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**Research Design for the TransCanada Keystone Pipeline
Cultural Resource Inventory
in North Dakota**

Prepared for:
ENSR International
Fort Collins, Colorado

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Introduction

TransCanada intends to construct a 30-inch crude oil pipeline (Keystone Pipeline) that crosses portions of eastern North Dakota. As planned the pipeline will have a 125' wide construction corridor with extra work space needed at road and stream crossings. It will enter North Dakota from Canada at the Pembina/Cavalier County line and travel south approximately 215 miles through Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, and Sargent counties in North Dakota (Figure 1 and Appendix B). Leaving North Dakota, the proposed pipeline will enter South Dakota near the Brown/ Marshall County line. The Department of State is the lead Federal agency and the lead State agency is the Public Service Commission.

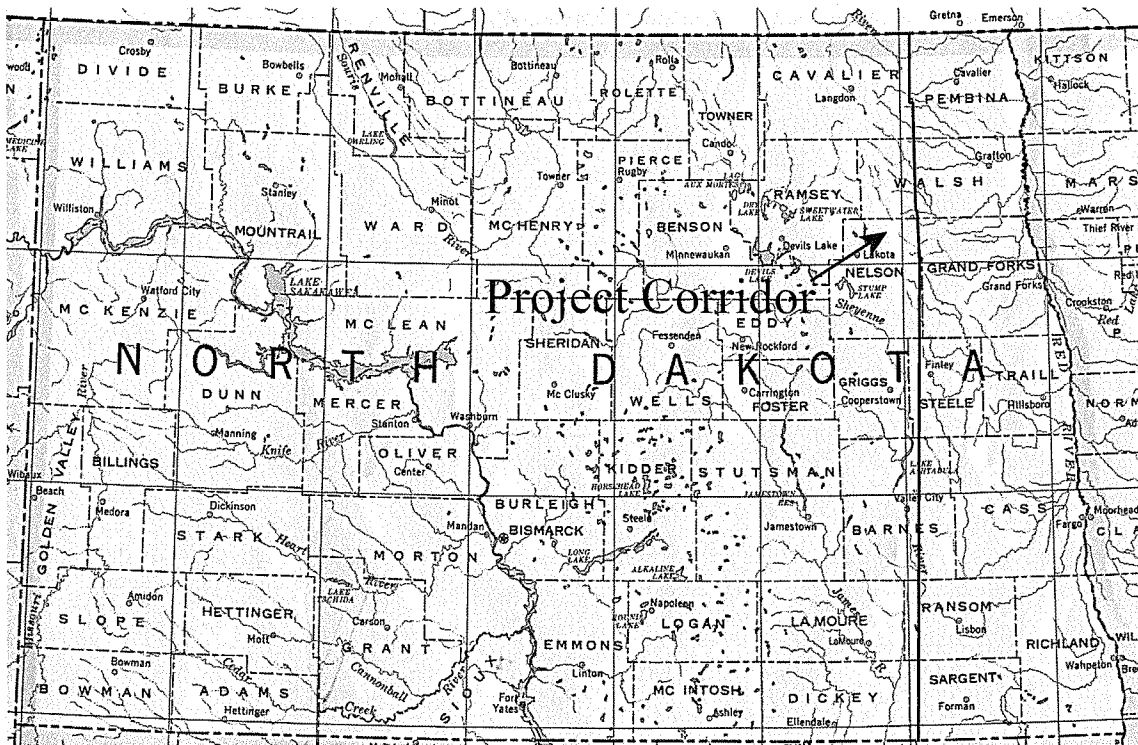


Figure 1: Pipeline route through North Dakota.

This document presents a research design for a cultural resource inventory, to be conducted in 2006, of the proposed pipeline corridor in North Dakota. The ideas and concepts underlying this document are the results of informal discussions with Paul Picha, Chief Archaeologist of the North Dakota State Historic Preservation Office (NDSHPO), as well as ENSR International. This research design is intended only for the inventory phase of the pipeline project. Issues such as open trench monitoring, site evaluative testing, and mitigation/data recovery will be addressed following the

inventory. The exact scopes for monitoring or evaluative testing will be determined following the inventory phase in consultation with ENSR staff, NDSHPO archaeologists, and North Dakota Public Service Commission (PSC) officials.

A sampling strategy comprising five levels of investigation is proposed for this project. Two of these levels apply to the entire project route through North Dakota, while the remaining three apply only to selected areas. The first, a literature and files search of an area one-mile wide centered on the proposed pipeline route, is already complete, and the results of this search are presented in this document. The second level of investigation is a reconnaissance of the proposed route by a geomorphologist. The geomorphological investigation will identify areas that may need closer investigation, and conversely areas that are not archaeologically sensitive. The third level is a Class III intensive pedestrian survey of selected segments of the proposed pipeline route in areas with high potential to contain archaeological resources. The fourth level is a reconnaissance inventory of approximately 41 miles of the proposed pipeline corridor, to be conducted by Metcalf Archaeological Consultants, Inc. (MAC) archaeologist(s). The fifth level of investigation will be no survey, which will apply only to areas determined (by the results of the previous four types of investigations) to have essentially no potential for the presence of cultural resources.

Approximately 49.5 miles of the proposed pipeline route have been selected for intensive (Class III) inventory. These areas have been identified based on the results of the literature search (Class I Files Search) of the State Historical Society of North Dakota's site and manuscript files and the various land forms crossed by or adjacent to the corridor. The intensive pedestrian inventory will consist of close inspection of a 300' wide corridor centered on the proposed pipeline centerline. This inventory will include areas recognized to be archaeologically sensitive, including river crossings, and areas with documented sites.

The reconnaissance survey will consist of intensive inventory of areas to be determined in the field based on the drive-by inspection and the geomorphological investigation. These areas will include small individual areas along glacial lake beach lines, fan alluvium, playa lakes, etc. This additional inventory will almost certainly total less than ten miles and may total five or fewer miles. Approximately 41 miles will be subject to a Class II reconnaissance level (drive-by) inventory. Most of this length will be covered during the geomorphological survey and some may not need re-walking. Metcalf Archaeological Consultants, Inc. will coordinate the Class II reconnaissance inventory with the geomorphological survey since each may provide useful information and observations to the other. The segments to be covered by the pedestrian inventory are depicted on the project maps in Appendix B.

Environmental Setting

The pipeline corridor crosses three major geographic areas. The northern approximately 50 miles of corridor is along the western edge of glacial Lake Agassiz. South of the Lake Agassiz basin, the proposed pipeline corridor crosses land that rises somewhat and enters drift prairie which is cut by the Sheyenne River. The southern approximately 20 miles is rolling uplands with numerous glacial moraines.

The Pembina Escarpment marks the west edge of Lake Agassiz and much of the pipeline length follows along the escarpment base. The land forms in this area include interbeaches, deltas, and beach lines along former levels of Lake Agassiz. The area is generally flat to gently rolling and slopes down to the east. The escarpment, immediately to the west, is a prominent feature and its proximity to the corridor would tend to make the area somewhat sensitive regarding the presence of archaeological sites. The escarpment provides an excellent overview of the area and provides diverse ecological micro-niches, both attributes demonstrated to have positively influenced area use by past populations. The route through the Pembina Escarpment and Lake Agassiz basin is cut by a number of stream and river valleys with their associated terraces and minor breaks. The larger streams crossed by the corridor in this area include, from north to south, the Pembina River, the Tongue River, three branches (North, Middle, and South) of the Park River, and the Forest River. Previous investigations along the rivers have demonstrated the presence of numerous sites along their reaches.

The drift prairie, over which the central length crosses, consists of gently rolling uplands dotted with pothole lakes and sloughs but generally lacking in much topographic relief. The Sheyenne River with its breaks and terraces provides the major relief in the area and it was extensively utilized by past populations. Approximately 80 miles of the corridor roughly parallels the Sheyenne and lies one to three miles from the valley rim, crossing the river near its bend to the east. The proposed pipeline route crosses the Sheyenne River in an area where a number of prehistoric sites, including burial mounds, have been documented.

The southern approximately 20 miles of the proposed route crosses rolling terrain with a number of prominent glacial moraines. The area overlooks the bed of former glacial Lake Dakota to the west and southwest. Prominent rises such as the moraines in Sargent County are known to be land forms favored by past Native populations and the area has moderate to high potential for the presence of prehistoric sites.

Results of Class I Files Search

Cultural Resources

The search of the State Historical Society of North Dakota's site files revealed 117 cultural resources documented within the one mile wide project corridor (Table 1). Included among these are 16 prehistoric sites, seven historic sites, five multi-component sites (prehistoric and historic), 25 architectural sites, 31 historic/architectural site leads, 24 prehistoric site leads, and nine isolated finds within the one mile wide project corridor (Appendix A and B). The majority of the site leads were not plotted on the project maps. Most of the site leads were either filed under the Regional Environmental Assessment Program (REAP) or were compiled from the 1884 Andreas' atlas of North Dakota and lack information that would allow precise mapping of their locations.

Table 1: Cultural Resources by County								
County	Prehistoric	Isolate	Site Lead Prehistoric	Historic	Archit.	Site Lead Historic	Multi-Com	Total
Barnes	2	1	4		4	12		23
Cavalier	1						1	2
Nelson		1	4		4			9
Pembina				2	3	6	2	13
Ransom	11	6	6	3	4	3	2	35
Sargent	2		10		2	5		19
Steele		1			2			3
Walsh				2	6	5		13
Total	16	9	24	7	25	31	5	117

Isolate = Isolated Find Archit = Architectural Multi-Com = Multi-Component

The mapped sites along the Pembina escarpment edge (in Cavalier and Pembina counties) include seven historic/architectural sites, one prehistoric site and three multi-component (prehistoric and historic) sites. Two of the multi-component sites and the prehistoric site are located on the Pembina River valley rim and overlook that river. There are also four historic site leads, for which there were no maps, three for post offices and the fourth filed simply as historic. The lack of sites, especially prehistoric sites along this stretch, probably reflects the dearth of investigations in the area rather than the actual lack of sites.

The greatest concentration of sites related to this project are in the vicinity of the Sheyenne River crossing and are located on the rim of the Sheyenne River valley, on the river's terraces, or on the valley floor. There are 24 mapped cultural resources here including nine historic/architectural sites, 11 mapped prehistoric sites/site leads, two multi-component sites, and two prehistoric isolated finds. In addition there are two historic and two prehistoric site leads recorded but which lack adequate maps. Twenty-four percent of all the cultural resources (and 69% of the prehistoric sites) recorded during this files search lie within the ten mile stretch where the pipeline corridor either crosses the river or lies immediately adjacent to it.

In Sargent County four cultural resources with adequate maps are on file. Two are farmsteads and two are prehistoric sites. In addition there are ten prehistoric site leads and five historic site leads which lack adequate information to allow for mapping. The number of site leads attests to this area's potential to contain numerous sites.

Previous Investigations

Class III inventories range in size from the very small (2-5 acres) to the large (sometimes over 100 miles in length and covering hundreds of acres). The number and size of inventories in a particular county is driven by that county's resources; the presence of energy (coal and oil), water (dams, bridges, and reservoirs), and gravel resources often result in many, often large inventories. Counties lacking some of these resources will have fewer and sometimes smaller inventories. The absence of any quantity of known sites in a particular county cannot be ascribed solely to a lack of prehistoric or historic use and occupation or geologic forces that may have obliterated such evidence, but is at least in part a function of the lack of inventory work.

Along the corridor length there have been 70 investigations conducted within ½ mile of the project corridor (Appendices A and B). Of these, 13 were conducted prior to 1980 and generally are not considered to meet current inventory or testing standards. Of the remaining 57 investigations, one is a literature search, three were inventories, conducted only at a reconnaissance level, two were testing programs, two were surveys of churches, and one was a bridge survey. The church and bridge surveys were architectural surveys and did not include investigations of any other site type. Although the three reconnaissance surveys may have adequately documented the sites within their survey areas, only 49 inventories have been conducted with results that can be confidently relied upon. The following discussion of the inventories focuses on the three most archaeologically sensitive geographic areas, the glacial Lake Agassiz shore/Pembina Escarpment, the Sheyenne River crossing, and the prominent moraine system in Sargent County. Previous investigations in North Dakota have demonstrated that much of the more featureless drift prairie has low potential for prehistoric sites.

The Pembina Escarpment and adjacent areas have 25 investigations within three counties: Cavalier, Pembina and Walsh. Note that five of the inventories are multi-county and are therefore listed in multiple counties in the following summaries.

Pembina County has 12 investigations on file within ½ mile of the proposed corridor, one Class I records search, one reconnaissance level inventory, one architectural inventory of churches, one inventory conducted prior to 1980, and eight other investigations meeting current standards. Four of the inventories also extended into Nelson and/or Walsh counties.

Nelson County has nine investigations on file including two conducted prior to 1980, one church survey, and six inventories meeting current standards, three of which are multi-county surveys extending into Pembina County and a fourth extending into Walsh County.

Walsh County has 11 investigations on file including, two architectural inventories (one of bridges and one of churches), two that were conducted prior to 1980, and seven inventories that meet current standards. Four of the seven extend into Pembina and/or Nelson County.

The Sheyenne River and areas adjacent has been the most extensively investigated stretch crossed by the pipeline corridor. Between Barnes and Ransom counties there are 36 investigations on record, 20 in Barnes County and 22 in Ransom County, six of which include areas in both counties. Of the 36, seven were conducted prior to 1980, one was evaluative testing, and two were architectural inventories (one of churches and one of bridges). There are 26 inventories on file that meet current standards.

Sargent County, the southern-most county in the current project area, has seven inventories on file. One was conducted prior to 1980, leaving six inventories that meet current standards. This part of North Dakota is likely poorly studied and additional inventories, such as those proposed for this project, will undoubtedly result in more sites being documented.

Inventory Recommendations

The proposed pipeline route, documented sites, previous inventories, and areas recommended for pedestrian inventory are depicted on USGS 7.5' (1:24,000) quadrangle maps in Appendix B. In addition to the areas marked for inventory, all railroads crossed by the line will be recorded and site forms or site form updates will be filed. We recommend Class III inventory of 49.5 miles of the 215-mile-long corridor. In addition we recommend that another 41 miles be covered at a Class II reconnaissance level. The Class III and Class II inventory lengths are provided by county in the following table (Table 2). Note that as planned the pipeline will enter North Dakota from Canada along the Pembina-Cavalier county line and after approximately seven miles shifts east out of Cavalier County. The two counties are not split up in the table.

County	Miles	Class III Miles	Class III %	Class II Miles	Class II %
Pembina/Cavalier	32.5	15.5	48	8.0	25
Walsh	24.0	5.5	23	9.0	38
Nelson	36.0	4.0	11	9.0	25
Steele	30.0	0.0	0	0.0	0
Barnes	42.5	7.5	18	0.0	0
Ransom	25.0	8	32	7.0	28
Sargent	25.0	9	36	8.0	32
Total	215.0	49.5	23	41	19

Field Methods

Geomorphological Investigations initially will consist of a study of existing geologic and soil maps and a review of the Class I files search (site locations) followed by a reconnaissance drive-by of the entire pipeline route in order to determine areas that may have the potential for the presence of archaeological sites, particularly deeply buried sites. At that time specific areas will be identified where more detailed investigations, including intensive pedestrian survey and soil coring are recommended. Areas with low potential for the presence of archaeological sites will also be identified with no further investigations in those areas. The geomorphological investigations will focus on river crossings and their deeply buried Holocene sediments but may also identify more topographically subtle areas with moderate to high site potential such as glacial lake beach lines, alluvial fans, pothole lakes etc.

Pedestrian Survey will be the primary focus of the cultural resource inventory of the 300' wide pipeline corridor. Portions of the mapped pipeline corridor, chosen in consultation with NDSHPO archaeologists and PSC representatives, based on the results of the literature search and geomorphological investigations, will be inspected employing parallel zig-zag pedestrian transects spaced at no more than 20 meter intervals. When an artifact or feature is encountered the pedestrian transects will be collapsed to approximately five meter intervals in the area of the find and the area will be closely scrutinized to determine the nature of the find. Temporally diagnostic artifacts such as hafted stone tools and rim sherds may be collected for further analysis and will, at a minimum be sketched and photographed in the field. Site boundaries and center points will be recorded with a Trimble GeoExplorer (or equivalent) GPS unit. The Class III inventory, site recording, and documentation will conform to the standards and guidelines of the NDSHPO and those of any involved Federal agencies.

Shovel probes will augment the pedestrian survey in areas where surface visibility is inadequate and/or where cultural material is suspected to be within one meter of the ground surface. Shovel probes will be approximately 40 cm in diameter and will be excavated into pre-Holocene soils or one meter deep, whichever comes first. The geomorphological investigations will aid in determining the depth of Holocene soils. Probes will generally be spaced at ten meter intervals in multiple transects. All fill from the probes will be screened through 1/4" mesh. Probe locations will be recorded with a Trimble GeoExplorer (or equivalent) GPS unit.

Reconnaissance for this project is defined as a windshield/drive-by survey of the corridor when it, and topography, are clearly visible from the road. In cases where the area is forested or the distance from the road (generally over 1/4 mile) is too great to clearly see the corridor, it will be walked with a single transect (one archaeologist). Specific areas that appear to be sensitive, e.g., locally prominent rises, areas near good sources of potable water etc., will be marked on maps and then intensively inspected. Metcalf Archaeological Consultants, Inc. will coordinate the Class II reconnaissance inventory with the geomorphological survey since each may provide useful information and observations to the other.

Native American Consultation







Metcalf Archaeological Consultants, Inc. will first contact all involved Federal agencies and confirm that we should initiate consultation on their behalf (Federal agencies are restricted in delegating that responsibility). For agencies that do request the proponent (TransCanada) initiate consultation, SHPOs and any appropriate Federal agencies will be contacted and requested to provide information about appropriate tribes to contact along with individual contact names and addresses for those tribes. We will also research appropriate literature, including the *Smithsonian Handbook of North American Indians*, to help determine tribes that may have an interest in the project area. We will contact those tribes by mail (certified, return requested) inviting them to be consulting parties under Section 106 of the National Historic Preservation Act for the project. Cheryl Kulas, Executive Director, of the Indian Affairs Commission will also be contacted. We will address any responses from tribes as they are received, in consultation with ENSR, SHPO.




Appendix A
Files Search Results

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**Appendix B
Project Corridor Maps**

Map Key

-  Architectural Site
-  Multi-Component Site
-  Post-Contact Archaeological Site
-  Pre-Contact Archaeological Site
-  Isolated Find
-  Previous Survey

-  Pipeline ROW
-  Class II (Reconnaissance Survey)
-  Class III (Intensive) Survey