



**WBI ENERGY TRANSMISSION, INC.**

**Demicks Lake Pipeline Project**

**Resource Report 10**

**Alternatives**

***DRAFT***

**Docket No.  
PF15-24-000**

**July 2015**

**WBI ENERGY TRANSMISSION, INC.  
DEMICKS LAKE PIPELINE PROJECT  
RESOURCE REPORT 10 – ALTERNATIVES**

<b>Minimum Filing Requirements:</b>	<b>Addressed in Section:</b>
Address the “no action” alternative - 18 CFR §380.12(1)(1) Discuss the costs and benefits associated with the alternative	Section 10.1
For large projects, address the effect of energy conservation or energy alternatives to the project - 18 CFR §380.12(1)(1)	Sections 10.2
Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative - 18 CFR §380.12(1)(1)	Section 10.3
Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route - 18 CFR §380.12(1)(2)(ii)	Section 10.4 and 10.5
Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site - 18 CFR §380.12(1)(2)(ii)	Section 10.6

**WBI ENERGY TRANSMISSION, INC.  
DEMICKS LAKE PIPELINE PROJECT  
RESOURCE REPORT 10 – ALTERNATIVES**

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## ACRONYMS AND ABBREVIATIONS

Demicks Lake Plant	Demicks Lake natural gas processing plant
ESRI	Environmental Systems Research Institute
FERC	Federal Energy Regulatory Commission
GIS	geographic information system
Northern Border	Northern Border Pipeline Company
NRHP	National Register of Historic Places
ONEOK	ONEOK Rockies Midstream L.L.C.'s
Plant	Demicks Lake natural gas processing plant
Project	Demicks Lake Pipeline Project
WBI Energy	WBI Energy Transmission, Inc.

**WBI ENERGY TRANSMISSION, INC.  
DEMICKS LAKE PIPELINE PROJECT**

**10.0 RESOURCE REPORT 10 – ALTERNATIVES**

Resource Report 10 describes alternatives that WBI Energy Transmission, Inc. (WBI Energy) has evaluated to determine whether they would be reasonable and environmentally preferable to the proposed Demicks Lake Pipeline Project (Project). Alternatives considered include the no-action alternative, alternative energy sources and energy conservation, system alternatives, major route alternatives, and route variations. To be considered preferable to the proposed Project, an alternative must provide a significant environmental advantage over the Project; meet the objectives and timeframes of the Project; and be technically and economically feasible and practicable.

In addition to major route alternatives, WBI Energy identified a number of route variations along the proposed route to avoid or minimize crossings of sensitive environmental features or to address engineering or other concerns. These pre-filing route variations were incorporated into the proposed route and are briefly described in section 10.6. Additional post-application route variations to address localized issues along the proposed route may be identified as a result of ongoing environmental and civil field surveys, engineering design work, agency consultations, landowner communications, and other stakeholder input. Any post-application route variations identified as a result of these activities will be identified in supplemental filings with the Federal Energy Regulatory Commission (FERC).

**10.1 NO-ACTION ALTERNATIVE**

As discussed in Resource Report 1, the primary objectives of the Project are to build a pipeline from ONEOK Rockies Midstream L.L.C.'s (ONEOK) proposed Demicks Lake natural gas processing plant (Demicks Lake Plant or Plant) to a new interconnect with Northern Border Pipeline Company's (Northern Border) existing mainline to satisfy natural gas demand in the midcontinent region of the United States; and to place the proposed facilities into service as early as September 2017.

The Bakken/Three Forks formation is the largest oil field in the world, and contains extensive amounts of crude oil and associated natural gases. The Project will provide an outlet for this natural gas. Under the no-action alternative, the Project would not be built, and the environmental impacts associated with construction and operation of the proposed facilities would not occur. By not constructing the Project, however, WBI Energy would be unable to provide the transportation capacity requested by ONEOK. In particular, WBI Energy would be unable to transport the gas processed at ONEOK's Demicks Lake Plant, which could leave the gas stranded and unable to get to market. Therefore, the Project objectives would not be met and the benefits of the Project would not be realized. Under the no-action alternative, other natural gas pipeline companies could propose to construct similar, new facilities to meet the demand for the transportation of the contracted volume of gas from ONEOK's proposed Plant. Such actions would likely result in impacts similar to or greater than the proposed Project, and might not meet the Project's objectives within the proposed timeframe. Therefore, the no-action alternative is not practical and provides no advantage over the proposed Project.

## 10.2 ALTERNATIVE ENERGY SOURCES AND ENERGY CONSERVATION

The use of alternative energy sources, such as solar, wind, geothermal or biofuels, or the use of energy conservation measures are not reasonable options to meet the objectives of the Project, which is to transport gas from the Demicks Lake Plant to Northern Border's interstate pipeline system. The natural gas that will be transported by the proposed Project is associated natural gas resulting from oil drilling in the Bakken/Three Forks formation and neither alternative energy sources nor energy conservation would provide an outlet for the gas after it is processed.

## 10.3 SYSTEM ALTERNATIVES

System alternatives would make use of other existing, modified, or proposed pipeline systems to meet the objectives of the Project. Use of a system alternative would make it unnecessary to construct all or part of the proposed Project, though some modifications or additions to the existing or proposed systems may be required. Such modifications or additions would result in environmental impacts; however, the impacts could be less than, similar to, or greater than those associated with construction of the proposed Project.

There are no existing natural gas systems available to directly connect the proposed Demicks Lake Plant with Northern Border's system. Therefore, new construction would be required for any potential system alternative. The only other existing system in the Project area is WBI Energy's North Badlands subsystem. WBI Energy examined an alternative that would have connected ONEOK's Demicks Lake Plant to the existing 12- and 16-inch-diameter North Badlands subsystem. This alternative would have connected the Demicks Lake Plant to the north end of the existing North Badlands subsystem near the Garden Creek Meter Station. Specifically, the following upgrades would have been required to implement this system alternative:

- construction of approximately 11.5 miles of 20-inch-diameter pipeline;
- construction of a new compressor station near the Spring Creek Meter Station consisting of three compressor units totaling approximately 7,110 horsepower; and
- construction of a new interconnect, including a tap, on Northern Border's Pipeline.

A new compressor station would be needed to compress gas from the existing 12- and 16-inch-diameter pipelines into Northern Border's system. The station would have consisted of three units where two of the three compressor units would have been online at any given time. The third unit would have been installed to increase system reliability and allow maintenance activities on the off-line compressor unit without restricting transportation services. The compressor station would have been powered by natural gas, and would have required approximately 875 thousand cubic feet per day of fuel. Burning natural gas to facilitate compression would have also resulted in air emissions at the compressor station site. This system alternative would have ongoing fuel costs, and would require additional personnel to manage the higher operation oversight and maintenance needs for the additional facilities.

This system alternative would be less reliable due to operation of the compressor station, and would not have the expansion capacity of the proposed Project. The proposed Project is also preferred over this system alternative since it provides operational flexibility and backup to the existing WBI Energy natural gas lines in the area.

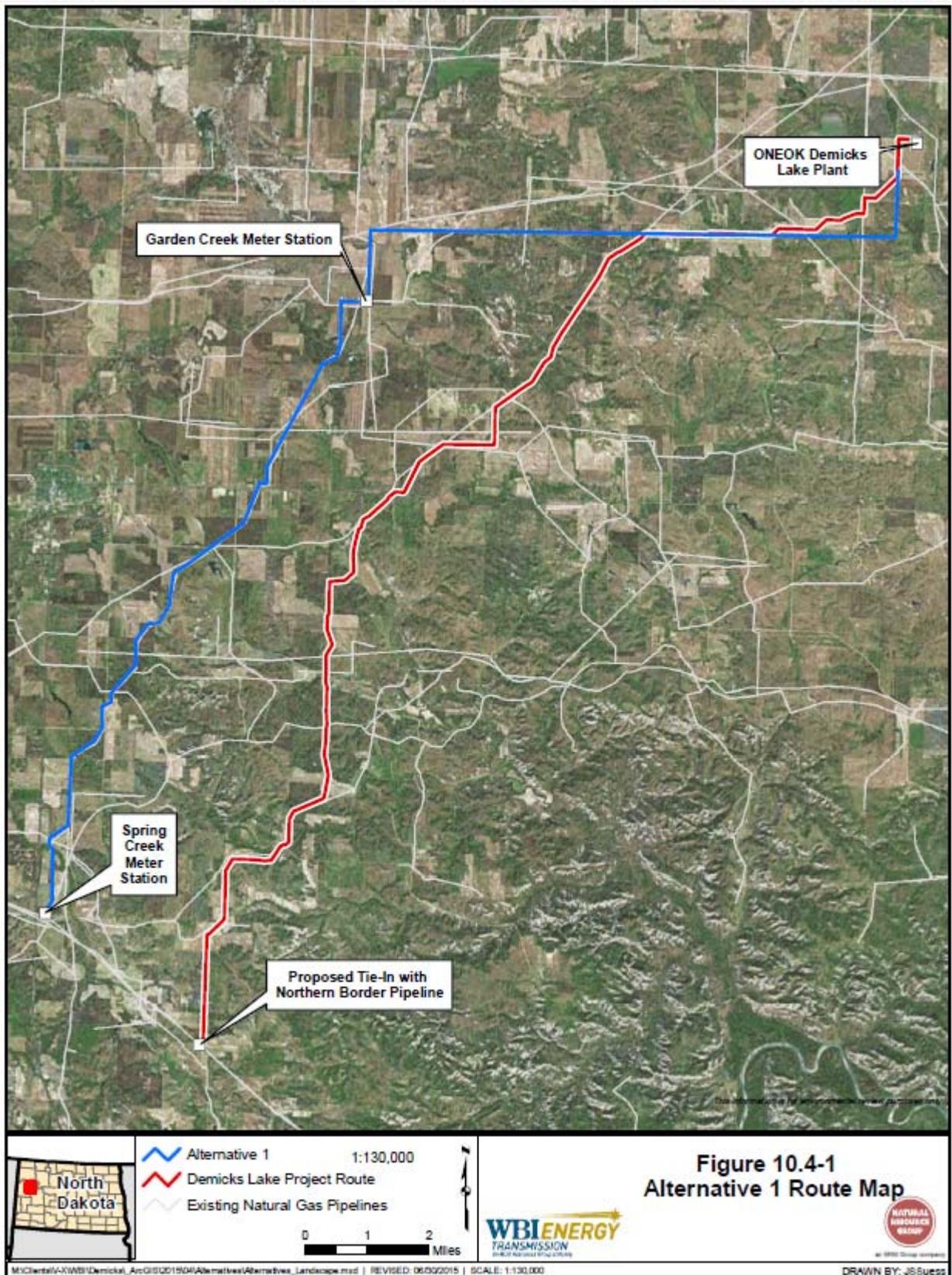
## 10.4 MAJOR ROUTE ALTERNATIVES

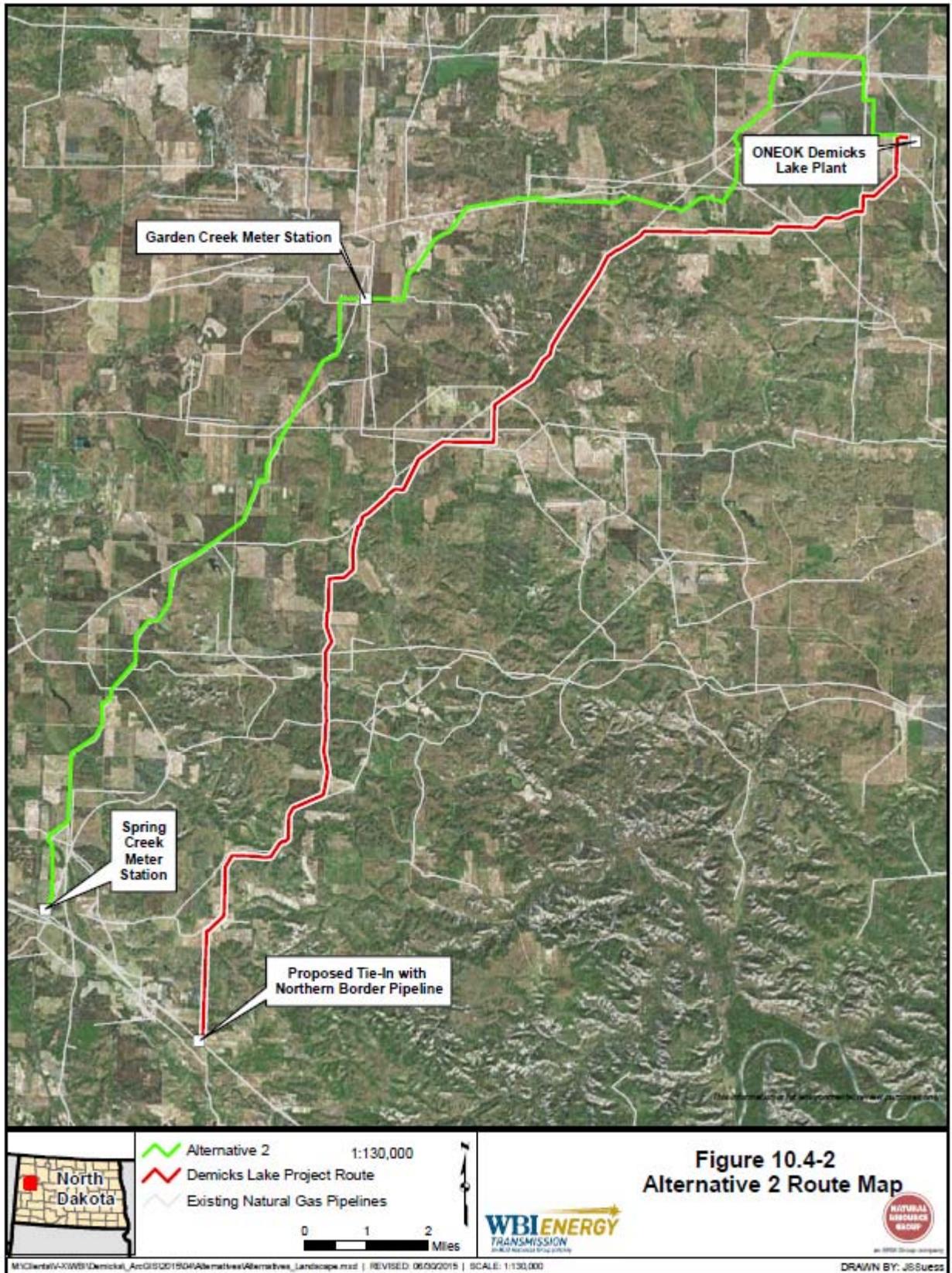
WBI Energy implemented an interdisciplinary process to identify and evaluate route alternatives for the Project. The process assumed a take-off point at ONEOK's proposed Demicks Lake Plant located west of Keene, North Dakota, and a terminus along Northern Border's existing mainline located approximately 8 miles south of Watford City, North Dakota. The objective of the process was to identify the shortest possible route between these points taking into account Project needs, engineering constraints, crossings of public lands, stakeholder concerns, and the potential for impacts on sensitive environmental resources. In addition to the proposed route, WBI Energy identified three major route alternatives (i.e., Alternatives 1, 2, and 3) for the Project (see figures 10.4-1, 10.4-2, and 10.4-3).

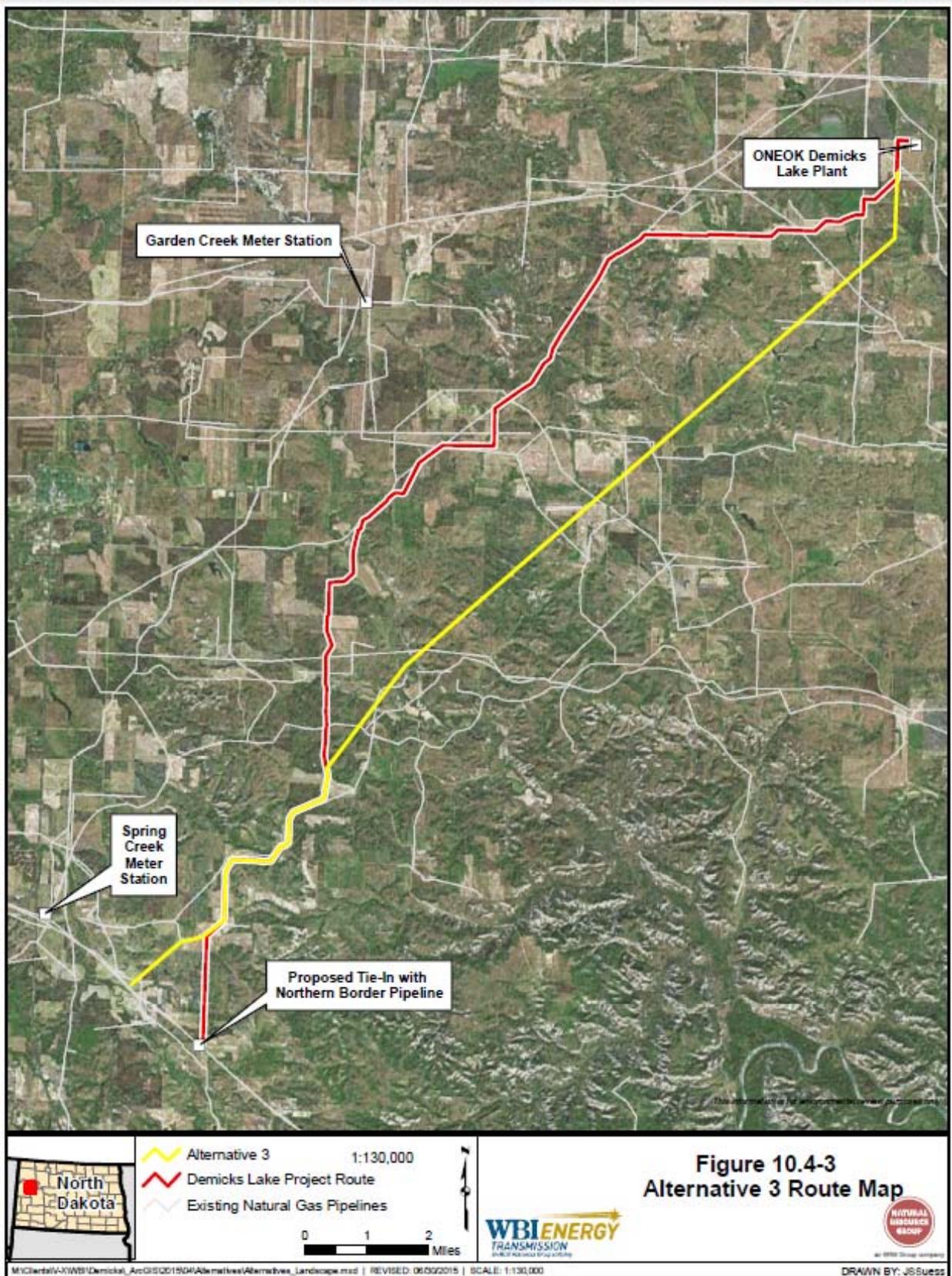
During its initial review, WBI Energy attempted to identify routes or route segments that paralleled existing linear infrastructure corridors. WBI Energy reviewed topographic maps, recent aerial photography, and geographic information system (GIS) datasets for pipelines and other utilities in an effort to identify existing rights-of-way between ONEOK's proposed Demicks Lake Plant and the existing Northern Border mainline. The area along the proposed routes was found to be congested with existing pipelines, so the alternative routes and proposed route were planned to collocate with some of these lines yet avoid areas that have extremely dense existing linear infrastructure. As a result, two of the major route alternatives identified and evaluated by WBI Energy are collocated with existing transportation and utility infrastructure. One major route alternative is primarily greenfield to allow for the shortest possible distance between the Plant and the Northern Border interconnect.

Following the initial identification of potential routes, WBI Energy conducted a desktop route review to refine each route in an effort to minimize engineering constraints, crossings of public lands, and impacts on environmental resources. This effort considered input from WBI Energy's marketing, engineering, and environmental groups, as well as engineering and environmental consultants. Each route was reviewed in a GIS and compared with a variety of digital datasets and map resources to identify potential constraints. To the extent feasible, each route was adjusted to avoid or minimize crossings of significant resources. WBI Energy evaluated each major route alternative to quantify and assess the potential environmental impacts associated with each route. Factors considered in this analysis included:

- length of route;
- landownership;
- state and local parks;
- land use/land cover types;
- roads and railroads;
- existing pipelines;
- high consequence areas (population areas and commercial navigable waters);
- surface waters (including streams/rivers, lakes/ponds, and wetlands);
- navigable waters;
- impaired waters;
- designated critical habitat (piping plover);
- cultural resource sites listed in the National Register of Historic Places (NRHP); and
- soil characteristics (shallow bedrock soils, highly erodible soils, prime farmland soils, and farmland of statewide importance).







WBI Energy also evaluated each alternative relative to the purpose and need of the Project. WBI Energy used the results of its analysis to determine if any of the major route alternatives provided a significant environmental advantage over the proposed route while still meeting the objectives of the Project.

Some of the constraints and features considered in WBI Energy's analysis are avoided by all of the route alternatives and, therefore, are not pertinent to a comparative assessment of the routes. Specifically, none of the routes cross:

- federal land;
- high consequence areas (population areas);
- wild and scenic rivers;
- sites listed in the NRHP;
- railroads;
- navigable waters;
- impaired waters;
- freshwater forested wetland; or
- soils with near-surface hard bedrock.

As shown in table 10.4-1, which provides comparative information pertinent to the routes, crossings of other constraints and features are generally similar for each route, including emergent herbaceous wetlands, mixed forest, woody wetlands, county highways, freshwater ponds, and prime farmland. Crossings of the remaining constraints or features variously favor one route over the others. On balance, however, WBI Energy believes that the results of its analysis justify its selection of the proposed route.

A description of each major route alternative, including a summary of constraints along each route, is provided below.

#### **10.4.1 Alternative 1**

Route Alternative 1 is 23.1 miles long and commences at ONEOK's proposed Plant and extends southwestward across McKenzie County, closely paralleling WBI Energy's existing pipelines before terminating at the Spring Creek Meter Station where it would tie-in with Northern Border's existing mainline. See figure 10.4-1 for a depiction of the Alternative 1 route in relation to the proposed route.

As shown in table 10.4.-1, Alternative 1 crosses 3.6 miles more farmland of statewide importance, 2.5 miles more cultivated cropland, 0.6 mile more open space, and 0.4 mile more hay/pastureland than the proposed route. It is also 1.2 miles longer and crosses nine more roads than the proposed route. However, Alternative 1 crosses 2.7 miles less herbaceous land uses, 0.4 mile less shrub/scrub, one less intermittent stream, and one less perennial stream. On balance, Alternative 1 is a less direct route, and crosses more sensitive resources than the proposed route. As a result, Alternative 1 provides no significant environmental advantage over the proposed route, and complications related to securing the right-of-way including difficult landowners and congestion of other pipelines are reasons why this alternative was rejected.

TABLE 10.4-1					
<b>Demicks Lake Pipeline Project Comparison of Major Route Alternatives <sup>a, b</sup></b>					
Environmental Features	Unit	Proposed Route	Alternative 1	Alternative 2	Alternative 3
<b>Length</b>	miles	21.9	23.1	25.2	19.2
<b>Land Use Ownership and Uses</b>					
Land Ownership <sup>c</sup>					
Federal Lands	miles	0.0	0.0	0.0	0.0
State Lands	miles	0.0	0.0	0.0	0.5
Private Lands	miles	21.9	23.1	25.2	18.7
Land Use/Land Cover <sup>d</sup>					
Cultivated Crops	miles	6.9	9.4	13.0	5.2
Deciduous Forest	miles	0.1	0.1	0.0	0.4
Developed Open Space	miles	0.3	0.9	0.5	0.2
Emergent Herbaceous Wetlands	miles	0.0	0.0	0.0	0.1
Hay/Pasture	miles	0.1	0.5	0.5	0.0
Herbaceous	miles	13.3	10.9	10.4	11.1
Mixed Forest	miles	0.0	0.0	0.0	0.1
Shrub/Scrub	miles	1.5	1.1	0.7	2.0
Woody Wetlands	miles	0.0	0.1	0.1	0.0
Roads <sup>e</sup>					
Primary U.S. or State Highway	number	0	0	0	0
Secondary State or County Highway	number	1	1	1	1
Other/Local Road	number	14	23	20	11
Railroads <sup>f</sup>	number	0	0	0	0
Existing Pipelines <sup>g</sup>					
Crude Oil Pipelines	number	13	12	15	19
Natural Gas Pipelines	number	13	41	60	21
Products Pipelines	number	0	2	4	0
<b>Biological Resources/ Constraints</b>					
Streams/Rivers <sup>h</sup>					
Intermittent	number	26	25	22	21
Perennial	number	2	1	1	10
Navigable Waters <sup>i</sup>	number	0	0	0	0
Impaired Waters <sup>i</sup>	number	0	0	0	0
Wetlands (National Wetlands Inventory) <sup>k</sup>					
Freshwater Emergent	miles	<0.1	0.3	<0.1	0.3
Freshwater Forested	miles	0.0	0.0	0.0	0.0
Freshwater Pond	miles	0.0	<0.1	0.0	0.0
Critical Habitat <sup>l</sup>					
Piping Plover	miles	21.9	23.1	25.2	19.2
<b>Soils Properties <sup>m</sup></b>					
Bedrock within 5 feet of the Soil Surface <sup>n</sup>					
Hard Bedrock	miles	0.0	0.0	0.0	0.0
Soft Bedrock	miles	11.7	6.9	7.8	10.7
Highly Wind Erodible <sup>o</sup>	miles	2.8	1.3	1.5	2.1
Highly Water Erodible <sup>p</sup>	miles	15.1	10.0	12.0	13.7
Prime Farmland <sup>q</sup>	miles	<0.1	0.0	0.0	<0.1
Farmland of Statewide Importance <sup>r</sup>	miles	4.3	7.9	8.1	4.3

TABLE 10.4-1 (cont'd)

**Demicks Lake Pipeline Project  
Comparison of Major Route Alternatives<sup>a, b</sup>**

a	Data in this table are not consistent with data presented in other sections of the Environmental Report for the proposed route. To facilitate an accurate comparison of all major route alternatives, and to ensure consistency in data sets, national data layer sets were used to prepare this table. Data provided elsewhere in this EA for the proposed route are based on field surveys.
b	The numbers in this table have been rounded for presentation purposes.
c	Calculated from a Conservation Biology Institute database (2012).
d	Calculated from a Land Use/Land Cover database from the U.S. Geological Survey (2011).
e	Calculated from an Environmental Systems Research Institute (ESRI) database (2005).
f	Calculated from an ESRI database (2002).
g	Calculated from a Hart Energy Company (REXTAG) database (2014).
h	Calculated from the National Hydrography Dataset from the U.S. Geological Survey (2010).
i	Based on a list of navigable waters for the Omaha District, accessed from the district website, May 2014 and discussions with District staff.
j	Calculated from an Environmental Protection Agency database (2010).
k	Calculated from National Wetland Inventory data from the U.S. Fish and Wildlife Service.
l	Calculated from a U.S. Fish and Wildlife Service database (2014).
m	Based on analysis of the Natural Resources Conservation Service's Soils Survey Geographic (SSURGO) database.
n	Includes soils that have bedrock within 60 inches of the soil surface. Soft refers to paralthic (weathered) bedrock that will not likely require blasting during construction.
o	Includes soils in wind erodibility groups 1 and 2.
p	Includes land in capability subclasses IVe through VIIe and soils with an average slope greater than or equal to 9 percent.
q	As designated by the Natural Resources Conservation Service; only includes those soils that are considered prime with no mitigation.
r	As designated by the Natural Resources Conservation Service.

### 10.4.2 Alternative 2

Route Alternative 2 begins at ONEOK's Plant and extends northwestward above Demicks Lake, and then southwestward through the Garden Creek Meter Station; terminating at the Spring Creek Meter Station where it would tie-in with Northern Border's existing mainline. Route Alternative 2 follows the same general route as Alternative 1, but is approximately 2 miles longer as a result of route adjustments to avoid wetlands by routing the line north of Demicks Lake, and collocates more closely to existing lines rather than crossing greenfield. See figure 10.4-2 for a depiction of the Alternative 2 route in relation to the proposed route.

Alternative 2 is approximately 3.3 miles longer than the proposed route. It crosses 6.1 miles more cultivated cropland, 3.8 miles more farmland of statewide importance, and 0.4 mile more hay/pastureland. It crosses six more roads, but four fewer intermittent and one fewer perennial streams. It also crosses 2.9 miles less herbaceous land uses. This alternative has fewer impacts on water resources, but does not provide a clear advantage to the proposed Project route due to the additional environmental and economic impacts associated with construction of a longer pipeline. In addition, the portion of the route that is located just east of Demicks Lake is located in a highly congested utility area, and construction within this area would be difficult.

### 10.4.3 Alternative 3

Route Alternative 3 begins at the same takeoff point as Alternatives 1 and 2, but extends in a straight line for approximately 12 miles in a southwestward direction, before collocating with a pipeline for a few miles and then ending at a point approximately 1.5 miles northwest of the proposed tie-in for the selected route. This route is approximately 19.2 miles long, and is shorter

than the proposed route and the other alternatives. However, the direct route would also cross more greenfield than the proposed Project route, which would cause significantly more environmental impacts compared to a route that is primarily collocated with existing linear infrastructure. See figure 10.4-3 for a depiction of the Alternative 3 route in relation to the proposed route.

Alternative 3 crosses approximately 0.5 mile of state land, compared to the other routes, which cross no state land. Alternative 3 is 2.7 miles shorter, and crosses the same amount of farmland of statewide importance as the proposed route. This alternative crosses 1.7 fewer miles of cultivated cropland, 2.2 miles less herbaceous land uses, and 3 fewer roads. However, Alternative 3 crosses eight additional perennial streams than the proposed route, 0.5 mile more shrub/scrub, and 0.3 mile more deciduous forest.

Alternative 3 provides the most direct route from ONEOK's Demicks Lake Plant to the tie-in with Northern Border's existing mainline, and would seemingly result in fewer environmental effects compared to the proposed route, but it is environmentally preferable to collocate with existing linear facilities rather than constructing on greenfield land. It was determined that collocating the line with existing linear transmission infrastructure would cause significantly less environmental impacts, despite the proposed Project route being longer than Alternative 3.

**10.5 ROUTE VARIATIONS**

Route variations differ from system alternatives or route alternatives in that they are identified to reduce impacts on specific localized features, are typically shorter in length than route alternatives, and do not always clearly display an environmental advantage other than reducing or avoiding impacts on specific features. Table 10.5-1 summarizes, by milepost, the route variations for the Project. These route variations were identified and incorporated into the proposed route by WBI Energy and are part of the environmental analyses presented in each environmental resource report.

TABLE 10.5-1		
<b>Demicks Lake Pipeline Project</b>		
<b>Select Pre-Filing Route Variations Incorporated into the Proposed Route</b>		
Route Variation(s)	Approximate Mileposts	Description
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

**[NOTE: WBI Energy is continuing to evaluate additional route variations and will update Table 10.5-1 in subsequent versions of this Report.]**

## 10.6 ALTERNATIVES FOR ABOVEGROUND FACILITIES

Aboveground facilities required for the Project include two meter stations, a block valve, and two launcher/receiver facilities. The meter stations will be located at the site of ONEOK's proposed Demicks Lake Plant, and at the tie-in with Northern Border's mainline. WBI Energy considered alternative locations for the delivery point with Northern Border's existing mainline; at the Spring Creek Meter Station, the proposed tie-in location, and a tie-in between the aforementioned sites. The proposed location for the delivery point was chosen because:

- It will result in a shorter pipeline length than the Spring Creek location discussed in Alternatives 1 and 2.
- There is less existing infrastructure in the area when compared to the Spring Creek alternative.
- It is close to an existing road that provides good, permanent access to the tie-in.

The launcher/receiver assemblies that will be constructed at the receipt point and delivery point will be built as part of the meter station facilities; therefore no alternative locations were evaluated for these facilities. The block valve facility will be located at about the midpoint of the proposed route, at approximately milepost 10.7. WBI Energy sited this facility to avoid conservation easements, non-easement wetlands, cultural resources, and high quality grasslands. Close proximity of the site to a public road is required for access during operation to minimize the need to construct a long permanent access road to the facility. Figure 10.6-1 shows the alternative locations evaluated for the facility.

Figure 10.6-1 Alternative Locations Evaluated for the Block Valve

**[Note: Figure 10.6-1 is still in development and will be provided in a subsequent version of this report.]**

## 10.7 CONCLUSION

WBI Energy determined that constructing the Project in the manner proposed is preferred from an engineering, constructability, environmental, and economic standpoint. No significant adverse environmental impacts will result from the Project and the proposed route will allow WBI Energy to meet the Project purpose and need in the most cost-effective manner.