

**ATLANTIC COAST PIPELINE, LLC  
ATLANTIC COAST PIPELINE**

**and**

**DOMINION TRANSMISSION, INC.  
SUPPLY HEADER PROJECT**

**Supplemental Filing  
March 24, 2017**

**APPENDIX C**

**Site-Specific Designs of Representative Steep Slope  
Crossings on U.S. Forest Service Lands**

# GEOHAZARD MITIGATION SITE SPECIFIC DESIGN FOR ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50

**GENERAL NOTES:**

1. **MAPPING AND TOPOGRAPHY BASED ON UTM COORDINATE SYSTEM WITH NAD83 DATUM, ZONE 17, US SURVEY FOOT, CENTRAL MERIDIAN 81° WW.**
2. STATIONING SHOWN IS SLOPE STATIONING FOR ROUTE REV 11B (3D) PROVIDED BY GAI CONSULTANTS, INC.
3. CONTOURS AND TOPOGRAPHIC FEATURES DERIVED FROM LIDAR DATA AND GPS SUB-METER GROUND SURVEY PERFORMED BY GAI CONSULTANTS, INC.
4. STREAM AND WETLAND DATA PROVIDED BY ERM.
5. FINAL CONFIGURATION OF ROW RESTORATION MEASURES TO BE DETERMINED BASED ON CONDITIONS ENCOUNTERED AT TIME OF CONSTRUCTION, AND MAY CHANGE OR VARY AND/OR INCORPORATE ADDITIONAL BIC INCREMENTAL CONTROLS TO MITIGATE SPECIFIC CONDITIONS.
6. VOLUMES, GRADES, ELEVATIONS, AND QUANTITIES WILL VARY DEPENDING ON SITE CONDITIONS ENCOUNTERED.

**BIC INCREMENTAL CONTROLS NOTES:**

1. INSTALL ENHANCED DRAINS (GERMAN DRAINS) (BIC INCREMENTAL CONTROL NO. 1B) WHERE SEEPAGE IS ENCOUNTERED IN THE TRENCH.
2. INSTALL TARGETED SEEP DRAINS (BIC INCREMENTAL CONTROL NO. 1C) TO INTERCEPT SEEPS WHERE EXCAVATION ENCOUNTERS SEEPAGE.
3. GRADE TEMPORARY ROW SURFACE (BIC INCREMENTAL CONTROL NO. 2A) FOR SLOPING AND TEXTURING TO MITIGATE EROSION DURING AND AFTER CONSTRUCTION.
4. GRADE TEMPORARY ROW WITH OUTBOARD WEDGE (BIC INCREMENTAL CONTROL NO. 2B) TO ENCOURAGE MOVEMENT OF SURFACE FLOW AWAY FROM THE TRENCH.
5. BACKFILL USING ONLY DRY AND MOIST SOILS (BIC INCREMENTAL CONTROL NO. 2D). DO NOT REUSE SATURATED SOILS AS BACKFILL.
6. REMOVE EXISTING SOILS WITH ENGINEERING PROPERTIES UNSUITABLE FOR REUSE AS BACKFILL (BIC INCREMENTAL CONTROL NO. 2E). THIS MAY INCLUDE SATURATED SOILS AND ORGANIC SOILS, AMONG OTHER UNSUITABLE MATERIALS.
7. GRADE FINAL GROUND SURFACE TO MATCH EXISTING GROUND SURFACE CONTOURS (BIC INCREMENTAL CONTROL NO. 2G).
8. DEVELOP SPOILS MANAGEMENT PLAN (BIC INCREMENTAL CONTROL NO. 2J) WITH PROCEDURES FOR MANAGING SPOILS FOR BOTH TEMPORARY AND PERMANENT CONDITIONS.
9. TRACK DISTURBED SLOPES (BIC INCREMENTAL CONTROL NO. 3A) TO PROMOTE GROWTH OF VEGETATION AND TO MITIGATE EROSION.
10. INSTALL TRENCH BREAKERS (BIC INCREMENTAL CONTROL NO. 4A) AT TARGETED LOCATIONS.
11. INSTALL TRENCH BREAKERS WITH DRAINAGE (BIC INCREMENTAL CONTROL NO. 4F) AND BLEEDER DRAINS (BIC INCREMENTAL CONTROL NO. 1D) TO COLLECT SEEPAGE FROM THE TRENCH AND CONVEY OFF THE RIGHT-OF-WAY AT TARGETED AREAS.
12. INSTALL SLOPE BREAKERS (TEMPORARY AND PERMANENT) (BIC INCREMENTAL CONTROL NO. 5A) TO SLOW AND REDIRECT SURFACE WATER OFF THE RIGHT-OF-WAY.
13. INSTALL ARMORED OUTLET FOR SLOPE BREAKER (BIC INCREMENTAL CONTROL NO. 5B) TO DISSIPATE ENERGY FROM DISCHARGING SURFACE FLOW WHERE HYDRAULIC FORCES ARE ANTICIPATED TO BE HIGH.
14. CONTROL SURFACE WATER RUN-ON FROM EXISTING ACCESS ROADS (BIC INCREMENTAL CONTROL NO. 5D).
15. INSTALL BELTED REINFORCED SILT FENCE (BIC INCREMENTAL CONTROL NO. 7A) AT TARGETED LOCATIONS TO INTERCEPT SURFACE RUNOFF AND PREVENT SOIL MATERIAL FROM LEAVING THE WORK AREA.
16. INSTALL SUPER SILT FENCE (BIC INCREMENTAL CONTROL NO. 7B) AT TARGETED LOCATIONS TO RETAIN SOIL MATERIAL ALONG THE EDGE OF THE WORKSPACE.
17. RE-CONSTRUCT BENCHES THROUGH NATURAL SLOPES (BIC INCREMENTAL CONTROL NO. 10A) TO AVOID DEVELOPING TROUGH ALONG THE TRENCH LINE.
18. CONDUCT AS-BUILT SURVEY OF TRENCH BREAKERS (BIC INCREMENTAL CONTROL NO. 11F) SO THAT TRENCH BREAKERS AND SLOPE BREAKERS CAN BE CO-LOCATED FOR IMPROVED OVERALL FUNCTION.
19. DEVELOP BLASTING PLAN (BIC INCREMENTAL CONTROL NO. 14C) WHERE BEDROCK REQUIRES BLASTING.

DRAWING NO.	TITLE
1	COVER SHEET WITH GENERAL NOTES AND LEGEND
2	PLAN VIEW: EXISTING GROUND (1 OF 5)
3	PLAN VIEW: EXISTING GROUND (2 OF 5)
4	PLAN VIEW: EXISTING GROUND (3 OF 5)
5	PLAN VIEW: EXISTING GROUND (4 OF 5)
6	PLAN VIEW: EXISTING GROUND (5 OF 5)
7	PLAN VIEW: TEMPORARY GROUND (1 OF 5)
8	PLAN VIEW: TEMPORARY GROUND (2 OF 5)
9	PLAN VIEW: TEMPORARY GROUND (3 OF 5)
10	PLAN VIEW: TEMPORARY GROUND (4 OF 5)
11	PLAN VIEW: TEMPORARY GROUND (5 OF 5)
12	PLAN VIEW: FINAL GROUND (1 OF 5)
13	PLAN VIEW: FINAL GROUND (2 OF 5)
14	PLAN VIEW: FINAL GROUND (3 OF 5)
15	PLAN VIEW: FINAL GROUND (4 OF 5)
16	PLAN VIEW: FINAL GROUND (5 OF 5)
17	PROFILE A-A' (1 OF 5)
18	PROFILE A-A' (2 OF 5)
19	PROFILE A-A' (3 OF 5)
20	PROFILE A-A' (4 OF 5)
21	PROFILE A-A' (5 OF 5)
22	SECTIONS (1 OF 8)
23	SECTIONS (2 OF 8)
24	SECTIONS (3 OF 8)
25	SECTIONS (4 OF 8)
26	SECTIONS (5 OF 8)
27	SECTIONS (6 OF 8)
28	SECTIONS (7 OF 8)
29	SECTIONS (8 OF 8)

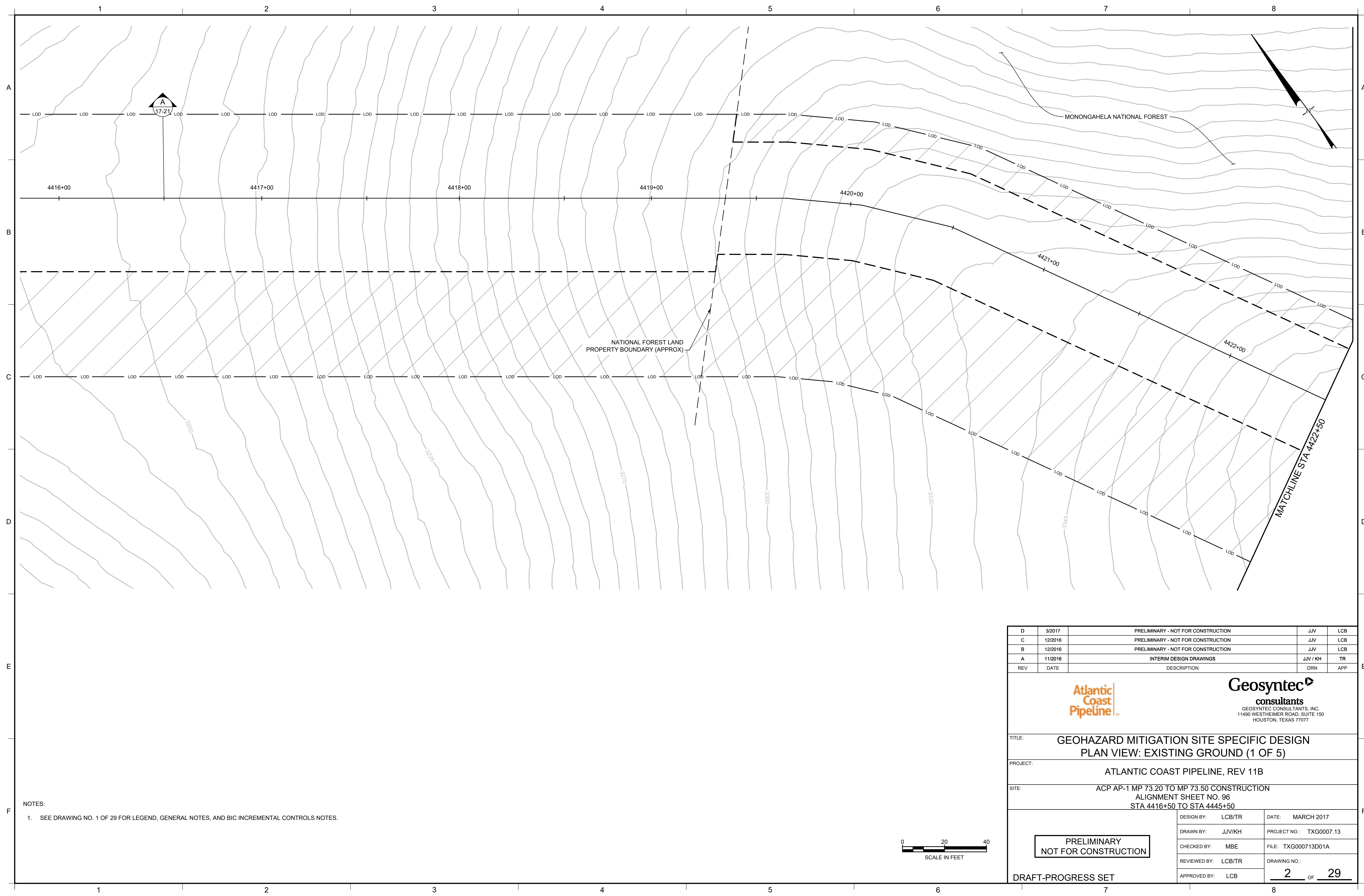
**LEGEND**

	EXISTING GROUND ELEVATION CONTOUR (FT. MSL)		TEMPORARY ROW
	EXISTING STREAM LINE		EXTRA WORKSPACE
	BELTED SILT RETENTION FENCE (BSRF)		SACK-CRETE
	LIMIT OF DISTURBANCE		RIPRAP ARMOR LAYER (R-4 GRADATION)
	PERMANENT ROW		CRUSHED STONE (R-2 GRADATION)
	PERMANENT SLOPE BREAKER		TECCO MESH AND COIR CLOTH SYSTEM
	TEMPORARY SLOPE BREAKER		FOAM TRENCH BREAKER
	PIPELINE CENTERLINE AND STATIONING		COIR LOG
	MILE POST		
	SOIL NAIL		
	ROCK GUARD		
	SLEEVE INTERFACE		
	DRAINAGE TIGHTLINE PIPE		
	PERFORATED DRAINAGE COLLECTION PIPE		

D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



<b>TITLE:</b> GEOHAZARD MITIGATION SITE SPECIFIC DESIGN COVER SHEET WITH GENERAL NOTES AND LEGEND											
<b>PROJECT:</b> ATLANTIC COAST PIPELINE, REV 11B											
<b>SITE:</b> ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50											
<b>PRELIMINARY NOT FOR CONSTRUCTION</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">DESIGN BY: LCB/TR</td> <td style="width: 50%;">DATE: MARCH 2017</td> </tr> <tr> <td>DRAWN BY: JJV/KH</td> <td>PROJECT NO.: TXG0007.13</td> </tr> <tr> <td>CHECKED BY: MBE</td> <td>FILE: TXG0007D00</td> </tr> <tr> <td>REVIEWED BY: LCB/TR</td> <td>DRAWING NO.:</td> </tr> <tr> <td>APPROVED BY: LCB</td> <td style="text-align: center;"><b>1</b> OF <b>29</b></td> </tr> </table>	DESIGN BY: LCB/TR	DATE: MARCH 2017	DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13	CHECKED BY: MBE	FILE: TXG0007D00	REVIEWED BY: LCB/TR	DRAWING NO.:	APPROVED BY: LCB	<b>1</b> OF <b>29</b>
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APPROVED BY: LCB	<b>1</b> OF <b>29</b>										
<b>DRAFT-PROGRESS SET</b>											



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NOTES:  
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**Geosyntec**  
 consultants  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: EXISTING GROUND (1 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

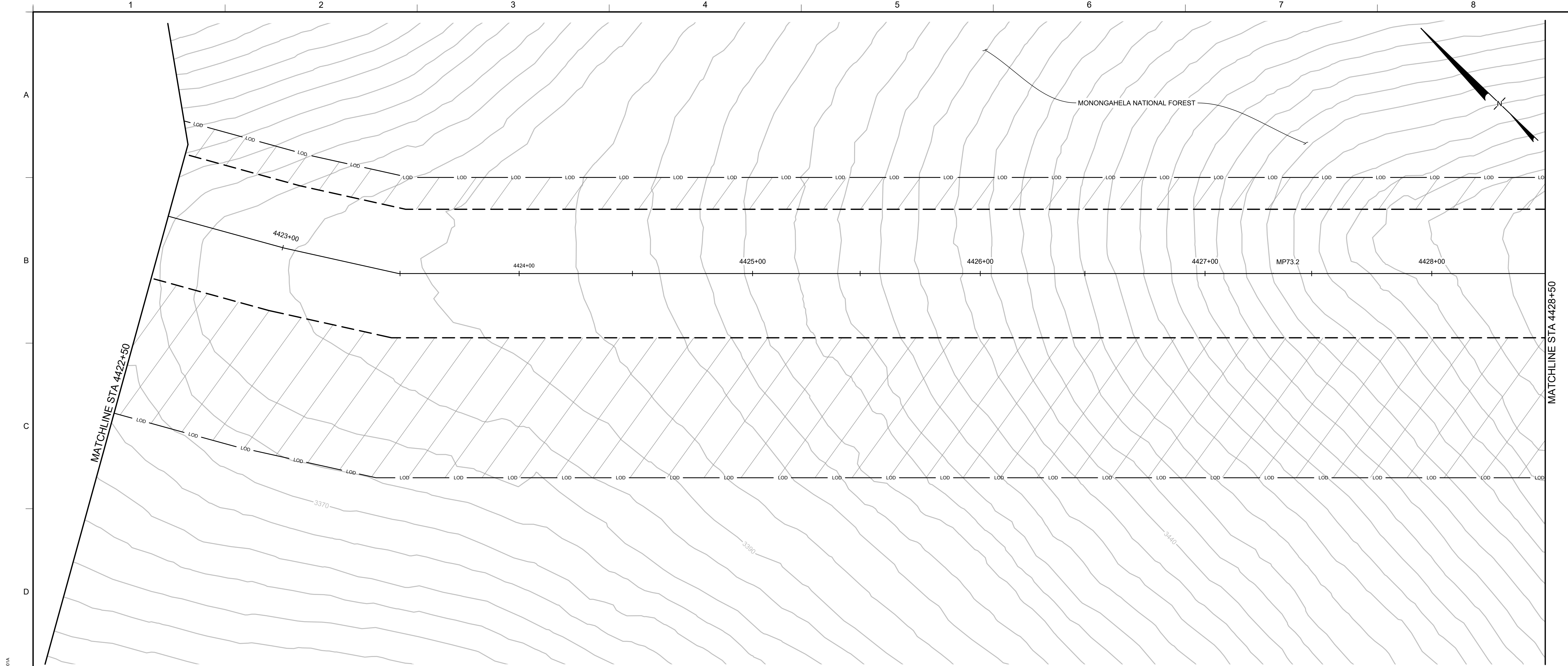
SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

**PRELIMINARY  
 NOT FOR CONSTRUCTION**

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DESIGN BY:	LCB/TR	DATE:	MARCH 2017
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CHECKED BY:	MBE	FILE:	TXG000713D01A
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		

**2** OF **29**



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NOTES:  
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 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: EXISTING GROUND (2 OF 5)**

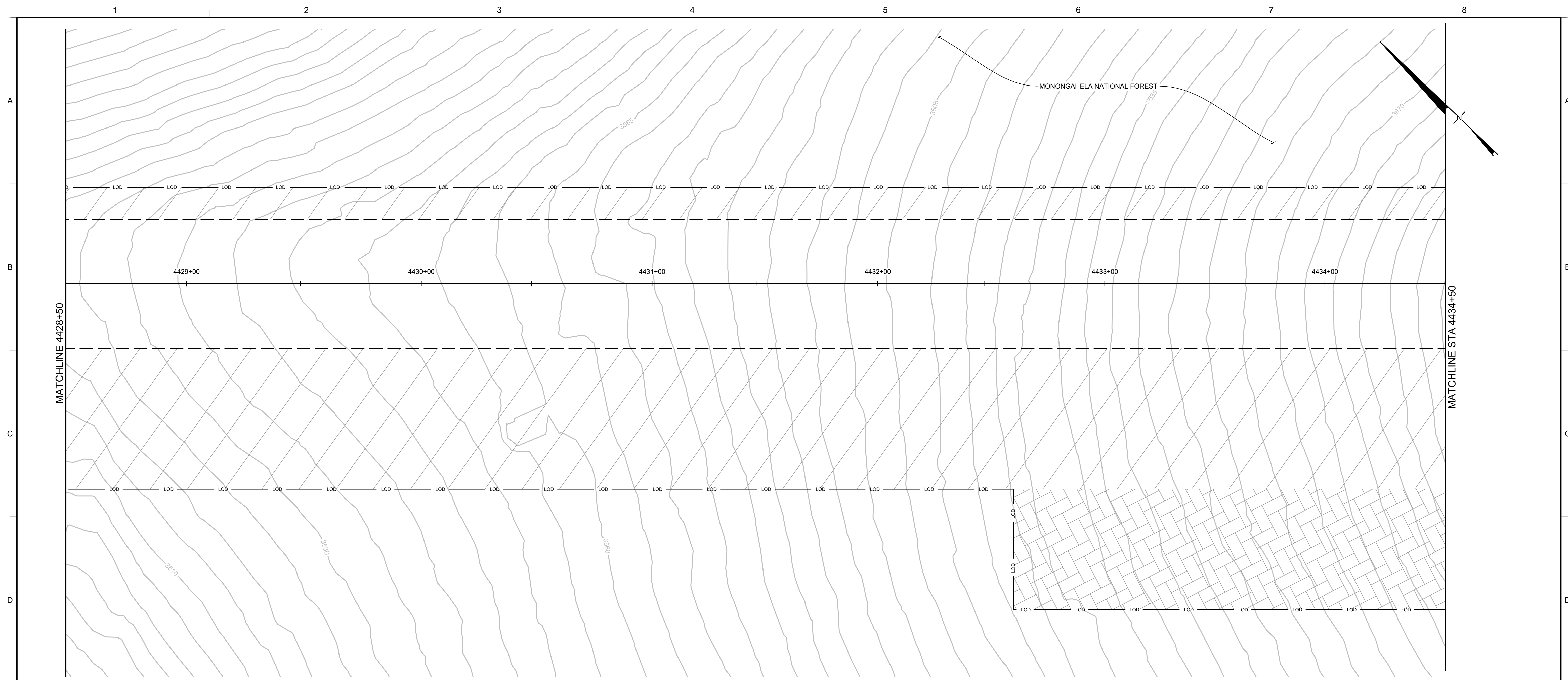
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
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REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>3</b> OF <b>29</b>
APPROVED BY:	LCB		



MATCHLINE 4428+50

MATCHLINE STA 4434+50

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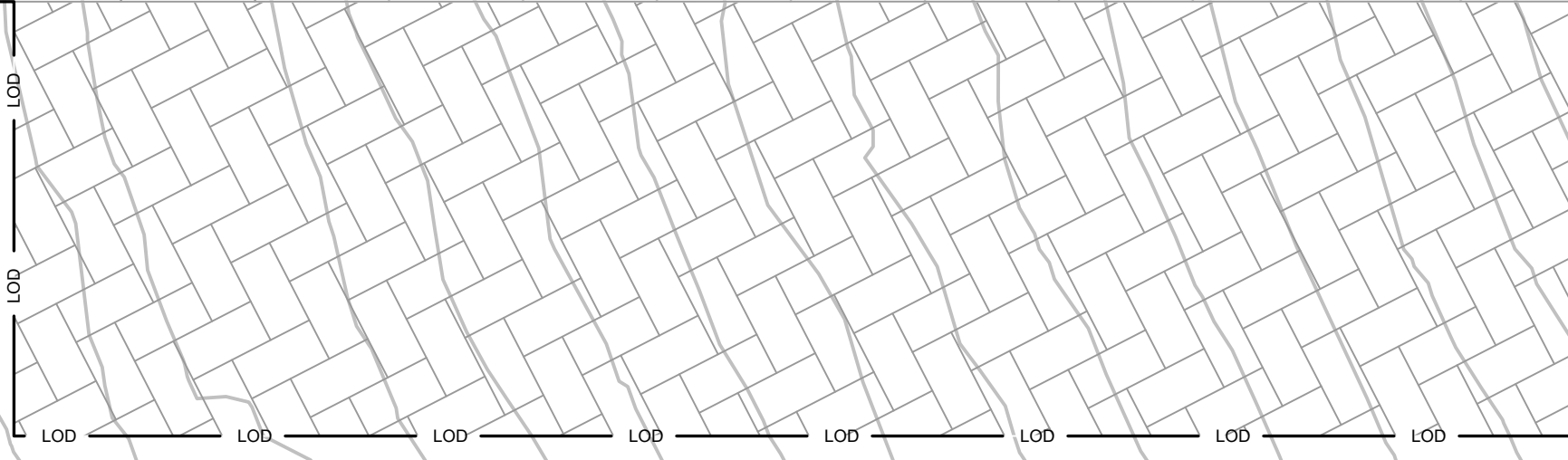
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 PLAN VIEW: EXISTING GROUND (3 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

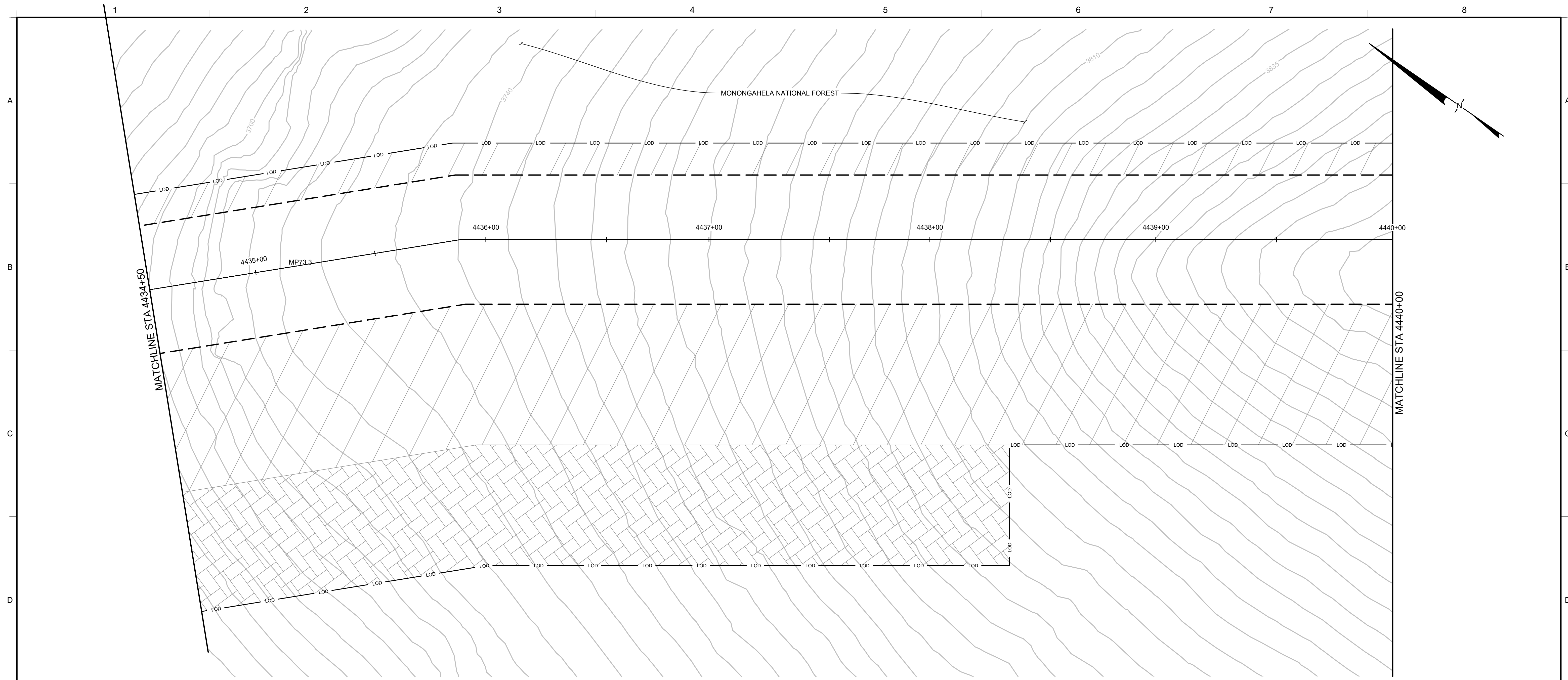
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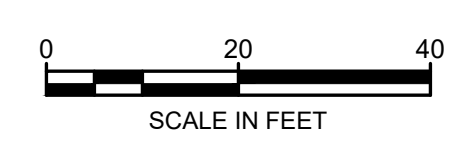
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APPROVED BY: LCB	<b>4</b> OF <b>29</b>

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NOTES:  
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 consultants  
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 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: EXISTING GROUND (4 OF 5)**

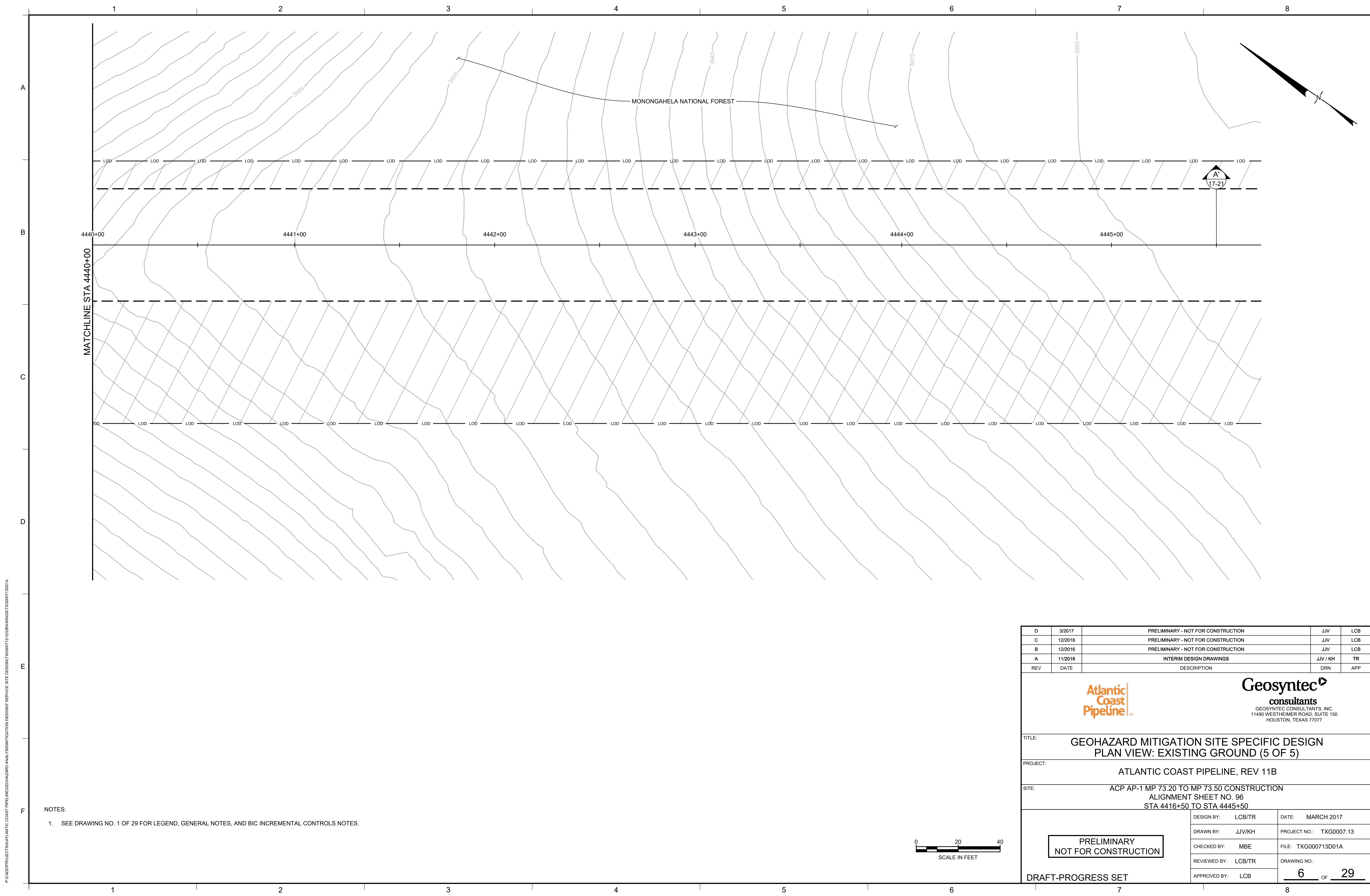
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
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 STA 4416+50 TO STA 4445+50**

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REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>5</b> OF <b>29</b>
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**consultants**  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: EXISTING GROUND (5 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

**PRELIMINARY  
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DESIGN BY:	LCB/TR	DATE:	MARCH 2017
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CHECKED BY:	MBE	FILE:	TXG00713D01A
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		

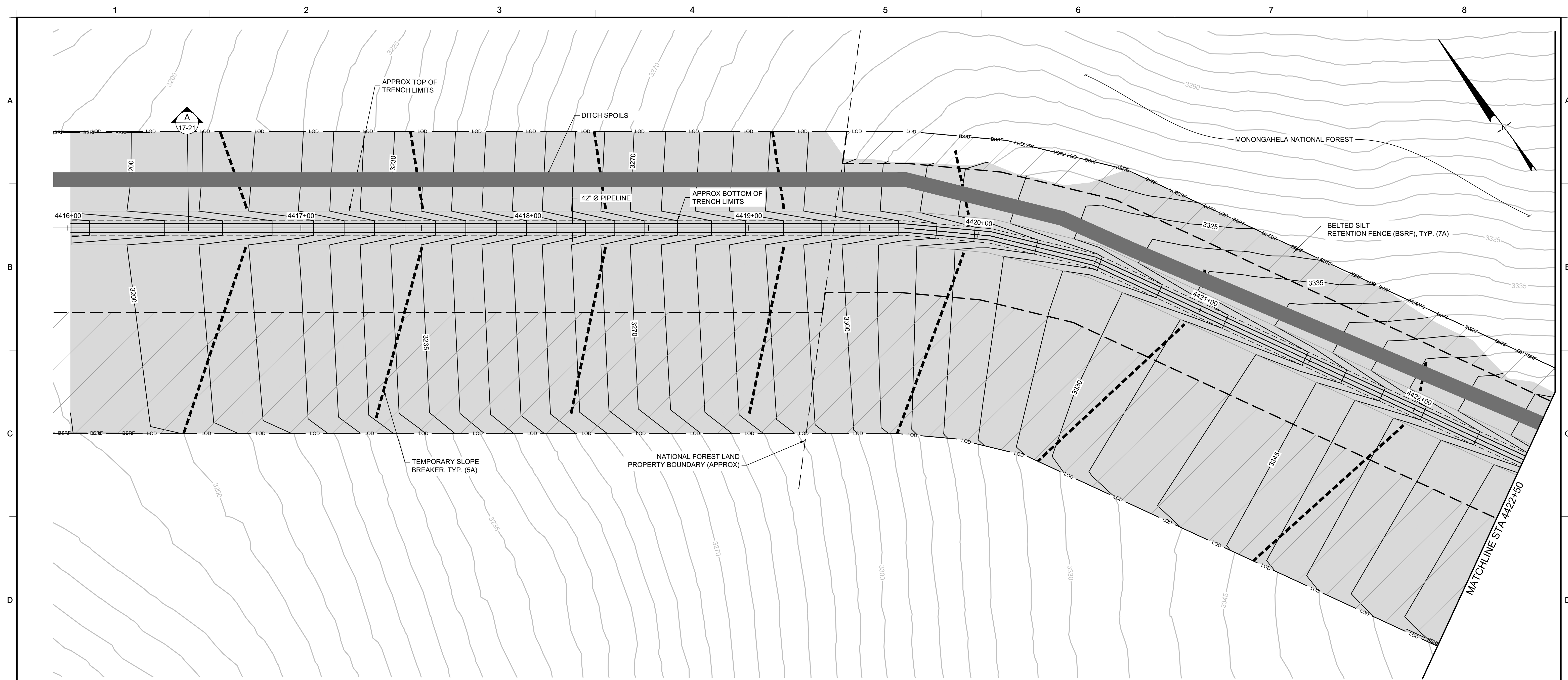
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**6 OF 29**

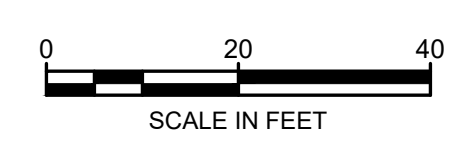


NOTES:  
 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.

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NOTES:  
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 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: TEMPORARY GROUND (1 OF 5)  
 PROJECT: ATLANTIC COAST PIPELINE, REV 11B  
 SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50

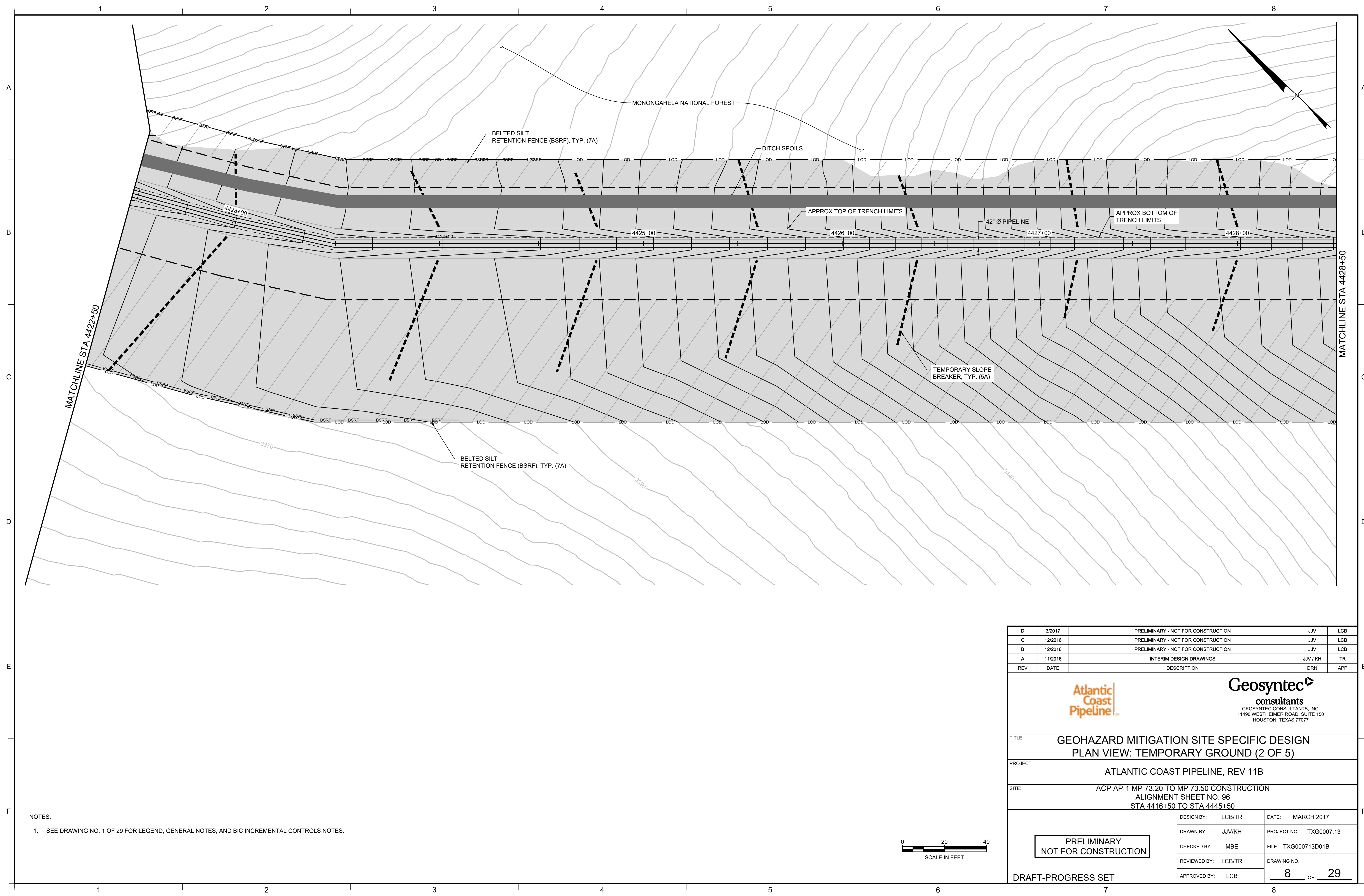
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REVIEWED BY:	LCB/TR	DRAWING NO.:	7 OF 29
APPROVED BY:	LCB		

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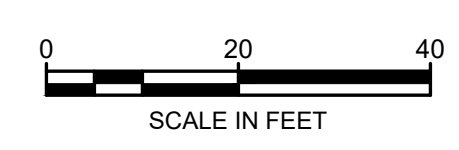




MATCHLINE STA 4422+50

MATCHLINE STA 4428+50

NOTES:  
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 consultants  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: TEMPORARY GROUND (2 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

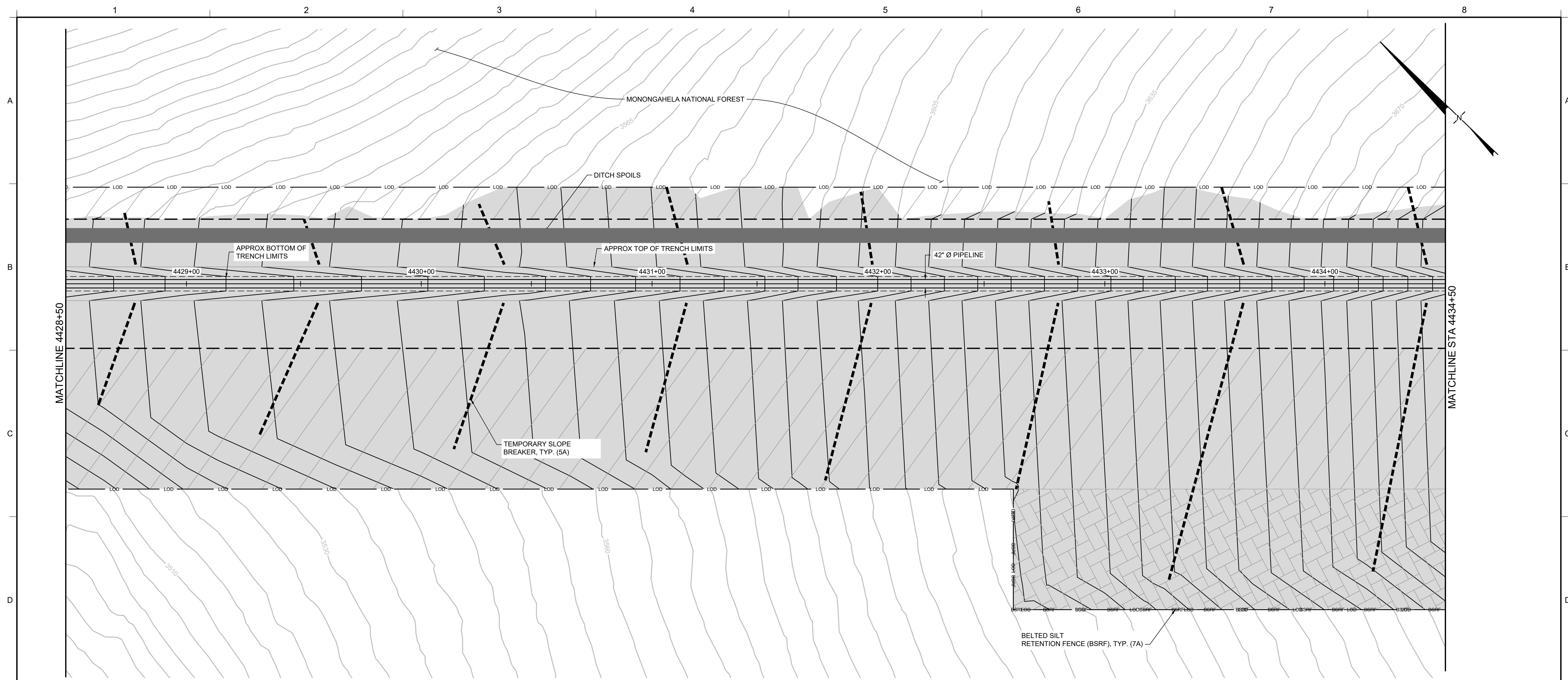
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APPROVED BY: LCB	<b>8</b> OF <b>29</b>

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**Geosyntec**  
 consultants  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: TEMPORARY GROUND (3 OF 5)**

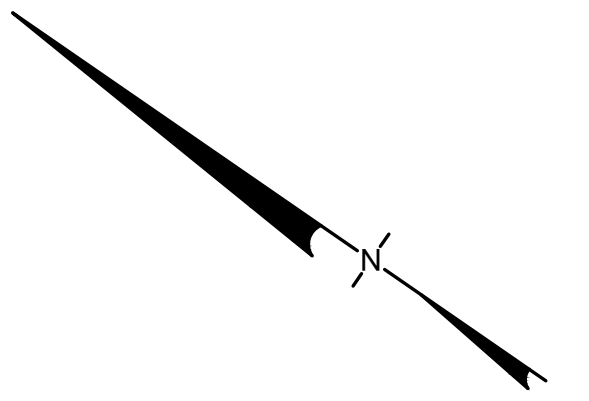
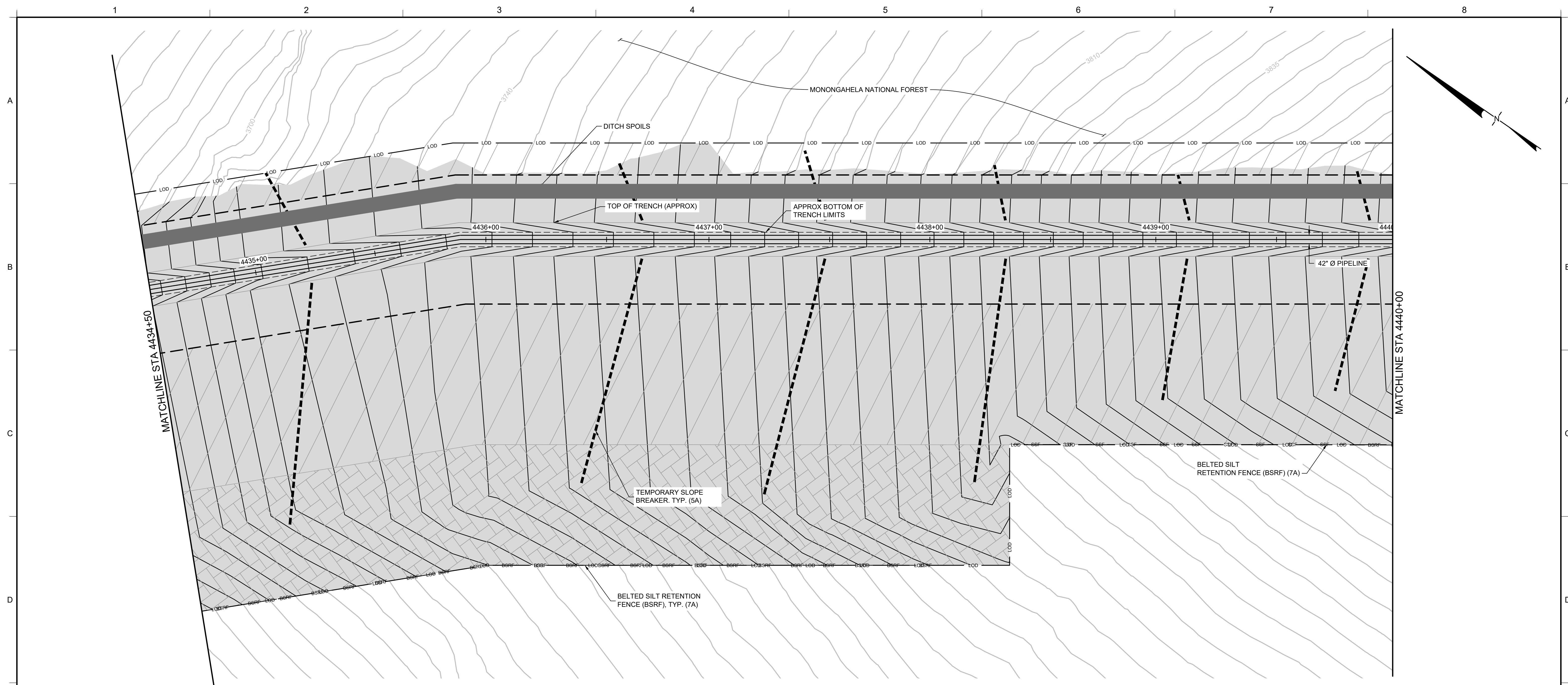
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APPROVED BY:	LCB		



MATCHLINE STA 4434+50

MATCHLINE STA 4440+00

TEMPORARY SLOPE BREAKER, TYP. (5A)

BELTED SILT RETENTION FENCE (BSRF) (7A)

BELTED SILT RETENTION FENCE (BSRF), TYP. (7A)

D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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GEOSYNTEC CONSULTANTS, INC.  
11490 WESTHEIMER ROAD, SUITE 150  
HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PLAN VIEW: TEMPORARY GROUND (4 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
ALIGNMENT SHEET NO. 96  
STA 4416+50 TO STA 4445+50**

**PRELIMINARY  
NOT FOR CONSTRUCTION**

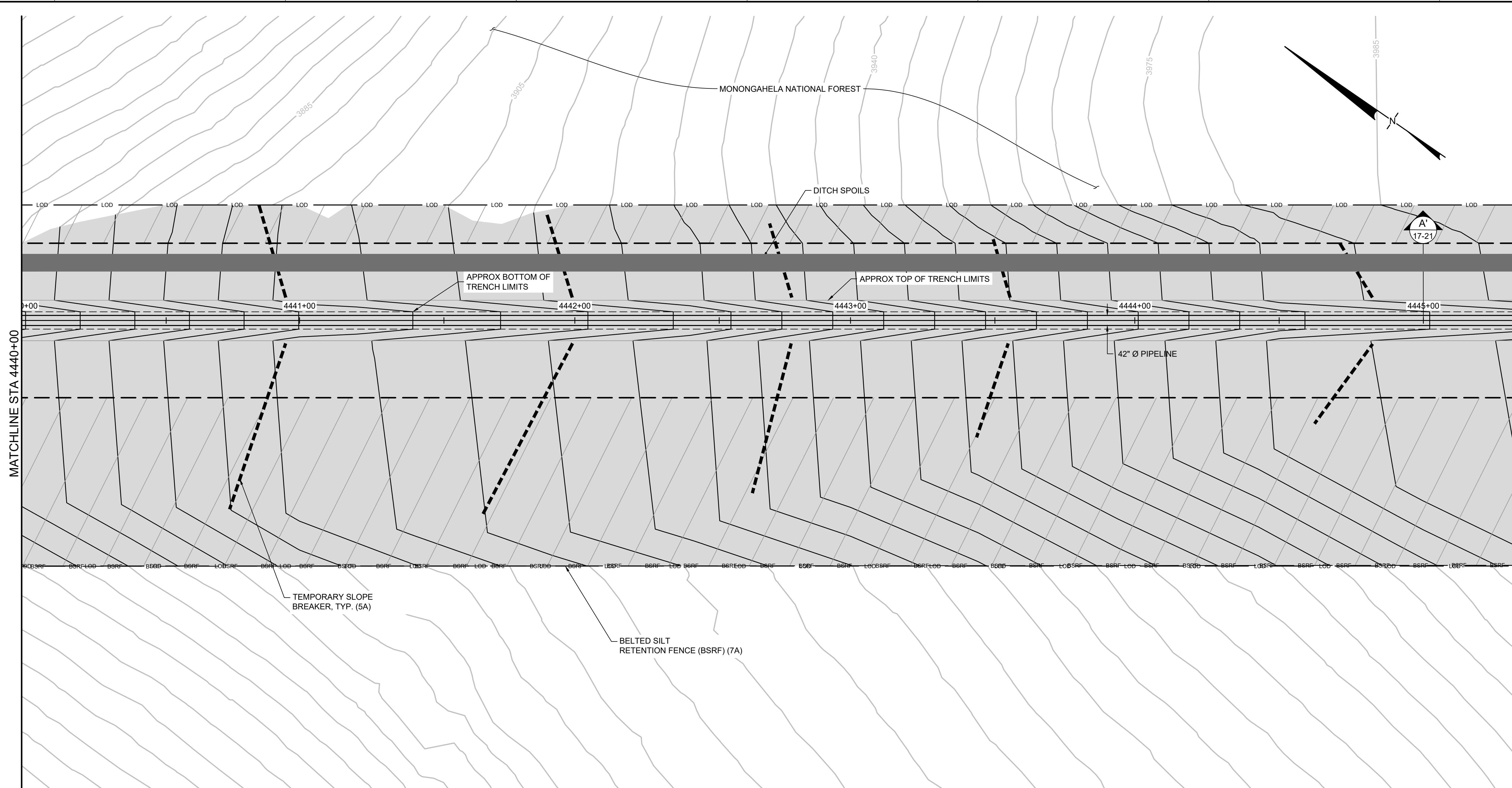
DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG007.13
CHECKED BY:	MBE	FILE:	TXG00713D01B
REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>10</b> OF <b>29</b>
APPROVED BY:	LCB		

DRAFT-PROGRESS SET

NOTES:  
1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



P:\CADD\PROJECTS\ATLANTIC COAST PIPELINE\GEOHAZARD ANALYSIS\MITIGATION DESIGN\SERVICE SITE DESIGN\TXG00713\10\DRAWINGS\TXG00713D01B



MATCHLINE STA 4440+00

NOTES:  
 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



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 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: TEMPORARY GROUND (5 OF 5)

PROJECT: ATLANTIC COAST PIPELINE, REV 11B

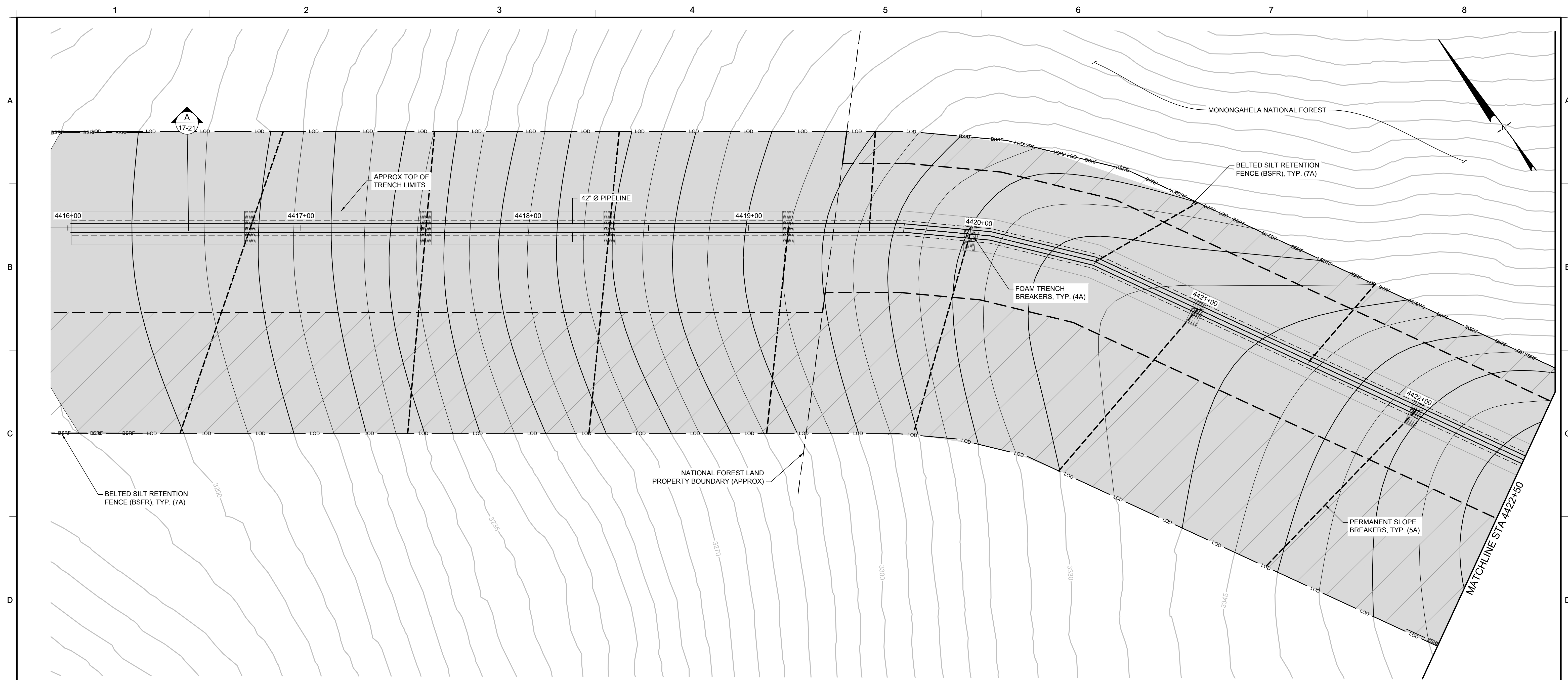
SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50

PRELIMINARY  
NOT FOR CONSTRUCTION

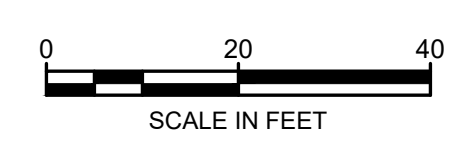
DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG007.13
CHECKED BY: MBE	FILE: TXG00713D01B
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>11</b> OF <b>29</b>

P:\CADD\PROJECTS\ATLANTIC COAST PIPELINE\GEOHAZARD ANALYSIS\MITIGATION DESIGN\SERVICE SITE DESIGN\TXG00713\10\DRAWINGS\TXG00713D01B



NOTES:  
 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



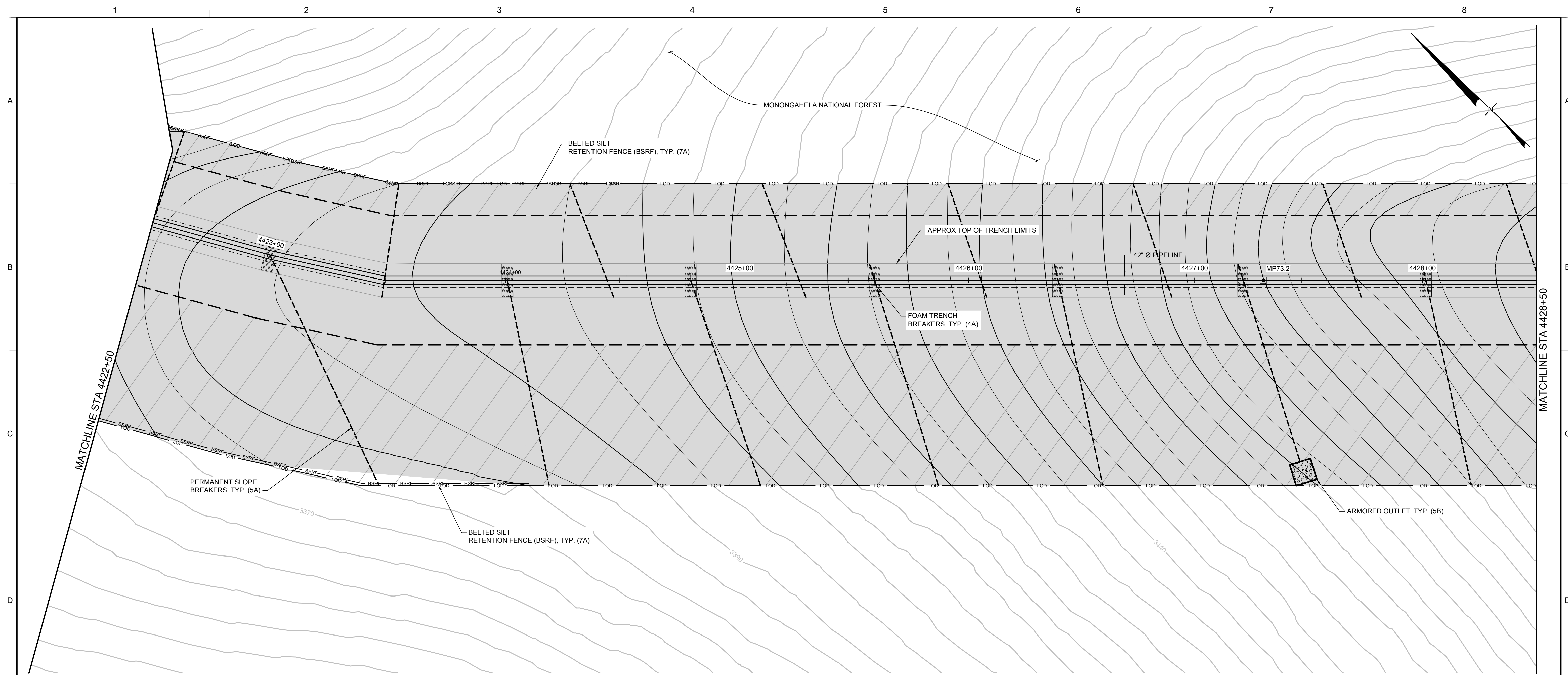
TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: FINAL GROUND (1 OF 5)  
 PROJECT: ATLANTIC COAST PIPELINE, REV 11B  
 SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50

**PRELIMINARY  
 NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D01C
REVIEWED BY:	LCB/TR	DRAWING NO.:	12 OF 29
APPROVED BY:	LCB		

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MATCHLINE STA 4422+50

MATCHLINE STA 4428+50

MONONGAHELA NATIONAL FOREST

BELTED SILT RETENTION FENCE (BSRF), TYP. (7A)

APPROX TOP OF TRENCH LIMITS

FOAM TRENCH BREAKERS, TYP. (4A)

42" Ø PIPELINE

PERMANENT SLOPE BREAKERS, TYP. (5A)

BELTED SILT RETENTION FENCE (BSRF), TYP. (7A)

ARMORED OUTLET, TYP. (5B)

4423+00

4424+00

4425+00

4426+00

4427+00

4428+00

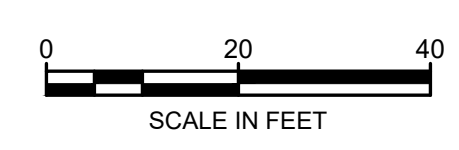
MP73.2

3370

3390

3410

- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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GEOSYNTEC CONSULTANTS, INC.  
11490 WESTHEIMER ROAD, SUITE 150  
HOUSTON, TEXAS 77077

TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PLAN VIEW: FINAL GROUND (2 OF 5)

PROJECT: ATLANTIC COAST PIPELINE, REV 11B

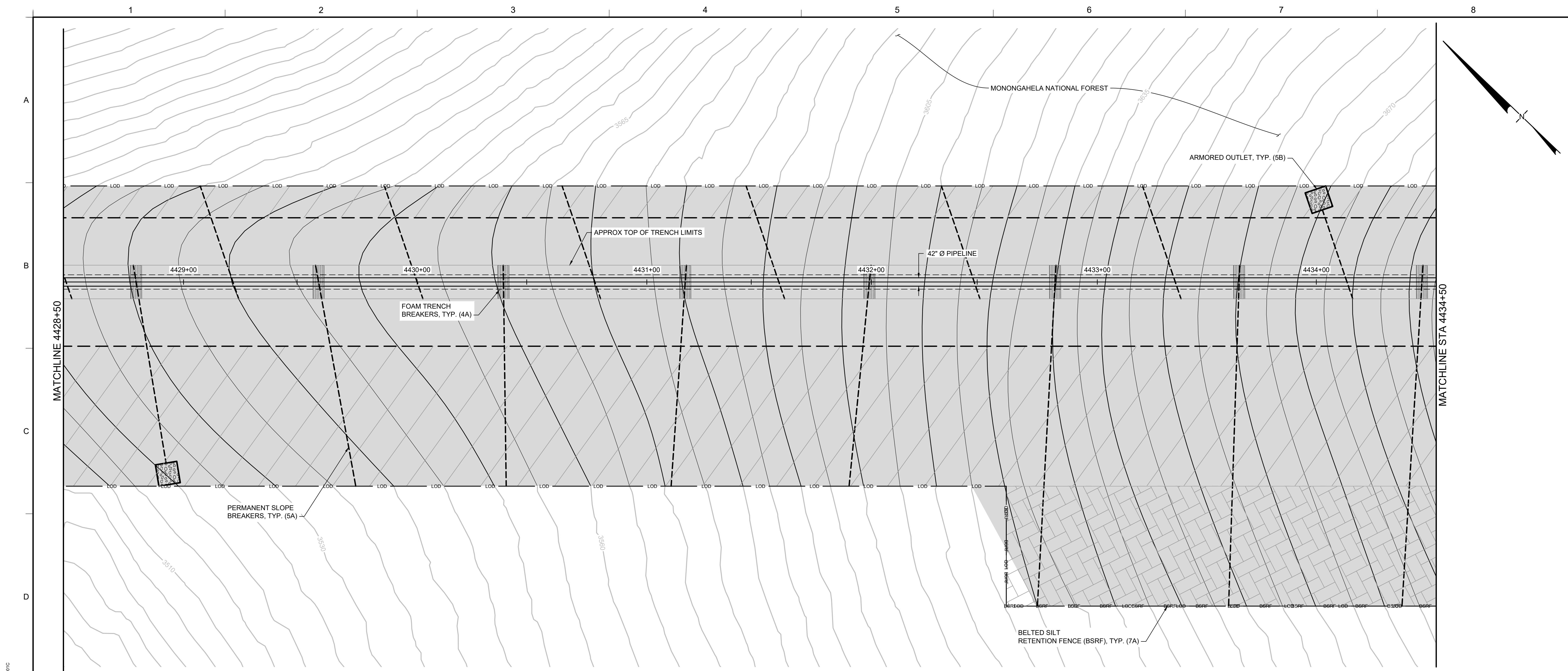
SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
ALIGNMENT SHEET NO. 96  
STA 4416+50 TO STA 4445+50

**PRELIMINARY  
NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

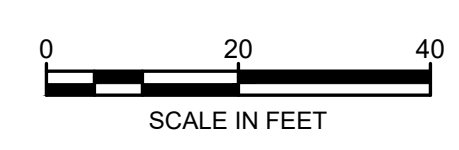
DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D01C
REVIEWED BY:	LCB/TR	DRAWING NO.:	13 OF 29
APPROVED BY:	LCB		

P:\CADD\PROJECTS\ATLANTIC COAST PIPELINE\GEOHAZARD ANALYSIS\MITIGATION DESIGN\SERVICE SITE DESIGN\TXG000713D01C



P:\CADD\PROJECTS\ATLANTIC COAST PIPELINE\GEOHAZARD ANALYSIS\MITIGATION DESIGN\SERVICE SITE DESIGN\TXG000713\DRAWINGS\TXG000713D01C

NOTES:  
 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: FINAL GROUND (3 OF 5)**

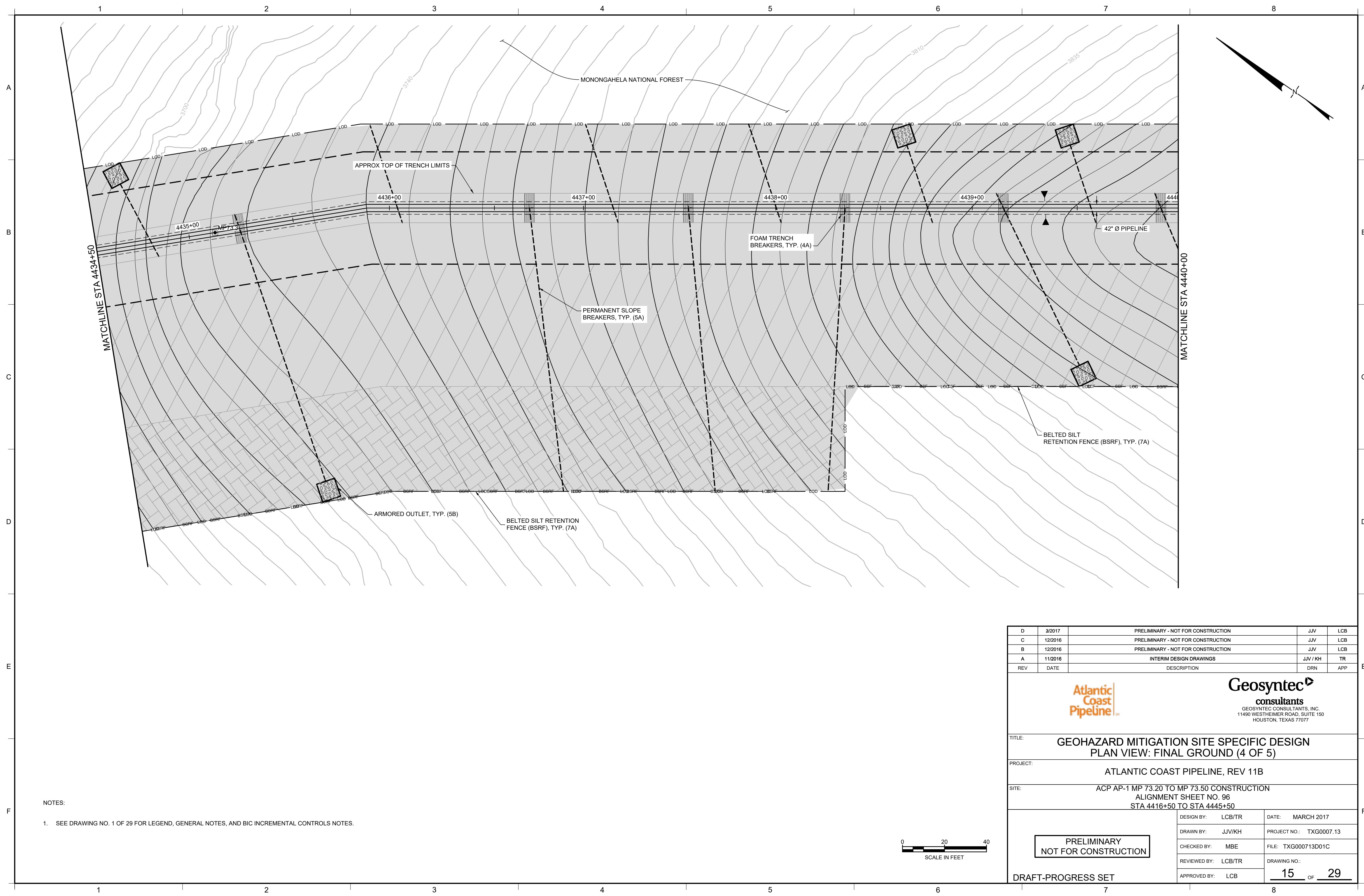
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

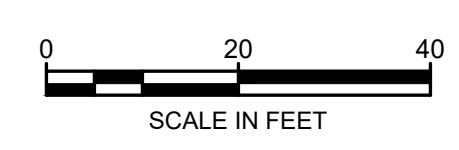
**PRELIMINARY  
 NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D01C
REVIEWED BY:	LCB/TR	DRAWING NO.:	14 OF 29
APPROVED BY:	LCB		



NOTES:  
 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



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 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: FINAL GROUND (4 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

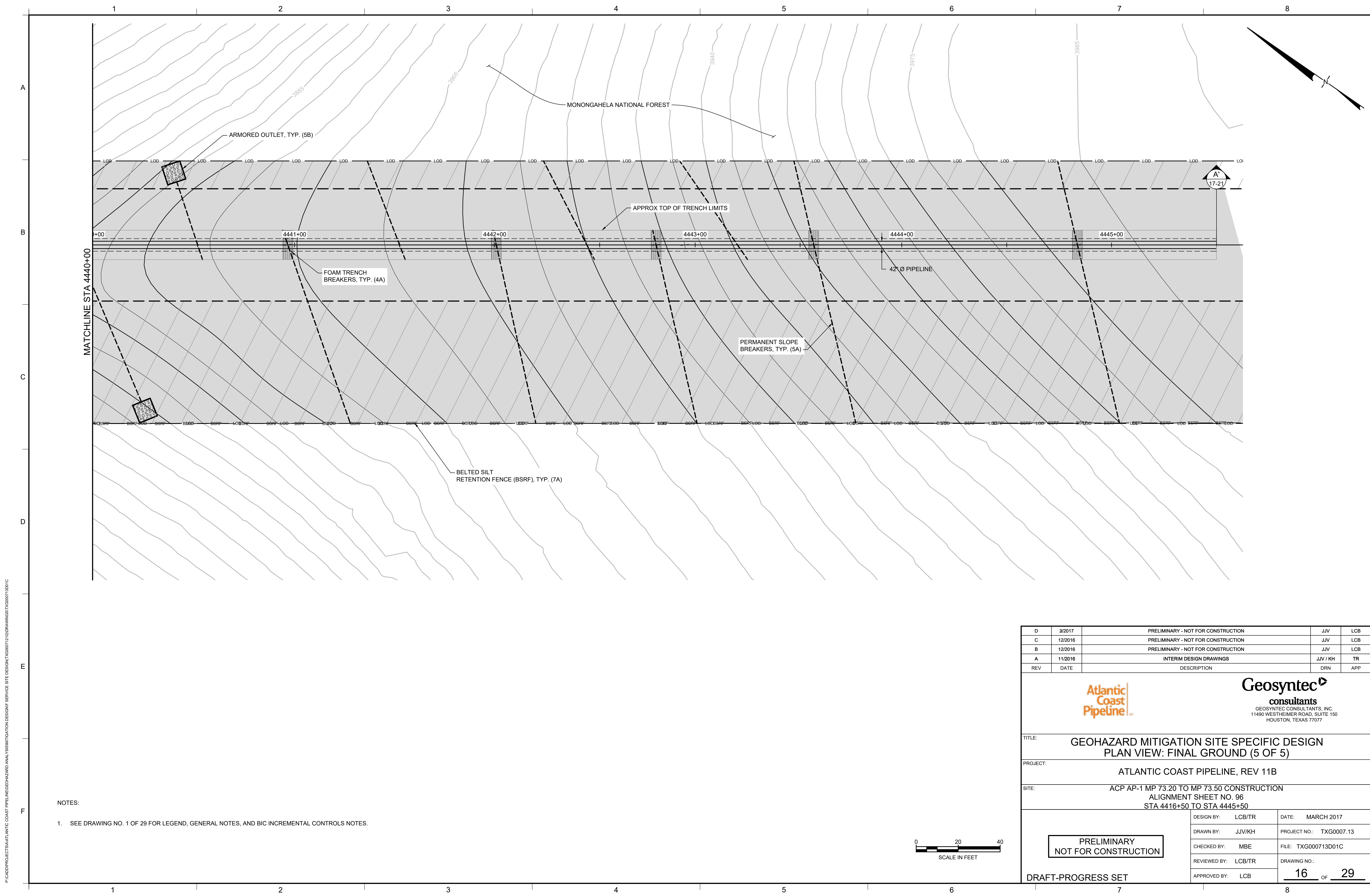
**PRELIMINARY  
 NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D01C
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>15</b> OF <b>29</b>

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D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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**consultants**  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 PLAN VIEW: FINAL GROUND (5 OF 5)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

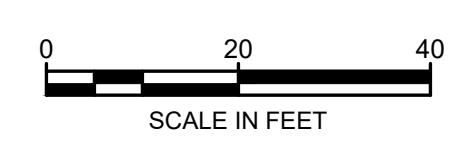
**PRELIMINARY  
 NOT FOR CONSTRUCTION**

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D01C
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		

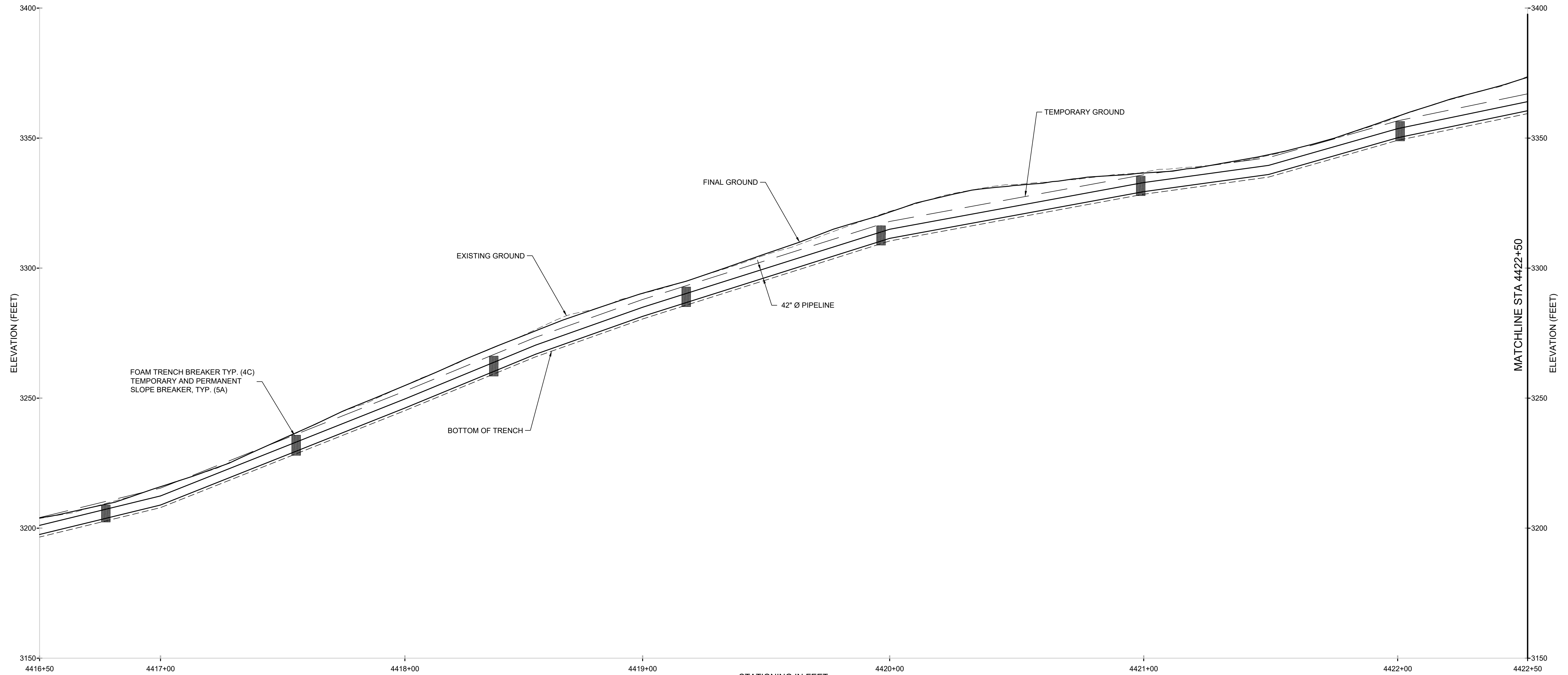
DRAFT-PROGRESS SET

**16** OF **29**

- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



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SECTION A-A'

NOTES:

- 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	2/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN PROFILE A-A' (1 OF 5)

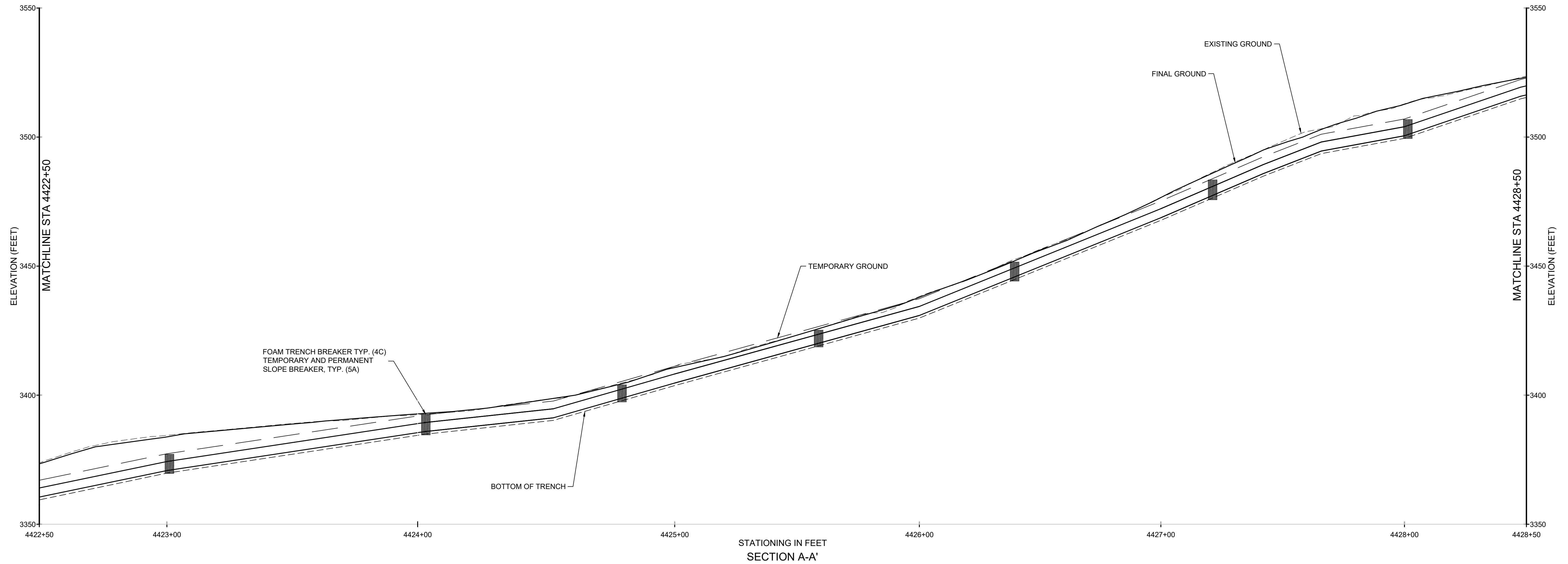
PROJECT: ATLANTIC COAST PIPELINE, REV 11B

SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50

**PRELIMINARY  
NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D01D
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>17</b> OF <b>29</b>



NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PROFILE A-A' (2 OF 5)

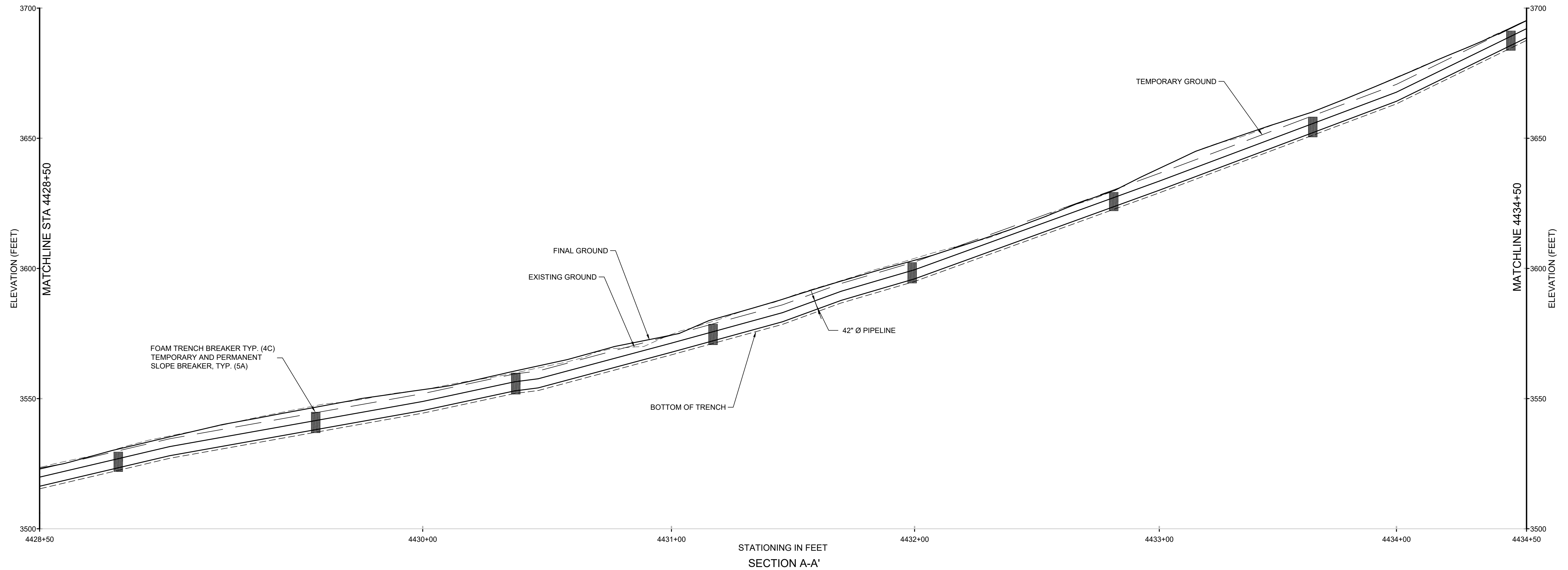
PROJECT: ATLANTIC COAST PIPELINE, REV 11B

SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
ALIGNMENT SHEET NO. 96  
STA 4416+50 TO STA 4445+50

PRELIMINARY  
NOT FOR CONSTRUCTION

DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D01D
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	18 OF 29



NOTES:

- 1. SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	2/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PROFILE A-A' (3 OF 5)

PROJECT: ATLANTIC COAST PIPELINE, REV 11B

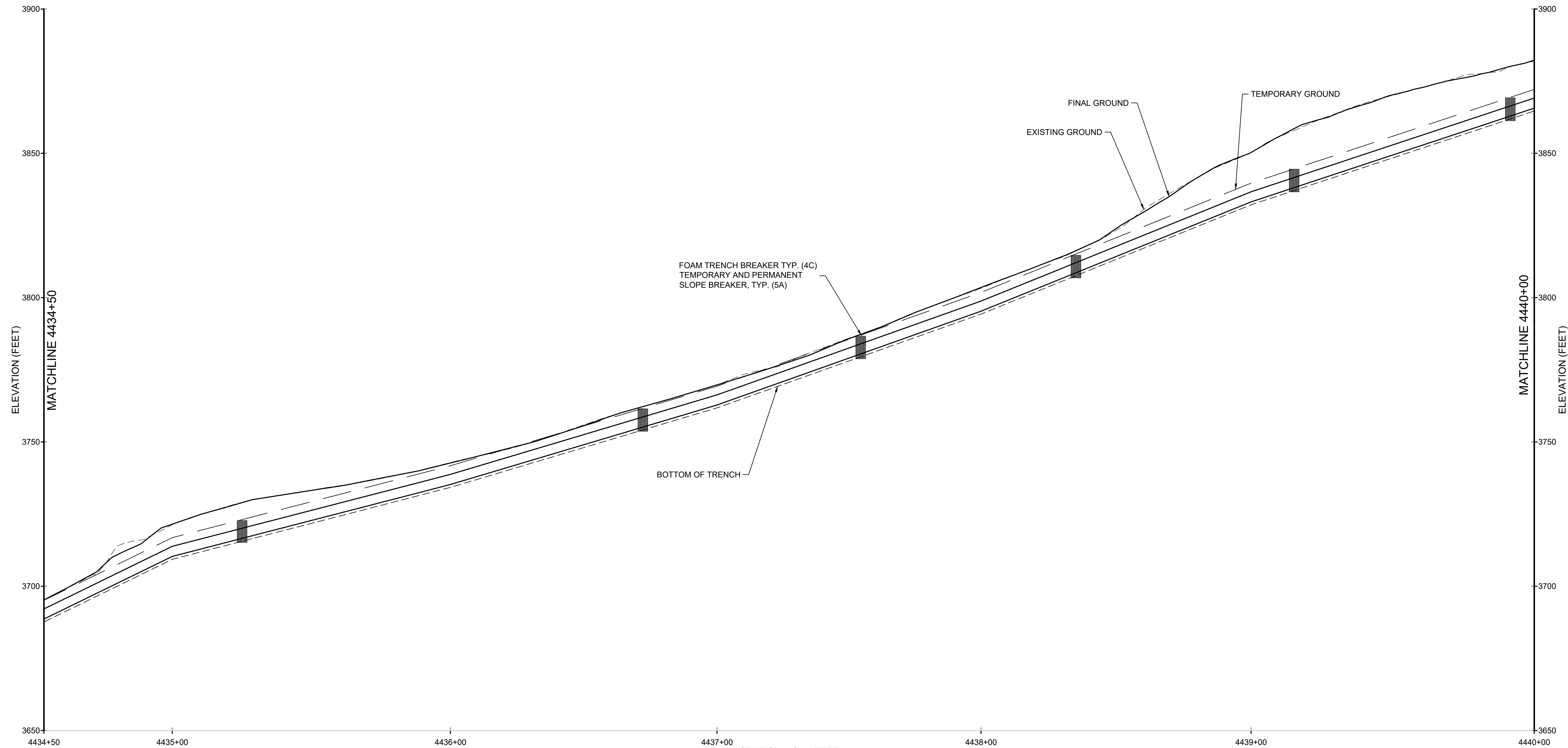
SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
ALIGNMENT SHEET NO. 96  
STA 4416+50 TO STA 4445+50

**PRELIMINARY  
NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

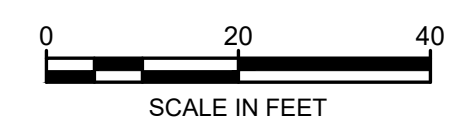
DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D01D
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>19</b> OF <b>29</b>

P:\CADD\PROJECTS\ATLANTIC COAST PIPELINE\GEOHAZARD ANALYSIS\MITIGATION DESIGN\SERVICE SITE DESIGN\TXG000713\DRAWINGS\TXG000713D01D



SECTION A-A'

- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	2/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN PROFILE A-A' (4 OF 5)

PROJECT: ATLANTIC COAST PIPELINE, REV 11B

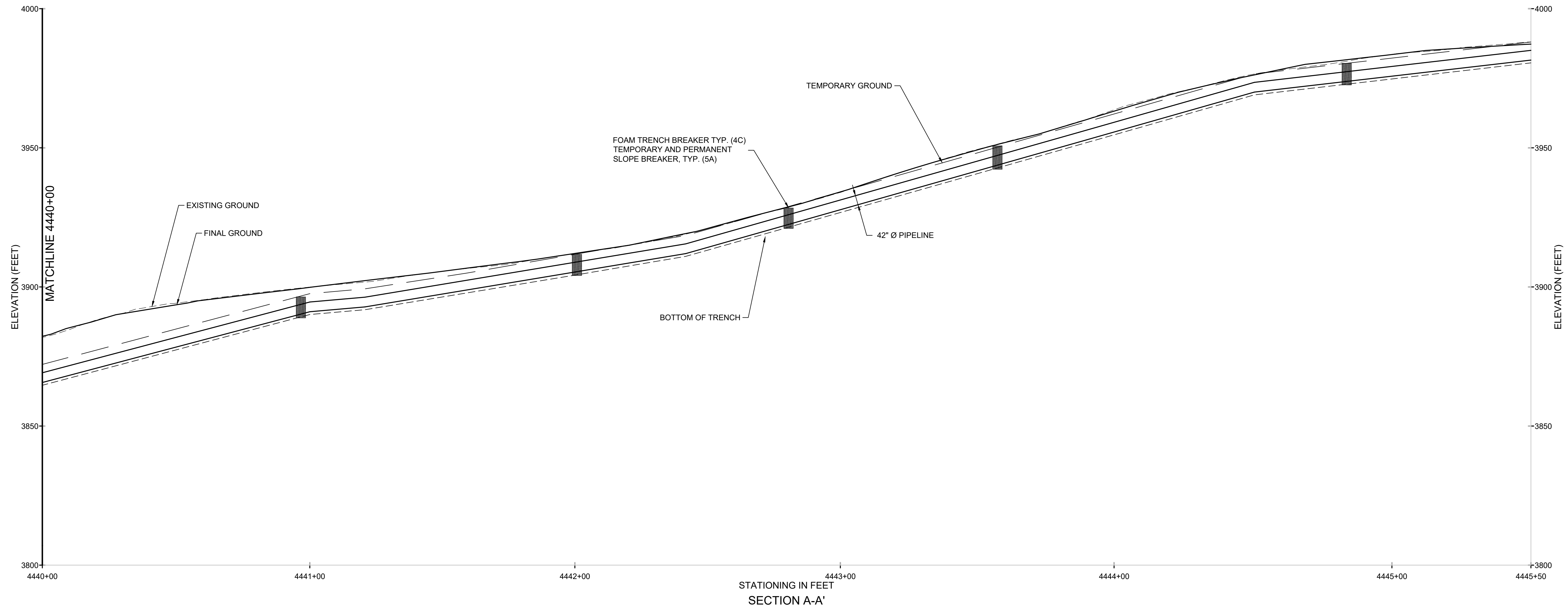
SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50

**PRELIMINARY  
NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D01D
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		

20 OF 29



NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	2/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



TITLE: GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PROFILE A-A' (5 OF 5)

PROJECT: ATLANTIC COAST PIPELINE, REV 11B

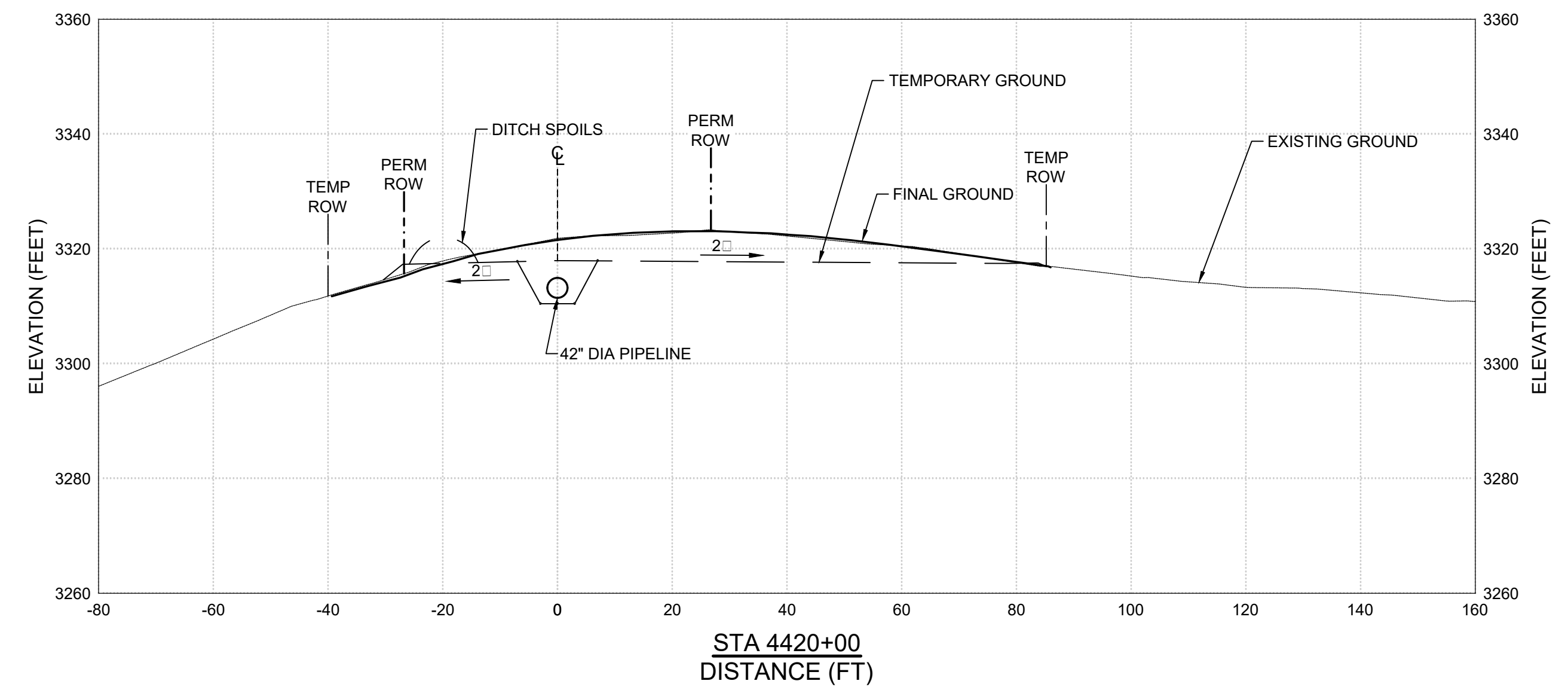
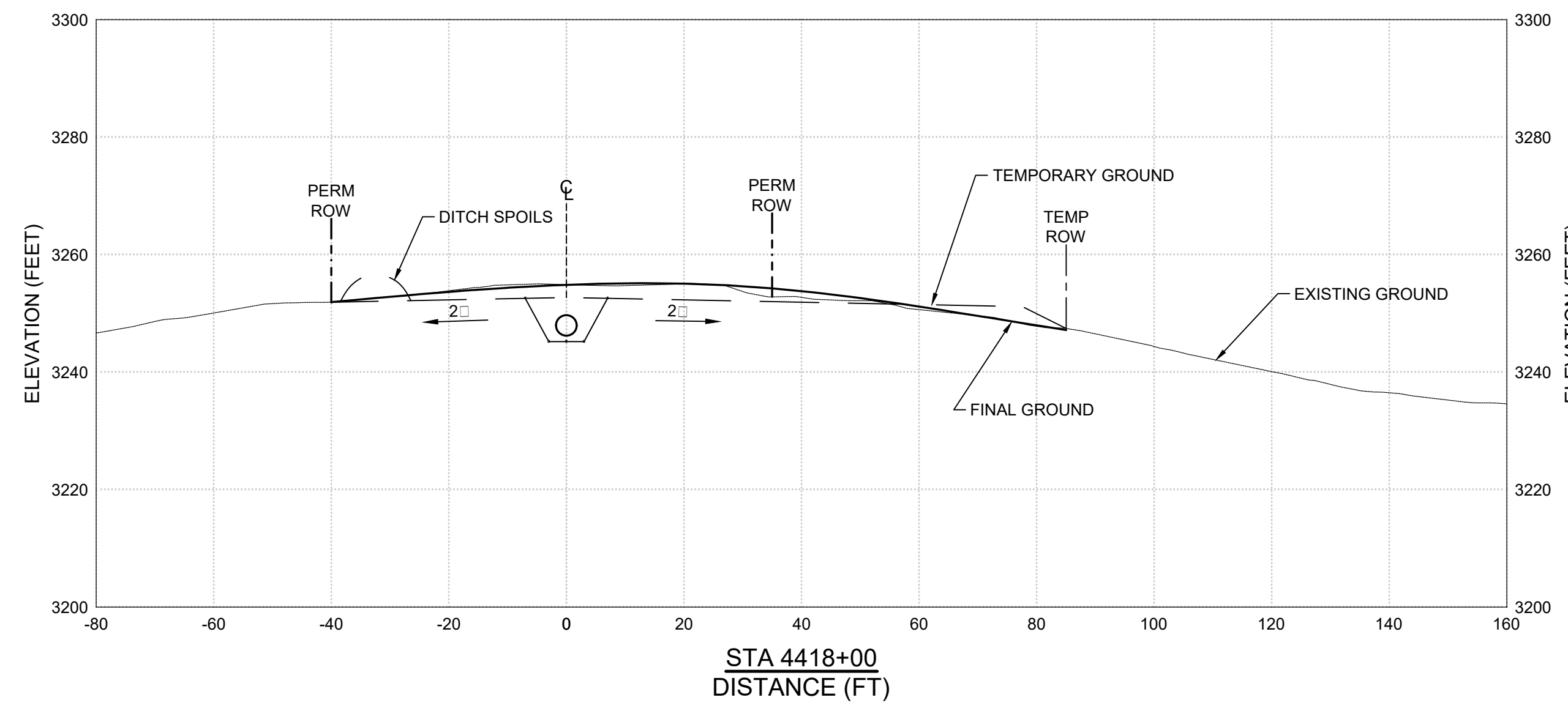
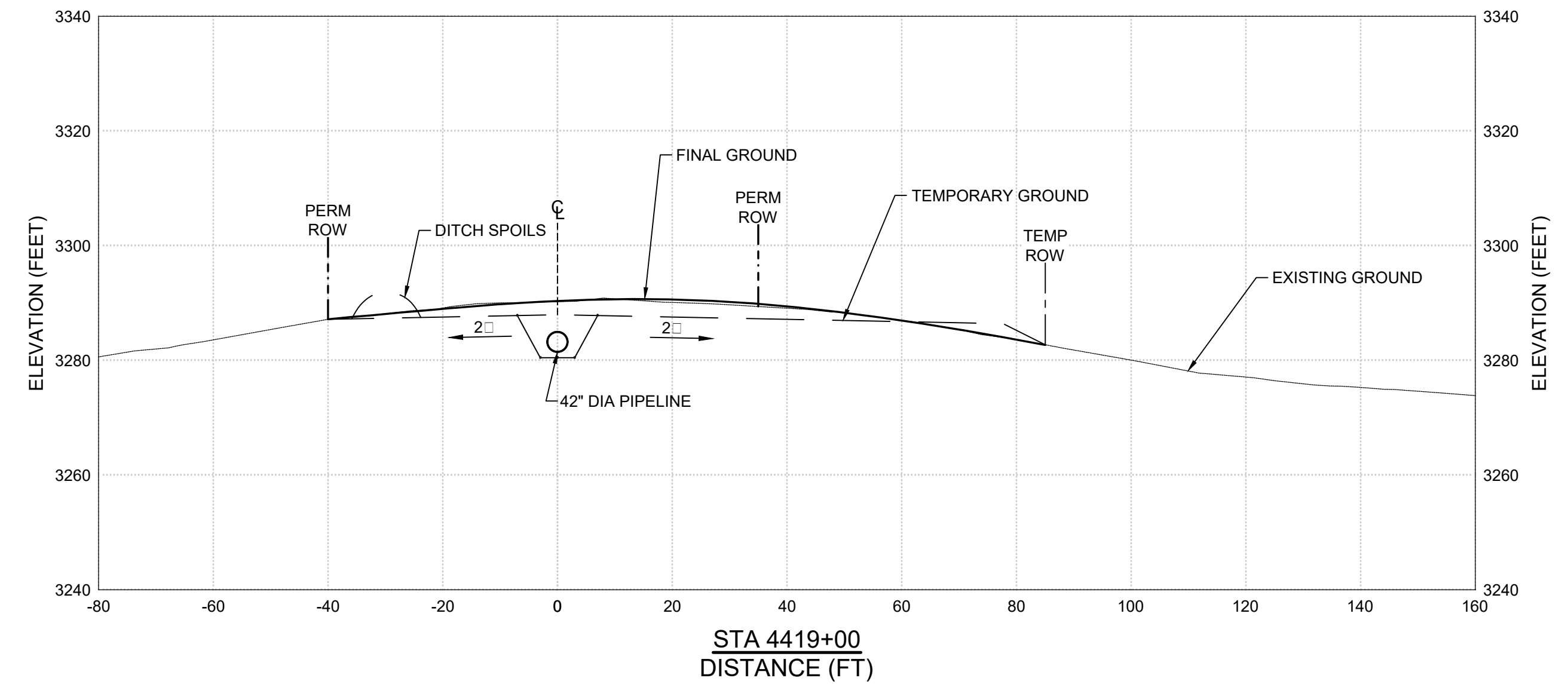
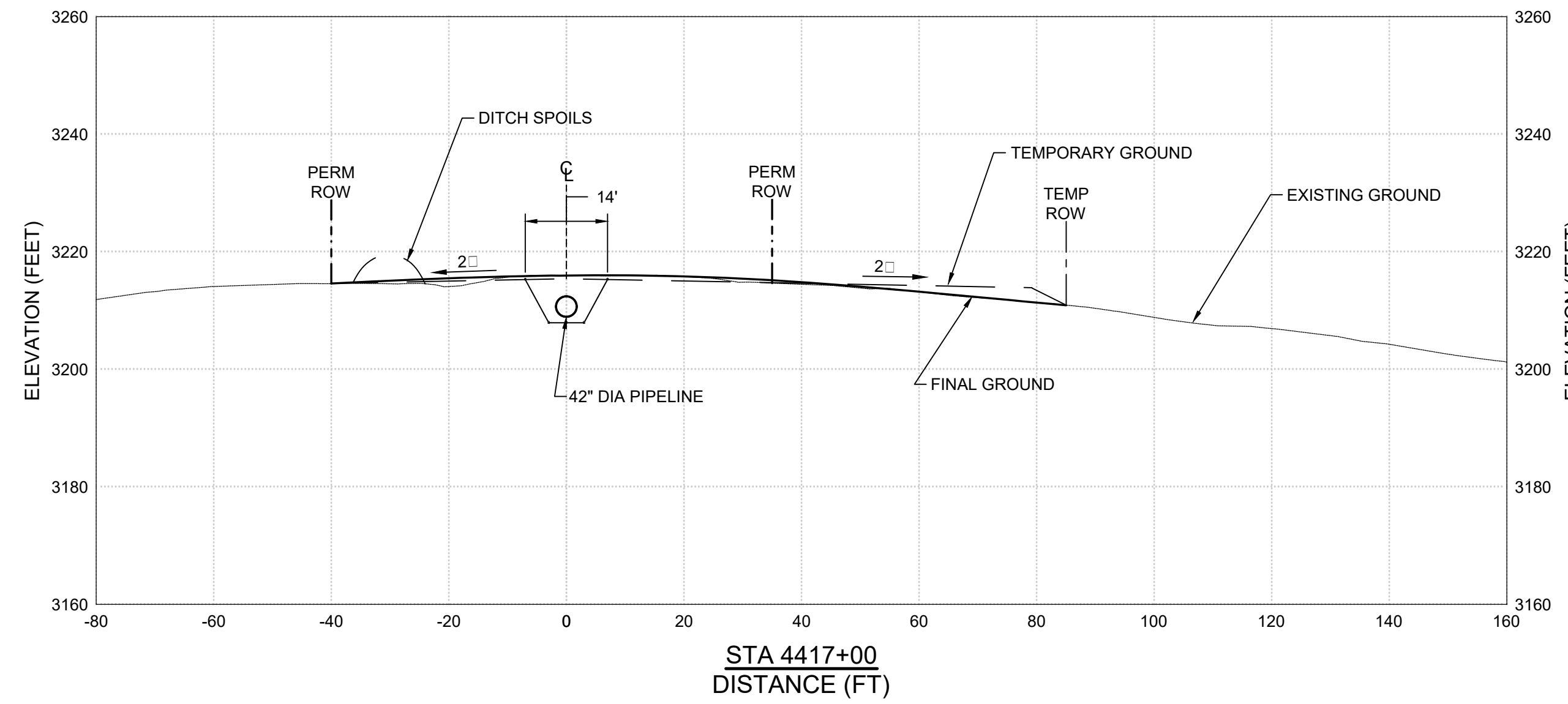
SITE: ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
ALIGNMENT SHEET NO. 96  
STA 4416+50 TO STA 4445+50

**PRELIMINARY  
NOT FOR CONSTRUCTION**

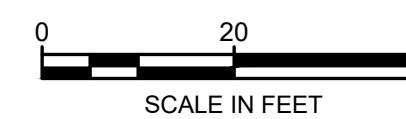
DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D01D
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>21</b> OF <b>29</b>

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- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



**Geosyntec**  
**consultants**  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (1 OF 8)**

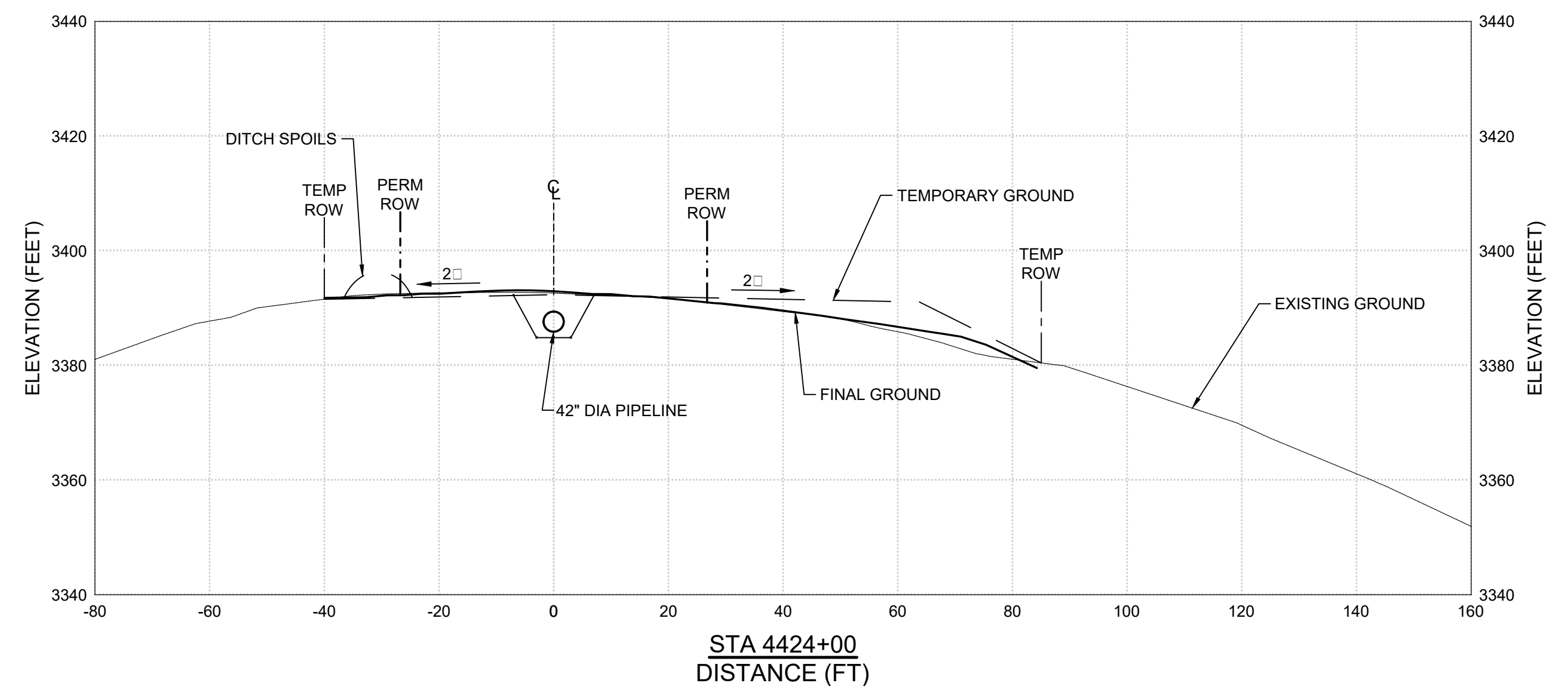
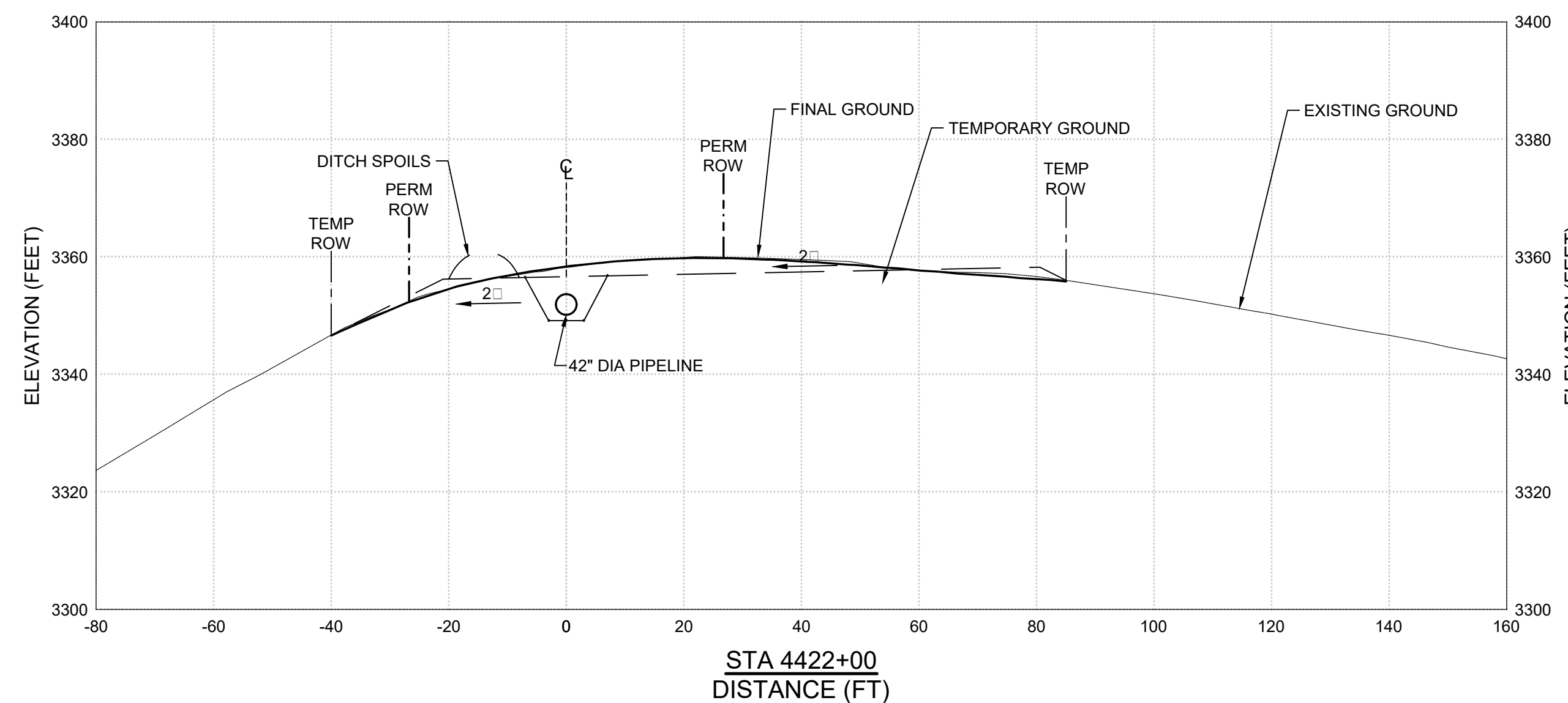
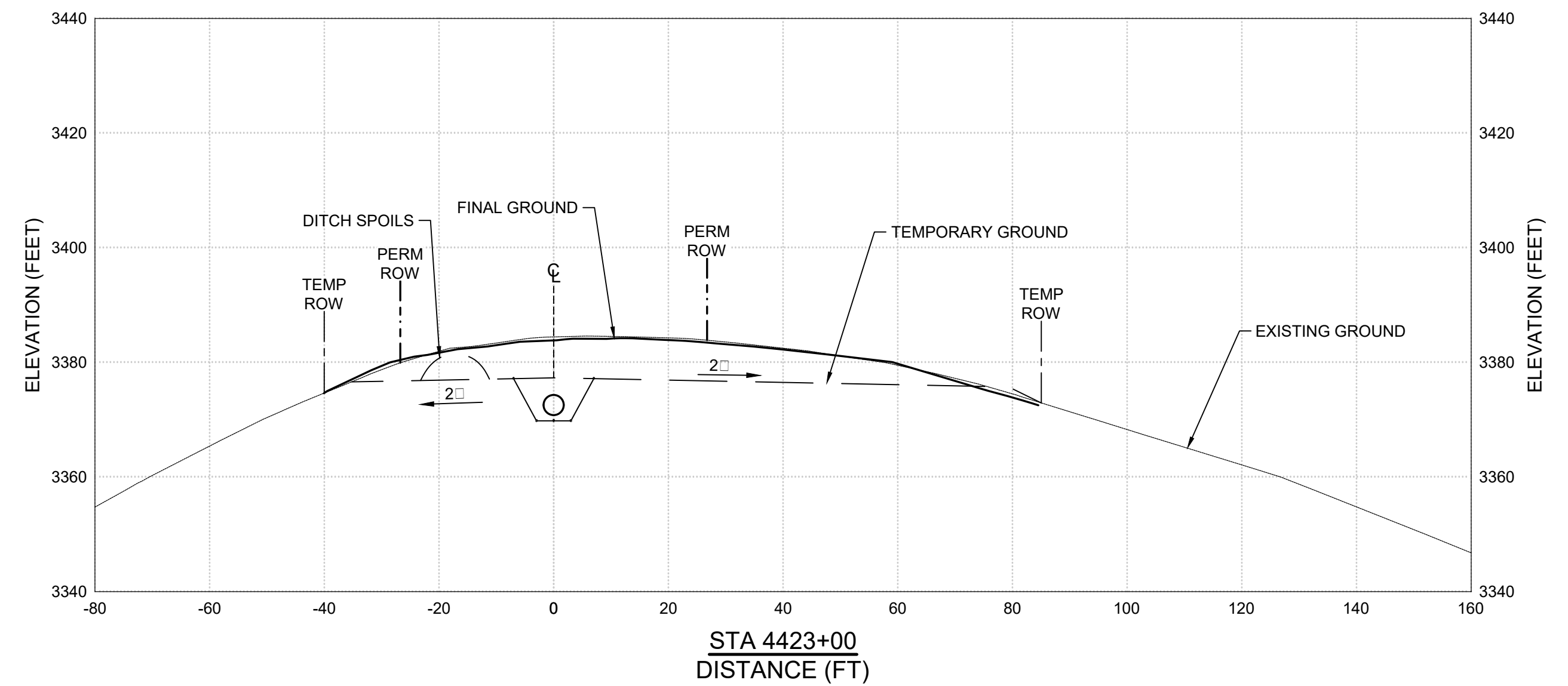
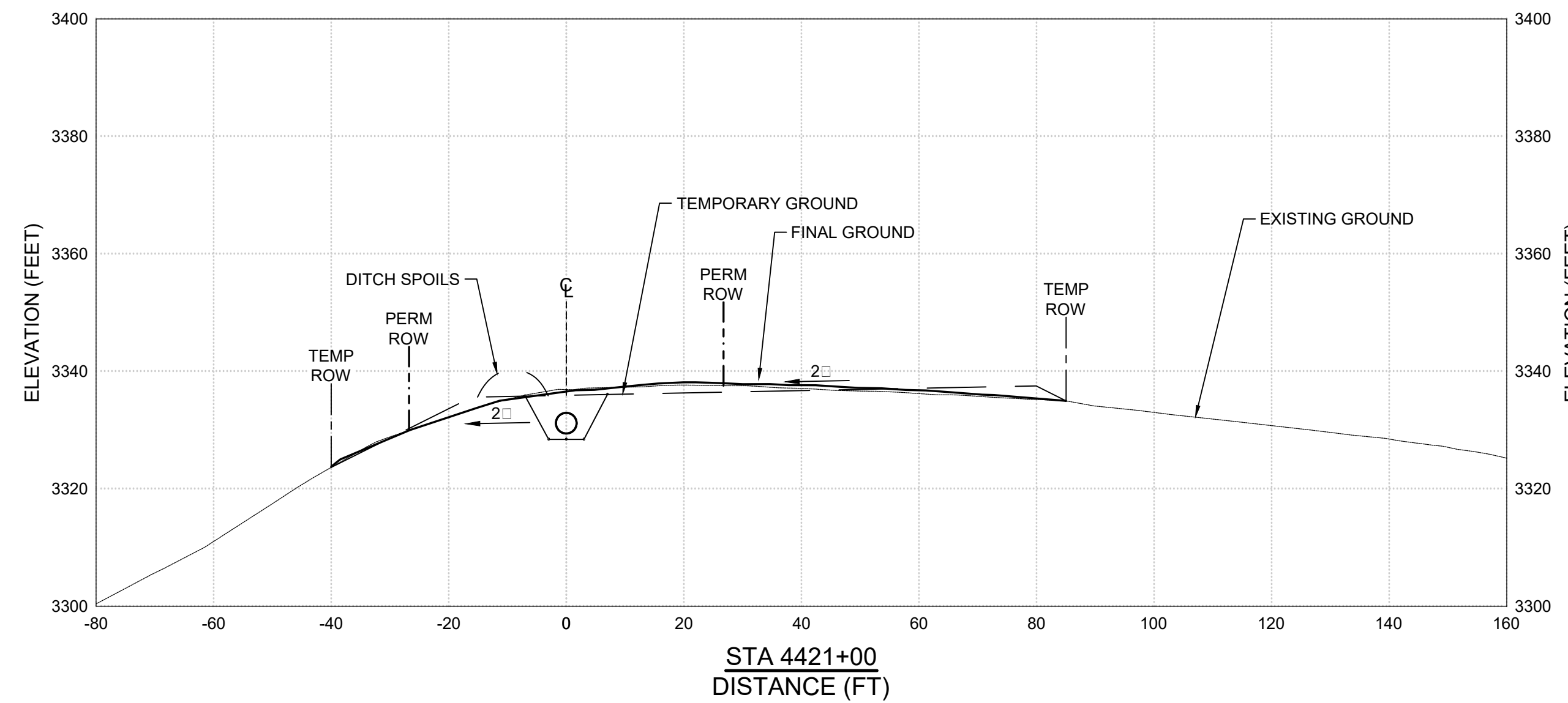
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50**

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D06
REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>22</b> OF <b>29</b>
APPROVED BY:	LCB		

DRAFT-PROGRESS SET

**PRELIMINARY NOT FOR CONSTRUCTION**



NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (2 OF 8)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50**

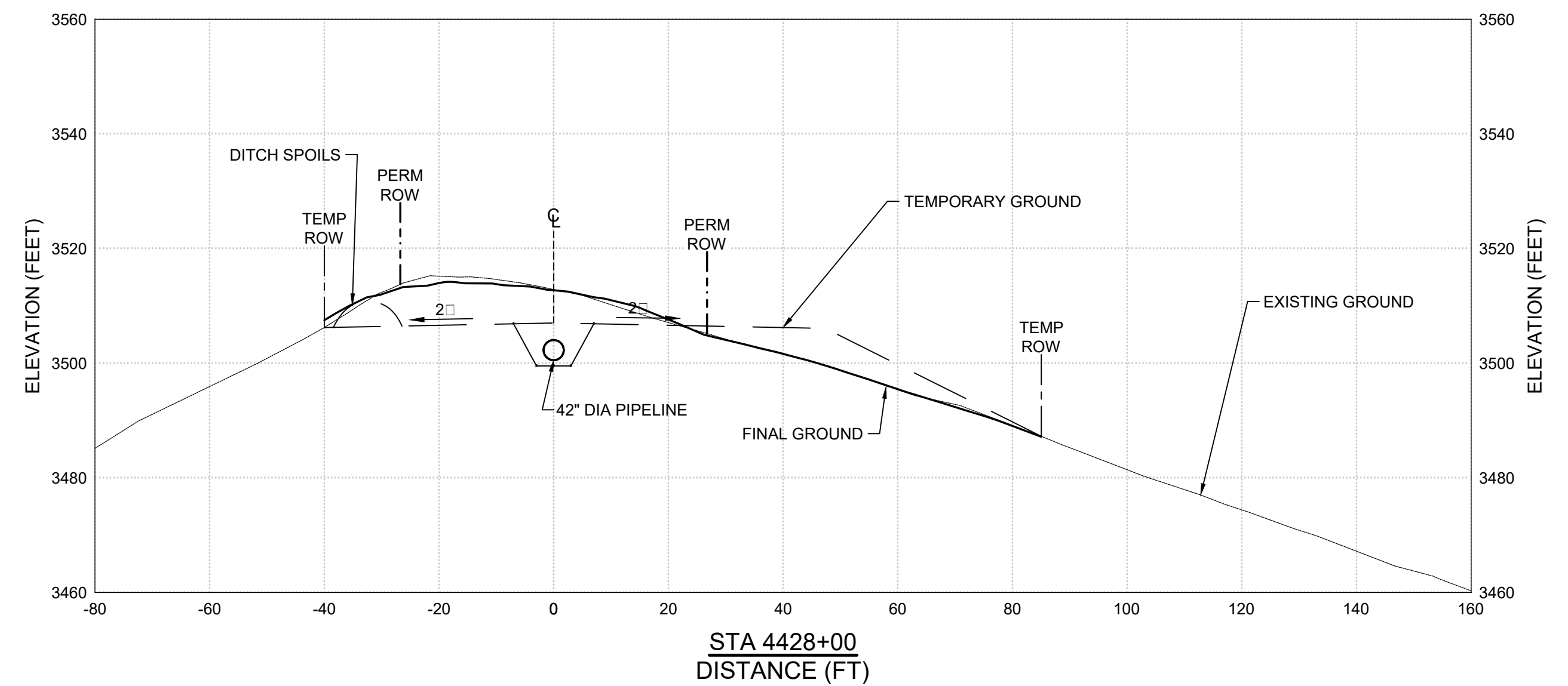
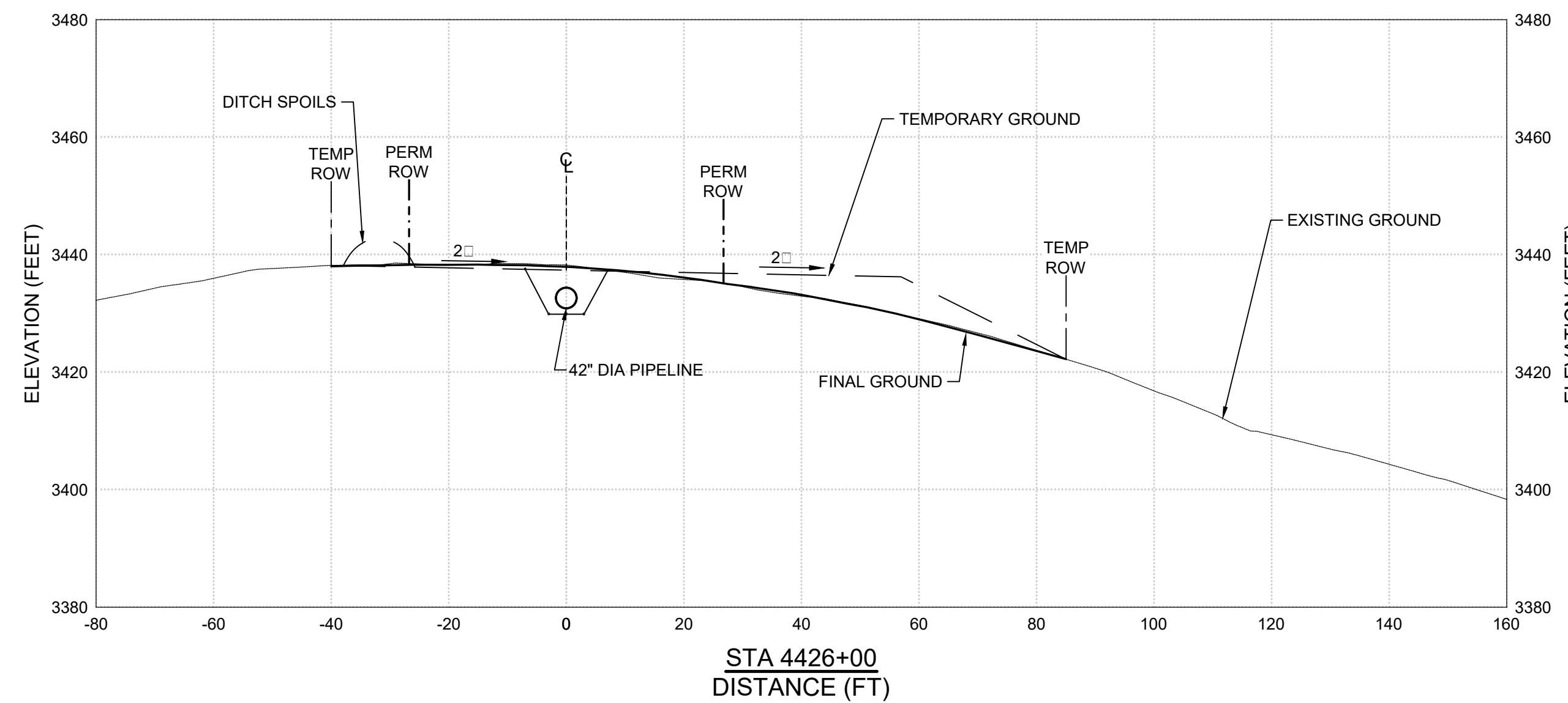
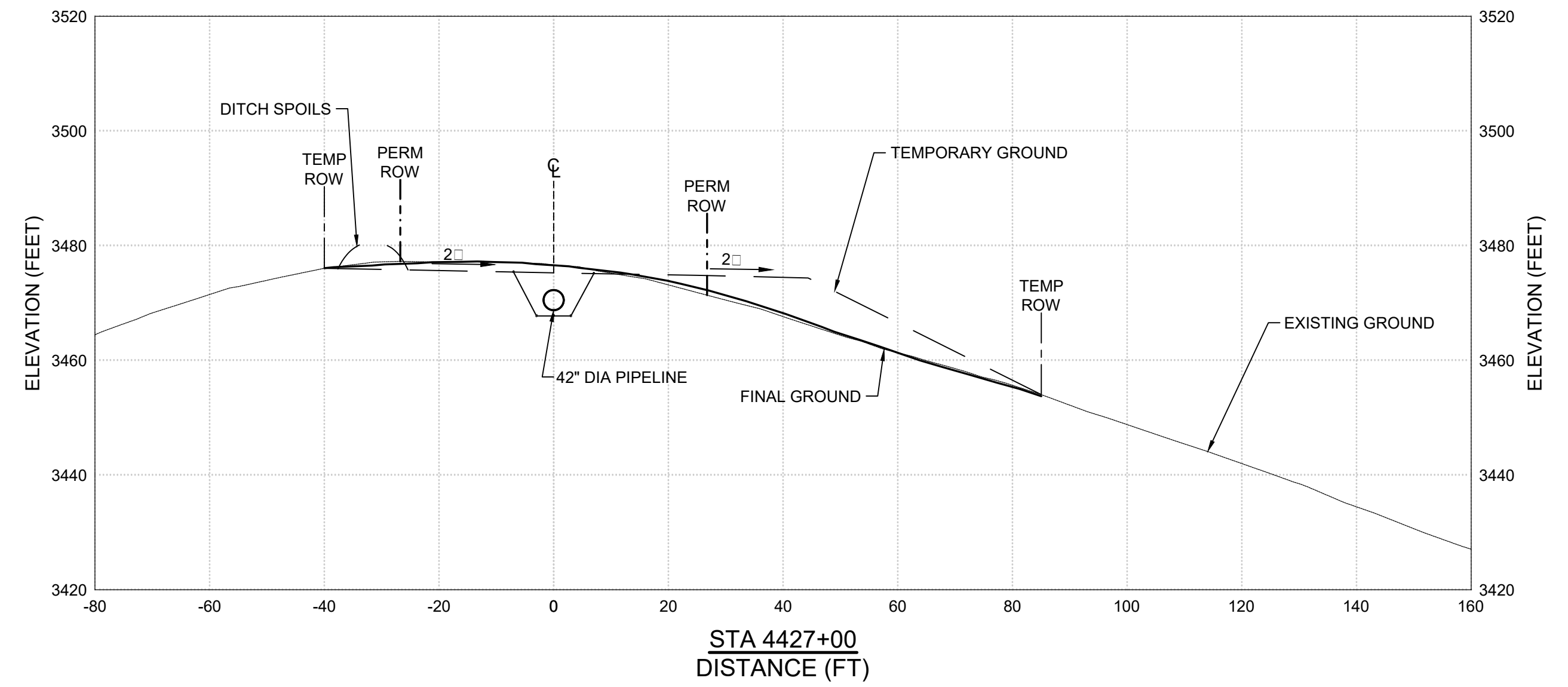
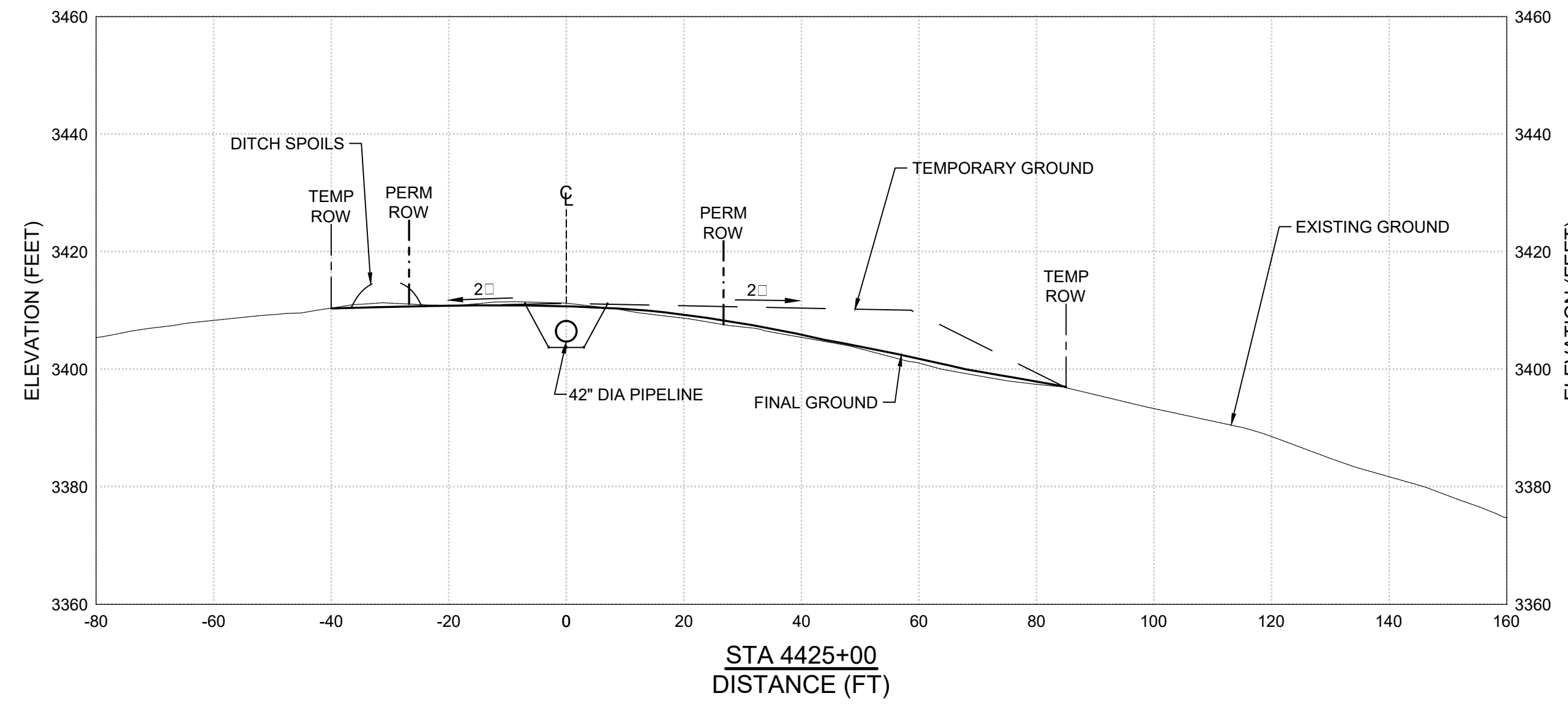
**PRELIMINARY NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D06
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		<b>23</b> OF <b>29</b>

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- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
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HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (3 OF 8)**

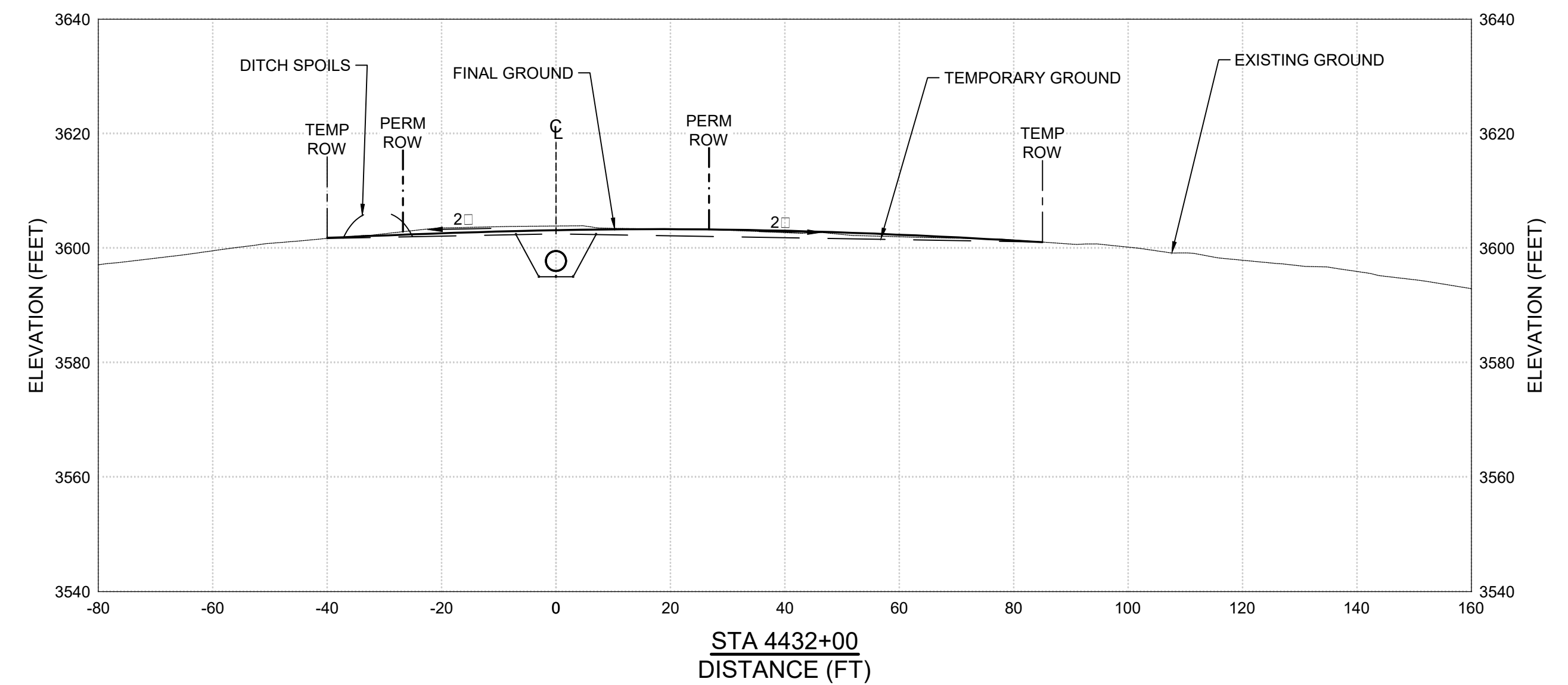
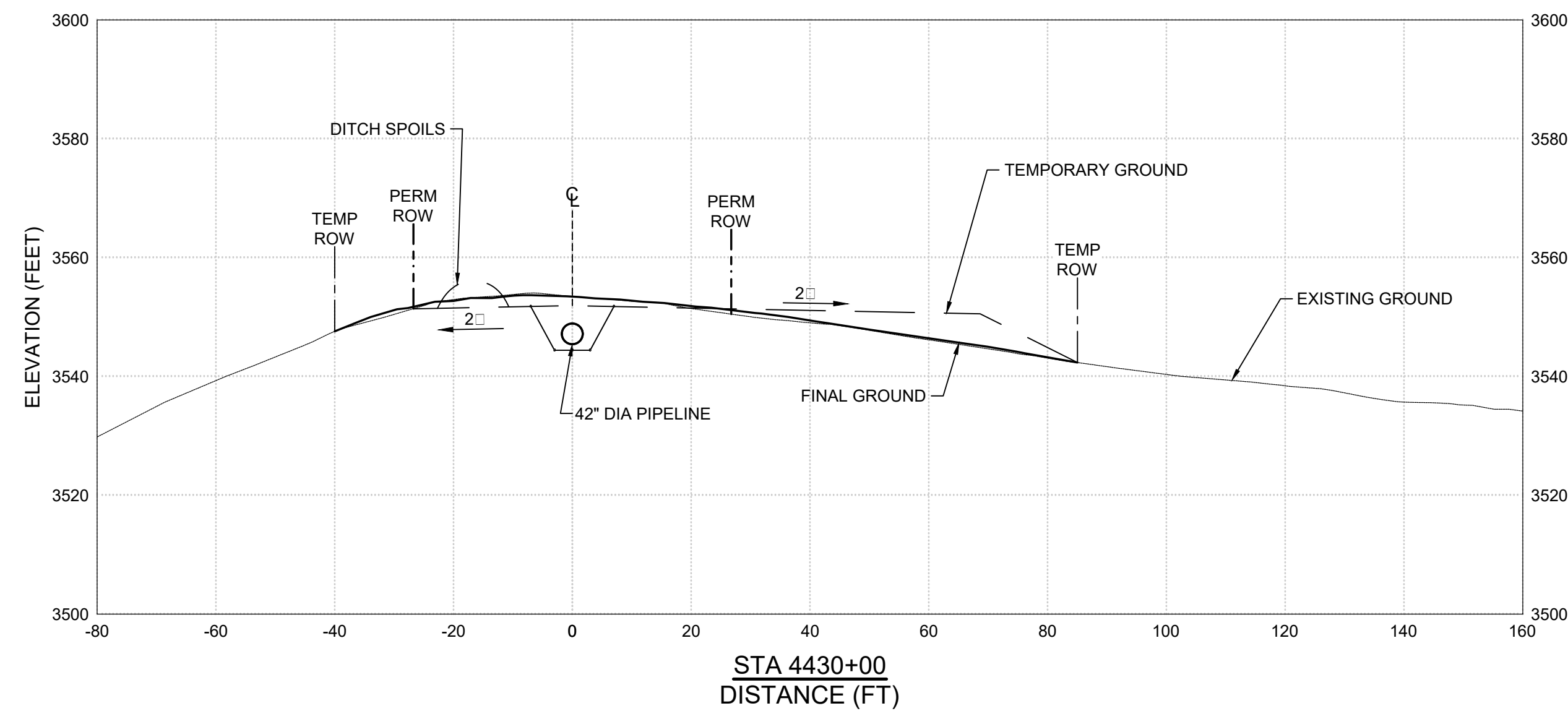
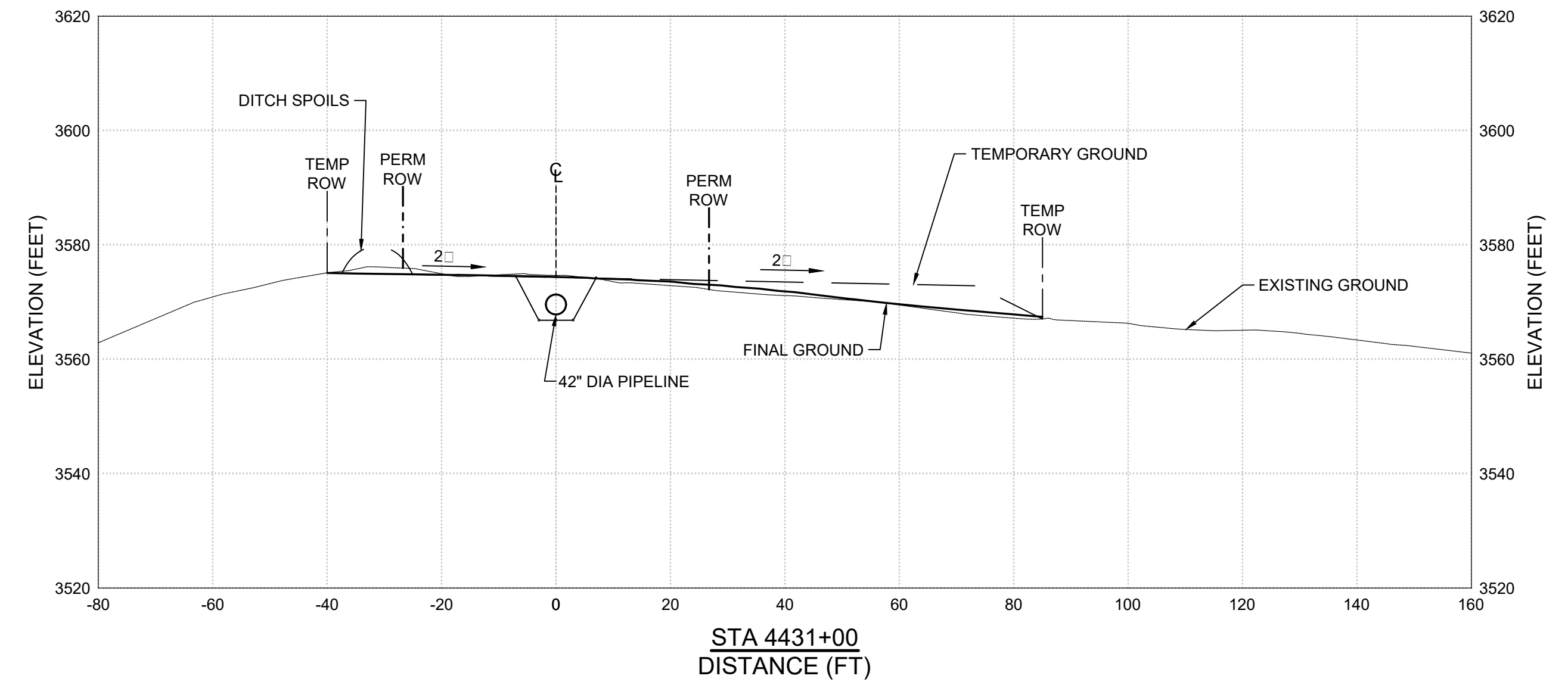
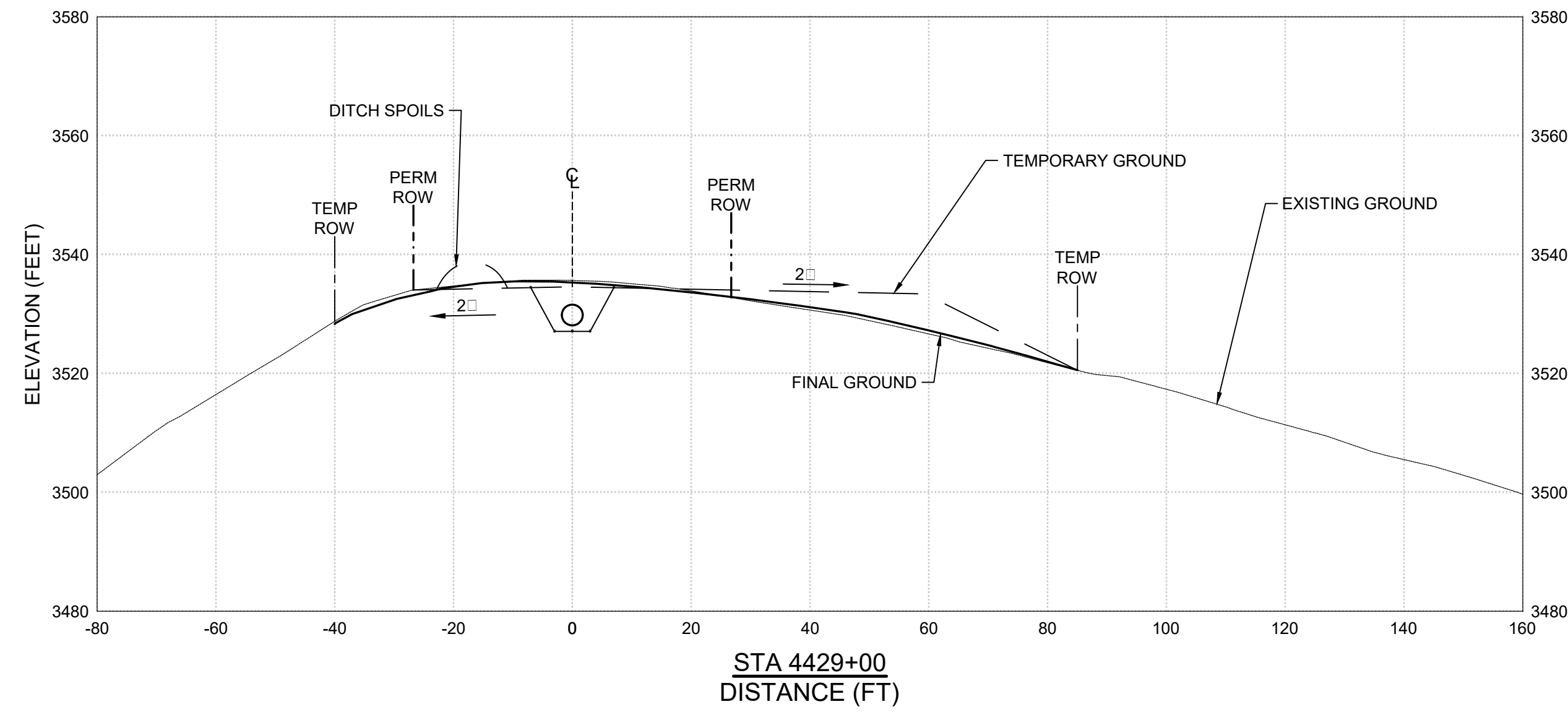
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50**

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D06
REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>24</b> OF <b>29</b>
APPROVED BY:	LCB		

DRAFT-PROGRESS SET

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NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
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TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (4 OF 8)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

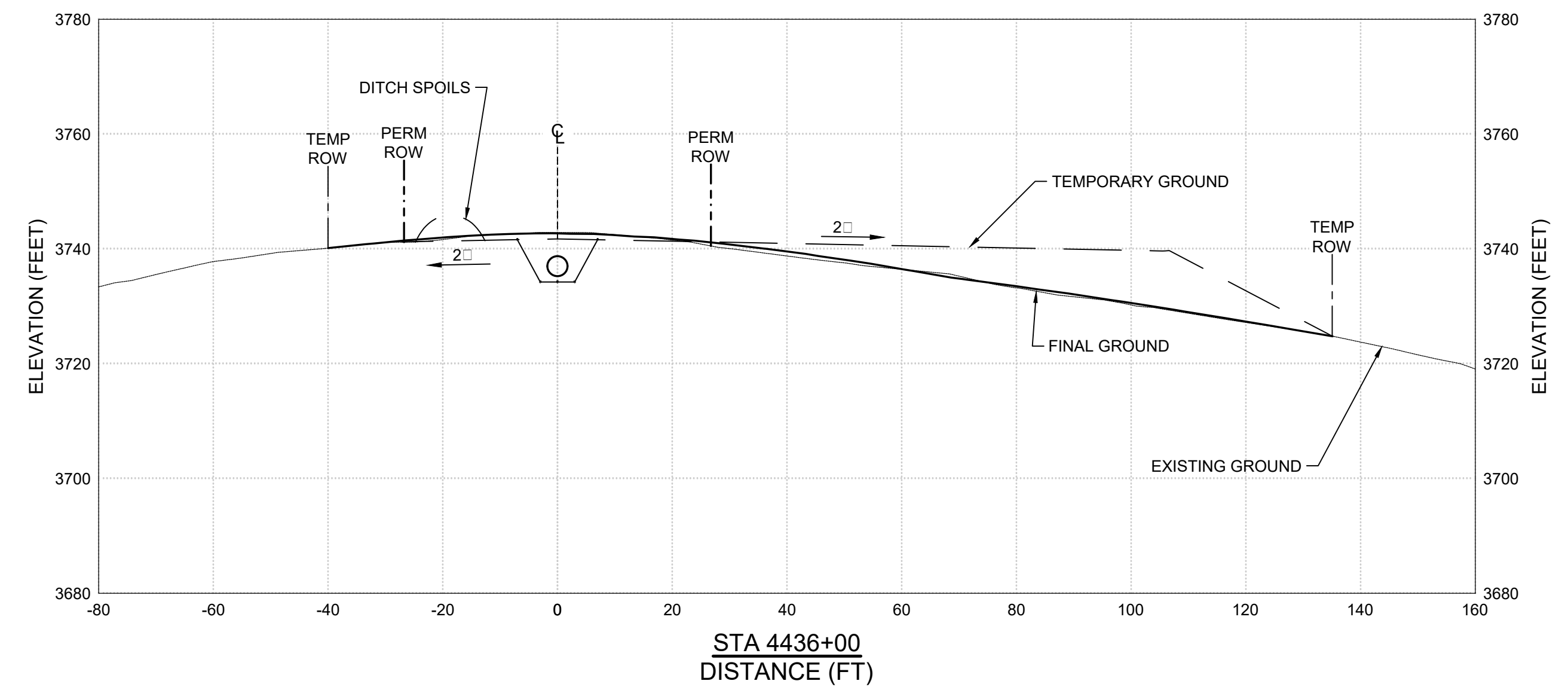
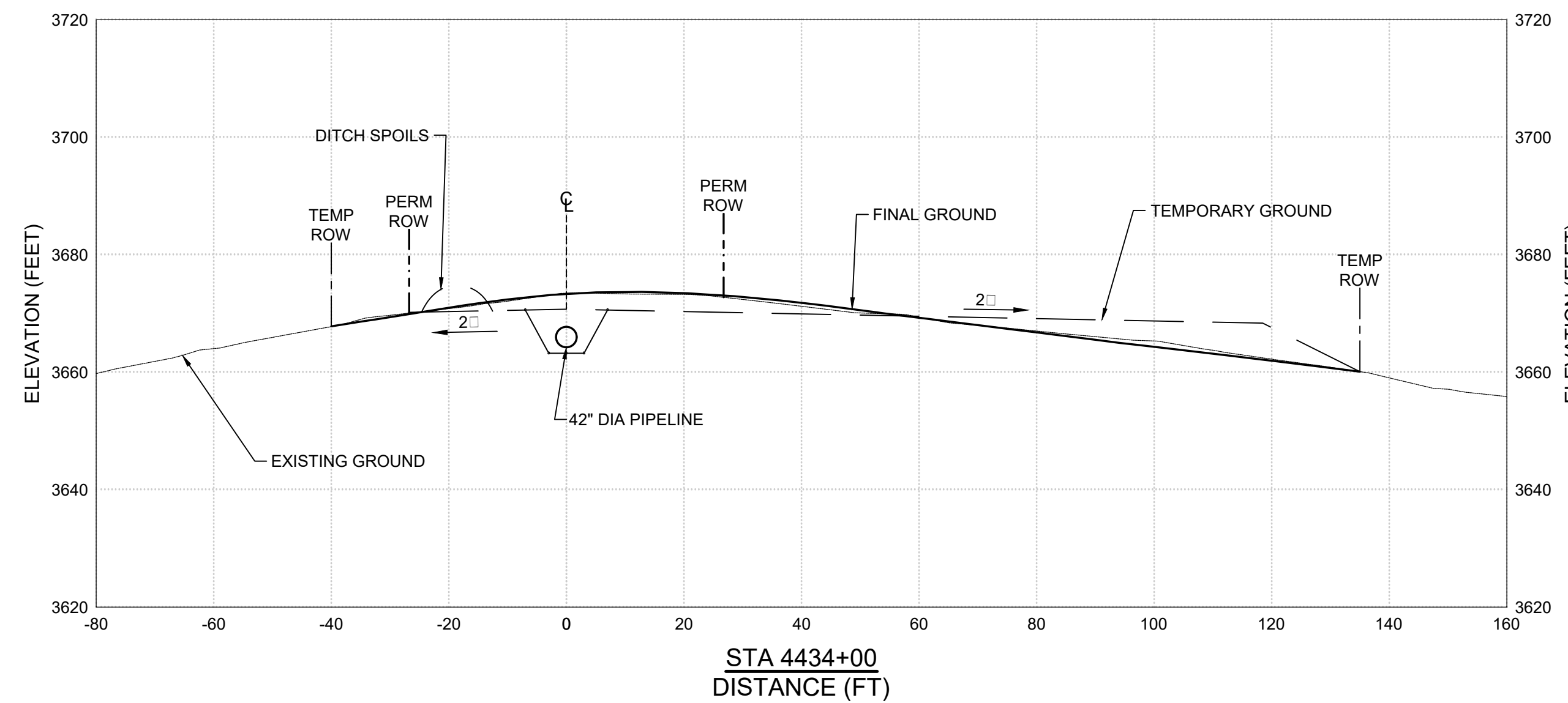
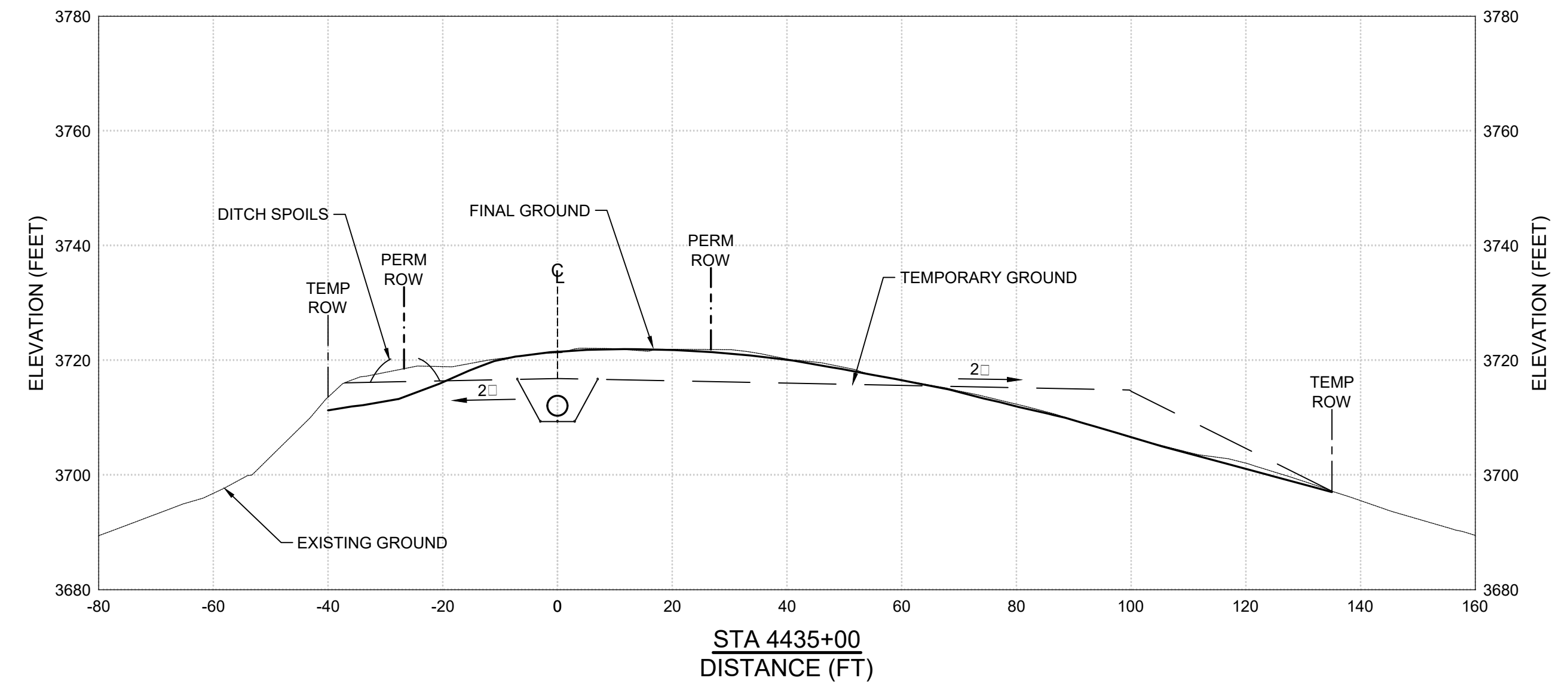
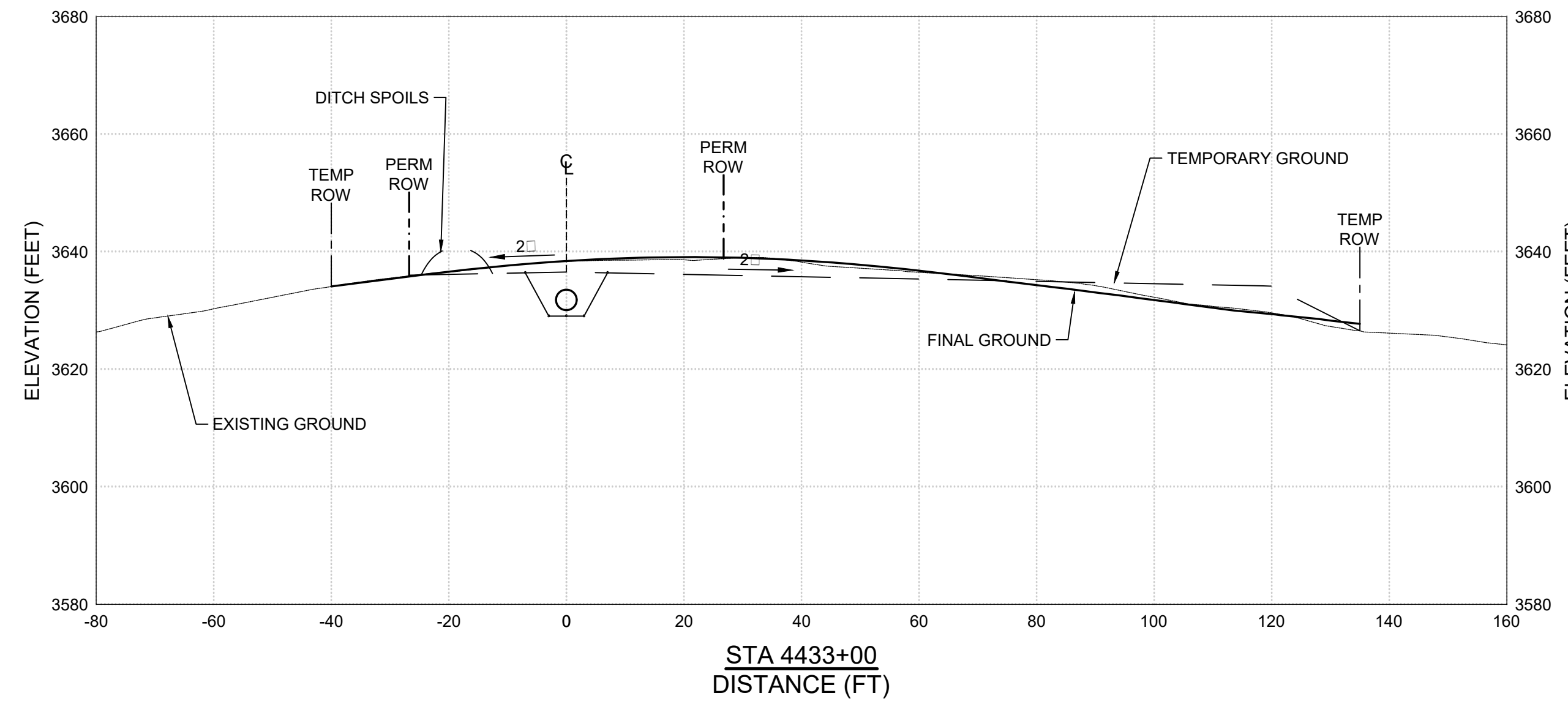
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**PRELIMINARY NOT FOR CONSTRUCTION**

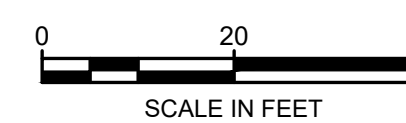
DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D06
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>25</b> OF <b>29</b>

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- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



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TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (5 OF 8)**

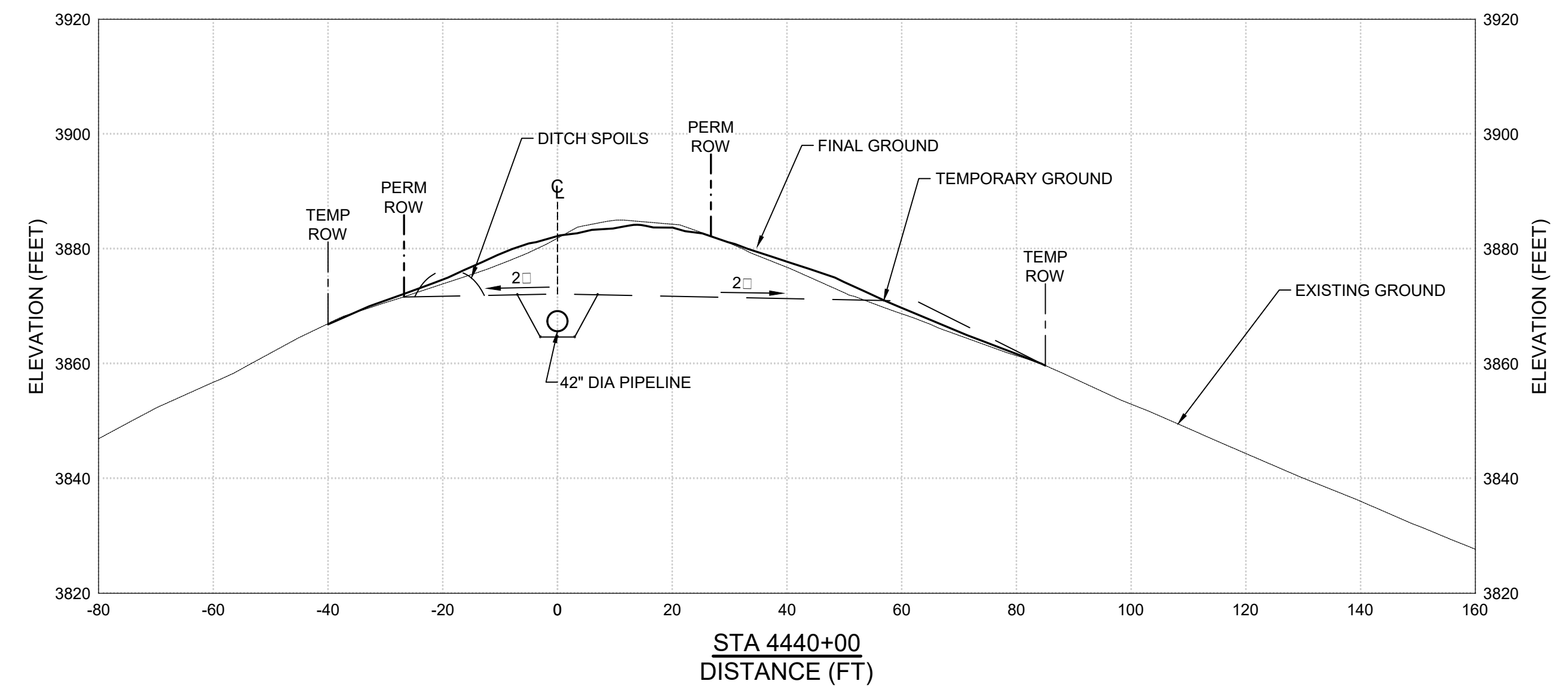
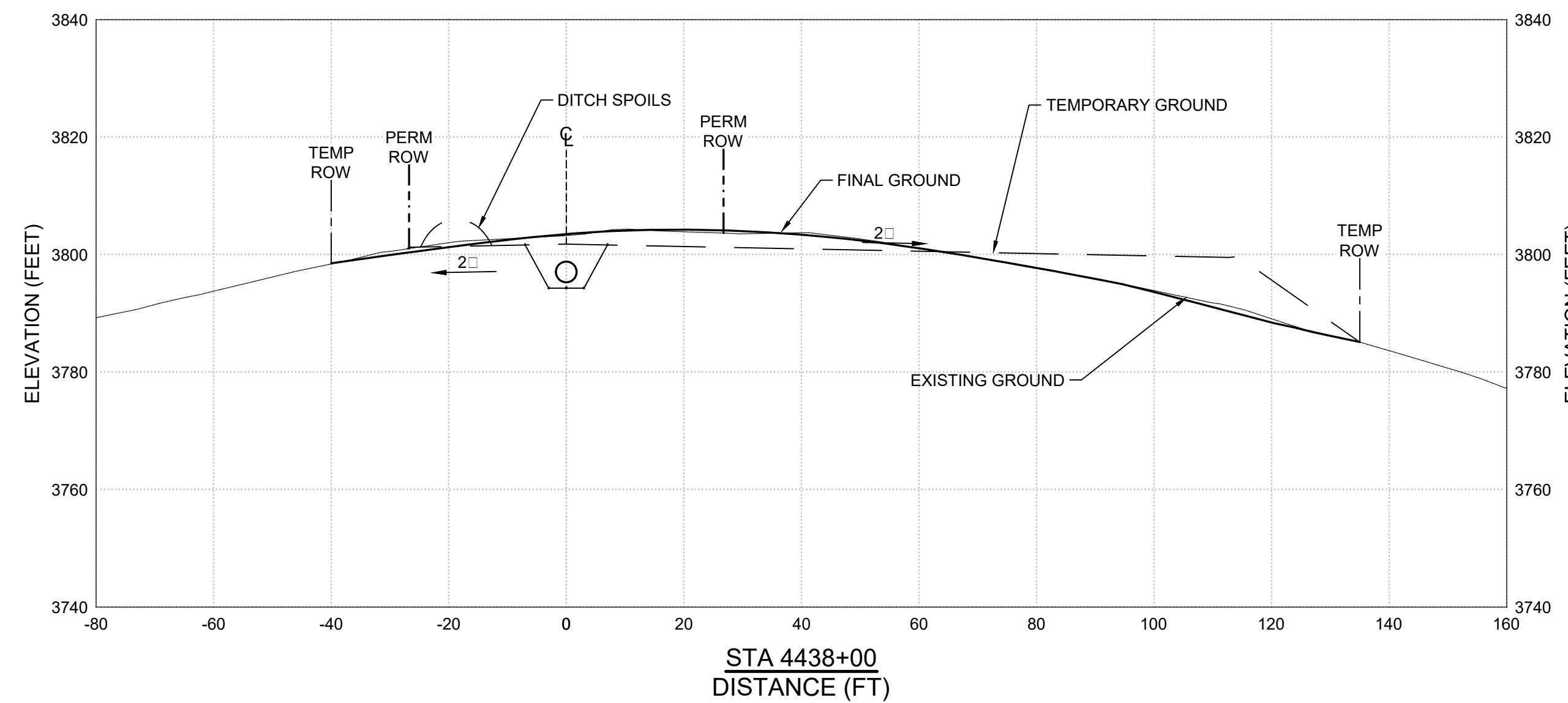
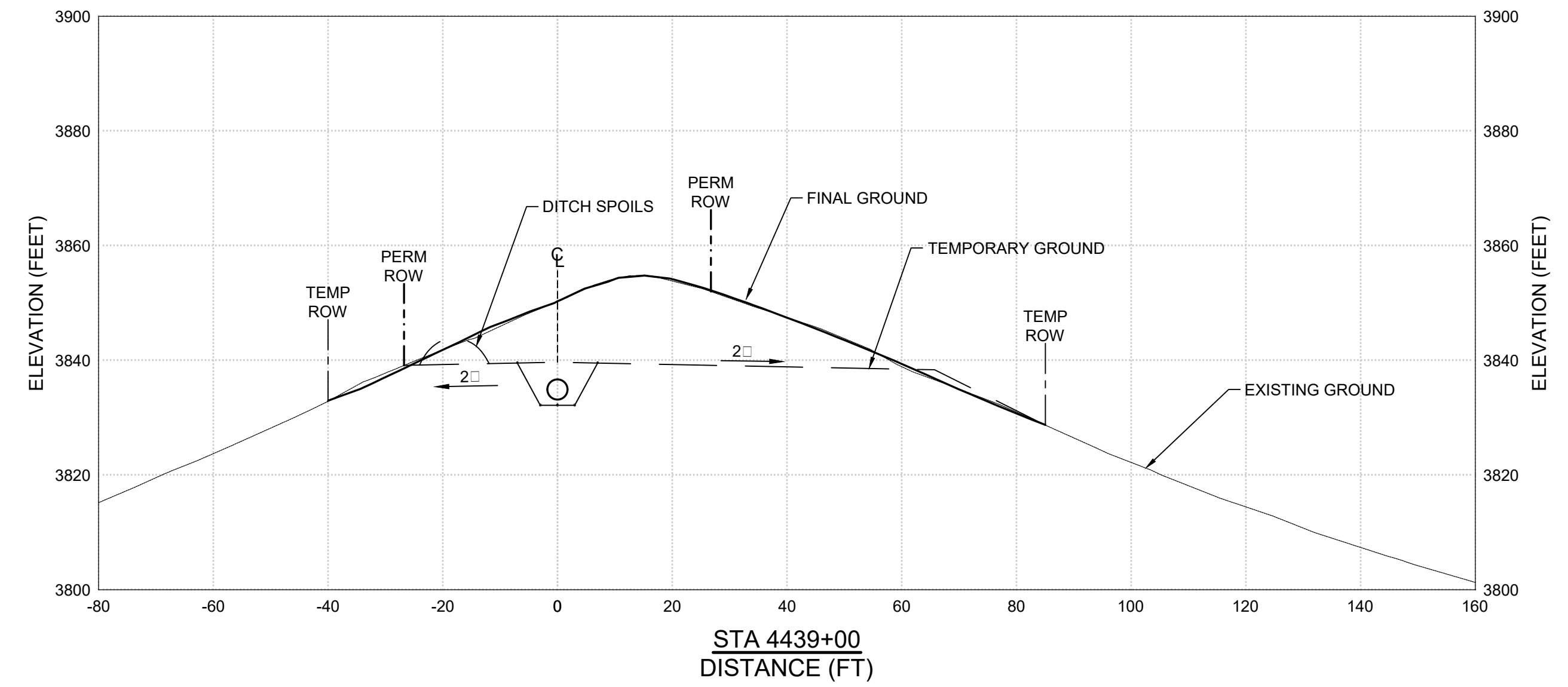
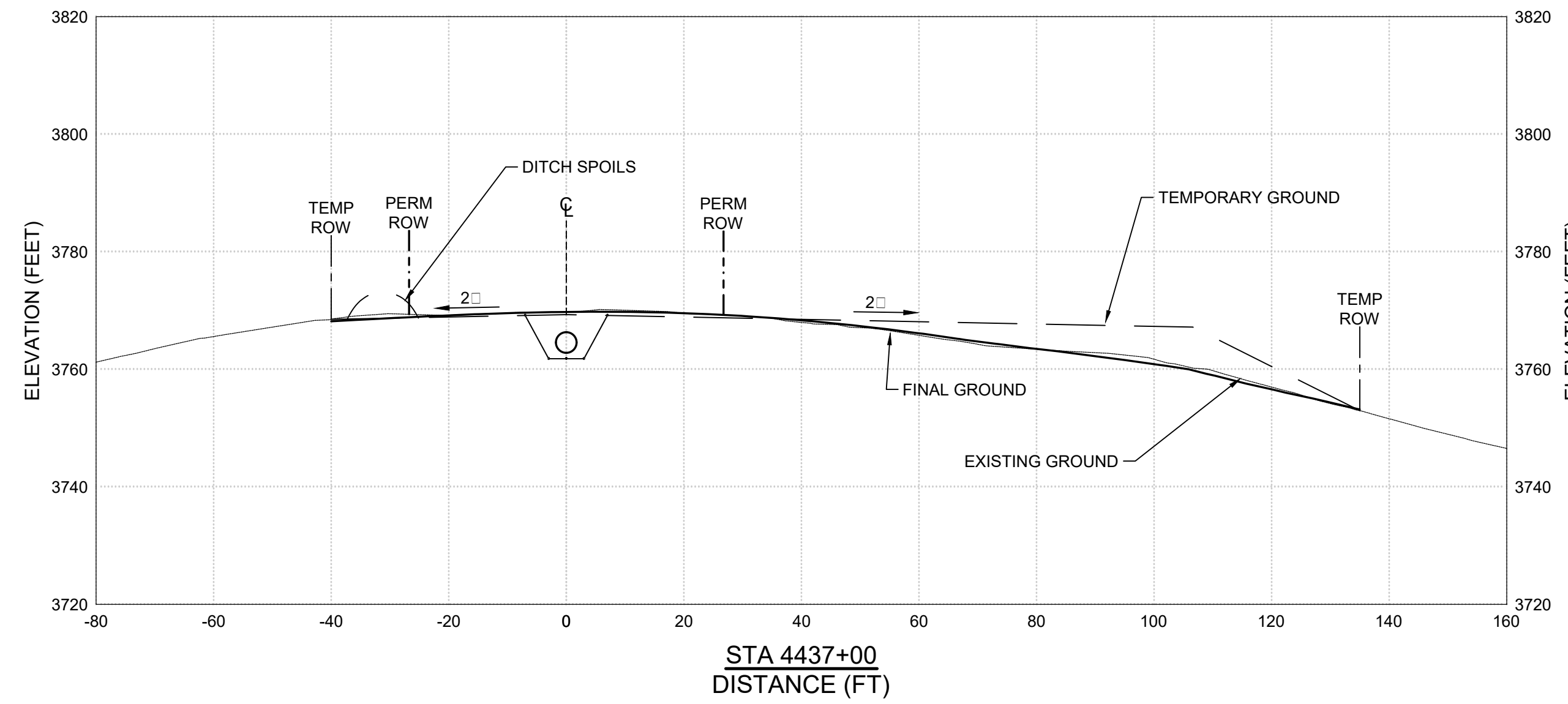
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50**

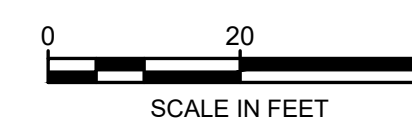
**PRELIMINARY NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D06
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>26</b> OF <b>29</b>



- NOTES:
- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
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TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (6 OF 8)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

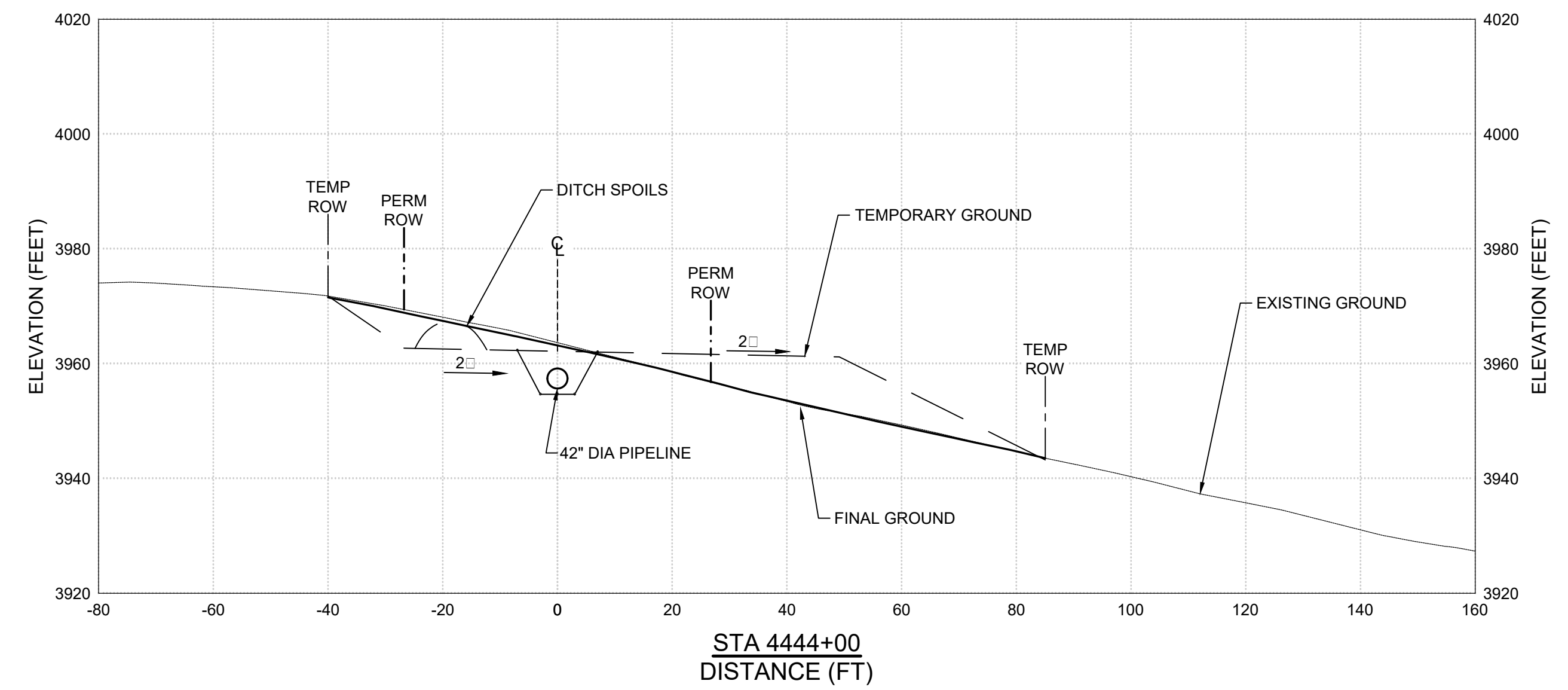
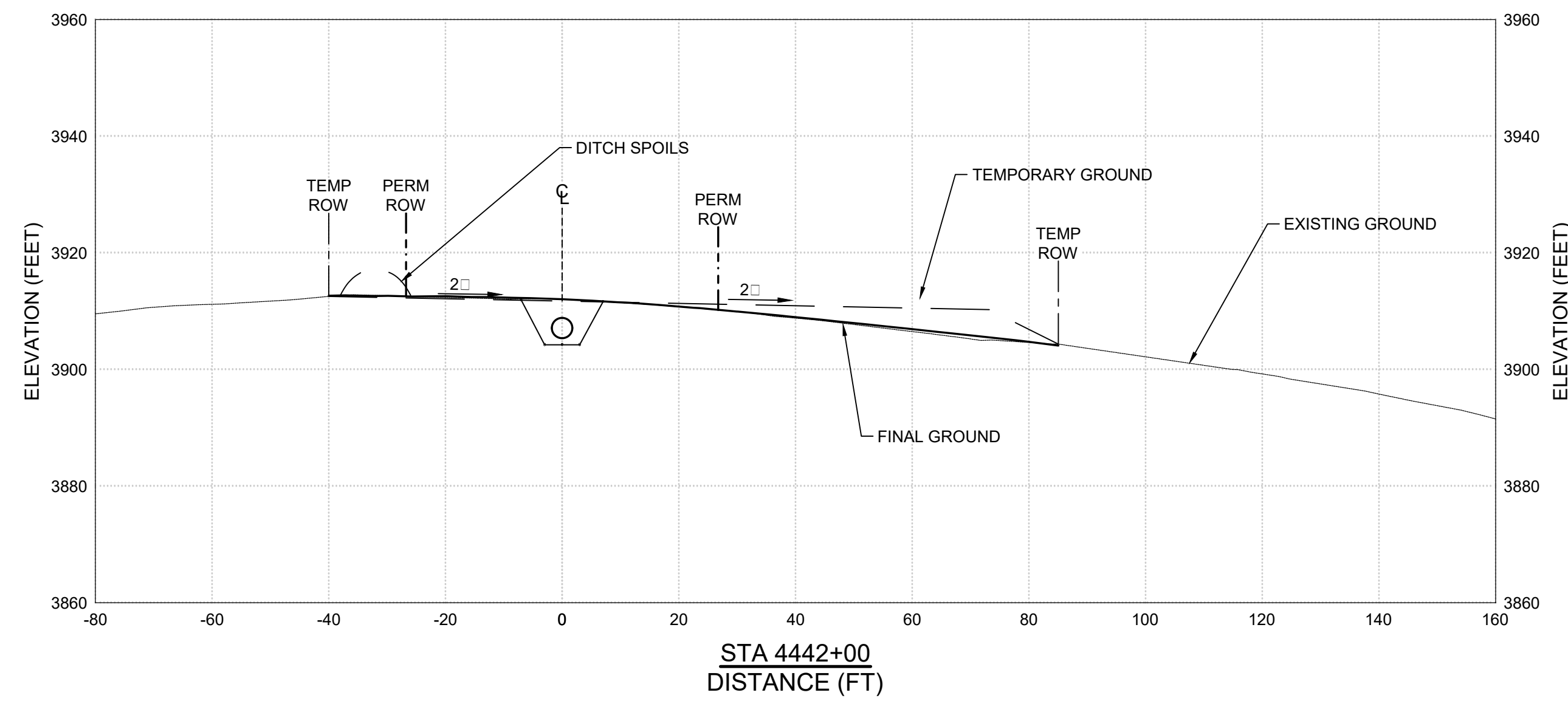
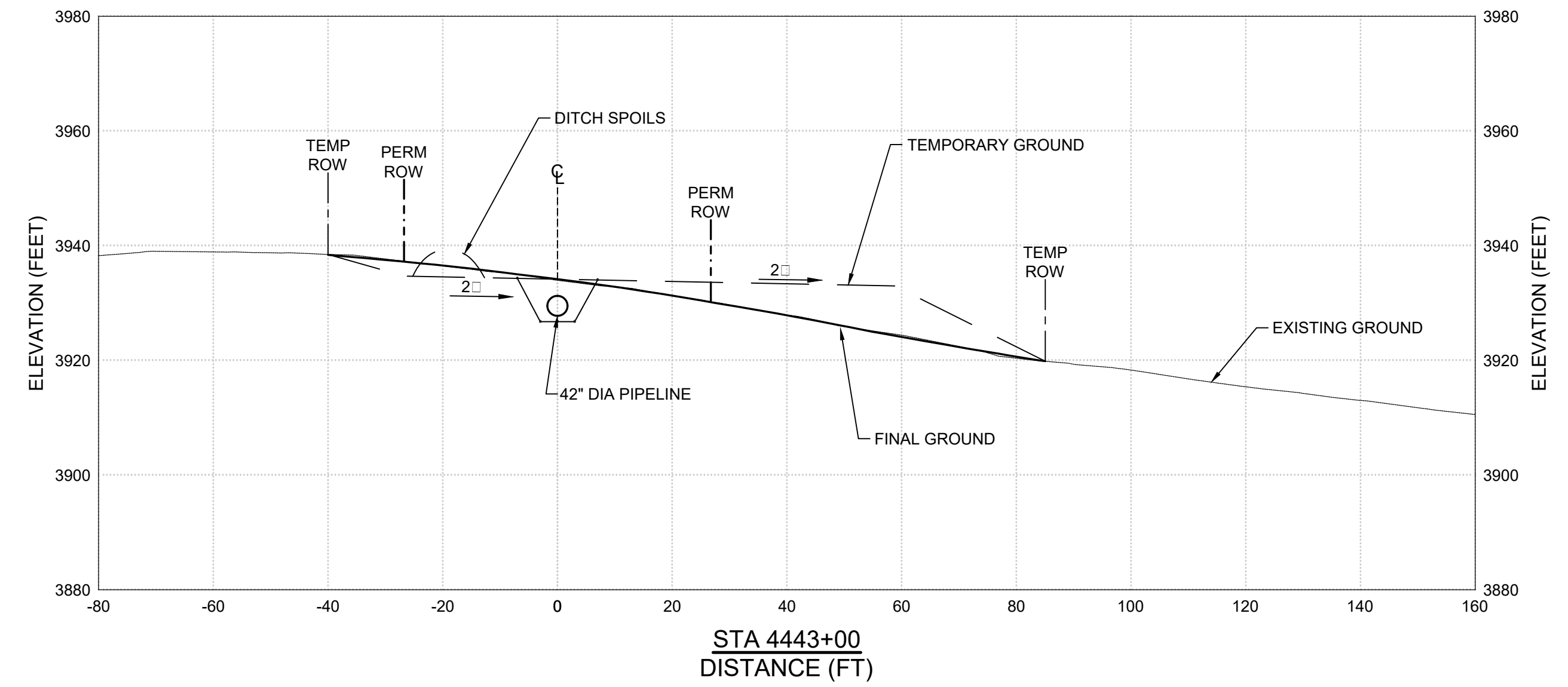
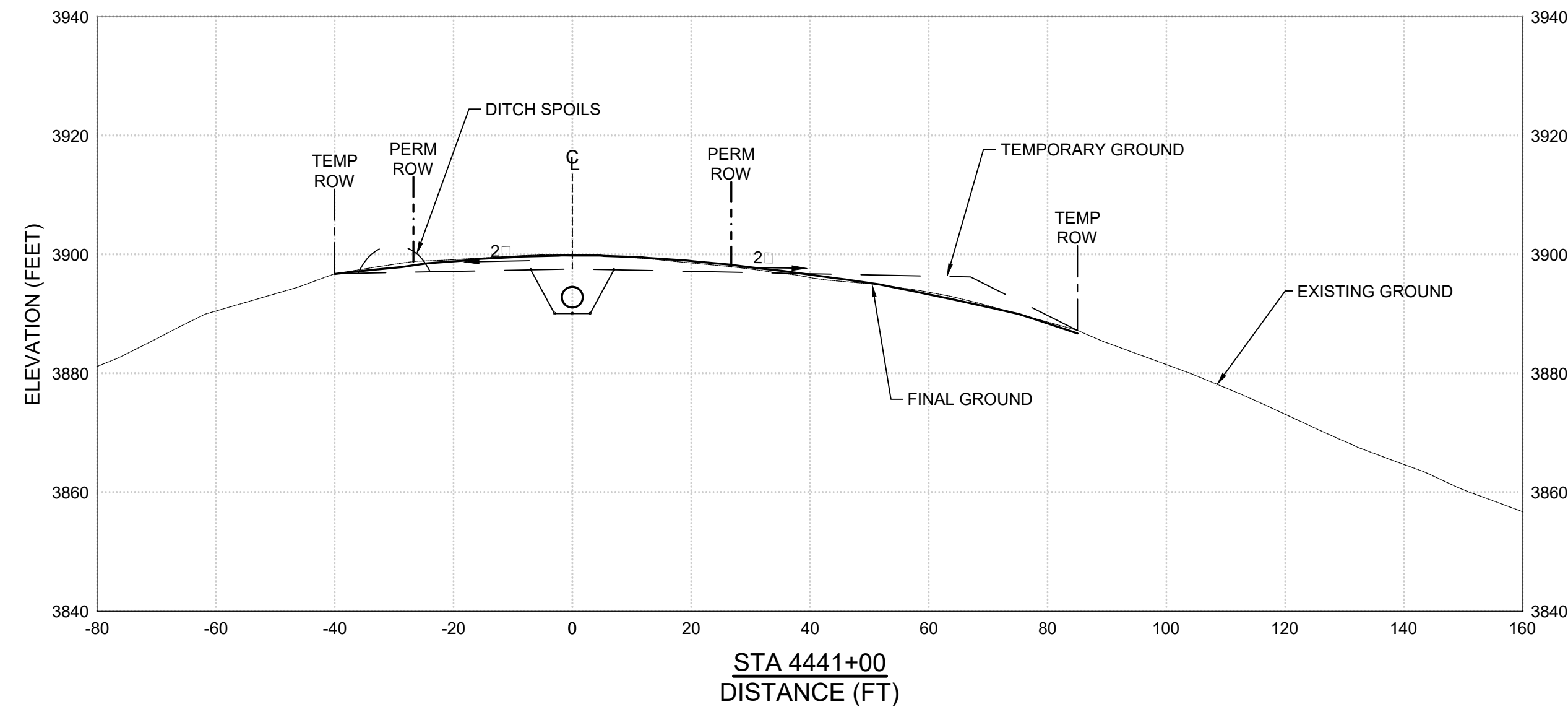
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**PRELIMINARY NOT FOR CONSTRUCTION**

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DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D06
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		<b>27</b> OF <b>29</b>

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NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
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 HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS (7 OF 8)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

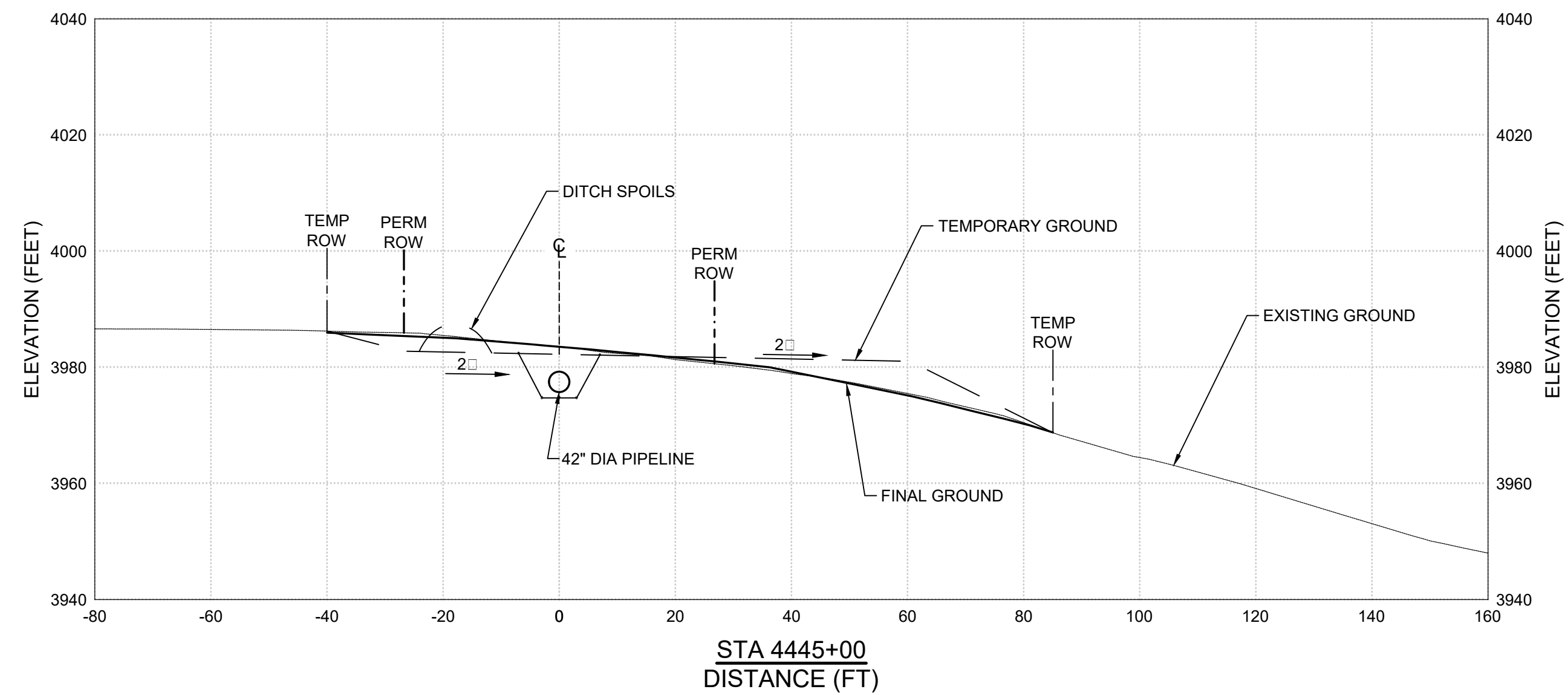
SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION ALIGNMENT SHEET NO. 96 STA 4416+50 TO STA 4445+50**

DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D06
REVIEWED BY:	LCB/TR	DRAWING NO.:	
APPROVED BY:	LCB		

DRAFT-PROGRESS SET

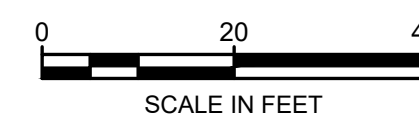
**PRELIMINARY  
NOT FOR CONSTRUCTION**

**28** OF **29**



NOTES:

- SEE DRAWING NO. 1 OF 29 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROLS NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
 SECTIONS (8 OF 8)**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 73.20 TO MP 73.50 CONSTRUCTION  
 ALIGNMENT SHEET NO. 96  
 STA 4416+50 TO STA 4445+50**

**PRELIMINARY  
 NOT FOR CONSTRUCTION**

DRAFT-PROGRESS SET

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D06
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>29</b> OF <b>29</b>

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# GEOHAZARD MITIGATION SITE SPECIFIC DESIGN FOR ACP AP-1 MP 84.95 TO MP 85.05 CONSTRUCTION ALIGNMENT SHEET NO. 113 STA 5346+00 TO STA 5352+00

**GENERAL NOTES:**

1. MAPPING AND TOPOGRAPHY BASED ON UTM COORDINATE SYSTEM WITH NAD83 DATUM, ZONE 17, US SURVEY FOOT, CENTRAL MERIDIAN 81° W.
2. STATIONING SHOWN IS SLOPE STATIONING FOR ROUTE REV 11B (3D) PROVIDED BY GAI CONSULTANTS, INC.
3. CONTOURS AND TOPOGRAPHIC FEATURES DERIVED FROM LIDAR DATA AND GPS SUB-METER GROUND SURVEY PERFORMED BY GAI CONSULTANTS, INC.
4. STREAM AND WETLAND DATA PROVIDED BY ERM.
5. FINAL CONFIGURATION OF ROW RESTORATION MEASURES TO BE DETERMINED BASED ON CONDITIONS ENCOUNTERED AT TIME OF CONSTRUCTION, AND MAY CHANGE OR VARY AND/OR INCORPORATE ADDITIONAL BIC INCREMENTAL CONTROLS TO MITIGATE SPECIFIC CONDITIONS.
6. VOLUMES, GRADES, ELEVATIONS, AND QUANTITIES WILL VARY DEPENDING ON SITE CONDITIONS ENCOUNTERED.

**BIC INCREMENTAL CONTROLS NOTES:**

1. INSTALL ENHANCED DRAINS (GERMAN DRAINS) (BIC INCREMENTAL CONTROL NO. 1B) WHERE SEEPAGE IS ENCOUNTERED IN THE TRENCH.
2. INSTALL TARGETED SEEP DRAINS (BIC INCREMENTAL CONTROL NO. 1C) TO INTERSEPT SEEPS WHERE EXCAVATION ENCOUNTERS SEEPAGE.
3. GRADE TEMPORARY ROW SURFACE (BIC INCREMENTAL CONTROL NO. 2A) FOR SLOPING AND TEXTURING TO MITIGATE EROSION DURING CONSTRUCTION.
4. GRADE TEMPORARY ROW WITH OUTBOARD WEDGE (BIC INCREMENTAL CONTROL NO. 2B) TO ENCOURAGE MOVEMENT OF SURFACE FLOW AWAY FROM THE TRENCH.
5. BACKFILL USING ONLY DRY AND MOIST SOILS (BIC INCREMENTAL CONTROL NO. 2D). DO NOT REUSE SATURATED SOILS AS BACKFILL.
6. REMOVE EXISTING SOILS WITH ENGINEERING PROPERTIES UNSUITABLE FOR REUSE AS BACKFILL (BIC INCREMENTAL CONTROL NO. 2E). THIS MAY INCLUDE SATURATED SOILS AND ORGANIC SOILS, AMONG OTHER UNSUITABLE MATERIALS.
7. UTILIZE ROCK BACKFILL (WITH DRAIN) (BIC INCREMENTAL CONTROL NO. 2F) WITH SPECIFIED RIPRAP GRADATIONS (BIC INCREMENTAL CONTROL NO. 6F) TO PROVIDE IMPROVED STABILITY IN TARGETED AREAS.
8. GRADE FINAL GROUND SURFACE TO MATCH EXISTING GROUND SURFACE CONTOURS (BIC INCREMENTAL CONTROL NO. 2G).
9. DEVELOP SPOILS MANAGEMENT PLAN (BIC INCREMENTAL CONTROL NO. 2J) WITH PROCEDURES FOR MANAGING SPOILS FOR BOTH TEMPORARY AND PERMANENT CONDITIONS.
10. UTILIZE SOIL NAIL WITH TECCO MESH GEO-STRUCTURAL STABILIZATION SYSTEM (BIC INCREMENTAL CONTROL NO. 2L) ON TARGETED SLOPE AREAS. SEE DRAWING NO. 7 OF 7 FOR SPECIFICATIONS FOR THE SOIL NAIL AND MESH SYSTEM.
11. TRACK DISTURBED SLOPES (BIC INCREMENTAL CONTROL NO. 3A) TO PROMOTE GROWTH OF VEGETATION AND TO MITIGATE EROSION.
12. INSTALL COIR CLOTH ON DISTURBED SLOPES (BIC INCREMENTAL CONTROL NO. 3C) TO CONTROL EROSION AND TO PROMOTE GROWTH OF VEGETATION AT TARGETED AREAS.
13. ROCK ARMORING (BIC INCREMENTAL CONTROL NO. 3D) IN TARGETED AREAS FOR SLOPE STABILIZATION.
14. INSTALL COIR LOGS (BIC INCREMENTAL CONTROL NO. 3E) AT TARGETED LOCATIONS ON DISTURBED SLOPES TO FACILITATE SURFACE WATER DIVERSION WHERE SLOPES ARE TOO STEEP FOR CONVENTIONAL SLOPE BREAKERS.
15. INSTALL TRENCH BREAKERS (BIC INCREMENTAL CONTROL NO. 4A) AT TARGETTED LOCATIONS.
16. INSTALL SACK-CRETE TRENCH BREAKERS (STRUCTURAL BREAKER) (BIC INCREMENTAL CONTROL NO. 4C) FOR IMPROVED STABILIZATION OF TRENCH BACKFILL IN TARGETED AREAS.
17. INSTALL SLEEVE INTERFACE BETWEEN PIPELINE AND TRENCH BREAKER (BIC INCREMENTAL CONTROL NO. 4D) TO DECOUPLE THE BOND BETWEEN THE TRENCH BREAKER AND THE PIPELINE AT TARGETED AREAS.
18. INSTALL TRENCH BREAKERS WITH DRAINAGE (BIC INCREMENTAL CONTROL NO. 4F) TO COLLECT SEEPAGE FROM WITHIN THE TRENCH.
19. INSTALL TEMPORARY AND PERMANENT SLOPE BREAKERS (BIC INCREMENTAL CONTROL NO. 5A) TO SLOW AND REDIRECT SURFACE WATER OFF THE RIGHT-OF-WAY.
20. INSTALL ARMORED OUTLET FOR SLOPE BREAKER (BIC INCREMENTAL CONTROL NO. 5B) TO DISSIPATE ENERGY FROM DISCHARGING SURFACE FLOW WHERE HYDRAULIC FORCES ARE ANTICIPATED TO BE HIGH.
21. SURFACE WATER DIVERSIONS (BIC INCREMENTAL CONTROL NO. 5H) IN TARGETED AREAS, SUCH AS WATER BARRIERS FOR STREAM CROSSING WITH FLUME.
22. INSTALL BANK ARMORING (BIC INCREMENTAL CONTROL NO. 6E) IN TARGETED AREAS, SUCH AS RIP RAP REVETMENT AT TOE OF SLOPE TO PREVENT WASHOUT AT TRENCH.
23. USE STANDARD RIP RAP GRADATIONS (BIC INCREMENTAL CONTROL NO. 6F) WHEN CRUSHED ROCK AND STONE BACKFILL ARE REQUIRED.
24. INSTALL BELTED REINFORCED SILT FENCE (BIC INCREMENTAL CONTROL NO. 7A) AT TARGETED LOCATIONS TO INTERCEPT SURFACE RUNOFF AND PREVENT SOIL MATERIAL FROM LEAVING THE WORK AREA.
25. INSTALL ROCK GUARD (BIC INCREMENTAL CONTROL NO. 8A) TO PROTECT PIPELINE WHERE TRENCH IS EXCAVATED IN BEDROCK.
26. BENCH RE-CONSTRUCTION THROUGH NATURAL SLOPES (BIC INCREMENTAL CONTROL NO. 10A) TO AVOID DEVELOPING TROUGH ALONG THE TRENCH LINE.
27. CONDUCT AS-BUILT SURVEY OF TRENCH BREAKERS (BIC INCREMENTAL CONTROL NO. 11F) SO THAT TRENCH BREAKERS AND SLOPE BREAKERS CAN BE CO-LOCATED FOR IMPROVED OVERALL FUNCTION.
28. FLUME METHOD FOR PIPELINE STREAM CROSSING (BIC INCREMENTAL CONTROL NO. 13B).
29. DEVELOP BLASTING PLAN (BIC INCREMENTAL CONTROL NO. 14C) WHERE BEDROCK REQUIRES BLASTING.

LIST OF DRAWINGS	
DRAWING NO.	TITLE
1	COVER SHEET WITH GENERAL NOTES AND LEGEND
2	PLAN VIEW: EXISTING GROUND
3	PLAN VIEW: TEMPORARY GROUND
4	PLAN VIEW: FINAL GROUND
5	PROFILE A-A'
6	SECTIONS
7	SOIL NAIL AND MESH SYSTEM SPECIFICATIONS

**LEGEND**

	EXISTING GROUND ELEVATION CONTOUR (FT. MSL)		TEMPORARY ROW
	EXISTING STREAM LINE		EXTRA WORKSPACE
	BELTED SILT RETENTION FENCE (BSRF)		SACK-CRETE
	LIMIT OF DISTURBANCE		RIPRAP ARMOR LAYER (R-4 GRADATION)
	PERMANENT ROW		CRUSHED STONE (R-2 GRADATION)
	PERMANENT SLOPE BREAKER		TECCO MESH AND COIR CLOTH SYSTEM
	TEMPORARY SLOPE BREAKER		FOAM TRENCH BREAKER
	PIPELINE CENTERLINE AND STATIONING		COIR LOG
	MILE POST		
	SOIL NAIL		
	ROCK GUARD		
	SLEEVE INTERFACE		
	DRAINAGE TIGHTLINE PIPE		
	PERFORATED DRAINAGE COLLECTION PIPE		

D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



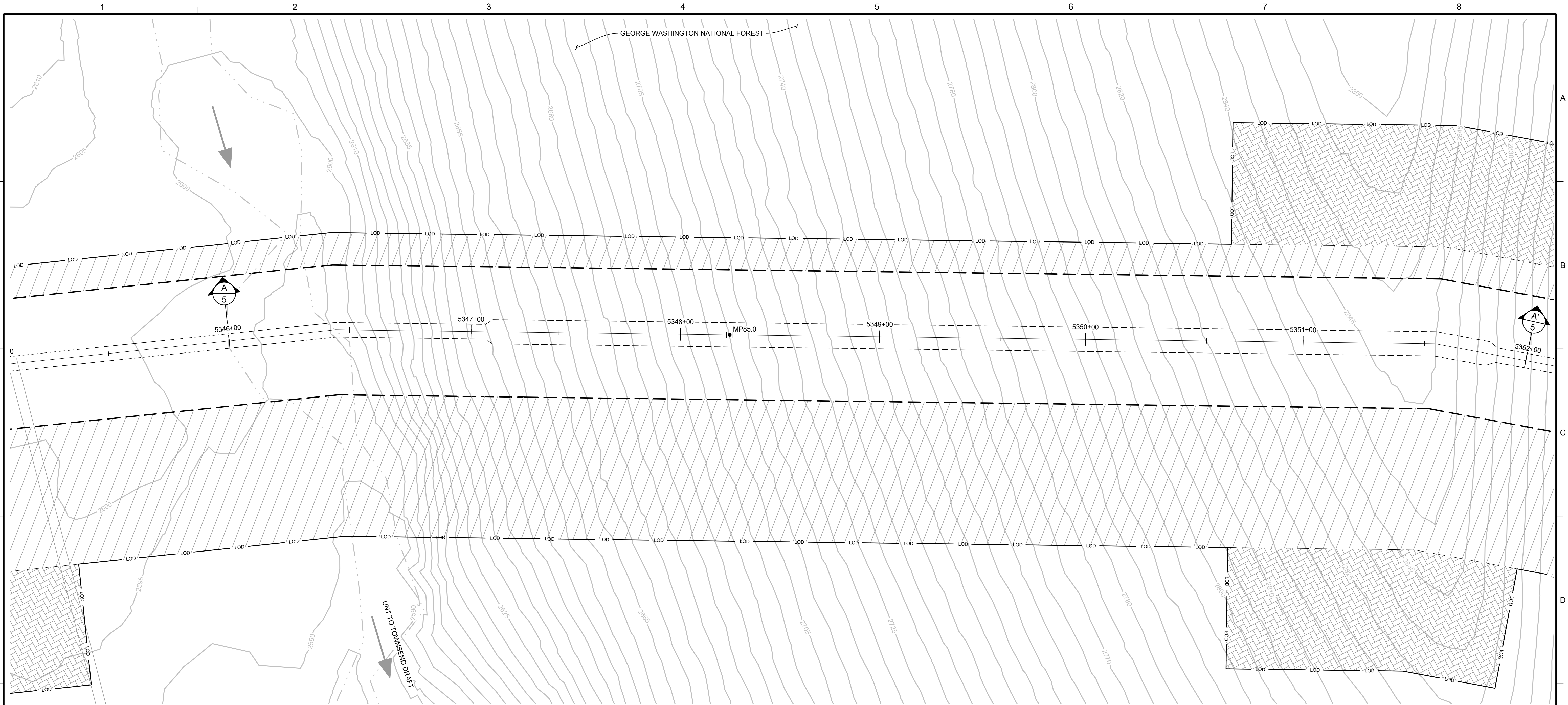
**TITLE:** GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
COVER SHEET WITH GENERAL NOTES AND LEGEND

**PROJECT:** ATLANTIC COAST PIPELINE, REV 11B

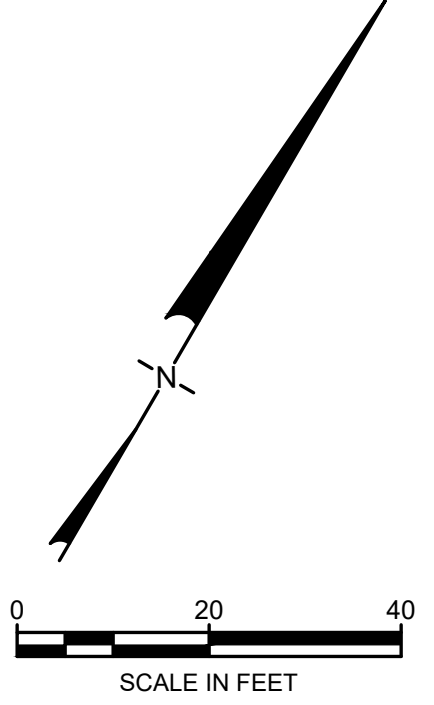
**SITE:** ACP AP-1 MP 84.95 TO MP 85.05  
CONSTRUCTION ALIGNMENT SHEET NO. 113  
STA 5346+00 TO STA 5352+00

<b>PRELIMINARY NOT FOR CONSTRUCTION</b>	DESIGN BY: LCB/TR	DATE: MARCH 2017	
	DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13	
	CHECKED BY: MBE	FILE: TXG000713D02A	
	REVIEWED BY: LCB/TR	DRAWING NO.:	
	APPROVED BY: LCB	<b>1</b> OF <b>7</b>	

**DRAFT-PROGRESS SET**



- NOTES:
- SEE DRAWING 1 OF 7 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROL NOTES.



REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR

GEOSYNTEC CONSULTANTS, INC.  
11490 WESTHEIMER ROAD, SUITE 150  
HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PLAN VIEW: EXISTING GROUND**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 84.95 TO MP 85.05  
CONSTRUCTION ALIGNMENT SHEET NO. 113  
STA 5346+00 TO STA 5352+00**

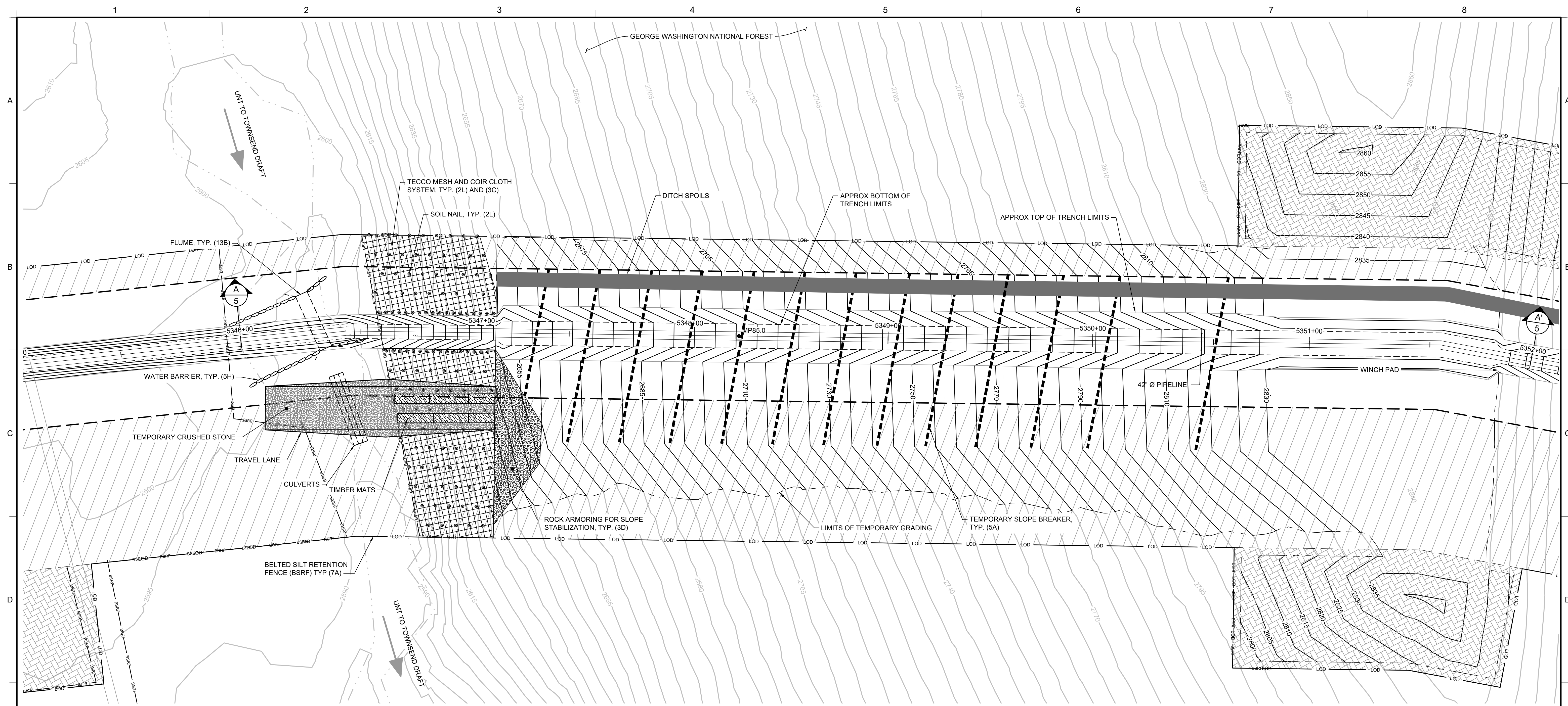
DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D03
REVIEWED BY:	LCB/TR	DRAWING NO.:	<b>2</b> OF <b>7</b>
APPROVED BY:	LCB		

**PRELIMINARY  
NOT FOR CONSTRUCTION**

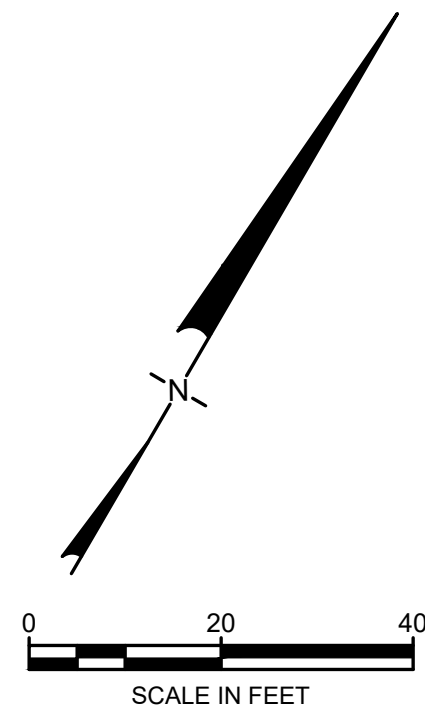
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- NOTES:
- SEE DRAWING 1 OF 7 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROL NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP

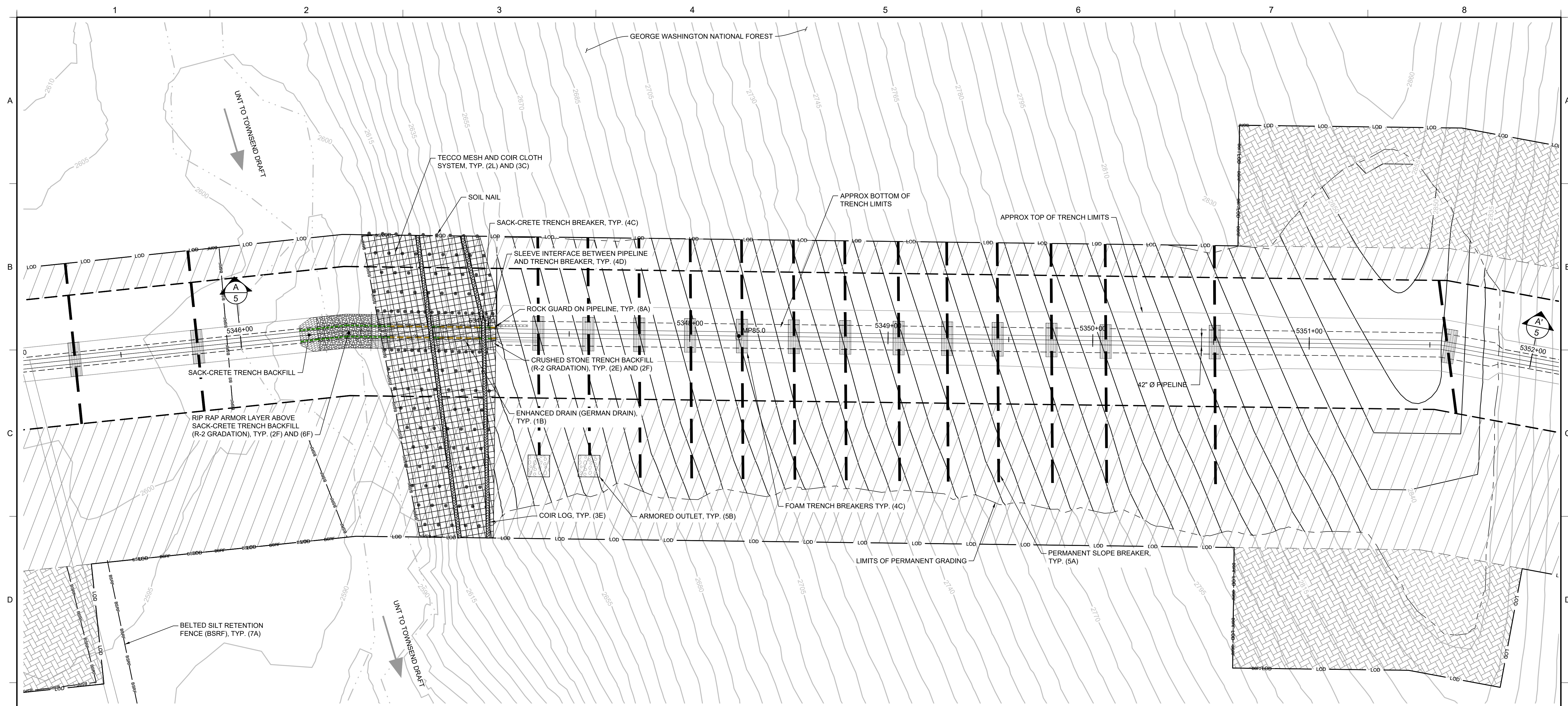
**Geosyntec**  
**consultants**  
 GEOSYNTEC CONSULTANTS, INC.  
 11490 WESTHEIMER ROAD, SUITE 150  
 HOUSTON, TEXAS 77077

TITLE:	GEOHAZARD MITIGATION SITE SPECIFIC DESIGN PLAN VIEW: TEMPORARY GROUND		
PROJECT:	ATLANTIC COAST PIPELINE, REV 11B		
SITE:	ACP AP-1 MP 84.95 TO MP 85.05 CONSTRUCTION ALIGNMENT SHEET NO. 113 STA 5346+00 TO STA 5352+00		
DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D03A
REVIEWED BY:	LCB/TR	DRAWING NO.:	3 OF 7
APPROVED BY:	LCB		

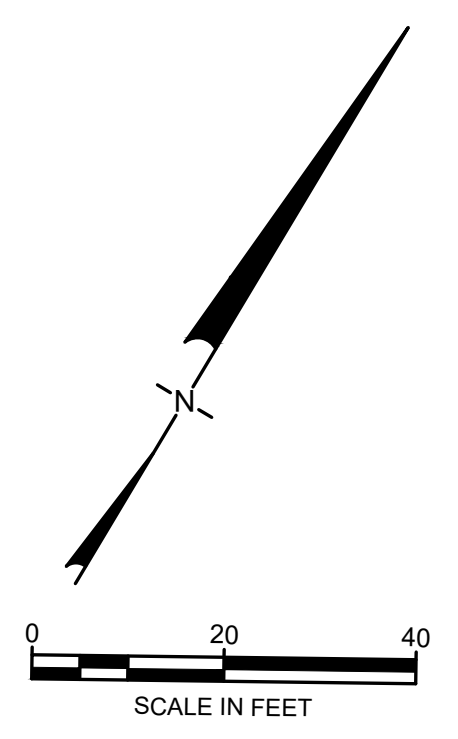
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NOT FOR CONSTRUCTION**

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NOTES:  
 1. SEE DRAWING 1 OF 7 FOR LEGEND, GENERAL NOTES, AND BIC INCREMENTAL CONTROL NOTES.



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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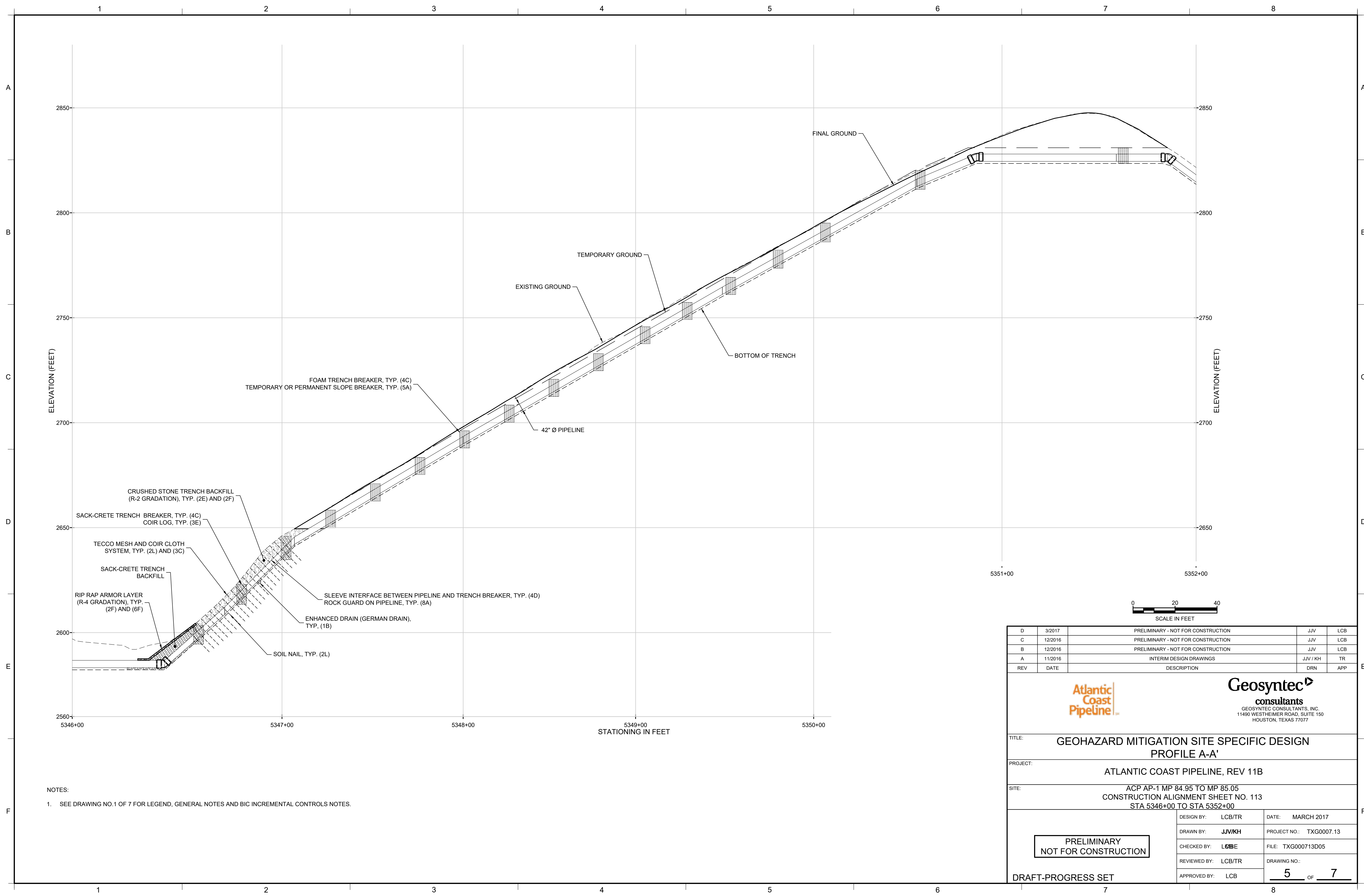
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PROJECT:	ATLANTIC COAST PIPELINE, REV 11B		
SITE:	ACP AP-1 MP 84.95 TO MP 85.05 CONSTRUCTION ALIGNMENT SHEET NO. 113 STA 5346+00 TO STA 5352+00		
DESIGN BY:	LCB/TR	DATE:	MARCH 2017
DRAWN BY:	JJV/KH	PROJECT NO.:	TXG0007.13
CHECKED BY:	MBE	FILE:	TXG000713D03B
REVIEWED BY:	LCB/TR	DRAWING NO.:	4 OF 7
APPROVED BY:	LCB		

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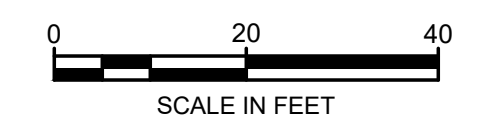
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ELEVATION (FEET)

ELEVATION (FEET)

STATIONING IN FEET



- NOTES:
- SEE DRAWING NO.1 OF 7 FOR LEGEND, GENERAL NOTES AND BIC INCREMENTAL CONTROLS NOTES.

REV	DATE	DESCRIPTION	DRN	APP
D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



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HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
PROFILE A-A'**

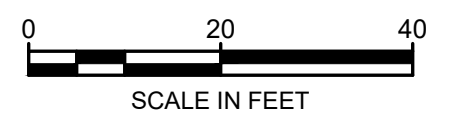
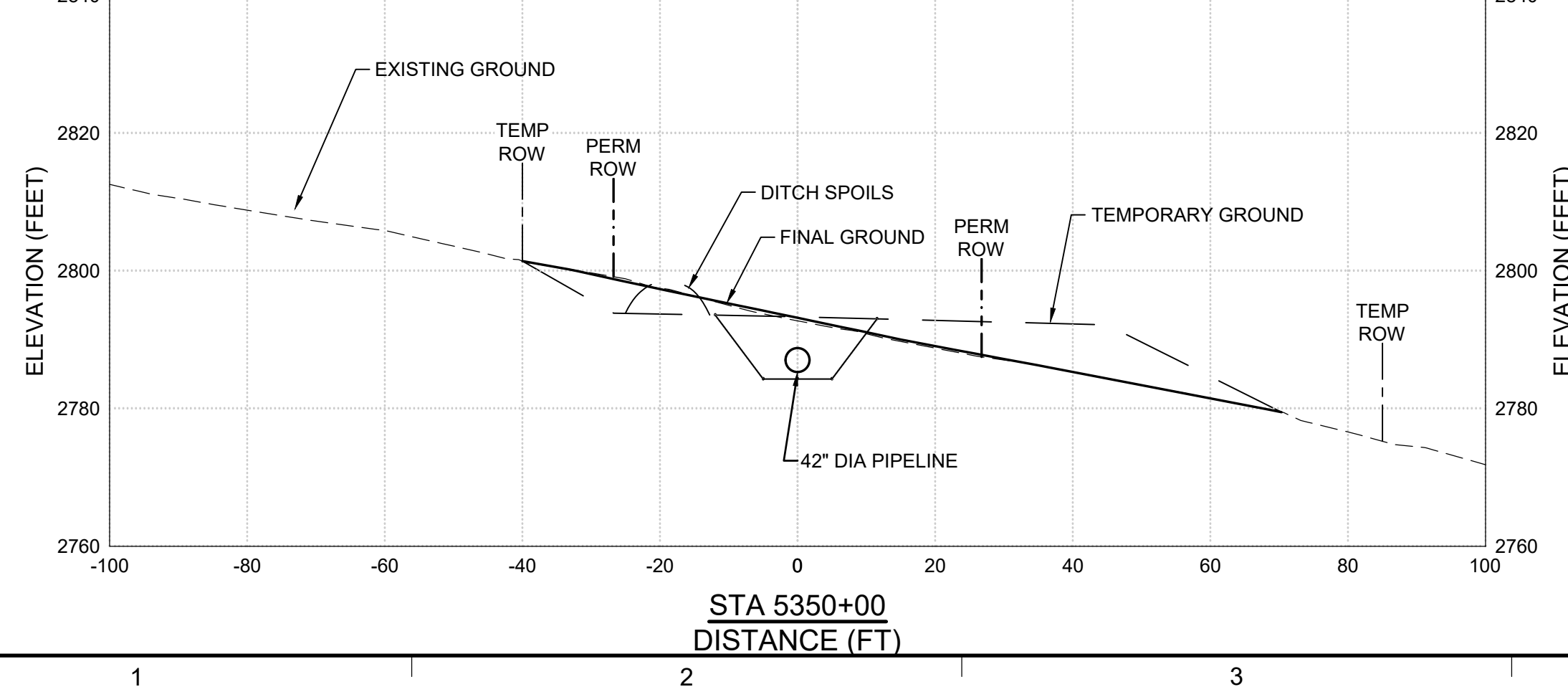
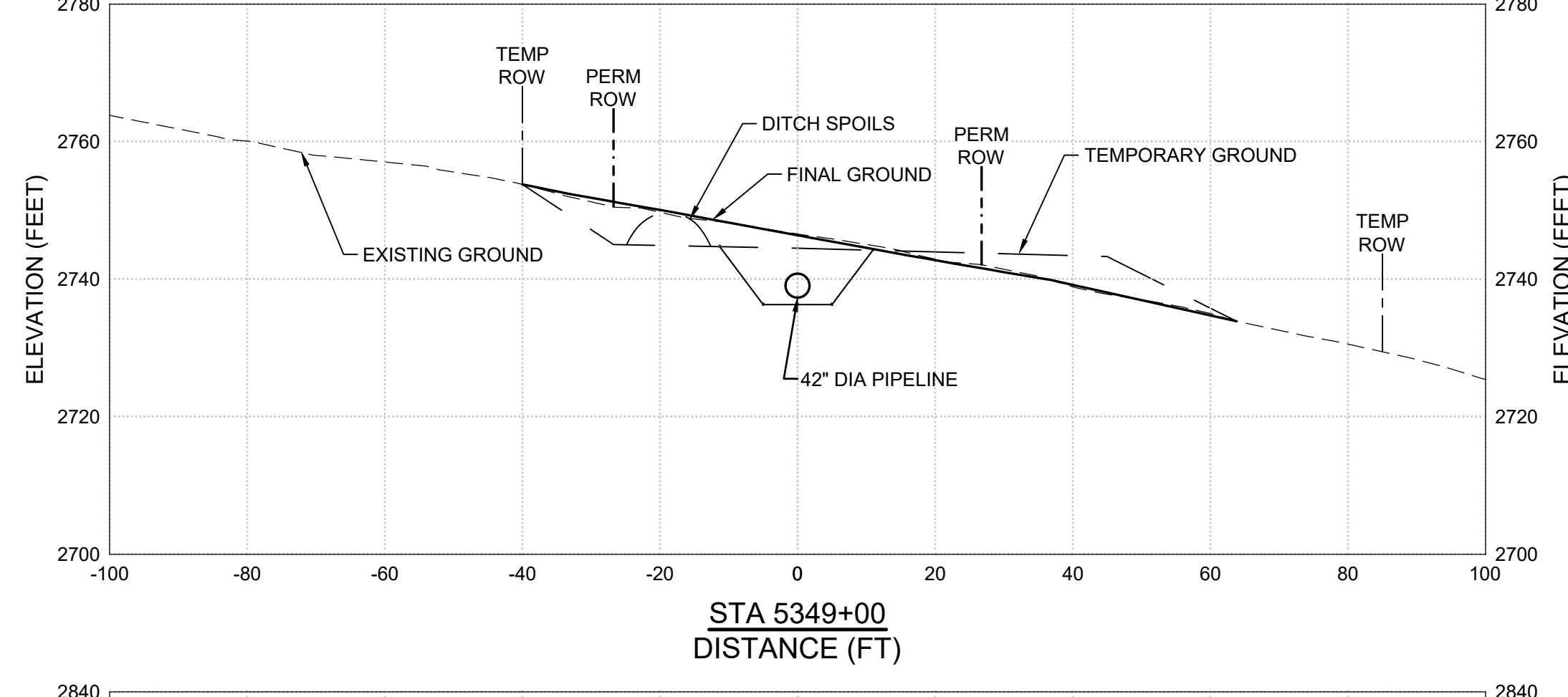
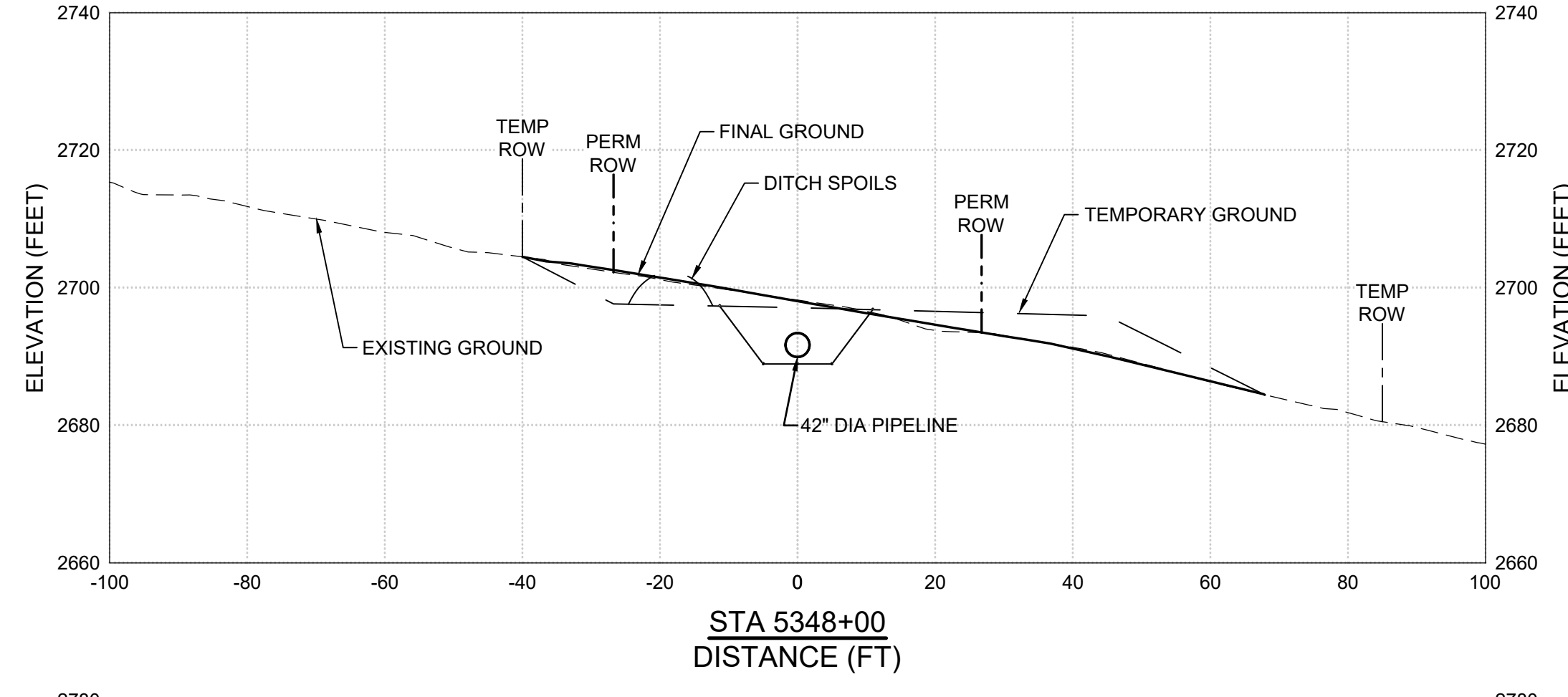
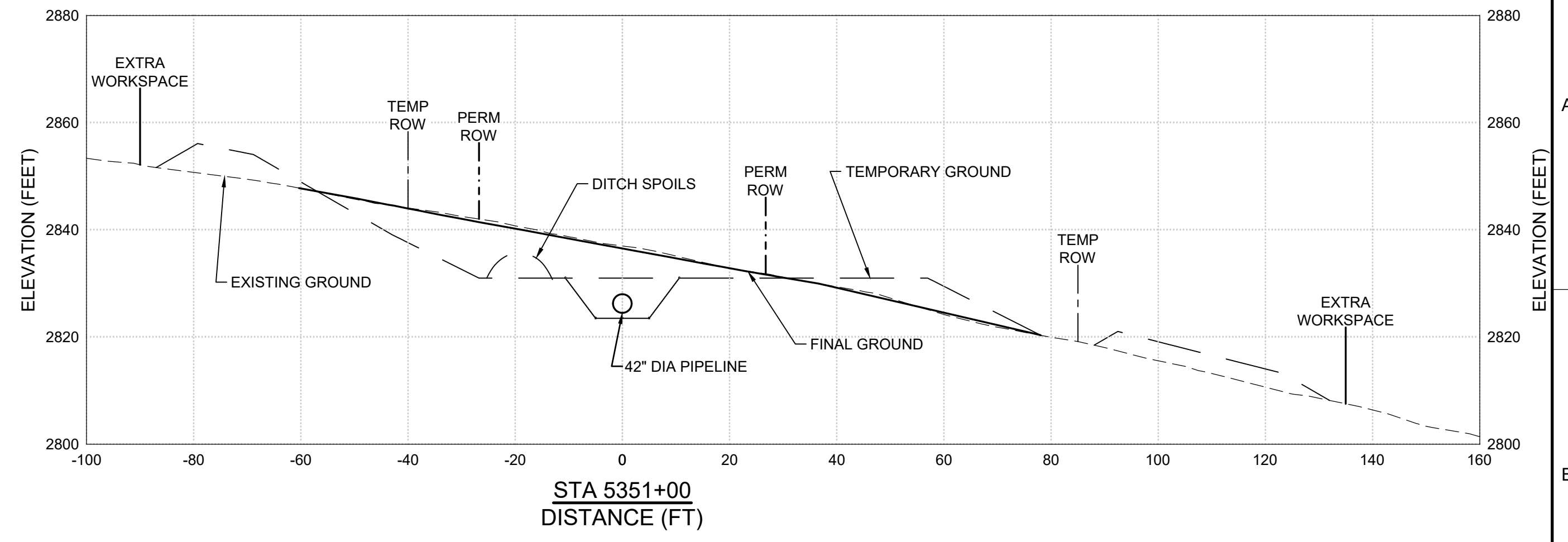
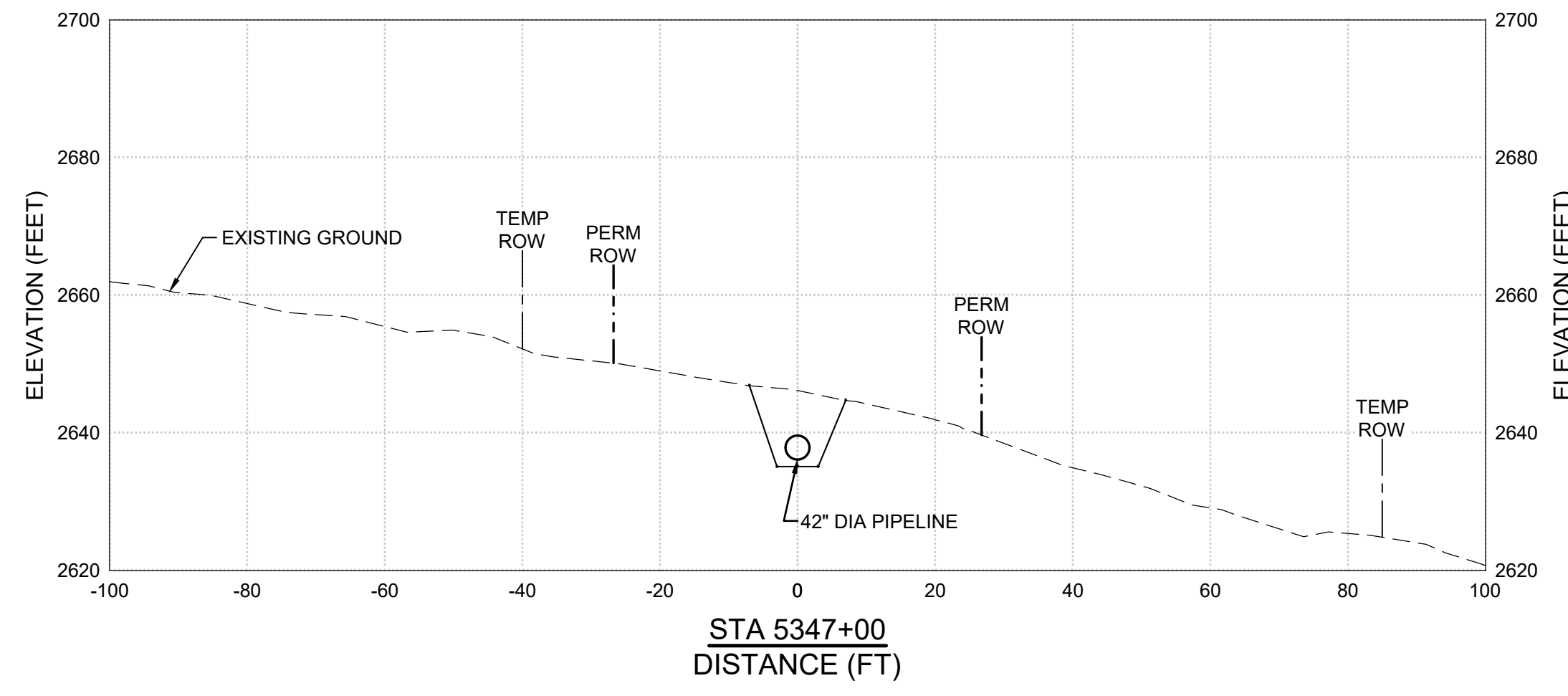
PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 84.95 TO MP 85.05  
CONSTRUCTION ALIGNMENT SHEET NO. 113  
STA 5346+00 TO STA 5352+00**

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DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: LCB/E	FILE: TXG000713D05
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>5</b> OF <b>7</b>



D	3/2017	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
C	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR
REV	DATE	DESCRIPTION	DRN	APP



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HOUSTON, TEXAS 77077

TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN SECTIONS**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 84.95 TO MP 85.05  
CONSTRUCTION ALIGNMENT SHEET NO. 113  
STA 5346+00 TO STA 5352+00**

DESIGN BY: LCB/TR      DATE: MARCH 2017

DRAWN BY: JJV/KH      PROJECT NO.: TXG007.13

CHECKED BY: MBE      FILE: TXG00713D02B

REVIEWED BY: LCB/TR      DRAWING NO.: **6** OF **7**

APPROVED BY: LCB

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**GENERAL NOTES**

1. STEEL WIRE MESH REINFORCEMENT SYSTEM INCLUDING STEEL TECCO WIRE MESH REINFORCEMENT (G65/4 MM), SPIKE PLATES (P66), AND OTHER FACING HARDWARE FABRICATED BY GEOBRUGG.
2. SOIL NAIL BARS ARE DYWIDAG #9, GRADE 75 THREADBAR® (ASTM A615).
3. SOIL NAIL BARS ARE TO BE COATED WITH FUSION-BONDED EPOXY (ASTM A775).
4. BOND ZONE TO EXTEND 6 FT INTO BEDROCK.
5. MAXIMUM THICKNESS OF SOIL LAYER RETAINED BY SOIL NAILS IS AS FOLLOWS:
  - a. 6.0 FT FOR SLOPE ANGLES BETWEEN 30 AND 37 DEGREES.
  - b. 3.5 FT FOR SLOPE ANGLES BETWEEN 37 AND 45 DEGREES.
6. TOTAL LENGTH OF SOIL NAILS VARIES WITH SOIL THICKNESS.
7. SOIL NAIL ORIENTATION = 30 DEGREES FROM THE HORIZONTAL.
8. DIAMETER OF DRILLED HOLES ARE 6 INCHES.
9. COMPRESSIVE STRENGTH OF GROUT SHOULD BE 4,000 PSI (28-DAYS).
10. SPECIFIC GRAVITY OF GROUT SHOULD BETWEEN 1.8 AND 1.9.
11. GROUT CUBES PREPARED IN THE FIELD SHOULD BE TESTED IN A LABORATORY ACCORDING TO ASTM C109.
12. SOIL NAIL SPACING WITHIN PERMANENT ROW IS 8 FT (HORIZONTAL) PERPENDICULAR TO THE ALIGNMENT BY 8 FT (MEASURED ON FINAL SLOPE) PARALLEL TO THE ALIGNMENT, EXCEPT FOR SOIL NAIL ROWS ADJACENT TO THE TRENCH WHERE SPACING IS 4 FT (MEASURED ON FINAL SLOPE) PARALLEL TO THE ALIGNMENT.

**SOIL NAIL VERIFICATION TESTING NOTES**

1. PERFORM VERIFICATION TESTS ON SACRIFICIAL TEST NAILS WHICH WILL NOT BE INCORPORATED INTO THE PERMANENT WORK.
2. PERFORM NAIL TESTING ONLY AFTER THE GROUT HAS CURED FOR AT LEAST 72 HOURS AND ATTAINED AT LEAST 1,700 PSI (3-DAY) COMPRESSIVE STRENGTH.
3. SOIL NAILS USED FOR VERIFICATION TESTING SHOULD BE CONSTRUCTED FROM SAME MATERIALS AND TO THE SAME DIMENSIONS OF PRODUCTION NAILS.
4. PROVIDE A BONDED LENGTH OF 6 FT IN ROCK.
5. PROVIDE EXTRA BAR LENGTH OUTSIDE THE DRILL HOLE TO ALLOW PROPER CONNECTION TO THE LOAD ASSEMBLY.
6. PRIOR TO GROUTING THE DESIGNATED VERIFICATION TEST NAILS, INSTALL FREE STRESSING SLEEVE AS INDICATED TO ENSURE FULL TRANSFER OF VTL TO DESIGN BOND ZONE DURING TESTING.
7. THE ALIGNMENT LOAD (AL) NECESSARY TO MAINTAIN POSITION OF THE STRESSING AND TESTING EQUIPMENT MUST NOT EXCEED 0.025 TIMES VTL. [SET DIAL GAUGES TO "0" AFTER THE ALIGNMENT LOAD HAS BEEN APPLIED].
8. IN CASE PULLOUT IS NOT ACHIEVED UP TO VTL, TEST LOADS LARGER THAN VTL MAY BE APPLIED TO ACHIEVE PULLOUT. MONITOR THE JACK LOAD WITH A LOAD CELL. PROVIDE THE ENGINEER WITH THE LOAD CELL CALIBRATION CURVE BEFORE START OF TEST.
9. PROVIDE A DIAL GAUGE CAPABLE OF MEASURING TO 1/1000" MOVEMENT.
10. PERFORM A MINIMUM OF TWO VERIFICATION TESTS ON INSTALLATION OF PRODUCTION NAILS TO VERIFY THE CONTRACTOR'S INSTALLATION METHODS AND NAIL PULLOUT RESISTANCE.
11. APPLY INCREMENTAL LOAD UP TO VTL IN ACCORDANCE WITH THE FOLLOWING SCHEDULE. RECORD SOIL NAIL MOVEMENTS AT EACH LOAD INCREMENT.

LOAD	HOLD TIME
AL	1 MINUTE
0.13 VTL	10 MINUTES
0.25 VTL	10 MINUTES
0.38 VTL	10 MINUTES
1.50 VTL	10 MINUTES
0.75 VTL (CREEP TEST)	60 MINUTES (RECORDED AT 1, 2, 4, 5, 6, 10, 20, 30, 50, 60 MINUTES)
0.88 VTL	10 MINUTES
1.00 VTL	10 MINUTES
AL	1 MINUTES

HOLD EACH LOAD INCREMENT FOR A TIME PERIOD SPECIFIED ABOVE.

12. MONITOR THE VERIFICATION TEST NAIL FOR CREEP AT THE 0.75VTL LOAD INCREMENT. MEASURE NAIL MOVEMENTS DURING CREEP PORTION OF THE TEST AND RECORDED AT 1 MINUTE, 2, 4, 5, 6, 10, 20, 30, 50 AND 60 MINUTES. MAINTAIN LOAD DURING THE CREEP TEST WITHIN 2 PERCENT OF THE INTENDED LOAD.
13. THE ENGINEER WILL REVIEW ALL VERIFICATION TEST TO DETERMINE IF THE NAIL IS ACCEPTABLE. A NAIL WILL BE ACCEPTED IF THE FOLLOWING 3 CRITERIA ARE MET:
  - a. PULLOUT DOES NOT OCCUR AT LOADS LESS THAN 1.00 VTL;
  - b. THE TOTAL MEASURED MOVEMENT AT THE MAXIMUM TEST LOAD EXCEEDS 80 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE TEST NAIL UNBONDED LENGTH.
  - c. THE CREEP MOVEMENT BETWEEN THE 1-MINUTE AND 10-MINUTE READINGS AT 0.75 VTL IS LESS THAN 0.04 INCH, AND 6-AND 60-MINUTE READINGS AT 0.75 VTL IS LESS THAN 0.08 INCH. THE CREEP RATE IN LINEAR OR DECREASING THROUGHOUT THE CREEP TEST LOAD-HOLD PERIOD.

**SOIL NAIL PROOF TESTING NOTES**

1. UPON COMPLETION OF VERIFICATION TESTING, PERFORM PROOF TESTING AT SELECT LOCATIONS OR AS APPROVED BY THE ENGINEER. PROOF TEST A MINIMUM OF 5 PERCENT OF PRODUCTION NAILS.
  2. SIMILAR TO VERIFICATION TESTING, PROVIDE A BONDED LENGTH OF 6 FT.
  3. THE MAXIMUM PROOF TEST LOAD (PTL) IS 75 PERCENT OF THE PRODUCT OF THE BONDED LENGTH AND THE NOMINAL PULLOUT RESISTANCE PER UNIT LENGTH OF THE SOIL MASS.
  4. APPLY INCREMENTAL LOAD UP TO PTL IN ACCORDANCE WITH THE FOLLOWING SCHEDULE. RECORD ALL SOIL NAIL MOVEMENT AT EACH LOAD INCREMENT. THE ALIGNMENT LOAD IS LESS OR EQUAL TO 0.025 TIMES PTL.
- | LOAD     | HOLD TIME   |
|----------|---|
| AL       | 1 MINUTE  |
| 0.17 PTL | UNTIL MOVEMENT STABILIZES   |
| 0.33 PTL | UNTIL MOVEMENT STABILIZES   |
| 0.50 PTL | UNTIL MOVEMENT STABILIZES   |
| 0.67 PTL | UNTIL MOVEMENT STABILIZES   |
| 0.83 PTL | UNTIL MOVEMENT STABILIZES   |
| 1.00 PTL | UNTIL MOVEMENT STABILIZES (CREEP TEST, RECORDED AT 1, 2, 4, 5, 6, AND 10 MINUTES) |
| AL       | 1 MINUTE  |
5. EACH LOAD INCREMENT IS HELD FOR A MINIMUM PERIOD OF 10 MINUTES.
  6. CREEP TESTS MUST BE PERFORMED AT THE MAXIMUM PROOF TEST LOAD (PTL). THE CREEP PERIOD MUST START AS SOON AS THE MAXIMUM PROOF TEST LOAD IS APPLIED AND THE NAIL MOVEMENT MUST BE MEASURED AND RECORDED AT 1, 2, 4, 5, 6 AND 10 MINUTES. WHERE THE NAIL MOVEMENT BETWEEN 1 MINUTE AND 10 MINUTES EXCEEDS 0.04", THE MAXIMUM TEST LOAD SHALL BE MAINTAINED FOR AN ADDITIONAL 50 MINUTES AND MOVEMENTS MUST BE RECORDED AT 20, 30, 50 AND 60 MINUTES.
  7. THE ENGINEER WILL REVIEW ALL PROOF TESTS TO DETERMINE IF THE NAIL IS ACCEPTABLE. A NAIL WILL BE ACCEPTED IF THE FOLLOWING THREE CRITERIA ARE MET:
    - a. PULLOUT DOES NOT OCCUR AT LOADS LESS THAN 1.0 PTL.
    - b. THE TOTAL SOIL NAIL MOVEMENT MEASURED AT PTL IS GREATER THAN 80 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE UNBONDED LENGTH.
    - c. THE TOTAL CREEP MOVEMENT OF LESS THAN 0.04" MEASURED BETWEEN THE 1 AND 10 MINUTE READINGS OR A TOTAL CREEP MOVEMENT OF LESS THAN 0.08" IS MEASURED BETWEEN THE 6 AND 60 MINUTE READINGS AND THE CREEP RATE IS LINEAR OR DECREASING THROUGHOUT THE CREEP TEST HOLD PERIOD.
  8. SUCCESSFUL PROOF TEST NAILS MEETING THE ABOVE TEST ACCEPTANCE CRITERIA MAY BE INCORPORATED AS PRODUCTION NAILS.

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B	12/2016	PRELIMINARY - NOT FOR CONSTRUCTION	JJV	LCB
A	11/2016	INTERIM DESIGN DRAWINGS	JJV / KH	TR



TITLE: **GEOHAZARD MITIGATION SITE SPECIFIC DESIGN  
SOIL NAIL AND MESH SYSTEM SPECIFICATIONS**

PROJECT: **ATLANTIC COAST PIPELINE, REV 11B**

SITE: **ACP AP-1 MP 84.95 TO MP 85.05  
CONSTRUCTION ALIGNMENT SHEET NO. 113  
STA 5346+00 TO STA 5352+00**

DESIGN BY: LCB/TR	DATE: MARCH 2017
DRAWN BY: JJV/KH	PROJECT NO.: TXG0007.13
CHECKED BY: MBE	FILE: TXG000713D07A
REVIEWED BY: LCB/TR	DRAWING NO.:
APPROVED BY: LCB	<b>7</b> OF <b>7</b>

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