Environmental Assessment

United States Bureau of Indian Affairs

Great Plains Regional Office
Aberdeen, South Dakota

ORIGINAL

Arrow Midstream Holdings, LLC
Oil and Gas Gathering System

Fort Berthold Indian Reservation

March 2009

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Finding of No Significant Impact

Arrow Midstream Holdings, LLC, Oil and Gas Gathering System

The U.S. Bureau of Indian Affairs (BIA) received a proposal for construction of three pipelines (oil, gas and water) and a utilities line. The gathering system would be installed in a single 50-foot Right-of-Way (ROW) on the Fort Berthold Indian Reservation, in T149N R93W, T149N R94W and T150N R94W in Dunn and McKenzie Counties, North Dakota. Associated federal actions by BIA include determinations of effect regarding cultural resources and approvals of leases, rights-of-way and easements.

Potential of the proposed action to impact the human environment is analyzed in the attached Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the recently completed EA, I have determined the proposed project will not significantly affect the quality of the human environment. No Environmental Impact Statement is required for any portion of the proposed activities. This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.

2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, water resources, and cultural resources. The potential for impacts was disclosed for both the proposed action and the No Action alternative.

3. Guidance from the U.S. Fish and Wildlife Service was fully considered.

4. The proposed action was designed to avoid adverse effects to historic, archaeological, cultural, and traditional properties, sites, and practices. The Tribal Historic Preservation Officer has concurred with BIA's determination that no historic properties will be affected.

5. Environmental justice was fully considered.

6. Cumulative effects to the environment are either mitigated or minimal.

7. No regulatory requirements have been waived or require compensatory mitigation measures.

8. The proposed project will improve the socioeconomic condition of the affected Indian community.

Regional Director – GPRO

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3/2/2009
Date

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1. Purpose and Need for the Proposed Action

Arrow Midstream Holdings, LLC is proposing to construct and operate the trunk line of an oil, gas and water gathering system on the Fort Berthold Indian Reservation. Plans also include a buried electrical power line. For convenience, this document will refer to these facilities collectively as "the project" or as Arrow Midstream Holdings Pipeline (AMHP).

Development has been proposed on tribal land held in trust by the United States in McKenzie and Dunn Counties, North Dakota. The U.S. Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The proposed project would also cross land owned in fee simple title in McKenzie County. As shown in Figure 1, AMHP would start about 4.5 miles east of Mandaree, North Dakota, in the NENW of Section 16, T149N R93W. Heading west, AMHP would roughly follow the south side of BIA Route 12, then head north on the west side of North Dakota State Highway 22. At the junction of Highways 22 and 73, the powerline and pipelines would turn west again on the south side of Highway 73. The project would terminate off the reservation at a new tank farm and shipping facility about three miles east of Johnson's Corner, in the NWNE of Section 19, T150N R96W.

The economic development of available resources and associated BIA actions are consistent with BIA's general mission. Leasing and development of mineral resources offer substantial economic benefits to both the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation (MHA Nation) and to individual tribal members. The AMHP is being proposed to reduce waste of valuable resources through continued flaring of gas and to mitigate environmental and public safety concerns – including visual impacts, noise, heavy truck traffic and road deterioration.

Oil and gas exploration and development activities are conducted under authority of the Indian Mineral Leasing Act of 1938 (25 USC 396a *et seq.*), the Gas Royalty Management Act of 1982 (30 USC 1701, *et seq.*), the Energy Policy Act of 2005 (42 USC 13522) and 25 Code of Federal Regulations (CFR) 169. BIA actions in connection with the proposed project are largely administrative and include approval of rights-of-way and determinations regarding cultural resource effects.

This proposed federal action requires compliance with the *National Environmental Policy Act* of 1969 (NEPA) and analysis of the proposed project's potential to impact the human and natural environment. Compliance with NEPA is expected to both improve and explain federal decision making. This EA will result in either a Finding of No Significant Impact (FONSI) or a decision to prepare an Environmental Impact Statement (EIS).

There are several components to the proposed action. Existing roads would be used to access AMHP for construction or operation and would be maintained to existing or improved conditions. After the AMHP corridor and facility pad were cleared and topsoil stockpiled, the pipeline trench would be excavated, pipelines installed and the trench promptly backfilled, re-graded, re-seeded and reclaimed. A storage and transfer facility would be constructed off the reservation on fee land. Analysis of potential impacts from this portion of the project is included in this document as reasonably foreseeable and stemming from BIA actions, but BIA does not have direct jurisdiction over the storage facility's operation or reclamation. All project components on trust land would eventually be reclaimed and abandoned according to applicable federal and tribal conditions, unless formally transferred with federal approval to either the BIA or the landowner.

Any authorized project will comply with all applicable federal, state and tribal laws, rules, policies, regulations and agreements. No construction or other ground-disturbing operations will begin until all necessary leases, easements, surveys, clearances, consultations, permissions, determinations and permits are in place. Additional NEPA analysis, findings and federal actions will be required prior to development beyond what is described and analyzed in this EA.

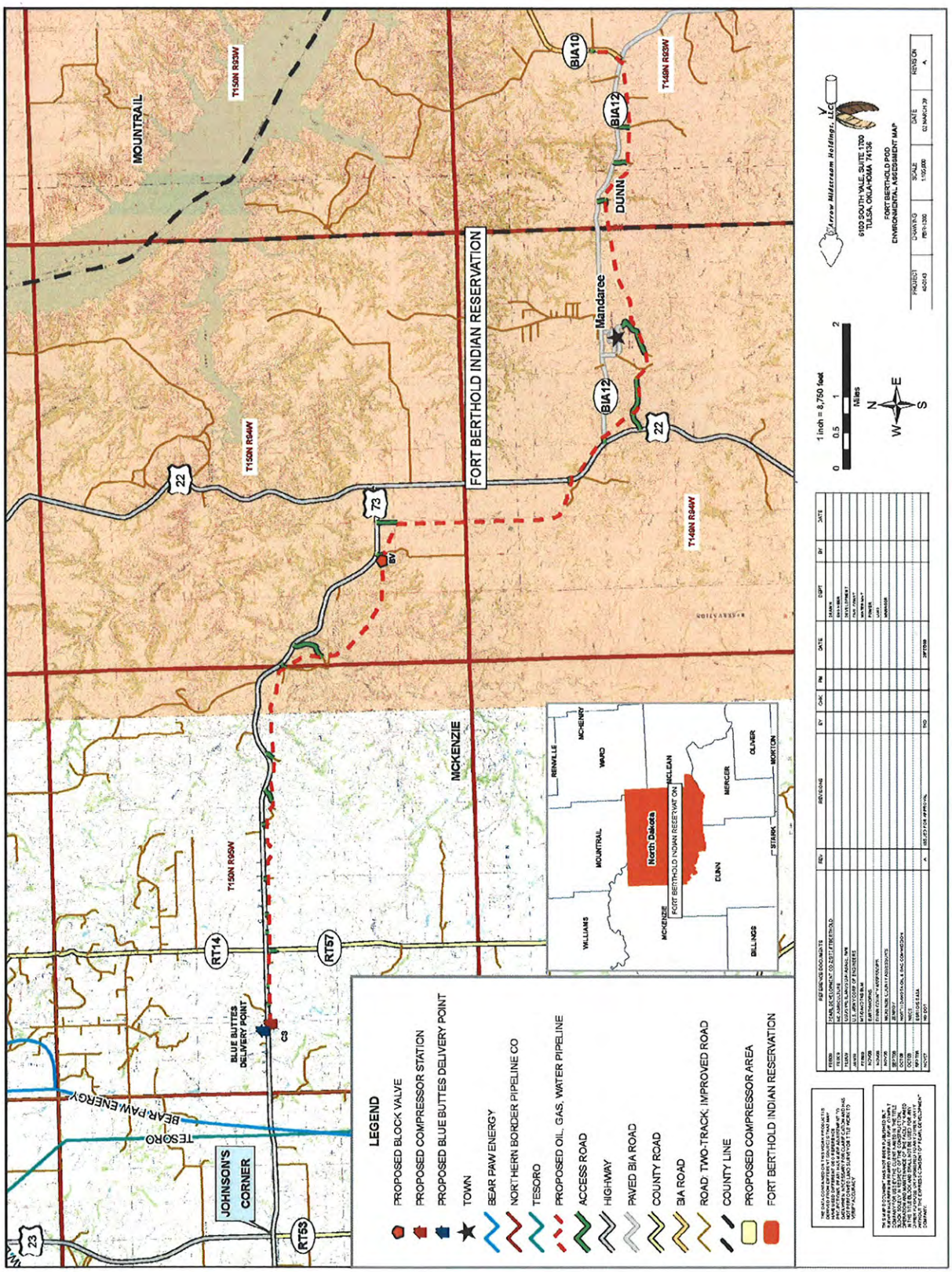


Figure 1: Project location.

2. Proposed Action and Alternatives

The **No Action alternative** must be considered within an Environmental Assessment. If this alternative is selected, BIA would not approve the proposed oil and gas gathering system. Current land use practices would continue, as would current oil and gas operations. Transport of oil and water from wells on the reservation would continue on heavy trucks; truck traffic would increase over time as more wells were installed. Valuable resources would continue to be wasted without economic benefit, as gas is flared rather than brought to market. No Action is the only available or reasonable alternative to the specific proposal considered in this document.

The proposed project consists of a single corridor in which would be buried an electrical line and pipelines for oil, gas and wastewater separated at the well pad. As shown in Figure 1, about 13.5 miles of the system would be on the reservation. The AMHP right-of-way (ROW) would start about 4.5 miles east of the town of Mandaree, then roughly follow BIA Route 12, ND Hwy 22 and ND Hwy 73 to a point about 4.5 miles past the reservation boundary. The AMHP would end at a proposed oil and gas storage and transfer facility on the south side of Hwy 73.

All construction activities would follow stipulations, practices, and procedures outlined in this document, associated technical reports, guidelines and standards in *Surface Operating Standards for Oil and Gas Exploration and Development* (U.S. Department of the Interior [USDI] and U.S. Department of Agriculture [USDA] 2007), and any conditions added by the BIA. All pipeline operations would be conducted in full compliance with applicable laws and regulations. The proposed action is described in more detail in the remainder of this chapter.

2.1 System Design and Relation to Other Pipelines

The proposed system would consist of three separate pipelines for transport of oil, gas and produced water. An electrical utility line would also be installed for future service to compressors, well sites and pumping stations. As shown in Figure 1, all system components would begin at the same point about 4.5 miles east of Mandaree. A 100-foot wide construction ROW corridor about 18 miles long would cross tribal, fee and allotted lands. The ROW would be reduced to 50 feet wide after construction was completed. A new storage and transfer facility would be constructed off the reservation about three miles east of Johnson's Corner, where there is easy access to ND Hwy 73 for truck hauling of oil to market and of wastewater to an off-reservation injection well. All system components would end at the new facility, with the exception of a slight extention of the gas pipeline, which would connect to an existing Bear Paw regional gasline just north of the new facility at Blue Buttes. Bear Paw has indicated it has sufficient capacity to accept deliveries of gas from AMHP.

Table 2.1: Estimated average daily production over time

	Oil Barrels/day	Gas	Water
Year 1	243	195	44
Year 2	115	92	21
Year 3	80	64	14
Year 4	53	51	11
Year 5	45	42	9
Year 6	40	36	8
Year 7	36	32	7
Year 8	33	29	7
Year 9	30	26	6
Year 10	28	24	5

No lateral pipelines or other secondary gathering lines have been proposed to collect products or waste products from any producing or proposed wells. The proposed project consists of a trunkline system only, which could be operated at low or high pressure. At low pressure (no more than 80 psig), the system could move more than 14,000 barrels of oil, nine million cubic feet of gas and 4,000 barrels of water each day. This is the expected output of about 100 wells. Operated at high pressure with necessary infrastructure, daily capacity would be more than 100,000 barrels of oil, 90 million cubic feet of gas and 15,000 barrels of water, which is roughly the output of 1,000 wells. These claims are based on estimated daily production rates for oil, gas and water over ten years of operation, as shown in Table 2.1. As the table clearly shows, output from the Bakken is expected to decline abruptly over the first several months of production, after which output continues to decrease, but the rate of decline tends to slow.

West and south of the Missouri River and Lake Sakakawea, the Fort Berthold Indian Reservation comprises about 365,000 acres. Most of these acres have been leased for oil and gas exploration and possible production. Well spacing units vary according to producer preference and geologic conditions, but commonly range from 320 acres to 1280 acres per well. Full development of the leased area therefore results in an estimated total number of wells between 285 and 1140. Given the size of the service area, the variation in spacing units, and the low probability that all leases will result

in commercial production, a system with capacity to service 1,000 wells is considered to render additional trunk line construction in the immediate area unnecessary. Construction of the proposed system does not, however, preclude construction of additional trunklines in the immediate area.

If well locations and production rates support additional construction, the proposed trunkline is sufficiently modular to allow for extensions north, east and south by either Arrow Midstream Holdings, or by another pipeline operator. To achieve its purpose, the proposed project must be augmented with gathering lines to individual producing wells or off-site tank batteries. Arrow Midstream Holdings has suggested it may propose connection to about ten wells the first year, with 10-20 wells added each following year. Low pressure service would not require any compression or pumping stations on the reservation, and no such facilities are included in the proposed project, but high-pressure facilities may be proposed in the future in response to production on the reservation and producer interest. All such construction, cooperative arrangements and connections require design compatability, mutually agreeable economic terms, additional NEPA analysis, and BIA approval. Off-reservation connections to existing regional oil or gas pipelines do not require BIA review or approval, unless trust land may be directly or indirectly impacted.

2.2 Construction Plan and Specifications

Construction is expected to require four to six months and would be confined within a 100-foot wide temporary right-of-way (ROW). Pipeline materials would be staged at the storage facility and/or trucked directly to the corridor via existing federal, state, county roads and private roads. Traffic is expected to be heavy and daily at all access points. Prior to construction, road conditions would be documented in a photographic record provided to BIA, and erosion controls would be installed as necessary or as determined by BIA. Existing roads used to access the AMHP corridor would be maintained until final abandonment and reclamation of the corridor occurs. Excessive rutting or other surface disturbing activities would be avoided. No new roads would be constructed. Traffic would be confined to the ROW and access roads designated in Table 2.2 and shown in Figure 2.2a. All off-road driving, other than within the ROW, would be strictly prohibited. Signs would be installed on approved access roads and would also be used to identify roads where access is prohibited.

The gathering system would include three pipelines. One 10" oil line, one 12" gas line and one 6" waterline would be laid in a continuous operation in either a single 60" trench or in two 36" trenches. Although DOT regulations do not apply in the sparsely populated project area, all pipe and facilities in the system would be designed, assembled and installed in accordance with the DOT Title 49 CFR Part 195 and Part 192, and American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME) B31.4 and B31.8. Oil and gas lines would be constructed of carbon steel to high pressure specifications and hydrostatically tested to more than 1,000 psig; wall thicknesses would allow for a minimum of 1/16" internal corrosion. The 6" water line would consist of a fiberglass and polyethylene composite rated and tested to at least 750 psig. All three lines could be operated at either high or low pressure.

Table 2.2: Access roads

Access Road Number	Location	Description	Ownership	Length (miles)
1	HWY 73 TO PIPELINE SEC 19/20 T150N R95W	two-track	FEE	0.03
2	HWY 73 TO PIPELINE NWNW SEC 20 T150N R95W	two-track	FEE	0.03
3	HWY 73 TO PIPELINE NENW SEC 20 T150N R95W	two-track	FEE	0.03
4	CO RD 57 TO PIPELINE NENE SEC 20 T150N R95W	two-track	FEE	0.10
5	HWY 73 TO PIPELINE NWNW SEC 21 T150N R95W	two-track	FEE	0.04
6	HWY 73 TO PIPELINE NENW SEC 21 T150N R95W	two-track	FEE	0.05
7	HWY 73 TO PIPELINE NENE SEC 21 T150N R95W	two-track	FEE	0.06
8	HWY 73 to pipeline, NENE SEC 22 T150N R95W	two-track	FEE	0.06
9	HWY 73 to pipeline, NWNW SEC 23 T150N R95W	two-track	FEE	0.21
10	HWY 73 to pipeline, NWNE SEC 23 T150N R95W	improved scoria road	FEE	0.12
11	HWY 73 to pipeline, allotments 1131A, 1131A-A	bladed	1131A; 1131A-A	0.07
12	IMPROVED RD to pipeline, allotment 1131A-A	bladed	1131A-A	0.03
13	HWY 73 to pipeline, allotment 2259-A	two-track	2259-A	0.50
14	HWY 73 to pipeline, allotment 1598A	two-track	1598A	0.10
15	HWY 73 to pipeline, allotment 1598	two-track	1598	0.28
16	HWY 22 to pipeline, allotments T743A, 742A	two-track	T743A; 742A	0.05
17	HWY 22 to pipeline, allotments 743A-C, 742A	two-track	743A-C; 742A	0.03
18	BIA 12 to pipeline, Sec.10/16 T149N R94W	paved road	BIA	0.09
19	HWY 22 to allotments 861A-D, 862A-C, 862A-A	two-track	861A-D; 862A-C; 862A-A	0.76
20	BIA paved road to allotments G3118, T695A	two-track	G3118, T695A	0.65
21	BIA 12 to pipeline, allotment T897A	improved gravel road	T897A	0.12
22	Improved road to pipeline, allotment T897A	two-track	T897A	0.06
23	BIA 12 to pipeline, allotment 3068	two-track	3068	0.19
24	BIA 12 to pipeline, allotment744A	two-track	744A	0.18
25	BIA 12 to pipeline, allotment 688A	two-track	688A	0.17
26	BIA 12 to pipeline, allotment T690A-B	improved gravel road	T690A-B	0.02
27	BIA 10 to pipeline, allotment 690A-A	two-track	690A-A	0.02
28	BIA 10 to pipeline, SESW SEC 9 T149N R93W	improved scoria road	Fee	0.03

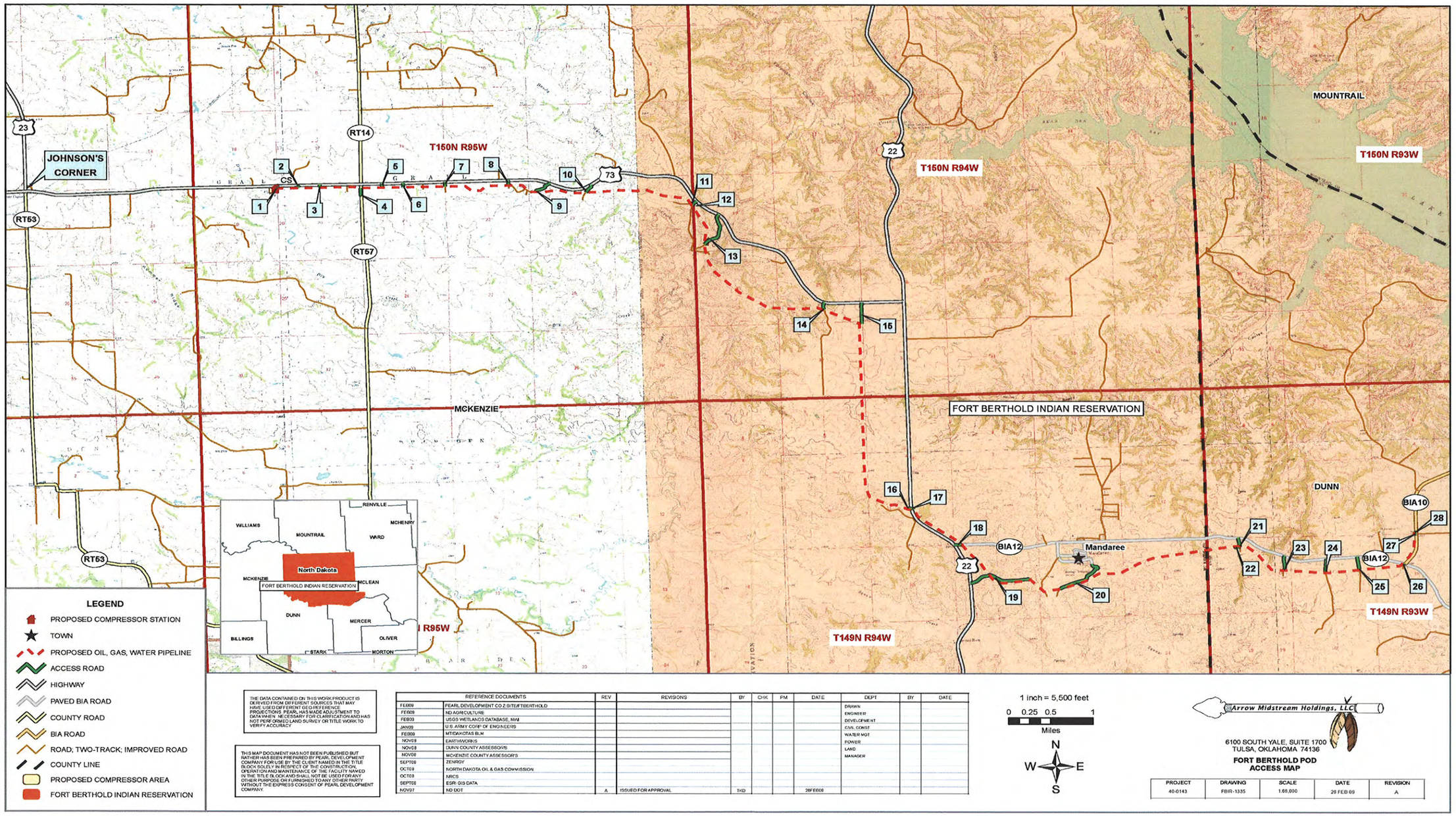


Figure 2.2a: Access Roads

Installation of pipelines and utilities would require clearing and grading within the construction ROW. Topsoil would be separated and stockpiled to prepare for prompt re-seeding and reclamation of the disturbed surface. Continuous beneficial use of pastures, grazing units, livestock facilities and public improvements would be maintained. Trenches would be excavated to a depth of 78 inches to minimize frost heaving, using either rotary trenching equipment or backhoes, and pipelines would be covered with at least 66 inches of backfilled soil. Cover will increase to at least 72 inches at highway crossings, borrow ditches and at the lowest points within a highway ROW. Typical procedures are shown in Figure 2.2b. After construction, the ROW would be reduced to 50 feet wide.

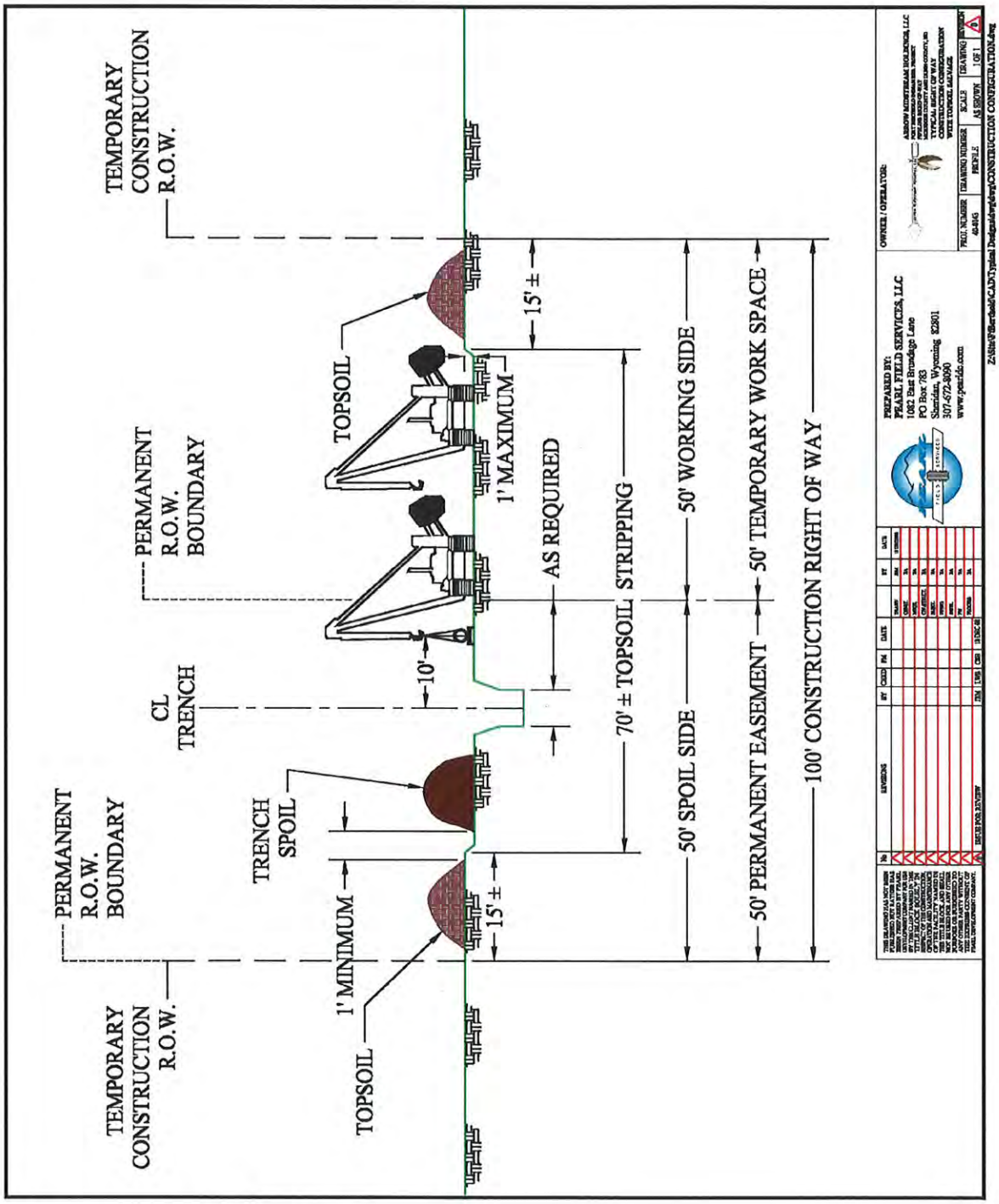


Figure 2.2b: Typical ROW construction

Trenches may be open for several days before pipes are placed and the trench backfilled. Crossings would be created as needed by temporarily filling the trench to allow pedestrians and vehicles to cross over. Ramps or soft plugs would be installed to help wildlife and domestic stock to escape the trench. BIA's instructions on all of these measures would be binding on the operator/installer. Installation involves several other procedures that are summarized below:

- **Stringing:** Stringing is a method of pipeline delivery that involves trucking the pipe from the pipe supplier to designated locations along the ROW prior to bending, line-up, and welding the pipe.
- **Bending:** After stringing is completed along a section of pipe, a hydraulic bending machine would field-bend each pipe to conform to vertical and horizontal changes in the trench. If a required bend exceeds certain design criteria, factory-bent segments may be required.
- **Welding:** After the pipe segments are bent, they would be welded together. The pipeline will be mounted on supports as a continuous line along the side of the trench to facilitate welding.
- **X-ray/Inspection:** A certified welding inspector would visually inspect each weld and 100% of the welds would be x-rayed in the field to detect flaws that could lead to pipeline failure. All welds of pre-fabricated assemblies and welds at road and stream crossings would be x-rayed.
- **Lowering:** Sideboom tractors would then lower the pipeline into the open trench. Before backfilling, the trench and pipeline would be inspected to ensure that 1) the trench is deep enough to comply with minimum cover requirements; 2) the bottom of the trench is free of large rocks, tree limbs, large roots, and other debris; 3) the pipe bends adequately conform to the trench; and 4) the external coating on the pipe has not been damaged. If the trench line is located in rock, soil padding and rock shield would be used to protect the pipeline from damage when it is lowered.
- **Hydrostatic Testing:** After the pipe is placed in the trench, the line would be pressure tested with water for structural soundness. Test water for hydrostatic testing would be trucked from a municipal source and returned, via the pipeline, to the facility. The water will then be hauled off and disposed of in a permitted facility.
- **Trench Backfilling:** Marker tape will be added to the pipeline trench to avoid unintended excavation or damage to pipes. After the trench is backfilled, it will be compacted with a wheel roller. A 3- to 6-inch crown would be left over the centerline of the trench to allow for natural subsidence. Trench breakers, or water stops, would be installed, as necessary, adjacent to wetlands or stream crossings to eliminate groundwater migration along the trench. Trench breakers are areas along the pipeline where bentonite, or a similar material, is packed around the pipe. In the event of a pipe blowout, the trench breakers effectively stop water from washing out the area.
- **Re-grading:** After the trench has been backfilled, disturbed areas would be re-graded to original contours and stockpiled topsoil would be redistributed over the ROW.

Other features of the system would include:

- **Air release valves** (ARVs) would be placed at about five high-elevation locations along the water pipeline to release air pressure and prevent disturbances in water flow and prevent damage to pipes and fittings. ARVs would surface in a two-foot wide covered manhole extending about 12 inches above ground surface. The manhole is a non-pressurized, insulated vessel allowing access to the ARV. ARVs pose no threat to livestock or humans.
- **Pipeline inspection gauges** (PIGs) are tools sent down gas pipelines to clean the line or inspect the walls. The AMHP launcher will be installed at the east end of the gas pipeline on a 20' x 35' pad enclosed by a chain link fence or housed in a shed painted an unobtrusive color determined by BIA. The receiver for the PIG would be located at the storage facility at the west end of AMHP. The launcher enclosure will also include storage for 90 barrels of methanol for injection into the gas line to prevent freezing of water in that line and a 20-foot tall radio antennae to communicate with the PIG receiver site.
- As shown in Figure 1, a manual **block valve** will be installed in the SESE of Section 29, T150N R94W to allow a portion of the gas pipeline to be isolated for repairs or any other purpose. A five-foot diameter covered, insulated manhole would allow access to the block valve six feet underground. The manhole would extend about 12 inches above ground surface. An additional 20' antenna will be located at the block valve and will be powered with a solar panel about 2 feet by 4 feet in size. Radio communications depend on line-of-sight transmission and additional repeaters may be needed to ensure communications from one end of the pipeline to the other. With BIA approval, these radio repeater locations will be located in the future as needed.

- **Tie-in valves** along the AMHP corridor would be needed to connect lateral pipelines to the main AMHP corridor. The number and location of these valves would be determined and proposed for BIA consideration as more productive wells are drilled.

Non-hazardous materials, such as paper, plastic and wood, would be collected and stored in appropriate waste containers with lids. Portable toilets would be confined to trailers while parked in the ROW. A sanitation company would be contracted to periodically remove solid, non-hazardous waste materials and deposit them in an approved landfill.

2.3 Storage Facility

The storage and transfer facility would be built 4.5 miles outside the exterior boundaries of the reservation, in NWNW of Section 19, T150N R95W, on the south side of ND Hwy 73. The facility would occupy less than five acres in a cultivated field, directly adjacent to the highway. A temporary headquarters may be established there, consisting of an office trailer, a portable toilet and a material staging area. Self-contained trailers may house a few key personnel during construction operations, but any such arrangements would be very short-term. Construction personnel would commute to construction areas and no long-term residential camp is proposed. Human waste would be collected in standard portable chemical toilets or service trailers located on site, then transported off site to a state-approved wastewater treatment facility. Other solid waste would be collected in enclosed containers and disposed of at a state-approved facility. During construction, the storage facility would include a truck washing station to prevent the spread of noxious weeds.

The storage facility will include a receiver for pipeline inspection gauges (PIGs), oil and gas separators, tanks for oil and water, a control room, compressors, a product load-out rack, an oil heater-treator, vapor recovery unit and an emergency flare. The emergency flare will be used in situations when the pipeline system must be depressurized, either for maintenance or in response to Bear Paw requirements. Pressure safety valves at the facility would allow gas to be sent to the flare, thus depressurizing the facility to avoid explosions. The closest residence is 0.27 miles to the north. Site details are shown in Figure 2.3, with short-term construction shown in black and longer-term components in green.

Oil received at the storage facility would be stabilized prior to truck transport for sales. Gas would be separated, metered and then transferred to a Bear Paw facility on the other side of the highway via a short pipeline lateral. Water would be hauled off to an approved injection site.

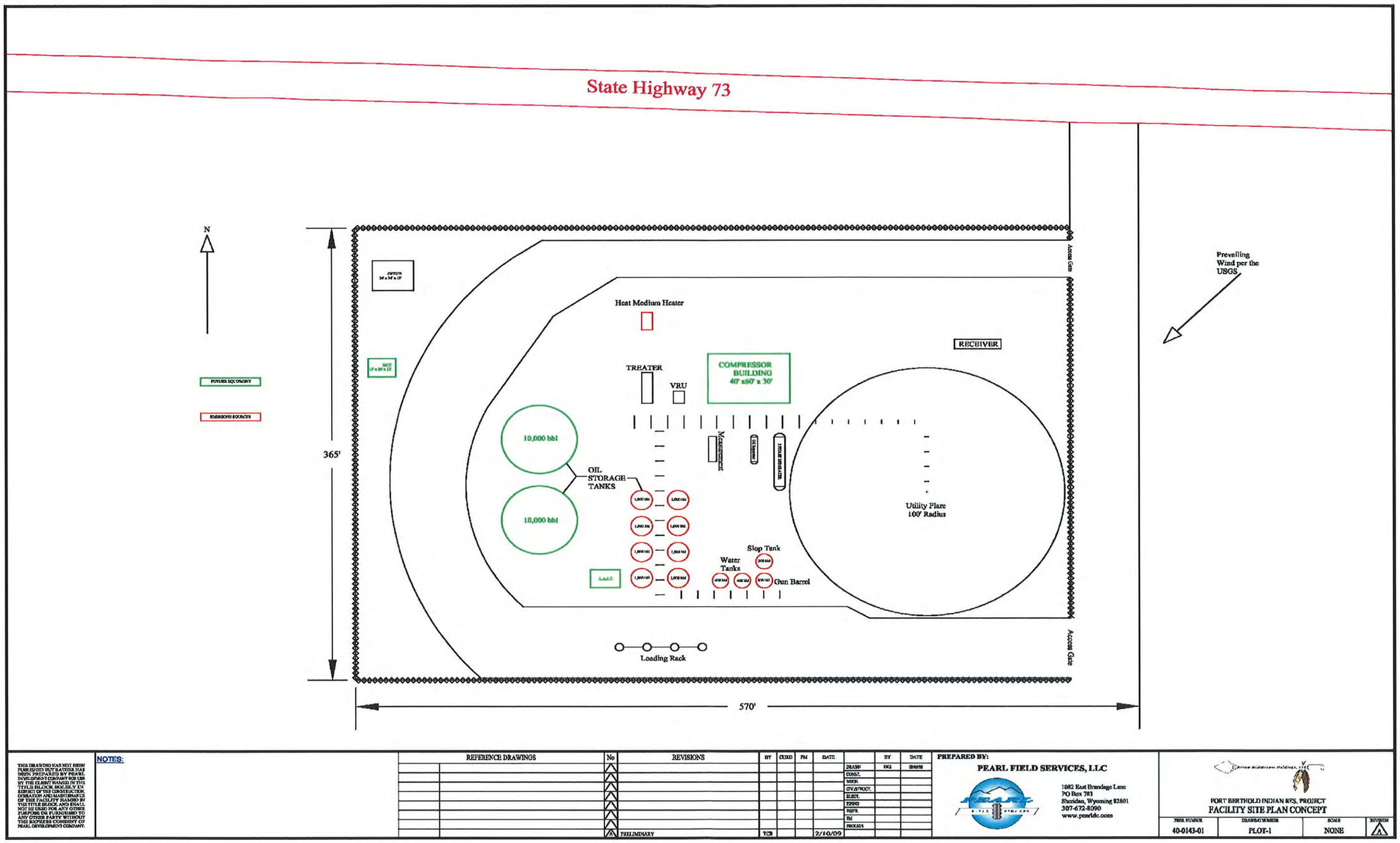


Figure 2.3: Storage facility design

2.4 Directional Drilling

Directional drilling – sometimes referred to as horizontal drilling or boring – can reduce or mitigate surface disturbance, traffic interruptions, damage to roads and environmental impacts to waterways, wetlands, cultural resources or other valuable surface or near-surface assets. A hole would be bored beneath the asset in a shallow arch from one surface location to another. The pipeline is pulled through either the bare hole or through a casing. Locations have been identified within the proposed project area that require directional drilling, either in conformance with North Dakota Department of Transportation regulations or as best management practices around running water, extensive standing water, or steeper, wooded draws. These locations, listed in Table 2.4, include all paved highway crossings and several streams and wetlands. Directional drilling would also be used to avoid impacts to an existing shelter belt and windrow on private property. Wetlands to be bored are discussed in greater detail in Section 3.10 and shown on Figure 3.10.

Table 2.4: Directional drilling locations

Location	Type of Asset	Asset	Length (ft)
SWNE Sec. 16 T149N R93W	road	BIA Route 12	195
NWSW Sec. 14 T149N R94W	wetland	Tributary to Squaw Creek	415
NWNW Sec. 15 T149N R94W	road	BIA 12 Road	360
NWSE Sec. 9 T149N R94W	road	State HWY 22	235
SENE Sec. 32 T150N R94W	wetland	Wetland land in cultivated field	415
NWNW Sec. 30 T150N R94W	wetland	Bear Den Creek	65
SWSW Sec. 19 T150N R94W	wetland	Handy Water Creek	75
NWNW Sec. 24 T150N R95W	wetland	Handy Water Creek	420
NWNW Sec 21 T150N R95W	road	County Road 57	140
NENE Sec. 20 T150N R95W	Private property	Tree and Driveway	425
NENE Sec. 19 T150N R95W	road	State HWY 73	235

2.5 Reclamation

Reclamation would take place throughout the project lifespan. Reclamation would be required after the initial construction, after any maintenance work or addition of auxiliary infrastructure, and before final abandonment of the decommissioned system. At all times, successful reclamation would remain the obligation and responsibility of the system operator.

Trenches would be backfilled immediately after pipe and utility installation and testing, waiting only if soils are frozen or overly wet. A stormwater pollution prevention plan is not required by the EPA (Energy Policy Act, 2005), but a SWPP developed for the off-reservation portion of the project would be applied uniformly to the entire project. Appropriate temporary and long-term measures would be applied to all disturbed areas to minimize and control erosion. Field practices would conform with standard recommendations of the Natural Resources Conservation Service (2003) and may include 1) installing silt fences and erosion fabric, mats or logs; 2) construction of ditches, water bars; 3) seeding, planting, mulching and creation of buffer strips; and/or 4) any other measures required by BIA to minimize erosion and soil loss.

After subsoil on the working side of the ROW was plowed to alleviate compaction, stockpiled topsoil would be redistributed over the ROW. Re-contouring and reclamation of disturbed areas would be accomplished as soon as possible after construction is completed, and no later than by the next appropriate planting season (fall or spring). The ROW would be re-seeded with certified, weed-free seed mixtures established by BIA. In all cases, native species would be used to the extent possible and all seeding and planting would comply with BIA directions to ensure successful reclamation.

The entire corridor would be monitored to identify areas of excessive erosion, subsidence or invasion of noxious weeds. Periodic monitoring would be performed – and repeated reclamation efforts would be undertaken in problem

areas – until BIA has certified the entire corridor as successfully reclaimed. Successful reclamation is defined to include the following observable factors: reproduction from seeded and re-established species, natural invasion of plants from undisturbed adjacent communities, and control or exclusion of noxious weeds. A noxious weed survey was conducted in the project corridor. A weed management plan was developed with BIA to facilitate the treatment of known and likely noxious/invasive weed species. Details of surveys and plans for invasive species can be found in Section 3.9. If re-seeding is not successful within two growing seasons, BIA may require extraordinary efforts to stabilize the site, such as matting the entire area or using a mix of rapidly growing forbs and annual grasses, followed by re-seeding with grasses, forbs, and shrubs with rapidly expanding, deep root systems.

Decommissioning of the pipeline would result in mandatory final reclamation of the corridor. All surface facilities would be removed. Cement foundations would be broken and hauled to an approved disposal site. Gravel pads would be buried onsite or hauled to a disposal site. Compacted areas would be scarified, ripped and re-contoured. Stockpiled topsoil would be redistributed and re-vegetated. Long-term monitoring would be required to ensure successful reclamation and implementation of any necessary remedial efforts.

Due to economic and environmental costs associated with excavation and removal, pipelines would be purged with water to remove hydrocarbons, then abandoned in place.

2.6 Operation and Maintenance

County, state, private and BIA roads used by AMHP would be maintained in the same or better condition as existed prior to the start of operations, as documented in photographs taken prior to construction. Maintenance of roads used to access the ROW would continue until final abandonment and reclamation of the corridor occurs. Excessive rutting or other surface disturbing activities would be avoided or immediately repaired. Maintenance on pipelines and utilities would be confined to the 50' permanent ROW.

Corrosion or leaking might require replacement of system sections. Loss of products or waste products might require excavation of contaminated soils and other remedial projects. All applicable regulations and best management practices would be implemented aggressively to minimize waste of resources and/or environmental damage.

2.7 Preferred Alternative

The preferred alternative is to complete all administrative actions and approvals necessary to authorize or facilitate the proposed installation of pipelines and an electrical line, in order to reduce public hazards and increase economic gain associated with production of oil and gas.

3. The Affected Environment and Potential Impacts

The Fort Berthold Indian Reservation is the home of the Three Affiliated Tribes of the Mandan, Hidatsa and Arikara Nation (MHA Nation). Located in west-central North Dakota, the reservation encompasses more than one million acres, of which almost half are held in trust by the United States for either the MHA Nation or individual allottees. The remainder of the land is generally owned in fee simple title, sometimes by the MHA Nation or tribal members, but usually by non-Indians. The reservation occupies portions of six counties, including Dunn, McKenzie, McLean, Mercer, Mountrail and Ward. In 1956, much of the land was inundated by water and the balance divided into three sections by Lake Sakakawea, an impoundment of the Missouri River upstream of the Garrison Dam near Riverdale, North Dakota.

The proposed AMHP is situated geologically within the Williston Basin, where the shallow structure consists of sandstones, silts, shales and some lignite coal. These date from the Tertiary Period (65 to 2 million years ago). Oil, gas and water to be transported by the proposed project would usually be from the underlying Bakken, Sanish or Three Forks formations. Earlier oil/gas exploration activity within the Reservation was limited and commercially unproductive, but recent economic changes and technological advances now make accessing resources more feasible. Impacts and hazards have increased proportionately.

The reservation is in the northern Great Plains ecoregion, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the Missouri River trench (now flooded); 3) the Little Missouri River badlands; and 4) the Missouri Plateau south and west of Lake Sakakawea (Williams and Bluemle 1978). Much of the reservation is on the Missouri Coteau Slope. Elevation of the glaciated, gently rolling landscape ranges from a normal pool elevation of 1,838 feet at Lake Sakakawea to over 2,600 feet on Phaelan's Butte near Mandaree. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3° and 21° F in January and between 55° and 83° F in July, with 95 to 130 frost-free days each year (Bryce et al. 1998; High Plains Regional Climate Center 2008).

The proposed AMHP is in a rural area with native/mixed-grass prairie. Areas with steep slopes and/or rocky, thin soils are usually used to graze cattle. Some of the areas with broad gentle slopes are farmed, mostly in small grains or perennial hay crops. The broad definition of the human and natural environment under NEPA leads to the consideration of the following elements: air quality, public health and safety, socioeconomic, environmental justice cultural resources, wildlife, soils, water resources, wetlands, vegetation and invasive species. Potential impacts to these elements are analyzed for both the No Action alternative and the preferred alternative. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. The EA also analyzes the potential for cumulative impacts and ultimately makes a determination as to the significance of any impacts. In the absence of significant negative consequences, it should be noted that a significant benefit from the project does *not* in itself require preparation of an EIS.

3.1 The No Action Alternative

Under the No Action alternative, the proposed project would not be constructed or operated. Trucking of products and waste products from existing wells would continue, as would flaring of gas at well pads. With no practicable alternative, trucking and flaring would increase as more wells are completed; existing conditions would be progressively impacted for the following critical elements: air quality, invasive species, and public safety. Flaring of gas from more wells might lead over time to measurable degrading of air quality. Trucking impacts range from seeding of invasive species to loss of human life. Loss of tribal and individual royalties from existing and potential wells would impact tribal and individual economies and planning.

No Action exacerbates waste of resources and loss of revenue. Loss due to flaring is estimated at 2 million dollars over the life of each well, based on average gas prices in North Dakota 2006-2008, Estimated Ultimate Recovery of 350,000 barrels oil per Bakken well, and a typical gas to oil ratio (Energy Information Administration, 2009). Typical leases assign 18% of these revenues to the lessor, either the MHA Nation or allottees. Inasmuch as losses to producers are significantly higher, No Action may also have an indirect dampening effect on development decisions, further depressing economic benefits to the MHA Nation and individual Indians.

3.2 Air Quality

The North Dakota Department of Health (NDDH) network of Ambient Air Quality Monitoring (AAQM) stations includes Watford City in McKenzie County, Dunn Center in Dunn County, and Beulah in Mercer County. These stations are located west, south and southeast of proposed well sites. Criteria pollutants tracked under National Ambient Air Quality Standards (NAAQS) of the *Clean Air Act* include sulfur dioxide (SO_2), particulate matter (PM_{10}), nitrogen dioxide (NO_2) and ozone (O_3). Two other criteria pollutants – lead (Pb) and carbon monoxide (CO) – are not monitored by any of three stations. Table 3.2 summarizes federal air quality standards and available air quality data from the three- county study area.

Table 3.2: Air quality standards and county data

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	NAAQS (ppm)	County		
				Dunn	McKenzie	Mercer
SO_2	24-Hour	365	0.14	0.004 ppm	0.004 ppm	0.011 ppm
	Annual Mean	80	0.030	0.001 ppm	0.001 ppm	0.002 ppm
PM_{10}	24-Hour	150	--	50 ($\mu g/m^3$)	35 ($\mu g/m^3$)	35 ($\mu g/m^3$)
	Annual Mean	50	--	--	--	--
$PM_{2.5}$	24-Hour	35	--	--	--	--
	Weighted Annual Mean	15	--	--	--	--
NO_2	Annual Mean	100	0.053	0.002 ppm	0.001 ppm	0.003 ppm
CO	1-Hour	40,000	35	--	--	--
	8-Hour	10,000	9	--	--	--
Pb	3-Month	1.5	--	--	--	--
O_3	1-Hour	240	0.12	0.071 ppm	0.072 ppm	0.076 ppm
	8-Hour	--	0.08	0.061 ppm	0.066 ppm	0.067 ppm

Source: U.S. Environmental Protection Agency (EPA) 2006. $\mu g/m^3$ = micrograms per cubic meter. ppm = parts per million.

North Dakota was one of only nine states in 2006 that met standards for all criteria pollutants. The state also met standards for fine particulates and the eight-hour ozone standards established by the U.S. Environmental Protection Agency (EPA) (NDDH 2007). The three counties addressed in Table 3.2 are also in full attainment and usually far below established limits (American Lung Association 2006). The Clean Air Act mandates prevention of significant deterioration in designated attainment areas. Class I areas are of national significance and include national parks greater than 6,000 acres in size, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres and designated prior to 1977. There is a Class I airshed at nearby Theodore Roosevelt National Park, which covers about 110 square miles in three units within the Little Missouri National Grassland between Medora and Watford City, about 50 miles west and upwind of the proposed AMHP corridor. The reservation can be considered a Class II attainment airshed, which affords it a lower level of protection from significant deterioration.

The proposed project is similar to other projects installed nearby with the approval of state offices. Construction traffic would generate temporary, intermittent and nearly undetectable gaseous emissions of particulates, SO_2, NO_2, CO, and volatile organic compounds. Road dust would be controlled as necessary and other best management practices implemented as necessary to limit emissions to the immediate project areas (BLM 2005). A permit for the storage facility as a minor source will be requested from the NDDH.

No detectable or long-term impacts to air quality or visibility are expected within the airsheds of the reservation, state, or Theodore Roosevelt National Park. Despite minor construction impacts, the proposed project is expected to have an overwhelmingly positive and long-term impact on air quality. In addition to eliminating flaring of gas from connected wells, the gathering system will drastically reduce heavy truck traffic. Over its first ten years, the typical Bakken well will produce almost 2,000 tanker loads of oil and 450 loads of produced water. Within that period, a gathering system servicing 50 wells will make unnecessary about 6,000,000 miles of heavy truck traffic. No laws, regulations or other requirements have been waived; no monitoring or compensatory measures are required.

3.3 Public Health and Safety

Health and safety concerns include traffic hazards posed by heavy trucks and equipment during construction, hazardous materials used or generated during installation or production, and burning or explosive hazards during operation of the pipelines and storage facility.

Negative impacts from construction would be largely temporary. Noise, fugitive dust, and traffic hazards would be present for about sixty days during construction and then diminish sharply during operations. The U.S. EPA specifies chemical reporting requirements under Title III of the *Superfund Amendments and Reauthorization Act* (SARA) of 1986, as amended. No materials used or generated by this project for production, use, storage, transport, or disposal are on either the SARA list or on EPA's list of extremely hazardous substances in 40 CFR 355. The most common and potentially hazardous substances used during the construction of the pipeline and facility would include diesel fuel, gasoline, lubricating oils, paints, and solvents. The Spill Prevention Control and Countermeasure (SPCC) plan includes procedures for hazardous materials storage, handling, disposal, cleanup and reporting. Potentially hazardous materials would be stored only in designated and permitted staging areas at least 100 feet from watercourses and wetlands. Vehicle refueling would comply with the same minimum setback. Material Safety Data Sheets (MSDS) for each potentially hazardous substance would be maintained onsite in the control room and at the point of use at all times.

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), pipelines are a reliable and cost-effective means to transport natural gas and hazardous liquids. PHMSA statistics show one gallon of oil is spilled for every barrel of oil that is transported one million miles: "In household terms, this is less than one teaspoon of oil spilled per thousand barrel-miles". The SPCC plan for the proposed project also specifies concrete and earthen berms at the storage facility to contain spills from tanks, receivers or loading racks. In the event of a spill, Arrow Midstream Holdings (AMH) would notify local emergency management authorities and state or federal response centers. After the pipeline and facility are operational, AMH would also install and utilize the following programs for public safety: operator training, cathodic protection, detailed ROW marking, regular inspections, and integrity management programs (automated PIG launcher). Continuous computer monitoring systems located in the facility control room would be accessible both onsite and remotely. Continuous monitoring of input and output volumes would detect minor leaks in all three pipelines. Pipeline pressure would also be monitored at both ends of the system; significant leaks causing pressure drops would be located by launching a special PIG or other detection equipment down a line.

There have been four oil transport related deaths on or near the reservation in the past two years. PHMSA data show that pipelines generally have a far better safety record (deaths, injuries, fires/explosions) than other modes of oil transportation. For a given volume transported, there are 87 times more oil transport truck-related deaths, 35 times more oil transport truck related fires/explosions and twice as many oil transport truck-related injuries. There are about 7,000 miles of gas and hazardous liquid pipelines in North Dakota. Over the past ten years, there have been no fatalities and 4 injuries associated with these facilities (PHMSA 2009).

The production estimates in Table 2.1 can be extrapolated to understand the significance of public safety hazards under the No Action alternative. During the first ten years of operation, the typical Bakken well is expected to produce 256,595 barrels of oil and 48,180 barrels of water. Oil is commonly carried in tankers with a capacity of 140 barrels, while water tankers usually carry up to110 barrels. Ten-year transportation needs are therefore about 2,300 trucks. Average roundtrip distances from oil depots can be very conservatively estimated at 50 miles. Service to each productive well on the reservation will therefore result in at least 115,000 miles driven during the ten year period of interest. Fifty typical wells will require almost six million miles to be driven by heavy trucks on sometimes substandard roads through sometimes severe weather. Since full development estimates range from 285 wells to as many as 1,185 on the west side of the reservation, traffic loading may be between 33 million and 130 million miles over ten years. A comprehensive gathering system would eliminate the need for most of this traffic.

Combustion and explosive hazards are considered extremely unlikely for the proposed project, but modeling results shown in Figure 3.3a shows that no damage is expected within about ½ mile of the pipelines. The mile-wide corridor shown in Figure 3.3b is therefore potentially at some risk. Satellite imagery shows 105 within ½ mile of the proposed pipeline route, including about 73 in Mandaree.

Project design and operational precautions mitigate against impacts from traffic or hazardous materials. The size of the area potentially impacted by leaks, fire or explosion is limited by burial of the pipelines at least 5.5 feet underground and the relatively small diameter of the proposed lines. All operations would conform to instructions from BIA fire management staff. Impacts from the proposed project are considered minimal, insignificant or unlikely. No laws, regulations or other requirements have been waived; no compensatory mitigation measures are required.

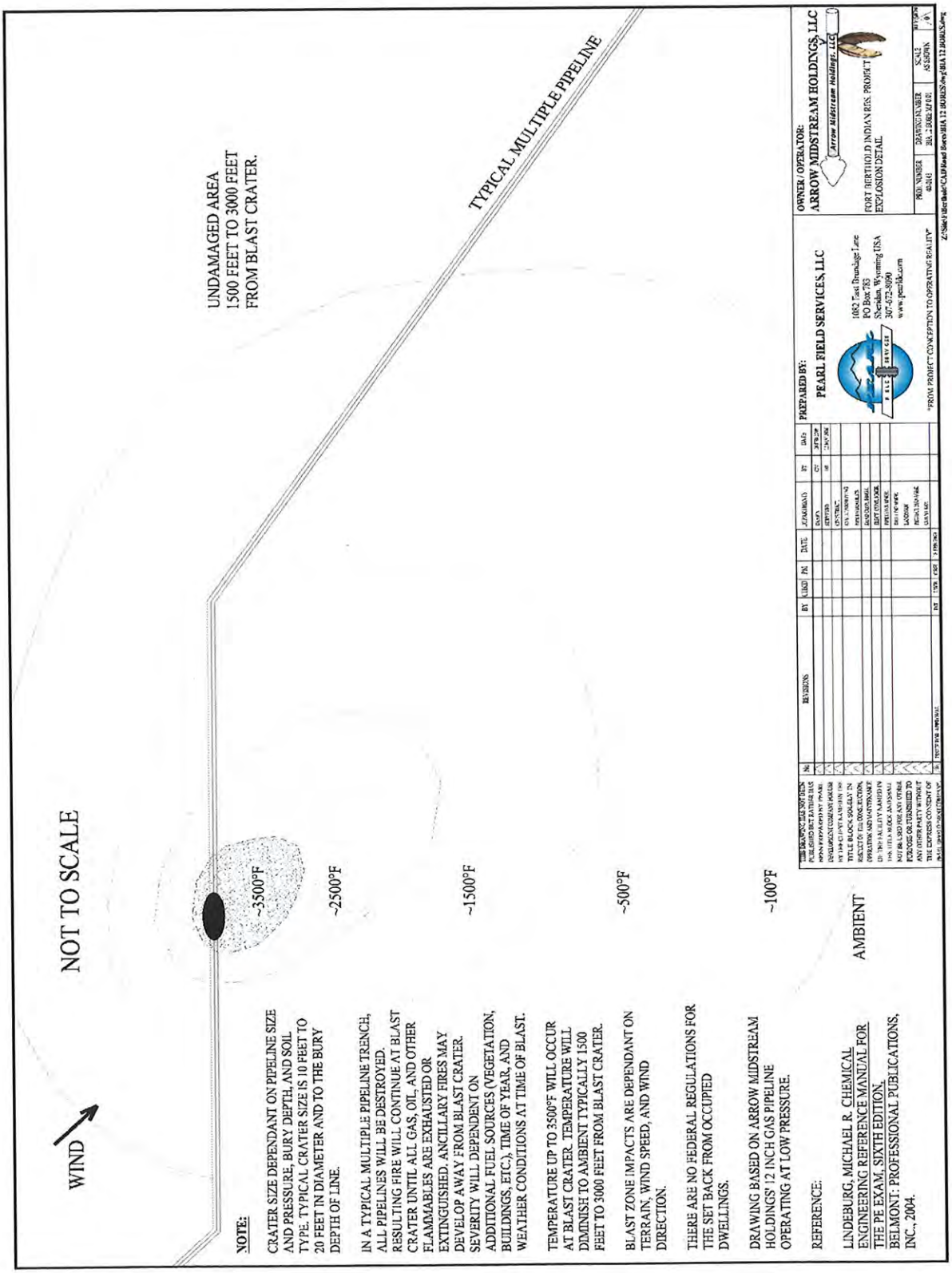


Figure 3.3a: Explosive hazard modeling

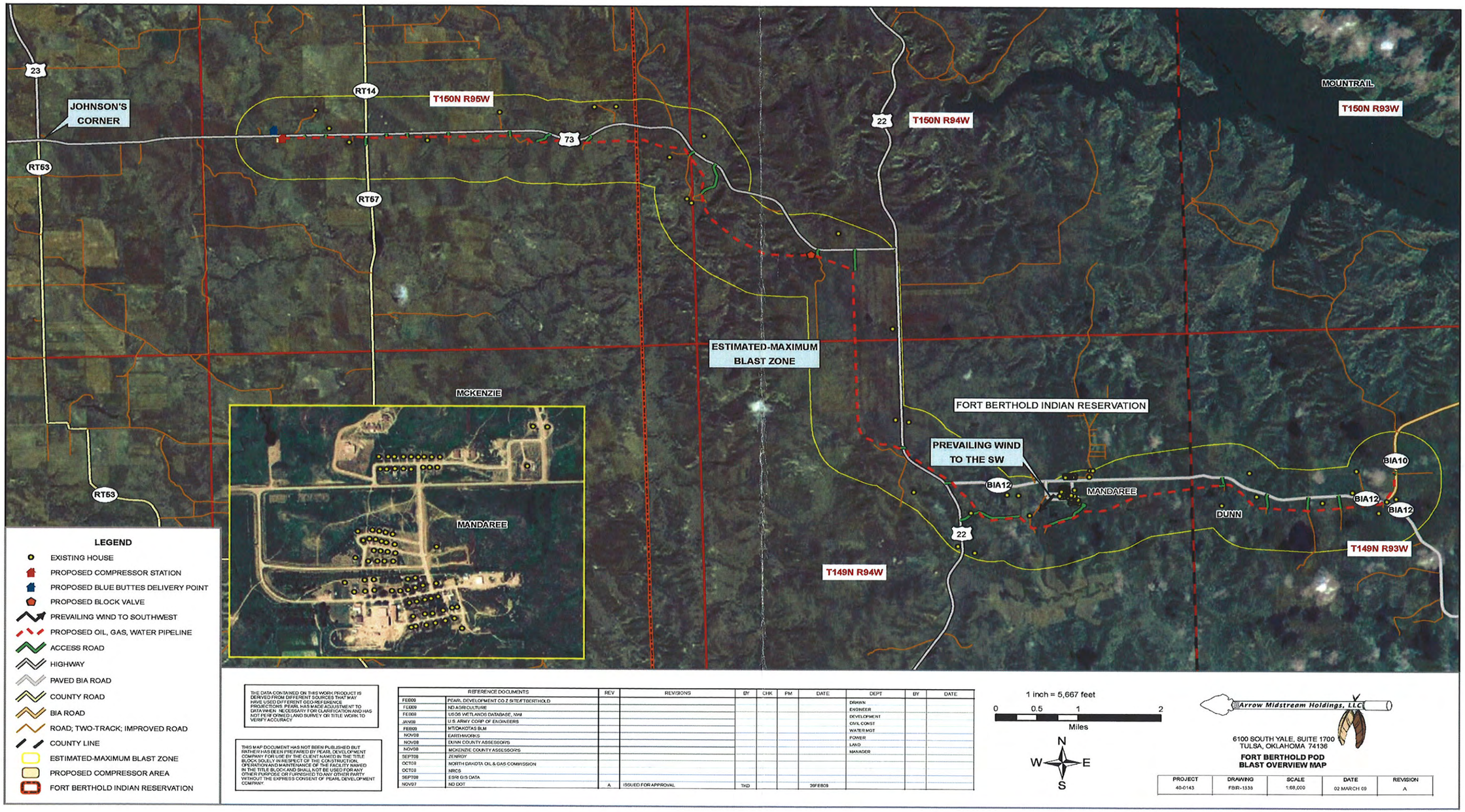


Figure 3.3b: Blast Overview

3.4 Socioeconomics

Socioeconomic conditions include population, demographics, income, employment, and housing. These conditions can be analyzed and compared at various scales. This analysis focuses on the Reservation, the four counties that overlap most of the Reservation, and the state of North Dakota. The state population showed little change between the last two censuses (1990–2000), but there were notable changes locally, as shown in Table 3.4a. Populations in Dunn, McKenzie, McLean, and Mountrail counties declined 5 to 11%, while population on the Fort Berthold Reservation increased by almost 10%. These trends are expected to continue (Rathge et al. 2002). While American Indians are the largest group on the Reservation, they are a minority within the four counties and statewide. More than two-thirds (3,986) of the Reservation population are tribal members.

Table 3.4a: Population and Demographics

County/Reservation	Population in 2000	% of State Population	% Change, 1990-2000	Predominant Group	Predominant Minority
Dunn County	3,600	0.56%	- 10.1%	White	American Indian (12%)
McKenzie County	5,737	0.89%	- 10.1%	White	American Indian (21%)
McLean County	9,311	1.45%	- 11.0%	White	American Indian (6%)
Mountrail County	6,631	1.03%	- 5.6%	White	American Indian (30%)
Fort Berthold	5,915	0.92%	+ 9.8%	American Indian	White (27%)
North Dakota	642,200	100%	+ 0.005%	White	American Indian (5%)

Source: U.S. Census Bureau 2007. BLM 2006.

In addition to the ranching and farming that are mainstays in western North Dakota, employment on the Reservation largely stems from tribal government, tribal enterprises, schools, and federal agencies. The MHA Nation's Four Bears Casino and Lodge, near New Town, employs over 320 people, 90% of whom are tribal members (Three Affiliated Tribes 2008). Counties overlapping the Reservation tend to have per capita incomes, median household incomes, and employment rates that are lower than North Dakota statewide averages. Reservation residents have lower average incomes and higher unemployment rates compared to the encompassing counties. MHA Nation members are in turn disadvantaged relative to overall Reservation incomes and unemployment rates that average in non-Indian data.

The most recent census found that per capita income for residents of the Reservation is $10,291 (less than ⅓ of the state average). Overcrowded housing skews the median Reservation household income upward to $26,274 (about ⅔ of the state average). A BIA report in 2003 found that 33% of *employed* MHA Nation members were living below federal poverty levels. The unemployment rate for tribal members is 22 %, compared to 11.1% for the Reservation as a whole and 3.2% statewide. These and other comparisons are shown in Table 3.4b.

Table 3.4b: Income and Unemployment

Unit of Analysis	Per Capita Income	Median Household Income	Unemployment Rate (2007)	Employed but Below Poverty Level	Percent of All People in Poverty
MHA Nation members	--	--	22 %	33 %	Unknown
Fort Berthold Reservation	$ 10,291	$ 26,274	11.1 %	--	Unknown
Mountrail County	$ 29,071	$ 34,541	5.8 %	--	15.4%
Dunn County	$ 27,528	$ 35,107	3.4 %	--	13%
McKenzie County	$ 27,477	$ 35,348	3.1 %	--	15.8 %
McLean County	$ 32,387	$ 37,652	4.7 %	--	12.8%
North Dakota	$ 31,871	$ 40,818	3.2 %	--	11.2 %

Source: U.S. Department of Agriculture Economic Research Data 2008 and BIA 2003.

Availability and affordability of housing could impact oil and gas development and operations. The tribal Housing Authority manages a majority of the housing units within the Reservation. Housing typically consists of mutual help homes built through various government programs, low-rent housing units, and scattered-site homes. New housing

construction has recently increased within much of the analysis area, but availability remains low. Housing data is summarized in Table 3.4c.

Table 3.4c: Housing

Housing Development	Fort Berthold Reservation	Dunn County	McKenzie County	McLean County	Mountrail County
Existing Housing					
Owner-Occupied Units	1,122	1,570	2,009	4,332	2,495
Renter-Occupied Units	786	395	710	932	941
Total	1,908	1,965	2,719	5,264	3,436
New Private Housing Building Permits 2000-2005	--	18	4	135	113
Housing Development Statistics					
State rank in housing starts	--	51 of 53	15 of 53	21 of 53	17 of 53
National rank in housing starts	--	3112 / 3141	2498 / 3141	2691 / 3141	2559 / 3141

Source: U.S. Census Bureau, 2007 and 2008.

The proposed project is not expected to have measurable impacts on population trends, housing starts or local unemployment rates. Construction jobs would result from pipeline construction on the reservation, but these opportunities are short-term. The proposed actions would require temporary employees during the well construction cycle and a few full-time employees for the long-term production cycle. The capture and sale of gas presently wasted in well pad flare pits would provide significant royalty income and other indirect economic benefits.

3.5 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, was signed by President Clinton in 1994. The Order requires agencies to advance environmental justice by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative consequences from federal programs, policies, decisions or operations. Meaningful involvement means federal officials actively promote opportunities for public participation and federal decisions can be materially affected by participating groups and individuals.

The U.S. Environmental Protection Agency (EPA) headed the interagency workgroup established by the 1994 Order and is responsible for related legal action. Working criteria for designation of targeted populations are provided in *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (EPA 1998). This guidance uses a statistical approach to consider various geographic areas and scales of analysis to define a particular population's status under the Order.

Environmental justice is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. It is nevertheless clear that tribal members on the Great Plains qualify for environmental justice consideration as both a minority and low-income population. The population of the Dakotas is predominantly Caucasian. While some 70% of Fort Berthold residents are tribal members, Indians comprise only 5% of North Dakota residents and 12% of the population of Dunn County. Even in a state with relatively low per capita and household income, Indian individuals and households are distinctly disadvantaged.

There are, however, some unusual considerations when proposed federal actions are meant to benefit tribal members. Determination of fair treatment necessarily addresses the existence and distribution of both benefits and negative impacts, due to variation in the interests of various tribal groups and individuals. There is also potential for major differences in impacts to resident tribal members and those enrolled or living elsewhere. A general benefit to MHA Nation government and infrastructure has already resulted from tribal leasing, fees and taxes. Oil and gas leasing has also already brought much-needed income to MHA Nation members who hold mineral interests, some of whom might eventually benefit further from royalties on commercial production. Profitable production rates at proposed locations might lead to exploration and development on additional tracts owned by currently non-benefiting allottees. The absence of lease and royalty income does not, moreover, preclude other benefits. Exploration and development may provide many relatively high-paying jobs, with oversight from the Tribal Employment Rights Office.

The owners of allotted surface within project areas may not hold mineral rights. In such cases, surface owners do not receive oil and gas lease or royalty income and their only related income would be compensatory for productive acreage temporarily lost to the pipeline corridor. Tribal members without either surface or mineral rights would not receive any direct benefits whatsoever. Indirect benefits of employment and general tribal gains would be the only offset to negative impacts.

Potential impacts to tribes and tribal members include disturbance of cultural resources. There is potential for disproportionate impacts, especially if the impacted tribes and members do not reside within the Reservation and therefore do not share in direct or indirect benefits. This potential is significantly reduced following surveys of the proposed pipeline route and access road routes and determination by the BIA that there will be no effect to historic properties. Nothing is known to be present, furthermore, that qualifies as a traditional cultural property or for protection under the American Indian Religious Freedom Act. Potential for disproportionate impacts is further mitigated by requirements for immediate work stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultations will take place during any such work stoppage, affording an opportunity for all affected parties to assert their interests and contribute to an appropriate resolution, regardless of their home location or tribal affiliation.

The proposed project has not been found to pose significant impacts to any other critical element—air, public health and safety, water, wetlands, wildlife, soils or vegetation— within the human environment. Avoiding or minimizing such impacts generally also makes unlikely specific and disproportionate impacts to low-income or minority populations. The proposed action offers many positive consequences for tribal members, while recognizing environmental justice concerns. Procedures summarized in this document are binding and sufficient. No laws, regulations or other requirements have been waived; no compensatory mitigation measures are required.

3.6 Cultural Resources

Cultural resources is a broad term encompassing sites, objects, or practices of archeological, historical, cultural or religious significance. Cultural resources on federal or tribal lands are protected by many laws, regulations, and agreements. The *National Historic Preservation Act* of 1966 requires a cultural resources survey of the Area of Potential Effect (APE) prior to undertaking a federal action. Resources identified are evaluated for eligibility as historic properties on the National Register of Historic Places (NRHP). Eligibility criteria (36 CFR 60.4) include association with important events or people, distinctive construction or artistic characteristics, and either a record of yielding or a potential to yield at least locally important information. Properties are generally not eligible for listing on the NRHP if they lack diagnostic artifacts, subsurface remains, or structural features, but those considered eligible are treated as though they were listed on the NRHP, even when no formal nomination has been filed.

The APE of any federal undertaking must also be evaluated for significance to Native Americans from a cultural and religious standpoint. Sites and practices may be eligible for protection under the *American Indian Religious Freedom Act* of 1978 (42 USC 1996). Sacred sites may be identified by a tribe or an authoritative individual (Executive Order 13007). Special protections are afforded to human remains, funerary objects and objects of cultural patrimony under the *Native American Graves Protection and Repatriation Act* of 1990 (NAGPRA, 25 USC 3001, *et seq.*).

Traditional cultural properties (TCPs) of the Mandan, Hidatsa and Arikara Nation (MHA Nation) can take the form of earthlodge villages, eagle trapping pits, natural springs, or sites used for hunting/gathering, gardens, fasting, prayer, human burial, or other ceremonial purposes. Landforms—such as buttes, ridges, valleys, and hills—can constitute TCPs with specific purposes for the MHA Nation, as can whole landscapes where boulders placed on hilltops or hillsides serve as trailmarkers to sacred and cultural places. Various rock constructions—including cairns, circles, lines, alignments, and effigies—are also critical to the continuity and revitalization of spiritual and cultural lifeways. Hundreds of such places are woven into origin stories, oral histories, and continuing practices. BIA relies upon tribal elders and TCP practitioners for advice on the presence of TCPs and proper avoidance or buffer zones. Depending on the nature of the site, identified TCPs may be protected under several regulations, conventions, and traditions.

Whatever the nature of a cultural resouree addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a Tribal Historic Preservation Officer (THPO) by Tribal Council resolution. Within the exterior boundaries of the reservation, the THPO operates with the same authority exercised in most of the rest of North Dakota by the

State Historic Preservation Officer (SHPO). As a result, BIA consults and corresponds with the THPO on all projects proposed within the Fort Berthold Reservation. The SHPO may have useful information, but has no official role regarding proposed federal actions on trust land. The MHA Nation has designated responsible parties for consultations and actions under NAGPRA and cultural resources generally.

Table 3.6: Cultural resource findings

Location	Previous Surveys	Previously Recorded Sites or Isolated Finds within 1 mile	Current Project Finding	
			Historic Properties	Traditional Cultural Properties
pipeline corridor	56	29	No effect	No effect

As shown in Table 3.6, no effects to cultural resources are expected from proposed projects. For the entire length of the proposed corridor, a Class I literature search identified earlier fieldwork and previously recorded sites within one mile. Class III surface inspections followed that examined about four acres at the storage and transfer facility and a pipeline corridor 150 feet wide and 18 miles long. A total of about 331 acres was surveyed. No subsurface testing was conducted. No historic properties were identified or are likely to be affected, according to reports filed with the BIA. No TCP report was received, but BIA was informed that no TCPs are within the corridor. BIA determined that no historic properties would be affected in official correspondence mailed to the THPO on February 13, 2009. The THPO concurred with this determination on February 18, 2009. Related correspondence is included in Section 4 of this EA.

No cultural resources are known to be present within the APE. If cultural resources are discovered during construction or operation, the operator must immediately stop work, secure the affected site, and notify both BIA and THPO. Unexpected or inadvertent discoveries of cultural resources or human remains trigger mandatory federal procedures that include work stoppage and BIA consultation with all appropriate parties. Following any such discovery, the operator would not resume construction or operations until written authorization to proceed was received from the BIA. **Project personnel are prohibited from collecting artifacts or disturbing cultural resources or practices under any circumstances.** No laws, rules, regulations, or other requirements have been waived; no compensatory mitigation measures are required. The presence of qualified cultural resource monitors during construction activities is encouraged.

3.7 Wildlife

Species may be listed by the USFWS as threatened or endangered under the *Endangered Species Act* (ESA). Tribes and states may recognize additional species of concern; such lists are taken under advisement by federal agencies, but are not legally binding in the manner of the ESA. The North Dakota Natural Heritage (NDNH) does not record any occurrences of plant or animal species of concern within project areas (NDNH 2007). The NDNH considers appearance of listed species to be unlikely to rare, based on available reports and the absence of critical, essential, or designated habitat. Information on status, life history and habitat requirements may be found online at: www.fws.gov/northdakota fieldoffice/endspecies. The following species are listed or proposed by the USFWS or of special concern to BIA:

Bald eagle *(Haliaeetus leucocephalus).* Status: de-listed in 2007. Likelihood of occurrence: **unlikely.** Despite recent de-listing, eagles are treated as a species of special concern by the Department of the Interior, BIA and Indian tribes. The project areas do not contain suitable roosting/perching habitat, concentrated feeding areas, or other special habitat. No impacts are expected.

Golden eagle *(Aquila Chrysaetos).* Status: unlisted. Likelihood of occurrence: **unlikely.** Eagles are protected under the Migratory Bird Treaty Act and the Eagle Protection Act and as a species of special concern within both the Department of the Interior and the BIA. Less riverine in their habits than bald eagles, golden eagles favor open prairie, plains and forested areas. Soaring areas are within one mile of badlands cliffs, where the birds are vulnerable to transmission lines. The project areas do not contain suitable soaring or roosting habitat, concentrated feeding areas, or other special habitat. No impacts are expected.

Black-footed ferret *(Mustela nigripes).* Status: endangered. Likelihood of occurrence: **none.**
Presence of the black-footed ferret has not been confirmed in North Dakota for over twenty years and the species is presumed extirpated. Preferred food sources are not present. Impacts are not expected.

Dakota skipper *(Hesperia Dacotae).* Status: candidate. Likelihood of occurrence: **may occur.**
Although North Dakota has a large and stable population of Dakota skippers, no individuals were observed during the wildlife survey. In the western part of the state, its habitat includes ungrazed native prairie with little bluestem, needle and thread, purple coneflower and a high forb and grass diversity (USFWS 2006). The butterfly has been documented in both McKenzie and Dunn Counties (USFWS 2008) at three sites 2-3 miles south/southwest of the AMHP project (USFWS 2008). The proposed pipeline corridor contains suitable habitat for the Dakota skipper, primarily east of Hwy 22. Mixed grass prairie on hilly/steep slope areas and ungrazed pastures could potentially host this species. The proposed project may displace individuals and/or destroy seasonal habitat, but is not likely to adversely affect the Dakota skipper or its habitat.

Gray wolf *(Canis lupus).* Status: endangered. Likelihood of occurrence: **unlikely.**
The proposed development areas do not contain preferred habitat of dense, contiguous forests nor suitable prey to sustain a permanent gray wolf population. No occurrences have been documented in the area (USFWS 2006; Grondahl, NDGFD, personal communication, 2006). It is highly unlikely wolves would colonize or transit project areas, given poor habitat, unreliable food supplies, nearby human habitation, and the distance to known wolf populations in Minnesota, Canada, Montana and Wyoming. No impacts are expected.

Interior least tern *(Sterna antillarum).* Status: endangered. Likelihood of occurrence: **rare.**
The birds are generally restricted to larger meandering rivers with broad floodplains, slow currents and greater sedimentation rates. Proposed projects are in upland areas well away from preferred nesting habitat of sparsely vegetated sandbars along rivers, sand and gravel pits, and lake or reservoir shorelines. There is no suitable nesting/foraging habitat within or near the AMHP project area. No impacts are expected.

Pallid sturgeon *(Scaphirhynchus albus).* Status: endangered. Likelihood of occurrence: **none.**
In North Dakota, the pallid sturgeon is found principally in the Missouri River and upstream of Lake Sakakawea in the Yellowstone River (USFWS 2006). There is no existing or potential aquatic habitat within or near the AMHP project area that would be suitable for this species. Activities are not expected to affect water quality or flows in the river. No impacts are expected.

Piping plover *(Charadrius melodus).* Status: threatened. Likelihood of occurrence: **unlikely.**
The birds nest on sparsely vegetated shoreline beaches, peninsulas, riverine sandbars and islands composed of sand, gravel or shale. USFWS has designated critical habitat on the Missouri River system, including the entire shoreline of Lake Sakakawea, which is four miles from the east end of the AMHP. There is no suitable nesting/foraging habitat within the project area, which is mostly cropland and grassland. Birds may occasionally may fly though the project area when migrating or moving between nesting and foraging areas, but no impacts are expected.

Whooping crane *(Grus americana).* Status: endangered. Likelihood of occurrence: **unlikely.**
Whooping cranes migrate through North Dakota along a band running from the south-central to the northwest parts of the state. During spring and fall migrations, they use shallow, seasonally and semi-permanently flooded marshes for roosting and nearby cropland and emergent wetlands for feeding. The lack of food sources and roosting/foraging habitat in project areas makes stopovers by migrating cranes unlikely. Impacts are not expected.

None of the listed or special interest species were observed during field reconnaissance of the proposed AMHP and surrounding area on November 17-20, 2008. The walking survey identified 14 resident and migratory bird species. These were American crow (*Corvus bracyrhynchos),* black-capped chickadee (*Poecile atricapilla),* blue jay (*Cyanocitta cristata),* European starling (*Sturnus vulgaris),* gray partridge (*Perdix perdix),* house sparrow (*Passer domesticus),* ring-necked pheasant (*Phasianus colchicus),* sharp-tailed grouse (*Tympanuchus phasianellus),* wild turkey

(*Meleagris galliopavo),* prairie horned lark *(Eremophila alpetris),* red-tailed hawk (*Buteo jamaicensis),* rough-legged hawk (*Buteo lagopus),* turkey vulture (*Cathartes aura)* and snow bunting (*Plectrophenax nivalis).* Numerous other birds, mammals, amphibians and insects occupy or use the mixed grass prairie, cropland, wetlands and tree and shrub cover, either continuously or intermittently. One red-tailed hawk nest was observed, as shown in the adjacent photo.

Many others known or expected to occur in the project area are listed in Table 3.7, including 18 resident birds and 71 migratory birds. Waterfowl are considered unlikely to occur or be affected. Information was obtained from state and federal natural resource related databases and interviews with state (Kreft, B., NDGFD 2008) and federal management personnel (Ellsworth, T., USFWS 2008). The majority of available trend information on birds focuses on game species. Review of NDGFD annual game bird reports for central and western North Dakota indicates that populations are healthy and stable-to-increasing in this region.

At least twenty-one large and small mammal species present within McKenzie and Dunn Counties throughout the year are also listed in Table 3.7. The rolling mixed grass prairie, cropland and intermittent woody cover of the AMHP project area and vicinity likely provide food sources for many of these species. White-tailed deer (*Odocoileus virginanus)* and mule deer (*Odocoileus hemionus)* were observed during the field survey. A review of NDGFD winter aerial survey data indicates that white-tailed deer and mule deer density within McKenzie and Dunn Counties is excellent and suggests a healthy and stable-to increasing deer population. Several other big game and furbearer species are either known or expected to inhabit the vicinity of the AMHP project area.

Pipeline construction and operation is not likely to impact the six federally listed species whose ranges include the AMHP project area. No effects are expected for the pallid sturgeon, black-footed ferret, gray wolf and whooping crane because these species do not occupy the vicinity of the AMHP project area, other than occasional transients. Habitat of the Interior least tern and piping plover is near but not within the AMHP corridor. Indirect and minor impacts, such as temporary displacement due to noise or human activity, are not likely to affect these species or habitat. Dakota skipper habitat is found in the AMHP project area and vicinity. Pipeline construction may displace individuals or temporarily destroy seasonal habitat, but will not adversely affect the Dakota skipper or its habitat in the long term.

Disturbance during construction – due to noise, groundclearing, increased traffic, and human presence – may temporarily displace individuals but is unlikely to cause measurable or long term declines in populations. Construction activities that remove vegetation and disturb soil may cause direct mortality, displacement, or increased exposure to predators for less mobile species, such as small mammals, amphibians, reptiles and ground-nesting birds. More mobile species, such as medium to large mammals and birds, would be expected to disperse from the project area during construction and re-enter later. Prompt reclamation of disturbed areas is expected to speed this process. Long-term habitat loss would be minimal. Disturbance due to operation of the buried pipeline is considered minimal. Wildlife inhabiting project areas are generally expected to adapt to conditions and continue to thrive.

Table 3.7: Wildlife in McKenzie and Dunn Counties

Resident Birds	Migratory Birds		Mammals
American Crow	American Coot	Turkey Vulture	Pronghorn Antelope
Black-billed Magpie	Marbled Godwit	Brewer's Blackbird	Badger
Black-capped Chickadee	American Goldfinch	Cooper's hawk	Beaver
Blue Jay	Franklin's Gull	Brown Thrasher	Big Brown Bat
Short-eared Owl	American Kestrel	Northern Harrier	Coyote
Downy Woodpecker	Loggerhead Shrike	Brown-headed Cowbird	Eastern Chipmunk
Eastern Screech Owl	American Robin	American Avocet	Fox Squirrel
European Starling	Long-billed Dowitcher	Bufflehead	Franklin's Ground Squirrel
Gray Partridge	American Tree Sparrow	Greater Yellowlegs	Little Brown Bat
Great Horned Owl	Mallard	Cedar Waxwing	Long-tailed Weasel
Hairy Woodpecker	Bank Swallow	Chipping Sparrow	Meadow Vole
House Finch	Marsh Wren	Rough-legged hawk	Mink
House Sparrow	Gray Catbird	Common Yellowthroat	Muskrat
Ring-necked Pheasant	Mountain Bluebird	Ruby-throated Hummingbird	Raccoon
Sharp-tailed Grouse	Mourning Dove	Eastern Wood-Pewee	Red Fax
White-breasted Nuthatch	Killdeer	Savannah Sparrow	Red Squirrel
Wild Turkey	Northern Flicker	Semi-palmated Plover	Silver-haired Bat
Horned Lark	Least Flycatcher	Short-billed Dowitcher	Thirteen-lined Ground Squirrel
	Western Meadowlark	Snow Bunting	White-tailed Deer
	Lesser Yellowlegs	Snow Goose	Mule Deer
	Common Nighthawk	Solitary Sandpiper	White-tailed Jackrabbit
	Great Blue Heron	Song Sparrow	
	Willet	Sora	
	Black-crowned Night Heron	Spotted Sandpiper	
	Yellow Warbler	Horned Grebe	
	Canada Goose	Eared Grebe	
	Barn Swallow	Swainson's Hawk	
	Blue-winged Teal	Tree Swallow	
	Belted Kingfisher	Upland Sandpiper	
	Gadwall	Vesper Sparrow	
	Red-Headed woodpecker	Double-crested Cormorant	
	Northern Shoveler	White-fronted goose	
	Black Tern	Wood Duck	
	American Wigeon	Lesser Scaup	
	Black-bellied Plover		
	Ruddy Duck		
	Bonaparte's Gull		

Sources: Sibley, D.A. 2006. Sibley Field Guide to Birds.

Knue, J. 1991. Big Game in North Dakota, A Short History. NDGFD.

3.8 Soils

Physiographically, the project area is part of the Missouri Plateau, a relatively high plain that slopes to the east and northeast. In some areas, sedimentary material is covered with a thin layer of glacial drift or till. Where present, this may consist of just a few pebbles or be distinct layer of stony soils. In places, the till has been mostly eroded away and is only represented by large granite glacial boulders.

Soils are categorized and described as soil mapping units. Published soil surveys are available for Dunn County (1982) and McKenzie County (2006). Updated information is available online from the Natural Resources Conservation Service (NRCS 2008) and soil attributes can be found at the NRCS website http://soildatamart.nrcs.usda. Databases were reviewed and soils in the AMHP corridor were surveyed by professionally certified specialists on 17-20 October 2008, in conjunction with vegetation and wetland surveys. Their detailed report is on file with BIA and indicates 40 soil mapping units are present, most of which are loams, silty clays and sandy loams. Most of these soils present no special construction problems and when trenched and compacted after pipeline placement, will be receptive to re-seeding and reclamation. As shown in Table 3.8, almost half of the ROW is comprised of just six soils:

Table 3.8a: Common soils

Soil	Map Unit	Percent Occurrence	Erosion Factors				
			slope	Kf	T	Hydrologic Soil Group	Wind Erodibility Group
Belfield-Grail silty clay loam	33	6.57	0-2	0.37	5	C	6
Williams loam	42C	7.08	6-9	0.28	5	B	6
Williams -Zahl loam	43C	7.42	6-9	0.28	5	B	6
Zahl-Williams	44D	5.42	9-15	0.28	5	B	4L
Zahl-Cabba-Maschetah complex	45F	9.86	3-70	0.32	5	B	4L
Beisigal-Flasher-Tally complex	61F	5.39	9-50	0.17	3	A	2

- Kf indicates erodibility of material less than two millimeters in size. Values of K range from 0.02 to 0.69, with higher values indicating greater erodibility.
- T Factors estimate maximum average annual rates of erosion by wind and water that will not affect crop productivity. Tons/acre/year range from 1 for shallow soils to 5 for very deep soils, with higher T values indicating greater tolerance.
- Hydrologic Soil Groups (HSG) are based on estimates of runoff potential and infiltration rates for thoroughly wetted soils unprotected by vegetation during long-duration storms, with the rate of infiltration decreasing from Group A (high infiltration, low runoff) to Group D (low infiltration, high runoff).
- A WEG consists of soils with similar properties affecting susceptibility to wind erosion in cultivated areas, with susceptibility decreasing from group 1 to group 8.

- **Map Unit 33.** Belfield-Grail silt clay loams, 0-2% slopes, are deep and well drained. They are located on the flats and uplands. Permeability and surface runoff are low and water capacity is high in both soils. Restrictive layer is found at a depth of about 14 inches. This unit is made up of 45% Belfield soils and 40% Grail soils. The remaining 15% is Daglum, Harriet, and Rhoades soils.

- **Map Unit 42C.** Williams loam, 6-9% percent slopes, is deep, gently rolling and well drained. It is located on glacial till uplands. Permeability is moderately slow, surface runoff is medium, and available water capacity is high.

- **Map Unit 43C.** Williams-Zahl loams, 6-9% slopes, are deep, gently rolling soils that are well drained. This unit is made up of 50 percent Williams soils and 30 percent Zahl soils. Permeability is moderately low, surface runoff is medium, and available water capacity is high. The remaining 20% is Amor, Arnegard, Cabba, and Noonan soils.

- **Map Unit 44D.** Zahl-Williams loams, 9-15% slopes, are deep, hilly and well drained. They are found on glacial till plains, with Zahl soils on the knobs and Williams soils on the side slopes. Permeability is moderately low, surface runoff is rapid, and available water capacity is high. Restrictive layer is found at a depth of about 80 inches. They are 40% Zahl soils and 40% Williams soils. The remaining 20% is Arnegard, Cabba, Noonan, and Rhoades soils.

- **Map Unit 45F.** Zahl-Cabba-Maschetah complex, 3-70% slopes, are well drained. They are found on ridges and till-mantled uplands, with Zahl on summits, Cabba on shoulders and Maschetah on foot slopes. Restrictive layer is found at a depth of about 20 inches. The complex is made up of 23% Zahl soils, 21% Cabba soils, and 17% Maschetah soils. The remaining 39% is made up of Williams, Chama, Straw, Amor, Dogtooth, Dooley, Savage, and Wabek soils.

- **Map Unit 61F.** Beisigl-Flasher-Tally complex, 9-50 percent slopes, are well- to somewhat excessively drained. They are located on upland ridges, with Beisigl on convex backslopes, Flasher on shoulders and Tally on concave foot slopes. Restrictive layer is found at a depth of 7-40 inches. The complex is made up of 35% Beisigl soils, 30% Flasher soils and 17% Tally soils. The remaining 18% is made up of Vebar, Amor, Telfer, Cabba, and Regan soils.

Erosion potential increases in the interval between construction and reclamation, while topsoil and stabilizing vegetation are absent. Soil erosion rates have been extensively studied and various practices have been shown to feasibly and significantly reduce erosion of a wide variety of soils, including those within the project area (BLM Instruction Memorandum 2004-124, www.blm.gov/bmp; USDI and USDA 2007; Graph 1997).

Table 3.8b: Other Soils

Mapping Unit Name	Map Unit	Percent Occurrence
Cabba loam (15-45 percent slopes)	9E	4.13%
Cabba-Badland, outcrop complex (9-70 percent slopes)	83F	3.49%
Williams-Bowbells loam (3-6 percent slopes)	41B	3.46%
Zahl-Cabba-Arikara complex* (9-70 percent slopes)	145F	3.29%
Amor-Cabba loam (9-15 percent slopes)	9D	3.25%
Cabba-Chama-Havrelon silt loam* (3-70 percent slopes)	84F	3.18%
Zahl-Williams-Cabba complex (6-9 percent slopes)	460C	3.18%
Lawther silty clay* (0-2 percent slopes)	30	2.98%
Zahl-Williams loam (15-25 percent slopes)	93E	2.98%
Cohagen-Vebar fine sandy loam (9-25 percent slopes)	30E	2.27%
Amor loam (6-9 percent slopes)	101C	2.17%
Dogtooth-Jonesburg-Cabba complex (6-30 percent slopes)	38F	2.13%
Zahl-Williams loam dissected (15-70 percent slopes)	442F	1.96%
Dogtooth-Cabba complex (9-15 percent slopes)	62D	1.90%
Savage silty clay loam (0-2 percent slopes)	29	1.86%
Lambert-Slickspots-Rhoades complex (0-9 percent slopes)	232C	1.59%
Cabba-Sen-Chama silt loam* (15-70 percent slopes)	54F	1.52%
Vebar-Flasher complex (6-9percent slopes)	63C	1.29%
Korchea loam* (0-2 percent slopes)	14	1.25%
Manning-Schaller-Wabex complex (6-25 percent slopes)	90E	1.22%
Farnuf loam (2-6 percent slopes)	25B	1.15%
Dooley-Zahl (6-9 percent slopes)	46C	1.05%
Pits gravel and sand	96	0.95%
Zahl-Cabba-Williams complex* (9-15 percent slopes)	460D	0.95%
Belfield-Savage silt clay loam* (2-6 percent slopes)	33B	0.78%
Williams-Zahl loams (3-6 percent slopes)	42B	0.71%
Tonka-Hamerly complex*(0-3 percent slopes)	5	0.61%
Morton-Dogtooth silt loam (0-6 percent slopes)	52B	0.61%
Zahl-Williams-Arikara loam* (9-45 percent slopes)	242F	0.58%
Rhoades silt loam (0-6 percent slopes)	62B	0.54%
Manning fine sandy loam (0-6 percent slopes)	66B	0.41%
Belfield-Savage silt clay loam (0-6 percent slopes)	16B	0.30%
Arnegard-Cabba loam (15-70 percent slopes)	287F	0.27%
Zahl-Tally-Williams complex (6-9 percent slopes)	470C	0.24%

Source: NRCS Web Soil Survey website: http://websoilsurvey.nrcs.usda.gov (NRCS 2008a)

Erosion control and reclamation can be affected by topography and soil characteristics. Descriptions of two common soil complexes (45F and 61F) along the corridor indicate severe slopes are possible. The AMHP ROW has, however, been aligned and situated to generally avoid steep areas more susceptible to erosion. Sections on steeper slopes are never more than 300 feet long, where proven best management practices would be implemented to reduce erosion to negligible levels. Moderate to deep soil conditions would also tend to minimize water erosion. Low WEG rating for soil complex 61F indicates relatively greater susceptibility to wind erosion, but all of the common soils have moderate to low sodium absorption ratios, indicating no restrictions on vegetative regrowth after disturbance. Directional drilling would be used to avoid increasing erosion problems in several wetland areas.

3.9 Water Resources

Surface Water

The AMHP is located within the Missouri Region and the Missouri-Little Missouri Sub-Region and the Lake Sakakawea 8-Digit Hydrologic Unit Code (HUC) (10110101) and the Lower Little Missouri River 8-Digit Hydrologic Unit Code (HUC) (10110205) sub-basins as seen in Figure 3.9b (NRCS 2008). Moving from east to west the AMHP goes through three watersheds; Independence Point, Waterchief Bay, and Bear Den Creek. Also moving from east to west the AMHP goes through six different sub-watersheds; Skunk Creek, Upper Squaw Creek, Boggy Creek, Bear Den Creek, Handy Water Creek, and Dry Creek. The AMHP crosses the Bear Den Creek three times all in which had running water and several intermittent streams (NDSWC 2008).

The easternmost portion of the AMHP follows a comparatively high area between ravines draining north and east into Lake Sakakawea and those draining south into the Little Missouri River. In a few places the route crosses the upper ends of northward draining ravines. South of Mandaree, the AMHP crosses a broad drainage that contributes to the Little Missouri River. The middle and western portions of the AMHP cross some deep, sharp-relief ravines that drain northeast.

Runoff is generally sheet-flow until collected by ephemeral and perennial drainages leading to the Missouri River (Lake Sakakawea) or the Lower Little Missouri River. There are four surface water monitoring sites located in the same townships as the AMHP. One of these sites (NE ¼ 150-94-30) is 187 feet to the NE of the center of the AMHP or 137 feet from the east edge of the AMHP corridor. This is the only well on record that is relatively close to the AMHP but still outside the 100 foot ROW. Please See Figure 3.9a: Water Wells Locations.

Groundwater

Aquifers in Dunn and McKenzie County, North Dakota, include Sentinel Butte, Tongue River, Hell Creek, Fox Hills and Fort Union. The AMHP crosses the Fort Union aquifer at Section 24 T150N R95W (NDSWC 2008). This is the only aquifer that is within close proximity of the AMHP (Figure 3.9b). The proposed depth of the AMHP is 6 ½ feet to ensure 5 ½ feet of soil coverage over the largest pipeline diameter. The AMHP will be bored at least 14 feet below the surface when crossing several wetlands, as described in the following section. No significant impacts to surface water or groundwater are expected as a result of the proposed AMHP construction.

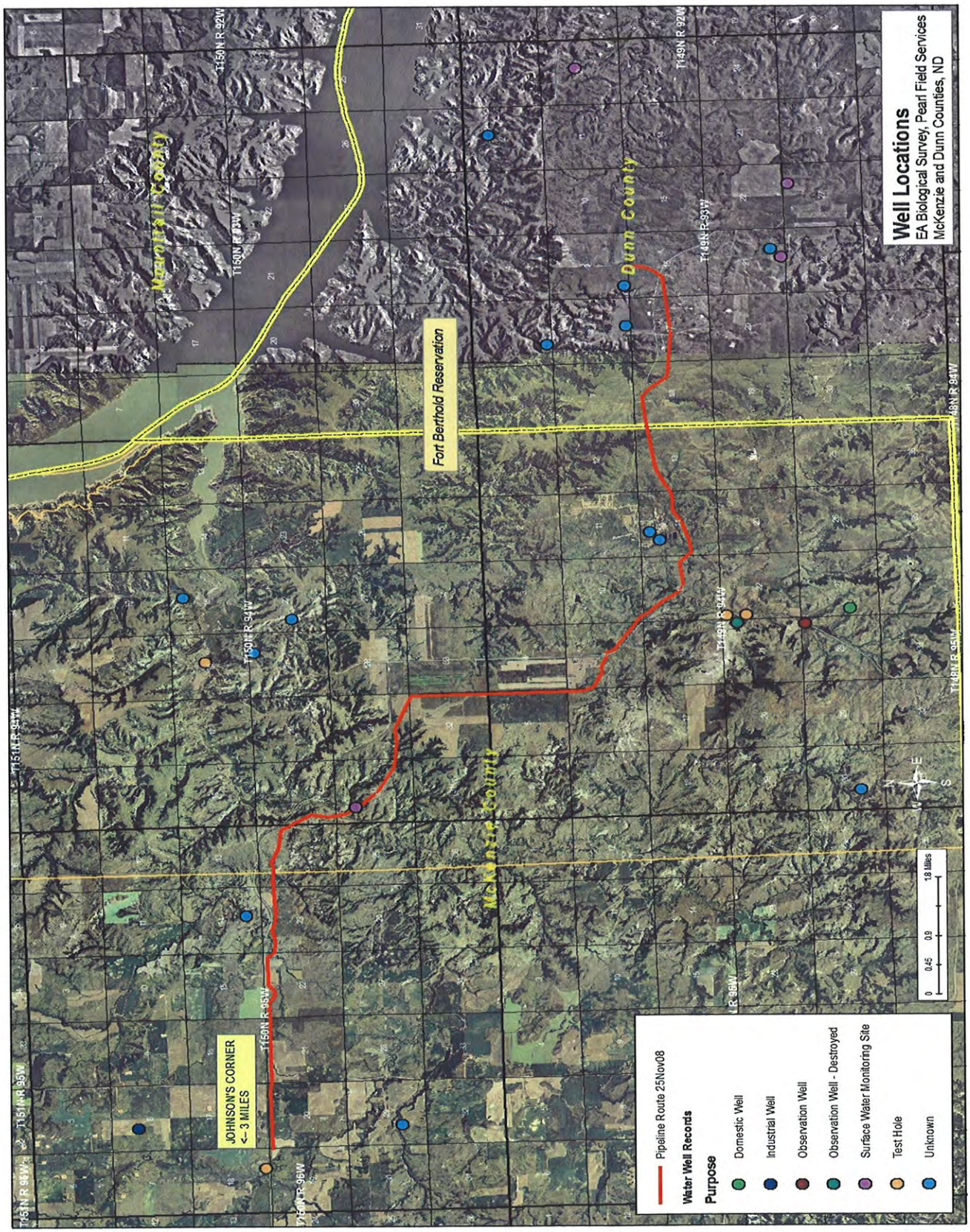


Figure 3.9a: Water Wells

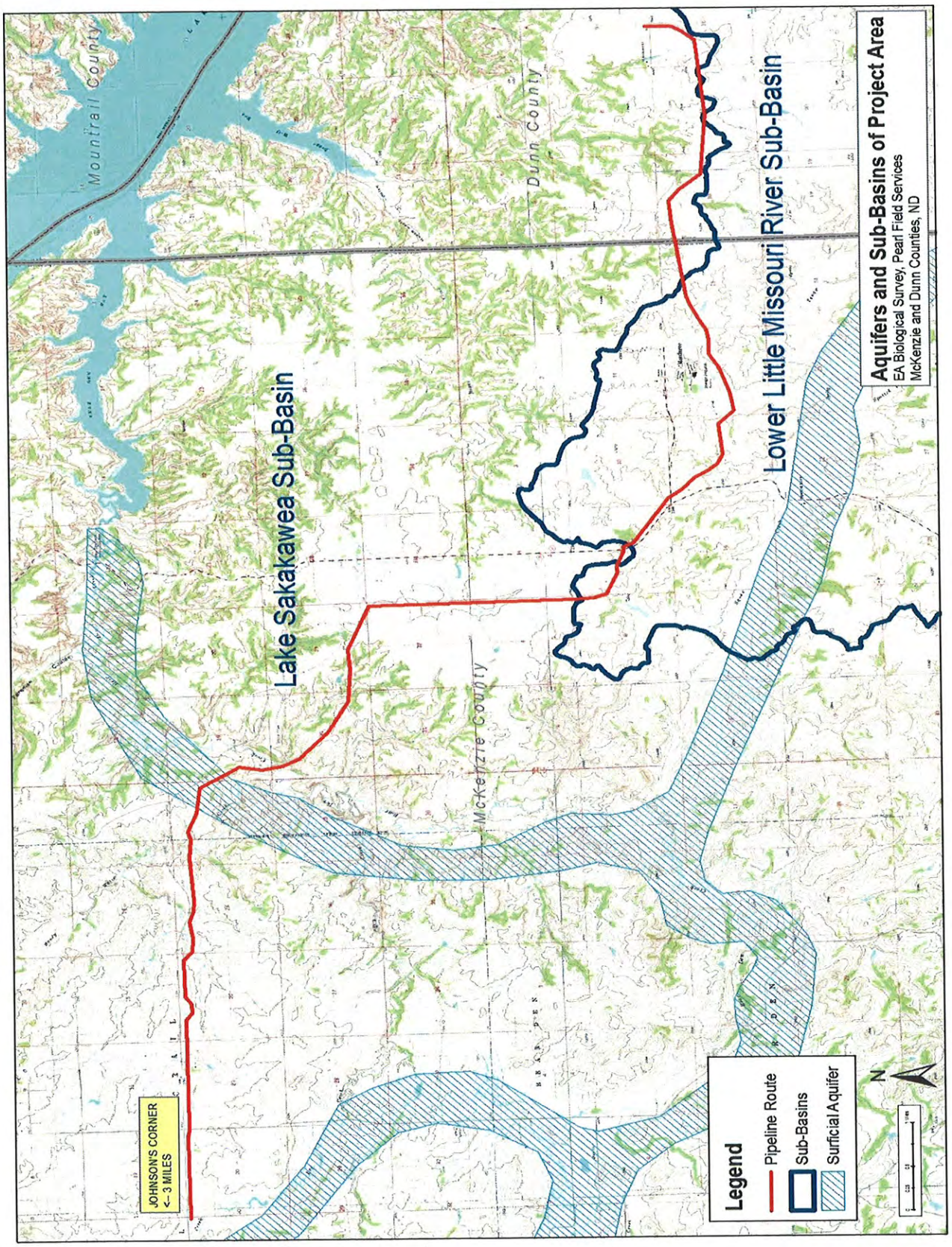


Figure 3.9b: Aquifers and Sub-Basins

3.10 Wetlands

Published and available soils and wetland information was reviewed. Soils information from the Natural Resources Conservation Service (NRCS) was downloaded. After a review of the National Wetland Inventory (NWI) maintained by the U.S. Fish and Wildlife Service, in conjunction with soil and vegetation surveys, the AMHP corridor was examined for wetlands meeting criteria in the Corps of Engineers (COE) Wetlands Delineation Manual (Environmental Laboratory, 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (US Army Corps of Engineers, 2008). Criteria include hydrophytic vegetation, hydric soils, and wetland hydrology. Areas meeting all three criteria are classified as wetlands. Wetland indicator status for plant species was determined using Reed (1997).

Fieldwork identified 12 wetlands within the AMHP corridor, comprising a total of slightly more than two acres. All but ½ acre is included in four wetlands. Vegetation and soils were described in detail for each wetland and intervening upland.

Wetland 1

Location:	NENE of section 13, T149N-R94W
Size:	0.05 acres
Setting:	Deep intermittent drainage with minor cattle traffic
Soil:	Clay loam, sandy clay loam
Vegetation:	*Carex sp.,Phalaris arundinacea, Poa palustris, Rumex crispus, Artemisia absinthium, and Asther ericode* and the *shrub Salix sp.*
Indicators:	Vegetation, hydrology, soils

Wetland 2

Location:	NENE of section 13, T149N-R94W
Size:	0.02 acres
Setting:	Deep intermittent drainage with minor cattle traffic
Soil:	Loam, sandy loam, sandy clay loam
Vegetation:	*Carex sp.* and *Phalaris arundinacea.* Other common herbs were *Poa palustris, Rumex crispus, Artemisia absinthium,* and *Asther ericode* and the shrub *Salix sp.*
Indicators:	Vegetation, hydrology, soils

Wetland 3

Location:	NWSW of section 14, T149N-R94W
Size:	0.05 acres
Setting:	Intermittent drainage with major cattle traffic
Soil:	Clay, loam, sandy clay loam
Vegetation:	*Cirsium arvense, Carex sp., Spartina pectinata, Rumex crispus*
Indicators:	Vegetation, hydrology, soils

Wetland 4

Location:	NWNW of section 20, T150N-R95W
Size:	0.19 acres
Setting:	Shallow intermittent drainage
Soil:	Clay, silty clay loam
Vegetation:	*Eleocharis sp., Atriplex patula, Typha sp., Phalaris arundinacea, Sonchus arvensis.*
Indicators:	Vegetation, hydrology, soils

Wetland 5

Location:	NWNW of section 21, T150N-R95W
Size:	0.57 acres
Setting:	Shallow intermittent drainage
Soil:	Silty clay loam, clay, gravelly clay loam
Vegetation:	*Hordeum jubatum, Eleocharis sp., Rumex crispus*
Indicators:	Vegetation, hydrology, soils.

Wetland 6

Location:	SESE of section 18, T150N-R95W
Size:	0.05 acres
Setting:	Disturbed ground in a road ditch
Soil:	Clay loam, clay, silty clay loam
Vegetation:	*Typha sp., Eleocharis sp.,Spartina pectinata, Hordeum jubatum, Eleocharis sp., Rumex crispus*, and *Sonchus arvensis.*
Indicators:	Vegetation, hydrology

Wetland 7

Location:	NENE of section 22, T150N-R95W
Size:	0.07 acres
Setting:	Deep intermittent drainage
Soil:	Clay loam, silty clay loam, sandy clay loam
Vegetation:	*Hordeum jubatum, Carex sp.,Spartina pectinata, Grindelia sqarrosa, Polygonum sp.,Rumex crispus*
Indicators:	Vegetation, hydrology, soils.

Wetland 8

Location:	NWNW of section 24, T150N-R95W
Size:	0.06 acres
Setting:	Running water
Soil:	Sandy loam, sand
Vegetation:	*Spartina pectinata, Phalaris arundinacea,Solidago rigida, Typha sp., Agropyron smithii, Elymus canadensis* and *Rumex crispus.*
Indicators:	Vegetation, hydrology, soils

Wetland 9

Location:	SENW of section 33, T150N-R94W
Size:	0.89 acres.
Setting:	Shallow depression
Soil:	Silty clay loam, silt loam, clay loam, clay and gravelly loam
Vegetation:	*Carex sp., Polygonum sp., Bromus inermis, Cirsium arvense, Phalaris arundinacea,, Polygonum sp. Typha sp.* and *Rumex crispus*
Indicators:	Vegetation, soils

Wetland 10

Location:	NWNW of section 30, T150N-R94W
Size:	0.08 acres
Setting:	Running water
Soil:	Loamy sand, loam and sandy loam
Vegetation:	*Spartina pectinata, Agropyron decentorum, Carex sp., Asther ericodes* and *Hordeum jubatum*
Indicators:	Vegetation, hydrology, soils

Wetland 11

Location:	SWSW of Section 19, T150N-R94W
Size:	0.09 acres
Setting:	Running water
Soil:	Loamy sand, medium sand
Vegetation:	*Spartina pectinata, Carex sp. Asther ericodes* and *Rumex crispus*
Indicators:	Vegetation, hydrology, soils

Wetland 12

Location:	SWSW of Section 29, T150N-R94W
Size:	0.19 acres
Setting:	Intermittent drainage
Soil:	Clay
Vegetation:	*Spartina pectinata, Cirsium arvense, Phalaris arundinacea* and *Rumex crispus*
Indicators:	Vegetation, hydrology, soils

No permits were required by the Corps of Engineers, under Section 404 of the Clean Water Act, regarding work in or near wetlands within the corridor. Directional drilling would nevertheless be used to ensure there would be no impacts to the five wetlands listed in Table 3.10. Construction will disrupt vegetation in wetlands 1, 2, 4, 5, 6, 7, and 12, but no long-term impacts are expected. Wetland vegetation removed during pipeline construction will quickly grow/revegetate during the growing season following pipeline installation. There will be no long-term impact to wetland vegetation from the AMHP construction.

Table 3:10 Wetland Bore Locations

Wetland ID	Location	Affected Resources	Bore Length (ft)
03	NWSW Sec. 14 T149N R94W	Tributary to Squaw Creek	415
09	SENE Sec. 32 T150N R94W	Wetland land in cultivated field	415
10	NWNW Sec. 30 T150N R94W	Bear Den Creek	65
11	SWSW Sec. 19 T150N R94W	Handy Water Creek	75
08	NWNW Sec. 24 T150N R95W	Handy Water Creek	420

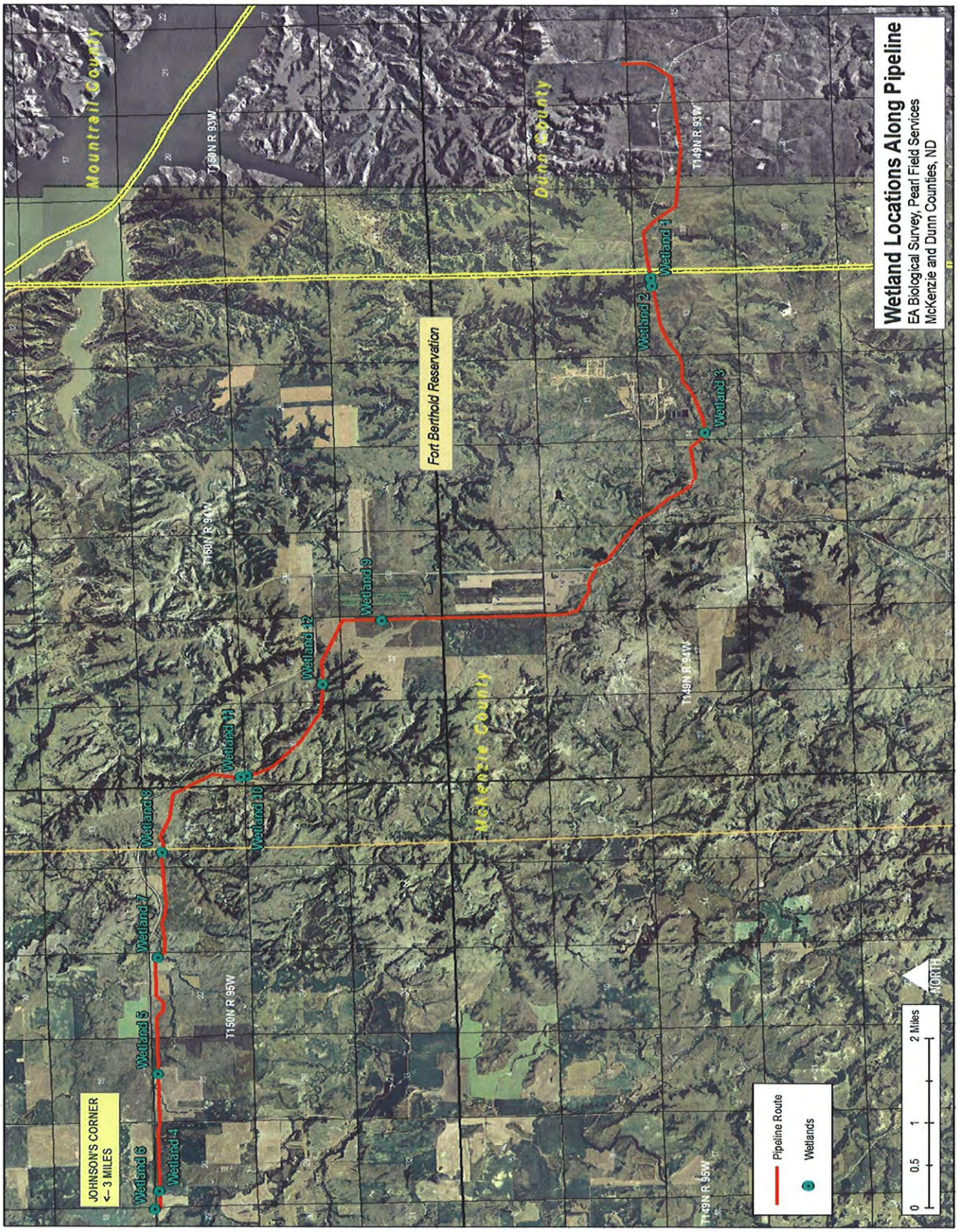


Figure 3.10: Wetlands

3.11 Vegetation and Invasive Species

Through most of the proposed route, the AMHP follows a high ridge of rolling prairie with drainage ravines extending away from the high grassland. The species composition is highly dependent on slope and soil. However, a few species were usually predominant. Typically, on the gently rolling or nearly level sites western wheatgrass (*Agropyron smithii*) was dominant. Needlegrasses (*Stipa* sp.) were usually associated. On hilltops or the crests of ravines little bluestem (*Andropogon scoparius*) was typically dominant. Blue grama (*Bouteloua gracilis*) occurred in both general areas typically as a secondary species. It, however, becomes dominant with long term heavy grazing.

The proposed AMHP ROW usually skirted but sometimes crossed the drainage channels. The deeper areas were usually wooded. Western snowberry (*Symphoricarpos occidentalis*) was usually found around the edge of the woody ravines as well as being common in gentle swales on the prairie. Buffalo berry (*Shepherdia argentea*) was also typically found on the edges of ravines and on upper hill slopes. Hawthorn (*Crataegus rotundifolia*) was found sparingly at the east and west ends of the proposed route but was the dominant shrub species on slopes and ravines near Mandaree. In the deep draws, bur oak (*Quercus macrocarpa*) was common, even more so than green ash (*Fraxinus pennsylvanica*). A variety of forbs were observed but most were late season species since most of those blooming early had either disappeared or were no longer recognizable.

There were no rare species observed. Furthermore, the habitats surveyed were unlikely to provide conditions appropriate for the growth of any such species. There should be no adverse impact on rare species. There were, however, non-native species that are considered invasive. Those commonly encountered along the route were smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*) and Kentucky bluegrass (*Poa pratensis*). Yellow sweet clover (*Melilotus officinalis*) is also sometimes considered invasive. There was also a little Japanese brome (*Bromus japonicus*), an annual grass that is increasingly becoming a problem in western North Dakota. Two noxious weeds, Canada thistle (*Cirsium arvense*) and Absinthe wormwood (*Artemisia absinthium*), were found as part of the survey. Controlling and minimizing the spread of these undesirable species during and following pipeline construction will be part of the reclamation plan and montitoring.

Starting at the east end of the proposed AMHP, a survey of vegetation, invasive species, topography and soils was performed by qualified and certified professionals on November, 17-20, 2008. All plant species that could be identified were noted, with special attention to sensitive plant species, those of concern to the United States Forest Service (2005), those listed by the North Dakota Natural Heritage Inventory (2006), and those listed in North Dakota's Noxious Weed Law (2005). Scientific nomenclature and common names follow that of *Flora of the Great Plains* (McGregor et al. 1986).

Since the survey was conducted after the growing season, it is unlikely that all species that grow along the proposed AMHP ROW were observed or identified, but efforts were made to provide as complete a list as possible of species present and identify those most common or abundant.

More detailed information follows. Photo locations are shown on Figure 3.11, below.

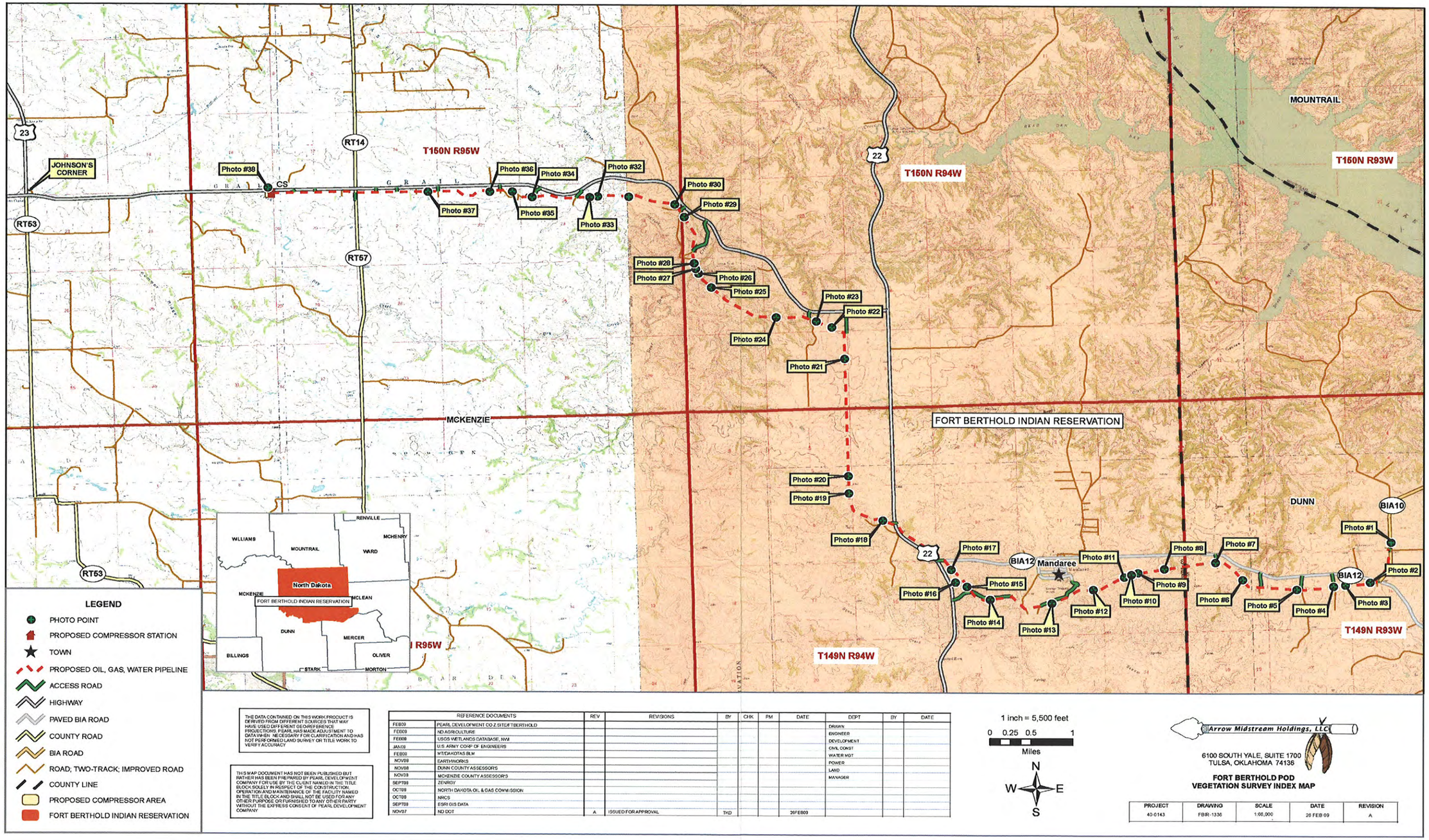


Figure 3.11: Vegetation Photo Point Map

1. The AMHP begins roughly four miles west of Mandaree, North Dakota along the south boundary of the SE ¼ SE ¼ of Section 9, T149N R93W (Photo 1). The route crosses into Section 16 and for approximately ¾ of a mile the route proceeds south following the west side of BIA # 12 (Photo 1). The vegetation in the road ditch was primarily smooth brome with a small amount of crested wheatgrass on the edge of the road and on slight rises. There was a small amount of western snowberry in hollows. The adjacent cultivated field to the west, through which the proposed pipeline actually runs, had been planted to alfalfa. Near the intersection with BIA # 12, yellow sweet clover was present. The soils along this stretch of the route were grayish brown to dark grayish brown loams.

South of the paved road near the center of Section 16, the route crossed a hill crest of native prairie dominated by green needle grass and western wheatgrass. There was a large patch of smooth brome to the right of the route. The most noticeable species included: Silky wormwood, fringed sage, purple coneflower, liatris, yarrow, aromatic aster, golden aster, goat's beard and prairie rose.

2. The route crosses a swale of western snowberry and smooth brome grass where the soils were light brownish gray silt loam (Photo 2) and up a grassy slope with a heavy accumulation of litter. Kentucky bluegrass seemed to be the most abundant grass species but there were small amounts of little bluestem, porcupine grass, prairie dropseed and western wheatgrass. A clump of buffaloberry grew on the top of the crest along with western snowberry and smooth brome. Forbs observed included: white aster, white sage, soft goldenrod and cutleaf goldenweed.

3. The proposed pipeline crosses into Section 17 and into a field of small grain stubble. The soils are a dark grayish brown loam with a somewhat higher component of clay at the base of the slope. The pile of large boulders (Photo 3) collected from the field is the remnants of glacial till, from which most of the smaller materials have eroded away.

4. Past the cultivated field the pipeline route enters a heavily overgrazed pasture (Photo 4) in the SE ¼ NE ¼ Section 17. One of the most conspicuous components of the vegetation was thread-leaf sedge which had been grazed down to the crowns. Other than blue grama, the only grass species readily identifiable was smooth brome. There were a few plants of woods rose, western snowberry and buffalo berry. The most abundant forbs observed at the time of the survey were chickweed and golden aster. Prickly pear was present on the upper slope while silverweed was more common on the lower slope.

5. Crossing into the NE ¼ NW ¼ Section 17 (Photo 5) the past grazing intensity appeared to have been moderate and the vegetation exhibited a more typical diversity. The soils were a gray or dark gray loam. The most abundant grass species was western wheatgrass. There were lesser amounts green needlegrass, needle-and-thread and Sandberg's bluegrass. There was some plains muhly and sun sedge on the upper slopes and small amount of prairie dropseed on the mid and lower slopes. There were also scattered clumps of crested wheatgrass and a small patch of smooth brome. Patches of western snowberry shrubs had an undergrowth of Kentucky bluegrass and wild bergamot. There were a number of forbs observed on this part of Section 17, including: white sage, silky sagewort, soft goldenrod, purple coneflower, blazing star, golden aster, candle anemone, alumroot, prairie rose, snakeweed, skeleton weed and spikemoss.

6. The proposed route crosses the east boundary into Section 18, slightly north of the middle of the section (Photo 6). The vegetation is similar to that described for the western portion of Section 17. However, three additional grass species were observed: red three-awn and prairie Junegrass and little bluestem. Rigid goldenrod was rather abundant around the edges of a buck brush (western snowberry) dominated swale. The proposed route turns northwest and crosses the shrubby upper end of a wooded draw dominated by hawthorn and chokecherry. A thick growth of western snowberry with an understory of Kentucky bluegrass and smooth brome grass were seen around the margins. West of the shrubby area

the proposed route continues up a grassy area with a species composition similar to the previous prairie except that over the crest there were patches of creeping juniper and a few dwarf juniper. Near a cross fence through the middle of the section and further west past a north/south dirt trail there were both dead plants and seedlings of yellow sweet clover. Smooth brome and Kentucky bluegrass were also fairly abundant. Curly-top gumweed was present primarily along the trail. Past the trail there was a topographic rise to the west. The soils were a brown sandy loam. The predominant grass species observed were western wheatgrass, needle-and-thread, little bluestem and prairie junegrass as well as patches of prairie sandreed and smooth brome. There were small amounts of prairie dropseed and a tufted bluegrass. Thread-leaf sedge was also present. Forbs observed included: pussytoes, white sage, milkvetch, prairie rose, golden aster, rock cress, rigid sunflower, candle anemone, penstemon, aromatic aster, blue flax, silver-leaf scurf pea, Missouri goldenrod and soft goldenrod.

7. In the middle of Section 18 the vegetation had been rather heavily grazed (Photo 7). The soils are a grayish brown loam with some evidence of glacial till. There were scattered clumps of western snowberry. The primary grass species that could be recognized on the east facing slope were smooth brome, Kentucky bluegrass, blue grama and a tufted bluegrass. At the crest of the hill little bluestem was present. Soft goldenrod was the most common goldenrod. White sage and silky wormwood were the most common sages. Plains yellow primrose was observed for the first time on the survey.

The proposed route crosses a north-south gravel road in the NW ¼ of Section 18, T 149 R 93, and proceeds west. The terrain is gently rolling in the area of the proposed pipeline. The soil is a brownish loam or sandy silt loam. To the north the surface drops away leading to wooded ravines draining into Lake Sakakawea. To the south the drainage is into creeks leading into the Little Missouri River.

The hilltops were dominated by little bluestem with an understory of blue grama. Western wheatgrass was more abundant on the mid and lower slopes and the grassy upper portions of developing drainage channels. Needlegrasses, prairie Junegrass and sun sedge were also present in those locations. Prairie dropseed and bearded wheatgrass were present in the deeper parts of the grassy drainage channels. The forbs most noticeable on the hilltops were aromatic aster, Missouri goldenrod, purple coneflower and prairie rose. Patches of western snowberry, rigid goldenrod and soft goldenrod were common on the relatively gentle slopes.

8. The proposed route now leaves Dunn County, enters the NE ¼ of Section 13, 149N R94W, McKenzie County (Photo 8) and proceeds down a slope into the upper reaches of a drainage ravine. A trail down the hill had been scrapped into a slope of little bluestem and buffalo berry. Along the disturbed area the most conspicuous species were curly cup gumweed, yellow coneflower, purple coneflower, purple prairie clover, chickweed and Russian thistle. There is Chokecherry on the lower slope along with yellow sweet clover, pliant milkvetch, golden aster, white sage and fringed sage.

At the bottom of the draw the proposed route passes just on the edge or just outside (approximately 75

feet away) of a small wetland with clumps of small sedges that are growing in hummocks as a result of trampling by livestock. Other species encountered in this low area included curly dock, willow-leaved dock, blue vervain, Canada goldenrod, Maximilian sunflower and panicled aster. The western slope of the ravine was dominated by smooth brome and Kentucky bluegrass.

Closer to the crest there was a gentle swale extending to the north which had a small amount of big bluestem as well as green needlegrass, porcupine grass, prairie dropseed and bluegrass. The forbs present in this swale were penstemon, northern bedstraw, candle anemone and field milkvetch. On the crest the primary species were little bluestem, green needlegrass, Sandberg's bluegrass, prairie junegrass and sun sedge.

The proposed route crosses the upper end of swale leading to the northwest that connects to a woody draw. The primary species were western snowberry, brome grass and Kentucky bluegrass which continued in intermittent patches across the prairie to west. Red three awn was also present. There were also a few clumps of buffalo berry and a couple of hawthorn shrubs. The most common forbs were aromatic aster in the swale and soft goldenrod on the gentle slope to the west. A number of broken off, above ground, parts of prairie turnip were observed lying in the grass. Other forbs were similar to the prairie hillsides previously described.

The proposed pipeline route continues west into McKenzie County, entering the NE ¼ of Section 13, T149N R94W. The first hilltop is dominated by little bluestem and thread-leaf sedge (Photo 8). The route continues down a slope through chokecherry and buffalo berry. At the base of the slope there was a narrow wetland about 15 to 20 feet wide. Hummocks had been caused by livestock trampling. The most abundant species were fowl bluegrass canary grass sedge, spikerush, wild mint, blue vervain and a willow. Canadian goldenrod grew on the edges of the wetland and up the west slope. Further up the west slope, within a thicket of western snowberry, there were plants of wild bergamot, dogbane, blue aster, Canada goldenrod and porcupine grass.

The route goes over a crest that was dominated by little bluestem before descending into another wooded draw with a small narrow wetland at the bottom. Other grass species on the crest were western wheatgrass and red three-awn. Noticeable forbs included: purple coneflower, blazing star, rigid goldenrod, alumroot and cutleaf ironplant.

The woodland had buffaloberry at the upper end of the draw and chokecherry surrounding bur oak in the deeper parts of the ravine. There were patches of prairie sandreed above the woods and woodland sedge under the trees. The bottom of the draw was slightly hummocky from livestock walking on the wet ground. Fowl bluegrass was present along with several forbs including wild mint, American germander, yellow avens and willow-leaved dock. Canada goldenrod and Maximilian sunflower grew on the edge of the small wetland.

9. The slope up toward the west was vegetated with little bluestem and needlegrasses along with lesser amounts of sedge and prairie dropseed. There was also a large expanse of creeping juniper which continued to the top of the crest. The most noticeable forbs were pliant milkvetch, harebell, candle anemone and purple coneflower. In addition to lesser amounts of these species, Missouri goldenrod was abundant at the crest along with western snowberry and some red three-awn and Sandberg's bluegrass. The swale to the west had buffaloberry shrubs along with the snowberry (Photo 9) but here the most abundant understory grass was Kentucky bluegrass. Green needlegrass and needle-and-thread were more abundant than on the previous area and prairie junegrass was present.

10. The route of the proposed pipeline turns to the southwest and across a high, gently rolling prairie (Photo 10). The soils were a grayish brown silty loam. The vegetation was similar to the previous areas with the exception that western wheatgrass was more abundant. Another noticeable difference was that purple coneflower was more conspicuously abundant. The past grazing regime appeared to have been moderate. The range was in good condition.

11. The route continued southwest into the upper end of a shallow, grassy drainage area (Photo 11) dominated by western snowberry, western wheatgrass and bluegrass. Clumps of buffaloberry were present on the edges of the crests. Little bluestem and green needlegrass were noticeable on the sides of the hills.

12. The route turns to west as it enters Section 14 (Photo 12) following the bottom of the draw. A heavy growth of hawthorn bordered by western snowberry was present immediately to the south of the route. Kentucky bluegrass and brome grass were abundant. Canada goldenrod was the most conspicuous forb. One noxious weed, Canada thistle was present at this location. Further up the slope, the shrubs changed to clumps of buffaloberry and chokecherry. There was one Siberian elm tree on the slope. Between the clumps of large shrubs there were bunches of dwarf sagebrush. The most conspicuous forbs were wild bergamot and wild licorice.

13. The route continues west across the broad bottom of a drainage area (Photo 13). The soils were a grayish brown silty clay loam. The area had been heavily grazed. The most conspicuous species that remained recognizable were western wheatgrass, blue grama, Kentucky bluegrass, white sage and yarrow.

The proposed route continued across the relatively level bottom land and intersected a shrub bordered drainage with hawthorn and woods rose. A narrow channel was present with sedges in the deepest part. Two noxious weed species, Canada thistle and wormwood, grew along the edges of the channel.

14. On the west side of the creek drainage the route turned to the northwest and progressed up the slope through the shrubs on the slope to a high prairie (Photo 14). The dominant shrub species was hawthorn. Western snowberry with an understory of Kentucky bluegrass and smooth brome grew around the edges. Away from the shrubs, western wheatgrass was common along with three sages, white sage, silky wormwood and fringed sage. Proceeding up the hill the primary grass species was still western wheatgrass but the small amount of bearded wheatgrass was noticeable. There were a few areas of western snowberry with wild bergamot and a few creeping juniper. Mid slope the most conspicuous forbs were soft goldenrod and rigid goldenrod. Near the crest of the hill there was more Sandberg's bluegrass and little bluestem. Aromatic aster and pussytoes were the most conspicuous forbs.

At the top of the crest the land stretched away to the west in a gently undulating high prairie toward the center of Section 15, T149N R94W. The soil was a dark grayish brown loam. The most common grass species were western wheatgrass, green needlegrass and blue grama. Sun sedge and needle-and-thread were also noted. The dried tops of white sage and silky wormwood were conspicuous among the grasses. A variety of additional forbs were present, including: cut-leaf ironplant, snakeweed, Hood's phlox, purple coneflower, Missouri goldenrod, chickweed, silver-leaf scurf pea, golden aster, sneezewort aster, white aster, rigid goldenrod and fringed sage.

The proposed pipeline route roughly follows a grassy two track path in the SE ¼ of the NW ¼ of Section 15 T149N R 94W that bends to the northwest skirting the upper ends of woody draws. One of the first draws encountered had a large thicket of Saskatoon service-berry with a sedge understory. The next had hawthorn at the upper end and green ash and American elm deeper in the ravine. American bittersweet grew in this ravine.

The proposed route continues up and over the crest of a hill with exposed pieces of shale. Western wheatgrass, little bluestem, plains muhly, blue grama and needlegrasses were the predominant grass species. There were also a few clumps of prairie sandreed and a small amount of red three-awn. The most noticeable forbs on this hill were snakeweed, golden aster, aromatic aster, prairie rose and purple coneflower.

15. Photo 15 shows a red-tailed hawk nest in the SENW of sSection 15, T149N, R94W. This photo can be seen in Section 3.7 of this EA.

16. After going over the crest the proposed route continues northwest along the lower part of the south facing grassy slope of a brushy draw (Photo 16) with service-berry, hawthorn, chokecherry and western snowberry on the edges. A few forb species that were present on this slope that weren't observed on the previous crest were skeleton weed, white aster, yarrow, blazing star and soft goldenrod. Porcupine grass and needlegrass was also observed. There were a few clumps of buffalo berry and some patches of smooth brome grass both scattered in the prairie and along the edge of ND Highway 22 which the proposed route intersected near the junction of BIA#12. Dwarf juniper is also present near the intersection.

17. The route crosses under BIA #12 and then parallels the northeast side of ND Highway 22 for approximately ¼ mile. The slope bordering the road is covered with a heavy growth of smooth brome grass before the vegetation changes to woody species in a draw (Photo 17). The primary species were service-berry and hawthorn with the orange of American bittersweet fruits conspicuous in the tops of the shrubs. Along the upper slope to the west the primary shrub was buffalo berry. Again, smooth brome was the predominant grass species. A small branch of the drainage system intersects the route to the northwest. The primary species here were hawthorn with western snowberry on the margins. The area was heavily grazed but the primary grass in evidence was little bluestem.

Further along to the northwest, there was a large woody draw. Along the edge on the east side and deep in the draw there were large bur oak trees. Large aspen trees occurred primarily along the edges but especially on the west side. Hawthorn grew primarily under the aspen. There were also some service berry and buffalo berry along the edges as well as a few chokecherry bushes. The understory was sedge. The most conspicuous species on the grassland to the northwest of the draw were little bluestem with blue grama and thread-leaf sedge. A few noticeable large glacial erratics are evidence of former glacial activity. A smaller branch to the west of the large woody draw was crossed next. It had green ash at its upper end, bur oak deeper in the draw and service berry and hawthorn on the margins.

18. The proposed route now crossed to the west side of ND Highway 22. The primary species along the edge of the road were switchgrass, crested wheatgrass, smooth brome and alfalfa. Away from the road the proposed route continued west-northwest across grassland with little bluestem and blue grama on the hill crests and western wheatgrass and green needlegrass on the lower slopes and relatively level areas (Photo 18).

19. Near the western border of Section 9, T149N R94W, the land slopes away into a ravine (Photo 19). At the crest little bluestem along with needle-and-thread and blue grama were the most common grass species. Golden aster was abundant. The other most noticeable forbs were blazing star, yellow wild buckwheat and silky wormwood. Creeping juniper was growing on the slope. The route of the proposed pipeline crosses the ravine and then turns north following the east boundary of the NE ¼ of Section 8, T149N R94W. The shrubs in the deeper parts of the ravine were primarily buffalo berry, chokecherry and western snowberry. Smooth brome was abundant in the ravines. Vegetation on the crests across the ravine was similar to that on the crest previously described. On the grassy uplands going north there appeared to have been a minimal amount of grazing. Green needlegrass, needle-and-thread and western wheatgrass were abundant. There were patches of smooth brome. As the north boundary of Section 8 was approached, brome became more abundant.

20. The route of the proposed pipeline follows the east side of Section 5, T149N R94W across the entire section. The east half of the section is cultivated and had been planted to small grains (Photo 20).

21. The east ½ of Section 32 had been planted to tame grasses and had been hayed. Smooth brome seemed to be the predominant species present; however, there was some alfalfa, Kentucky bluegrass and crested wheatgrass. The latter was more abundant on the hill crests. A wetland was present in the SE1/4 of the NE1/4 of Section 32 T150N R 94W. An area to the west of the proposed pipeline appears to hold water at times but was presently dry (Photo 21). Bulrushs and water smartweed grew around the margins of this depression. There was considerable reed canary grass both near the depression and on both sides. Wetland sedge was abundant as was a species of dock but the area had been mowed so neither could be determined as to species. A few weedy species were prevalent around the edge of and/or outside the wetland including: pennycress, flixweed, pigweed, kochia and prickly lettuce as well as a small amount of Japanese brome.

22. The proposed route proceeds north until shortly before it enters the SE ¼ SE ¼ of Section 29, T150N R94W, where it makes a sharp turn to the northwest continuing through a cultivated area (Photo 22).

23. After leaving the cultivated area the proposed route follows a high grassy area between two wooded ravines in the NE ¼ of the SW ¼ of Section 29, T150N R94W (Figure 7 on page 69). Along the high prairie, the soil was a grayish brown loam. The most noticeable grass species were western wheatgrass, green needlegrass and sideoats grama (Photo 23). Proceeding west on the ridge separating the wooded ravines little bluestem became the most abundant grass species. There were many old, senescent clumps indicating minimal grazing in the past. Another noticeable feature of the vegetation was the present of large clumps of dwarf juniper within the grassy area. The wooded ravines north and south of the grassy

ridge are dominated by bur oak with some green ash on the edge along with dwarf juniper and western snowberry.

The grassy ridge culminates in a very steep slope leading down into a ravine. The crest is dominated by little bluestem and plains muhly. Buffalo berry grew just over the edge along with a couple of green ash trees. There were some service-berry shrubs on the mid and lower slopes. Smooth brome was growing at the base of the hill along with a small amount of bearded wheatgrass. Away from the base of the hill there was western wheatgrass, green needlegrass and thread-leaf sedge between clumps of western snowberry.

24. Further west, the route went past the base of a clay butte with a clay apron extending out from it's base (Photo 24). Several species were limited to these barren clay sites, including: inland saltgrass, alkali-grass, slender wheatgrass seepweed and moundscale.

In the lowest area of the ravine were several species that are typical of the edges of wetlands, including a sedge, alkali cordgrass, reedgrass, fowl bluegrass and foxtail barley. At the base of the slope, before ascending the west side out of the ravine, there was a small amount of big bluestem.

At the top of the hill were gently rounded grassy site dominated by western wheatgrass and large patches of western snowberry. The prevalence of little bluestem increased toward the west as the hilltop became a narrow ridge and bushes of fragrant sumac became prominent. On the north side of the ridge there was a grassy area on the upper slope. Woody species became prevalent further down the slope. Grass species included green needlegrass, needle-and-thread, porcupine grass and inland bluegrass in addition to those species on the previous grassy area. The forbs that were most noticeable were yellow coneflower, blue flax, yarrow, blazing star and aromatic aster. The woody species down the slope included: green ash. Rocky Mountain juniper, dwarf juniper, buffalo berry and western snowberry.

The crest of the steep south facing slope had exposed sandstone and loose sandy loam soil. Species growing on this site included yucca plains muhly, thread-leaf sedge winterfat and moundscale. Further down the slope there were shrubs of dwarf sagebrush and clumps of prairie sandreed. The lower part of the southwest facing slope was exposed clay. Three species often found on such a site were present: including spiny saltbush, rabbit brush and plains prickly pear.

Extending out from the base of the butte was a clay fan. The primary species noticed on this site were wild buckwheat, inland saltgrass, snakeweed, a penstemon species and Hood's phlox. The latter species was present on top of soil pedestals with residual topsoil. On the shoulder slope outside the clay outwash little bluestem was the dominant species. This portion of the slope also had shrubby areas of buffalo berry with few green ash trees on both sides of the proposed route. Lower down the slope leading into the ravine the primary grass species was western wheatgrass. Scattered clumps of dwarf sagebrush were also present. Deep in the draw there was dense woodland. The western snowberry and green ash trees formed the eastern edge. Deeper into the draw there were mostly bur oak trees with an understory of sedges and fowl bluegrass. A small amount of catchweed bedstraw was present as well as a few shrubs of Missouri gooseberry. Toward the outer edge there were few hawthorns and some service-berry.

The east facing slope to the west above this woodland had shrubby and wooded areas separated by grassy areas. Part way up this slope there was a shoulder with mostly western wheatgrass, porcupine grass and dwarf sagebrush. Above this was another band of woody species that was predominantly green ash, chokecherry buffalo berry and western snowberry. Another grassy opening above this had primarily western wheatgrass, sideoats grama and red three-awn. Another band of wood species was present on the slope near the crest. Here fragrant sumac was present on the lower edge of this band. The primary tree species here were green ash, and

bur oak along with a few dead and dying American elm. Silverberry was present along the upper crest along with yucca, dwarf juniper and little bluestem. Patagonian plantain was also present at this location.

Just past the crest of the ravine the proposed route turned northwest across Section 30, T150N R 94W following the top of a rolling upland skirting the upper ends of drainage ravines. Large glacial erratics were noticeable in several places on this high prairie. At the point where the diagonal portion begins the soils vary from a grayish brown loam or silty loam to areas with a substantial component of clay. Areas with clay loam soils were primarily on the lower portions of the slopes. In these areas Snakeweed and curly cup gumweed were particularly common. The upper slopes had patches of buffalo berry and/or western snowberry as well as mats of creeping juniper separated by grasses, primarily western, green needlegrass, needle-and-thread and blue grama. The most conspicuous forb was silky wormwood. Prairie sandreed and cutleaf ironplant grew in a few places (Photo 24).

25. The vegetation for the remainder of the rolling upland of Section 30 was similar to that described for the upper slopes in the previous paragraph except for the absence of buffalo berry on the high prairie (Photo 25).

26. At the NW ¼ of the NW ¼ of Section 30 the route for the pipeline begins an abrupt decent down a northwest facing slope (Photo 26). Just over the crest there is a considerable amount of silverberry.

27. Further down the slope there were a few Rocky Mountain junipers and green ash. Creeping juniper was quite common. Yucca was especially abundant on portions of the slope facing south. Chokecherry was present in the wooded draw south of the route (Photo 27) and at the base of the hill.

28. The route entered a broad valley at the base of the hill in the northwest corner of Section 30. A ranch headquarters was present on the far side. Ranching activities and livestock probably account for the presence of a number of weedy and invasive species (Photo 28). Flixweed, lamb's quarters, oak-leaved goosefoot and kochia were particularly abundant. Smooth brome was also abundant.

The proposed pipeline intersects two creek channels with flowing water in the process of crossing the valley. The crossing to the south had a wide bottom with sandy silt loam soils. The most noticeable species near the creek were foxtail barley, Canada wild rye, inland saltgrass, wild licorice and fowl bluegrass. There was a weedy area with kochia lamb's quarters before the second stream was encountered. This stream was deeper and narrower with a steep bank on the north side on which prairie cordgrass was growing on the lower portion of the bank. Bulrushes grew along the edge of the stream. Alkali cordgrass also grew near the stream. Panicled aster was present a bit farther away from the stream. Inland saltgrass grew on the south side and near the road.

The proposed pipeline route proceeds north up the west side of the SW ¼ of Section 19, T150N R94W following the trail cut up the side of a hill. The primary species were little bluestem, thread-leaf sedge and side oats grama. The most conspicuous forbs were Missouri goldenrod and purple coneflower. There were also a couple plants of black or big sagebrush on this slope and yucca near the crest.

29. At the top of the hill the route follows a ridge between two drainage ravines (Photo 29). The primary grass species were little bluestem and blue grama. In places, western wheatgrass was abundant. In addition, Sandberg's bluegrass was observed. Silky wormwood and white sage were both common. Western snowberry occupied the occasional hollows in the topography. Sporadic gravel excavations had left hollows that provided sites for the establishment of cottonwood. A variety of forbs were observed on the ridge, including: purple coneflower, prairie rose, white aster, soft goldenrod, yellow coneflower, purple prairie clover and blazing star. Toward the edge of the ridge to the northeast there was a woody draw with silverberry, buffalo berry, and aspen. A few junipers were also present. An old gravel pit had been dug near the route just before it entered Section 24 T150N R95W. Only two additional species were observed that had not been noted on the previous ridge. Curly cup gumweed was abundant at the bottom of the excavation and rabbit brush grew on the sides.

30. The route continued west following the high country above the ravines (Photo 30) traveling at an angle slightly to the northwest. The soils were a dark grayish brown loam. The presence of occasional granite boulders of varying size are evidence of a former glacial event. On the relatively level or gently sloping areas western wheatgrass was common but on the hill crests it was largely replaced by little bluestem. Blue grama was very common throughout as was spikemoss. The relatively high abundance of these two species is an indication of heavy grazing in the past. Western snowberry was present in slight swales where it was associated with white sage and bluegrass. The variety of forbs present on this site included: yarrow, cinquefoil, snakeweed, aromatic aster, soft goldenrod, golden aster and silky wormwood.

31. The latter was increasingly abundant further west on this high prairie (Photo 31).

The proposed route left the high prairie and descended into a ravine in the NW ¼ of Section 24 T150N R 95W. Silverberry was present along the upper slope. In the deepest part of the ravine the primary woody species were bur oak, green ash and service-berry. Bluegrass was common in the understory. Canada goldenrod was the most conspicuous forb.

The route crossed a terrace/shelf on the west side of the draw where the dominant grasses were blue grama and western wheatgrass along with lesser amounts of green needlegrass. Dwarf sagebrush and creeping juniper were present at this level but buffalo berry was abundant higher up the slope where there was also some dwarf juniper. The route then crossed a clay slick at the base of a clay butte. The sparse vegetation there included inland saltgrass, alkali grass, snakeweed, Patagonian plantain and plains prickly pear.

32. The proposed route continues over a steep bank with silverberry at the top and down to a creek with flowing water (Photo 32). The vegetation on the bank included buffalo berry, fragrant sumac, creeping juniper, dwarf juniper and prairie sandreed. At the base of the bank there was Canada rye along the stream and a small amount of big bluestem. On the edge of the stream there were patches of hardstem bulrush, American bulrush, prairie cordgrass and reed canary grass. There were a few forbs along the stream and up the bank, including: water hemlock, panicled aster, Canada goldenrod and northern bedstraw. Up the far bank quackgrass, Flodman's thistle, and fowl bluegrass.

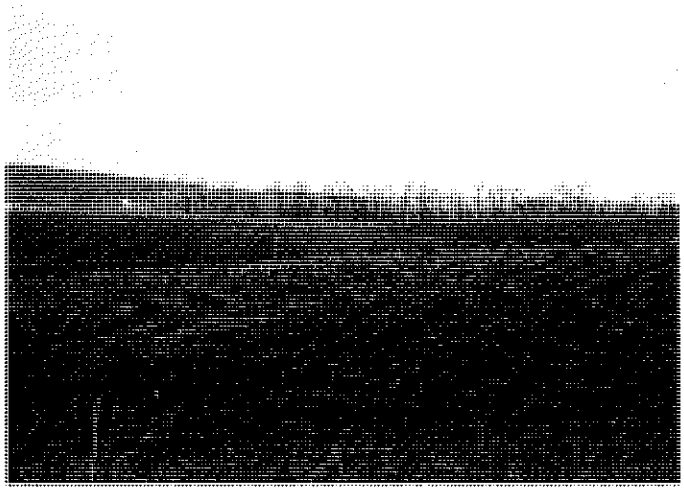
33. Moving up the hillside, crested wheatgrass was the dominant grass (Photo 33). Further up the hill the grassland was similar to that on top of the hill north of the stream with the exception that there was more purple coneflower and green needlegrass.

34. & 35. At the top there were scattered tufts of crested wheatgrass and a few prairie sandreed clumps (Photo 34 & 35) noticeable sticking above the grazed western wheatgrass and blue grama.

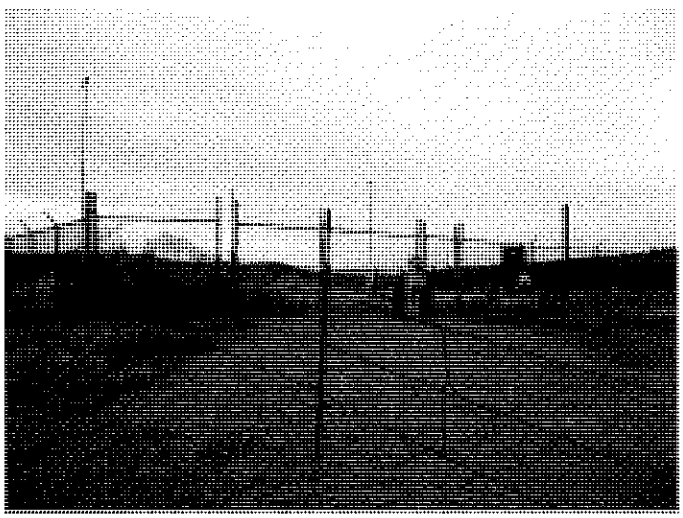
36. Shortly after crossing into the NE ¼ of Section 23 T150N R95W the route cuts across the south end of a field with cropland stubble (Photo 36). From this point on the proposed route more or less parallels HWY 73. West of this field, the proposed route travels west across a rolling prairie. The hollows supported western snowberry. It was usually associated with smooth brome or crested wheatgrass and often with white sage. The relatively level areas were dominated by western wheatgrass, blue grama and sometimes thread leaf sedge. The low hill tops primarily had little bluestem, sometimes associated with needle-and-thread and plains muhly. On a few of the crests there were mats of creeping juniper. Yarrow, purple coneflower, skeleton weed, snakeweed and blazing star were the most conspicuous forbs. To the north of the route in the upper ends of the drainage channels there were woody species, including: buffalo berry, western snowberry, dwarf juniper, aspen and a few dead cottonwood trees.

Where the route crosses the section line between Section 22 and Section 23 a small area was encountered with a couple of species tolerant of wet conditions, including dock and foxtail barley. Other species near the eroded hollow included Canada rye, Russian thistle, and curly-top gumweed.

Beyond the previous low area, the route continued northwest up a steep slope with sandy soil and exposed rocks of sandstone/mudstone. Little bluestem was the predominant grass species but there were also noticeable amounts of thread-leaf sedge as well as some sideoats grama. The noticeable forbs included: golden aster. Hood's phlox, chickweed and aromatic aster. On the top of the hill there was also yarrow, pussytoes, purple locoweed and many lichens. The site was heavily grazed and, as a result, some weeds had become established. Those observed were peppergrass and flixweed.



37. The route continued west across a field with a thin growth of crested wheat (Photo 37) Depressions were present with smooth brome and curly top gumweed. The next field to the west had a thin cover of alfalfa and smooth brome. In some places there was a lot of Russian thistle. The NE ¼ NE ¼ of Section 21, T150N R95W (Photo 37) was a cultivated field. West of the field, the route crossed a meandering drainage channel. Cultivation had occurred on both sides of the channel and mowing had occurred as well. The grass species bordering the channel included smooth brome, Kentucky bluegrass and crested wheatgrass. The primary species in the wetter areas included reed canary grass, spikerush, pearscale, cattail and field sow thistle. The remainder of the route, until it crosses the highway near the end of the route, was tilled. Another wetland occurred in the road ditch on the north side of the road near the end of the route. The predominant species in this site were prairie cordgrass, cattail, foxtail barley, spikerush, curly dock, reed canary grass and field sow thistle. The wetland was surrounded with smooth brome and western wheatgrass.



38. The pipeline culminated at Johnson Corner Valve in the SE ¼ of the SE ¼ of Section 18, T150N R95W (Photo 38).

3.12 Mitigation and Monitoring

Monitoring programs would be initiated immediately following all reclamation efforts, whether following initial construction, any operational ground disturbance or after final reclamation. Monitoring results would be used to determine need for additional seeding, planting or other soil preparation or stabilization measures. Identified problem areas would be treated as soon as possible. Unauthorized vehicle access would be noted during monitoring and measures to block access would be taken, such as fencing or signage of the pipeline corridor. Many protective measures and procedures are described in this document. No laws, regulations, or other requirements have been waived.

3.13 Irreversible and Irretrievable Commitment of Resources

Construction of an oil and gas gathering system may expedite removal and consumption of oil or gas from the Bakken Formation would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include acreage devoted to the facility and associated infrastructure along the AMHP, soil lost through wind and water erosion, cultural resources inadvertently destroyed, wildlife killed by earthmoving, habitat loss or in collisions with vehicles, and energy expended during construction and operation.

3.14 Short-term Use of the Environment versus Long-term Productivity

Short-term activities would not detract significantly from long-term productivity of the project area. The small area dedicated to the AMHP corridor would be temporarily unavailable for livestock grazing, wildlife habitat or other uses, but original uses would be re-established very quickly. Allottees with surface rights would be compensated for temporary loss of productive acreage and project footprints would shrink considerably once the pipeline was backfilled and non-working areas were reclaimed and reseeded. Successful and ongoing reclamation of the landscape would quickly stabilize the soil, reduce potential for erosion and sedimentation, and re-establish customary land uses for wildlife and livestock. The major long-term resource loss corresponds with the project purpose: gathering of hydrocarbons from the Bakken Formation for economic benefit of MHA Nation and individual Indians.

3.15 Cumulative Impacts

Environmental impacts may accumulate either over time or in combination with similar activities in the area. Unrelated activities may also have negative impacts on critical elements, thereby contributing to cumulative degradation of the environment. Past and current disturbances in the vicinity of the project include farming, grazing, roads, and other oil/gas wells. Virtually all available acreage is already organized into agricultural leases of range permits. Small-scale disruption of these activities during construction of the proposed gathering system would not have more than a minor, temporary effect on surface use patterns.

Construction of the proposed system can facilitate additional oil/gas exploration by salvaging revenue streams currently wasted in flaring. Gathering capability may therefore lead to more wells drilled, even while commodity prices are relatively low, but all such developments remain speculative and incapable of analysis. Extensions of the gathering system itself are viewed generally as posing relatively minor direct impacts and tending to reduce indirectly overall oil field environmental impacts, through reductions in flaring, trucking and public hazards from all serviced wells. No significant cumulative, negative impacts are reasonably foreseen from proposed activities.

4. Consultation and Coordination

The project notice reproduced below was posted at the BIA Fort Berthold Agency and direct-mailed to the recipients listed in Table 4 on October 30, 2008.

Dear Interested Party:

The Bureau of Indian Affairs (BIA) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA), in cooperation with the Bureau of Land Management (BLM). BIA and BLM are considering approval of three pipelines (oil, gas and water) and a utilities line in one 100 foot Right-of-Way (ROW) on the Fort Berthold Reservation by Arrow Midstream Holdings, LLC.

The proposed route of the ROW is shown on the enclosed map and described in the following paragraph:

> The ROW will start in the NENW of Section 16, T149N R93W. The pipeline route will head west roughly following BIA road 12, on the south side of the road, and then head north, on the west side of, Highway 22. At the junction of Highway 22 and Highway 73 the pipeline route then turns west again and follows the south side of Highway 73 off the Reservation and ends in the NWNE of Section 19, T150N R96W.

To ensure that social, economic, and environmental effects are analyzed accurately, we solicit your views and comments on the proposed action, pursuant to Section 102(2) (D) (IV) of NEPA, as amended. We are interested in developments proposed or underway that should be considered in connection with the proposed project. We also ask your assistance in identifying any property or resources that you own, manage, oversee or otherwise value that might be adversely impacted. Please send your replies and requests for additional project information to:

Pearl Field Services
Attn: Christi Haswell
P.O. Box 783
Sheridan, WY 82801

Questions for the BIA can be directed to Paul Hofmann, Chief, Division of Environment, Safety and Cultural Resources Management, at (605) 226-7656.

Sincerely,

Regional Director

Table 4: Public comments

Name	Organization	Comment
Bagley, Lonny	Bureau of Land Management	No comments
Benson, Barry	Three Affiliated Tribes	No comments
Berg, George	NoDak Electric Cooperative, Inc.	No comments
Black, Mike	Bureau of Indian Affairs	No comments
Boland, Mike	Saddle Butte Pipelines, LLC	Requesting additional information regarding technical details of the proposed pipeline.
Boyd, Bill	Midcontinent Cable Company	No comments
Brady, Perry	THPO, Three Affiliated Tribes	No comments
Brien, David	Chairman, Turtle Mountain Band of Chippewa	No comments
Brugh, V. Judy	Three Affiliated Tribes	No comments
Cayko, Richard	McKenzie County	No comments
Christenson, Ray	Southwest Water Authority	No comments
Cimarosti, Dan	U.S. Army Corps of Engineers	No comments
Corps of Engineers, Omaha District	Garrison Project Office	No comments
Danks, Marvin	Fort Berthold Rural Water Director	No comments
Dhieux, Joyce	U.S. Environmental Protection Agency	No comments
Director, Insurance & Hazard	Federal Emergency Management Agency	No comments
Dixon, Doug	Montana Dakota Utilities	No comments
Early, John	President, Saddle Butte Pipeline, LLC	Believes BIA did not provide adequate information concerning the pipeline to allow informed public review and comments. The scoping comment period should be extended.
Erickson, Carroll	Ward County Board of Commissioners	No comments
Flores, J.R.	U.S. Department of Agriculture	No comments
Fox, Fred	Three Affiliated Tribes	No comments
Glatt, David	ND Department of Health, cont	Environmental impacts resulting from the proposed project are expected to be minor and can be controlled by proper construction methods. Care is to be taken during construction activity near any water, including minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Prevent spills of any construction material that may reach a water source. A permit to discharge stromwater may be required by the EPA. Check with the local officials to be sure any local storm water management considerations are addressed. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment has a recommended muffler in good working condition or by ensuring construction activities are not conducted during early morning or late evening hours. Prevent soil erosion of exposed soils surfaces from being transported. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss and unnecessary damage. All attempts will be made to prevent contamination of water at construction sites. Any fill material placed below the high water mark must be free of top soils, decomposable materials and persistent synthetic organic compounds.
Gorton, Candace	U.S. Army Corps of Engineers	No comments
Guzman, Frank	U.S. Forest Service	No comments

Hall, Joseph	U.S. Department of Interior Bureau of Reclamation, Chief Resource Management	Pipeline construction could potentially affect Reclamation facilities in the form of the rural water pipelines of the Fort Berthold Rural Water System. Any work should be coordinated with Mr. Marvin Danks, Fort Berthold Rural Water Director, and Three Affiliated Tribes.
Hall, Tex	President, Fort Bethold Allottee Land & Mineral Owners Association	Bureau needs to clarify that required allottee consents have been obtained and approved. Concerned that the Arrow pipeline proposal is not a comprehensive solution to all gather oil and gas and transport off the Reservation.
Hall, Todd	Three Affiliated Tribes	No comments
Hauck, Reinhard	Dunn County	No comments
His Horse Is Thunder, Ron	Chairman, Standing Rock Sioux Tribe	No comments
Hoffman, Warren	Killdeer, Weydahl Field	No comments
Hovda, Roger	Reservation Telephone Cooperative	No comments
Hudson-Schenfisch, Julie	McLean County Board of Commissioners	No comments
Hynek, David	Chair, Mountrail Board of County Commissioners	No comments
Kulas, Cheryl	Indian Affairs Commission	No comments
Manager	Xcel Energy	No comments
McKenna, Mike	ND Game and Fish Department	Project may possibly disturb native prairie and wooded draws associated with construction of pipeline and access roads. It is recommended that construction be avoided to the extent possible within native prairie, wooded draws, and wetland areas. It is requested that disturbed areas be reclaimed to pre-project conditions. No significant adverse effects on wildlife or wildlife habitat.
McLean, Alex	Peak North Dakota, LLC.	Believes BIA did not provide adequate information concerning the pipeline to allow informed public review and comments. The scoping comment period should be extended.
Missile Engineer, Chief	Minot Air Force Base	No comments
Moch, Alan	ND Public Service Commission	Based upon information received, the pipeline is non-jurisdictional.
NAGPRA Office	Three Affiliated Tribes	No comments
Nash, Mike	Bureau of Land Management	No comments
Natural Resources Department	Three Affiliated Tribes	No comments
Nelson, Richard	Bureau of Reclamation	No comments
Obenauer, Steve	Federal Aviation Administration	No comments
Olson, Frances	McKenzie County	No comments
Paaverud, Merl	State Historical Society	The SHPO looks forward to receipt of reports with manuscript data forms attached, covering the pipeline route for the manuscript archives.
Packineau, Mervin	Three Affiliated Tribes	No comments
Paulson, Gerald	Western Area Power Administration	No comments
Pearson, Myra	Spirit Lake Sioux Tribe	No comments
Peterson, Walter	ND Department of Transportation	No comments
Poitra, Fred	Three Affiliated Tribes	No comments
Prchal, Doug	ND Parks and Recreation Department	Comment by Jesse Hanson: The proposed project does not affect state park lands. Based on review of the North Dakota Natural Heritage database, no plant or animal species of concern are known to occur with-in or adjacent to the project area. Regarding reclamation efforts, it is recommended that any impacted areas be revegetated with species native to the project area.
Representative, Mandaree Segment	Three Affiliated Tribes	No comments
Roth, Sandy	Northern Border Pipeline Company	No comments
Rudolph, Reginald	McLean Electric Cooperative, Inc.	No comments
Schelkoph, David	West Plains Electric Cooperative, Inc.	No comments
Selvage, Micheal	Chairman, Sisseton-Wahpeton Sioux	No comments

	Tribe	
Sorenson, Charles	U.S. Army Corps of Engineers	No comments
Svoboda, Larry	U.S. Environmental Protection Agency	No comments
Thompson, Brad	U.S. Army Corps of Engineers	If the proposed pipeline crosses flood plains of small drainageways and streams, flood-related problems should not occur if the pipelines are buried far enough below the beds of the drainageways and streams to prevent exposure due to streambed erosion during periods of high floodflows. Any aboveground construction subject to flood damage should either be placed above or flood proofed to a level above the 100-year flood elevation. Plans should be coordinated with the U.S. EPA, and consult U.S. Fish and Wildlife Service and the North Dakota Game and Fish Department, in addition to the North Dakota State Historic Preservation Office.
Thorson, Gary	McKenzie Electric Cooperative	No comments
Towner, Jeffrey	U.S. Fish and Wildlife Service	Contractor should schedule construction for late summer or fall/winter to avoid disturbing waterfowl or other wildlife during breeding season. Also, make no alterations to stream channels, use appropriate erosion control measures, reseed with native plant species and avoid wetlands, if wetlands are not avoidable, replace loss of wetland habitat. Overhead powerlines should be built to prevent migratory bird electrocution or buried electric should be used.
Wells, Marcus	Chairman, Three Affiliated Tribes	No comments
Whitcalf, Frank	Three Affiliated Tribes	No comments
Williams, Damon	Three Affiliated Tribes	No comments
Wolf, Malcolm	Three Affiliated Tribes	No comments

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

TAKE PRI
IN AMERI

IN REPLY REFER TO:
DESCRM
MC-208

FEB 1 3 2009

Perry 'No Tears' Brady, THPO
Mandan, Hidatsa and Arikara Nation
PO Box 429
Parshall, North Dakota 58770

Dear Mr. Brady:

We have considered the potential effects on cultural resources of an oil pipeline in McKenzie and Dunn Counties, North Dakota. Approximately 330.74 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the area depicted in the enclosed report. No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.4) for inclusion on the National Register of Historic Places, although site 32DU87 had previously been recorded as eligible within the project area. No properties were located that appear to qualify for protection under the American Indian Religious Freedom Act (16 USC 1996).

As the surface management agency, and as provided for in 36 CFR 800.5, we have therefore reached a determination of **no adverse effect** for this undertaking, as the supposed site area will be monitored. Catalogued as **BIA Case Number AAO-1607/FB/09,** the proposed undertaking, location, and project dimensions are described in the following report:

Markman, Jon M., Kade M. Ferris, Erin Salisbury and Scott Slessman
(2009) A Class I and Class III Cultural Resource Inventory of the Proposed Arrow Pipeline and Compressor Station in McKenzie and Dunn Counties, North Dakota. SWCA Environmental Consultants for Arrow Midstream Holdings LLC, Tulsa, OK.

If your office concurs with this determination, consultation will be completed under the National Historic Preservation Act and its implementing regulations. The Standard Conditions of Compliance will be adhered to.

If you have any questions, please contact Dr. Carson N. Murdy, Regional Archaeologist, at (605) 226-7656.

Sincerely,

(sgd) Michael S. Black

Regional Director

Enclosure

cc: Chairman, Three Affiliated Tribes
Superintendent, Fort Berthold Agency
208:CMURDY:bkb:X7656:2/11/09:O:\cultural resources\NHPA\project files\A04-FtBerthold\2009\AAO1607fb.prj.DOC
bcc: Subject/Reading file

MAILED
2/18/09

TRIBAL HISTORIC PRESERVATION
Mandan Hidatsa Arikara
Perry 'No Tears' Brady, Director.
404 Frontage Road,
New Town, North Dakota 58763
Ph/701-862-2474 fax/701-862-2490
pbrady@mhanation.com

February 18, 2009

Dr. Carson N. Murdy
Regional Archeologist
Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Ave. S.E.
Aberdeen, SD, 57401

RE: Project #AAO-1607/FB/09

Dr. Murdy:

Thank you for your letter in which you notified our Nation of the proposed Project;

Arrow Pipeline & compressor Station, Dunn/McKenzie Counties, ND.

After review of the documentation provided by your office, the Mandan Hidatsa Arikara Nations THPO concurs with the determination of 'No Adverse Affect'/No Historic Properties Affected' to any pre and post-historic relics, artifacts or sacred and cultural resources in the proposed Project area. We respectfully request to be notified should any NAGPRA issues arise as the Project progresses.

We look forward to further opportunities to participate in any future consultations.

Sincerely,

Perry 'No Tears' Brady

Perry 'No Tears' Brady,
Tribal Historic Preservation Officer,
Mandan Hidatsa Arikara Nations.

5. List of Preparers

An interdisciplinary team contributed to this document, following guidance in Part 1502.6 of CEQ regulations. Pearl Field Services prepared portions of this EA under contract to Zenergy, Inc/Arrow Midstream Holdings, LLC and under the direction of the Bureau of Indian Affairs, Great Plains Regional Office (GPRO), Division of Energy and Environment. Western Plains Consulting performed fieldwork and prepared water, soil, vegetation and wildlife sections. Preparers, reviewers, consultants, and federal officials include the following:

• Paul Hofmann	Chief, Division of Energy and Environment, BIA – GPRO. Production of EA template and writing of background sections. Editing of EA and recommendation to BIA Regional Director regarding FONSI or EIS.
• Scott Martin	Arrow Midstream Holdings, LLC Project Manager. Document Review.
• Pearl Field Services, LLC	Christi Haswell, Regulatory Project Manager. Project Manager
	Kimberlee Newman, Regulatory Project Coordinator.
• Western Plains Consulting	John W. Schulz, Certified Wildlife Biologist / Senior Biologist.
	Carolyn Godfread, Ph.D., Senior Botanist.
	Lance G. Loken, Senior Soil Scientist.
	Justin Askim, Wildlife Biologist / Botanist.
	Sara Simmers, Natural Resource Specialist / GIS Specialist.
	Norm Prochnow, Senior Botanist / Registered Professional Soil Classifier.
• SWCA Environmental	Jon Markman, Archeologist / Field Director.
	Kade Ferris, Tribal Liaison/Tribal Consultation.

6. References and Acronyms

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Acronyms

AAQM	Ambient Air Quality Monitoring
AIRFA	American Indian Religious Freedom Act
APD	Application for the Permit to Drill
APE	Area of potential effect
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BOR	Bureau of Reclamation
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EUR	Estimated Ultimate Recoverable
FEL	From the east line
FONSI	Finding of No Significant Impact
FSL	From the south line
GPRO	Great Plains Regional Office
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
MMCFD	Million Cubic Feet per Day
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NDDA	North Dakota Department of Agriculture
NDDH	North Dakota Department of Health
ND-GAP	North Dakota Gap Analysis Project
NDIC	North Dakota Industrial Commission
NDSWC	North Dakota State Water Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
Psig	Pounds per Square Inch Gauge
Reservation	Fort Berthold Indian Reservation
ROW	Right-of-way
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention, Control, and Countermeasure
TCP	Traditional Cultural Property
TERO	Tribal Employment Rights Office
THPO	Tribal Historic Preservation Officer
TRNP	Theodore Roosevelt National Park
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service