Appendix A

Corridor Level Assessment

WAIVER OF PROCEDURES AND TIME SCHEDULES

AND

APPLICATION TO

NORTH DAKOTA PUBLIC SERVICE COMMISSION

FOR

CERTIFICATE OF CORRIDOR COMPATIBILITY

FOR THE WILLISTON TO TIOGA TRANSMISSION PROJECT

(CASE NUMBER PU-07-671)

by

BASIN ELECTRIC POWER COOPERATIVE

July 2009

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A. Project Description

A.1 Type

Electrical power transmission improvements are needed in northwestern North Dakota to meet increasing load demands. A systems study concluded that the transmission of additional power to the Tioga, North Dakota area was the most effective way of meeting future demands. As a result, Basin Electric Power Cooperative (BEPC) proposes to construct and operate a new 230-kilovolt (kV) transmission line to meet existing and future electric power requirements in northwestern North Dakota. The new transmission line would transfer power from the Western Area Power Administration (Western) Williston Interconnect Substation, near Williston, North Dakota, to a substation near Tioga, which is owned and operated by Montana-Dakota Utilities (MDU). The proposed transmission line, in addition to other system improvements in northwestern North Dakota, would allow for an additional 130 megawatts (MW) of load in northwestern North Dakota.

The proposed Project would be located in Williams and Mountrail counties in northwestern North Dakota. The Williston Interconnect Substation is located in Williams County, approximately 3.6 miles southwest of the City of Williston. The Tioga Substation also is located in Mountrail County, approximately 2 miles northeast of the City of Tioga. A 6-mile-wide corridor was identified from the Williston Interconnect Substation to the Tioga Substation in accordance with North Dakota Public Service Commission (PSC) requirements, as illustrated in **Exhibit A-1**.

The proposed 61.1-mile-long transmission line would be constructed using steel single-pole structures within a 125-foot-wide right-of-way (ROW). Minor modifications would be made to the existing Williston Interconnect Substation and Tioga Substation. Changes to the Williston Substation are part of an existing substation expansion being done by Western.

A.2 Product

Electricity would be transmitted via the proposed transmission line between the existing Williston and Tioga Substations.

A.3 Size and Design

Section A.3.4, Transmission Line Specifications, and Section A.3.5, Other Facilities, provide general information regarding the size and design of the proposed transmission line. Proposed construction procedures also are described in the following sections.

The proposed 230-kV, single-circuit transmission line would be constructed using steel single-pole self supporting structures within a 125-foot-wide ROW. Western would be responsible for modifying the 230-kV bay at Williston Interconnect Substation to accommodate interconnection of the new transmission line.

A.3.1 ROW and Construction Procedures

A.3.1.1 Permits, Pre-construction Surveys, and Geotechnical Analyses

Various studies must be completed and permits acquired before construction begins, including completion of the EA process, Western authorization, cultural resource (section 106 National Historic Preservation Act [NHPA]) clearance and biological surveys.

BEPC and/or its contractors would perform initial transmission line survey work, consisting of survey control, route centerline location, profile surveys, and access surveys prior to construction. These surveys would likely be conducted concurrently with other pre-construction tasks.

Geotechnical analyses would be conducted at transmission line angle points and other locations to determine engineering requirements for structures. A truck-mounted auger would be transported to each site to drill a small-diameter borehole. Cuttings from each borehole would be evaluated to determine soil characteristics. Geotechnical analyses would be conducted after harvest to minimize impacts to local agricultural activities. Land disturbance would be confined to a relatively small area needed for site access and equipment operations. Geotechnical locations would require an area totaling approximately 400 square feet (ft^2) in addition to an access trail.

A.3.1.2 ROW Access and Construction Preparation

Crews would gain access from public roads and section line trails as well as within the transmission line ROW for constructing and maintaining the line. Access for line construction would be by truck travel within the ROW; structure sites located along section lines would be accessed directly from section line roads and trails, where possible. New graded surface access roads are not anticipated. Existing roads and trails would be left in comparable or better condition than what existed before construction. Gates would be installed where fences cross the ROW and locks would be installed at the landowner's request. Gates not in use would be closed but not locked, unless requested by the landowner.

Three temporary material staging and equipment laydown areas, each averaging approximately 4 acres, would be used. If additional areas are needed, appropriate biological and cultural resource surveys would be conducted before disturbance. Staging areas would be returned to their previous condition when work is completed.

Tree and brush removal in the ROW is anticipated to be minimal because the Project area consists largely of cultivated cropland and rangeland, and because woodlands and shelterbelts were avoided during the routing process. The ROW would only be cleared if the trees and/or shrubs present interfere with construction activities or the safe, reliable operation of the transmission line. Trees would be cut at ground level to provide access within the ROW and to allow vehicle access. Stumps and roots would remain in the ROW unless the landowner requests otherwise. Disposal of cut trees and brush would be consistent with the landowner's wishes and applicable State waste management rules. Trees would be replaced at a 2:1 ratio.

A.3.1.3 Transmission Structure Site Preparation

Transmission structure site clearing would be minimal. The Project area and locations along the proposed route are relatively flat and the need for structure site leveling is expected to be minimal. It is anticipated that at some structure locations, blading of small areas (up to 40 feet by 40 feet for crane and manlift landings) may be required to level the ground surface to allow the safe operation of the equipment. Blading would be confined to the ROW and accomplished using bulldozers or front-end loaders. Soil removed during leveling would be stockpiled and replaced following construction; special emphasis would be placed on salvaging topsoil to be used for reclamation. The ground would be re-graded to the approximate original contour and revegetated (rangeland) or tilled (cropland) when the work has been completed. Temporary disturbance to soils would be mitigated by returning the sites to grazing and farming.

A.3.1.4 Borehole Excavation

Crews would use a truck-mounted auger or tracked vehicle equipped with a power auger to drill holes for the structures at appropriate locations along the ROW. The total disturbance at each structure location would vary depending on terrain and equipment; however, all disturbances would be confined to the ROW.

Borings for the pole holes would have an average diameter of 5 feet and an average depth of 20 feet. The single-pole structure would be lowered by crane into boreholes and the annulus around the pole would be backfilled with crushed rock. Surplus material (expected to total approximately 15 cubic yards at each tangent structure site) would be spread around the bases of structures or hauled to an off-site location (i.e., area landfills) for disposal, in accordance with landowner wishes.

Approximately 32 structures would require reinforced concrete foundations; these require a 6-foot-diameter boring to an average depth of 20 feet. Large volumes of soil would be disposed of at local landfills. Landfills typically need additional fill as cover for waste material. Disposal of waste material, including concrete spoil, would be in compliance with applicable regulations and would not include placement in wetlands or aquatic sites. Site-specific borehole diameters, depth, and the use of reinforced concrete foundations would be determined during geotechnical engineering evaluations.

A.3.1.5 Structure Assembly and Erection

Structure components (i.e., structure segments, davit arms, hardware, insulators, and related materials) would be trucked to the structure work site locations and assembled. Davit arms, insulators, and other appurtenances would be attached to the poles while on the ground at each structure location, within the 125-foot-wide ROW. Erection crews would place the lower portion of the structure in the boreholes (directly imbedded) or on reinforced foundations (i.e., self-supporting angle point and dead-end structures) using cranes or large boom trucks. The structure would then be plumbed and the holes backfilled, as previously described. Both sections would then be bolted together. Approximately 12,500 square feet would be temporarily disturbed at each structure site due to borehole excavation, structure laydown, and assembly.

A.3.1.6 Conductor Stringing and Tensioning

Following structure construction, crews would install the conductors and an optical groundwire (OPGW) using conductor stringing sheave blocks and line pulling and tensioning equipment. The conductor and OPGW are kept under tension during the stringing process to keep the conductor clear of energized circuits, the ground, and obstacles that could damage the conductor and OPGW surfaces.

Pulling and tensioning sites are typically located at 10,000-foot intervals and at angle point structures. Sites along tangent structures are located within the construction ROW; those at angle points typically are located partially outside of the normal 125-foot-wide ROW. Each site typically requires two 37,500-ft^2 (0.9 acre) temporary use areas. Stringing equipment generally consists of wire pullers, tensioners, conductor reels, OPGW reels, and sheave blocks. About 10,000 feet of conductors and OPGW could be installed for each pull. After the conductors and OPGW are pulled for a section of line, they are tightened or sagged to the required design tension in compliance with the National Electrical Safety Code (NESC). The process would be repeated until the OPGW and conductors are pulled through all sheaves. Conductor stringing also would require access to each structure for securing the conductor to the insulators or OPGW to each structure, once final line sag is established.

For public safety and property protection, temporary wooden guard structures would be used to provide temporary support when stringing conductors and OPGW across existing power lines, roads, highways, railroads, and other linear obstacles. The structures would be removed when stringing is complete; the pole borings would be backfilled and the temporary support structure sites would be reclaimed. All temporary wooden guard structures would be installed within the transmission line ROW.

A.3.1.7 Structure Site Access and Traffic

Access would involve the use of existing roads where available, and temporary overland access trails, where necessary. No new access roads would be constructed for the Project. The use of temporary overland access trails between structure sites would not require new construction, but would result in temporary disturbance. Occasional access from section line trails could result in temporary disturbance along the ROW; however, such disturbance would be limited to a 12-foot-wide track (approximately) and only long enough to provide vehicle access directly to structure locations. Some additional access disturbance could occur if truck or vehicle turnarounds are needed; however, the use of structure work sites would be encouraged.

Existing access roads (typically paved or maintained with a gravel or aggregate base) would be used in their original condition to the extent possible, or with minor road blading or other improvements as agreed upon by the county or township. BEPC would be responsible for repairing any damage caused by construction equipment movement and would return existing roads to original or better condition following construction.

BEPC would not be responsible for maintaining roads following construction. BEPC would not be responsible for maintaining fences and gates, following construction and restoration; however, access gates that would be installed during construction would be left in place following construction.

Line segments that are parallel to section lines that do not have established roadways would utilize the 66-foot-wide public ROW to the extent practicable. A 33-foot-long, 12-foot-wide temporary access point would temporarily disturb 0.009 acre. If blading or other minor improvements are needed (in localized areas) to ensure the safe movement of heavy equipment, such improvements would remain in place following construction and such areas would be restored to their original contour.

BEPC would restore disturbed areas to pre-construction conditions, to the extent practicable, and would not be responsible for the long-term maintenance of such section line trails. Any fences, gates, or similar features that would be removed during construction would be replaced or rebuilt. Gates and fences that would be installed during construction would be left in place for future use.

A.3.1.8 Temporary Overland Access

Temporary overland access would be used in areas without existing roads. Access through cultivated fields would be, to the extent practicable, during the non-growing season. Landowners would be compensated for loss of crops caused by construction activities. Gates may be installed to facilitate access to some structures and the ROW. The gates would be left in place, following construction activities. Permanent access roads to the ROW or structures would not be maintained.

Temporary access routes would result in a 12-foot-wide temporary disturbance and compaction of vegetation and soils. Natural vegetation along these temporary access routes would recover quickly, primarily because grading would not be required. Temporary overland access routes would be subject to the same cultural resource and vegetation surveys as the other ROWs. Landowners would be compensated for access routes where public access does not exist.

A.3.2 Reclamation

Following construction, disturbed areas would be graded and/or re-sloped to their approximate original contours to minimize erosion and visual alteration. In grassland or pasture areas, disturbed areas would be reseeded with native species. Cultivated land would be tilled and returned to production. Fences and gates damaged as a result of the Project would be repaired.

Rangeland from which vegetation has been removed, destroyed, or damaged would be reclaimed and revegetated. Reclamation activities, weather permitting, would be ongoing throughout construction and would be undertaken as soon as construction activities are completed in a particular area. Drainage structures and similar improvements would be removed from areas to be reclaimed, where appropriate, and the area would be revegetated using a native seed mixture, as recommended by the County Agricultural Extension Service or the Natural Resources Conservation Service (NRCS).

Ruts and scars from overland travel would be leveled to break up compacted soils and aid in returning areas to approximate original contours. Cultivated areas disturbed by overland travel would be leveled and tilled to break up compacted soils (if necessary) and returned to production.

The optimal timing for revegetation success would be spring or fall to coincide with seasonal rains. Mulching or netting may be required to protect seeded areas from erosion. Follow-up inspections would be carried out during the next growing season. Areas that did not become revegetated would be reseeded again, as necessary.

The reclamation procedures described above would be applied to disturbed areas including temporary access, staging areas, the transmission line ROW, and other areas disturbed by Project activities.

A.3.3 Construction Waste Management

Typical waste materials generated from construction activities include miscellaneous lumber and shipping materials used to protect equipment during transportation, paper products, soda cans, food-related materials, and sanitary waste. Waste from construction materials and rubbish from all construction areas would be collected, hauled away, and disposed of in an approved landfill. Sanitary waste would be disposed of through arrangements with local municipal sanitary waste treatment facilities. Hazardous waste would not be stored or located near the ROW or in proximity to waterways or drainages at any time before, during, or after construction.

Material staging areas and vehicle maintenance and refueling areas would not be located near waterways. If any of the material staging areas include vehicle and equipment refueling, or storage of petroleum products in excess of 1,320 gallons, a Spill Prevention, Control, and Countermeasures (SPCC) Plan would be developed. The SPCC Plan would address: 1) operating procedures to prevent spills; 2) control measures to prevent a spill from reaching navigable waters; and 3) countermeasures to contain, clean up, and mitigate the effects of a spill that reaches navigable waters. Additionally, spill containment and clean up materials (e.g., absorbent material, shovels) would be available at every work site. The materials would be used to contain and clean up oil and hydraulic spills that may result from equipment leaks. Workers would be trained in procedures to follow to contain and clean up released materials.

A.3.4 Transmission Line Specifications

The single-pole transmission line structures would range in height from approximately 95 to 120 feet and average 110 feet, depending on span distances between structures and area topography. The span between structures would range from 700 feet to 950 feet and average approximately 800 feet, depending on topography; taller structures could be used for crossing existing distribution and transmission lines or where unusual terrain exists. The single-pole frame structures would be designed to support three conductors and an OPGW. The OPGW would provide lightning suppression and fiber optic communications between the Williston and Tioga Substations for systems control. Tangent structures would be free-standing and directly imbedded into the soil. Angle structures (used where the transmission line changes direction) and dead-end structures (used to provide longitudinal stability along the length of the line) would be steel with concrete foundations. Guy wires would not be used.

Project construction and design would meet the requirements of the NESC for the Heavy Loading District, BEPC design criteria, and other applicable local or national building codes. The Heavy Loading District refers to those areas (including North Dakota) that are subject to severe ice and wind loading. **Table A-1** describes the typical physical design characteristics for the proposed transmission line, and a typical single-pole structure is illustrated in **Exhibit A-2**.

Minimum conductor clearance is measured at the point of greatest conductor sag and closest proximity to the ground. The proposed transmission line would be constructed with clearances that exceed standards set by the NESC. Minimum conductor height would be 26 feet over agricultural land, 28 feet over rural roads, and 31 feet over paved highways.

Table A-1 Transmission Line Characteristics

Design Component	Value
Voltage (kV)	230
Conductor diameter (inches)	1.345
ROW width (feet)	125
Typical span distances between structures (feet)	700-950
Average span (feet)	800
Maximum and minimum structure height (feet)	95-120
Average height of structures (feet)	110
Average number of structures (per mile)	6.6
Temporary disturbance per structure (square feet) (approximately 125-foot x 100-foot area)	12,500
Permanent disturbance per structure (acre) (approximately 3-foot diameter per structure leg)	<0.0002
Minimum conductor ground clearance to agricultural land at 100°C (feet)	26
Minimum conductor-ground clearance to rural roads at 100°C (feet)	28
Minimum conductor-ground clearance to paved highways at 100°C (feet)	31
Circuit configuration	Vertical

A.3.5 Other Facilities

A Supervisory Control and Data Acquisition (SCADA) system would interconnect the Williston Interconnect Substation and the Tioga Substation. Hard-wire system communications would utilize fiber optics within the OPGW between the two substations and microwave communications equipment would be installed for SCADA redundancy and to facilitate voice and data communications by field personnel. Thus, minimal modifications at the substations would be required.

A.3.6 Operation, Maintenance, and Abandonment

The following operation and maintenance activities would be performed throughout the life of the Project.

- BEPC's preventive maintenance program for the transmission line includes aerial and ground inspections. Aerial inspections would be conducted at least two times each year. Ground patrols would be conducted annually for the first 3 or 4 years, and less frequently thereafter. Climbing inspections of structures would be conducted on a 5-year cycle with every fifth structure inspected each year. Inspections and patrols would involve the use of vehicles in areas where there is suitable vehicle access.
- Maintenance activities would include repairing damaged conductors, inspecting and repairing structures, replacing damaged and broken insulators, and tightening hardware.
- BEPC would maintain any gates it installs or uses for access.

- BEPC would trim trees that pose a clearance or safety problem to the operation of the transmission line. Specific requirements of the National Electric Reliability Council would be followed. This activity would be completed in accordance with the landowner easement.

If the transmission line were to be abandoned or rebuilt, decommissioning and removal of structures, conductor, and ancillary equipment would be in accordance with applicable regulations in place at the time.

Treatment of vegetation within the ROW would include the selective removal or trimming of trees to prevent their contact with the transmission line conductors. Some trees would have to be removed if they are classified as "danger trees" (trees that are 20 feet in height or taller, which upon falling, would come within 10 feet of the structure or conductors). Disposal of cut trees and brush would be in a manner acceptable to the landowner and in accordance with applicable State waste management rules. The need for tree removal is expected to be minimal as areas with trees were intentionally avoided during detailed routing.

A.3.7 Time Schedule

Exhibit A-3 illustrates the time schedule for important permitting and construction phases of the proposed Project. Transmission line construction would take place over a 1-year period and would generally follow a sequential set of activities performed by crews proceeding along the length of the line. Activities that would impact nesting migratory bird species would be scheduled to avoid the nesting period (typically April 15 through July 15) to the extent practicable. However, some activities would coincide with the nesting period. Surveys would be carried out during the nesting period to determine if species are present. If species are found to be present, activities would be rescheduled to avoid disturbance to nesting birds.

Table A-2 lists construction activities. The proposed transmission line would take an estimated 7 months to construct. Construction activities associated with the Project are estimated to begin early 2010. It is anticipated that the transmission line would be in service by late 2010. The sequential nature of construction would minimize activities at any given work site.

Table A-2 Conventional Personnel, Equipment, and Time Requirements for Construction

Task	Number of Personnel	Equipment	Length of Time
Transmission Line Construction			
Structure site clearing and vegetation management	4–6	Pickups, all-terrain vehicles (ATVs)	1 month
Gate installation	3	Flatbed and pickup trucks	1 month
Structure assembly	6–8	Pickups, cranes, material trucks, rubber-tired crane, 4x4 pickups	4 months
Hole excavation	2–3	Rotary drilling rigs, backhoes, pickups, rubber-tired digging equipment, ATVs, portable compressors	4 months
Structure erection	6–8	Rubber-tired cranes, boom trucks, 4x4 pickups	5 months
Ground wire and conductor stringing	16–20	Pickups, manlifts/boom trucks, hydraulic tensioning machines, reel trailers	3 months
Cleanup	4	Pickups, dump trucks, flatbed trucks	Duration of Project
Concrete foundations	10	Excavators, concrete trucks, skid steer	1–2 months
Equipment installation	10	Cranes and trucks	3–4 months

B. Studies

B.1 Environmental Reports/Application

Western is the federal lead agency for an EA that is being completed for the proposed Project and a federal power-marketing agency within the United States (U.S.) Department of Energy (DOE). Western sells and delivers federal electric power to municipalities, public utilities, federal and state agencies, and Native American tribes in 15 western and central states. As a federal agency, Western is required to comply with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.), and regulations set forth under Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500 – 1508) and DOE regulations 10 CFR Part 1021–1022.

BEPC is the Project applicant (also referred to as Project sponsor or Project proponent) and would be responsible for construction, operation, maintenance, and decommissioning of the proposed Project. BEPC is one of the largest electric generation and transmission cooperatives in the U.S. and provides power to more than 120-member rural electric systems in nine states. BEPC's northern service area within North Dakota, South Dakota, and Montana is illustrated in **Exhibit B-1**.

The NEPA requires federal agencies to make a series of evaluations and decisions that anticipate adverse effects on environmental resources and that a reasonable range of Project alternatives identify potential direct, indirect, and cumulative environmental impacts. If impacts cannot be fully avoided, mitigation measures are to be recommended to reduce the severity of impacts.

Based on Western's NEPA implementation policies, an EA would be required for the proposed Williston to Tioga Transmission Project to determine if the proposed Project could potentially cause significant environmental impacts. Letters were mailed to potentially affected landowners, Native American tribes, interested individuals, non-governmental organizations, interest groups, and agencies on March 5, 2008. Public scoping meetings were held in Williston and Tioga on March 17 and 18, 2008, respectively. Public input was used to refine transmission line alignments and to identify potential impacts and mitigation measures.

Specific regulations require Western to coordinate and consult with federal, state, and local agencies about the potential of the proposed Project and alternatives to affect sensitive resources. The coordination and consultation must occur in a timely manner and are required before any final decisions are made. Issues related to agency consultation may include biological resources, cultural resources, socioeconomics, land, and water management. Biological resource consultations are completed to address potential impacts to sensitive species or habitats, as required by Section 7 of the Endangered Species Act (ESA). Cultural resource consultations are completed to address potential impacts to important cultural or archaeological sites, as required under Section 106 of the NHPA. The federal, state, and local agencies that Western contacted are provided in **Appendix A**, Notification. **Appendix B**, Agency Correspondence, is a compilation of correspondence letters in response to the notification letters submitted by Western.

In compliance with NEPA, as amended, Western initiated government-to-government consultation for BEPC's proposed Project by sending letters and Project maps on March 8, 2008, to the following tribal groups: Eastern Shoshone Tribe, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Lakota Nation, Rosebud Sioux Tribe, Cheyenne River Sioux Tribe, Standing Rock Sioux, Crow Tribe, Fort Peck Tribes, and Three Affiliated Tribes. The letters were sent to inform the tribal groups of the proposed undertaking and to solicit comments concerning traditional cultural properties (TCPs) or places of cultural and religious importance. At this time, no TCPs or places of cultural and religious importance have been identified within the proposed corridor by the contacted tribal groups.

B.2 Affected Environment

B.2.1 Jurisdictions, Land Use, and Agricultural Practices

The proposed corridor is located in Williams and Mountrail counties in northwestern North Dakota and oriented to avoid exclusion and avoidance areas to the extent practicable, including population centers of Williston, Ray, and Tioga. Lands operated by the U.S. Fish and Wildlife Service (USFWS) Wetland Management Districts (WMD), including Lostwood WMD and Crosby WMD, were avoided. Resources that could not be fully avoided in the proposed corridor included rural residences and water resources.

Agriculture and livestock production dominates approximately 91 percent of land uses within the proposed corridor. Land uses within the proposed corridor were classified from U.S. Geological Services (USGS)-State of North Dakota data as open water, cropland and planted herbaceous perennials, pasture/rangeland, shrubland and barren land, wetland and riverine, woodlands, and developed lands (USGS 2004).

The proposed corridor includes 199,468.5 acres of land, of which 90.8 percent are classified as cropland, pasture, and planted herbaceous perennials. The land use composition of the proposed corridor is provided in **Table B-1**.

Table B-1 Land Use Categories within the Proposed Corridor

Land Use Category	Acres	Percent
Cultivated crops	127,794.3	64.1
Pasture/hay	719.1	0.4
Grassland/herbaceous	52,398.3	26.3
Shrub/scrub	3,131.9	1.6
Woodlands	442.2	0.2
Wetlands/riverine	3,524.8	1.8
Open water	543.7	0.3
Developed	10,832.0	5.4
Barren land	82.2	0.0
Total	**199,468.5**	**100.0**

B.2.2 Physiography, Topography, Soils, Geology, and Minerals

The proposed corridor includes gently rolling terrain that is crossed by well-defined streams and drainages. Elevation within the proposed corridor ranges from 1,877 feet above mean sea level (amsl) in the vicinity of Williston to 2,244 feet amsl near Tioga. Land within the central portion of the proposed corridor is largely drained by the Little Muddy Creek and its tributaries, which flow in a southerly direction to the Missouri River and Lake Sakakawea.

B.2.2.1 Physiography

The proposed transmission line is located in the Great Plains physiographic province (Fenneman 1928). In western North Dakota, the Great Plains is divided into two major sections, the Glaciated Missouri Plateau and the Unglaciated Missouri Plateau. The Missouri Plateau is essentially a dissected plateau characterized by badlands, buttes and mesas, and exhumed mountain ranges such as the Black Hills. The proposed corridor is in the Glaciated Missouri Plateau. The glaciated area is generally of low relief compared to the unglaciated area, which has more variety of landforms (Trimble 1980). The Glaciated Missouri Plateau is covered by

glacial deposits, but the boundary between the glaciated and non-glaciated sections is not distinct because the glacial deposits thin gradually.

B.2.2.2 Topography

The western part of the study area is located in bottomlands of the Missouri River, while much of the area is located on fairly level uplands. In the eastern part of the study area near Tioga, North Dakota, the topography consists of undulating hills (Freers 1970). Project area elevation ranges from 1,877 feet amsl in the Williston area to 2,244 feet amsl near Tioga.

B.2.2.3 Geology

The surficial deposits are primarily composed of Quaternary alluvium and colluvium and glacial till (Freers 1970). The alluvium occurs in the Muddy Creek alluvial valley. Glacial material consists of a variety of moraine deposits including ground moraines, dead ice moraines, and lake deposits. The surficial material is largely composed of sand, gravel, and clay.

The bedrock geology consists of Tertiary Bullion Creek and Sentinel Butte Formations of the Fort Union Group (Bluemle 1988). These formations are largely composed of claystone, siltstone, sandstone, and lignite. There are very few exposures of bedrock in the proposed corridor, it being mostly covered by glacially derived surficial deposits (Freers 1970). The bedrock is mainly exposed along the Missouri River south of the proposed corridor.

The proposed corridor is located in the Williston Basin, a major structural basin that covers northeastern Montana, most of North Dakota, and northwestern South Dakota (Peterson and McCary 1987). The Williston Basin also extends north into Saskatchewan and Manitoba in southern Canada. The basin contains about 15,000 feet of Paleozoic through Tertiary sedimentary rock. The center of the basin is located south of the proposed corridor in McKenzie County and the rocks dip gently to the south. The major structural feature in the proposed corridor is the Nessen Anticline, a north-south trending structure located in eastern Williams County, but actually extends for 75 miles south from the Canadian border to eastern McKenzie County (Gerhard et al. 1987). North-south trending fault zones paralleling the Nessen Anticline have been mapped in the deeper bedrock in Williams County, but do not extend up to the surface.

B.2.2.4 Mineral Resources

The major energy mineral resources in the proposed corridor are oil, natural gas, and lignite (Freers 1970). Important non-fuel mineral resources are sand and gravel, clay, salt (halite), and scoria. The Williston Basin is a major oil and gas producing basin. The first commercial oil well in North Dakota was drilled in Williams County on the Nessen Anticline in 1951, about 7 miles south of Tioga (Freers 1970). In the U.S. portion of the basin, total production since 1951 to the end of 2007 was approximately 2.5 billion barrels of oil and 470 billion cubic feet of gas (Burke 2006; Montana Board of Oil and Gas 2007; North Dakota Industrial Commission 2007; South Dakota Oil and Gas Section 2008). Oil production decline in the 1990s has been offset in recent years by technological advances that have resulted in increased production from the Bakken Formation, which has an estimated mean technically recoverable resource of 3.7 billion barrels of oil and 1.9 trillion cubic feet of gas (USGS 2008a). **Table B-2** lists the well fields and number of wells that are within and immediately adjacent to the proposed corridor.

The proposed Project is located in the Fort Union Coal region (Averitt 1972). Coal in the Fort Union Formation is generally lignite in the proposed corridor. The Fort Union Group in Williams County contains at least six important lignite beds that have been mined (Freers 1970). Lignite was mined in Williams County before modern surface mining methods were employed; lignite was mined by room-and-pillar underground methods. Because the overburden was thin (often less than 50 feet), underground voids would collapse to the surface creating sinkhole-type subsidence, fissures, and unstable ground conditions. Several abandoned lignite mines are present in the study area and an active underground mine reclamation is underway west of Williston, North Dakota (North Dakota Abandoned Mine Lands Reclamation Division 2006; Dodd 2008a). The abandoned lignite mine sites of record are listed on **Table B-3** and are located within the proposed corridor.

Table B-2 Oil and Gas Well Summary[1,2]

Field Name	Number of Wells	Well Type	Status
Beaver Lodge	21	Oil and Gas, Salt Water Disposal, Water Injection	Active, Plugged and Abandoned, Inactive, and Permit now Canceled
Cow Creek	2	Oil and Gas	Active
East Fork	1	Oil and Gas	Plugged and Abandoned
Pleasant Valley	3	Oil and Gas	Dry Hole, Plugged and Abandoned, and Inactive
Ray	1	Gas Condensate	Active
Tioga	1	Oil and Gas	Plugged and Abandoned
Wildcat	7	Oil and Gas	Dry Hole, Permit now Canceled

[1] Source: North Dakota Industrial Commission, Oil and Gas Division (2008).

[2] Due to the large number of wells within the proposed corridor, only wells within 0.25 mile of the proposed route were included in this table.

Table B-3 Abandoned Lignite Mines within the Proposed Corridor[1]

Name	Location	Dates of Operation
Eby	T154N, R101W, SW ¼ 5	Not known
Peterson	T154N, R101W, SW ¼ 5	1921-1926
Head	T154N, R101W, SE ¼ 7	1910-1916(?)
Union	T154N, R101W, SW ¼ 8	1920s
Nichols	T154N, R101W, SW ¼ NE ¼ 8	1920s

[1] Source: North Dakota Abandoned Mine Lands Reclamation Division (2006).

The mines listed were all operated and abandoned over 70 years ago. The abandoned mine database (North Dakota Abandoned Mine Lands Reclamation Division 2006) indicates that the exact locations and extent of abandoned mine workings were not determined with certainty, but are approximate locations based on the best historical information available. Sinkholes have developed in areas located in Sections 5 and 7, Township 154 North (T154N), Range 101 West (R101W), and the North Dakota Mined Land Reclamation Division (Dodd 2008b) has documented the precise locations and, in some cases, dimensions of the sinkholes. The information is provided in **Table B-4**.

Aggregate (i.e., sand and gravel) production is from localized deposits in floodplains or glacial deposits. Approximately 59 gravel pits are located within the proposed corridor (Freers 1970; National Atlas 2008).

Table B-4 Sinkhole Data

Section, Township, Range	Latitude/Longitude	Length (feet)	Width (feet)	Diameter (feet)	Depth (feet)
5, T154N, R101W	48.18342/103.71127	25	18	ND	8
	near previous coordinates	ND	ND	6	3
	48.18453/103.71169	ND	ND	30	6
	near previous coordinates	ND	ND	15	4
7, T154N, R101W	48.17616/103.71737	20	15	ND	6
	48.17629/103.71711	12	4	ND	4
	48.17573/103.7177	ND	ND	12	4
	48.17584 103.71559	ND	ND	6	3

ND = No Data Available.

Source: Dodd (2008b).

Clay deposits suitable for ceramic production are present in the Fort Union Group formations, but none are being mined currently. Another commodity is “scoria” or “clinker” that occurs when lignite beds burn and bake the shale and claystone strata next to the coal. Scoria is used for road surfacing and oil well location surfacing material (Freers 1970). No scoria pits are located in the proposed corridor.

B.2.2.5 Seismicity

There are three major phenomena associated with seismic hazards: faults, seismicity, and ground motion. The following describes the potential for seismic hazard occurrence in the proposed corridor.

Faults are dislocations whereby blocks of earth material on opposite sides of the faults have moved in relation to one another. Rapid slippage of blocks of earth past each other can cause energy to be released, resulting in an earthquake. As described in section B.2.2.3, there is evidence of fault offset in older strata underlying the surficial cover, but no evidence that would lead to a conclusion of movement on the faults in the last 10,000 years. No active faults have been identified in the proposed corridor (Crone and Wheeler 2000). An active fault is one in which movement can be demonstrated to have taken place within the last 10,000 years (USGS 2008b).

Seismicity concerns the intensity, frequency, and location of earthquakes in a given area. Northwestern North Dakota has historically little earthquake activity (USGS 2008c). From 1990 to 2006, almost no seismic events were recorded North Dakota.

Ground motion hazards result when the energy from an earthquake is propagated through the ground. The USGS ground motion hazard mapping indicates that potential ground motion hazard in the proposed corridor is low. The hazard map used estimates peak ground acceleration of 4 to 6 percent of gravity with a 2 percent probability of exceedance in 50 years (Frankel et al. 1997; Peterson et al. 2008).

B.2.2.6 Landslides

Landslide is a term used for various processes involving the movement of earth material down slopes (USGS 2004). Landslides can occur in a number of different ways in different geological settings. Large masses of earth can become unstable and by gravity begin to move downhill. The instability can be caused by a combination of steep slopes, periods of high precipitation, undermining of support by natural processes

(stream erosion), or unintentional undercutting or undermining the strength of unstable materials in the construction of roads and structures.

Landslides are present in the proposed corridor and are mainly found in badlands next to Lake Sakakawea and in areas adjacent to drainages (Murphy 2004a,b). Landslides occur when headward erosion creates instability where unconsolidated glacial deposits overlie the Fort Union Group formations. Landslides are not present in the upland areas dominated by thick layers of glacial deposits. Landslides have been identified in the proposed corridor near Sand Creek and its tributaries in Section 6, Township 154 North (T154N), Range 101 West (R101W) (Murphy 2004a). In addition, landslides have been identified on slopes along Camp Creek in Section 36, T156N, R101W, and in areas of Section 16, T155N, R101W.

B.2.2.7 Subsidence

As described in section B.2.2.4, there are potential subsidence hazards as a result of underground mining of lignite.

B.2.2.8 Paleontological Resources

Paleontological resources are potentially present in the bedrock in the proposed corridor. The Rocks of the Fort Union Group have a high potential for fossils including plants, invertebrates, and vertebrates (mammals and reptiles) (Bureau of Land Management 2006). However, the proposed corridor is situated on surficial deposits where there is low potential for finding important fossils, especially the glacial deposits, since glacial processes often are not conducive to the preservation of fossils.

B.2.2.9 Soils

Prime and unique farmland and farmland of statewide importance occur within the proposed corridor. Prime farmland is characterized as the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban or built-up land or water areas). It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or no rocks. They have soils that are permeable to water and air. Prime farmland is neither excessively erodible nor saturated with water for a long period of time, and it either does not flood frequently, or is protected from flooding (NRCS 2007).

Specific technical criteria were established by Congress to identify prime farmland soils. In general, criteria reflect adequate natural moisture content; specific soil temperature range; pH between 4.5 and 8.4 in the rooting zone; low susceptibility to flooding; low risk to wind and water erosion; minimum permeability rates; and low rock fragment content (NRCS 2007).

Unique farmland is defined by the NRCS as land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods.

Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favors the production of a specific food or fiber crop (NRCS 2007).

Farmland of statewide importance is determined by the state agencies. Some areas other than areas of prime and unique farmland are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by the appropriate state

agency or agencies. Generally, additional farmland of statewide importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed by acceptable farming methods. Some areas can produce as high a yield as prime farmland if conditions are favorable. In some states, additional farmland of statewide importance may include tracts of land that have been designated for agriculture by state law (NRCS 2007).

Prime and unique farmland and farmland of statewide importance were compiled from Soil Survey Geographic databases. Data indicate that prime farmland soils occupy approximately 8.2 percent of the proposed corridor and farmlands of statewide importance comprise approximately 52.7 percent of the proposed corridor. Prime and unique farmland and farmland of statewide importance are included in **Table B-5**.

Table B-5 Important Soils within the Proposed Corridor

Soil Types	Acres	Percent
Prime and unique farmland	16,392	8.2
Farmland of statewide importance	105,124	52.7
Other lands	77,953	39.1
Total	**199,469**	**100.0**

B.2.3 Hydrology and Drainage

Although surface waters would be avoided to the extent practicable, secondary impacts could result from sediment loading to receiving streams. Direct impacts to drainages and waterways would be avoided because they would be either avoided or spanned during detailed engineering.

The U.S. Congress passed the National Flood Insurance Act of 1968 in response to increasing losses from flood hazards nationwide, which resulted in establishing the National Flood Insurance Program (NFIP). The Act was subsequently expanded by the Flood Disaster Protection Act of 1973, in which floodplain areas and flood risk zones within the U.S. were identified as part of the Act.

The NFIP identified floodplain areas through flood insurance studies, consisting of hydrologic and hydraulic studies of flood risks, which are administered by the Federal Emergency Management Agency (FEMA). FEMA prepares Flood Insurance Rate Maps that depict the spatial extent of flood hazard areas within Special Flood Hazard Areas (SFHAs). Flood hazard areas within the proposed corridor are illustrated in **Exhibits D-7** through **D-9** and largely associated with the Little Muddy River and its tributaries, north of Williston. Although SFHAs have been designated to describe the potential for flooding events, those applicable to the proposed corridor are limited to those described in **Table B-6**.

Table B-6 Special Flood Hazard Zones Applicable to the Proposed Corridor

Zone Name	Zone	Description
Zone X (500-year)	X500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1-square-mile; or an area protected by levees from 100-year-flooding.
Zone AE	AE	An area inundated by 100-year flooding, for which Base Flood Elevations (BFEs) have been determined.
Zone A	A	An area inundated by 100-year flooding, for which no BFEs have been determined.

B.2.4 Vegetation Resources

Vegetation within the proposed corridor was characterized from a literature review of the North Dakota Game and Fish Department (NDGFD) Comprehensive Wildlife Conservation Strategy (Hagen et al. 2005) and by Geographic Information System (GIS) analysis of land use and land cover. The proposed Project is located within the Missouri Coteau Mixed-grass Prairie region and the Missouri River System/Breaks region of North Dakota. The Missouri Coteau region was historically dominated by mixed-grass prairie and the Missouri River Breaks with woody draws and shortgrass prairie uplands. The topography of the area is rolling hills becoming steeper breaks and draws towards the Missouri River (Hagen et al. 2005). Based on field surveys completed in September 2008, cropland and native prairie dominate the proposed corridor; planted grasslands, deciduous shrublands, wetlands, and other vegetation types are scattered throughout the proposed corridor. Open water and waterbodies, developed land, and areas with barren lands do not support vegetation. Barren and developed lands consist of areas that are devoid of vegetation due to construction-related disturbances and urban development. Vegetation cover types that occur within the proposed corridor are listed in **Table B-7**.

Table B-7 Vegetation Cover Types within the Proposed Corridor

Vegetation Types	Acres	Percent
Cultivated cropland	127,794.3	64.1
Pasture/hay	719.1	0.4
Grassland/herbaceous perennials	52,398.3	26.3
Shrubland	3,131.9	1.6
Woodlands	442.2	0.2
Wetlands	4,068.5	2.0
Other lands	10,914.2	5.5
Total	**199,468.5**	**100.0**

Source: Strong 2004 (North Dakota GAP Analysis Land Cover Database).

B.2.4.1 Grassland and Planted Herbaceous Perennials

Pasture/Rangeland

Agricultural activities within the proposed corridor have largely eliminated the presence of native prairie communities. The remnants of native prairie are mostly utilized for cattle grazing. Grasslands within the proposed corridor include:

- Mixed-Grass Prairie Community: The mixed-grass prairie of North Dakota is a combination of the tallgrass species of eastern North Dakota and the shortgrass species found to the west. It is comprised of warm- and cool-season grasses and sedges. Common grasses include prairie junegrass (*Koeleria macrantha*), western wheatgrass (*Elymus smithii*), green needlegrass (*Nassella viridula*), needleandthread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), little bluestem (*Schizachyrium scoparium*), and needleleaf sedge (*Carex duriuscula*) (Hagen et al. 2005). Other grass species include Canada wild-rye (*Elymus canadensis*), spike oats (*Helictotrichon hookeri*), mat muhly (*Muhlenburgia richardsonis*), spikemoss (*Selaginella* spp.), plains reedgrass (*Calamagrostis montanensis*), and buffalograss (*Buchloe dactyloides*). Forbs included in the mixed-grass prairie community include purple coneflower (*Echinacea* spp.), field sagewort (*Artemisia campestris*), snowberry (*Symphoricarpos albus*), yarrow (*Achillea* spp.), goldenrod (*Solidago* spp.), wavyleaf thistle (*Cirsium undulatum*), Missouri milkvetch (*Astragalis missouriensis*), Indian breadroot (*Pediomelum* spp.), purple prairie clover (*Dalea purpurea*), prairie sagewort (*Artemesia frigida*), pasque flower

(*Pulsatilla* spp.), western wallflower (*Erysimum asperum*), prairie smoke (*Geum triflorum*), gaura (*Guara* spp.), and harebell (*Asyneuma* spp.) (Hagen et al. 2005).

- Shortgrass Prairie Community: The shortgrass prairie is mostly found on the uplands of the Missouri Breaks region within the proposed corridor. It is comprised of warm-season species that can survive the low average rainfalls of southwestern North Dakota. Common grass species include blue grama, buffalograss, needleandthread, needleleaf sedge, and threadleaf sedge (*Carex filifolia*). These species mature at six to 12 inches in height. Forbs include white wild onion (*Allium textile*), death camas (*Zigadenus* spp.), buffalo-bean (*Thermopsis* spp.), purple loco (*Oxytropis lambertii*), silverleaf (*Astragalus* spp.), field sagewort, snowberry, prickly pear (*Optunia polyacantha*), moss phlox (*Phlox subulata*), white beardtongue (*Penstemon* spp.), and fringed sage (Hagen et al. 2005).

- Planted Grassland (i.e., herbaceous perennials): These areas are croplands that have been replanted to perennial grasses and/or legumes. This class also includes native grasslands that have been invaded by smooth brome (*Bromus inermis*) or leafy spurge (*Euphorbia esula*). Commonly planted species include smooth brome, crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), tall wheatgrass (*Thinopyrum ponticum*), big bluestem (*Andropogon gerardii*), alfalfa (*Medicago sativa*), and sweet clover (*Melilotus* spp.). These lands are generally used for hay or forage production. Planted grasslands also can be enrolled in the Conservation Reserve Program (CRP) that restricts their use for hay/forage (Hagen et al. 2005).

B.2.4.2 Shrubland

Deciduous shrublands are a small component of the proposed corridor and usually confined to breaks and draws. The dominant shrub species include silver buffaloberry (*Shepherdia argentea*) and chokecherry (*Prunus virginiana*).

B.2.4.3 Cultivated Cropland

This community is comprised mostly of wheat production, although sunflowers, lentils, dry edible beans, and peas are raised in the proposed corridor.

B.2.4.4 Woodlands

Woodland habitats are found in only a few locations in North Dakota, and they do not cover large contiguous areas (Hagen et al. 2005). Isolated areas of woodland habitat occur within the proposed corridor. Dominant species in woodlands include green ash (*Fraxinus pennsylvanica*), chokecherry, roses (*Rosa* sp.), and snowberry. The proposed corridor also includes windbreaks (i.e., shelterbelts) adjacent to cropland and farmsteads. The dominant species in these wind breaks is Siberian elm (*Ulmus pumila*).

B.2.4.5 Wetland and Riverine

Wetland and riverine habitats are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands are classified depending on how long water and vegetation are present. These range from temporary wetlands that typically hold water for only a few weeks, to permanent wetlands that hold water year round. Wetland types within the proposed corridor include palustrine and riverine wetlands. Dominant vegetation of wetland areas includes fine-textured grasses, sedges, and rushes (Hagen et al. 2005).

- Palustrine Wetlands: Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. They can be grouped into vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the U.S. It also includes the small, shallow, permanent or intermittent water bodies often called ponds (Cowardin et al. 1979). Palustrine wetlands are classified as either seasonal, semi-permanent, or permanent subcategories. Seasonal wetlands are described as having surface water present for extended periods in spring and early summer, but usually disappear as early as midsummer

(Hagen et al. 2005). Semi-permanent wetlands have water present year-round in most years; permanent wetlands will contain water throughout the year, in all years (Hagen et al. 2005).

- Riverine Wetlands: Riverine wetlands include wetlands contained within a channel, with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and 2) habitats with water containing ocean-derived salts. Water is usually, but not always, flowing in the riverine system. Upland islands or palustrine wetlands may occur in the channel but they are not included in the riverine system. The lower perennial subsystem includes waterbodies where some water flows throughout the year and the gradient is low and water velocity is slow. The intermittent subsystem includes channels where the water flows for only part of the year (Cowardin et al. 1979). Wetland types that occur within the proposed corridor are listed in **Table B-8**.

Table B-8 Wetland Types within the Proposed Corridor

Wetland Types	Acres	Number
Freshwater pond	266.1	268
Freshwater emergent wetland	2,361.0	3,039
Freshwater forested/shrub wetland	2.1	7
Lake	65.0	3
Riverine	86.2	18
Other	1.7	5
Total	**2,782.1**	**3,340**

[1] Wetland acreage differs from acreages provided in **Table B-1** and **Table B-7** due to different data sources.

Source: NWI maps.

B.2.4.6 Sensitive Ecological Communities

Sensitive ecological communities for the study area were identified by the North Dakota Natural Heritage Inventory (NDNHI) 2008. These terrestrial communities consist of interrelated assemblages of plants, animals, other living organisms, geological substrates, and soils that are shaped by natural processes. These communities are either rare/endangered, ecologically significant, or unique to the area. These communities are not protected by state statutes. Several sensitive ecological communities were identified by the NDNHI as present in the vicinity but not within the proposed corridor. However, biological surveys conducted in September 2008 identified three of these communities to be within the proposed corridor. These communities are summarized below.

Western Three-square Meadow

The community is found along perennial streams, marshes, ponds, and overflows with permanently saturated soils. Dominant species of the community include common threesquare (*Schoenoplectus pungens* var. *longispicatus*), broadleaf cattail (*Typha latifolia*), arctic rush (*Juncus arcticus*), cordgrass (*Spartina* spp.), common rush (*Juncus effusus*), and spotted water hemlock (*Cicuta maculata*) (Jones et al. 2006). The community is globally secure (G5 Rank) but is critically imperiled within North Dakota (S1 Rank) (Jones et al. 2006; Duttenhefner 2008).

Needleandthread Mixed Grass Prairie

The community is found on level to rolling uplands with loam to sandy loam soils across the northern Great Plains. Dominant species of the community include needleandthread (*Hesperostipa comata*), blue grama

(*Bouteloua gracilis*), threadleaf sedge (*Carex filifolia*), prairie junegrass (*Koeleria macrantha*), western wheatgrass (*Pascopyrum smithii*), prairie sagewort (*Artemisia frigida*), broom snakeweed (*Gutierrezia sarothrae*), prairie rose (*Rosa arkansana*), spiny phlox (*Phlox hoodii*), hairy false goldenaster (*Heterotheca villosa*), scarlet beeblossom (*Gaura coccinea*), and dotted blazing star (*Liatris punctata*) (Drake 2006). The community is globally secure (G5 Rank) but is imperiled within North Dakota (S2 Rank) (Drake 2006; Duttenhefner 2008).

Green Ash Upland Woodland

This community occurs on slopes of ravines, open valleys, and along streams. The dominant species of this community include green ash (*Fraxinus pennsylvanica*), boxelder (*Acer negundo*), chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*), currant (*Ribes* sp.), rose (*Rosa* sp.), smooth brome (*Bromus inermis*) (Faber-Langendoen 2001). This community is globally imperiled/vulnerable (G2G3 Rank) and it is vulnerable within North Dakota (S3 Rank) (Duttenhefner 2008; Faber-Langendoen 2001).

B.2.4.7 Noxious Weeds

Several noxious weed species are known to cause ecological and commercial damage in North Dakota. If not controlled, noxious weeds can infest areas, resulting in the loss of native vegetation and crops. The state- and county-prohibited or restricted noxious weeds are listed in **Table B-9**. Canada thistle, field bindweed, leafy spurge, and yellow toadflax were observed within the Proposed Corridor during field surveys conducted in September 2008.

Table B-9 Noxious Weeds Known to Occur in North Dakota

Common Name	Scientific Name
Russian knapweed	*Acroptilon repens*
Absinth wormwood	*Artemisia absinthium*
Musk thistle	*Carduus nutans*
Yellow starthistle	*Centaurea solstitialis*
Spotted knapweed	*Centaurea stoebe* ssp. *micranthos*
Canada thistle	*Cirsium arvense*
Field bindweed	*Convolvulus arvensis*
Leafy spurge	*Euphorbia esula*
Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*
Purple loosestrife	*Lythrum salicaria*
Saltcedar	*Tamarix ramosissima*
Yellow toadflax	*Linaria vulgaris*
Dodder	*Cuscuta* sp.
Broomrape	*Orobanche* sp.

Source: North Dakota Department of Agriculture 2008.

B.2.5 Wildlife and Fisheries

Wildlife use within the proposed corridor was characterized from a literature review of the North Dakota Game and Fish Department's (NDGFD's) Comprehensive Wildlife Conservation Strategy (Hagen et al. 2005), as well

as both 2008 spring and fall field investigations. Additionally, agency correspondence and species information was collected from the USFWS, NDGFD, and the NDNHI (USFWS 2008a,b; NDGFD 2008; NDNHI 2008).

The predominant wildlife habitats along the proposed corridor consist of agricultural land, grasslands (tall and mixed-grass prairie), shrublands, woodlands (mixed conifer and deciduous), and wetlands (woody and emergent herbaceous). These vegetation types support a diversity of wildlife species and are discussed in section B.2.4, Vegetation Resources. This section focuses on species of high economic and/or recreational importance and those that are considered sensitive to human disturbance.

B.2.5.1 Big Game

Big game species within the proposed corridor include white-tailed deer (*Odocoileus virginianus*), with possible occurrences of mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*). No seasonal big game ranges were identified by the NDGFD (NDGFD 2008).

B.2.5.2 Small Game

Small game species that occur within the proposed corridor include native and non-native furbearers, upland game birds, and waterfowl. Common furbearers within the proposed corridor include red fox (*Vulpes vulpes*), raccoon (*Pyrocyon lotor*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*).

Representative upland game birds in the proposed corridor include ring-necked pheasant (*Phasianus colchicus*) (an introduced species), sharp-tailed grouse (*Tympanuchus phasianellus*), gray partridge (*Perdix perdix*), and wild turkey (*Meleagris gallopavo*). Representative waterfowl species include mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), northern shoveler (*Anas clypeata*), and gadwall (*Anas strepera*).

B.2.5.3 Nongame Species

A diverse number of nongame species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupy a variety of trophic levels and habitat types within the proposed corridor. Common wildlife species include small mammals such as bats, voles, squirrels, gophers, and mice. These small mammals provide a substantial prey base for predators in the area including, larger mammals (coyote and badger), raptors (eagles, buteos, accipiters, owls), and reptiles.

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and Executive Order (EO) 13186 (66 Federal Register 3853), which makes it unlawful to take, kill, or possess migratory birds. EO 13186 was enacted to, among other things, ensure that environmental analyses of Federal actions evaluate impacts of actions and agency plans on migratory birds. Federally listed and other sensitive bird species are discussed in section B.2.6.

Migratory birds are considered integral to natural communities and act as environmental indicators based on their sensitivity to environmental changes caused by human activities. Examples of migratory bird species that occur within the proposed corridor include the mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*), common nighthawk (*Chordeiles minor*), western kingbird (*Tyrannus verticalis*), eastern kingbird (*Tyrannus tyrannus*), horned lark (*Eremophila alpestris*), eastern bluebird (*Sialia sialis*), mountain bluebird (*Sialia currucoides*), common yellowthroat (*Geothlypis trichas*), clay-colored sparrow (*Spizella pallida*), vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), savannah sparrow (*Passerculus sandwichensis*), western meadowlark (*Sturnella neglecta*), and brown-headed cowbird (*Molothrus ater*).

Raptor species that occupy habitats within the proposed corridor are those associated with tall- and mixed-grass prairie, shrubland, woodlands, wetlands, and cropland. Those species include eagles (bald and golden eagles), buteos (e.g., red-tailed and ferruginous hawks), falcons (American kestrel and prairie falcon), owls (burrowing owl, great horned owl, and short-eared owl), northern harrier, and other birds of prey including the turkey vulture (Peterson 1990). Protected raptor species that have been identified for the proposed corridor

include bald eagle, ferruginous hawk, northern harrier, Swainson's hawk, short-eared owl, and burrowing owl (**Appendix C**, Special Status Species). These species all are designated as North Dakota Species of Conservation Priority.

B.2.5.4 Fisheries Resources

The proposed corridor includes several occasional intermittent and ephemeral streams. One perennial water, the Little Muddy River, is crossed in Williams County. Federal and state wildlife agencies have not expressed concerns for any fish species or sensitive aquatic habitat within any of the waterbodies within the proposed corridor. In addition, no waterbodies within the proposed corridor contain species managed by the National Marine Fisheries Service, or support essential fish habitat (EFH) as defined under the Magnuson-Stevens Fishery Conservation and Management Act.

B.2.6 Special Status Species

Special status species are those in which state and/or federal agencies provide protection by law, regulation, or policy. Federally listed and federally proposed for listing species with designated critical habitat are protected under the ESA. For this analysis, special status species also include those species that have been designated as species of conservation priority by the NDGFD.

The State of North Dakota categorizes wildlife species into three levels of conservation priority (Hagen et al. 2005). The following categories were developed to describe the conservation needs for North Dakota species of conservation priority:

- Level I: species with a high level of priority due to the declining status here or across the range or high rate of occurrence in North Dakota, constituting the core of the species breeding range but are at-risk range-wide.
- Level II: species with a moderate level of priority or species with a high level of priority but a substantial level of non-state wildlife grants funding.
- Level III: species with a moderate level of priority but are believed to be peripheral or non-breeding in North Dakota.

Special status species analysis focused on wildlife and plant species and habitats that may occur within the proposed corridor. The process considered federal laws and state statutes. The ESA is administered by the USFWS and provides broad national protection for fish, wildlife, and plants that are listed as endangered, threatened, or proposed for listing. The ESA outlines procedures for federal agencies to follow when a listed species or designated habitat may be affected by an action they authorize, fund, or permit. Species considered North Dakota species of conservation priority also receive some protection. The MBTA also is administered by the USFWS. The MBTA is a federal law enabling the U.S. to fulfill its international, bilateral conventions for conserving migratory bird populations and their habitats. The MBTA makes it unlawful to take, kill, or possess migratory birds, nests, eggs, or parts of birds without a permit. Additionally, the Bald and Golden Eagle Protection Act (BGEPA), also administered by the USFWS, provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. Revised regulations providing mechanism to authorize take under the BGEPA went into effect June 19, 2008.

Methods for establishing a baseline of status, occurrence and associated habitat of wildlife that may occur within the proposed corridor include reviewing published literature, natural heritage database information, internet websites, agency correspondence, and field surveys. Biologists with the USFWS, NDGFD, and NDNHI were contacted for information about the status of wildlife species, habitat, special wildlife features, and habitats in the proposed corridor (USFWS 2008a,b; NDGFD 2008; NDNHI 2008). Baseline biological surveys within the proposed corridor were conducted in September 2008.

The analysis for special status species focused on those species that could occur within the proposed corridor. Special status species originally considered for the proposed corridor are presented in **Appendix C**, Special Status Species. The evaluation determined that some of these species would not occur in the proposed corridor. Comments on these species are provided in **Appendix C** and are not discussed further.

A total of 64 special status wildlife species were identified by the USFWS, the State of North Dakota, and the NDNHI as occurring within the 6-mile-wide corridor (USFWS 2008a,b; Hagen et al. 2005; NDNHI 2008). These species, their habitat associations, and their occurrence within the proposed corridor are summarized in **Appendix C**, Special Status Species. Occurrence for each species was based on habitat requirements and known distribution. Based on these evaluations, 24 species have been eliminated from detailed analysis, of which 3 of these species are federally listed species (threatened and endangered). The federally listed species that were eliminated from detailed analysis include the gray wolf (*Canis lupus*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirynchus albus*). The gray wolf was eliminated because it is highly unlikely to be within the proposed corridor and would only be present as a migratory occurrence. Interior least tern was eliminated because nesting habitat is not present. Pallid sturgeon was eliminated because the species requires large fast-flowing rivers, which are not present within the proposed corridor. The Dakota skipper (*Hesperia dacadae*), a federal candidate species, was also eliminated from detailed analysis. The non-listed species eliminated from detailed analysis include American white pelican (*Pelecanus erythrorhynchos*), arctic shrew (*Sorex arcticus*), bald eagle (*Haliaeetus leucocephalus*), Franklin's gull (*Larus pipixcan*), greater prairie chicken (*Tympanuchus cupido*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), peregrine falcon (*Falco peregrinus*), pygmy shrew (*Sorex hoyi*), horned grebe (*Podiceps auritus*), red-headed woodpecker (*Melanerpes erythrocephalus*), Richardson's ground squirrel (*Spermophilus richardsonii*), sagebrush vole (*Lemmiscus curtatus*), swift fox (*Vulpes velox*), and western small-footed myotis (*Myotis ciliolabrum*), and eight species of fish. Of the remaining 40 species retained for analysis, two are listed species; whooping crane (*Grus americana*), and piping plover (*Charadrius melodus*). Special status wildlife species that have not been eliminated from analysis are discussed below and in **Appendix C**. No designated critical habitat is located within the proposed corridor.

B.2.6.1 Federally Listed Species

Whooping Crane

The whooping crane is a federally endangered species and a North Dakota Level III species of conservation priority. Collision with power lines is the greatest source of mortality for fledged whooping cranes that migrate between nesting and wintering habitat (USFWS 2006). Designated critical habitat, nesting habitat, and breeding rookeries are not present in the vicinity of the proposed corridor. However, the proposed corridor is located within the yearly migratory route for the Aransas-Wood Buffalo Breeding Population (AWBP). Species records show migration routes through Williams and Mountrail counties (USFWS 2008a,b). Whooping cranes may migrate through the proposed corridor in the spring (April to mid-May) and in the fall (mid-September to October). Suitable stop-over habitat for migrating whooping cranes includes wetlands and cropland ponds for roosting and/or feeding. Individual cranes typically spend only a few days at most at a given site during migration before moving on.

Piping Plover

The piping plover is a federally threatened species and a North Dakota Level II species of conservation priority. The piping plover is generally characterized as using exposed, sparsely vegetated shores and islands of shallow, alkali lakes and impoundments for breeding (Hagen et al. 2005). Salt-encrusted, alkali, or subsaline semipermanent lakes, ponds, and rivers with wide shorelines of gravel, sand, or pebbles are preferred (Hagen et al. 2005). Piping plovers forage on fly larvae, beetles, crustaceans, mollusks, and other small animals near the shoreline or sometimes by the nest. It is expected that the piping plover would only use the proposed corridor for migration and foraging purposes, and are not likely to breed and nest within the small and limited waterbodies located in the vicinity of this Project.

B.2.6.2 North Dakota Species of Conservation Priority

Grassland Associated Species

Baird's sparrow (*Ammodramus bairdii*), black-billed cuckoo (*Coccyzus erythropthalmus*), bobolink (*Dolichonyx oryzivorus*), chestnut-collared longspur (*Calcarius ornatus*), dickcissel (*Spiza americana*), grasshopper sparrow (*Ammodramus savannarum*), lark bunting (*Calamospiza melanocorys*), LeConte's sparrow (*Ammodramus leconteii*), loggerhead shrike (*Lanius ludovicianus*), marbled godwit (*Limosa fedoa*), Sprague's pipit (*Anthus spragueii*), and upland sandpiper (*Bartramia longicauda*) are migratory bird species that are listed as North Dakota species of conservation priority and may occur within the proposed corridor. These migratory bird species are associated with grassland habitats.

Perching Species

Red-tailed hawk (*Buteo jamaicensis*), Ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), short-eared owl (*Asio flammeus*), and Swainson's hawk (*Buteo swainsoni*) are migratory birds and raptor species that are also North Dakota species of conservation priority that may occur within the proposed corridor and are associated with grassland habitats. Several raptor species were observed foraging within the proposed corridor during September 2008 field surveys, including Swainson's hawk, northern harrier, and red-tailed hawk.

Lekking Species

Sharp-tailed grouse are found in mixed-grasslands with patches of small trees or shrubs. During the breeding season male sharp-tailed grouse congregate on specific areas known as leks in the early morning to impress nearby females. Leks are usually located within wet meadows, ridges, and knolls, or recently burned areas. No lek sites for sharp-tailed grouse have been identified by the NDGFD or the NDNHI in the vicinity of the proposed corridor. During the September 2008 surveys, numerous sharp-tailed grouse were observed.

Less Mobile and Burrowing Species

Plains spadefoot (*Spea bombifrons*), smooth green snake (*Liochlorophis vernalis*), short horned lizard (*Phrynosoma douglassi*) and western hognose snake (*Heterodon nasicus*) are also North Dakota species of conservation priority which inhabit dry, open grasslands with sandy or loose soils and, occasionally rock crevices. Other habitat factors include proximity to water and small mammal burrows (Hagen et al. 2005). Plains spadefoot, short horned lizard, and western hognose snake utilize burrows during portions of their life history. Smooth green snake utilize may utilize hibernacula and have been documented hibernating within ant mounds. These species were not detected during September 2008 surveys.

Burrowing owl (*Athene cunicularia*), is a ground nesting owl which nests in abandoned mammal burrows which they enlarge and excavate (Hagen et al. 2005). One burrowing owl was also observed during September 2008 surveys (see **Exhibit D-1**).

Wetland and Riparian Associated Species

American avocet (*Recurvirostra americana*), American bittern (*Botaurus lentiginosus*), black tern (*Chlidonias niger*), canvasback (*Aythya valisineria*), Franklin's gull (*Larus pipixcan*), Nelson's sharp-tailed sparrow (*Ammodramus nelsoni*), northern pintail (*Anus acuta*), redhead (*Aythya americana*), sedge wren (*Cistothorus platensis*), willet (*Catoptrophorus semipalmatus*), Wilson's phalarope (*Phalaropus tricolor*), and yellow rail (*Corurnicops noveboracensis*) are migratory bird species that are North Dakota species of conservation priority and may occur within the proposed corridor. These migratory bird species are associated with wetlands, wetland complexes, and waterbody habitats.

The Canadian toad (*Bufo hemiophrys*) and common snapping turtle (*Chelydra serpentina*) also are a North Dakota species of conservation priority. These species prefer permanent lakes, ponds, rivers, and wetlands (Hagen et al. 2005).

The September 2008 and June 2009 field surveys found a limited amount of habitat that would support these species including one perennial water, the Little Muddy River, and a limited number of ponds or wetlands with permanent water. Additionally, occasional intermittent and ephemeral streams were also observed.

B.2.6.3 Special Status Fish

A total of nine special status fish species were identified by the USFWS, the State of North Dakota, and the NDNHI as occurring within the proposed corridor (USFWS 2008a,b; Hagen et al. 2005; NDNHI 2008). These species, their habitat associations, and their occurrence within the proposed corridor are summarized in **Appendix C**, Special Status Species. Based on evaluations in **Appendix C**, all nine fish species have been eliminated from detailed analysis, of which one is a federally listed endangered species, the pallid sturgeon (*Scaphirhynchus albus*). The non-listed species eliminated from further analysis include blue sucker (*Cycleptus elongates*), finescale dace (*Phoxinus meogaeus*), flathead catfish (*Pylodictis olivaris*), flathead chub (Platygobio gracilis), northern redbelly dace (*Phoxinus eos*), paddlefish (*Polyodon spathula*), sicklefin chub (*Macrhybopis meeki*), and sturgeon chub (*Macrhybopsis gelida*).

The September 2008 and June 2009 field surveys did not detect habitat that would support these species. Only one perennial water, the Little Muddy River, occurs within the proposed corridor. These species are not known to occur in this river.

B.2.6.4 Special Status Plants

A total of three special status plant species were identified by the USFWS, the State of North Dakota, and the NDNHI as occurring within the proposed corridor (USFWS 2008a,b; Hagen et al. 2005; NDNHI 2008). These species, their habitat associations, and their occurrence within the proposed corridor are summarized in **Appendix C**, Special Status Species. Based on evaluations, in **Appendix C**, all three plant species have been eliminated from detailed analysis, none of which is a federally listed species. The non-listed species eliminated from further analysis include Dakota buckwheat (*Eriogonum visheri*), heart-leaved buttercup (*Ranunculus cardiophyllus*), and jointed-spike sedge (*Carex athrostachya*). Species-specific surveys for these plant species were not required by the NDGFD (NDGFD 2008).

All three species were identified as having potential to occur within the proposed corridor but were eliminated from detailed analysis as the habitat characteristics necessary to support these species were not detected during September 2008 survey.

B.2.7 Archaeological and Historic Resources

Cultural resources are protected by a series of federal laws enacted to protect these resources from damage or loss due to federal undertakings, or private undertakings operating under federal license, federal funding, or on federally managed lands. The public's recognition that these non-renewable resources are important and should be protected began in the 20th Century and continues to the present. Three of the most important laws are the NHPA of 1966, as amended; the American Indian Religious Freedom Act of 1978; and the Archaeological Resource Protection Act of 1979. EO 11593 also provides necessary guidance on protection and enhancement of cultural resources. New legislation and emphases that have come to the forefront over the past 20 years include the Native American Graves Protection and Repatriation Act; EO 13007, the consideration of historic and traditional landscapes; and the increased awareness of and consultation for traditional cultural properties (Parker and King 1989).

Class I Cultural Resources Survey Results

From February 27 to June 20, 2008, Metcalf Archaeological Consultants, Inc. (Metcalf) conducted a Class I records and files search through the State Historical Society of North Dakota to identify previously conducted cultural resources inventories and previously documented cultural resources within the study area. Additionally, Metcalf reviewed historic General Land Office (GLO) records to determine if remains of trails, transportation routes, homesteads, or other historic resources may be present in the study area.

The files search revealed 148 sites in the proposed corridor (Metcalf 2008). Sixty-seven of these sites are prehistoric, including 62 sites with stone circles and/or cairns, one site recorded as a mound, and four low-density material scatters. A small number of the stone circle/cairn sites also have associated material scatters. Thirteen of the 148 sites are historic, including seven material scatters with depressions indicative of foundation remains and six with structural foundation remnants and/or small depressions. One multi-component site containing stone circles and a historic material scatter also was identified in the proposed corridor. The remaining 67 sites are architectural sites. These include farmsteads, houses, bridges, churches, municipal buildings, a utility line, and a number of agricultural outbuildings. Most of the architectural sites are in or near the Town of Ray.

Summary of General Land Office Review for the Proposed Corridor

On April 7, 2008, Metcalf reviewed GLO maps of the proposed corridor. The townships, ranges, and sections that lie within the proposed corridor were entered into the GLO database and the results were examined for any evidence of trails, transportation routes, homesteads, or other historic resources. The Great Northern Railroad, trails, several buildings, and modern highways, pipelines, and road systems were identified within the proposed corridor. Most of the identified trails subsequently have been modified or removed as a result of modern highway construction or other forms of infrastructure.

B.2.8 Native American Setting

Northwestern North Dakota and surrounding areas traditionally have been used by Native Americans since pre-recorded time. Present-day tribes with ties to the area include:

- Eastern Shoshone Tribe – Fort Washakie, Wyoming;
- Northern Arapaho Tribe – Fort Washakie, Wyoming;
- Northern Cheyenne Tribe – Lame Deer, Montana;
- Oglala Lakota Nation – Pine Ridge, South Dakota;
- Rosebud Sioux Tribe – Rosebud, South Dakota;
- Cheyenne River Sioux Tribe – Eagle Butte, South Dakota;
- Standing Rock Sioux – Fort Yates, North Dakota;
- Crow Tribe – Crow Agency, Montana;
- Fort Peck Tribes – Poplar, Minnesota; and
- Three Affiliated Tribes – New Town, North Dakota.

Western sent Nation-to-Nation consultation letters to these 10 tribes on August 1, 2008. The letter described the proposed Project and provided the tribes with the opportunity to comment on the Project and identify sites or places that might be of religious or cultural significance to the tribes. To date, only the Rosebud Sioux Tribe has responded to the letter. The Tribe has no concerns with the Project; however, they requested copies of the Class I and Class III cultural resources reports.

B.2.9 Paleontological Resources

Paleontological resources that are located on state lands are protected under North Dakota's Paleontological Resource Protection Act (North Dakota Century Code [NDCC] 54-17.3), which gives the North Dakota Industrial Commission, acting through the Office of the State Geologist, the responsibility to protect paleontological resources that are located on land owned by the state, or its political subdivisions (North Dakota Geological Survey 2007). Resources on private land are not protected under this Act, and are considered property of the landowner.

B.2.10 Transportation

Regional transportation facilities, largely consisting of highways and rural roads, would be used to transport construction and maintenance workers, equipment, and materials to transmission line sites. Construction of the proposed Project would require crossing numerous local roads, highways and the Burlington Northern-Santa Fe Railroad.

The proposed corridor would be located west of the Williston - Sloulin Field International Airport. Sloulin Field provides international service to commercial carriers and general aviation. The main runway is 6,650 feet long and 100 feet wide. Currently, the proposed corridor contains the Tioga Municipal Airport. This airport serves general aviation and has a 4,501-foot-long, 75-foot-wide main runway.

Major highways in the proposed corridor include U.S. Highway 2/U.S. Highway 85 that extends north from Williston; U.S. Highway 2 that extends east-west through Ray, North Dakota; and ND Highway 40 that is oriented north-south from U.S. Highway 2 to Tioga. Other roads and highways in the proposed corridor are oriented in a north-south, east-west grid along section lines.

B.2.11 Socioeconomics

Socioeconomic analyses address population, demography, economy, and employment.

Population and Demography

The proposed Project is located in Williams and Mountrail counties in rural northwestern North Dakota. Williams County is approximately 2,148 square miles with a population of 19,761 residents (U.S. Census Bureau 2000). The eastern portion of the proposed corridor, which includes the Tioga Substation and a small portion of the proposed route, extend east into Mountrail County within an area of approximately 1,941 square miles and a population 6,631 residents (U.S. Census Bureau 2000).

Racial composition of residents within the two counties is predominantly white; approximately 93 percent in Williams County and 66 percent in Mountrail County. **Table B-10** provides demographic information for the towns located within the proposed corridor.

Table B-10 Population and Demography within the Proposed Corridor

Town	County	Population[1]	Median Household Income[2]	% Below Poverty Level	
				Families	Individuals
Williston	Williams	12,512	29,962	11.3	13.4
Ray	Williams	534	31,563	2.6	3.7
Tioga	Williams	1,125	29,740	3.5	7.0

[1] U.S. Census Bureau, American Fact Finder 2000.

[2] U.S. Census Bureau, American Fact Finder, Census 2000, Income 1999.

Economy and Employment

Agriculture is the primary industry, with wheat being the most common crop produced, followed by lentils, barley, oats, dry edible beans and peas, and sugar beets (U.S. Department of Agriculture 2008). Livestock production is the second largest industry, primarily producing beef cattle, and hogs. Service industries and retail trade support residents in the area towns.

The oil and gas industry is a major economic contributor to the region since the discovery of oil in the Williston Basin in 1951 (Williston 2008). Since 1951, total production from the Williston Basin has exceeded 2.5 billion barrels (Williston 2008). While oil and gas production is concentrated in western North Dakota, the secondary effects (refining and transporting) affects and significantly benefits the entire state's economy.

During the hunting season, the hunting industry provides numerous recreational activities. Recreation in the area includes big game and small game hunting on private and state owned and managed lands. Big game hunting includes whitetail deer and antelope; small game hunting includes pheasant, Hungarian partridge, and sharptail grouse (Williston Convention and Visitors Bureau 2008).

Additional recreational activities include fishing, bird watching, and canoeing (Williston Convention and Visitors Bureau 2008). Fishing in nearby Lake Sakakawea for walleye and northern pike attract many visitors to the area. Bird watching enthusiasts come to the area for the 365 bird species in the region. Canoeing is a popular recreational activity on the Yellowstone River, Missouri River, and Lake Sakakawea.

B.2.12 Public Health and Safety

Construction, operation, and maintenance of the proposed Project could result in short- and long-term impacts to public health and safety. Potential health and safety concerns associated with construction include highway and roadway safety associated with the transport of structures, structure hardware, conductor, and personnel and solid waste management. Those associated with operations include electric shock, electric and magnetic fields, stray voltage, and induced voltage. Worker safety issues are associated with Project construction, operation, and maintenance activities.

B.2.13 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed on February 11, 1994. EO 12898 directs federal agencies to review proposals and identify, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations to the greatest extent practicable and permitted by law. As such, the proposed Project must be evaluated in terms of an adverse effect that:

- Is predominantly borne by a minority population and/or low-income population; or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population.

Racial composition of residents within the two counties that constitute the Project area is predominantly white; 93 percent in Williams County and 66 percent in Mountrail County. Approximately 30 percent of residents in Mountrail County are Native Americans who live on the Fort Berthold Reservation, which covers the southern portion of the county. The nearest community to the proposed Project in Mountrail County is Tioga, where the racial composition is 97 percent Caucasian.

B.2.14 Visual Resources

Visual resources within the proposed corridor are what many individuals would describe as aesthetically pleasing. Scenic quality is based on evaluating the overall character and diversity of landform, vegetation, water, color, and cultural features of a landscape. Additionally, visual resources are evaluated based on viewer sensitivity, which is described as the degree of concern for change in the landscape's visual character. Sensitive viewers include residents and viewers from churches, parks, recreational areas, and roadways. The level of viewer sensitivity is associated with the duration of the view. For example, residents' views of a landscape would be long-term and characterized as a highly sensitive viewer; whereas, a motorist's view of the landscape would be short-term in duration and characterized as a low- to moderate-sensitive viewer.

The western part of the study area is located in bottomlands of the Missouri River, while much of the area is located on fairly level uplands. In the eastern part of the study area near Tioga, North Dakota, the topography consists of undulating hills (Freers 1970). Elevations along the proposed corridor vary from just less than 2,000 feet amsl at the Missouri River to 2,400 feet amsl at Tioga, North Dakota. Visual resources in the area include large expanses of cropland and pastureland, interspersed with homesteads, surrounded by shelter belts. Much of the landscape has been modified and used for agriculture. Colors range from varying shades of greens, soft yellows, and browns, depending on the time of year. The broad horizons create a broad spectrum of colors from bright to deep blues during daylight hours and golds, oranges, and reds at dusk to the west, and dawn to the east.

Major highways in the proposed corridor include U.S. Highway 2/U.S. Highway 85 that extends north from Williston; U.S. Highway 2 that extends east-west through Ray, North Dakota; and ND Highway 40 that is oriented north-south from U.S. Highway 2 to Tioga. Other roads and highways in the proposed corridor are oriented in a north-south, east-west grid along section lines.

B.2.15 Noise

Ambient noise levels within the proposed corridor are minimal, broken only by the sound of wind and occasional vehicle traffic and farm machinery. Sensitive receptors within the area are largely limited to scattered area residents.

B.2.16 Air Quality

Air quality parameters typically include consideration of criteria pollutants and prevention of significant deterioration impact levels of nitrogen dioxide, particulate matter, carbon monoxide, and sulfur dioxide.

The North Dakota Department of Health, Division of Air Quality has determined that the concentrations of the criteria pollutants in the proposed corridor are currently lower than the allowable limits established by the National and State Ambient Air Quality Standards (AAQS). Thus, the area is considered to be in attainment of the AAQS for all pollutants.

C. Need for Facility

C.1 Analysis of Need

BEPC's Transmission Services Division completed a comprehensive transmission system study in September 2008 that addressed load forecasts in portions of northwestern North Dakota and northeastern Montana. The study analyzed impacts of the latest load forecast for this region that has been affected by rapid increases in oil and gas extraction and delivery. The load forecast for this area is illustrated in **Exhibit C-1**.

The study showed that the existing system will have insufficient capacity to accommodate projected loads by 2011. Furthermore, Western's Williston to Charlie Creek 115-kV line is in poor physical condition and is currently being rebuilt to 230-kV service.

The existing Tioga 230/115-kV transformer limits the power imports from Saskatchewan to 165-MW. The increased 115-kV network load has increased loading on the Tioga 230/115-kV transformer to the extent the 165-MW Saskatchewan import can no longer be accommodated. Also, the loss of the Tioga 230/115-kV transformer causes low voltage on the 115-kV system. Therefore, a parallel transformer is needed to mitigate the existing overload and provide a backup for loss of the existing transformer. This Project also is underway.

The proposed Williston to Tioga 230-kV transmission line is necessary to complete the 230-kV loop from Tioga to Charlie Creek and to meet the projected loads. Without the facility, the existing Williston-Tioga 115-kV line would be subject to overload, resulting in non-compliance with utility practice and requirements, reduced substation equipment service life, or failure outage to end users.

C.2 Alternatives

Demand side management is a non-structural method that is often called upon to aid in meeting power supply shortfalls. The North Dakota Department of Commerce is mandated to implement the State Energy Program promoting energy conservation and efficiency and reducing energy consumption growth rates. Implementation of additional demand side management energy conservation efforts would fail to meet near-term and future energy needs in southwestern North Dakota.

C.3 Deviation from Ten-Year Plan

The description of the proposed Project corresponds with information provided in the most recent Ten-Year Plan, which was submitted to the PSC by BEPC. There were no deviations between the planned Project described in the Ten-Year Plan and the proposed Project described in this application.

D. Location

D.1 Study Area

North Dakota Administrative Code, Section 69-06-04-02 1 b. requires that the width of the corridor for the proposed transmission line be at least 10 percent of its length, but not less than 1 mile and not greater than 6 miles, unless approved by the PSC. Therefore, the proposed Project is using a 6-mile-wide corridor. Due to geographic constraints, a single 6-mile-wide corridor was routed from the Williston area to the Tioga area as illustrated in **Exhibit A-1**.

Factors provided in Section 49-22-09 NDCC that are to be considered in evaluating application and designation of sites, corridors, and routes are listed below. The PSC shall be guided by, but is not limited to, the following considerations, where applicable, to aid in the evaluation and designation of sites, corridors, and routes:

1. *Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment*.

   A Class I file search of recorded cultural resource sites within the proposed corridor was completed using data from the Division of Archaeology and Historic Preservation, State Historical Society of North Dakota. The NDNHI also provided database information regarding threatened, endangered, and state sensitive plant species. In addition, an EA is currently being completed by Western for the proposed Project.

2. *The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.*

   BEPC would use self-supporting electric transmission line structures without the use of guy wires for support. Steel single-pole structures would be used instead of steel H-frame structures, which would result in less permanent disturbance. Also, there would be no need for construction of new substations as the proposed Project would utilize the existing Williston Interconnect Substation and Tioga Substation.

3. *The potential for beneficial uses of waste energy from a proposed energy conversion facility.*

   Not applicable.

4. *Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.*

   To the extent practicable, all effects from the construction and operation of a transmission line within the proposed corridor would be mitigated. No other permanent direct or indirect adverse effects are anticipated.

5. *Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.*

   No alternatives to the proposed corridor location have been identified at this time. Alternative corridors may be identified during the public hearing process.

6. *Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.*

   Minimal amounts (<0.2 acre) of land at the structure locations would be taken permanently out of production. No irreversible or irretrievable commitments of natural resources would occur from Project construction and operation. All areas of natural vegetation within the ROW would be reclaimed with agency-recommended or landowner-approved seed mixtures; wetlands and woodlands would be avoided to the extent practicable.

7. *The direct or indirect economic impacts of the proposed facility*.

   Economic impacts would be positive. Ad valorem taxes would be paid annually, which help the economy. North Dakota sales or use tax would be paid on all materials purchased. During construction, workers would increase the level of business activity in the area.

8. *Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.*

   Several oil fields are located within the proposed corridor. However, exact locations of future oil field developments are not known at this time.

9. *The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.*

   The proposed corridor does include several historic sites, structures, and archaeological sites. Due to the geologic substrate with the proposed corridor, it is unlikely that paleontology resources would be encountered. It is anticipated that the proposed route would avoid these sites.

10. *The effect of the proposed site or route on areas which are unique because of the biological wealth or because they are habitats for rare and endangered species*.

    The proposed corridor includes wetlands and wooded areas in localized areas. A total of 64 special status wildlife species and three special status plant species potentially occur within the proposed corridor. However, impacts to these species are not anticipated to these species with the implementation of best management practices and mitigation measures.

11. *Problems raised by federal agencies, other state agencies, and local entities.*

    To date, no problems have been indentified. Federal and state agencies were contacted during the data collection phase of the proposed Project. These agencies have provided input and identified concerns that have been addressed in this document.

D.2 Proposed Corridor Location and Selection Criteria

The proposed transmission line must originate at the existing Williston Interconnect Substation and terminate at the existing Tioga Substation. No alternative corridors were selected. Alternative corridors would not be feasible based on the proposed Project's need and design.

The criteria identified and illustrated in this section and **Exhibits D-1** through **D-9** are difficult to list in order of importance in terms of relative value as they are closely interrelated. They were of equal value and importance in the corridor selection process. The exclusion, avoidance, and selection criteria are discussed in the following sections.

The PSC requires a two-step process consisting of identifying and selecting corridors and routes within corridors. Corridor widths are to be 10 percent of the total corridor length, with a maximum width not to exceed 6 miles.

Transmission line routing criteria have been developed using PSC guidelines for Energy Conversion and Transmission Siting (North Dakota Century Code, Title 49). Additional criteria have been included, when appropriate. The criteria are applicable to the identification of potential alternative corridors and potential alternative routes. Routing criteria were updated and refined to reflect issues and concerns expressed by federal, state, and local agencies, the applicant, and the public.

The PSC classifies routing constraints as exclusion areas, avoidance areas, selection criteria, and policy criteria. The criteria are summarized in the following sections.

D.2.1 Exclusion Areas

Exclusion areas are defined as geographical areas that are to be completely avoided during transmission line routing. Buffer zones of reasonable distance are to be applied to each exclusion area; natural screening may be considered in determining the extent of the buffer zone. **Exhibits D-1** through **D-3** illustrate exclusion areas that occur within and immediately adjacent to the proposed corridor. Exclusion areas include:

1. *Designated or registered national: parks, memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas.*

   None are located within the proposed corridor.

2. *Designated or registered state: parks, historic sites; monuments; historical markers; archaeological sites and nature preserves.*

   Based on the review of cultural resources information obtained from the State Historical Society of North Dakota, cultural resource sites occur within the proposed corridor.

3. *County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.*

   Three parks have been identified as occurring within or near the town of Williston on the south end of the proposed corridor. Harmon Park and East Lawn Park located in Williston, and Twin Lakes Park located north of Williston and occur approximately 1 mile (or greater) east of the proposed corridor (**Exhibit D-1**). There are several golf courses (Ray Golf Course, Tioga Golf Course, Williston Municipal Golf Course, Eagle Ridge Golf Course) that also occur within and adjacent to the proposed corridor. No other parks or recreational areas occur within or adjacent to the proposed corridor.

4. *Areas that are critical to the life stages of threatened or endangered animal or plant species.*

   Although federally listed species, such as the whooping crane and piping plover may occur within the proposed corridor, critical habitat for these species does not occur within the proposed corridor.

5. *Areas where animal or plant species that are unique or rare to the state would be irreversibly damaged.*

   Although state sensitive animal and plant species occur within the proposed corridor, none of these species would be irreversibly damaged by construction activities. **Exhibits D-1** through **D-3** illustrate general locations of state sensitive species populations present within and adjacent to the proposed corridor.

D.2.2 Avoidance Areas

Avoidance areas are defined as geographical areas that are to be completely avoided during transmission line routing, unless the applicant shows that under the circumstances, there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the PSC may consider, among

other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative routes. Economic considerations alone shall not justify approval of these areas. Buffer zones of a reasonable distance shall be included, unless a distance is specified in the criteria. Natural screening may be considered in determining the width of the buffer zone. **Exhibits D-4** through **D-6** illustrate the avoidance areas that occur within the proposed corridor. Avoidance areas include:

1. *Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.*

   The proposed corridor was selected to avoid lands operated by the USFWS Wetland Management Districts (WMD) within the proposed corridor including Lostwood WMD and Crosby WMD, which maintains the Tioga Waterfowl Production Area located west of the Town of Tioga. Additionally, the proposed corridor avoids the majority of lands managed by the U.S. Army Corps of Engineers (USACE) as wildlife and grassland areas. These areas include the Williston Grassland Area, Little Muddy Wildlife Area, and the Williston Grassland Area (see **Exhibit D-4**). USACE lands that are included within the proposed corridor include a small portion of the Williston Wildlife Area located south of the Town of Williston (see **Exhibit D-4**). There are no wild, scenic, or recreational rivers within the proposed corridor.

2. *Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.*

   The proposed corridor was selected to avoid designated or registered state wild, scenic, or recreational rivers; game refuges; game management areas (i.e., Lewis and Clark Wildlife Management Area, White Earth Wildlife Management Area); management areas; forests; forest management lands; and grasslands.

3. *Historic resources that are not specifically designated as exclusion or avoidance areas.*

   None are located within the proposed corridor.

4. *Areas that are geologically unstable.*

   No faults are known to occur within the proposed corridor. However, due to underground lignite mining, sinkhole-type subsidence, fissures, and unstable ground conditions do exist within the proposed corridor.

5. *Areas within 500 feet of a residence, school, or place of business (also to include community centers, healthcare facilities, and daycare facilities).*

   Residences, other structures, active and abandoned schools, and businesses are located within the proposed corridor. The majority of the residences and other structures are scattered throughout the proposed corridor. The highest density or residences and businesses are located in the towns of Williston, Ray, and Tioga. Several schools occur within the proposed corridor, of which the majority occur in rural portions of the proposed corridor.

6. *Reservoirs and municipal water supplies.*

   The proposed corridor includes a total of eight wells used for municipal water supplies. The majority of these wells are located near the Town of Ray.

7. *Water sources for organized rural water districts.*

   None are located within the proposed route.

8. *Irrigated land.*

   The proposed corridor includes all or parts of eight center-pivot irrigation fields.

9. *Areas of recreational significance that are not designated as exclusion areas.*

   None are present within the proposed corridor.

D.2.3 Selection Criteria

In selecting its proposed corridor, a corridor or route shall be designated only when it is demonstrated to the PSC by the applicant that any significant adverse effects that would result from the location, construction, and maintenance of the facility as they relate to the following, would be at an acceptable minimum, or that those effects would be managed and maintained at an acceptable minimum. Selection criteria within the proposed corridor are illustrated in **Exhibits D-7** through **D-9**. Selection criteria include:

1. *Agricultural production.*

   Land within the proposed corridor is predominantly used for agricultural production, which could not be avoided during the corridor identification process.

2. *Family farms and ranches.*

   Family farms and ranches could not be avoided during the corridor identification process. Rural residences and buildings would be avoided during the routing process.

3. *Land that the owner can demonstrate has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation.*

   Any areas for future irrigation would be identified along the proposed route via landowner discussions and avoided to the extent practicable.

4. *Surface drainage patterns and groundwater flow patterns.*

   Section B.2.3, Hydrology and Drainage, provides a general description of the hydrology and surface drainage within the proposed corridor. Perennial, ephemeral, and intermittent creeks and wetlands occur within the proposed corridor. These areas would be identified along the proposed route and avoided to the extent practicable.

5. *Noise-sensitive land uses.*

   Section B.2.15, Noise, provides information regarding existing noise levels and potential sensitive receptors within the proposed corridor.

6. *The visual effect on the adjacent area*.

   Section B.2.14, Visual Resources, provides information regarding the visual landscape and potential sensitive receptors within the proposed corridor.

7. *Extractive and storage resources.*

   The eastern portion of the proposed corridor includes several oil and natural gas fields, along with three natural gas plants. Transmission line development is not expected to have any impact on these resources.

8. *Wetlands, woodlands, and wooded areas.*

   Wetlands, woodlands, and wooded areas, including shelterbelts, occur in localized areas within the proposed corridor. These areas would be avoided wherever feasible by the proposed route.

9. *Radio and television reception, and other communication or electronic control facilities.*

   Several radio, television, and other communication facilities occur within the proposed corridor. However, the operation of the proposed Project would not affect either communication transmission or reception.

10. *Human health and safety.*

    Not applicable to the corridor selection process. Potential impacts to human health and safety have been addressed in the Route Permit Application.

11. *Animal health and safety.*

    Not applicable to the corridor selection process. Potential impacts to animal health and safety have been addressed in the Route Permit Application.

12. *Plant life.*

    Not applicable to the corridor selection process. Potential impacts to plant life have been addressed in the Route Permit Application.

D.2.4 Policy Criteria

The PSC may give preference to an applicant that would maximize benefits that result from the adoption of the following policies and practices, and in a proper case, may require the adoption of such policies and practices. The PSC also may give preference to an applicant that would maximize interstate benefits. Policy criteria include:

1. *Location and design.*

   The proposed corridor was selected to avoid sensitive resources to the extent possible.

2. Training and utilization of available labor in North Dakota for the general and specialized skills required.

   Not applicable.

3. *Economics of construction and operation.*

   Not applicable.

4. *Use of citizen coordinating committees.*

   Not applicable.

5. *A commitment of a portion of the transmitted product for use in North Dakota.*

   Power would be purchased by Mountrail-Williams Electric Cooperative, Western, and MDU, which are local energy suppliers. The proposed transmission line would serve the increasing electrical load needed for oil and gas activity in North Dakota.

6. *Labor relations.*

   Union and non-union construction contractors would bid on the proposed Project. The construction contract would be awarded to the lowest qualified bidder. Transmission line construction would require special skills and equipment. The construction contractor would be encouraged to use local labor when possible.

7. *The coordination of facilities.*

   The existing Williston Interconnect Substation would be used to interconnect with the Tioga Substation.

8. *Monitoring of impacts.*

   Not applicable.

9. *Utilization of existing and proposed ROWs and corridors.*

   The proposed corridor was selected to maximize the potential use of existing highways, roads, and section lines.

10. *Other existing or proposed transmission facilities.*

    Not applicable.

D.2.5 Design and Construction Limitations

In order to serve the intended functions of transmitting electricity from the Williston Interconnect Substation to the northwestern North Dakota area, the proposed transmission line must originate at the Williston Interconnect Substation and terminate at the Tioga Substation. Areas of construction limitations including exclusion areas, avoidance areas, selection criteria, and policy criteria are described in sections D.2.1 through D.2.4 and illustrated in **Exhibits D-1** through **D-9**.

D.2.6 Economic Considerations

BEPC is committed to constructing the proposed transmission line as economically as possible while strictly adhering to the PSC's criteria. The anticipated construction cost for installation of the proposed transmission line towers within the proposed corridor is $24.3 million; annual operation costs are estimated at approximately $23,673 per year for the proposed transmission line.

D.3 Mitigative Measures

Construction specifications would be designed to minimize potential impacts associated with the proposed transmission line. Certain impacts may not be entirely avoidable, but could be mitigated to reduce the severity and longevity. Specific mitigation measures for the proposed Project have been provided in **Appendix D**.

D.4 List of Preparers and Qualifications

This application for a Certificate of Corridor Compatibility was prepared by AECOM Inc., dba AECOM Environment (AECOM) (formerly ENSR Corporation), BEPC, and Metcalf. The qualifications of the individuals who participated in the preparation and review of this application are provided in **Table D-1**.

Table D-1 Qualifications of Application Preparers

Company and Person	Responsibilities	Education and Experience
AECOM Environment - Fort Collins, Colorado		
Jon Alstad	Corridor Compatibility Application Manager	M.S. Range Science B.S. Animal Science A.A. Liberal Arts 20 Years Experience
George High	Project Manager	B.S. Biology 34 Years Experience
Peggy Roberts	Assistant Project Manager, Public Involvement Specialist	B.J. Journalism/PR M.S. Public Communications (in progress) 17 Years Experience
Erik Bray	Wildlife and Fisheries	B.S. Wildlife Management and Biology 10 Years Experience
Jessica Rubado	Special Status Species	B.S. Fisheries and Wildlife Science 9 Years Experience
Terra Mascarenas	Soils	B.S. Soil Science (Environmental Concentration) 11 Years Experience
Rachel Ridenour	Vegetation and Special Status Plant Species	B.S. Natural Resource Management 1 Year Experience
Kim Munson	Cultural Resources	M.A. Anthropology B.A. Anthropology 13 Years Experience
Bill Berg	Geology, Mineral Resources, and Paleontology	M.S. Geology 30 Years Experience
Billy Williams	GIS	B.S. Forestry Science 1 Year Experience
Matt Brekke	Technical Support	B.S. Wildlife Biology 2 Years Experience
Susan Coughenour	Technical Editor	Two Years General Studies 25 Years Experience
Basin Electric Power Cooperative – Bismarck, North Dakota		
Duey Marthaller	Project Manager	M.S. Civil Engineering B.S. Civil Engineering 29 Years Experience Registered Professional Engineer

Table D-1 Qualifications of Application Preparers

Company and Person	Responsibilities	Education and Experience
Kevin Solie	Environmental Analyst	M.S. Geology B.S. Geology B.S. Geological Engineering 17 Years Experience Engineer in Training
Mike Murray	Right-of-Way	A.A. Business Administration Various Courses through International ROW Association SR/WA (Senior ROW designation) 8 Years Experience
Valeree King	Right-of-Way	Interstate Business College – Legal Writing and Descriptions Various Courses through International ROW Association 16 Years Experience
Don Hellman	Right-of-Way	2 yr degree Electrical tech Associate Arts and Science degree Various courses through International ROW Association 36 Years experience working for Utility Companies with the last 16 years in ROW
Duffy Heinle	Right-of-Way	A.A. Criminal Justice A.S. Polygraph Sciences B.A. College Studies 1 Year Experience
Veda Christman	Right-of-Way	B.S. Business Administration Various courses through International ROW Association 10 Years Experience
Jason Brekke	GIS Analyst	BS Geography 7 Years Experience
Curt Pearson	Corporate Communications	B.S. Business Administration M.B.A. Cert. Cooperative Communicator 30 Years Experience
Metcalf Archaeological Consultants – Eagle, Colorado		
Patrick O'Brien	Cultural Resources	M.A. Anthropology B.A. Anthropology 17 Years Experience

D.5 Maps

Detailed maps (i.e., **Exhibits**) of the proposed corridor have been provided in the **Exhibits** section.

D.6 Permits, Licenses, Approvals, and Consultation Requirements

Permits, consultations, and approvals would be required from various federal and state agencies, which would include:

- North Dakota Public Service Commission – Certificate of Corridor Compatibility and Route Permit;
- Western – System Interconnection Authorization, compliance with the National Environmental Policy Act and Native American Consultation;
- USFWS – Compliance with the ESA (section 7 consultation), compliance with the MBTA;
- State of North Dakota Historic Preservation Office – Compliance with the NHPA (section 106 consultation);
- Federal Aviation Administration – Aeronautical study with a determination of hazards and requirements for painting and/or lighting;
- Federal Communications Commission – Agency may require registration and lighting of tower less than 200 feet tall;
- North Dakota Department of Transportation – Permit to construct and operate a transmission line across or within highway ROWs;
- Burlington Northern-Santa Fe Railroad – Authorization to construct and operate a transmission line across railroad ROWs;
- NDGFD – Consultation to identify any state-listed species of concern that could potentially be affected by the proposed Project; and
- Willliams County – Acquire Zoning Permit.

D.7 References

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