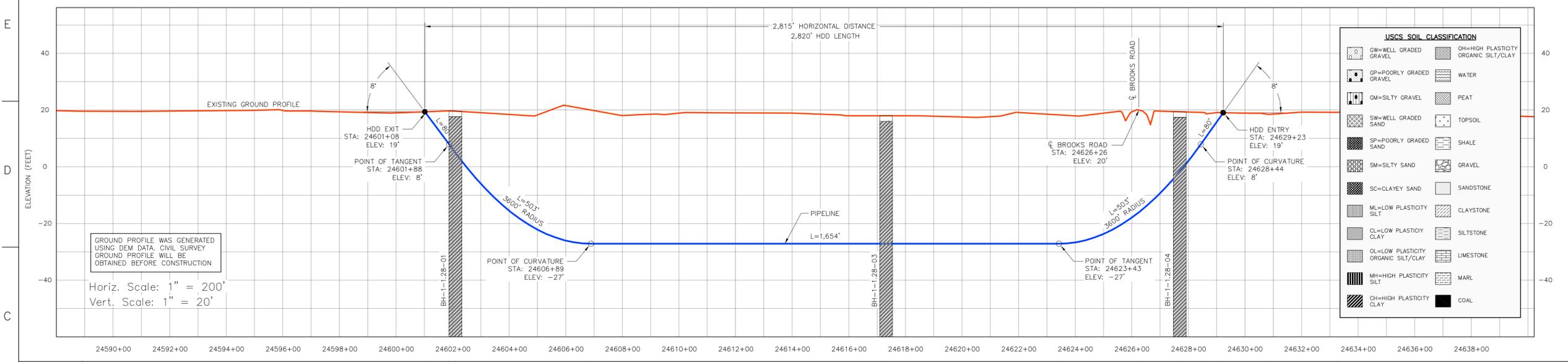
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PRELIMINARY



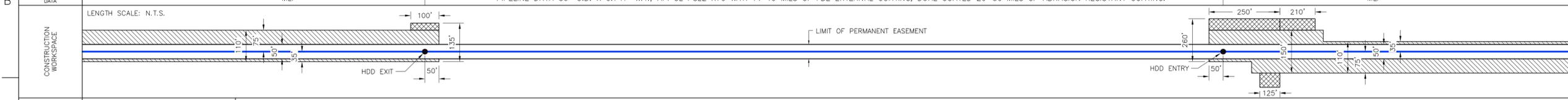
**INSTALLATION NOTES**

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CROSSING INFORMATION (ESTIMATED SHOWN)	24601+08 HDD EXIT	24601+88 PT OF TANGENT	24606+89 P.T. OF CURVATURE	24629+23 PT OF TANGENT	24630+83 P.I. 6070814' RT.	24635+25 L.I. P.I. 6035225' LT.
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PIPELINE DATA	MLP PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. MLP					
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ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	
	STREAMS	
	WETLANDS	
	TIMING CONSTRAINTS	
	MILEPOST	
	MONITORING	
	RECLAMATION	
	SPECIAL CONSIDERATIONS	

**LEGEND**

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

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**

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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

**APPROVAL**

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
DATE	DATE

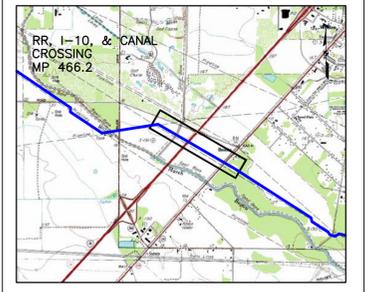
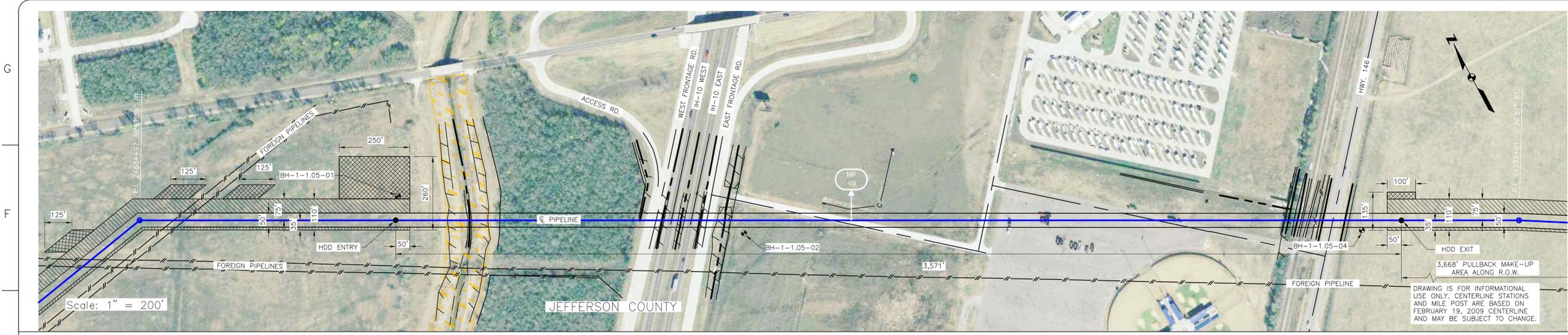
**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**

FIA # 4387 CHAINAGE: M.P. 466.4 DISCIPLINE # 03

GOLF GREEN & BROOKS RD. HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

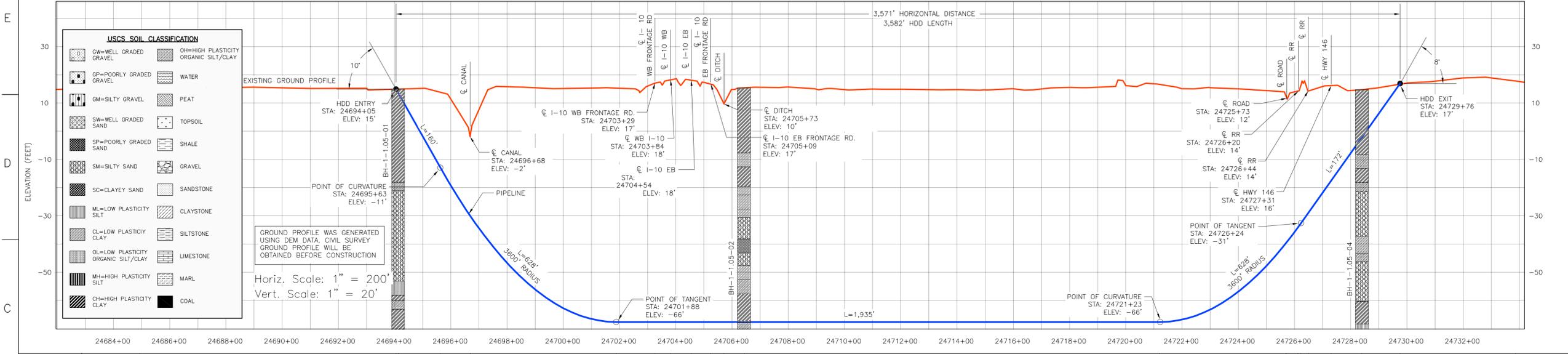
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PRELIMINARY

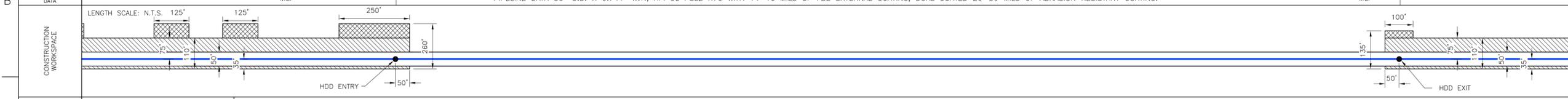


**INSTALLATION NOTES**

- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
- VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
- 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).
- 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 ENTRAPMENT 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.
- 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.
- 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.
- 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.
- TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
- PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
- 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.
- 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 INCONVENIENTLY 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.
- CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEED AS SPECIFIED IN PROJECT DOCUMENTS.
- 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.



CROSSING INFORMATION (ESTIMATED SHORINGS)	PIPELINE DATA
24684+97 P.L. 38.5739' RT.	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.
24694+05 HDD ENTRY BH-1-1.05-01	
24695+63 PT. OF CURVATURE	
24696+68 CANAL	
24701+68 PT. OF TANGENT	
24703+29 WB FRONTAGE RD.	
24703+84 WB FRONTAGE RD.	
24704+54 WB FRONTAGE RD.	
24705+09 WB FRONTAGE RD.	
24705+73 DITCH	
24706+43 BH-1-1.05-02	
24721+23 PT. OF CURVATURE	
24725+73 ROAD	
24726+20 RAILROAD	
24726+24 PT. OF TANGENT	
24726+44 RAILROAD	
24727+31 HWY. 146	
24728+40 BH-1-1.05-04	
24729+76 HDD EXIT	
24735+91 P.L. 02.3657' RT.	



ENVIRONMENTAL MITIGATION/RECLAMATION
TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSTRAINTS
MILEPOST
MONITORING
RECLAMATION
SPECIAL CONSIDERATIONS

**LEGEND**

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

**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	
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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	

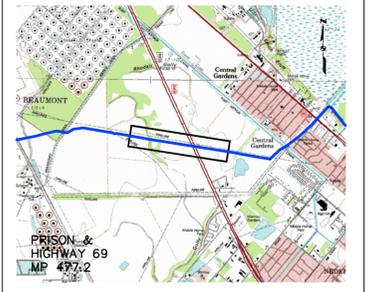
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REV. NO.	DATE	PERMIT NUMBER:	DATE

**UNIVERSAL ENSCO, INC.** **ConocoPhillips** **TransCanada**  
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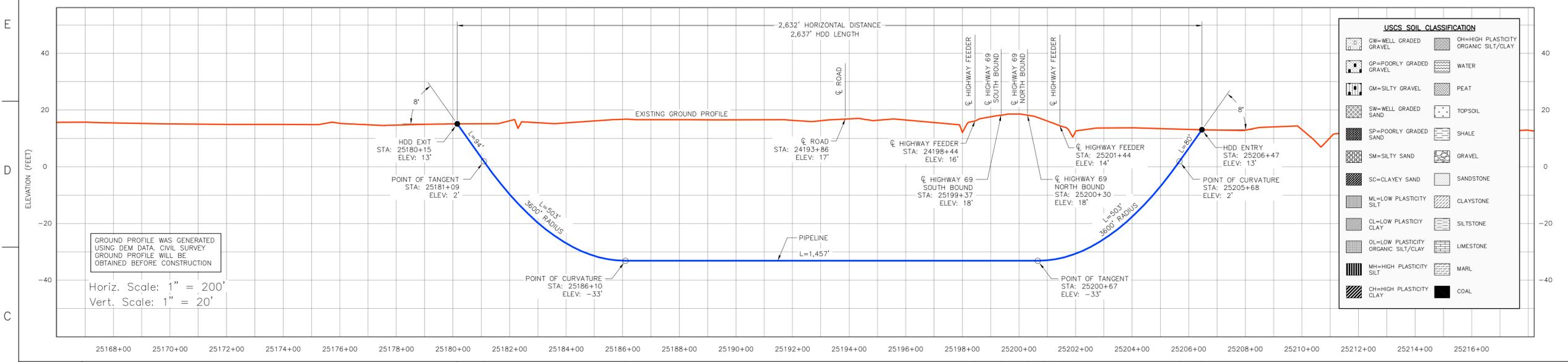
FIA # 4387 CHAINAGE: M.P. 467.8 DISCIPLINE # 03

RR, I-10, & CANAL HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

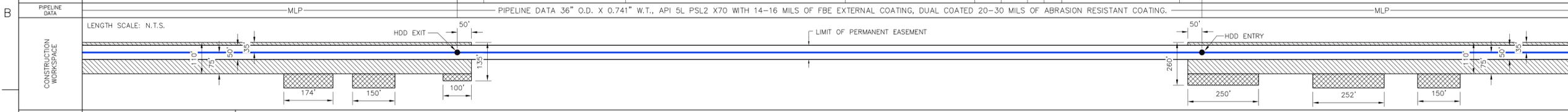
SCALE AS SHOWN DRAWING No 4387-03-ML-03-106 REV 2



- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
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CROSSING INFORMATION (ESTIMATED SHOWN)	25180+15 HDD EXIT	25181+09 PT OF TANGENT	25186+10 PT OF CURVATURE	25193+86 ROAD	25205+68 PT OF CURVATURE	25206+47 HDD ENTRY
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ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD	
	STREAMS	
	WETLANDS	
	TIMING CONSTRAINTS	
	MILEPOST	
	MONITORING	
	RECLAMATION	
	SPECIAL CONSIDERATIONS	

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

TO BE DETERMINED

REFERENCE DRAWINGS	
DRAWING No	TITLE
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TC_UD_BR_UI	TC_UD_BR_UI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION			APPROVAL							
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY	
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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
<b>PRELIMINARY</b>	
REV. NO.	DATE
	PERMIT NUMBER:

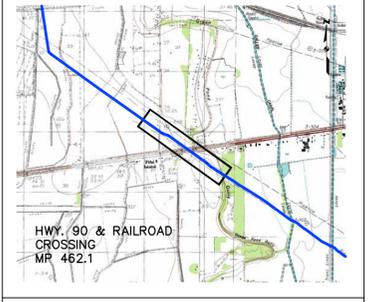
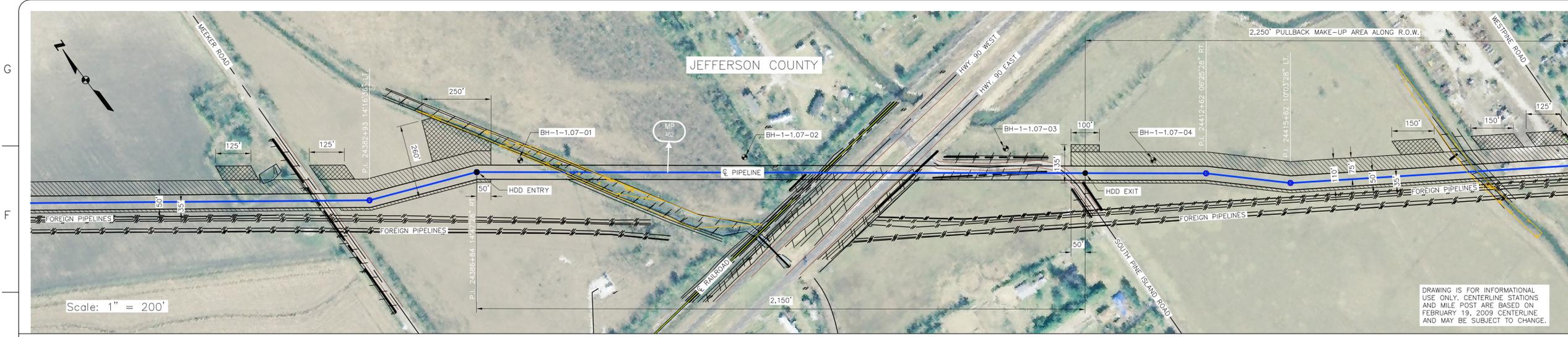
UNIVERSAL ENSCO, INC.

in business to deliver

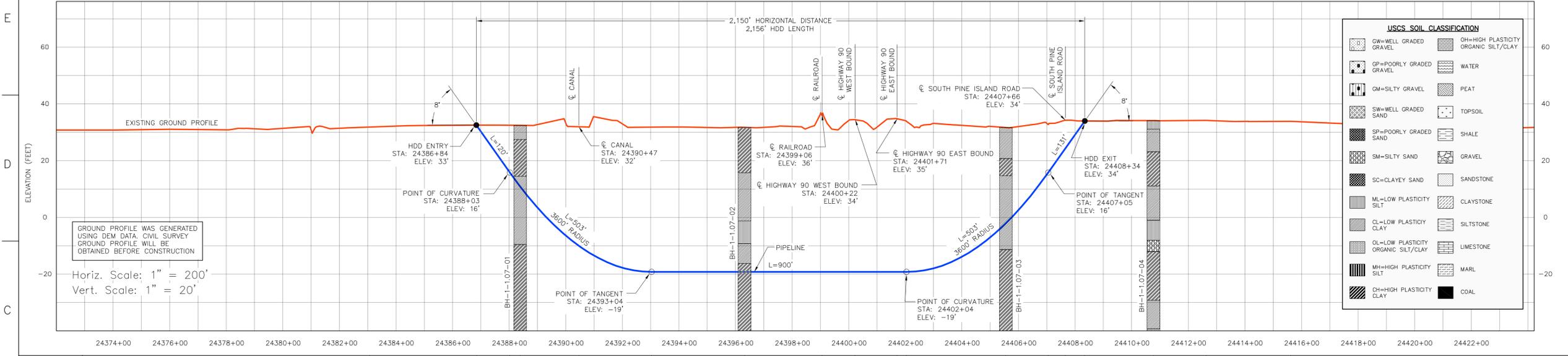
FIA # 4387 CHAINAGE: 477.2 DISCIPLINE # 03

PRISON & HIGHWAY 69 HDD INSTALLATION  
KEYSTONE XL PROJECT  
JEFFERSON COUNTY, TEXAS

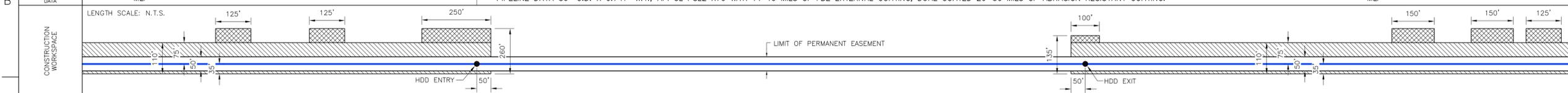
SCALE AS SHOWN DRAWING No 4387-03-ML-03-109 REV 2



- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
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CROSSING INFORMATION (ESTIMATED SPACING)	PIPELINE DATA
24382+93 P.I. 141636" LT.	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.
24386+84 HDD ENTRY P.I. 144728" RT.	
24388+03 PT OF CURVATURE BH-1-1.07-01	
24390+47 CANAL	
24393+04 PT OF CURVATURE	
24396+32 BH-1-1.07-02	
24399+06 RAILROAD	
24400+22 HIGHWAY 90 WEST BOUND	
24401+71 HIGHWAY 90 EAST BOUND	
24402+04 PT OF CURVATURE	
24405+62 BH-1-1.07-03	
24407+05 PT OF CURVATURE 24407+66 SOUTH PINE ISLAND ROAD 24408+34 HDD EXIT	
24410+77 BH-1-1.07-04	
24412+62 P.I. 062528" RT.	
24415+62 P.I. 107028" LT.	



ENVIRONMENTAL MITIGATION/RECLAMATION	LEGEND
TOPSOIL SALVAGE METHOD	○ POINT OF INTERSECTION (P.I.)
STREAMS	● ENTRY OR EXIT POINT
WETLANDS	⊕ GEOTECHNICAL BOREHOLE
TIMING CONSTRAINTS	⊙ POWERPOLE
MILEPOST	— MLP
MONITORING	— PIPELINE
RECLAMATION	- - - FOREIGN PIPELINE
SPECIAL CONSIDERATIONS	- - - EDGE OF WATER
	- - - PRIVATE ACCESS SHOULDER ROAD
	- - - COUNTY BOUNDARY
	- - - WATER LEVEL
	⊕ USACOE CONSTRUCTION REFERENCE POINT
	⊕ WETLANDS
	▭ PERMANENT EASEMENT
	▭ TEMPORARY EASEMENT
	▭ EXTRA WORKSPACE

TO BE DETERMINED

REFERENCE DRAWINGS	
DRAWING No	TITLE
11042 HDD_XREF_15	11042 HDD_XREF_15.dwg
TC_UD_BR_UIE	TC_UD_BR_UIE.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
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0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

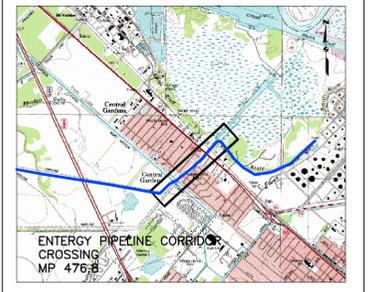
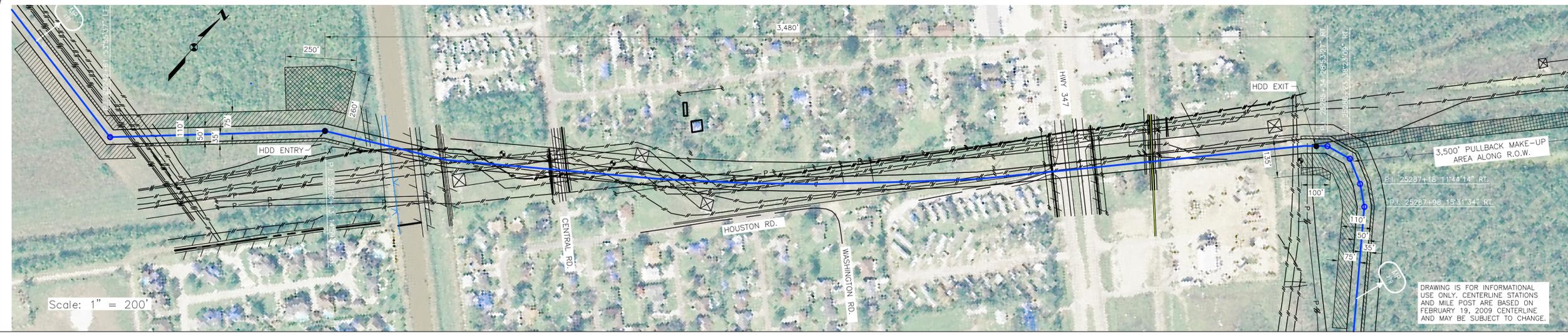
PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
	DATE
<b>PRELIMINARY</b>	
REV. NO.	DATE
	PERMIT NUMBER:

UNIVERSAL ENERGY SERVICES, INC.

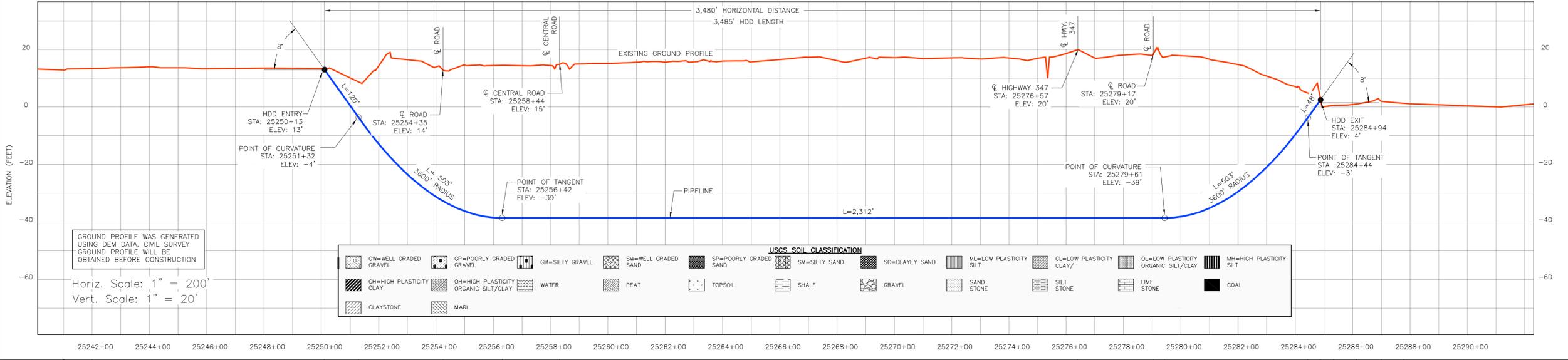
CONOCO PHILLIPS

TRANSCANADA  
in business to deliver

FIA # 4387	CHAINAGE: M.P. 462.1	DISCIPLINE # 03
HWY. 90 & RAILROAD HDD INSTALLATION KEYSTONE XL PROJECT JEFFERSON COUNTY, TEXAS		
SCALE AS SHOWN	DRAWING No 4387-03-ML-03-202	REV 2



- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
  - VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
  - 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).
  - 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 ENTRAPMENT 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.
  - 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.
  - 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.
  - 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.
  - TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
  - PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
  - 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.
  - 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 INADEQUATELY 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.
  - CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEED AS SPECIFIED IN PROJECT DOCUMENTS.
  - 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.



CROSSING INFORMATION (ESTIMATED SPACING)	PIPELINE DATA
25242+61 P.I. 52°55'37" LT.	MLP
25250+13 HDD ENTRY	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.
25251+32 PT OF CURVATURE	MLP
25254+35 Q. ROAD	
25256+42 PT OF TANGENT	
25258+44 Q. CENTRAL ROAD	
25276+57 Q. HWY 347	
25279+17 Q. ROAD	
25279+61 PT OF CURVATURE	
25284+44 PT OF TANGENT	
25284+94 HDD EXIT	
25285+34 P.I. 28°53'27" RT.	
25286+23 P.I. 35°23'09" RT.	
25287+18 P.I. 11°44'14" RT.	
25287+98 P.I. 15°31'34" RT.	



ENVIRONMENTAL MITIGATION/RECLAMATION
TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSTRAINTS
MILEPOST
MONITORING
RECLAMATION
SPECIAL CONSIDERATIONS

TO BE DETERMINED

**LEGEND**

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

REFERENCE DRAWINGS	
DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UFI	TC_UD_BR_UFI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	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	SIGNATURE	DATE	SIGNATURE

FIA # 4387 CHAINAGE: M.P. 476.8 DISCIPLINE # 03

**ENTERGY PIPELINE CORRIDOR HDD INSTALLATION**

KEYSTONE XL PROJECT

JEFFERSON COUNTY, TEXAS

SCALE AS SHOWN DRAWING No 4387-03-ML-03-601 REV 2

PRELIMINARY