

August 30, 2017

Cenex Pipeline, LLC
Attn: Robb Schwend
802 Highway 212 South
P.O. Box 909
Laurel, MT 59044

**Re: CHS Sidney to Minot Slide Areas – Williams and Mountrail Counties
Site 2 – NW¼, Section 3, T155N, R96W, Williams County, North Dakota
Revised for Proposed 10-inch Diameter Pipeline
Terracon Project No. 26175044**

Dear Robb:

INTRODUCTION

Terracon Consultants, Inc. has completed the geotechnical services for an area in the NW¼ Section 3, T155N, R96W, Williams County, North Dakota, as referenced. Approximate lat/long for this area are 48° 17' 02.15" N, 103° 01' 10.84" W. The area is identified in the North Dakota data base as having historic landslides. See Exhibits 1 and 2 for general location. This letter presents the results of our limited geotechnical investigation regarding:

- Site topography;
- Conditions of the slopes; and
- Design alternatives for traversing the area with a pipeline.

PROJECT INFORMATION

At this site, the proposed pipeline corridor crosses 60th Street NW (County Road 8) in a North-South direction, then turns sharply toward the east and stays between 60th Street NW and an unnamed tributary to Beaver Creek. As it crosses 60th Street NW, the proposed corridor runs into an area with active shallow slides along relatively short slopes. See Exhibit 3 of 6, which shows the approximate layout of the corridor and contours of the slopes within the mapped area.

The unnamed tributary to Beaver Creek appears to be at least intermittent and may be perennial. The main stem of this stream crosses 60th Street NW approximately 600 feet to the east at the bottom of a mild slope that runs parallel to the road. The bottom of the drainage between the road crossing and the landslide area was wet at the time of our field visit.



SITE AND SUBSURFACE CONDITIONS

From west to east, following the fence line, the proposed corridor follows level, then breaks over to a narrow bench with a 30-foot width that continues down on a relatively gentle grade to the stream crossing. Near the top of this slope, a culvert crossing conveys a small drainage across the road.

Looking west within the mapped area, the contours bend around toward the south, forming a west-facing slope. In this slope is a shallow active slide that lies along the south edge of the proposed corridor and is depicted in Figure 4 of 6 as Section A-A'. Below the unvegetated head scarp, the slide exhibits fresh cracks around its circumference that cut across the slump. The material from the slide is relatively shallow, and the flanks are shallow. A small stream of water emanates from near the bottom of the slide near its southeast corner. Standing water lies just downslope of the slump, and below this location the slope is wet. It is estimated that this slide is about 7 feet deep. The general angle of this slope is approximately 31°, and is steepened in the head scarp to approximately 45°.

On the section through this slide, coordinates are shown, which were used in layouts for slope-stability analysis. A grab sample of the soil was taken from the head scarp and was transported to our laboratory for analysis. Also, a thin-tube sample was taken from the same location and transported to our laboratory for analysis. Results of our limited testing are attached and follow:

■ Soil Classification	Sandy Lean Clay
■ Percent Fines (%)	68%
■ Plasticity Index, PI	22%
■ Moisture Content	12% and 16%
■ Unconfined Compression Strength	1.51 tsf.

Terracon has performed limited slope stability analysis for the landslide depicted by Section A-A'. For the slope in its current condition, parameters as may be expected for the soils encountered have been selected that would yield a factor of safety against sliding of 1.0 (FS = 1.0), or a condition of imminent failure. The slump material lies on top of the calculated failure surface, which is at a depth of approximately 14 feet. Slope failures are more likely when the soils are saturated, such as during the spring of the year. In this case, near the slump failure and downslope, the surface is wet as the result of a spring that emanates near the base of the head scarp, and the subsurface likely is saturated to some depth. With the soil parameters used to calculate the shape of the existing failure surface, it does not appear that a satisfactory FS (1.25 or higher) is attainable for this slope.

South of the fence line, the slope breaks off the narrow bench toward the drainage bottom. This slope (south-facing) exhibits one active shallow slope failure marked by hummocky topography. This side hill section perpendicular to 60th Street NW is depicted in Figure 5 of 6 as Section B-B'.

The general angle of this slope is approximately 22°. The angle through the shallow hummocks is not appreciably different. This slope is relatively short, but because of the inherent instabilities, Terracon would not recommend that a pipeline be placed in a sidehill manner. The pipeline would remain in a stable condition, in our opinion, if the pipeline were to be placed using cut and cover techniques and remained atop the slope in the narrow bench.

ALTERNATIVES FOR DESIGN AND CONSTRUCTION

Terracon has identified two alternatives for crossing the valley associated with this unnamed tributary to Beaver Creek: 1) cut and cover; and 2) HDD.

Cut and Cover. Cut and cover is technically feasible through this landslide area. Two routes through the area, depicted as Section C-C' and Section D-D', are shown on Exhibit 6 of 6.

Section C-C' is preferred:

- An alignment along this section would follow a mild slope angle from the top of the bench down to a drainage crossing further toward the east below;
- The alignment along this section would stay out of the stream bottom that runs parallel to this alignment;
- The side slope next to this alignment is relatively short and mild, see Section B-B' on Exhibit 5 of 6;
- Staying out of the stream as much as practicable will make permitting easier;
- One disadvantage may be that the bench in which the pipe would be buried is narrow and may present some challenges;
- In Exhibit 6 of 6, Section C-C' is shown, which would be stable in the downslope direction and which would not be subject to a sidehill failure.

Section D-D' is technically not feasible with an acceptable Factor of Safety for cut and cover.

- The combination of slope length, steepness and water renders this slope too risky for a shallow pipeline installation;
- Burial depth would be excessive, estimated at 20 feet, in order to place the pipeline beneath the failure surface;
- Water in the excavation and saturated soils further render this option unworkable;
- In Exhibit 6 of 6, Section D-D' is shown that would run perpendicular to the contours of the steep slope and ending in the stream bottom.

HDD. A potential plan and profile for an HDD crossing has not been developed for this site, as we did not obtain sufficient topography through the drainage. In order to prepare an appropriate HDD report, we would recommend a geotechnical drilling program with accompanying

observations and calculations related to pullback forces and potential for hydraulic fracturing. The potential profile would be developed using criteria consistent with a 10-inch welded steel pipeline:

- Preferably a 12° or less entry/exit angle;
- Allowing for a minimum tangent of 40 feet from the entry/exit point before initiating a curve;
- A bend radius of curvature for vertical or compound vertical and horizontal curves of a minimum of 1,000 feet; and,
- Preferably allowing for a depth of cover over the bore path as it passes beneath water bodies of 40 feet, 20 feet beneath ephemeral drainages, or 10 feet within competent bedrock.

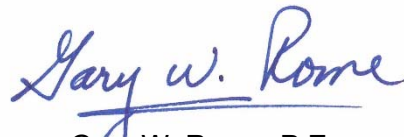
Conceptually, for the potential HDD, based on aerial imagery, the total horizontal length would be approximately 940 feet. This would carry the pipeline from the bench to the west of this area through the stream crossings and onto a bench to the east.

We appreciate the opportunity to work with you on these projects. If there are any questions, please call.

Sincerely,
TERRACON



AJ Torres, P.E.
Senior Staff Engineer

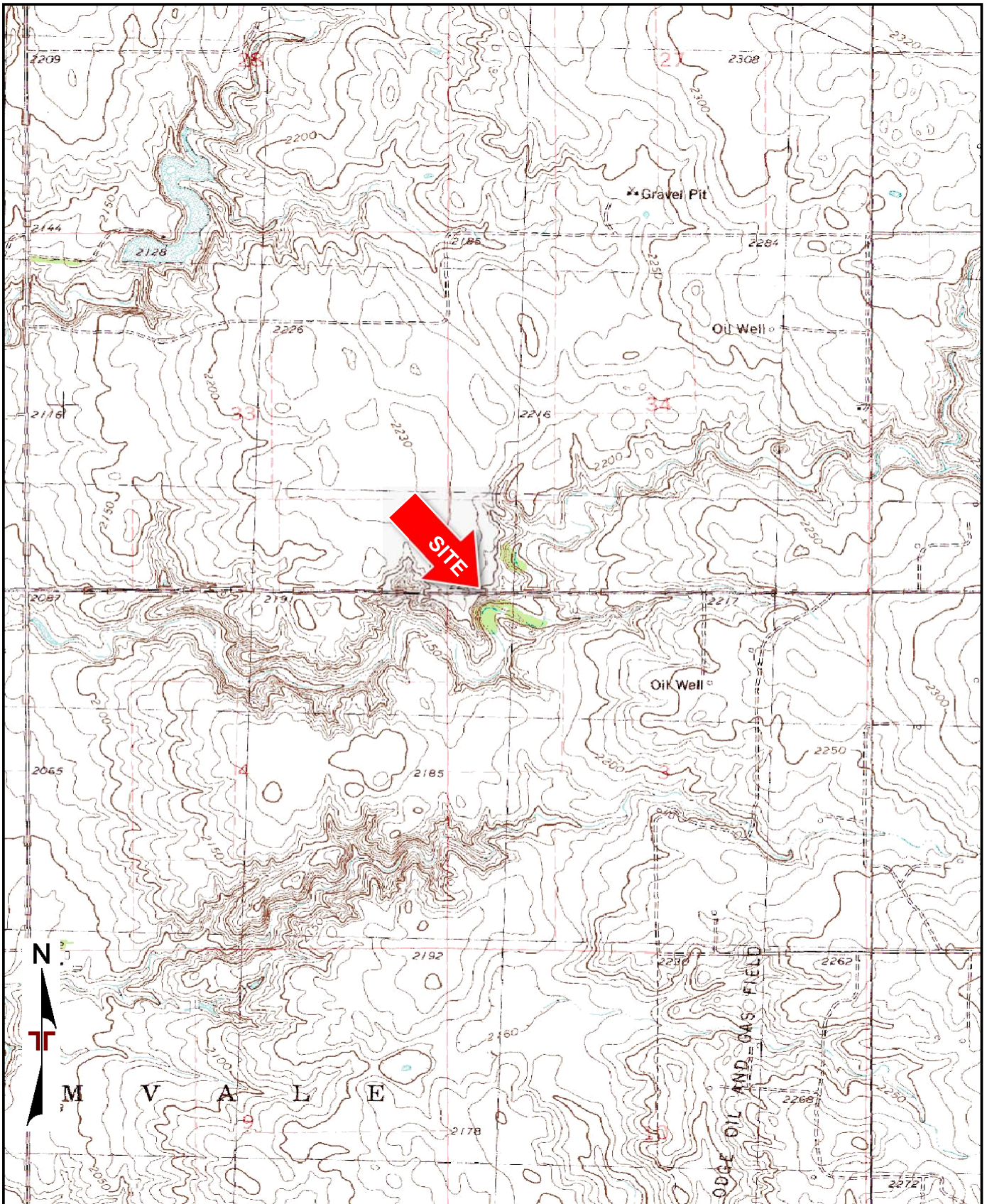


Gary W. Rome, P.E.
Senior Principal

Reviewed by: Dan C. Nebel

Enclosures

Exhibits



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: RAY SE, ND (1/1/1978) and TIOGA SW, ND (1/1/1979).

Project Manager: GR	Project No. 26175044	 2110 Overland Ave Ste 124 Billings, MT 59102-6440	USGS Location	Exhibit 1
Drawn by: AT	Scale: 1"=2,000'		Site 2 Southwest of Tioga	
Checked by: -	File Name: Site 2		Cenex Pipeline, LLC	
Approved by: -	Date: Aug. 2017		Proposed Refined Fuels Line	

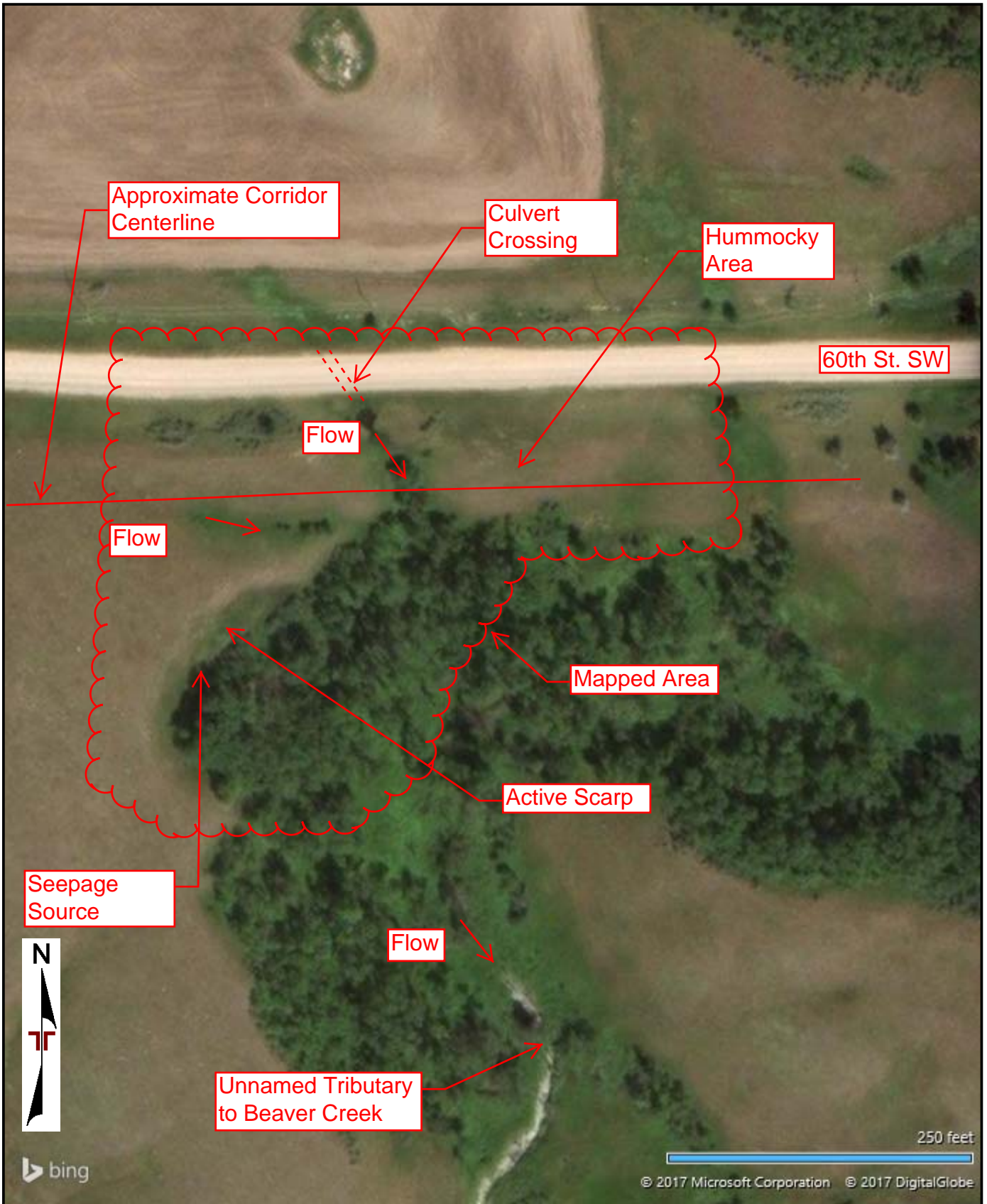


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

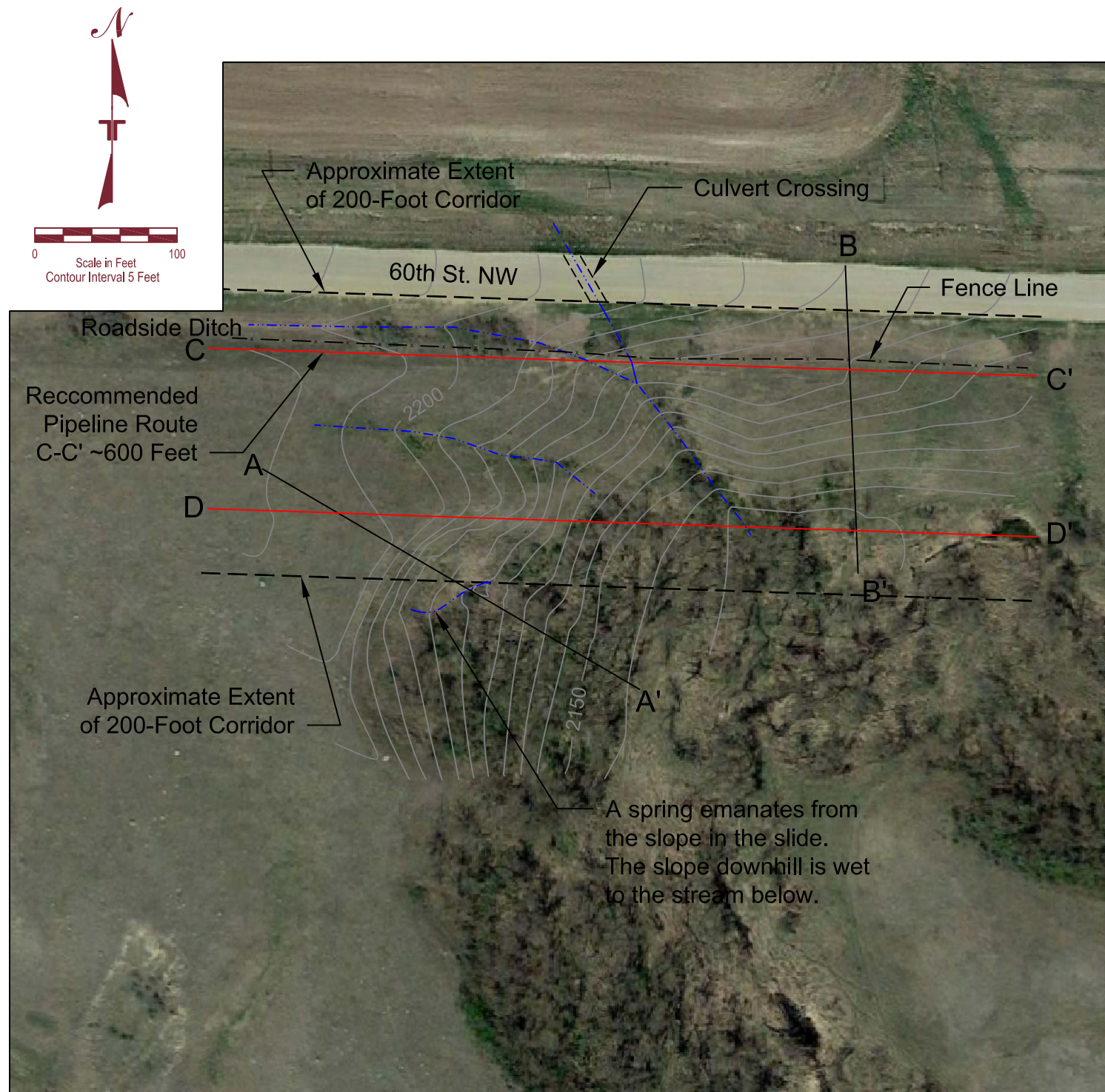
Project Manager:	GR	Project No.	26175044
Drawn by:	AT	Scale:	AS SHOWN
Checked by:	-	File Name:	Site 2
Approved by:	-	Date:	Aug. 2017

Terracon
 2110 Overland Ave Ste 124
 Billings, MT 59102-6440

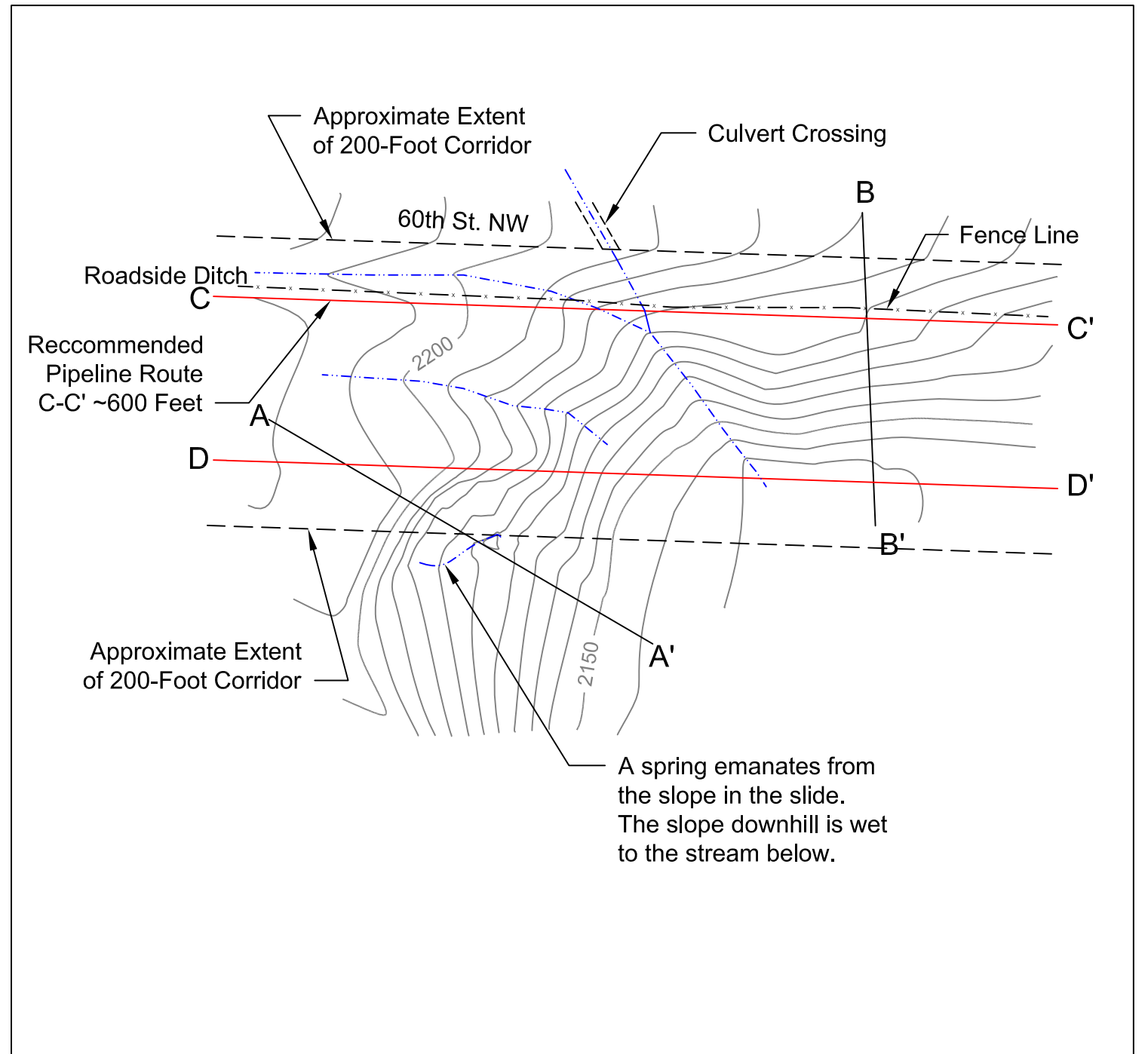
Aerial Location

**Site 2 Southwest of Tioga
 Cenex Pipeline, LLC
 Proposed Refined Fuels Line**

Exhibit	2
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Aerial Image Excerpted from Google Earth Dated May 2016

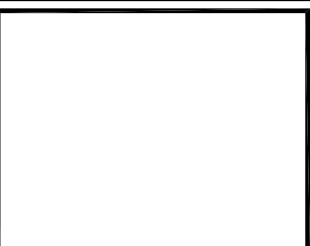


Terracon Generated Topographic Detail

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists

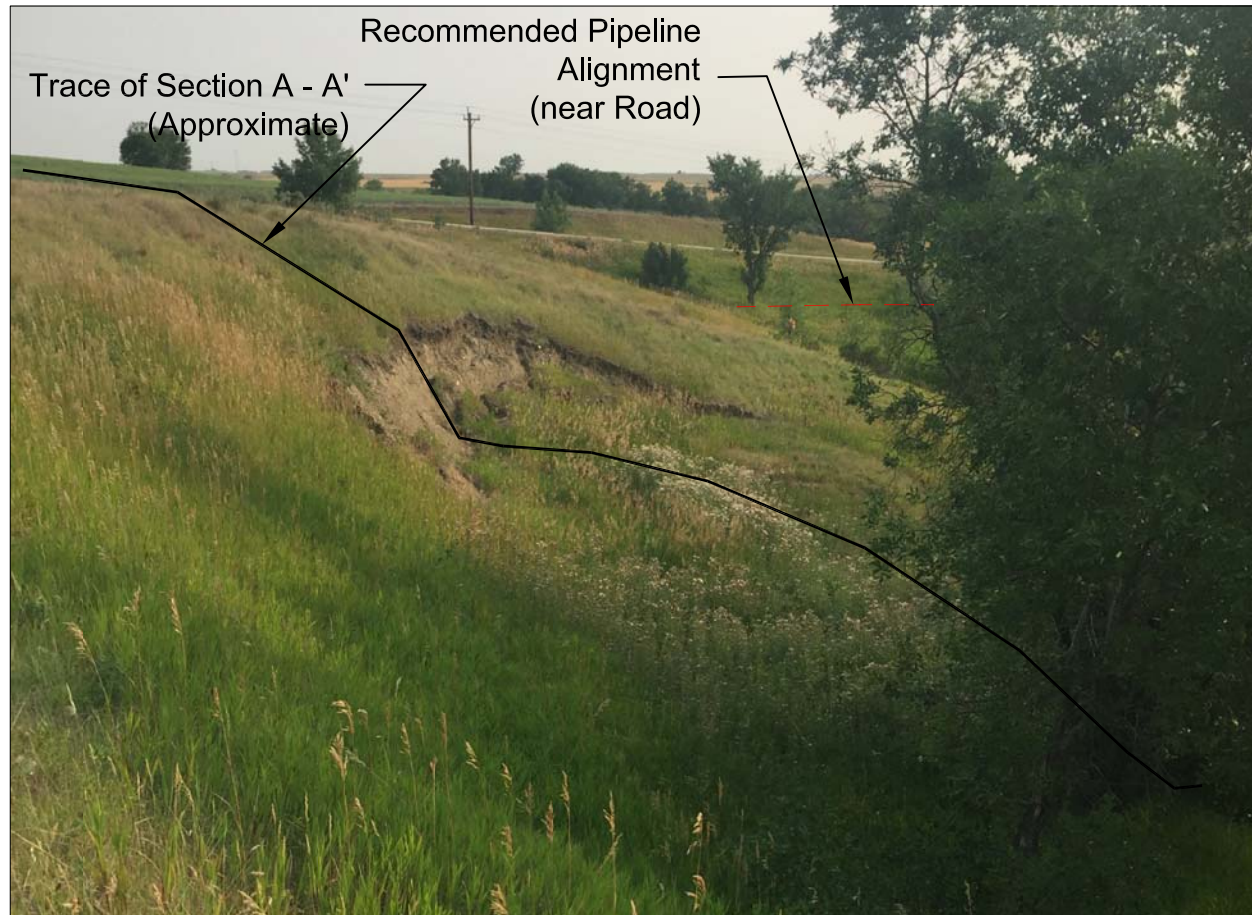
2110 Overland Avenue, Suite 124 Billings, MT 59102
PH. (406) 656-3072 FAX. (406) 656-3578



Plan and Contours
Site 2 Southwest of Tioga
Cenex Pipeline, LLC
Proposed Refined Fuels Line

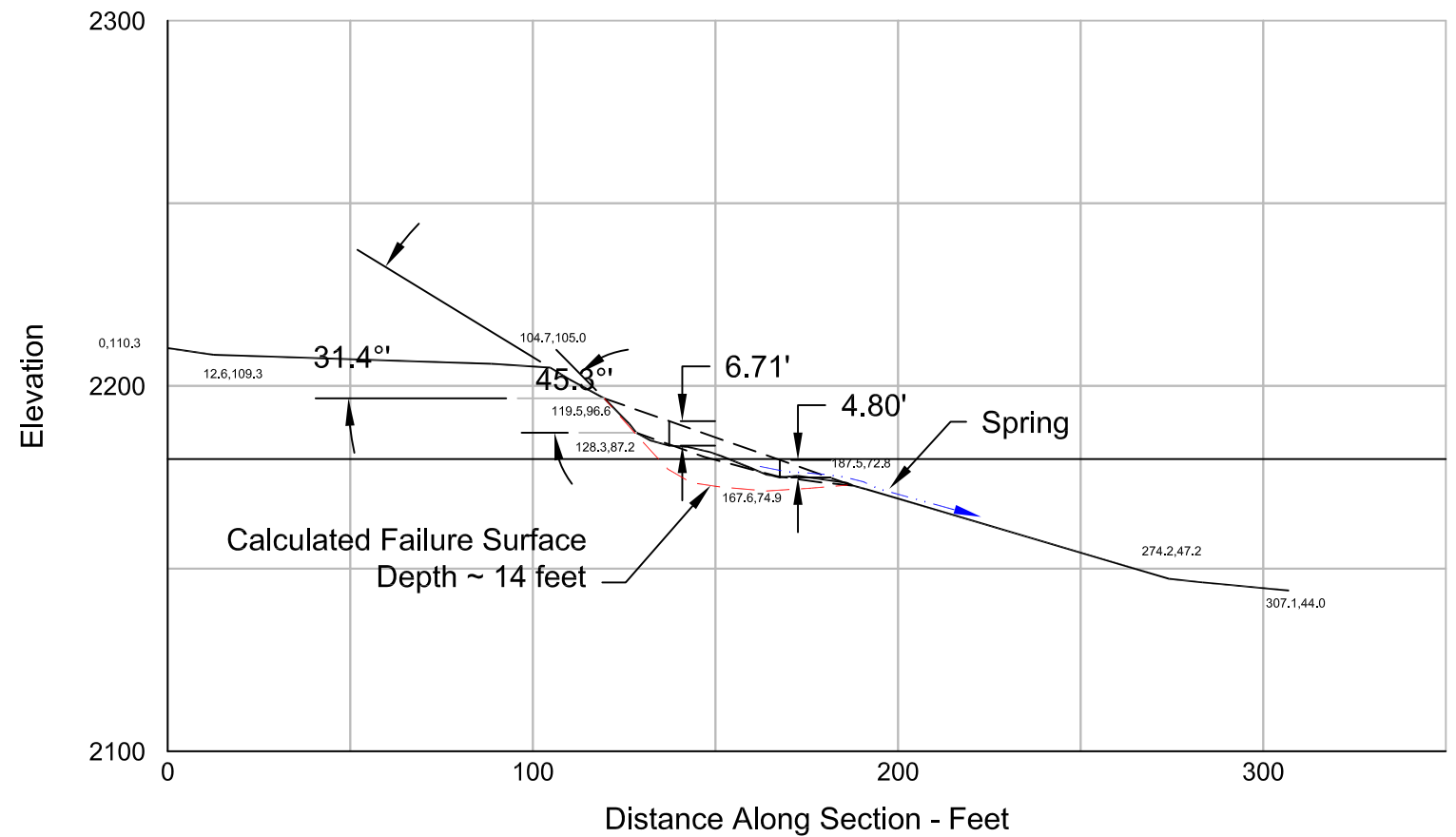
Williams County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.:	26175044
FILE NAME:	Site 2 - SW of Tioga
SHEET NO.:	3 OF 6



Pic Shows Approximate Trace of Section A - A'
 Note: Section A - A' is not parallel to and is not along the Recommended Pipeline Alignment. See Sheet 3 of 6 to Observe the Proximity and Orientation of Section A - A' in Relation to the Recommended Pipeline Alignment.

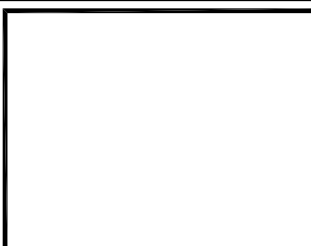
Section A - A' Through Shallow Slide near South Edge of Corridor (Away from the Proposed Pipeline Alignment)



*Coordinates used for Slope Stability Analysis

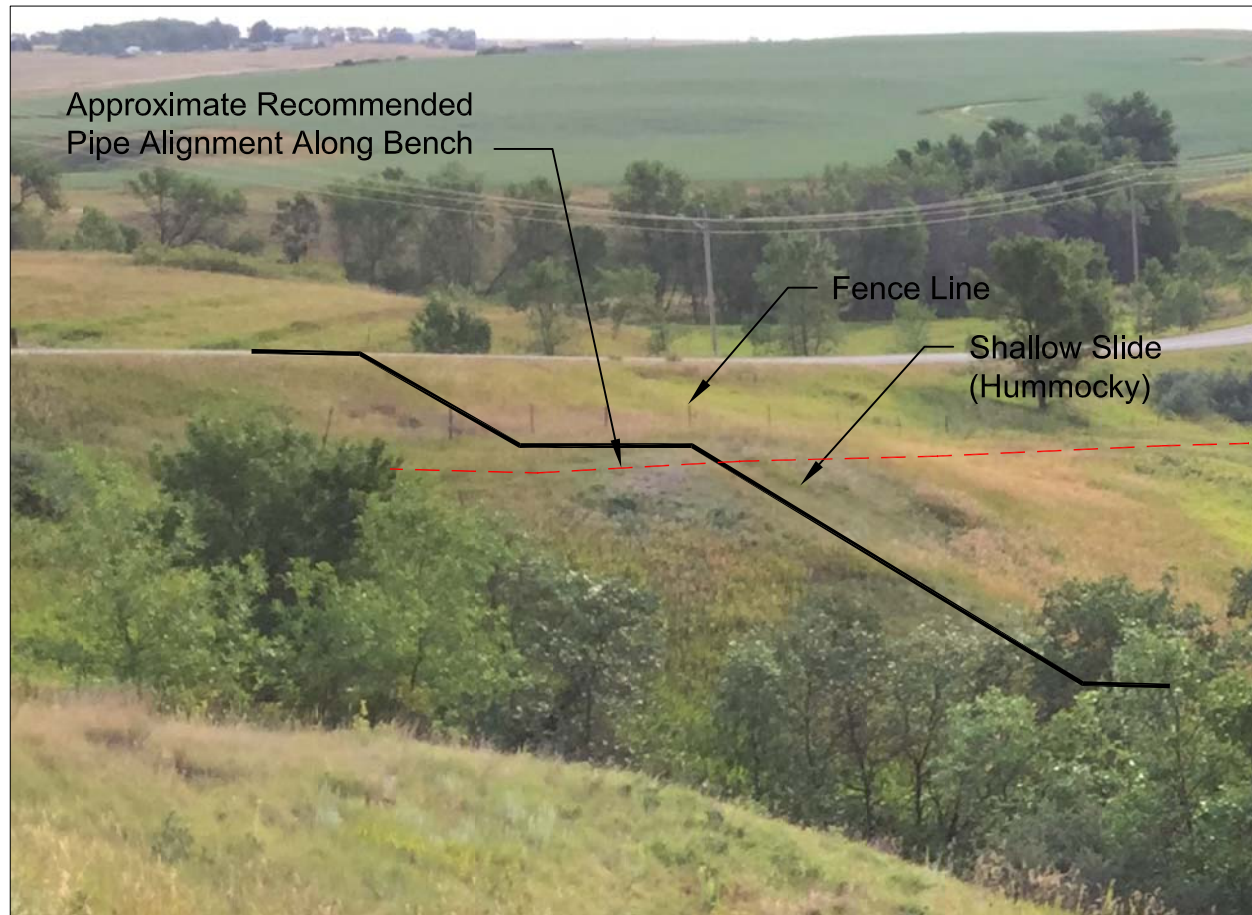
REV.	DATE	BY	DESCRIPTION

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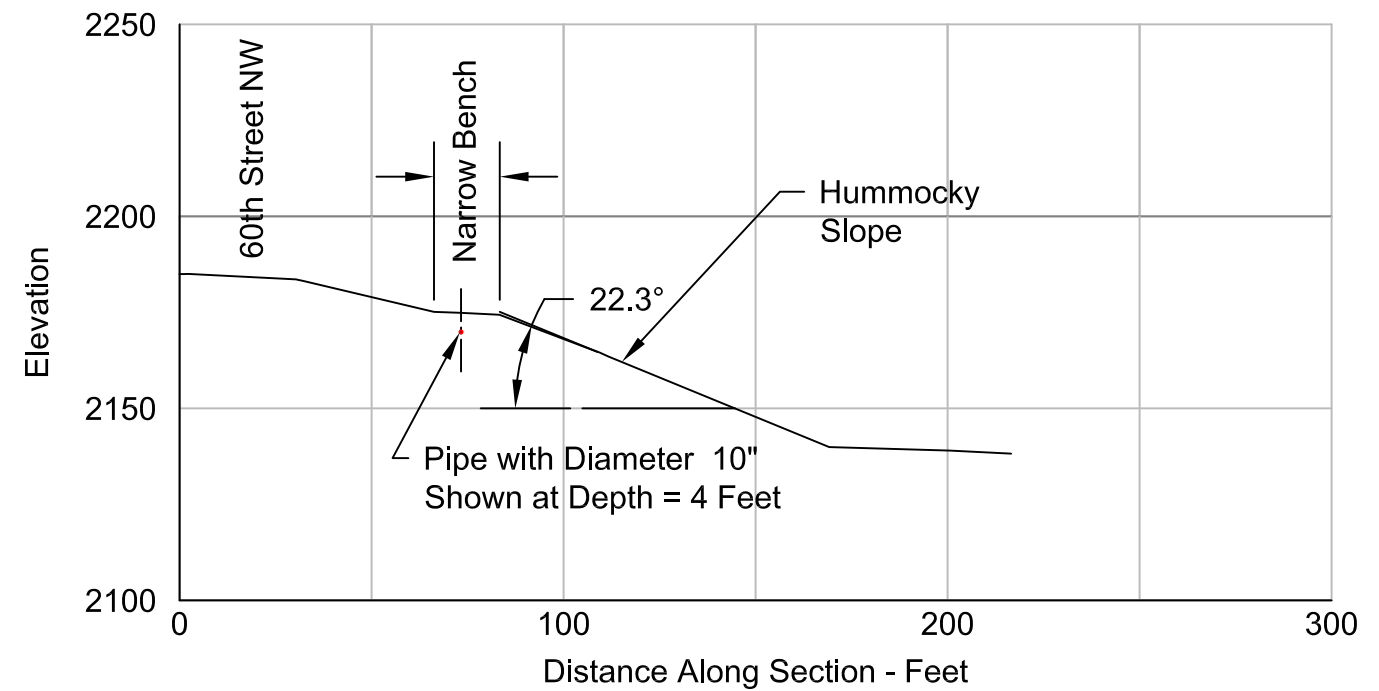
Slope Section - Shallow Slump Along Corridor - Section A-A'
 Site 2 Southwest of Tioga
Cenex Pipeline, LLC
 Proposed Refined Fuels Line
 Williams County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.:	26175044
FILE NAME:	Site 2 - SW of Tioga
SHEET NO.:	4 OF 6



Pic Shows Approximate Trace of Section B - B'
 Note: Section B - B' is Perpendicular to the Recommended Pipeline Alignment.

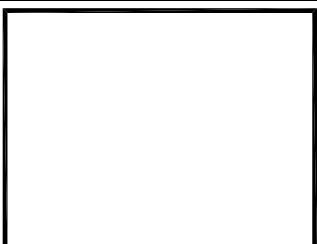
Section B - B' Through Shallow Slide near South Edge of Corridor



REV.	DATE	BY	DESCRIPTION
1	8/30/17	AT	Revised pipe radius to 10"

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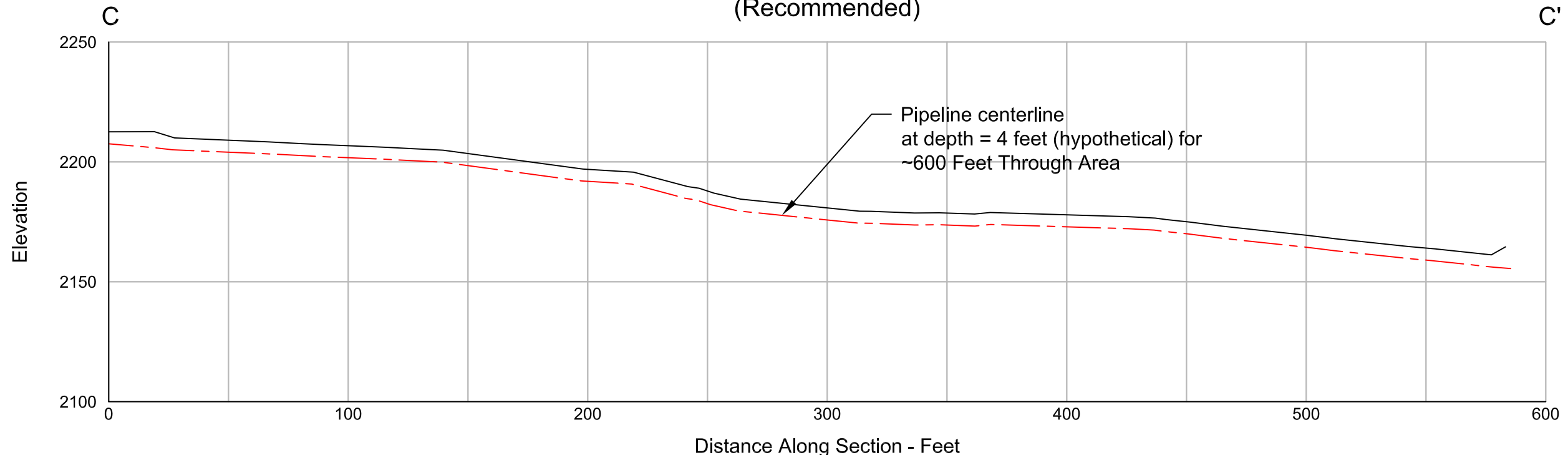
Sidehill Section - Perpendicular to 60th Street NW - Section B-B'

Site 2 Southwest of Tioga
Cenex Pipeline, LLC
 Proposed Refined Fuels Line

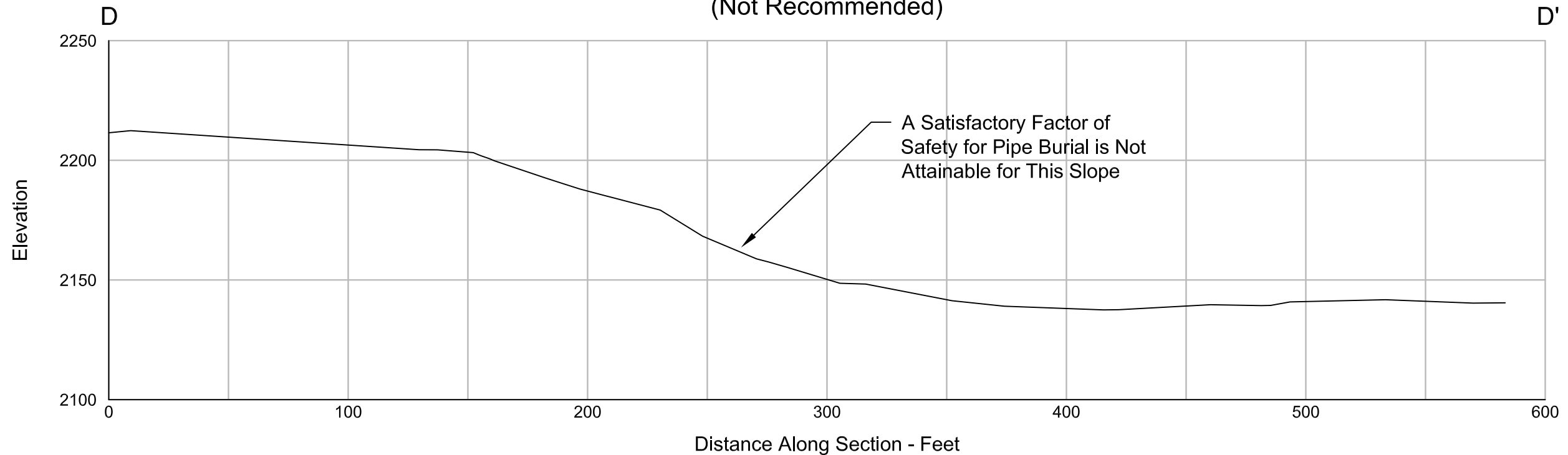
Williams County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.:	26175044
FILE NAME:	Site 2 - SW of Tioga
SHEET NO.:	5 OF 6

Section C - C' Along the Narrow Bench Between 60th Street NW and the Sidehill Slope
(Recommended)



Section D - D' Along the Bottom of the Sidehill Slope
(Not Recommended)



REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists

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Potential Cut and Cover Sections - On Bench and at Toe of Slope

Site 2 Southwest of Tioga
Cenex Pipeline, LLC
Proposed Refined Fuels Line

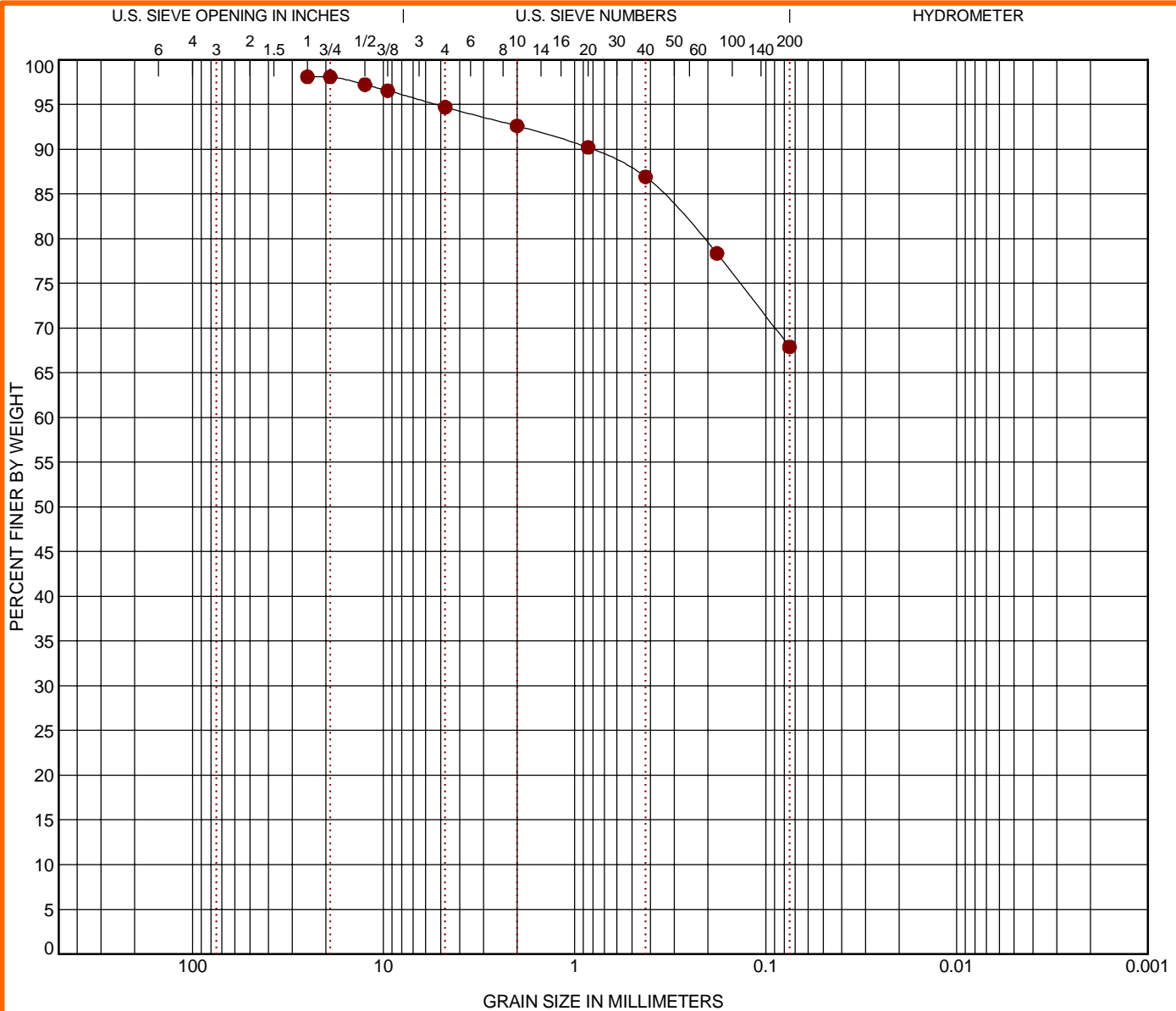
Williams County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.	26175044
FILE NAME:	Site 2 - SW of Tioga
SHEET NO.:	6 OF 6

Laboratory Results

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● Site 2	0	SANDY LEAN CLAY (CL)	12	38	16	22		

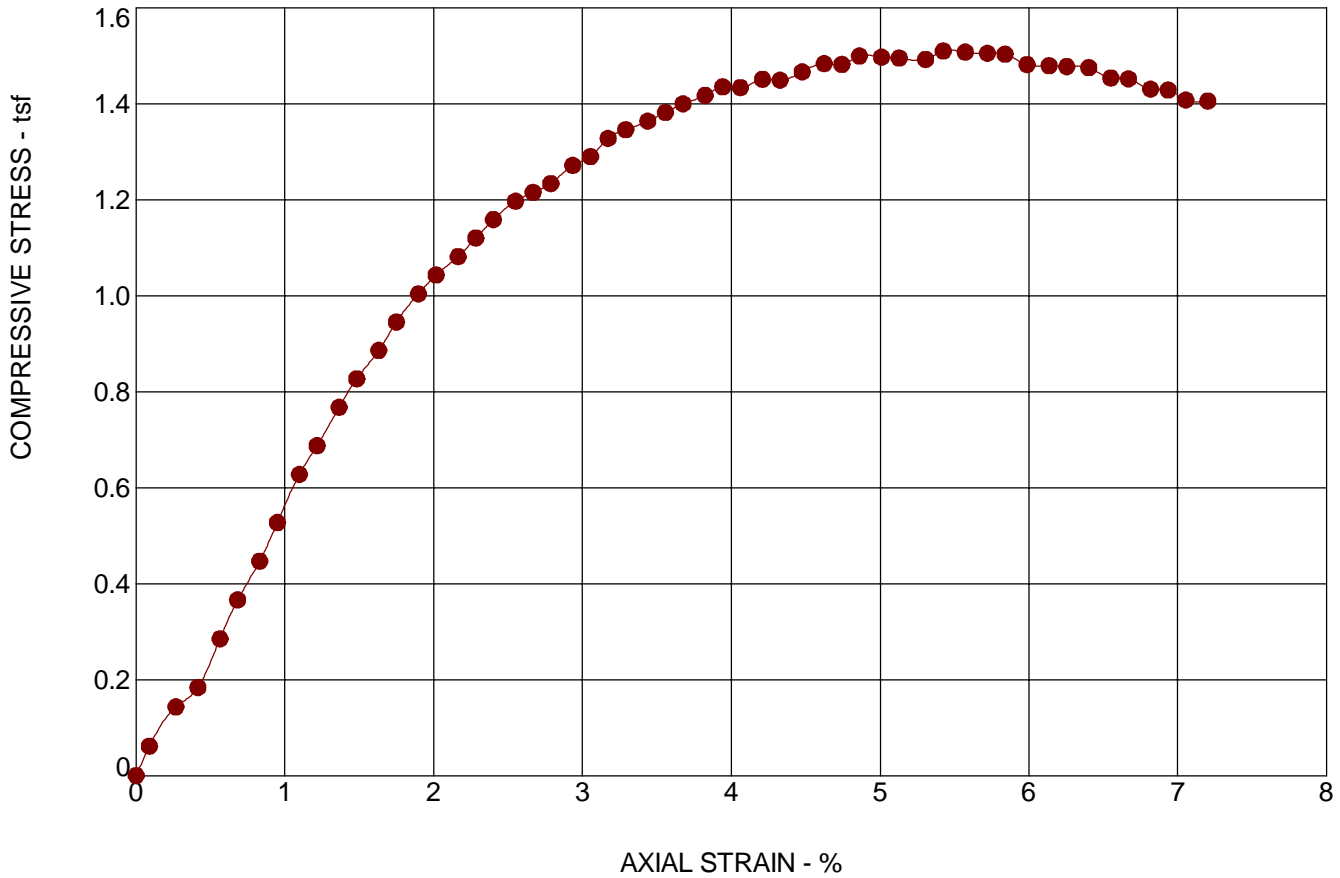
Boring ID	Depth	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Gravel	%Sand	%Silt	%Fines	%Clay
● Site 2	0	25				3.4	26.8		67.9	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 26175044 CHS SIDNEY TO MINOT TRIAL 2.GPJ TERRACON_DATATEMPLATE.GDT 8/24/17


PROJECT: CHS Sidney to Minot Slide Areas SITE: Williams & Mountrail Counties, ND	2110 Overland Ave Ste 124 Billings, MT	PROJECT NUMBER: 26175044 CLIENT: Cenex Pipeline, LLC Laurel, MT
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UNCONFINED COMPRESSION TEST

ASTM D2166



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. UNCONFINED WITH PHOTOS 26175044 CHS SIDNEY TO MINOT TRIAL 2.GPJ TERRACON_DATATEMPLATE.GDT 8/24/17

SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA	
	Moisture Content:	16 %
	Dry Density:	109 pcf
	Diameter:	1.93 in.
	Height:	3.37 in.
	Height / Diameter Ratio:	1.75
	Calculated Saturation:	%
	Calculated Void Ratio:	
	Assumed Specific Gravity:	
	Failure Strain:	5.42 %
	Unconfined Compressive Strength	1.51 (tsf)
	Undrained Shear Strength:	0.75 (tsf)
	Strain Rate:	in/min
	Remarks:	

SAMPLE TYPE: RING	SAMPLE LOCATION: Site 2 @ 0.5 - 0.9 feet			
DESCRIPTION:	LL	PL	PI	Percent < #200 Sieve

PROJECT: CHS Sidney to Minot Slide Areas	 2110 Overland Ave Ste 124 Billings, MT	PROJECT NUMBER: 26175044
SITE: Williams & Mountrail Counties, ND		CLIENT: Cenex Pipeline, LLC Laurel, MT

August 30, 2017

Cenex Pipeline, LLC
Attn: Robb Schwend
802 Highway 212 South
P.O. Box 909
Laurel, MT 59044

**Re: CHS Sidney to Minot Slide Areas – Williams and Mountrail Counties
Site 3 – N½, Section 27, T155N, R94W, Mountrail County, North Dakota
Revised for Proposed 10-inch Pipeline
Terracon Project No. 26175044**

Dear Robb:

INTRODUCTION

Terracon Consultants, Inc. has completed the geotechnical services for an area in the N½ Section 27, T155N, R94W, Mountrail County, North Dakota, as referenced. Reference lat/long for this site are 48° 13' 18.68" N, 102° 45' 15.68" W. These lat/long are near the westmost PI that we found in the field when we mapped the site. Fairly large areas north and south of the proposed corridor near this point are identified in the North Dakota data base as having historic landslides. From this point, a previous pipe line installation turns toward the south and proceeds into one of the identified historic slide areas. The proposed Cenex Refined Fuels Pipeline corridor, however, continues east from this point and avoids the historic landslide areas. See Exhibits 1 and 2 for general location; especially note in Exhibit 2 the Hiland Partners LP Existing Pipeline installation compared to the area that Terracon mapped. This letter presents the results of our limited geotechnical investigation regarding:

- Site topography;
- Conditions of the slopes; and
- Design alternatives for traversing the area with a pipeline.

PROJECT INFORMATION

White Earth River, approximately 1500 feet east of Site 3, is a perennial stream with a tortuous meandering pattern. The channel is incised into the valley floor, and slope failures along the banks can be seen upstream and downstream from the proposed corridor crossing.

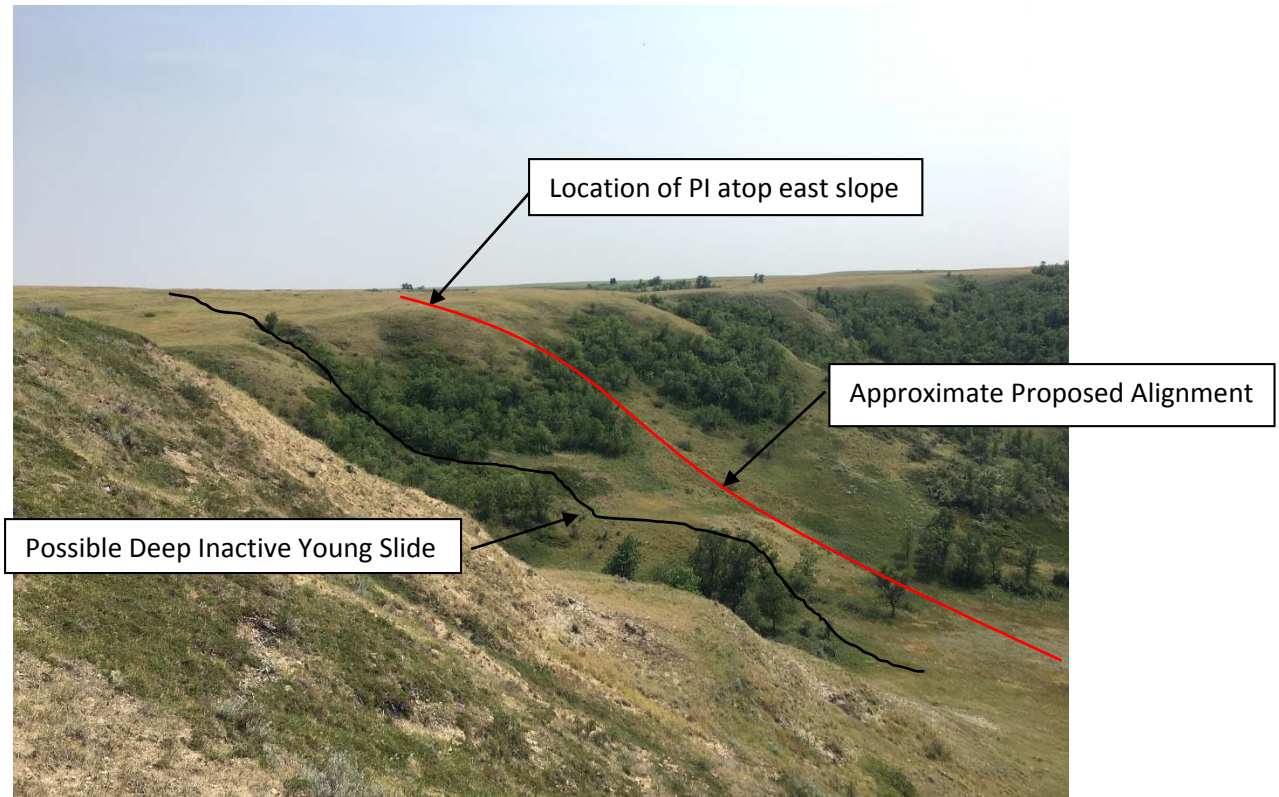
Although, it is not noted on the North Dakota Areas of Landslides mapping, the hillslope to the east of White Earth River in which the proposed corridor would climb to the bench on the opposite



Terracon Consultants, Inc. 2110 Overland Avenue, Suite 124 Billings, Montana 59102
P [406] 656 3072 F [406] 656 3578 terracon.com



site exhibits what appears to be deep, Inactive Young Slides. Terracon did not map this slope in the field; however, we have constructed a section of the slope based on USGS topographic mapping. See Exhibit 4 of 6. A photo, below, of this slope shows the Approximate Proposed Alignment and slumps. It is recommended that this east slope (west-facing slope) be considered for further study.



Picture shows East Slope (west-facing) of White Earth River valley. Note location of Proposed Alignment and PI and Possible Deep Inactive Young Slide.

SITE AND SUBSURFACE CONDITIONS

The proposed corridor was mapped from the PI on the west bench, through the hill slope and then for a distance from the toe of the slope onto the valley floor for a total of approximately 1750 feet.

The area of landslide concern lies along the slope, which proceeds down from a bench and which lies in a direction generally west of the River. Within the mapped topography, the proposed pipeline corridor traverses a relatively flat bench that overlooks White Earth River valley for approximately 875 feet. From there, the corridor drops off along a slope toward the valley bottom, see Section A-A' on Exhibit 4 of 6. Just west of the proposed corridor in this slope, there are two landslides next to each other. One slide, shown as Section B-B' on Exhibit 5 of 6 is characterized as an Inactive Young slide, that is, it appears to be historic, and may be approximately 100 years

old or more. This slide is within a slope with an angle of approximately 25°. It appears that the hill slope through this section is somewhat stable, as the slumped material lies as a weight on the toe of the failure surface. The next slide, shown as Section C-C' on Exhibit 5 of 6 is characterized as Active, that is, it appears to have occurred recently. This slide is within a slope with an angle of approximately 30°.

On the sections through the two landslides, coordinates are shown, which were used in layouts for slope-stability analysis. A grab sample of the soil was taken from the unvegetated head scarp of Section C-C' and was transported to our laboratory for analysis. Also, a thin-tube sample was taken from the same location and transported to our laboratory for analysis. Results of our limited testing are attached and follow:

■ Soil Classification	Lean Clay
■ Percent Fines (%)	97.3%
■ Plasticity Index, PI	23%
■ Moisture Content	9% and 18%
■ Unconfined Compression Strength	3.27 tsf.

Terracon has performed limited slope stability analyses for the landslides depicted by Sections B-B' and C-C'. For the slope in its current condition, as represented by these two landslides, parameters as may be expected for the soils encountered have been selected that would yield a factor of safety against sliding of 1.0 (FS = 1.0), or a condition of imminent failure. Both slides appear to have a depth of 6 to 7 feet. The active slide occurs in a steeper section than does the inactive young slide. Slope failures are more likely when the soils are saturated, such as during the spring of the year. In this case, near the slump failure and downslope, the surface is relatively dry, but the subsurface is moist. With the soil parameters used to calculate the shapes of the existing failure surfaces, it appears that a satisfactory FS (1.25 or higher) is attainable for this slope at a depth of approximately 8 feet.

ALTERNATIVES FOR DESIGN AND CONSTRUCTION

Terracon has identified two alternatives for crossing the slope leading down toward White Earth River: 1) cut and cover; and 2) HDD.

Cut and Cover. Cut and cover is technically feasible through this landslide area. Two slope sections through the area, Section B-B' and Section C-C', are shown on Exhibit 5 of 6.

A Section Similar in slope to Section B-B' is preferred.

- Consider Section A-A', depicted in plan on Exhibit 3 of 6 and depicted in section on Exhibit 4 of 6. Section A-A' follows the Pl's located in the field. The alignment down the slope is at an angle of approximately 16°. However, the alignment is skewed to the contours by

nearly 45°, which would increase risk of damage to the pipe as a result of any potential surface movement.

- A modified Section A-A' also is depicted on Exhibit 3 of 6 wherein the alignment would be directed perpendicular to the contours. This realignment would increase the slope of the alignment, but it would not increase the angle of the slope. This modified alignment would be preferred to the alignment along the PI's, as it does not traverse the slope in a sidehill manner. The hillslope along this modified alignment is approximately 210 feet long on an angle of 25°, which is similar to Section B-B'.
- Burial depth of a minimum of 8 feet in this slope would yield an acceptable Factor of Safety (FS > 1.3).


HDD. A potential plan and profile for an HDD to traverse this slope has been developed for this site and is shown on Exhibit 6 of 6. The potential profile was developed using criteria consistent with a 10-inch welded steel pipeline:

- Preferably a 12° or less entry/exit angle, in this case an angle of 14° was used to shorten the length;
- Allowing for a minimum tangent of 40 feet from the entry/exit point before initiating a curve;
- A bend radius of curvature for vertical or compound vertical and horizontal curves of a minimum of 1,000 feet; and,
- Allowing for a depth of cover of approximately 26 feet, chosen somewhat arbitrarily.

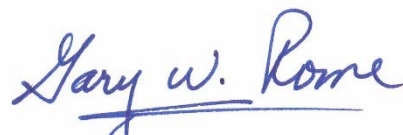
Conceptually, the potential HDD would have a total length of 777 feet and a horizontal length of 766 feet, as shown.

We appreciate the opportunity to work with you on these projects. If there are any questions, please call.

Sincerely,
TERRACON



AJ Torres, P.E.
Senior Staff Engineer

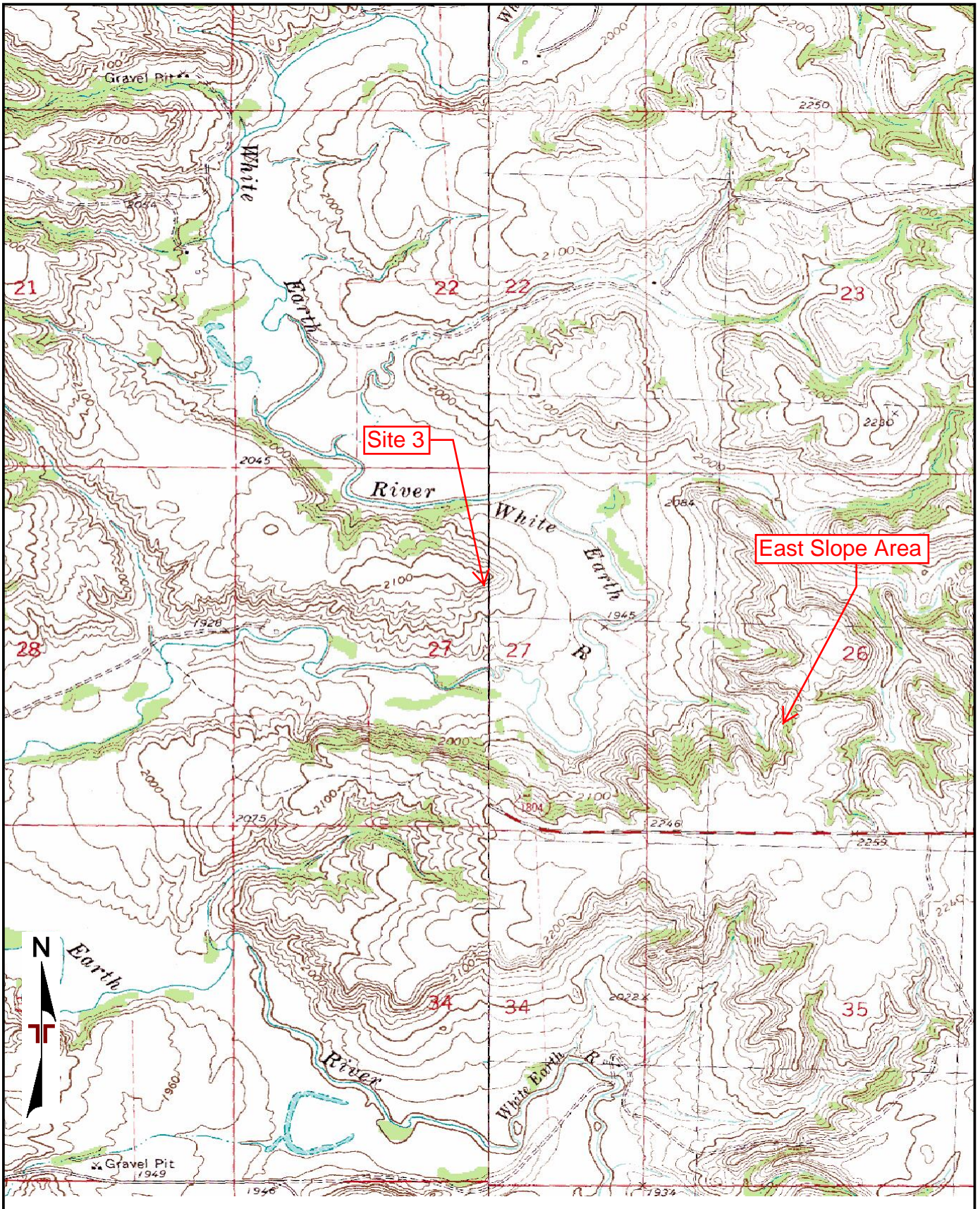


Gary W. Rome, P.E.
Senior Principal

Reviewed by: Dan C. Nebel

Enclosures

Exhibits



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: CHARLSON NE, ND (1/1/1965) and RAT LAKE, ND (1/1/1981).

Project Manager:	GR
Drawn by:	AT
Checked by:	-
Approved by:	-
Project No.	26175044
Scale:	1"=2,000'
File Name:	Site 3
Date:	Aug. 2017

Terracon
 2110 Overland Ave Ste 124
 Billings, MT 59102-6440

USGS Location Site 3 Northwest of New Town Cenex Pipeline, LLC Proposed Refined Fuels Line
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Exhibit 1

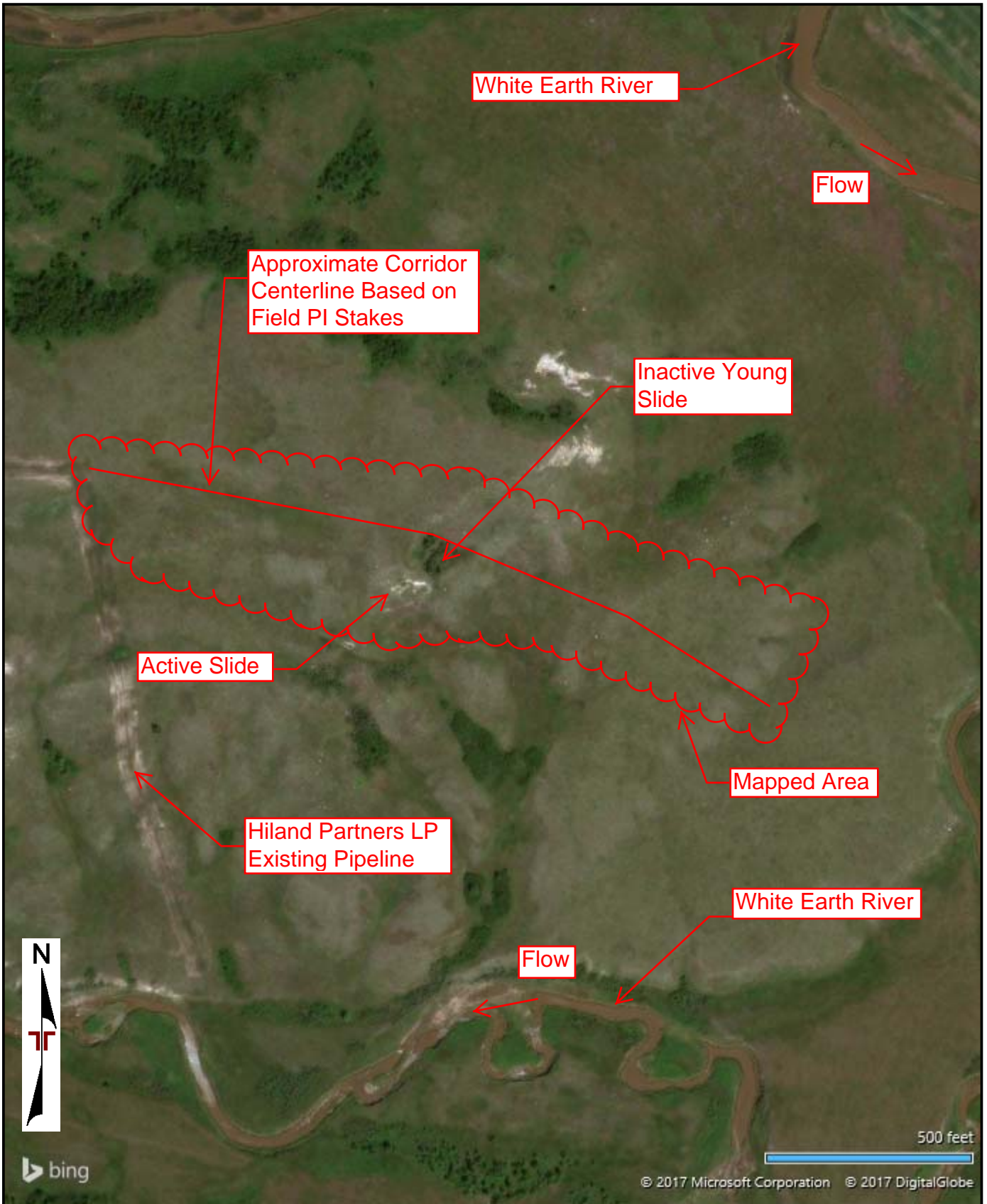


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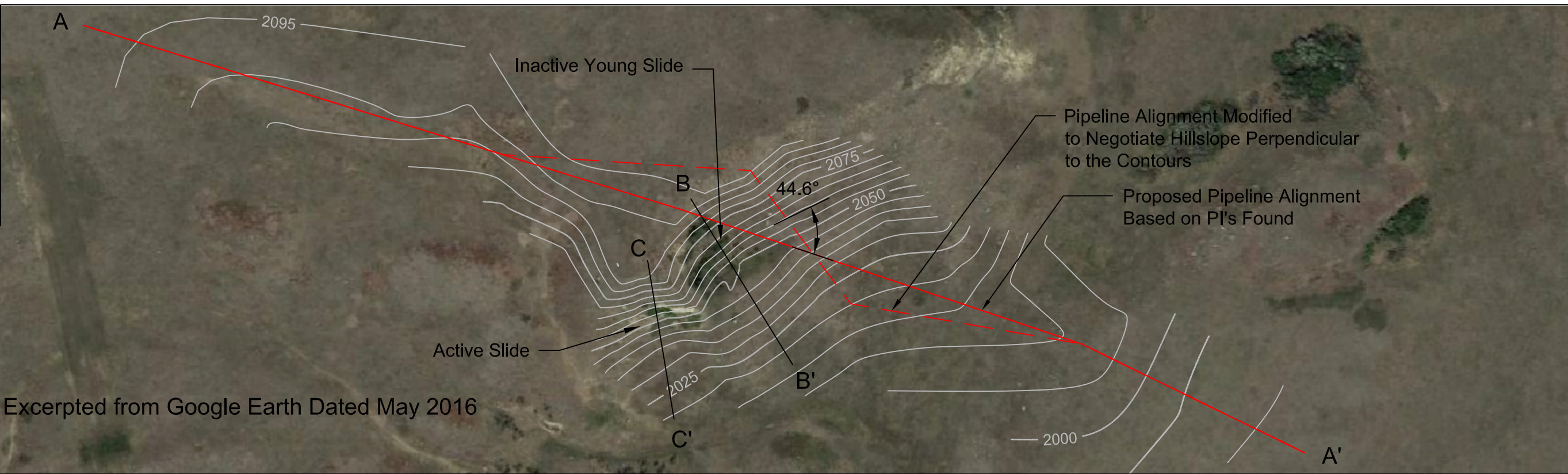
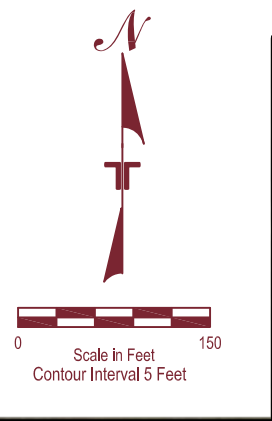
AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager:	GR	Project No.	26175044
Drawn by:	AT	Scale:	AS SHOWN
Checked by:	-	File Name:	Site 3
Approved by:	-	Date:	Aug. 2017

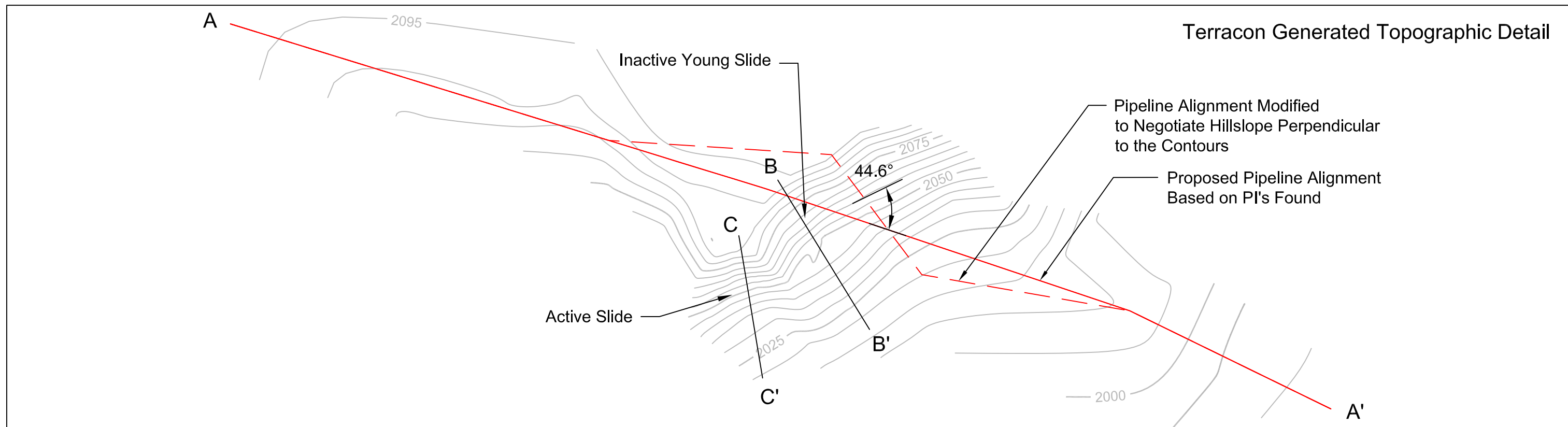
Terracon
 2110 Overland Ave Ste 124
 Billings, MT 59102-6440

Aerial Location
Site 3 Northwest of New Town Cenex Pipeline, LLC Proposed Refined Fuels Line

Exhibit
2



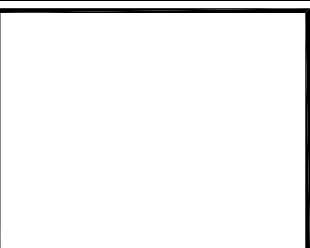
Aerial Image Excerpted from Google Earth Dated May 2016



REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists

2110 Overland Avenue, Suite 124 Billings, MT 59102
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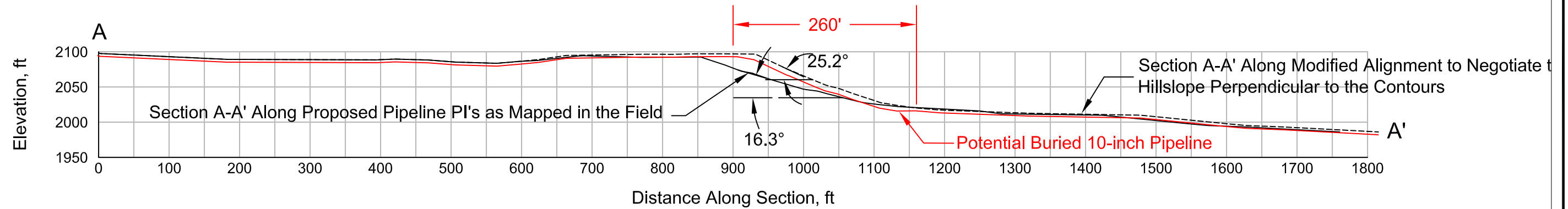


Plan and Contours
Site 3 Northwest of New Town
Cenex Pipeline, LLC
Proposed Refined Fuels Line

Mountrail County North Dakota

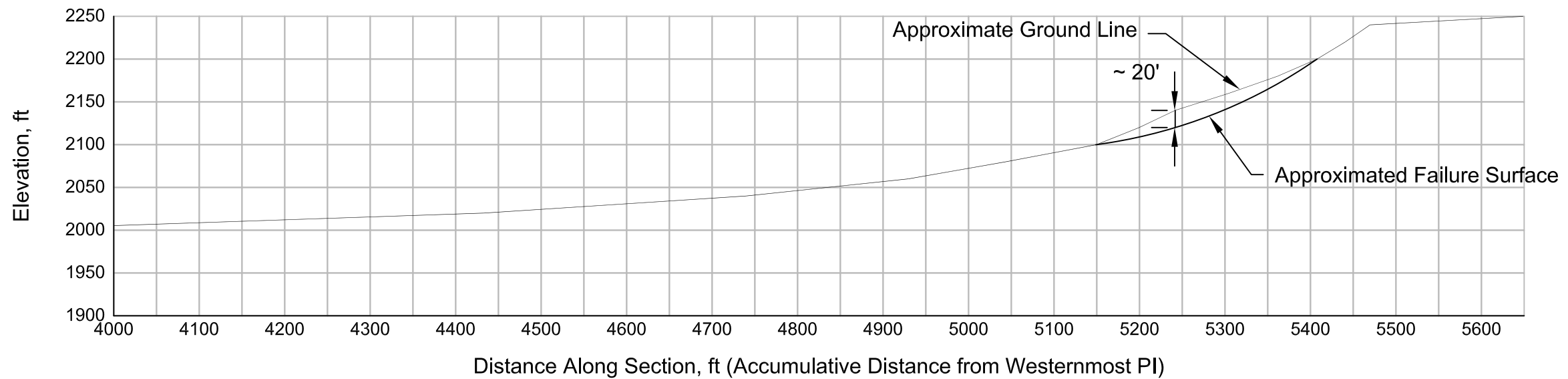
DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.	26175044
FILE NAME:	Site 3 - White Earth River
SHEET NO.:	3 OF 6

Section Along Pipeline PI's on the West (East Facing) Side of the White Earth River Valley - Section A-A'



Note: Potential Pipeline is shown at a burial depth of 4 feet outside of the valley slopes and floor. Through the valley slopes, the Potential Pipeline is shown at a depth of 8 feet. Total length for 8-foot burial is ~ 260 feet.

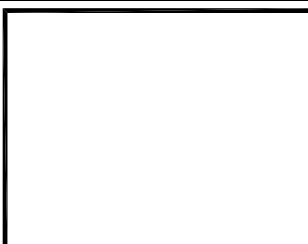
Section Along Approximate Pipeline on the East (West Facing) Side of the White Earth River Valley
Section Approximated from USGS Topography
Deep Inactive Slides May be Present in this Hill Slope - See Text



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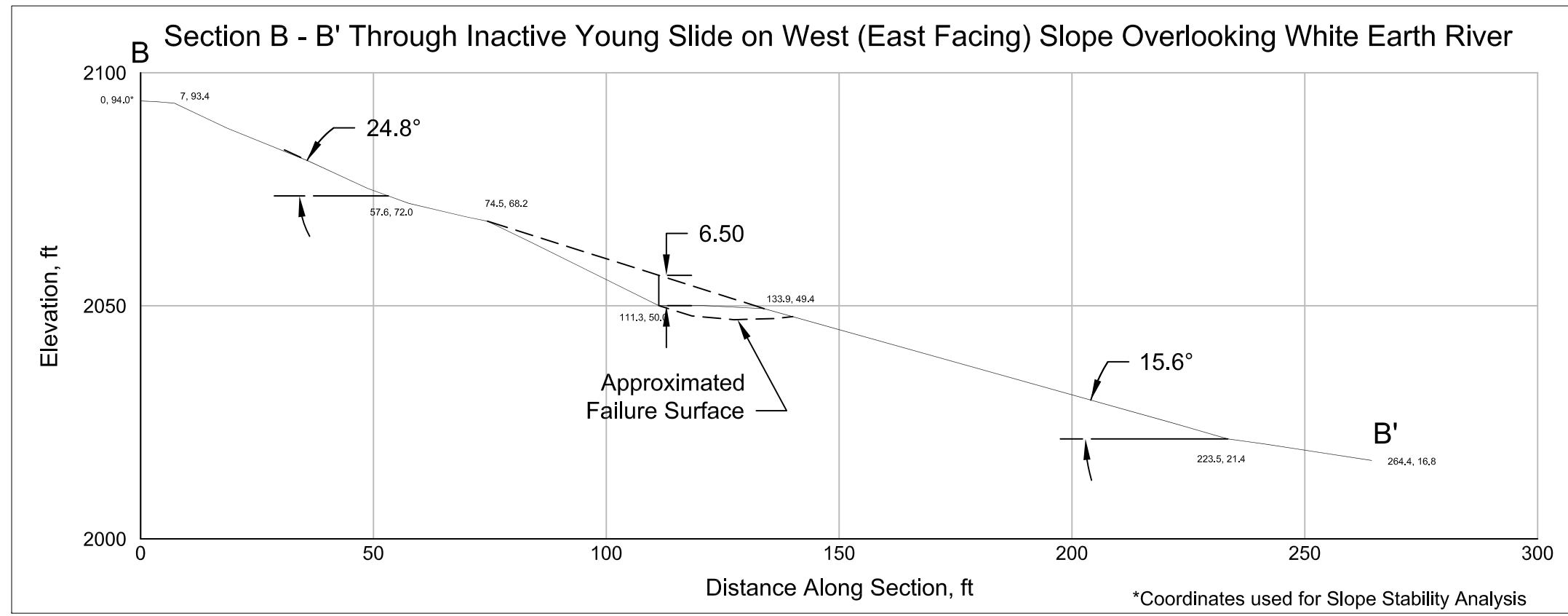


Sections Along Proposed Pipeline - Section A-A' and East Slope

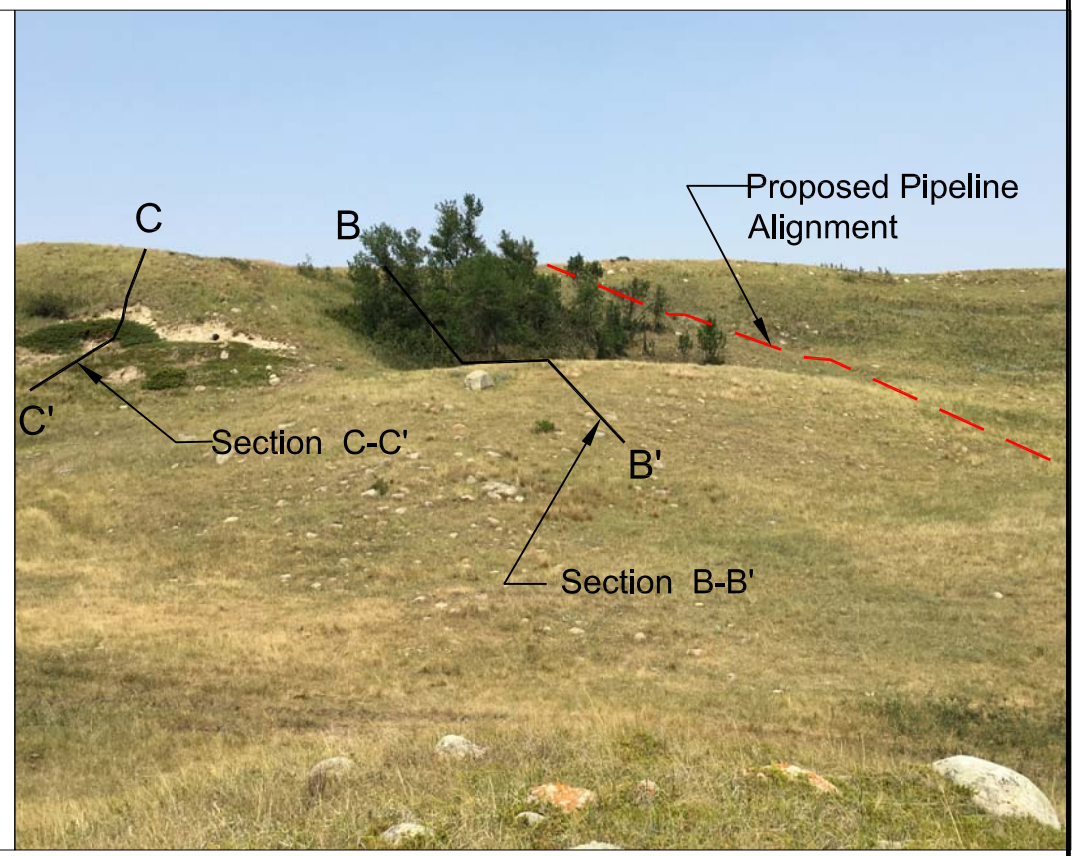
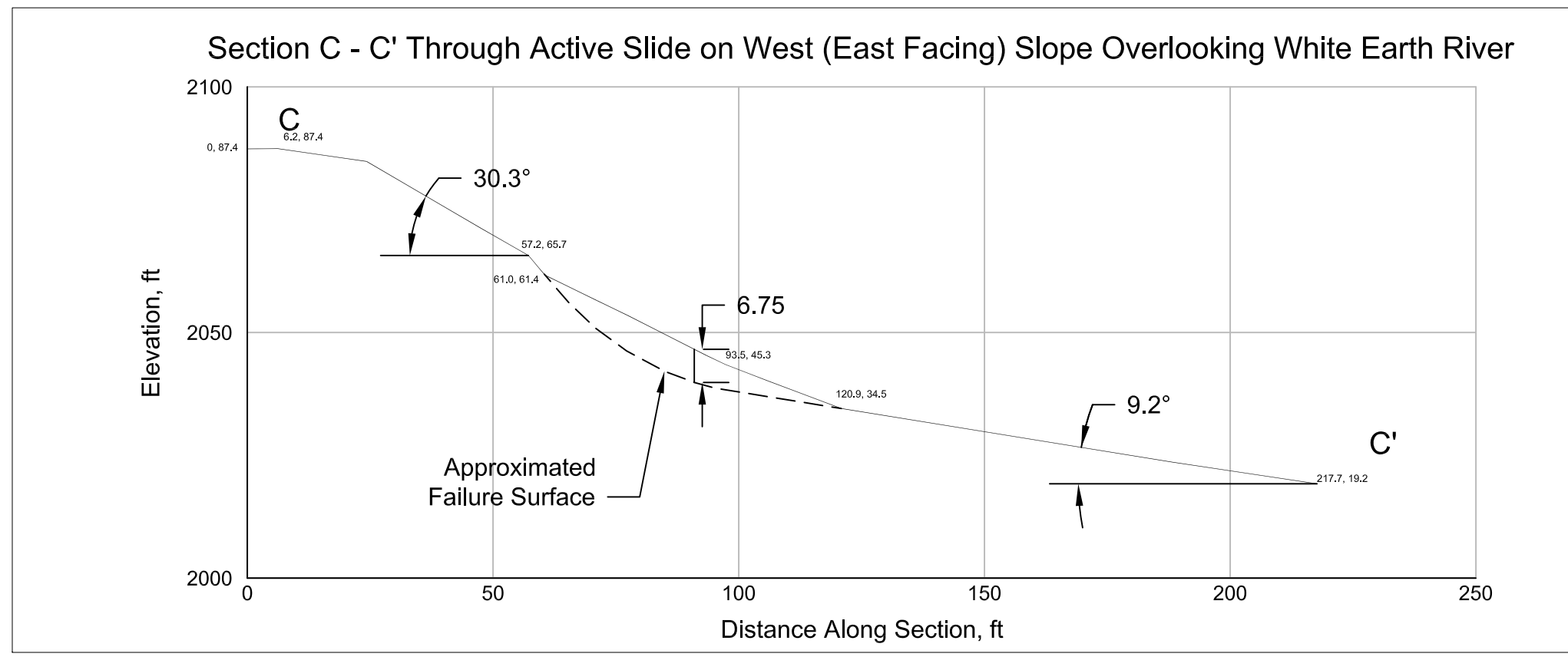
Site 3 Northwest of New Town
Cenex Pipeline, LLC
Proposed Refined Fuels Line

Mountrail County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.	26175044
FILE NAME:	Site 3 - White Earth River
SHEET NO.:	4 OF 6



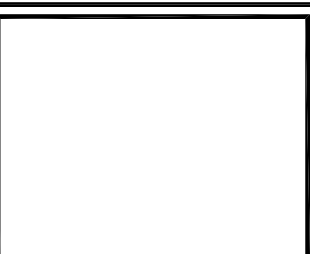
Looking NW at slope, picture shows the active slide and the inactive young slide plus the approximate location of the Proposed Pipeline Alignment.



REV.	DATE	BY	DESCRIPTION

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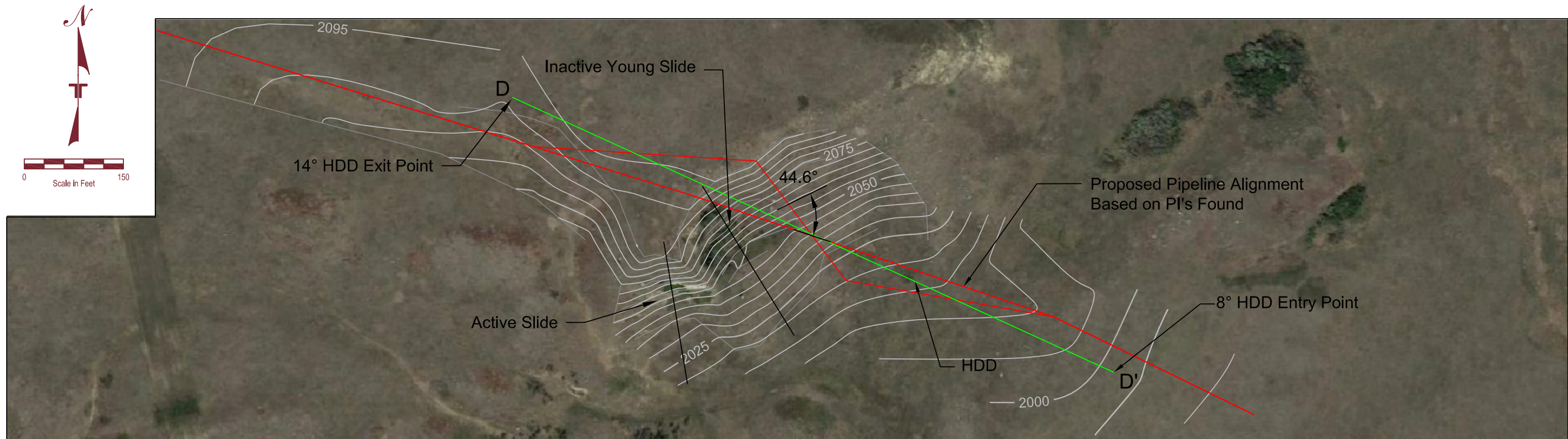


Slope Sections - Slumps Along Corridor - Sections A-A' and B-B'

Site 3 Northwest of New Town
Cenex Pipeline, LLC
Proposed Refined Fuels Line

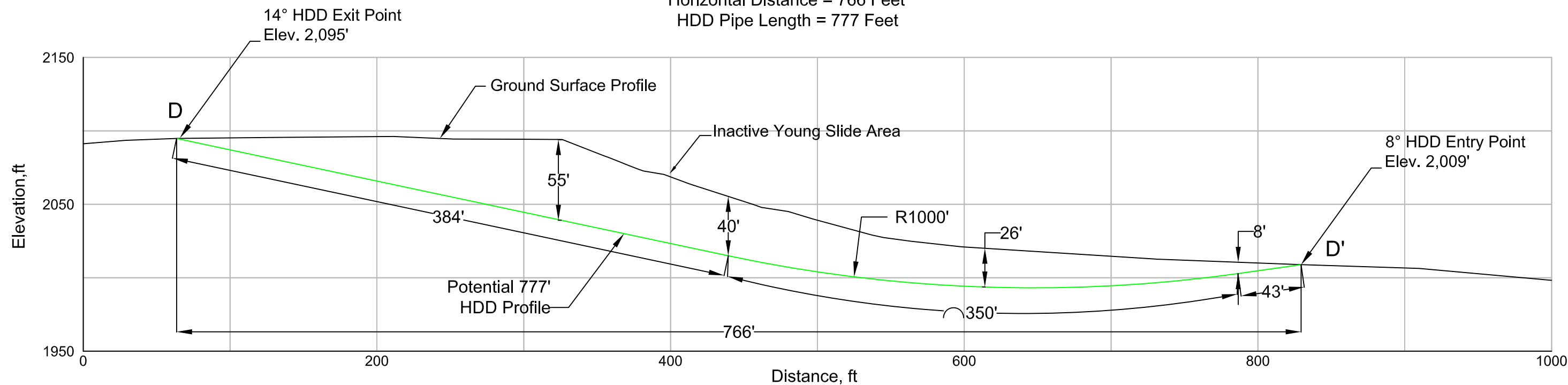
Mountrail County North Dakota

DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.	26175044
FILE NAME:	Site 3 - White Earth River
SHEET NO.:	5 OF 6



Potential HDD Profile D - D' Looking Northeast

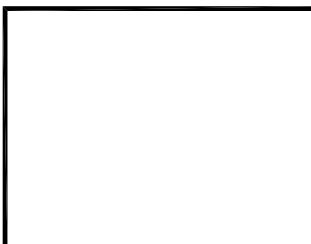
Horizontal Distance = 766 Feet
HDD Pipe Length = 777 Feet



REV.	DATE	BY	DESCRIPTION
1	8/30/17	AT	Revised Radius of curvature to 1,000'

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Potential HDD Profile
Site 3 Northwest of New Town
Cenex Pipeline, LLC
Proposed Refined Fuels Line

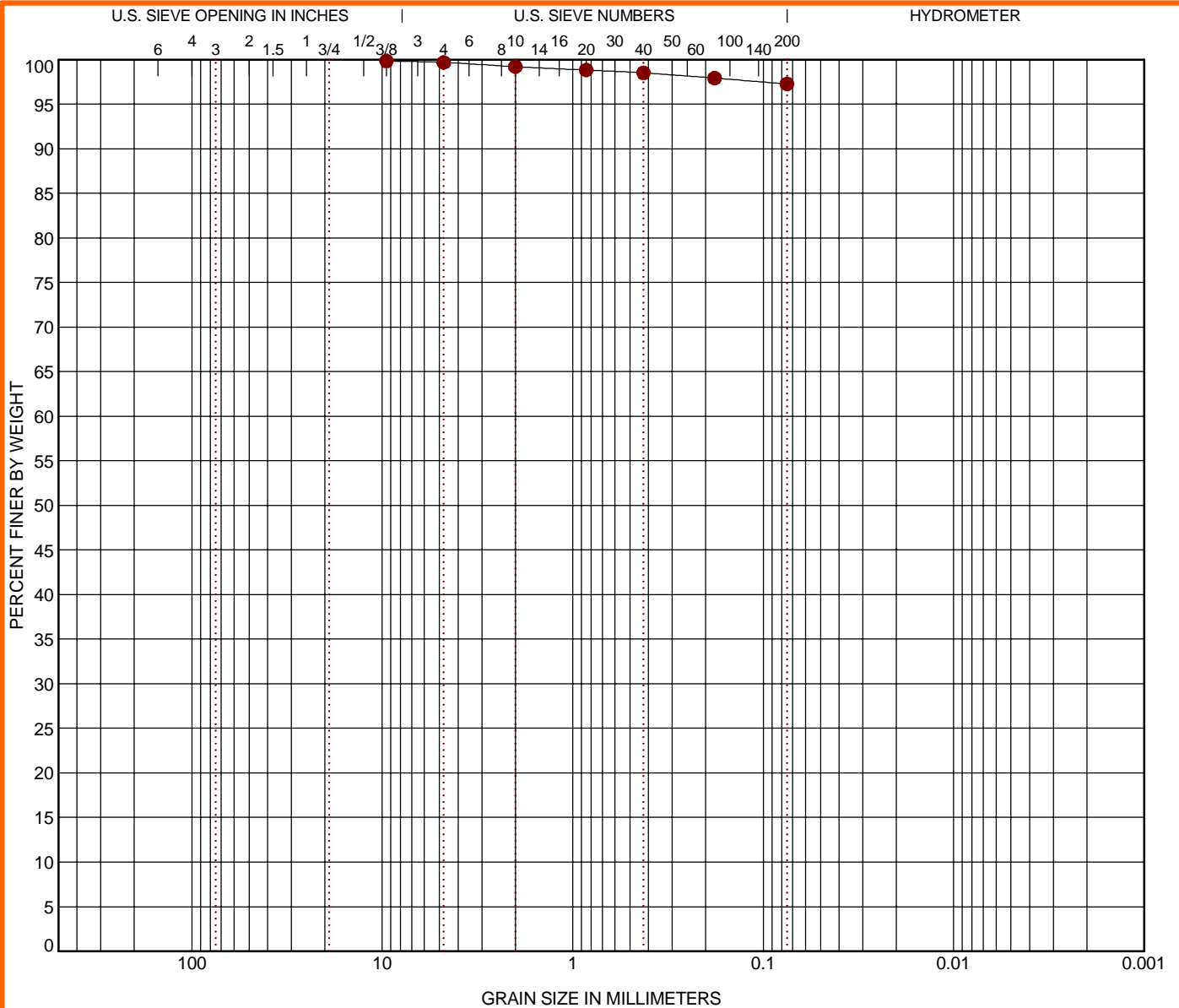
Mountrail County North Dakota

6	
DESIGNED BY:	GRome
DRAWN BY:	GRome
APPVD. BY:	AJTorres
SCALE:	As Shown
DATE:	August 2017
JOB NO.:	26175044
FILE NAME:	Site 3 - White Earth River
SHEET NO.:	6 OF 6

Laboratory Results

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● Site 3	0	LEAN CLAY (CL)	9	42	19	23		

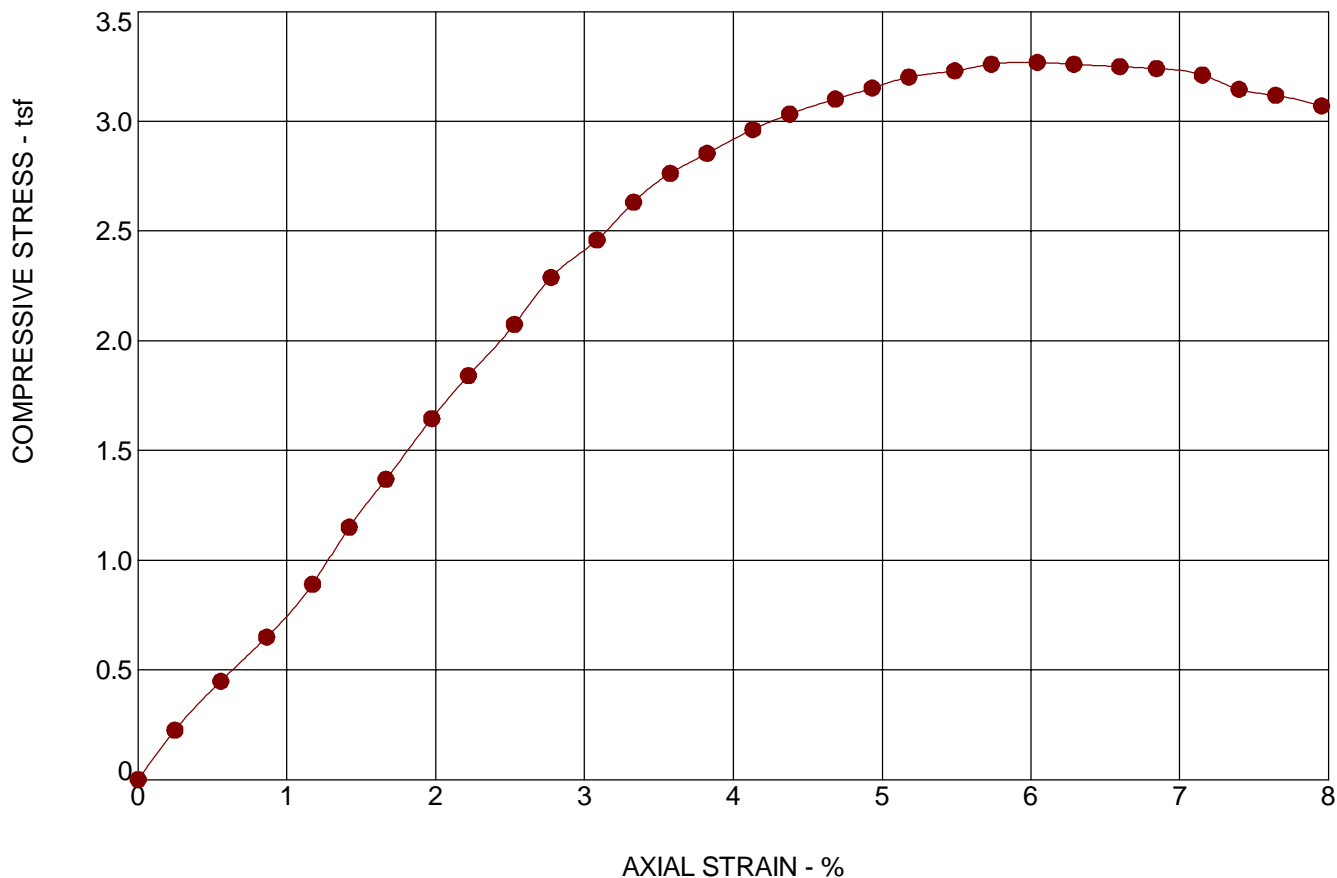
Boring ID	Depth	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Gravel	%Sand	%Silt	%Fines	%Clay
● Site 3	0	9.5				0.2	2.4		97.3	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 26175044 CHS SIDNEY TO MINOT TRIAL 2.GPJ TERRACON_DATATEMPLATE.GDT 8/25/17

PROJECT: CHS Sidney to Minot Slide Areas SITE: Williams & Mountrail Counties, ND	2110 Overland Ave Ste 124 Billings, MT	PROJECT NUMBER: 26175044 CLIENT: Cenex Pipeline, LLC Laurel, MT
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UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH



SPECIMEN TEST DATA

Moisture Content:	%	18
Dry Density:	pcf	97
Diameter:	in.	1.93
Height:	in.	1.62
Height / Diameter Ratio:		0.84
Calculated Saturation:	%	
Calculated Void Ratio:		
Assumed Specific Gravity:		
Failure Strain:	%	6.04
Unconfined Compressive Strength	(tsf)	3.27
Undrained Shear Strength:	(tsf)	1.63
Strain Rate:	in/min	
Remarks:		

SAMPLE TYPE: RING

SAMPLE LOCATION: Site 3 @ 0.5 - 0.9 feet

DESCRIPTION:

LL

PL

PI

Percent < #200 Sieve

PROJECT: CHS Sidney to Minot Slide Areas

PROJECT NUMBER: 26175044

SITE: Williams & Mountrail Counties, ND

Terracon
2110 Overland Ave Ste 124
Billings, MT

CLIENT: Cenex Pipeline, LLC
Laurel, MT