

CONFIDENTIAL

Keystone Pipeline Project – Mainline Pipeline Route Alternatives

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1.0 Introduction

The Keystone Project filed an updated pipeline centerline in its November 17, 2006 Supplemental Filing, which incorporated changes in the as-filed mainline pipeline alignment since April 2006 when the Environmental Report was first filed. Subsequent to November 2006, three additional route alternatives (4 to 55 miles in length) were developed by the Project to respond to environmental, land use, and project operational issues. For each route alternative, an alternative pump station location would also be required. These route alternatives consist of the following:

- Hecla Sandhills Route Alternative (55 miles in North and South Dakota; also involving Pump Station 19)
- Chain of Rocks Route Alternative (11 miles in Missouri; also involving Pump Station 36)
- Wood River Route Alternative (4 miles in Missouri and Illinois; also involving Pump Station 37)

Keystone has examined the environmental and project operational effects of each of these route and pump station alternatives, and recommends that the Department of State (DOS) adopt these alternatives as a component of an Agency Preferred Alternative for the Environmental Impact Statement. The comparative analysis below provides the basis for this recommendation.

2.0 Alternative Routes and Pump Station Locations

The following sections describe the three mainline route alternatives, the rationale for developing each alternative, and a comparative tabulation and analysis of the potential natural and human resource characteristics of the alternatives. The pipeline route centerline and associated pump station locations that were filed with the DOS in its November 17, 2006, filing are referred to as the "as-filed" facilities. The route alternatives are designated by a geographical name (e.g., Hecla Sandhills Route Alternative) and the alternative pump stations by the current numbering system for individual pump stations (e.g., Alternative Pump Station 19).

The majority of the data used in this analysis are from published sources and high resolution aerial photography. During the summer of 2006, wetland, cultural resources, and biological surveys were conducted on portions of the as-filed mainline pipeline route that correspond to the pipeline route alternatives. No field work has been conducted on the route alternatives described here, with the exception of the Wood River Alternative Route and Alternative Pump Station 37 site. Field work will be completed on the alternatives in spring and summer 2007.

Line lists of landowners crossed by alternative routes, and landowners within 0.5 mile of the alternative pump station locations are contained in Appendix A.

3.0 Hecla Sandhills Route Alternative and Alternative Location for Pump Station 19

3.1 Introduction

The 55-mile Hecla Sandhills Route alternative is located in Sargent County, North Dakota, and Marshall and Day counties, South Dakota. The Hecla Sandhills Route Alternative deviates from the as-filed alignment at approximately Milepost 192.3 in Sargent County, North Dakota, and rejoins the as-filed route at approximately Milepost 247.5

The Hecla Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 1**.

The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Hecla". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Hecla". The alternative Pump Station 19 is illustrated on Sheet 018 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0138 through Sheet 0177 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 19 location is illustrated on sheet 0155 in Appendix A to the November 17, 2006, Supplemental Filing.

3.2 Rationale for Considering the Alternative

The following factors influenced the consideration of this route alternative:

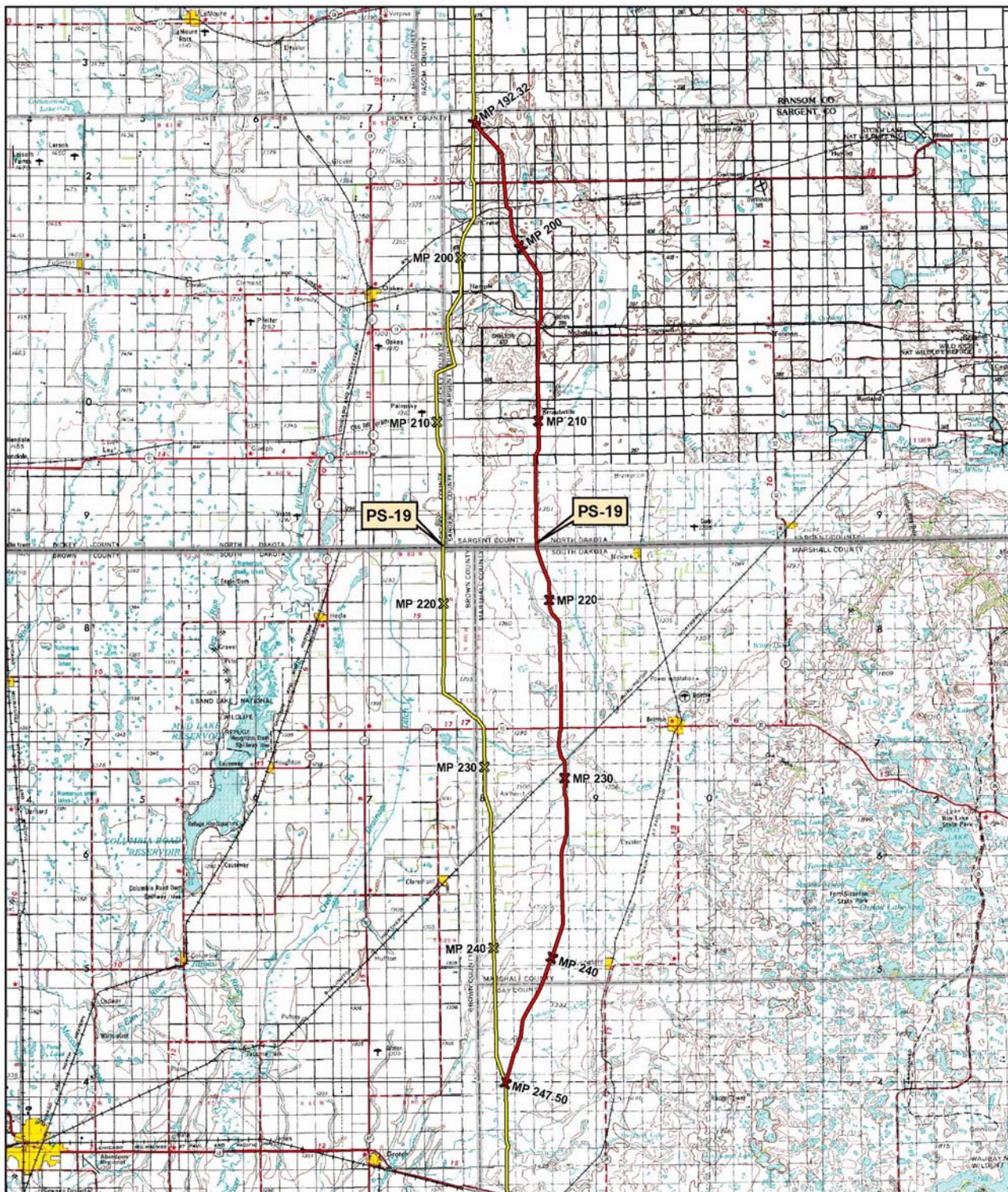
- 1) The as-filed route would cross USFWS wetland and grassland easements. Concerns were raised about revegetating and stabilizing native grasslands on dune and sandy substrates.
- 2) The as-filed route would cross shallow aquifers that are used for domestic and agricultural uses, and would cross an extensive area of wetlands within an area of very sandy substrates (stabilized dunes). Concerns were expressed by landowners, local officials, and the U.S. Fish and Wildlife Service (USFWS) about the risk of groundwater contamination from any pipeline leaks and spills, and the potential for movement of contaminants into the sandy and gravelly substrates that contain shallow aquifers.
- 3) The pump station site associated with this alternative requires a shorter power line.

3.3 Pipeline Route Analysis

Table 1 provides a comparative summary of natural and human resources relevant to the Hecla Sandhills Route alternative and the corresponding portion of the as-filed route.

3.3.1 Natural Resources

As compared to the as-filed route, the alternative route would cross 11 fewer miles of palustrine emergent wetlands. The as-filed route would cross approximately 1.0 mile of USFWS grassland easements versus none for the alternative; the as-filed route would cross approximately 4 miles of wetland easements versus 1 mile for the alternative (**Figure 2**). The as-filed route crosses approximately 3 more miles of high quality native prairie, which could support populations of



Legend

- As-Filed Route
- Hecla Sandhills Alternative Route

Keystone Pipeline Project

- Figure 1 -
Hecla Sandhills Route and Pump Station Alternatives

0 5 10 Miles

1:500,000

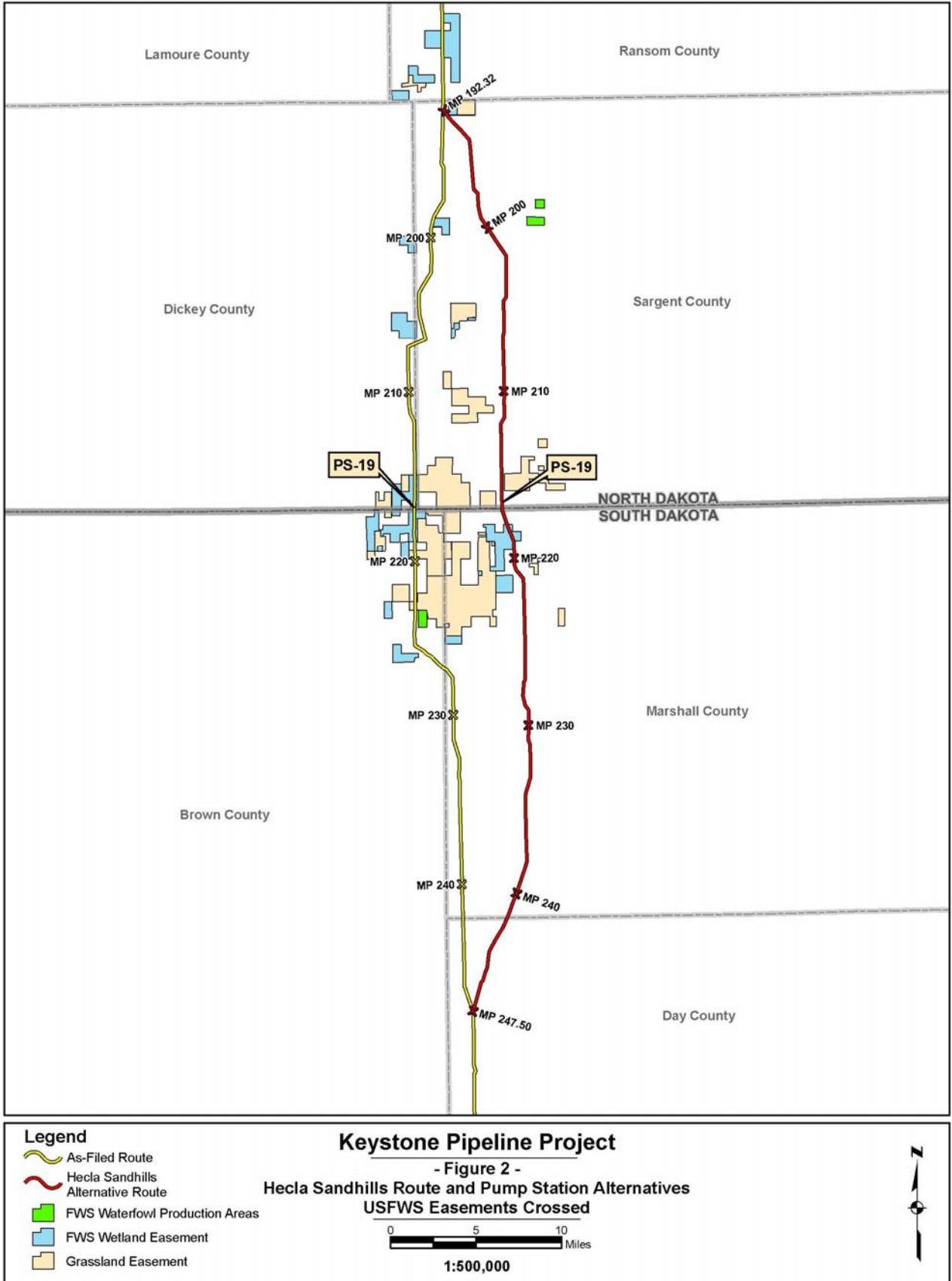


Table 1 Resource Factors – Hecla Sandhills Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Length	Mi.	55.1	55.2
Length By County	Mi.		
Sargent County, ND	Mi.	14.4	24.5
Dickey County, ND	Mi.	10.1	
Brown County, SD	Mi.	10.2	
Marshall County, SD	Mi.	14.9	24.7
Day County, SD	Mi.	5.5	6.0
Ownership			
Private	Mi.	54.6	54.1
State	Mi.	0.5	1.1
Federal	Mi.	0.0	0.0
Mineral Resources			
Mineral Extraction Sites		Potential sand and gravel in Day County	Potential sand and gravel in Day County
Soils			
Sandy (surface)	Mi.	21.6	11.2
Shallow to bedrock	Mi.	<0.1	0.0
Stony/rocky	Mi.	0.0	0.0
Prime farmland	Mi.	26.2	29.4
Water Resources/Wetlands			
Perennial streams	No.	0	0
Impaired waterbodies	No.	0	0
Public water supplies within 1 mile of centerline	No.	1	1
Shallow water supply aquifers (North Dakota)	Mi.	20.4 (12.7 high yield)	5.2 (high yield)
Land Cover			
Wetlands			
Palustrine emergent	Mi.	13.1	2.3
Shrub scrub	Mi.	1.0	0.1
Palustrine forested	Mi.	0.0	0.0
Open Water	Mi.	0.1	0.0
Grassland/pastureland	Mi.	6.9	14.2
Woodlands	Mi.	0.0	0.2
Annual Cropland	Mi.	33.6	37.5
Residential/Commercial	Mi.	0.2	0.1
ROW (road, railroad)	Mi.	0.2	0.8
Utility Crossings			
Railroad crossings	No.	3	3
Road crossings (major paved highways)	No.	4	4

Table 1 Resource Factors – Hecla Sandhills Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	3.9	1.1
Sensitive Plants (by species)		More potential habitat – Western Prairie Fringed Orchid	Less potential habitat – Western Prairie Fringed Orchid
Sensitive Animals (by species)		More potential habitat – Dakota Skipper	Less potential habitat – Dakota Skipper
Sensitive Aquatic systems (by name)	No.	0	0
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	21	5
Public Assembly locations (e.g., schools, churches) within 500 feet	No.	0	1
Designated recreation areas (state, federal, local) – by name	Mi.	0.0	0.0
Special Management Area (USFWS grassland easements on private land)	Mi.	1.0	0
Special Management Area (USFWS wetland easements on private land)	Mi.	4.2	1

western prairie fringed orchid and the Dakota skipper butterfly. Based on these factors, the alternative route would result in less surface disturbance within sensitive habitats (wetlands and native prairie) than the as-filed route.

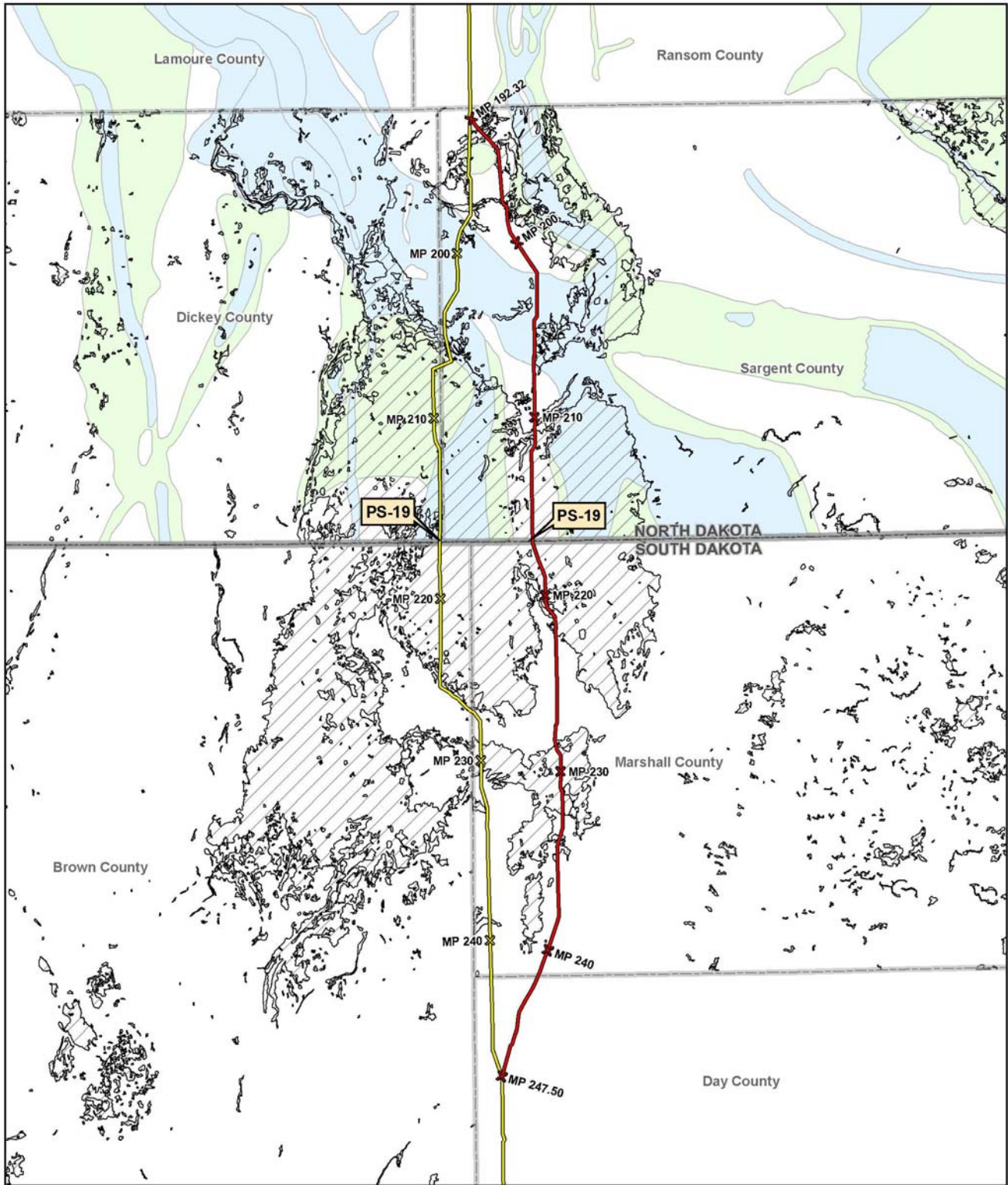
As compared to the as-filed route, the alternative route would cross approximately 5 fewer miles of sandy and gravelly soils, and approximately 15 fewer miles of mapped shallow water supply aquifers in North Dakota (**Figure 3**). As a consequence, there would be proportionally less potential (based on mileage) for crude oil releases to directly affect underlying shallow aquifers along the alternative route, and potentially lower potential risk of downward spread of a spill or leak into highly permeable soils.

3.3.2 Human Resources






As compared to the as-filed route, the alternative route would cross approximately 3 more miles of prime farmland. Keystone would apply agricultural mitigation procedures outlined in its *Construction Mitigation and Reclamation Plan*. The number of utility crossings (roads, railroads) is the same between alternatives. The alternative route would pass within 500 feet of 16 fewer residences or residential areas (based on photointerpretation) as compared to the as-filed route.

3.4 Pump Station 19 Location Analysis

Table 2 provides a comparative summary of natural and human resource that may be affected by pump station.

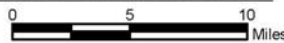


Legend

-  As-Filed Route
-  Hecla Sandhills Alternative Route
-  ND Aquifers - Yields 50 to 500 gpm
-  ND Aquifers - Yields >500 gpm
-  Sandy Substrate Soils
(Data not available for Day County, SD)

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- Figure 3 -
**Hecla Sandhills Route and Pump Station Alternatives
Aquifers and Sandy Substrate Soils**



1:500,000



Table 2 Hecla Sandhills Alternative Resource Factors – Pump Stations

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Powerline Required	miles	26.7	21.7
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils Constraints (sandy, shallow, rocky, wet)	Yes/no	No	No
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	No	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	Yes	No
Wetlands	Yes/no	No	No
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No
Land Use			
Residences/Residential Areas within 1 mile	Number	3	0
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	0	0
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Yes/no	No	No

3.5 Natural Resources

The primary difference between the as-filed site and the alternative pump station site is that the alternative location would not overlie a mapped shallow aquifer. There would be 5 less miles of powerline required by the alternative as compared to the as-filed pump station.

3.5.1 Human Resources

The primary difference between the alternative pump station sites would be the shifting of local property tax benefits. The alternative pump station location would be located in Sargent County, while the as-filed route location would be in Dickey County, North Dakota.

3.6 Recommendations

Construction of the Hecla Sandhills Alternative pipeline segment would result in substantially less miles of palustrine (meadow) wetlands, high quality native prairie, and shallow aquifers crossed as compared to the as-filed route. The alternative route would cross no USFWS grassland easements, and would cross 3 less miles of USFWS wetland easements. The alternative pipeline route would largely address spill risk concerns related to the shallow aquifers and revegetation concerns raised by landowners, local elected officials, and the USFWS. The alternative pump station would require 5 less miles of electrical service powerline. Based on these factors, Keystone recommends that the Department of State include the Hecla Sandhills Alternative Route and Alternative Pump Station 19 site in its Agency Preferred Alternative in the Environmental Impact Statement.

4.0 Chain of Rocks Alternative and Alternative Pump Station 36

4.1 Introduction

The 11-mile Chain of Rocks Alternative Route is located in Lincoln and Saint Charles counties, Missouri. The Chain of Rocks route alternative deviates from the as-filed route at Milepost 976.5, and rejoins the as-filed route at Milepost 987.5.

The Chain of Rocks Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 4**.

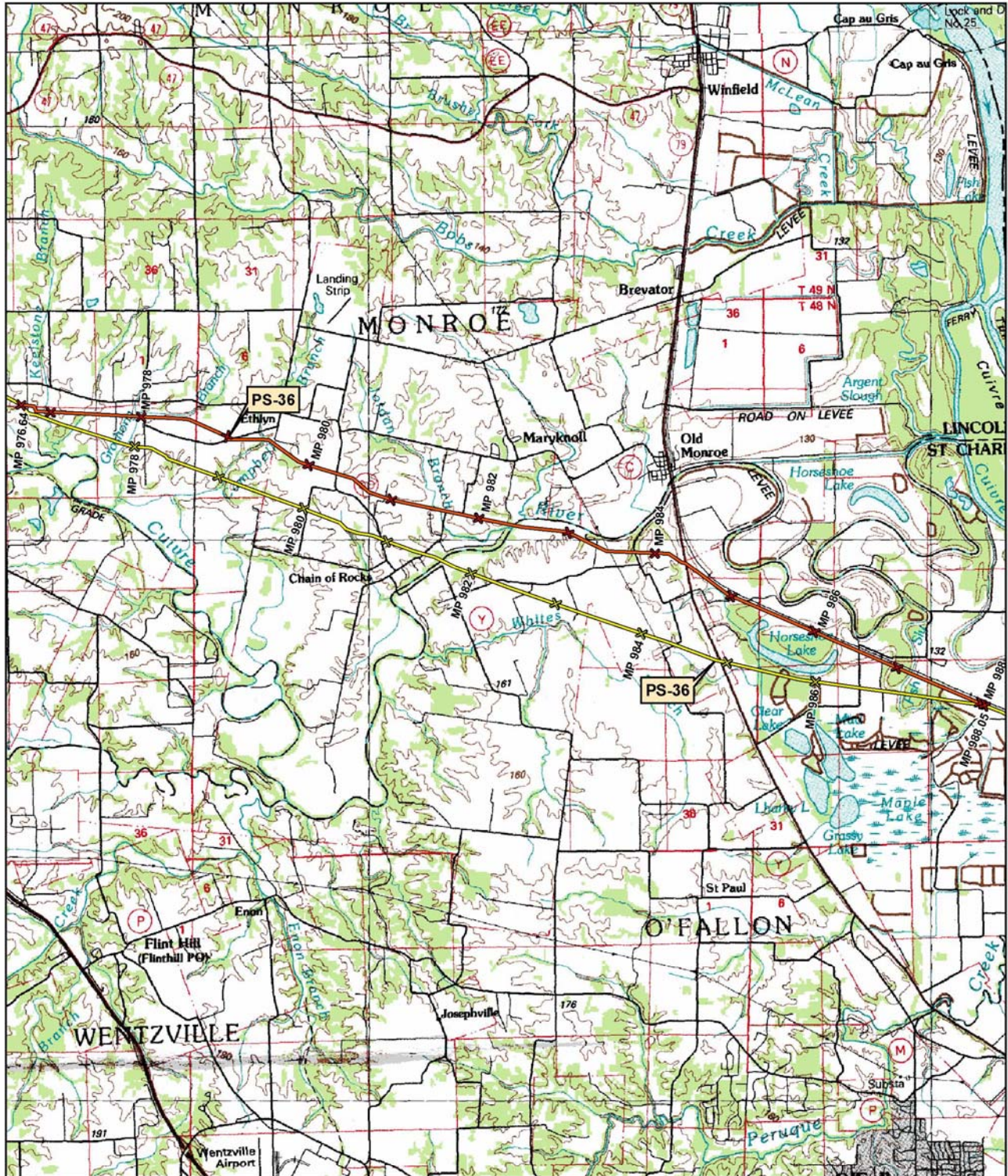
The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Chain of Rocks". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Chain of Rocks". The alternative Pump Station 36 is illustrated on Sheet 003 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0699 through Sheet 0707 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 36 location is illustrated on sheet 0705 in Appendix A to the November 17, 2006, Supplemental Filing.

4.2 Rationale for Considering the Alternative

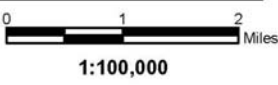
The following factors influenced the consideration of a route alternative:

1. The as-filed pipeline alignment is located parallel to the existing Platte pipeline that was constructed approximately 50 years ago. Residences and residential developments have been constructed adjacent to the existing pipeline since then. In particular, the existing pipeline passes within 500 feet of an existing mobile home park that contains 150 to 200 individual mobile home units. Even if residences and outbuildings are avoided, lawns and pastures on smaller acreages would be crossed.



- Legend**
-  As-Filed Route
 -  Chain of Rocks Alternative Route

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 - Figure 4 -
 Chain of Rocks Route and Pump Station Alternatives



2. The Keystone Project is in discussions with an electric utility to purchase land for pump station 36 adjacent to an existing power line which requires the pipeline to be routed to this location. This utility is planning to install a substation to improve service to other utility customers in the area and increase capacity. The substation for the pump station 36 will be an extension of the utility substation and no additional power lines to the Keystone pump station are required. Locating pump station 36 adjacent to existing utility infrastructure will improve reliability of service to Keystone and other utility customers in the area.

3. The alternative pipeline alignment provides a better location for crossing the Cuivre River as compared to the as-filed route because it avoids congestion associated with the existing Platte Pipeline and an adjacent county road bridge. The alternative route also would avoid two large archaeological sites crossed by the as-filed route near the Cuivre River.

4.3 Pipeline Route Analysis

Table 3 provides a comparative summary of natural and human resources that would be crossed, or be affected by pipeline construction and operation.

Table 3 Resource Factors – Chain of Rocks Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Length	Mi.	10.4	11.4
Length By County			
Lincoln County	Mi.	4.3	5.4
Saint Charles County	Mi.	6.1	6
Ownership			
Private	Mi.	10.4	11.4
Mineral Resources			
Mineral Extraction Sites		No	No
Soils			
Sandy	Mi.	0.0	0.0
Shallow to bedrock	Mi.	7.9	8.3
Stony/rocky	Mi.	0.3	0.3
Prime farmland	Mi.	4.6	5.6
Water Resources/Wetlands			
Perennial streams	No.	2	2
Impaired waterbodies	No.	1	1
Public water supplies within 1 mile of centerline	No.	3	1
Shallow water supply aquifers		Alluvial aquifer – Cuivre River floodplain	Alluvial aquifer – Cuivre River floodplain
Wetlands			
Palustrine emergent	Mi.	0.1	0.2
Shrub scrub	Mi.	<0.1	0.7
Palustrine forested	Mi.	1.0	0.2
Open water	Mi.	0.1	0.1
Land Cover			
Grassland/pastureland	Mi.	0.0	1.5
Woodlands	Mi.	0.4	1.2
Annual Cropland	Mi.	8.4	7.3
Residential/Commercial	Mi.	0.3	0.0
ROW (road, railroad)	Mi.	0.1	0.2

Table 3 Resource Factors – Chain of Rocks Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Railroad crossings	No.	0	0
Road crossings	No.	1	1
Levee crossings	No.	0	0
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	0.0	0.0
Sensitive Plants (by species)	Mi.	0.2 False Aster, Buffalo	0.3 False Aster, Buffalo Clover
Sensitive Animals (by species)	Mi.	0.4 Indiana Bat 0.2 King Rail 0.2 Northern Harrier 0.2 Massasauga/W. Fox Snake	0.4 Indiana Bat 0.2 King Rail 0.2 Northern Harrier 0.2 Massasauga/W. Fox Snake
Sensitive Aquatic systems (by name)	No.	Fish/Mussel at Cuivre River	Fish/Mussel at Cuivre River
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	86	32
Public Assembly locations (e.g., schools, churches) within 500 feet.	No.	1	0
Designated recreation areas (state, federal, local) – by name	Mi.	0.0	0.0
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Mi.	0.0	0.0

4.3.1 Natural Resources

The primary differences between the routes are the length of floodplains crossed, and proximity to waterbodies. The as-filed route would cross approximately 0.3 mile of the Cuivre River floodplain versus 1.2 miles by the alternative. The as-filed route would pass within 0.1 mile of the Horseshoe Lake, with a buffer of woodlands between the pipeline route and the lake; the alternative route would cross a short segment (200 feet) of Horseshoe Lake. The alternative route would cross approximately 0.7 mile of shrub-scrub wetlands versus less than 0.1 mile for the as-filed route; the alternative route would cross 0.2 mile of palustrine forested wetland versus 1.0 mile for the as-filed route, so that reductions in the land cover of woody wetland species would be slightly higher for the as-filed route as compared to the alternative. The alternative route passes within 1 mile of two fewer public water supplies than the as-filed route.

4.3.2 Human Resources

The primary difference between the two routes is the larger number of residences within 500 feet of the as-filed route versus the alternative (86 versus 32, respectively). This larger number is primarily

because of the mobile home park. Another difference is the length parallel to existing utilities. The as-filed route is parallel to an existing pipeline for 10.5 miles; the alternative is parallel to a railroad bed for 1.8 miles and a highway for 3.6 miles, or approximately 50 percent of its length.

4.4 Pump Station Location Analysis

Table 4 provides a comparative summary of natural and human resource that may be affected by the Pump Station 36 locations.

Table 4 Resource Factors – Chain of Rocks Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Power line Required	miles	0	0
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils Constraints			
		No	No
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	Yes	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	No	No
Wetlands		No	No
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No
Land Use			
Potential Residences/Residential Areas within 1 mile	Number	10	20
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	0	0
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Yes/no	No	No

4.4.1 Natural Resources

The alternative location would be located in an upland area approximately 0.2 mile away from a small Cuivre River tributary (Campbell Branch). The as-filed pump station location would be located approximately 0.2 mile from a large wetland complex (Horseshoe Lake) on the Cuivre River floodplain.

4.4.2 Human Resources

The primary difference between the alternative pump station sites is the larger number of residences within 0.5 mile of the alternative route site. The as-filed route site is located adjacent to an existing highway, the alternative site is located next to a less traveled county road. The as-filed station site would be located to existing transmission line; the alternative pump station would be located adjacent to an electrical substation. Based on this proximity to electrical utilities, no additional powerline would be required to operate these stations.

4.5 Recommendations

The alternative route would affect less forested wetlands and would provide a better location for crossing the Cuivre River. Co-location of the pump station with a utility substation provides an opportunity for clustering industrial facilities within a rural and residential landscape, and improving the service reliability to the Keystone pump station. In addition, the alternative route would reduce the number of potential residences in close proximity to the pipeline. On balance, the reduction in land use issues associated with the as-filed route, and the opportunity for co-location with the utility substation favor the selection of the alternative route and pump station. Keystone recommends that the Department of State include the Chain of Rocks Alternative Route and Alternative Pump Station 36 site in its Agency Preferred Alternative in the Environmental Impact Statement.

5.0 Wood River Pipeline Route Alternative and Alternative Pump Station 37

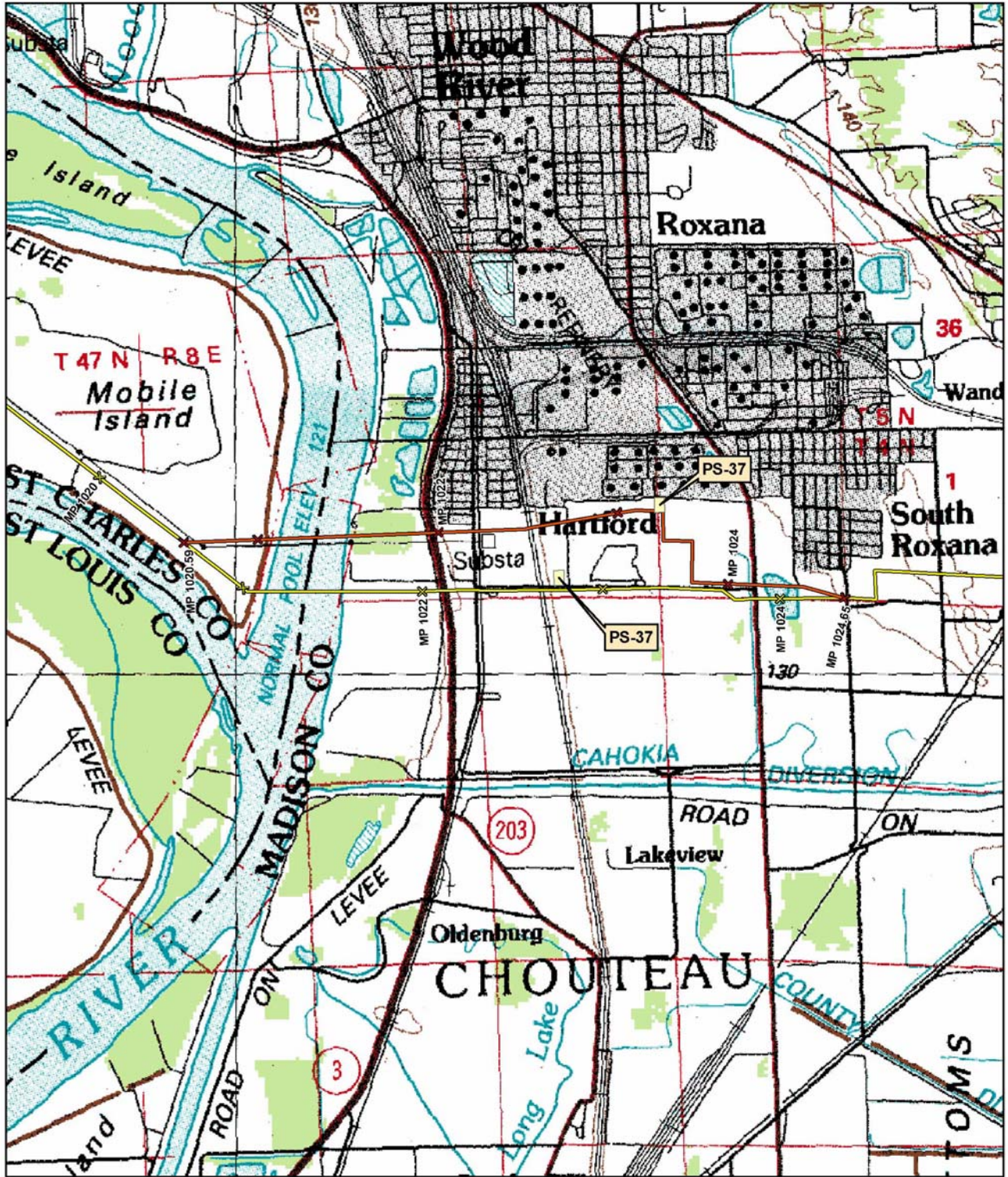
5.1 Introduction

The 4-mile Wood River Alternative Route is located in Saint Charles County, Missouri and Madison County, Illinois. The Wood River route alternative deviates from the as-filed route at Milepost 1020.6, and rejoins the as-filed route at Milepost 1024.4.

The Wood River Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 5**.

The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Wood River". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Wood River". The alternative Pump Station 37 is illustrated on Sheet 003 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0730 through Sheet 0733 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 37 location and 0.8 mile pipeline lateral is illustrated on sheet 0732 in Appendix A to the November 17, 2006, Supplemental Filing.



Legend

- As-Filed Route
- Wood River Alternative Route

Keystone Pipeline Project

- Figure 5 -
Wood River Route and Pump Station Alternatives

0 0.5 1 Miles

1:50,000

7

5.2 Rationale for Considering the Alternative

The following factors influenced the consideration of a route alternative:

- 1) During route refinement activities, an opportunity to site Pump Station 37 adjacent to the Wood River refinery was identified. The route alternative represents the adjustment necessary to site the station at that location.
- 2) This relocation would allow the pullback for horizontal directional drills of the Mississippi River and levees on the east side of the river to stay within the Keystone Project right-of-way (ROW), which would eliminate additional surface disturbance outside the construction ROW.
- 3) Construction of the alternative would eliminate the need to construct a 0.8 mile lateral from the as-filed pump station to the terminus at the refinery.

5.3 Pipeline Route Analysis

Table 5 provides a comparative summary of natural and human resources that would be crossed, or be affected by pipeline construction and operation.

Table 5 Resource Factors – Wood River Alternative Pipeline Crossings

	Units	As-filed Mainline Route and Pump Station lateral pipeline	Alternative Route
Length	Mi.	4.9	4.1
Length By County			
St Charles County	Mi.	0.8	0.8
Madison County	Mi.	4.1	3.3
Ownership			
Private	Mi.	3.6	3.6
State	Mi.	1.3	0.5
Federal	Mi.	0.0	0.0
Mineral Resources			
Mineral Extraction Sites		Potential stone, sand, gravel, clay, and coal in Madison County	Potential stone, sand, gravel, clay, and coal in Madison County
Soils Constraints			
Prime farmland	Mi.	4.6	3.5
Water Resources/Wetlands			
Perennial streams	No.	1	1
Impaired waterbodies	No.	1	1
Public water supplies within 1 mile of centerline	No.	0	3
Shallow water supply aquifers		Potential in Madison County	Potential in Madison County
Wetlands			
Palustrine emergent	Mi.	0.2	0.3
Shrub scrub	Mi.	0.0	0.1
Palustrine	Mi.	0.0	0.4

Table 5 Resource Factors – Wood River Alternative Pipeline Crossings

	Units	As-filed Mainline Route and Pump Station lateral pipeline	Alternative Route
forested			
Open water	Mi	0.5	0.4
Land Cover			
Grassland/pastureland	Mi.	0.0	0.8
Woodlands	Mi.	0.0	0.0
Annual Cropland	Mi.	3.6	1.5
Residential/Commercial	Mi.	0.5	0.4
ROW (road, railroad)	Mi.	0.1	0.2
Railroad crossings	No.	2	2
Road crossings	No.	2	2
Levee crossings	No.	2	2
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	0.0	0.0
Sensitive Plants (by species)		Eastern Fringed Orchid, Royal Catchfly, Prairie spiderwort	Eastern Fringed Orchid, Royal Catchfly, Prairie spiderwort
Sensitive Animals (by species)		Massasauga/Kirtlands's snake, Indiana bat	Massasauga/Kirtlands's snake, Indiana bat
Sensitive Aquatic systems (by name)	No.	Directional drill of Mississippi River	Directional drill of Mississippi River
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	20	33
Public Assembly locations (e.g., schools, churches) within 500 feet.	No.	0	0
Designated recreation areas (state, federal, local) – by name	Mi.	Confluence State Park 1.3	Confluence State Park 0.5
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Mi.	0.0	0.0

5.3.1 Natural Resources

There are few differences in potential effects on sensitive resources between the two alternatives. The primary differences between the routes is that the alternative route would involve less distance within a state park at the confluence of the Missouri and Mississippi Rivers. The alternative is 0.8 mile shorter in total, representing an overall reduction in the footprint of the project. Both routes would cross previously disturbed or farmed land on the east side of the Mississippi River.

5.3.2 Human Resources

The alternative route would be located closer to an existing residential development on the west side of the Wood River Refinery. Therefore there would be a larger number of residences within 500 feet of the alternative pipeline route. Levee and utility crossings would be the same for both routes. The as-filed route would cross more farmland because of construction of the pump station lateral pipeline. Since the alternative route crosses less state park land, this location could reduce public access and use disruptions to the state park.

5.4 Pump Station Analysis

Table 6 provides a comparative summary of natural and human resource that may be affected by pump station.

Table 6 Resource Factors – Wood River Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Powerline Required (345 kV)	miles	0	0.5
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils			
Prime farmland	Acres	5	2.9
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	No	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	No	No
Wetlands			
Palustrine emergent	Yes/no	No	Yes
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No

Table 6 Resource Factors – Wood River Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Land Use			
Residences/Residential Areas within 1 mile	Number	486	1045
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	Unknown	Unknown
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)		No	No

5.4.1 Natural Resources

Both sites are located on cropland in and near an industrial facility. Based on wetlands surveys, the as-filed pump station would not be located in a wetland; however a portion of the alternative pump station site may be located on a farmed wetland (subject to completion of field surveys). It is likely that the alternative pump station could be located outside wetlands while fulfilling the operational purpose of being located close to the delivery point for refinery storage.

5.4.2 Human Resources

Both sites are located on cropland in and near an industrial facility. Neither site location would be accessible to the public. The 0.5 mile of power line needed for the alternative pump station location would traverse the existing refinery.

The alternative pump station location is located closer to a larger number of residences within 1 mile. However, this pump station would represent a small addition to an existing refinery complex. Accordingly, the incremental effect of this station on those residences would be very minor compared to the refinery as a whole.

5.5 Recommendations

The primary benefits provided by the alternative pipeline route and pump station are lower overall surface disturbance (better alignments for horizontal directional drill pullbacks, and elimination of the need for a lateral pipeline), and co-location of the alternative Pump Station 37 with existing refinery facilities that would provide higher operational efficiency as well as higher security. Keystone recommends that the Department of State include the Wood River Alternative Route and Alternative Pump Station 37 site in its Agency Preferred Alternative in the Environmental Impact Statement.

Appendix A

Landowners List

(List maintained as confidential material)