Listed Exhibit: 15

DAPL, South Dakota
Gray & Pape, Inc.
Geoarchaeological Assessment Scope of Work

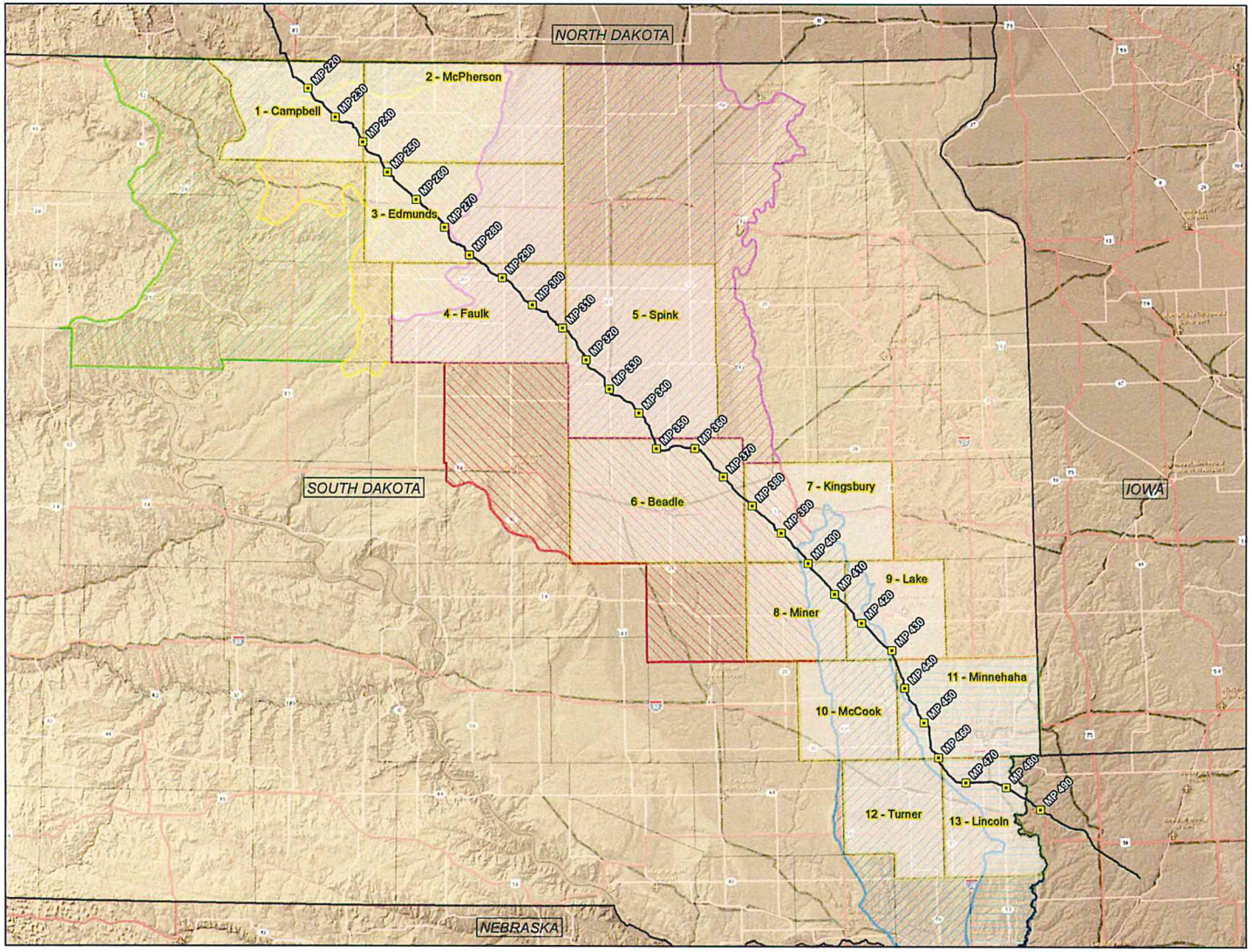
Introduction

As part of the Level III intensive cultural resources survey for the Dakota Access Pipeline Project (DAPL)(Figure 1), Gray and Pape have included methods designed to identify any potentially deeply buried cultural deposits. Deeply buried cultural deposits are those that are buried deeper than 0.50 to 1.0 meters (m) below the current ground surface. As such they are difficult to identify by conventional archaeological surface or near surface investigations. Since the DAPL Project crosses a dynamic landscape, the potential exists that deeply buried cultural materials are present. The object of the geoarchaeological investigation portion of this overall study is to first identify landscape or landforms with the potential to hold deeply buried cultural deposits and, second, to ascertain if those landforms do contain deeply buried cultural materials.

To identify areas with the potential to contain deeply buried deposits, a desktop assessment was used to construct a model for identifying areas to be investigated in the field. This geoarchaeological investigation followed the procedures outlined by Artz (2011). Artz (2011: 44–45) categorizes buried site potential of landforms as High, Medium, and Low:

> **High Potential**: Given to landforms created in low-energy depositional circumstances that have strata that are both thick enough to contain stratigraphically separated cultural deposits and that are capable of having preserved such deposits in primary context.
>
> **Medium Potential**: Landforms that are capable of preserving buried cultural deposits, by may have been altered by high-energy or erosional processes.
>
> **Low Potential**: Landforms composed of sediments that may be either too old or too young to contain cultural deposits or that may have formed in high-energy depositional environments that were not conducive for either habitation or site preservation.

Using these criteria, a number of different sources were consulted to undertake the desktop assessment, including but not limited to: quarternary geology maps, soil surveys, and aerial and topographic mapping. These sources were used to identify sedimentary environments and any landforms they might contain that could have either high or medium potential landforms such as: dunes, alluvial terraces and fans, loess and sand sheets, lip loess, and beach ridges. The geomorphic desktop assessment identified 49 areas with high or moderate potential for buried cultural resources. Once identified, these Deep Testing Locations (DTL) were numbered sequentially by the county. Not all counties crossed by the DAPL project area contained areas of high or medium probability.



DAPL Pipeline Project,
South Dakota

DAKOTA ACCESS, LLC

Figure 1

Once identified, these area were ground truthed by the survey team to provide a field assessment of the areas and determine if they had the potential to contain deeply buried cultural deposits. Field investigations provided an assessment of the landform and topographic setting. Hand augering was also conducted at the DTLs. The hand auger tests provided subsurface information on the landform. Data gathered included a description of the deposits, such as depth of overall low-energy sedimentary deposits, presence of intact strata, and the presence of buried paleosols (buried A horizons). If the field investigation confirmed the DTL to have high or medium potential, they were recommended for further geoarchaeological investigation or avoidance.

The field investigations identified nine locations with a high potential for buried deposits. Two the locations were avoided by route modifications and will be avoided by construction. Four locations at the James River in Beadle County, Pearl Creek in Beadle County, the Vermillion River in Lake County and the Big Sioux River in Lincoln County, will include horizontal directional drilling (HDD). The depth of the HDD will avoid strata identified to contain the potential for buried cultural deposits and no further investigation of these areas is warranted. The remaining three locations at Campbell 6 (Spring Creek), Faulk 2 (Snake Creek), and Beadle 11 (Foster Creek), are recommended for further geoarchaeological investigations and described in more detail below.

Project Construction

The typical construction workspace (i.e., the temporary ROW) for the pipeline will be 38.1-m wide but may range from 25.9 m wide up to 61 m in width to accommodate environmental and engineering constraints. The construction corridor will be divided into a spoil side, where fill from the trench is stored, and a working side, where vehicles will travel and where pipe will be placed prior to lowering it into the trench. The typical ROW split will be 15 m on the spoil side and 23 m on the working side. Dakota Access will retain a permanent ROW of 15 m centered on the pipeline during operation of the new facilities.

Ground disturbance will consist of blading and trenching. Staked construction corridors will be cleared of vegetation with heavy machinery. The corridors may also be bladed by bulldozers to remove topsoil and to prepare a relatively even surface for vehicular traffic, pipeline placement, and welding. Disturbances associated with corridor clearing and preparation is usually restricted to the uppermost 0.3 m. Deeper cuts may be made on the steep side-slopes and at drainage crossings. It is likely, however, that efforts will be made to minimize corridor blading, except in areas where blading is necessary to ensure the safety of project personnel. Most gently sloping areas will simply have vegetation cut at ground level, so that vegetation roots can serve to stabilize the soil. Pipeline trenches will be excavated by trenching machines or trackhoes. Generally, the trench will be excavated to a sufficient depth to allow for a minimum of 0.9 m of cover over the pipe as required by federal laws, regulations and industry best practices. Typically the bottom width of the trench will be cut at least 0.3 m wider than the width of the pipe. The width at the top of the trench will vary to allow the side slopes to be adapted to local conditions at the time of construction for safety and compliance

Geoarchaeological Methods

The primarily method of preforming the geoarchaeological investigation of the three locations will be through backhoe trenching performed by a qualified geoarchaeologist (e.g. possessing the educational background and skill sets outlined in (Artz 2011:65)). In adherence to the excavation safety standards established by OSHA in 29CFR 1926.650, 1926.651, and 1926.652 and state equivalents for deep excavation safety, a competent person, having completed competency training (29CFR1926 Subpart P), will be on site to help establish the proper trench width necessary to ensure safe excavation methods, based on soil type and conditions. Trenches will be between 3.0 and 5.0 meters in length. Trenches will generally be judgmentally placed within the project workspace, in order to best test the landform(s) present; however, spacing between trenches should be not exceed 50 m. Trench orientation will also be determined in the field, as dictated by orientation of the landforms(s) being tested. The location of each excavated trench will be recorded using a GPS unit.

Trenching equipment should include a back-hoe/track-hoe with a minimum 1.2 m wide flat blade bucket. Under the supervision of a Gray & Pape geoarchaeologist, natural soil horizons will be removed in 5-10 centimeters (cm) thick slices, until either a depth between 1.5 m is reached, the water table is breached, or basal sediment deposits are encountered. If, at 1.5 m, neither the water table nor basal sediments have been encountered, the depth of the trench will be extended another meter, after first excavating one meter wide benches on either side of the trench. Before such expansion occurs, trench walls will be cleaned first using heavy equipment and then by hand tools, such as shovels and trowels, and then examined for evidence of cultural materials or features.

If cultural materials are identified within trenches, between two and four 1- by 1-m test units will be excavated to gather additional information regarding the nature and density of cultural materials. Test units will be excavated in 10-cm arbitrary levels within natural soil horizons. All soils will be screened through 0.64 cm mesh hardware cloth to ensure complete artifact recovery. If features are identified, the top of the feature will be exposed and a scaled drawing of the planview will be completed. One half of the feature will be excavated and all sediments screened through ¼-in mesh hardware cloth. A profile will be drawn of the unexcavated half of the feature. The remainder of the feature will be excavated. Sediments will be excavated in 10-cm arbitrary levels within natural or cultural deposits. One 10-liter soil sample will be recovered to process later for the presence of macro- and mirco-botanical specimens. Artifacts recovered will be bagged by provenience. Artifacts will be washed, or otherwise cleaned as required by their state of preservation, and then sorted, labeled, processed by material and type, and placed in appropriately labeled plastic bags. The analysis of artifacts will include a quantitative summary by type, form, age, and function, if possible.

After the investigation for cultural materials or features is complete the trench profiles will be described. Each trench will be documented through the use of detailed descriptions and photographs. Sample trench profiles will be drawn to document soil and sediment stratigraphic sequencing and archaeological deposits (if present). In the event that the trench is expanded and taken deeper, the newly exposed lower extent of the trench will be document in the same manner as described above. Trench depth will not exceed this second depth with mechanical excavation

halting at 2.5 m below surface. Before a trench is entered a viable egress, in the form of steps or a ramp on at least one end of the trench will created.

Overall description of the trench profiles will follow set standards in accordance with USDA terminology discussed in the Soil Survey Manual (Soil Survey Staff 1993). Such descriptions of the soil profiles will be done while the profile was in a moistened condition and included: soil horizon, Munsell color, texture, mottling, soil structure, ped coatings, sedimentary structure and bedding characteristics, moisture consistency, boundary type, and inclusions such as organic material or artifacts.

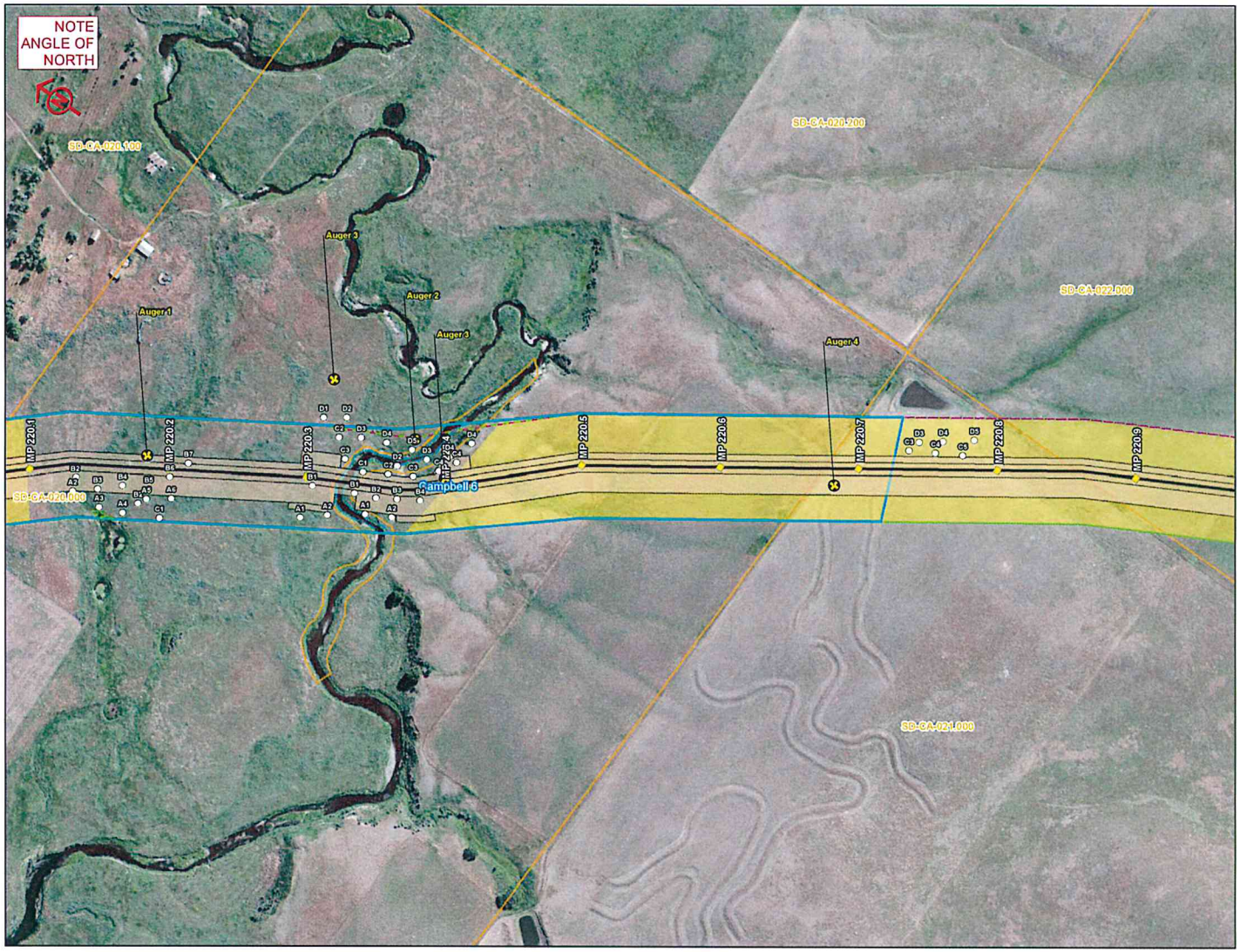
Radiocarbon samples, if present, will be collected from exposed trench walls. If it is determined that radiocarbon dating will aid in the interpretation of either the natural or cultural deposits, samples will be selected from those collected in the field to preforms such analysis.

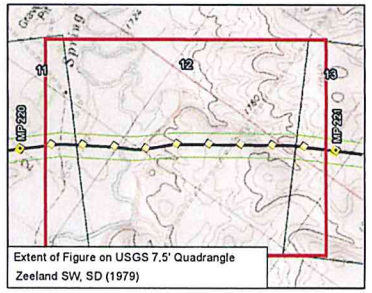
If basal sedimentary deposits are not reached at the trench's maximum depth of 2.5 m below ground surface, hand auger cores, consisting of a 8-cm bucket auger, will be employed to test through the base of the trench in order to better ascertain the extent of deposits that make up the landforms being tested. This testing will extend until either basal sedimentary deposits, the auger hole collapses, or the auger refuses. Auger tests will be recorded according to the depth of sediment or soil changes, the descriptions of soils encountered (including color, texture, structure, and inclusions), and any other information that would be likely to better indicate the particular landform's depositional history. In addition to testing below trenches, auger test may also be used to explore the horizontal extent of deposits of interest within the project workspace.

DTL Summary

Spring Creek (Campbell County DTL 6)

The project crosses Spring Creek in Campbell County in Section 2, Township 127 North, Range 76 West (Figure 2). Initial hand auger testing encountered a buried surface horizon (Ab horizon) in Auger 1. This auger was excavated to a depth of 154 m and exhibited the following sequence: A-B1-B2-B3-Ab-B4-C1-C2. The A horizon was 30 cm thick and consisted of a very dark grayish brown (10YR 3/2) sandy loam. The B1 horizon was identified at a depth of 30 to 40 cm and consisted of a very dark grayish brown (10YR 3/2) silt with 3% gravels. The B2 horizon was identified between 40 and 58 cm and consisted of a dark grayish brown (10YR 4/2) blocky silt with 2% gravels. The B3 horizon was identified between 58 and 68 cm and consisted of a grayish brown (10YR 5/2) silt loam. A buried soil horizon (Ab) was identified between 68 and 98 cm and consisted of a darky grayish brown (10YR 3/2) silty clay loam. The B 4 horizon was found between 98 and 117 cm and consisted of a dark grayish brown (10YR 3/2) silty sandy loam mixed with pale brown (10YR 6/3). The B5 horizon was found between 117 and 132 cm and consisted of brown (7.5YR 4/3) silty clay loam. The C1 horizon was found between 132 and 143 cm and consisted of a dark brown (7.5YR 3/3) mixed with light brownish gray (10YR 6/2) sandy loam. The C2 horizon occurred between 143 and 154 cm and consisted of a light yellowish brown medium coarse sand with gravel.





LEGEND

- Current Centerline
- Tenth
- Footprint
- Property Tract
- Field-Confirmed Stream
- Field-Confirmed Wetland
- Survey Corridor - Current
- Survey Corridor - Outdated

CRM Survey Coverage

- Surface Inspection
- Shovel Test - Negative
- Auger Test
- Deep Testing Location

0 100 200 Meters

0 300 600 Feet

Detail of Survey Coverage
Spring Creek Crossing
Campbell County, South Dakota

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Figure 2

Review of aerial and topographic maps indicate this location is likely a landform composed of alluvium and could be either an alluvial terrace or an alluvial fan. The buried surface was encountered at 68 and 98 cm below ground surface, while basal deposits were likely reached at approximately 1.5 m below ground surface. If this is a fan, the sand and gravels could be part of the overall fan stratigraphy and not true basal deposits. Therefore, testing should aim for depths that exceed 1.5 m to verify the findings of the initial testing. This can be accomplished initially by hand auguring through the base of the trench to determine if subsequent trench expansion (stepped benched) is need to reach greater depths.

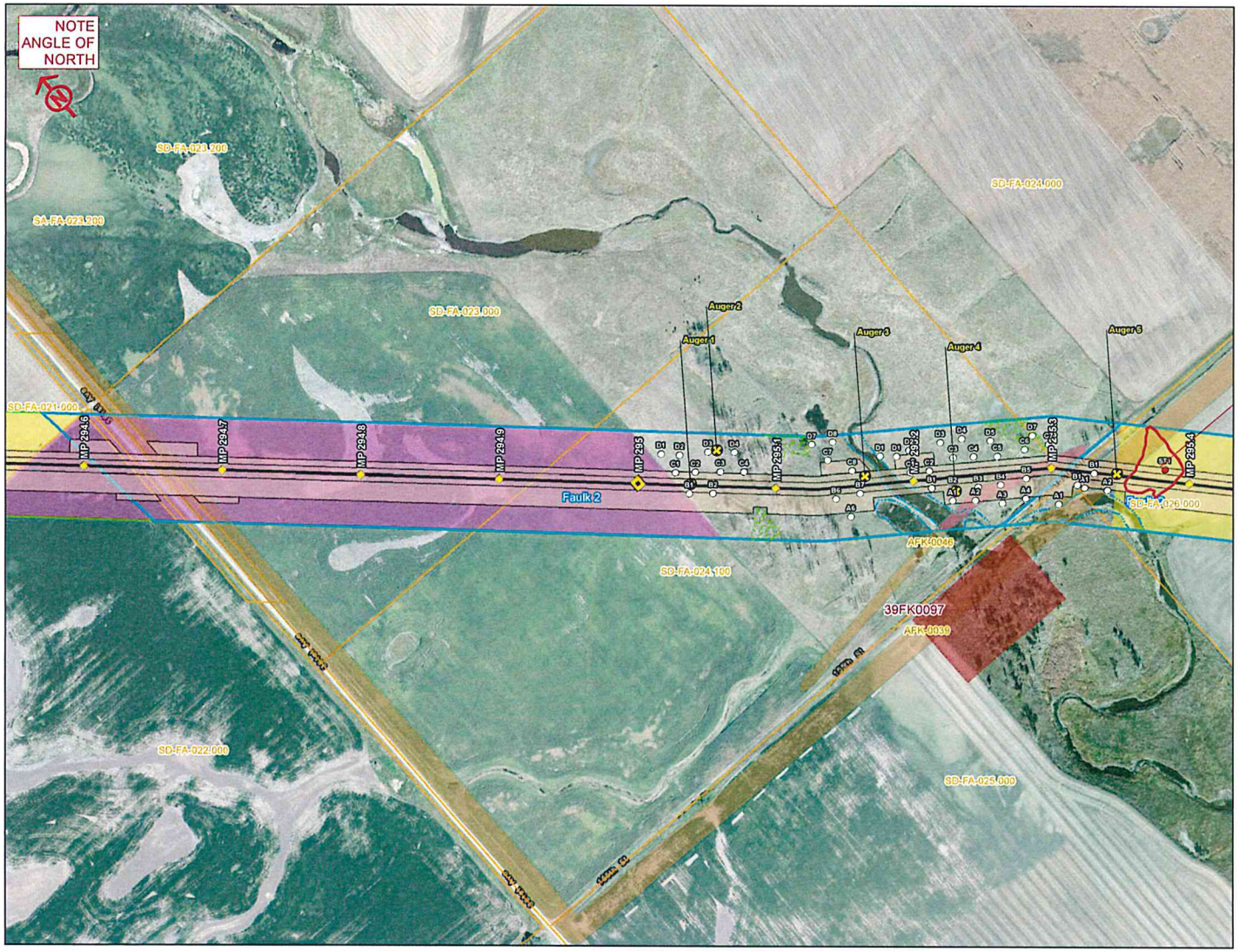
Additional detailed geoarchaeological testing and assessment of this location will be performed primarily through a series of backhoe excavated trenches. Up to four trenches will be employed, generally in a single transect running northwest from the northern bank of Spring Creek, approximately 100 m. If further buried surface horizons are encountered in these trenches, select augers test will be performed laterally away from such trenches to better ascertain the horizontal extent of the deposits, up to a total of 8 auger tests.

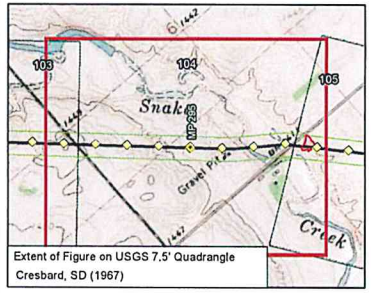
Snake Creek (Faulk County DTL 2)

The project crosses Snake Creek in Faulk County in Section 6, Township 119 North, Range 67 West (Figure 3). Initial hand auger testing encountered a buried surface horizon (Ab horizon) in Auger 3. Auger 3 was excavated to a depth of 176 cm and exhibited the following sequence: A-Bw-Bt1-Ab-Bt2-Bt3-Bt4-Bt4-C. The A horizon was 42 cm thick and consisted of a very dark grayish brown (10YR 3/2) silt loam. The Bw horizon was found between 42 and 65 cm and consisted of a dark brown (10YR 3/3) silt loam. The Bt1 horizon was found between 65 and 90 cm and consisted of a brown (10YR 4/3) silty clay loam. A buried soil horizon (Ab) was found between 90 and 105 cm and consisted of a very dark brown (10YR 2/2) clay loam. The Bt2 horizon was found between 105 and 126 cm and consisted of a dark brown (7.5YR 3/4) silty clay loam. The Bt3 horizon was found between 126 and 150 cm and consisted of a brown (10YR 4/3) sandy clay loam. The Bt4 horizon was found between 150 and 160 cm and consisted of a dark brown (10YR 3/3) silty clay loam. The Bt5 horizon was found between 160 and 167 cm and consisted of a brown (10YR 4/3) silty clay loam. The C1 horizon was found between 167 and 176 cm and consisted of a brown (7.5YR 4/3) sandy loam.

Review of aerial and topographic maps indicate this location is likely a landform composed of alluvium, either an alluvial terrace or a floodplain. The buried surface was encountered at 90 and 105 cm below ground surface, while basal deposits were likely reached at approximately 1.8 m below ground surface. Therefore, testing should aim for depths that do not exceed 2.0 m to verify the findings of the initial testing. This will likely require a trench with benched steps to allow depth below 1.5 m to be reached.

Additional detailed geoarchaeological testing and assessment of this location will be performed primarily through a series of backhoe excavated trenches. Two trenches will be excavated on either side of Snake Creek. If further buried surface horizons are encountered in these trenches, select augers test will be performed laterally away from such trenches to better ascertain the horizontal extent of the deposits, up to a total of 4 auger tests.





Extent of Figure on USGS 7.5' Quadrangle
Cresbard, SD (1967)

LEGEND

- Current Centerline
- Milepost
- Tenth
- Footprint
- Property Tract
- Previously Recorded Archaeological Site
- Previously Surveyed Area
- Field-Confirmed Stream
- Field-Confirmed Wetland
- Survey Corridor - Current
- Survey Corridor - Outdated
- Newly Identified Site

CRM Survey Coverage

- CRM Survey Pending
- Surface Inspection
- Shovel Test - Negative
- Shovel Test - Positive
- Auger Test
- Deep Testing Location

0 100 200 Meters
0 300 600 Feet

Detail of Survey Coverage, Snake Creek Crossing Faulk County, South Dakota

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Figure 3

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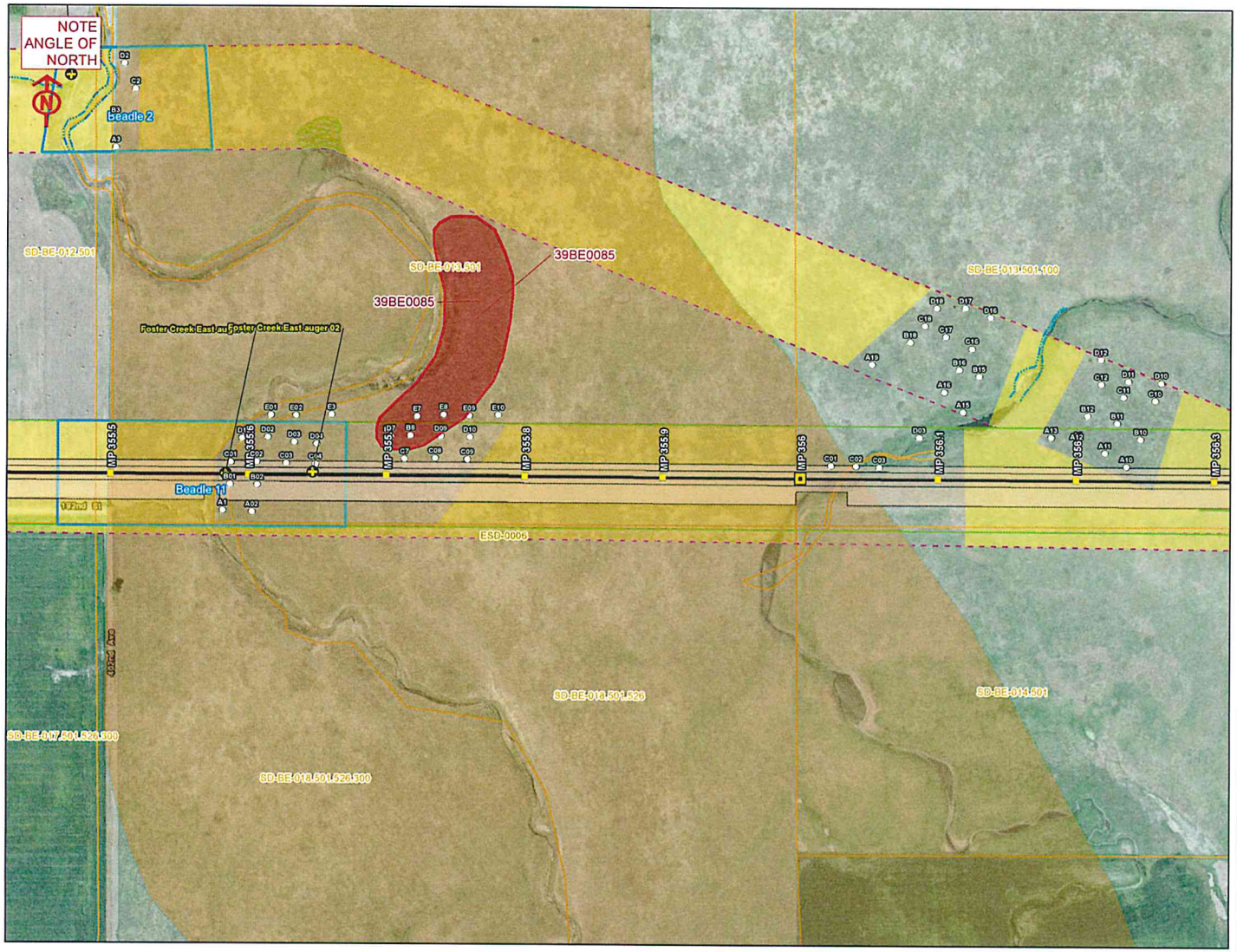
Created in ArcGIS 10.2.1 for Gray & Pape Project 14-66302

Foster Creek (Beadle County DTL 11)

The project crosses Foster Creek in Beadle County in Section 9, Township 113 North, Range 61 West (Figure 4). A paleosol or buried soil horizon was noted along the cutbank of Foster Creek, near the location of previously recorded site 39BE0085. Site 39BE0085 was reported in 1980 during the James River Survey (Haberman 1980). The edge of the site was observed in a cutbank on the west side of Foster Creek. Buried lithics and bone were observed in the cutbank. The artifacts were described as a biface midsection, utilized flakes, flakes and a shell fragment. The depth of the deposits was not provided and the size of the site was noted as unknown. The southern edge of the site boundary was located in the mainline corridor.

Review of aerial and topographic maps indicate this location is likely a landform composed of alluvium, either an alluvial terrace or a floodplain. A buried surface was noted in the cutbank of Foster Creek within the upper meter of sediments. Two augers were excavated nearby Foster Creek to depths between 152 and 155 cm below ground surface. Soils in Auger 1 were quite dark and ranged between black (10Y 2/1) and dark brown (10YR 3/3) with some grayish brown and dark yellowish brown mottles. Soils consisted of silty sand, sandy clay, and clayey sand. While archaeologists were unable to re-identify the buried soil horizon, low-energy sediments were identified, suggesting the potential for buried soil deposits. Testing should aim for depths that do not exceed 2.0 m to re-identify the paleosol identified in the creek cutbank and to reach the base of alluvial sediments. This will likely require a trench with bench steps to allow depth below 1.5 m to be reached.

Additional detailed geoarchaeological testing and assessment of this location will be performed primarily through a series of backhoe excavated trenches. Three trenches will be excavated on the east side of Foster Creek. If further buried surface horizons are encountered in these trenches, select augers test will be performed laterally away from such trenches to better ascertain the horizontal extent of the deposits, up to a total of 4 auger tests.



References Cited

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2011 *A Geoarcaheological Overview of South Dakota and Preliminary Guidelines for Identifying and Evaluating Buried Archaeological Sites*. Office of the State Archaeologist. The University of Iowa. Iowa City.

Haberman, Thomas W.

1980 *Volume II, James River Survey, Spink and Beadle Counties, South Dakota*. CIS No. 68b (68-II). Copies available from South Dakota State Historical Society, Archaeological Research Center, Rapid City, South Dakota.