

Wade C. Mann  
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October 8, 2021

*Via Electronic Mail & Hand Delivery*

Mr. Steve Kahl  
Executive Director  
North Dakota Public Service Commission  
600 E. Boulevard, Dept. 408  
Bismarck, ND 58505-0480  
[ndpsc@nd.gov](mailto:ndpsc@nd.gov)

In re: Denbury Green Pipeline-North Dakota, LLC  
12-Inch Cedar Hills Pipeline Project  
Slope and Bowman Counties  
Case No. PU-19-294  
Our File No. 025331-000058

Dear Mr. Kahl:

Please find enclosed for filing in the above-captioned matter the original and seven copies of the following:

1. Application for Amendment of Certificate of Corridor Compatibility; and
2. Certification Relating to Route Adjustment.

Also enclosed is a flash drive containing the related GIS files.

If you have any questions, please feel free to contact me. Thank you.

Sincerely,



Wade C. Mann

WCM/drh

Enc.

cc: Rusty Shaw (via email w/enc.)  
Forrest Hudson (via email w/enc.)



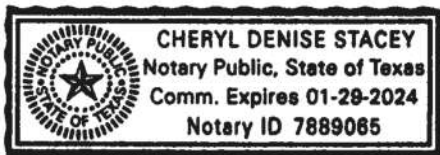
- a. The construction activities for Route Adjustment 2 occurred within the existing approved corridor;
  - b. The construction activities for Route Adjustment 2 occurred within areas previously surveyed and did not affect any known avoidance or exclusion areas within the existing approved corridor;
  - c. The construction activities for Route Adjustment 1 will not affect any known exclusion or avoidance areas;
  - d. The route outside of the existing approved corridor for Route Adjustment 1 is not longer than one and one-half miles.
  - e. No owner of real property on which Route Adjustment 1 is to be located and no governmental entity with an interest in the adjustment area oppose the adjustment.
  - f. Denbury will comply with the Commission's Order, laws, and rules designating the corridor and designating the route.
7. Attached to this Certification as Exhibit A, is correspondence from Denbury's project consultant SWCA including project maps depicting the route adjustments in relation to the existing approved corridor and route. Exhibit A also includes detailed reports and studies regarding exclusion and avoidance areas for the route adjustments. Updated shapefiles regarding the route adjustments have been filed with the Commission.

Dated this 16th day of October, 2021.

David E. Sheppard  
 David Sheppard  
 Denbury Green Pipeline – North Dakota, LLC

STATE OF Texas )  
 COUNTY OF Collin ) ss.

The foregoing instrument was signed and sworn to before me on this 16th day of October, 2021 by Cheryl Stacey.



Cheryl Denise Stacey  
 Notary Public

# Exhibit A



ENVIRONMENTAL CONSULTANTS  
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Bismarck Office  
201 Slate Drive, Suite 8  
Bismarck, ND 58503  
701.258.6622  
701.258.5957  
www.swca.com

October 4, 2021

Rusty Shaw  
Denbury Green Pipeline – Montana, LLC  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

**Subject: CHSU Lateral CO<sub>2</sub> Pipeline Project  
Bowman County, North Dakota  
Route Adjustments and Proposed Additions to the Designated Corridor**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) provides this letter in support of the Denbury Green Pipeline – Montana, LLC (Denbury) route adjustments filing for the CHSU Lateral CO<sub>2</sub> Pipeline Project (Project) in Bowman County, North Dakota. On April 1, 2020, the North Dakota Public Service Commission issued Findings of Fact, Conclusions of Law and Order, granting Denbury Certificate of Corridor Compatibility No. 215 and Route Permit No. 225 for a Designated Corridor and a Designated Route, respectively, for the Project.

It is SWCA's understanding that at the start of Project construction, Denbury identified two new utilities and one area with constructability issues that will require two route adjustments: Route Adjustment No. 1 is necessary to avoid the two underground utilities and will result in relocating the Designated Route outside of the Designated Corridor. Route Adjustment No. 2 will require shifting the Designated Route to the east of its designated location but still within the Designated Corridor. For both route adjustments, the location of the 200-foot wide Designated Corridor will change to keep it centered on the new proposed pipeline route. In addition to the proposed route adjustments, Denbury identified 5 locations where the workspace area for pipeline construction will have to extend beyond the Designated Corridor and thus, these areas should be considered as proposed additions to the Designated Corridor. Information on the route adjustments and proposed additions to the Designated Corridor are summarized in the following table and maps of the route adjustments and proposed corridor additions are included in a separate attachment.

Permit Area ID*	Length		Area	Milepost	Location			
	Total (feet)	Outside of Corridor (feet)	Addition to Corridor (acres)		Township	Range	Section	QtrQtr†
Route Adjustment No. 1	964	363	N/A†	11.3	132N	107W	1	SESE
Route Adjustment No. 2	2,689	0	N/A	14.6	132N	106W	16	SWNW, NWSW, SWSW
Proposed Addition No. 1	200	50	0.22	11.7	132N	106W	7	NWNW
Proposed Addition No. 2	200	50	0.22	11.8	132N	106W	7	NENW
Proposed Addition No. 3	100	50	0.11	12.3	132N	106W	7	SWNE
Proposed Addition No. 4	100	50	0.11	12.7	132N	106W	8	NWSW
Proposed Addition No. 5	200	52	0.24	17.77	132N	106W	33	SENW, NESW

\* See Figures 2 – 5 for locations  
† Location: QtrQtr = QuarterQuarter  
‡ N/A = Not Applicable

SWCA previously conducted natural resources, paleontological resources, and cultural resources desktop analyses and field surveys along the proposed pipeline route, as documented in the Application for Certificate of Corridor Compatibility and Route Permit and Waiver Application, dated August 7, 2019. As summarized below, SWCA reviewed aerial imagery in the vicinity of the route adjustments and proposed additions to the Designated Corridor and determined that natural resources and paleontological resources field surveys would not be required to assess potential impacts from the route proposed adjustments and corridor additions, but that cultural resources field surveys would be required to assess if cultural or historic artifacts would be affected by construction of the route adjustments and the ATWs. Summaries of these studies are presented in the following sections, while copies of the natural resources and paleontological resources letter reports and the cultural resources report and correspondence from the State Historical Preservation Office are enclosed herewith.

**Natural Resources:** Natural resources desktop analyses and field surveys were conducted in the immediate vicinity of the route adjustments and ATW expansion areas, as presented in the Natural Resources Report included as Appendix D to the Certificate of Corridor Compatibility and Route Permit and Waiver Application (Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). As described in Attachment 1 hereto, aerial imagery interpretation of the proposed route adjustments and corridor additions did not identify any exclusion or avoidance areas, as defined in North Dakota Administrative Code (NDAC) § 69-06-08-02.1 and NDAC § 69-06-08-02.2, respectively. Trees and shrubs that meet the North Dakota Public Service Commission (NDPSC) tree and shrub mitigation requirement may be impacted by the route adjustments and proposed additions to the Designated Corridor and SWCA recommends that any trees and shrubs removed during construction be documented for inclusion in post-construction tree and shrub mitigation activities.

**Paleontological Resources:** Paleontological resources desktop analyses and field surveys were conducted in the immediate vicinity of the route adjustments and proposed additions, as presented in the Paleontological Resources Report included as Appendix E to the Application for a Certificate of Corridor Compatibility and Route Permit and Waiver Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). As described in the Paleontological Resources Letter Report presented as Attachment 2 hereto, aerial imagery interpretation and literature reviews of the proposed route adjustments and proposed corridor additions did not identify any bedrock exposures or locality information that would warrant field surveys to determine the presence or absence of significant paleontological resources that would need to be considered by the NDPSC, as required by North Dakota Century Code Chapter 49-22.1-09.9. Additionally, the aerial imagery and literature review did not identify any exclusion or avoidance areas, as defined in NDAC § 69-06-08-02.1 and NDAC § 69-06-08-02.2, respectively.

**Cultural Resources:** Class I and Class III Cultural Resources inventories were conducted in the immediate vicinity of the route adjustments and proposed additions areas, as presented in the Cultural Resources Report included as Appendix C to the Application for a Certificate of Corridor Compatibility and Route Permit and Waiver Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). The concurrence letter from the North Dakota State Historical Society (SHSND) for the initial report was included in Appendix F to the application (see Docket No. PU-19-294, Item No. 1), and the SHSND concurrence letter for evaluation of previously identified site 32BO00245 for listing in the National Register of Historic Places that was filed with the NDPSC on November 12, 2019 was submitted as Hearing Exhibit No. 6 (see Docket No. PU-19-294, Item No. 6). Because the route adjustments and proposed additions are outside of the previous cultural resources survey corridor and due to the potential for cultural resources to be within these areas, SWCA conducted pedestrian surveys of these areas on July 27, 2021. The pedestrian surveys did not identify any cultural resources within the route adjustments or proposed additions to the Designated

Corridor. The Class III Cultural Resource Inventory for these additional areas was submitted to the SHSND for concurrence on the report's "No Significant Sites Affected" determination. The report and the SHSND concurrence letter are included as Attachment 3. The route adjustments and proposed corridor additions will not impact cultural resources.

Based on SWCA's review of existing data (desktop analysis), aerial photographic interpretation, and the results of the August 2021 Class I and Class III Cultural Resource Inventory, construction activities associated with the two route adjustments and the five proposed corridor additions will not affect any known exclusion or avoidance areas, as set forth in NDAC §§ 69-06-08-02(1) and (2), respectively.

If you have any questions or need further information, please contact me at [jdawson@swca.com](mailto:jdawson@swca.com) or 701.595.2081.

Sincerely,

A handwritten signature in blue ink that reads "Jim Dawson". The signature is fluid and cursive, with a long horizontal stroke at the end.

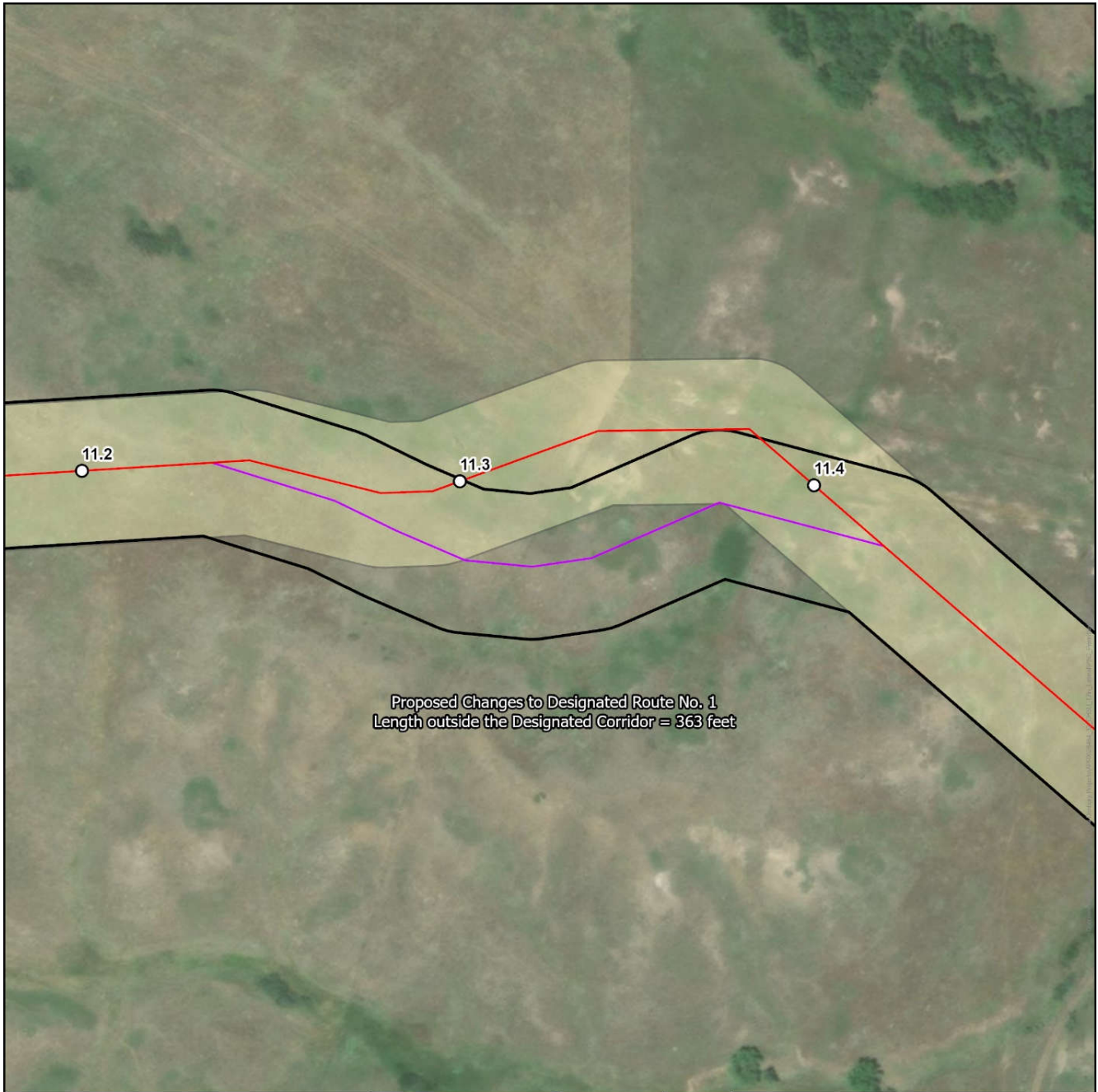
Jim Dawson, PG, CHMM  
Senior Hydrogeologist

Enclosure: as stated.

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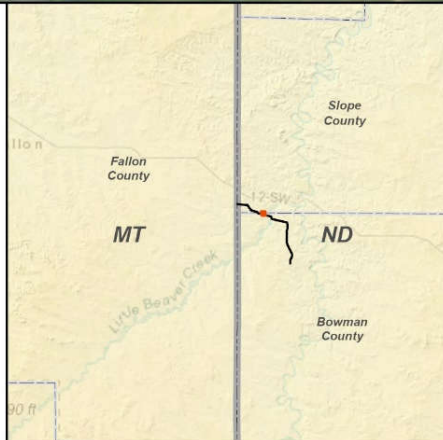
**ROUTE ADJUSTMENT  
AND  
PROPOSED CORRIDOR ADDITION LOCATION MAPS**


**Proposed Change to Designated Route No.1**



**CHSU Lateral Pipeline Proposed Reroute**

- Designated Route
- New Route
- Mile Posts
- Designated Corridor
- New Corridor






**Cedar Hills South Unit Lateral Project**  
Proposed Project Change: Reroute

Page 1 of 1

Coordinate System:  
Name: UTM83-13F  
Datum: North American 1983  
Projection: Transverse Mercator  
Page units: Foot US  
Imagery Source: USA NAIP (USDA)



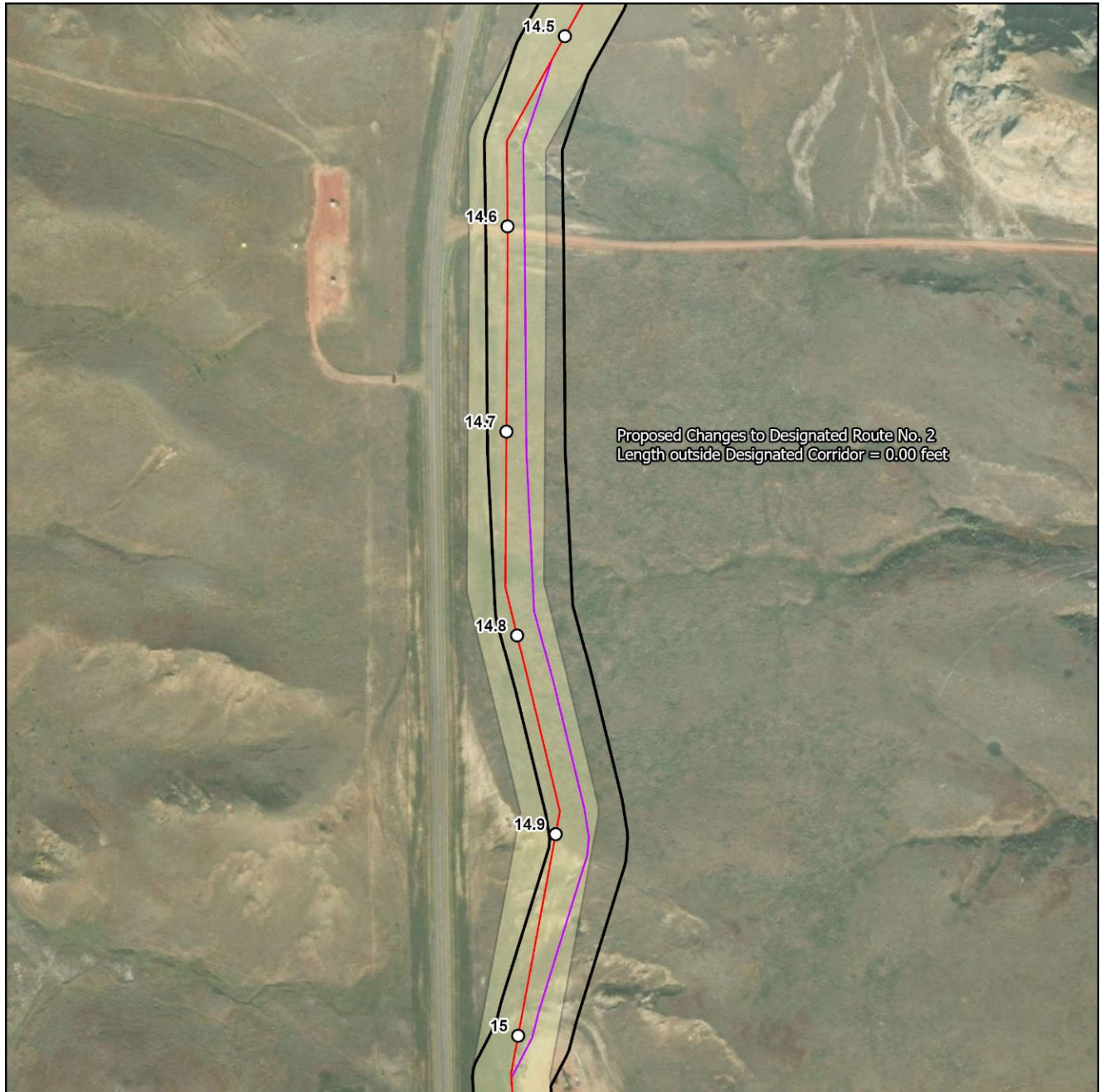
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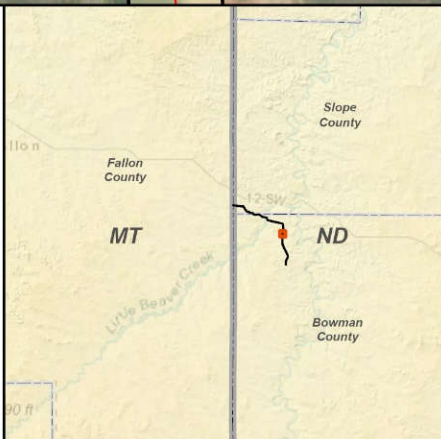
Date: 10/1/2021

**Proposed Change to Designated Route No.2**



**CHSU Lateral Pipeline Proposed Reroute**

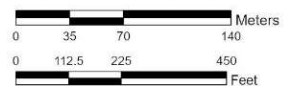
- Designated Route
- New Route
- Mile Posts
- Designated Corridor
- New Corridor



**Cedar Hills South Unit Lateral Project**  
 Proposed Project Change: Reroute

Page 1 of 1

Coordinate System:  
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 Datum: North American 1983  
 Projection: Transverse Mercator  
 Page units: Foot US  
 Imagery Source: USA NAIP (USDA)







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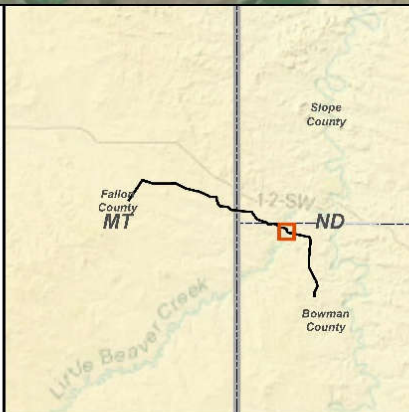
Date: 10/1/2021

**Proposed Addition to Designated Corridor No. 1, No. 2, No. 3, and No. 4**



**CHSU - Additional Workspace**

-  Designated Route
-  Mile Posts
-  Designated Corridor
-  Proposed Additions to Designated Corridor



**Cedar Hills South Unit Lateral Project**  
Proposed Project Change: Additional Workspace

Page 1 of 1

Coordinate System:  
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Datum: North American 1983  
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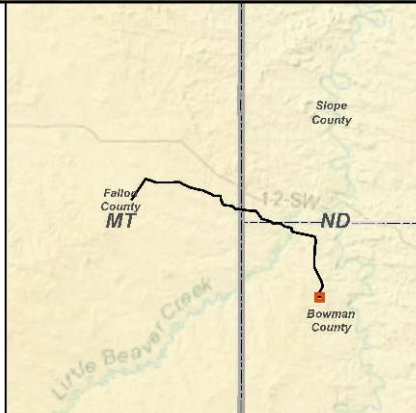
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Date: 9/28/2021

**Proposed Addition to Designated Corridor No. 5**



- CHSU - Additional Workspace**
- Designated Route
  - Mile Posts
  - ▭ Designated Corridor
  - Proposed Additions to Designated Corridor

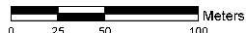




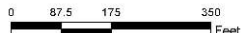
**Cedar Hills South Unit Lateral Project**  
**Proposed Project Change: Additional Workspace**

Page 1 of 1


Coordinate System:  
 Name: UTM83-13F  
 Datum: North American 1983  
 Projection: Transverse Mercator  
 Page units: Foot US  
 Imagery Source: USA NAIP (USDA)



Meters



Feet



1:3,500

Date: 9/28/2021

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**Attachment 1**  
**Natural Resources Letter Report**



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October 1, 2021

Rusty Shaw  
Denbury Green Pipeline – Montana, LLC  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

**Re: Natural Resource Review of Reroutes and Additional Temporary Workspace Areas  
CHSU Lateral CO<sub>2</sub> Pipeline, Bowman County, North Dakota**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) previously conducted natural resources analyses of existing data (i.e., desktop analysis) and field surveys for the proposed Denbury Green Pipeline – Montana, LLC's (Denbury's) Cedar Hills South Unit (CHSU) Lateral Carbon Dioxide (CO<sub>2</sub>) Pipeline Project (Project) in Slope and Bowman Counties, North Dakota (Figure 1). The natural resources studies were documented in the Natural Resources and Wetland Delineation Report, included as Appendix D to the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit, and Waiver Application, dated August 7, 2019, that was submitted to the North Dakota Public Service Commission (NDPSC). The NDPSC issued Certificate of Corridor Compatibility Number 215 and Route Permit Number 225 (i.e., Designated Corridor and Designated Route, respectively) on April 1, 2020 (NDPSC Case Number PU-19-204), per the requirements of the North Dakota Energy Conversion and Transmission Facility Siting Act (North Dakota Century Code [NDCC] §49-22.1).

Since the start of Project construction, Denbury identified two locations where the pipeline route will have to be moved to avoid two previously unknown underground utilities (Route Adjustment No. 1) and for constructability concerns (Route Adjustment No. 2), plus five additional temporary workspace areas (i.e., proposed additions to the Designated Corridor) in Bowman County that are necessary to facilitate pipeline construction. As summarized in Table 1 and illustrated in the attached figures, the pipeline reroute for Route Adjustment No. 1 (Figure 2) is partly outside the Designated Corridor, while the pipeline location for Route Adjustment No. 2 (Figure 3) is within the Designated Corridor, but the associated construction easement for this reroute is partly outside the Designated Corridor. Proposed additions to the Designated Corridor No. 1, No. 2, No. 3, and No. 4 (Figure 4), and proposed addition to the Designated Corridor No. 5 (Figure 5) are portions of temporary work areas required for pipeline construction that extend outside the Designated Corridor. Because the pipeline reroutes, construction right-of-way (ROW), and proposed corridor additions are partly outside of the Designated Corridor, notification of these required changes to the Designated Corridor and Designated Route must be filed with the NDPSC per NDCC §49-22.1-15.3 for Route Adjustment No.1, NDCC §49-22.1-15.1 for Route Adjustment No. 2, and NDCC §49-22.1-06.4 for the proposed additions to the Designated Corridor.

**Table 1. Route Adjustment and Proposed Corridor Additions Information**

Permit Area ID*	Length		Area	Landowner	Location			
	Total (feet)	Outside of Corridor (feet)	Addition to Corridor (acres)		Township	Range	Section	QtrQtr†
Route Adjustment No. 1	964	363	N/A†	Hadley Brothers LLP	132N	107W	1	SESE
Route Adjustment No. 2	2,689	0	N/A	Fischer	132N	106W	16	SWNW, NWSW, SWSW
Proposed Addition No. 1	200	50	0.22	Duffield	132N	106W	7	NWNW
Proposed Addition No. 2	200	50	0.22	Duffield	132N	106W	7	NENW
Proposed Addition No. 3	100	50	0.11	Duffield	132N	106W	7	SWNE
Proposed Addition No. 4	100	50	0.11	Duffield	132N	106W	8	NWSW
Proposed Addition No. 5	200	52	0.24	Miller	132N	106W	33	SENW, NESW

\* See Figures 2 through 5 for locations

† QtrQtr = QuarterQuarter

‡ N/A = Not Applicable

NDCC §49-22.1-15.3 addresses route adjustments before or during construction for gas or liquid transmission lines and states that a utility (Denbury), without any action by the NDPSC, may adjust the route of a gas or liquid transmission line outside the Designated Corridor if, before conducting any construction activities associated with the adjustment, the utility:

1. Files with the NDPSC certification and supporting documentation that:
  - a. The construction activities will not affect any known exclusion or avoidance areas.
  - b. The route outside the corridor is no longer than one and one-half miles.
  - c. The utility will comply with the NDPSC's order, laws, and rules designating the corridor and designating the route.
  - d. Each owner of real property on which the adjustment is to be located and any applicable governmental entity with an interest in the same adjustment area do not oppose the adjustment.
2. Files detailed field studies indicating exclusion and avoidance areas for an area encompassing the route outside the designated corridor equal to the length of the adjustment of the proposed corridor.

SWCA previously completed desktop analyses and field surveys of a 200-foot-wide survey corridor for the CHSU Lateral CO<sub>2</sub> Pipeline Project, as documented in Appendix D of the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit, and Waiver Application (Consolidated Application), dated August 7, 2019, and included, in part, the following findings:

1. Five wetlands, totaling approximately 0.42 acres, were identified within the 200-foot-wide survey corridor; 0.41 acres of those wetlands will be temporarily impacted by project construction.
2. One waterbody, classified as a small lake or pond, was identified within the survey corridor, but this feature is outside of the proposed construction ROW and will not be impacted by the project.
3. Each of the wetland crossings is a single, and complete project as defined by the U.S. Army Corps of Engineers (USACE) and can be constructed under NWP 12, which authorizes utility line construction projects in non-tidal waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5-acre of waters of the U.S.
4. A tree and shrub survey recorded 161 tree, sapling, and shrub individuals that may be impacted by construction activities.
5. No threatened or endangered species or habitat were observed during the field survey.
6. Listed threatened and endangered species in Bowman County are the gray wolf, whooping crane, and northern long-eared bat; however, these species are not likely to be impacted by construction of the proposed project.
7. Migratory birds and suitable nesting habitat were observed throughout the survey corridor and mitigation measures to avoid an unauthorized take of migratory birds and active nests were recommended.
8. No active raptor nests were observed within 0.5-mile of the survey corridor and no bald or golden eagle nests were observed.
9. The project lies within the greater sage-grouse primary range in Bowman County and recommendations to minimize impacts to greater sage-grouse and their habitats were included.

Transmission facility corridor and route criteria are defined in North Dakota Administrative Code (NDAC) §69-06-08-02. Compliance with these criteria for the proposed pipeline route (i.e., the permanent and temporary construction easements and the proposed corridor additions), was demonstrated in the Consolidated Application, which culminated in issuance of permits for the Designated Corridor and Designated Route. The NDCC §49-22.1-15.3, NDCC §49-22.1-15.1, and NDCC §49-22.1-06.4 certification and documentation requirements for natural resources are discussed below:

- Route Adjustment No. 1 – the route adjustment is completely within the one-mile-wide project study area for the desktop analysis and approximately 363 feet of the reroute lies outside of the Designated Corridor (Figure 2). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of the route adjustment indicates that a pedestrian survey of the reroute is not warranted.
- Route Adjustment No. 2 – required for constructibility concerns; the route adjustment is completely within the one-mile-wide project study area for the desktop analysis and, while the rerouted pipeline itself lies within the Designated Corridor, approximately 2,689 feet of the associated temporary construction easement lies outside of the Designated

Corridor which will have to be relocate as shown in Figure 4. No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of the route adjustment indicates that a pedestrian survey of the reroute is not warranted.

- Proposed Corridor Addition No. 1 – this proposed addition is for expansion of a temporary workspace area from approximately 100 x 100 feet to 100 x 200 feet, with an area that measures approximately 50 x 200 feet (0.22-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 2 – this proposed addition is for expansion of a temporary workspace area from approximately 100 x 100 feet to 100 x 200 feet, with an area that measures approximately 50 x 200 feet (0.22-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 3– this proposed addition is for a temporary workspace area that measures approximately 100 x 100 feet, with an area that measures approximately 50 x 100 feet (0.11-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 4– this proposed addition is for a temporary workspace area that measures approximately 100 x 100 feet, with an area that measures approximately 50 x 100 feet (0.11-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 5 – this proposed addition is for a portion of the Miller Station that measures approximately 52 feet by 200 feet (0.24 acre) that was not included in the previous field survey and Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.

If you have any questions or wish to discuss this matter, please do not hesitate to contact me by telephone at (701) 595-2081 or by email at [jdawson@swca.com](mailto:jdawson@swca.com).

Sincerely,



James W. Dawson, PG  
Senior Hydrogeologist

## **Figures**

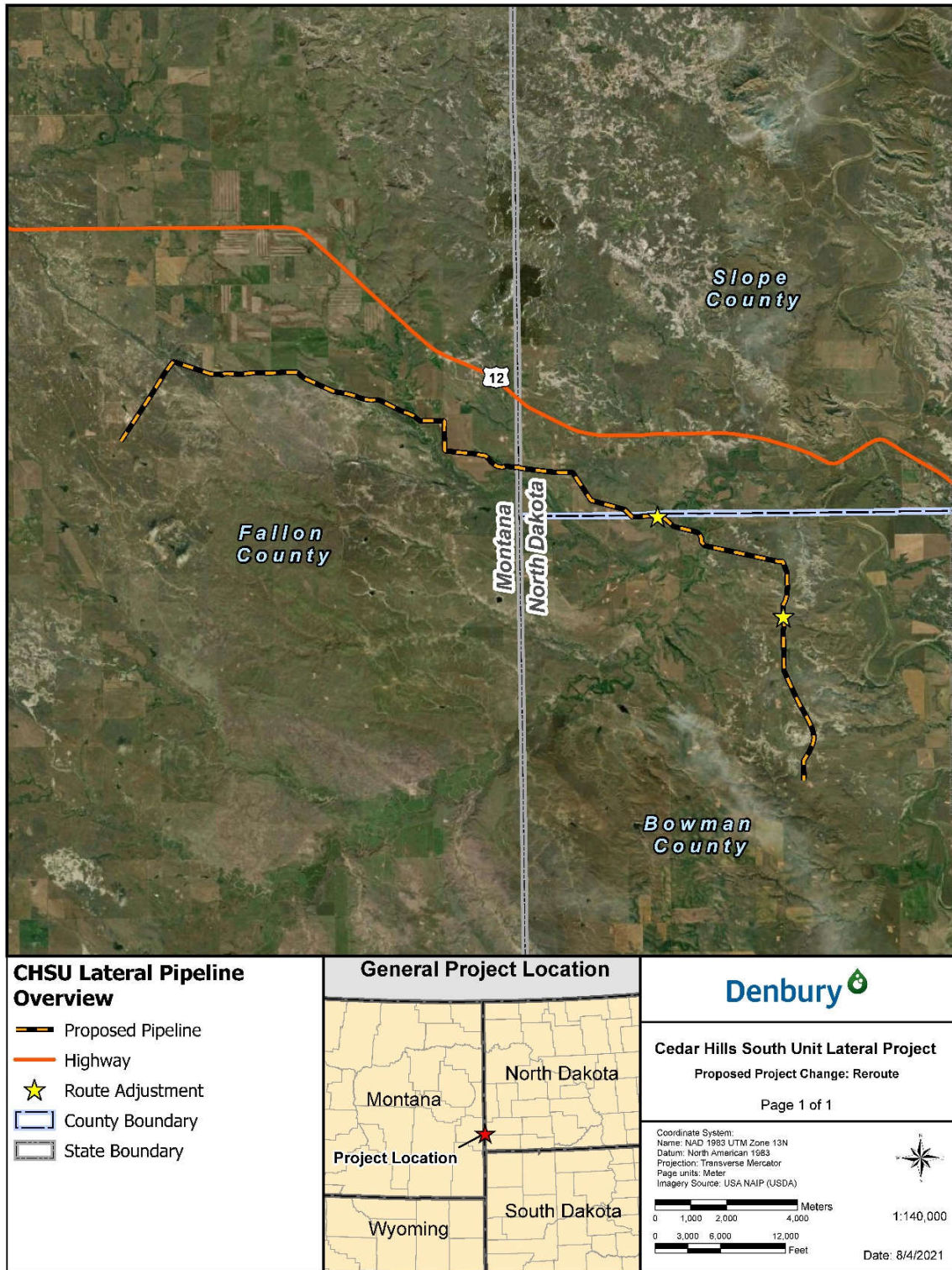


Figure 1. CHSU Lateral CO<sub>2</sub> Pipeline location map.

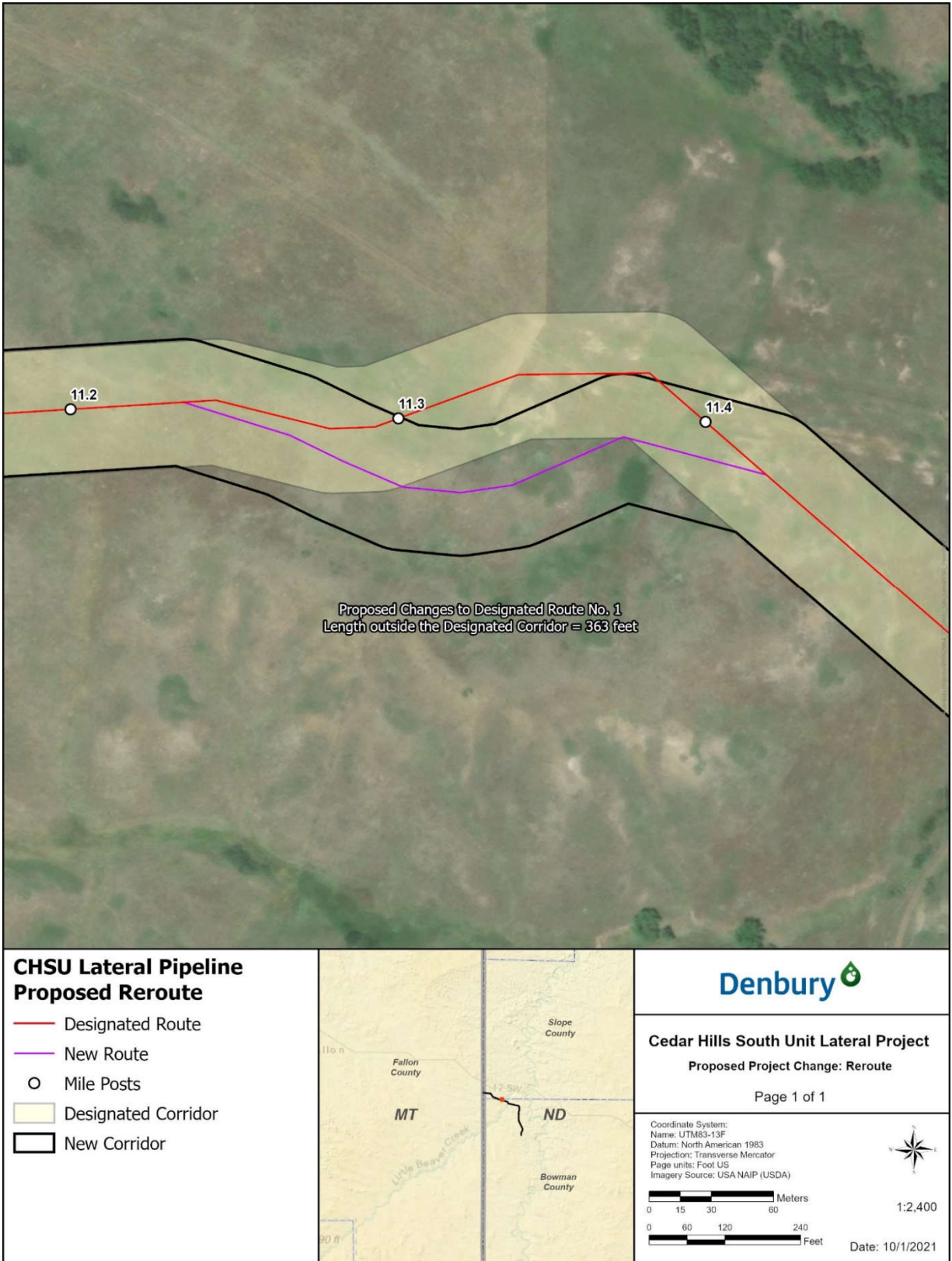


Figure 2. Route Adjustment No. 1 location map.

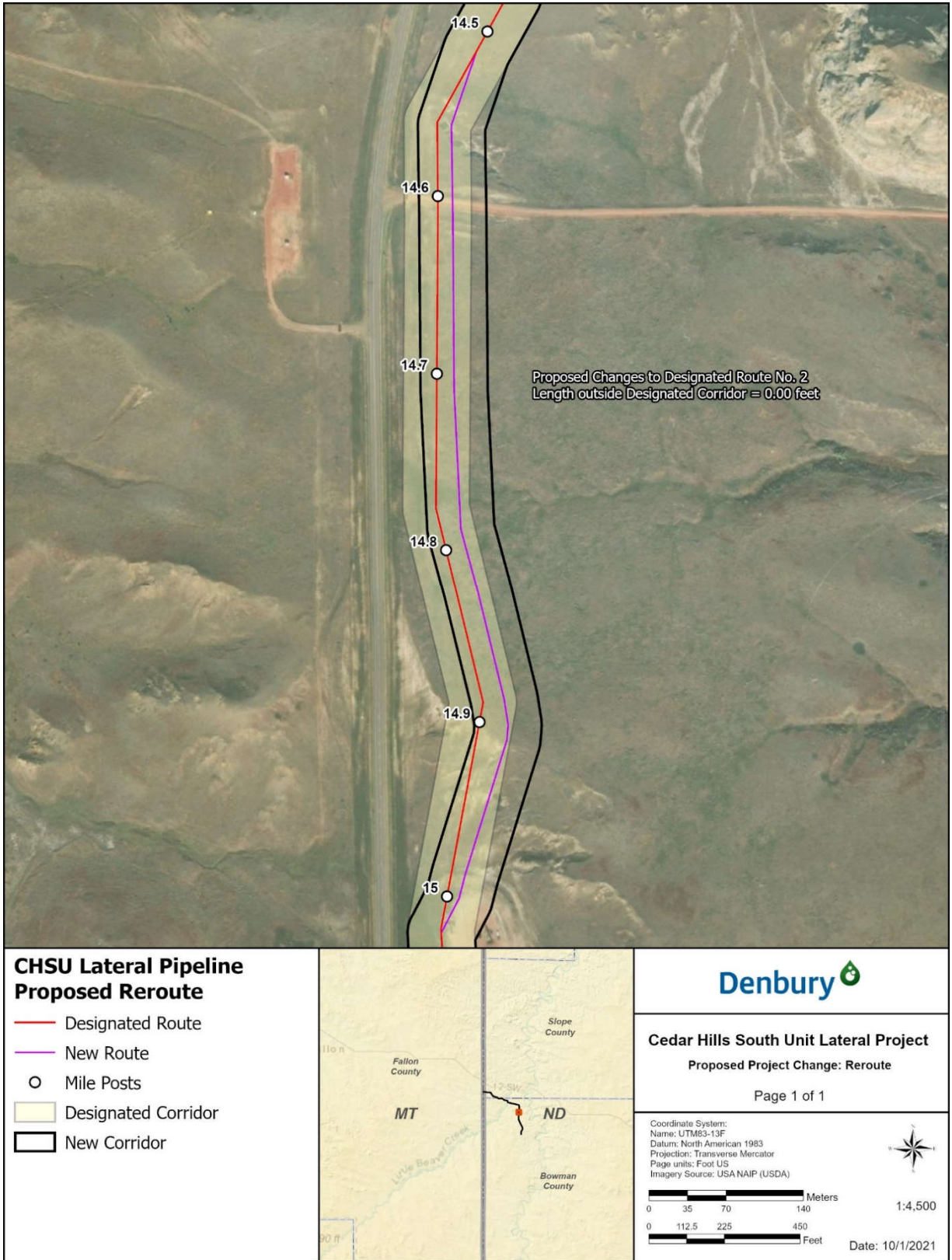


Figure 3. Route Adjustment No. 2 location map.

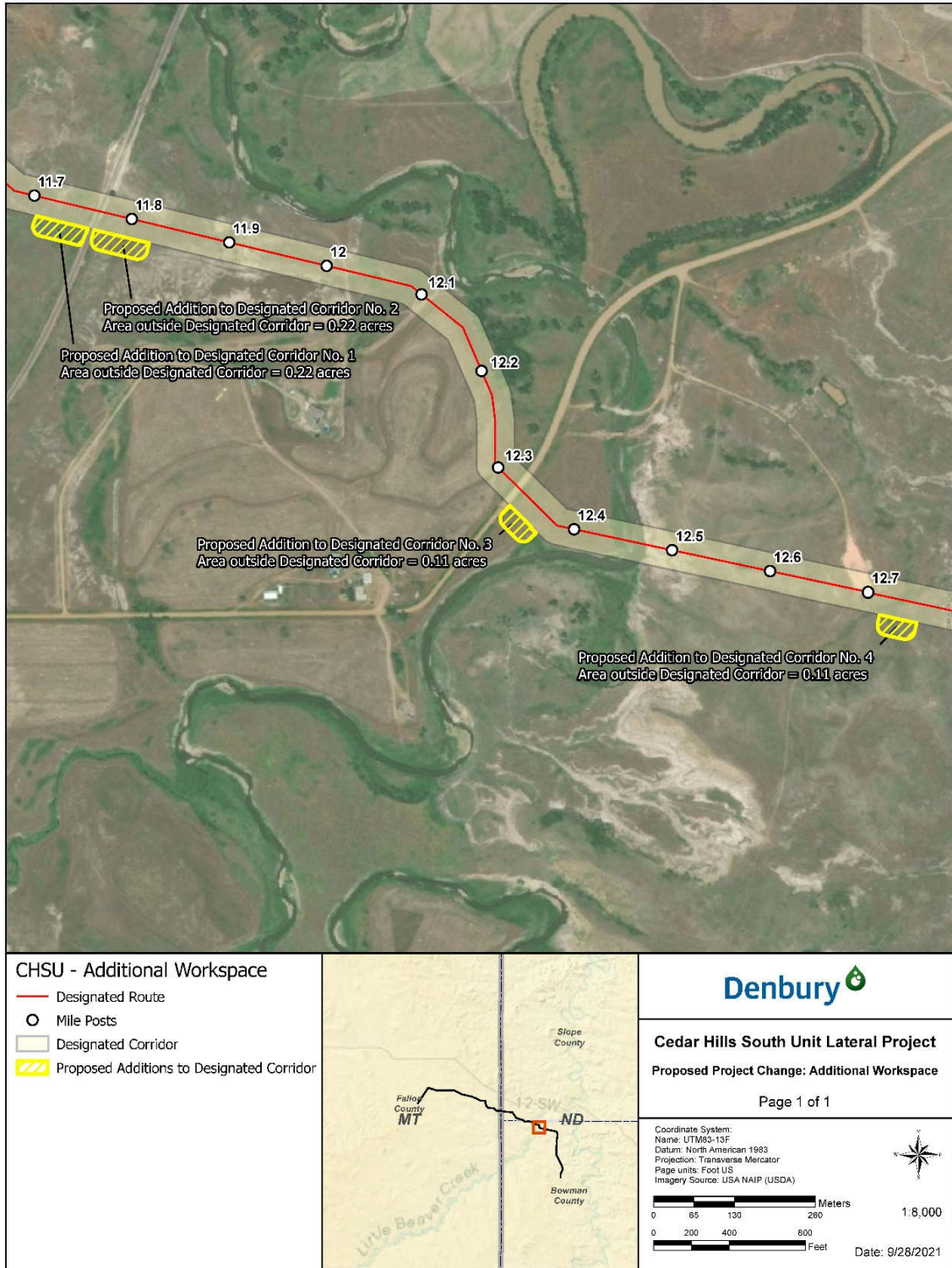


Figure 4. Proposed Corridor Additions 1, 2, 3, and 4 location map.

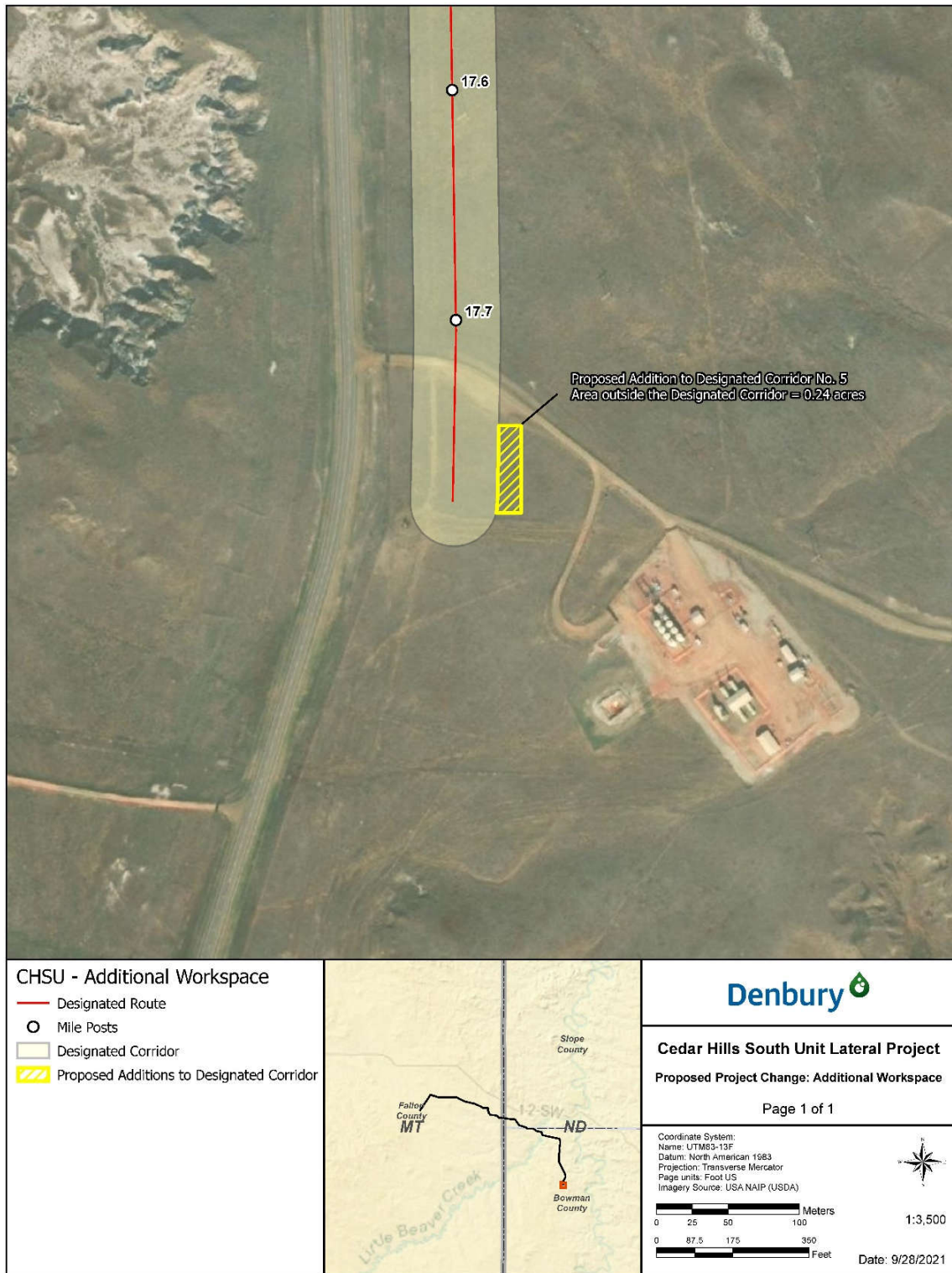


Figure 5. Proposed Corridor Addition No. 5 location map.

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**Attachment 2**  
**Paleontological Resources Letter Report**



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Sheridan, Wyoming 82801  
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www.swca.com

October 1, 2021

Rusty Shaw, REM  
Environmental Compliance Manager  
Denbury, Inc.  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

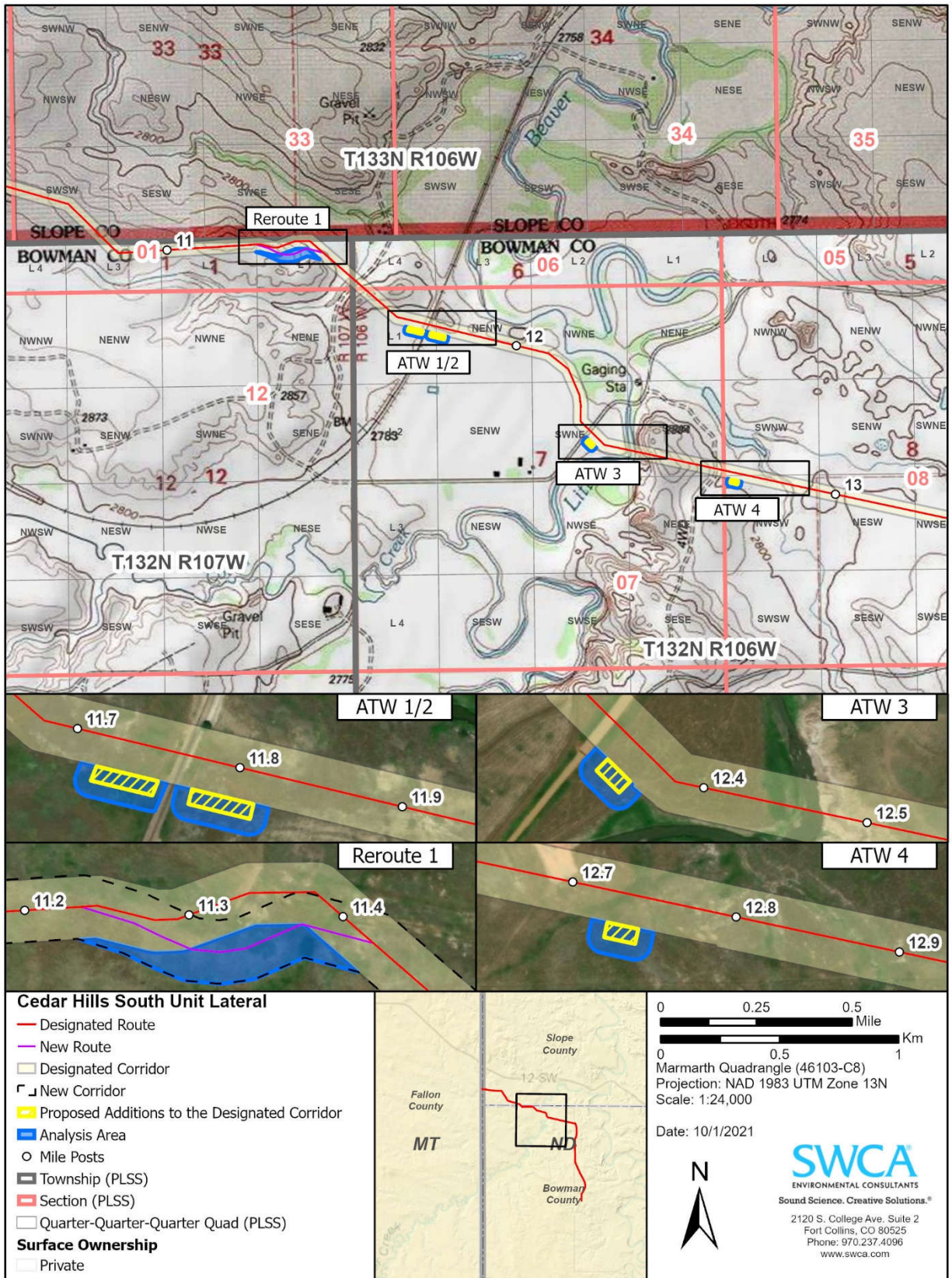
**Re: Paleontological Resource Review of Two Route Adjustments and Five Proposed Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) conducted a paleontological resource analysis of existing data (i.e., desktop analysis) for proposed route adjustments and additions to the designated corridor for the Cedar Hills South Unit (CHSU) Lateral Carbon Dioxide (CO<sub>2</sub>) Pipeline Project (Project). Denbury Green Pipeline – Montana, LLC (Denbury) is constructing a 17.76-mile-long pipeline through southeast Montana and southwest North Dakota. The Project consists of a 75-foot-wide construction right-of-way (ROW) and 12-inch-diameter pipeline to transmit liquid CO<sub>2</sub> from Denbury facility in the Coral Creek Unit Oilfield in Fallon County, Montana to the Cedar Hills South Unit Oilfield in Bowman County, North Dakota. The North Dakota Public Service Commission issued a Certificate of Corridor Compatibility Number 215 and Route Permit Number 225 on April 1, 2020, under the North Dakota Energy Conversion and Transmission Facility Siting Act. As part of the permitting process, a paleontological resource assessment was conducted for the Project because published geologic mapping indicated that most of the area overlies geologic units with a high potential to contain scientifically important paleontological resources and to assist Denbury in meeting the paleontological resource assessment requirements of the permitting process.

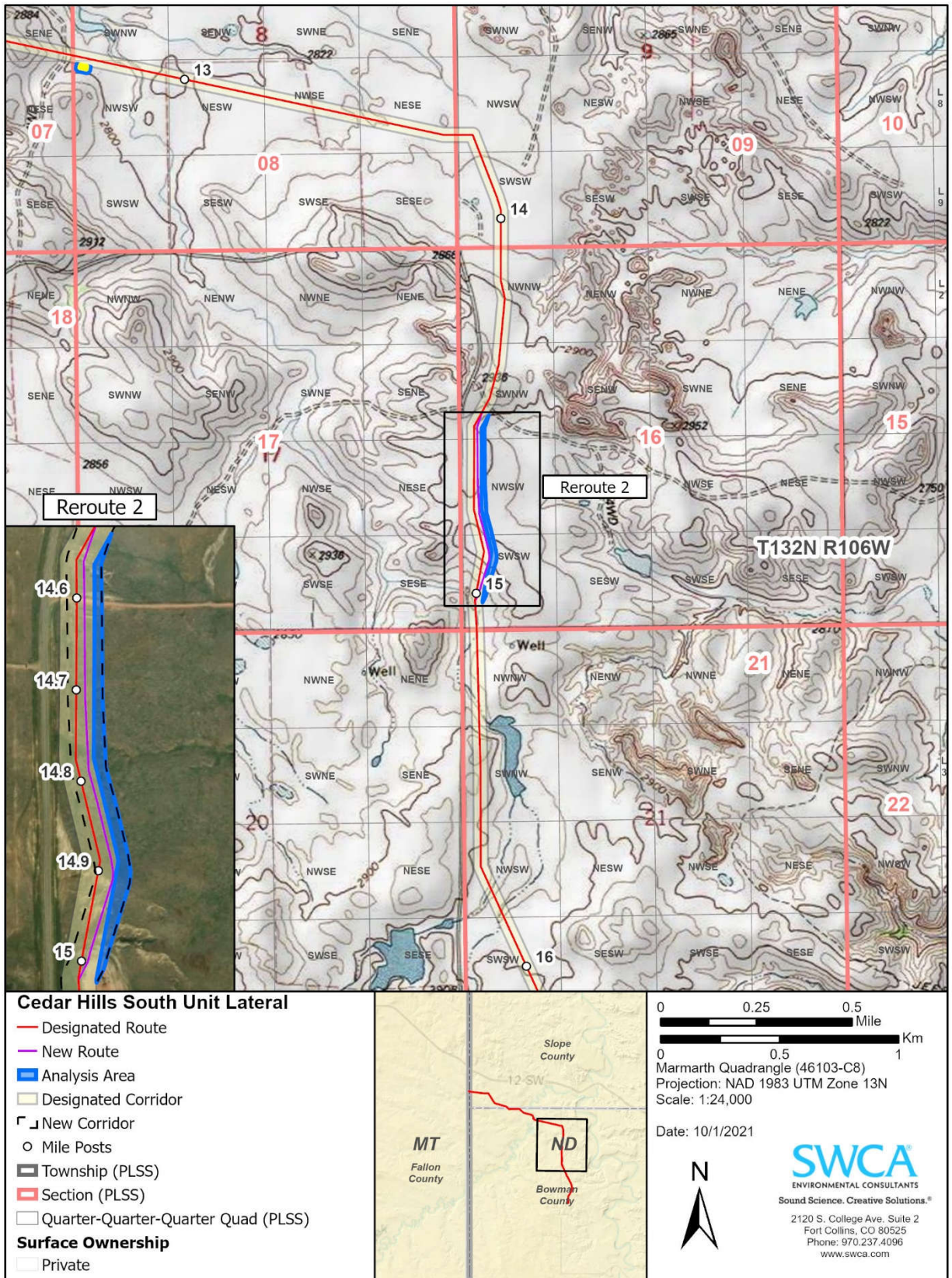
SWCA previously completed a desktop analysis and pedestrian surveys of 9.22 miles of pipeline on privately owned land in Slope and Bowman Counties, North Dakota, as documented in the Paleontological Survey Report (Knauss et al. 2019) submitted as Appendix E of the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit for CHSU Lateral CO<sub>2</sub> Pipeline, dated August 7, 2019 (SWCA 2019). Since the start of Project construction, Denbury identified two route adjustments (or reroutes) and five additions to the designated corridor for additional temporary workspace areas (ATWs) along the pipeline route in Bowman County, North Dakota (Figures 1-3; Table 1). An analysis area comprised of a 100-foot-wide buffer of the two proposed route adjustments and the five proposed corridor additions was reviewed. The reroutes and ATW areas comprise a total of 10.55 acres that are outside of the previously analyzed areas and require paleontological resources assessments of this analysis area to meet corridor and route permit conditions. The analysis area is located on private lands in Township (T) 132 North (N), Range (R) 106 West (W); T132N, R107W; and T133N, R106W, within the Waterhole Creek (1981), Kid Creek (1976), and Marmarth (1980), North Dakota, U.S. Geological Survey (USGS) 7.5-minute quadrangles. Analysis of the reroutes and ATW areas was conducted by SWCA lead paleontologist Georgia E. Knauss.

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



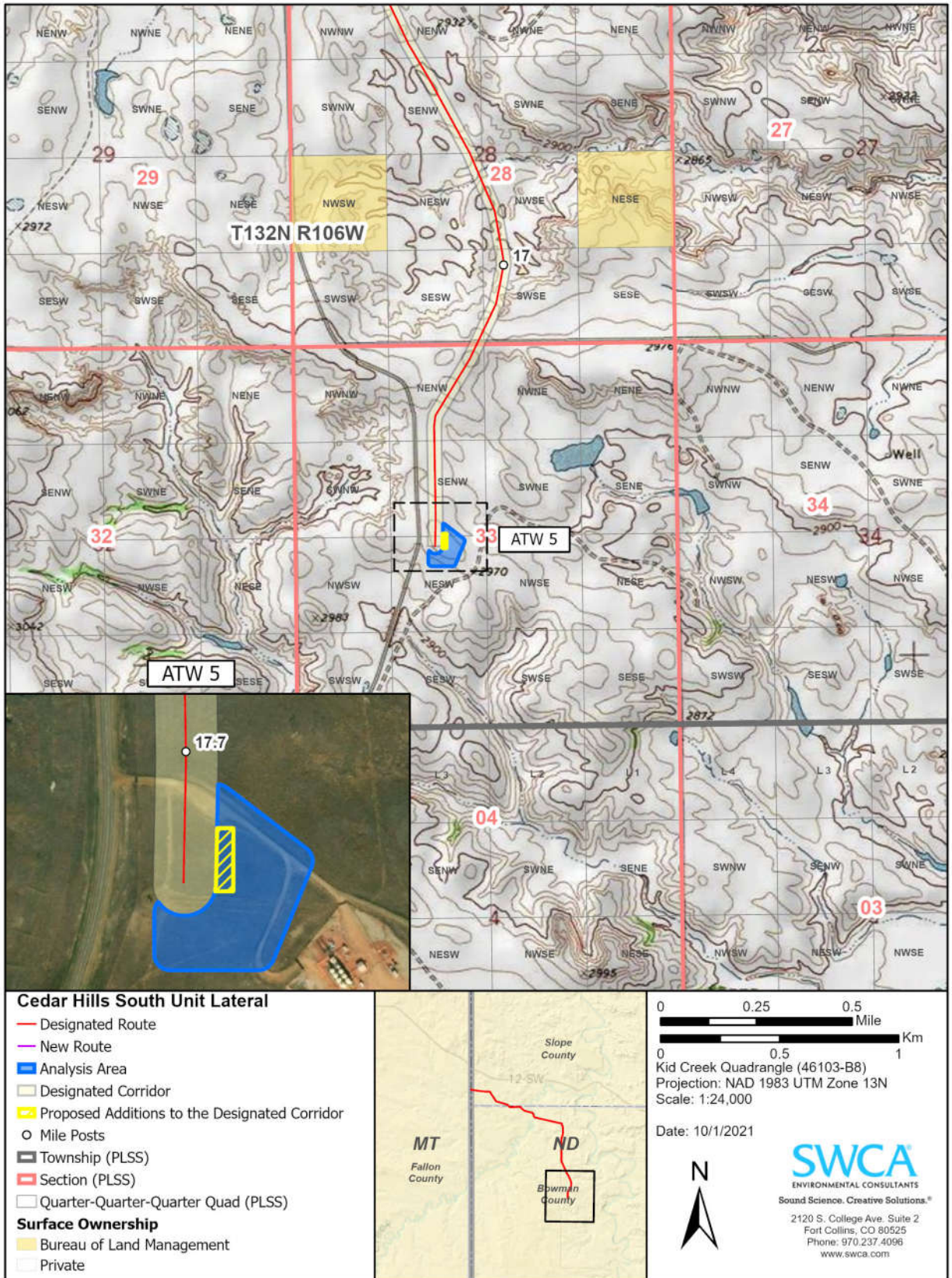
**Figure 1. Map with paleontological resource analysis areas for Reroute 1 and ATWs 1 through 4.**

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



**Figure 2. Map with paleontological resource analysis area for Reroute 2.**

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



**Figure 3. Map with paleontological resource analysis areas for ATW 5.**

**Table 1. Project Area Legal Descriptions**

<b>Infrastructure Name*</b>	<b>Acres Inventoried</b>	<b>Township</b>	<b>Range</b>	<b>Sections</b>
Reroute 1	1.68	132N	107W	1
ATWs 1 and 2	1.01	132N	106W	7
ATW 3	0.65	132N	106W	7
ATW 4	0.42	132N	106W	8
Reroute 2	3.08	132N	106W	16
ATW 5	3.71	52N	93W	33

\* See Figures 2 – 4 for locations of route adjustments (or reroutes) and additions to the designated corridor for ATWs.

According to previous geological mapping (Clayton et al. 1980), the two routes and five additional ATWs overlie the Cretaceous-age Pierre Shale Formation, the Fox Hills Formation, and the Hell Creek Formation. SWCA analyzed existing data on the Project to identify known fossil resources therein and nearby in the same geologic formation. SWCA then used that information and the Potential Fossil Yield Classification (PFYC) ranking of the underlying geologic unit to evaluate the paleontological sensitivity of the Project and to assess the potential for construction to disturb known and unknown paleontological resources. SWCA’s pre-field research included a review of geologic maps and current literature. In addition, SWCA compiled locality data from the Pioneer Trails Regional Museum and the North Dakota State Fossil Collection. No previously documented localities are within the two routes and five additional ATWs analyzed.

Information about the geology and paleontological potential of each of the route adjustments and ATW areas analyzed is summarized below:

- Reroute 1 (# CHSU-CL-003), from milepost (MP) 11.2 through MP 11.4, is in a portion of the project that was previously cleared for paleontological resources through a review of aerial imagery due to the lack of bedrock exposures. The route adjustment to the south is completely within the property of Hadley Brothers LLP and the length of segment is 0.18 miles. Terrian, and the potential for bedrock exposures of mapped Fox Hills Formation, is the same as observed in the previously analyzed area along this portion of the pipeline. The area is mostly vegetated, sloping, with some cobble-armored slopes and ridges near MP 11.3, possibly representative of unmapped Quaternary or Tertiary gravels. No pedestrian survey was conducted. Exposed paleontological resources are not expected within the route adjustment.
- ATW 1 and ATW 2, near MP 11.7 and MP 11.8, respectfully, are in a portion of the project that was previously cleared for paleontological resources through a review of aerial imagery due to lack of exposures of the mapped Pierre Shale Formation. The area is mostly vegetated with minor weathered areas (or blow outs) within the ATW 2 analysis area. Exposed paleontological resources are not expected within the ATWs.
- ATW 3, northwest of MP 12.4, is in a portion of the project that was previously cleared for paleontological resources through an aerial image review due to lack of bedrock exposures. In addition, while conducting initial pedestrian surveys nearby, a paleontologist walked through the area to access the next survey area (i.e., bedrock exposure). The area is vegetated with no exposures of the mapped Fox Hills Formation. Exposed paleontological resources are not expected within the ATW.

***Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota***

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- ATW 4, southeast of MP 12.7, is in a portion of the project that was previously cleared for paleontological resources through a visual review while conducting nearby pedestrian surveys due to a lack of bedrock exposures. The area is vegetated with no exposures of the mapped Hell Creek Formation. Exposed paleontological resources are not expected within the ATW.
- Reroute 2 (# CHSU-CL-004), from milepost MP 14.5 through MP 15, is adjacent to a portion of the project analysis area that was previously surveyed for paleontological resources. No paleontological resources were observed during initial paleontological project surveys near this reroute (Knauss et al., 2019) and no pedestrian survey was conducted for this reroute. The route adjustment is to the east within the Fischer property and the length of the segment is 0.5 miles. While there is a sandstone exposure, possibly of the mapped Hell Creek Formation within the analysis area at MP 14.9, the route shift (e.g., no more than 30 feet east) keeps most of the proposed disturbance area within the previously surveyed area and/or mostly vegetated areas. In addition, as is typical with standard paleontological survey methodology, pedestrian surveys of small exposures of this type would be unlikely to detect any significant paleontological resource. Exposed paleontological resources are not expected within the route adjustment.
- ATW 5, south of MP 17.7, is in a portion of the project that was previously cleared through an aerial image review and a visual review conducted during pedestrian paleontological surveys in the area due to lack of bedrock exposures. The area is vegetated with no exposures of the mapped Hell Creek Formation. Exposed paleontological resources are not expected within the ATW.

Sincerely,



Georgia Knauss  
SWCA Paleontology Lead

## **REFERENCES CITED**

- Clayton, L., S.R. Moran, and J.P. Bluemile. 1980. Geologic Map of North Dakota. U.S. Geological Survey, Scale 1:500,000.
- Knauss, G.E, V. Meyers, and A. Gerwitz. 2019. Paleontological Survey Report for the Cedar Hills South Unit CO2 Lateral Pipeline, Slope and Bowman Counties, North Dakota. SWCA Paleontological Report No. ND18-28464-01. Sheridan, Wyoming: SWCA Environmental Consultants.

**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF NORTH DAKOTA**

Denbury Green Pipeline – North Dakota, LLC  
12-inch Cedar Hills Pipeline Project  
Slope and Bowman Counties  
Siting Application

Case No. PU-19-294

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**APPLICATION FOR AMENDMENT OF  
CERTIFICATE OF CORRIDOR COMPATIBILITY**

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Pursuant to North Dakota Century Code § 49-22.1-06(4) Denbury Green Pipeline – North Dakota, LLC (“Denbury”) hereby files this application for an amendment to Certificate of Corridor Compatibility No. 215 issued April 1, 2020, (“Certificate”) in Case No. PU-19-294 to Denbury by the North Dakota Public Service Commission (“Commission”).

The Certificate designated a corridor for the construction, operation, and maintenance of approximately 9.23 miles of 12-inch diameter CO<sub>2</sub> pipeline and associated facilities in Slope and Bowman Counties, North Dakota, consisting of a 200-foot wide area centered on the designated route. (Docket No. 58). The designated route approved by the Commission is the route of the pipeline Project as depicted on the Survey Corridor map set forth in Appendix A of Hearing Exhibit 1 in Case No. PU-19-294. *Id.*

At the start of project construction, Denbury identified two new utilities and an area with constructability issues requiring two minor route adjustments. One route adjustment was entirely within the existing Corridor approved by the Commission and the other route adjustment extended outside of the existing approved corridor for

approximately 363 feet. These route adjustments have been addressed through a separate filing entitled Certification Relating to Route Adjustments. That filing is in accordance with the provisions and procedures set forth in N.D.C.C. § 49-22.1-15(1) and (3) and is being made contemporaneously with this application to amend the Corridor.

In addition to the two minor route adjustments addressed in the Certification Relating to Route Adjustments, Denbury also identified five locations where additional temporary workspace is required in order to safely construct the pipeline. It is necessary to extend these five temporary workspace locations outside of the existing approved Corridor. The proposed Corridor expansions are located in Section 7 of Township 132 North, Range 106 West at milepost (“MP”) 11.7 (“Proposed Expansion No. 1”), MP 11.8 (“Proposed Expansion No. 2”), MP 12.3 (“Proposed Expansion No. 3”); in Section 8 of Township 132 North, Range 106 West at MP 12.7 (“Proposed Expansion No. 4”); and in Section 33, Township 132 North, Range 106 West at MP 17.77 (“Proposed Expansion No. 5”).

Attached to this application as Exhibit A is correspondence from Denbury’s project consultant SWCA including project maps identifying the specific location of each of the five proposed Corridor expansions and the area impacted in relation to the existing approved Corridor. Exhibit A also includes detailed reports and studies regarding exclusion and avoidance areas for both the route adjustments and the proposed Corridor expansions. Updated shapefiles regarding the route adjustments and proposed Corridor expansions are also being filed with the Commission.

Paragraph 32 of the Certification Relating to Order Provisions – Transmission Facility Siting in this case (Docket No. 58), incorporated into the April 1, 2020 Order approving the existing Corridor provides as follows:

Company understands and agrees that it shall inform the Commission in writing of any plans to modify the transmission facility or of any plans to modify the site plan for the transmission facility.

Through this application and the Certification Relating to Route Adjustments, Denbury is hereby providing written notice of the route adjustments and proposed corridor expansions to facilitate the required additional temporary workspace areas. As detailed in the attached Exhibit A, Denbury has conducted studies pursuant to the Commission's facility siting criteria for exclusion areas and avoidance areas as set forth in North Dakota Administrative Code Ch. 69-06-08. The studies confirm that no exclusion or avoidance areas are impacted by the five minor expansions to the existing Corridor to allow for the increased temporary workspace.

Pursuant to North Dakota Century Code § 49-22.1-06(4) and paragraph No. 32 of the Certification, Denbury hereby requests an amendment to the Certificate of Corridor Compatibility No. 215 designating the expansions of the existing Corridor as set forth in the attached Exhibit A.

Dated this 8<sup>th</sup> day of October, 2021.

Respectfully submitted,

DENBURY GREEN PIPELINE – NORTH DAKOTA, LLC

CROWLEY FLECK PLLP

Attorneys for Applicant

100 West Broadway, Suite 250

Post Office Box 2798

Bismarck, North Dakota 58502-2798

Phone: 701-223-6585

By: Wade Mann  
WADE C. MANN, ND Bar ID 05871

STATE OF NORTH DAKOTA)

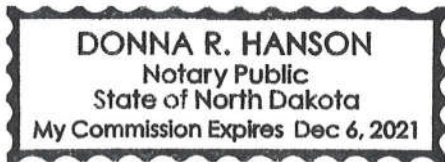
)SS.

COUNTY OF BURLEIGH )

Wade C. Mann, being separately sworn, deposes and states that he has read the above and foregoing Application, that he knows the contents thereof, and that the same is true of his own personal knowledge.

Wade Mann  
WADE C. MANN

Subscribed and sworn to this 8<sup>th</sup> day of October, 2021.



Donna R. Hanson  
Notary Public  
Burleigh County, North Dakota  
My Commission Expires 12/6/2021

# Exhibit A



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201 Slate Drive, Suite 8  
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701.258.6622  
701.258.5957  
www.swca.com

October 4, 2021

Rusty Shaw  
Denbury Green Pipeline – Montana, LLC  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

**Subject: CHSU Lateral CO<sub>2</sub> Pipeline Project  
Bowman County, North Dakota  
Route Adjustments and Proposed Additions to the Designated Corridor**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) provides this letter in support of the Denbury Green Pipeline – Montana, LLC (Denbury) route adjustments filing for the CHSU Lateral CO<sub>2</sub> Pipeline Project (Project) in Bowman County, North Dakota. On April 1, 2020, the North Dakota Public Service Commission issued Findings of Fact, Conclusions of Law and Order, granting Denbury Certificate of Corridor Compatibility No. 215 and Route Permit No. 225 for a Designated Corridor and a Designated Route, respectively, for the Project.

It is SWCA's understanding that at the start of Project construction, Denbury identified two new utilities and one area with constructability issues that will require two route adjustments: Route Adjustment No. 1 is necessary to avoid the two underground utilities and will result in relocating the Designated Route outside of the Designated Corridor. Route Adjustment No. 2 will require shifting the Designated Route to the east of its designated location but still within the Designated Corridor. For both route adjustments, the location of the 200-foot wide Designated Corridor will change to keep it centered on the new proposed pipeline route. In addition to the proposed route adjustments, Denbury identified 5 locations where the workspace area for pipeline construction will have to extend beyond the Designated Corridor and thus, these areas should be considered as proposed additions to the Designated Corridor. Information on the route adjustments and proposed additions to the Designated Corridor are summarized in the following table and maps of the route adjustments and proposed corridor additions are included in a separate attachment.

Permit Area ID*	Length		Area	Milepost	Location			
	Total (feet)	Outside of Corridor (feet)	Addition to Corridor (acres)		Township	Range	Section	QtrQtr†
Route Adjustment No. 1	964	363	N/A†	11.3	132N	107W	1	SESE
Route Adjustment No. 2	2,689	0	N/A	14.6	132N	106W	16	SWNW, NWSW, SWSW
Proposed Addition No. 1	200	50	0.22	11.7	132N	106W	7	NWNW
Proposed Addition No. 2	200	50	0.22	11.8	132N	106W	7	NENW
Proposed Addition No. 3	100	50	0.11	12.3	132N	106W	7	SWNE
Proposed Addition No. 4	100	50	0.11	12.7	132N	106W	8	NWSW
Proposed Addition No. 5	200	52	0.24	17.77	132N	106W	33	SENW, NESW

\* See Figures 2 – 5 for locations

† Location: QtrQtr = QuarterQuarter

† N/A = Not Applicable

SWCA previously conducted natural resources, paleontological resources, and cultural resources desktop analyses and field surveys along the proposed pipeline route, as documented in the Application for Certificate of Corridor Compatibility and Route Permit and Waiver Application, dated August 7, 2019. As summarized below, SWCA reviewed aerial imagery in the vicinity of the route adjustments and proposed additions to the Designated Corridor and determined that natural resources and paleontological resources field surveys would not be required to assess potential impacts from the route proposed adjustments and corridor additions, but that cultural resources field surveys would be required to assess if cultural or historic artifacts would be affected by construction of the route adjustments and the ATWs. Summaries of these studies are presented in the following sections, while copies of the natural resources and paleontological resources letter reports and the cultural resources report and correspondence from the State Historical Preservation Office are enclosed herewith.

**Natural Resources:** Natural resources desktop analyses and field surveys were conducted in the immediate vicinity of the route adjustments and ATW expansion areas, as presented in the Natural Resources Report included as Appendix D to the Certificate of Corridor Compatibility and Route Permit and Waiver Application (Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). As described in Attachment 1 hereto, aerial imagery interpretation of the proposed route adjustments and corridor additions did not identify any exclusion or avoidance areas, as defined in North Dakota Administrative Code (NDAC) § 69-06-08-02.1 and NDAC § 69-06-08-02.2, respectively. Trees and shrubs that meet the North Dakota Public Service Commission (NDPSC) tree and shrub mitigation requirement may be impacted by the route adjustments and proposed additions to the Designated Corridor and SWCA recommends that any trees and shrubs removed during construction be documented for inclusion in post-construction tree and shrub mitigation activities.

**Paleontological Resources:** Paleontological resources desktop analyses and field surveys were conducted in the immediate vicinity of the route adjustments and proposed additions, as presented in the Paleontological Resources Report included as Appendix E to the Application for a Certificate of Corridor Compatibility and Route Permit and Waiver Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). As described in the Paleontological Resources Letter Report presented as Attachment 2 hereto, aerial imagery interpretation and literature reviews of the proposed route adjustments and proposed corridor additions did not identify any bedrock exposures or locality information that would warrant field surveys to determine the presence or absence of significant paleontological resources that would need to be considered by the NDPSC, as required by North Dakota Century Code Chapter 49-22.1-09.9. Additionally, the aerial imagery and literature review did not identify any exclusion or avoidance areas, as defined in NDAC § 69-06-08-02.1 and NDAC § 69-06-08-02.2, respectively.

**Cultural Resources:** Class I and Class III Cultural Resources inventories were conducted in the immediate vicinity of the route adjustments and proposed additions areas, as presented in the Cultural Resources Report included as Appendix C to the Application for a Certificate of Corridor Compatibility and Route Permit and Waiver Application, submitted as Hearing Exhibit No. 1 (see Docket No. PU-19-294, Item No. 1). The concurrence letter from the North Dakota State Historical Society (SHSND) for the initial report was included in Appendix F to the application (see Docket No. PU-19-294, Item No. 1), and the SHSND concurrence letter for evaluation of previously identified site 32BO00245 for listing in the National Register of Historic Places that was filed with the NDPSC on November 12, 2019 was submitted as Hearing Exhibit No. 6 (see Docket No. PU-19-294, Item No. 6). Because the route adjustments and proposed additions are outside of the previous cultural resources survey corridor and due to the potential for cultural resources to be within these areas, SWCA conducted pedestrian surveys of these areas on July 27, 2021. The pedestrian surveys did not identify any cultural resources within the route adjustments or proposed additions to the Designated

Corridor. The Class III Cultural Resource Inventory for these additional areas was submitted to the SHSND for concurrence on the report's "No Significant Sites Affected" determination. The report and the SHSND concurrence letter are included as Attachment 3. The route adjustments and proposed corridor additions will not impact cultural resources.

Based on SWCA's review of existing data (desktop analysis), aerial photographic interpretation, and the results of the August 2021 Class I and Class III Cultural Resource Inventory, construction activities associated with the two route adjustments and the five proposed corridor additions will not affect any known exclusion or avoidance areas, as set forth in NDAC §§ 69-06-08-02(1) and (2), respectively.

If you have any questions or need further information, please contact me at [jdawson@swca.com](mailto:jdawson@swca.com) or 701.595.2081.

Sincerely,

A handwritten signature in blue ink that reads "Jim Dawson". The signature is fluid and cursive, with a long horizontal stroke at the end.

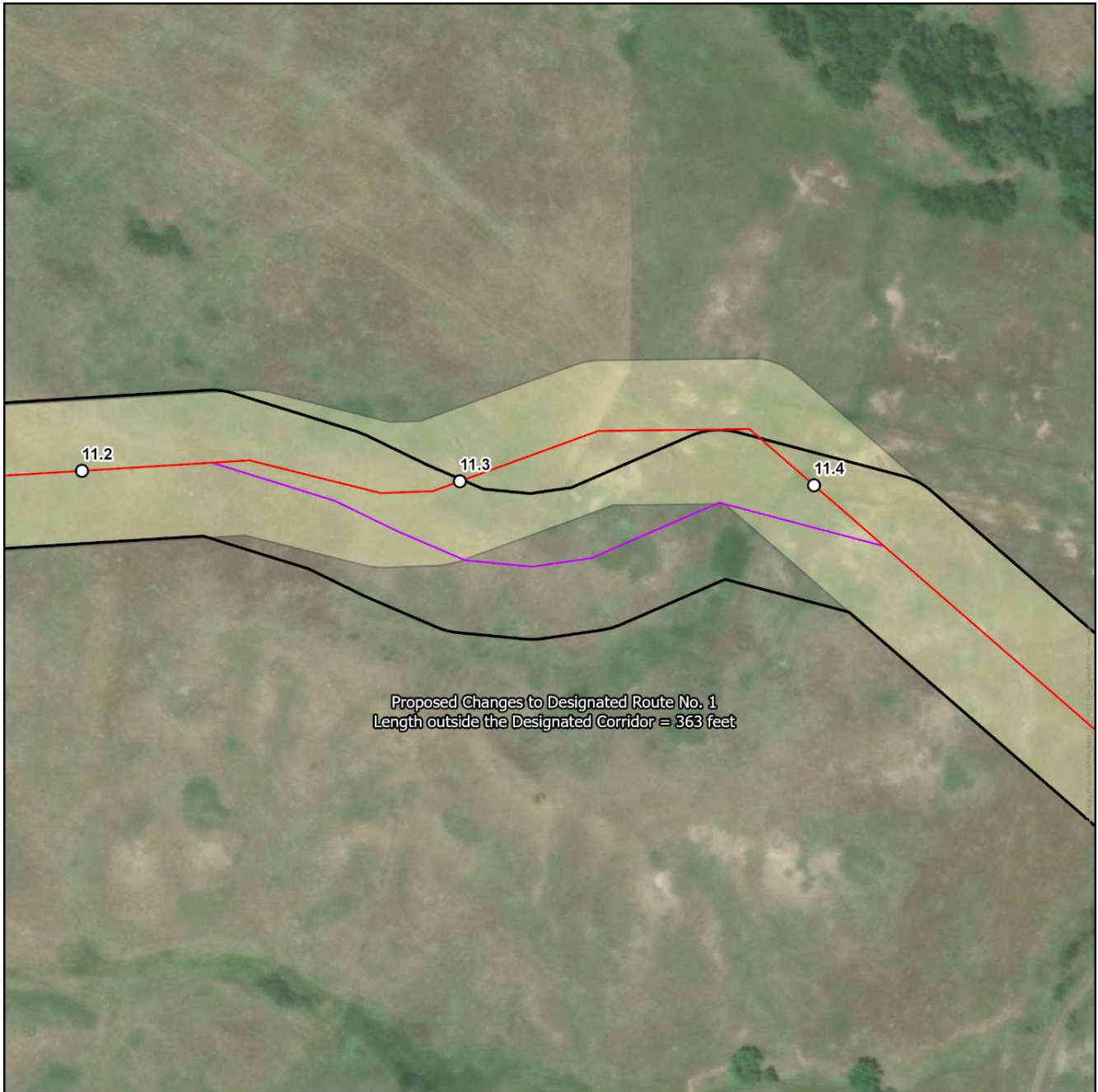
Jim Dawson, PG, CHMM  
Senior Hydrogeologist

Enclosure: as stated.

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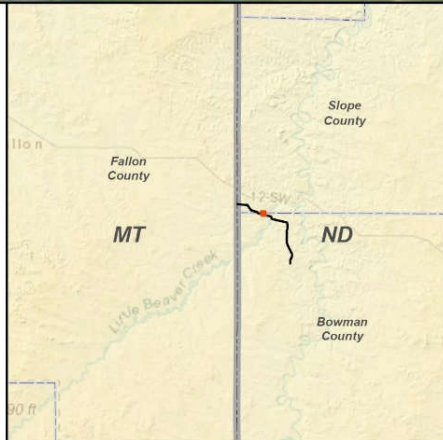
**ROUTE ADJUSTMENT  
AND  
PROPOSED CORRIDOR ADDITION LOCATION MAPS**


**Proposed Change to Designated Route No.1**



**CHSU Lateral Pipeline Proposed Reroute**

- Designated Route
- New Route
- Mile Posts
- Designated Corridor
- New Corridor






**Cedar Hills South Unit Lateral Project**  
Proposed Project Change: Reroute

Page 1 of 1

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Datum: North American 1983  
Projection: Transverse Mercator  
Page units: Foot US  
Imagery Source: USA NAIP (USDA)



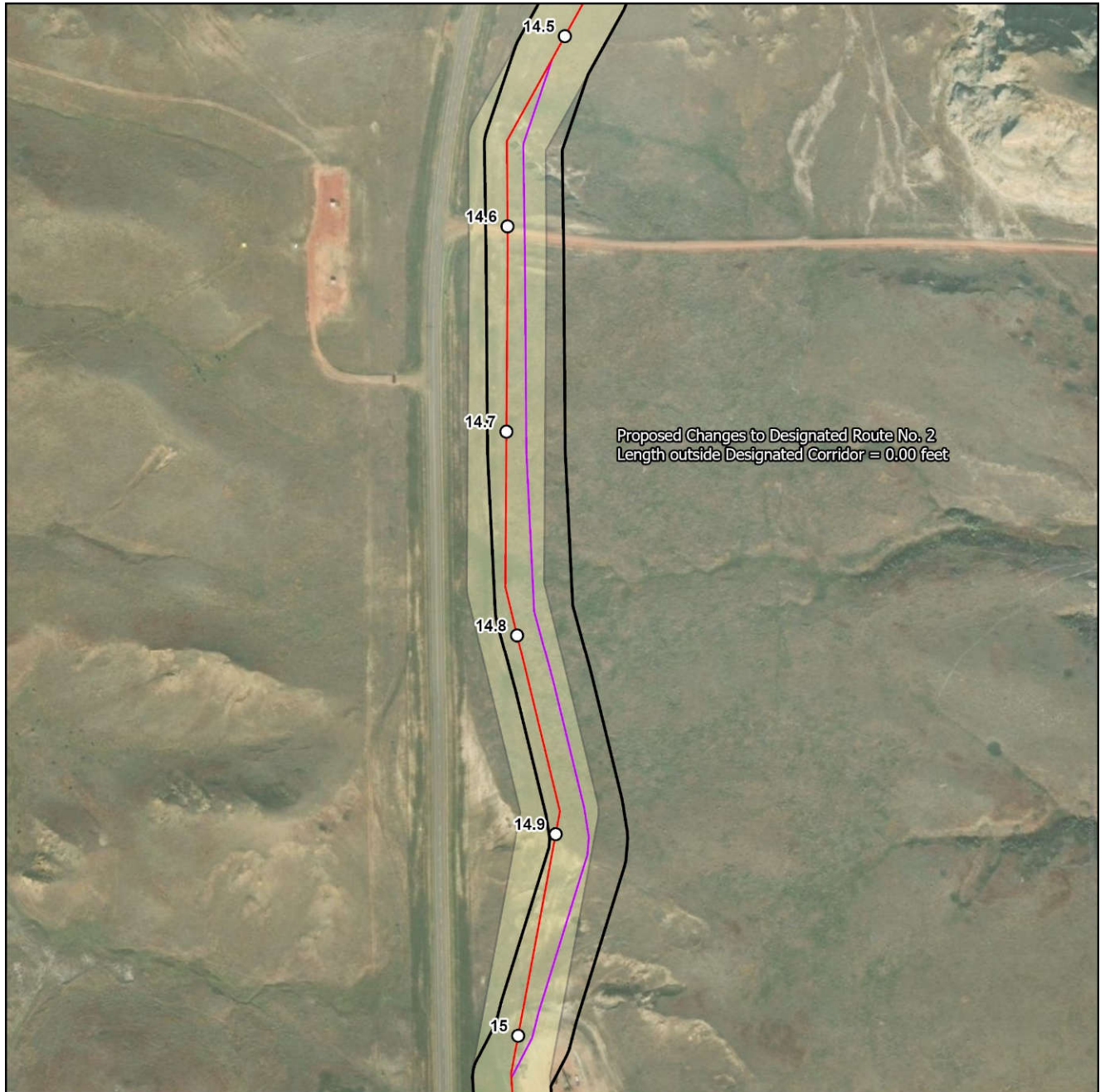
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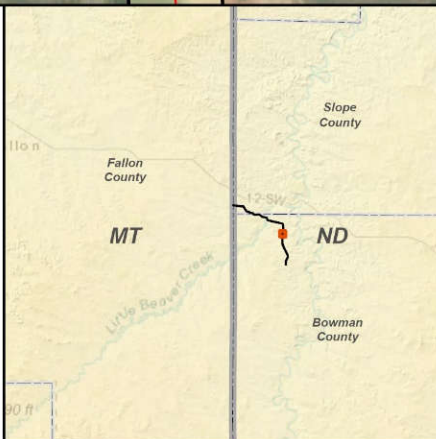
Date: 10/1/2021

**Proposed Change to Designated Route No.2**



**CHSU Lateral Pipeline Proposed Reroute**

- Designated Route
- New Route
- Mile Posts
- Designated Corridor
- New Corridor



**Cedar Hills South Unit Lateral Project**  
 Proposed Project Change: Reroute  
 Page 1 of 1

Coordinate System:  
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 Datum: North American 1983  
 Projection: Transverse Mercator  
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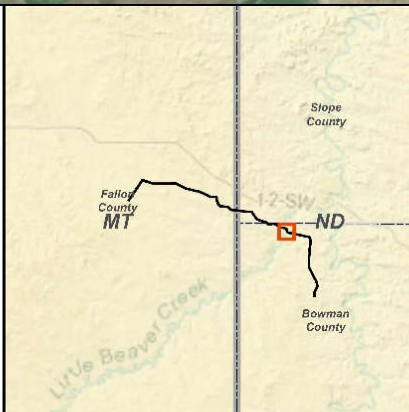
Date: 10/1/2021

**Proposed Addition to Designated Corridor No. 1, No. 2, No. 3, and No. 4**



**CHSU - Additional Workspace**

- Designated Route
- Mile Posts
- ▭ Designated Corridor
- Proposed Additions to Designated Corridor



**Cedar Hills South Unit Lateral Project**  
Proposed Project Change: Additional Workspace

Page 1 of 1

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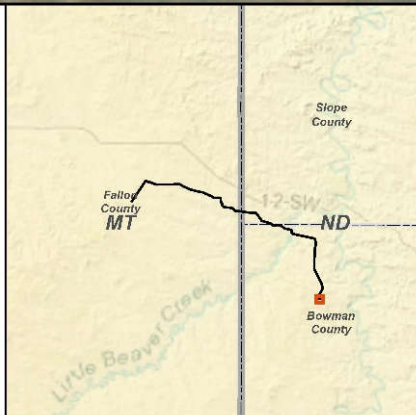
Date: 9/28/2021

**Proposed Addition to Designated Corridor No. 5**



**CHSU - Additional Workspace**

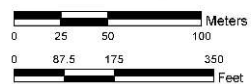
- Designated Route
- Mile Posts
- ▭ Designated Corridor
- Proposed Additions to Designated Corridor



**Cedar Hills South Unit Lateral Project**  
**Proposed Project Change: Additional Workspace**

Page 1 of 1

Coordinate System:  
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 Datum: North American 1983  
 Projection: Transverse Mercator  
 Page units: Foot US  
 Imagery Source: USA NAIP (USDA)



1:3,500

Date: 9/28/2021

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**Attachment 1**  
**Natural Resources Letter Report**



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701.258.5957  
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October 1, 2021

Rusty Shaw  
Denbury Green Pipeline – Montana, LLC  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

**Re: Natural Resource Review of Reroutes and Additional Temporary Workspace Areas  
CHSU Lateral CO<sub>2</sub> Pipeline, Bowman County, North Dakota**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) previously conducted natural resources analyses of existing data (i.e., desktop analysis) and field surveys for the proposed Denbury Green Pipeline – Montana, LLC's (Denbury's) Cedar Hills South Unit (CHSU) Lateral Carbon Dioxide (CO<sub>2</sub>) Pipeline Project (Project) in Slope and Bowman Counties, North Dakota (Figure 1). The natural resources studies were documented in the Natural Resources and Wetland Delineation Report, included as Appendix D to the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit, and Waiver Application, dated August 7, 2019, that was submitted to the North Dakota Public Service Commission (NDPSC). The NDPSC issued Certificate of Corridor Compatibility Number 215 and Route Permit Number 225 (i.e., Designated Corridor and Designated Route, respectively) on April 1, 2020 (NDPSC Case Number PU-19-204), per the requirements of the North Dakota Energy Conversion and Transmission Facility Siting Act (North Dakota Century Code [NDCC] §49-22.1).

Since the start of Project construction, Denbury identified two locations where the pipeline route will have to be moved to avoid two previously unknown underground utilities (Route Adjustment No. 1) and for constructability concerns (Route Adjustment No. 2), plus five additional temporary workspace areas (i.e., proposed additions to the Designated Corridor) in Bowman County that are necessary to facilitate pipeline construction. As summarized in Table 1 and illustrated in the attached figures, the pipeline reroute for Route Adjustment No. 1 (Figure 2) is partly outside the Designated Corridor, while the pipeline location for Route Adjustment No. 2 (Figure 3) is within the Designated Corridor, but the associated construction easement for this reroute is partly outside the Designated Corridor. Proposed additions to the Designated Corridor No. 1, No. 2, No. 3, and No. 4 (Figure 4), and proposed addition to the Designated Corridor No. 5 (Figure 5) are portions of temporary work areas required for pipeline construction that extend outside the Designated Corridor. Because the pipeline reroutes, construction right-of-way (ROW), and proposed corridor additions are partly outside of the Designated Corridor, notification of these required changes to the Designated Corridor and Designated Route must be filed with the NDPSC per NDCC §49-22.1-15.3 for Route Adjustment No.1, NDCC §49-22.1-15.1 for Route Adjustment No. 2, and NDCC §49-22.1-06.4 for the proposed additions to the Designated Corridor.

**Table 1. Route Adjustment and Proposed Corridor Additions Information**

Permit Area ID*	Length		Area	Landowner	Location			
	Total (feet)	Outside of Corridor (feet)	Addition to Corridor (acres)		Township	Range	Section	QtrQtr†
Route Adjustment No. 1	964	363	N/A†	Hadley Brothers LLP	132N	107W	1	SESE
Route Adjustment No. 2	2,689	0	N/A	Fischer	132N	106W	16	SWNW, NWSW, SWSW
Proposed Addition No. 1	200	50	0.22	Duffield	132N	106W	7	NWNW
Proposed Addition No. 2	200	50	0.22	Duffield	132N	106W	7	NENW
Proposed Addition No. 3	100	50	0.11	Duffield	132N	106W	7	SWNE
Proposed Addition No. 4	100	50	0.11	Duffield	132N	106W	8	NWSW
Proposed Addition No. 5	200	52	0.24	Miller	132N	106W	33	SENW, NESW

\* See Figures 2 through 5 for locations

† QtrQtr = QuarterQuarter

‡ N/A = Not Applicable

NDCC §49-22.1-15.3 addresses route adjustments before or during construction for gas or liquid transmission lines and states that a utility (Denbury), without any action by the NDPSC, may adjust the route of a gas or liquid transmission line outside the Designated Corridor if, before conducting any construction activities associated with the adjustment, the utility:

1. Files with the NDPSC certification and supporting documentation that:
  - a. The construction activities will not affect any known exclusion or avoidance areas.
  - b. The route outside the corridor is no longer than one and one-half miles.
  - c. The utility will comply with the NDPSC's order, laws, and rules designating the corridor and designating the route.
  - d. Each owner of real property on which the adjustment is to be located and any applicable governmental entity with an interest in the same adjustment area do not oppose the adjustment.
2. Files detailed field studies indicating exclusion and avoidance areas for an area encompassing the route outside the designated corridor equal to the length of the adjustment of the proposed corridor.

SWCA previously completed desktop analyses and field surveys of a 200-foot-wide survey corridor for the CHSU Lateral CO<sub>2</sub> Pipeline Project, as documented in Appendix D of the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit, and Waiver Application (Consolidated Application), dated August 7, 2019, and included, in part, the following findings:

1. Five wetlands, totaling approximately 0.42 acres, were identified within the 200-foot-wide survey corridor; 0.41 acres of those wetlands will be temporarily impacted by project construction.
2. One waterbody, classified as a small lake or pond, was identified within the survey corridor, but this feature is outside of the proposed construction ROW and will not be impacted by the project.
3. Each of the wetland crossings is a single, and complete project as defined by the U.S. Army Corps of Engineers (USACE) and can be constructed under NWP 12, which authorizes utility line construction projects in non-tidal waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5-acre of waters of the U.S.
4. A tree and shrub survey recorded 161 tree, sapling, and shrub individuals that may be impacted by construction activities.
5. No threatened or endangered species or habitat were observed during the field survey.
6. Listed threatened and endangered species in Bowman County are the gray wolf, whooping crane, and northern long-eared bat; however, these species are not likely to be impacted by construction of the proposed project.
7. Migratory birds and suitable nesting habitat were observed throughout the survey corridor and mitigation measures to avoid an unauthorized take of migratory birds and active nests were recommended.
8. No active raptor nests were observed within 0.5-mile of the survey corridor and no bald or golden eagle nests were observed.
9. The project lies within the greater sage-grouse primary range in Bowman County and recommendations to minimize impacts to greater sage-grouse and their habitats were included.

Transmission facility corridor and route criteria are defined in North Dakota Administrative Code (NDAC) §69-06-08-02. Compliance with these criteria for the proposed pipeline route (i.e., the permanent and temporary construction easements and the proposed corridor additions), was demonstrated in the Consolidated Application, which culminated in issuance of permits for the Designated Corridor and Designated Route. The NDCC §49-22.1-15.3, NDCC §49-22.1-15.1, and NDCC §49-22.1-06.4 certification and documentation requirements for natural resources are discussed below:

- Route Adjustment No. 1 – the route adjustment is completely within the one-mile-wide project study area for the desktop analysis and approximately 363 feet of the reroute lies outside of the Designated Corridor (Figure 2). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of the route adjustment indicates that a pedestrian survey of the reroute is not warranted.
- Route Adjustment No. 2 – required for constructibility concerns; the route adjustment is completely within the one-mile-wide project study area for the desktop analysis and, while the rerouted pipeline itself lies within the Designated Corridor, approximately 2,689 feet of the associated temporary construction easement lies outside of the Designated

Corridor which will have to be relocate as shown in Figure 4. No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of the route adjustment indicates that a pedestrian survey of the reroute is not warranted.

- Proposed Corridor Addition No. 1 – this proposed addition is for expansion of a temporary workspace area from approximately 100 x 100 feet to 100 x 200 feet, with an area that measures approximately 50 x 200 feet (0.22-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 2 – this proposed addition is for expansion of a temporary workspace area from approximately 100 x 100 feet to 100 x 200 feet, with an area that measures approximately 50 x 200 feet (0.22-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 3– this proposed addition is for a temporary workspace area that measures approximately 100 x 100 feet, with an area that measures approximately 50 x 100 feet (0.11-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 4– this proposed addition is for a temporary workspace area that measures approximately 100 x 100 feet, with an area that measures approximately 50 x 100 feet (0.11-acre) outside of the Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.
- Proposed Corridor Addition No. 5 – this proposed addition is for a portion of the Miller Station that measures approximately 52 feet by 200 feet (0.24 acre) that was not included in the previous field survey and Designated Corridor (Figure 3). No transmission facility corridor and route exclusion and avoidance areas were identified during the desktop analysis and field surveys for the proposed pipeline route and aerial photographic interpretation of this proposed corridor addition indicates that a pedestrian survey of the area is not warranted.

If you have any questions or wish to discuss this matter, please do not hesitate to contact me by telephone at (701) 595-2081 or by email at [jdawson@swca.com](mailto:jdawson@swca.com).

Sincerely,



James W. Dawson, PG  
Senior Hydrogeologist

## **Figures**

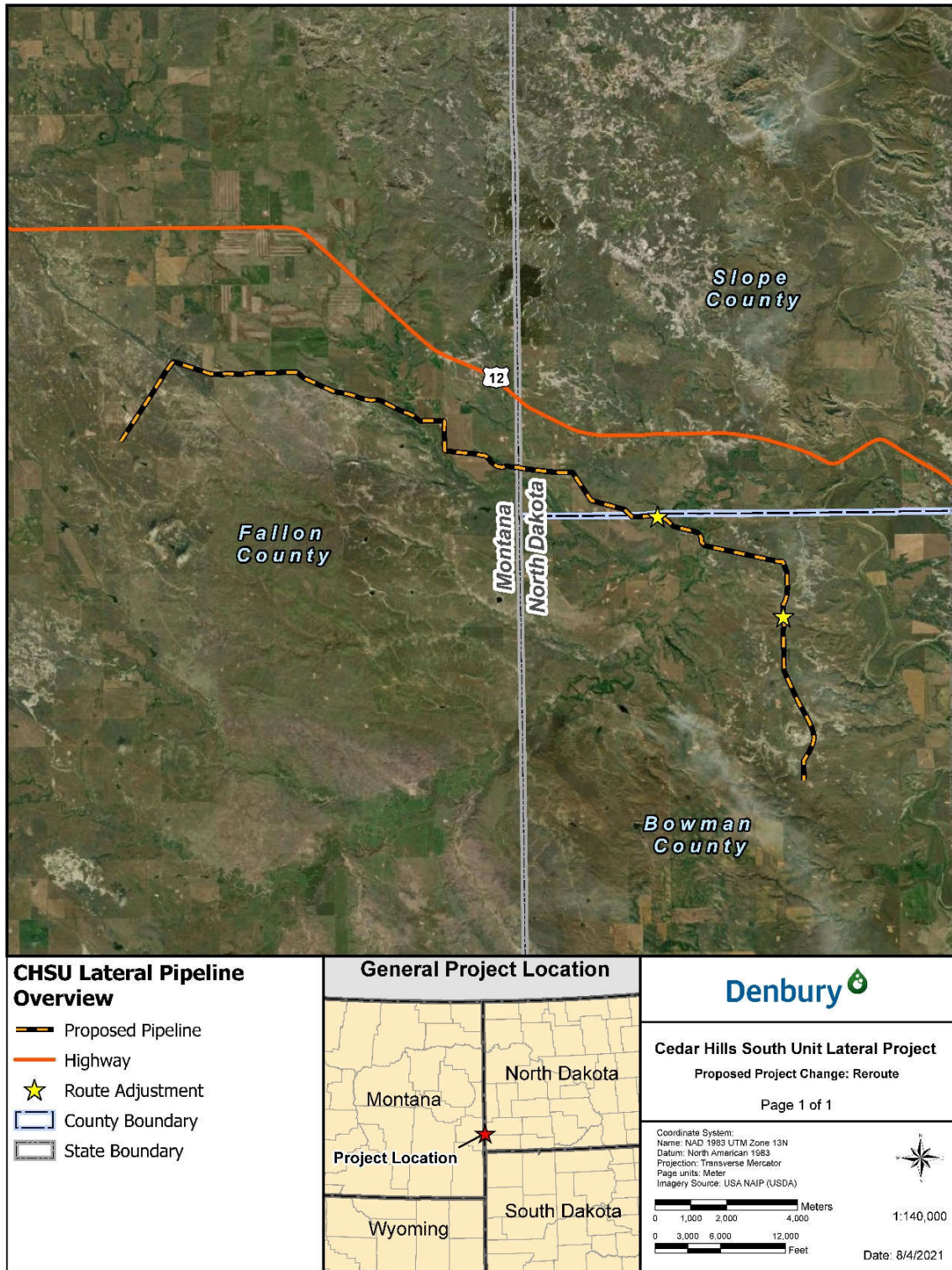


Figure 1. CHSU Lateral CO<sub>2</sub> Pipeline location map.

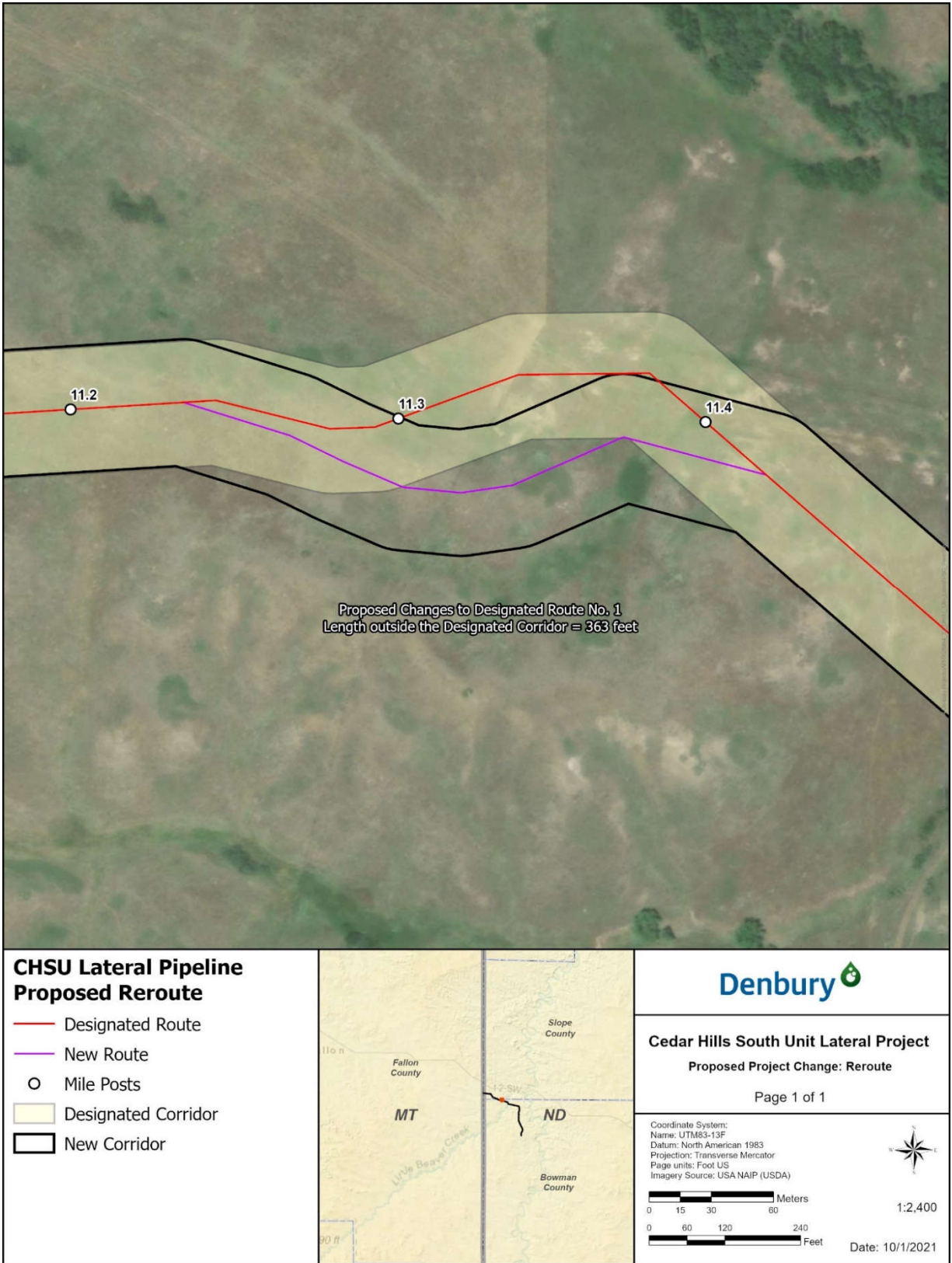


Figure 2. Route Adjustment No. 1 location map.

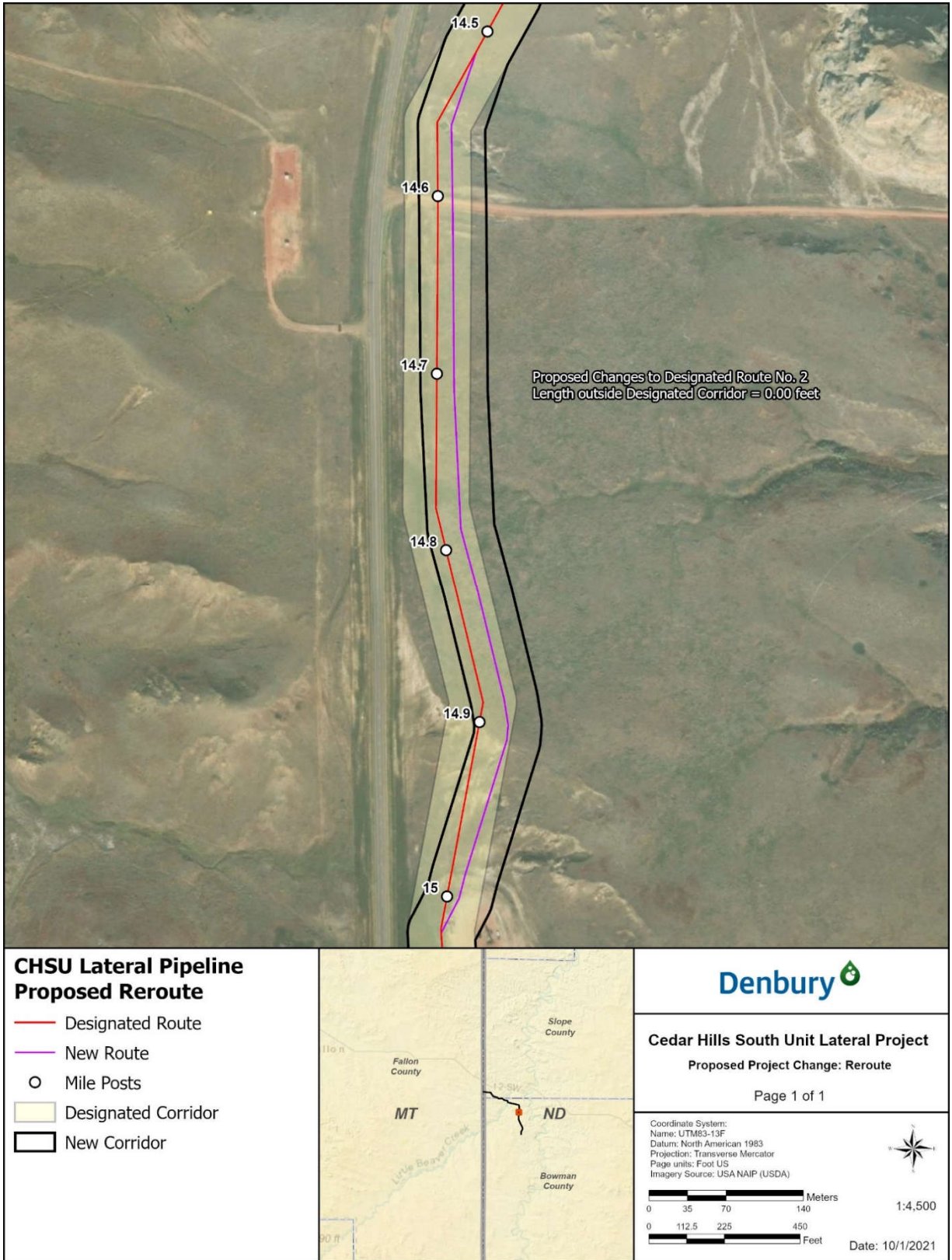


Figure 3. Route Adjustment No. 2 location map.

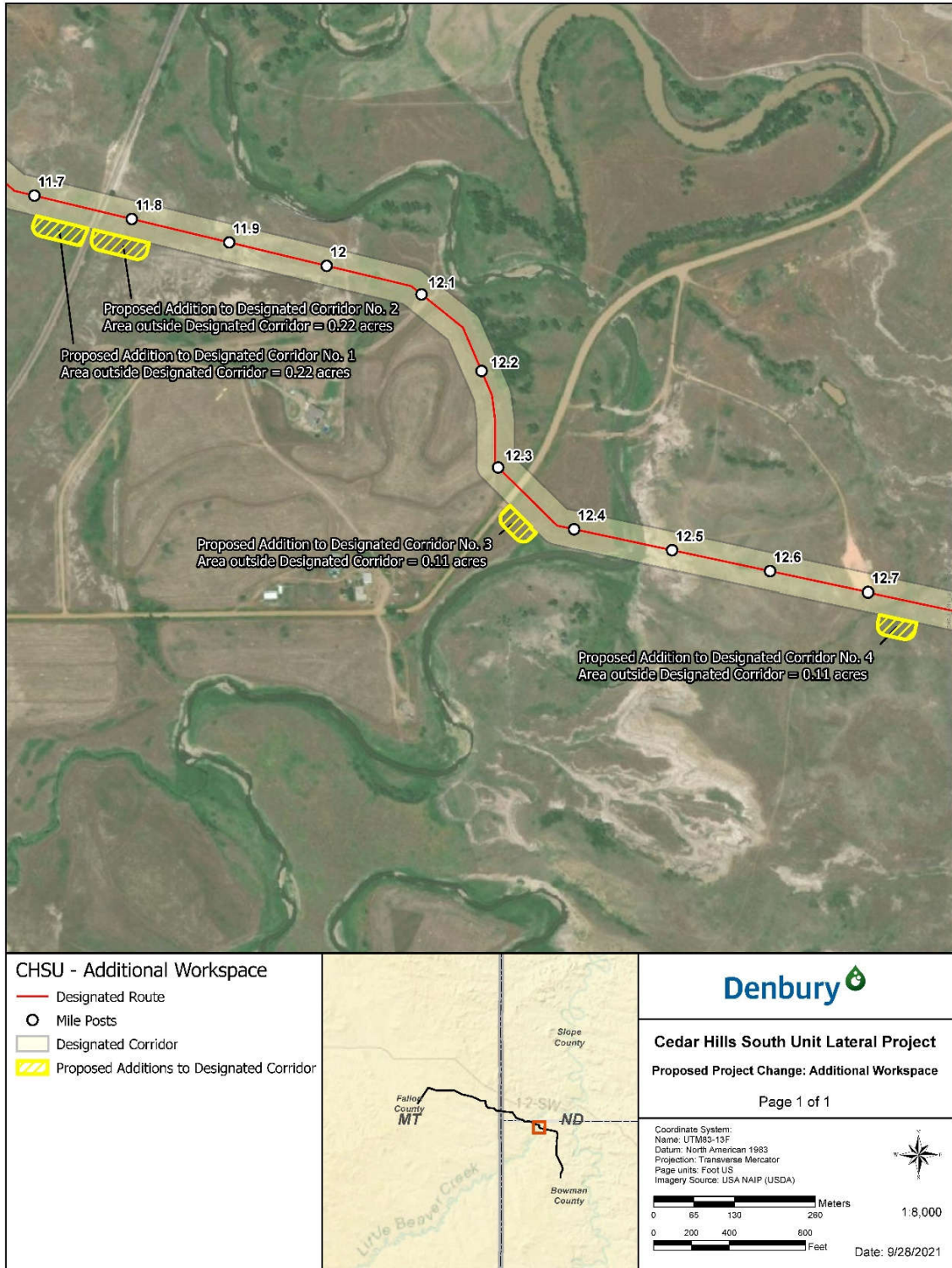


Figure 4. Proposed Corridor Additions 1, 2, 3, and 4 location map.

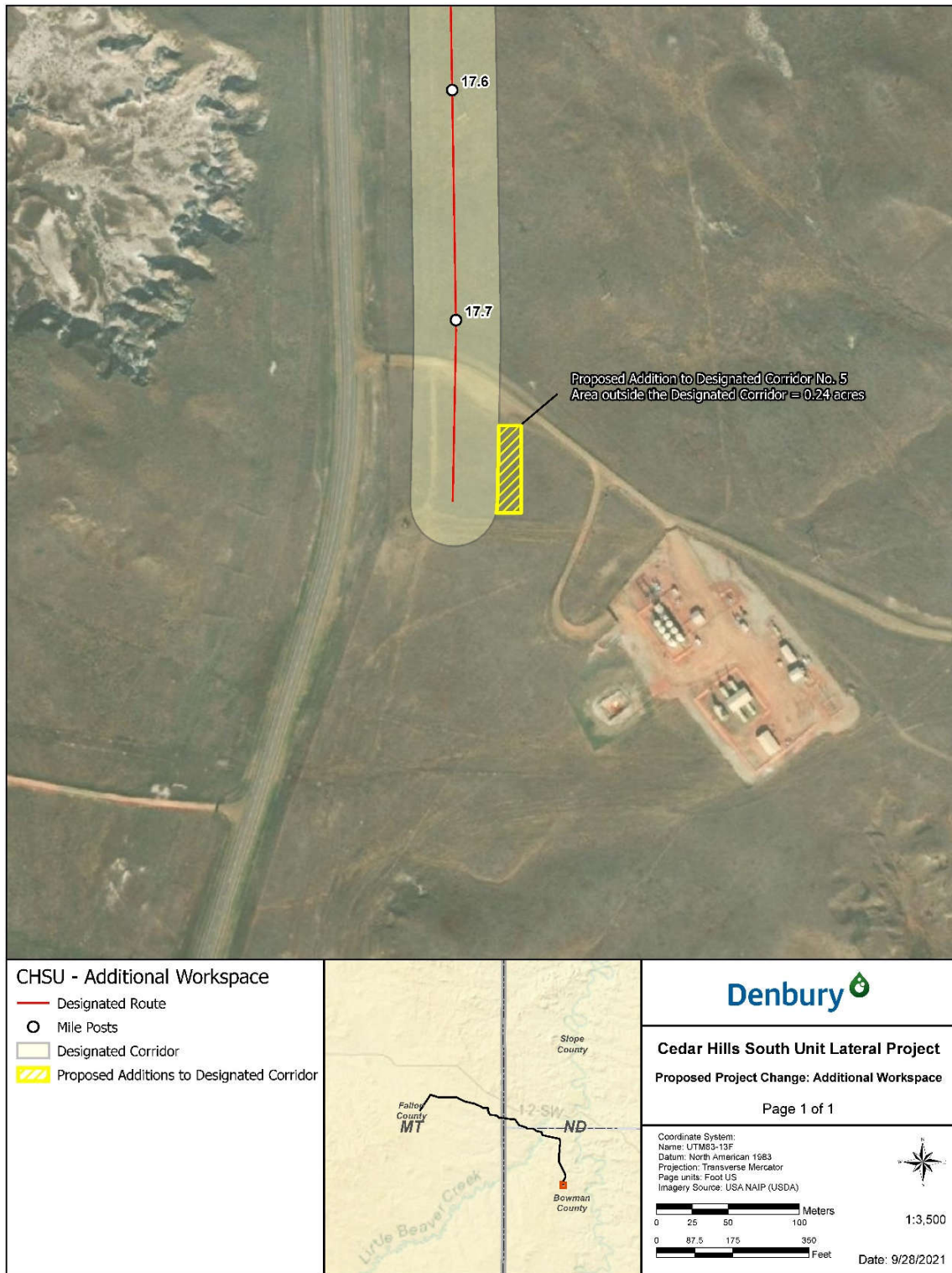


Figure 5. Proposed Corridor Addition No. 5 location map.

---

**Attachment 2**  
**Paleontological Resources Letter Report**



ENVIRONMENTAL CONSULTANTS

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October 1, 2021

Rusty Shaw, REM  
Environmental Compliance Manager  
Denbury, Inc.  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

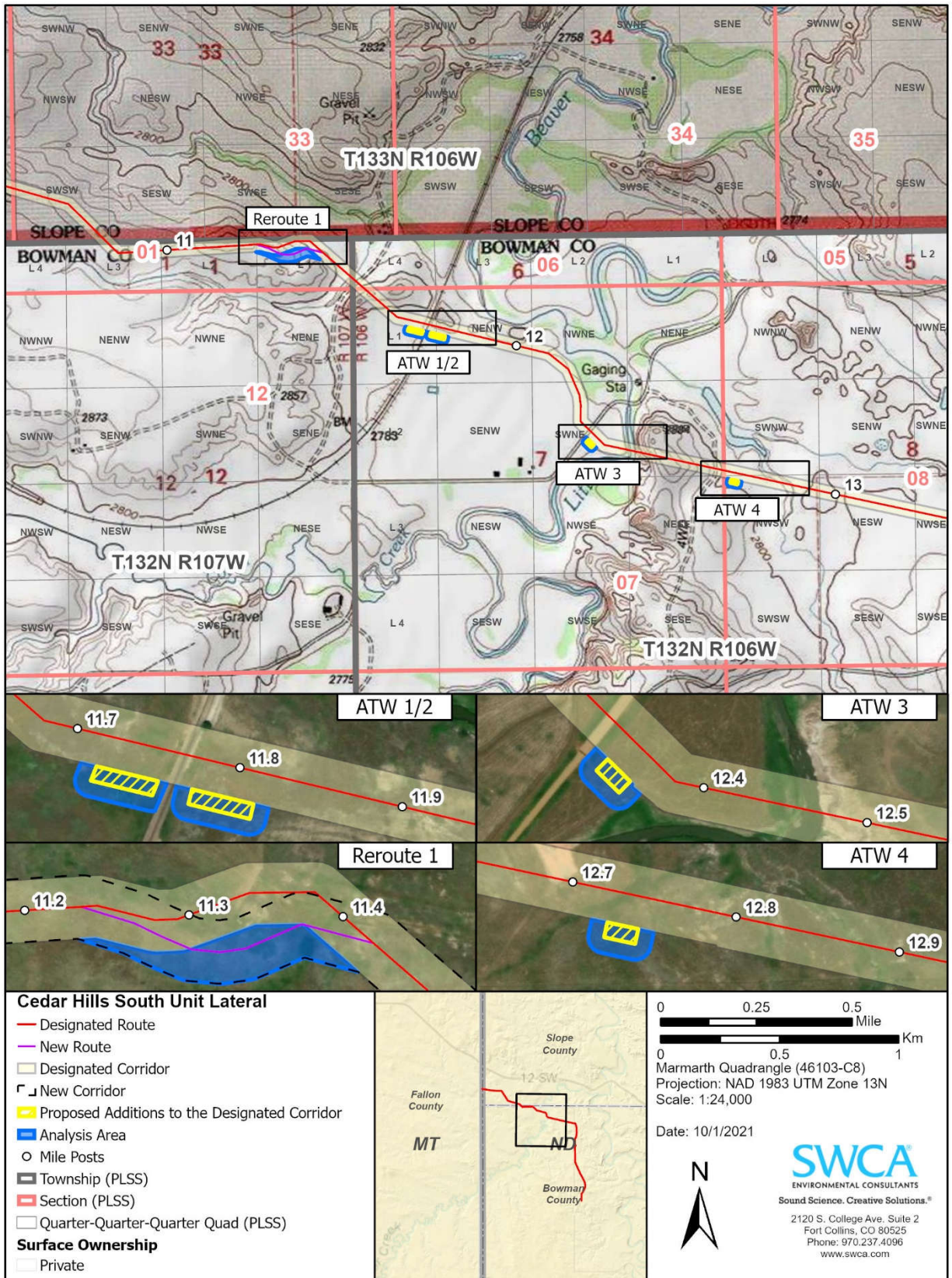
**Re: Paleontological Resource Review of Two Route Adjustments and Five Proposed Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota**

Dear Mr. Shaw:

SWCA Environmental Consultants (SWCA) conducted a paleontological resource analysis of existing data (i.e., desktop analysis) for proposed route adjustments and additions to the designated corridor for the Cedar Hills South Unit (CHSU) Lateral Carbon Dioxide (CO<sub>2</sub>) Pipeline Project (Project). Denbury Green Pipeline – Montana, LLC (Denbury) is constructing a 17.76-mile-long pipeline through southeast Montana and southwest North Dakota. The Project consists of a 75-foot-wide construction right-of-way (ROW) and 12-inch-diameter pipeline to transmit liquid CO<sub>2</sub> from Denbury facility in the Coral Creek Unit Oilfield in Fallon County, Montana to the Cedar Hills South Unit Oilfield in Bowman County, North Dakota. The North Dakota Public Service Commission issued a Certificate of Corridor Compatibility Number 215 and Route Permit Number 225 on April 1, 2020, under the North Dakota Energy Conversion and Transmission Facility Siting Act. As part of the permitting process, a paleontological resource assessment was conducted for the Project because published geologic mapping indicated that most of the area overlies geologic units with a high potential to contain scientifically important paleontological resources and to assist Denbury in meeting the paleontological resource assessment requirements of the permitting process.

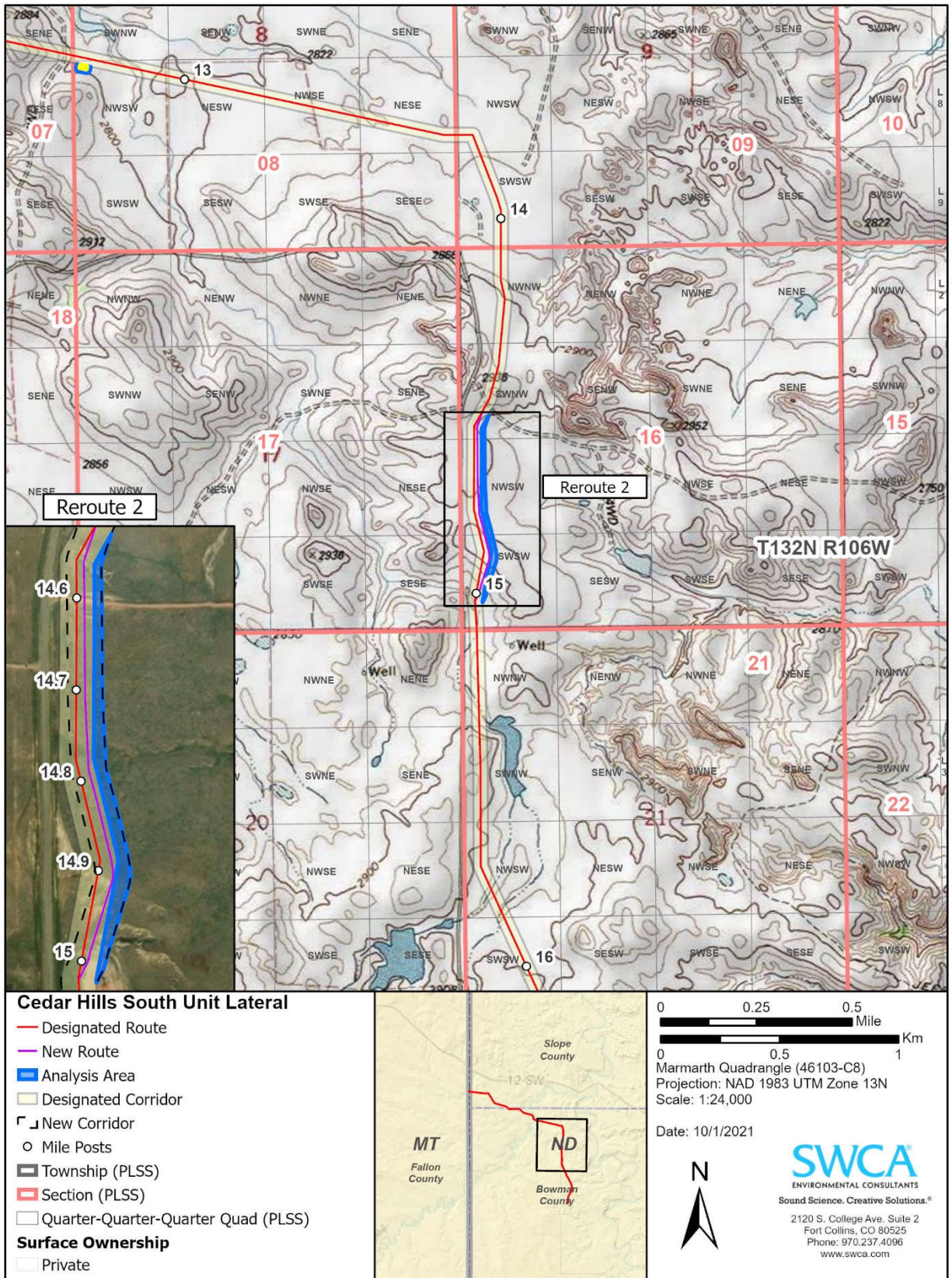
SWCA previously completed a desktop analysis and pedestrian surveys of 9.22 miles of pipeline on privately owned land in Slope and Bowman Counties, North Dakota, as documented in the Paleontological Survey Report (Knauss et al. 2019) submitted as Appendix E of the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit for CHSU Lateral CO<sub>2</sub> Pipeline, dated August 7, 2019 (SWCA 2019). Since the start of Project construction, Denbury identified two route adjustments (or reroutes) and five additions to the designated corridor for additional temporary workspace areas (ATWs) along the pipeline route in Bowman County, North Dakota (Figures 1-3; Table 1). An analysis area comprised of a 100-foot-wide buffer of the two proposed route adjustments and the five proposed corridor additions was reviewed. The reroutes and ATW areas comprise a total of 10.55 acres that are outside of the previously analyzed areas and require paleontological resources assessments of this analysis area to meet corridor and route permit conditions. The analysis area is located on private lands in Township (T) 132 North (N), Range (R) 106 West (W); T132N, R107W; and T133N, R106W, within the Waterhole Creek (1981), Kid Creek (1976), and Marmarth (1980), North Dakota, U.S. Geological Survey (USGS) 7.5-minute quadrangles. Analysis of the reroutes and ATW areas was conducted by SWCA lead paleontologist Georgia E. Knauss.

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



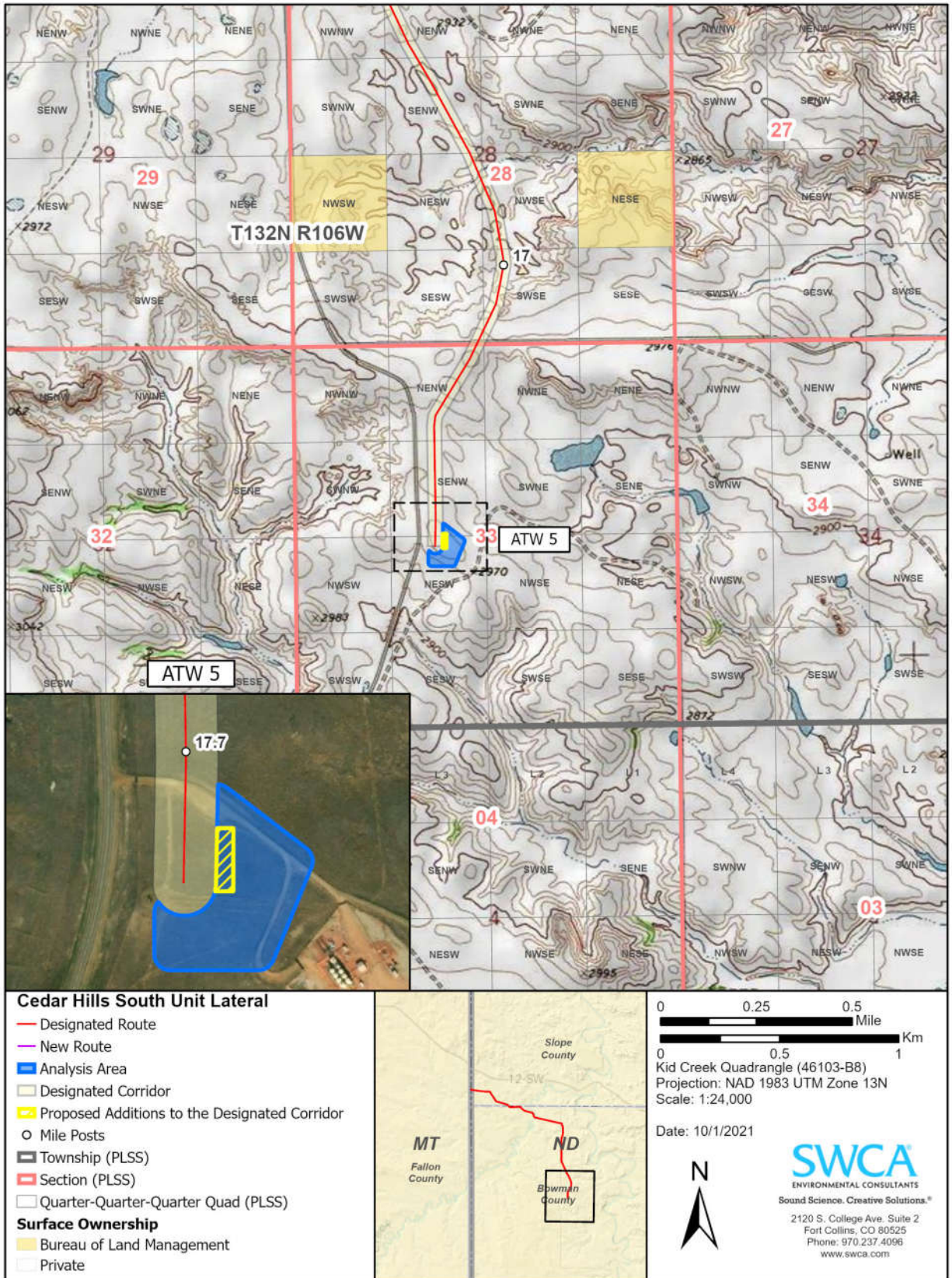
**Figure 1. Map with paleontological resource analysis areas for Reroute 1 and ATWs 1 through 4.**

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



**Figure 2. Map with paleontological resource analysis area for Reroute 2.**

**Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota**



**Figure 3. Map with paleontological resource analysis areas for ATW 5.**

**Table 1. Project Area Legal Descriptions**

<b>Infrastructure Name*</b>	<b>Acres Inventoried</b>	<b>Township</b>	<b>Range</b>	<b>Sections</b>
Reroute 1	1.68	132N	107W	1
ATWs 1 and 2	1.01	132N	106W	7
ATW 3	0.65	132N	106W	7
ATW 4	0.42	132N	106W	8
Reroute 2	3.08	132N	106W	16
ATW 5	3.71	52N	93W	33

\* See Figures 2 – 4 for locations of route adjustments (or reroutes) and additions to the designated corridor for ATWs.

According to previous geological mapping (Clayton et al. 1980), the two routes and five additional ATWs overlie the Cretaceous-age Pierre Shale Formation, the Fox Hills Formation, and the Hell Creek Formation. SWCA analyzed existing data on the Project to identify known fossil resources therein and nearby in the same geologic formation. SWCA then used that information and the Potential Fossil Yield Classification (PFYC) ranking of the underlying geologic unit to evaluate the paleontological sensitivity of the Project and to assess the potential for construction to disturb known and unknown paleontological resources. SWCA’s pre-field research included a review of geologic maps and current literature. In addition, SWCA compiled locality data from the Pioneer Trails Regional Museum and the North Dakota State Fossil Collection. No previously documented localities are within the two routes and five additional ATWs analyzed.

Information about the geology and paleontological potential of each of the route adjustments and ATW areas analyzed is summarized below:

- Reroute 1 (# CHSU-CL-003), from milepost (MP) 11.2 through MP 11.4, is in a portion of the project that was previously cleared for paleontological resources through a review of aerial imagery due to the lack of bedrock exposures. The route adjustment to the south is completely within the property of Hadley Brothers LLP and the length of segment is 0.18 miles. Terrian, and the potential for bedrock exposures of mapped Fox Hills Formation, is the same as observed in the previously analyzed area along this portion of the pipeline. The area is mostly vegetated, sloping, with some cobble-armored slopes and ridges near MP 11.3, possibly representative of unmapped Quaternary or Tertiary gravels. No pedestrian survey was conducted. Exposed paleontological resources are not expected within the route adjustment.
- ATW 1 and ATW 2, near MP 11.7 and MP 11.8, respectfully, are in a portion of the project that was previously cleared for paleontological resources through a review of aerial imagery due to lack of exposures of the mapped Pierre Shale Formation. The area is mostly vegetated with minor weathered areas (or blow outs) within the ATW 2 analysis area. Exposed paleontological resources are not expected within the ATWs.
- ATW 3, northwest of MP 12.4, is in a portion of the project that was previously cleared for paleontological resources through an aerial image review due to lack of bedrock exposures. In addition, while conducting initial pedestrian surveys nearby, a paleontologist walked through the area to access the next survey area (i.e., bedrock exposure). The area is vegetated with no exposures of the mapped Fox Hills Formation. Exposed paleontological resources are not expected within the ATW.

***Paleontological Resource Review of Two Routes Adjustments and Five Additions to the Designated Corridor along Denbury's Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota***

---

- ATW 4, southeast of MP 12.7, is in a portion of the project that was previously cleared for paleontological resources through a visual review while conducting nearby pedestrian surveys due to a lack of bedrock exposures. The area is vegetated with no exposures of the mapped Hell Creek Formation. Exposed paleontological resources are not expected within the ATW.
- Reroute 2 (# CHSU-CL-004), from milepost MP 14.5 through MP 15, is adjacent to a portion of the project analysis area that was previously surveyed for paleontological resources. No paleontological resources were observed during initial paleontological project surveys near this reroute (Knauss et al., 2019) and no pedestrian survey was conducted for this reroute. The route adjustment is to the east within the Fischer property and the length of the segment is 0.5 miles. While there is a sandstone exposure, possibly of the mapped Hell Creek Formation within the analysis area at MP 14.9, the route shift (e.g., no more than 30 feet east) keeps most of the proposed disturbance area within the previously surveyed area and/or mostly vegetated areas. In addition, as is typical with standard paleontological survey methodology, pedestrian surveys of small exposures of this type would be unlikely to detect any significant paleontological resource. Exposed paleontological resources are not expected within the route adjustment.
- ATW 5, south of MP 17.7, is in a portion of the project that was previously cleared through an aerial image review and a visual review conducted during pedestrian paleontological surveys in the area due to lack of bedrock exposures. The area is vegetated with no exposures of the mapped Hell Creek Formation. Exposed paleontological resources are not expected within the ATW.

Sincerely,



Georgia Knauss  
SWCA Paleontology Lead

## **REFERENCES CITED**

- Clayton, L., S.R. Moran, and J.P. Bluemile. 1980. Geologic Map of North Dakota. U.S. Geological Survey, Scale 1:500,000.
- Knauss, G.E, V. Meyers, and A. Gerwitz. 2019. Paleontological Survey Report for the Cedar Hills South Unit CO2 Lateral Pipeline, Slope and Bowman Counties, North Dakota. SWCA Paleontological Report No. ND18-28464-01. Sheridan, Wyoming: SWCA Environmental Consultants.

---

**Attachment 3**  
**Class I and Class III Cultural Resource Inventory**  
**and**  
**SHSND Concurrence Letter**



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Sheridan, Wyoming  
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October 1, 2021

Rusty Shaw  
Denbury Green Pipeline – Montana, LLC  
5851 Legacy Circle, Suite 1200  
Plano, Texas 75024

**Subject: Re-Submittal of *A Class I and Class III Cultural Resource Inventory for Two Route Adjustments and Five Proposed Corridor Additions Along Denbury’s Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota***

Dear Mr. Shaw,

SWCA Environmental Consultants (SWCA) previously conducted cultural resources inventory for the proposed Denbury Green Pipeline – Montana, LLC’s (Denbury’s) Cedar Hills South Unit (CHSU) Lateral Carbon Dioxide (CO2) Pipeline Project (Project) in Slope and Bowman Counties, North Dakota. SWCA submitted a report entitled: *A Class I and Class III Cultural Resource Inventory for Two Reroutes and Five Additional Temporary Workspaces Along Denbury’s Cedar Hills South Unit CO2 Lateral Pipeline, Bowman County, North Dakota* and associated site form to the North Dakota State Historic Preservation Office (SHPO) on August 10<sup>th</sup> to assist Denbury in meeting the cultural resource requirements within the North Dakota Public Service Commission’s Certificate of Corridor Compatibility and Route Permit application for the proposed project.

Since concurrence, the North Dakota Public Service Commission (NDPSC) requested updates to the application from reroute to route adjustments and additional temporary workspaces to proposed corridor additions. Attached is the report with the updated language.


The total Class III inventory consists of 10.58 acres for the areas along the proposed pipeline route adjustments and proposed corridor additions that fall outside previously surveyed areas. During the inventory, SWCA personnel recorded one isolated find (32BOX612). Isolated finds are considered to lack the historic integrity necessary to be considered eligible for the National Register of Historic Places. Based on these results, SWCA recommended a finding of No Historic Properties Affected for the CHSU pipeline reroutes and five ATWS project. SWCA received SHPO’s concurrence on this report on August 16th, 2021.

Thank you for your review of this project and please let me know if you need anything further.

Sincerely,

A handwritten signature in black ink, appearing to read "Christine Varah", is written over a faint, light-colored circular stamp or watermark.

Christine Varah  
Project Manager  
[cvarah@swca.com](mailto:cvarah@swca.com)  
307.204.3271

The logo for SWCA (Soil Water Conservation Agency) is displayed vertically on the left side of the page. It consists of the letters 'S', 'W', 'C', and 'A' in a large, stylized, light blue font. The 'S' is at the bottom, followed by 'W', 'C', and 'A' at the top.

# A Class I and Class III Cultural Resource Inventory for Two Route Adjustments and Five Proposed Corridor Additions along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota

AUGUST 2021

UPDATED OCTOBER 2021

***CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE***

PREPARED FOR

**Denbury Green Pipeline – Montana,  
LLC**

PREPARED BY

**SWCA Environmental Consultants**



## MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:
2. SHPO Reference #: 19-0233
3. Author(s): Laci L. Paul and Christine Varah
4. Title: A Class I and Class III Cultural Resource Inventory for Two Reroutes and Five Additional Temporary Workspaces Along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota
5. Report Date: August 10, 2021
6. Number of Pages: 22
7. Type – I  
I=Inventory; T=Formal Testing; E=Excavation; O=Other
8. List formally tested or excavated sites (not probes): N/A
9. Acres: 10.58
10. List the legal description\* and study unit. For study unit assignment, use the township tables in the *State Plan*, [http://history.nd.gov/hp/stateplan\\_arch.html](http://history.nd.gov/hp/stateplan_arch.html).  
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

*\*For inventory, formal testing and excavation projects, list the CLASS III legal locations only.*

<u>County</u>	<u>Township</u>	<u>Range</u>	<u>Sections</u>	<u>Study Unit</u>
Bowman	132N	107W	1	LM
Bowman	132N	106W	7, 8, 16, and 33	LM



**A CLASS I AND CLASS III CULTURAL RESOURCE  
INVENTORY FOR TWO ROUTE ADJUSTMENTS AND FIVE  
PROPOSED CORRIDOR ADDITIONS ALONG DENBURY'S  
CEDAR HILLS SOUTH UNIT CO<sub>2</sub> LATERAL PIPELINE,  
BOWMAN COUNTY, NORTH DAKOTA**

Prepared for

**Denbury Green Pipeline – Montana, LLC**  
5320 Legacy Drive  
Plano, Texas 75024

Submitted to

**State Historical Society of North Dakota**

Prepared by

Laci L. Paul and Christine Varah

Principal Investigator: Naomi Ollie

**SWCA Environmental Consultants**

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SWCA Cultural Resources Report No. 21-446

SWCA Project No. 28464.32

August 10, 2021

***CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE***



## **ABSTRACT**

In 2018, SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory in support of the proposed Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline Project (project) in Slope and Bowman Counties, North Dakota (Varah et al. 2019). In continued support of the project, SWCA conducted an additional cultural resources inventory for newly proposed route adjustments and proposed corridor additions, also known as additional temporary workspaces (ATWS).

Denbury Green Pipeline – Montana, LLC (Denbury) is constructing a 17.76-mile-long pipeline through southeast Montana and southwest North Dakota. This report presents the results of the Class I and Class III cultural resource inventory for two route adjustments and five proposed corridor additions along the pipeline, on privately owned land in Bowman County, North Dakota. The inventory was undertaken to assist Denbury in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application for the proposed project.

The total Class III inventory consists of 10.58 acres for the areas along the proposed pipeline route adjustments and proposed corridor additions that fall outside previously surveyed areas. During the inventory, SWCA personnel recorded one isolated find (32BOX612). Isolated finds are considered to lack the historic integrity necessary to be considered eligible for the National Register of Historic Places. Based on these results, SWCA recommends a finding of No Historic Properties Affected for the CHSU pipeline route adjustments and five proposed corridor additions project.

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## INTRODUCTION

SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory for the proposed Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline Project (project). Denbury Green Pipeline – Montana, LLC (Denbury) is constructing a 17.76-mile-long pipeline through southeast Montana and southwest North Dakota. As currently planned, the project consists of a 12-inch-diameter pipeline carrying carbon dioxide (CO<sub>2</sub>) from a facility in the Coral Creek Oil Unit south of Baker, Montana, to the Cedar Hills South Oil Unit (CHSU) south of Marmarth, North Dakota. The right-of-way (ROW) consists of a 75-foot disturbance corridor. This report presents the results of the Class I and Class III cultural resource inventory for two route adjustments and five proposed corridor additions also known as additional temporary workspaces (ATWS), along the pipeline, on privately owned land in Bowman County, North Dakota.

The North Dakota Public Service Commission is the lead regulatory agency under the North Dakota Energy Conversion and Transmission Facility Siting Act (excluding any applicable county or local requirements). SWCA's Class I and Class III inventory of the project area assists Denbury in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application for the proposed project.

The inventoried areas are summarized in Table 1 and are depicted on the Waterhole Creek (1981), Kid Creek (1976), and Marmarth (1980), North Dakota, U.S. Geological Survey (USGS) 7.5-minute quadrangles (Figures 1–3). SWCA inventoried the route adjustments using a 200-foot-wide linear corridor centered on the proposed pipeline route and a 50-foot buffer around the proposed corridor additions. In total, 10.58 acres were inventoried for the CHSU pipeline route adjustments and proposed corridor additions project. Portions of the project within the areas previously inventoried for the original Class III cultural resource inventory (Varah et al. 2019) were not re-inventoried for the current project.

**Table 1. Project Area Legal Descriptions**

<b>Infrastructure Name</b>	<b>Acres Inventoried</b>	<b>Township</b>	<b>Range</b>	<b>Sections</b>
Reroute 1	1.68	132N	107W	1
Additions ½	1.26	132N	106W	7
Addition 3	0.43	132N	106W	7
Addition 4	0.42	132N	106W	8
Reroute 2	3.08	132N	106W	16
Addition 5	3.71	132N	106W	33
<b>Total acres</b>	<b>10.58</b>			

Naomi Ollie served as principal investigator and completed the Class III inventory during fieldwork conducted on July 15, 28, and 29, 2021. All field notes and photographs are on file at SWCA's Sheridan, Wyoming, office under project number 28464.32. The North Dakota Public Service Commission is the permitting agency, and the North Dakota State Historic Preservation Office (SHPO) will serve as the review agency.

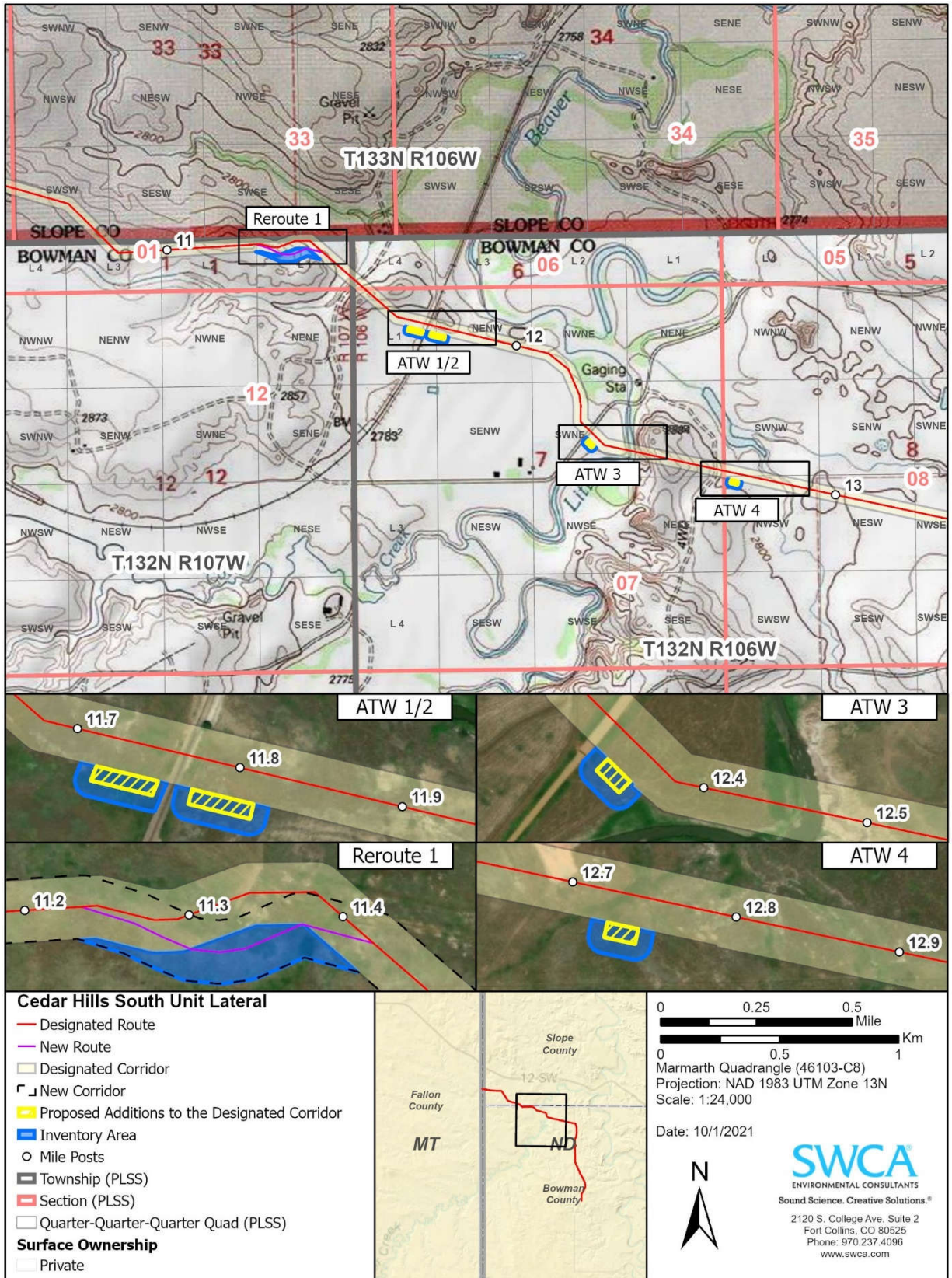


Figure 1. Project location map, page 1 of 3.

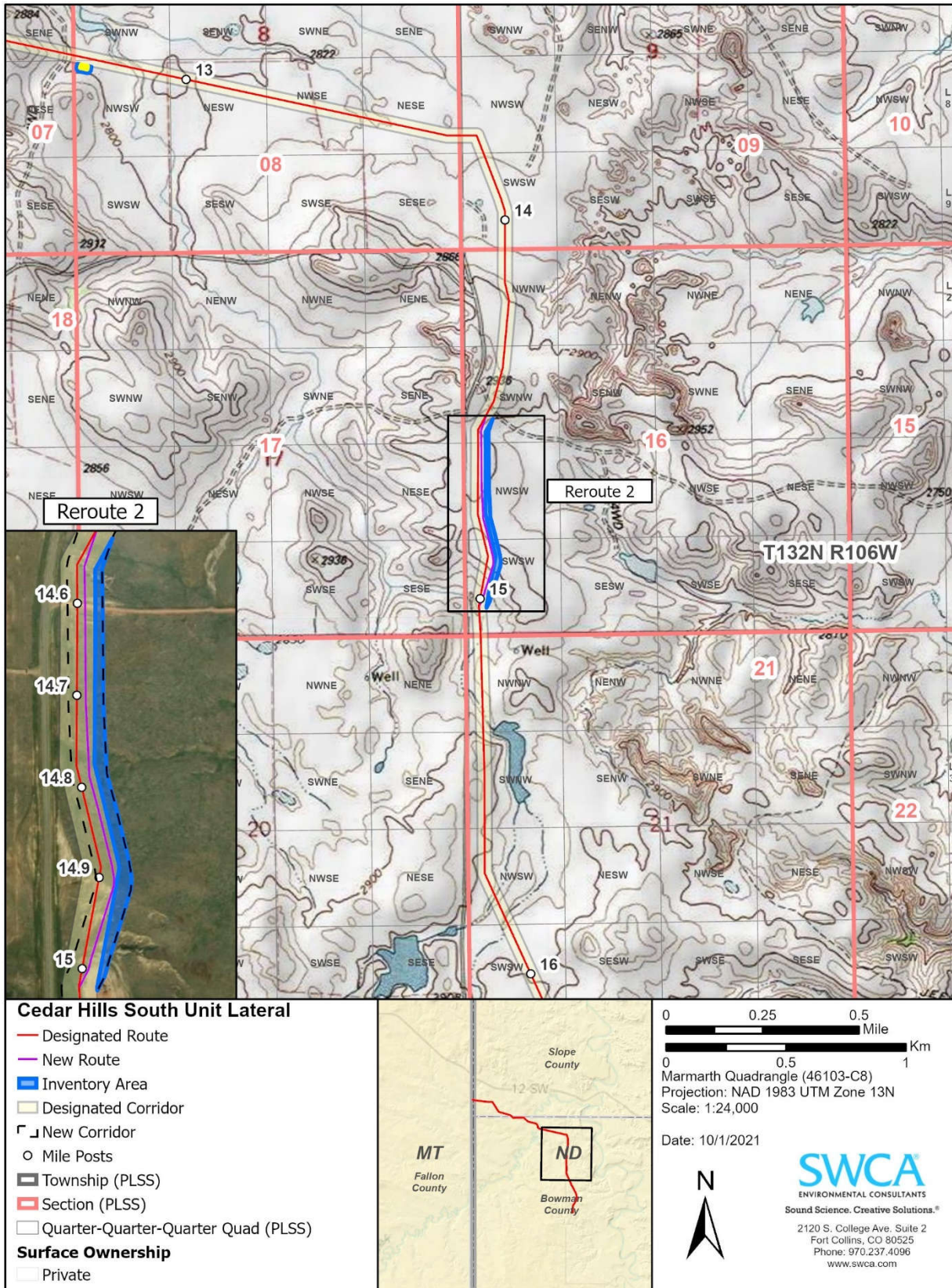


Figure 2. Project location map, page 2 of 3.

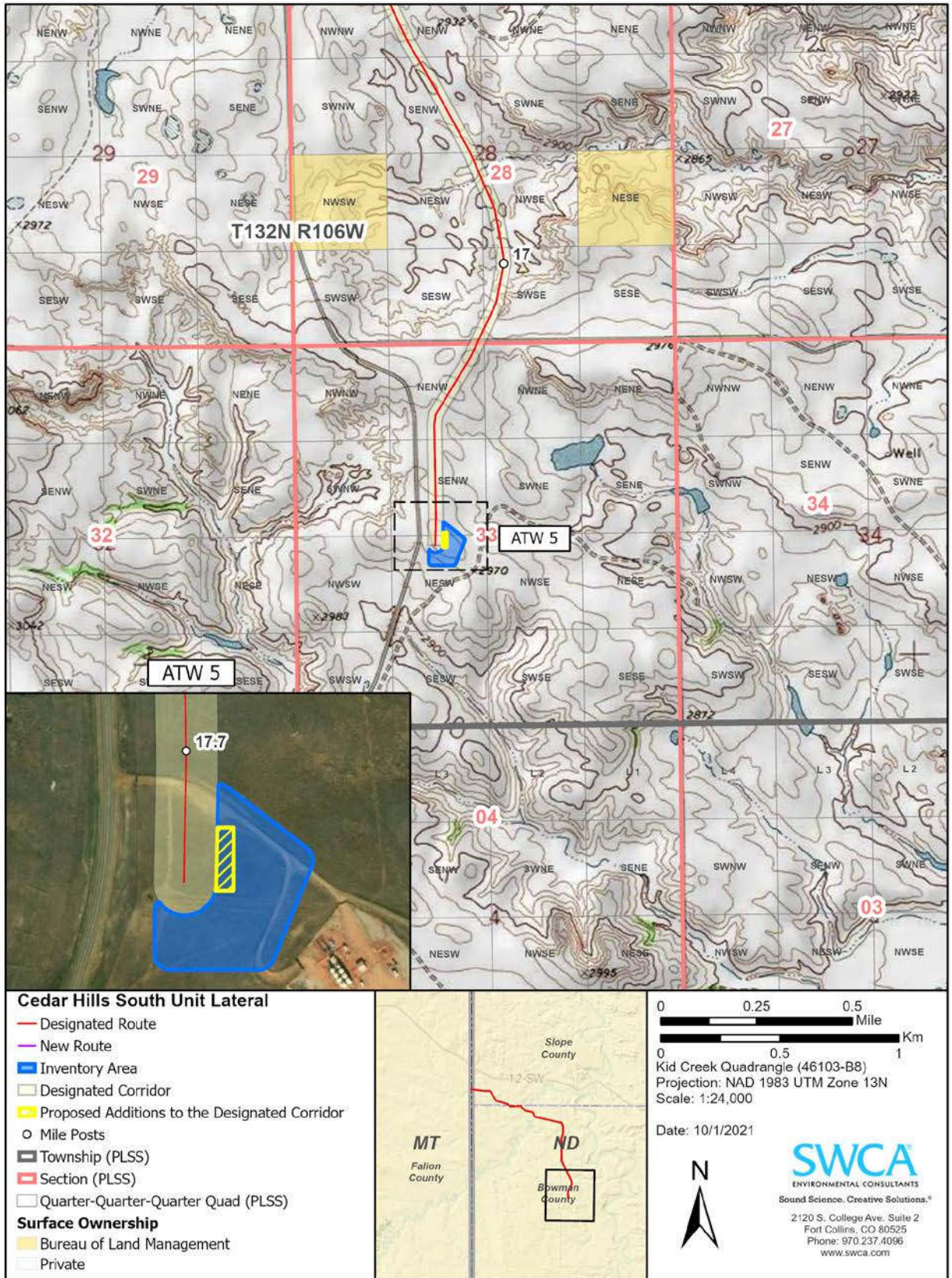


Figure 3. Project location map, page 3 of 3.

## ENVIRONMENTAL SETTING

The project area is west-southwest and south of Marmarth, North Dakota. The project area is accessible from various access roads off 172 Avenue SW. The North Dakota / Montana state line is 2.5 miles west of Reroute 1 and the county line between Bowman and Slope Counties is just north of route adjustment 1 and proposed corridor additions 1/2 through 4.

### Topography

The proposed route adjustments and proposed corridor additions are within the unglaciated portion of the Great Plains physiographic province (Fenneman 1931). The U.S. Environmental Protection Agency (EPA) has categorized this area as the Northwestern Great Plains Level 3 ecoregion (EPA 2013). This semiarid ecoregion covers the Missouri Plateau section of the Great Plains and contains rolling hills underlain primarily by siltstone, shale, and sandstone, interspersed with occasional buttes and badlands. This ecoregion is primarily used as rangeland and agricultural land, which is restricted primarily by water availability. In terms of the more detailed EPA Level 4 ecoregions (EPA 2013), Reroute 1 and additions 1/2 through 4 are within Sagebrush Steppe and route adjustment 2 and addition 5 are in the Little Missouri Badlands (Figures 4–9).



**Figure 4. Overview of the topography from along route adjustment 1, facing east near the west end of the proposed pipeline reroute.**

Photographed by SWCA (N. Ollie), July 15, 2021; image has not been altered.



**Figure 5. Overview of the topography within addition 1/2 near milepost 11.7, facing north toward ROW.**

Photographed by SWCA (N. Ollie), July 28, 2021; image has not been altered.



**Figure 6. Overview of the topography within addition 3 near milepost 12.4, facing southeast toward Little Beaver Creek.**

Photographed by SWCA (N. Ollie), July 28, 2021; image has not been altered.



**Figure 7. Overview of the topography within addition 4 near milepost 12.7, facing east from west edge of survey area.**

Photographed by SWCA (N. Ollie), July 29, 2021; image has not been altered.



**Figure 8. Overview of topography along addition 2, facing northeast from proposed reroute.**

Photographed by SWCA (N. Ollie), July 15, 2021; image has not been altered.



**Figure 9. Overview of topography within addition 5 near milepost 17.7, facing northwest from southeast corner.**

Photographed by SWCA (N. Ollie), July 29, 2021; image has not been altered.

## Hydrology

The project area is within the Little Missouri River drainage system (North Dakota Geographic Information Systems 2021). Drainages flow generally southeast into Corral Creek. Corral Creek flows southeast before joining north-flowing Little Beaver Creek. Little Beaver Creek flows north then east to drain into the Little Missouri River approximately 5.6 miles north-northeast of the project area. Based on watershed boundary data (U.S. Department of Agriculture 2021), the pipeline passes through the Sandstone Creek, Corral Creek, Little Beaver Creek, and Kid Creek watersheds; however, none of the current project area is directly crossed by these drainages.

## Geology

The bedrock geology of the two route adjustments and five proposed corridor additions is characterized by Paleocene and Upper Cretaceous sedimentary deposits that have been deformed through uplifts and subsequent erosion, which has affected the age and types of deposits exposed along the route (Figure 10). In general, the geology of the project area is characterized by the Fox Hills formation and Hell Creek formation, which are described from youngest to oldest below.



**Figure 10. Overview of the cobble and petrified wood deposit on a toe slope within route adjustment 1, facing west.**

Photographed by SWCA (N. Ollie), July 15, 2021; image has not been altered.

The Fox Hills formation was deposited during the Upper Cretaceous (North Dakota Geological Survey 2001). This formation is a marine deposit at the base, and transitions to a non-marine deposit. The transition reflects the last recession of the Western Interior Seaway (Anna 1986). Fox Hills material consists of light gray sandstone in the upper member, overlying a brownish gray siltstone and sandstone that grade into the underlying Pierre Shale (North Dakota Geological Survey 2001).

The Hell Creek formation was deposited during the Upper Cretaceous (North Dakota Geological Survey 2001) and represents the latest Cretaceous deposit, ending at the Cretaceous-Tertiary boundary. The Hell Creek formation is well known for its abundance of dinosaur fossils. This formation contains interbedded sandstones, shales, and lignite (North Dakota Geological Survey 2001).

## **Soils**

Ten soil map units are present within the project area and generally consist of fine-loamy alluvium derived from alluvium or residuum with some secondary glacial deposits within the project area. Gerda Maltese complex and Tinsley-Chanta complex are the most common soil series within the project area (Natural Resources Conservation Service 2021). Gerda Maltese complex soils occur in the northern portion of the project area, on the terraces above Little Beaver Creek and to the east and south. The soils series features very deep, well- and moderately well-drained soils found on slopes of 0 to 6 percent. Tinsley-Chanta complex soils occur in the central and western portions of the project area, on the terraces above Little Beaver Creek and to the west. The soils series features very deep, excessively drained soils that formed in alluvium consisting of sand and gravel deposits associated with lakes and glacial river channels and is found on hillslopes of 6 to 35 percent.

The eight soil map units representing the remaining portions of the project area include Boxwell-Kremlin loams; Fleak-Rock outcrop-Tusler complex; Tusler-Fleak-Chinook complex; Rhame-Fleak complex;

Tusler-Fleak-Telfer loamy fine sands; Tusler-Telfer loamy fine sands; Havre clay loam; and Fleak-Badlands complex. These soils are generally well-drained and derived from sandstone or mixed sedimentary deposits. Most are upland soils with little depositional potential; however, Chinook and Kremlin soils are alluvially derived.

The soil types that present depth potential consistently occur on steep slopes, suggesting there is generally low potential for intact subsurface cultural deposits across the survey area. Gerda Maltese loams have a higher potential for subsurface deposits because of the low slope percentages, relative depth of this series, and its association with terraces surrounding Beaver Creek.

## Flora and Fauna

The project area is within the Northwestern Great Plains, Level 3 ecoregion. This semiarid ecoregion covers the Missouri Plateau section of the Great Plains and contains rolling hills underlain primarily by siltstone, shale, and sandstone, interspersed with occasional buttes and badlands. This ecoregion is primarily used as rangeland and agricultural land, which is restricted primarily by water availability and soil quality.

The natural vegetation is characterized by a wide variety of grasses, including buffalograss (*Bouteloua dactyloides*), blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*), prairie junegrass (*Koeleria macrantha*), and Sandberg bluegrass (*Poa secunda*). Other notable plant species in this ecoregion include silver sagebrush (*Artemisia cana*), yucca (Asparagaceae), prickly pear cactus (*Optunia polyacantha*), rabbitbrush (*Chrysothamnus* sp.), skunkbush (*Rhus trilobata*), fringed sage (*Artemisia frigida*), and a variety of sedges in the seasonally inundated lowlands. Sparse stands of ponderosa pine (*Pinus ponderosa*) trees are occasionally located on the hills and ridges in the area, and cottonwood (*Populus* sp.) stands are located adjacent to some streams and ponds. Bare-ground visibility ranged from 10 to 75 percent and averaged 50 percent at the time of the current inventory.

Approximately 160 wildlife species are resident or seasonal visitors to the Missouri River ecosystem, and hundreds of native fish species live in the mainstem and tributaries. Some of the animal species that would have been common and available for human use in the Missouri River Valley area—both prehistorically and historically—include fur-bearing mammals such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), eastern cottontail (*Sylvilagus floridanus*), elk (*Cervus canadensis*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), and bison (*Bison bison*), as well as bird and waterfowl species such as mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), sharp-tailed grouse (*Tympanuchus phasianellus campestris*), golden eagle (*Aquila chrysaetos*), and bald eagle (*Haliaeetus leucocephalus*) (Seabloom et al. 1978).

At present, four federally listed threatened and endangered species reside in Slope and Bowman Counties: whooping crane (*Grus americana*), black-footed ferret (*Mustela nigripes*), gray wolf (*Canis lupus*), and northern long-eared bat (*Myotis septentrionalis*) (U.S. Fish and Wildlife Service 2021).

## Environmental Constraints

The potential for preservation of archaeological materials within or adjacent to the project area has been impacted by farming, cattle grazing, and active oil and gas exploration activity, including nearby well pads and access roads. Oil and gas development is common near the project areas (Figure 11). In some places, these land uses have resulted in increased ground visibility and removal of overburden, allowing

for the identification of numerous sites and an interpretation of high site density. In other cases, these impacts have removed the archaeological materials and resulted in the identification of low site densities.

Other impacts include the Burlington Northern Railroad that crosses Section 7, Township (T) 132 North (N), Range (R) 106 West (W) between additions 1 and 2.



**Figure 11. Overview of the current pipeline blading activities adjacent to addition 3, facing northwest.**

Photographed by SWCA (N. Ollie), July 28, 2021; image has not been altered.

## **CULTURAL/HISTORICAL OVERVIEW**

The prehistoric chronology for southwest North Dakota is typically divided into five major periods based on adaptive strategies and technological developments. These major periods are the Paleoindian, Plains Archaic, Late Prehistoric (which includes the Plains Woodland and the Plains Village traditions), Protohistoric, and Historic. At a minimum, humans have lived in western North Dakota since the end of the Pleistocene geologic epoch, based on occasional surface finds of Clovis and Folsom projectile points.

The Paleoindian period ranges between 12,000 and 8,000 years before present (B.P.) (Frison 2001). The transition from Paleoindian to Plains Archaic is archaeologically visible as shift from large lanceolate projectile points to large notched projectile points (Kornfeld et al. 2010), perhaps indicating a shift to atlatl-propelled darts from hand-thrown spears. This transition is also associated with warming/drying trends that prompted diverse subsistence adaptations among hunter-gatherers (Carlson 1994). Temporally overlapping with the Northwestern Plains Late Archaic, the Plains Woodland tradition is characterized by increased sedentism, garden horticultural activity, expanding regional exchange networks with eastern Woodland populations (Adena and Hopewell), and the elaboration of ceremonial activities and mortuary practices, specifically mound burials (Griffin 1967). Lehmer (1971) defined the Plains Village tradition as possessing equal horticulture and hunting and gathering strategies, semipermanent villages near the Missouri River floodplain, earthlodges, large storage and refuse pits, distinctive ceramics, abundant end scrapers and arrow points, bison scapula hoes, and a well-developed bone tool industry. The Plains

Village tradition is divided into the Middle Missouri tradition (A.D. 969–1500) and the Coalescent tradition (A.D. 1300–1650).

A notable prehistoric site in Slope County is the Pretty Butte site (32SL100) and in Bowman County the Doaks Butte site (32BO222) is a notable prehistoric site. The Pretty Butte site (32SL100) represents the Paleoindian period and contains lanceolate points similar to Frederick and Lusk (Borchert and Loendorf 1986). The Doaks Butte site (32BO222) is an example of an early Middle Woodland site containing Besant projectile points and Sonota-related ceramics (Toom 2001). The Doaks Butte site is near the confluence of the Little Missouri River and Box Elder Creek. Both sites have been recommended eligible for inclusion in the National Register of Historic Places (NRHP). Neither of these sites occur near the current project area.

The historic chronology of western North Dakota has been characterized by 32 diverse themes. A representative sample includes fur trade; exploration; Native American reservations; commerce; education; energy development; farming; irrigation and conservation; and roads, trails, and highways (North Dakota SHPO 2003). The characteristics of the Prehistoric and Historic periods are summarized in Figure 12.

From these overlapping series of prehistoric contexts and historic chronologies, a number of relevant and potentially relevant prehistoric and historic research themes are distillable in relation to the resource potential identified for the current project area. The types of prehistoric resources already identified within the area—cairns, cultural material scatters, stone circles, and isolated chipped stone—readily point to certain themes such as hunting and gathering, seasonal occupations, and possibly ceremonial activities. The types of historic sites and the historic use of the area point toward agriculture as the primary historic theme.

Years B.P.	Period	Climate	Characteristics	Complexes/Traditions
0	Historic	Warmer and dryer	Advent of written records	Euro-American settlement
100				
200	Protohistoric	Warmer, xeric	Euro-American trade goods introduced	Post-contact Coalescent
300				
350	Plains Archaic Tradition Plains Woodland Tradition Plains Village Tradition	Little Ice Age	Increased sedentism, horticulture, regional exchange networks with eastern populations, the elaboration of ceremonial activities and mortuary practices, mound burials, ceramics appear, small notched points, warfare	Coalescent
400				
450				
500				
550				
600		Warmer, mesic		Middle Missouri: Blackduck, Old Womans, Avonlea, Laurel, Besant
650				
700				
750				
800				
850		Warmer and xeric		Pelican Lake, McKean, Oxbow, Logan Creek/Mummy Cave
900				
950				
1,000				
1,050				
1,500				
2,000				
2,500				
3,000				
3,500				

**Figure 12. Characteristics of cultural periods in North Dakota.**

## BACKGROUND RESEARCH

As part of the initial phase of this investigation, SWCA conducted a Class I background search of archaeological and historical literature and records for the project area and surrounding 1.0-mile-wide survey area (0.5 mile either side of the proposed pipeline route adjustments or proposed corridor additions) on July 13 and 28, 2021. Researchers searched relevant records holdings at the State Historical Society of North Dakota for information regarding previously conducted cultural resource inventories and previously recorded historic and prehistoric sites within the survey area. Additionally, SWCA searched historical survey maps of the project area. The historic General Land Office survey plat dated to 1905 does not show any historic features within the survey area (North Dakota State Water Commission 2021).

Based on the records search results, 22 previous cultural resource inventories and investigations were conducted in the 1-mile survey area between 1980 and 2019 (Table 2). The inventories were conducted for oil and gas development, including access roads and pipelines; transportation projects; power projects; communication projects; water-related projects; and a historic architectural survey. Only the 2019 Class III inventory for Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline covers a substantial portion of the current project area (Manuscript No. 018295).

**Table 2. Previous Inventories within 1-mile Survey Area**

<b>Manuscript Number</b>	<b>Location</b>	<b>Title</b>	<b>Author</b>	<b>Year</b>
004170	Section 28 T132N, R106W	1987 Bowman County Class III Inventory No. 3.	G. Smith	1986
001178	Section 34, T133N, R106W	Little Missouri Grazing Association Sonsalla Spring 07-02-80 Survey, Slope County, North Dakota	A. Simon	1980
006629	Sections 17 and 18, T132N, R106W	Four Meridian Oil, Inc. Well Pads in Bowman County, North Dakota: Results of the Class III Cultural Resources Inventories	D. Klinner	1995
006721	Sections 21 and 28, T132N, R106W	Meridian Oil, Inc. #41-28H Golien Well Pad and Access Road in Bowman County, North Dakota: Results of the Class III Cultural Resources Inventory (UW #1839)	D. Klinner	1996
006855	Section 4, T131N, R106W; Sections 16, 28, and 33, T132N, R106W	KLJ-Consolidated Telephone Cooperative Rhame Exchange: A Class II and III Cultural Resource Inventory in Bowman and Slope Counties, North Dakota	A. Kulevsky	1996
006764	Sections 8, 17, and 18, T132N, R106W	Continental Resources, Inc. Frank #1-18F Well Pad and Access Road in Bowman County, North Dakota: Results of the Class III Cultural Resources Inventory (UW #1866)	G. Wermers	1996
006885	Section 5, 7, and 8, T132N, R106W; Section 12, T132N, R107W	The Williston Basin Interstate Pipeline Company 1997 Marmarth-Bowman Pipeline Replacement Project: Portions within Bowman and Slope Counties, North Dakota (UW #1925a)	D. Klinner	1997
008416	Section 7, T132N, R106W	Historic Architectural Survey of Bowman County, North Dakota	T. Isern	1998
008036	Sections 7 and 8, T132N, R106W	Continental Swede 42-7SH Well Pad and Access Road: A Class III Cultural Resource Inventory, Bowman County, North Dakota	W. Bluemle	2001
008201	Section 28, T132N, R106W	Continental Resources Inc., Water Injection Pipeline: A Class III Cultural Resource Inventory, Bowman County, North Dakota	J. Morrison	2002
008205	Section 10, T132N, R107W	Murphy 43-10NH Well Pad and Access Road: A Class III Cultural Resource Inventory, Bowman County, North Dakota	J. Morrison	2002
008206	Section 10, T132N, R107W	Murphy 43-10SH Well Pad: A Class III Cultural Resource Inventory, Bowman County, North Dakota	J. Morrison	2002
008609	Section 33, T132N, R106W	Burlington CHSU 12-33NH 26 Well Pad and Access: A Class III Cultural Resource Inventory, Bowman County, North Dakota	W. Bluemle	2003
009348	Section 4, T131N, R106W	Burlington's CHSU 13C-4SH/NH 16: A Class III Cultural Resource Inventory in Bowman County, North Dakota	D. Hiemstra	2005
009576	Sections 28, 29, 32, and 33, T132N, R106W	Burlington Resources' CHSU 44D-29 NH/SH 26: A Class III Cultural Resource Inventory in Bowman County, North Dakota	A. Bleier	2006
009577	Sections 32 and 33, T132N, R106W	Burlington Resources' CHSU 41D-32 NH/SH 26: A Class III Cultural Resource Inventory in Bowman County, North Dakota	A. Bleier	2006
009612	Sections 29 and 32, T132N, R106W	Burlington's CHSU 24C-29SH/NH 26 Dual Well Pad: A Class III Cultural Resource Inventory in Bowman County, North Dakota	E. Stine	2006
009802	Section 11, T132N, R107W	Hadley 13-11 NH/SH: A Class III Cultural Resource Inventory in Bowman County, North Dakota	W. Bluemle	2006
010371	Section 8, T132N, R106W	Joy 22-8SH: A Cultural Resource Inventory in Bowman County, North Dakota	W. Bluemle	2008

*A Class I and Class III Cultural Resource Inventory for Two Route Adjustments and Five Proposed Corridor Additions Along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota*

<b>Manuscript Number</b>	<b>Location</b>	<b>Title</b>	<b>Author</b>	<b>Year</b>
010989	Section 4, T131N, R106W; Sections 5, 7, 8, 9, 16, 17, 20, 21, 27, 28, 29, 32, and 33, T132N, R106W; Section 12, T132N, R107W; Sections 29 and 33, T133N, R106W	Amidon, Bowman, Rhame and Mott-Four Telecom Exchanges in Southwestern North Dakota: A Class II and Class III Cultural Resource Inventory, Bowman, Slope and Hettinger Counties, North Dakota	J. Harty	2009
017492	Section 4, T131N, R106W; Sections 5, 8, 9, 16, 17, 20, 21, 28, 29, and 33, T132N, R106W	A Class III Cultural Resource Inventory of the Marmarth Road Improvements Project in Bowman County, North Dakota	B. Brooks	2017
018295	Sections 6, 7, 8, 28, and 33, T132N, R106W; Sections 1 and 12, T132N, R107W; Section 33, T133N, R106W	A Class I and Class III Cultural Resource Inventory for Denbury's Cedar Hills South Unit CO <sub>2</sub> Lateral Pipeline, Slope and Bowman Counties, North Dakota	C. Varah	2019

Results of the background search identified nine previously recorded cultural resources within 1 mile of the survey area (Table 3). Of the nine cultural resources, two are historic and consist of one cable car with trestles (ferry) and one farmstead. The remaining seven sites are prehistoric and consist of four material concentrations and three isolates. The ferry (32BO00950) remains unevaluated regarding its eligibility for inclusion in the NRHP. In addition, 32BO00245 was originally shown as unevaluated in SWCA's background search; however, as part of SWCA's 2019 site testing and evaluation, 32BO00245 was recommended as not eligible. The remaining six resources are recommended not eligible for inclusion in the NRHP. None of the sites are within the current inventory area. In addition, none of the sites within 1 mile of the survey area are eligible for the NRHP or are known to have tribal significance and therefore indirect effects of the project were not considered.

**Table 3. Previously Recorded Resources within 1 Mile of the Survey Area**

<b>Site Number</b>	<b>Location</b>	<b>Site Type</b>	<b>Cultural Affiliation</b>	<b>NRHP Eligibility</b>
32BO00123	Section 28, T132N, R106W	Material concentration	Prehistoric	Not Eligible
32BO00236	Section 28, T132N, R106W	Farm/farmstead	Historic	Not Eligible
32BO00245	Section 21, T132N, R106W	Material concentration	Prehistoric	Unevaluated
32BO00950	Section 7, T132N, R106W	Ferry	Historic	Unevaluated
32BOX0149	Section 18, T132N, R106W	Material concentration	Prehistoric	Not Eligible
32BOX0184	Section 28, T132N, R106W	Material concentration	Prehistoric	Not Eligible
32BOX0261	Section 7, T132N, R106W	Isolate	Prehistoric	Not Eligible
32BOX0460	Section 21, T132N, R106W	Isolate	Prehistoric	Not Eligible
32BOX0461	Section 7, T132N R106W	Isolate	Prehistoric	Not Eligible

## **STATEMENT OF OBJECTIVES/RESEARCH DESIGN**

### **Objectives**

The overall goal of this cultural resource inventory is to assist Denbury in the identification, evaluation, and management of identified cultural resources that might be affected by the proposed project. In general, the objectives of the inventory were to 1) identify all cultural and historic resources within the survey area; 2) make an initial recommendation regarding identified resources' eligibility for inclusion in the NRHP; and 3) make the appropriate recommendations regarding the treatment of all identified resources. The inventory was undertaken to assist Denbury in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application for the proposed project.

### **Expected Results**

Small, localized prehistoric activity sites are common within the general region. Due to substantial historic farming and cattle grazing in the project area and, more recently, oil and gas infrastructure construction, it is not expected that significant prehistoric resources remain in undisturbed surface exposures. However, buried cultural deposits could coincide with deeper soils along terrace deposits surrounding major drainages. Regardless, the limited extent of the project area is anticipated to minimize the possibility of encountering significant (NRHP-eligible) prehistoric archaeological sites. Likewise, no significant subsurface historic resources are expected to be recorded as a result of this inventory. Identifiable historic resources were expected to be represented by isolated historic materials related to farming and ranching. Based on site data collected for the little Missouri River Study Unit, the density of archeological sites per acres surveyed is approximately one site per 171.5 acres (North Dakota SHPO Archaeology and Historic Preservation Division 2016).

## **FIELD METHODS**

Fieldwork was designed so that project archaeologists could record all appropriate and necessary data for the completion of the project report, to convey Class I and Class III cultural resource inventory results and recommendations, and to ensure accurate completion of site forms for all resources encountered.

In accordance with the scope of work, archaeologists inventoried the survey area using parallel linear transects with spacing not exceeding 15 meters (m). The ground surface was examined for artifacts, features, or other evidence of cultural occupation. Cut banks, eroded surfaces, and other areas with significant exposure were examined intensively throughout the fieldwork.

When cultural resources are located, project archaeologists make an intensive effort to fully and accurately establish the extent and boundaries of newly identified and previously recorded sites. SWCA archaeologists verify and plot all spatial data using submeter Juniper Systems Geode global positioning system (GPS) receivers and Samsung Galaxy Tab S3 tablets running Collector for ArcGIS application. Office staff use ArcGIS 10.6 software to post-process the GPS data for plotting onto associated USGS 7.5-minute quadrangles to ensure accuracy and to produce required location maps of all sites and resources.

In addition to site mapping, project personnel photograph cultural resources in overview. Associated features and diagnostic artifacts are described, measured, recorded using handheld GPS units, and

photographed. Field personnel note the environmental setting, context, topography, and geographical location for each cultural resource.

## **Site Evaluation**

SWCA evaluates sites and their significance, as defined by the following criteria set forth in Title 36 Code of Federal Regulations 60.4 (National Park Service 1991).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A) that are associated with events that have made a significant contribution to the broad patterns of our history;
- B) that are associated with the lives of persons significant in our past;
- C) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D) that have yielded, or may be likely to yield, information important in prehistory or history.

Sites that are not eligible are unlikely to contribute further data significant to our knowledge of prehistory or history and/or may no longer possess integrity.

### ***Prehistoric Archaeological Sites***

Prehistoric lithic scatters/campsites (sites without any structures or association with known significant events or persons) generally will not require discussion of Criteria A, B, and C. Instead, for NRHP recommendation purposes, these properties are discussed for their potential to yield information significant to prehistory or the archaeological record under NRHP Criterion D. Special cases generally relate to Criterion A, where a prehistoric site type (such as a stone circle site) may not be recommended eligible for the NRHP from an archaeological perspective but may be considered important to cultures of Native American peoples.

Evaluation of the significance of archaeological sites under Criterion D involves considering general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site (construction techniques, building materials, structural integrity); and the age range reflected by the site assemblage. Sites considered to be significant generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and allow confirmation of the period of site use. Sites with the most potential to address research questions about human lifeways contain associated features, structures, and/or relatively intact and dateable artifacts.

### ***Historic Archaeological Sites or Components***

Historic sites containing or consisting of preserved features or structures are evaluated primarily under Criteria A, B, and C. Historic trash scatters lacking associated features or structures are primarily evaluated under Criterion D. In general, these types of sites represent ephemeral prospecting or stock management activities, but they lack identifiable or important association with specific persons or events of regional or national history (Criteria A and B), and they lack the formal and structural attributes necessary to qualify as eligible under Criterion C. The evaluation of significance of historic

archaeological sites under Criterion D focuses on the capacity of the sites or components to yield significant information regarding knowledge of history during the period(s) of site significance. Evaluation of the significance of historic sites considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site; construction techniques; building materials; structural integrity; and the age range reflected by the site assemblage.

Historic sites considered to be significant under Criterion D generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and allow confirmation of the period of site use. Sites with the most potential to address research questions contain associated features, structures, and relatively intact and datable artifacts. Significant sites are those that could impart information not available solely from historical documents. Although archival research may provide an essential form of information, often historical records are inaccurate or incomplete. For example, examination of construction techniques or household assemblages can provide information on economic slumps, reuse of structures for other than original purposes, and re-occupation cycles. As a result, insight may be gained into questions about human lifeways that are often asked in archaeology, but rarely answered directly in historical documentation.

### ***Non-Archaeological Historic Sites or Components***

Non-archaeological historic sites or sites with non-archaeological components are those primarily assessed for NRHP eligibility under Criteria A, B, and C, rather than Criterion D, and typically are not subject to subsurface testing. The integrity of historic sites is addressed using the guidelines presented in National Register Bulletin 15 (National Park Service 1991), which defines the seven elements of integrity as location, design, setting, materials, workmanship, feeling, and association. Individual segments of significant historic sites are evaluated as contributing or non-contributing in terms of physical and environmental integrity. Examples of historic site types include linear historic features, such as transportation routes and water conduits, standing buildings, and structure sites. Historic and ethnographic sites evaluated for potential contributions to history or cultural traditions for reasons beyond their possible future research value tend to have different evaluation and management considerations than archaeological sites. Traditional cultural properties are considered under the guidelines of National Register Bulletin 38 (Parker and King 1998).

## **RESULTS**

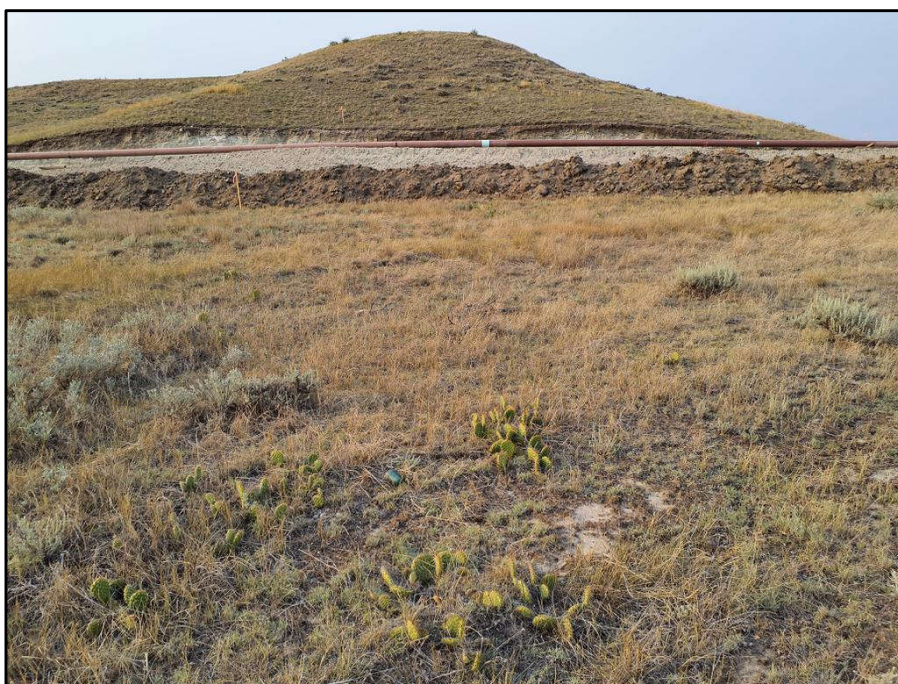
SWCA conducted a Class III inventory of the project area on July 15, 28, and 29, 2021. During the inventory, SWCA personnel newly recorded one historic isolated find (32BOX612). The location of the newly recorded resource is illustrated in the maps provided in Appendix A, and a copy of the North Dakota site form is provided in Appendix B (detached).

Vegetation within the project area consists of buffalograss, blue grama, western wheatgrass, needle and thread, green needlegrass, prairie junegrass, Sandberg bluegrass, and various grasses and forbs. Ground surface visibility during the survey ranged from 10 to 75 percent, with higher surface visibility on uplands and lower visibility in draws. Overall visibility was 50 percent. Impacts to the project area include oil and gas activities, and agricultural activities, such as plowing, cattle grazing, and ranching.

## Isolated Find

### **32BOX612 (CHSU\_MP11.8\_IF1)**

32BOX612 is a historic isolated find on a south-facing slope of a terrace, 0.12 mile southwest of Beaver Creek (Figure 13). The isolate was identified at the eastern edge of the 50-foot buffer around additions 1/2. Aspect is to the south, east, and west. Low-lying ridges are visible to the west and north and the Beaver Creek River Valley is visible to the east. The slope is approximately 3 degrees. Vegetation consists of mixed prairie grasses, sage, and prickly pear cactus, allowing for 51 to 75 percent bare-ground visibility. Soil is a brown silt loam with few chert and quartzite gravels and cobbles derived from alluvium. 32BOX612 has been affected by off road use and slope wash erosion. The Burlington Northern Railroad is 300 feet to the west and several ranch buildings and homes are visible to the southeast of the isolate location.



**Figure 13. 32BOX612 overview, facing north. CHSU ROW is visible in the background.** Photographed by SWCA (N. Ollie), July 28, 2021; image has not been altered.

32BOX612 consists of one fragment of a turquoise insulator with threading (Figure 14). The lower half of the insulator has been broken and no maker's marks were identified but the shape and color are very similar to the Hemingray No. 21 style insulator that was produced between 1880 and 1930 (Hemingray.info 2021). No historic features or other artifacts are associated with this insulator.

The isolate is in poor condition and does not have associated artifacts or features. As such, it lacks integrity of material, design, and workmanship as well as association necessary to convey its historic significance. Feeling and setting do not apply to the significance of this isolate. The isolate appears to have been removed from its original context as no poles or posts are nearby and thus does not indicate integrity of location.

The isolate is a single artifact that cannot be associated with a particular event or series of events important in history (NRHP Criterion A), it cannot be associated with the lives with important persons

(NRHP Criterion B), nor does it contain architecture that would meet NRHP Criterion C; the artifact does not have associated features or an assemblage and thus does not have potential to answer important questions on history (NRHP Criterion D). The isolated find lacks the historic integrity necessary to be considered significant and therefore is not eligible for the NRHP.



**Figure 14. 32BOX612 detail of insulator fragment.**  
Photographed by SWCA (N. Ollie), July 28, 2021; image has not been altered.

## CONCLUSIONS

SWCA conducted a Class I and Class III cultural resource inventory in support of two route adjustments and five proposed corridor additions for the CHSU CO<sub>2</sub> Lateral Pipeline project. The inventory was undertaken to assist Denbury in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application for the proposed project.

SWCA covered 10.58 acres during this Class III inventory. Weather was conducive to survey and the discovery of cultural resources. Ground visibility was variable across the project area but averaged 50 percent. Low visibility areas were not of a sufficient size or on high-probability landforms to warrant alternative discovery strategies. SWCA is confident in the results of this inventory.

During the inventory, SWCA recorded one isolated find (32BOX612). The isolate lacks integrity necessary to be considered eligible for the NRHP and no further work is recommended for this resource.

Should project development result in the discovery of previously unidentified cultural resources, all work in the vicinity of the discovery will halt and will not resume until approved by the SHPO after the discovery has been examined by a qualified archaeologist and resource concerns have been addressed. If the above stipulation is met, then a finding of No Historic Properties Affected would be recommended for the proposed route adjustments and proposed corridor additions.

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Varah, Christine

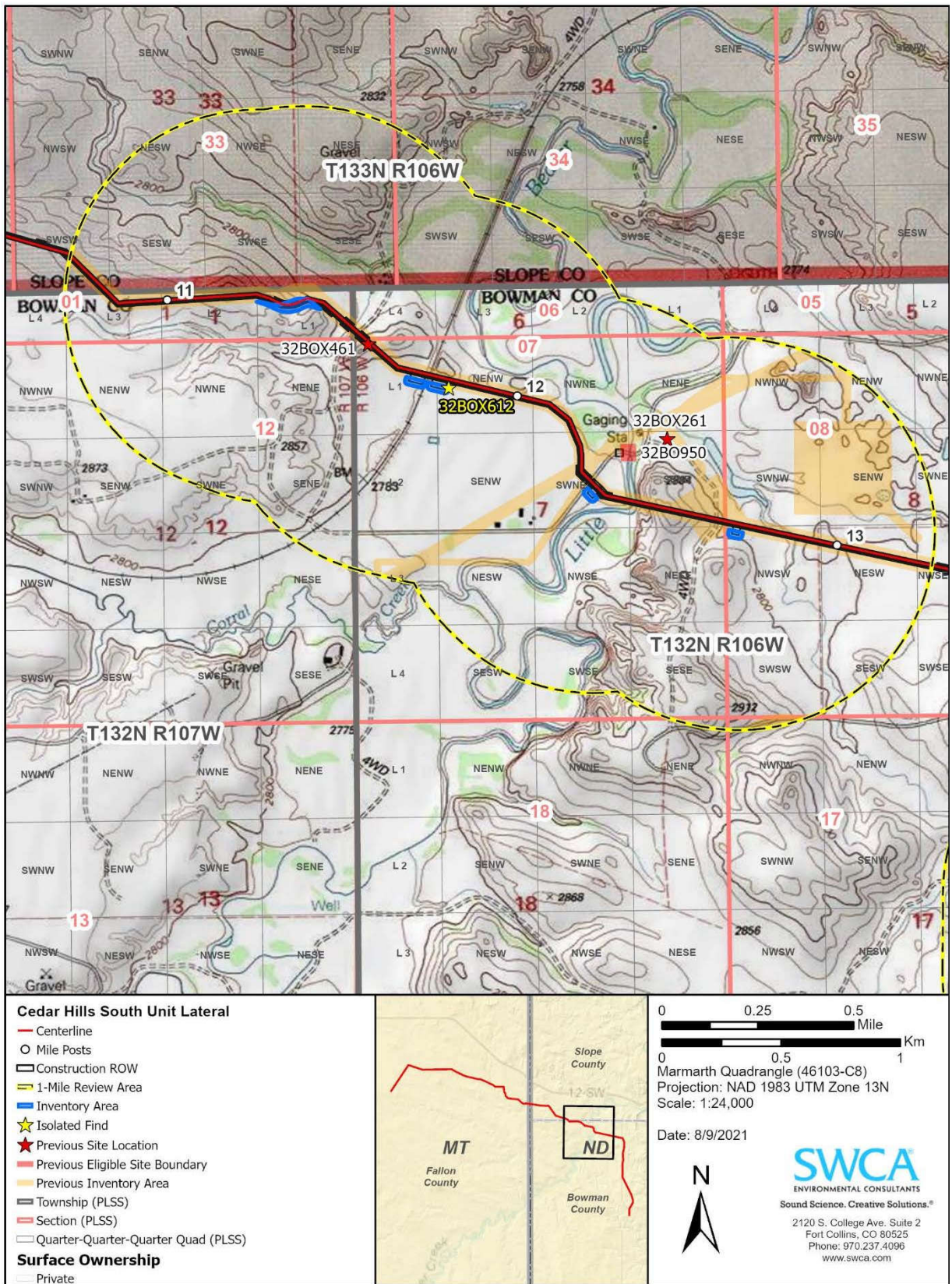
- 2019 *A Class I and Class III Cultural Resource Inventory for Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Slope and Bowman Counties, North Dakota*, SWCA Environmental Consultants, Sheridan Wyoming.

## **APPENDIX A**

### **Resource Location Maps**

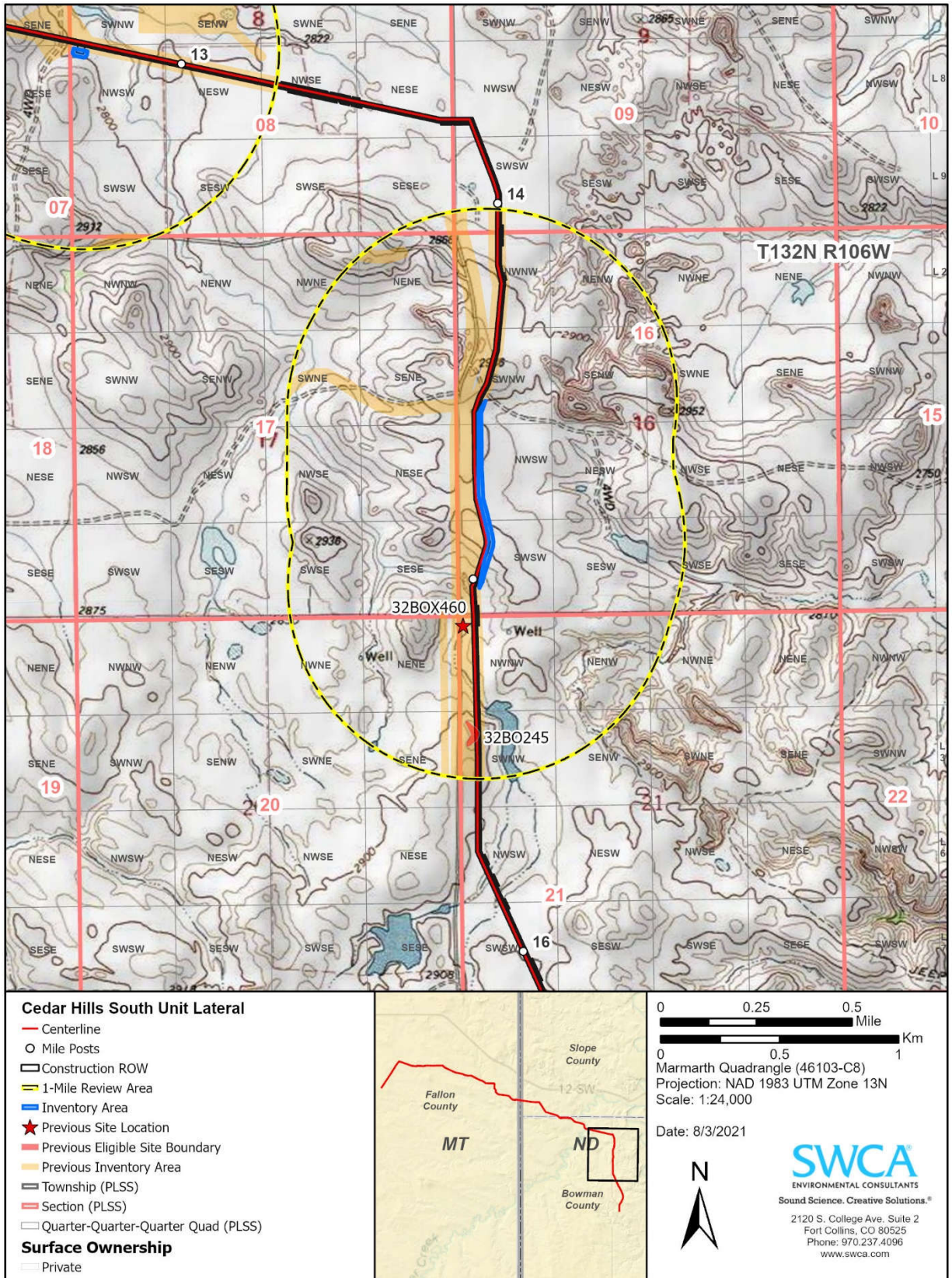


*A Class I and Class III Cultural Resource Inventory for Two Reroutes and Five Additional Temporary Workspaces Along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota*



**Figure A1. Resource location map 1 of 3 at 1:24,000-scale.**

*A Class I and Class III Cultural Resource Inventory for Two Reroutes and Five Additional Temporary Workspaces Along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota*



**Figure A2. Resource location map 2 of 3 at 1:24,000-scale.**

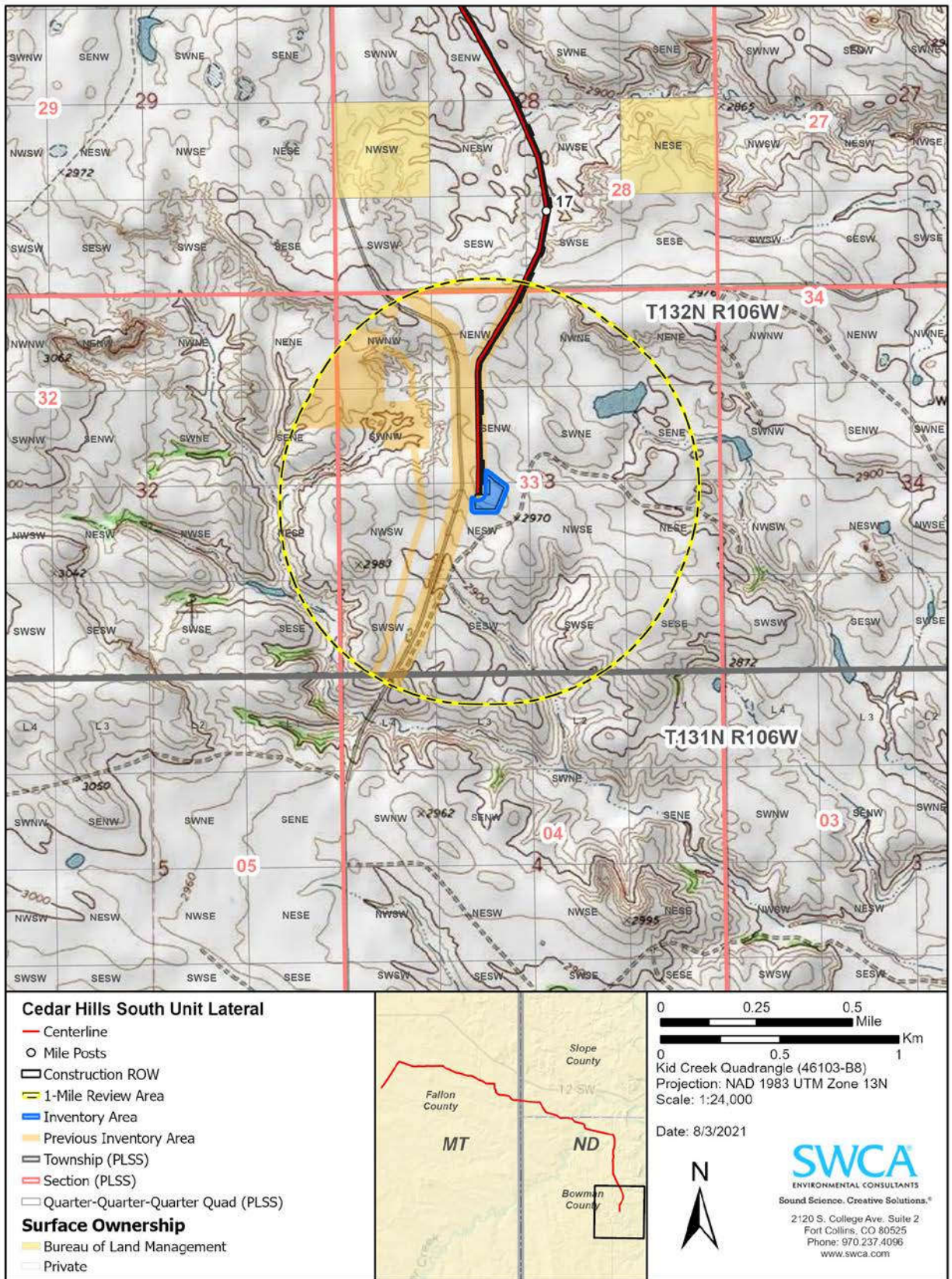


Figure A3. Resource location map 3 of 3 at 1:24,000-scale.

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**APPENDIX B  
(Detached)**

**North Dakota Cultural Resource Site Forms**





August 16, 2021

Project Manager Christine Varah  
SWCA - Sheridan Office  
1892 South Sheridan Avenue  
Sheridan, WY 82801-6104

**ND SHPO Ref: 19-0233 Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline in portions of [T132N R106W Sections 6-9, 16, 21, 28, 33, T132N R107W Section 1, and T133N R106W Sections 31-33] Bowman and Slope Counties, North Dakota**

Dear Project Manager Varah,

We received ND SHPO Ref: 19-0233 "A Class I and Class III Cultural Resource Inventory for Two Reroutes and Five Additional Temporary Workspaces Along Denbury's Cedar Hills South Unit CO<sub>2</sub> Lateral Pipeline, Bowman County, North Dakota" in portions of [T132N R106W Sections 7, 8, 16, 33, and T132N R107W Section 1] and find this SWCA Environmental Consultants report by Laci L. Paul and Christine Varah acceptable. We will add it to our Manuscript Collection. We also concur with no significant sites affected.

If you have any questions, please contact either Andrew Clark, Chief Archeologist at (701) 328-3574 or [andrewclark@nd.gov](mailto:andrewclark@nd.gov) or Lorna Meidinger, Historic Preservation Specialist at (701) 328-2089 or [lbmeidinger@nd.gov](mailto:lbmeidinger@nd.gov).

Sincerely,

for William D. Peterson PhD  
State Historic Preservation Officer  
(North Dakota)

19-0233

TRACT NUMBER: CH.ND.BO.0011.000

AMENDMENT TO EASEMENT AND RIGHT OF WAY AGREEMENT

STATE OF NORTH DAKOTA           §  
   §  
COUNTY OF BOWMAN               §

This AMENDMENT TO EASEMENT AND RIGHT-OF-WAY AGREEMENT (“Amendment”), dated July 14, 2021, is by and between HADLEY BROTHERS, LLP (“Grantor,” **whether one or more**) whose address is 3515 Elk River Road, Billings, Montana 59101 and DENBURY GREEN PIPELINE-NORTH DAKOTA, LLC (“Grantee”) a Delaware limited liability company whose address is 5851 Legacy Circle, Suite 1200, Plano, Texas 75024.

WHEREAS, Grantor and Grantee entered into that certain Easement and Right-of-Way Agreement dated October 1, 2018 (the “Effective Date”) recorded as Document Number 184475 of the Official Public Records of Bowman County, North Dakota (the “Agreement”); and

WHEREAS, due to engineering and construction factors, Grantee needs to move a portion of the pipeline route that crosses Grantor’s land by more than fifty (50) feet from the pipeline route described in the Agreement and depicted on the Exhibit “A” attached thereto; and

WHEREAS, the Agreement will need to be amended to show these changes to the Easement Area (as defined in the Agreement), the Exhibit “A”, and the temporary work spaces along the pipeline route; and

WHEREAS, pursuant to paragraph 1.8 of the Agreement, Grantee is to notify Grantor and obtain approval for any changes to the Easement Area and the corresponding temporary work spaces that are moved more than fifty (50) feet in any direction from the original route; and

WHEREAS, this Amendment is intended clarify the changes to the Easement Area and the temporary work spaces, to confirm Grantor’s approval of these changes, and to amend the Agreement to specifically include the new portions of the Easement Area, the temporary work spaces, and the Exhibit “A”.

NOW, THEREFORE, in consideration of TEN and NO/100 (\$10.00) DOLLARS in hand paid and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor and Grantee agree and approve as follows:

1. The Easement Area, the corresponding temporary work spaces, and the Exhibit “A” of the Agreement are hereby amended to reflect and include the new portions of the pipeline route, which are more specifically described and depicted on the attached Exhibit “A” to this Amendment. The unchanged portions of the Easement Area and the temporary work spaces described in the Agreement shall remain in full force and effect.

2. Grantor hereby approves and ratifies these changes and additions to the pipeline route, the Easement Area, the temporary work spaces, and the Exhibit A of the Agreement and described herein.

3. The Agreement, and any and all other agreements, documents or instruments now or hereafter executed and delivered are hereby amended so that any reference to the Agreement shall mean a reference to the Agreement as amended by this Amendment.

4. Except as described herein, all other terms and conditions of the Agreement, including the portions of the Easement Area and the corresponding temporary work spaces that did not change, shall remain in full force and effect and Grantor and Grantee hereby ratify, confirm, and approve same.

5. Grantor and Grantee agree that the Agreement, as hereby amended, shall continue to be legal, binding, valid and enforceable in accordance with its terms. The parties further agree that the Agreement shall not be further amended except as provided and permitted under the Agreement.

6. THE AGREEMENT, AS AMENDED HEREBY, REPRESENTS THE ENTIRE EXPRESSION OF THE PARTIES WITH RESPECT TO THE SUBJECT MATTER HEREOF ON THE DATE THIS AMENDMENT IS EXECUTED. THE AGREEMENT, AS AMENDED HEREBY, MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES.

7. All the terms, provisions, covenants, obligations, indemnities, representations, warranties and conditions of this Amendment shall be covenants running with the land and shall inure to the benefit of and be binding upon, and shall be enforceable by, the parties hereto and their respective successors and assigns.

8. This Amendment may be executed in multiple counterparts with each separate counterpart consisting of a valid and binding agreement. Each of the undersigned agree that their respective signature pages and acknowledgements may be removed from their respective counterpart and attached to a single original of this Amendment. For purposes of this Amendment, facsimile or .pdf copies of signature pages shall be deemed originals.

*[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK  
SIGNATURE PAGES FOLLOW]*



IN WITNESS WHEREOF, the undersigned has executed this instrument on the dates of the respective acknowledgments annexed hereto, but effective as of the Effective Date described herein.

**GRANTEE:**

DENBURY GREEN PIPELINE-NORTH DAKOTA, LLC

Print: James S. Matthews

Sign: *[Signature]*

Its: EVP + General Counsel

ACKNOWLEDGEMENT

STATE OF TEXAS

§  
§  
§

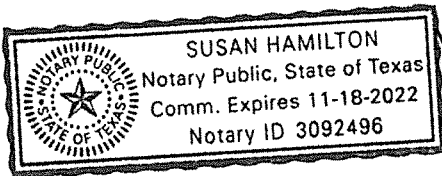
COUNTY OF COLLIN

This instrument was acknowledged before me on this the 5<sup>th</sup> day of August, 2021, by James S. Matthews, EVP & General Counsel of **Denbury Green Pipeline-North Dakota, LLC**, a Delaware limited liability company, on behalf of said company.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

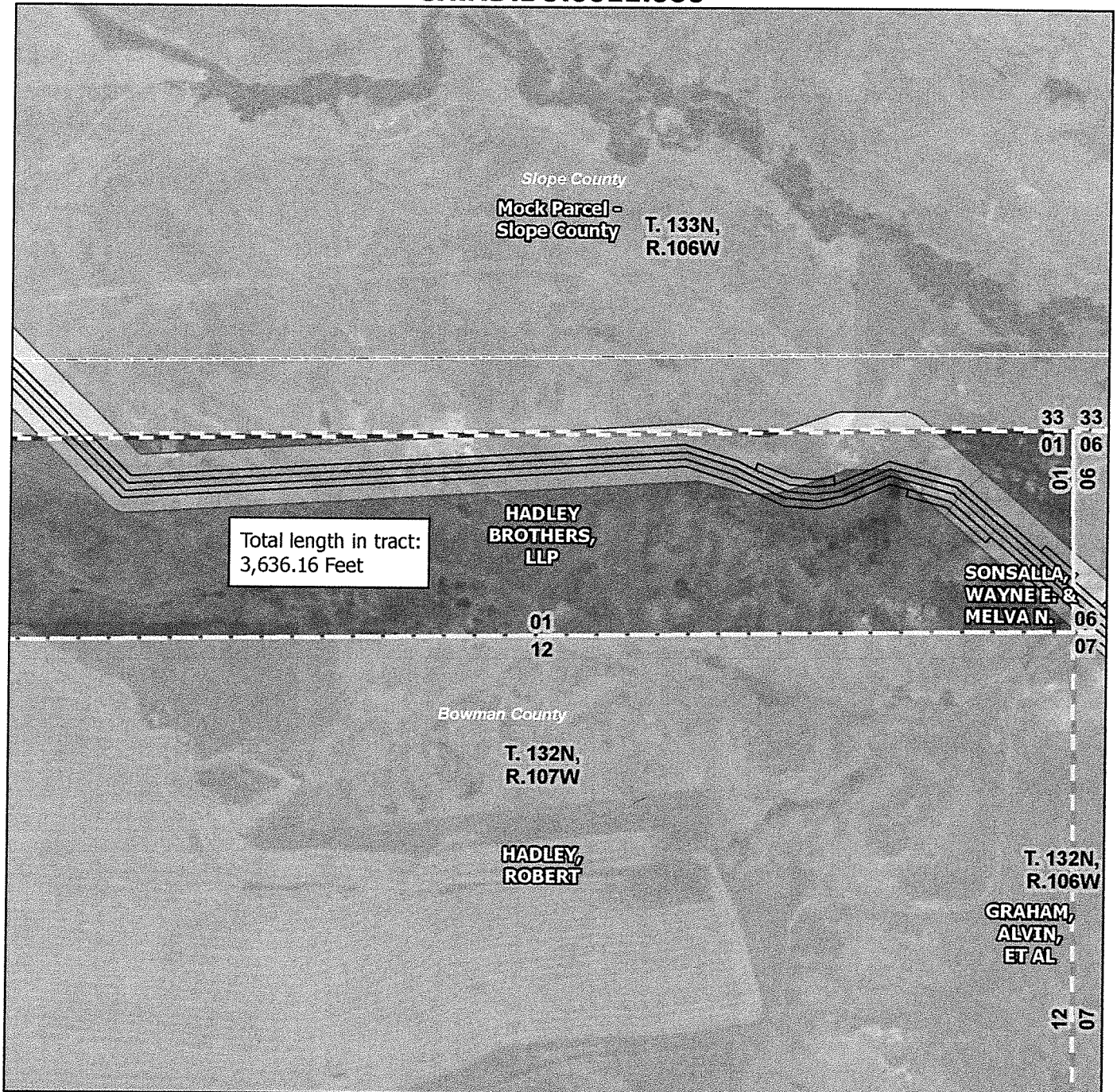
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Notary Public

(SEAL)

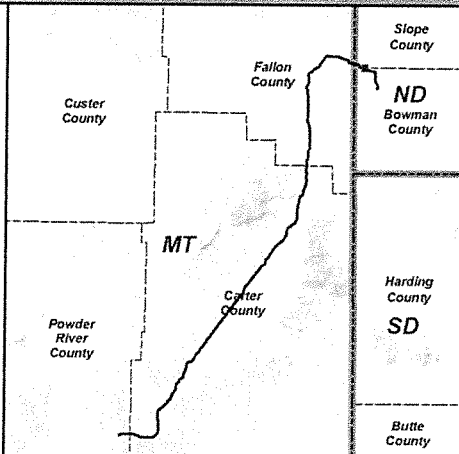


My Commission Expires: 11-18-2022

**Exhibit "A"**  
**CH.ND.BO.0011.000**



- CHSU - Proposed Reroute**
- Project Centerline
  - Construction ROW
  - Current Survey Corridor
  - Tract Boundary
  - County Boundary
  - Township Boundary (PLSS)
  - Section Boundary (PLSS)



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**Cedar Hills South Unit Lateral Project**  
Proposed Project Change:  
**Hadley Property Reroute**  
Page 1 of 1

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Projection: Transverse Mercator  
Page units: Foot US  
Imagery Source: USA NAIP (USDA)

Meters

Feet

1:6,000

Date: 7/12/2021

TRACT NUMBER: CH.ND.BO.0019.000

SECOND AMENDMENT TO EASEMENT AND RIGHT OF WAY AGREEMENT

STATE OF NORTH DAKOTA           §  
  §  
COUNTY OF BOWMAN           §

This SECOND AMENDMENT TO EASEMENT AND RIGHT-OF-WAY AGREEMENT (“Second Amendment”), dated July 15, 2021, is by and between DANIEL J. FISCHER AND JOANNE I. FISCHER, husband and wife, (“Grantor,” **whether one or more**) whose address is P.O. Box 59, Marmarth, North Dakota 58643 and DENBURY GREEN PIPELINE-NORTH DAKOTA, LLC, a Delaware limited liability company (“Grantee”) whose address is 5851 Legacy Circle, Suite 1200, Plano, Texas 75024.

WHEREAS, Grantor and Grantee entered into that certain Easement and Right-of-Way Agreement dated October 1, 2018 (the “Effective Date”) recorded as Document Number 184477 of the Official Public Records of Bowman County, North Dakota (**the “Agreement”**); and into that certain Amendment to Easement and Right-of-Way Agreement dated October 1, 2018 (the “Effective Date”) recorded as Document Number 184969 of the Official Public Records of Bowman County, North Dakota (**the “Amendment”**); and

WHEREAS, due to engineering and construction factors, Grantee needs to move a portion of the pipeline route that crosses Grantor’s land by more than fifty (50) feet from the pipeline route described in the Agreement and depicted on the Exhibit “A” attached thereto; and

WHEREAS, the Agreement will need to be amended to show these changes to the Easement Area (as defined in the Agreement), the Exhibit “A”, and the temporary work spaces along the pipeline route; and

WHEREAS, pursuant to paragraph 1.8 of the Agreement, Grantee is to notify Grantor and obtain approval for any changes to the Easement Area and the corresponding temporary work spaces that are moved more than fifty (50) feet in any direction from the original route; and

WHEREAS, this Second Amendment is intended clarify the changes to the Easement Area and the temporary work spaces, to confirm Grantor’s approval of these changes, and to amend the Agreement to specifically include the new portions of the Easement Area, the temporary work spaces, and the Exhibit “A”.

NOW, THEREFORE, in consideration of TEN and NO/100 (\$10.00) DOLLARS in hand paid and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor and Grantee agree and approve as follows:

1. The Easement Area, the corresponding temporary work spaces, and the Exhibit “A” of the Agreement are hereby amended to reflect and include the new portions of the pipeline route, which are

more specifically described and depicted on the attached Exhibit "A" to this Second Amendment. The unchanged portions of the Easement Area and the temporary work spaces described in the Agreement shall remain in full force and effect.

2. Grantor hereby approves and ratifies these changes and additions to the pipeline route, the Easement Area, the temporary work spaces, and the Exhibit A of the Agreement and described herein.

3. The Agreement, and any and all other agreements, documents or instruments now or hereafter executed and delivered are hereby amended so that any reference to the Agreement shall mean a reference to the Agreement as amended by this Second Amendment.

4. Except as described herein, all other terms and conditions of the Agreement, including the portions of the Easement Area and the corresponding temporary work spaces that did not change, shall remain in full force and effect and Grantor and Grantee hereby ratify, confirm, and approve same.

5. Grantor and Grantee agree that the Agreement, as hereby amended, shall continue to be legal, binding, valid and enforceable in accordance with its terms. The parties further agree that the Agreement shall not be further amended except as provided and permitted under the Agreement.

6. THE AGREEMENT, AS AMENDED HEREBY, REPRESENTS THE ENTIRE EXPRESSION OF THE PARTIES WITH RESPECT TO THE SUBJECT MATTER HEREOF ON THE DATE THIS SECOND AMENDMENT IS EXECUTED. THE AGREEMENT, AS AMENDED HEREBY, MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES.

7. All the terms, provisions, covenants, obligations, indemnities, representations, warranties and conditions of this Second Amendment shall be covenants running with the land and shall inure to the benefit of and be binding upon, and shall be enforceable by, the parties hereto and their respective successors and assigns.

8. This Second Amendment may be executed in multiple counterparts with each separate counterpart consisting of a valid and binding agreement. Each of the undersigned agree that their respective signature pages and acknowledgements may be removed from their respective counterpart and attached to a single original of this Second Amendment. For purposes of this Second Amendment, facsimile or .pdf copies of signature pages shall be deemed originals.

*[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK  
SIGNATURE PAGES FOLLOW]*

IN WITNESS WHEREOF, the undersigned have executed this instrument on the dates of the respective acknowledgments annexed hereto, but effective as of the Effective Date described herein.

**GRANTOR:**

Print: DANIEL J. FISCHER

Sign: *Daniel J. Fischer*

ACKNOWLEDGEMENT

STATE OF <sup>ND</sup>~~MONTANA~~ §  
COUNTY OF *Slope* §  
§

This instrument was acknowledged before me on this 15 day of July, 2021, by **Daniel J. Fischer.**

*Margaret Sonsalla*  
Notary Public

(SEAL)

My Commission Expires: 5-21-2022



IN WITNESS WHEREOF, the undersigned have executed this instrument on the dates of the respective acknowledgments annexed hereto, but effective as of the Effective Date described herein.

**GRANTOR:**

Print: JOANNE I. FISCHER

Sign: Joanne I. Fischer

ACKNOWLEDGEMENT

STATE OF MONTANA §

COUNTY OF Golden §

This instrument was acknowledged before me on this 15 day of July, 2021, by **Joanne I. Fischer.**

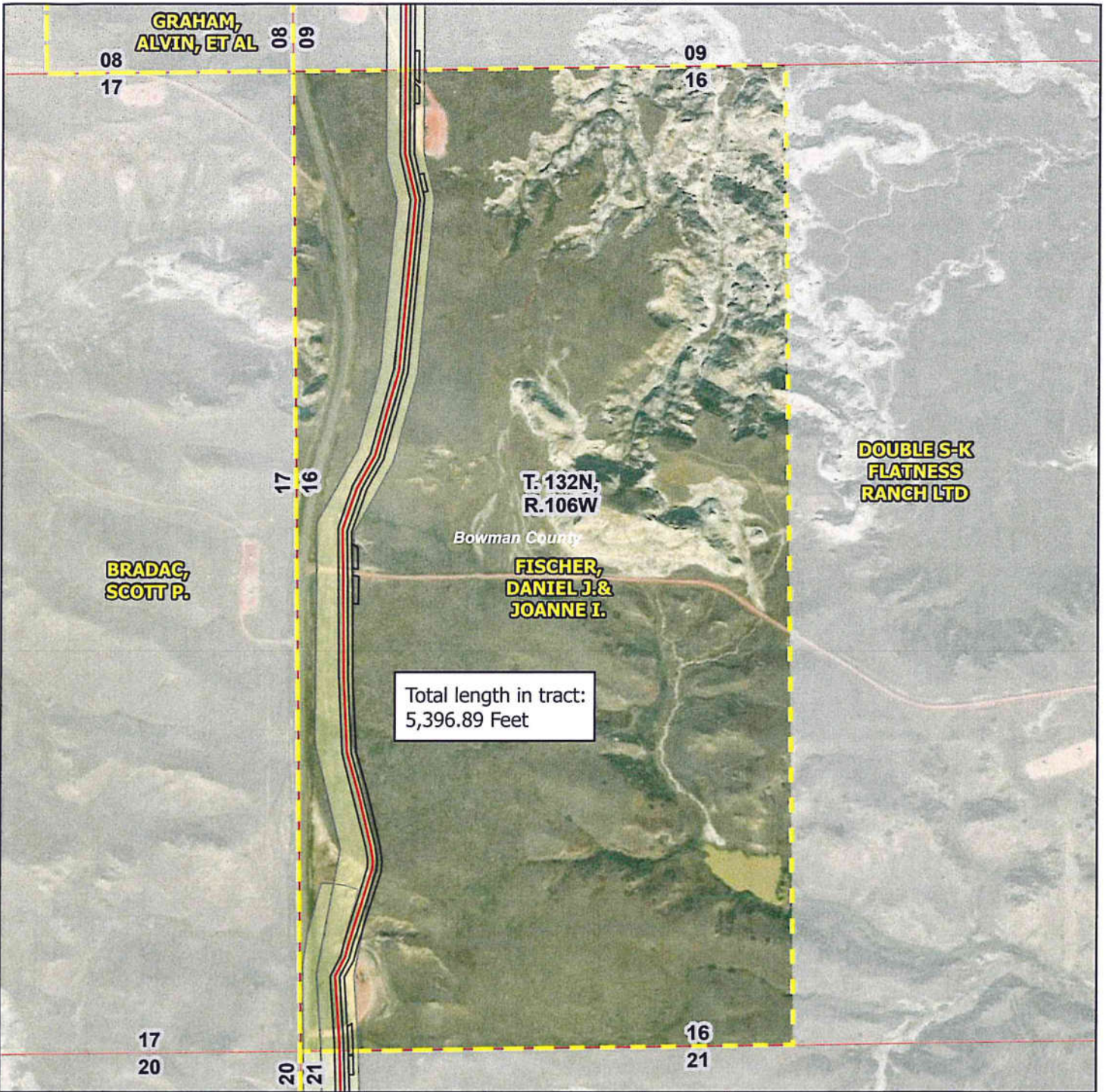
Margaret Sonsalla  
Notary Public

(SEAL)

My Commission Expires: 5-21-2022

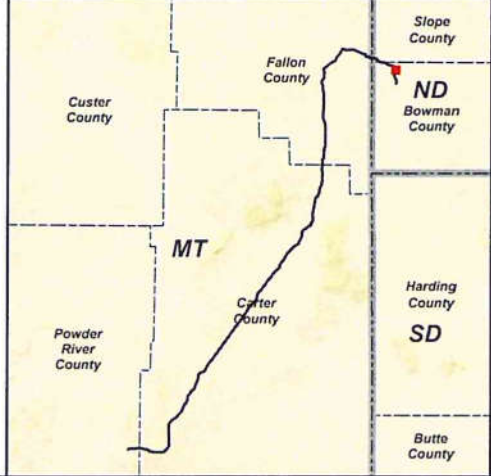






**CHSU - Proposed Reroute**

- Project Centerline
- Construction ROW
- Current Survey Corridor
- Tract Boundary
- County Boundary
- Township Boundary (PLSS)
- Section Boundary (PLSS)



**Denbury**

**Cedar Hills South Unit Lateral Project**  
 Proposed Project Change:  
 Fischer Property Reroute  
 Page 1 of 1

Coordinate System:  
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 Datum: North American 1983  
 Projection: Transverse Mercator  
 Page units: Foot US  
 Imagery Source: USA NAIP (USDA)

Meters

Feet

1:9,375

Date: 7/12/2021