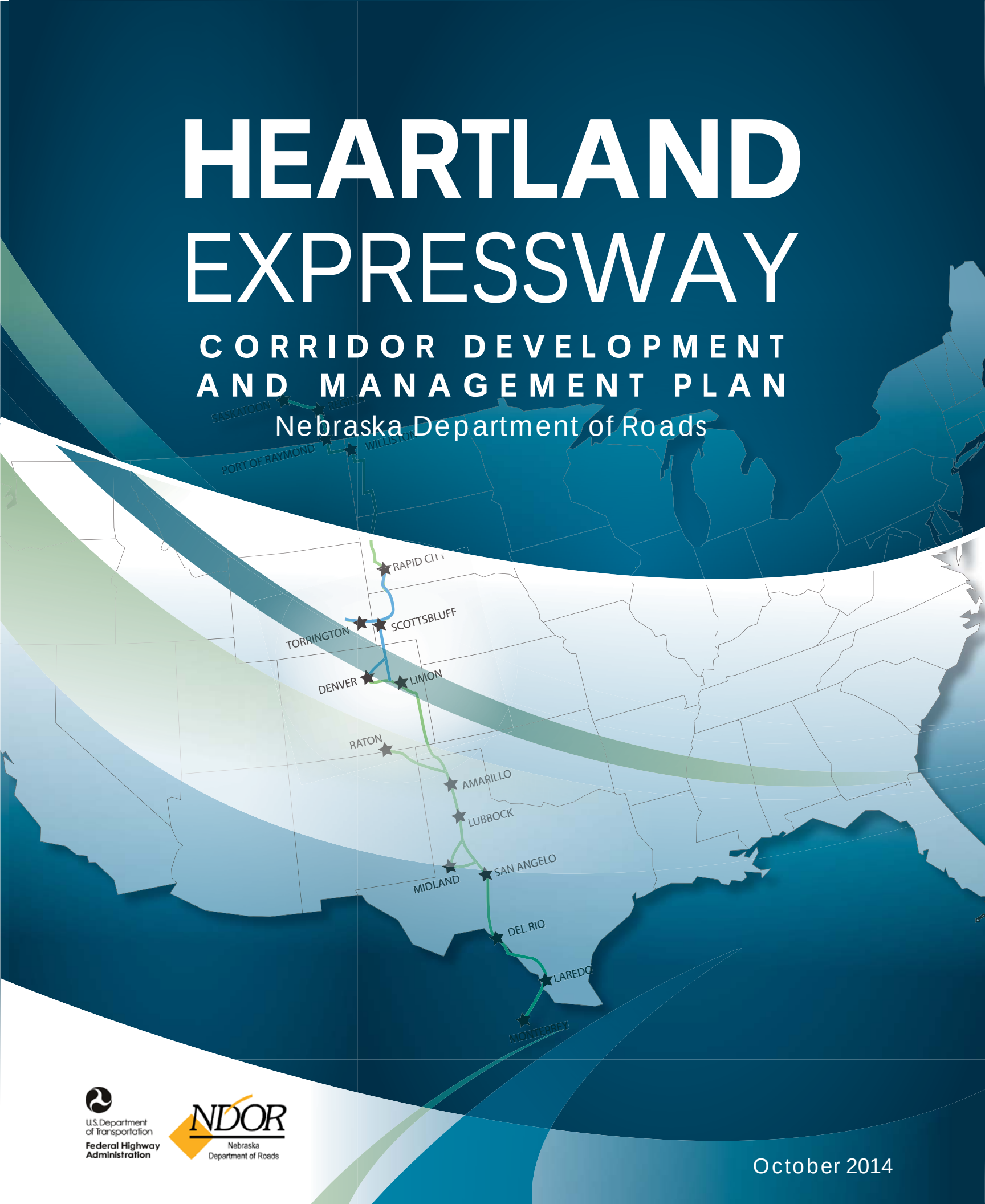
HEARTLAND EXPRESSWAY

CORRIDOR DEVELOPMENT AND MANAGEMENT PLAN

Nebraska Department of Roads



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Executive Transportation Leaders:

Mr. Randy Peters, P.E.	Director of Nebraska Department of Roads
Mr. Monty Fredrickson, P.E.	Former Director of Nebraska Department of Roads

Steering Committee:

Randy Peters	Nebraska Department of Roads (NDOR)
Mike Owen	Nebraska Department of Roads (NDOR)
Craig Lind	Nebraska Department of Roads (NDOR)
Doug Leafgreen	Nebraska Highway Commission
Travis Hiner	Heartland Expressway Association
Lane Danielzuk	Heartland Expressway Association
Deb Cottier	Heartland Expressway Association
Joe Kiely	Ports to Plain Alliance

Nebraska Department of Roads:

Randy ElDorado	NDOR
David Schoenmaker	NDOR
Doug Hoevet	NDOR

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LIST OF ABBREVIATIONS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
B/C	Benefit-Cost Ratio
BEA	U.S. Bureau of Economic Analysis
BNSF	BNSF Railway, formerly known as Burlington Northern and Santa Fe Railway
BOR	Bureau of Reclamation
BUL	Biologically Unique Landscape
CANAM	Canadian American Highway
CDMP	Corridor Development and Management Plan
CDOT	Colorado Department of Transportation
CE	Categorical Exclusion (NEPA)
CFR	Code of Federal Regulations
CMV	Commercial Motor Vehicle
CORBOR	Coordinated Border Infrastructure Program
CP	Canada Pacific
DM&E	Dakota, Minnesota & Eastern Railroad
DOT	Department of Transportation
DSRR	Dakota Southern Railroad
EA	Environmental Assessment (NEPA)
EIS	Environmental Impact Statement (NEPA)
EPA	U.S. Environmental Protection Agency
FAF	Freight Analysis Framework
FAF3	Freight Analysis Framework version 3
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act
FPPA	Farmland Protection Policy Act
GARVEE	Grant Anticipation Revenue Vehicle
GO	General Obligation Bonds
GWMA	Groundwater Management Area
HMVM	100 Million Vehicle Miles
I-	Interstate Highway
ISTEA	Intermodal Surface Transportation Efficiency Act, 1991
ITS	Intelligent Transportation Systems
Jct	Junction
L23D	Nebraska Highway Link 23D
L62A	Nebraska Highway Link 62A
L79E	Nebraska Highway Link 79E

LCC	Launch Control Center
LF	Launch Facility
LRMP	Long Range Management Plan
M&O	Maintenance and Operations
Map-21	Moving Ahead for Progress in the 21st Century bill
MEAN	Municipal Energy Agency of Nebraska
MEV	Million Entering Vehicles
mph	Miles per hour
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NAFTA	North American Free Trade Act
NAGPRA	Native American Graves Protection and Repatriation Act
NCPD	National Corridor Planning and Development
NCRC	Nebraska Central Railroad Company
NDEQ	Nebraska Department of Environmental Quality
NDNR	Nebraska Department of Natural Resources
NDOR	Nebraska Department of Roads
NE 2	Nebraska Highway 2
NE 71	Nebraska Highway 71
NE 92	Nebraska Highway 92
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NHPA	National Historic Preservation Act of 1966
NHS	National Highway System
NKCR	Nebraska, Kansas & Colorado Railway
NLT	Nebraska Land Trust
NNW	Nebraska Northwestern Railroad
NNLP	Nebraska Natural Legacy Project
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRD	Natural Resources District
NRHP	National Register of Historic Places
NSHS	Nebraska State Historical Society
NSI	Nebraska Serviceability Index
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
OMB	Office of Management and Budget
PABS	Private Activity Bond
PDO	Property Damage Only Crash (no injuries or fatalities)
PEL	Planning and Environment Linkages
POP	Pavement Optimization Program
PTP	Ports to Plains

RANS	Revenue Anticipation Note
RIMS II	Regional Input-Output Modeling System
ROD	Record of Decision
ROW	Right-Of-Way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
SDDOT	South Dakota Department of Transportation
SHPO	State Historic Preservation Office
SRA	State Recreation Area
STP	Surface Transportation Program
SWAP	State Wildlife Action Plan
TAZ	Traffic Analysis Zone
TCP	Traditional Cultural Property
TEA 21	Transportation Equity Act for the 21st Century (1998)
THPO	Tribal Historical Preservation Officer
TIF	Tax Increment Financing
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery
TMDL	Total Maximum Daily Load
TxDOT	Texas Department of Transportation
UPRR	Union Pacific Railroad
US #	U.S. Route #
U.S. or US	United States
US 20	United States Highway 20
US 26	United States Highway 26
US 385	United States Highway 385
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish & Wildlife Service
USGSA	U.S. General Services Administration
VHT	Vehicle-Hours Traveled
VMT	Vehicle-Miles Traveled
Warren AFB	Francis E. Warren Air Force Base
WHP	Wellhead Protection Program
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
WYDOT	Wyoming Department of Transportation

1.0 INTRODUCTION

The Transportation Equity Act of the 21st Century (TEA-21) enacted by Congress in May of 1998, authorized highway and other surface transportation programs for the period 1998 through 2003. One element of TEA-21 was the designation of additional *High Priority Corridors* on the National Highway System (NHS), including the Heartland Expressway Corridor, the Ports to Plains Corridor, and the Theodore Roosevelt Expressway. Together, these three corridors form the Ports to Plains Alliance Corridor connecting Canada to Mexico as shown in Figure 1.1.

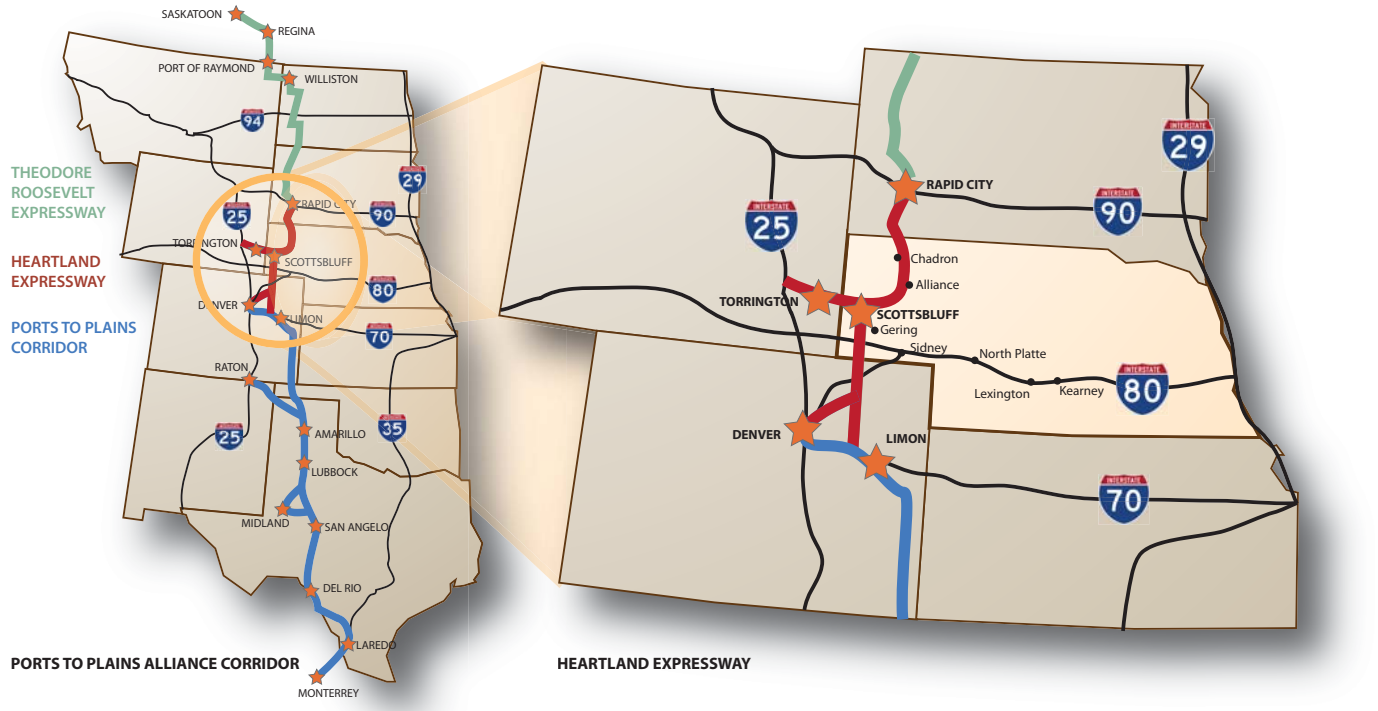


Figure 1.1- The Ports to Plains Alliance Corridor

The Ports to Plains (PTP) Alliance Corridor is a high-speed highway corridor that promotes and enhances domestic and international trade in North America, provides connectivity to east/west interstate system components, provides an essential economic development tool for the rural Great Plains, and improves Homeland Security throughout the Great Plains by connecting metropolitan cities and regional trade centers from Canada to Mexico via the Great Plains.

As part of the PTP Alliance Corridor, the vision for the Heartland Expressway Corridor consists of a high-speed highway that will promote and enhance domestic and international trade as it connects Denver, Colorado Springs, and the PTP Alliance Corridor to Rapid City and the Theodore Roosevelt Expressway. The Heartland Expressway also provides an essential economic development tool for rural areas in Colorado, Nebraska, South Dakota, and Wyoming and improves Homeland Security in the nation's Heartland.

The Heartland Expressway Corridor will provide many national, regional, and local benefits. Some of the most noteworthy national benefits include:

- Connection of metropolitan cities and regional trade centers
- Develops a significant North American Free Trade Act(NAFTA) corridor
- Provides an alternative to avoid urban congestion and delay along Interstate 25
- Completes an integral segment of the PTP Alliance Corridor, a trans-national corridor
- Enhances the national freight network and freight movements
- Provides safer travel
- Provides a north/south high speed corridor
- Enhances delivery capacity and efficiency to Great Plains markets
- Provides essential economic development infrastructure to the Great Plains
- Develops a significant tourism corridor

The Heartland Expressway Corridor will provide an opportunity to improve the efficiency and reliability of freight movements. Currently, many trucking companies schedule shipments to avoid urban congestion times. A rural route to bypass urban congestion along the I-25 corridor will provide opportunities for trucking companies to improve the efficiency and timeliness of shipments within the critical freight network.

Figure 1.2- The Heartland Expressway Corridor

This Heartland Expressway Corridor Development and Management Plan (CDMP) is focused on the portion of the Heartland Expressway within the State of Nebraska. The CDMP has been prepared in compliance with Section 1118(d) of TEA-21[1] which is similar to the work previously completed for the Port to Plains corridor in 2005. Section 1118(d), entitled "Corridor Development and Management Plan" declares that:

"A state or metropolitan planning organization receiving an allocation under this section shall develop, and submit to the secretary for review, a development and management plan for the corridor, or a usable component thereof, with respect to which the allocation is being made. Such plan shall include, at a minimum, the following elements:

- A coordinated corridor development plan and schedule, including a timetable for completion of all planning and development activities, environmental reviews, permits, and construction of all sections;
- The results of any environmental reviews and mitigation plans;
- A complete and comprehensive analysis of corridor costs and benefits;
- A finance plan, including any alternative financing methods and, if the corridor is a multi-state corridor, a state-by-state alternative of corridor finances;
- The identification of any impediments to the development and construction of the corridor, including any possible environmental, social, political, and economic objections.'"

The Heartland Expressway Steering Committee has agreed to pursue the following long-term improvement concepts that meet the overall Ports to Plains Alliance corridor vision. These improvements were identified in the 1993 Heartland Expressway Economic and Engineering Feasibility Study:

- Four-lane divided highway, except in sections where more than four-lanes exist or are planned, with a stepped development process to achieve the ultimate four-lane corridor;
- A Super-2 facility as an interim improvement which includes: two 12-foot lanes and ten-foot shoulders with eight feet paved. The Super-2 facility is a two-lane highway with passing lanes located at optimum locations.

In addition, potential relief routes, at-grade railroad crossing upgrades, intelligent transportation systems (ITS) improvement, intersection improvement and safety improvement needs will be identified.

The Heartland Expressway Steering Committee is composed of the following individuals:

Randy Peters	Nebraska Department of Roads (NDOR)
Mike Owen	NDOR
Craig Lind	NDOR
Doug Leafgreen	Nebraska Highway Commission
Lane Danielzuk	Heartland Expressway Association
Travis Hiner	Heartland Expressway Association
Deb Cottier	Heartland Expressway Association
Joe Kiely	Port to Plains Alliance

[1]TEA-21 was the applicable law during the preparation of the majority the Heartland Expressway CDMP. The Moving Ahead for Progress in the 21st Century Act (MAP-21) was put signed into law in 2012, and revisions to this document have been made where possible to reflect changes brought about by the passing of MAP-21.

2.0 DEVELOPMENT PLAN

2.1 CORRIDOR ASSESSMENT

The Corridor Assessment characterizes the project need, describes existing features of the Heartland Expressway Corridor, explains the future travel demand forecast methodology, presents the forecast results, provides a safety analysis and concludes with recommendations and improvement priorities.

The following opportunities and challenges for economic development present themselves:

- **Overall travel demand in the four-state region in and around the Nebraska Panhandle is expected to increase by approximately 90 percent between now and the year 2035.** Currently the Heartland Expressway Corridor's share of the north/south travel demand is approximately 22 percent. However, forecasts indicate that without Corridor improvements, this share will fall to about 18 percent. Specifically, Heartland Expressway Corridor improvements are needed to maintain Nebraska's existing percentage share of travel demand. When these improvements are linked with the other Ports to Plains (PTP) Alliance Corridor improvements located north and south of the Heartland Expressway Corridor, the proportion of trucks on the Heartland Expressway is expected to rise significantly and the overall travel demand share will increase to 24 percent of the total. In addition, along with this growth in travel demand will be a corresponding increase in economic output in the Panhandle and growth in population, reversing historic trends.[1]
- **According to the Federal Highway Administration (FHWA) and historic trends, a substantial increase in truck freight activity is expected to occur nationally.** Nearby competing facilities such as Interstate 25 (I-25) through northern Colorado are expected to be congested. In addition, there is a nearly 500 mile wide gap between the I-25 and Interstate 29 (I-29) corridors. The PTP Alliance Corridor can help fill this large gap and provide a trade conduit from Canada to Mexico through the Panhandle of Nebraska, but only if it is included as part of a continuous transportation corridor that has an identity and provides a reliable and efficient route for freight, similar to the Interstate Highway network.
- **Travel demand in the Nebraska Panhandle has fallen the last ten years for a variety of reasons, but fundamental factors remain in place to support future travel and economic development.** One key factor limiting travel demand and economic development is the limited capacity of the transportation infrastructure in the Panhandle, which mainly consists of two-lane highways that lack passing opportunities. While some four-lane improvements have been constructed within the Heartland Expressway Corridor (i.e. Nebraska Highway 71 from Kimball to Scottsbluff and U.S. Highway 26 from East of Morrill to Minatare), these segments need to be connected with other improvements to increase posted speed limits and improve travel time reliability to substantially shift travel patterns.
- **With a comprehensive trade corridor in place, the groundwork will be cultivated for economic activity to extend outward from it.** Additionally, emerging economic sectors and opportunities such as those possible from energy development and the emerging wind and solar energy sectors will have an infrastructure framework upon which to grow. This infrastructure investment will reduce the barriers and cost to development, place the Panhandle in a much better competitive position for limited exploration and development investments, and help offset the negative impacts associated with a potentially and suddenly booming new need for the resources available in the Panhandle.

[1]Travel demand statistics are based on the travel demand model, which can be found in Appendix B.

2.1.1 VISION OF THE CORRIDOR

Figure 2.1 – Corridor Area Detail

One goal of this Corridor Development and Management Plan (CDMP) is to address these challenges and to leverage them into opportunities. The Heartland Expressway Corridor is comprised of the following highways located within the State of Nebraska:

- U.S. Highway 26 (US 26) from the Wyoming/Nebraska border to Scottsbluff and continues to Nebraska Highway Link 62A (L62A) intersection located east of Minatare, Nebraska.
- Nebraska Highway 71 (NE 71) from the Colorado/Nebraska border to the intersection with US 26 located on the eastern edge of Scottsbluff, NE.
- L62A from the US 26 junction to the intersection with U.S. Highway 385 (US 385).
- US 385 from the intersection with L62A to the South Dakota/Nebraska border. US 385 borders the city of Alliance, Nebraska and goes through the west edge of Chadron, Nebraska.

The Heartland Expressway Corridor route identified above was adopted, in part, from the Heartland Expressway Economic and Engineering Feasibility Study (NDOR and South Dakota Department of Transportation 1993). This study primarily focused on potential economic development that could be brought to the region by the Heartland Expressway. It also included reviews of alignment options, road standards, traffic demands, conceptual design, costs, economic benefits, and environmental impacts and implications. The study concluded that a major investment in the Heartland Expressway is economically feasible, and identified the route that is expected to provide the greatest economic benefit. Multiple highway routes were examined, and ultimately the study concluded that the Heartland Expressway's most feasible route (from engineering, environmental, and economic perspectives) would connect Rapid City to Scottsbluff/Gering via Hot Springs, SD, Chadron, NE, and Alliance, NE (i.e. using US 385, L62A, and US 26). *The Heartland Expressway Economic and Engineering Feasibility Study Executive Summary* is included as Appendix A.

Figure 2.2- Selected Route from the Heartland Expressway Economic and Engineering Feasibility Study Executive Summary

As part of the CDMP, the study team evaluated improvements for the Heartland Expressway Corridor to meet the needs of the high priority corridor. The following evaluation criteria were used to determine alternatives to be considered:

- Travel demand within the border of Nebraska and from the adjacent states located along the PTP Alliance Corridor
- Safety
- Connectivity to improved corridors

The selected improvements to the proposed route of the Heartland Expressway were chosen to present a positive environment for economic growth and prosperity, as well as to serve the existing population of the Panhandle of Nebraska.

The vision of the proposed Heartland Expressway improvements consists of the following:

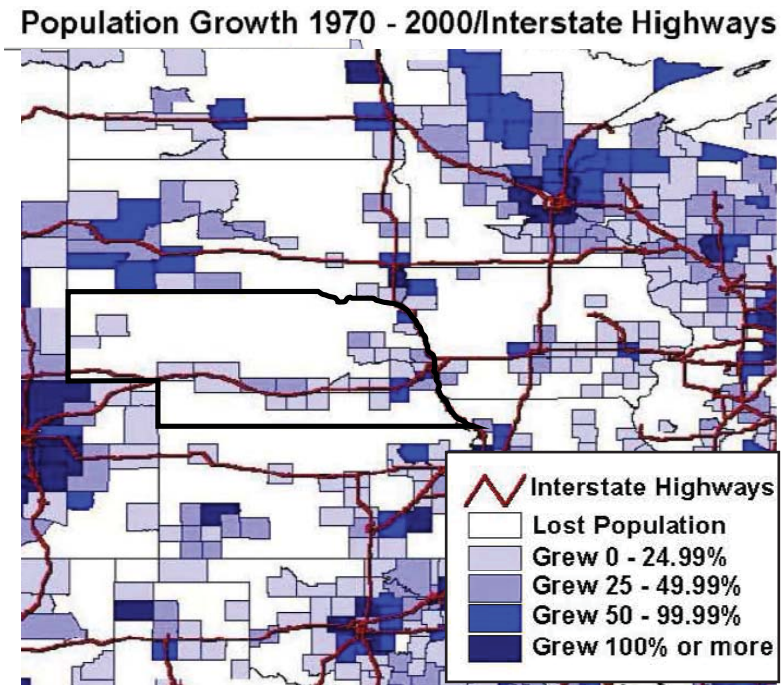
- Widen US 26 to a four-lane divided highway from Torrington, Wyoming to County Road (CR) 10 east of Morrill, Nebraska.
- Widen US 26 to a four-lane divided highway from CR 30 in Minatare, Nebraska to the US 26/L62A junction.
- Widen L62A to four lanes with median from US 26/L62A split to US 385.
- Widen US 385 to four lanes with median from L62A Link to Nebraska Highway 2 (NE 2) in Alliance, Nebraska.[2]
- Improve US 385 into a "Super-2" facility to include 12-foot lanes, 10-foot shoulders, auxiliary turn lanes and passing lanes from NE 2 to US 20 in Chadron, Nebraska. This should be constructed in accordance to the Super-2 criteria. The ultimate roadway section would include a four-lane highway when traffic volumes warrant the four-lane section.
- Improve the intersection of US 385 and US 20.
- Improve US 385 into a Super-2 facility to include 12-foot lanes, 10-foot shoulders, auxiliary turn lanes and passing lanes from US 20 west of Chadron, Nebraska to Oelrichs, South Dakota.
- Additional major safety and bottleneck improvements.

The intent of the Heartland Expressway CDMP is to identify long range transportation improvements that meet the vision of the overall Heartland Expressway and Ports to Plains Alliance Corridors. The goals of this corridor are to promote economic development, encourage population growth, improve system reliability, and reduce travel time. Project-specific purpose and need and alternative analysis will occur as project specific details arise and during future NEPA documentation.

[2]This improvement along the Heartland Expressway Corridor ("Junction L 62A US 385 to Alliance," Project number 385-3(118), Control number 51432) has received funding from the Build Nebraska Act and is currently in the Pre-liminary Engineering and NEPA phase. More information about this project can be found on NDOR's website http://www.transportation.nebraska.gov/projects/heartland-exp/. See Chapter 6 for more information on the Build Nebraska Act.

2.1.2 PROJECT NEED

Corridor Development and Economic Activity Linkages



Data Source: US Census Bureau Environmental Systems Research Institute
Map produced by: Jarrod Haberman, Panhandle Area Development District

Figure 2.3- Population Growth Rates 2000 to 2010

Figure 2.3 provides an illustration of interesting growth trends between 1970 and 2000. Together, these trends reflect the importance and interdependence of the Interstate Highway system and growth and the significance of travel infrastructure addressed by the PTP Alliance Corridor. The areas adjacent to major regional highway facilities have grown, whereas areas without an interstate have been stagnant or have decreased in population.

While the argument could be made that interstate facilities are located in areas that are growing, many of these facilities were constructed prior to 1970. The pattern of growth around city centers clearly demonstrates that the location of major roadways influences the location of new development and population increases.

Figure 2.3 suggests that without an investment in major highway improvement necessary to promote interstate travel, economic development and growth is difficult to achieve. As illustrated in Figure 2.3, the counties that experienced population growth are located along major interstates or trade corridors.

For example, the I-25 and I-29 corridors have grown compared to areas within Nebraska and North Dakota where a 4-lane highway exists. On the positive side, the evidence is clear that highway infrastructure improvements have been proven to be linked to both economic and population growth. Although this link is clear, the magnitude and timing of related growth may vary considerably.

Connectivity

Connectivity is an important consideration in developing a unified transportation network. The importance of connectivity is illustrated in the following historic examples:

Erie Canal

The Erie Canal is a waterway in New York that runs from Albany, New York, on the Hudson River to Buffalo, New York, at Lake Erie, completing a navigable water route from the Atlantic Ocean to the Great Lakes. This canal was the first transportation system between the eastern seaboard (New York City) and the western interior (Great Lakes) of the United States that did not require portage. The canal was faster than carts pulled by draft animals, and cut transport costs by about 95 percent. The canal fostered a population surge in western New York State, opened regions farther west to settlement, and helped New York City become the chief U.S. port.

Transcontinental Railroad
The world's First Transcontinental Railroad was built between 1863 and 1869 to join the eastern and western halves of the United States. When it opened, this served as a vital link for trade, commerce, and travel and opened up vast regions of the North American heartland for settlement. Shipping and commerce could thrive away from navigable watercourses for the first time since the beginning of the nation.

Interstate Highway System
Development of the Interstate Highway System has had significant positive impacts on the nation's economic performance since 1956. The Interstate Highway System represented an investment in a new, higher speed, safer, lower cost per mile technology which fundamentally altered relationships between time, cost, and space in a manner which allowed new economic opportunities to emerge that would never have emerged under previous technologies. The Interstate Highway System replaced a lower capacity, lower speed, less safe, and more expensive (per mile of travel) highway system. The Interstate Highway System provided a new envelope of space, time, and cost, in which the U.S. economy could reorganize.

There is a nearly 500 mile wide gap between the I-25 corridor in Wyoming and the I-29 corridor in Iowa. Specifically, there are no four-lane or greater north/south highways fully traversing the State of Nebraska. If one excludes the very short segment of Interstate 76 (I-76) in western Nebraska and the urban interstates (Interstate 180 (I-180) which is confined to Lincoln, Nebraska, and Interstates 480 and 680 (I-480 and I-680) which are confined to Omaha, Nebraska), Nebraska is one of only two lower 48 states with only one through/continuous Interstate Highway. The other state is Maine.

In developing the Interstate Highway System, many links were included for their connectivity rather than travel demand on any particular segment. Examples include Interstate 70 (I-70) through Eastern Utah and the interstate connections to the Canadian and Mexican borders. An objective view of the national highway network clearly indicates that the PTP Alliance Corridor would fill a missing gap in the highway network since there are currently no north/south routes through Nebraska. The closest north/south routes are I-25 through Colorado and Wyoming and I-29 in Iowa.

Existing Truck Mobility and Freight Demand

The American Association of State Highway and Transportation Officials (AASHTO) report "Unlocking Freight" states that railroads, highways, ports, waterways and airports require investments well beyond current levels to maintain and improve freight mobility (July 2010). The report identifies key projects in 30 states that would improve freight delivery and dependability, and outlines a three-point plan for relieving freight congestion, generating jobs and improving productivity. Although the Heartland Expressway Corridor is not listed in this report, the PTP Alliance Corridor to which it connects, is listed.

The AASHTO report clarifies that "despite more long-distance freight being moved by intermodal rail, trucks continue to haul 74 percent of all cargo." By 2035, the report concludes that the "number of trucks traveling on the nation's highways is expected to increase from 10,500 to 22,700 daily."

More specifically, the report concludes:

- The need to move significantly more freight across the country and the world will increase substantially in the 21st century.
- The U.S. population reached 308 million in 2010, and is expected to reach 420 million by 2050. A larger population will consume more food, clothing, and other commodities.
- By 2020, the U.S. trucking industry will move three billion more tons of freight than we haul today. To meet this demand, the industry will put another 1.8 million trucks on the road.
- In 20 years, for every two trucks now on the road, there will be an additional one right behind it, carrying the expected growth in food deliveries, goods, and manufacturing equipment.
- In 40 years, overall freight demand will double, from 15 billion tons today to 30 billion tons by 2050. Freight carried by trucks will increase 41 percent; by rail 38 percent from today's quantities. The number of trucks on the road compared to today will also double.

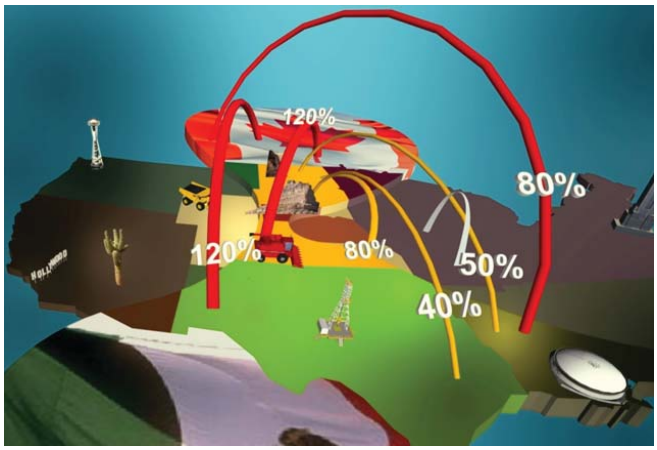


Figure 2.4 - Forecast Growth Rates from FHWA's Freight Analysis Framework for Canada and Ports to Plains Alliance Corridor

The Heartland Expressway responds to these demands by providing an alternate route and expanded roadway capacity to meet future freight needs.

The FHWA's Freight Analysis Framework (FAF) integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. With data from the 2007 Commodity Flow Survey and additional sources, FAF version 3 (FAF3) provides estimates for tonnage and value, by commodity type, mode, origin, and destination for 2007, the most recent year, and forecasts through 2040. Also included are truck flows assigned to the highway network for 2007 and 2040.

Figure 2.4 summarizes forecast growth rates from FHWA's Freight Analysis Framework (FAF) for Canada and the overall PTP Alliance Corridor. The truck freight between Canada and the PTP Alliance Corridor is estimated to increase about 120 percent; and the Heartland Expressway Corridor is a core component of the overall PTP Alliance Corridor. This data was the basis for baseline 2035 border crossings between Canada and the U.S. along the Montana and North Dakota borders. This increase in international trade is only part of the overall increase in freight movement. Growth in surrounding states, as well as freight activity within the U.S., is also increasing.

On the domestic scale, Figures 2.5, 2.6, and 2.7 represent a nationwide perspective of freight transportation in 2007 and 2040, respectively. Truck and rail freight movements through Nebraska are clearly depicted along with a major north/south gap that relates directly to the planned alignment of the PTP Alliance Corridor (Figures 2.5 and 2.6). Freight congestion is anticipated through Nebraska east of the Heartland Expressway Corridor (Figure 2.7). Highly congested conditions along I-25 (north/south) and I-70 (east/west) in Colorado reflect capacity challenges that may ultimately shift some freight operations into Nebraska.

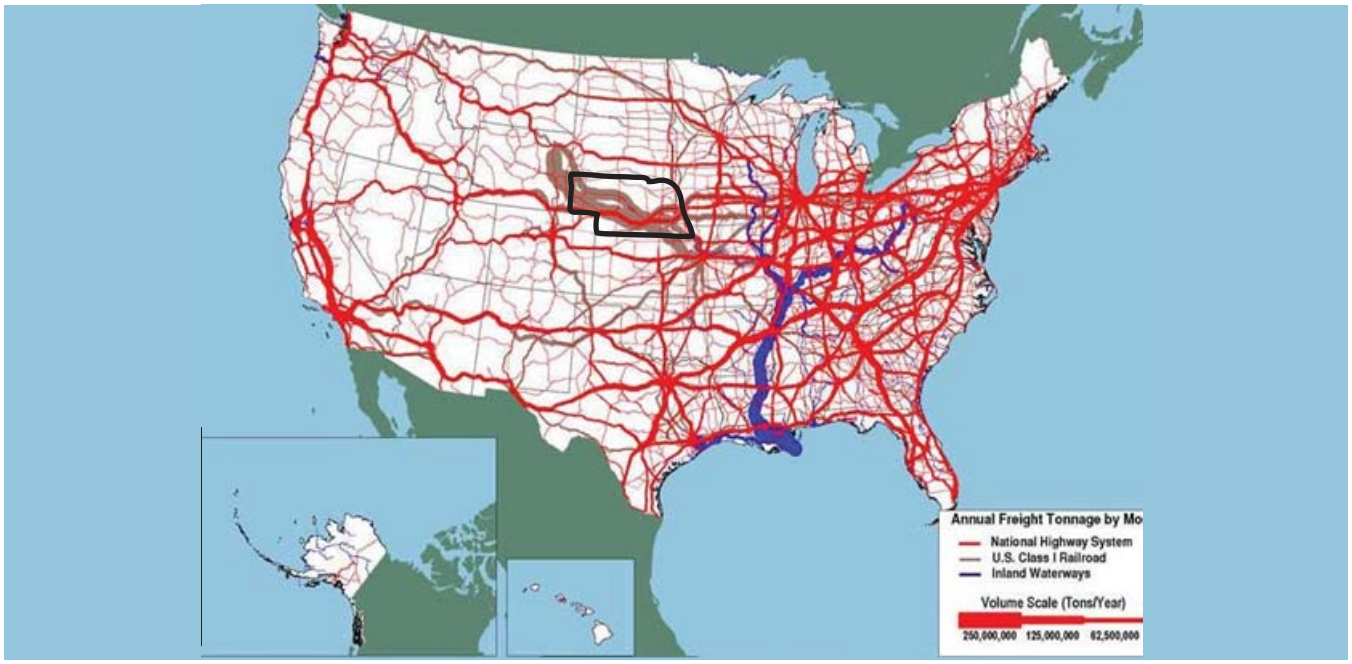


Figure 2.5 - Tonnage on Highways, Railroads and Inland Waterways in 2007
Source: FHWA

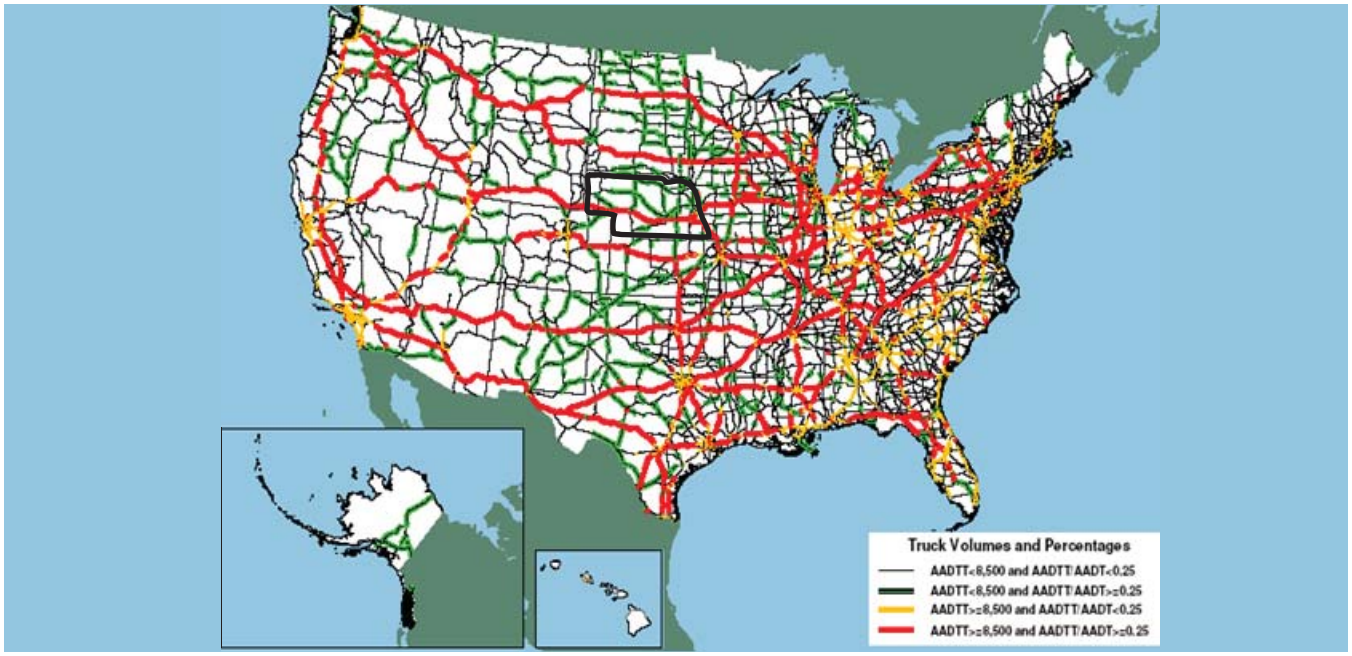


Figure 2.6 - Major Truck Routes on the National Highway System in 2040
Source: FHWA

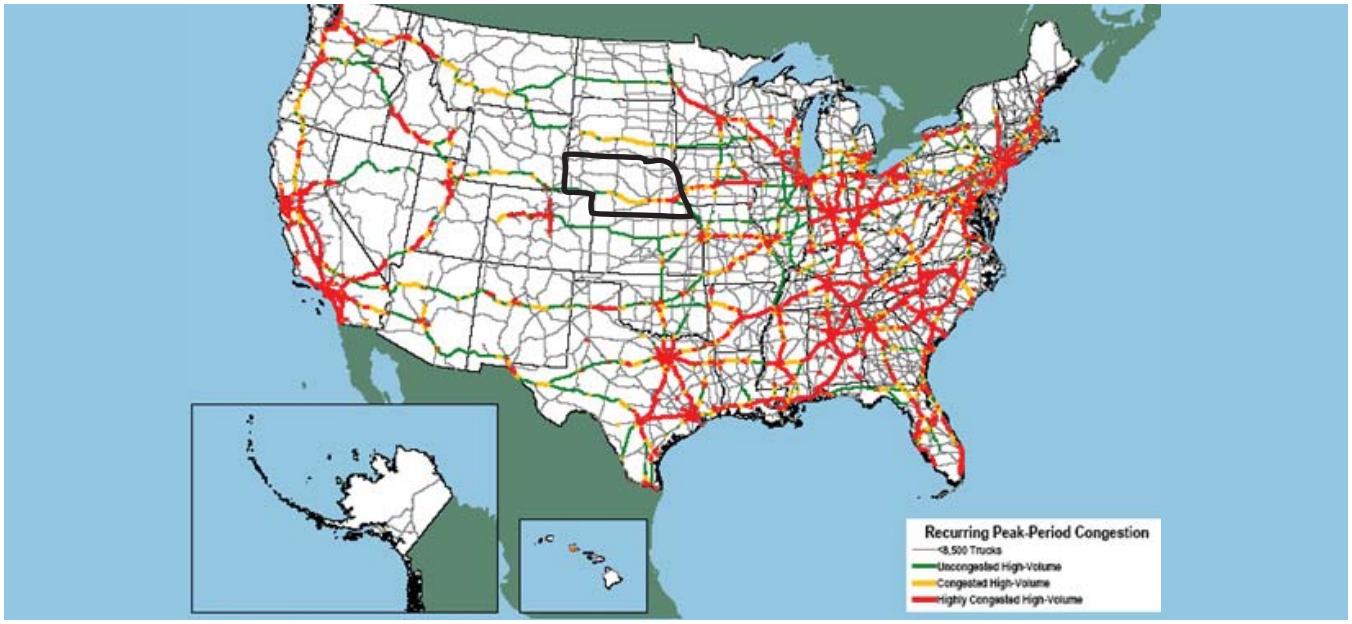


Figure 2.7 - Peak-Period Congestion on High-Volume Truck Portions of the National Highway System in 2040
Source: FHWA

The Nebraska Department of Economic Development and Nebraska Department of Labor report defines the twelve primary industry clusters in Nebraska as follows:

1. Agricultural Machinery
2. Agriculture and Food Processing
3. Biosciences
4. Business Management and Administrative Services
5. Financial Services
6. Health Services
7. Hospitality and Tourism
8. Precision Metals Manufacturing
9. Renewable Energy
10. Research, Development, and Engineering Services
11. Software and Computer Services
12. Transportation, Warehousing, and Distribution Logistics

Trends in Population, Land Use and Economic Development in Nebraska

Past economic trends in Nebraska are generally reflected in population data presented in Appendix D. However, future trends may be driven by Nebraska's competitive advantages and new industrial development such as oil and gas development.

Competitive Advantages

Some areas in the Heartland Expressway Corridor are growing while others show no growth or declining growth. Local, regional, and statewide economic development efforts are at work throughout the state in an effort to identify economic strengths and weaknesses and to develop strategic economic development plans.

Economic output related to agriculture is heavily dependent on commodity prices. Recently, commodity prices have been favorable and in some ways the Panhandle has fared somewhat better than the nation as a whole. However, with farm consolidation and further advances in farming automation, fewer jobs are required to produce a comparable output of agricultural product and this has been a contributing factor in the trend of declining population.

The Nebraska Department of Economic Development and Nebraska Department of Labor prepared a report entitled: "Growing Jobs, Industries, and Talent: A Competitive Advantage Assessment and Strategy for Nebraska" in September of 2010. The report states the following:

"Nebraska's primary industry clusters have performed strongly in industry employment measures. These 12 industry clusters provide a balanced portfolio of growth opportunities. Five of them—financial services; transportation, warehousing, and distribution logistics; precision metals manufacturing; biosciences; and renewable energy—are current strengths, i.e., they have a larger concentration of employment than found nationally and they are adding jobs more rapidly than at the national level. Three other industry clusters—R&D and engineering services; health services; and hospitality and tourism—are emerging strengths and opportunities with strong employment growth in Nebraska, but they are not yet specialized in their overall employment concentration in the state. The remaining four industry clusters—agriculture and food processing; business management and administrative services; software and computer services; and agricultural machinery—fall into a retention category, being highly specialized in their employment concentration but not faring as well in employment growth."

The report also states that "Nebraska has weathered the recession much stronger than other states." Given global and nationwide economic conditions, growth forecasts for Nebraska or other states and regions are difficult to make with much certainty. In general, Nebraska is reasonably well positioned to grow in the future.

According to the Nebraska Department of Economic Development, Business Development Division, some factors that support this assertion include:

2nd Best Employment Leader
Business Facilities Magazine Rankings Report 2010

3rd Best States for Jobs
MSN and Career Builder.com 2011

3rd Best Pro-Business Legal Climate
U.S. Chamber's Institute for Legal Reform 2010

4th Best Quality of Life
Business Facilities Magazine Rankings Report 2010

5th Best Education Climate
Business Facilities Magazine Rankings Report 2010

5th Best Pro-Business State
Pollina Corporate Real Estate 2012

9th Best State for Business and Careers
Forbes.com 2010

Top 10 America's Top States for Business
CNBC Special Report 2011

Oil and Gas Development

The Niobrara formation, as shown in Figure 2.8, is one among many natural resources areas in the Denver Basin and western U.S. that presents substantial oil and gas development opportunities that are active now and are likely to be more active in the future. Based on a U.S. Geological Survey Report for Province 39 entitled: "Petroleum Systems and Assessment of Undiscovered Oil and Gas in the Denver Basin Province, Colorado, Kansas, Nebraska, South Dakota, and Wyoming" compiled by Debra K. Higley:

> *"More than 1.05 billion barrels of oil and 3.67 trillion cubic feet of natural gas have been produced from wells across the Denver Basin. Of this, 245 million barrels of oil and 2.15 trillion cubic feet of natural gas are from wells within the Front Range Urban Corridor; this totals about 23 percent of the oil and 58 percent of the gas produced in the basin. The urban corridor located adjacent to and east of the Rocky Mountains in the Colorado and Wyoming portions of the basin is as much as 40 miles (64 kilometers) wide and encompasses Denver, Colorado, Cheyenne, Wyoming, and other population centers."*

The Niobrara resource potential, or "play" in industry terms, has the potential to create substantial amounts of traffic within and near the Heartland Expressway Corridor due to the location of the Niobrara formation, which includes parts of Wyoming, Colorado, and Nebraska (see Figure 2.8). More specifically, the Niobrara formation generally spans the southern portion of the Heartland Expressway Corridor in Nebraska and Colorado, a northern portion of the PTP Alliance Corridor in Colorado, and a portion of the Camino Real Corridor in Colorado and Wyoming. Other plays, such as the Bakken in North Dakota, are part of a large production effort that is driven largely by commodity prices and the proven results from ongoing and future drilling operations. The Niobrara play is large. Resource extraction is expected to occur over a long period of time and exploration and production activity will occur in what may or may not be a predictable manner.

The overall play is anticipated to involve a wide range of operators over a large geographic area. The rate at which drilling will occur and the drilling locations are uncertain. Consequently, like all plays of this type, there will be a ramp up period, peak period and waning period over the course of many years. In general and overall terms, the Niobrara Play is expected to involve exploration and production activity for 20 to 30 years. Details of the methodology used to estimate the travel demand associated with the Niobrara and other energy development activities are detailed in Appendix B.

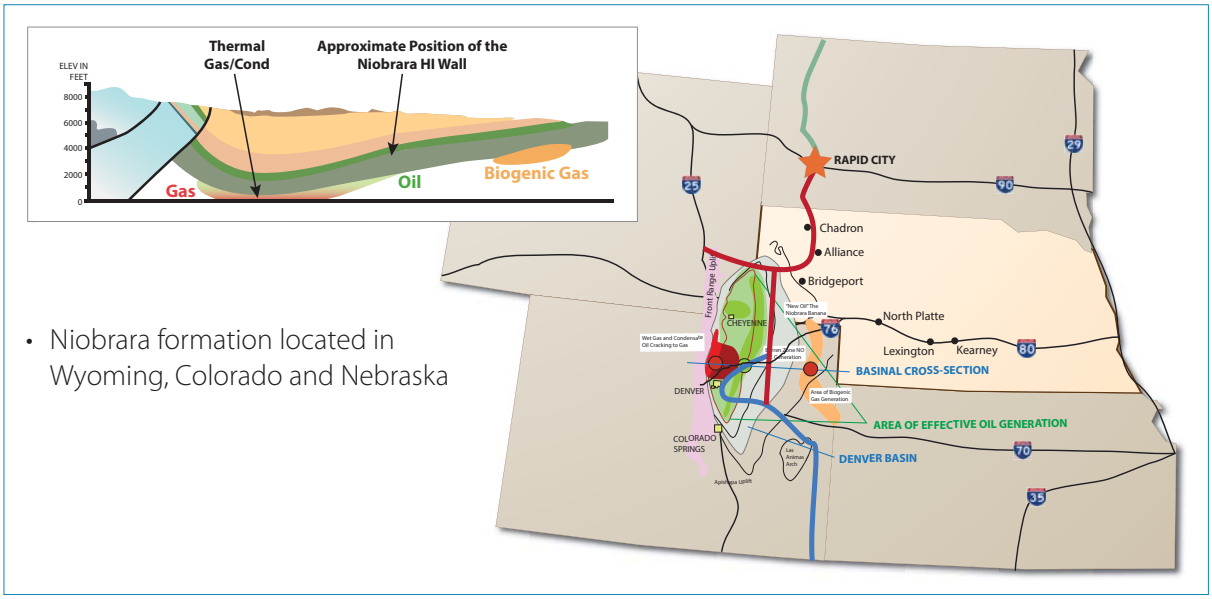


Figure 2.8 - Boundaries and Characteristics of the Niobrara Play

2.1.3 EXISTING FEATURES OF THE HEARTLAND EXPRESSWAY CORRIDOR

Corridor Limits

- NE 71 from the Colorado/Nebraska border to Scottsbluff;
- US 26 from Scottsbluff to the Nebraska/ Wyoming border;
- US 26 from Scottsbluff to the intersection with L62A;
- L62A from the intersection with US 26 to US 385, north of Bridgeport;
- US 385 from L62A intersection north to the Nebraska/South Dakota border.

The following discussion characterizes the existing features of the Heartland Expressway Corridor. The discussion begins with highway characteristics and features, and then describes intermodal freight facilities, railroads, airports and truck freight amenities such as parking and rest stops.

Highway Characteristics and Features

Nebraska Highway 71 (NE 71) – Colorado/Nebraska State Line to Interstate 80 (I-80): NE 71 is a two-lane undivided roadway classified as a Major Arterial with a posted speed limit of 60 miles per hour (mph). Driveways are sparsely located throughout the section of highway for access to residential land. There are no left-turn lane bays for any of the driveways of intersections. There are no traveler amenities (traveler services such as gas stations, rest stops, truck plazas, restaurants, hotels, etc.) along this stretch of highway. The Kimball Municipal Airport is located about 1.5 miles south of I-80. There are no paved shoulders south of the Kimball Airport. NE 71 intersects I-80 as a diamond interchange.

Nebraska Highway 71 (NE 71) - Interstate 80 (I-80) to U.S. Highway 26 (US 26): A new bypass has opened approximately two miles east of the existing NE 71 interchange. NE 71 continues east along I-80 to the newly opened NE 71. The NE 71 northbound exit on I-80 is at Exit 22, and the southbound exit is at Exit 20. The City of Kimball is located just north of I-80 at Exit 20, and traveler amenities are located within the city. NE 71 is a four-lane divided roadway classified as an Expressway with a speed limit of 65 mph. The median varies from sixteen- to forty-feet-wide. Outside shoulders are about eight-feet-wide with inside shoulders being about five feet. Paved intersections are located roughly every half mile to allow access to adjacent farm land. There are pullout areas that are used for temporary weigh stations for the Nebraska State Patrol Carrier Enforcement Division. These pullouts have no facilities and are not intended for the general public.

NE 71 bypasses along the eastern edge of Gering and Scottsbluff. Travelers on NE 71 have access to the City of Gering through the interchanges of County Road 21 (CR 21), Nebraska Highway 92 (NE 92), and a partial diamond interchange at South Beltline Highway before intersecting US 26 as a T-intersection. There are five at-grade intersections between CR 21 to US 26.

United States Highway 26 (US 26) – Wyoming/Nebraska State Line to Nebraska Highway Link 62A (L62A): US 26 is a three-lane undivided road coming out of Torrington, Wyoming with a posted speed limit of 45 mph. Approximately one mile east of Torrington, the road narrows to a two-lane facility and the speed limit increases to 65 mph. The BNSF Powder River Basin rail line roughly parallels US 26 to the south and west between Torrington and Scottsbluff, Nebraska.

The Town of Henry, Nebraska is located just east of the Wyoming-Nebraska State Line to the south of US 26. US 26 is a two lane undivided roadway classified as a Major Arterial Roadway with a posted speed limit of 45 mph and transitions to a posted speed limit of 65 mph just east of the Henry town limits. Shoulder widths are approximately six feet wide on both sides. Passing is not allowed near Henry. There are many unpaved driveways accessing US 26 near Henry but they diminish to one or two every mile east of Henry.

The number of driveway access points increases again as US 26 approaches the Village of Morrill. US 26 transitions to a three-lane roadway through Morrill with a posted speed limit of 25 mph. For approximately 1,500 feet, there is a posted speed limit of 45 mph on US 26 prior to the two-way left-turn lane on the eastern and western edges of town. The intersections within the Village of Morrill are all unsignalized. As US 26 leaves the Morrill city limits, the two-way left-turn lane is dropped and the roadway transitions to a four-lane divided roadway, with a 40-foot-wide median, and a 65 mph speed limit one mile east of town at CR 10.

US 26 transitions from a four-lane divided roadway to a four-lane undivided roadway at the city limit of Mitchell. A 50 mph speed zone is located about 1,000 feet outside of town and transitions to a 30 mph speed limit in town. There is one intersection that is signalized in the City of Mitchell (Center Avenue/15th Avenue.)

Within the Scottsbluff city limits, US 26 has seven signalized intersections with left and right turn lanes and four unsignalized intersections. The roadway remains a divided four-lane facility with a posted speed limit of 45 mph and transitions to 65 mph east and west of Scottsbluff.

US 26 remains as a four-lane divided highway and then transitions to a two-lane undivided roadway within the Minatare city limits with approximately eight foot shoulders and continues with these characteristics until the intersection with L62A. The posted speed limit within Minatare is 50 mph.

Nebraska Highway Link 62A (L62A) – US Highway 26 to US Highway 385: L62A is a two-lane undivided highway classified as a Major Arterial with a posted speed limit of 65 mph. Shoulder widths are approximately eight feet wide. L62A has many driveway accesses from the local farm land and residences. There are no left or right-turn bays at the driveways. No traveler amenities are available along this stretch of roadway. L62A has several crossings of irrigation ditches along this portion of the corridor. L62A terminates at an unsignalized T-intersection with US 385.

Figure 2.9 – Photograph of the US 385/US 20 Intersection

Figure 2.10 – Rest Area Pullout with Historical Marker on the West Side of US 385

US Highway 385 (US 385) – Nebraska Highway Link 62A (L62A) to Alliance: US 385 is a two-lane undivided roadway classified as a Major Arterial. The speed limit is 65 mph and shoulder widths vary from six to eight feet. The L62A intersection with US 385 is a T-intersection with L62A traffic required to stop and yield to US 385 traffic. About ¾ of a mile north of the intersection there is a truck parking area on the west side of US 385. This pullout area is used as a temporary weigh station for the Nebraska State Patrol Carrier Enforcement Division. There are no shelters, rest rooms or other amenities at this parking area.

Further north, approximately three miles north of the L62A intersection and near the unincorporated community of Angora, the BNSF mainline parallels US 385 to the east. There are several intersecting roadways that have at-grade crossings with the rail line that are located about 100 to 200 feet east of US 385.

There is one rest area, with no facilities, on the east side of US 385 approximately six miles north of L62A intersection. This area is served with southbound left-turn lanes for both entrances.

The City of Alliance is located east of US 385 and there are four local streets connecting the city with US 385 (W. Kansas Street, W. 3rd Street, W. 10th Street and Nance Road).W. 3rd Street is also designated as NE 2. Each intersection is unsignalized with the city street traffic required to stop for US 385 traffic. There are turn lanes provided at three of the intersections, with no turns at the intersection of Nance Road. The BNSF mainline is located east of US 385 approximately 4,300 feet at W. 3rd Street and converges back to US 385 north and south of Alliance. Just south of Alliance and east of US 385 is a major BNSF rail yard. The BNSF mechanical division operates a major locomotive maintenance facility at this location that performs preventive maintenance and repairing and servicing of equipment. Further south is a large switching yard used primarily for coal unit trains.

US Highway 385 (US 385) – Alliance to US 20 (Charon): North of Alliance, US 385 continues to the northwest. The BNSF rail line runs parallel and adjacent to US 385. There are several roadway intersections that have at-grade crossings with the rail line. Each crossing is located about 100 to 200 feet from US 385. US 385 and NE 2 share the same alignment, beginning at the intersection with W. 3rd Street and continuing north approximately eight miles

where US 385 and NE 2 split at a grade separated interchange. US 385 continues north and is grade separated over NE 2 and the adjacent BNSF rail line via a two-lane bridge. NE 2 intersects US 385 south of the interchange at a T-intersection with NE 2 required to stop for US 385 traffic. North of the interchange NE 2 continues to the northwest, adjacent to the rail line.

About 13 miles south of Chadron, the road passes through the wooded area of the Nebraska National Forest where the road descends approximately 1,000 feet in elevation to Chadron. This occurs near the Chadron Reservoir. Within this section of roadway, US 385 has a climbing lane for the southbound (uphill) direction. There are also a number of large radius curves within this section.

US 385 transitions to a three-lane roadway within the Chadron city limits and has a posted speed limit of 45 mph. The center lane is a two-way left-turn lane. US 385 intersects with US 20 as a four-legged intersection. The south leg of US 385 and the driveway to the Shell gas station are stop sign controlled.

US Highway 385 (US 385) – Chadron to South Dakota State Line: US 385 and US 20 share the same alignment for 2.5 miles west of Chadron. US 20 is a three-lane roadway with a posted speed limit of 45 mph.

US 385 has a sweeping horizontal right-turn lane to the north at the western intersection with US 20. Southbound US 385 traffic is required to stop and yield to US 20 traffic on the large horizontal curve. Along the large horizontal curve, US 385 intersects with Nebraska Highway Link 23D (L23D). US 385 is a two-lane roadway with a posted speed limit of 65 mph through the horizontal curve and continues to the South Dakota border.

Located just north of the horizontal curve is a historical marker parking area with a picnic table on the west side of US 385. No restroom services are provided at this location. The Chadron airport is also west of US 385 at this location. There is an at-grade railroad crossing with the Nebraska Northwestern rail line, approximately two miles north of US 20.

General highway characteristics include:

- Speed limits along the majority of the Heartland Expressway Corridor are 65 MPH. NE 71 is posted as 60 MPH from the Colorado/Nebraska state line to Kimball. Speed limits drop to less than 50 MPH through the following cities:
  - US 26 - Henry, Morrill, Mitchell, Scottsbluff, Minatare
  - US 385 - Alliance, Chadron
- Two-lane undivided roadways that allows passing when the driver feels it is safe to complete the passing maneuver:
  - NE 71 from the Colorado/Nebraska state line to the beginning of the four-lane divided roadway south of Kimball, passing is allowed 85 percent of the time (estimated).
  - US 26 from the Wyoming/Nebraska state line to the beginning of the four-lane divided roadway east of Morrill, passing is allowed 75 percent of the time (estimated), except when driving through Henry and Morrill.
  - L62A from US 26 to US 385, passing is allowed 75 percent of the time (estimated).
  - US 385 from L62A to the South Dakota/Nebraska state line, passing is allowed 75 percent of the time (estimated), except when adjacent to Alliance, south of Chadron, and through Chadron city limits. There are also two climbing lane locations for southbound US 385, south of Chadron, as the roadway travels through Nebraska National Forest.

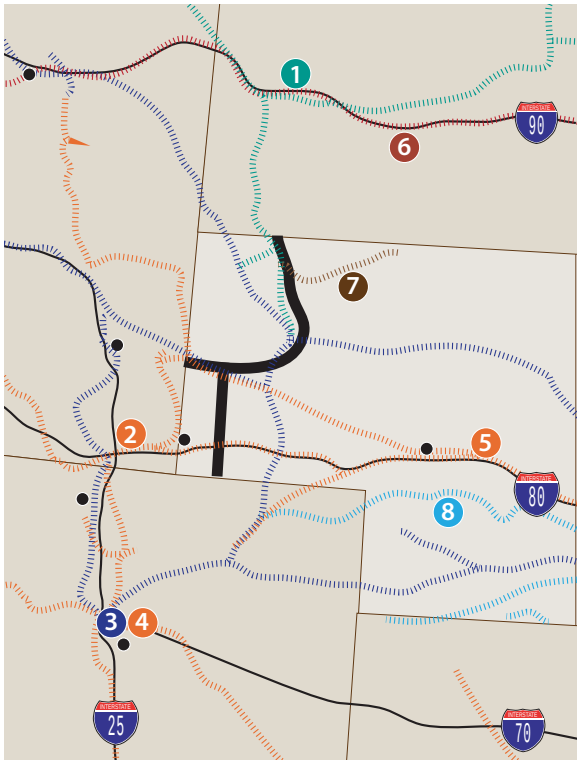
Intermodal Freight Facilities and Railroads

Intermodal freight facilities primarily involve railroad freight operations, but also include airport freight operations. Rail operations are described first. Three major intermodal freight hubs influence truck traffic in the Heartland Expressway Corridor. These hubs include:

1. Denver, Colorado
2. Omaha, Nebraska/Council Bluffs, Iowa
3. Billings, Montana

In these locations, freight trailers (containers) are off-loaded from railcars to be hauled by trucks, or are loaded onto railcars to be hauled by train. While no major facilities of a similar size exist within the Heartland Expressway Corridor, there are other intermodal rail activities and facilities near and within the corridor, specifically the grain silo facilities adjacent to rail lines. The following discussion briefly describes Union Pacific Railroad (UPRR), Burlington Northern Santa Fe Railway (BNSF) and other relevant rail activities and facilities. Figure 2.11 presents existing railroad facilities and their relationship to freight movement.

The following summaries provide additional information.



1. DAKOTA, MINNESOTA & EASTERN RAILROAD (DM&E)
- Black Hills Transload Facility
- Owned by Canada Pacific (CP)

2. UNION PACIFIC YARD: CHEYENNE

Ships
- Coal
- Soda Ash

Receives
- Coal
- Non-Metallic Minerals
- Stone, Sand and Gravel
- Fertilizer
- Revenue Empty Covered Hoppers

Rail Cars Originated in Wyoming in 2010: 1,845,145
Rail Cars Terminated in Wyoming in 2010: 15,473

3. BNSF INTERMODAL HUB: DENVER

BNSF Nationwide Ships
- Coal
- Grain
- Chemicals
- Petroleum
- Grain Mill
- Sand/Gravel

Total Intermodal and Carloads Services Nationwide: 9,143,043

Heartland Expressway Corridor
Coal Fired Power Plant
N

4. UNION PACIFIC YARD: DENVER

Ships
- Coal
- Intermodal - Wholesale
- Wheat and Food Grains

Receives
- Coal
- Intermodal - Wholesale
- Non-Metallic Minerals
- Assembled Autos
- Roofing Products

Rail Cars Originated in Colorado in 2010: 240,576
Rail Cars Terminated in Colorado in 2010: 121,511

5. UNION PACIFIC YARD: NORTH PLATTE

Ships
- Corn and Feed Grains
- Corn Refining
- Feed and Animal Protein
- Meats and Oils
- Wheat and Food Grains

Receives
- Coal
- Fertilizer
- Ferrous Scrap
- Roofing Products

Rail Cars Originated in Nebraska in 2010: 174,952
Rail Cars Terminated in Nebraska in 2010: 162,264

6. DAKOTA SOUTHERN RAILROAD (DSRR)
- Owned by state of South Dakota
- Non-operational: Rapid City to Kadoka (98.5 Miles)
- Local operating line: Kadoka to Mitchell (190 Miles)

7. NEBKOTA RAILWAY

Ships
- Grain

8. NEBRASKA, KANSAS & COLORADO RAILWAY (NKCR)

Ships
- Wheat
- Corn
- Coal
- Fertilizer

NEBRASKA CENTRAL RAILROAD COMPANY (NCRC)

Ships
- Steel
- Agricultural Product
- Grain

Figure 2.11 - Existing Railroad Facilities and their Relationship to Freight Movement

Union Pacific Railroad (UPRR)

North Platte, Nebraska Yard: Corn and feed grains, corn refining, feed and animal protein, oils, and wheat and food grains are the top commodities shipped from the North Platte Yard. Coal, fertilizer, ferrous scrap, steel, and roofing products are the top commodities received at the North Platte Yard.

Cheyenne, Wyoming Yard: Coal and soda ash are the top commodities shipped from the Union Pacific Cheyenne Yard. Coal, non-metallic minerals, stone, sand and gravel, fertilizer, and revenue empty covered hoppers are the top commodities received at the Cheyenne Yard.

Denver, Colorado Yard: Coal; intermodal wholesale and wheat and food grains are the top commodities shipped from the Denver Yard. Coal, intermodal wholesale, non-metallic minerals, assembled automobiles, and roofing products are the top commodities received at the Denver Yard.

Burlington Northern Santa Fe Railway Company (BNSF)

- BNSF Railway Company has one major intermodal hub near the Heartland Expressway Corridor in Denver, Colorado.
- The Denver (Irondale) site is on the BNSF automotive network and contains an automotive facility with an automotive ramp.
- BNSF rail transports coal and has rail lines accessing the Powder River Region which contains numerous coal fired power plants and coal mines.
- Nationwide, BNSF top commodities shipped are coal, grain, chemicals, petroleum, grain mill and sand/gravel.
- BNSF has a rail yard located in Alliance, Nebraska. The southern portion of this rail yard parallels US 385 for approximately half a mile.

Dakota, Minnesota & Eastern Railroad (DM&E)

DM&E is owned by Canada Pacific (CP) and has a "transload" facility located at Box Elder, South Dakota

Dakota Southern Railroad (DSRR)

DSRR is owned by the State of South Dakota. The rail line is non-operational from Rapid City to Kadoka, South Dakota (total of 98.5 miles). The rail line is locally operated from Kadoka to Mitchell, South Dakota (total of 190 miles).

Nebraska, Kansas & Colorado Railway (NKCR)

NKCR owns and operates approximately 559 miles of track. The top commodities shipped include wheat, corn, coal and fertilizer.

Nebkota Railway

Nebkota Railway is owned by West Plains Company. The Nebkota Railway is a short-line carrier serving stations in northwest Nebraska near Chadron. The main commodity transported is grain.

Nebraska Central Railroad Company (NCRC)

NCRC is owned and operated by Rio Grande Pacific Corporation. NCRC is a network of 340 miles of track operating solely in Nebraska. It serves industries such as steel production, agricultural products, grain marketing and ethanol production.

Nebraska Northwestern Railroad (NNW)

NNW is a short-line railroad that owns track from Chadron to Dakota Junction, which is approximately 1.3 miles west of US 385, and leases track from DM&E and Canadian Pacific from Dakota Junction to Crawford, Nebraska. NNW operates the Chadron Yard, where it also operates a roundhouse/machine shop for repair activities for railroads, utilities, and other car owners.

In addition to these rail operations, there are other important truck/rail connection points associated with grain silos. Grain silos along active rail lines are located in the following communities:

Sidney	Potter	Lodgepole	Chappel	Big Springs	Brule
Ogallala	Scottsbluff	Gering	Melbeta	Hemingford	Lyman
Morrill	Kimball	Alliance	Chadron	Bridgeport	Bayard

Airports

Airports with direct access to major road and railroad transportation tend to provide efficient air to ground intermodal service. A wide range of airports with freight operations exist in Nebraska and the surrounding states. The primary operations are associated with major urban areas such as Denver and larger cities such as Omaha. The primary airports in Nebraska are the Lincoln Airport at Lincoln, Eppley Airfield at Omaha, North Platte Regional Airport at North Platte and the Kearney Municipal Airport at Kearney. Other important airports in Nebraska are located in Chadron, Gordon, Valentine, Ainsworth, O'Neill, Norfolk, Alliance, Scottsbluff, Ogallala, Imperial, North Platte, McCook, Hastings, Grand Island, and Fremont. All of these airports and others play a role in freight operations passing through the Heartland Expressway Corridor.

According to a February 19, 2007, article in the Denver Post entitled: "Hub Awaits Word on Rail"–

"An intermodal transportation hub planned for years near Colorado's Front Range Airport may not get the key piece its developers have been hoping for - a Union Pacific rail and truck freight yard. Union Pacific and the Schuck Corp., the developer of the hub, called TransPort, signed a letter of intent in 2004 that called for Union Pacific to move its freight operation to the TransPort location near Front Range, a general aviation airport southeast of Denver International Airport. But now, Union Pacific is conducting a study to look at moving its rail yards to about 640 acres in the Fort Lupton area, a $40 million initial project (Yamanouchi)."

New facilities of this type can create a substantial shift in freight movement. At this time, no major road, rail, or air hub is proposed to be developed within the Heartland Expressway Corridor. However, UPRR provides line-haul service to and from facilities in Egbert, Wyoming with the remainder of the deliveries completed by local motor carriers. This facility, located approximately 10 miles west of the Nebraska border along I-80, could be a future intermodal hub for oil and gas transportation. This facility and other rail operations associated with the Niobrara formation and other energy resource developments could substantially influence freight operations in Nebraska.

Truck Amenities: Rest Areas, Truck Stops and Parking Facilities

The Heartland Expressway Corridor has four existing rest areas: one on NE 71 and three along US 385. Three rest areas provide parking only, while the fourth has amenities including shaded picnic tables.

There are pullouts for both northbound and southbound NE 71 three miles south of State Spur 4a at approximately mile post 36.5 which travels to the town of Harrisburg. These pullouts are ¼ of a mile long and are located adjacent to the roadway. These are truck scale pullouts used by the State Patrol. These pullouts have no amenities.

There is a rest area pullout on the west side of US 385 at approximately mile post 85.5. The pullout is approximately 500 feet long and is located about 125 feet away from southbound traffic. US 385 has turn lanes to access the rest area. There are no amenities at this pullout.

There is a rest area pullout on the south side of US 385 at approximately mile post 90.5. The rest area is at least 250 feet away from traffic on US 385 and amenities include shaded picnic tables. Additionally, commuters use this area as a park-and-ride lot. US 385 has turn lanes to access the rest area.

There is a rest area pullout on the west side of US 385 just north of Chadron and the intersection with US 20 at mile post 164. The pullout is approximately 300 feet long and is located about 70 feet away from southbound traffic on US 385. US 385 does not have turn lanes to access this pullout. There are no amenities at this pullout; however, a historical marker is present.

Truck Stops are located along the Heartland Expressway corridor at the following locations:

1. Gering, 2648 NE 71 Business. This stop is not open 24 hours a day.
2. Scottsbluff, 401 NE 71 Bypass SW. This stop is not open 24 hours a day.
3. Scottsbluff, NE 71 and S Beltline W. This stop is open 24 hours a day.
4. Alliance, NE 2 W and US 385. This stop is not open 24 hours a day.
5. Chadron, 1250 US 20 and US 385. This stop is open 24 hours a day.

Additional truck parking exists beyond the limits of the Heartland Expressway Corridor.

The primary truck parking facilities are located along I-80. These facilities are private trucking plazas located throughout the I-80 corridor. Some of the larger facilities are located at Sidney, Big Springs, Ogallala, North Platte and Grand Island. America's Independent Truckers' Association, Inc. (AITA) provides a comprehensive list of truck stops.

As the Heartland Expressway Corridor is developed, the demand for rest areas and truck parking will increase. New rest area construction, modifications and renovations should be considered. Construction costs of rest areas can vary significantly from $1.5 million for a minimal installation to $15 million for a comprehensive installation.

There is a growing need for a systematic network of safe rest areas for all traffic, and a special need for long-term truck parking facilities. The increase in allowable speed limits and traffic on the Heartland Expressway Corridor may increase the need for locations offering rest and rejuvenation for the commercial vehicle operator who must maintain a high level of awareness on the road.

Currently, Nebraska has rest stops on I-80 spaced between 30 and 60 miles apart. These rest facilities are large with picnic areas, flush toilets, truck parking, and visitor information services. It is recognized that I-80 differs from the Heartland Expressway Corridor.

The following minimum levels of service should be provided for along the corridor:

Truck parking facilities should be spaced at a minimum of 60 miles with a desired spacing of 30 miles. They should be wherever possible near locations where trucks may have to wait to pick up or drop off a load. These facilities could be State facilities or private facilities such as a truck stop.

There should be, at a minimum, flush restroom facilities provided every 60 miles along the corridor accessible to all vehicle types. These facilities should also incorporate either a picnic facility or be located near an easily accessible restaurant or fueling facility. Again these facilities can be State operated facilities or private facilities, or a public-private partnership.

2.1.4 FUTURE TRAVEL DEMAND FORECAST METHODOLOGY

Forecast Horizon Year and Analysis Scenarios

The forecast horizon year for long-range planning is typically 25 years. In 2011, the appropriate forecast year is 2035. In addition to forecast years, various scenarios are frequently developed and applied to characterize future assumptions and corresponding influences on future outcomes. The following scenarios were developed for this study:

Existing and Future Baseline Conditions

2010 Existing Traffic: This scenario serves as the baseline condition and applies existing traffic counts. The baseline condition is compared to the Year 2035 forecast scenarios to establish anticipated differences attributable to various factors. Existing traffic volumes and historical growth are depicted in detail in Appendix B.

2035 without Improvements: This scenario evaluates the Year 2035 conditions based on traffic counts and growth trends, but does not reflect traffic that may result from making transportation improvements that would draw additional vehicles into the Heartland Expressway Corridor. This scenario is often referred to as the "No Build Alternative."

Future "Build" Conditions

2035 with Heartland Improvements: This scenario highlights how improvements within the boundaries of the Heartland Expressway Corridor would influence the Year 2035 traffic volumes.

2035 with Heartland Improvements and Intensified Energy Resource Development: This scenario reflects the future importance of transportation increases associated with anticipated natural resource extraction activities involving intensified oil and gas and alternative energy development in the region, such as the Niobrara energy basin and wind energy potential.

2035 with All PTP Alliance Corridor Improvements: This scenario highlights how improvements along the entire PTP Alliance Corridor would influence the Year 2035 traffic volumes without considering impacts of the energy development. This scenario includes the Heartland Expressway Corridor improvements.

2035 with All PTP Alliance Corridor Improvements and Intensified Energy Resource Development: This is the long-term ultimate scenario reflecting all of the primary conditions that are expected to influence future traffic by the Year 2035.

Methods and Assumptions

The following discussions provide details regarding the forecast methodology, including details about the assumptions behind these scenarios.

Transportation Demand Model

A transportation demand model was built to evaluate impacts of Heartland Expressway Corridor improvements (Appendix B). This model was built to reflect the special rural roadway travel demand patterns of this part of Nebraska as well as to integrate traffic forecasts and methodologies from several different sources and states. The modeled area was bounded by:

- Interstate 90 (I-90) on the north
- I-25 on the west
- I-76 to the southeast extending down to Denver
- Nebraska Highway 61 and South Dakota Highway 73 on the east

Roadway facilities within the modeled boundary included all Interstate, US, and State Highways along with selected county roads.

Traffic Analysis Zones

Model traffic was generated using 133 Traffic Analysis Zones (TAZ). A TAZ is an area where traffic generation assumptions can be made based on development characteristics within the zone. Appendix B includes a listing of the TAZs. The model only considered the number of trips generated from TAZs to the regional highway network. Local trips on local roads within a TAZ were not used in the model.

The size of the individual TAZs varied substantially within the study area. Many major population centers such as Cheyenne and Denver were modeled as a single TAZ. Trips generated by these large TAZs only accounted for the trips either entering or leaving via the regional highway network. Internal trips, such as shopping trips or many work related trips were not specifically modeled as they were assumed to be within the zone and hence never reaching the modeled regional highway network. At the other end of the spectrum were smaller rural communities which could have a significant enough influence to change the traffic volume on the highway network passing through or near them. The result was a TAZ structure specifically designed to model rural traffic between cities and towns.

Modeling Steps

The methodology used to develop traffic forecasts followed the following steps:

- Identify existing Average Annual Daily Traffic (AADT) 2010 travel demands for both the total number of vehicles and for trucks. This was done by consulting the published traffic count maps from the four states (NDOR, Colorado Department of Transportation (CDOT), Wyoming Department of Transportation (WYDOT) and South Dakota Department of Transportation (SDDOT)).
- Trip generation totals for TAZs within Nebraska were taken from the NDOR statewide travel demand model. Trip generation totals for TAZs outside of Nebraska were initially estimated using an external trip rate derived from the NDOR model based on population. These initial estimates were refined in the next step.
- The model network was built with link speeds and distances. The shortest path between each TAZ pair was determined. An initial trip origin destination (OD) matrix was then estimated and assigned to the roadway network. Rates for trips generated outside of Nebraska were then varied to correspond or agree with the observed existing travel demands thereby calibrating the model results. Forecast travel demands were then compared to existing counts and a very good fit was found to have taken place (i.e. model results correlated appropriately with existing conditions).
- The model forecasts were then analyzed and adjusted to account for local variations in travel demand such as increases in traffic near cities and towns since the calibrated link volumes were for those between the "influence areas" of cities. These adjustments were noted and used in the development of future forecasts.
- Future travel demands were developed in consultation with the following sources:
  - Expected growth in travel demand from the NDOR Statewide travel demand model
  - SDDOT Decennial Interstate Corridor Study, March, 2011
  - Mead County (South Dakota) Transportation Plan, November 2008
  - City of Gillette, Wyoming, 2009 Transportation Plan Update
  - Laramie County (Wyoming) Wyoming Planning Department Growth factors for population and travel demand
  - CDOT 20-year growth factors
  - North Front Range Metropolitan Planning Organization (Fort Collins, Colorado) 2035 travel demand forecasts
  - Denver Regional Council of Governments (Denver, Colorado) 2035 travel demand forecasts
  - WYDOT Interstate 80 Tolling Feasibility Study, Phase 2 Final Report, November 2009

Scenario Assumptions

Travel demand growth assumptions were developed for each "Build" scenario. These assumptions addressed population growth, economic conditions, anticipated freight activity and major new industrial operations with a potential to influence basic forecasts. Table 2.1 summarizes the primary assumptions applied to the 2035 build scenarios.

Table 2.1 –Summary of Technical Assumptions Used in Travel Forecasts for the Build Alternatives

Scenario/ Assumptions	2035 With Heartland Improvements	2035 With Heartland Improvements and Intensified Energy Resource Development	2035 With All Ports to Plains Alliance Corridor Improvements	2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development
Population Growth	No Change from No Build, 15% increase from 2010	A 7% increase in the Panhandle area over No Build	A 7% increase in the Panhandle area over No Build	A 13% increase in the Panhandle area over No Build
Economic Conditions	Baseline economic conditions same as No Build	Significant additional development due to the increased energy activity.	Baseline economic conditions same as No Build	Significant additional development due to the increased energy activity.
Travel Behavior	Some shifting of travel demand to the Heartland Corridor, overall 9% increase over No Build	30% increase over No Build	63% increase over No Build	70% increase over No Build
Anticipated Freight Activity	Some shifting of Freight demand to the Heartland Corridor, overall 8% increase over No Build	52% increase over No Build	103% increase over No Build	124% increase over No Build
Major New Industrial Development (Niobrara and Other)	No Change from No Build	Energy Development	No Change from No Build	Energy Development

NDOR modeling results were not used in these assumptions because economic conditions outside of Nebraska were not accounted for in the NDOR model.

As described previously, the "No Build" scenario or "2035 without Improvements" scenario evaluates the projected Year 2035 conditions based on traffic counts and growth trends, but does not reflect traffic that may result from making transportation improvements that would draw additional vehicles into the Heartland Expressway Corridor.

Future travel demands from the above mentioned sources were placed on the model roadway network. Future OD patterns were then estimated using the existing OD travel demand as a seed matrix (Appendix B contains existing OD travel demand). It became evident that the four to five percent total growth in travel demand assumed in the NDOR travel demand model between existing conditions and the Year 2035 was out of step with the much higher rate of growth expected in the surrounding states.

Based on this differential, the rate of growth in Nebraska was increased to accommodate the expected growth rates in the surrounding states (Appendix B). The resulting increase in overall traffic for all vehicles was 19 percent versus the five percent assumed in the NDOR model. The increase in truck demand needed to balance the surrounding demand rates was eight percent.

There is some historic evidence to support a greater level of travel demand through the panhandle of Nebraska generated by surrounding states. The one corridor within the panhandle that has seen growth in travel demand over the last ten years is the US 26 corridor between the Powder River, Wyoming energy production area and I-80.

US 26 also serves as a shortcut around Cheyenne, Wyoming between I-80 and I-25. Given this pattern, it is likely that much of this growth in travel demand is due to trips with origins and destinations outside the panhandle area.

The final set of growth rates that were applied are presented in Table 2.2.

Table 2.2 – Assumed Baseline Growth in Travel Demand Under No-Build Conditions

State	2010 to 2035 Baseline Growth in Travel Demand	
	All Vehicles	Trucks
Nebraska	19%	8%
Wyoming	60%	48%
South Dakota	82%	67%
Colorado	118%	97%
Average	88%	56%

The following discussions elaborate on travel behavior, freight and energy development assumptions.

Travel Behavior Changes Related to Improvements

Travel behavior is the outcome of travel conditions faced by a driver, and in this case, route choices available to a motorist. Key factors associated with travel behavior include clear or perceived travel time savings, safety benefits, travel simplicity (fewer turns and route changes reduce complexities) and roadside attractions, features and services. New road alignments and access benefits that enhance a road system's reach have the most significant influences on driver behavior.

The PTP Alliance Corridor is not a new route, but the overall set of anticipated improvements has the effect of creating a new major route option for many motorists. However, perhaps more importantly, a comprehensive package of improvements that upgrades everything from travel speeds and safety to drive amenities and directional signage is expected to draw existing and future travel demand into this corridor to varying degrees from Canada to Mexico. The modeling effort for the "Build" scenarios reflects this effect.

In September 2008, the Texas Department of Transportation (TxDOT) produced the Great Plains International Trade Corridor Assessment document and the travel forecast section referred to the FAF3 data. This study concluded that the data was not disaggregated enough to conduct travel demand forecasts. However, the data can be used to estimate the added demand by fully improving the corridor as well as for expected increases in international trade due to the North American Free Trade Act (NAFTA) and other trade conditions and agreements.

In summary, just north of Limon, Colorado, Highway 71 carries approximately 870 vehicles per day, with 190 of those being trucks. The PTP Corridor Development and Management Plan prepared by CDOT in December 2004 for the States of Colorado, New Mexico, Texas, and Oklahoma estimated that traffic on Colorado Highway 71 north of Limon would grow as a result of the PTP improvements as well as ambient growth by approximately 210 percent. Truck travel is expected to increase from 190 vehicles per day (VPD) to 430 VPD by 2035 with corridor improvements.

According to the Montana Department of Transportation and the North Dakota Department of Transportation records, at the Canadian border there are approximately 2,640 vehicles crossing the border each day between US 191 in Montana and US 256 North of Minot, North Dakota. Of these crossings, approximately 720 are trucks. These boundaries for the crossings were selected as being those that could reasonably be expected to feed the improved PTP Alliance Corridor. The total volume of border crossings between I-15 and I-29 is approximately 11,520 with 3,200 being trucks.

To estimate the total number of crossings for the PTP Alliance Corridor, it was assumed that 70 percent of the crossings occurring between US 191 in Montana and US 256 would occur on the PTP Alliance Corridor. Additionally, an estimated one third of the remaining crossings between I-15 and I-29 would be diverted to the PTP Alliance Corridor. This results in a base border crossing at the PTP Alliance Corridor of 3,000 daily trips, with 820 being trucks, or approximately ¼ of the total crossings between I-15 and I-29. These results are summarized in Table 2.3.

Table 2.3– Additional PTP Alliance Corridor Travel Demand (2035)

	Vehicles (Vehs.) Per Day			
	To/From Canada		To/From Ports to Plains	
	All Vehs.	Trucks	All Vehs.	Trucks
With Attraction Due to PTP Improvements (2010)	4,730	1,300	1,290	300
With Expected Trade Corridor Growth	7,570	2,860	2,660	430

As the corridor proceeds northward, the Ports to Plains component decreases and the Canadian component increases as the corridor gets closer to the Canadian border, and the reverse occurs in the southbound direction. The changes in travel demand are attributable to cars entering or leaving the corridor at intersecting facilities. As expected, interstate highway crossings have a large influence on vehicles accessing the corridor. The two right-most columns depict total segmental trade component due to the combined impact of Ports to Plains and Canadian Border crossings. These results are summarized in Table 2.4.

Table 2.4– Additional Ports to Plains Alliance Corridor Travel Demand by Heartland Expressway Corridor Location (2035)

	Vehicles (Vehs.) Per Day					
	To/From Canada		To/From Ports to Plains		Totals	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
Between Canada and US 2	7,570	3,390	40	5	7,610	3,395
Between US 2 and ND 23	7,080	3,160	40	10	7,120	3,170
Between ND 23 and I-94	6,930	3,090	40	10	6,970	3,100
Between I-94 and US 12	2,630	1,080	70	20	2,700	1,100
Between US 12 and SD 20	2,480	950	140	30	2,620	980
Between SD 20 and I-90	2,450	920	150	30	2,600	950
Between I-90 and US 18	1,650	210	510	60	2,160	270
Between US 18 and US 20	1,420	190	680	90	2,100	280
Between US 20 and NE 2	1,260	170	790	110	2,050	280
Between NE 2 and US 26	1,210	170	820	120	2,030	290
Between US 26 and I-80	740	120	1,160	190	1,900	310
Between I-80 and CO 14	80	50	1,640	280	1,720	330
Between CO 14 and I-76	70	50	1,770	300	1,840	350
South of I-76	30	30	2,660	430	2,690	460

Future Travel Demand Model Results

As shown in Table 2.5, AADT increases based on general traffic growth and anticipated community population changes ranging from low to high. With the addition of Heartland Expressway Corridor improvements, additional increases are evident. These increases are based on the value of the improvements for travelers in terms of travel time savings and increased safety on the new facilities. Larger increases are noticeable in the southern portion of the corridor when anticipated energy development activity is added to the forecasts. The largest increases are attributed to completion of the overall PTP Alliance Corridor improvements. Clearly, the formation of this new corridor from Canada to Mexico has substantial influences on travel route choices and reflects the importance of travel to and through Nebraska from distant origins and destinations.

Table 2.5 –2010 Existing Traffic and 2035 Traffic Forecasts for Various Scenarios (AADT)

Location	2010 Existing Traffic		Future No Build 2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy Resource Development		2035 With All Ports to Plains Alliance Corridor Improvements		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
NE 71												
At Colorado Border	820	135	860	140	1,020	220	1,480	350	2,180	820	2,640	950
South of Kimball	1,610	355	1,690	370	1,850	450	2,310	580	2,850	970	3,310	1,100
North of Kimball	2,055	315	2,160	330	2,460	410	3,080	500	3,770	1,110	4,390	1,200
South of Gering	3,805	215	4,000	230	4,360	310	4,430	330	6,980	1,200	7,050	1,220
North of Scottsbluff	1,860	185	2,900	330	3,010	330	3,160	330	3,160	350	3,310	350
North of NE 2	750	105	1,950	190	1,780	100	1,830	100	1,870	110	1,920	110
L7E												
West of US 385	2,470	435	2,590	540	2,650	550	3,170	590	4,010	730	4,530	770
NE2												
West of Hemingford	1,035	110	2,590	460	2,870	550	2,970	550	3,010	580	3,110	580
South of Hemingford	1,220	135	2,000	160	2,000	160	2,020	160	2,000	160	2,020	160
South of US 385	3,010	305	3,160	320	3,220	320	3,380	330	4,640	510	4,800	520
East of Alliance	1,260	245	1,320	300	1,320	300	1,350	300	1,320	300	1,350	300
I-80												
At Wyoming Border	7,475	4,350	7,800	4,570	7,750	4,570	8,150	4,750	7,920	4,660	8,320	4,840
East of Kimball	7,285	4,455	8,700	4,620	8,650	4,620	9,200	4,780	8,820	4,710	9,370	4,870
West of Sidney	7,215	4,420	9,600	4,700	9,650	4,700	10,010	4,740	9,750	4,750	10,110	4,790
West of I-76	7,395	4,515	9,600	4,740	9,660	4,740	9,870	4,770	9,710	4,760	9,920	4,790
East of Ogallala	14,865	6,830	20,400	9,060	20,400	9,060	21,080	9,190	20,400	9,060	21,080	9,190

Table 2.5 (continued) –2010 Existing Traffic and 2035 Traffic Forecasts for Various Scenarios (AADT)

Location	2010 Existing Traffic		Future No Build 2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy Resource Development		2035 With All Ports to Plains Alliance Corridor Improvements		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
I-76												
At Colorado Border	6,500	2,100	18,400	4,170	18,390	4,170	18,950	4,240	18,390	4,170	18,950	4,240
US 26												
East of Henry	4,320	390	9,340	480	9,500	520	10,970	550	9,690	530	11,160	560
West of NE 71	7,615	445	13,040	540	13,200	580	14,670	610	13,390	590	14,860	620
East of Scottsbluff	4,890	350	9,140	630	9,160	630	9,830	700	9,160	630	9,830	700
East of Melbeta	2,510	285	6,030	490	6,050	490	6,720	560	6,050	490	6,720	560
West of Bridgport	3,175	440	6,570	510	6,550	510	7,260	590	6,550	510	7,260	590
West of Lisco	1,315	285	5,450	780	5,410	780	5,850	830	5,460	780	5,900	830
East of Oshkosh	1,920	330	6,170	700	6,120	700	6,490	740	6,170	700	6,540	740
NE 92												
At Wyoming Border	540	70	1,170	90	1,190	100	1,370	100	1,210	100	1,400	110
West of Scottsbluff	1,415	130	2,420	160	2,450	170	2,720	180	2,480	170	2,760	180
US 385												
North of Sidney	2,795	405	4,070	470	4,070	470	4,100	470	4,070	470	4,100	470
South of NE 92	2,095	380	2,510	470	2,510	470	2,630	480	2,510	470	2,630	480
South of Angora	3,230	580	4,690	610	4,690	610	4,740	610	4,740	610	4,790	610
South of Alliance	3,485	385	3,660	400	3,720	400	4,150	440	5,140	590	5,570	630
North of NE 2	1,960	305	2,060	320	2,270	410	2,400	420	3,700	620	3,830	630
South of Chadron	3,370	230	3,540	240	3,750	330	3,880	340	5,180	540	5,310	550
At South Dakota Border	1,790	235	2,610	340	2,660	340	2,710	340	4,130	520	4,180	520
US 20												
At Wyoming Border	550	125	580	180	460	180	460	180	470	190	470	190
East of Crawford	1,595	205	2,590	370	2,300	280	2,310	280	2,300	280	2,310	280
West of Chadron	3,515	290	3,690	300	3,930	390	3,990	390	4,130	570	4,190	570
East of Hay Springs	2,560	215	4,120	300	4,120	300	4,150	300	4,320	480	4,350	480

Table 2.6 provides a summary percent change in traffic growth along several Nebraska Highway segments in Nebraska. The percent increase in travel demand is from Year 2010 to Year 2035 Ultimate PTP Corridor condition. Some traffic volumes are anticipated to double or triple between Year 2010 and 2035. Tables 2.5 and 2.6 summarize how the traffic growth along the Heartland Expressway and the adjacent highways will see an increase in overall vehicle traffic and truck traffic with the completion of the overall Ports to Plains Corridor.

A couple of the largest traffic increases occur on US 26 and NE 71 corridors. US 26 provides a shorter route between I-80 and I-25 resulting in the increase in traffic, and NE 71 is expected to have an increase in traffic south of Scottsbluff to the Nebraska/Colorado border. Tables 2.6 and 2.7 also provide a summary of the expected increase in truck traffic.

Table 2.6 –Travel Forecasts Reflecting Percent Change from 2010 to 2035

	2010		Ultimate 2035 With All PTP Alliance Corridor Improvements and Intensified Energy Resource Development		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
Segment	Veh.	Trucks	Veh.	Trucks	Veh.	Trucks
NE 71						
At Colorado Border	820	135	2,640	950	222%	604%
South of Kimball	1,610	355	3,310	1,100	106%	210%
North of Kimball	2,055	315	4,390	1,200	114%	281%
South of Gering	3,805	215	7,050	1,220	85%	467%
North of Scottsbluff	1,860	185	3,310	350	78%	89%
North of NE 2	750	105	1,920	110	156%	5%
L7E						
West of US 385	2,470	435	4,530	770	83%	77%
NE 2						
West of Hemingford	1,035	110	3,110	580	200%	427%
South of Hemingford	1,220	135	2,020	160	66%	19%
South of US 385	3,010	305	4,800	520	59%	70%
East of Alliance	1,260	245	1,350	300	7%	22%
I-80						
At Wyoming Border	7,475	4,350	8,320	4,840	11%	11%
East of Kimball	7,285	4,455	9,370	4,870	29%	9%
West of Sidney	7,215	4,420	10,110	4,790	40%	8%
West of I-76	7,395	4,515	9,920	4,790	34%	6%
East of Ogallala	14,865	6,830	21,080	9,190	42%	35%
I-76						
At Colorado Border	6,500	2,100	18,950	4240	192%	102%

Segment	2010		Ultimate 2035 With All PTP Alliance Corridor Improvements and Intensified Energy Resource Development		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
	Veh.	Trucks	Veh.	Trucks	Veh.	Trucks
US 26						
East of Henry	4,320	390	11,160	560	158%	44%
West of NE 71	7,615	445	14,860	620	95%	39%
East of Scottsbluff	4,890	350	9,830	700	101%	100%
East of Melbeta	2,510	285	6,720	560	168%	96%
West of Bridgeport	3,175	440	7,260	590	129%	34%
West of Lisco	1,315	285	5,900	830	349%	191%
East of Oshkosh	1,920	330	6,540	740	241%	124%
NE 92						
At Wyoming Border	540	70	1,400	110	159%	57%
West of Scottsbluff	1,415	130	2,760	180	95%	38%
US 385						
North of Sidney	2,795	405	4,100	470	47%	16%
South of NE 92	2,095	380	2,630	480	26%	26%
South of Angora	3,230	580	4,790	610	48%	5%
South of Alliance	3,485	385	5,570	630	60%	64%
North of NE 2	1,960	305	3,830	630	95%	107%
South of Chadron	3,370	230	5,310	550	58%	139%
At South Dakota Border	1,790	235	4,180	520	134%	121%
US 20						
Wyoming Border	550	125	470	190	-15%	52%
East of Crawford	1,595	205	2,310	280	45%	37%
West of Chadron	3,515	290	4,190	570	19%	97%
East of Hay Springs	2,560	215	4,350	480	70%	123%

Table 2.7 – Daily Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT) for the Modeled Area (in thousands)

Location	2010 Existing Traffic		2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy Resource Development		2035 With All Ports to Plains Alliance Corridor Improvements		2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
VMT												
Nebraska	3,299	1,025	3,937	1,103	3,959	1,107	4,248	1,137	4,219	1,188	4,507	1,218
Wyoming	2,689	594	4,292	880	4,274	878	4,430	905	4,066	855	4,222	882
South Dakota	1,427	166	2,601	277	2,603	277	2,610	278	2,703	283	2,710	283
Colorado	10,216	1,245	22,283	2,454	22,280	2,452	23,586	2,589	22,458	2,451	23,764	2,588
Total	17,631	3,030	33,113	4,714	33,116	4,714	34,874	4,909	33,446	4,777	35,203	4,971
VHT												
Nebraska	52.1	17	66	21.7	62.1	18.1	67.7	18.9	66.8	19.5	72.4	20.5
Wyoming	41.9	9.8	70.1	17.1	66.1	14.3	69.7	15.0	63.6	14.0	67.0	14.7
South Dakota	25.9	3.3	47.5	5.6	47.5	5.5	48.0	5.6	49.6	5.7	50.3	5.8
Colorado	164.7	21.4	365.6	42.7	365.8	42.7	389.7	45.7	368.8	42.6	393.1	46.0
Total	284.6	51.5	549.3	87.1	541.5	80.6	575.1	85.2	548.8	81.8	582.8	87.0

The data in Table 2.8 indicates that without improvements to the Heartland Expressway Corridor, the corridor's overall share of the total travel demand will be significantly reduced. Improvements to the Heartland Expressway Corridor will help reverse some of the declines, but not all. It is only with the full corridor improvements that the total share of vehicles is roughly equal to the existing share. However, a much greater share of the truck traffic will be on the corridor with implementation of the full improvements to the PTP Alliance Corridor. This finding validates that as the corridor is improved the attraction for the trucking activity will increase.

Table 2.8 reflects changes in travel behavior found during the modeling process. On the table are "cordons." Cordons are imaginary lines drawn east-west across all north/south modeled facilities. The total AADT crossing the cordon is depicted on the table along with the percentage of the total that is on the Heartland Expressway Corridor.

Table 2.8 – Changes in Travel Behavior Found during the Modeling Process

Cordon		2010 Existing Traffic		2035 without Improvements		2035 With Heartland Improvements		2035 With Complete PTP Improvements	
		All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
South of I-90	AADT	27,330	2,990	44,780	5,070	44,790	5,080	45,530	5,170
	Heartland %	23.1%	31.5%	20.5%	26.8%	20.5%	26.8%	23.5%	29.8%
South of US 20	AADT	12,300	2,225	16,540	2,540	16,380	2,530	16,470	2,570
	Heartland %	15.9%	13.7%	12.5%	12.6%	13.9%	16.2%	22.5%	24.1%
South of US 26	AADT	15,695	2,822	25,090	3,620	25,100	3,670	26,420	4,370
	Heartland %	25.2%	8.0%	15.9%	6.4%	17.4%	8.4%	26.4%	27.5%
South of I-80	AADT	33,390	6,425	74,000	14,110	74,000	14,160	74,000	14,560
	Heartland %	2.5%	2.1%	1.2%	1.0%	1.4%	1.6%	2.9%	5.6%

2.1.5 SAFETY ANALYSIS

NDOR provided crash data for a four-year time period from July 1, 2007, to June 30, 2010. The crashes were separated into four categories by severity: Property Damage Only (PDO - reportable crashes with at least $1,000 damage); Non-reportable PDO (less than $1,000 damage); Injury; and Fatality. NDOR calculated the crash rates for roadway sections and intersections. The crash rates for the project area were compared to the statewide averages to identify any locations with a crash rate at least 150 percent of the average (these have been highlighted in red for emphasis). This analysis did not consider the specific location or the causes of individual crashes.

Table 2.9 displays the statewide average crash rates for roadway sections by facility type. The roadway section crash rates are expressed as "crashes per hundred million vehicle-miles" (HMVM).

Table 2.9 – Nebraska Average Crash Rates for Roadway Sections (Crashes/HMVM)

Roadway Type	Urban Crash Rate	Rural Crash Rate
6-lane Interstate	30.10	28.90
4-lane Interstate	24.70	32.90
Freeway	25.80	23.30
Expressway	150.20	62.40
Other 4-lane	301.10	90.80
2-lane with shoulder	102.00	74.60
2-lane without shoulder	185.90	98.20
2-lane combined	153.70	83.90

Table 2.10 and Table 2.11 display the intersection crash rates for complex intersections and simple intersections, respectively. The intersection crash rates are expressed as "crashes per million entering vehicles" (MEV).

The NDOR definitions for the terms in the statewide average tables are as follows:

- "with shoulder" are highway sections that have at least a six-foot paved shoulder
- "without shoulder" are highway sections that have less than a six-foot paved shoulder
- "combined" is all two-lane highways included into one rate

Table 2.10 – Nebraska Average Crash Rates for Complex Intersections (Crashes/MEV)

Roadway Type	Urban Crash Rate	Rural Crash Rate
6-lane Interstate	1.244	0.890
4-lane Interstate	1.050	0.458
Freeway	0.708	1.633
Expressway	0.810	0.624
Other 4-lane	0.903	0.943
2-lane with shoulder	0.337	0.721
2-lane without shoulder	0.394	0.492
2-lane combined	0.372	0.687

Table 2.11 – Nebraska Average Crash Rates for Simple Intersections (Crashes/MEV)

Roadway Type	Urban Crash Rate	Rural Crash Rate
Expressway	0.934	0.367
Other 4-lane	0.666	0.404
2-lane with shoulder	0.414	0.321
2-lane without shoulder	0.388	0.311
2-lane combined	0.395	0.318

The crash rates along the segments were broken out by two-lane and four-lane segments.

Table 2.12 and Table 2.13 display the crash rates for the two-lane and four-lane sections, respectively. Two of the two-lane sections, US 26 within Henry, NE, and US 385 within Alliance, NE, have crash rates more than 150% of the statewide average, and are highlighted in Table 2.12. Both of these sections are urban, two-lane sections with shoulder. One four-lane section has a crash rate greater than 150 percent of the statewide average, depicted in Table 2.13, US 26 between the junctions with NE 71, on the northeastern side of Scottsbluff, NE. This section is an urban, four-lane expressway.

In addition to the roadway section crash rates, NDOR provided crash rates at intersections along the study corridor, excluding intersections with local roads. The intersection crash rates, expressed as "crashes per million entering vehicles" (MEV), are displayed in Table 2.14.

Five intersections have crash rates greater than 150 percent of the statewide average:

1. West Junction of US 26 and NE 92 south of Bayard, NE
2. Junction of US 26 and L79E west of Minatare, NE
3. West Junction of US 20, US 385, and L23D west of Chadron, NE
4. Junction of US 30 and NE 71 in Kimball, NE
5. East Junction of US 20 and US 385 in Chadron, NE

Table 2.12 – Existing Two-Lane Roadway Section Crash Rates (Crashes/HMVM)

Roadway	From	To	Length (mi)	Existing AADT	Type	Crash Rate	Avg Rate	%Avg
NE 71	CO State Line	I-80 EB Ramps	15	1,300	Rural	63.6	98.20	65%
NE 71	I-80 WB Ramps	Kimball S Corp Lim	1	2,780	Rural	114.4	98.20	116%
NE 71	Kimball S Corp Lim	Kimball N Corp Lim	1	2,400	Urban	216.6	185.90	117%
NE 71	Kimball N Corp Lim	Begin Divided Hwy	2	1,910	Rural	120.0	98.20	122%
US 26	WY State Line	Henry	7	3,770	Rural	85.0	74.60	114%
US 26	**Henry NW Corp Lim**	**Henry SE Corp Lim**	**1**	**5,220**	**Urban**	**197.4**	**102.00**	**194%**
US 26	Morrill W Corp Lim	Morrill E Corp Lim	1	8,870	Urban	58.8	153.70	38%
US 26	Morrill E Corp Lim	Begin Divided Hwy	1	7,100	Rural	46.5	74.60	62%
US 26	End Divided Hwy	Junction (Jct) L62A	9	3,060	Rural	67.2	83.90	80%
L62A	Jct US 26	Jct US 385	9	2,060	Rural	73.2	74.60	98%
US 385	Jct L62A	Alliance S Corp Lim	24	3,170	Rural	48.3	74.60	65%
US 385	**Alliance S Corp Lim**	**Alliance N Corp Lim**	**1**	**3,610**	**Urban**	**180.0**	**102.00**	**176%**
US 20	W Jct US 385	Chadron W Corp Lim	2	3,690	Rural	58.6	74.60	79%
US 20	Chadron W Corp Lim	E Jct US 385	0.3	3,690	Urban	64.6	102.00	63%
US 385	W Jct US 20	SD State Line	16	1,800	Rural	62.1	74.60	83%

Table 2.13 – Existing Four-Lane Roadway Section Crash Rates (Crashes/HMVM)

Roadway	From	To	Length (mi)	Existing AADT	Type	Crash Rate	Avg Rate	%Avg
NE 71	Begin Divided Hwy	Ramp from NE 92	39	1,770	Rural	81.9	62.40	131%
NE 71	NE 92	US 26	2	2,430	Rural	49.7	62.40	80%
US 26	Begin Divided Hwy	Mitchell W Corp Lim	4	7,100	Rural	33.7	62.40	54%
US 26	Mitchell W Corp Lim	Mitchell E Corp Lim	1	9,580	Urban	159.7	150.20	106%
US 26	Mitchell E Corp Lim	W Jct NE 92	7	9,580	Urban	50.9	150.20	34%
US 26	W Jct NE 92	W Jct NE 71	0.6	7,150	Urban	20.3	150.20	14%
US 26	W Jct NE 71	E Jct NE 71	3	9,780	Urban	251.2	150.20	167%
US 26	E Jct NE 71	End Divided Hwy	7	5,080	Rural	88.9	62.40	142%

Table 2.14 – Existing Intersection Crash Rates (Crashes/MEV)

Intersection	Type	Crash Rate	Avg Rate	%Avg
Interchange I-80 & NE 71	Rural	0.577	0.458	126%
Jct US 30 & NE 71	Urban	0.806	0.414	195%
Jct NE 71 & S-4a	Rural	0	-	-
S Jct NE 71 & NE 88	Rural	0	-	-
N Jct NE 71 & NE 88	Rural	0	-	-
S Jct NE 71 & NE 92	Rural	0.621	0.624	100%
Jct US 26 & NE 29	Urban	0.625	0.934	67%
W Jct US 26 & NE 92	Rural	1.043	0.367	284%
W Jct US 26 & NE 71	Urban	0.676	0.934	72%
E Jct US 26 & NE 71	Rural	0.344	0.367	94%
Jct US 26 & L79E	Rural	0.962	0.367	262%
Jct US 26 & L62a	Rural	0.271	0.721	38%
Jct L62A & US 385	Rural	0.836	0.721	116%
E Jct US 20 & US 385	Urban	0.795	0.414	192%
W Jct US 20, US 385, L23D	Rural	1.421	0.687	207%

As previously stated, this crash analysis did not consider the specific location and causes of individual crashes; rather, the purpose of this analysis was the identification of roadway sections and intersections that have crash rates greater than 150 percent of the statewide average, highlighted in Table 2.14. The crashes on the identified sections and intersections should be examined in detail on a project level.

Figure 2.12 – NE 71, Two-Lane Highway South of Kimball

Figure 2.13 – NE 71, Four-Lane Highway Kimball to Scottsbluff

Figure 2.14 – US 26, Two-Lane Highway Through Henry, NE

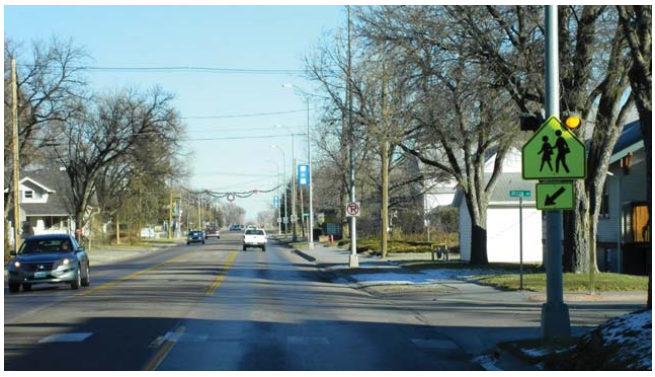


Figure 2.15 – US 26, Two-Lane Highway with Center Two-Way Left Lane Through Morrill, NE

2.1.6 CORRIDOR RECOMMENDATIONS AND IMPROVEMENT PRIORITIES

The many sub-corridors that constitute the Heartland Expressway Corridor are considered a single system for analysis purposes.

Recommended Corridor Vision

The Heartland Expressway Steering Committee further refined the concept of the corridor agreeing on the following definitions. The ultimate vision is a four lane expressway with interim improvements defined below.

- Four-lane divided highway, except in sections where more than four-lanes exist or are planned, with a stepped development process to achieve the ultimate four-lane corridor
- Super-2 facility including two 12-foot lanes and ten-foot shoulders with passing lanes
- Individual state rules and guidelines will be followed for specific design details, such as highway width and access management
- Inclusion of planned relief routes
- Consideration of other major safety bottleneck improvements

2.2 GAP ANALYSIS

The Gap Analysis portion of the study is to identify and discuss enhancements to the corridor that help fill the gaps of the Heartland Expressway Corridor transportation network, and ultimately the overall PTP Alliance Corridor. Providing enhancements along the Heartland Expressway Corridor may help to attract more private and commercial vehicles. These enhancements could include relief routes, roadway geometric improvements, intermodal facilities, connecting routes and truck amenities.

Figure 2.16 – US 26, Four-Lane Divided Highway Entering Mitchell, NE

Figure 2.17 – US 26, Four-Lane Highway Through Mitchell, NE

Figure 2.18 – US 385, Two-Lane Highway with Multiple Turning Lanes

Figure 2.19 – US 385, Two-Lane Highway at the US 385/NE 2 Junction

Figure 2.20 – US 385, Three-Lane Highway Through the Nebraska National Forest, Approximately Ten Miles South of Chadron at Mile Marker 157.

Figure 2.21 – US 385 Through the Nebraska National Forest, Three-Lane Highway with Climbing Lane for the Southbound (Uphill) Direction.

Figure 2.22 – US 26, Intersection of Jct US 26 and NE L79E

Figure 2.23 – US 385, Intersection at E Jct US 20 and US 385 at Chadron (facing north)

Figure 2.24 – L23D, Intersection of W Jct US 20, US 385, L23D (Facing South/Southeast) Approximately Two Miles West of Chadron.

2.2.1 RELIEF ROUTES

NDOR has no planned relief routes for the proposed Heartland Expressway Corridor within the borders of Nebraska. Relief routes perform a needed function for communities as well as for through traffic. Relief routes are considered to help improve the efficiency and safety of the corridor. Review of potential relief routes locations include:

- US 385 at Chadron - The existing US 385 route intersects with US 20 in Chadron, NE. From Alliance, US 385 would intersect US 20 on the western edge of town then would continue west approximately 2.5 miles to the western intersection of US 385 and US 20. As part of an improved corridor, the evaluation of a revised route to align the southern portion of US 385 to the north leg of US 385 may be considered in the future. As part of this study, no detailed route locations will be evaluated
- US 26 west of Scottsbluff - NDOR has no current plan to evaluate relief routes near Mitchell or Morrill, NE.

2.2.2 GEOMETRIC SAFETY IMPROVEMENTS

The overall corridor of the Heartland Expressway within the State of Nebraska was evaluated to identify geometric improvements that should be studied further in order to improve the safety and efficiency of the corridor. The geometric factors along the corridor that were evaluated include shoulder widths, intersection geometrics and horizontal curves.

Shoulder Width

The entire corridor of the Heartland Expressway has a paved shoulder. Majority of paved shoulders are eight feet wide. Consideration should be given to widen the shoulders to eight to ten feet to facilitate the future growth of the traffic along the corridor. Figures 2.12 through 2.24 shown on the previous page represent the different roadway types throughout the Heartland Expressway Corridor.

Intersection Geometrics

The majority of the intersections along the Heartland Expressway corridor are unsignalized intersections. The following intersections were identified as experiencing crash rates that are over 150 percent over the state wide average. Further analysis of these intersections will need to be considered to determine the crash patterns at the study intersections.

- Intersection of US 30 and NE 71
- Intersection of W Junction (Jct) US 26 and NE 92
- Intersection of Jct US 26 and NE L79E
- Intersection of E Jct US 20 and US 385
- Intersection of W Jct US 20, US 385, L23D

Horizontal Curve

The horizontal curves along the corridor will be evaluated in more detail upon the evaluation and design of the existing two-lane highway to the four-lane highway. Based on our windshield survey, the horizontal curves appear to meet the current design speed criteria. No speed advisory curves were observed during our field survey, but the horizontal curves should be evaluated during future design studies.

2.2.3 CONNECTING ROUTES

The Heartland Expressway Corridor is the middle section of the overall PTP Alliance Corridor. The Heartland Expressway Corridor will connect to the PTP Alliance Corridor to the south, and the PTP Alliance Corridor will then connect to Texas and the ports in Mexico and the Gulf of Mexico. The Theodore Roosevelt Corridor to the north of the Heartland Expressway Corridor connects the ports in Canada to the Great Plains area. The Theodore Roosevelt Corridor runs north/south through North Dakota and South Dakota.

The Heartland Expressway Corridor is a north/south corridor that will run parallel to I-25 and I-29. I-25 and I-29 are separated by about 500 miles and there are no other north/south four-lane corridors between them. The Heartland Expressway Corridor will intersect I-70 and I-76 in Colorado, I-80 in Nebraska, and I-90 in South Dakota.

In addition to connecting the interstate highways, the Heartland Expressway Corridor will intersect with U.S. Highway 30 in Kimball, NE; US 26 connects Scottsbluff to Ogallala, NE, Torrington, WY, and I-25; US 20 in Chadron, NE; and NE 2 at Alliance, NE. Each of these highways provide important connections to rural communities in Nebraska.

2.3 COST, PRIORITIZATION, AND IMPLEMENTATION SCHEDULE

As part of the Corridor Development and Management Plan, the study evaluated the entire Heartland Expressway Corridor located within the State of Nebraska. An unconstrained twenty year improvement program was developed to be used as part of the economic analysis. The overall vision of the corridor is to develop a high-speed highway that will promote and enhance domestic and international trade as it connects metropolitan areas of Denver, Colorado Springs, Cheyenne, and Rapid City to the PTP Alliance Corridor. The Heartland Expressway also provides an essential economic development tool for rural areas in Colorado, Nebraska, South Dakota, and Wyoming.

2.3.1 COST ESTIMATES

The study team, working with NDOR, developed a list of potential improvement projects to improve the safety, increase capacity of the corridor and to ultimately meet the overall goal of a four lane divided roadway. The improvements considered included intersection improvements, roadway widening for a Super-2 facility, widening for a four-lane roadway, safety improvements, and ITS improvements. The following projects were considered:

NE 71:

1. Widen NE 71 to a Super-2 facility from Colorado/ Nebraska border to I-80
2. Intersection Improvement at Clean Harbors (South of Kimball)
3. Extend NE 71 Bypass to NE 71 south of Kimball
4. I-80 Interchange Improvements
5. Truck Parking/Visitor Center I-80 & NE 71 interchange.
6. Widen NE 71 to four lanes from Colorado/Nebraska border to I-80

US 26:

1. Pedestrian Overpass Scottsbluff at 5th Avenue[3]
2. L79E and US 26 Intersection Improvement
3. Widen US 26 to four lanes from Wyoming/Nebraska border to Morrill
4. Safety and Traffic Operation Improvements/Relief Route in Morrill
5. Safety and Traffic Operation Improvements in Mitchell
6. Widen US 26 to four lanes from Minatare to L62A/US 26 intersection
7. Safety and Traffic Operation Improvements in Minatare
8. US 26 and NE 71 Interchange
9. US 26 Relief Route Mitchell

L62A:

1. Widen L62A to four lanes from L62A/US 26 intersection to US 385

US 385:

1. Widen US 385 to four lanes from L62A intersection to Alliance
2. Construct Passing Lanes (Super-2) on US 385 from Alliance to Chadron
3. US 385 and US 20 Intersection Improvement
4. Widen US 385 to four lanes from Chadron to South Dakota/Nebraska state border
5. Widen US 385 to four lanes from Alliance to L7E (Hemmingford)
6. US 385 bridge widening over NE 2
7. US 385 to four lanes from L7E to Chadron
8. Relief Route for Chadron
9. Truck Parking/Visitor Center for Chadron

[3]A public open house meeting was held on June 25, 2013 for the "Scottsbluff Valley Pathway North Project," which was in the preliminary design phase at this time.

Planning level costs, in 2012 dollars[4], were developed based on recent information from NDOR improvement projects in the area. The following costs were general costs used in the estimation process. Independent costs were completed for some individual projects that do not meet the following criteria. A summary of the cost estimates are included in Appendix D.

The Super-2 section includes two 12-foot lanes and ten-foot shoulders and construction of a 12-foot passing lane. The passing lanes were estimated to be one mile in length with appropriate taper lengths.

"Four-lane" improvements include construction of two new lanes with ten-foot shoulders and the existing two lanes would remain in place.

- Construction of two new lanes of a four-lane roadway. Assumption that the existing two lanes would remain in place - $3,000,000/mile
- Construction of four lanes of relief route. Assumption that four new lanes are constructed. - $5,000,000/mile
- Construction of "Super-2" improvements - $1,000,000/mile

(2012 Dollars)

Costs for the project development, engineering, construction engineering, utilities, and right-of-ways were developed based upon a percentage of the construction costs. The estimated percentages are listed below. These percentages were based on historical NDOR data.

- Project Development, Engineering, and Construction Engineering were estimated to be 16 percent of the construction costs.
- Utility Costs were estimated to be three percent of the construction costs.
- Right-of-Way Costs were estimated to be three percent of the construction costs.

[4]2012 dollars were used for cost development due to the uncertainty of the years of expenditure, which will likely vary.

2.3.2 PRIORITIZATION

With such a large investment required to upgrade the Heartland Expressway Corridor, located within the State of Nebraska, to the envisioned capacity and functionality, it is important to understand the priority of the improvement projects from the standpoint of the overall system need. The prioritization process used criteria for ranking the improvement projects relative to one another. The weighting criteria, used in this study, is similar to the prioritization process used in the Ports to Plains Corridor Development and Management Plan. The following criteria were used for ranking both expansion sections and relief routes.

Truck Average Annual Daily Traffic (AADT): The PTP Alliance Corridor is designated as a high priority corridor with the importance of improving the trade corridor to promote the flow of goods both regionally and internationally. Using truck AADT allows priority to be given to improvement projects that are expected to have a higher number of trucks.

Accident Rate: Existing crash rates were used to compare improvement projects with each other to identify safety enhancements.

Existing Pavement Condition: The existing pavement conditions were provided by NDOR. Improvement projects with known deteriorating pavement received a higher priority over projects with good pavement.

Intermodal Connection: As discussed in Section 2.1.3 of this report, intermodal facilities are at the forefront of increasing efficiency in the transfer and transport of goods. Roadway expansion projects that support existing intermodal facilities should be considered in prioritizing improvements to the system. Improving the efficiency of transporting freight and goods to the intermodal facilities provides an additional benefit.

System Connectivity: As discussed in Section 2.1.2, the system connectivity provides the ability to connect the Heartland Expressway improvements to the planned improvements along the PTP Alliance Corridor. The measure provides priority to projects that connect planned improvements to improved corridors outside of Nebraska.

Total Vehicle AADT: While a primary focus of the Heartland Expressway is to promote trade growth along the PTP Alliance Corridor, the general motorist will also benefit from improvements. This measure accounts for all motorists, not just commercial vehicles. The data includes existing and forecasted AADT.

Travel Time Savings Rate: This criterion allows existing and (forecasted) future delay along the Corridor to be accounted for in prioritization. Improvements that cause greater travel time savings per mile of improvement have a higher priority for implementation.

Cost per Vehicle Mile Traveled: This measure allows cost to play a role in prioritizing improvements. The lower the cost per vehicle mile traveled, the greater the cost-effectiveness of the improvement.

Volume to Capacity Ratio: The volume to capacity ratio is a measure that allows areas with higher congestion to gain priority over areas where congestion is less of a problem. Congested roadways cause costly delays in the movement of goods and people.

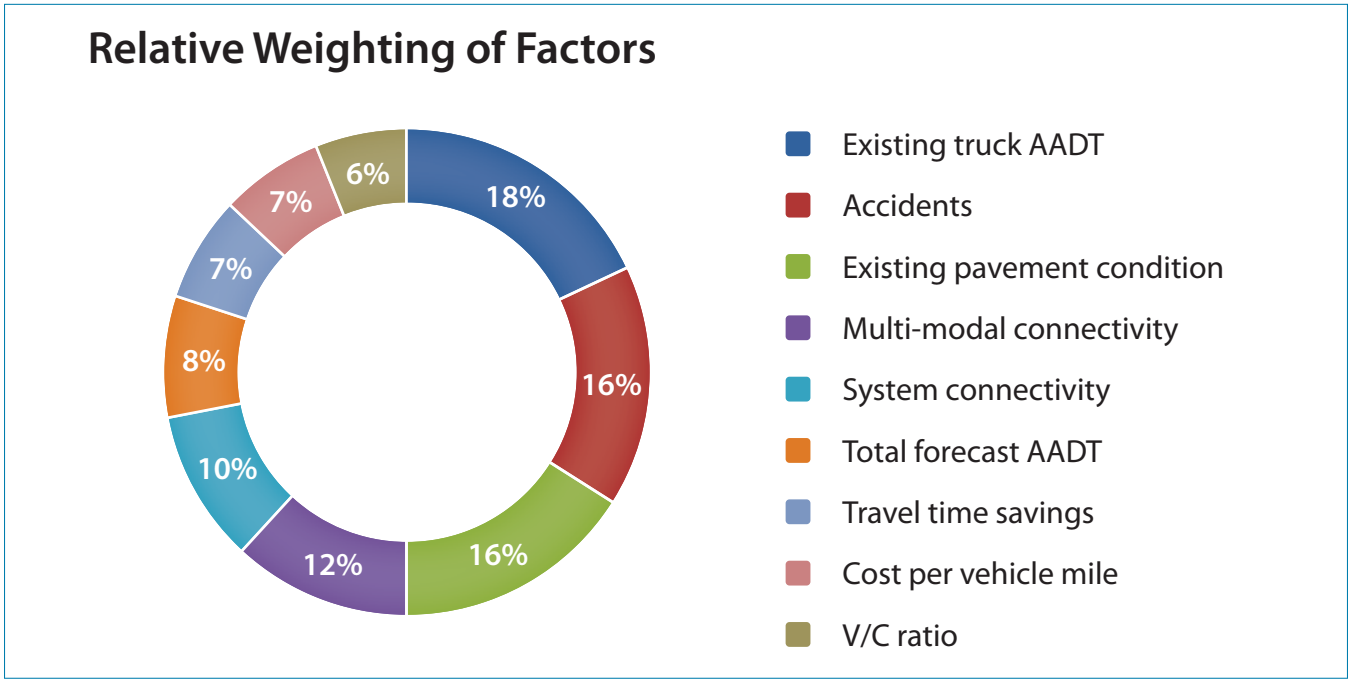


Figure 2.25 – Project Prioritization Weighting Criteria

Figure 2.25 shows the weighting used to assign importance of these criteria for prioritization purposes. These weighted factors were discussed and verified by the Project Steering Committee. The weights were established based upon the significance of the criteria in meeting the function of the Corridor. See Appendix B for more detail on criteria and weighting.

2.3.3 IMPLEMENTATION PLAN

A 20-Year implementation plan was developed to address the operational and safety needs along the corridor to ultimately develop the high priority corridor. The 20-Year implementation plan was created into five year periods. The periods are 2015 to 2020; 2020 to 2025; 2025 to 2030; and 2030 to 2035. See Appendix C for the Heartland Expressway Corridor 20-year implementation plan.

This 20-year plan was established to assist in the economic analysis described in Chapter 5. This program currently is an unconstrained plan with no identified funding sources, with the exception of the current US 385 project from Junction L62A to Alliance which is being funded by the Build Nebraska Act. To develop the implementation plan, the proposed improvement projects were developed to spread the improvement costs over the twenty year period while addressing the project priorities. The weighting criteria described in Section 2.3.2 was used to measure the project implementation groups. Figures 2.26, 2.27, 2.28 and 2.29 illustrate the project implementation plan and the estimated time frame.

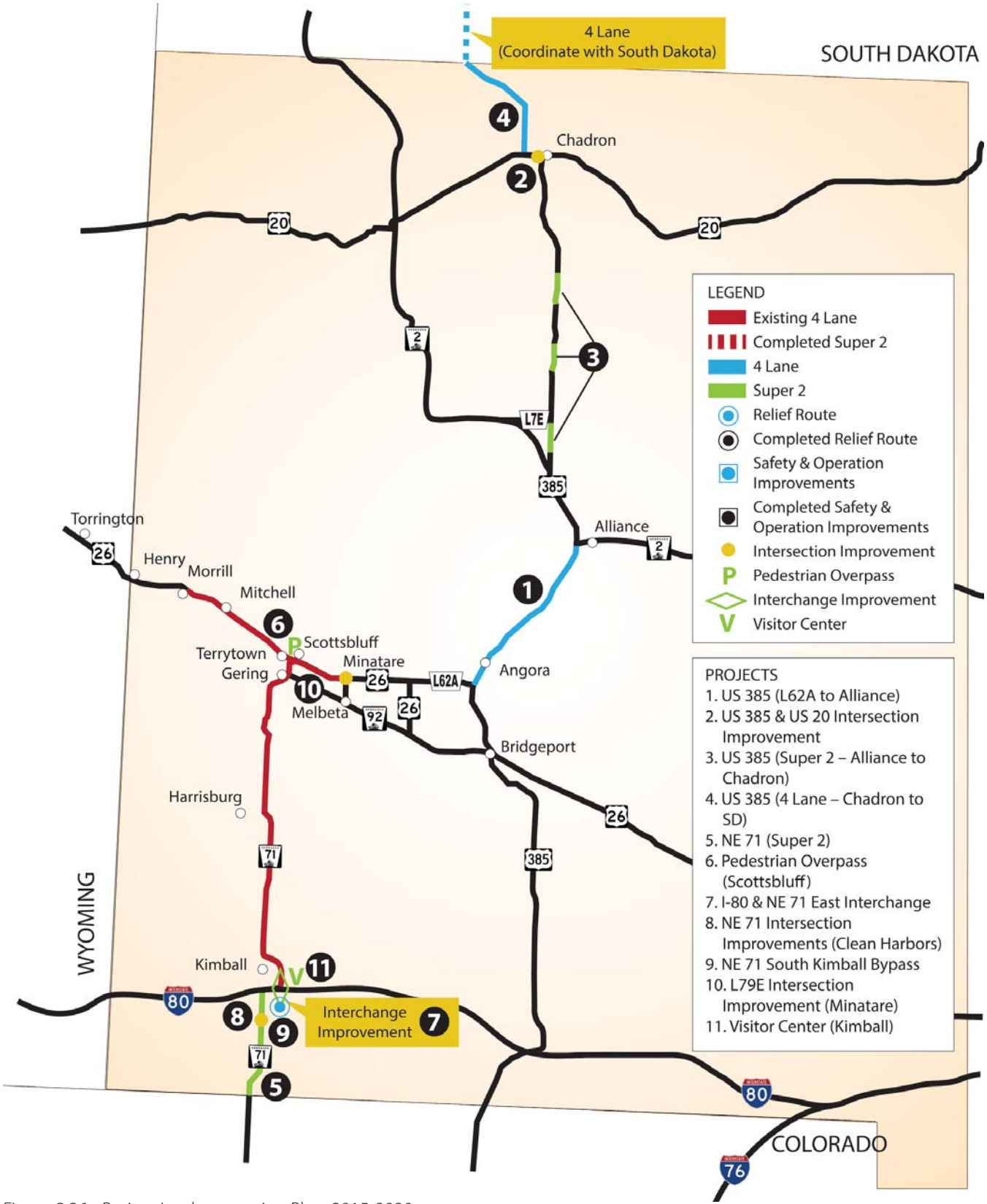


Figure 2.26 - Project Implementation Plan, 2015-2020

Figure 2.27 - Project Implementation Plan, 2020-2025

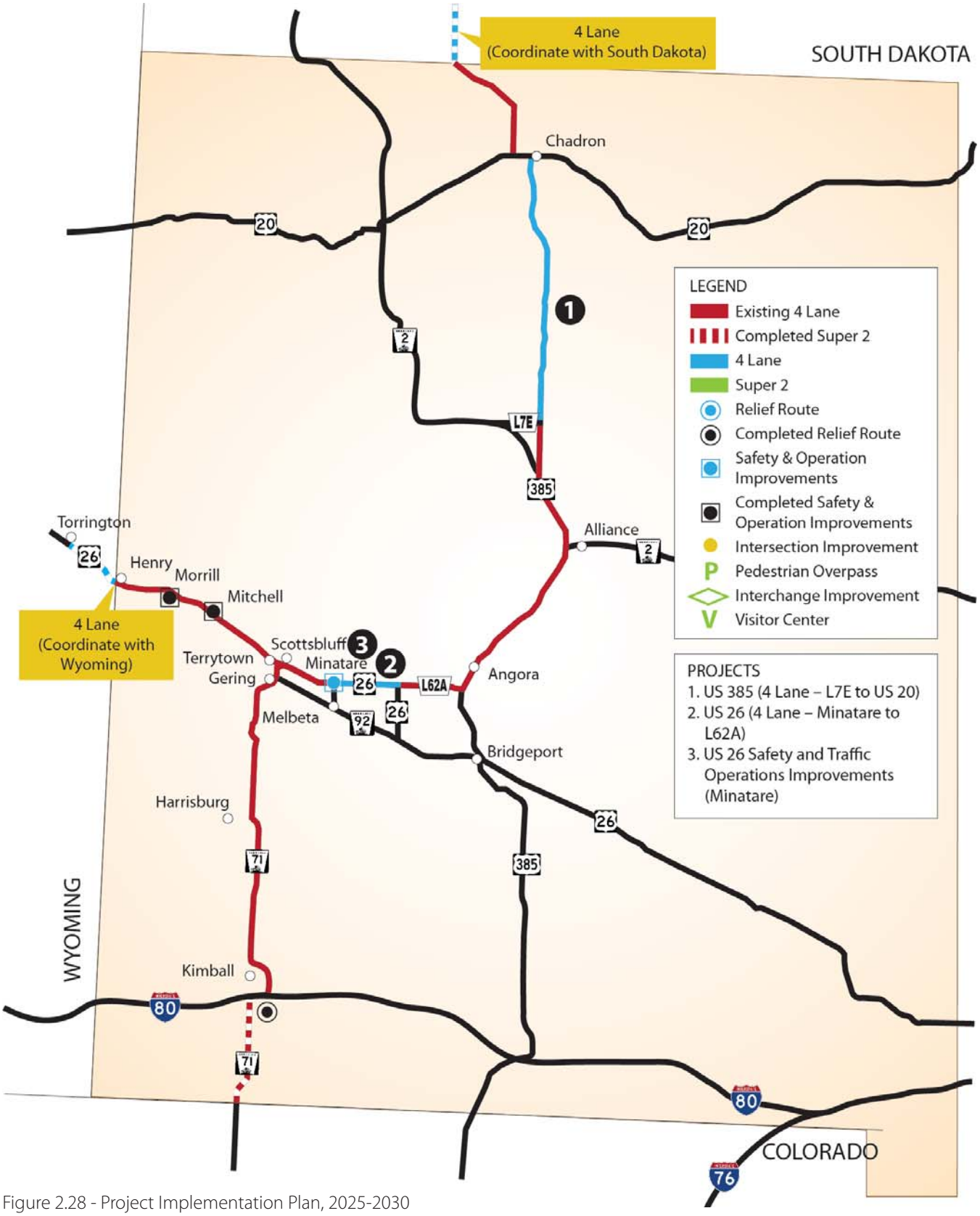


Figure 2.28 - Project Implementation Plan, 2025-2030

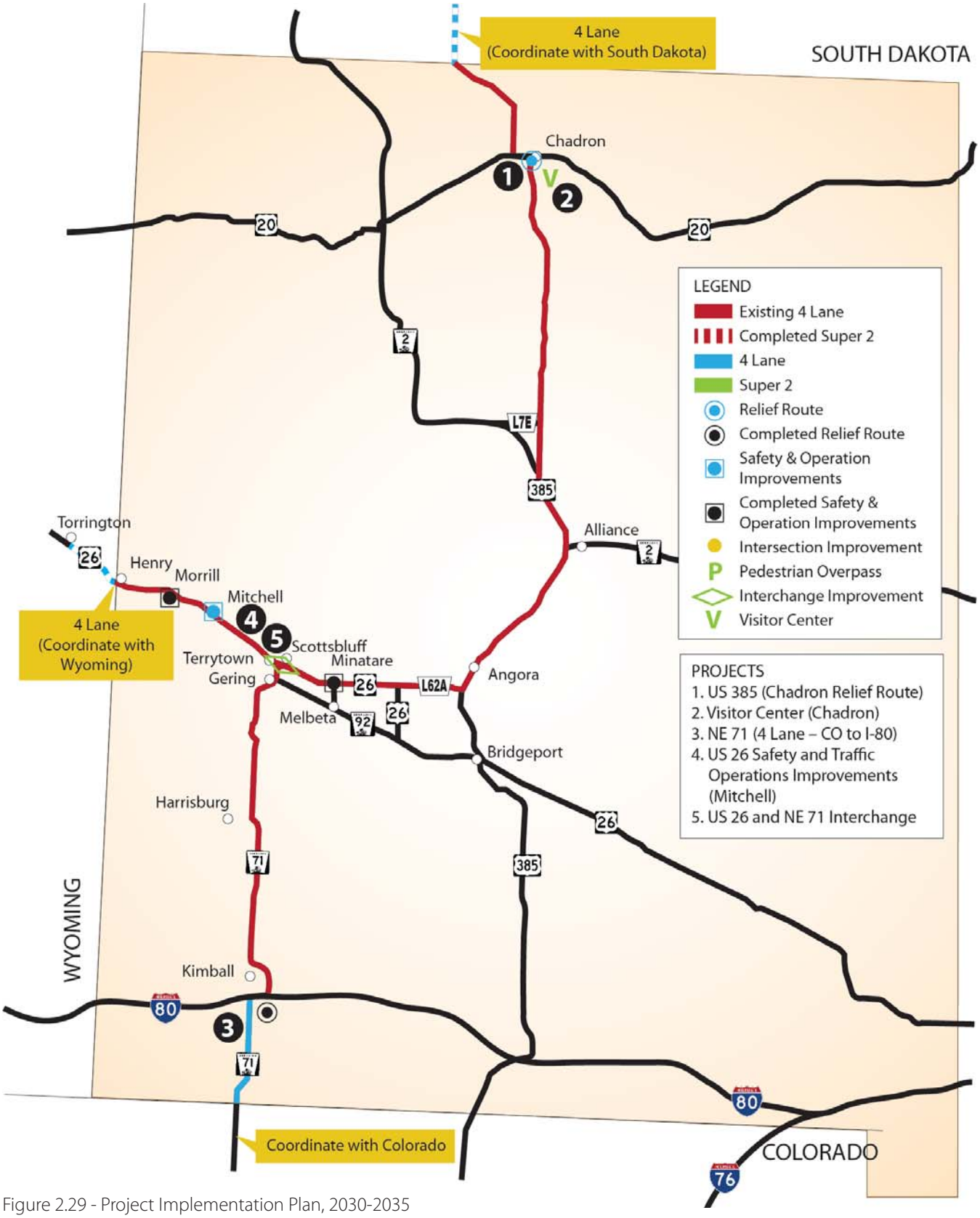


Figure 2.29 - Project Implementation Plan, 2030-2035

2.3.4 IMPLEMENTATION PLAN RANKING

The priority score summary listed in Figure 2.30 represents a summary of overall score for the project groupings using the relative weighting factors discussed in Section 2.3.2. The dollar value listed in the legend for each project grouping is the overall project group cost. Based on the project prioritization criteria described in Section 2.3.2, Group 1 rated the highest group followed by Groups 2, 3, and 4. The project prioritization was completed after the project groups were developed to meet the overall corridor needs and goals. The project groupings were established to complete the gaps within the highway system to complete the vision of the corridor and to establish a proposed improvement program to be used in the economic analysis (Chapter 5). The proposed improvement program is financially unconstrained.

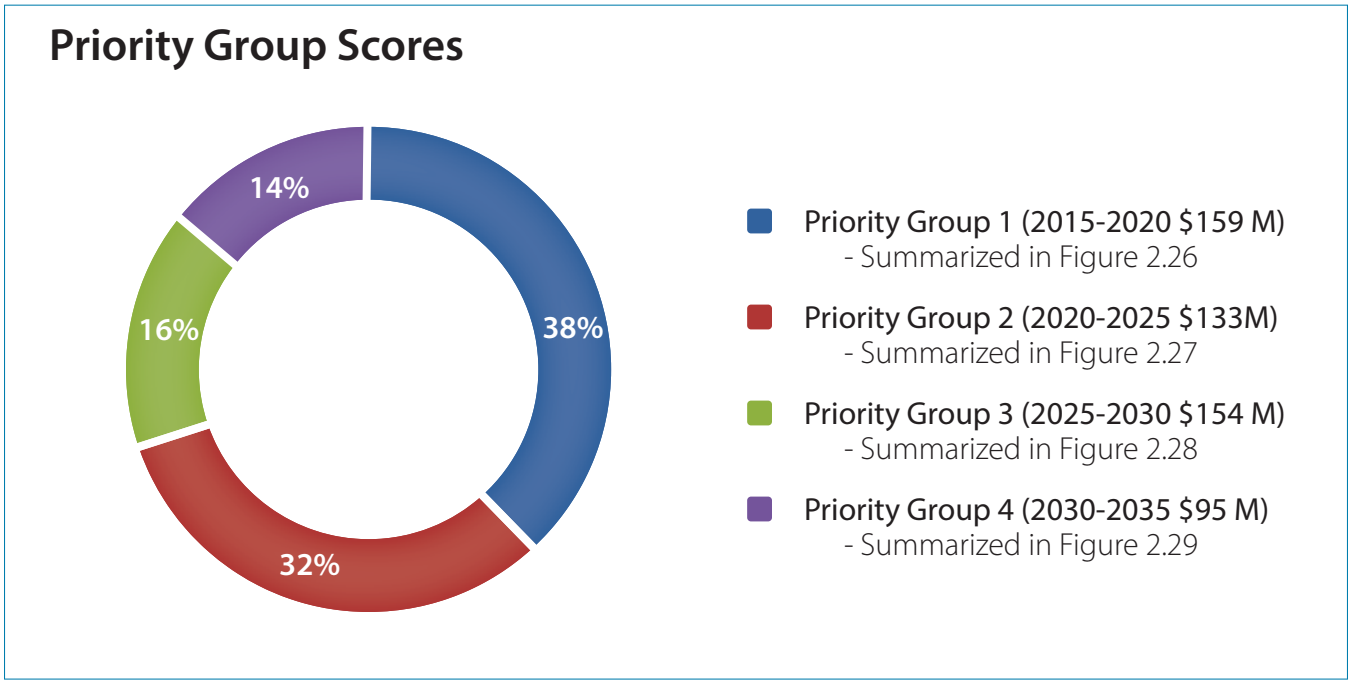


Figure 2.30 – Overall Implementation Priority Group Scores

3.0 ENVIRONMENTAL REVIEW

3.1 INTRODUCTION

The following discussions clarify the Study Area boundaries, the scope of the project, the scope of this environmental review and summarizes how the National Environmental Policy Act of 1969 (NEPA) relates to the Corridor Development and Management Plan (CDMP) in terms of future NEPA documentation and process requirements. Section 3.2 presents key environmental resources that may be encountered along the Heartland Expressway Corridor, documents agency coordination, and identifies potential mitigation measures. Figures are provided that illustrate major environmental elements, resources, or complexes where helpful. Section 3.3 describes potential sub-corridors that could be considered to have independent utility, connect logical termini, and not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

3.1.1 STUDY AREA AND SCOPE

The Heartland Expressway Corridor extends from northwest Colorado to southern South Dakota and eastern Wyoming, through the western panhandle of Nebraska, passing through the cities of Kimball, Scottsbluff, Gering, Mitchell, Morrill, Alliance, and Chadron. Counties affected by the Heartland Expressway Corridor include Kimball, Banner, Scotts Bluff, Morrill, Box Butte, and Dawes. A broad range of environmental issues, both natural and socio-economic, are present along the Heartland Expressway Corridor. This environmental review included an evaluation of several previously completed reports and studies, existing resources, maps, data, and a limited 'windshield' review of the resources adjacent to the existing roadway, to identify potential impact issues, and guide Nebraska Department of Roads (NDOR) to the proper agencies and entities for coordination to minimize, avoid or mitigate, these potential impacts. The Study Area for this Environmental Review encompasses a corridor several miles wide along the existing roadway. This Study Area therefore, does not preclude the future evaluation of possible roadway re-alignments, by-passes, geometric upgrades, enhancements, or other improvements outside the existing roadway.

The Environmental Review identifies environmental resources within the Heartland Expressway Corridor. While specific environmental impacts from individual projects are unknown at this stage of planning, potential impacts have been identified where possible and are discussed in the following sections of this chapter. In general, any construction activity could have impacts to various environmental resources identified in this document; therefore, specific types of construction activities (i.e. grading, widening, bridge repair) were not discussed in relation to potential impacts. As more project-specific details arise during the Preliminary Engineering and NEPA phase, a more in-depth analysis of potential impacts to environmental resources will occur. This will include developing project specific purpose and need statements and alternatives analyses, as required by NEPA. The intent of the environmental review in this CDMP is not to fully address NEPA requirements, but rather to provide a resource for future NEPA compliance and documentation.

3.1.2 DETERMINING NEPA CLASS OF ACTION

The National Environmental Policy Act of 1969 (NEPA) established a national policy for protecting, restoring, and enhancing the human environment. Federal agency undertakings such as funding or permitting of projects must show compliance with NEPA. For transportation projects, NEPA requires FHWA and other federal agencies to consider potential impacts to the social and natural environment. In addition to evaluating the potential environmental effects, FHWA must take into account the transportation needs of the public in reaching a decision that is in the best overall public interest (23 USC 109(h)).

For projects with known potential for significant environmental impacts, agencies must prepare an Environmental Impact Statement (EIS). For projects that do not individually or cumulatively have a significant impact on the environment, agencies are categorically excluded (CE) from preparing an EIS. For all other projects, agencies must prepare an Environmental Assessment (EA) to determine if there will be significant impacts. If there are no significant impacts, or if the impacts can be mitigated such that they are no longer significant, the agency may issue a Finding of No Significant Impact (FONSI). However, if the EA determines that there are unavoidable significant impacts, the agency must prepare an EIS.

The purpose of this environmental review is **NOT** to serve as the NEPA documentation for future improvements to the entire Heartland Expressway Corridor. The purpose is to assist FHWA, NDOR, and local transportation agencies in identifying potential natural and socio-economic issues along rational sub-corridors, and provide information that can be incorporated into future NEPA documents.

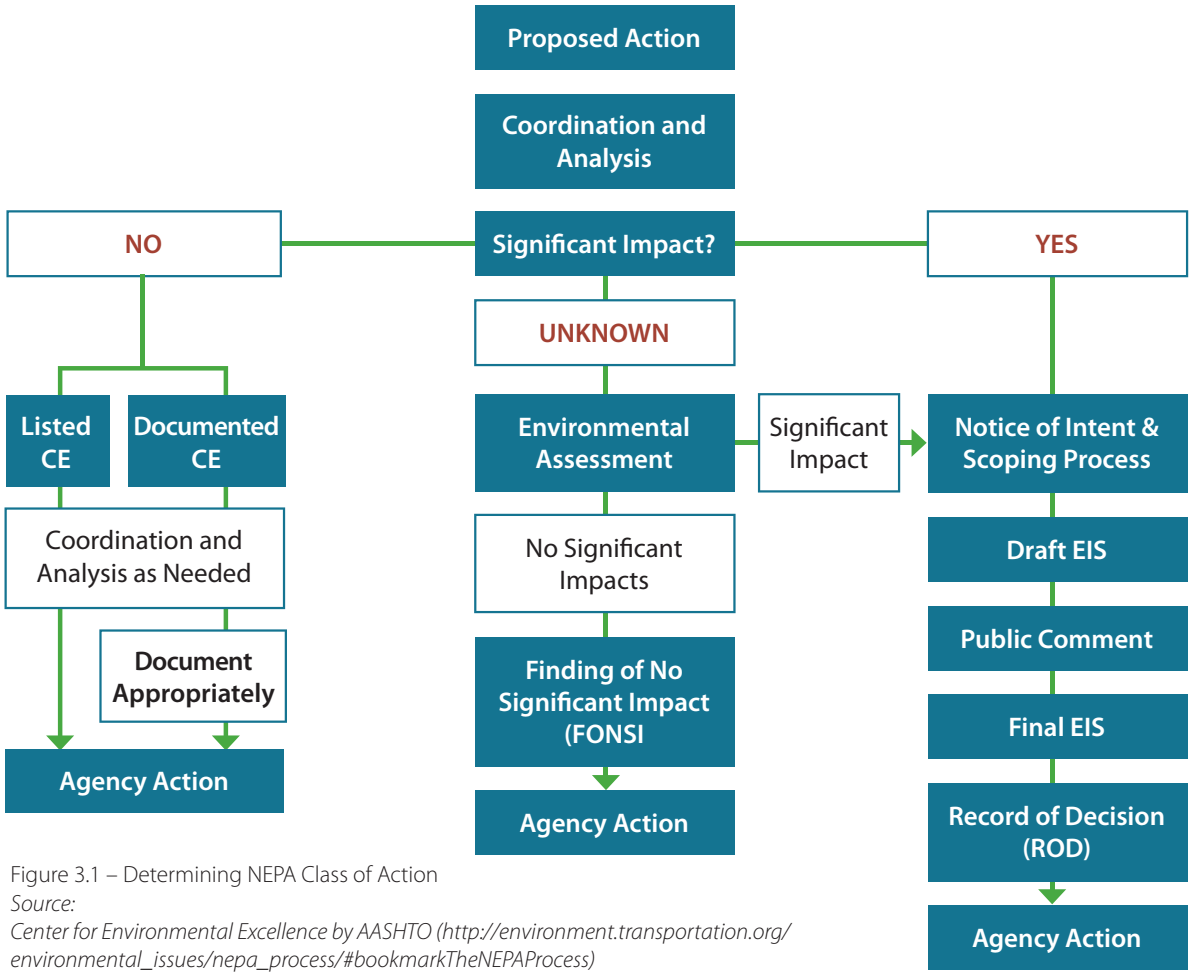


Figure 3.1 – Determining NEPA Class of Action
Source:
Center for Environmental Excellence by AASHTO (http://environment.transportation.org/environmental_issues/nepa_process/#bookmarkTheNEPAProcess)

3.1.3 NEPA PROCESS AND FUNDING OPTIONS

Many funding options exist for completion of the Heartland Expressway Corridor, including federal, state, local, and private funds. Use of federal funds, or improvements to federal facilities, will require compliance with NEPA as previously described. While NEPA is an umbrella that covers a multitude of environmental regulations, specific environmental compliance and permitting requirements (e.g. Section 404 of the Clean Water Act, Endangered Species Act) would apply whether or not compliance with NEPA is required.

The source of federal funds usually determines the Lead Agency for NEPA administration. For example, if federal highway trust funds are used, the FHWA will be the Lead Agency. Other federal agencies may become Cooperating Agencies depending on the nature of their involvement in the decision making process and the type and intensity of impacts to resources under their regulation. For instance, an improvement project involving a bridge over a major river may involve the U.S. Army Corps of Engineers (USACE) as a Cooperating Agency, while an improvement project within a National Forest or a National Park may involve the United States Forest Service (USFS) or the National Park Service (NPS). Depending on funding types of or limits of the project, these or other agencies may actually become the Lead Agency instead of FHWA.

The level of NEPA documentation is determined by the Lead Agency, and varies depending on the potential for significant impacts. The various levels of documentation are explained in greater detail below.

Environmental Impact Statement (EIS)
An EIS is required when an action is likely to have significant impacts on the environment. Such actions could include a new controlled access freeway, a roadway on a new alignment, a new interchange, by-passes, or similar actions. A Draft EIS is prepared, public comments are received, and then incorporated into the Final EIS. A Record of Decision (ROD) is then prepared for signature by the lead agency and sponsors. The ROD presents the basis for the decision to approve the project, summarizes any mitigation measures, and documents compliance with the myriad of laws under the NEPA umbrella.

Environmental Assessment (EA)
An EA is prepared when the significance of impacts are unknown. Examples of project requiring the preparation of an EA may include widening a two-lane highway to four lanes on the existing alignment, a new bridge over an existing railroad line, a grade separation project, or modifications to a major intersection or interchange. The EA determines if the project will have significant impacts, at which time the project is required to prepare an EIS; or if there are none, a Finding of No Significant Impact (FONSI) is prepared.

Categorical Exclusion (CE)
A CE is completed for projects that are not anticipated to have significant impacts, either individually or cumulatively. Projects that might be approved by a CE include landscaping, enhancements, trails, minor intersection modifications, pedestrian structures, maintenance, or traffic signal improvements. Some projects are so minor that they can be approved using a Programmatic CE (PCE), which groups entire categories of routine projects having no significant impacts. PCE's can be approved by NDOR, while CE's require NDOR and FHWA approval.

3.1.4 LOGICAL TERMINI

Logical termini for project development are defined as (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts, even though the environmental impact review frequently covers a broader geographic area than the strict limits of the transportation improvements. In the past, the most common termini have been major intersecting roadways or major traffic generators. However, there are also cases where the project improvement is not primarily related to traffic generation or roadway locations, and the choice of termini based on these factors may not be appropriate.

According to FHWA's guidance paper, *The Development of Logical Project Termini*[1] (November 5, 1993) "choosing a corridor of sufficient length to look at all impacts need not preclude staged construction. Therefore, related improvements within a transportation facility should be evaluated as one project, rather than selecting termini based on what is available for short range improvements. Construction may still be 'staged' or programmed for shorter sections or discrete construction elements as funding permits."

In developing a project concept which can be advanced through the stages of planning, environmental review, design, and construction, the project sponsor needs to consider a "whole" or integrated project. Projects should satisfy an identified need, such as safety, rehabilitation, economic development, or capacity improvements, and should be considered in the context of the local area, socioeconomics, topography, the future travel demand, and other infrastructure improvements in the area. Without framing a project in this way, proposed improvements may miss the mark by only peripherally satisfying the need or by causing unexpected side effects which require additional corrective action. The problem of "segmentation" also often occurs when a transportation need extends throughout an entire corridor, but environmental issues are inappropriately discussed for only a segment of the corridor.

FHWA regulations outline three general principles at 23 CFR 771.111(f) that are to be used to define the logical termini for a highway project:

"In order to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the action evaluated in each environmental impact statement (EIS) or finding of no significant impact (FONSI) shall:

1. Connect logical termini, and be of sufficient length to address environmental matters on a broad scope;
2. Have independent utility or independent significance (i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made); and
3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements."

These concepts of connecting logical points, sufficient length, independent utility, reasonable expenditure, and not precluding alternatives for future improvements are all imperative to identifying the eventual sub-corridors that may be considered under NEPA.

The logical termini for the Heartland Expressway Corridor were generally identified by highway junctions and population areas. See Section 3.3 Rational Sub-Corridors for the potential sub-corridors that could be considered to connect logical termini.

[1] http://environment.fhwa.dot.gov/projdev/tdmtermini.asp

3.2 ENVIRONMENTAL RESOURCES

The following section presents key environmental resources that may be encountered along the Heartland Expressway Corridor, documents agency coordination, and identifies potential mitigation measures. Figures are provided that illustrate major environmental elements, resources, or complexes where helpful.

3.2.1 SURFACE WATER AND GROUNDWATER RESOURCES

Surface water resources can include rivers, streams, wetlands, seeps, ponds, lakes, and other open water areas. Groundwater resources can include aquifers, recharge areas, wellhead protection areas, artesian wells, and municipal, residential and commercial/industrial wells. Surface water and groundwater resources in the Study Area are listed below.

Major Rivers and Streams

There are several major river crossings along the Heartland Expressway Corridor; the North Platte River near Scottsbluff, Lodgepole Creek near Kimball, the Niobrara River south of Chadron, and the White River north of Chadron. There are also numerous minor streams, creeks and watercourses that are crossed by the Heartland Expressway Corridor. Specific streams along various portions of the Heartland Expressway Corridor are described in greater detail in Section 3.3 “Rational Sub-Corridors.”

State Resource Waters

Within Nebraska, State Resource Waters are divided into Class A and Class B. Class A State Resource Waters are surface waters, whether or not they are designated in Nebraska’s Surface Water Quality Standards (Title 117), which constitute an outstanding State or National resource, suchas waters within national or state parks, national forests or wildlife refuges, and waters of exceptional recreational or ecological significance. Waters which provide a unique habitat for federally designated endangered or threatened species and rivers designated under the Wild and Scenic Rivers Act are also included. Class B State Resource Waters include surface waters, whether or not they are designated in Title 117, which possess an existing quality which exceeds levels neceassary to maintain recreational and/or aquatic life uses.There are currently no Class A or B State Resource Waters in the Study Area.

Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 defines certain rivers that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, and provides for their preservation. The Niobrara River is a designated as a National Scenic River; however the designation begins 130 miles east of the Study Area, near Valentine at US Highway 83, and extends approximately 100 miles further east, to Nebraska Highway 137 (NPS *Niobrara National Scenic River*). There are no Wild and Scenic Rivers in the Study Area.

Groundwater Management Areas

The "Nebraska Ground Water Management and Protection Act" provides a framework for establishment of Ground Water Management Plans by the state's 23 Natural Resource Districts (NRD). These plans are aimed at the management of groundwater quality and quantity. Each NRD can set their own standards for managing these resources.

The Groundwater Management Area (GWMA) program focuses on assessing areas where groundwater problems from nonpoint source contaminants (such as agricultural chemicals) exist or are likely to exist. The Nebraska Department of Environmental Quality (NDEQ) and local NRDs carry out detailed field studies to collect groundwater data, assess the data, and determine whether a correlation exists between land use practices and any nonpoint contamination trends. The Department's conclusions and recommendations are presented at public hearings during which public comments are also obtained. The Director makes a determination on whether or not to designate an area as a Groundwater Management Area. The staff works closely with the NRDs within whose boundary the area is located throughout the investigation, designation and implementation stages (NDEQ 2012a).

Within the Study Area, there are three GWMA's, each corresponding to a separate NRD; the Upper Niobrara White, North Platte, and South Platte. Generally, the Upper Niobrara White GWMA covers Dawes and Box Butte Counties; the North Platte GWMA covers Morrill, Scotts Bluff, and Banner Counties; while the South Platte GWMA covers Kimball County.

Potential impacts to individual GWMAs will vary depending on the location of a future project. For example,a project occurring exclusively in one GWMA would probably be unlikely to impact resources of another GWMA; whereas a project occurring in multiple GWMAs would be have a higher potential to impact multiple GWMAs. Therefore, coordination should occur between the NDOR and the appropriate NRD(s) to understand GWMA rules and regulations and to assess potential impacts.

Wellhead Protection Areas (WHPA)

Nebraska's Wellhead Protection (WHP) Program is a voluntary program which assists communities and other public water suppliers in preventing contamination of their water supplies. The Nebraska Legislature passed LB 1161 in 1998 (Neb. Rev. Stat. §46-1501 – 46-1509), authorizing the Wellhead Protection Area Act. This Act sets up a process for public water supply systems to use if they choose to implement a local Wellhead Protection plan. NDEQ is the lead agency for WHP Plan approval.

The goal of Nebraska's WHP Program is to protect the land and groundwater surrounding public drinking water supply wells from contamination. Since approximately 85% of Nebraskans receive their drinking water from groundwater, preventing groundwater contamination is vital (NDEQ 2012b).Within the Study Area, there are several WHPAs, including those for the Cities of Chadron, Alliance, Minatare, Scottsbluff and Kimball, and several private water supplies. Specific WHPAs along various portions of the Heartland Expressway Corridor are described in greater detail in Section 3.3 "Rational Sub-Corridors."

Irrigation Wells and Canals

The Canal Act of 1890 authorized federally constructed irrigation facilities on private surfaces. Many of these water conveyance facilities (canals, ditches,and drains) are located on private lands where the Bureau of Reclamation (BOR) is not the underlying landowner. However, the BOR maintains the 1890 Canal Act right-of-way for these irrigation facilities. The operation and maintenance of water conveyance facilities within the study area has been transferred from the BOR to irrigation districts for use in delivery and distribution of water to irrigable lands of the North Platte Project. BOR water conveyance facilities in or near the Study Area are operated and maintained by the Gering Ft. Laramie, Northport, and Pathfinder Irrigation Districts (personal communication, Lyle Myler BOR, 13 March 2012).

BOR controls and manages a series of dams and reservoirs along the Platte river, starting with the Seminoe Reservoir in southeastern Wyoming, which conveys water to the Tri-State Canal along the Platte River in Nebraska, irrigating thousands of acres of cropland between Morrill and Bridgeport (University of Nebraska-Lincoln 2011). Potential impacts from roadway construction may include direct impacts, such as crossings, or indirect impacts, such as diverting irrigation water or modifying irrigation patterns.

NDOR will work with the BOR, underlying land owners, cities, and the aforementioned irrigation districts prior to future roadway projects in order to avoid or minimize impacts to the water conveyance facilities. Coordination will also occur to ensure that permits, permissions, and/or letters of consent are obtained prior to future projects.

Water Wells

Western Nebraska is covered with numerous water wells. These water wells can be used for multiple purposes including domestic, livestock, and irrigation. According to Nebraska Department of Natural Resources (NDNR) and Section 46-601.01, the well is the hole in the ground, not the equipment placed in the hole. Therefore, the person owning the land that contains a well is the owner of that well. Any person who constructs a water well is required by state law to register it and provide certain information collected during the excavation of the well. Additionally, law requires that only licensed water well contractors and landowners may dig a well, so it is their responsibility to register the water well. The registry of these wells is maintained by the NDNR and the database can be found online on the NDNR website (NDNR 2007).

NDOR will work with the NDNR to identify water wells that may be potentially impacted by future projects. As these wells are identified, NDOR will coordinate with water well landowners to avoid and minimize damages to water wells.

Impaired Waters - Clean Water Act Section 303(d)

The Clean Water Act requires states to prepare a list of impaired surface waters every even numbered year. These waters do not support their assigned beneficial uses as listed in Title 117 – Nebraska Surface Water Quality Standards. From this list, referred to as the 303(d) List of Impaired Waters, states prepare Total Maximum Daily Loads (TMDLs) that include the pollution control goals and strategies necessary to improve the quality of these waters and remove the identified impairments. NDEQ is also required to provide a surface water quality report every two years, known as the Section 305(b) Water Quality Report, which describes the status and trends of existing water quality for all waters of the state and provides information as to the extent to which designated uses are supported (NDEQ 2012c).

Nebraska's 2012 Water Quality Integrated Report and 303(d) list, prepared by NDEQ, were approved by the U.S. Environmental Protection Agency (EPA) on April 16, 2012. The 2012 Integrated Report identifies five categories of waters, with Category 5 being the most impaired. There are several 2012 Category 5 waterways in the Study Area, including Chadron Creek, the Niobrara River, the North Platte River, Ninemile Creek, Winters Creek, Gering Drain and Tub Springs Drain.

As the 303(d) list is updated on a two-year cycle, these waters may not be listed as Category 5 waters in future reports, while other waters may be added. Therefore, it is recommended that during future NEPA reviews, the State of Nebraska's latest Water Quality Integrated Report and 303(d) list should be reviewed, and precautions taken to ensure compliance with any TMDLs for impaired waters.

3.2.2 WETLANDS

Wetlands, as defined by the Clean Water Act of 1979 (CWA) are "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Wetlands are some of the most productive and dynamic habitats in the world, and provide many functions and values, including groundwater recharge, nutrient cycling, particulate matter removal, surface water discharge, maintenance of plant and animal communities, aesthetics, water filtration and purification, carbon sequestration, fish and wildlife habitat, and flood reduction, among many others. Care should be taken to avoid bisecting isolated wetlands if possible in order to avoid or minimize disturbance to reptiles, amphibians, and other wildlife that live in or utilize isolated wetlands.

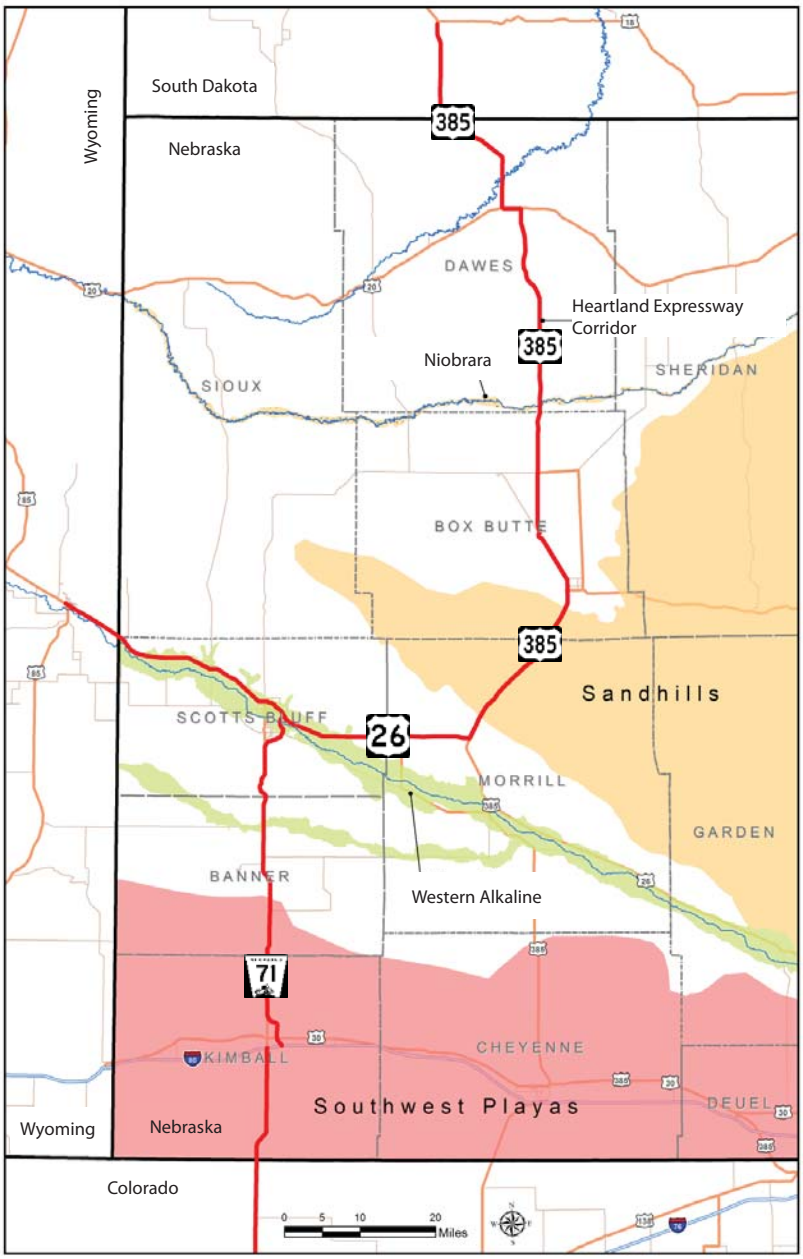


Figure 3.2 - Heartland Expressway Wetland Complexes

Regional Wetland Complexes

Nebraska has many diverse and unique wetland complexes, including marshes, lakes, river, oxbows, wet meadows, forest swamps, and seeps. Several distinct complexes occur in the Study Area, including the Southwest Playas, Western Alkaline, and Sandhills wetlands.

Southwest Playas
These wetlands occupy small clay-lined depressions on nearly flat tablelands of loess soil. These freshwater wetlands receive water mostly from runoff and are small (mostly less than five acres), temporarily and seasonally flooded wetlands. Most have no natural outlet for water. In most years, these wetlands dry early enough in the growing season to be farmed (LaGrange 2005). In the Study Area, the Southwest Playas complex occurs in Kimball and southern Banner counties.

Sedimentation is a concern in the watersheds of the Southwest Playas, as eroded soil can quickly fill in a wetland. Careful consideration of water balance and erosion control is needed around these wetlands.

Western Alkaline
These wetlands occur on the floodplain of the North Platte River upstream of Lewellen, and along the upper reaches of Pumpkin Creek. They receive their water from a combination of overland runoff, flood overflows, and springs. The hydrology of these wetlands is complex and influenced by local irrigation runoff as well. The water sources are alkaline (i.e. salty), primarily from concentration by evaporation (LaGrange 2005). In the Study Area, the Western Alkaline complex occurs along Pumpkin Creek in northern Banner County, and along the North Platte River in Scotts Bluff County.

These wetlands have not been lost as much as other complexes due to lower development pressure. However, crop production has resulted in some loses. Irrigation and water diversions are also threats to their existence.

Sandhills
These wetlands are formed in depressions in sandhill areas where groundwater intercepts the surface of the land. Sandhills wetlands are mostly freshwater and include saturated wet meadows, shallow marshes, and open water lakes. This complex also includes fens, a very unique wetland type to Nebraska. These wetlands are characterized by slightly acidic water and peat soils, and harbor a number of rare plants including cotton-grass, buckbean, and marsh marigold. These wetlands are particularly attractive to shorebirds (LaGrange 2005). In the Study Area, the Sandhills complex occurs in northern Morrill and southern Box Butte counties.

Wetlands depicted on the United States Fish and Wildlife Service (USFWS) National Wetland Inventory Maps (NWI) were also reviewed.

Wetland impacts will be considered during the planning of future projects. During future NEPA reviews, individual projects in these areas should conduct a wetland delineation using USACE approved methodology, and obtain a Jurisdictional Determination from the USACE. If any individual project will impact wetlands, it will have to comply with all regulatory requirements, including obtaining a Section 404 Permit and Section 401 Water Quality Certification for impacts to Waters of the U.S. During future projects USACE will be invited as a cooperating agency through the NEPA/Section 404 merge process to facilitate reviews. In addition, Executive Order 11990 - *Protection of Wetlands* refers to all wetlands including Waters of the State, so if there are impacts to Waters of the State, coordination will be required with NDEQ to determine compliance with Title 117.

3.2.3 FLOODPLAINS

Executive Order 11988 requires federal agencies to, among other directives, reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related resources planning, regulating, and licensing activities.

The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program (NFIP), and publishes and updates Flood Insurance Rate Maps (FIRMs) to illustrate those areas susceptible to flooding, and therefore requiring federal flood insurance. Current FIRM maps (where available) were reviewed to determine the location of regulated floodplains; Kimball, Banner, and Morrill County either do not participate in the NFIP or do not have any FIRM maps available in any format, Scotts Bluff and Box Butte County only have paper FIRM maps available. Dawes County has digital FIRM maps available. If individual projects result in floodplain impacts, local floodplain administrators will need to be consulted for permit approval.

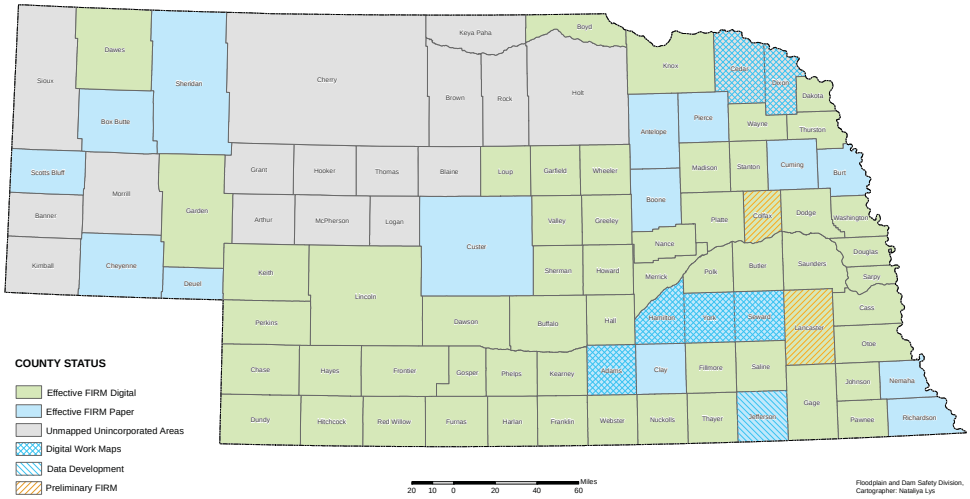


Figure 3.3 - Floodplain Mapping Status in Nebraska as of September 2012

3.2.4 WILDLIFE

Nebraska is host to a diverse array of wildlife. Wildlife refers to the numerous species of plants and animals that exist throughout nature. These plants and animals are an intrinsic part of nature, and also provide economic and cultural benefits. For example, insects act as pollinators for a countless number of plants, many of which are a food source for humans. Also, animals can provide for recreational activities such as hunting, fishing, or wildlife viewing (e.g. bird watching). Wildlife can also be used as a gauge by which the overall health of an ecosystem or environment is measured. Through the conservation and enhancement of wildlife, ecosystems and the natural environment are improved.

Threatened and Endangered Species

The Endangered Species Act (ESA), the Nebraska Nongame and Endangered Species Conservation Act, and other related laws were enacted to protect sensitive species from actions that could imperil their very existence. NEPA requires that FHWA coordinate with the USFWS and state agencies that protect threatened and endangered species.

Numerous federal and state protected species occur within the Study Area, including swift fox (*Vulpes velox*), river otter (*Lutra canadensis*), mountain plover (*Charadrius montanus*), blacknose shiner (*Notropisheterolepis*), northern redbelly dace (*Phoxinus eos*), finescale dace (*Phoxinus neogaeus*), blowout penstemon (*Penstemon haydenii*), Colorado butterfly plant (*Gauraneomexicana ssp. coloradensis*), black-footed ferret (*Mustela nigripes*) and grey wolf (*Canis lupis*)[1]. (NGPC 2013a and USFWS 2013).

Brief descriptions of species, their habitat, potential impacts, and management practices are described within. Information on individual species was gathered from the USFWS and Nebraska Game and Parks Commission

[2]The USFWS has proposed to remove the grey wolf from the list of threatened and endangered Species under the ESA. For more information see http://www.fws.gov/home/wolfrecovery/ and http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=AOOD#status

(NGPC), including the NGPCs Nebraska Natural Legacy Project (NNLP) and 2011 State Wildlife Action Plan (SWAP) (Schneider et al.), as well as the non-profit conservation organization, NatureServe, whose website (www.natureserve.org/explorer) is referenced by USFWS and NGPC. Specific occurrences, known habitats, or potential habitats for individual species are described in greater detail in Section 3.3 "Rational Sub-Corridors."

Swift Fox (State: Endangered, Federal: Not listed): Habitat for the swift fox includes open prairie and arid plains, including agricultural areas. Their home range size ranges from a thousand to several thousand acres, and individuals may range over several hundred acres during a single night. They may also shift the location of their home range from one year to the next. Swift fox den in burrows, sometimes using those dug by other mammals (e.g. prairie dogs, badgers), usually in sandy soil on high ground in open prairies, or along fence rows in agricultural areas. Individuals may use several dens throughout the year. Swift fox are also known to live next to or in existing roadways near suitable habitat. Within the Study Area, the swift fox is listed as endangered by the NGPC in Kimball, Banner, Scotts Bluff, Morrill, Box Butte and Dawes Counties. The swift fox's range is depicted on the NGPC Threatened and Endangered Species Range Map (NGPC 2013b) below. According to the Nebraska Natural Heritage Database, there are records of swift fox within five miles of U.S. Highway 26 (US 26) in Scotts Bluff County, Nebraska Highway 71 (NE 71) in Kimball County, and the northern portion of U.S. Highway 385(US 385) in Dawes County (personal communication, Melissa Marinovich, NDOR, 13 March 2012). Additionally a swift fox survey along L62A and US 385 from L62A to NE 2 in Alliance (conducted in 2013 by NDOR) reported no signs of swift fox or active dens; however suitable habitat was observed.

Potential impacts may include habitat degradation, home range separation, vehicle collisions, and others. Care should be taken to suvery project areas and identify dens prior to construction, relocate dens (if necessary), minimize vehicle collisions by providing crossing opportunities or escape dens (i.e. artificial dens), and preserve known habitat if possible.

USFWS is currently conducting a research study entitled "Swift Fox Survey along the Heartland Expressway Corridor." This study is being performed as a result of comments made at the resource agency meeting in 2012 (see Appendix E for more information), and is being funded with Federal Research Funds administered by NDOR (80% Federal, 20% State). After the study concludes, a strategy would be developed to address swift fox habitat connectivity. This strategy would then be carried forward into future projects created as a part of the Heartland Expressway Corridor.

River Otter (State: Threatened, Federal: Not Listed): Habitat for river otter includes streams, lakes, ponds, swamps, marshes, canals and other watercourses. Specific locations include hollow logs, root voids, dense overhanging vegetation, abandoned beaver lodges, thickets, or burrows of other animals. River otters feed on aquatic animals, fishes, frogs, crayfish, turtles, insects, and sometimes small birds and mammals. They are active during the winter, even in deep snow, and are generally active during the day. Their home range may be 20-30 miles long for a pair, and may hunt over 20 thousand acres during the year.

Within the Study Area, the river otter is listed as threatened by the NGPC in Scotts Bluff and Morrill Counties. The river otter's range is depicted on the NGPC Threatened and Endangered Species Range Map below. Additionally, according to the Nebraska Natural Heritage Database, there are records of river otter within five miles of US 26 in Scotts Bluff County (personal communication, M. Marinovich, NDOR, 13 March 2012).

Potential impacts may include habitat degradation, home range separation and others. Care should be taken for projects involving watercourse impacts to identify burrows, allow for aquatic movement, and preserve known habitat if possible.

Mountain Plover (State: Threatened, Federal: De-listed May 2011): Habitat for the mountain plover includes short- and mixed-grass prairie, prairie dog colonies, agricultural lands, and semi-desert habitats. Mountain plover have a geographically widespread breeding and wintering distribution. They breed in the western Great Plains and Rocky Mountain states from the Canadian border to northern Mexico. Most wintering occurs in California, southern Arizona, Texas, and Mexico. Mountain plover are adaptable to human activities and utilize a variety of habitat types (USFWS 2011a).

Within the Study Area, the mountain plover is listed as threatened by the NGPC in Kimball and Banner Counties. The mountain plover's range is depicted on the NGPC Threatened and Endangered Species Range Map below. Additionally, according to the Nebraska Natural Heritage Database, there are records of mountain plover within five miles of NE 71 in Kimball County (personal communication, M.Marinovich, NDOR, 13 March 2012).

Potential for impacts are limited because of their ability to utilize a variety of habitats.

Blacknose Shiner (State: Endangered, Federal: Not listed): Habitat for the blacknose shiner includes lakes and slow streams with weedy vegetation, primarily in cold, freshwater areas, mainly over sand. They eat mainly invertebrates, some plant material, as well as the bottom of aquatic beds. Within the Study Area, the blacknose shiner is listed as endangered by the NGPC in Box Butte and Dawes Counties. The blacknose shiner's range is depicted on the NGPC Threatened and Endangered Species Range Map that follows. Additionally, according to the Nebraska Natural Heritage Database, there are records of blacknose shiner within five miles of the southern portion of US 385 in Dawes County (personal communication, M. Marinovich, NDOR, 13 March 2012).

Potential impacts include sedimentation, which causes turbidity, siltation of stream beds, and loss of aquatic vegetation, as well as habitat fragmentation due to dams, improperly placed culverts and similar impacts. Care should be taken to minimize land disturbance and establish vegetative cover quickly on construction projects in this species' range.

Northern Redbelly Dace (State: Threatened, Federal: Not listed): Habitat for the northern redbelly dace includes boggy lakes, beaver ponds, pools of headwaters and creeks, often in tea colored water over fine detritus or silt. Northern redbelly dace are usually found near vegetation. Spawning occurs among mats of filamentous algae or aquatic plants. Redbelly dace eat mainly diatoms and filamentous algae, also zooplankton and aquatic insects. Within the Study Area, the northern redbelly dace is listed as threatened by the NGPC in Box Butte and Dawes Counties. The northern redbelly dace's range is depicted on the NGPC Threatened and Endangered Species Range Map that follows.

Potential impacts include habitat degradation and fragmentation due to dams, improperly placed culverts and similar impacts.

Finescale Dace (State: Threatened, Federal: Not listed): Habitat for the finescale dace includes pools of boggy headwaters, creeks, small rivers, lakes and ponds, often common in beaver ponds, usually over silt and near vegetation. Spawning occurs under logs and debris. Finescale dace eat mainly insects and mollusks. Within the Study Area, the finescale dace is listed as threatened by the NGPC in Box Butte and Dawes Counties. The finescale dace's range is depicted on the NGPC Threatened and Endangered Species Range Map that follows.

Potential impacts include habitat degradation and fragmentation due to dams, improperly placed culverts and similar impacts.

Blowout Penstemon (State: Endangered, Federal: Endangered): Habitat for blowout penstemon is uniquely limited to the Nebraska Sandhills Prairie, in features called blowouts which are becoming rare due to stabilization efforts, fire control and settlement. Even though populations can be geographically isolated, wind driven seed dispersal results in genetic variation. Penstemon reproduces vegetatively, but pollination is a concern due to the distance between available habitat areas. Within the Study Area, the blowout penstemon is listed as endangered by the USFWS and NGPC in Morrill and Box Butte Counties. The blowout penstemon's range is depicted on the following NGPC Threatened and Endangered Species Range Map.

Potential impacts include direct impacts from construction, reduction of available habitat, and reduction of available pollinators. Care should be taken to identify potential habitat, and preserve it if possible.

Colorado Butterfly Plant (State: Endangered, Federal: Threatened): Habitat for Colorado butterfly plant is limited to southwestern Wyoming, northeastern Colorado, and the southwest portion of the Nebraska panhandle. Specifically, within Nebraska, the Colorado Butterfly Plant is a regional endemic historically found in western Kimball County. Individual colonies may be locally abundant or sparse, often depending on habitat conditions, and climate. They prefer periodically disturbed, sub-irrigated stream channels and shortgrass prairie. Haying, mowing and grazing are the main threats to this species (USFWS 2010a).

Within the Study Area, the Colorado butterfly plant is listed as threatened by the USFWS and endangered by the NGPC in Kimball County. The Colorado butterfly plant's range is depicted on the NGPC Threatened and Endangered Species Range Map below. Additionally, according to USFWS, the Colorado Butterfly Plant occurs along Lodgepole Creek (personal communication, John Cochnar 20 March 2012). Lodgepole Creek runs from Wyoming into Nebraska through Kimball, Cheyenne, and Deuel County until it eventually empties into the South Platte River just south of the Colorado/Nebraska border. Lodgepole Creek runs through the Study Area near Kimball, NE, and the NGPC Threatened and Endangered Species Range Map shows the range of the plant to be on Lodgepole Creek west of the City of Kimball. The USFWS lists portions of Lodgepole Creek in Wyoming as critical habitat for the plant; however the critical habitat designation did not include any portions of Nebraska (USFWS 2010a). According to the USFWS Species Profile, "the Colorado butterfly plant is likely extirpated in Nebraska; no plants have been found during surveys of historic known population in the last few years" (USFWS 2014a).

Due to the varied ranges listed by these references, it is difficult to discern whether the Colorado butterfly plant would be impacted by any future projects. Exact locations of the occurrence of the Colorado butterfly plant have not been given, so the occurrence of the plant in the Study Area is unknown. NDOR should coordinate with NGPC and USFWS to monitor for and identify locations of Colorado butterfly plant colonies within proposed project areas. Care should be taken in order to avoid and minimize potential impacts and disturbance to plant colonies, specifically for projects in Kimball County.

Black-Footed Ferret (State: Endangered, Federal: Endangered): The historic range of the black-footed ferret included much of North America's intermountain and prairie grasslands extending from Canada to Mexico; however the species has been extirpated virtually everywhere, with the exception of at reintroduction sites (USFWS 2010b) . Black-footed ferret reintroduction sites are located in Wyoming, South Dakota, Montana, Arizona, Utah, Colorado, Kansas, New Mexico, Canada and Mexico. There are currently no reintroduction sites in Nebraska. Black-footed ferrets live mainly in vacant prairie dog burrows, and over 90 percent of the black-footed ferret's diet consists of prairie dogs (Black-footed Ferret Recovery Program 2011).

Within the Study Area, the black-footed ferret is listed as endangered by the USFWS in Kimball, Banner, Scotts Bluff, Morrill, Box Butte, and Dawes Counties. The NGPC Threatened and Endangered Species Range Map does not depict any estimated range for the black-footed ferret in Nebraska.

Potential for impacts are very limited as there are no known colonies or reintroduction sites in Nebraska. However, due to the black-footed ferret's dependence on prairie dogs and their closely coinciding ranges, prairie dog colonies along the corridor should be identified and assessed for suitable black-footed ferret habitat, and for the potential presence of black-footed ferrets.

Grey Wolf (State: Not Listed, Federal: Threatened): The grey wolf has a wide range of habitats due to their adaptability. Habitats include temperate forests, mountains, tundra, tiaga, and grasslands. The territory size of a wolf pack can range from 25 to 1,500 square miles (USFWS 2014b).

Within the Study Area, the grey wolf is listed as threatened by the USFWS in Kimball, Banner, Scotts Bluff Morrill, Box Butte, and Dawes Counties. The NGPC Threatened and Endangered Species Range Map does not depict any estimated range for the grey wolf in Nebraska. The USFWS has proposed to remove the grey wolf from the list of threatened and endangered Species under the ESA due to successful recovery efforts.

The listing status of the grey wolf should be identified prior to future project. Due to the large potential range of the grey wolf and the unknown occurrence of grey wolf in the Study Area, it is difficult to discern whether it would be impacted by future projects. NDOR should coordinate with NGPC and USFWS prior to future projects to identify any known occurrences of this species within the proposed project areas. Care should be taken to avoid and minimize potential impacts to the grey wolf.

Candidate Species: The USFWS has proposed two species, the Northern long-eared bat and rufa red knot (a shorebird that migrates through the state), for listing as threatened or endangered in Nebraska (USFWS 2013). Proposed species are those candidate species that were found to warrant listing as either threatened or endangered and were officially proposed as such in a Federal Register notice after the completion of a status review and consideration of other protective conservation measures (NOAA 2014). Within the Study Area, the Northern long-eared bat is listed as Proposed-Endangered by the USFWS in Box Butte and Dawes Counties, and rufa red knot is listed as Proposed-Threatened in Kimball, Scotts Bluff, Morrill, Box Butte, and Dawes Counties.

The listing status of these two species should be identified prior to future projects. NDOR should coordinate with NGPC and USFWS prior to future projects to identify any known occurrences of these species within the proposed project areas. Care should be taken to avoid and minimize potential impacts to these species.

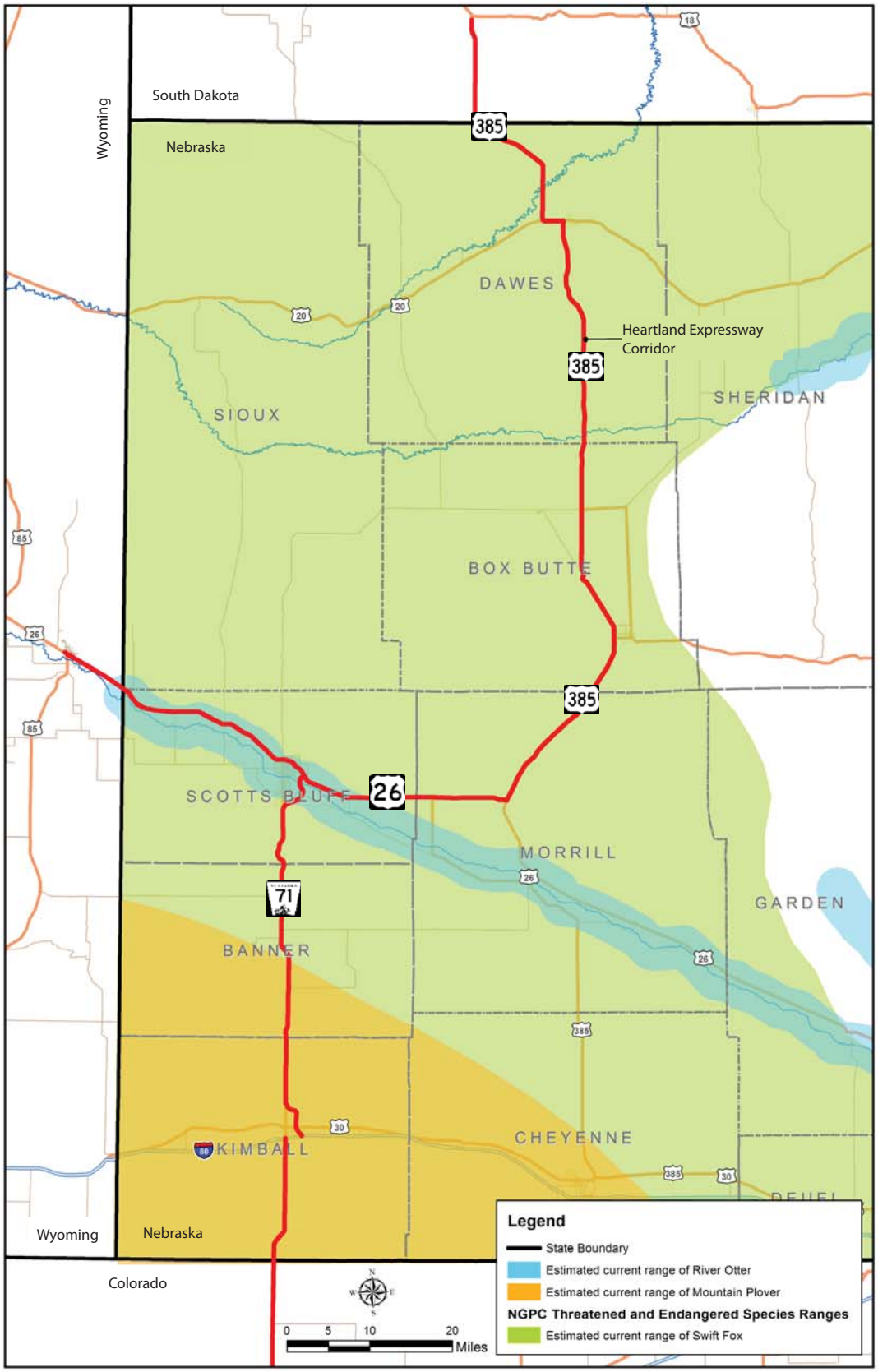


Figure 3.4 - Heartland Expressway Species Range Map 1

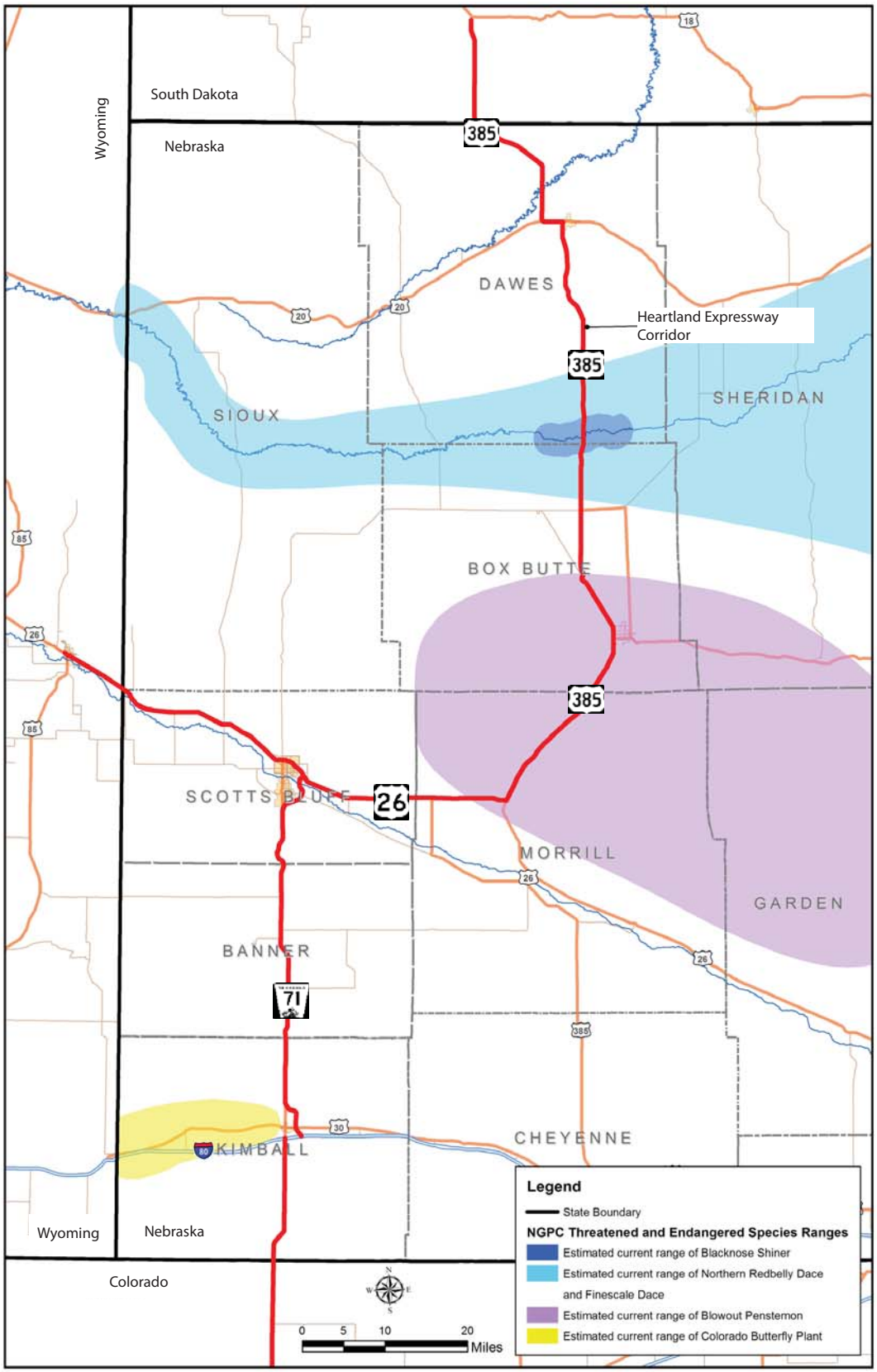


Figure 3.5 - Heartland Expressway Species Range Map 2

Other Sensitive Species

Nebraska is also home to many species of plants and animals that are not listed as threatened or endangered, but they are nonetheless important and require protection. The NNLP and the 2011 SWAP provides additional information on these resources and their "at-risk" status. For example, Bighorn sheep (*Ovis canadensis*) are listed as a Tier I At-Risk Species.

Bighorn Sheep

According to NGPC, bighorn sheep were extirpated from Nebraska in the early 1900s due to unregulated hunting, loss of habitat, and disease. In 1981, NGPC began reintroducing sheep at Fort Robinson State Park. In 2001, 2005, and 2007, three more reintroductions occurred, resulting in four herds of sheep in western Nebraska; two in the Pine Ridge area, and two in the Wildcat Hills area. Recently, in February 2012, NGPC reintroduced more sheep on a ranch west of Fort Robinson.

The recent reintroductions of bighorn sheep have resulted in young rams crossing US 385, but lambing activities east of US 385 are uncertain. Future bighorn sheep migration east of US 385 could be expected. The USFS Bighorn Sheep Land and Resources Management Plan (LRMP) set aside an approximately 2,400 acre bighorn sheep management area, which is located in the Nebraska National Forest approximately three miles south U.S. Highway 20 (US 20) and just east of US 385.

NDOR will work with NGPC to identify current and planned reintroduction sites and avoid or minimize impacts from roadway projects on these properties.

Rainbow Trout

According to the USFWS, the rainbow trout is placed among the top five sport fishes in North America as a result of its popularity among anglers. Reduction of trout habitat due to impacts including streambank and upland soil erosion, loss of riparian vegetation, water diversion, logging and mining activities, and point and non-point source pollution have reduced the distribution and abundance of rainbow trout. In addition, construction of dams, road crossings, and other structures impede the ability of rainbow trout to migrate upstream and downstream, which is critical to successful completion of their life cycles (NRCS 2000).

Most of the cold-water trout streams in Nebraska are found in the western and northern parts of state. This includes Ninemile Creek, which is a perennial favorite among trout anglers (NGPC 2012a). Additionally, brown trout and rainbow trout are listed by the NDEQ as key species in Ninemile Creek. Recently, trout have been found reproducing in Ninemile Creek (personal communication, John Moeschen, USACE, 20 March 2012).

Ninemile Creek is located in Scotts Bluff County where it originates north of the Study Area and flows through it in a southerly direction at US 26. Public access to Ninemile Creek at Ninemile Wildlife Management Area (WMA) is approximately five miles north of the existing roadway, therefore the public access area will likely be unaffected by future roadway projects

NDOR will work with NGPC to avoid or minimize impacts to public access to Ninemile Creek. If necessary, detours should be considered in order to accommodate public access. Future projects should take appropriate measures avoid or minimize disturbance on trout habitat in Ninemile Creek. Also, because Ninemile Creek is being utilized by trout for reproduction, coordination should occur with USFWS, NGPC, and USACE to survey which sections of the creek trout are utilizing for reproduction. Consideration should be taken to avoid construction near the creek during trout spawning season.

3.2.5 HABITAT

A habitat is the natural environment of an organism. Habitats can be terrestrial or aquatic, or share features of both. According to the USFWS, habitat is a combination of environmental factors that provides food, water, cover and space that a living thing needs to survive and reproduce (USFWS 2011b). Habitat types found in Nebraska include rivers and streams, lakes and ponds, wetlands, riparian areas, grasslands/prairie, forests, and urban.

Riparian Habitat

As described previously, there are several river and stream crossings within the Study Area. Some of these watercourses have significant riparian corridors associated with them. These riparian corridors can be wooded or grassed, but they serve similar purposes: to provide a buffer along the watercourse, increase habitat biodiversity, provide shade, improve water quality and more (BOR and USFWS 2006). Specific riparian zones identified within the Study Area are described in greater detail in Section 3.3 "Rational Sub-Corridors".

Biologically Unique Landscapes

Biologically Unique Landscapes (BULs) are those which have been declared priority landscapes for conservation by the NNLP. These landscapes consist of resources including natural aquatic and terrestrial communities and the species, specifically at-risk species that utilize these communities and landscapes. These BULs provide the greatest potential for the conservation of at-risk species and natural communities. Descriptions of BULs and Tier I species were gathered from the Nebraska Natural Legacy Project: State Wildlife Action Plan 2nd ed. (Schneider et al. 2011). The NNLP developed the SWAP to identify priorities for the conservation of Nebraska's rarest species, natural habitats, and biological diversity. According to the SWAP, to identify locations of key habitats, information on known locations of natural communities and at-risk species was used to identify a series of BULs. BULs were identified as areas of the state/landscapes with the greatest potential for at-risk species and natural community conservation. If these landscapes are managed properly they would conserve the majority of Nebraska's biological diversity. The highest at-risk species in the NNLP are the Tier I species, which are those that are globally or nationally at-risk. In addition to at-risk species, BULs also support a variety of common species. The BULs identified by the NNLP that lie within the Study Area include (listed from south to north) the Kimball Grasslands, South and North Wildcat Hills, North Platte River, Panhandle Prairies, Upper Niobrara River, Pine Ridge, and the Oglala Grasslands. The location of these BULs are depicted on Figure 3.6 on the following page.

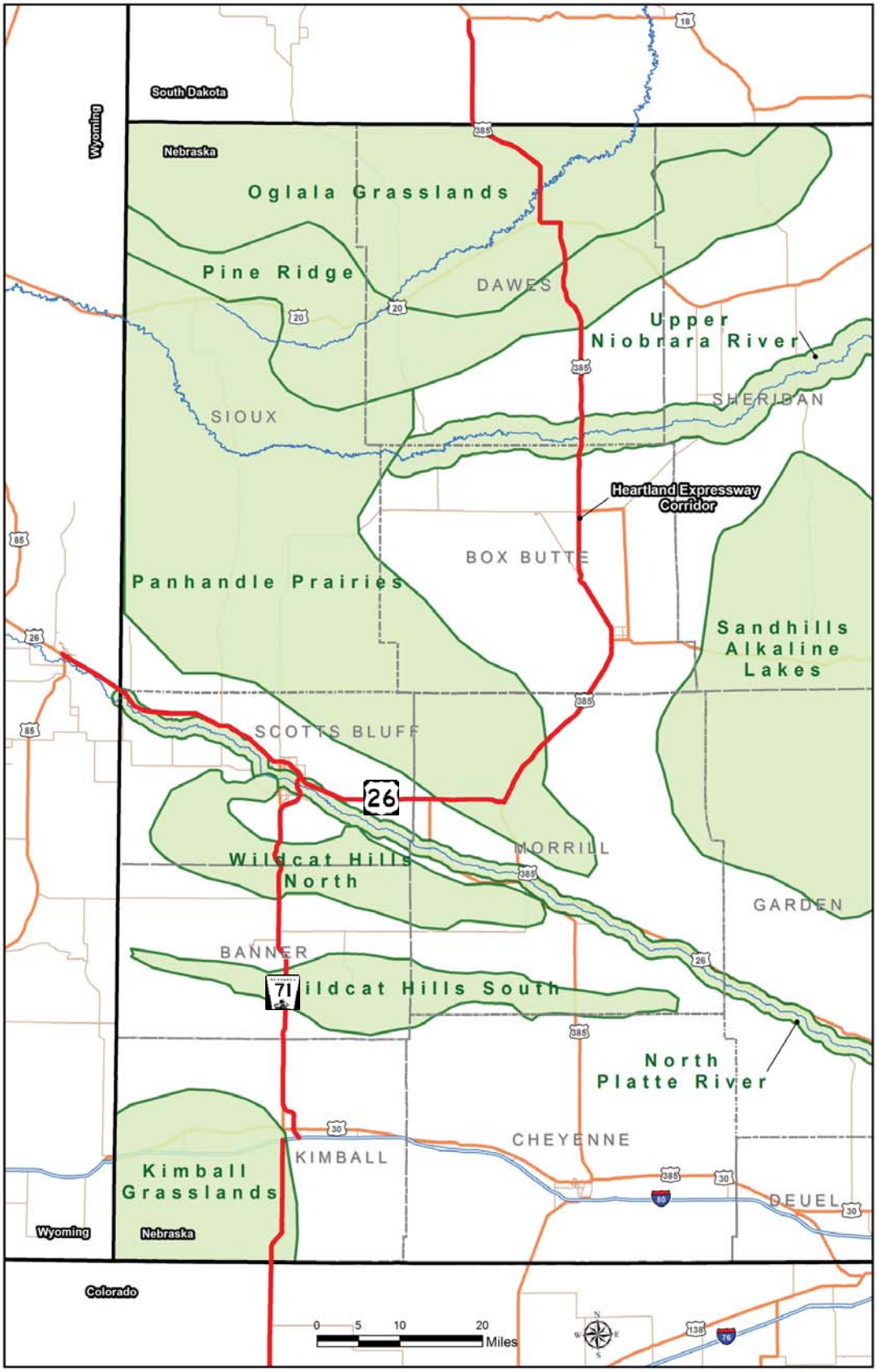


Figure 3.6 – Map of Nebraska's Biologically Unique Landscapes (Schneider et al. 2011)

Kimball Grasslands

According to the NNLP, the Kimball Grasslands is a BUL consisting of level to rolling hills and breaks in southwest Kimball County. The uniqueness of the Kimball Grasslands comes from its ability to support Nebraska's only population of the federally and state listed Colorado butterfly plant, within the Lodgepole Creek Valley. In this BUL the mountain plover nests in heavily grazed native grasslands. The level plains of the northern portion of the BUL support Playa wetlands. Tier I at-risk species occurring in this BUL are the Colorado butterfly plant, matted prickly-phlox, Short's Milkvetch, swift fox, burrowing owl, ferruginous hawk, loggerhead shrike, chestnut-collared longspur, Mccown's longspur, mountain plover, plains topminnow, Cheyenne northern pocket gopher, regal fritillary, and Colorado Rita dotted-blue. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Wildcat Hills

The Wildcat Hills BUL occurs on the south side of the North Platte River in Scotts Bluff, Banner, and Morrill counties. The Wildcat Hills is a rocky escarpment that rises several hundred feet. The north bluff of the escarpment is steep and deep canyons cut into the bluff. The canyons support stands of mountain-mahogany, eastern redcedar and Rocky Mountain juniper. The north-facing slopes of the escarpment support Ponderosa pine woodlands while the remainder of the Wildcat hills consists of mixed-grass prairie, rock outcrops, and scattered patches of sandsage prairie. The Wildcat Hills are home to one of three Rocky Mountain bighorn sheep populations in Nebraska. Several protected lands occur in the Wildcat Hills, including Scotts Bluff National Monument; Platte River Basin Environment's Bead Mountain, Carter Canyon, and Montz ranches; The Nature Conservancy's Murphy Ranch; and the NGPC's Cedar Canyon and Buffalo Creek Wildlife Management Areas and Wildcat Hills State Recreation Area. Tier I at-risk species occurring in this BUL are the dog-parsley, matted prickly-phlox, fringe-tailed myotis, Rocky Mountain bighorn sheep, swift fox, Bell's vireo, Brewer's sparrow, burrowing owl, long-billed curlew, pinyon jay, short-eared owl, regal fritillary, plains topminnow, and sagebrush lizard. Multiple natural aquatic and terrestrial communities are also present in this BUL.

North Platte River

According to the NNLP, the North Platte River BUL includes the river channel and associated wetlands and riparian woodlands within the valley from the upper end of Lake McConaughy to the Wyoming/ Nebraska border. The headwater reach of Pumpkin Creek is also included in this BUL. The North Platte River valley has a braided channel which is lined with trees. Although much of the river floodplain is farmed, both alkaline and freshwater wetlands remain. These wetlands are important stop over points for migratory birds. Tier I at-risk species occurring in this BUL are the large-spike prairie-clover, Platte River dodder, northern river otter, Bell's vireo, burrowing owl, trumpeter swan, regal fritillary and plains topminnow. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Panhandle Prairies

The Panhandle Prairie BUL occurs in the northern Panhandle from the Pine Ridge south to the North Platte River Valley. This BUL consists of plains and rolling hills which include the rough breaks and rocky outcrops associated with the Niobrara River in Central Sioux County and the North Platte River in Scotts Bluff and Morrill Counties. Isolated sand dunes also occur within the plains in west-central Sioux County. The Panhandle Prairies support extensive, intact prairie inhabited by swift fox, prairie dogs and grassland birds. The only protected lands in this BUL include (3 of the 4)the North Platte National Wildlife Refuge and a couple of small WMAs. Tier I at-risk species occurring in this BUL are the blowout penstemon, Gordon's wild buckwheat, large-spike prairie-clover, swift fox, Brewer's

sparrow, burrowing owl, ferruginous hawk, loggerhead shrike, long-billed curlew, chestnut-collared longspur, Mccown's longspur, nine-spotted ladybird beetle, regal fritillary, finescale dace, northern redbelly dace, plains topminnow and sagebrush lizard. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Upper Niobrara River

According to the NNLP, the Upper Niobrara BUL occupies the Niobrara River channel and a two-mile wide buffer on each side of the river, from eastern Cherry County westward to the Nebraska/Wyoming border. In the far west the Niobrara River is a narrow, cold-water stream with a gently sloping valley with few trees. As it progresses eastward, the river gains flows and the valley becomes entrenched with depths eventually reaching several hundred feet. Rocky outcrops are common along the valley bluffs with mixed-grass prairie occurring on most of the bluffs and ponderosa pine woodlands occupying portions of the bluffs. The Upper Niobrara River supports cold-water fish including the pearl dace, blacknose shiner and finescale dace. Nebraska's only known population of Ute ladies'-tresses orchid is supported in the wet meadows of the Niobrara River valley in western Sioux County. Several protected areas occur on the Upper Niobrara River, including the Agate Fossil Beds National Monument, The Nature Conservancy's Cherry Ranch, and Prairie Plains Resource Institute's Guadalcanal Memorial Prairie. Tier I at-risk species occurring in this BUL are the blowout penstemon, Gordon's wild buckwheat, large-spike prairie-clover, meadow lousewort, Ute ladies'-tresses, northern river otter, swift fox, Bell's vireo, Brewer's sparrow, burrowing owl, ferruginous hawk, long-billed curlew, trumpeter swan, regal fritillary, blacknose shiner, finescale dace, northern redbelly dace, and plains topminnow. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Pine Ridge

The Pine Ridge BUL occurs in Sioux, Dawes, and Sheridan counties in northwest Nebraska. Pine Ridge is a rocky, pine-dominated escarpment that rises several hundred feet from the surrounding plains. Ponderosa pine woodlands and forests, pine woodlands, and mixed-grass prairie occupy the majority of the slopes and bottoms of Pine Ridge. Several streams also originate in the Pine Ridge including the White River, Hat Creek, and Soldier Creek. The floodplains of these stream valleys support deciduous woodlands and meadows. Pine Ridge also supports two of the state's three populations of Rocky Mountain Bighorn Sheep. This BUL contains several protected areas including the Nebraska National Forest (Pine Ridge District), Fort Robinson State Park and several WMAs. Tier I at-risk species occurring in this BUL are the dog-parsley, Rocky Mountain bighorn sheep, swift fox, fringe-tailed myotis, Pierre northernpocket Gopher, Bell's vireo, Brewer's sparrow, ferruginous Hawk, pinyon jay, mottled duskywing, regal fritillary, and tawny crescent. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Oglala Grasslands

The Oglala Grasslands BUL occurs in the northwestern Panhandle north of the Pine Ridge. This BUL consists of plains and rolling hills, most of which are covered by mixed-grass prairie. Dispersed among the prairie are rock outcrops, badlands and small stream valleys. The Oglala Grasslands is one of the larger, intact grasslands remaining in Nebraska and contains extensive badlands. This BUL boasts several plant communities which occur nowhere else in the state. Tier I at-risk species occurring in this BUL are Barr's milkvetch, dog-parsley, Gordon's wild buckwheat, Rocky Mountain bulrush, Pierre northern pocket gopher, swift fox, Baird's sparrow, Bell's vireo, Brewer's sparrow, burrowing owl, chestnut-collared longspur, McCown's longspur, ferruginous hawk, loggerhead shrike, long-billed curlew and regal fritillary. Multiple natural aquatic and terrestrial communities are also present in this BUL.

Wildlife Corridors

Human activities have the potential to impact habitat. There are various human activities that can impact habitat, for example, damming rivers, logging, mining, clearing/grubbing, and various construction projects. Impacts to habitat can include destruction, degradation, and fragmentation. These types of impacts to habitat can be detrimental to wildlife and biodiversity. Fragmentation is a primary concern during roadway projects as they can divide wildlife habitats. Impacts to habitat can be reversed, avoided or minimized by conservation, habitat management and enhancement, and proper planning. By taking these steps, impacts to habitat and the wildlife that it harbors can be mitigated. One successful method for minimizing the impacts of habitat fragmentation has been the use of wildlife corridors. Wildlife corridors are areas or features which allow for the safe, efficient movement of wildlife from one area or habitat to another.

NDOR will coordinate with NGPC, Nebraska Land Trust (NLT), USFS, USFWS, and NPS to avoid or minimize impacts on wildlife and wildlife habitat from roadway projects. During the planning of future roadway projects it may be beneficial to consider and evaluate the development of wildlife corridors, crossways, or underpasses in areas of concentrated animal crossing to encourage safe crossing, help minimize roadway impacts to animals, and minimize the impacts of habitat fragmentation. These areas of concentrated animal crossing are currently unknown.

Habitat and wildlife studies/inventories could help to identify resources and assess the area for future roadway projects in order to determine, avoid, and/or minimize impacts to wildlife and wildlife habitat. As previously mentioned, the USFWS, in cooperation with NDOR, is currently performing a swift fox survey along the corridor. After the study concludes, a strategy would be developed to address swift fox habitat connectivity. This strategy would then be carried forward and applied to future projects created as a part of the Heartland Expressway Corridor. Additional wildlife and habitat connectivity studies could also be beneficial in locating concentrated wildlife crossings for other species and could be used in minimizing impacts of habitat fragmentation.

3.2.6 SECTION 106 AND TRIBAL CONSULTATION

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. The revised regulations, *Protection of Historic Properties* (36 CFR Part 800), which became effective on January 11, 2001 outline the guidelines for federal agencies to comply with Section 106 of NHPA. The Archeological and Historic Preservation Act of 1960 (16 USC 469-470), and Executive Order 11593 - Protection and Enhancement of the Cultural Environment, issued in 1971, provide additional directives to Federal agencies on historic preservation.

Executive Order 13175 - *Consultation and Coordination with Indian Tribal Governments* was given in order to establish regular and meaningful consultation and collaboration between tribal officials and federal agencies in the development of policies that have tribal implications. FHWA complies with Executive Order 13175 by participating in tribal consultation regarding policy and regulatory matters. Additionally, Section 106 of the NHPA requires that all federal agencies, including the FHWA, perform tribal consultation during undertakings that may affect tribal land, or properties that are religiously or culturally significant to a tribe whether on or off tribal land (USGSA 2012, FHWA *Tribal Issues*).

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) provides for the protection of Native American graves, and for other purposes. NAGPRA protects the ownership or control of Native American cultural items which are excavated or discovered on Federal or tribal lands. NAGPRA requires

that any person inadvertently discovering Native American cultural items on Federal land notifies the proper agency and the appropriate Native American Tribe. This act also provides that the intentional excavation and removal of Native American Human remains shall not occur unless a Section 4 permit under the Archaeological Resources Protection Act (ARPA) is issued or consent of the appropriate Indian tribe or Native Hawaiian organization is given.

Potential cultural resources within the Study Area include Native American artifacts (e.g. Cheyenne, Lakota Sioux, Arapaho), early European settlements and military installations, emigration trails (e.g. Oregon, Mormon, California, Pony Express, the Rebecca Winters gravesite), and even 20th century features (e.g. historic buildings, bridges, or sites).

Historical Properties and Archeological Sites

The Nebraska State Historical Society (NSHS) provided preliminary lists of known cultural resources in the Study Area, including historic properties and archeological resources. Segments where construction has already occurred (e.g. Kimball Bypass, existing four-lane roadway) or an environmental review is pending (Junction L62A to Alliance) were not considered for these lists.

A draft list of historic properties in the Study Area was provided in March, 2012 which identified two sites listed on the National Register of Historic Places (NRHP) and nine sites that are eligible for listing on the NRHP. This list is incomplete and subject to change in the future as new structures are identified or other structures deemed not eligible. When a future project is submitted a full review of properties will need to take place to identify historic properties that may be eligible for listing on the NRHP.

A preliminary list of known archeological sites and possible trail crossings within the Study Area was also provided. NSHS has performed archeological resource surveys on 27 of the 105 miles of existing two-lane roadway in the Study Area. Twelve known archeological sites were identified, three of which have been determined not eligible for the NRHP and the remainder are unevaluated. The list also identified nine possible trail crossings in the Study Area. Exact locations of historic sites, archeological sites, and possible trail crossings are not shown on maps for the purpose of privacy and because of the unknown location of the road at this time.

In addition, historical markers, such as the Chadron Creek Trading Post marker and the Fort Pierre-Fort Laramie Trail marker, are located along the Heartland Expressway Corridor. Historical markers themselves are not necessarily historic, but rather commemorate significant events, people, places, sites, movements, and traditions in Nebraska history (NSHS 2011). Also, according to the NSHS, the preferred location for historical markers is on public property or on property owned by non-profit organizations operating for public purposes; therefore, historical markers are not always located at an actual historic site, but are often located along roads and at other easily accessible public areas. The NSHS is responsible for coordinating the erection of historical markers in Nebraska. A list of historical markers by county, along with their location, can be found at the following NSHS website: http://www.nebraskahistory.org/publish/markers/texts/index.shtml.

Traditional Cultural Properties and Native American Resources

According to the NPS, traditional cultural properties (TCPs) are those that are associated with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. Examples of TCPs can range from neighborhoods or communities with significant cultural history to Native American ceremony or hunting grounds (Parker 1998). According to the NSHS, the Arapaho, Cheyenne, and Sioux (specifically the Oglala Lakota Sioux) tribes have documented history, oral traditions, and archeological sites throughout western Nebraska. Other tribes such as Apache, Arikara, Pawnee,

Kiowa, Wichita, Crow, Omaha, and Ponca may also have ancestral ties to the Study Area through the Central Plains and Dismal River Traditions. As Part of the study FHWA requested preliminary tribal consultation to identify potential sites in the Study Area. Section 3.5 "Agency Coordination" contains a detailed description of the results of the tribal coordination effort. Preliminary results yielded information from the Tribal Historical Preservation Officer (THPO) for the Pawnee Nation concerning five sites west of Chadron. These and other sites will be identified and considered prior to future projects through coordination with the tribes.

The scope of future projects will determine the scope of potential for archeological surveys and recovery efforts, as well as the potential for impacts to historical properties and TCPs. Therefore, NDOR will work with the NSHS to identify potential historical, archeological and traditional cultural resources that may be encountered on future projects along the Heartland Expressway Corridor in order to comply with Section 106. Based on Executive Order 13175 and Section 106, tribal coordination must occur for federally funded/government projects in order to consult those specific tribes who may have interests in project areas. During future projects consideration should be given to proper coordination with Tribal Governments.

3.2.7 PALEONTOLOGICAL RESOURCES

This section provides an overview of the paleontological resources in the Study Area, and background on laws and regulations affecting their discovery and treatment. Paleontology is the study of plant and animal life of past geologic time, including their evolutionary history, and their paleo-ecological interrelationships. This area of study does not include prehistoric human remains and their associated cultural artifacts (e.g. stone tools, pottery), which are the domain of archaeology. For the purposes of this document, the term "paleontological resources" includes not only fossils but associated physical items and data that contribute to the understanding of the fossils, such as associated datable rocks or organic matter and the physical characteristics of the fossils' associated sedimentary matrix.

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906, which requires protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federally-administered lands, including paleontological resources. Other federal requirements and guidelines for the protection of significant paleontological resources include NEPA, the Federal Land Policy and Management Act of 1976 (FLPMA), the National Preservation Act of 1966, and Title 43 CFR.

The FHWA considers protection of fossils on FHWA-funded projects a NEPA issue, but the extent of work required to protect the resource is based on the degree of protection afforded by each state's laws, and whether or not a project is located on federal land. For instance, fossil collection on USFS administered lands is regulated under 36 CFR 261.9(i), which prohibits "[e]xcavating, damaging, or removing any vertebrate fossil or removing any paleontological resource for commercial purposes without a special use authorization."

NDOR also has a fairly extensive and collaborative Salvage Program in place with the University of Nebraska Lincoln (UNL) and NSHS. This program seeks to protect and preserve when possible, and catalog and archive when appropriate, paleontological and historic remains if such remains would be disturbed by construction (NDOR n.d.). NDOR works with these agencies to research, investigate, and conduct field-reconnaissance to locate these sites several years prior to construction. Specifically, within the Study Area, NDOR has tested the Fort Mitchell site in Scotts Bluff County, and unearthed the fossils of at least 65 different animals along NE 71 through the Wildcat Hills area south of Gering.

The University of Nebraska State Museum has noted that a moderate to high paleontological potential exists in road cuts adjacent to the known paleontological sites throughout the Study Area. It is suggested that pedestrian surveys and minor excavations be conducted in areas adjacent to known sites prior to future construction. Known paleontological sites identified by the State Museum include eight sites within the right-of-way of existing two-lane highway between Colorado and South Dakota. Fifty-two (52) sites were observed when area was increased to five miles on each side of the right-of-way. One non-fossil related site also brought to attention by the State Museum is the type section[3] of the Kimball Formation located approximately one-half mile south of Exit 20 on Interstate 80 (I-80).

As previously noted, the potential exists for additional paleontological resources to be identified and encountered on future projects along the Heartland Expressway Corridor. It is advised that FHWA, NDOR, Cooperating Agencies, UNL and SHPO evaluate these projects for paleontological resources, and continue to implement the Salvage Program to ensure that these resources are protected. To identify and evaluate these areas of paleontological potential it is recommended that surveys and minor excavations are conducted prior to construction of future projects.

3.2.8 AIR QUALITY

Motor vehicle emissions are one of the major sources of air pollution. Such emissions vary with traffic volumes, distances traveled, travel speeds, and vehicle types. This study focuses on the current air quality of the Study Area to determine the potential for air quality degradation with an increase in vehicles, due both to background socioeconomic growth and improvements that increase a facility's attractiveness to drivers.

The Federal Clean Air Act passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. Basic elements of the act include National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutants standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions. Under the federal Clean Air Act, the EPA regulates air quality.

Areas of the country where air pollution levels persistently exceed that NAAQS may be designated as "non-attainment" areas. All portions of the Study Area are currently in attainment, or unclassifiable with respect to all pollutants for which a NAAQS exists.

In 2004, NDOR, FHWA, and NDEQ signed an Air Quality Memorandum of Understanding (MOU) identifying the minimum threshold requirements for detailed air quality analysis on federal-aid roadway projects in the State of Nebraska. According to the MOU, a detailed analysis only needs to be conducted on federal-aid projects when the 20-year projected ADT exceeds 100,000 vehicles per day. While there will be emission from increased traffic, the impact is expected to be negligible. No mitigation is likely to be required, but NDOR and NDEQ will continue to monitor this resource.

Mobile Source Air Toxics

Mobile source air toxics (MSATs) are hazardous air pollutants emitted by motor vehicles and other moving sources (e.g. airplanes, boats, and trains) which are known or suspected to cause cancer or other serious health and environmental effects. In 2001, the EPA issued its first MSAT Rule, which identified 21 MSAT compounds as being hazardous air pollutants that required regulation. The EPA issued a second MSAT Rule in February 2007, which generally supported the first rule and provided additional recommendations of compounds having the greatest impact on health, and also identified several engine emission certification standards that must be implemented (FHWA 2014a). According to the EPA, the final MSAT standards will significantly

[3]According to the McGraw-Hill Dictionary of Scientific and Technical Terms, a type section is that sequence of stra-ta identified as the original sequence for a location or area; the standard against which other stratigraphy of parts of the area are compared.

lower emissions of benzene and the other air toxics by lowering benzene content in gasoline, reducing exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees), and reducing emissions that evaporate from and permeate through portable fuel containers. Nationally, a substantial overall reduction in emissions is projected due to stricter engine and fuel emissions regulations issued by the EPA (EPA 2007).

FHWA released their *Interim Guidance on Mobile Source Air Toxic Analysis in NEPA*[4] in September 2009, and updated this guidance in December 2012. This guidance uses a tiered approach with three categories for analyzing MSATs in NEPA documents, depending on specific circumstances and the potential for MSAT effects:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

MSAT effects have not historically been a major issue in the State of Nebraska. The potential for meaningful MSAT increases or meaningful MSAT effects as a result of future projects along the Heartland Expressway Corridor are unknown at this time, and should be examined in more detail for individual projects. If an MSAT analysis indicates meaningful differences in levels of MSAT emissions, mitigation options should be identified and considered. FHWA's *Interim Guidance on Mobile Source Air Toxic Analysis in NEPA* includes information for prototype language and examples for the different categories of MSAT analysis, as well as MSAT mitigation strategies. This resource (or any updated guidance) should be consulted to assist in determining the level of MSAT analysis required for future projects along the Heartland Expressway Corridor.

3.2.9 NOISE

Noise is essentially "unwanted sound," and, by this definition, the perception of noise is subjective. Several factors affect the actual level and quality of sound as perceived by the human ear, but the focus of this inventory is to recognize that traffic noise has an effect on the quality of life near transportation facilities. This topic is covered because increased traffic using the Heartland Expressway Corridor could cause a corresponding increase in noise, and because federal law governs abatement of highway traffic noise under the Federal-Aid Highway Act of 1972, which requires FHWA to develop standards for mitigating highway traffic noise.

The FHWA regulations for mitigation of such noise in the planning and design of federally aided highways are contained in Title 23 CFR Part 772. The regulations require the following during the planning and design of a highway project: 1) identification of traffic noise impacts and examination of potential mitigation measures; 2) incorporation of reasonable and feasible noise mitigation measures into the highway project; and 3) coordination with local officials to provide helpful information on compatible land use planning and control. The regulations contain noise abatement criteria which represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. The regulations do not require that the abatement criteria be met in every instance. Rather, they require that every reasonable and feasible effort be made to provide noise mitigation when the thresholds are approached or exceeded.

NDOR is responsible for providing regulatory guidance and implementation of traffic noise analysis and abatement (e.g., noise barriers and other measures) in accordance with federal regulations. The State's "Noise Analysis and Abatement Policy" (effective date 13 July 2011), describes the requirements for conducting a noise analysis.

[4]http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm

In the Study Area, noise levels related to the FHWA Noise Abatement Criteria will need to be identified, and measures may need to be considered to reduce potential noise impacts. The traffic noise assessment findings will need to be included in the individual environmental documentation processes for future projects along the Heartland Expressway Corridor.

3.2.10 LOW-INCOME AND MINORITY POPULATIONS (ENVIRONMENTAL JUSTICE)

Executive Order 12898 (signed in 1994) directed Federal agencies to make Environmental Justice a part of its mission by identifying and addressing their programs', policies' and actions' effect on "minority populations and low-income populations." The Department of Transportation (DOT) has developed Environmental Justice initiatives to accomplish this goal by involving potentially affected populations in the decision-making process, and by developing projects that fit within communities, without sacrificing safety or mobility.

There are three main principles in Environmental Justice; (1) to avoid, minimize or mitigate disproportionately high adverse human health and environmental effects, including social and economic effects, on minority and low-income populations; (2) to ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and (3) to prevent the denial or reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Minority and low-income populations are defined by Title VI of the Civil Rights Act, which prohibits discrimination on the basis of race, color, or national origin. The FHWA issued Order 6640.23A in 2012, which established policies and procedures for the FHWA to use in complying with Executive Order 12898. Executive Order 12898 therefore compels the DOT and FHWA to address Environmental Justice issues affecting communities comprised of persons of the following groups:

- ***Black:*** any person with origins in any black racial groups of Africa
- ***Hispanic or Latino:*** any person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- ***Asian American:*** any person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent.
- ***American Indian or Alaskan Native:*** any person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition.
- ***Native Hawaiian or Other Pacific Islander:*** any persons having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- ***Low-Income:*** any persons whose household income (or in the case of a community or group, whose median household income) is at or below the U.S. Department of Health and Human Services poverty guidelines (FHWA 2012b).

Exact locations of minority and low-income populations that could be impacted will need to be determined at the project level with screening studies to determine the location of potentially affected populations, followed by a determination of whether the possibility of disproportionate impacts exists. If any disproportionate impacts are found, it will be necessary to determine the type of mitigation that is necessary and reasonable for each section.

Poverty (ACS 2012, Table DP03) and racial data (Census 2010, Table P5) are provided in Table 3.1.

Table 3.1 – Poverty and Racial Data from the 2010 Census

Area	Income or Poverty Level					Race							
	Median household income	Median family income	Per capita income	Families below poverty level	Individuals below poverty level	White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or more races	Hispanic or Latino (of any race)
U.S.	$53,046	$64,585	$28,051	10.9%	14.9%	72.4%	12.6%	0.9%	4.8%	0.2%	6.2%	2.9%	16.3%
State of Nebraska	$51,381	$64,820	$26,523	8.4%	12.4%	86.1%	4.5%	1.0%	1.8%	0.1%	4.3%	2.2%	9.2%
Banner County	$32,292	$50,208	$19,877	12.8%	18.0%	95.7%	0.0%	0.4%	0.0%	0.0%	3.2%	0.7%	3.8%
Box Butte County	$44,025	$53,786	$24,389	16.3%	19.9%	89.8%	0.5%	3.6%	0.3%	0.0%	3.4%	2.5%	10.2%
Dawes County	$36,974	$57,728	$20,345	14.5%	24.0%	89.4%	1.5%	3.9%	1.0%	0.5%	1.1%	2.5%	3.3%
Kimball County	$43,542	$54,566	$25,304	9.1%	10.8%	94.2%	0.2%	1.3%	0.7%	0.1%	1.8%	1.8%	6.4%
Morrill County	$42,025	$49,500	$21,881	11.2%	14.7%	91.2%	0.2%	1.1%	0.4%	0.0%	5.6%	1.5%	13.6%
Scotts Bluff County	$43,113	$53,264	$22,345	11.1%	15.1%	87.4%	0.6%	2.1%	0.6%	0.1%	7.4%	2.0%	21.1%
City of Alliance	$43,118	$52,742	$22,711	19.1%	23.4%	87.5%	0.5%	4.6%	0.3%	0.0%	4.2%	2.9%	12.3%
City of Chadron	$30,573	$50,608	$18,293	19.1%	30.7%	87.8%	1.6%	5.1%	0.8%	0.6%	1.1%	2.9%	3.6%
City of Gering	$50,850	$57,571	$25,093	6.7%	6.8%	89.6%	0.6%	1.5%	0.4%	0.1%	5.5%	2.4%	17.2%
City of Kimball	$41,745	$52,774	$23,547	9.4%	10.7%	93.8%	0.2%	1.5%	0.4%	0.1%	1.6%	2.5%	7.1%
City of Scottsbluff	$35,116	$42,250	$19,886	15.4%	21.7%	83.0%	0.8%	3.4%	0.8%	0.0%	9.8%	2.2%	29.1%

If any disproportionate impacts are found, it will be necessary to determine the type of impact, consider how the magnitude and severity of the impact can be prevented or reduced, and the type of mitigation that is necessary and reasonable for each section. For each alternative that will result in environmental justice concerns, mitigation measures should be carefully examined with the affected population. Mitigation measures should focus on true mitigation of the impact, rather than merely shifting the impact from one population to another. The approach is first to avoid impacts, if possible, then to minimize impacts, and finally to mitigate unavoidable impacts. Enhancements may also be considered for mitigation. Examples of enhancements include the addition of pedestrian and bicycle facilities; safety and education activities; beautification projects such as lighting, landscaping, and public art; historic preservation; improved access to neighborhood parks and recreation facilities; and conversion projects such as rails to trails.

NDOR will evaluate minority and low-income populations for individual projects and address potential impacts and mitigation during project-level NEPA reviews. Public outreach efforts pertaining to environmental justice issues should occur on a project-level basis and be tailored to the circumstances of each project.

3.2.11 POTENTIAL DISPLACEMENTS AND RELOCATIONS

Residential displacement results from the removal of occupied housing, and through the loss of available replacement housing. Displacement can occur by demolition of housing units, conversion of housing units from ownership to rental (or vice versa). Displacement can also occur by the process of neighborhood gentrification, in which a neighborhood or housing area changes in such a way that influences home prices so greatly that individuals are forced to move. Generally, when a large number of residences are lost, and the existing housing availability is low, there will be displacements.

Adverse human health effects resulting from displacements may include loss of family unity, overcrowding, homelessness, acceptance of inadequate or substandard housing, physiological and psychological stress, erosion of social cohesion, segregation, increased demand for social services, increased demand on transportation systems, and many more.

Acquisitions and relocations must be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended (42 USC 4601 et seq.), and the Nebraska Relocation Assistance Act (Neb. Rev. Stat. Section 76-1214 et seq.).

The Uniform Act provides protections and benefits for people affected by federal and federally assisted projects. Its purpose is to provide for uniform and equitable treatment of all persons relocated from their homes, businesses, and farms, without discrimination on any basis. The Uniform Act ensures fair compensation of property owners for their residential structures. It requires that the sponsor of a project provide financial and technical relocation assistance for relocated residents. The Uniform Act also contains allowances for renters. A one-time rental assistance payment is available for the tenant to find a decent, sanitary, safe dwelling for a period of 42 months.

While there are several populated places along the Heartland Expressway Corridor, the projects envisioned at this time would not result in the taking of large numbers of residences. However, NDOR will evaluate the potential for displacements and relocations during project-level NEPA reviews. Additionally, any property acquisition along the Heartland Expressway Corridor will occur in accordance with the Uniform Act.

3.2.12 PUBLIC LANDS AND COMMUNITY FACILITIES INCLUDING POTENTIAL SECTION 4(F)/6(F) PROPERTIES

There are several public lands and community facilities along the Heartland Expressway Corridor, including the Pine Ridge unit of the Nebraska National Forest, Chadron State Park, Chadron Creek Ranch Wildlife Management Area, North Platte National Wildlife Refuge, Wildcat Hills State Recreation Area, Scotts Bluff National Monument, numerous golf courses, local parks, and public and private campgrounds, as well as potential historic sites.

Nebraska National Forest

The Nebraska National Forest Pine Ridge District is located in Dawes County south of Chadron, NE on US 385. The Nebraska National Forest provides for camping and recreation in a natural setting. The 6,600-acre Pine Ridge National Recreation Area located in the Nebraska National Forest provides primitive and semi-primitive recreation in a natural environment. The Pine Ridge trail system provides approximately 80 miles of marked trails that accommodate hikers, horseback riders, and mountain bikers. The Red Cloud Campground site is generally located along the west side of US 385 and features 13 camping sites with picnic tables and fire grates, and a vault toilet. Nebraska National Forest also allows for back country or primitive camping anywhere on the National Forest (USFS *Nebraska National Forest and Grasslands*). NDOR will work with the USFS during future projects to avoid or minimize impacts to Nebraska National Forest's features, facilities, and operations.

Chadron State Park

Situated in the heart of the Nebraska National Forest Pine Ridge District, Chadron State Park is located in Dawes County nine miles south of Chadron on US 385. The park consists of more than 1,000 acres in the Pine Ridge and is dominated by ponderosa pines. Altitudes in some places of the park approach 5,000 feet. Chadron State Park hosts 22 cabins, a group camp/conference facility, and 70 modern campground pads. The park also offers other amenities such as a swimming pool, tennis and sand volleyball courts, a lagoon, concessions, shelters, showers, and modern restrooms. Chadron State Park provides for many outdoor recreational activities including fishing, nature viewing, hiking, and others (NGPC 2014). Hiking and bike trails are located throughout the park and adjoining Forest Service lands. The main entrance for Chadron State Park is accessed directly from US 385. Chadron State Park personnel have indicated heavy usage of this entrance during peak times and the potential for backed-up traffic to reach US 385. The park offers many visual resources and aesthetics, which are discussed further in Section 3.2.15 "Visual Resources and Aesthetics."

NDOR will work with NGPC to avoid or minimize impacts to State Park features, facilities, and operations during future projects.

Chadron Creek Ranch Wildlife Management Area

Chadron Creek Ranch Wildlife Management Area (WMA) is located in Dawes County, roughly ten miles south of Chadron and two miles south of Chadron State Park on US 385. This WMA consists of 2,449 acres and is primarily managed for wildlife and public use. Recreational activities available at Chadron Creek Ranch WMA include hunting, hiking, horseback riding, mountain biking, bird watching and photography. Adjacent to this WMA is National Forest property which allows for a larger tract of land available for public recreation. Chadron Creek Ranch WMA was purchased in 2003 with the assistance of Platte River Basin Environments, NGPC, and the Nebraska Environmental Trust. This WMA is now under the management and control of the NGPC (Platte River Basin Environments 2012). NDOR will work with the NGPC during future projects to avoid or minimize impacts to Chadron Creek Ranch WMA features and operations.

North Platte National Wildlife Refuge

Stateline Island is one of four units that make up the North Platte National Wildlife Refuge (NWR) and is the only unit that occurs within the Study Area. Stateline Island sits approximately one-half mile south of Henry, NE directly east of the Nebraska/Wyoming border and is in close proximity to US 26. Stateline Island is a 136-acre diversion project on the North Platte River and is one of four Refuge units that make up the North Platte NWR. The North Platte NWR is managed by the USFWS (USFWS n.d.). NDOR will work with the USFWS during future projects to avoid or minimize impacts to Stateline Island and its features and operations.

Wildcat Hills State Recreation Area, Nature Center and Big Game Reserve

The Wildcat Hills State Recreation Area (SRA), Nature Center and big game reserve is located in Scotts Bluff County ten miles south of Gering, NE. The area consists of 761 acres of rugged rock buttes and pine-covered canyons. In some areas of the Wildcat Hills elevations approach 5,000 feet. Facilities in the recreation area include a Nature Center, picnic tables, shelters, water, vault toilets, hiking trails and 30 non-pad campsites. Many of the buildings are built of native stone which was quarried nearby. Wood that was used to build roofs, bridges, and benches came from logs cut in the area. The Nature Center is an education facility, museum and interpretive center, and is located just off NE 71 (approximately 600 feet east of the highway). The big game reserve consists of 310 acres which holds a small herd of buffalo, elk, and sometimes longhorn cattle. Visitors are not allowed within the fenced reserve; however, these species can be viewed from the boundary fence. Other wildlife is also present on the reserve including turkey,

deer, bobcat, and coyote. The Wildcat Hills SRA, Nature Center, and big game reserve are managed by NGPC (NGPC 2012). NDOR will work with the NGPC during future projects to avoid or minimize impacts to Wildcat Hills SRA and its features and operations.

Scotts Bluff National Monument

Scotts Bluff National Monument is located in Scotts Bluff County roughly two miles south of US 26 and roughly two miles west of NE 71 near the cities of Scottsbluff and Gering. Scotts Bluff National Monument consists of 3,000 acres of which includes Scotts Bluff and the adjacent prairie lands. Scotts Bluff rises 800 feet above the North Platte River and served as a prominent landmark for Native Americans and the emigrants on the Oregon, California, and Mormon Trails. A three-mile scenic trail leads to the summit of Scotts Bluff Monument. Scotts Bluff National Monument also preserves the numerous wildlife species that reside in its boundaries. The movements of animal populations are somewhat restricted in and out of the Monument due to the surrounding private land, approximately half of which is agricultural (NPS *Scotts Bluff National Monument*).

Potential for impacts to Scotts Bluff National Monument appear to be unlikely due to its far distance from the current roadway. The potential for animal movement across NE 71 from the Monument is not a concern as their direction of movement is primarily north and south (personal communication, Ken Mabery, NPS, 15 March 2012). Also, as previously mentioned, the private land surrounding the Monument restricts the movement of animal populations outside of the boundaries of the Monument. In addition, the distance of the Monument from existing roadways minimizes the potential of wildlife crossings along future proposed roadways.

In addition to publicly accessible lands there are several other lands that either serve a public use or are owned by governmental agencies.

Nebraska Land Trust

The Nebraska Land Trust (NLT) was founded in 2001 as a 501(c)(3) non-profit organization, to provide conservation options for landowners who want to protect their land. Land trusts play a role in protecting natural and historical resources on private land primarily through conservation easements (NLT *n.d.*). Although the NLT holds conservation easements on private lands, the intent of these easements is for a public purpose as their role is to protect natural and historic resources. The NLT currently has 1,667 acres under easement on two private properties in Dawes and Sioux Counties, all west of the Heartland Expressway Corridor. A third easement is being worked on in Dawes County (also west of the Heartland Expressway Corridor) that would bring another 592 acres under protection, pending funding. The NLT is also obtaining conservation easements in the Pine Ridge area to help maintain scenic views and habitat for wildlife, especially bighorn sheep and other at-risk-species (personal communication, Dave Sands, 20 March 2012).

NDOR will communicate with NLT to avoid and minimize impacts to current and future NLT conservation easements.

Minuteman III Missile Silos

Francis E. Warren Air Force Base (Warren AFB), home to the 90th Missile Wing, is located in Cheyenne, Wyoming, approximately 60 miles west of Kimball, Nebraska, and NE 71. Warren AFB and the 90th Missile Wing host 150 Minuteman III Intercontinental Ballistic Missiles in an area extending from Cheyenne to east of Sidney, Nebraska, and from Sterling, Colorado to Scottsbluff, Nebraska (i.e. the Wing area) as shown in Figure 3.8. Individual missile installations are widely dispersed in underground, hardened Launch Facility (LF) silos within the Wing area. For every grouping, or "flight" of ten LFs in the field, there is one manned Launch Control Center (LCC) providing command and control interface with the LFs. Each polygon on the figure represents an approximate area containing a single "flight" of

approximately ten missile LFs, and one LCC. Additional missile maintenance and training facilities are also located at Warren AFB.

While the exact location of individual missile silos is not publicly available information, NDOR has a long history of coordinating with Warren AFB and the 90th Missile Wing regarding projects in this area of the state, and will continue to coordinate with them on future projects.

Additionally, any historic sites identified along the Heartland Expressway Corridor may have the potential to be a Section 4(f) property. NDOR will work with the NSHS to identify historic sites along the corridor that may warrant Section 4(f) consideration.

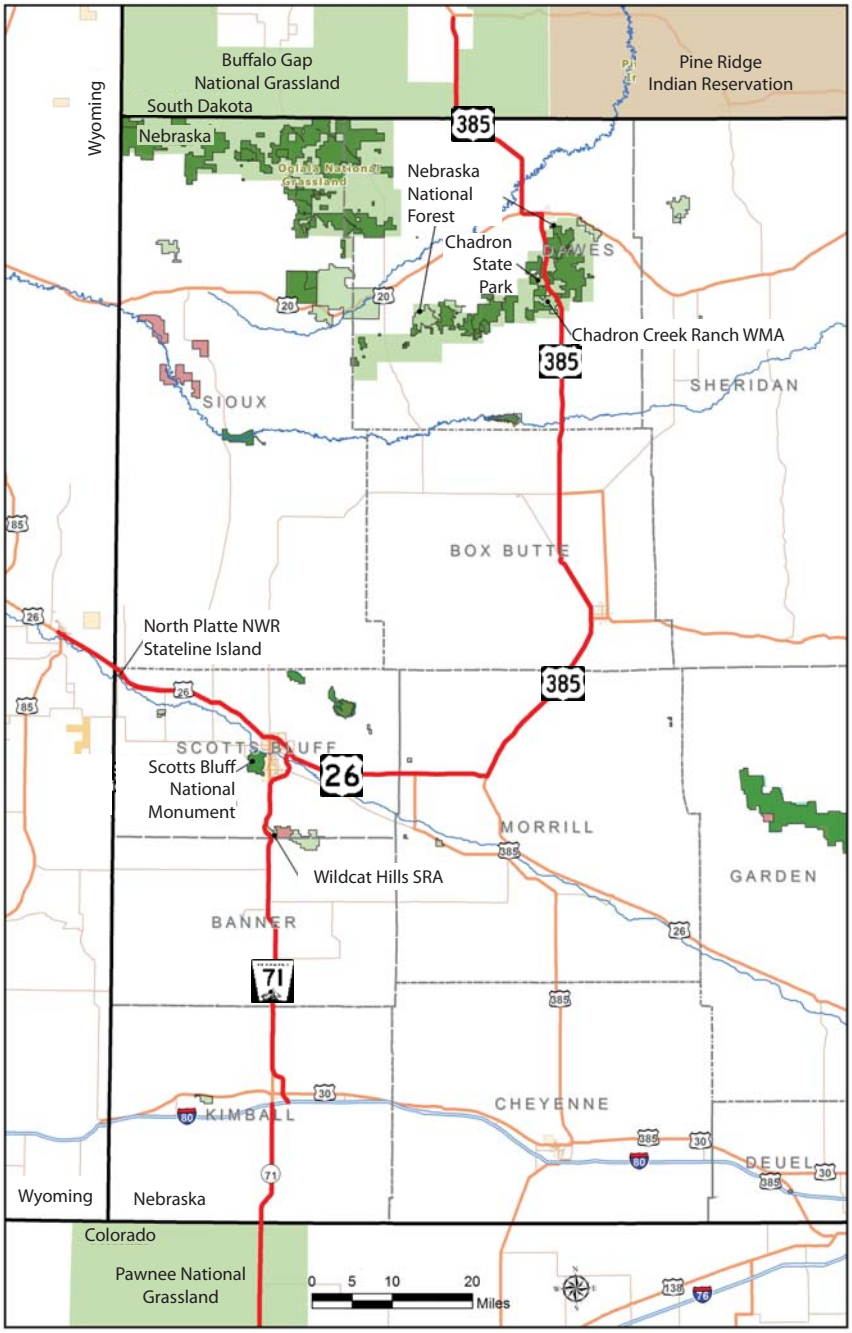


Figure 3.7 – Heartland Expressway Section 4f

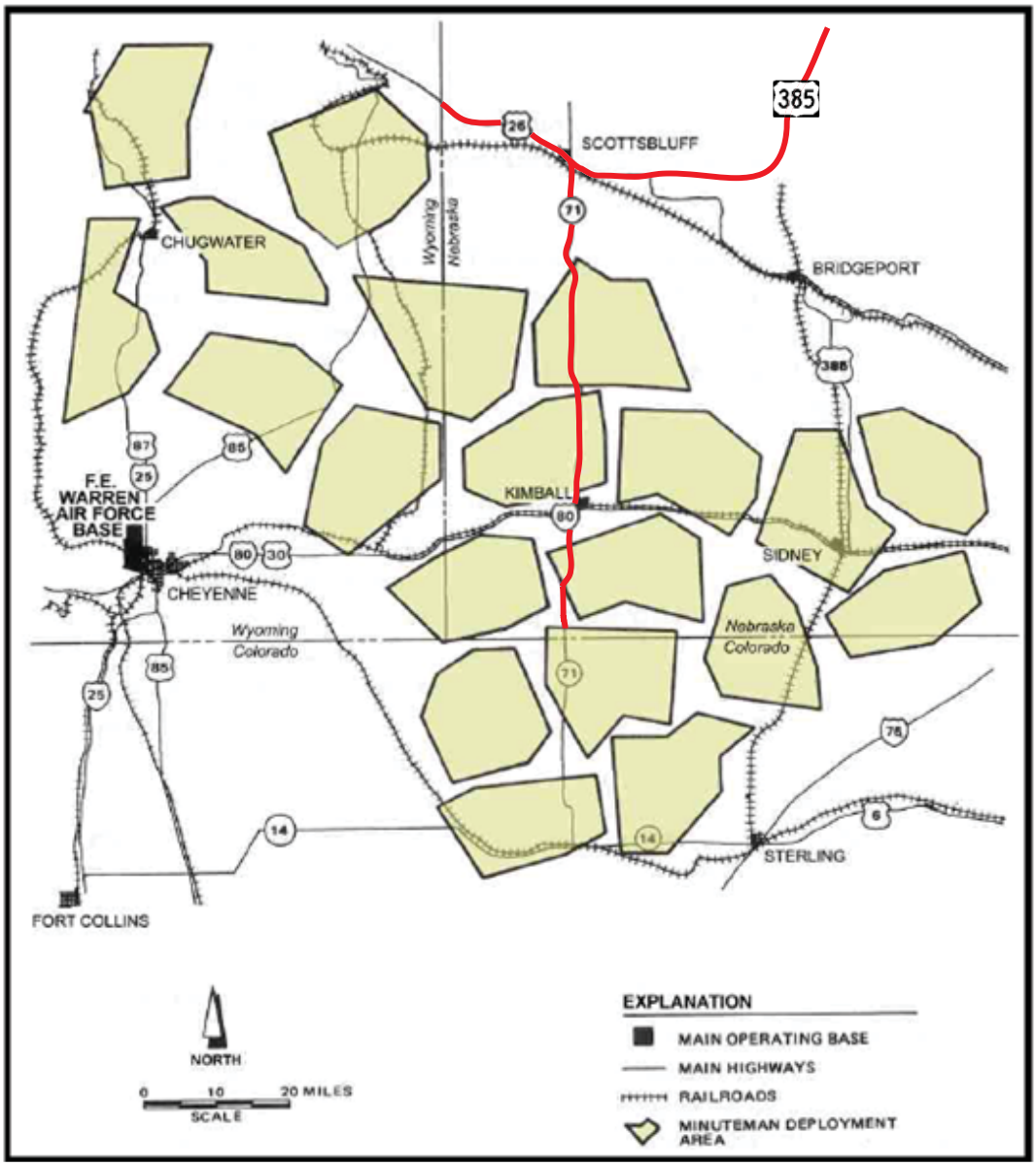


Figure 3.8 – Warren AFB Minutemen Deployment Areas

3.2.13 PRIME AND IRRIGATED FARMLAND

7 CFR Part 658 defines policies for complying with the Farmland Protection Policy Act of 1981 (FPPA), and outlines guidelines for federal agencies to take into account any adverse effects on farmland and develop alternatives that would avoid or mitigate such adverse effects. Farmland is defined as "prime or unique farmlands" or "farmland of statewide or local importance. "'Farmland' does not include land already in or committed to urban development or water storage."

As required by the FPPA, NDOR will coordinate with the National Resources Connservation Service (NRCS) to determine potential areas of prime farmland for future projects and will work to avoid and minimize impacts to prime farmland to the extent possible.

3.2.14 VISUAL RESOURCES AND AESTHETICS

Within the Study Area there are numerous locations such as Chadron State Park, Nebraska National Forest, NLT conservation easement areas, Pine Ridge, Wildcat Hills, privately owned land, and multiple other features and areas that provide visual and aesthetic resources. These areas have varied landscapes that provide scenic views, vistas, and viewing opportunities of standing structures, rolling hills, surface waters, forests, and wildlife. Specific visual landscapes identified within the Study Area are described in greater detail in Section 3.3 "Rational Sub-Corridors." Future projects occurring in the Study Area may produce changes in visual resources and aesthetics both temporarily and permanently. NDOR will coordinate with the managers of these resources, the public, and other interested parties to minimize these effects, and possibly to create opportunities to enhance views of unique visual resources.

Scenic Byways

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration "Established in Title 23, Section 162 of the United States Code under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and reauthorized and expanded significantly in 1998 under TEA-21 and again under SAFETEA-LU in 2005, the program is a grass-roots collaborative effort established to help recognize, preserve and enhance selected roads throughout the United States." The program recognizes roads having outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities and provides for designation of these roads as National Scenic Byways, All-American Roads or America's Byways (FHWA 2013a). Recently, the passing of MAP-21 in 2012 eliminated the National Scenic Byways Program; however, some scenic byway projects may be eligible under other Transportation Alternative programs.

Gold Rush Scenic Byway

The Gold Rush Scenic Byway is a 158-mile byway along US 385 that traverses the panhandle of Nebraska north and south from the Nebraska/South Dakota border to the Nebraska/Colorado border. It is also a part of the Canadian American (CANAM) Highway which runs from Canada to Mexico. This Scenic Byway is a historic route that was used to transport over $200,000 worth of gold out of the Black Hills between 1874 and 1881. Scenery along this byway includes sandhills, pine-covered buttes, rolling hills, and river valleys. In the Study Area the Gold Rush Scenic Byway passes by and through many unique landscapes in the Study Area including Chadron State Park and the Pine Ridge District of the Nebraska National Forest. Outside of the Study Area it passes by unique landscapes such as Courthouse Rock and Jail Rock outside of Bridgeport (Nebraska Department of Economic Development n.d.).

3.3 RATIONAL SUB-CORRIDORS

This section describes potential sub-corridors that could be considered to have independent utility, connect logical termini, and not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. The rational end points of these sub-corridors were generally identified by highway junctions and population areas, and represent corridors of sufficient length to look at all potential impacts. Although some of these sub-corridors are relatively long, construction may be "staged," or programmed for shorter sections as funding permits. This set of sub-corridors may change or be refined in the future, but for the purposes of this report, the list provides a framework for identifying groups of environmental issues based on similar geographic or transportation characteristics that may need to be addressed, and also provides a starting place for future projects and planning efforts.

- NE 71, from CO Highway 14 to I-80, south of Kimball, NE
- NE 71, from I-80 to US 26, east of Scottsbluff, NE
- US 26, from Torrington, WY to Morrill, NE
- US 26, from Morrill, NE to Scottsbluff, NE
- US 26, from Scottsbluff, NE to Minatare, NE
- US 26 and Nebraska Highway Link 62A (L62A), from Minatare, NE to US 385 intersection

- US 385, from L62A intersection to Alliance, NE
- US 385, from Alliance, NE to Dodge Road (L7E), east of Hemingford, NE
- US 385, from Dodge Road (L7E), east of Hemingford, NE to US 20 in Chadron, NE
- US 385, from US 20 in Chadron, NE to Oelrichs, SD

Several of these sub-corridors cross state boundaries, which are often used as programming or funding limits. However, in defining the purpose and need for future projects, which could include portions or groups of these sub-corridors, careful consideration should be given to actual transportation demands and needs, which are rarely defined solely by political boundaries. Nonetheless, for this report, the focus is on the Nebraska portion of these segments. A general description of each sub-corridor and a summary of the most likely environmental issues to be encountered are presented below.

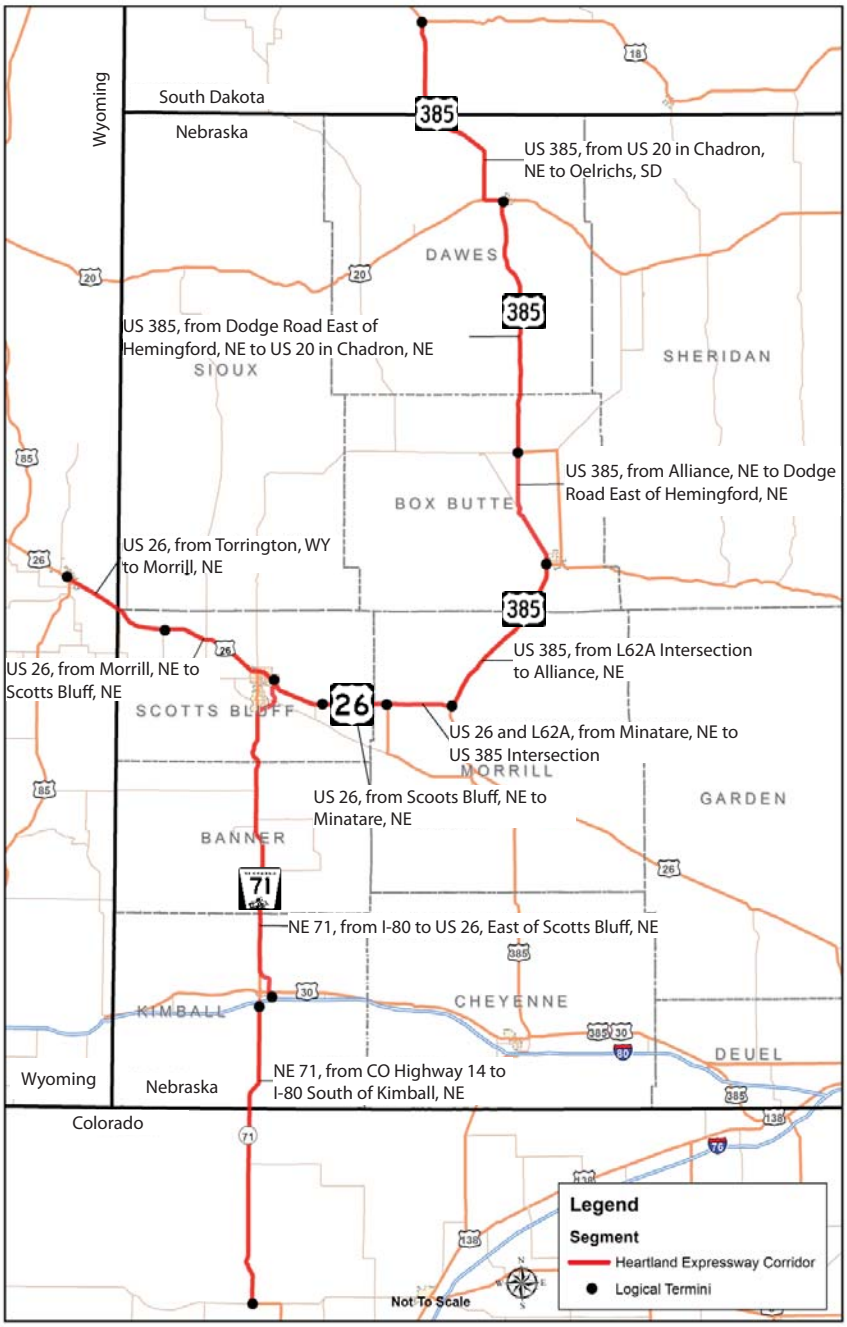


Figure 3.9 – Heartland Expressway Sub-corridors

3.3.1 NE 71, FROM CO HIGHWAY 14 TO I-80, SOUTH OF KIMBALL, NE

Figure 3.10 – Minuteman III missile silo, just north of Nebraska/Colorado border

Figure 3.11 – Clean Harbors Hazardous Materials Recycling and Disposal Center

Beginning at the Colorado/Nebraska border, this segment is approximately 15 miles long, and traverses the Flat to Rolling Plains sub-region of the High Plains ecoregion, which is characterized by flat to rolling plains covered with mixed- and short-grass prairie, and dryland cropland with large areas of irrigated agriculture, with few intermittent streams.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four-lanes, addition of passing lanes, intersection modifications, geometric upgrades, and enhancement projects.

Potential resources affected in this segment include:

- Kimball Municipal Airport (south of Kimball, NE)
- High Point Motor Speedway (south of Kimball, NE)
- Kimball Grasslands BUL
- Minuteman III Missile Silo Installments
- Clean Harbors Environmental (Hazardous Materials Recycling and Disposal)
- Oil and gas impacts (several pipelines and oil fields)
- Waters of the United States (several unnamed streams)
- Playa Wetlands
- Swift Fox
- Mountain Plover
- Colorado Butterfly Plant (west of Kimball, NE)
- Pawnee National Grassland (in Colorado)

3.3.2 NE 71, FROM I-80 TO US 26, EAST OF SCOTTSBLUFF, NE

This segment is approximately 50 miles long, and also traverses the Flat to Rolling Plains, the Pine Bluffs and Hills, and the Platte River Valley and Terraces sub-regions of the Western High Plains ecoregion. The Pine Bluffs and Hills sub-region is characterized by bluffs, escarpments, and steep valley side slopes covered with mixed grass prairie and rangeland, as well as rock outcrops. The Platte River Valley and Terraces sub-region is characterized by flat alluvial valleys, bluffs and uplands covered with lowland tallgrass, mixed-grass and sandsage prairies, floodplain woodlands, irrigated cropland and native rangelands.

This segment has already been improved to a four-lane roadway, including a northeast bypass around Kimball, north of I-80. Major improvements are not expected in this segment, but may include enhancements (e.g. rest areas) or intersection modifications.

Figure 3.12 – NE 71, north of Kimball, already widened to 4 lanes

Potential resources along this segment include:

- Municipal Energy Agency of Nebraska (MEAN) Kimball wind farm (i.e. future expansion)
- Wildcat Hills State Recreation Area
- Waters of the United States (Pumpkin Creek, Lodgepole Creek, North Platte River)
- Category 5 Impaired Waters (North Platte River, Winters Creek, Gering Dam)
- Irrigation canals (Fort Laramie Canal, Gering Canal, Kimball Canal)
- Wellhead Protection Areas (City of Kimball, Scotts Bluff County SID #10, City of Gering, City of Scottsbluff)
- Playa wetlands and Western Alkaline wetlands
- Swift fox
- Mountain plover
- Bighorn sheep
- Colorado butterfly plant (west of Kimball, NE)

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U.S. Department of Transportation

3.3.3 US 26, FROM TORRINGTON, WY TO MORRILL, NE

This segment is approximately 14 miles long, from the Wyoming/Nebraska border to Morrill, NE, and traverses the Platte River Valley and Terraces sub-region of the Western High Plains ecoregion. These areas are characterized by flat alluvial valleys, bluffs and uplands covered with lowland tallgrass, mixed-grass and sandsage prairies, floodplain woodlands, irrigated cropland, and native rangelands.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four-lanes, addition of passing lanes, intersection modifications, bypasses, geometric upgrades, and enhancement projects.

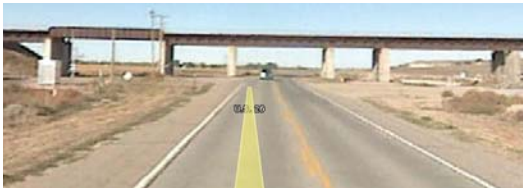

Figure 3.13 – US 26, two-lane highway passing under BNSF railway. This picture is looking west, showing US 26, between Henry and Morrill, NE, where the BNSF railroad (double track) crosses the highway and the adjacent Tri-State Canal (right side of the photo). Improving the highway to four-lanes at this location may require modifications to the overpass and coordination with the local irrigation district.

Potential resources affected in this segment include:

- North Platte National Wildlife Refuge (Stateline Island, south of Henry, NE)
- BNSF Railway coordination (overpass near City Road D)
- Irrigation canal crossings (Farmers Canal and Tri-State Canal)
- Wellhead Protection Areas (Village of Henry, Village of Morrill)
- Waters of the United States (Sheep Creek, North Platte River)
- Floodplains (Sheep Creek, Tub Springs Drain)
- Cultural/Historic properties (emigration trails, Pony Express)
- Business impacts (downtown Morrill, NE and Henry, NE)
- Socio-economic impacts
- Western Alkaline wetlands
- Swift fox

3.3.4 US 26, FROM MORRILL, NE TO SCOTTSBLUFF, NE

This segment is approximately 18 miles long, and traverses the Platte River Valley and Terraces sub-region of the Western High Plains ecoregion. These areas are characterized by flat alluvial valleys, bluffs and uplands covered with lowland tallgrass, mixed-grass and sandsage prairies, floodplain woodlands, irrigated cropland, and native rangelands.

This segment is currently a four-lane roadway. Potential improvements in the future would likely be limited to intersection modifications and enhancement projects.

Potential resources along this segment include:

- BNSF Railway coordination
- Cultural/Historic Properties (emigration trails, Pony Express)
- Category 5 Impaired Waters (Tub Springs Drain, Winters Creek)
- Irrigation canals (Tri-State Canal, Enterprise Canal)
- Wellhead Protection Areas (Village of Morrill, City of Mitchell, City of Gering, City of Scottsbluff, Northside Mobile Home Ranch, Sunflower Mobile Home Court)
- Business and Industry impacts (downtown Mitchell, NE, industries northwest of Scottsbluff, NE)
- Swift fox

3.3.5 US 26, FROM SCOTTSBLUFF, NE TO MINATARE, NE

This segment is approximately seven miles long, and traverses the Platte River Valley and Terraces sub-region of the Western High Plains ecoregion. These areas are characterized by flat alluvial valleys, bluffs and uplands covered with lowland tallgrass, mixed-grass and sandsage prairies, floodplain woodlands, irrigated cropland, and native rangelands.

This segment is currently a four-lane roadway. Potential improvements in the future would likely be limited to intersection modifications and enhancement projects. An Environmental Assessment was prepared for this segment in 1997, which addressed specific issues when the road was upgraded from two lanes to four.

Potential resources affected in this segment include:

- BNSF Railway coordination
- Cultural/Historic Properties (Rebecca Winters Memorial Park and Gravesite)
- Category 5 Impaired Waters (Winters Creek, Ninemile Creek)
- Irrigation canals (Minatare Canal, Fairfield Seep)
- Wellhead Protection Areas (City of Minatare, Minatare Plaza)
- Western Alkaline wetlands
- Swift fox
- River otter

3.3.6 US 26 AND L62A, FROM MINATARE, NE TO US 385 INTERSECTION

This segment is approximately 18 miles long, and traverses the Platte River Valley and Terraces, and the Pine Bluffs and Hills sub-regions of the Western High Plains ecoregion. These areas are characterized by flat alluvial valleys, bluffs and uplands covered with lowland tallgrass, mixed-grass and sandsage prairies, floodplain woodlands, irrigated cropland, and native rangelands.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four lanes, additional passing lanes, intersection modifications, geometric upgrades, and enhancement projects. An Environmental Assessment was prepared in 1997 for this segment to address specific concerns related to the proposed widening to four lanes.

Potential resources along this segment include:

- Business and Industry impacts (numerous feed lots)
- Residential impacts (numerous homes close to the existing roadway)
- Waters of the United States (Ninemile Creek, Wildhorse Creek, West Water Creek, Red Willow Creek)
- Irrigation canals (Minatare Drain, Bayard Drain, Wildhorse Drain)
- Floodplains (Ninemile Creek)
- Unique natural features (Wildhorse Canyon)
- Cultural/Historic Properties
- Swift fox
- River otter
- Prairie dog colonies
- Black-footed ferret
- Blowout penstemon
- Trout
- Panhandle Prairies Biological Unique Landscape

3.3.7 US 385, FROM L62A INTERSECTION TO ALLIANCE, NE

This segment is approximately 24 miles long, and traverses the Sand Hills sub-region of the Nebraska Sand Hills ecoregion, which is characterized by sand sheets and extensive fields of sand dunes, covered by mixed grass prairie and rangeland.

This segment is currently a two-lane roadway, and is planned to be improved to a four-lane roadway in the near future. An Environmental Assessment is currently being prepared for this segment which addresses the currently proposed improvements.

Potential resources in this segment include:
- BNSF Railway coordination
- Business and Industry impacts (Alliance, NE)
- Residential impacts (Angora, NE)
- Wellhead Protection Areas (City of Alliance)
- Sandhills wetlands
- Waters of the United States (Snake Creek)
- Blowout penstemon
- Swift fox
- Prairie dog colonies
- Cultural/Historic Properties
- Panhandle Prairies Biological Unique Landscape

3.3.8 US 385, FROM ALLIANCE, NE TO DODGE ROAD (L7E), EAST OF HEMINGFORD, NE

This segment is approximately 17 miles long, and traverses the Flat to Rolling Plains sub-region of the High Plains ecoregion, which is characterized by flat to rolling plains covered with mixed-and short-grass prairie, and dryland cropland with large areas of irrigated agriculture, with few intermittent streams.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four-lanes, addition of passing lanes, intersection modifications, geometric upgrades, and enhancement projects.

Potential resources affected in this segment include:
- BNSF Railway coordination
- Irrigated cropland impacts
- Waters of the United States (North Branch Box Butte Creek, South Branch Box Butte Creek, Hemingford Creek, Berea Creek)
- Swift fox
- Blowout penstemon

3.3.9 US 385, FROM DODGE ROAD (L7E), EAST OF HEMINGFORD, NE TO US 20 IN CHADRON, NE

This segment is approximately 36 miles long, and traverses the Flat to Rolling Plains, the Sandy and Silty Tablelands, and the Pine Ridge Escarpment sub-regions of the Western High Plains ecoregion. The Flat to Rolling Plains are characterized by mixed- and short-grass prairie, and dry cropland with large areas of irrigated agriculture, with few intermittent streams. The Sandy and Silty Tablelands are characterized by tablelands with areas of moderate relief, some areas of isolated sand dunes, and canyons along stream valleys, with mixed-grass prairies, rangeland, and limited agriculture. The Pine Ridge Escarpment is characterized by alternating ridges and valleys with entrenched channels and rock outcrops, covered with ponderosa pine woodlands and mixed-grass prairie, with cattle grazing and wildlife habitat and limited agriculture.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four-lanes, addition of passing lanes, intersection modifications, geometric upgrades, and enhancement projects.

Potential resources affected in this segment include:

- Pine Ridge District of the Nebraska National Forest (private and federal owned lands)
- Chadron State Park
- Chadron Creek Ranch Wildlife Management Area
- Bighorn Sheep Management Area
- Multiple public and private campgrounds and open spaces
- Pine Ridge Job Corps
- NLT Conservation Easement Lands
- Cultural/Historic Properties (Fort Robinson-Camp Sheridan-Pine Ridge Agency Road)
- Waters of the United States (Chadron Reservoir, Chadron Creek, Niobrara River, Pebble Creek, Cottonwood Creek, Dry Creek)
- Category 5 Impaired Waters (Niobrara River, Chadron Creek)
- Ridgeview Golf Course (south of Chadron, NE)
- Socio-Economic impacts (Redwood Trailer Court south of Chadron, NE)
- Business impacts (Chadron, NE)
- Greenwood Cemetery (Chadron, NE)
- Wellhead Protection Areas (City of Chadron)
- Blacknose shiner, finescale dace and redbelly dace
- Swift fox
- Bighorn sheep
- Upper Niobrara and Pine Ridge Biologically Unique Landscapes

Figure 3.14 – Approaching the Niobrara River on US 385

Figure 3.15– Niobrara River crossing US 385

Figure 3.16 – US 385 in Nebraska National Forest approaching the Pine Ridge Job Corps

Figure 3.17 – Chadron State Park along US 385

Figure 3.18 – Chadron Reservoir

3.3.10 US 385, FROM US 20 IN CHADRON, NE TO OELRICHS, SD

This segment is approximately 32 miles long, and traverses the Semiarid Pierre Shale Plains sub-region of the Northwest Great Plains ecoregion, which is characterized by un-glaciated, undulating to rolling plains, with steep sided, incised stream channels. The vegetation is mixed-grass prairie, with cattle grazing and some limited dryland farming.

This segment is currently a two-lane roadway. Potential improvements in the future could span a range of projects, including, but not limited to: widening to four-lanes, addition of passing lanes, intersection modifications, geometric upgrades, and enhancement projects.

Potential resources affected in this segment include:

- Cultural/Historic (Historical marker just north of U.S. 20 / U.S. 385 intersection)
- Wellhead Protection Area (Eagles Nest Estates)
- Waters of the United States (White River, Rush Creek)
- Swift fox
- Oglala Grasslands Biologically Unique Landscape
- Buffalo Gap National Grassland (in South Dakota)

Figure 3.19 – US 385 looking north just north of US 20

Figure 3.20 – Work beginning on widening US 385 to four-lanes north of Oelrichs, SD

3.4 AGENCY COORDINATION

As part of the Heartland Expressway Corridor Development and Management Plan (CDMP), FHWA requested preliminary agency coordination with interested resource agencies to identify potential concerns, and gather input on possible environmental resources to be considered in the environmental review section of the CDMP. Agency coordination consisted of multiple emails and a resource agency meeting held on March 20th, 2012 at the NDOR District Office in North Platte, NE. Agencies in attendance at the meeting include FHWA, NDOR, USFWS, NGPC, USACE, NLT, NSHS, USFS, and University of Nebraska State Museum. Agencies invited to the meeting but who were unable to attend were the BOR, EPA, NPS, NDEQ, Upper Niobrara White NRD, North Platte NRD and South Platte NRD. The agencies not in attendance but that had relevant concerns sent responses via email prior to the meeting. Concerns, comments, and other identified resources brought to attention by the various agencies have been incorporated into this document, and are also included in the Public Involvement Appendix (Appendix E).

Preliminary tribal coordination was also requested by FHWA for this project. A list of tribes with potential interests in the Study Area was generated using several resources, including maps of historic treaties and land claims. The NSHS then contributed a list of additional tribes that might also have interests in the Study Area based on oral tradition, archeology, and historical and ethnographic information. A statewide list of tribes expressing some interest in Nebraska was also provided by FHWA. Thirty-eight (38) tribes were sent letters requesting their attendance at the resource agency meeting on March 20th, 2012 in North Platte, NE. See the Public Involvement Appendix (Appendix E) for a complete list of tribes that were contacted.

Tribal groups who responded included the Bureau of Indian Affairs - Winnebago Agency, the Iowa Tribe of Kansas and Nebraska, the Northern Arapaho Tribe of Wyoming, and the Pawnee Nation of Oklahoma. The Winnebago Agency indicated that the reservation resources of the tribes they serve (Omaha, Winnebago, and Santee Sioux) would not be affected, and the Iowa Tribe also indicated that they did not anticipate any tribal resources to be affected within the Study Area. The Northern Arapaho Tribe of Wyoming requested additional information about the nature of the proposed project, and the Pawnee Nation of Oklahoma indicated that they had several sites near Chadron, and would provide additional information to NDOR.

Wildlife Corridors

As previously mentioned, the USFWS is currently conducting a research study entitled "Swift Fox Survey along the Heartland Expressway Corridor." This study is being performed as a result of comments made at the resource agency meeting in 2012 (see Appendix E for more information), and is being funded with Federal Research Funds administered by NDOR (80% Federal, 20% State). After the study concludes, a strategy would be developed to address swift fox habitat connectivity. This strategy would then be carried forward into future projects created as a part of the Heartland Expressway Corridor.

4.0 MAINTENANCE AND OPERATION

The maintenance and operation section addresses the needs for the Heartland Expressway Corridor to maintain and preserve the existing 215 miles of pavement as well as the new improvement projects that will be included as part of the "Vision" of the corridor. The Heartland Expressway Corridor traverses a wide variety of terrain from the high plains of Colorado along NE 71 to Kimball, the Platte River valley along US 26, and the rolling hills along US 385 near Chadron.

However, the public expects a certain consistency in maintenance efforts provided by the Nebraska Department of Roads (NDOR). This chapter will detail the two types of maintenance considered: 1) routine maintenance and 2) preventative maintenance. This chapter develops a cost of maintaining and operating the existing pavement along the corridor, which is a mixture of two-lane and four-lane highways, and the additional maintenance and operation costs for new pavement added along the Heartland Expressway Corridor. The new pavement is for the proposed projects identified in the 20-Year vision of the corridor.

4.1 MAINTENANCE TYPES

Routine

Routine functions are those performed frequently and repeated, such as pavement repairs, shoulder grading, paint striping, mowing, snow removal, pavement edge repair, sign maintenance and does include unusual repairs, which are typically warranted due to weather extremes.

Examples of unusual repairs include the undermining of bridges and overtopping of roadways during flooding conditions, excessive asphalt pavement rutting due to extreme heat or concrete pavement "blow ups," which are sudden, severe breaks in the pavement due to the extreme heat.

Snow removal is a critical maintenance function during the winter season. Due to the windy nature of western Nebraska, severe snow conditions can occasionally cause temporary shutdown of highways in the Heartland Expressway Corridor.

Routine maintenance is typically performed by the NDOR Operations Division personnel. However some functions, such as mowing and rest area maintenance are performed using contracted service providers.

Preventive

Preventive maintenance is typically focused on the pavement surface. This includes crack sealing, milling, chip seals and thin overlays. This work is done by both in house efforts by the Operations Division and also contracted service providers.

4.2 EXISTING CORRIDOR MAINTENANCE EVALUATION

An evaluation was made of the overall maintenance and operations costs for maintaining the roadways along the corridor. NDOR's Material and Research Division uses a custom written program called the Pavement Optimization Program (POP) which uses extensive databases to develop costs over time to maintain pavement to a certain level of serviceability (driving condition). NDOR's goal is to maintain all highways at or above 84.7 Nebraska Serviceability Index (NSI). This is equivalent to maintaining a highway in good driving condition.

The designated route of the Heartland Expressway Corridor is about 215 miles in length. Currently, 71 miles (about 1/3) of the corridor is already a four-lane facility. The total cost to maintain the current corridor for 25 years, (until the year 2037) is estimated to be approximately $134 million. Table 4.1 provides a summary of the maintenance and operations costs for the corridor.

However, the POP assumes that the ongoing district maintenance operations, which include both routine and preventative maintenance, continue at their current pace. These costs average $4,684 per lane-mile per year, for NDOR's District 5, (which includes the counties in the Nebraska panhandle). Note that a two-lane highway segment ten miles long, (centerline miles) has twenty lane-miles. Similarly, a ten mile long four-lane highway segment has forty lane-miles. The yearly POP maintenance of the existing pavement is estimated to be $11,042 per lane mile per year.[1]

4.3 PROPOSED CORRIDOR MAINTENANCE EVALUATION

Determining the total maintenance costs for the overall Heartland Expressway Corridor involves estimating the maintenance costs for the new pavement as the improvements are added to the system. The maintenance cost for a new pavement is based on the year that the improvement is programmed, and the maintenance costs are spread out over the remainder of the twenty-year program. The additional maintenance costs were estimated with $4,684 per lane-mile per year. Additional joint sealing costs were used to add the additional costs for the new lanes. The joint sealing cost is estimated to be $12,500 per lane-mile per year.

The implementation program was used for the estimation of the maintenance and operation costs. This is subject to change due to funding opportunities and agency priorities. Figures 4.1, 4.2, 4.3, and 4.4 illustrate the improvement implementation plan for the Vision of the Heartland Expressway. Based on the implementation plan of the "Vision" of the corridor, the maintenance of the new pavement is estimated to be about $27,606,908.00 or about $28 million, as shown in Table 4.1.

4.4 REVIEW OF PROCEDURES AND OPPORTUNITIES

There are certain steps that Nebraska should consider to provide a corridor that consistently meets the transportation needs of its users.

The following summary identifies both specific items and formats to meet these needs:

1. Identify and advance Intelligent Transportation Systems (ITS) projects that will improve corridor efficiency and driver information, such as weather conditions.
2. Increase maintenance and operations budgets and personnel to meet future needs of the expanded Heartland Expressway Corridor.
3. Utilize maintenance personnel in planning and design of transportation projects.
4. Increase the state maintenance research effort and that of the Transportation Research Board to minimize and reduce maintenance and operation costs.
5. Increase the scope of maintenance topics during the annual NDOR maintenance and operations conference.
6. Identify and expand innovative and money-saving ideas, such as Nebraska's Adopt a Highway.

[1] The $4,684 cost covers NDOR's basic maintenance practices (e.g. crack seal or fog seal) completed annually by NDOR personnel. The $11,402 annual cost is for additional maintenance practices, such as an overlay of a determined depth, to achieve NDOR's pavement maintenance strategy. These numbers were generated from NDOR Materials and Research Division's Pavement Optimization Program (POP).

Table 4.1 – Heartland Expressway Corridor Maintenance and Operation Costs

Hwy	Segment	Completion Year	Length (miles, approximate)	Existing Maintenance & Operation Costs	New Pavement Maintenance & Operations Costs	Total Maintenance & Operation Costs
US 26	Morrill to Minatare	Existing	26	$40,887,600.00	$ -	$40,887,600.00
NE 71	Kimball to Scottsbluff	Existing	47	$73,912,200.00	$ -	$73,912,200.00
US 385	L62A to Alliance	2019	22	$17,298,600.00	$4,809,728.00	$22,108,328.00
US 385	Alliance to Chadron	2020	58	$45,605,400.00	$955,536.00	$46,560,936.00
US 385	Chadron to SD	2022	16	$12,580,800.00	$3,048,320.00	$15,629,120.00
NE 71	I-80	2022	3	$ -	$1,143,120.00	$1,143,120.00
NE 71	Colorado Border to I-80	2021	15	$4,246,020.00	$2,998,320.00	$7,244,340.00
NE 71	I-80 (MP 22) Interchange Rest Area / Visitor Center	2022	N/A	$ -	$1,650,000.00	$1,650,000.00
L62A	US 26 to US 385	2022	8	$2,516,160.00	$3,048,320.00	$5,564,480.00
US 385	Alliance to L7E (Hemingford)	2027	16	$12,580,800.00	$1,898,880.00	$14,479,680.00
US 26	Wyoming State Line to Morrill	2024	7	$5,504,100.00	$1,202,488.00	$6,706,588.00
US 26	Mitchell	2026	1	$1,572,600.00	$ -	$1,572,600.00
US 26	Morrill Relief Route	2027	4	$ -	$949,440.00	$949,440.00
US 385	L7E (Hemingford) to Chadron St Pk.	2032	22	$17,298,600.00	$1,580,480.00	$18,879,080.00
US 26	Minatare to L62A intersection	2027	9	$4,246,020.00	$2,136,240.00	$6,382,260.00
US 385	Chadron Relief Route	2033	4	$ -	$299,776.00	$299,776.00
US 385	Chadron to S Edge of Chadron St Park	2032	14	$11,008,200.00	$1,005,760.00	$12,013,960.00
US 385	Chadron Rest Area / Visitor Center	2034	N/A	$ -	$330,000.00	$330,000.00
NE 71	Colorado Border to I-80	2037	15	$ -	$ -	$ -
	ITS Improvements	2015 to 2025	N/A	$ -	$550,500.00	$550,500.00
				$249,257,100.00	**$27,606,908.00**	**$276,864,008.00**

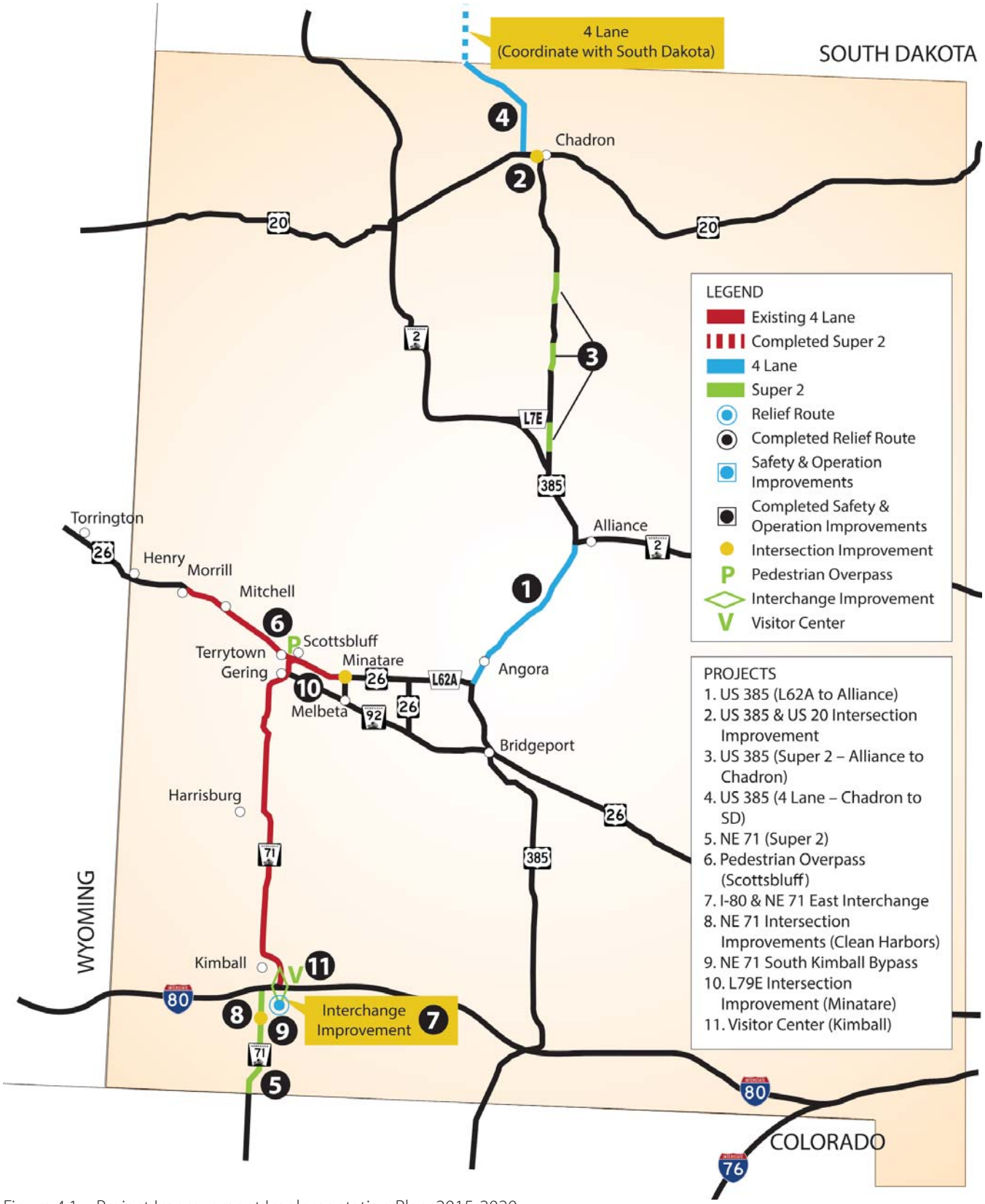

Figure 4.1 – Project Improvement Implementation Plan, 2015-2020

Figure 4.2 – Project Improvement Implementation Plan, 2020-2025

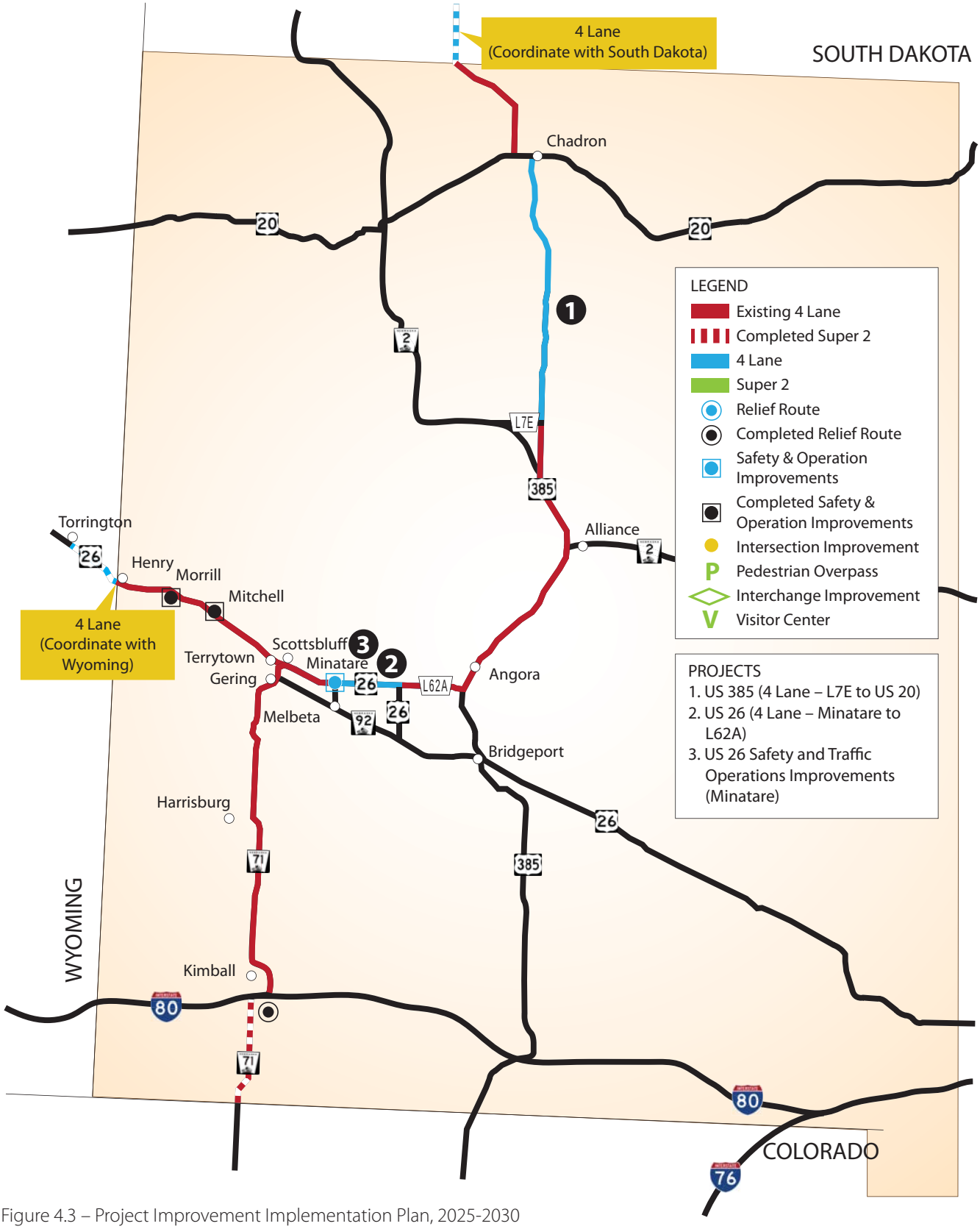

Figure 4.3 – Project Improvement Implementation Plan, 2025-2030

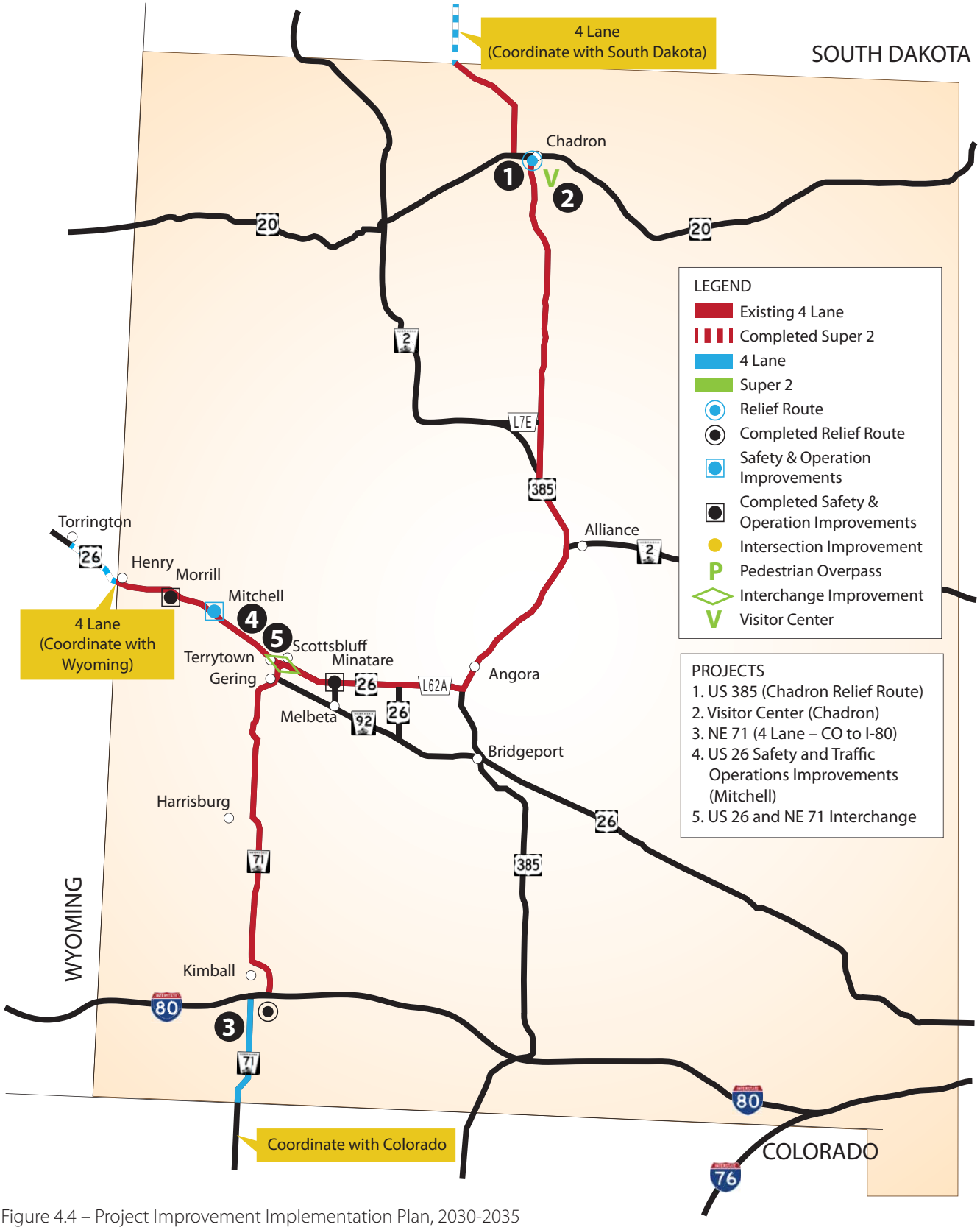

Figure 4.4 – Project Improvement Implementation Plan, 2030-2035

5.0 ECONOMIC ANALYSIS

5.1 INTRODUCTION

The economic analysis provided for the Heartland Expressway Corridor Development and Management Plan (CDMP) analyzed transportation and economic benefits in relation to project costs. A formal Benefit Cost Analysis (BCA) was performed along with a detailed economic impact analysis. The findings of the BCA are presented first. A detailed evaluation of the economic impacts follows.

The economic analysis relied on a variety of technical data sources and input obtained from the public, agency staff members, elected officials and business community representatives[1]. The first public information meeting was held on October 11, 2012, and included a workshop with business and City and County leaders from the region. This workshop focused on obtaining input from the business community. Economic issues and preliminary findings were discussed at the NDOR Highway Commission meeting on May 18, 2012 and at a June 7, 2012 public open house meeting on the CDMP. Input obtained from NDOR Highway Commissioners and from the public workshop attendees[2] was incorporated into the analysis methodology and assumptions.

5.2 TRANSPORTATION BENEFIT COST ANALYSIS

5.2.1 SCOPE OF ANALYSIS

The benefit cost analysis considers the potential net benefits attributable to the Heartland Expressway project in Nebraska, i.e. those differences between an Improvement Case (with project) and Base Case (no build, or without project). Four improvement scenarios were evaluated:

1. Heartland Expressway Corridor improvements
2. Heartland Expressway Corridor improvement with Intensified Energy Resource Development
3. Entire Ports to Plains (PTP) Corridor improvements
4. Entire PTP Corridor improvements with Intensified Energy Resource Development

The improvements evaluated in the benefit cost analysis were the projects identified as part of the overall Heartland Expressway Corridor Vision detailed in Section 2.3.3. The benefits associated with these improvement scenarios include transportation and operational savings, travel time and accident reductions, pavement cost savings, as well broader economic benefits, such as inventory gains. It is important to note that the economic benefit analysis only considers direct impacts (those first-level impacts that result from the construction and operation of the project); and therefore, does not include any multiplier effects (i.e. indirect and induced impacts).

[1]Technical data sources and input from these entities are available in the Public Involvement Appendix.
[2]A summary of the workshop is included in the Public Involvement Appendix.

The benefit stream estimated as part of the benefit cost analysis is converted to present values using real discount rates of 7% and 3% and is then compared to the discounted project capital and operating costs. Discounting is important because a dollar 10 years from now is not worth the same as a dollar today. The dollar today could be invested and return more than a dollar 10 years from now (excluding inflationary impacts). As a result, benefits and costs that are experienced today are more valuable than the benefits and costs expected in 10 years. Projects expecting to use federal funding are required to use a 7% discount rate (analysis in 2012 dollars)[3], however, given the interest rates of the last few years, the results are also shown with a 3% discount rate. Presenting the results with both a 3% and 7% discount rate, as recommended in the US DOT TIGER BCA guidance, allows for a relative comparison and demonstrates the sensitivity of the results to the discount rate applied.

An analysis period of 2016 through 2054 was used. The implementation plan identified in Section 2.3.3 is an estimated plan for the improvement projects from 2015 to 2035. The analysis period extends to 2054 to account for 20 years of benefits after the estimated completion of the last segment of the Heartland Expressway Corridor improvements. The results of this analysis generate a benefit cost ratio, indicating whether or not the Heartland Expressway Corridor benefits in Nebraska exceed Nebraska's costs.

5.2.2 TRANSPORTATION BENEFITS

This section describes the transportation benefits that may occur as a result of the transportation infrastructure improvements along Nebraska's portion of the Heartland Expressway Corridor. Typically, these benefits are comprised of travel time savings, which may occur as motorists experience reduced travel times; increased safety, which may occur as the number of accidents that take place on the corridor are reduced; and operating cost savings that may occur as the distances driven by motorists on parallel facilities are reduced.

The travel time savings benefits are estimated for both commercial (truck) and non-commercial (non-truck) traffic. These benefits are calculated using estimated increases in travel speeds resulting from improved transportation infrastructure and the value of the time saved. The improved safety benefits are calculated by first estimating the accident avoidance that may occur as a result of improved transportation infrastructure, and then by estimating the cost of those avoided accidents. Because improvements along the corridor, in accordance with the Heartland Expressway Vision, typically involve expansion from two-lane facilities to four-lane facilities, it is assumed that there are no operating cost benefits for travelers. However, there would be operating cost savings associated with reduced maintenance costs for parallel roadways as travelers divert to the Heartland Expressway Corridor, thereby reducing the pavement wear and tear on parallel roadways. As a result, the transportation benefits associated with Heartland Expressway Corridor improvements in Nebraska are comprised of travel time, accident reduction, and pavement cost savings only.

Travel Time Savings

The reduction in travel times for autos and trucks that could be expected in 2035 due to the improved transportation infrastructure along Nebraska's portion of the Heartland Expressway Corridor was calculated and provided by AECOM (see the travel demand analysis in Chapter 2 and Appendix B). This section uses the forecasted 2035 travel time savings to calculate the annual time saved for:

1. ***Existing users*** – those vehicles and passengers currently using the Heartland Corridor roadways without the improvements
2. ***Diverted users*** – those vehicles and passengers currently using parallel routes who divert to the improved Heartland Corridor roadways

[3] The analysis discounts future benefits using a real discount rate of 7% following guidance from the Office of Management and Budget (OMB) in circulars A-4 and A-94 (http://www.whitehouse.gov/omb/circulars/).

These travel time savings are valued according to whether the time is saved by auto travelers or truck drivers; therefore, results are presented for both auto and truck traffic. The analysis begins with the calculation of travel time savings for existing users and is followed by the diverted user travel time savings.

Existing Traffic

Existing users of the Nebraska portion of the Heartland Expressway Corridor would experience a travel time savings associated with the improvement in speed and efficiency achieved with the transportation investments. The daily vehicle hours saved for each improvement scenario in comparison to the no build scenario in 2035 was estimated by AECOM and is summarized below in Table 5.1 (see the travel demand analysis in Chapter 2 and Appendix B).

Table 5.1– Daily Vehicle and Truck Travel Time Savings for Existing Users in 2035 (Hours)

Users	Heartland		Heartland & Intensified Energy Resource Development		Entire PTP		Entire PTP & Intensified Energy Resource Development	
	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours
NE Background Traffic (Regardless or Improvements	2,451	761	2,422	752	2,431	755	2,375	737

Source: AECOM Travel Model

Table 5.2 summarizes the total discounted existing traveler time savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

Table 5.2 – Value of Travel Time Savings for Existing Users between 2016 and 2054 (2012 Dollars in Millions)

Scenarios	Auto	Truck	Total
Heartland			
Discounted @7%	$100.3	$40.5	$140.8
Discounted @ 3%	$247.7	$100.0	$347.7
Heartland & Intensified Energy Resource Development			
Discounted @7%	$99.1	$40.0	$139.1
Discounted @ 3%	$244.8	$98.8	$343.6
Entire PTP			
Discounted @7%	$99.5	$40.2	$139.6
Discounted @ 3%	$245.7	$99.2	$344.9
Entire PTP & Intensified Energy Resource Development			
Discounted @7%	$97.2	$39.2	$136.4
Discounted @ 3%	$240.1	$96.8	$336.9

Source: AECOM

Diverted Traffic

In addition to the time savings for existing users, a reduction in travel times also would occur for those users who divert to the Heartland Expressway Corridor from other parallel roads. These users divert to the improved Heartland Corridor due to the faster average speeds achievable on the improved roadway in comparison to their existing route. The diverted daily vehicle hours saved for each improvement scenario in comparison to the no build scenario in 2035 was estimated by AECOM and is summarized below in Table 5.3 (see the travel demand analysis in Chapter 2 and Appendix B).

Table 5.3 – Daily Vehicle and Truck Travel Time Savings for Diverted Users in 2035 (Hours)

Users	Heartland		Heartland & Intensified Energy Resource Development		Entire PTP		Entire PTP & Intensified Energy Resource Development	
	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours
Current CO Users Diverted to Improved Heartland Expressway Corridor in NE	2	2	2	2	2	2	2	2
Current WY Users Diverted to Improved Heartland Expressway Corridor in NE	11	2	10	2	11	2	10	2
Current NE Users Diverted to Improved Heartland Expressway Corridor in NE	6	4	6	4	6	4	6	3
Current Outside the Model Users Diverted to Improved Heartland Expressway Corridor in NE	-	-	-	-	419	82	381	74
Total Daily Hours Saved	**19**	**8**	**18**	**8**	**438**	**90**	**399**	**81**

Source: AECOM Travel Model

The vehicle time savings shown in Table 5.3 assumes that all Heartland Expressway Corridor improvements in Nebraska are complete, therefore, the time saved between 2017 (year the first project is completed) and 2035 was interpolated assuming that the time saved increases equally in each year until 2035. Table 5.4 summarizes the total discounted diverted traveler time savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

Table 5.4 – Value of Travel Time Savings for Diverted Users between 2016 and 2054 (2012 Dollars in Millions)

Scenarios	Auto	Truck	Total
Heartland			
Discounted @ 7%	$0.6	$0.4	$1.0
Discounted @ 3%	$1.5	$1.0	$2.5
Heartland & Intensified Energy Resource Development			
Discounted @ 7%	$0.6	$0.4	$1.0
Discounted @ 3%	$1.4	$1.0	$2.4
Entire PTP			
Discounted @ 7%	$20.6	$4.8	$25.4
Discounted @ 3%	$50.9	$11.8	$62.7
Entire PTP & Intensified Energy Resource Development			
Discounted @ 7%	$18.8	$4.3	$23.1
Discounted @ 3%	$46.4	$10.7	$57.1

Source: AECOM

Accident Reduction Savings

Another transportation benefit of the Heartland Expressway Corridor improvements is the potential to reduce the number of accidents that could occur along the corridor due to roadway widening and the introduction of Intelligent Transportation Systems (ITS) variable message boards for incident management. The reduction in accidents in the project corridor that could be expected due to these investments was determined by reviewing crash rates and crash reduction factors from the Highway Safety Manual for rural, two-lane, Super 2, and four-lane divided highways. These accident rates were then assigned to the Heartland Expressway Corridor roadways in Nebraska based on their average annual daily traffic (AADT). In addition, the introduction of dynamic variable accident and speed warning signs along roadways has been shown to reduce the likelihood of injury and property damage accidents. The Heartland Expressway Corridor improvements in Nebraska include the introduction of these signs throughout the corridor, further reducing the potential for crashes. The 2007 FHWA Desktop Reference for Crash Reduction Factors cites a 44% reduction in injury and property damage accidents due to the operation of dynamic variable warning signs[4].

In order to estimate the reduction in accidents along the Nebraska portion of the Heartland Expressway Corridor, the total number of accidents that would occur on the corridor without any improvement was first estimated. That estimate was calculated by multiplying segment specific accident rates for each portion of the Heartland Expressway Corridor by the estimated annual Vehicle Miles Traveled (VMT) on each segment between 2016 and 2054. The AECOM travel model estimated the VMT for the Heartland Corridor roadways without the improvements in 2035, (see the travel demand analysis in Chapter 2 and Appendix B), which is shown below in Table 5.5.

Table 5.5 – Nebraska Heartland Expressway Corridor Daily VMT without Improvements in 2035

Heartland Corridor Roadways	All Scenarios	
	Total VMT	Truck VMT
US 385	375,668	41,326
US 26	266,561	13,116
NE 71	170,213	16,237
NE 71 Bypass	2,366	310
L62A	106,327	8,871
Total Daily VMT	**921,135**	**79,860**

Source: AECOM Travel Model

Next, the lower accident rates associated with the completion of the Super 2 and/or four-lane divided roadways and the ITS improvements were applied to the same VMT forecasts (without improvements) to determine the number of accidents that would occur on the project corridor given transportation improvements[5]. A comparison of the number of accidents with and without transportation improvement allowed the reduction in accidents due to Nebraska's Heartland Expressway Corridor investment to be calculated.

Before estimating the economic benefits associated with a reduction in accidents, the accidents that were avoided must be distributed into types of accidents. The accident rates applied were for fatal, injury, and property damage accidents only. These crash estimates were then converted to the Maximum Abbreviated Injury Scale (MAIS) accident types in order to apply US DOT Guidance on the value of avoiding an accident. The conversion is based on the National Highway Traffic Safety Administration (NHTSA) KABCO-AIS Conversion Table (July 2011) Injury (severity unknown) and No Injury accidents.

[4]FHWA, Desktop reference for Crash Reduction Factors, 2007, p.80.

[5]The number of accidents was calculated using the 2035 VMT forecast without improvements as opposed to increased VMT with transportation improvement based on FHWA guidance. In FHWA's *The Safety Effects of the Conversion of Rural Two-Lane Roadways to Four-Lane Roadways,* it was noted that the more appropriate comparison is between baseline existing and projected traffic volumes without improvement where data for all affected streets in the system were not available (FHWA 1999). This analysis was only conducted on portions of the Heartland Expressway Corridor that were to be improved.

Based on the comparison of the number of fatalities, injuries, and property damage incidents with the improvements and without the improvements, the accident reductions for each Heartland Expressway Corridor improvement scenario were estimated. The total value of the accidents avoided is based on US DOT Guidance[6] and the NHTSA[7] estimates for the value of avoiding an accident. The values applied in this analysis are summarized below in Table 5.6.

Table 5.6 – Value of One Person Avoiding a Crash in 2012 Dollars

AIS Level	Fraction of VSL	Unit Value (2011 Dollars)	Unit Value (2012 Dollars)
0			$3,375
1	0.003	$18,600	$18,859
2	0.047	$291,400	$295,458
3	0.105	$651,000	$660,065
4	0.266	$1,649,200	$1,672,164
5	0.593	3,676,600	3,727,795
FATAL	1.000	$6,200,000	$6,286,333

Source: US DOT and NHTSA

Applying the value of the fatalities, injuries, and property damages to the annual avoided crashes by type, yields the accident reduction savings associated with Nebraska's Heartland Expressway Corridor improvements. Table 5.7 summarizes the total discounted accident reduction savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period. The benefits are the same for all scenarios because the analysis is based on the 2035 VMT without improvements and the impacts associated with the investments made; the transportation investments made are the same for each improvement scenario.

Table 5.7 – Value of Accident Reduction Savings between 2016 and 2054
(2012 Dollars in Millions)

Scenarios	Total
All Scenarios	
Discounted @ 7%	$94.8
Discounted @ 3%	$226.7

Source: AECOM

[6] US DOT, *Treatment of the Economic Value of a Statistical Life in Departmental Analyses*, 2008 revised guidance and 2011 update.
[7] NHTSA, *The Economic Impact of Motor Vehicle Crashes,* Table A-1, 2000.

Pavement Cost Savings in Neighboring States

Another transportation benefit of the Heartland Expressway Corridor improvements is the potential reduction in VMT along parallel routes, as travelers divert to Nebraska's Heartland Corridor roadways. This reduction in traffic on alternate highway routes would reduce the pavement maintenance needs on those routes. Both auto and truck traffic would be diverted to the improved Heartland Corridor; however, the pavement benefits are realized only by truck diversions because the damaged caused by autos on a rural interstate is negligible. The daily truck VMT projected to be removed from neighboring states for each scenario in comparison to the 2035 no build (see the travel demand analysis in Chapter 2 and Appendix B) are shown in Table 5.8.

Table 5.8 – Daily Truck VMT Removed from Neighboring States in 2035 (Net of No- Build)

Users	Heartland	Heartland & Intensified Energy Resource Development	Entire PTP	Entire PTP & Intensified Energy Resource Development
Current CO Users Diverted to Improved Heartland Corridor in NE	1,766	1,724	1,737	1,656
Current WY Users Diverted to Improved Heartland Corridor in NE	1,695	1,654	1,668	1,590
Total Daily Truck VMT Removed	**3,461**	**3,378**	**3,405**	**3,246**

Source: AECOM travel model

Table 5.9 summarizes the total discounted pavement cost savings in neighboring states associated with the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

Table 5.9 – Value of Pavement Cost Savings between 2016 and 2054
(2012 Dollars in Millions)

Scenarios	Total
Heartland	
Discounted @ 7%	$0.44
Discounted @ 3%	$1.10
Heartland & Intensified Energy Resource Development	
Discounted @ 7%	$0.43
Discounted @ 3%	$1.07
Entire PTP	
Discounted @ 7%	$0.43
Discounted @ 3%	$1.08
Entire PTP & Intensified Energy Resource Development	
Discounted @ 7%	$0.41
Discounted @ 3%	$1.03

Source: AECOM

5.2.3 ECONOMIC BENEFITS FROM TRANSPORTATION EFFICIENCY

The following discussion summarizes economic benefits derived from transportation efficiency improvements. These benefits are used in a Benefit Cost Analysis. Additional economic benefits are described in Section 5.3. These benefits involve job creation and expanded payrolls from construction, operation and maintenance of the proposed improvements as well as benefits from purchases of goods and services necessary to operate and maintain the project.

Agriculture and food processing activities anchor western Nebraska's economy. Soybeans, corn, dry beans, sugar beets and animals are mainstays of the region's farm economy and exports. Mexico is the third largest importer of agricultural goods from the US. Although rail is the dominant mode for such shipments, Nebraska shipped over $317 million in goods (of all types) to Mexico by truck through the Port of Laredo in 2011, the main route between western Nebraska and Mexico's markets, according to the Bureau of Transportation Statistics' TransBorder Freight Data[8]. Another $7 million in Nebraska goods (of all types) traveled north to Canada through the Port of Raymond.

While not all of those shipments originated in western Nebraska (it is not possible to divide the state's exports by truck into sub-state regions), knowing that the western part of the state is a rich agricultural center, that Mexico is a leading consumer of agricultural imports, and that the commodities entered via the Port of Laredo suggests that a significant portion of this trade originated in the Heartland Expressway Corridor region. This indicates that a significant flow of goods currently travel between western Nebraska and Mexico with much upside potential for additional exports as Mexican household incomes rise gradually over time.

Overland transportation offers several advantages over marine transport, beyond the direct routing between western Nebraska to Mexico that is facilitated by an improved Heartland Expressway Corridor. Using grain as the example, these include[9]:

- The avoidance of transfer upon entry into the country, resulting in less damage than to grain shipped by vessel, which has to be off-loaded;
- Smaller lot sizes that permit more specialized purchasing, with less variation in shipment quality; and
- Lower inventory costs because smaller lots are purchased more frequently.

Road improvements that reduce travel times and improve reliability for truck freight improve the productivity of the logistics chain through the ability to use truck fleets more efficiently resulting in a reduction of inventory cost and organize production more efficiently. If shipments are more reliable, then distribution facilities can be more centralized and enjoy greater scale economies in many cases. Collectively, this allows the economy to be more economically competitive. The annual hours of delay avoided due to the Heartland Expressway improvements were estimated and described as part of the truck travel time savings (see travel demand analysis in Chapter 2 and Appendix B). A total inventory savings of $215.4 million across all alternatives results from applying a discount rate of 7%. The inventory savings with a 3% discount rate would be of $532.1 million.

5.2.4 PROJECT COSTS

Project capital and operating costs for the Nebraska portion of the Heartland Expressway Corridor were developed by NDOR and Alfred Benesch & Company and are in 2012 dollars. The project and capital costs were not inflated to match year of expenditure because the actual year of expenditure is unknown. Table 5.10 summarizes the total capital costs for each project component and specifies an estimated completion date in accordance to the implementation plan of the Vision of the Heartland Expressway Corridor detailed in Section 2.3.3. The total costs include costs for project development, engineering, and construction

[8]http://transborder.bts.gov/programs/international/transborder/TBDR_QuickSearchPC.html
[9]Summarized from Delmy L. Salin. *U.S. Grain and Soybean Exports to Mexico A Modal Share Transportation Analysis,* 2007-2010, USDA Agricultural Marketing Service, April 2011.

engineering; utilities; right-of-way; and construction. Table 5.11 summarizes the total new maintenance and operating costs (M&O) costs for each project, which include annual M&O expenses as well as the joint sealing and new pavement cost required every eight years.

Table 5.10 – Total Capital Costs for Nebraska Components of Heartland Expressway Corridor (2012 Dollars in Millions)

Highway	Segment	Type	Completion Year	Total Cost
Group 1 (2015-2020)				
US 385	Intersection with NE 20 (East)	Safety	2017	$0.80
US 385	L62A to Alliance	Roadway	2019	$66.00
US 385	Alliance to Chadron	Roadway	2020	$2.25
US 26	In Scottsbluff @ 5th Avenue	Safety	2020	$1.00
US 385	Chadron to South Dakota	Roadway	2022	$48.00
US 26	L79E Intersection (Minatare)	Safety	2017	$0.15
NE 71	I-80		2022	$18.00
NE 71	Colorado Border to I-80	Roadway	2021	$15.00
NE 71	Clean Harbors (South of Kimball)	Safety	2020	$0.25
NE 71	I-80 (MP 22) Interchange	Truck Parking	2022	$5.00
	ITS Improvements			$2.82
			Total Cost of Group 1	**$159.27**
Group 2 (2020-2025)				
L62A	US 26 to US 385	Roadway	2022	$40.00
US 385	Alliance to L7E (Hemingford)	Roadway	2027	$48.00
US 385	Alliance to L7E (Hemingford)	Roadway	2027	$3.00
US 26	Wyoming State Line to Morrill	Roadway	2024	$21.00
US 26	Mitchell		2026	$1.00
US 26	Morrill Relief Route		2027	$20.00
	ITS Improvements			$0.85
			Total Cost of Group 2	**$133.85**
Group 3 (2025-2030)				
US 385	L7E (Hemingford) to Chadron State Park	Roadway	2032	$66.00
US 26	Minatare to L62A Intersection	Roadway	2027	$45.00
US 26	Minatare		2028	$1.00
			Total Cost of Group 3	**$112.00**
Group 4 (2030-2035)				
US 385	Chadron		2033	$20.00
US 385	Chadron to S Edge of Chadron State Park	Roadway	2032	$42.00
US 26	Intersection with NE 71		2035	$5.00
US 385	Chadron	Truck Parking	2034	$5.00
US 26	Mitchell Relief Route		2037	$20.00
NE 71	Colorado Border to I-80	Roadway	2037	$45.00
			Total Costs for Group 4	**$137.00**
			Total Costs for Group 1-4	**$542.12**

Source: NDOR and Benesch

Table 5.11 – Total New M&O Costs for Heartland Expressway Corridor Components located within the State of Nebraska (2012 Dollars in Millions)

Highway	Segment	M&O Start Year	Annual M&O Costs	Every 8 Year Costs	Total M&O Cost (2016-2054)
Group 1 (2015-2020)					
US 385	Intersection with NE 20 (East)	2018	$ -	$ -	$ -
US 385	L62A to Alliance	2020	$0.21	$0.55	$9.41
US 385	Alliance to Chadron	2021	$0.06	$ -	$1.91
US 26	In Scottsbluff @ 5th Avenue	2021	$ -	$ -	$ -
US 385	Chadron to South Dakota	2023	$0.15	$0.40	$6.40
US 26	L79E Intersection (Minatare)	2018	$ -	$ -	$ -
NE 71	I-80	2023	$0.06	$0.15	$2.40
NE 71	Colorado Border to I-80	2022	$0.14	$0.38	$6.14
NE 71	Clean Harbors (South of Kimball)	2021	$ -	$ -	$ -
NE 71	I-80 (MP 22) Interchange	2023	$0.11	$ -	$3.52
	ITS Improvements		$0.42	$ -	$15.23
				Total M&O Costs for Group 1	**$45.00**
Group 2 (2020-2025)					
L62A	US 26 to US 385	2023	$0.15	$0.40	$6.40
US 385	Alliance to L7E (Hemingford)	2028	$0.15	$0.40	$5.25
US 385	Alliance to L7E (Hemingford)	2028	$0.07	$0.18	$2.30
US 26	Wyoming State Line to Morrill	2025	$ -	$ -	$ -
US 26	Mitchell	2027	$0.07	$0.20	$2.70
US 26	Morrill Relief Route	2028	$ -	$ -	$ -
	ITS Improvements		$0.13	$ -	$3.95
				Total M&O Cost of Group 2	**$20.59**
Group 3 (2025-2030)					
US 385	L7E (Hemingford) to Chadron State Park	2033	$0.21	$0.55	$5.63
US 26	Minatare to L62A Intersection	2028	$0.17	$0.45	$5.90
US 26	Minatare	2029	$ -	$ -	$ -
				Total M&O Cost of Group 3	**$11.54**
Group 4 (2030-2035)					
US 385	Chadron	2034	$0.07	$0.20	$1.97
US 385	Chadron to S Edge of Chadron State Park	2033	$0.13	$0.35	$3.59
US 26	Intersection with NE 71	2036	$ -	$ -	$ -
US 385	Chadron	2035	$0.11	$ -	$2.20
US 26	Mitchell Relief Route	2037	$ -	$ -	$ -
NE 71	Colorado Border to I-80	2037	$0.14	$0.38	$3.28
				Total M&O Costs for Group 4	**$11.04**
				Total Costs for Group 1-4	**$88.17**

Source: NDOR and Benesch

In order to calculate the BCA, the capital and M&O costs must be discounted before they can be compared to the project benefits. Similarly, the total expenditures for M&O were allocated over the analysis period so that the annual M&O expenses for each project component started in the year following project completion, as provided by NDOR.

5.2.5 BENEFIT COST SUMMARY

The preceding discussion has illustrated the varied ways that the Nebraska components of the Heartland Expressway Corridor generate benefits. Table 5.12 below summarizes the discounted value of the transportation and economic benefits that have been discussed. Taken in total and using a 7% discount rate, the travel time savings, accident reduction savings, pavement cost savings, and economic benefits provide over $452 million dollars of benefits over the 2016 to 2054 analysis period. Compared to a similarly discounted cost estimate, the Benefit Cost Ratio for the project is 1.88. In summary, this means that while using conservative/restrictive estimates, the corridor passes the BCA test.

Table 5.12 – Summary of Discounted Benefits and Costs (2012 Dollars in Millions)

	7% Discount Rate				3% Discount Rate			
	Heartland Improvements	Heartland Improvements & Intensified Energy Resource Development	Entire PTP Improvements	Entire PTP Improvements & Intensified Energy Resource Development	Heartland Improvements	Heartland Improvements & Intensified Energy Resource Development	Entire PTP Improvements	Entire PTP Improvements & Intensified Energy Resource Development
Benefits								
Travel Time								
Existing Traffic	$140.8	$139.1	$139.6	$136.4	$347.7	$343.6	$344.9	$336.9
Diverted Traffic	$1.0	$1.0	$25.4	$23.1	$2.5	$2.4	$62.7	$57.1
Pavement Savings	$0.4	$0.4	$0.4	$0.4	$1.1	$1.1	$1.1	$1.0
Accident	$94.8	$94.8	$94.8	$94.8	$226.7	$226.7	$226.7	$226.7
Economic - Inventory Savings	$215.4	$215.4	$215.4	$215.4	$532.1	$532.1	$532.1	$532.1
Total	**$452.4**	**$450.7**	**$475.7**	**$470.2**	**$1,110.0**	**$1,105.8**	**$1,167.4**	**$1,153.8**
Costs								
Capital	$224.1	$224.1	$224.1	$224.1	$361.8	$361.8	$361.8	$361.8
M&O	$16.3	$16.3	$16.3	$16.3	$40.2	$40.2	$40.2	$40.2
Total	**$240.4**	**$240.4**	**$240.4**	**$240.4**	**$402.0**	**$402.0**	**$402.0**	**$402.0**
Benefit Cost Ratio	**$1.88**	**$1.87**	**$1.98**	**$1.96**	**$2.76**	**$2.75**	**$2.90**	**$2.87**

Source: AECOM

5.3 ECONOMIC IMPACTS

5.3.1 SCOPE OF ANALYSIS

The following discussions address the potential economic impacts of the Heartland Expressway Corridor in Nebraska through an examination of what changes would occur because of the project's construction and implementation and who is affected by these changes, regardless of whether they are a transfer or net incremental change. The Heartland Expressway Corridor would generate economic impacts through its construction and daily operation for the Nebraska Heartland Expressway Corridor counties as well as the four-state Heartland Expressway Corridor.

These economic impacts include:

- **Construction impacts.** Construction of the project would create jobs and expand payrolls for the duration of the project's construction cycle.
- **Operation and maintenance impacts.** Since the project adds new lane miles, there would be hiring associated with the operation and maintenance of these new lane miles as well as the local purchases of goods and services necessary to operate and maintain the project. Unlike the one-time construction impacts, these new operations jobs and local purchases required to operate the project would be recurring impacts.
- **Economic development impacts.** Economic development would increase with the market's response to the operation of the improved facility. As described in Section 5.2 the improved road will improve travel times and reliability, which improves the productivity of the logistics chain through the ability to use fleets more efficiently. If shipments are more reliable, then businesses can reduce their inventories and organize their production processes to be leaner. Collectively, this allows the Heartland Corridor economy to be more economically competitive. In addition, traffic in the corridor would increase, increasing demand for roadside services in the corridor.
    - **Roadside services impacts.** Since the project attracts new long distance users to the corridor, demand for roadside services, including lodging, food, fuel, and other retail purchases would increase. The increase in demand would result in additional hiring and wages earned along the corridor. These would be recurring impacts.
    - **Competitive response.** It is not possible to predict the exact type of business relocation that might occur in response to the productivity improvement; likely expansions would include food processing manufacturing to take advantage of the corridor's significant agricultural assets and distribution facilities that take advantage of the corridor's low costs and proximity to the larger urban areas.

The construction, operating, and economic development impacts associated with the project represent the direct effects of the Nebraska components of the Heartland Expressway Corridor investment on the Nebraska Heartland Expressway Corridor counties as well as the four-state corridor counties. The construction, operation, and economic development purchases associated with the project would stimulate demand for support industries. As a result, a further increase of new employment across a variety of industrial sectors and occupational categories is expected as employers hire to meet this increase in local consumer demand. Additionally, the earnings of these newly-hired construction, maintenance and operations, manufacturing/distribution, and roadside services workers would translate into a proportional increase in consumer demand as these workers purchase goods and services throughout the region. This latter hiring represents the project's indirect and induced impacts.

The direct, indirect, and induced economic impacts associated with the construction, operation, and economic development of the Nebraska portion of the Heartland Expressway Corridor are measured using regional multipliers from the Bureau of Economic Analysis (BEA) within the US Department of Commerce. Derived from the Regional Input-Output Modeling System (RIMSII), the RIMS II multipliers measure the total change (direct + indirect + induced effects) in employment and earnings that result from an incremental change to a particular industry. The multipliers are based on the 2008 Annual Series accounts data; they represent the most up to date version available at the time this analysis was prepared.

While the improvement being studied all occur within Nebraska, the economic impact analysis includes two study areas: 1) Nebraska counties along the Heartland Expressway Corridor, illustrated in Figure 5.1, and 2) four-state counties along the Heartland Expressway Corridor. The Nebraska counties only area represents Nebraska's impacts associated with the construction and operation of the state's Heartland investments. However, many of the inputs, services, and employment used to construct and operate the Nebraska Heartland Expressway Corridor improvements will come from the larger region, including neighboring Heartland Expressway counties in Colorado, South Dakota, and Wyoming. As a result, the economic impacts shown in this section include both areas as detailed below.

5.3.2 CONSTRUCTION IMPACTS

Construction of the Heartland Expressway Corridor improvements in Nebraska may have a substantial impact on the regional and local economy due to new direct and indirect employment that would result from the capital expenditures associated with the investments. Direct employment consists of the construction-related employment in industries whose jobs and services are directly purchased to build the alternative. Indirect economic impacts are created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing the construction services. These indirect impacts are reflected in the economic multipliers for construction. The analysis estimates the number of construction jobs and earnings generated by the Heartland Expressway Corridor improvements in Nebraska based on construction cost estimates.

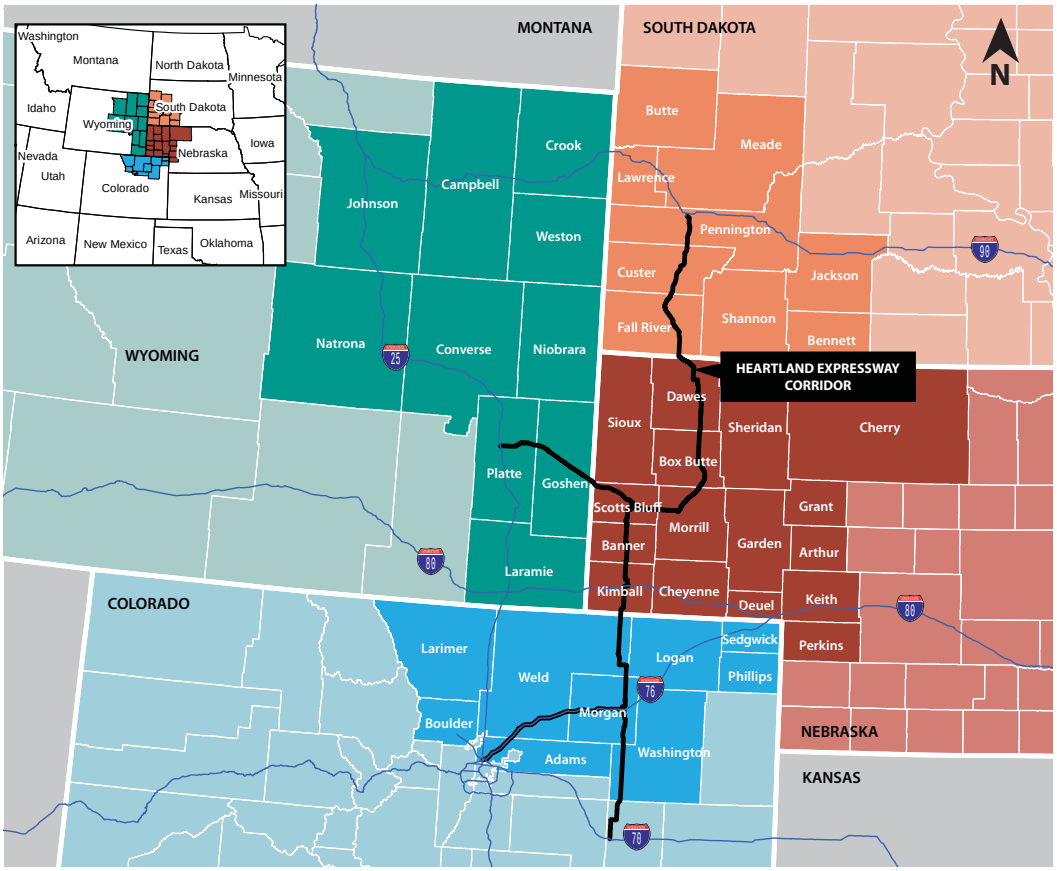

Figure 5.1 - Counties included in the Heartland Expressway Study

The analysis applies a consistent set of multipliers tailored to the structure of the four-state Heartland counties economy as well as the Nebraska Heartland counties only. The economic impacts associated with construction expenditures are measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

Construction Expenditures

The capital expenditures for the Nebraska components of the Heartland Expressway Corridor improvements were provided by NDOR in 2012 dollars. Table 5.13 summarizes the total capital costs for each project component and specifies a completion date. The total capital expenditures are divided into four major categories.

These include:

- **General Construction:** guideway elements, stations, yards and shops, site work, systems, and contingencies;
- **Utilities:** utility relocation and accommodation
- **Right-of-Way (ROW):** all rights-of-way, land and existing improvements; and
- **Soft Costs:** project development, professional engineering, and construction engineering.

The economic impact of these expenditures would vary significantly by activity and depend on the amount of locally produced goods and services embodied in the purchases. Construction (including utilities) goods and services and professional services (soft costs) would be purchased in the local economy. Although every building material required for the improvements would not be produced locally, the RIMS II multipliers reflect the supplier linkages for the industry, and thus account for this leakage from the local economy.

Conversely, right-of-way expenditures are for real property only; the transaction costs associated with these expenditures are included in the soft cost category. As there is no labor associated with the ROW expenditures, there is no economic impact to the pure land costs.

As a result, only the construction (including utilities) and soft costs are expected to impact the local and regional economies. The total expenditures for these costs are allocated over several years so that each project was complete in the year provided by NDOR. Table 5.14 summarizes capital costs applied in the analysis. This allocation is just an estimate in order to provide an annual cost and impact estimate; it is not intended to serve as a construction schedule or represent a cash flow for the project.

Table 5.13 – Total Capital Costs of the Vision of the Heartland Expressway Corridor Components located within Nebraska (2012 Dollars in Millions) (Estimated Completion Year)

Highway	Segment	Completion Year	Soft Costs	Utility	ROW	Const.	Total Cost
Group 1 (2015-2020)							
US 385	Intersection with NE 20 (East)	2017	$ 0.13	$ 0.02	$ 0.02	$ 0.62	$ 0.80
US 385	L62A to Alliance	2019	$ 10.56	$ 1.98	$ 1.98	$ 51.48	$ 66.00
US 385	Alliance to Chadron	2020	$ 0.36	$ 0.07	$ 0.07	$ 1.76	$ 2.25
US 26	In Scottsbluff @ 5th Avenue	2020	$ 0.16	$ 0.03	$ 0.03	$ 0.78	$ 1.00
US 385	Chadron to South Dakota	2022	$ 7.68	$ 1.44	$ 1.44	$ 37.44	$ 48.00
US 26	L79E Intersection (Minatare)	2017	$ 0.02	$ 0.00	$ 0.00	$ 0.12	$ 0.15
NE 71	I-80	2022	$ 2.88	$ 0.54	$ 0.54	$ 14.04	$ 18.00
NE 71	Colorado Border to I-80	2021	$ 2.40	$ 0.45	$ 0.45	$ 11.70	$ 15.00
NE 71	Clean Harbors (South of Kimball)	2020	$ 0.04	$ 0.01	$ 0.01	$ 0.20	$ 0.25
NE 71	I-80 (MP 22) Interchange	2022	$ 0.80	$ 0.15	$ 0.15	$ 3.90	$ 5.00
	ITS Improvements		$ 0.20	$ -	$ -	$ 2.62	$ 2.82
	Total Costs for Group 1		**$25.23**	**$4.69**	**$4.69**	**$124.65**	**$159.27**
Group 2 (2020-2025)							
L62A	US 26 to US 385	2022	$6.40	$1.20	$1.20	$31.20	$40.00
US 385	Alliance to L7E (Hemingford)	2027	$7.68	$1.44	$1.44	$37.44	$48.00
US 385	Alliance to L7E (Hemingford)	2027	$0.48	$0.09	$0.09	$2.34	$3.00
US 26	Wyoming State Line to Morrill	2024	$3.36	$0.63	$0.63	$16.38	$21.00
US 26	Mitchell	2026	$0.16	$0.03	$0.03	$0.78	$1.00
US 26	Morrill Relief Route	2027	$3.20	$0.60	$0.60	$15.60	$20.00
	ITS Improvements		$0.06	$ -	$ -	$0.79	$0.85
	Total Cost of Group 2		**$21.34**	**$3.99**	**$3.99**	**$104.53**	**$133.85**
Group 3 (2025-2030)							
US 385	L7E (Hemingford) to Chadron State Park	2032	$10.56	$1.98	$1.98	$51.48	$66.00
US 26	Minatare to L62A Intersection	2027	$7.20	$1.35	$1.35	$35.10	$45.00
US 26	Minatare	2028	$0.16	$0.03	$0.03	$0.78	$1.00
	Total Cost of Group 3		**$17.92**	**$3.36**	**$3.36**	**$87.36**	**$112.00**
Group 4 (2030-2035)							
US 385	Chadron	2033	$3.20	$0.60	$0.60	$15.60	$20.00
US 385	Chadron to S Edge of Chadron State Park	2032	$6.72	$1.26	$1.26	$32.76	$42.00
US 26	Intersection with NE 71	2035	$0.80	$0.15	$0.15	$3.90	$5.00
US 385	Chadron	2034	$0.80	$0.15	$0.15	$3.90	$5.00
US 26	Mitchell Relief Route	2037	$3.20	$0.60	$0.60	$15.60	$20.00
NE 71	Colorado Border to I-80	2037	$7.20	$1.35	$1.35	$35.10	$45.00
	Total Costs for Group 4		**$21.92**	**$4.11**	**$4.11**	**$106.86**	**$137.00**
	Total Costs for Group 1-4		**$86.41**	**$16.15**	**$16.15**	**$423.40**	**$542.12**

Source: NDOR and Benesch

Table 5.14 – Annual Construction and Soft Costs of the Heartland Expressway Corridor Components located in Nebraska (2012 Dollars in Millions)

Year	Total Construction Costs	Total Professional Services Costs
2016	$0.85	$0.10
2017	$18.79	$3.65
2018	$18.34	$3.56
2019	$23.31	$4.54
2020	$35.12	$6.87
2021	$32.83	$6.47
2022	$38.50	$7.59
2023	$5.83	$1.13
2024	$5.83	$1.13
2025	$30.67	$6.04
2026	$31.32	$6.19
2027	$32.94	$6.51
2028	$0.81	$0.16
2029	$-	$-
2030	$29.16	$5.76
2031	$34.56	$6.83
2032	$34.56	$6.83
2033	$9.45	$1.87
2034	$4.05	$0.80
2035	$17.55	$3.47
2036	$17.55	$3.47
2037	$17.55	$3.47
Total	**$439.56**	**$86.41**

Source: AECOM calculation using NDOR capital costs

Construction Jobs and Earnings Effects

RIMS II multipliers are used to translate capital expenditures for the Nebraska component of the Heartland Expressway Corridor improvements into the associated job and income effects. The impacts are shown for the four-state Heartland Expressway counties and the Nebraska Heartland Expressway counties only. The impacts vary by the geographic area considered; impacts are greater for the four-state area relative to the Nebraska counties as there is less "leakage" associated with construction spending. Put another way, a larger economy captures a greater share of project spending as its greater size allows it to provide a greater share of the diverse range of services required for construction.

The Final Demand Earnings Multiplier represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the construction and professional, scientific, and technical services industries.

The Final Demand Employment Multiplier represents the total change in the number of jobs that occur in all industries for each $1 million of output delivered to final demand by the construction and professional, scientific, and technical services industries.

Applying the final demand multipliers for the construction and professional services industries to the amount of capital expenditures in each industry provides estimates of the earnings and employment impacts generated by the construction of the Heartland Expressway Corridor improvements in Nebraska. The results are summarized in Tables 5.15 and 5.16, showing the four-state corridor county impacts and Nebraska county impacts, respectively. Note that the impacts shown in Tables 5.15 and 5.16 are not additive. The Nebraska Heartland Expressway Corridor county impacts are included in the four-state Heartland Expressway county impacts. In addition, these are one-time impacts that last for the duration of the construction period only. One job is defined as a job for one person during a one year's duration. As an example, a job for one person for three years would be defined as three person-year jobs.

Table 5.15 – Annual Construction Impacts for the Four-State Heartland Expressway County Region
(2012 Dollars in Millions)

	4 State Heartland Counties			
Year	Total Job Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	12	$0.51	$0.39	$0.46
2017	288	$12.17	$8.68	$10.50
2018	281	$11.88	$7.92	$9.95
2019	358	$15.10	$9.41	$12.28
2020	539	$22.78	$13.26	$17.98
2021	505	$21.32	$11.59	$16.34
2022	592	$25.00	$12.71	$18.60
2023	89	$3.77	$1.79	$2.73
2024	89	$3.77	$1.68	$2.65
2025	471	$19.91	$8.26	$13.56
2026	482	$20.35	$7.89	$13.45
2027	507	$21.40	$7.76	$13.74
2028	12	$0.53	$0.18	$0.33
2029	-	$-	$-	$-
2030	488	$18.94	$5.61	$11.13
2031	531	$22.45	$6.21	$12.80
2032	531	$22.45	$5.80	$12.43
2033	145	$6.14	$1.48	$3.30
2034	62	$2.63	$0.59	$1.37
2035	270	$11.40	$2.41	$5.78
2036	270	$11.40	$2.25	$5.61
2037	270	$11.40	$2.10	$5.45
Total	**6,754**	**$285.32**	**$117.95**	**$190.42**

Note: To use the final demand multiplier for employment, the construction expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

Table 5.16 – Annual Construction Impacts for the Nebraska Heartland County Region
(2012 Dollars in Millions)

Year	Northeast Heartland Counties			
	Total Job Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	12	$0.44	$0.34	$0.39
2017	280	$10.57	$7.54	$9.12
2018	273	$10.32	$6.88	$8.64
2019	347	$13.12	$8.17	$10.67
2020	524	$19.79	$11.52	$15.62
2021	490	$18.52	$10.08	$14.20
2022	575	$21.73	$11.04	$16.17
2023	87	$3.28	$1.56	$2.37
2024	87	$3.28	$1.46	$2.30
2025	458	$17.31	$7.18	$11.78
2026	468	$17.68	$6.86	$11.69
2027	492	$18.60	$6.74	$11.94
2028	12	$0.46	$0.15	$0.28
2029	-	$-	$-	$-
2030	435	$16.46	$4.87	$9.67
2031	516	$19.51	$5.40	$11.13
2032	516	$19.51	$5.04	$10.80
2033	141	$5.34	$1.29	$2.87
2034	60	$2.29	$0.52	$1.19
2035	262	$9.91	$2.09	$5.02
2036	262	$9.91	$1.95	$4.87
2037	262	$9.91	$1.83	$4.73
Total	**6,558**	**$247.95**	**$102.50**	**$165.48**

Note: To use the final demand multiplier for employment, the construction expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by capital expenditures for the project, there are no long-term effects. Construction-related impacts last for the duration of the project's construction cycle. For the four-state region the effects of the Nebraska component of the Heartland Expressway Corridor construction would result in $285.3 million in earnings ($2012) and 6,754 person-year jobs for the 2016-2037 construction period. Similarly, for the Nebraska Heartland Expressway Corridor counties, the effects would results in $248.0 million in earnings ($2012) and 6,558 person-year jobs for the 2016-2037 construction period.

5.3.3 MAINTENANCE AND OPERATIONS IMPACTS

The maintenance and operations (M&O) of the Nebraska components of the Heartland Expressway Corridor improvements would have an impact on the regional and local economy due to new direct and indirect employment that would result from the M&O expenditures associated with the improvements. The new M&O expenditures are those expenditures associated with the yearly maintenance and less frequent repaving costs for the additional lanes created by the Heartland Expressway Corridor investment. Direct employment consists of operations-related employment in industries whose jobs and services are purchased directly to operate and maintain the new lanes. Indirect economic impacts are those that would be created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing the M&O services. These indirect impacts are reflected in the economic multipliers for construction, as most roadway maintenance is construction related. The analysis estimates the number of M&O jobs and earnings generated by the Heartland Expressway Corridor improvements in Nebraska based on new (or additional) M&O cost estimates provided by NDOR.

The analysis applies a consistent set of multipliers tailored to the structure of the four-state Heartland counties economy as well as the Nebraska Heartland counties only. The economic impacts associated with M&O expenditures were measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

M&O Expenditures

The annual M&O expenditures as well as the less frequent joint sealing and new pavement costs (every eight years) for the new lane miles added in Nebraska as part of the Heartland Expressway Corridor improvements were provided by NDOR in 2012 dollars (see Chapter 4 for more information on M&O costs). The capital costs of the ITS improvements are phased in over five years, therefore, the M&O costs are also phased in over five years.

The total M&O expenditures are divided into two major categories. These include:

- **Annual Expenditures:** yearly maintenance including snow removal, striping, etc.
- **Expenditures Incurred Every Eight Years:** joint sealing and new pavement

The economic impact of these expenditures would vary by activity and depends on the amount of locally produced goods and services embodied in the purchases. Construction (the industry most associated with highway M&O) goods and services would be purchased in the local economy. Although every material required for M&O would not be produced locally, the RIMS II multipliers reflect the supplier linkages for the industry, and thus account for this leakage from the local economy.

The total expenditures for these costs are allocated over the analysis period so that the annual M&O expenses for each project component started in the year following project completed, as provided by NDOR. In addition, the joint sealing and new pavement expenses are incurred in the eighth year after operation begins and every eight years thereafter through 2054. Table 5.17 summarizes total M&O costs for the Heartland Expressway Corridor applied for each year in the analysis. This allocation is just an estimate in order to provide an annual cost and impact estimate; it is not intended to represent a cash flow for the project.

Table 5.17 – Annual New M&O Costs for Nebraska Components of Heartland Expressway Corridor (2012 dollars in millions)

Year	Total M&O Costs
2016	$-
2017	$0.08
2018	$0.17
2019	$0.25
2020	$0.54
2021	$0.69
2022	$0.85
2023	$1.34
2024	$1.37
2025	$1.39
2026	$1.42
2027	$2.04
2028	$1.88
2029	$2.25
2030	$2.83
2031	$1.88
2032	$1.88
2033	$2.22
2034	$2.49
2035	$3.98
2036	$2.40
2037	$2.92
2038	$3.49
2039	$2.54
2040	$3.44
2041	$2.74
2042	$2.74
2043	$4.12
2044	$2.92
2045	$2.92
2046	$3.49
2047	$2.54
2048	$3.44
2049	$2.74
2050	$2.74
2051	$4.12
2052	$2.92
2053	$2.92
2054	$3.49
Total	**$88.17**

Source: NDOR

M&O Jobs and Earnings Effects

RIMS II multipliers are used to translate the M&O expenditures for the Nebraska component of the Heartland Expressway Corridor improvements into the associated job and income effects. The impacts are shown for the four-state Heartland Expressway counties and the Nebraska Heartland Expressway counties only. The impacts vary by the geographic area considered; impacts are greater for the four-state area relative to the Nebraska counties as there is less "leakage" associated with construction spending. Put another way, a larger economy captures a greater share of project spending as its greater size allows it to provide a greater share of the diverse range of services required for highway M&O activities.

The Final Demand Earnings Multiplier represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the construction industry.

The Final Demand Employment Multiplier represents the total change in the number of jobs that occur in all industries for each $1 million of output delivered to final demand by the construction industry.

Applying the final demand multipliers for the construction industry to the annual M&O expenditures shown in Table 5.17 provides an estimate of the earnings and employment impacts generated by the new Nebraska components of the Heartland Expressway Corridor improvements. The Nebraska total annual M&O expenditures for Groups 1-4 for the 2016 to 2054 period is $88.17M in 2012 dollars.

In the case of economic impacts generated by M&O expenditures for the project, the annual impacts are recurring effects that last as long as the project is operating. In the results summarized below, one job year is defined as a job for one person for one year's duration. As an example, a job for one person for three years would be defined as three person-year jobs. For the four-state region the effects of the Nebraska component of the Heartland Expressway Corridor maintenance and operations would result in $46.9 million in earnings ($2012) and 1,146 person-year jobs for the 2016-2054 analysis period. These jobs and earnings consist of operations-related employment in industries whose jobs and services are purchased directly to operate and maintain the new lanes as well as the secondary demand for goods and services across a broader spectrum of industrial sectors that support the industries providing the M&O services. Similarly, for the Nebraska Heartland Corridor counties,

the effects would results in $40.2 million in earnings ($2012) and 1,108 person-year jobs for the 2016-2054 analysis period.

5.3.4 ECONOMIC DEVELOPMENT IMPACTS

As the market recognizes and responds to the travel time and reliability improvements associated with the Heartland Expressway Corridor investments, long-term economic development would occur. For example, if shipments are more reliable and travel times are reduced, then businesses can reduce their inventories and organize their production processes to be leaner and can reach a larger market area than without the improvements. Collectively, this allows the Heartland Expressway Corridor economy to be more economically competitive. Food processing and other light manufacturing, as well as distribution are important opportunities for the corridor that would capitalize on the region's existing industrial base and the productivity improvements offered by the improved road network. The corridor's rail links, including rail connections to the West Coast ports, offer upside potential to this development strategy. In addition, auto traffic in the corridor would increase, increasing demand for roadside services in the corridor. This section describes the estimation of likely development impacts.

Roadside Services Impacts

Traffic along the Nebraska portion of the Heartland Expressway Corridor is expected to increase by at least 3.6% (see the travel demand analysis in Chapter 2 and Appendix B) with the completion of the transportation improvements due to the attraction of new users and diversions from parallel routes with slower travel times. This increase in traffic translates into increases in spending on lodging, food, gasoline, diesel, and other retail items by travelers along Nebraska's portion of the Heartland Corridor.

These new roadside service expenditures are important because they generate additional revenues for small businesses and result in additional direct and indirect employment and earnings for the corridor counties. Direct employment consists of accommodation, food services, and retail trade employment in industries whose jobs and services are purchased by roadside travelers. Indirect economic impacts are those that would be created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing roadside services. These indirect impacts are reflected in the economic multipliers for accommodation, food services, and retail trade industries. The analysis estimates the number of roadside service jobs and earnings generated by the Heartland Expressway Corridor improvements based on new roadside services expenditure estimates.

Unlike the construction and M&O impacts, the economic impacts associated with the new roadside services expenditures in the Heartland Expressway Corridor are only estimated for the local Nebraska counties. Since the traffic generating most of the new roadside service expenditures along the corridor is diverted traffic from slower routes, largely in neighboring states, the roadside service expenditures in the corridor would have been spent in these neighboring states, if the Nebraska portion of the Heartland Expressway Corridor project were not constructed. In other words, the impacts of roadside services are largely a transfer from parallel routes to Nebraska's portion of the Heartland Expressway Corridor. As a result, the analysis applies a consistent set of multipliers tailored to the structure of the Nebraska Heartland Expressway counties only. The economic impacts associated with roadside services expenditures were measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

Roadside Services Expenditures

To estimate the increase in roadside services expenditures on lodging, food, gasoline, diesel, and other retail along Nebraska's Heartland Expressway Corridor, an estimate of expenditures per vehicle mile traveled (VMT) was developed based on an analysis from the Appalachian Regional Commission's (ARC) Appalachian Development Highways Economic Impact Studies (1998)[10]. The logic used to estimate lodging, food, gasoline, diesel, and other retail expenditures per VMT is the same as the ARC report; however, the dollar values assumed have been updated to reflect prices in 2012.

The roadside services expenditures per VMT are multiplied by the annual new or diverted VMT projected to occur along Nebraska's portion of the Heartland Expressway Corridor. The daily VMT projections for each Heartland Expressway scenario were provided by the AECOM travel model for 2035.

Roadside Services Jobs and Earnings Effects

RIMS II multipliers are used to translate the annual roadside services expenditures for the Nebraska component of the Heartland Expressway Corridor improvements into the associated job and income effects. The impacts are shown for the Nebraska Heartland Corridor counties only as these expenditures are largely diverted from neighboring areas.

Applying the final demand multipliers for the appropriate industry to the annual roadside expenditures provides an estimate of the earnings and employment impacts generated by the new components of Nebraska's Heartland Expressway Corridor improvements. Accommodation multipliers are used for lodging expenditures; food services multipliers are used for food expenditures; and retail trade multipliers are used for gasoline, diesel, and other retail expenditures.

In the case of economic impacts generated by roadside services expenditures for the Heartland Expressway travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Expressway Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor travel scenario would result in $73.5 million in earnings ($2012) and 3,175 person-year jobs for the 2016-2054 analysis period.

In the case of economic impacts generated by roadside services expenditures for the Heartland & Intensified Energy Resource Development travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Expressway Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Heartland & Intensified Energy Resource Development travel scenario would result in $330.9 million in earnings ($2012) and 14,374 person-year jobs for the 2016-2054 analysis period.

In the case of economic impacts generated by roadside services expenditures for the Entire PTP Corridor travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Expressway Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Entire PTP Corridor travel scenario would result in $370.8 million in earnings ($2012) and 16,079 person-year jobs for the 2016-2054 analysis period.

In the case of economic impacts generated by roadside services expenditures for the Entire PTP Corridor & Intensified Energy Resource Development travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Expressway Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor and the Entire PTP Corridor & Intensified Energy Resource Development travel scenario would result in $655.0 million in earnings ($2012) and 28,468 person-year jobs for the 2016-2054 analysis period.

[10] http://www.arc.gov/assets/research_reports/AppalachianDevelopmentHighwaysEconomicImpactStudies3chap2.pdf

Competitive Impacts

Unlike the estimate of roadside services, which relies on projections of VMT, the assessment of relocations and expansions cannot be tied directly to travel time and VMT savings. It is possible, however, to estimate the typical impact of food processing and distribution expansions in the Heartland Expressway Corridor. Based on recent food processing relocations to the region such as KYS Foods and industry trends, the typical food processing plant employs between 20 and 50 employees directly. There are several established food processors in the corridor that are much larger, but these are at the upper end of the industry's size and not representative of a typical firm. Distribution facilities are also in that similar range based on data from the Bureau of Economic Analysis's County Business Patterns and information on specific distribution facilities currently operating in the corridor. The estimation assumes an average industry wage of $29,000 for food processing, an average wage of $35,000 for distribution activities, and an average wage of $40,000 for other services.

Table 5.18 - Economic Impact of Typical Firm Relocation in Industries Likely to Capitalize on Heartland Expressway Improvements

	Direct Employment	Direct Earnings (000)	Final Demand Multipliers		Impact of a Typical Relocation	
			Earnings (dollars)	Employment (jobs)	Earnings (dollars)	Employment (jobs)
Industry Opportunity						
Food Processing	50	1,450	$2.3664	2.2868	$3,431	114
Distribution	35	1,225	$1.1631	1.1564	$1,425	40
Other Services	35	1,400	$1.1912	1.1962	$1,668	42

Note: RIMS II multipliers line19. Food, beverage, and tobacco product manufacturing, line 36. Warehousing and storage, and line 61 (Other services)

These are recurring jobs; the impacts in Table 5.18 are annual impacts that last for the duration of the firm's operation. Both industry opportunities are likely; the corridor has some established firms in each industry but has also been considered and ultimately not selected by other firms in the industry (based on stakeholder interviews) for expansions. Thus, the road improvements and associated accessibility gains created by the greater travel reliability and travel time savings is expected to improve the region's capture rate for these industries.

Table 5.18 contains an estimate for an additional industry opportunity beyond the corridor's traditional advantages. This opportunity involves "other services." Over time, as the nearby Denver region continues to develop into the dominant urban economy in this region of the country, industries will increasingly seek lower cost locations with good access to this dense urban market. There is upside potential that some businesses will select locations in the Heartland Expressway Corridor. Nebraska's cost of doing business is estimated to be 85% below the US national average cost by Moody's Analytics[11]. By contrast, the estimated cost in Denver is 94% of the national average, yielding a significant savings to those firms that can locate in the corridor and still access the Denver market as needed. The expanding manufacturing base, combined with low cost proximity to Denver, offers opportunities to expand the range of services (and employment opportunities) in the corridor over time. Accessibility of mining jobs associated with Intensified Energy Resource Development similarly offers support for an expanding service industry. Though the corridor is not expected to experience the direct employment impacts, workers in the corridor will more readily access the Intensified Energy Resource Development sites (see Chapter 2) and the well-paying jobs associated with these opportunities. Thus, incomes in the Heartland Expressway Corridor are supported, which in turn translates into support for a greater range of services in the local economy.

[11] Value is for 2009, the most recent available. No specific cost for Scottsbluff is available, but it is un-likely that costs in the panhandle region of the state exceed the national average which includes the state's main metropolitan centers. North American Business Cost Review, 2011 Edition.

5.3.5 ECONOMIC IMPACT SUMMARY AND FACTORS SUPPORTING SUCCESS

The preceding discussion has illustrated the varied ways that the Nebraska components of the Heartland Expressway Corridor generate economic impacts in the form of jobs and earnings. Table 5.19 below summarizes the jobs and earnings created or supported by the Heartland Expressway Corridor investments that have been discussed. Taken in total the construction, maintenance and operations, and roadside services offered by the investment support between 10,840 and 36,133 job years and $362 to $943 million in earnings for the Nebraska Heartland Counties during the 2016 to 2054 analysis period. The range of results provided is based on the different roadside service scenarios analyzed.

Table 5.19 – Summary of Economic Impacts for the Nebraska Heartland Expressway Counties 2016-2054 (2012 Dollars in Millions)

	Total Job-Years (2016-2054)	Total Earnings (2016-2054)
Construction	6,558	$ 248
O&M	1,108	$ 40
Roadside Services		
Heartland	3,175	$ 73
Heartland & Intensified Energy Resource Development	14,374	$ 331
Entire PTP	16,079	$ 371
Entire PTP & Intensified Energy Resource Development	28,468	$ 655
Total (Range provided based on the Roadside Services Scenarios)	**10,840 to 36,133**	**$362 to $943**

Over time, as the nearby Denver region continues to develop into the dominant urban economy in this region of the country, industries will increasingly seek lower cost locations with good access to this dense urban market. As a result, there is upside potential that some businesses will select locations in the Heartland Expressway Corridor. The expanding manufacturing base, combined with low cost proximity to Denver, offers opportunities to expand the range of services (and employment opportunities) in the corridor over time. Food processing and distribution industry opportunities are likely in the Heartland Expressway Corridor; the corridor has some established firms in each industry but has also been considered and ultimately not selected by other firms in the industry (based on stakeholder interviews) for expansions. Thus, the road improvements and associated accessibility gains created by the greater travel reliability and travel time savings is expected to improve the region's capture rate for these industries. The attraction of one of these industry opportunities is likely to create between 40 and 114 annual jobs and $1.4 and $3.4 million in annual earnings. These jobs and earnings impacts include both the direct employment at the facility as well as in industries supporting the operation of the facility and its employees.

Researchers have found that any subset of the following factors supports highway investments' ability to generate meaningful economic growth. These include: high volumes of travel, travel time savings, improved connections among trade centers, better labor access, improved access to manufacturing centers, better connections between agricultural centers and markets, better access between raw materials and processors, and better access for tourists. Of note, all relate to mobility or accessibility, the traditional role of transportation. In each case, transportation enables the firms and workers to capitalize on an existing strength or competitive advantage present in the community's economic structure. The transportation improvement connects a regional asset (broadly understood to be a resource, labor force or amenity) to a

market for the asset. More directly, transportation investment is successful when addressing a transportation problem in the economy.

By contrast, transportation investment cannot overcome the economic disadvantages of a small labor pool, an unskilled or uneducated workforce, unreliable power or water supplies, nor can it attract industry where the requisite resources are not present. This perspective leads one to consider a collaborative approach to economic development, where investments of different types are bundled together to mitigate a region's economic disadvantages. For example, road improvements to support a desirable employer in a targeted industry might be combined with workforce training tailored to the needs of the employer, and tax incentives to permit a new industry to take hold in the region and demonstrate its success in a new location and can be marketed to other employers in the industry or to related industries. In this instance, road investment is part of a package of policies and investments that address the region's economic disadvantages; transportation investment is not the sole investment.

The Heartland Expressway Corridor has a number of ancillary qualities that allow it to leverage highway improvements. These include the following:

Advantageous costs. Nebraska's cost of doing business is estimated to be 85 percent below the US national average cost by Moody's Analytics[12]. By contrast, the estimated cost in Denver is 94 percent of the national average, yielding a significant savings to those firms that can located in the corridor and still access the Denver market as needed.

Educational programs aligned with the economy. Western Nebraska Community College offers course concentrations in Transportation, Distribution, and Logistics and Manufacturing Processes. These two areas accounted for 10 percent of attendees. Combined with the more general business curriculum, this accounted for over a quarter of attendees .

Complementary infrastructure. Stakeholder participants reported on the region's fiber optic network and excess supply of telecommunications capacity to support industry.

Strategic location. The corridor is strategically on major rail lines that feed to the west coast ports. These lines are gradually being upgraded to remove bottlenecks and to better connect the inland US to these Pacific gateways. The corridor benefits from these improvements along with the balance of the Midwest. In addition, the corridor is located in close proximity to Intensified Energy Resource Development areas and along an emerging North-South trade link.

Collectively, these ancillary qualities provide support for a strategy of highway-led economic development in the Heartland Expressway Corridor.

[12] Value is for 2009, the most recent available. No specific cost for Scottsbluff is available but it is unlikely that costs in the panhan-dle region of the state exceed the national average which includes the state's main metropolitan centers. 2011 Edition, North American Business Cost Review, 2011 Edition.

6.0 FINANCE PLAN

6.1 INTRODUCTION

This chapter summarizes committed and potential sources of funding and finance approaches to support development of the Heartland Expressway Corridor. It explores the funding options available for the Heartland Expressway Corridor and is designed to serve as a starting point to define the eventual funding strategies. As a result, additional analysis would be required to determine feasibility and to develop a detailed financial plan. The chapter includes the following sections:

- Overview of Nebraska highway funding sources and uses of funds
- Heartland Expressway Corridor sources and uses of funds
- Federal funding programs in the federal transportation bill Moving Ahead for Progress in the 21st Century Act, MAP-21
- State funding programs
- Innovative funding options that have been applied on a state, regional, or local basis to fund highway programs elsewhere
- Various options for financing improvements to the Heartland Expressway corridor
- Key strategies for selecting funding approaches and achieving the financial plan are summarized

6.2 NEBRASKA HIGHWAY SOURCES AND USES OF FUNDS

Table 6.1 summarizes the sources and uses of funds for highway programs in Nebraska in calendar year 2011, the most recent year for which this data is published in the Federal Highway Administration's Highway Statistics series. Local governments provide the highest share of funding (39 percent), followed by state highway user tax revenues (28 percent), and federal funds (17 percent).General funds and miscellaneous income comprise the rest.

Table 6.1 – Nebraska State Funding for Highways; Calendar Year 2011, Millions of Dollars

Receipts	Funding	% of Total
State Highway User Tax Revenues	$417.93	28%
Other Imposts and General Funds	$219.35	15%
Miscellaneous Income	$13.20	1%
Payments from Federal Government	$261.28	17%
Payments from Local Government	$580.56	39%
Total Receipts	$1,492.32	100%

Disbursements	Expenditure	% of Total
Capital Outlay	—	—
National Highway System	$354.92	25%
Other Federal Aid Highways	$216.00	15%
Other Roads and Streets	$72.40	5%
Maintenance and Highway Services	$320.63	22%
Administration, Highway Police, Safety	$224.41	15%
Grants In-Aid to Local Government	$254.83	18%
Total Disbursements	$1,443.18	100%

Source: FHWA Highway Statistics 2011, Table SF-21 (published February 2013).
Note: The difference between receipts and disbursements is related to different scheduling of program outlays and program receipts.

According to Table 6.1, Nebraska spends most available funds (45 percent) on capital outlays, including preservation activities such as rehabilitation, reconstruction, and replacement. Of the remainder, 22 percent is spent on maintenance and operations (M&O); 15 percent is applied to administration, enforcement and safety; and 18 percent provides grants in-aid to local government.

Of funds expended on capital outlays, 55 percent were expended on National Highway System (NHS) routes. The Heartland Expressway corridor in its entirety is comprised of designated NHS routes.

Nebraska has a long history of financing the entirety of its program on a pay-as-you-go basis, and is one of two states to finance highways without bonds or other borrowing. Bonding has been considered in Nebraska. Specifically, in April 2014 the Nebraska Legislature considered LB1092, which would have allowed the Nebraska Highway Commission to issue up to $200 million in revenue bonds through June 30, 2017 to advance high-priority projects. The bonds would have been backed by the State Highway Capital Improvement Fund, which consists of the quarter-cent sales tax designated for roads. The bill also required that the bonds issued carry an interest rate of 5 percent or less. However, this bill failed on final reading on April 10, 2014. Therefore, no bond proceeds were applied to fund highway programs in 2011, and there were no interest or bond retirement expenditures.

6.3 HEARTLAND EXPRESSWAY CORRIDOR SOURCES AND USES OF FUNDS

Table 6.2 summarizes the projected sources and uses of funds for the Heartland Expressway corridor between 2015 and 2035. The full program is projected to cost $542.1 million, with 89 percent of expenditures related to roadway improvements. The remaining expenditures are for safety, truck parking, and intelligent transportation system (ITS) improvements.

Table 6.2 – Heartland Expressway Projected Sources and Uses of Funds; Millions of Year-of-Expenditure (Inflated) Dollars

Expenditures by Type	2015-2020	2020-2025	2025-2030	2030-2035	Total	% of Total
Roadway	$149.25	$112.00	$153.00	$70.00	$484.25	89%
Safety	$2.20	$21.00	$1.00	$20.00	$44.20	8%
Truck Parking	$5.00	$0.00	$0.00	$5.00	$10.00	2%
ITS	$2.82	$0.85	$0.00	$0.00	$3.67	1%
Total	$159.27	$133.85	$154.00	$95.00	$542.12	100%
Committed Funds	$51.72	0	0	0	0	
Funding Gap	$107.55	$133.85	$154.00	$95.00	$490.40	

Currently, funding is committed for the 'L62A to Alliance' project on US-385. This funding is comprised of $30 million from the Build Nebraska Act, and an additional $21.72 million in congressionally designated funds. Significant funding shortfalls remain within the proposed build out construction plan for the completion of the Heartland Expressway.

6.4 FEDERAL FUNDING PROGRAMS

This section describes current federal highway funding sources under MAP-21. It summarizes the existing Federal Aid Highway Program and Nebraska's share of funding. Next, existing federal programs applicable to the Heartland Expressway Corridor are described.

6.4.1 MAP-21

MAP-21 is the current authorizing legislation for funding surface transportation projects for FY 2013 and FY 2014. Prior to MAP-21, each apportioned program had its own formula for distribution, and the total amount of federal assistance a state received was the sum of the amounts it received for each program. MAP-21 instead provides a total apportionment for each state and then divides that state amount among individual apportioned programs.

MAP-21 is designed to create a streamlined, performance-based, and multimodal program to address challenges in improving safety, existing infrastructure condition, congestion, efficiency of the system and freight movement, environmental sustainability, and delays in project delivery. Some highlights of MAP-21 include:

Consolidation of federal programs: MAP-21 simplifies the federal surface transportation program by consolidating existing highway programs. It establishes a National Highway Performance Program, aimed at repairing and improving an expanded National Highway System.

Optional enhancements spending: Under the previous transportation bill, states were required to spend 10 percent of STP funds on transportation enhancement activities, including bike, pedestrian, transit, landscaping, public art, or historic projects linked to transportation. MAP-21 does not mandate a specific set-aside for Enhancements, freeing federal transportation dollars for other priorities.

Accelerated project delivery: MAP-21 modifies USDOT administrative procedures to facilitate projects. More types of projects would qualify for a Categorical Exclusion to the National Environmental Policy Act (NEPA), thus enabling more projects to benefit from a streamlined environmental process. The act also facilitates early acquisition of right-of-way.

Enhanced TIFIA financing: MAP-21 provides significant additional funding for the Transportation Infrastructure Finance and Innovation Act (TIFIA), a USDOT program that provides direct lending to qualified projects under relatively favorable terms at attractive rates. The additional funding will enable lending to nearly 10 times as many projects as existing TIFIA funding levels support.

6.4.2 FEDERAL AID HIGHWAY PROGRAM FUNDING

The Federal Aid Highway Program under MAP-21 consists of several individual funding programs to which federal Highway Trust Fund monies are annually apportioned to the states. MAP-21 restructured the core highway funding programs under SAFETEA-LU and consolidated many of the formula programs into six core programs.

Table 6.3 summarizes the apportionment of Federal Aid Highway Funds for the six core programs to Nebraska in federal fiscal year 2014, the most recent year for which this data is published. The table divides funding programs into two categories. The first includes programs for which Heartland Expressway improvements are eligible, but the corridor competes with all other projects within the State of Nebraska that are also eligible for these programs. The second category is other federal programs, which comprise the remainder of Nebraska's Federal Aid Highway Program funding, but are not anticipated to provide funding for any Heartland Expressway Corridor projects.

Table 6.3 – Apportionment of Federal Aid Highway Funds to Nebraska; Fiscal Year 2014, Millions of Dollars

Receipts	Funding	% of Total
Funding Programs for which Heartland Expressway improvements are eligible*		
National Highway Performance Program	$162.55	58%
Surface Transportation Program	$74.77	27%
Highway Safety Improvement Program	$14.46	5%
Railway Highway Crossings Program	$3.56	1%
Subtotal of Funding Programs for which Heartland Expressway improvements are eligible*	$255.34	92%
Other Federal Funding Programs**		
Congestion Mitigation & Air Quality Improvement	$9.82	3%
Metropolitan Planning	$1.57	1%
Transportation Alternatives Program	$6.77	2%
State Planning & Research	$5.48	2%
Subtotal Other Federal Funding Programs**	$23.63	8%
Total	$278.98	100%

Source: FHWA Funding Notice 4510.772, Fiscal Year (FY) 2014 Supplementary Tables – Apportionments Pursuant to The Moving Ahead for Progress in the 21st Century Act, January 31, 2014 (FHWA 2014b).
* The Heartland Expressway is eligible for these programs, but competes with all other projects within the State of Nebraska that are also eligible for these programs.
** These programs comprise the remainder of Nebraska's Federal Aid Highway Program funding, but are not anticipated to provide funding for any Heartland Expressway Corridor projects.

Four programs for which the Heartland Expressway corridor is eligible provided Nebraska $255 million in highway funding in FY 2014, 92 percent of the state's total allocation of Federal Aid Highway Funding. Relevant programs include:

National Highway Performance Program (NHPP): Under MAP-21, NHPP places a heavy emphasis on National Highway System (NHS) improvement and preservation to meet performance targets established in state asset management plans. The NHS is comprised of rural and urban highways serving major population centers, international border crossings, intermodal transportation facilities, and major travel destinations. It includes the Interstate System, other urban and rural principal arterials, highways that provide motor vehicle access between the NHS and major intermodal transportation facilities, the defense strategic highway network, and strategic highway network connectors. The entirety of the Heartland Expressway Corridor is designated as part of the NHS. Nebraska was apportioned approximately $163 million in NHPP funding for FY 2014, 58 percent of the state's Federal Aid Highway Program funding apportionment. The NHPP program structure allows more flexibility to the State DOT to determine how much funding is provided to state bridges versus pavement condition, as compared to the previous federal transportation bill.

Surface Transportation Program (STP): MAP-21 continues the STP program, which provides flexible funding that may be used by states and localities for projects on any federal-aid highway, including the NHS, bridge projects on any public road, transit capital projects, public bus terminals and facilities, and access to ports. Under MAP-21, eligible activities that may be funded by STP have been expanded, including bridge safety and truck parking which may be applicable to the Heartland Expressway Corridor. At present, 50 percent of each state's STP funds are to be distributed based on population, with the remainder to be used in any area of the state. In addition, each state must set aside a portion of their STP funds (equivalent to 15 percent of the state's FY 2009 Highway Bridge Program apportionment) for bridges not on Federal-aid highways. Nebraska was apportioned $75 million in STP funding for FY 2014, 27 percent of the state's Federal Aid Highway Program funding apportionment. The proposed Heartland Corridor improvements include construction of truck parking at two locations, on Interstate 80 at milepost 22 between 2015 and 2020, and on US 385 near Chadron between 2030 and 2035. Each of these projects is estimated to cost $5 million and are eligible for STP funds under MAP-21.

Highway Safety Improvement Program (HSIP): HSIP aims to achieve a significant reduction in traffic fatalities and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements. FHWA requires states to apply a data-driven process to determine how funds should be applied towards planning, implementation, and evaluation of projects. MAP-21 also requires states to adopt performance related safety goals and develop and maintain a Strategic Highway Safety Plan (SHSP) that lays out strategies to address key safety problems. Nebraska was apportioned $14 million in HSIP funding for FY 2014, five percent of the state's Federal Aid Highway Program funding apportionment.

Rail-Highway Crossings Program: These funds provide for the elimination of hazards and the installation of protective devices at public railway-highway crossings, and are administered as part of the Highway Safety Improvement Program. Nebraska was apportioned approximately $3.5 million in funding from this program for FY 2014, one percent of the state's Federal Aid Highway Program funding apportionment. Currently, there are no existing railroad crossings that have been identified for improvements in the long range Vision of the Heartland Expressway Corridor.

Notably, while these programs provided an estimated $255 million in apportionments to Nebraska in FY 2014, they were applied to eligible projects across the state. For Heartland Expressway Corridor projects to receive money from these federal programs, they must compete well against other projects according to the allocation criteria applied by the Nebraska Department of Roads. For Heartland Expressway Corridor improvements to become priorities for receiving Federal Aid Highway Program monies, they must align with these criteria, which vary by funding program.

6.4.3 OTHER FEDERAL GRANT PROGRAMS AND PROVISIONS

This section describes another U.S. Department of Transportation (USDOT) discretionary grant program and MAP-21 provision that are applicable to the Heartland Expressway Corridor.

Freight Provision: MAP-21 includes a number of provisions to enhance freight movement by improving the condition and performance of the freight system. It creates a Primary Freight Network (PFN) and establishes incentives to prioritize projects that advance freight performance goals. As part of MAP-21, USDOT will create a national freight strategic plan and encourages states to develop their own freight plans and establish freight advisory committees. While the Heartland Corridor area is not on the draft PFN list, it potentially has an important role in the development of a Nebraska state freight plan.

Transportation Investment Generating Economic Recovery (TIGER): The TIGER program began as part of the American Recovery and Reinvestment Act of 2009 (ARRA) as a means for the USDOT to invest in critical surface transportation projects that create economic benefits for communities, regions, or the nation. Funds may be applied to the construction, reconstruction, or rehabilitation of routes eligible for Federal Aid Highway Program funding, as well as public transit, freight, and port projects eligible for federal funding.

The grant process is highly competitive, with only 51 projects selected for funding under TIGER I out of 1,457 applications. Under Tiger II, 42 projects were funded, 46 under TIGER III, 47 under TIGER 2012, and 52 under TIGER 2013. Projects are evaluated across five long-term outcomes, including state of good repair, economic competitiveness, livability, sustainability, and safety.

TIGER grants are particularly well suited for projects that are multi-modal, multi-jurisdictional, or otherwise challenging to fund under existing programs. USDOT uses a rigorous evaluation process to select projects with benefit-to-cost ratios greater than 1.0. Projects are also typically "shovel ready," innovative in project delivery, and produce more livable and sustainable communities. Eligible applicants include states, municipalities, port authorities, transit agencies, and most other political subdivisions.

6.5 STATE FUNDING

Nebraska uses three primary revenue sources to fund transportation programs: Fuel taxes, sales taxes on new and used motor vehicles and trailers; and motor vehicle registration fees. A new program, the Build Nebraska Act, will dedicate a portion of state sales tax revenues to highway programs over a 20-year period beginning in 2013.

6.5.1 EXISTING NEBRASKA FUNDING PROGRAMS

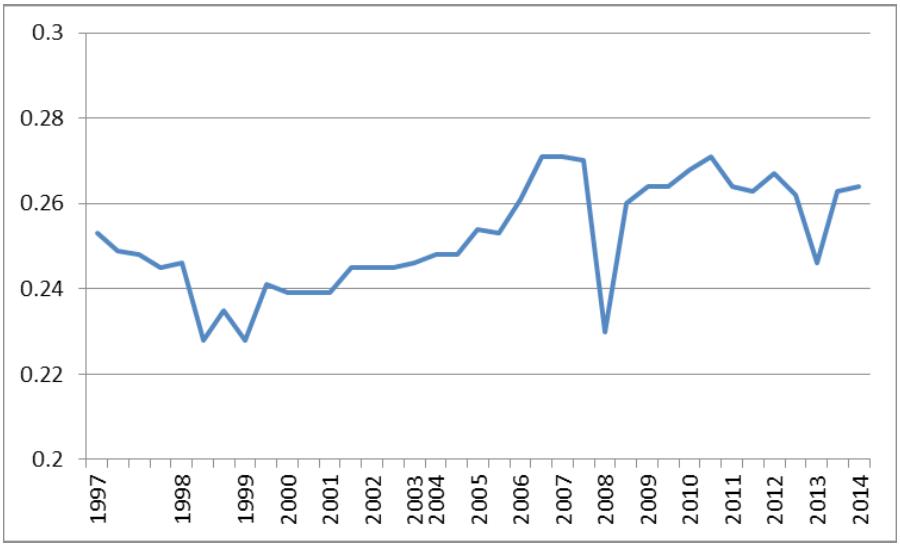

Figure 6.1– Nebraska Historical Fuel Tax Rate; Cents per Gallon, 1997-2014

Fuel Tax

The predominant source of highway funding in Nebraska is the fuel tax, which provides approximately 60 percent of state highway revenues. As of January 1, 2014, the state fuel tax rate for gasoline, gasohol, diesel, ethanol, and compressed fuels is 26.4 cents per gallon. Of this amount, 2.8 cents is a local fixed portion, evenly split between cities and counties; 7.5 cents is a fixed amount for state programs. To ensure stabilized funding for state transportation programs the remainder of the tax varies based on wholesale fuel prices (currently 15.2 cents per gallon) and a variable tax based on projected transportation funding receipts (currently 0.9 cents). The state receives 66 percent of wholesale tax revenues and 100 percent of variable tax revenues. The variable rates reset every January 1 and July 1. Nebraska's historical fuel tax rates since 1997 are summarized in Figure 6.1.

The fuel tax rate has ranged between a low of 22.8 cents per gallon from January 1 to June 30, 2006, and a high of 27.1 cents from July 1, 2006 to June 30, 2007 and July 1, 2010 to December 31, 2010. It has averaged 25.2 cents per gallon since 1997.

Sales taxes on new vehicles provide approximately 27 percent of NDOR funding . Vehicle registration fees provide approximately 10 percent of funding. Miscellaneous sources provide another 3 percent of revenues.

Build Nebraska Act

In 2011, the Nebraska Legislature passed the Build Nebraska Act, a multiyear funding commitment to highways. The Build Nebraska Act, which became effective July 1, 2013 and continuing through June 30, 2033, dedicates 0.25 percent of Nebraska's existing 5.5 percent sales tax towards transportation programs. The act allocates 15 percent of revenue to the Highway Allocation Fund, which is the established mechanism for allocating funds from the state Highway Trust Fund to counties and municipalities. The remaining 85 percent of revenues are dedicated to the new State Highway Capital Improvement Fund, of which at least 25 percent must be applied to four-lane expressways and federally-designated high priority corridors (including the Heartland Expressway Corridor). The remainder may be applied to surface transportation projects as prioritized by NDOR, including the reconstruction and new construction of roads, highways, and bridges which are part of, or if built, would be part of the state highway system.

Projections from February 2013 estimate that the Build Nebraska Act will designate an annual average of approximately $62 million to the State Highway Capital Improvement Fund and approximately $11 million to the Highway Allocation Fund from FY 2013 through FY 2017 (Nebraska Department of Revenue 2013). Current NDOR plans call for $30 million in Build Nebraska Act funding for improvements to US-385 from L62A to NE 2 in Alliance, which is part of the Heartland Expressway Corridor, between FY 2016 and FY 2019. This project includes adding an additional pair of lanes to be placed on the west side of the existing 2-lanes.

6.6 INNOVATIVE FUNDING OPTIONS

There are a number of innovative funding options that could potentially be applied to support delivery of the Heartland Expressway corridor program. These funds can supplement state and federal funds available to support improvements to the corridor. It can also help in filling any gaps in funding, if revenues are expected over extended periods of time. Options include vehicle registration fees, tolling, severance taxes, utility easements, local funding, and various value capture approaches, including special assessment districts, tax increment financing, development impact fees, developer contributions, and right-of-way donation. Each program is described below.

6.6.1 VEHICLE REGISTRATION FEES

Presently, annual vehicle registration fees paid by Nebraska motorists include a contribution to the state's Highway Trust Fund. Passenger vehicles pay $15 to the Highway Trust Fund annually, while variable rates for heavy trucks and commercial vehicles range between $18 and $1140 annually based on the registered weight of the vehicle. These registration fees provide approximately $70 million in annual revenue to Highway Trust Fund. These fees are separate from a variety of other registration fees ranging between $0.50 and $2.00 that are applied to the Recreation Road Fund, Department of Motor Vehicles Cash Fund, county general funds, and Nebraska Emergency Medical Systems Operations Fund. Registration fees are also separate from motor vehicle taxes and fees paid by motorists on the value of vehicle plus an additional

$20 fee. Motor vehicle taxes and fees provide revenue for cities, counties, and school systems and do not support the Highway Trust Fund.

Some states have opted to increase vehicle registration fees statewide to provide new revenues for transportation projects. Colorado adopted the Funding Advancement for Surface Transportation and Economic Recovery (FASTER) program to address structurally deficient bridges and deteriorating highways across the state. The program includes bridge and road safety programs funded with vehicle registration fees. The bridge program is funded by a bridge safety surcharge of $18 for the average passenger vehicle that raises an estimated $100 million statewide. The road safety surcharge is $23 for the typical passenger car and raises an estimated $150 million. The programs are also supported by increased late fees for vehicle registration and a new $2 daily car rental fee.

Another option is a dedicated regional vehicle registration fee applied to the program. North Carolina levied a $5 vehicle registration fee over a five-year period to pay for infrastructure improvements in a 13-county region surrounding the Global TransPark, a multimodal industrial park adjacent to air, rail, and highway transportation in the eastern part of the state.

If a $1 annual vehicle registration fee was proposed in the six counties where the Heartland Expressway corridor passes through —Dawes, Box Butte, Morrill, Scotts Bluff, Banner, and Kimball—an estimated $66,000 annually could be raised for transportation improvements along the corridor. This estimate assumes that private vehicle ownership rates in the region match statewide per capita vehicle ownership of 990 private vehicles per 1,000 population. This estimate is based on 2010 Census figures for the six Heartland Expressway corridor counties, with a total population of 67,013. Over 55 percent of the population of corridor counties resides in Scotts Bluff County.

Registration fees can have a stable revenue base if per capita growth in vehicle ownership grows proportionally with the state or regional economy, but fees would need to be indexed to keep pace with inflation. As the Heartland Expressway corridor regional vehicle registration fee example demonstrates, there is potential for a low revenue yield if rates are relatively minimal. Registration fees have a direct tie to transportation, and the levy is a user charge, not a tax, which can make it attractive to policy makers. The state has an existing collection mechanism in place, facilitating administration of the fee.

6.6.2 TOLLING

Transportation agencies across the country are increasingly turning to tolling as an option to close the increasing gap between traditional funding sources and highway infrastructure needs. However, tolling is not considered a viable option for funding Heartland Expressway corridor improvements for the following reasons:

- Limited incidence of tolling in Nebraska – presently, the only toll facilities in Nebraska are two toll bridges across the Missouri River between Iowa and Nebraska. There are no toll highways in the state.
- Insufficient traffic volume to generate the level of revenues to support the construction, operation, preservation, debt service, and coverage requirements if the toll revenues are used to pay for revenue bonds – most of the Heartland Expressway corridor lacks sufficient traffic density to support a toll schedule to pay its costs.
- Insignificant levels of traffic congestion– the extent of traffic congestion is primarily used to assess tolling potential for urban highway facilities where travel delay costs justify the payment of tolls by commuters seeking an alternative to highly congested non-tolled facilities. The Heartland Expressway corridor runs through mostly rural areas and the level of service rating for the corridor is LOS A or B, which suggests little or no congestion problems at the present time and into the foreseeable future.

- Availability of alternative non-tolled routes to which traffic could be diverted – the Heartland Expressway corridor has non-tolled state highways and local roadways to which traffic could be diverted if tolls were applied along the corridor, especially for long-distance truck movements.
- Sensitivity of auto and truck users to paying a toll to use the corridor, which has traditionally been available without requiring users to pay a toll.
- Uncontrolled access along the Heartland Expressway corridor, including numerous crossroads and other forms of entry and exit, would make it relatively easy for users to avoid toll plazas or barriers. This is in contrast to controlled access highways where access can be gained only by using prescribed on and off ramps, as with most Interstate highways. While controlling access along the Corridor would prevent vehicles from exiting the highway before the tolling facilities, it would be prohibitively expensive to achieve relative to the potential toll revenues.
- Public opposition of tolling along rural state highways.

Tolling in some form might become more viable in the future for selected sections of the Corridor if local communities are willing to support tolling, the potential for traffic diversion is minimized, and revenues from tolling exceed its costs.

6.6.3 SEVERANCE TAXES

A severance tax is a tax imposed on the extraction of non-renewable resources such as oil and natural gas. In Nebraska the severance tax is levied at three percent of the value of non-stripper oil and natural gas severed from the state. The rate for stripper wells producing oil is two percent. At present, no severance tax revenue is applied to transportation programs in Nebraska. Other states, such as Wyoming have used severance taxes to fund transportation programs. For example in FY 2011, Wyoming's transportation program included $72 million in funding from severance tax and mineral royalties. There is significant concern about additional taxation on the extraction of natural resources that include arguments related to discouraging exploration and extraction when other neighboring states may have lower taxing and regulatory restrictions.

There is significant potential to extract oil and natural gas from the Niobrara Shale formation in Kimball, Banner, and other southwestern panhandle counties, adjacent to the Heartland Expressway corridor. Petroleum exploration will require access to transportation and would benefit from regional highway improvements. One method of funding the transportation infrastructure necessary to support this industry is increasing the state's severance tax and/or dedicating a portion of revenues to highway projects.

Severance taxes have the ability to produce significant revenues when extraction is booming and commodity prices are high. However, energy prices—the basis on which the tax is levied—are highly volatile. Gyrations in price can lead to swings in production, as drilling companies shift between oil and natural gas to satisfy market demands. This will result in year-to-year variability in revenues for transportation programs.

Dedicated severance tax revenues for transportation would be relatively easy to administer, since the state already collects severance taxes. But while there is likely to be broad public support for applying severance taxes to improve highways, the petroleum industry is likely to oppose a tax increase.

6.6.4 UTILITY EASEMENTS

Utility easements permit access along corridor rights-of-way to private telecommunications, pipeline, and power companies, in exchange for payments to the owner of the right-of-way. The practice has declined considerably since the late 1990s with the retrenchment of the telecommunications industry. However, there may be potential for oil and/or natural gas pipelines along the Heartland Expressway corridor to serve the emerging petroleum industry in the region.

Oftentimes, using an existing right-of-way, such as a corridor along a railroad or highway, is preferable to acquiring land for such purposes. In such instances, utility companies will make a period rent payment to the owner of the right-of-way based on a portion of the fair-market value of the land associated with their use of the corridor. Given the hazardous nature of oil and natural gas, new pipelines must have appropriate setbacks from existing developments. This complicates the ability to use rights-of-way along urbanized or even moderately populated roadways.

Given the relatively low value of land in western Nebraska, utility easements are not likely to provide a significant source of revenue for the Heartland Expressway corridor, but could provide a small contribution (less than $250,000 annually) towards corridor maintenance.

6.6.5 LOCAL FUNDING

A significant share of Nebraska Highway Trust Fund revenues are set-aside for city and county road programs. In addition, localities raise their own funds to pay for roadway maintenance, primarily through property taxes. Improvements to the Heartland Expressway corridor will primarily be to state highways and will therefore be a state funding responsibility. The occasional project, however, may provide sufficient local benefits or improve a locally-owned roadway such that a share of local funding is warranted. The extent to which local transportation revenue will be available to support the program will depend entirely on the incidence of qualifying projects.

6.6.6 VALUE CAPTURE

Some alternative funding applications generate funding from private sector and local agency partners, rather than users of the transportation facilities. This "value capture" in effect prices the non-transportation benefits of projects and "captures" that value to assist in funding the project that created the benefit. To implement value capture strategies, NDOR policy changes may be needed and further study would be required to determine their feasibility and potential revenue yields.

Five potential value capture approaches are summarized on the following page: special assessment districts, tax increment financing, development impact fees, developer contributions, and right-of-way donation.

Special assessment districts: These districts, also called benefit assessment districts, are formed to provide a specific service or benefit to lands contained within its boundaries. Depending on the enabling legislation, a district's charges may be based on the benefit to property rather than value of the property. The approach has been applied for improvements as basic as sidewalks and streetlights in residential neighborhoods throughout the country to projects as complex as the widening and construction of interchanges on Route 28 near Dulles International Airport in Fairfax County, Virginia. Special assessments are common for street or sewer improvements by Nebraska localities, an example of which is Lincoln's Arterial Street Impact Fee. The revenue yield will depend on the rate of the surcharge. To take effect, a district must be defined and established in accordance with state statute (which includes public notice and several opportunities for public comment).The surcharge may face opposition from property owners and developers.

Tax increment financing (TIF): In Nebraska, this approach is primarily designed to finance the public costs associated with a private development project. Property tax increases resulting from a development are targeted to repay the public investment required by a project. The tax base is frozen at predevelopment levels, and property taxes derived from increases in assessed values (the tax increment) either go into a special fund created to retire bonds issued to originate the development or leverage future growth in the district. In Nebraska, such districts are only permitted in blighted areas, and are typically established by localities. They have a relatively low revenue yield initially but will grow over time as property values escalate. However, in recent years, TIF districts

have faced extreme financial duress when the assessed value of district properties has fallen below base tax values. Oftentimes, local governments that initiated the TIF district are required to make up the difference, especially when bond debt is owed from pledged TIF district revenues. TIF districts are relatively attractive to property owners because revenues are pledged without a tax increase. However, this diverts funds from other public priorities.

Development impact fees: These charges are assessed by local governments against developing property to offset the impact it has on existing infrastructure. The fees seek to recover the cost incurred by a local government to provide public facilities required to serve the new or expanded development. Generally the fees are one-time cash payments, the cost of which is typically passed on to the purchasers of the developed property. This approach is most appropriate to fund infrastructure serving new development, and is not typically applied to improve existing infrastructure, as is contemplated along the Heartland Expressway corridor.

Developer contributions and right-of-way donation: These generally take the form of in-kind contributions of right-of-way and sufficient land for constructing interchanges or transit stations/multimodal centers. It has the effect of providing superior access to developer's remaining land holdings. In some areas, developers also may pay for all or part of the cost for a new interchange, not just provide rights-of-way (ROW). Potential opportunities for contributions in the Heartland Expressway corridor include right-of-way donation[1] from local governments or private sector groups along the corridor.

6.7 FINANCING OPTIONS

This section describes several options for financing improvements to the Heartland Expressway corridor. Financing leverages future funds by borrowing against future revenue surpluses to deliver improvements today. Notably, it does not bring new money to the table; it is an approach for managing available funds to accelerate program delivery.

Pay-as-you-go financing, the exclusive approach of the Nebraska Department of Roads to deliver its existing highway program historically, is described first. Other approaches include bonds, grant anticipation notes, private activity bonds, government loan and credit support, state infrastructure bank, and shadow tolling. As is detailed below, utilizing many of these approaches requires specific enabling action by the Nebraska Legislature and further study would be required to determine their feasibility and potential revenue yields.

6.7.1 PAY-AS-YOU-GO

Under pay-as-you-go financing, all capital expenditures are made on a cash basis; when adequate funding authority is accumulated to fully fund a project, it can then proceed into construction. There is no leveraging of funds through debt financing (or borrowing), and therefore no debt service expenses. Pay-as-you-go financing was the traditional way that most state transportation agencies financed their capital programs dating to the establishment of the Federal Aid Highway Program in the 1950s. In recent years, however, many states have opted to apply debt financing using instruments described below. Nebraska, however, continues to apply a pay-as-you-go approach to financing its highway program. Other states that join Nebraska in financing highway programs on a cash basis over the past five years include Iowa, South Dakota, Tennessee, and Wyoming.
An advantage of pay-as-you-go funding is that it enables an agency to remain debt-free, thereby eliminating debt service expenses. A disadvantage, however, is that sufficient funding must accrue before construction occurs. Depending on funding availability, this can result in the lengthy deferral of project investment.

[1]Any property acquisitions, including right-of-way donation, would need to be conducted in accordance with the Uniform Act. For example the owner must be provided an explanation of the acquisition process, including the right of having the agency (i.e. NDOR) appraise the property and to receive and offer of just compensation. Only after receiving such an explanation may the property owner waive these rights and the agency accept the donation (FHWA 2013c).

6.7.2 BOND FINANCING

Bond financing is the most common and most basic form of public debt financing. Public agencies issue long-term bonds backed by a pledged revenue stream. Three of the most common forms of bond financing, general obligation bonds, revenue bonds, and system bonds, are described below.

General Obligation (GO) Bonds: These bonds leverage broad, common tax streams, such as property taxes, sales taxes, and income taxes. They are backed by the "full faith and credit" of the taxing authority with respect to commitment of revenues for repayment. This pledge effectively guarantees that the bondholders will be paid, but requires that a particular tax rate can be adjusted without a public vote. By law, agencies must be able to raise the tax rate on pledged revenue in order to provide the level of funding required for payment of debt service. GO bonds are generally the least expensive, most secure, with the lowest interest rate.

Revenue Bonds: These bonds borrow against future revenues from sources in which investors have great confidence. Bond holders have the first lien against pledged revenues; the balance can be applied to capital and operating expenses. Revenue bond covenants pledge future tax revenues, such as motor fuel taxes, rather than revenues generated by the operation of the transportation facility itself (e.g., tolls or fares). Investors see this as more secure and interest rates are lower. Revenue bonds are the most common approach to long-term finance, and offer relatively affordable rates without requiring the pledge of full faith and credit. Since there is more risk to lenders, however, rates are typically higher than GO debt. In addition, pledged revenue is the only source of funding that pays investors. If revenues are below projection, the agency has limited ability to borrow more. This may require the agency to reduce expenses, restructure debt, and/or identify additional revenues.

In April 2014, the Nebraska Legislature considered LB1092, which would have allowed the Nebraska Highway Commission to issue up to $200 million in revenue bonds through June 30, 2017, to advance high-priority projects identified in the Build Nebraska Act. However, on April 10, 2014 this bill failed on final reading

System Revenue Bonds: This debt instrument leverages future revenues generated by the issuing entity, applying a portion of system-generated revenues first to fund debt service. It works similar to other long-term debt, except that dedicated tax revenues are not pledged. It is commonly applied by transportation agencies pledging system-generated revenues such as toll revenue and parking fees. Advantages of this approach include user participation in funding project capital and operating costs through payment of user charges used for payment of debt service. With growth in project use over time, revenue from future system users can be used to pay for the initial project cost. However, this financing approach applies only to certain types of transportation projects/programs that are capable of generating revenue sufficient to offset all or a portion of capital and operating costs.

Bond financing was last applied by the Nebraska Department of Roads in 1968, when $20 million in bonds were issued to complete Interstate 80 through the state.

6.7.3 REVENUE ANTICIPATION NOTES (RANS)

These include short-term borrowing against the expected receipt of near-term proceeds from tax, grant, bond, and other revenues. It leverages future revenues to allow them to be spent now by issuing debt that typically matures in less than a year. This enhances the agency's cash flow and provides a way to get past periods of low revenue. However, it exposes the agency to volatility of the market. There are also transaction costs, which are offset in part by the lower interest rates associated with short-term debt. It obligates revenues that might otherwise be used to support operations or other uses.

6.7.4 GRANT ANTICIPATION REVENUE VEHICLES (GARVEES)

These instruments leverage future grant funding (such as STP or other Federal Aid Highway Funds) to advance highway construction projects. They are similar to RANs but are long-term rather than short-term issues. Investors must weigh the risks of future authorizations and future appropriations (similar to evaluating risks of future dedicated revenues).The bonds extend the capital capacity beyond state and local dedicated sources. However, it consumes the capacity of grant sources to fund on-going requirements.

6.7.5 PRIVATE ACTIVITY BONDS (PABS)

These are tax-exempt securities on which portions of the proceeds are used for private benefit or use. They allow for increased private sector investment in transportation projects with both public and private benefit by enabling a private sector partner, rather the public agency, to issue debt. PABs encourage the private sector to take an active role in project financing and take the debt burden "off the books" for the public agency, freeing up capacity for other uses. Given the limited potential to apply public-private partnerships to deliver Heartland Expressway improvements, this approach is probably less relevant to the corridor.

6.7.6 FEDERAL LOAN AND CREDIT SUPPORT

USDOT's Transportation Infrastructure Finance and Innovation Act (TIFIA) program is a federal credit assistance program providing direct loans, loan guarantees, and standby lines of credit to eligible projects of national and regional significance.

Projects must demonstrate economic benefit, creditworthiness, attractiveness to private investment, support of international commerce, as well as foster livability, sustainability, enhance national transportation system. Under the program, USDOT acts as investment banker, offering direct loans with interest rates based on the federal government's own long-term bond rates. The MAP-21 bill raises the level of funding available to the TIFIA program from $122 million to $750 million. It also raises the maximum percentage of the project that can be funded by the federal share from 33 percent to 49 percent.

6.7.7 SHADOW TOLLING AND AVAILABILITY PAYMENTS

Under shadow tolling, the project sponsor reimburses the highway contractor/operator proportionate to the use of the facility without the need for direct toll payments by users. In effect, roadway traffic becomes the basis for payments. No actual tolls are paid by motorists using the facility.

Availability payments are similar to shadow tolling, but the project sponsor reimburses the contractor a specified fee for making the facility open and available for public use, rather than structuring payments according to traffic levels.

Both of these approaches can be an attractive option for financing roadway projects in which bonding or other public borrowing capacity is limited or prohibited. Financing is instead arranged by the contractor, with debt repayment scheduled commensurate with the expected receipt of shadow tolling funds. The effective rate of borrowing is likely to be higher than for public financing, but this approach makes financing available when public borrowing is not feasible.

6.8 SECURING FUNDING AND FINANCING OPPORTUNITIES

This section describes strategies for evaluating funding options, and successes in achieving funding for projects elsewhere.

6.8.1 EVALUATING FUNDING STRATEGIES

There are a variety of considerations that go into evaluating and selecting potential alternative funding approaches, including financial, political, legal/regulatory, and administrative/institutional impacts. Each of these is described below:

Financial: These considerations are most important, because the estimate of revenue is critical to any decisions to further pursue a funding alternative. This factor addresses the fundamental question of the expected yield from the revenue source. Generally, this is judged on the basis of a "reasonable" rate of taxation given the size of the tax base. For example, if a sales tax is under consideration, a tax rate of 0.1 percent or 1.0 percent would be judged in the "reasonable" range, while a tax rate of 10.0 percent would be well outside the reasonable range. However, for narrower taxes such as a hotel/motel tax, the reasonable range might be higher. A related factor is stability – a source that could experience significant annual fluctuations would be judged less suitable than a source with less likelihood of year-to-year variance. For example, the employer-paid "head tax" in Portland, Oregon, resulted in a much more stable source of funding than a retail sales tax, which would have been more subject to economic cycles. Finally, this factor addresses the extent to which the revenue stream can be indexed to inflation. This is important because many elements of the costs to be funded are closely tied to inflation.

Key criteria include:

- Revenue yield: An estimate of the revenue that a funding alternative may generate.
- Stability of revenue flow: The likelihood that revenue will be reasonably stable on a year-to-year basis.
- Growth potential: The propensity for a revenue source to grow in relation to the general economy. Revenue yield should grow as the economy grows.
- Response to inflation: The relationship of the funding source to price levels.
- Market acceptance for securing debt: Capacity of the revenue source to support debt repayment, if the revenue source is to be pledge against financing.

Political: This factor addresses equity, or the extent to which the incidence (or burden) of dedicated funding source matches the incidence of the provision of or the benefit from the services that the source funds. For example, if a jurisdiction funds ten percent of the revenues, it should receive approximately ten percent of service. This factor also addresses differential impacts among demographic groups.

Key criteria include public acceptance, equity, and incentive/distortion effects, and benchmarking:

- Public acceptance: This can be particularly challenging for "new" taxes and/or fees. What is often desired is a tax that causes the least resistance—e.g., rental car taxes at airports that are imposed on visitors, rather than residents.
- Equity: The relationship between those who pay and those who benefit. Policymakers generally seek to ensure the burden doesn't fall disproportionately on lower-income persons. Sales taxes, for example, are frequently viewed as inequitable since they are regressive (i.e., low-income people pay a higher percentage of their income).
- Incentive and distortion effects: The effect of the tax or fee on segments of the economy. For example, imposing or raising a tax on a certain commodity (e.g., fuel) will cause less of that good to be consumed, distorting the market. It may also create incentives for consumers that help achieve policy objectives (e.g., raising fuel tax may reduce automobile travel, thereby lessening congestion and/or greenhouse gas emissions).
- Benchmarking: The comparison of taxes and fees to neighboring jurisdictions. Levying taxes that are higher than neighboring local jurisdictions can affect the market, necessitating an exercise in benchmarking before entertaining new or increased taxes or fees (e.g., raising the retail sales tax may drive sales to neighboring jurisdictions).

Legal and Regulatory: Any dedicated source of funding must adhere to various State constitutional, statutory, and regulatory limitations. In some cases, there are existing limitations to potential revenue sources. In addition, the source should ideally have a tie to a transportation purpose.

Key criteria include:

- Legislative authority: The extent to which legislative approval is required to apply a new revenue source. Funding options that have already been enabled by the state legislature are much easier to achieve than those that require legislative action.
- Voter approval: State constitutional or legislative requirements may require a referendum, which can slow, and in many cases, defeat an initiative.
- Regulatory authorization: Some funding options may require the development of regulations clarifying administration of legally enabled authority. For example, after voter approval, regulations may specify the collection and enforcement mechanisms of a local sales tax measure.

Administrative/Institutional: This factor addresses the actual methodology of revenue collection and the ease and cost of administration. Revenue sources that rely on existing collection mechanisms are generally preferred. For example, in most states with a pre-existing state sales tax, the state will act as the collection agent for a local sales tax. Unique new taxes may require that the benefiting agency directly collect the revenues and conduct enforcement.

Key criteria include consideration of how a revenue stream will be administered, collected, monitored, and enforced, as well as the potential for revenue leakage:

- Revenue assessment and collection: The efficiency and cost effectiveness of applying a revenue stream should be considered. This includes the costs of collection and compliance. For example, there may be advantages to increasing a tax already in place compared to implementing a new tax for which no collection mechanism presently exists. Some revenue streams (such as tolling) consume an enormous amount of revenues for collection and administration, while others (like the fuel tax) consumer relatively little.
- Monitoring mechanisms: These are procedures to limit evasion and the erosion of revenues, including enforcement.
- Revenue leakage: Any analysis should consider the potential for revenue leakage, which are means—legal or otherwise—of avoiding a new tax or fee. For example, to fund the Alameda Corridor, a rail freight corridor in Los Angeles, a container fee was applied to freight using the new higher-speed railroad corridor serving the Ports of Los Angeles and Long Beach. To avoid paying the fee, shippers were transporting containers by truck out of the ports and then re-assembling them onto railcars at an inland location. This practice served to reduce anticipated revenue from the container fee program.

6.9 SUMMARY

Currently, committed state and federal funds for Heartland Expressway corridor improvements are limited. Sales tax revenues generated by the Build Nebraska Act, adopted in 2011, along with congressionally designated funds will provide $51.72 million in improvements for the L62A to Alliance project on US-385.

Congressionally designated funding, which has provided funds in the past for the Heartland Expressway and similar federally designated high priority corridors throughout the country, have been eliminated by the federal transportation bill MAP-21.

MAP-21 consolidated many of individual programs into fewer but larger and more comprehensive programs. The consolidation of programs provides state DOT's increased flexibility in how they spend federal funding apportionments. This allows state DOT's to have more control on prioritizing needs within their transportation systems and spend the dollars on the projects they determine to maintain the highest performance of their highway system.

Given that federal funding is not expected to increase, the State would need to implement one or more innovative funding options to fully fund corridor improvements. Additional support at the private, local, state, and federal levels would be required to implement these strategies; however, this report is a starting point to define those funding strategies. Promising approaches might include a dedicated vehicle registration fee and severance taxes, both of which have been successful in other states to fund transportation infrastructure. Some alternative funding applications generate funding from private sector and local agency partners, rather than transportation facility users. This "value capture" in effect prices the non-transportation benefits of projects and captures that value to assist in funding the project that created the benefit. In selected locations, utility easements and value capture could provide revenue opportunities that could further strengthen financing capabilities. Since the corridor is not proposed to be a limited access highway and traffic levels are relatively low, tolling is not considered a viable funding option. There is a greater likelihood that funds will be identified for the Heartland Expressway Corridor if the project can be successfully linked to funding for other transportation priorities across the state.

Any funds identified for the project could potentially be leveraged through various financing approaches, including bonds, grant anticipation notes, private activity bonds, government loan and credit support, state infrastructure bank, and shadow tolling. However, pay-as-you-go financing has been the exclusive and preferred approach of the Nebraska Department of Roads to deliver its existing highway program, and it is therefore likely that the state would apply a pay-as-you-go approach to financing Heartland Expressway Corridor projects in the future. In April 2014 the Nebraska Legislature considered LB1092, which would have allowed the Nebraska Highway Commission to issue up to $200 million in revenue bonds through June 30, 2017, to advance high-priority projects identified in the Build Nebraska Act. However, on April 10, 2014 this bill failed on final reading.

7.0 RISK ASSESSMENT

The Risk Assessment process considers factors that will or may affect project feasibility. For the Heartland Expressway Corridor Development and Management Plan (CDMP), four types of potential risks were evaluated:

1. Financial
2. Environmental
3. Social
4. Political

The evaluation was conducted using a variety of inputs, including applicability of potential and traditional funding sources (financial), inventories of environmental sensitivities (environmental), interactions with residents, business operators and other stakeholders (social/political), and research involving the political setting of the corridor (political). The results are meant to highlight any issues that could affect Corridor improvements either positively or negatively. Whenever possible, action is prescribed that can help maintain momentum and manage potential risks.

Risks exist in a variety of forms, some of which can be quantified more readily than others. The risk summary for this project is a qualitative assessment, based on the evaluation of the significance of the risks identified.

7.1 FINANCIAL CONSIDERATIONS

The funding gap, explained in Chapter 6, identified to construct the improvement program for the Heartland Expressway is significant at $490 million. With limited abilities to fund the magnitude of this funding gap substantively at the local and state levels, it is clear that the Heartland Expressway Corridor must continue the strong Corridor advocacy with the Ports to Plain Alliance Coalition to continue the have a legislative voice at both the state and federal level in order for development and implementation of the improvements identified along the corridor. The Heartland Expressway Corridor in many ways has created its own momentum by having active, local support and a strong political voice. This momentum must be strengthened, not neglected, if development of the corridor is to be realized. Therefore, a specific impediment to the Corridor development would be not taking advantage of the Heartland Expressway Group and Ports to Plains Alliance Coalition collective voice to maximizing funding opportunities.

The continued economic downturn and reduced Highway Trust Fund revenues threatens the ability to adequately fund infrastructure and represents a strong risk to the implementation of improvements along the Corridor. Nebraska's economy must be strong enough to support the programs that have been put in place to encourage Corridor development, balanced with an appropriate level of risk taken by state leadership to improve infrastructure.

Another financial challenge involves the Heartland Expressway Corridor roadway volumes relative to often far higher volumes and more congestion on other competing corridors. Congestion and associated safety risk frequently garner more attention and funding than rural projects with different core objectives. In response to this challenge, NDOR can emphasize the importance of improved network connections and benefit cost analysis generated for the corridor. More specifically, other kinds of projects cost far more and their results are often limited as urban demand surges to fill additional peak period capacity. The Heartland Expressway Corridor enhances the national network and provides long-lasting benefits within Nebraska while reducing dependence on congested links elsewhere.

To fully fund improvements along the Corridor, the state would need to implement one or more innovative funding options. Promising approaches might include a dedicated vehicle registration fee and severance tax on natural resource extraction, both of which have been successful in other states for funding transportation infrastructure. These types of new revenue for transportation infrastructure projects would need to be supported and advanced through the state legislative process.

Local stakeholders will need to take active roles in developing the Heartland Expressway Corridor, including a constant search for ways to not only advocate, but to also provide financial support for the development of the Corridor. As a corridor project, communities connected by the Heartland Expressway will need to define and act on the mutual benefits of working together. The ability to gain local and state financial contributions to maximize and leverage federal funding will enhance the likelihood of realizing Corridor improvements. In addition to financial contributions, the local communities can look for other opportunities to contribute to the development of the Heartland Expressway Corridor. These potential opportunities include right-of-way donation[1] from local governments or property owners along the corridor and continued strong local and political support at public meetings.

7.2 ENVIRONMENTAL CONSIDERATIONS

Environmental risk measures the potential for impacts to environmental resources, documentation, costs, and effort associated with regulatory compliance, permitting and the National Environmental Policy Act (NEPA) process. NEPA ensures that all factors are considered in the transportation decision-making process, including a concern for the environment and the involvement of the public.

The NEPA processes for proposed improvements will vary in terms of complexity and time depending on the type of environmental documentation properly addresses environmental impacts. The three main categories for environmental documentation are Categorical Exclusions, Environmental Assessments and Environmental Impact Statements.

Categorical Exclusion (CE) is a straightforward process that can be typically completed in months.

Environmental Assessment (EA) process often takes one or more years to complete.

Environmental Impact Statement (EIS) process often takes two or more years to complete.

The relative environmental risk is generally measured by the level of potential impact a project may have on environmental resources. While the effort associated with the NEPA process is familiar and understood for most project types, the greater the potential for impacts, the greater the uncertainty becomes. These uncertainties include project design, scheduling, and cost. The evaluation of alternatives can also be time consuming, and the development of mitigation requirements to address potential effects can be costly. Project mitigation requirements range from relatively simple and inexpensive actions like maintaining access to properties or modifying construction methods, to more complex or expensive requirements such as noise walls or the purchase of land to create habitat for endangered species.

Within the Heartland Expressway Corridor, there are 24 potential improvement projects that have been identified in the implementation plan. Table 39 provides a summary of these improvement projects and an estimate of the anticipated environmental risk for each project based on current FHWA and NEPA requirements within the State of Nebraska. Factors that influence the level of risk associated with each project include the location of the project in respect to known environmentally sensitive areas. The risk listed in Table 39 is based on a very preliminary review of the environmental resources that exist adjacent to the corridor.

Prior to beginning the NEPA process for any of the improvements listed below, an extensive scoping process would be completed that involves FHWA and the resource agencies applicable to each project. Based on the result of the project-specific scoping, a final determination would be made of the appropriate level of environmental documentation.

[1]Any property acquisitions, including right-of-way donation, would need to be conducted in accordance with the Uniform Act. For example the owner must be provided an explanation of the acquisition process, including the right of having the agency (i.e. NDOR) appraise the property and to receive and offer of just compensation. Only after receiving such an explanation may the property owner waive these rights and the agency accept the donation (FHWA 2013c).

Table 7.1 – Environmental Risk Summary

	Improvement	Level of Environmental Risk (High, Moderate, Low)
GROUP 1	US 385 (L62A to Alliance)	Moderate to High
	US 385 & US 20 Intersection Improvement	Low to Moderate
	US 385 (Super 2 – Alliance to Chadron)	Low to Moderate
	US 385 (4 Lane – Chadron to SD)	Moderate
	NE 71 (Super 2)	Low to Moderate
	Pedestrian Overpass (Scottsbluff)	Low
	I-80 & NE 71 East Interchange	Low
	NE 71 Intersection Improvements (Clean Harbors)	Low
	NE 71 South Kimball Bypass	Moderate
	L79E Intersection Improvement (Minatare)	Low
GROUP 2	L62A (US 26 to US 385)	Moderate
	US 385 (4 Lane – Alliance to L7E)	Moderate
	US 26 (4 Lane – WY to Morrill)	Moderate to High
	US 26 Safety and Traffic Operations Improvements (Morrill)	Moderate to High
	US 26 Safety and Traffic Operations Improvements(Mitchell)	Moderate to High
GROUP 3	US 385 (4 Lane – L7E to US 20)	High
	US 26 (4 Lane – Minatare to L62A)	Moderate
	US 26 Safety and Traffic Operations Improvements (Minatare)	Low
GROUP 4	US 385 (Chadron Relief Route)	High
	Visitor Center (Chadron)	Low
	NE 71 (4 Lane – CO to I-80)	Moderate
	US 26 Safety and Traffic Operations Improvements (Mitchell)	Moderate to High
	US 26 and NE 71 Interchange	Low to Moderate

7.3 SOCIAL CONSIDERATIONS

Three primary social risk considerations are:

1. Impact to an individual's way of life or a community's viability
2. Importance in terms of providing transportation options
3. Importance to the economy

One indicator of social risk is derived from community input about the nature of the proposed improvements. Public information meetings were held during this study as a means of obtaining community input. Public input was analyzed as potential sources of social sensitivity, and therefore risk. In summary, there were concerns about possible adverse impacts on businesses and specific properties along the Corridor, but more general support for the overall program. The specific concerns were primarily expressed by property and business owners located near roadways that would be widened. This study did not provide the level of detailed design that would be required to show the exact impacts the widening of the roadway would have on adjacent properties. Therefore, as each project is developed in the planning and preliminary design phase, more detailed information should be provided at future public meeting to address property owner's specific questions regarding impacts.

As a result, the emphasis of public input was general support for the value and importance of the Heartland Expressway Corridor to local communities and the regional economy. Many of the local leaders who attended the public information meetings supported the proposed improvements and expressed comments that the improvements would strengthen the economic conditions in the panhandle region and would improve the transportation infrastructure within and across western Nebraska. Overall, the level of support was much higher than the opposition regarding the vision of the Corridor improvements.

More information on public meetings and comments can be found in the Public Involvement Appendix (Appendix E).

7.4 POLITICAL CONSIDERATIONS

Political risk addressed two basic issues. The first, "consensus," is defined by whether the affected communities generally agree to the overall vision for the program and the improvements set forth to address the purpose and associated set of needs. Consensus requires a deep understanding of the project benefits and a comparative assessment of the proposed benefits relative to the benefits of other investments. As described previously, projects addressing severe congestion are often favored when it comes to funding, so the Heartland Expressway Corridor supporters must work together to clarify short-term and long-benefits in relation to the anticipated costs.

The second, "support," ascertains the level of action that could be expected from advocates of the program and proposed improvements. The idea is that simply agreeing to a program is different than actively supporting the program. Persons advocating for the program or the individual improvements include those who have appeared at meetings to show their support as well as those who have indicated they have taken steps to contact decision makers regarding the project.

Various local decision makers were present at public meetings and the economic workshop for this study. The level of attendance from local decision makers represents a strong and ongoing advocacy for corridor improvements. Community leaders working with their neighbors to establish a stronger coalition is a primary strategy in gaining political momentum. This local support combined with the Ports to Plains Alliance Coalition as an engine of this collective effort is a vital component in unifying all levels of support for the Heartland Expressway Corridor improvements.

State and Federal congressional representatives attended the public information meetings and provided positive response to the study and vision for the Corridor. Regionally, the Ports to Plains Alliance Coalition was a driving influence in promoting public involvement for the study.

8.0 PUBLIC INVOLVEMENT

Public involvement is an important component critical to the success of any project. As part of the Heartland Expressway Corridor Development and Management Plan (CDMP), the study team and Nebraska Department of Roads (NDOR) prepared and implemented a public involvement plan (PIP) that would engage stakeholders along the corridor. The PIP is included in Appendix E.

The purpose of PIP was to describe the intent and scope of the public involvement effort to be implemented. The objectives of the communications and public participation effort for the project were to: efficiently and effectively obtain useful input from a broad, inclusive, and representative set of informed community members. The emphasis of the PIP was to engage stakeholders with specific business and economic interests in corridor improvements. The plan was designed in compliance with the NDOR public participation/ involvement manual "Pursuing Solutions through Public Involvement" and the other applicable requirements. This plan was customized for the Heartland Expressway project.

The study team made a concerted effort to share information with and gather input from federal, state and local officials, interested resource agencies, stakeholders, and the general public.

The following discussion summarizes the outreach activity completed during the preparation of the Heartland Expressway CDMP. Appendix E contains more information on outreach activities.

8.1 STEERING COMMITTEE

A Steering Committee was formed to provide technical direction; assistance in developing solutions to problems; guidelines for alternative development, evaluation and refinement; and review and comment on various documents. The committee consisted of representatives from the Nebraska Department of Roads (NDOR), representatives from the Heartland Expressway Group and representatives from the Ports to Plains Alliance Group. Steering Committee meetings were held at key milestones during the project to provide updates on the status of the study. The Federal Highway Administration (FHWA) provided input throughout the study process.

The Steering Committee was comprised of the following members:

• Randy Peters	Nebraska Department of Roads (NDOR)
• Mike Owen	NDOR
• Craig Lind	NDOR
• Doug Leafgreen	Nebraska Highway Commission
• Travis Hiner	Heartland Expressway Association
• Deb Cottier	Heartland Expressway Association
• Joe Kiely	Ports to Plain Alliance

8.2 PUBLIC INFORMATION MEETING

Two public information meetings were held in Gering, Nebraska. The first public information meeting was held October 13, 2011 at the Gering Civic Center from 4:30 to 7:30 PM. The meeting was an informal open house. The meeting featured a series of display boards and a video summarizing the purpose and objectives of the study. Attendees were greeted at the door, given handouts and maps, and asked to sign-in. In addition, each attendee was given a comment form and was encouraged to complete it before they left or to mail it back following the meeting.

Display boards were placed around the room with study team representatives who were available to explain the study process and answer questions. Meeting attendees were encouraged to complete comment forms and send them to Greg Weinert, NDOR Public Hearings Officer.

A second public information meeting was held on June 7, 2012, at the Gering Civic Center from 4:00 to 6:00 PM. The meeting was an informal open house with a format similar to the October 13th meeting. Attendees were greeted at the door, given handouts and maps, and asked to sign-in. In addition, each attendee was given a comment form and was encouraged to complete it before they left or to mail it back following the meeting. NDOR prepared a summary of both public input meetings and is included in Appendix E.

8.3 ECONOMIC WORKSHOP

An economic workshop was held prior to the first public information meeting on October 13, 2011. Meeting invitations were sent to local business leaders and representatives from the local communities. The workshop was held to provide an open discussion about how the Heartland Expressway corridor relates to and supports the local economy. The conversation helped the study team understand more about local businesses, and provided local stakeholders with an understanding of how the local freight and agricultural industry is dependent upon the state and national roadway system. The information obtained from the workshop was used as part of the economic analysis and cost benefit cost analysis (BCA) prepared for the project

8.4 INTERAGENCY COORDINATION MEETING

NDOR and Alfred Benesch & Company presented the Heartland Expressway Corridor Development and Management Plan at an interagency coordination meeting on September 1, 2011 at NDOR Headquarters in Lincoln, NE, to provide a general overview of the study.

In addition, an interagency meeting, focused solely on the Heartland Expressway Corridor Development and Management Plan, was held on March 20, 2012 at the NDOR District Office in North Platte, NE. This meeting was held to obtain more specific environmental information along the corridor. Information obtained from this meeting was used in Chapter 3 of the CDMP.

The agencies invited to this meeting are listed below:

- Federal Highway Administration
- Nebraska Game and Parks Commission
- U.S. Army Corps of Engineers
- Nebraska Land Trust
- Nebraska State Historical Society
- U.S. Forest Service
- U.S. Fish & Wildlife Service
- University of Nebraska State Museum
- Nebraska Department of Roads
- Bureau of Reclamation
- U.S. Environmental Protection Agency
- National Park Service
- Nebraska Department of Environmental Quality
- Upper Niobrara White Natural Resources District
- North Platte Natural Resources District
- South Platte Natural Resources District

8.5 WEBSITE AND PROJECT COMMUNICATIONS

The project team created a project website and various documents to clarify project goals and objectives, corridor details, planning issues, and the overall process and schedule. The website clarified how and when the public could participate. The handouts included key project messages, graphics and maps. The public notices and handouts are included in the NDOR public meeting summaries.

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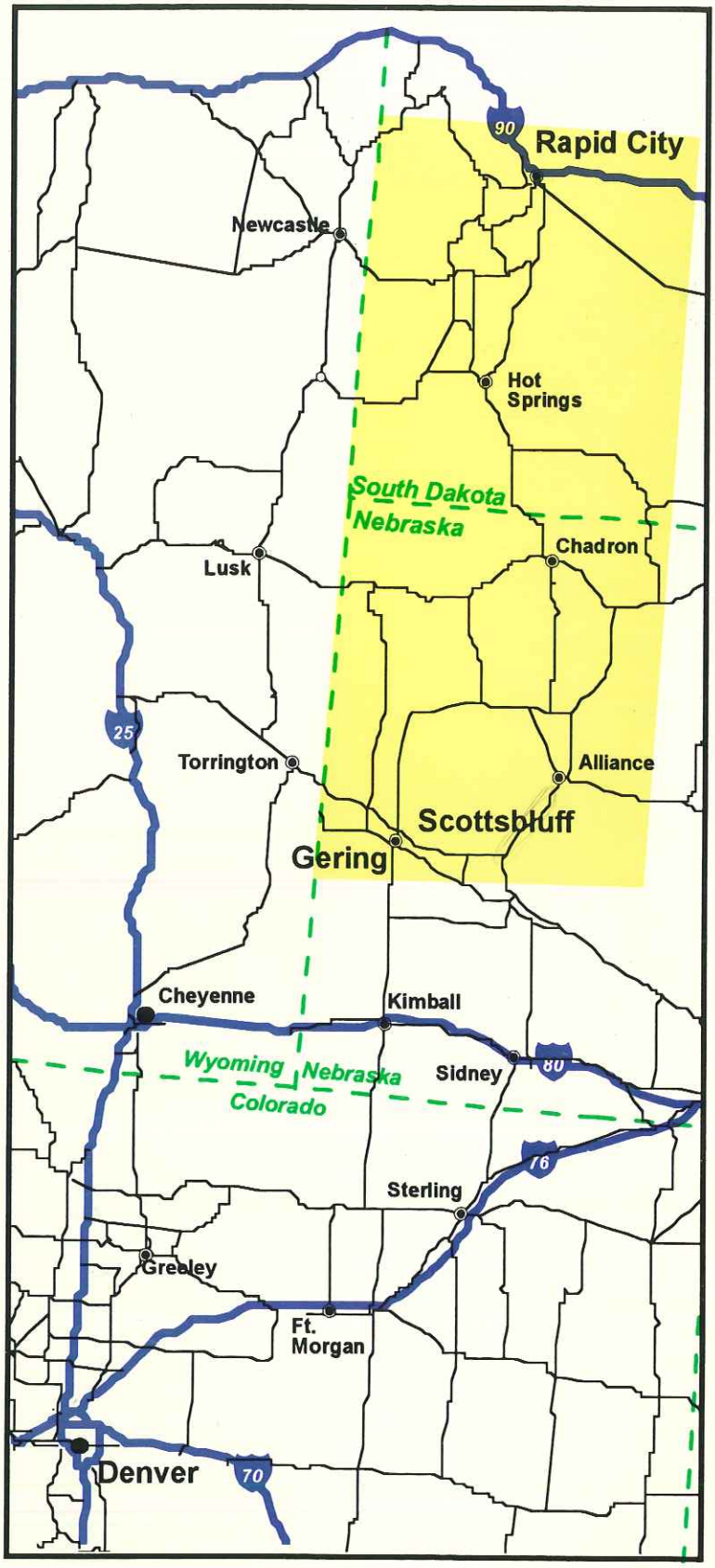
U.S. Department of Transportation
Federal Highway Administration

NDOR
Nebraska Department of Roads

Appendix A

Executive Summary – Heartland Expressway Economic and Engineering Feasibility Study

1993



Executive Summary

HEARTLAND EXPRESSWAY

Economic and Engineering Feasibility Study

Scottsbluff, NE - Rapid City, SD

submitted to:
NEBRASKA DEPARTMENT OF ROADS
and
SOUTH DAKOTA DEPARTMENT
OF TRANSPORTATION

submitted by:
WILBUR SMITH ASSOCIATES
in association with
WELLS ENGINEERS
BAKER & ASSOCIATES

1993

FEASIBILITY STUDY PARTICIPANTS

Allan L. Abbott
Director - State Engineer
Nebraska Department of Roads

Richard L. Howard
Secretary
South Dakota Dept. of Transportation

STEERING COMMITTEE

Art Yonkey, Project Director, Nebraska Department of Roads

Tom Wais, Nebraska Department of Roads

James Jenssen, South Dakota Department of Transportation

Joel Jundt, South Dakota Department of Transportation

Peter Picard, Federal Highway Administration

ADVISORY COMMITTEE

Nebraska

Carl Dierks, Chadron
John Harms, Scottsbluff
Travis Hiner, Scottsbluff
John Paris, Crawford
Richard Robb, Alliance

South Dakota

James Goodman, Rapid City
Robert Helmer, Belle Fourche
Roger Johnsen, Rapid City
Carl Oberlitner, Hot Springs
Chuck Vanderziel, Rapid City

Wyoming

Dan Epperson, Newcastle
Leslie Kee, Lusk

Executive Summary Report
HEARTLAND EXPRESSWAY ECONOMIC AND ENGINEERING FEASIBILITY STUDY

CONGRESSIONAL MANDATE

The "Intermodal Suface Transportation Efficiency Act of 1991" (ISTEA - Public Law 102-240) calls for the development of High Priority Corridors on a National Highway System. The Act of Congress states that the "development of the transportation corridors is the most efficient and effective way of integrating regions and improving efficiency and safety of commerce and travel and further promoting economic development." The Act also calls for the preparation of long-range plans and feasibility studies for these high priority corridors.

The Act identifies the Heartland Expressway from Denver through Scottbluff to Rapid City as a high priority corridor. The Act also authorizes a feasibility study of an expressway or other highway improvements from Rapid City to Scottsbluff. The study, as called for in the Act, is to make recommendations concerning the feasibility and the best route for the Heartland Expressway. This brief document summarizes the feasibility study called for in the Act. For greater information concerning the feasibility study, please refer to the study's Final Report.

STUDY ISSUES

Many residents of the panhandle of Nebraska and western South Dakota have long wanted a four-lane highway connecting their regions to Interstates 80 and 90. They believe that such a highway would stimulate economic development and tourism in the region. The expressway is perceived as a natural draw for tourists into the Black Hills of South Dakota and the national parks and recreational areas in western Nebraska. In addition, the region's communities need to diversify their economic base by attracting new industry to the area.

Western South Dakota's desire for a four-lane expressway is different from that of western Nebraska. Over the last several decades, Rapid City's economy has been outperforming the rest of South Dakota and much of the nation. A doubling of the manufacturing sector and a large increase in the tourism industry has strained the area's transportation system. This area has excellent east-west travel via Interstate 90. However, the region does not have four-lane access to the south, primarily to Denver, which is the nearest large metropolitan area. Construction of a four-lane Heartland Expressway would overcome this north-south access deficiency.

STUDY PURPOSES

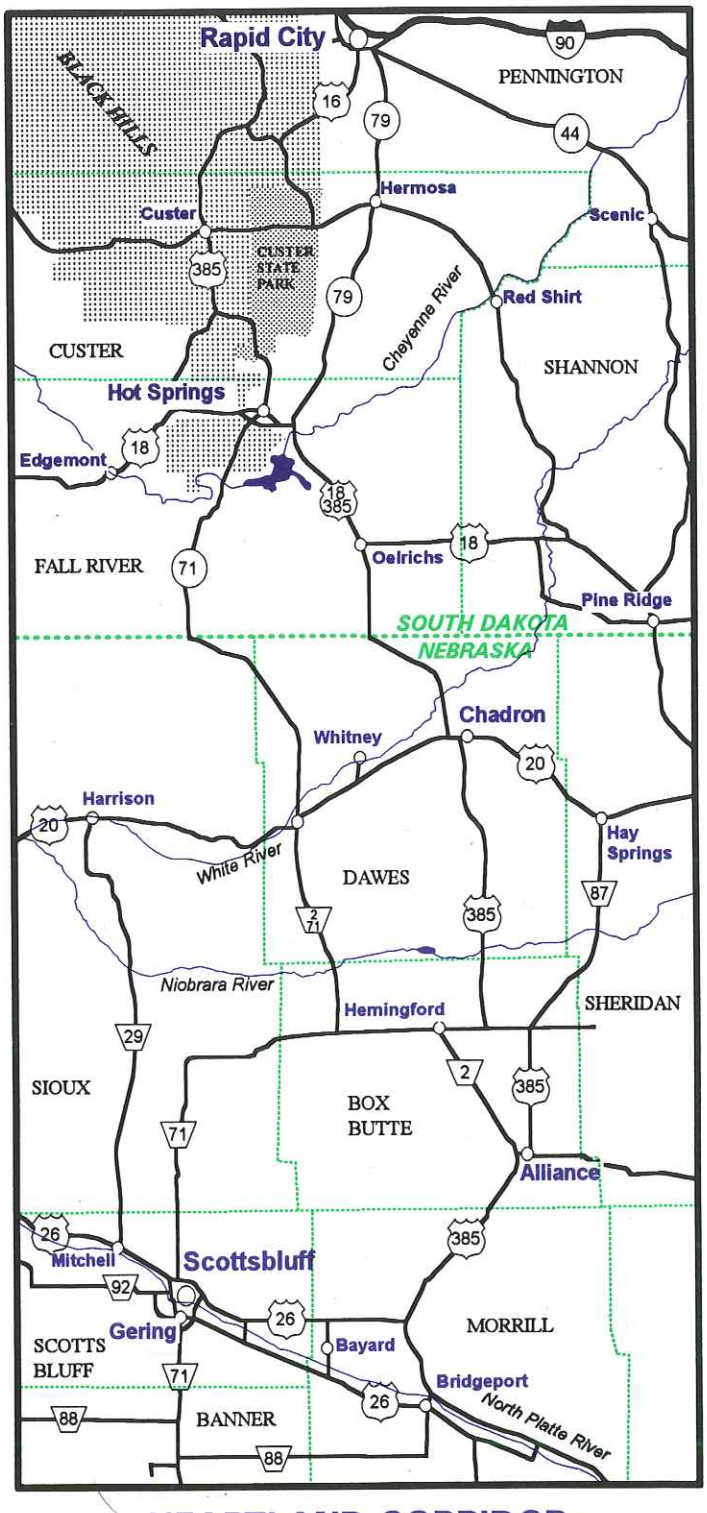
Currently, north-south highways in western Nebraska and western South Dakota are not operating at congested levels, are not over capacity, and most have quite low traffic volumes. Therefore, this study does not evaluate the feasibility of the Heartland Expressway simply based on existing levels of traffic or solely on travel efficiency improvments. Instead, the study examines alternative transportation roles for the Heartland Expressway, and determines whether such a highway might assist the region to develop economically. The study includes reviews of alignment options, road standards, traffic demands, conceptual design, costs, economic benefits, and environmental impacts and implications. The primary study focus, however, is economics, and what the Heartland Expressway might do for the area's economy, and the area's general well-being. The study concludes that a major investment is economically feasible, and identifies the route that is expected to provide the greatest economic development benefit.

HEARTLAND EXPRESSWAY CORRIDOR REGION

The Heartland Expressway Feasibility Study explores a variety of highway route options between Rapid City and Scottsbluff/Gering. The corridor extends from Rapid City, South Dakota on the north to Scottsbluff/Gering, Nebraska on the south, to the Wyoming border on the west, and to Nebraska Highway 27 and eastern Shannon and Pennington Counties in South Dakota on the east. The corridor area is approximately 200 miles long and 100 miles wide, and contains thirteen counties, seven in South Dakota and six in Nebraska. The thirteen-county corridor area is overwhelmingly rural, with a 1990 total population of approximately 227,000 persons. The corridor area community populations greater than 5,000 are: Rapid City (54,523), Scottsbluff/Gering (21,657), Alliance (9,765), Spearfish (6,966), Chadron (5,588), and Sturgis (5,330).

Regardless of the proximity of the two regions, western Nebraska and western South Dakota are two very diverse areas with different economic bases and different reasons for desiring the Heartland Expressway. The economy of western South Dakota has been flourishing over the last couple of decades. The area has grown significantly in population, which is primarily caused by the growth of the tourism industry as well as a doubling of the manufacturing sector. The desire for a Heartland Expressway from western South Dakota's perspective is to improve north-south travel, connecting the region to Interstate 80 and Denver, thereby expanding its tourist market and ability to attract additional industry. Western Nebraska, on the other hand, has experienced a declining population and slow growth in employment. The Heartland Expressway, from the panhandle region of Nebraska's perspective, is seen as an investment to stimulate the region's economy.

The Heartland Expressway region is currently served by numerous rather indirect two-lane north-south highways (see adjoining map). There is no north-south four-lane highway in the region.



HEARTLAND CORRIDOR

The existing system of highways was designed to serve local access needs of the area's communities, businesses and residents. It was not designed for longer distance, higher speed north-south travel. As a result the existing highway system serves a very different purpose than would the Heartland Expressway, and existing travel volumes are therefore less relevant. A review of the existing highway system suggests a number of things relative to the Heartland Expressway:

- There is currently no direct highway between Scottsbluff/Gering and Rapid City. Therefore any traffic between the two endpoints either uses a mix of existing 2-lane roads in the corridor, or uses north-south routes to the west in Wyoming or further east.

- The existing network is a myriad of two-lane highways designed for local access purposes. The existing network was never designed for longer-distance, higher speed travel. If a Heartland Expressway is to be built, it will comprise a totally new travel option to the region.

HEARTLAND EXPRESSWAY HIGHWAY ROLES

The Heartland Expressway could significantly improve transportation and mobility in the panhandle of Nebraska and western South Dakota. The existing north-south highways in the corridor play a predominantly local access function. If the Heartland Expressway is built, the local access function would be improved; in addition, longer distance traffic would be introduced to the corridor, with its accompanying economic benefits.

If the Heartland Expressway is constructed, it could accomplish a number of objectives:

- It would improve access to communities, recreational and tourist sites, and economic activities in proximity to the highway.

- It might influence longer distance multi-state travel, by diverting traffic to the highway, and inducing additional travelers and tourist to the region.

- It would help the region's communities to be better able to compete for new industries and new types of economic development.

This study finds that these changes will generate economic benefits not only to western Nebraska and western South Dakota, but also to both States statewide.

Most residents and businesses of the corridor area would benefit directly because they would have a significantly improved highway upon which to travel. Transportation benefits would include:

- Better access to the Interstate Highway System.

- Better access to communities for shopping, educational, work and social purposes.

- Improved accessibility for emergency medical care and overall better access to health facilities.

- Easier and more efficient goods transportation.

- A potentially safer highway.

- An improved all weather highway, especially for school buses, emergency vehicles, etc.

- Better access to the region's tourist and recreation sites.

In addition to these obvious direct benefits, the highway will assist in the region's attempts to diversify its economic base, by reducing the costs of doing business in the corridor, by making the area more accessible to tourists, and by generally making the area more competitive.

HEARTLAND EXPRESSWAY ROUTE AND HIGHWAY ALTERNATIVES

The ISTEA of 1991 specified that the Heartland Expressway Feasibility Study explore the feasibility of a new highway between Scottsbluff/Gering, Nebraska and Rapid City, South Dakota. This study responds to that congressional directive by exploring all practical routes between the two designated cities. The logical corridor region includes routes within a 50 mile band either side of a direct line between Scottsbluff and Rapid City. Any route outside of this area would yield a severely circuitous highway and was not considered.

HIGHWAY OPTIONS STUDIED

This study examines the feasibility of three highway type alternatives:

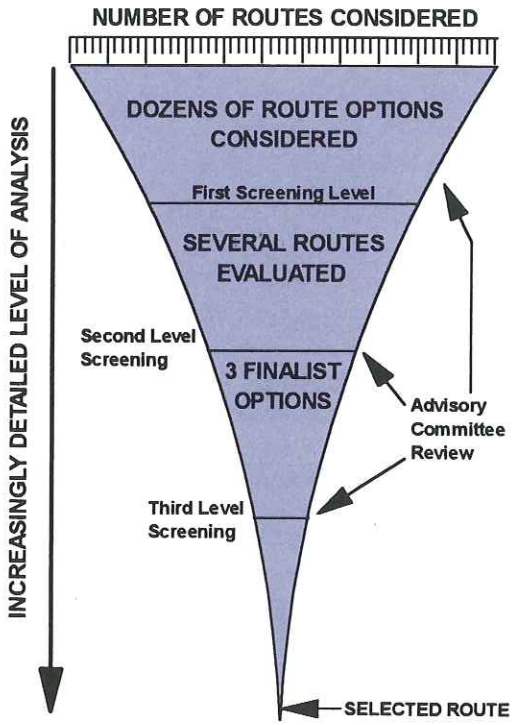
4-lane freeway type highway (65 mph) - This alternative is a four-lane divided highway with complete access control and grade separations at all intersections. This alternative would be comparable to Interstates 80 and 90.

4-lane expressway type highway (55 mph) - This alternative is four-lane divided highway with partial access control. The majority of intersections and crossings would be at-grade.

2-lane highway with some 4-lane sections - This alternative would provide a four-lane expressway type highway where traffic volumes are greatest, and the remaining portions of the highway would be an improved two-lane with uphill passing lanes, paved shoulders and turning lanes where necessary. All sections would have partial access control.

ROUTE SCREENING PROCESS

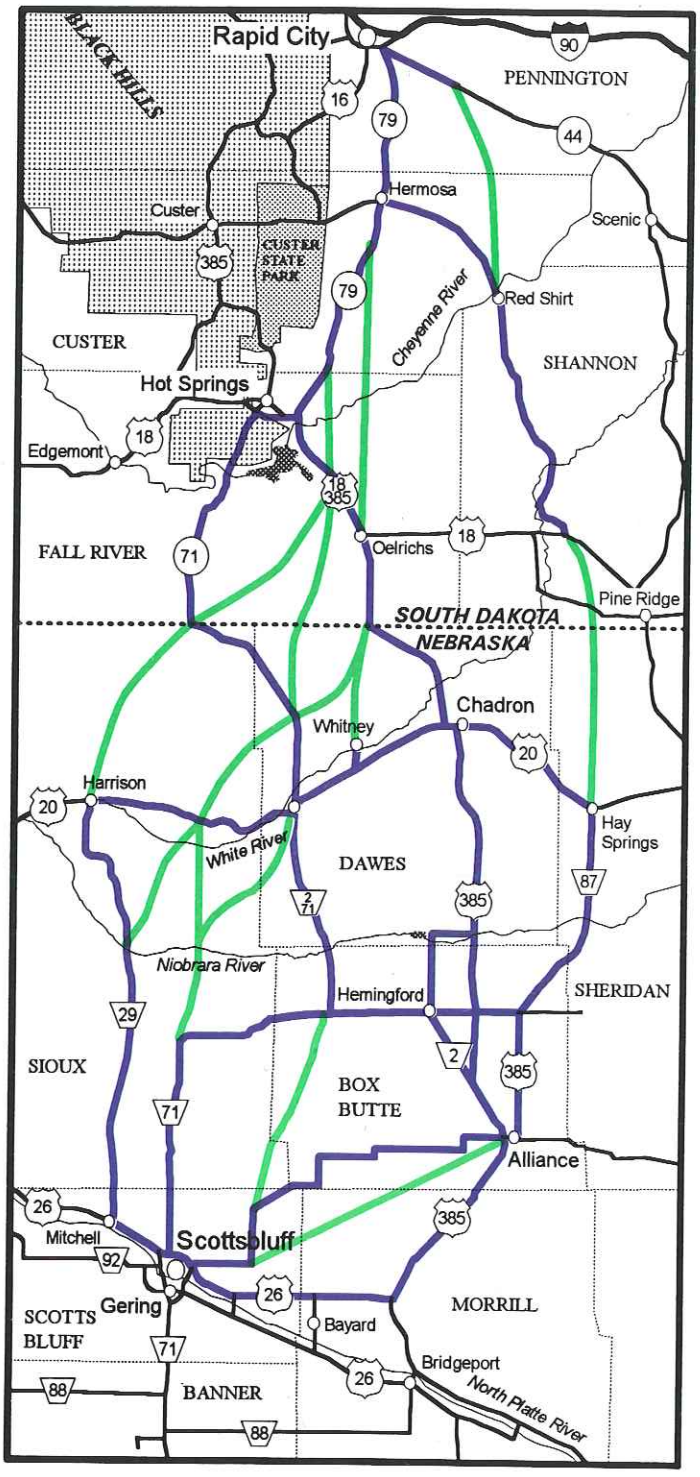
The routes considered for the Heartland Expressway add to over 50 route combinations, which is too many to evaluate in detail. To enable a reasonable evaluation, this study follows a formalized "screening process," whereby the route options were considered and, as evidence accumulated, the less desirable options were eliminated.



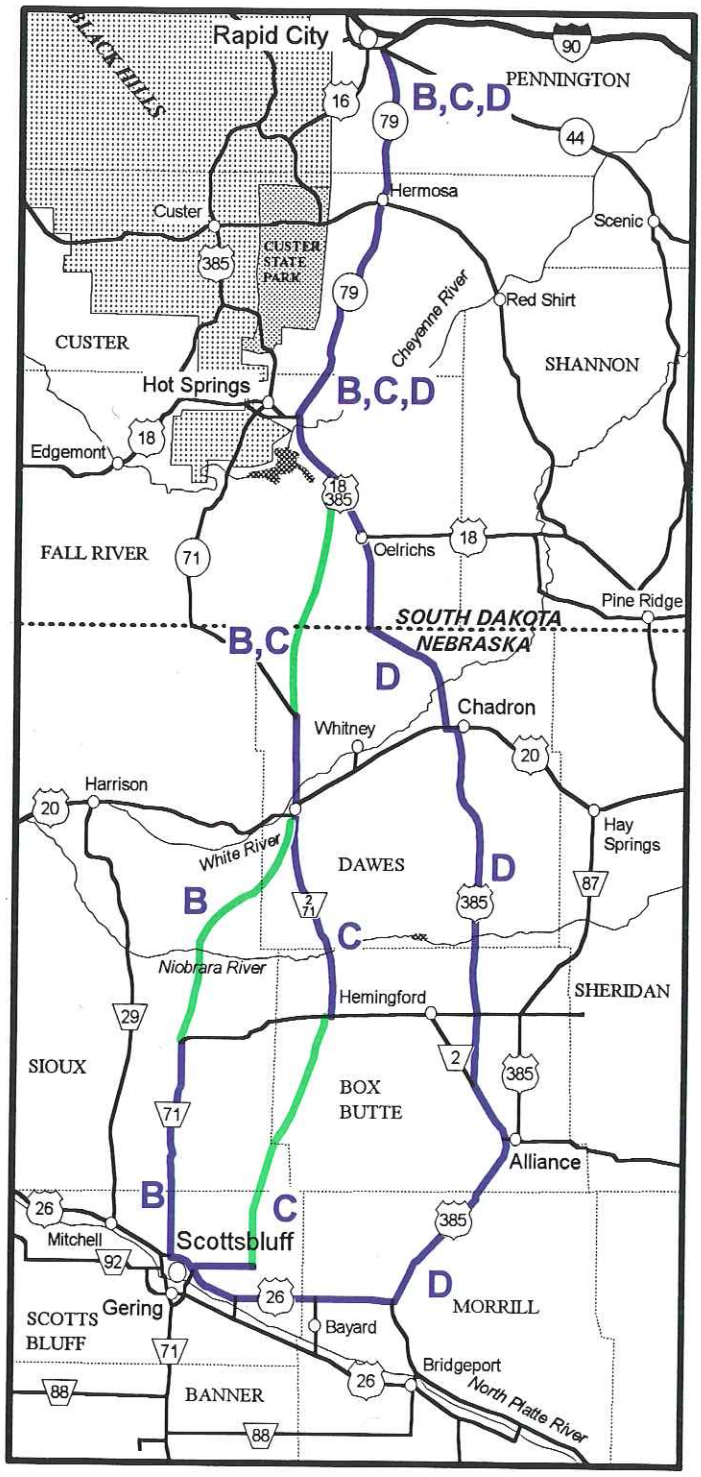
The screening process is divided into three sequential "analysis levels":

- In Analysis Level #1, all routes are considered and, based principally on logic and in concert with the study's Steering and Advisory Committees, many routes and route segments are eliminated.
- In Analysis Level #2, the options that survived Analysis Level #1 are examined in terms of cost, travel time, route length, accessibility, tourism, and economic development potential. This analysis selected three "finalist" route options to be studied in detail.
- In Analysis Level #3, the three "finalist" options are analyzed in terms of more detailed economic feasibility, environmental issues, and other criteria.

Based on these analyses, one "selected" route is defined.



ROUTE OPTIONS CONSIDERED



THREE "FINALIST" ROUTE OPTIONS

Existing Highway Alignment
New Highway Alignment

CONVENTIONAL FEASIBILITY EVALUATION

The primary issue in the study is whether the Heartland Expressway is feasible. To measure the feasibility of the Heartland Expressway, five "tests of feasibility" are applied:

- **Need Based on Traffic** - Is the Heartland Expressway warranted based on current and forecast traffic volumes?
- **Engineering and Cost Feasibility** - Are there any unusual engineering difficulties, and what would the Heartland Expressway cost to build and operate?
- **Environmental Feasibility** - Can the Heartland Expressway be constructed without undue harm to the environment?
- **Travel Efficiency Feasibility** - Will the Heartland Expressway cause sufficient road user benefits to justify the investment?
- **Economic Development Feasibility** - Will the Heartland Expressway cause sufficient economic activity to justify the investment?

The three "finalist" route options and three highway standard options are subjected to the five feasibility tests.

NEED BASED ON TRAFFIC

Both automobile and commercial truck traffic were extensively studied. Roadside surveys were conducted, a computerized traffic model was developed, and surveys were conducted of trucking firms, shipping firms, and other businesses in the region that rely on highway transportation. Traffic estimates were made for all Heartland Expressway alternatives. The traffic forecasts suggest the following concerning feasibility based solely on traffic:

- Most states start planning to widen rural two-lane highways to four-lanes when existing daily traffic volumes reach 5,000 to 6,000 vehicles per day. Based on the current highway system in western Nebraska and South Dakota, none of the highways in the region (other than the interstate highways) presently meet that threshold and, only South Dakota Highway 79 between Rapid City and Hermosa is forecast to reach this threshold by the year 2015.
- However, during peak times of the year (summer tourist and fall harvest seasons), the segment between Scottsbluff/Gering and Alliance and the segment between Rapid City and Hermosa currently reach this traffic threshold.
- From the more tourst-oriented South Dakota northern end of the corridor perspective, the more direct western alignments (Route Options B and C) are more effective in attracting traffic than is the more circuitous eastern alignment (Route Option D). This is because the more direct alignments are better able to attract the Denver area tourist traffic to the Black Hills.
- From the perspective of the Nebraska communities, the eastern alignment (Route Option D) has greater traffic volumes at the southern end than do the western alignments (Route Option B and Route Option C). This is because of traffic routing patterns on the south plus the ability of Route Option D to serve the Alliance and Chadron population centers in addition to Scottsbluff/Gering.
- From the Wyoming perspective, the eastern alignment (Route Option D) is best because it diverts the least traffic from eastern Wyoming. This is important to Wyoming because its communities rely on that traffic for sizeable shares of their economic activity.

ENVIRONMENTAL FEASIBILITY

Regardless of the alignment and highway option selected for the development of the Heartland Expressway, there will likely be impacts in almost every category of the natural, human, and cultural environments. The intensity of such impacts will depend, to a great extent, on the following:

- **Highway Type** - A freeway will require more right-of-way than either an expressway or an upgraded two-lane facility. As a result, related impacts are likely to be greater.

- **New Location** - Improvements made on existing highway alignments are likely to have less impact on the environment than highways on new locations.

- **Bridges** - Rivers and their associated floodplains and riparian environments constitute an area of potential impact when new bridges are introduced.

The study's environmental overview suggests that it is not likely that any environmental impacts will be so critical that they cannot be avoided or mitigated during construction.

The primary reason for the relatively low level of anticipated impacts is the fact that most alignments are being proposed along existing highway routes. Land use patterns, transportation patterns, and ecological functions have adapted to the presence of the existing highways. As a result, expansion, upgrade, or modest realignment of these highways is likely less harmful to the natural and manmade environments than would a new highway on new alignment. However, there are numerous environmentally sensitive areas in western Nebraska and western South Dakota where proper care needs to be taken to avoid these areas or minimize negative impacts.

Additional environmental work will be needed if the Heartland Expressway moves into its more detailed alignment and engineering phases.

ENGINEERING AND COST FEASIBILITY

Each route was field inspected, key construction and engineering issues were identified, and costs of highway construction were estimated. While the terrain in western Nebraska and western South Dakota can be quite severe, it was determined that any of the options can be constructed from an engineering perspective. However, final determination of engineering feasibility will require detailed alignment investigations which are beyond the scope of this planning study.

The Heartland Expressway, regardless of the route alignment or highway standard, will be quite expensive to build and maintain. In order to evaluate each alternative, cost estimates were developed for each "finalist" route option and each highway standard. The total construction cost estimates for the different improvement options include right-of-way acquisition, planning, design, and construction. These cost estimates should be viewed as "order of magnitude" estimates, suitable for feasibility testing purposes, but certainly subject to refinement in any future study.

In addition to the costs of constructing the highway, there will be more road to upkeep and maintain. This includes additional snow removal, mowing, striping, crack sealing, and other work activities. The capital costs and annual maintenance costs are shown below.

COST SUMMARY
($ Million)

	Total Construction	Annual Maintenance
Route Option B		
Freeway	$310.6	$1.35
Expressway	257.6	1.11
Two/Four Lane	145.2	0.55
Route Option C		
Freeway	$327.7	$1.28
Expressway	264.7	0.95
Two/Four Lane	147.3	0.33
Route Option D		
Freeway	$326.9	$1.53
Expressway	260.0	1.03
Two/Four Lane	147.7	0.50

TRAVEL EFFICIENCY FEASIBILITY

According to the Act, high priority corridors are an efficient and effective way of integrating regions and improving efficiency and the safety of commerce. This is true, since four-lane highways create a more economically efficient method of vehicle transportation than do two-lane highways. By eliminating unnecessary vehicle stops and by making passing easy and safe, four-lane highways create a safer travel environment. The travel efficiency evaluation measures these direct improvements in terms of car and truck vehicle cost savings and compares those travel efficiencies with the cost of the improvement. The highway user benefits are measured in terms of vehicle operating cost savings (fuel, tires, vehicle maintenance, etc), value of travel time saved, and accident reduction.

Transportation efficiency is a legitimate local, state, and national goal. If a new highway creates road user benefits that, over time, exceed the cost of the highway, then the road should be built.

Travel efficiency assessment is the traditional method of determining whether or not a highway improvement is economically feasible. According to this test of feasibility, a highway improvement must be quite successful in reducing per vehicle operating costs, travel time, and accident risk; and, it needs to have sufficient traffic volumes on the highway to attain the ncessary level of highway user economic benefits.

To determine whether or not a specific highway investment is economically feasible from the travel efficiency perspective, the user cost savings (cost, time, accidents) are compared with the highway's life cycle costs.

According to this travel efficiency economic feasibility measure, any highway improvement with a "benefit/cost ratio" of 1.0 or more, a positive "net present value," and a "rate of return" of seven percent or more, is economically feasible and should be built.

The table at the bottom of this page identifies the relative economic feasibility of each Heartland Expressway route and design standard in terms of travel efficiency. The travel efficiency feasibility calculations suggest the following conclusions:

- None of the Heartland Expressway route options are feasible from the travel efficiency perspective. This is because none of the alternatives have sufficient traffic volumes to produce user benefits greater than the highway improvement costs.

- The combination two/four lane options are more feasible than the freeway and expressway alternatives from the travel efficiency perspective. This is primarily caused by the lower construction costs required by the two/four lane options. In addition, the four-lane section portions of the two/four lane options are placed only in areas where the most traffic is found, thereby creating increased net highway user benefits.

It should be noted that travel efficiency is only one indicator of economic feasibility; the other test is economic development feasibility.

TRAVEL EFFICIENCY ECONOMIC FEASIBILITY RESULTS

	Net Present Value ($ Million)	Internal Rate of Return	Discounted Benefit/ Cost
Route Option B			
Freeway	−141.3	2.8%	0.59
Expressway	−141.9	1.7%	0.48
Two/Four Lane	−53.6	3.7%	0.65
Route Option C			
Freeway	−199.8	1.2%	0.45
Expressway	−151.9	1.6%	0.44
Two/Four Lane	−69.9	2.6%	0.53
Route Option D			
Freeway	−168.8	2.3%	0.56
Expressway	−101.2	3.5%	0.63
Two/Four Lane	−24.2	5.6%	0.84

ECONOMIC DEVELOPMENT FEASIBILITY

A key issue in this study is whether or not the Heartland Expressway will generate sufficient economic development activity in the two States to warrant the investment.

ECONOMIC OBJECTIVE

One objective of this study is to determine what level of highway investment, if any, is warranted between Scottsbluff/Gering and Rapid City. There are economic consequences of either underinvesting or overinvesting in the highway corridor. If the two States underinvest in the corridor, economic development will be inhibited because real and perceived travel costs will be greater, competitive position will be hindered, etc. There is therefore an economic cost associated with underinvestment in the Heartland Corridor. If the two States overinvest in the corridor, overall efficiency will suffer because those funds could have been put to better and more efficient use elsewhere. There is therefore an economic cost associated with overinvestment in the Heartland Corridor.

Recognizing these facts, this study seeks to define those highway investments, and those levels of investment, that are efficient (neither underinvested nor overinvested). This implies efficient and feasible use of tax dollars. The proper level of investment is calculated in terms of travel efficiency and economic development benefits, compared with the highway's costs.

ECONOMIC BASIS FOR A FEASIBLE HIGHWAY PROJECT

Investment in the Heartland Expressway contributes to economic development in that it will lower transportation costs which makes the corridor region increasingly attractive to other forms of investment. Such changes may be realized in numerous ways, including improved traffic safety, decreases in fuel and other vehicle operating costs, increased tourism, attraction of new industry, revised logistics, and changes in noise and air pollution. But in the final analysis, all of the direct benefits from the Heartland Expressway, and therefore the justification for investing in it, flow from using it for transportation.

Benefits from the Heartland Expressway may not only accrue to persons and businesses whose vehicles use the highway. Lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may thus benefit from the Heartland Expressway without traveling on it.

It is important to keep in mind that for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if perceptions do not change dramatically, the investment will not produce benefits that exceed its cost. Highway investment must be based on reasonable estimates of traffic volumes they will service, the cost savings travelers will experience, and a realistic assessment of revised business practices.

Investing in a highway improvement that produces benefits which are less than the associated costs of the improvements inhibit economic development. The costs will be paid by users and other taxpayers in the form of higher taxes, or would be paid in a lost opportunity (an alternative highway would not get improved). These higher taxes work against economic growth within the taxing jurisdiction because they reduce post-tax return to businesses and households by lowering disposable income, and investment in the "wrong" highway project similarly inhibits overall economic growth. Therefore it is imperative that the highway investment be economically feasible; if it is not, it is economically counterproductive.

FEASIBILITY PERSPECTIVES

Which Heartland Expressway alternative is best depends on one's perspective.

Corridor Area Perspective - The corridor's residents and businesses are interested in efficiency, but they are also interested in the economic development and economic diversification of their region. The study examines the Heartland Expressway's economic feasibility from the perspective of the communities located in proximity to the highway corridor.

Nebraska and South Dakota Statewide Perspectives - The two States perspective is that efficiency is important, and so is statewide economic development. The two States are concerned with their ability to be competitive with other states. The study also examines the Heartland Expressway's economic feasibility from this perspective.

Included in the economic feasibility calculations are all quantifiable public sector costs needed to build and operate the highway and all quantifiable economic benefits including road user travel efficiency benefits (vehicle operating cost savings, value of time savings, accident cost savings) and also including economic development benefits (competitive advantage benefits, increased visitor/tourism benefits, etc). Excluded from the cost/benefit calculations are the road improvement implications that cannot reasonably be tabulated in monetary terms.

CORRIDOR ECONOMIC DEVELOPMENT FEASIBILITY

From the perspective of the people in the corridor, all Heartland Expressway alternatives are economically feasible. The benefit/cost ratios are all greater than 1.0 (1.15 to 1.52), the internal rates of return are in the range of 9.3 to 13.5 percent, and the net present values

ECONOMIC DEVELOPMENT FEASIBILITY RESULTS

	Two States Perspective			Corridor Area Perspective		
	B/C	IRR	NPV ($ Million)	B/C	IRR	NPV ($ Million)
Route Option B						
Freeway	0.83	5.5%	−57.4	1.30	11.4%	103.1
Expressway	0.71	4.4%	−79.6	1.21	10.0%	57.8
Two/Four Lane	0.99	6.9%	−1.4	1.48	13.1%	72.7
Route Option C						
Freeway	0.66	3.7%	−121.8	1.15	9.3%	53.0
Expressway	0.66	3.9%	−93.8	1.18	9.5%	48.3
Two/Four Lane	0.86	5.8%	−20.6	1.40	12.1%	59.3
Route Option D						
Freeway	0.76	4.6%	−91.1	1.20	10.2%	75.6
Expressway	0.79	5.2%	−57.8	1.27	10.6%	73.2
Two/Four Lane	1.07	7.6%	11.0	1.52	13.5%	80.3

are all positive, indicating that the region would benefit by between $48 and $103 million if the Heartland Expressway is constructed. Clearly, from the perspective of those in the corridor, the Heartland Expressway is an economically beneficial and feasible undertaking.

STATES OF NEBRASKA AND SOUTH DAKOTA ECONOMIC DEVELOPMENT FEASIBILITY

From the two States' perspective, only one Heartland Expressway alternative is economically feasible. Route Option D, which connects Scottsbluff/Gering and Rapid City via Alliance, Chadron and Hot Springs, constructed partially as a four-lane expressway (between Scottsbluff/Gering and Alliance, and between Rapid City and Hot Springs) and partially as an improved two-lane (between Alliance and Hot Springs), is economically feasible from the states' perspective. This alternative has a benefit/cost ratio of 1.07, an internal rate of return of 7.6 percent, and a positive net present value of $11.0 million. According to this calculation, the economies of the two-state region will be better off by $11.0 million if the highway is built than if the highway is not built.

Route Option B (Two/Four Lanes) is nearly feasible with a benefit/cost ratio of 0.99. However, compared to Route Option D, Route B is not nearly as attractive. While Route B is a more direct alignment between Scottsbluff/Gering and Rapid City, it would carry less traffic and serve fewer people than Route D. Also, since Route D connects the larger cities in the Region, it has a greater ability to foster economic development.

PRIORITY SEGMENTS

In South Dakota the highest priority segment is Rapid City to Hermosa. The second highest priority in South Dakota is Hermosa to Hot Springs. In Nebraska the highest priority segment is the connection of existing four-lanes between Scottsbluff and Alliance. Alliance to Hot Springs would be the next priority.

ECONOMIC FEASIBILITY AS A NATIONAL HIGH PRIORITY CORRIDOR

The feasibility study indicates that Route Option D (Two/Four Lane) is economically feasible from the perspective of the two States. However, the benefit/cost ratio of 1.07 indicates that, if the two States were to fund the entire project, the project would have to compete with other feasible state projects for limited funds and, based on the 1.07 benefit/cost ratio, the Heartland Expressway might be a low priority project among feasible projects. However, the Heartland Expressway Corridor is a National High Priority Corridor and qualifies for federal demonstration funds. If the project were to receive 80 percent federal funding, and including the economic impact of these federal demonstration funds, the project is more feasible and should therefore receive a higher state priority. Using demonstration funds, this alternative has a statewide benefit/cost ratio of 1.6, an internal rate of return of 13.7 percent, and a net present value of $92.6 million.

ECONOMIC IMPACT AND FEASIBILITY INCLUDING FEDERAL DEMONSTRATION FUNDS

Route Option D (Two/Four–Lane)

ECONOMIC IMPACT OF FEDERAL CONSTRUCTION MONEY

Impact Terms	5–Year Construction Period
Value Added	$75.4 Million
Wages	$58.5 Million

ECONOMIC FEASIBILITY

Feasibility Indicators	
Benefit/Cost	1.60
Net Present Value	$92.6 Million
Internal Rate of Return	13.7%

STUDY FINDINGS

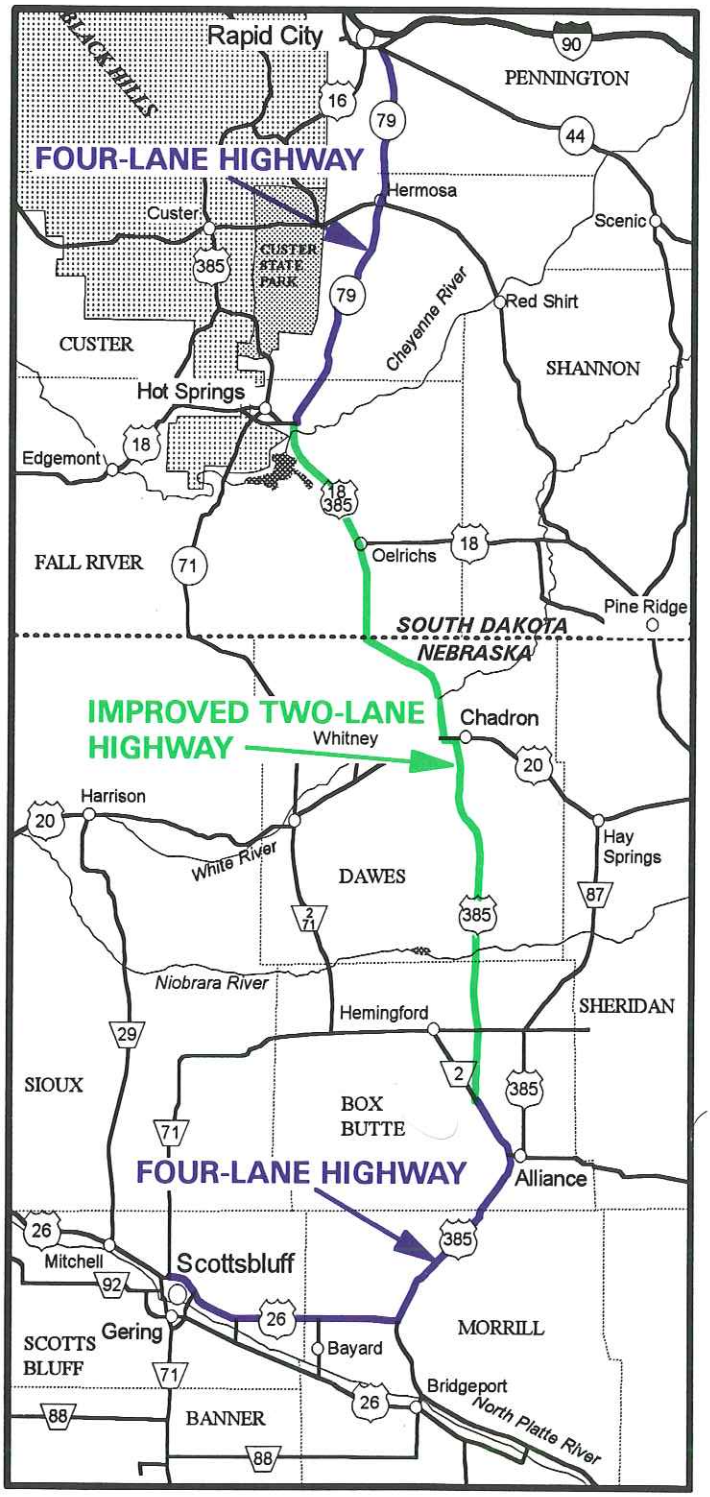
This Heartland Expressway Feasibility Study explored all possible routes and different highway standard alternatives between Rapid City and Scottsbluff/Gering. The feasibility results indicate that a combination four-lane/two-lane highway is feasible from the standpoint of Nebraska, South Dakota, and Wyoming. The Heartland Expressway's most feasible route would connect Rapid City to Scottsbluff/Gering via Hot Springs, Chadron, and Alliance. The segments from Rapid City to Hot Springs and from Scottsbluff/Gering to Alliance are feasible as four-lane highways. The segment between Hot Springs and Alliance via Chadron would be an improved two-lane highway with appropriate turning and passing lanes. The project would cost an estimated $147.7 million (at 1992 price levels), and is believed to be feasible from the engineering, environmental, and economic development perspectives.

STUDY RESULTS: ANALYSES AND COMPARISONS ONLY

This study identified alternative route options and highway alternatives between Scottsbluff/Gering and Rapid City. It developed traffic, economic and other statistics for each option.

Based on these statistics and comparisons, the Nebraska Department of Roads and the South Dakota Department of Transportation will make their detemination as to what improvements, if any, should be built between Scottsbluff/Gering and Rapid City. This study does not make that decision. The study only presents information which might be useful to the two States in making their decision.

While this study analyzed the Heartland Expressway as to cost and benefits, it must be recognized that any decision must be made within the context of available funds and competing uses for those limited funds.



SELECTED ROUTE

Appendix B

Travel Demand Model Forecast Methodology and Results

APPENDIX B TRAVEL DEMAND MODEL FORECAST METHODOLOGY AND RESULTS

FORECAST HORIZON YEAR AND ANALYSIS SCENARIOS

The following scenarios were developed for this study:

Existing and Future Baseline Conditions

2010 Existing Traffic: This scenario serves as the baseline condition and applies existing traffic counts. The baseline condition is compared to the Year 2035 forecast scenarios to establish anticipated differences attributable to various factors.

2035 without Improvements: This scenario evaluates the Year 2035 conditions based on traffic counts and growth trends, but does not reflect traffic that may result from making transportation improvements that would draw additional vehicles into the Heartland Expressway Corridor. This scenario is often referred to as the "No Build Alternative."

Future "Build" Conditions

2035 with Heartland Improvements: This scenario highlights how improvements within the boundaries of the Heartland Expressway Corridor would influence the Year 2035 traffic volumes.

2035 with Heartland Improvements and Intensified Energy Resource Development: This scenario reflects the future importance of transportation increases associated with anticipated natural resource extraction activities involving intensified oil and gas and alternative energy development in the region, such as the Niobrara energy basin and wind energy potential.

2035 with All PTP Alliance Corridor Improvements: This scenario highlights how improvements along the entire PTP Alliance Corridor would influence the Year 2035 traffic volumes without considering impacts of the energy development. This scenario includes the Heartland Expressway Corridor improvements.

2035 with All PTP Alliance Corridor Improvements and Intensified Energy Resource Development: This is the long-term ultimate scenario reflecting all of the primary conditions that are expected to influence future traffic by the Year 2035. This scenario includes the Heartland Expressway Corridor and the entire PTP Corridor.

METHODS AND ASSUMPTIONS

The following discussions provide details regarding the forecast methodology, including details about the assumptions behind these scenarios.

Transportation Demand Model

A transportation demand model was built to evaluate impacts of Heartland Expressway Corridor improvements. This model was built to reflect the special rural roadway travel demand patterns of this part of Nebraska as well as to integrate traffic forecasts and methodologies from several different sources and states.

The modeled area was bounded by:

- Interstate 90 (I-90) on the north
- I-25 on the west
- I-76 to the southeast extending down to Denver
- Nebraska Highway 61 and South Dakota Highway 73 on the east

Roadway facilities within the modeled boundary included all Interstate, US, and State Highways along with selected county roads.

NDOR modeling data and results were used as a source data but model forecasts were not directly used because economic conditions outside of Nebraska were not accounted for in the NDOR model. There is some historic evidence to support a greater level of travel demand through the panhandle of Nebraska generated by surrounding states.

Traffic Analysis Zones

Model traffic was generated using 133 Traffic Analysis Zones (TAZ). A TAZ is an area where traffic generation assumptions can be made based on development characteristics within the zone. The model only considered the number of trips generated from TAZs to the regional highway network. Local trips on local roads within a TAZ were not used in the model.

The size of the individual TAZs varied substantially within the study area. Many major population centers such as Cheyenne and Denver were modeled as a single TAZ. Trips generated by these large TAZs only accounted for the trips either entering or leaving via the regional highway network. Internal trips, such as shopping trips or many work related trips were not specifically modeled as they were assumed to be within the zone and hence never reaching the modeled regional highway network. At the other end of the spectrum were smaller rural communities which could have a significant enough influence to change the traffic volume on the highway network passing through or near them. The result was a TAZ structure specifically designed to model rural traffic between cities and towns.

Modeling Steps

The methodology used to develop traffic forecasts followed the following steps:

- Identify existing Average Annual Daily Traffic (AADT) 2010 travel demands for both the total number of vehicles and for trucks. This was done by consulting the published traffic count maps from the four states (NDOR, CDOT, WYDOT and SDDOT).
- Trip generation totals for TAZs within Nebraska were taken from the NDOR statewide travel demand model. Trip generation totals for TAZs outside of Nebraska were initially estimated using an external trip rate derived from the NDOR model based on population. These initial estimates were refined in the next step.
- The model network was built with link speeds and distances. The shortest path between each TAZ pair was determined. An initial trip origin destination (OD) matrix was then estimated and assigned to the roadway network. Rates for trips generated outside of Nebraska were then varied to correspond or agree with the observed existing travel demands thereby calibrating the model results. Forecast travel demands were then compared to existing counts and a very reasonable fit was found to have taken place (See **Table 1**)
- The model forecasts were then "post processed" to account for local variations in travel demand such as increases in traffic near cities and towns since the calibrated link volumes were for those between the "influence areas" of cities. These adjustments were noted and used in the development of future forecasts.
- Future travel demands were developed in consultation with the following sources:
  - Expected growth in travel demand from the NDOR Statewide travel demand model
  - SDDOT Decennial Interstate Corridor Study, March, 2011
  - Mead County (South Dakota) Transportation Plan, November 2008
  - City of Gillette, Wyoming, 2009 Transportation Plan Update
  - Laramie County (Wyoming) Wyoming Planning Department Growth factors for population and travel demand
  - CDOT 20-year growth factors
  - North Front Range Metropolitan Planning Organization (Fort Collins, Colorado) 2035 travel demand forecasts
  - Denver Regional Council of Governments (Denver, Colorado) 2035 travel demand forecasts
  - WYDOT Interstate 80 Tolling Feasibility Study, Phase 2 Final Report, November 2009

The process began with identifying Travel Analysis Zones (TAZ). These TAZs were based on geographic boundaries and by adjacent highway segments where existing or proposed travel demand would vary. Once the TAZs were identified,

origins and destinations between TAZs were estimated with the goal of developing an origin/destination table that when assigned to the existing roadway network would result in volumes similar to those observed and counted.
These origin/destination pairs did not include local traffic, only those trips that would be assigned to a segment of the Heartland Corridor study area.

The 2035 forecast were developed using the existing origin/destination detail developed for the existing conditions. Using the various forecast sources, individual origin/destination data was grown based on the estimated growth forecast for roadways adjacent to the zone. These 2035 origin/destination were then assigned to the 2035 No Build roadway network. **Table 2** presents the daily vehicle traffic for each TAZ in 2010 and 2035.

Table 1 Summary of Technical Assumptions Used in Travel Forecasts for the Build Alternatives

Scenario/ Assumptions	2035 With Heartland Improvements	2035 With Heartland Improvements and Intensified Energy Resource Development	2035 With All Ports to Plains Alliance Corridor Improvements	2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development
Population Growth	No Change from No Build, 15% increase from 2010	A 7% increase in the Panhandle area over No Build	A 7% increase in the Panhandle area over No Build	A 13% increase in the Panhandle area over No Build
Economic Conditions	Baseline economic conditions same as No Build	Significant additional development due to the increased energy activity.	Baseline economic conditions same as No Build	Significant additional development due to the increased energy activity.
Travel Behavior	Some shifting of travel demand to the Heartland Corridor, overall 9% increase over No Build	30% increase over No Build	63% increase over No Build	70% increase over No Build
Anticipated Freight Activity	Some shifting of Freight demand to the Heartland Corridor, overall 8% increase over No Build	52% increase over No Build	103% increase over No Build	124% increase over No Build
Major New Industrial Development (Niobrara and Other)	No Change from No Build	Energy development	No Change from No Build	Energy development

Table 2 Travel Analysis Zones: Daily Vehicle Traffic Attributed to the Model Area for 2010 and 2035

TRAVEL ANALYSIS ZONES (Name/Location)	All Vehicles		Trucks	
	2010	2035	2010	2035
Alliance Neb Node 4	4374	12500	403	569
Ault Eaton Pierce CO	8700	10345	432	470
Badlands Node 33	242	1799	101	291
Badlands SD East	4909	6005	244	208
Bayard NDOR Node 41	2009	3229	100	117
Beulah Wyo	674	818	281	452
Brighton CO	48593	80321	2411	2758
Brush CO	7671	9122	381	313
Buffalo Gap SD	260	1363	108	753
Burns Wyo	671	863	280	477
Chadron Neb Node 18	3807	4527	189	206
Cheyenne Wyo	381	493	159	234
Chugwater Wyo	867	6442	361	3559
Custer SD	7807	11395	387	423
Deadwood Lead SD	8131	10476	403	360
Degraw Node 42	286	1952	119	352
Denver, CO	142804	169809	7086	7730
Douglas Wyo	144	1067	60	65
Fort Collins CO	36931	43915	11090	15736
Fort Laramie Wyo	767	2046	120	131
Fort Morgan CO	5451	6482	271	295
Frederick Co	7292	17767	362	610
Ft. Lupton CO	10586	27632	525	1005
Gillette Wyo	834	6200	348	2992
Greeley CO	54657	77035	2712	2646
Guernsey Wyo	792	5888	39	202
Hawk Springs Wyo	579	2705	90	150
Hay Springs Neb Node 64	1150	4351	57	149
Henry NDOR Node 76	246	1830	31	67
Hermosa SD	645	4794	195	245
Hill City SD	1475	2687	615	1484
Hot Spring SD	2315	13230	115	454
Hudson CO	4093	9452	429	468
I-25 West to Casper	7822	9301	1233	1345
I-80 East	14791	17588	734	604
I-80 West to Laramie	13810	61960	685	2128
I-90 East of Rapid City	9507	27801	1419	2243
I-90 West to Sheridan	4917	8990	244	380
Julesburg CO	602	1164	83	132
Keensburg CO	2118	2785	105	96
La Grange Wyo	575	683	95	203

TRAVEL ANALYSIS ZONES (Name/Location)	All Vehicles		Trucks	
	2010	2035	2010	2035
Lake McConaughy Node 32	1027	4455	200	218
Lake Minatare NDOR Node 48	427	3174	120	156
Lawrence SD	647	1981	270	794
Limon Neb NDOR Node 52	1536	2366	365	742
Lingle Wyo	579	4300	127	161
Lochbuie CO	10964	23587	1866	2779
Lusk Wyo	579	860	193	210
Manville Wyo	1399	2669	69	92
Martin SD	693	1020	34	38
Mead Co	989	4601	49	167
Melbeta NDOR Node 55	1593	1895	664	1047
Milliken Johnstown Co	15247	42964	757	1476
Minatare NDOR Node 54	2335	16460	973	4143
Mitchell NDOR Node 50	4950	5886	246	268
Moorcroft Wyo	1261	2556	124	135
Morrell NDOR Node 51, 75	3237	24057	1350	13290
NDOR Node 10 Sydney	3895	4632	400	558
NDOR Node 11,12,28,30	3136	4438	1193	1354
NDOR Node 15, 16, 37	1649	3828	82	131
NDOR Node 21 Whitney	534	1336	223	738
NDOR Node 22 Crawford	1302	9678	124	352
NDOR Node 24	323	1613	16	55
NDOR Node 36 Kimball	1824	2169	91	99
NDOR Node 40	463	692	193	382
NDOR Node 47	447	532	97	149
NDOR Node 49	701	5209	72	189
NDOR Node 53	1119	1493	104	113
NDOR Node 58	1168	1793	65	81
NDOR Node 6	246	1827	102	144
NDOR Node 70 Harrison	434	576	181	318
NDOR Node 71 Jader	135	1002	7	34
NDOR Node 73	304	451	127	249
NDOR Node 74	284	723	118	194
NDOR Nodes 56, 46	15950	18966	791	863
NDOR Nodes 57, 60	2850	3388	141	204
NDOR Nodes 72, 23	820	1090	79	86
Neb 2 at SD Border	154	1142	64	105
Neb 2 East	625	743	93	101
Neb 61 South	4406	5239	377	835
Neb 92 East	188	1399	28	51
Neb Node 1 Harrisburg	752	895	250	480
Neb Node 13, 14, 44	1564	11625	652	1587
Neb Node 19	671	4988	33	171

TRAVEL ANALYSIS ZONES (Name/Location)	All Vehicles		Trucks	
	2010	2035	2010	2035
Neb Node 2, 43	556	4135	232	1065
Neb Node 3	179	318	46	51
Neb Node 39 Bridgeport	2327	2767	115	126
Neb Node 45, 34	1119	8315	261	302
Neb Node 5 Hemingford	1234	1468	93	128
Neb Node 61 Gordon	1628	2649	127	139
Neb Node 62	171	1270	46	50
Neb Node 63	320	2377	133	339
Neb Node 65 Rushville	1974	3850	552	652
Neb Node 68 Smith Lake	286	540	119	298
Neb Node 7	307	2283	49	83
Neb Node 8	692	5142	175	236
Neb Node 9	1347	1801	67	62
Neb Node 90	831	988	347	532
Neb Nodes 20, 25, 26, 27	1634	12142	81	417
Neb Nodes 67, 66	574	2181	28	77
Newcastle Wyo	437	3251	42	118
Node 34,45 Lisco	1120	4685	467	2588
Node 35	526	626	50	84
Oelrichs SD	48	360	20	102
Oglala SD	743	883	58	73
Pine Bluff Wyo	438	3252	58	118
Pine Ridge SD	2250	2675	173	239
Platteville CO	2599	5119	129	177
Rapid City SD	9494	15243	471	524
Scotts Airport NDOR Node 59	693	3292	289	799
SD 34 North	2954	3513	147	160
SD 44 East	1404	4236	585	805
SH 119 West, CO	35939	58451	1783	2125
SH 60 West, CO	2296	14167	114	487
SH 66 West, CO	13976	53677	694	1843
Spearfish SD	5706	9051	283	329
SR 7 West, CO	18967	22554	941	775
SR 71 South, CO	1796	6018	89	219
Sterling CO	22648	60578	1124	2080
Sturgis SD	10250	28620	509	983
Sundance Wyo	674	5008	218	237
Torington Wyo	579	688	241	263
Upton Wyo	1666	3287	695	1816
US 18 East in SD	740	881	309	486
US 20 East of SR 61	860	6388	272	297
US 34 East, CO	110	816	46	451
US 34 West, CO	38942	46306	1932	1590

TRAVEL ANALYSIS ZONES (Name/Location)	All Vehicles		Trucks	
	2010	2035	2010	2035
US 85 North End SD	6438	18547	319	637
Wellington CO	1597	11870	229	432
Wheatland Wyo	2991	11904	148	433
Wiggins CO	1304	2737	219	310
Windsor CO	8924	26078	443	896
Wright Wyo	4010	4769	199	217
TOTAL	**735,991**	**1,414,872**	**63,979**	**115,695**

Scenario Assumptions

Travel demand growth assumptions were developed for each "Build" scenario. These assumptions addressed population growth, economic conditions, anticipated freight activity and major new industrial operations with a potential to influence basic forecasts. **Table 1** summarizes the primary assumptions applied to the 2035 build scenarios.

As described previously, the "No Build" scenario or "2035 without Improvements" scenario evaluates the projected Year 2035 conditions based on traffic counts and growth trends, but does not reflect traffic that may result from making transportation improvements that would draw additional vehicles into the Heartland Expressway Corridor.

Future travel demands from the above mentioned sources were placed on the model roadway network. Future OD patterns were then estimated using the existing OD travel demand as a seed matrix. It became evident that the four to five percent total growth in travel demand assumed in the NDOR travel demand model between existing conditions and the Year 2035 was out of step with the much higher rate of growth expected in the surrounding states.

Based on this differential, the rate of growth in Nebraska was increased to accommodate the expected growth rates in the surrounding states. The resulting increase in overall traffic for all vehicles was 19 percent versus the five percent assumed in the NDOR model. The increase in truck demand needed to balance the surrounding demand rates was eight percent.

There is some historic evidence to support a greater level of travel demand through the panhandle of Nebraska generated by surrounding states. The one corridor within the panhandle that has seen growth in travel demand over the last ten years is the US 26 corridor between the Powder River, Wyoming energy production area and I-80. US 26 also serves as a shortcut around Cheyenne, Wyoming between I-80 and I-25. Given this pattern, it is likely that much of this growth in travel demand is due to trips with origins and destinations outside the panhandle area. Historic growth rates are depicted below in **Table 3.**

Table 3 Historic Growth Rates (Average Daily Traffic)

Location	2000		2010		
	All Veh.	Trucks	All Veh.	Trucks	% Change
NE 71					
At Colorado Border	810	140	820	135	**1%**
South of Kimball	2340	385	1610	355	**-31%**
North of Kimball	2140	330	2055	315	**-4%**
South of Gering	3450	395	3805	215	**10%**
North of Scottsbluff	2155	245	1860	185	**-14%**
North of SH 2	910	130	750	105	**-18%**
L7E					
West of US 385	2220	260	2470	435	**11%**
NE 2					
West of Hemingford	1550	155	1035	110	**-33%**
South of Hemingford	1825	235	1220	135	**-33%**
South of US 385	3390	340	3010	305	**-11%**
East of Alliance	830	160	1260	245	**52%**
I-80					
At Wyoming Border	8300	4335	7475	4350	**-10%**
East of Kimball	8290	4300	7285	4455	**-12%**
West of Sidney	7800	4320	7215	4420	**-8%**
West of I-76	7400	4150	7395	4515	**0%**
East of Ogallala	14130	6190	14865	6830	**5%**
I-76					
At Colorado Border	6197	1920	6500	2100	**5%**
US 26					
East of Henry	3500	420	4320	390	**23%**
West of NE 71	7025	380	7615	445	**8%**
East of Scottsbluff	5465	395	4890	350	**-11%**
East of Melbeta	2505	265	2510	285	**0%**
West of Bridgeport	2760	380	3175	440	**15%**
West of Lisco	1710	375	1315	285	**-23%**
East of Oshkosh	1970	365	1920	330	**-3%**
NE 92					
At Wyoming Border	460	60	540	70	**17%**
West of Scottsbluff	1865	165	1415	130	**-24%**
US 385					
North of Sidney	2365	370	2795	405	**18%**
South of SH 92	1715	350	2095	380	**22%**
South of Angora	3365	500	3230	580	**-4%**
South of Alliance	3760	525	3485	385	**-7%**
North of SH 2	1450	230	1960	305	**35%**
South of Chadron	3715	380	3370	230	**-9%**
At SD Border	1900	350	1790	235	**-6%**
US 20					
At Wyoming Border	865	195	550	125	**-36%**
East of Crawford	1850	240	1595	205	**-14%**
West of Chadron	4825	435	3515	290	**-27%**
East of Hay Springs	2440	210	2560	215	**5%**

The final set of growth rates that were applied are presented in **Table 4**.

Table 4 Assumed Baseline Growth in Travel Demand

State	2010 to 2035 Baseline Growth in Travel Demand	
	All Vehicles	Trucks
Nebraska	19%	8%
Wyoming	60%	48%
South Dakota	82%	67%
Colorado	118%	97%
Average	88%	56%

The following discussions elaborate on travel behavior, freight and energy development assumptions.

Travel Behavior Changes Related to Improvements

Travel behavior is the outcome of travel conditions faced by a driver, and in this case, route choices available to a motorist. Key factors associated with travel behavior include clear or perceived travel time savings, safety benefits, travel simplicity (fewer turns and route changes reduce complexities) and roadside attractions, features and services. New road alignments and access benefits that enhance a road system's reach have the most significant influences on driver behavior.

The PTP Alliance Corridor is not a new route, but the overall set of anticipated improvements has the effect of creating a new major route option for many motorists. However, perhaps more importantly, a comprehensive package of improvements that upgrades everything from travel speeds and safety to drive amenities and directional signage is expected to draw existing and future travel demand into this corridor to varying degrees from Canada to Mexico. The modeling effort for the "Build" scenarios reflects this effect.

In September 2008, Texas DOT produced a document Great Plains International Trade Corridor Assessment, Connecting America's Energy and Agricultural Heartland and the travel forecast section referred to the FAF3 data. This study concluded that the data was not disaggregated enough to conduct travel demand forecasts. However, the data can be used to estimate the added demand by fully improving the corridor as well as for expected increases in international trade due to the North American Free Trade Act (NAFTA) and other trade conditions and agreements.

In summary, just north of Limon, Colorado, Highway 71 carries approximately 870 vehicles per day, with 190 of those being trucks. The PTP Corridor Development and Management Plan prepared by CDOT in December 2004 for the States of Colorado, New Mexico, Texas, and Oklahoma estimated that traffic on Colorado Highway 71 north of Limon would grow as a result of the PTP improvements as well as ambient growth by approximately 210 percent. Truck travel is expected to increase from 190 vehicles per day (VPD) to 430 VPD by 2035 with corridor improvements.

At the Canadian border, there are approximately 2,640 vehicles crossing the border each day between US 191 in Montana and US 256 North of Minot, North Dakota. Of these crossings, approximately 720 are trucks. These boundaries for the crossings were selected as being those that could reasonably be expected to feed the improved PTP Alliance Corridor. The total volume of border crossings between I-15 and I-29 is approximately 11,520 with 3,200 being trucks.

To estimate the total number of crossings for the PTP Alliance Corridor, it was assumed that 70 percent of the crossings occurring between US 191 in Montana and US 256 would occur on the PTP Alliance Corridor. Additionally, an estimated one third of the remaining crossings between I-15 and I-29 would be diverted to the PTP Alliance Corridor. This results in a base border crossing at the PTP Alliance Corridor of 3,000 daily trips, with 820 being trucks, or approximately ¼ of the total crossings between I-15 and I-29. These results are summarized in **Table 5**.

Table 5 Additional PTP Alliance Corridor Travel Demand

	Vehicles (Vehs) Per Day			
	To/From Canada		To/From Ports to Plains	
With Attraction Due to Improvements (2010)	4730	1300	1290	300
With Expected Trade Corridor Growth	7570	2860	2660	430

Additional volume will occur on the segments due to local trip generation. As the corridor proceeds northward, the Ports to Plains component decreases and the Canadian component increases as the corridor gets closer to the Canadian border, and the reverse occurs in the southbound direction. The changes in travel demand are attributable to cars entering or leaving the corridor at intersecting facilities. As expected, interstate highway crossings have a large influence on vehicles accessing the corridor. The two right-most columns depict total segmental trade component due to the combined impact of Ports to Plains and Canadian Border crossings. These results are summarized in **Table 6**.

Table 6 Additional Ports to Plains Alliance Corridor Travel Demand by Heartland Expressway Corridor Location

	To/From Canada		To/From Ports to Plains		Totals	
	All Vehs	Trucks	All Vehs	Trucks	All Vehs	Trucks
Between Canada and US 2	7570	3390	40	5	7610	3395
Between US 2 and ND 23	7080	3160	40	10	7120	3170
Between ND 23 and I-94	6930	3090	40	10	6970	3100
Between I-94 and US 12	2630	1080	70	20	2700	1100
Between US 12 and SD 20	2480	950	140	30	2620	980
Between SD 20 and I-90	2450	920	150	30	2600	950
Between I-90 and US 18	1650	210	510	60	2160	270
Between US 18 and US 20	1420	190	680	90	2100	280
Between US 20 and NE 2	1260	170	790	110	2050	280
Between NE 2 and US 26	1210	170	820	120	2030	290
Between US 26 and I-80	740	120	1160	190	1900	310
Between I-80 and CO 14	80	50	1640	280	1720	330
Between CO 14 and I-76	70	50	1770	300	1840	350

FUTURE TRAVEL DEMAND MODEL RESULTS

As shown in **Table 7**, AADT increases based on general traffic growth and anticipated community population changes ranging from low to high. With the addition of Heartland Expressway Corridor improvements, additional increases are evident. These increases are based on the value of the improvements for travelers in terms of travel time savings and increased safety on the new facilities. Larger increases are noticeable in the southern portion of the corridor when anticipated energy development activity is added to the forecasts. The largest increases are attributed to completion of the overall PTP Alliance Corridor improvements. Clearly, the formation of this new corridor from Canada to Mexico has substantial influences on travel route choices and reflects the importance of travel to and through Nebraska from distant origins and destinations.

Table 7 2010 Existing Traffic and 2035 Traffic Forecasts for Various Scenarios (AADT)

Location	2010 Existing Traffic		Future No Build 2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy Resource Development		2035 With All Ports to Plains Alliance Corridor Improvements		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
NE 71												
At Colorado Border	820	135	860	140	1020	220	1480	350	2180	820	2640	950
South of Kimball	1610	355	1690	370	1850	450	2310	580	2850	970	3310	1100
North of Kimball	2055	315	2160	330	2460	410	3080	500	3770	1110	4390	1200
South of Gering	3805	215	4000	230	4360	310	4430	330	6980	1200	7050	1220
North of Scottsbluff	1860	185	2900	330	3010	330	3160	330	3160	350	3310	350
North of NE	750	105	1950	190	1780	100	1830	100	1870	110	1920	110
L7E												
West of US 385	2470	435	2590	540	2650	550	3170	590	4010	730	4530	770
NE2												
West of Hemingford	1035	110	2590	460	2870	550	2970	550	3010	580	3110	580
South of Hemingford	1220	135	2000	160	2000	160	2020	160	2000	160	2020	160
South of US 385	3010	305	3160	320	3220	320	3380	330	4640	510	4800	520
East of Alliance	1260	245	1320	300	1320	300	1350	300	1320	300	1350	300
I-80												
At Wyoming Border	7475	4350	7800	4570	7750	4570	8150	4750	7920	4660	8320	4840
East of Kimball	7285	4455	8700	4620	8650	4620	9200	4780	8820	4710	9370	4870
West of Sidney	7215	4420	9600	4700	9650	4700	10010	4740	9750	4750	10110	4790
West of I-76	7395	4515	9600	4740	9660	4740	9870	4770	9710	4760	9920	4790
East of Ogallala	14865	6830	20400	9060	20400	9060	21080	9190	20400	9060	21080	9190
I-76												
At Colorado Border	6500	2100	18400	4170	18390	4170	18950	4240	18390	4170	18950	4240
US 26												
East of	4320	390	9340	480	9500	520	10970	550	9690	530	11160	560
West of NE 71	7615	445	13040	540	13200	580	14670	610	13390	590	14860	620

Location	2010 Existing Traffic		Future No Build 2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy Resource Development		2035 With All Ports to Plains Alliance Corridor Improvements		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy	
	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
US 26 (Continued)												
East of Scottsbluff	4890	350	9140	630	9160	630	9830	700	9160	630	9830	700
East of Melbeta	2510	285	6030	490	6050	490	6720	560	6050	490	6720	560
West of Bridgeport	3175	440	6570	510	6550	510	7260	590	6550	510	7260	590
West of	1315	285	5450	780	5410	780	5850	830	5460	780	5900	830
East of Oshkosh	1920	330	6170	700	6120	700	6490	740	6170	700	6540	740
NE 92												
At Wyoming Border	540	70	1170	90	1190	100	1370	100	1210	100	1400	110
West of Scottsbluff	1415	130	2420	160	2450	170	2720	180	2480	170	2760	180
US 385												
North of Sidney	2795	405	4070	470	4070	470	4100	470	4070	470	4100	470
South of NE 92	2095	380	2510	470	2510	470	2630	480	2510	470	2630	480
South of Angora	3230	580	4690	610	4690	610	4740	610	4740	610	4790	610
South of Alliance	3485	385	3660	400	3720	400	4150	440	5140	590	5570	630
North of NE	1960	305	2060	320	2270	410	2400	420	3700	620	3830	630
South of Chadron	3370	230	3540	240	3750	330	3880	340	5180	540	5310	550
At South Dakota Border	1790	235	2610	340	2660	340	2710	340	4130	520	4180	520
US 20												
At Wyoming Border	550	125	580	180	460	180	460	180	470	190	470	190
East of Crawford	1595	205	2590	370	2300	280	2310	280	2300	280	2310	280
West of Chadron	3515	290	3690	300	3930	390	3990	390	4130	570	4190	570
East of Hay Springs	2560	215	4120	300	4120	300	4150	300	4320	480	4350	480

Table 8 provides a summary percent change in traffic growth along several Nebraska Highway segments in Nebraska. The percent increase in travel demand is from Year 2010 to Year 2035 Ultimate PTP Corridor condition. Some traffic volumes are anticipated to double or triple between Year 2010 and 2035. Tables 5 and 6 summarize how the traffic growth along the Heartland Expressway and the adjacent highways will see an increase in overall vehicle traffic and truck traffic with the completion of the overall Ports to Plains Corridor.

A couple of the largest traffic increases occur on US 26 and NE 71 corridors. US 26 provides a shorter route between I-80 and I-25 resulting in the increase in traffic and NE 71 is expected to have an increase in traffic south of Scottsbluff to the Nebraska/Colorado border. **Table 8** also provides a summary of the expected increase in truck traffic.

Table 8 Travel Forecasts Reflecting Percent Change from 2010 to 2035

	2010		Ultimate 2035 With All PTP Alliance Corridor Improvements and Intensified Energy Development		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resources Development	
Segment	Veh.	Trucks	Veh.	Trucks	Veh.	Trucks
NE 71						
At Colorado Border	820	135	2640	950	222%	604%
South of Kimball	1610	355	3310	1100	106%	210%
North of Kimball	2055	315	4390	1200	114%	281%
South of Gering	3805	215	7050	1220	85%	467%
North of Scottsbluff	1860	185	3310	350	78%	89%
North of NE 2	750	105	1920	110	156%	5%
L7E						
West of US 385	2470	435	4530	770	83%	77%
NE 2						
West of Hemingford	1035	110	3110	580	200%	427%
South of Hemingford	1220	135	2020	160	66%	19%
South of US 385	3010	305	4800	520	59%	70%
East of Alliance	1260	245	1350	300	7%	22%
I-80						
At Wyoming Border	7475	4350	8320	4840	11%	11%
East of Kimball	7285	4455	9370	4870	29%	9%
West of Sidney	7215	4420	10110	4790	40%	8%
West of I-76	7395	4515	9920	4790	34%	6%
East of Ogallala	14865	6830	21080	9190	42%	35%
I-76						
At Colorado Border	6500	2100	18950	4240	192%	102%

	2010		Ultimate 2035 With All PTP Alliance Corridor Improvements and Intensified Energy Development		Ultimate 2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resources Development	
Segment	Veh.	Trucks	Veh.	Trucks	Veh.	Trucks
US 26						
East of Henry	4320	390	11160	560	158%	44%
West of NE 71	7615	445	14860	620	95%	39%
East of Scottsbluff	4890	350	9830	700	101%	100%
East of Melbeta	2510	285	6720	560	168%	96%
West of Bridgeport	3175	440	7260	590	129%	34%
West of Lisco	1315	285	5900	830	349%	191%
East of Oshkosh	1920	330	6540	740	241%	124%
NE 92						
At Wyoming Border	540	70	1400	110	159%	57%
West of Scottsbluff	1415	130	2760	180	95%	38%
US 385						
North of Sidney	2795	405	4100	470	47%	16%
South of NE 92	2095	380	2630	480	26%	26%
South of Angora	3230	580	4790	610	48%	5%
South of Alliance	3485	385	5570	630	60%	64%
North of NE 2	1960	305	3830	630	95%	107%
South of Chadron	3370	230	5310	550	58%	139%
At South Dakota Border	1790	235	4180	520	134%	121%
US 20						
Wyoming Border	550	125	470	190	-15%	52%
East of Crawford	1595	205	2310	280	45%	37%
West of Chadron	3515	290	4190	570	19%	97%
East of Hay Springs	2560	215	4350	480	70%	123%

Table 9 reflects the changes in travel behavior found during the modeling process. On the table are "cordons." Cordons are imaginary lines drawn east-west across all north/south modeled facilities. The total AADT crossing the cordon is depicted on the table along with the percentage of the total that is on the Heartland Expressway.

Table 9 Daily Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT) for the Modeled Area (in thousands)

	2010 Existing Traffic		2035 without Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Intensified Energy		2035 With All Ports to Plains Alliance Corridor Improvements		2035 With All Ports to Plains Alliance Corridor Improvements and Intensified Energy Resource Development	
Location	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
VMT												
Nebraska	3,299	1,025	3,937	1,103	3,959	1,107	4,248	1,137	4,219	1,188	4,507	1,218
Wyoming	2,689	594	4,292	880	4,274	878	4,430	905	4,066	855	4,222	882
South Dakota	1,427	166	2,601	277	2,603	277	2,610	278	2,703	283	2,710	283
Colorado	10,216	1,245	22,283	2,454	22,280	2,452	23,586	2,589	22,458	2,451	23,764	2,588
Total	17,631	3,030	33,113	4,714	33,116	4,714	34,874	4,909	33,446	4,777	35,203	4,971
VHT												
Nebraska	52.1	17	66	21.7	62.1	18.1	67.7	18.9	66.8	19.5	72.4	20.5
Wyoming	41.9	9.8	70.1	17.1	66.1	14.3	69.7	15	63.6	14	67	14.7
South Dakota	25.9	3.3	47.5	5.6	47.5	5.5	48	5.6	49.6	5.7	50.3	5.8
Colorado	164.7	21.4	365.6	42.7	365.8	42.7	389.7	45.7	368.8	42.6	393.1	46
Total	284.6	51.5	549.3	87.1	541.5	80.6	575.1	85.2	548.8	81.8	582.8	87

The data in **Table 10** indicates that without improvements to the Heartland Expressway Corridor, the corridor's overall share of the total travel demand will be significantly reduced. Improvements to the Heartland Expressway Corridor will help reverse some of the declines, but not all. It is only with the full corridor improvements that the total share of vehicles is roughly equal to the existing share. However, a much greater share of the truck traffic will be on the corridor with implementation of the full improvements to the PTP Alliance Corridor. This finding validates that as the corridor is improved the attraction for the trucking activity will increase.

Table 10 Changes in Travel Behavior Found during the Modeling Process

		2010 Existing Traffic		2035 without Improvements		2035 With Heartland Improvements		2035 With Complete PTP Improvements	
Cordon		All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks	All Vehs.	Trucks
South of I- 90	AADT	27,330	2,990	44,780	5,070	44,790	5,080	45,530	5,170
	Heartland %	23.1%	31.5%	20.5%	26.8%	20.5%	26.8%	23.5%	29.8%
South of US 20	AADT	12,300	2,225	16,540	2,540	16,380	2,530	16,470	2,570
	Heartland %	15.9%	13.7%	12.5%	12.6%	13.9%	16.2%	22.5%	24.1%
South of US 26	AADT	15,695	2,822	25,090	3,620	25,100	3,670	26,420	4,370
	Heartland %	25.2%	8.0%	15.9%	6.4%	17.4%	8.4%	26.4%	27.5%
South of I-80	AADT	33,390	6,425	74,000	14,110	74,000	14,160	74,000	14,560
	Heartland %	2.5%	2.1%	1.2%	1.0%	1.4%	1.6%	2.9%	5.6%

For economic analysis purposes and to determine what value accrues to the traveling public as a result of Heartland Corridor improvements, the number of new trips, the number of diverted trips, and changes to existing traffic were estimated for two measures of effectiveness (Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT)) for the six modelling scenarios.

New Trips: Traffic generated by enhanced economic activity such as oil and gas development associated with the Niobrara play, and traffic resulting from Ports to Plains (PTP) improvements south of the Heartland Expressway corridor.

Diverted Trips: Traffic diverted to the Heartland Expressway roadway segments from regional roadway network facilities.

Existing Trips: Traffic on existing roadway segments under existing travel demand (2010 and 2035).

This information is presented in **Table 11.**

Table 11 Existing, New and Diverted Traffic in 2010 and 2035 (Vehicle Miles Traveled and Vehicle Hours Traveled)

	2010 Existing Traffic		2035 w/o Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Niobrara Activity		2035 With All Great Plains Trade Corridor Improvements		2035 With All Great Plains Trade Corridor Improvements and Niobrara Activity	
Location	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**
VMT												
Nebraska (total)	3,298,567	1,025,407	3,936,995	1,103,455	3,959,163	1,107,058	4,247,697	1,136,545	4,218,846	1,191,762	4,526,441	1,224,521
New (total)	na	na	na	na	na	na	289,062	29,573	260,036	84,761	546,208	114,039
Diverted (total)	na	na	na	na	22,168	3,603	21,640	3,517	21,815	3,546	43,239	7,028
Existing (total)	3,298,567	1,025,407	3,936,995	1,103,455	3,936,995	1,103,455	3,936,995	1,103,455	3,936,995	1,103,455	3,936,995	1,103,455
US 385												
New	na	na	na	na	na	na	19,445	1,385	23,285	1,747	42,535	3,117
Diverted	na	na	na	na	15,005	3,576	14,648	3,491	14,766	3,519	29,267	6,976
Existing	239,825	26,922	375,668	41,326	375,668	41,326	375,668	41,326	375,668	41,326	375,668	41,326
US 26												
New	na	na	na	na	na	na	61,646	2,208	56,338	2,040	117,368	4,226
Diverted	na	na	na	na	5,594	917	5,461	895	5,505	902	10,912	1,789
Existing	205,240	14,874	266,561	13,116	266,561	13,116	266,561	13,116	266,561	13,116	266,561	13,116
NE 71												
New	na	na	na	na	na	na	40,316	5,932	51,502	12,514	91,415	18,387
Diverted	na	na	na	na	11,259	2,213	10,991	2,160	11,080	2,178	21,960	4,317
Existing	147,691	15,497	170,213	16,237	170,213	16,237	170,213	16,237	170,213	16,237	170,213	16,237
NE 71 Bypass												
New	na	na	na	na	na	na	457	133	564	222	1,017	353
Diverted	na	na	na	na	151	36	147	35	148	35	294	69
Existing	1,297	132	2,366	310	2,366	310	2,366	310	2,366	310	2,366	310
L62A												
New	na	na	na	na	na	na	12,910	950	16,332	1,208	29,113	2,148
Diverted	na	na	na	na	1,205	79	1,176	77	1,185	78	2,350	154
Existing	106,315	9,982	106,327	8,871	106,327	8,871	106,327	8,871	106,327	8,871	106,327	8,871
Wyoming	700,368	67,407	921,135	79,860	954,349	86,681	1,088,333	97,127	1,101,842	104,302	1,267,367	121,396
New	na	na	na	na	na	na	134,775	10,608	148,021	17,730	281,448	28,231
Diverted	na	na	na	na	33,213	6,821	32,423	6,659	32,685	6,712	64,783	13,304
Existing	700,368	67,407	921,135	79,860	921,135	79,860	921,135	79,860	921,135	79,860	921,135	79,860

	2010 Existing Traffic		2035 w/o Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Niobrara Activity		2035 With All Great Plains Trade Corridor Improvements		2035 With All Great Plains Trade Corridor Improvements and Niobrara Activity	
Location	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**
South Dakota	2,689,199	593,965	4,291,722	879,806	4,273,525	878,111	4,429,627	905,006	4,066,213	851,864	4,221,881	878,719
New	na	na	na	na	na	na	155,668	26,855	0	0	155,668	26,855
Diverted	na	na	na	na	0	0	0	0	0	0	0	0
Existing	2,689,199	593,965	4,291,722	879,806	4,273,525	878,111	4,273,959	878,152	4,066,213	851,864	4,066,213	851,864
Colorado	1,426,738	165,926	2,600,640	277,162	2,602,803	277,296	2,609,785	277,747	2,703,385	283,440	2,712,016	283,993
New	na	na	na	na	na	na	7,033	454	100,616	6,145	107,146	6,568
Diverted	na	na	na	na	2,164	134	2,112	131	2,129	132	4,231	263
Existing	1,426,738	165,926	2,600,640	277,162	2,600,640	277,162	2,600,640	277,162	2,600,640	277,162	2,600,640	277,162
4-State Total	10,215,872	1,245,059	22,283,356	2,453,853	22,280,064	2,452,087	23,585,926	2,589,016	22,458,268	2,470,769	23,763,160	2,607,562
New	na	na	na	na	na	na	1,305,784	136,887	178,204	18,681	1,483,097	155,475
Diverted	na	na	na	na	0	0	0	0	0	0	0	0
Existing	10,215,872	1,245,059	22,283,356	2,453,853	22,280,064	2,452,087	22,280,142	2,452,129	22,280,064	2,452,087	22,280,064	2,452,087
VHT												
Nebraska (total)	17,630,376	3,030,357	33,112,712	4,714,275	33,115,555	4,714,553	34,873,034	4,908,314	33,446,711	4,797,834	35,223,498	4,994,796
New (total)	na	na	na	na	na	na	1,757,547	193,768	538,856	109,588	2,292,118	302,937
Diverted (new)	na	na	na	na	24,332	3,737	23,752	3,649	23,944	3,678	47,470	7,291
Existing (total)	17,630,376	3,030,357	33,112,712	4,714,275	33,091,224	4,710,815	33,091,735	4,710,897	32,883,911	4,684,568	32,883,911	4,684,568
US 385												
New	52,139	17,005	62,897	18,484	62,095	18,148	66,971	18,744	66,445	19,616	72,119	20,400
Diverted	na	na	na	na	na	na	4,558	488	4,096	1,395	8,740	1,902
Existing	na	na	na	na	342	59	335	58	337	58	680	118
US 26	52,139	17,005	62,897	18,484	61,753	18,089	62,078	18,199	62,012	18,162	62,699	18,381
New	0	0	0	0	0	0	0	0	0	0	0	0
Diverted	na	na	na	na	na	na	300	23	359	29	666	52
Existing	na	na	na	na	230	58	226	57	228	58	459	116
NE 71	3,725	445	5,914	690	5,771	675	5,805	679	5,794	678	5,863	686
New	0	0	0	0	0	0	0	0	0	0	0	0
Diverted	na	na	na	na	na	na	969	37	884	34	1,872	72
Existing	na	na	na	na	87	15	86	15	86	15	174	30
NE 71 Bypass	3,234	250	4,252	223	4,165	218	4,191	220	4,182	219	4,232	222
New	0	0	0	0	0	0	0	0	0	0	0	0
Diverted	na	na	na	na	na	na	611	95	779	201	1,403	299
Existing	na	na	na	na	170	35	166	35	168	35	337	70

	2010 Existing Traffic		2035 w/o Improvements		2035 With Heartland Improvements		2035 With Heartland Improvements and Niobrara Activity		2035 With All Great Plains Trade Corridor Improvements		2035 With All Great Plains Trade Corridor Improvements and Niobrara Activity	
Location	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**	**All Veh.**	**Trucks**
L62A	2,248	251	2,623	265	2,563	260	2,579	261	2,574	261	2,604	264
New	0	0	0	0	0	0	0	0	0	0	0	0
Diverted	na	na	na	na	na	na	8	2	9	4	17	6
Existing	na	na	na	na	3	1	2	1	2	1	5	1
Wyoming	22	2	41	6	39	6	40	6	40	6	40	6
New	0	0	0	0	0	0	0	0	0	0	0	0
Diverted	na	na	na	na	na	na	203	16	257	20	465	37
Existing	na	na	na	na	19	1	19	1	19	1	38	3
South Dakota	1,681	168	1,703	151	1,664	148	1,674	149	1,671	148	1,691	150
New	10,910	1,117	14,533	1,335	14,711	1,418	16,879	1,597	17,050	1,710	19,867	2,015
Diverted	na	na	na	na	na	na	2,091	174	2,288	288	4,423	466
Existing	na	na	na	na	509	111	500	109	503	110	1,012	221
Colorado	10,910	1,117	14,533	1,335	14,203	1,307	14,288	1,315	14,260	1,312	14,431	1,328
New	41,877	9,780	67,630	14,634	66,150	14,296	68,971	14,822	63,208	13,924	66,023	14,450
Diverted	na	na	na	na	na	na	2,413	443	0	0	2,423	445
Existing	na	na	na	na	0	0	0	0	0	0	0	0
4-State Total	41,877	9,780	67,630	14,634	66,150	14,296	66,558	14,379	63,208	13,924	63,600	14,005
New	25,853	3,293	47,550	5,556	47,523	5,546	47,984	5,583	49,611	5,692	50,293	5,770
Diverted	na	na	na	na	na	na	109	7	1,557	101	1,668	109
Existing	na	na	na	na	33	2	33	2	33	2	66	4

COST, PRIORITIZATION, AND IMPLEMENTATION SCHEDULE

Cost Estimates

The study team, working with NDOR, developed a list of potential improvement projects to improve the safety, increase capacity of the corridor and to ultimately meet the overall goal of a four lane divided roadway. The improvements considered included intersection improvements, roadway widening for a Super-2 facility, widening for a four-lane roadway, safety improvements, and ITS improvements. The following projects were considered:

NE 71:

- Widen NE 71 to a Super-2 facility from Colorado/Nebraska border to I-80
- Intersection Improvement at Clean Harbors (South of Kimball)
- Extend NE 71 Bypass to NE 71 south of Kimball
- I-80 Interchange Improvements
- Truck Parking/Visitor Center I-80 & NE 71 interchange.
- Widen NE 71 to four lanes from Colorado/Nebraska border to I-80

US 26:

- Pedestrian Overpass Scottsbluff at 5th Avenue
- L79E and US 26 Intersection Improvement
- Widen US 26 to four lanes from Wyoming/Nebraska border to Morrill
- Safety and Traffic Operation Improvements/Relief Route in Morrill
- Safety and Traffic Operation Improvements in Mitchell
- Widen US 26 to four lanes from Minatare to L62A/US 26 intersection
- Safety and Traffic Operation Improvements in Minatare
- US 26 and NE 71 Interchange
- US 26 Relief Route Mitchell

L62A:

- Widen L62A to four lanes from L62A/US 26 intersection to US 385

US385:

- Widen US 385 to four lanes from L62A intersection to Alliance
- Construct Passing Lanes (Super-2) on US 385 from Alliance to Chadron
- US 385 and US 20 Intersection Improvement
- Widen US 385 from Chadron to South Dakota/Nebraska state border
- Widen US 385 to four lanes from Alliance to L7E (Hemingford)
- US 385 bridge widening over NE 2
- US 385 to four lanes from L7E to Chadron
- Relief Route for Chadron
- Truck Parking/Visitor Center for Chadron

Planning level costs, in 2012 dollars, were developed based on recent information from NDOR improvement projects in the area. The following costs were general costs used in the estimation process. Independent costs were completed for some individual projects that do not meet the following criteria.

The Super-2 section includes two 12-foot lanes and ten-foot shoulders and construction of a 12-foot passing lane. The passing lanes were estimated to be one mile in length with appropriate taper lengths.

"Four-lane" improvements include construction of two new lanes with ten-foot shoulders and the existing two lanes would remain in place.

- Construction of two new lanes of a four-lane roadway. Assumption that the existing two lanes would remain in place - $3,000,000/mile
- Construction of four lanes of relief route. Assumption that four new lanes are constructed. - $5,000,000/mile
- Construction of "Super-2" improvements - $1,000,000/mile

Costs for the project development, engineering, construction engineering, utilities, and right-of-ways were developed based upon a percentage of the construction costs. The estimated percentages are listed below. These percentages were based on historical NDOR data.

- Project Development, Engineering, and Construction Engineering were estimated to be 16 percent of the construction costs.
- Utility Costs were estimated to be three percent of the construction costs.
- Right-of-Way Costs were estimated to be three percent of the construction costs.

Prioritization

With such a large investment required to upgrade the Heartland Expressway Corridor, located within the State of Nebraska, to the envisioned capacity and functionality, it is important to understand the priority of the improvement projects from the standpoint of the overall system need. The prioritization process used criteria for ranking the improvement projects relative to one another.

The weighting criteria used in this study are similar to the prioritization process used in the Ports to Plains Corridor Development and Management Plan. The following criteria were used for ranking both expansion sections and relief routes.

Truck Average Annual Daily Traffic (AADT): The PTP Alliance Corridor is designated as a high priority corridor with the importance of improving the trade corridor to promote the flow of goods both regionally and internationally. Using truck AADT allows priority to be given to improvement projects that are expected to have a higher number of trucks.

Accident Rate: Existing crash rates were used to compare improvement projects with each other to identify safety enhancements.

Existing Pavement Condition: The existing pavement conditions were provided by NDOR. Improvement projects with known deteriorating pavement received a higher priority over projects with good pavement.

Intermodal Connection: Intermodal facilities are at the forefront of increasing efficiency in the transfer and transport of goods. Roadway expansion projects that support existing intermodal facilities should be considered in prioritizing improvements to the system. Improving the efficiency of transporting freight and goods to the intermodal facilities provides an additional benefit.

System Connectivity: As discussed in Section 2.1.2, the system connectivity provides the ability to connect the Heartland Expressway improvements to the planned improvements along the PTP Alliance Corridor. The measure provides priority to projects that connect planned improvements to improved corridors outside of Nebraska.

Total Vehicle AADT: While a primary focus of the Heartland Expressway is to promote trade growth along the PTP Alliance Corridor, the general motorist will also benefit from improvements. This measure accounts for all motorists, not just commercial vehicles. The data includes existing and forecasted AADT.

Travel Time Savings Rate: This criterion allows existing and (forecasted) future delay along the Corridor to be accounted for in prioritization. Improvements that cause greater travel time savings per mile of improvement have a higher priority for implementation.

Cost per Vehicle Mile Traveled: This measure allows cost to play a role in prioritizing improvements. The lower the cost per vehicle mile traveled, the greater the cost-effectiveness of the improvement.

Volume to Capacity Ratio: The volume to capacity ratio is a measure that allows areas with higher congestion to gain priority over areas where congestion is less of a problem. Congested roadways cause costly delays in the movement of goods and people.

The following matrix presents the details of the evaluation process, including values and weights for each criterion. The factors and their weights were discussed and verified by the Project Steering Committee. The weights were established based upon the significance of the criteria in meeting the function of the Corridor.

Heartland Expressway

Project Priority Groupings

Travel Demand Priority	Highway	Segment	Improvement	Type	Completion Year	Pavement Type	Pavement Condition	Crash Rate (Int - Crashes/ MEV)	Crash Rate (Seg - Crashes/ HMVM)	RP Start	RP End	Distance	No. of Passing Lane Locations	No of Items	Unit Price	Price	New Maintenance & Operations for Project Program	Existing AADT	Existing AADT Trucks	2035 Forecast Background AADT	2035 Forecast Background Truck AADT	2035 Forecast AADT with GPTC Improvements	2035 Forecast Truck AADT with GPTC Improvements	Existing V/C
Group 1 (2015 to 2020)																								
	US 385	Intersection with NE 20 (East)	Intersection Improvements	Safety	2017			0.795						1.00	$ 800,000.00	$ 800,000.00		3,300	480	4,820	720	7,860	1,080	0.19
4	US 385	L62A to Alliance	4-Lane Roadway	Roadway	2019	Asphalt	Good		74.6	85.00	107.00	22.00	0.00		$ 3,000,000.00	$ 66,000,000.00	$ 4,809,728.00	3,400	480	4,160	500	4,990	600	0.40
5	US 385	Alliance to Chadron	Super 2 Facility - Add Passing Lanes	Roadway	2020	Asphalt	Very Good		108.4	110.00	168.00	58.00	3.00		$ 750,000.00	$ 2,250,000.00	$ 955,536.00	2,330	270	2,450	280	4,000	550	0.27
	US 26	In Scottsbluff @ 5th Avenue	Pedestrian Overpass	Safety	2020			1.5						1.00	$ 1,000,000.00	$ 1,000,000.00		7,340	350	13,710	630	13,740	630	0.24
7	US 385	Chadron to SD	4-Lane	Roadway	2022	Asphalt	Good		74.8	170.00	186.00	16.00			$ 3,000,000.00	$ 48,000,000.00	$ 3,048,320.00	1,650	240	2,410	360	3,930	540	0.19
	US 26	L79E Intersection (Minatare)	Intersection Improvements	Safety	2017			0.962						1.00	$ 150,000.00	$ 150,000.00		6,600	540	6,930	950	8,780	1,200	0.60
	NE 71	I-80	Extend Bypass to NE 71 to the south		2022				44.2			3.00			$ 6,000,000.00	$ 18,000,000.00	$ 1,143,120.00	1,420	300	1,500	310	2,660	910	0.17
6	NE 71	Colorado Border to I-80	Super 2 Facility (4-Lane Design Criteria)	Roadway	2021	Asphalt	Very Good		44.2	0.00	15.00	15.00			$ 1,000,000.00	$ 15,000,000.00	$ 2,998,320.00	1,420	300	1,500	310	2,660	910	0.17
	NE 71	Clean Harbors (South of Kimball)	Intersection Improvement	Safety	2020									1.00	$ 250,000.00	$ 250,000.00		1,420	300	1,500	310	2,660	910	0.17
	NE 71	I-80 (MP 22) Interchange	Rest Area/Visitor Center	Truck Parking	2022				44.2					1.00	$ 5,000,000.00	$ 5,000,000.00	$ 1,650,000.00	9,240	4,650	9,660	4,890	9,890	4,970	0.12
	ITS Improvements															$ 2,820,000.00	$ 423,000.00							
																$ 156,450,000.00	**$ 15,028,024.00**							
Group 2 (2020 to 2025)																								
3	L62A	US26 to US 385	4-Lane Roadway	Roadway	2022	Concrete	Good		62.1	0.00	8.00	8.00	0.00		$ 5,000,000.00	$ 40,000,000.00	$ 3,048,320.00	2,470	435	2,590	540	4,010	730	0.29
5	US 385	Alliance to L7E (Hemingford)	4-Lane	Roadway	2027	Asphalt	Very Good		51.8	110.00	126.00	16.00			$ 3,000,000.00	$ 48,000,000.00	$ 1,898,880.00	2,590	210	2,720	220	4,200	410	0.30
5	US 385	Alliance to L7E (Hemingford)	Bridge Widening of Existing Grade Separation (NE 2)	Roadway	2027				51.8					1.00	$ 3,000,000.00	$ 3,000,000.00		2,590	210	2,720	220	4,200	410	0.30
1	US 26	Wyoming State Line to Morrill	4-Lane Roadway	Roadway	2024	Concrete	Very Good		85.0	0.00	7.00	7.00	0.00		$ 3,000,000.00	$ 21,000,000.00	$ 1,202,488.00	4,320	390	9,340	480	9,690	530	0.51
1	US 26	Mitchell	Safety and Traffic Operation Improvements		2026							1.00		1.00	$ 1,000,000.00	$ 1,000,000.00	$ -	6,480	390	14,010	480	14,250	520	0.22
1	US 26	Morrill Relief Route	Safety and Traffic Operation Improvements		2027							4.00			$ 5,000,000.00	$ 20,000,000.00	$ 949,440.00	8,870	730	14,120	530	14,470	580	0.52
	ITS Improvements															$ 850,000.00	$ 127,500.00							
																$ 133,000,000.00	**$ 7,226,628.00**							
Group 3 (2025 to 2030)																								
5	US 385	L7E (Hemingford) to Chadron St P	4-Lane	Roadway	2032	Asphalt	Very Good		71.9	132.00	154.00	22.00			$ 3,000,000.00	$ 66,000,000.00	$ 1,580,480.00	1,960	310	2,060	320	3,700	620	0.23
2	US 26	Minatare to L62A intersection	4-Lane Roadway	Roadway	2027	Aphalt w/ Con. Base	Good		87.1	33.00	42.00	9.00	0.00		$ 5,000,000.00	$ 45,000,000.00	$ 2,136,240.00	5,080	415	5,330	730	6,750	920	0.60
2	US 26	Minatare	Safety and Traffic Operation Improvements		2028							1.00			$ 1,000,000.00	$ 1,000,000.00		5,080	415	5,330	730	6,750	920	0.60
5	US 385	Chadron to S Edge of Chadron St F	4-Lane	Roadway	2032	Asphalt	Good		188.3	154.00	168.00	14.00			$ 3,000,000.00	$ 42,000,000.00	$ 1,005,760.00	3,410	250	3,580	260	4,880	550	0.40
																$ 154,000,000.00	**$ 3,716,720.00**							
Group 4 (2030 to 2035)																								
7	US 385	Chadron	Relief Routes		2033				188.3			4.00			$ 5,000,000.00	$ 20,000,000.00	$ 299,776.00	3,410	250	3,580	260	4,880	550	0.40
	US 26	Intersection with NE 71	Interchange		2035			0.271						1.00	$ 5,000,000.00	$ 5,000,000.00		8,600	1,190	13,240	790	13,700	890	0.57
	US 385	Chadron	Rest Area/Visitor Center	Truck Parking	2034				74.8					1.00	$ 5,000,000.00	$ 5,000,000.00	$ 330,000.00	3,980	510	4,860	640	7,930	1,090	0.47
1	US 26	Mitchell	Relief Routes		2037				62.1			4.00			$ 5,000,000.00	$ 20,000,000.00		8,910	730	14,180	530	14,540	580	0.52
6	NE 71	Colorado Border to I-80	4-Lane	Roadway	2037	Asphalt	Very Good		44.2	0.00	15.00	15.00			$ 3,000,000.00	$ 45,000,000.00	$ -	1,420	300	1,500	310	2,660	910	0.17
																$ 95,000,000.00	**$ 629,776.00**							

20 Year Plan (2015 to 2035) =	**$ 538,450,000.00**
New Maintenance & Operation Costs for Project Program=	**$ 26,601,148.00**

Group 5 (2040+)																								
	US 385	L62A to Alliance	Reconstruct NB Lanes	Roadway		Asphalt	Good			85.00	107.00	22.00	0.00		$ 3,000,000.00	$ 66,000,000.00		3,400	480	4,160	500	4,990	600	0.40
5	US 385	Alliance to L7E (Hemingford)	Reconstruct NB Lanes	Roadway		Asphalt	Good		51.8	110.00	126.00	16.00			$ 3,000,000.00	$ 48,000,000.00		2,590	210	2,720	220	4,200	410	0.30
5	US 385	L7E (Hemingford) to Chadron St P	Reconstruct NB Lanes	Roadway		Asphalt	Very Good		71.9	132.00	154.00	22.00			$ 3,000,000.00	$ 66,000,000.00		1,960	310	2,060	320	3,700	620	0.23
5	US 385	Chadron to S Edge of Chadron St F	Reconstruct NB Lanes	Roadway		Asphalt	Very Good		188.3	154.00	168.00	14.00			$ 3,000,000.00	$ 42,000,000.00		3,410	250	3,580	260	4,880	550	0.40

(#) Projects included in NDOR's Current STP Program

Total Project Summary = $ 760,450,000.00

							Project Ranking Scores								
							Relative Weights								
							18	16	16	12	10	8	7	7	6	
Travel Demand Priority	**Highway**	**Segment**	**Improvement**	**Type**	**Completion Year**	**Pavement Type**	**Truck AADT**	**Accidents**	**Existing Pavement Condition**	**Multi-Modal Connectivity**	**System Connectivity**	**Total Forecast AADT**	**Travel Time Savings**	**Cost Per Vehicle Mile**	**V/C**	**Overall Project Group Score**
Group 1 (2015 to 2020)																
	US 385	Intersection with NE 20 (East)	Intersection Improvements	Safety	2017		0.25	0.27	0.35	0.15	0.03	0.14	0.12	0.05	0.06	
4	US 385	L62A to Alliance	4-Lane Roadway	Roadway	2019	Asphalt	3.03	1.94	2.23	0.61	0.25	0.93	0.70	0.29	0.89	
5	US 385	Alliance to Chadron	Super 2 Facility - Add Passing Lanes	Roadway	2020	Asphalt	1.48	1.68	1.29	0.18	0.05	0.65	0.11	0.55	0.53	
	US 26	In Scottsbluff @ 5th Avenue	Pedestrian Overpass	Safety	2020		0.21	0.39	0.20	0.15	0.12	0.10	0.08	0.08	0.08	
7	US 385	Chadron to SD	4-Lane	Roadway	2022	Asphalt	1.10	0.68	1.62	0.44	0.14	0.54	0.36	0.59	0.31	
	US 26	L79E Intersection (Minatare)	Intersection Improvements	Safety	2017		0.29	0.66	0.35	0.24	0.15	0.16	0.14	0.12	0.17	
	NE 71	I-80	Extend Bypass to NE 71 to the south		2022		0.27	0.30	0.39	0.90	1.17	0.06	0.05	0.24	0.06	**38**
6	NE 71	Colorado Border to I-80	Super 2 Facility (4-Lane Design Criteria)	Roadway	2021	Asphalt	0.43	0.11	0.33	0.24	0.72	0.11	0.09	0.68	0.08	
	NE 71	Clean Harbors (South of Kimball)	Intersection Improvement	Safety	2020		0.16	0.00	0.24	0.25	0.42	0.05	0.04	0.34	0.05	
	NE 71	I-80 (MP 22) Interchange	Rest Area/Visitor Center	Truck Parking	2022		1.86	2.13	1.18	1.08	1.40	0.97	0.85	0.31	0.18	
	ITS Improvements															
Group 2 (2020 to 2025)																
3	L62A	US26 to US 385	4-Lane Roadway	Roadway	2022	Concrete	1.00	0.43	0.81	5.81	3.42	0.93	0.95	0.24	0.23	
5	US 385	Alliance to L7E (Hemingford)	4-Lane	Roadway	2027	Asphalt	0.65	0.50	0.73	0.51	0.11	0.38	0.29	0.25	0.33	
5	US 385	Alliance to L7E (Hemingford)	Bridge Widening of Existing Grade Separation (NE 2)	Roadway	2027		2.16	1.92	1.92	1.44	1.20	0.96	0.84	0.84	0.72	
1	US 26	Wyoming State Line to Morrill	4-Lane Roadway	Roadway	2024	Concrete	0.78	0.89	0.47	0.66	0.50	0.58	1.51	0.22	0.36	**32**
1	US 26	Mitchell	Safety and Traffic Operation Improvements		2026		0.23	0.00	0.20	0.15	0.12	0.10	0.09	0.09	0.07	
1	US 26	Morrill Relief Route	Safety and Traffic Operation Improvements		2027		0.67	0.00	0.39	0.00	0.00	0.33	0.29	0.05	0.17	
	ITS Improvements															
Group 3 (2025 to 2030)																
5	US 385	L7E (Hemingford) to Chadron St Park	4-Lane	Roadway	2032	Asphalt	1.31	0.72	1.00	0.33	0.09	0.46	0.23	0.33	0.34	
2	US 26	Minatare to L62A intersection	4-Lane Roadway	Roadway	2027	Asphalt w/ Con. Base	1.07	1.38	0.91	0.72	0.76	0.52	1.56	0.11	0.54	**16**
2	US 26	Minatare	Safety and Traffic Operation Improvements		2028		0.38	0.00	0.39	0.00	0.00	0.15	0.13	0.41	0.20	
5	US 385	Chadron to S Edge of Chadron St Park	4-Lane	Roadway	2032	Asphalt	0.67	2.09	0.95	0.32	0.08	0.39	0.18	0.19	0.38	

Group 4 (2030 to 2035)																
7	US 385	Chadron	Relief Routes		2033		0.23	1.26	0.39	0.58	0.06	0.11	0.10	0.12	0.13	
	US 26	Intersection with NE 71	Interchange		2035		0.63	0.24	0.24	0.24	0.15	0.25	0.21	0.00	0.17	
	US 385	Chadron	Rest Area/Visitor Center	Truck Parking	2034		0.80	0.23	1.18	0.69	0.08	0.21	0.19	0.72	0.71	**14**
1	US 26	Mitchell	Relief Routes		2037		0.67	0.42	0.39	0.00	0.00	0.33	0.29	0.05	0.18	
6	NE 71	Colorado Border to I-80	4-Lane	Roadway	2037	Asphalt	0.87	0.22	0.68	0.49	1.46	0.23	0.19	0.46	0.17	

Group 5 (2040+)						
	US 385	L62A to Alliance	Reconstruct NB Lanes	Roadway		Asphalt
5	US 385	Alliance to L7E (Hemingford)	Reconstruct NB Lanes	Roadway		Asphalt
5	US 385	L7E (Hemingford) to Chadron St Park	Reconstruct NB Lanes	Roadway		Asphalt
5	US 385	Chadron to S Edge of Chadron St Park	Reconstruct NB Lanes	Roadway		Asphalt

Appendix C

Heartland Expressway

20-Year Program Estimated Project Costs

APPENDIX C:
Heartland Expressway 20-Year Program

20-Year Plan Estimated Project Costs

Heartland Expressway
Project Priority Groupings
20-Year Plan Estimated Project Costs (2015 to 2035)

Highway	Segment	Improvement	Type	Total Project Cost	Project Development, Engineering, & Const. Engineering (16% of Tot. Proj. Cost)	Utility Cost (3% of Tot. Proj. Cost)	ROW Cost (3% of Tot. Proj. Cost)	Construction Cost (78% of Tot. Proj. Cost)
Group 1 (2015 to 2020)								
US 385	Intersection with NE 20 (East)	Intersection Improvements	Safety	$ 800,000.00	$ 128,000.00	$ 24,000.00	$ 24,000.00	$ 624,000.00
US 385	L62A to Alliance	4-Lane Roadway	Roadway	$ 66,000,000.00	$ 10,560,000.00	$ 1,980,000.00	$ 1,980,000.00	$ 51,480,000.00
US 385	Alliance to Chadron	Super 2 Facility - Add Passing Lanes	Roadway	$ 2,250,000.00	$ 360,000.00	$ 67,500.00	$ 67,500.00	$ 1,755,000.00
US 26	In Scottsbluff @ 5th Avenue	Pedestrian Overpass	Safety	$ 1,000,000.00	$ 160,000.00	$ 30,000.00	$ 30,000.00	$ 780,000.00
US 385	Chadron to SD	4-Lane	Roadway	$ 48,000,000.00	$ 7,680,000.00	$ 1,440,000.00	$ 1,440,000.00	$ 37,440,000.00
US 26	L79E Intersection (Minatare)	Intersection Improvements	Safety	$ 150,000.00	$ 24,000.00	$ 4,500.00	$ 4,500.00	$ 117,000.00
NE 71	I-80	Extend Bypass to NE 71 to the south		$ 18,000,000.00	$ 2,880,000.00	$ 540,000.00	$ 540,000.00	$ 14,040,000.00
NE 71	Colorado Border to I-80	Super 2 Facility (4-Lane Design Criteria)	Roadway	$ 15,000,000.00	$ 2,400,000.00	$ 450,000.00	$ 450,000.00	$ 11,700,000.00
NE 71	Clean Harbors (South of Kimball)	Intersection Improvement	Safety	$ 250,000.00	$ 40,000.00	$ 7,500.00	$ 7,500.00	$ 195,000.00
NE 71	I-80 (MP 22) Interchange	Rest Area/Visitor Center	Truck Parking	$ 5,000,000.00	$ 800,000.00	$ 150,000.00	$ 150,000.00	$ 3,900,000.00
ITS Improvements				$ 2,820,000.00	$ 197,400.00	$ -	$ -	$ 2,622,600.00
		Group 1 Total Project Cost =		**$ 159,270,000.00**				

Highway	Segment	Improvement	Type	Total Project Cost	Project Development, Engineering, & Const. Engineering (16% of Tot. Proj. Cost)	Utility Cost (3% of Tot. Proj. Cost)	ROW Cost (3% of Tot. Proj. Cost)	Construction Cost (78% of Tot. Proj. Cost)
Group 2 (2020 to 2025)								
L62A	US26 to US 385	4-Lane Roadway (4-Lanes New Pavement)	Roadway	$ 40,000,000.00	$ 6,400,000.00	$ 1,200,000.00	$ 1,200,000.00	$ 31,200,000.00
US 385	Alliance to L7E (Hemingford)	4-Lane	Roadway	$ 48,000,000.00	$ 7,680,000.00	$ 1,440,000.00	$ 1,440,000.00	$ 37,440,000.00
US 385	Alliance to L7E (Hemingford)	Bridge Widening of Existing Grade Separation (NE 2)	Roadway	$ 3,000,000.00	$ 480,000.00	$ 90,000.00	$ 90,000.00	$ 2,340,000.00
US 26	Wyoming State Line to Morrill	4-Lane Roadway	Roadway	$ 21,000,000.00	$ 3,360,000.00	$ 630,000.00	$ 630,000.00	$ 16,380,000.00
US 26	Mitchell	Safety and Traffic Operation Improvements		$ 1,000,000.00	$ 160,000.00	$ 30,000.00	$ 30,000.00	$ 780,000.00
US 26	Morrill	Safety and Traffic Operation Improvements		$ 20,000,000.00	$ 3,200,000.00	$ 600,000.00	$ 600,000.00	$ 15,600,000.00
ITS Improvements				$ 850,000.00	$ 59,500.00	$ -	$ -	$ 790,500.00
		Group 2 Total Project Cost =		**$ 133,850,000.00**				

Heartland Expressway
Project Priority Groupings
20-Year Plan Estimated Project Costs (2015 to 2035)

Highway	Segment	Improvement	Type	Total Project Cost	Project Development, Engineering, & Const. Engineering (16% of Tot. Proj. Cost)	Utility Cost (3% of Tot. Proj. Cost)	ROW Cost (3% of Tot. Proj. Cost)	Construction Cost (78% of Tot. Proj. Cost)
Group 3 (2025 to 2030)								
US 385	L7E (Hemingford) to Chadron St Park	4-Lane	Roadway	$ 66,000,000.00	$ 10,560,000.00	$ 1,980,000.00	$ 1,980,000.00	$ 51,480,000.00
US 385	Chadron to S Edge of Chadron St Park	4-Lane	Roadway	$ 42,000,000.00	$ 6,720,000.00	$ 1,260,000.00	$ 1,260,000.00	$ 32,760,000.00
US 26	Minatare to L62A intersection	4-Lane Roadway (4-Lane of New Pavement)	Roadway	$ 45,000,000.00	$ 7,200,000.00	$ 1,350,000.00	$ 1,350,000.00	$ 35,100,000.00
US 26	Minatare	Safety and Traffic Operation Improvements		$ 1,000,000.00	$ 160,000.00	$ 30,000.00	$ 30,000.00	$ 780,000.00
		Group 3 Total Project Cost =		**$ 154,000,000.00**				

Highway	Segment	Improvement	Type	Total Project Cost	Project Development, Engineering, & Const. Engineering (16% of Tot. Proj. Cost)	Utility Cost (3% of Tot. Proj. Cost)	ROW Cost (3% of Tot. Proj. Cost)	Construction Cost (78% of Tot. Proj. Cost)
Group 4 (2030 to 2035)								
US 385	Chadron	Relief Routes		$ 20,000,000.00	$ 3,200,000.00	$ 600,000.00	$ 600,000.00	$ 15,600,000.00
US 26	Intersection with NE 71	Interchange		$ 5,000,000.00	$ 800,000.00	$ 150,000.00	$ 150,000.00	$ 3,900,000.00
US 385	Chadron	Rest Area/Visitor Center	Truck Parking	$ 5,000,000.00	$ 800,000.00	$ 150,000.00	$ 150,000.00	$ 3,900,000.00
US 26	Mitchell Relief Route	Safety and Traffic Operation Improvements		$ 20,000,000.00	$ 3,200,000.00	$ 600,000.00	$ 600,000.00	$ 15,600,000.00
NE 71	Colorado Border to I-80	4-Lane	Roadway	$ 45,000,000.00	$ 7,200,000.00	$ 1,350,000.00	$ 1,350,000.00	$ 35,100,000.00
		Group 4 Total Project Cost =		**$ 95,000,000.00**				

Total 20-Year Plan Estimated Project Costs (2015 to 2035) = $ 542,120,000.00

APPENDIX C:
Heartland Expressway 20-Year Program

Estimated Costs for Maintenance and Operations

Heartland Expressway
Project Priority Groupings
Program Maintenance and Operations Costs

Assumptions:

Base Year =	2012	
Study End Year =	2037	(Study Project Completion Date)
Total Years =	25	
Existing Maintenance and Operations Cost ($/Lane Mile/Year) =	$4,684	
New Pavement Maintenance (Joint Sealing) ($/Lane Mile/Year) =	$1,560	($12,500 per lane mile every eight years)
Existing POP Maintenance ($/Lane Mile/Year) =	$11,042	

Highway	Segment	Improvement	Type	Completion Year	Distance (miles)	Existing No. Lanes	Number of Years	Existing Yearly Maintenance & Operations Cost ($4,684/Lane Mile/Year)	Existing POP Maintenance ($11,042/Lane Mile/Year)	No. New Lanes	Number of Years	Additional Lanes Yearly Maint/Ops Costs ($4,684/Lane Mile/Year)	Number of Times	Joint Sealing New Pavement ($12,500/Lane Mile/ 8 Years)	Total Project (Existing and New Pavement) Maintenance & Operations Costs	New Pavement Maintenance and Operations Costs
Group 1 (2015 to 2020)																
US 385	L62A to Alliance	4-Lane Roadway, 2 Existing Lanes, 2 New Lanes	Roadway	2019	22	2	25	$ 5,152,400	$ 12,146,200	2	18	$ 3,709,728	2	$ 1,100,000	$ 22,108,328	$ 4,809,728
US 385	Alliance to Chadron	Super 2 - Add Passing Lanes, 3 Loc's, 12 Lane-Miles Total	Roadway	2020	58	2	25	$ 13,583,600	$ 32,021,800		17	$ 955,536		$ -	$ 46,560,936	$ 955,536
US 385	Chadron to SD	4-Lane, 2 Existing Lanes, 2 New Lanes	Roadway	2022	16	2	25	$ 3,747,200	$ 8,833,600	2	15	$ 2,248,320	2	$ 800,000	$ 15,629,120	$ 3,048,320
NE 71	I-80	Extend Bypass to NE 71 to the south, 4 New Lanes	Roadway	2022	3	0	0	$ -	$ -	4	15	$ 843,120	2	$ 300,000	$ 1,143,120	$ 1,143,120
NE 71	Colorado Border to I-80	Super 2 - Build 2 New Lanes, (PCC)	Roadway	2021	15	2	9	$ 1,264,680	$ 2,981,340	2	16	$ 2,248,320	2	$ 750,000	$ 7,244,340	$ 2,998,320
NE 71	I-80 (MP 22) Interchange	Rest Area/Visitor Center, Joint EB-WB	Truck Parking	2022			0		$ -		15	$ 110,000			$ 1,650,000	$ 1,650,000
ITS Improvements												$ 423,000			$ 423,000	$ 423,000
								$ 23,747,880	$ 55,982,940			$ 10,538,024		$ 2,950,000	**$ 94,758,844**	**$ 15,028,024**

Heartland Expressway
Project Priority Groupings
Program Maintenance and Operations Costs

Highway	Segment	Improvement	Type	Completion Year	Distance (miles)	Existing No. Lanes	Number of Years	Existing Yearly Maintenance & Operations Cost ($4,684/Lane Mile/Year)	Existing POP Maintenance ($11,042/Lane Mile/Year)	No. New Lanes	Number of Years	Additional Lanes Yearly Maint/Ops Costs ($4,684/Lane Mile/Year)	Number of Times	Joint Sealing New Pavement ($12,500/Lane Mile/ 8 Years)	Total Project (Existing and New Pavement) Maintenance & Operations Costs	New Pavement Maintenance and Operations Costs
Group 2 (2020 to 2025)																
L62A	US26 to US 385	4-Lane Roadway, (4-Lanes New PCC)	Roadway	2022	8	2	10	$ 749,440	$ 1,766,720	4	15	$ 2,248,320	2	$ 800,000	$ 5,564,480	$ 3,048,320
US 385	Alliance to L7E (Hemingford)	4-Lane, 2 Existing Lanes, 2 New Lanes	Roadway	2027	16	2	25	$ 3,747,200	$ 8,833,600	2	10	$ 1,498,880	1	$ 400,000	$ 14,479,680	$ 1,898,880
US 26	Wyoming State Line to Morrill	4-Lane, 2 Existing Lanes, 2 New Lanes	Roadway	2024	7	2	25	$ 1,639,400	$ 3,864,700	2	13	$ 852,488	2	$ 350,000	$ 6,706,588	$ 1,202,488
US 26	Mitchell	Safety and Traffic Operation Improvements		2026	1	4	25	$ 468,400	$ 1,104,200	0	11	$ -		$ -	$ 1,572,600	$ -
US 26	Morrill Relief Route	Safety & Traffic Op. Improv's, 4 New Lanes	Roadway	2027	4	0		$ -	$ -	4	10	$ 749,440	1	$ 200,000	$ 949,440	$ 949,440
ITS Improvements												$ 127,500			$ 127,500	$ 127,500
								$ 6,604,440	$ 15,569,220			$ 5,476,628		$ 1,750,000	**$ 29,400,288**	**$ 7,226,628**

Highway	Segment	Improvement	Type	Completion Year	Distance (miles)	Existing No. Lanes	Number of Years	Existing Yearly Maintenance & Operations Cost ($4,684/Lane Mile/Year)	Existing POP Maintenance ($11,042/Lane Mile/Year)	No. New Lanes	Number of Years	Additional Lanes Yearly Maint/Ops Costs ($4,684/Lane Mile/Year)	Number of Times	Joint Sealing New Pavement ($12,500/Lane Mile/ 8 Years)	Total Project (Existing and New Pavement) Maintenance & Operations Costs	New Pavement Maintenance and Operations Costs
Group 3 (2025 to 2030)																
US 385	L7E (Hemingford) to Chadron St Pk.	4-Lane, 2 Existing Lanes, 2 New Lanes	Roadway	2032	22	2	25	$ 5,152,400	$ 12,146,200	2	5	$ 1,030,480	1	$ 550,000	$ 18,879,080	$ 1,580,480
US 26	Minatare to L62A intersection	4-Lane Roadway (4-Lanes New PCC)	Roadway	2027	9	2	15	$ 1,264,680	$ 2,981,340	4	10	$ 1,686,240	1	$ 450,000	$ 6,382,260	$ 2,136,240
								$ 6,417,080	$ 15,127,540			$ 2,716,720		$ 1,000,000	**$ 25,261,340**	**$ 3,716,720**

Heartland Expressway
Project Priority Groupings
Program Maintenance and Operations Costs

Highway	Segment	Improvement	Type	Completion Year	Distance (miles)	Existing No. Lanes	Number of Years	Existing Yearly Maintenance & Operations Cost ($4,684/Lane Mile/Year)	Existing POP Maintenance ($11,042/Lane Mile/Year)	No. New Lanes	Number of Years	Additional Lanes Yearly Maint/Ops Costs ($4,684/Lane Mile/Year)	Number of Times	Joint Sealing New Pavement ($12,500/Lane Mile/ 8 Years)	Total Project (Existing and New Pavement) Maintenance & Operations Costs	New Pavement Maintenance and Operations Costs
Group 4 (2030 to 2035)																
US 385	Chadron Relief Route	Safety & Traffic Op. Improv's, 4 New Lanes		2033	4	0	0	$ -	$ -	4	4	$ 299,776	0	$ -	$ 299,776	$ 299,776
US 385	Chadron to S Edge of Chadron St Park	4-Lane, 2 Existing Lanes, 2 New Lanes	Roadway	2032	14	2	25	$ 3,278,800	$ 7,729,400	2	5	$ 655,760	1	$ 350,000	$ 12,013,960	$ 1,005,760
US 385	Chadron	Rest Area/Visitor Center	Truck Parking	2034			0		$ -		3	$ 110,000			$ 330,000	$ 330,000
NE 71	Colorado Border to I-80	4-Lane, 2 Existing Lanes (2021) & 2 New Lanes, (PCC)	Roadway	2037	15	0	0	$ -	$ -	2	0	$ -	0	$ -	$ -	$ -
								$ 3,278,800	$ 7,729,400			$ 1,065,536		$ 350,000	**$ 12,643,736**	**$ 1,635,536**

All Groups Existing Yearly Maintenance & Operations Cost	All Groups Existing POP Maintenance
$ 40,048,200	**$ 94,409,100**

All Groups Total Project (Existing and New Pavement) Maintenance and Operations Costs	All Groups New Pavement Maintenance and Operations Costs
$ 162,064,208	**$ 27,606,908**

Heartland Expressway
Project Priority Groupings
Program Maintenance and Operations Costs

Highway	Segment	Improvement	Type	Completion Year	Distance (miles)	Existing No. Lanes	Number of Years	Existing Yearly Maintenance & Operations Cost ($4,684/Lane Mile/Year)	Existing POP Maintenance ($11,042/Lane Mile/Year)	No. New Lanes	Number of Years	Additional Lanes Yearly Maint/Ops Costs ($4,684/Lane Mile/Year)	Number of Times	Joint Sealing New Pavement ($12,500/Lane Mile/ 8 Years)	Total Maintenance & Operation Costs
Existing 4-Lane Sections of Heartland Expressway Corridor															
US 26	Morrill to Minatare	Existing 4-Lanes (PCC)	Roadway		26	4	25	$ 12,178,400	$ 28,709,200			$ -	1	$ -	$ 40,887,600
NE 71	Kimball to Scottsbluff	Existing 4-Lanes (PCC)	Roadway		47	4	25	$ 22,014,800	$ 51,897,400			$ -	0	$ -	$ 73,912,200
								$ 34,193,200	$ 80,606,600						$ 114,799,800

Existing 4-Lane Maintenance and Operations Costs
$ 114,799,800

Summary Table

Existing Pavement Maintenance and Operations Costs =	$ 249,257,100
New Pavement Maintenance and Operations Costs =	$ 27,606,908
Total Project (Existing and New Pavement) Maintenance & Operations Costs =	$ 276,864,008

Appendix D
Economics Analysis

APPENDIX D:
Benefit Cost Analysis (BCA) and Economic Impact Analysis Technical Memoranda

The Economic Analysis chapter of the Heartland Expressway Corridor Development and Management Plan (CDMP) was prepared based on a formal Benefit Cost Analysis (BCA) and a detailed Economic Impacts Analysis (EIA).

The BCA considers the potential net benefits attributable to the project, i.e. those differences between an Improvement Case (with project) and Base Case (no build, or without project), adjusted for any transfers in comparison to project costs. These economic benefits include transportation and operational savings, including travel time, accident reductions, and pavement cost savings, as well broader economic benefits, including inventory gains. The BCA only considers direct impacts (those first-level impacts that result from the construction and operation of the project); and therefore, does not include any multiplier effects (i.e. indirect and induced impacts).

By contrast, the EIA focuses on the elements that are typically included in an environmental document, such as construction jobs created and sustained, operations and maintenance jobs created and sustained, and potential economic development impacts. The EIA examines what changes because of the project's construction and implementation and who would be affected by this change, regardless of whether they are a transfer or net incremental change.

A technical memorandum presents each analysis. The findings were combined and included as Chapter 5 of the Heartland CDMP. The BCA and EIA Technical Memoranda are each included in this appendix in their entirety. Following the format of Chapter 5 of the CDMP, the BCA Technical Memorandum is presented first and is followed by the EIA Technical Memorandum.

Technical Memorandum:
Summary of the Benefit Cost Analysis for the Heartland Expressway Corridor in Nebraska

Date: August 24, 2012

For: Nebraska Department of Roads (NDOR)

Introduction

The benefit cost analysis considers the potential net benefits attributable to the Heartland Expressway project in Nebraska, i.e. those differences between an Improvement Case (with project) and Base Case (no build, or without project) adjusted for any transfers. For this study, four improvement scenarios are being evaluated:

1. Heartland Expressway Corridor improvements
2. Heartland Expressway Corridor improvement with Intensified Energy Resource Development Activity
3. Entire Ports to Plains (PTP) Corridor improvements
4. Entire PTP Corridor improvements with Intensified Energy Resource Development Activity

The benefits associated with these improvement scenarios include transportation and operational savings, including travel time, accident reductions, and pavement cost savings, as well broader economic benefits, including inventory gains. It is important to note that the economic benefit analysis only considers direct impacts (those first-level impacts that result from the construction and operation of the project); and therefore, does not include any multiplier effects (i.e. indirect and induced impacts).

The benefit stream estimated as part of the benefit cost analysis is converted to present values using real discount rates of 7% and 3% and is then compared to the discounted project capital and operating costs. Discounting is important because a dollar 10 years from now is not worth the same as a dollar today. The dollar today could be invested and return more than a dollar 10 years from now (excluding inflationary impacts). As a result, benefits and costs that are experienced today are more valuable than the benefits and costs expected in 10 years. Projects expecting to use federal funding are required to use a 7% discount rate (on real dollars, in this analysis $2012)[1]; however, given the interest rates of the last few years, the results are also shown with a 3% discount rate. Presenting the results with both a 3% and 7% discount rate, as recommended in the US DOT TIGER BCA guidance, allows for a relative comparison and demonstrates the sensitivity of the results to the discount rate applied.

The analysis period for this study is 2016 through 2054. It extends to 2054 to account for 20 years of benefits after the completion of the last segment of the Heartland Expressway Corridor improvements. The results of this analysis generate a benefit cost ratio, indicating whether or not the Heartland Expressway Corridor benefits in Nebraska exceed Nebraska's costs.

[1] The analysis discounts future benefits using a real discount rate of 7% following guidance from OMB in Circulars A-4 and A-94.(http://www.whitehouse.gov/omb/circulars/)

Study Area

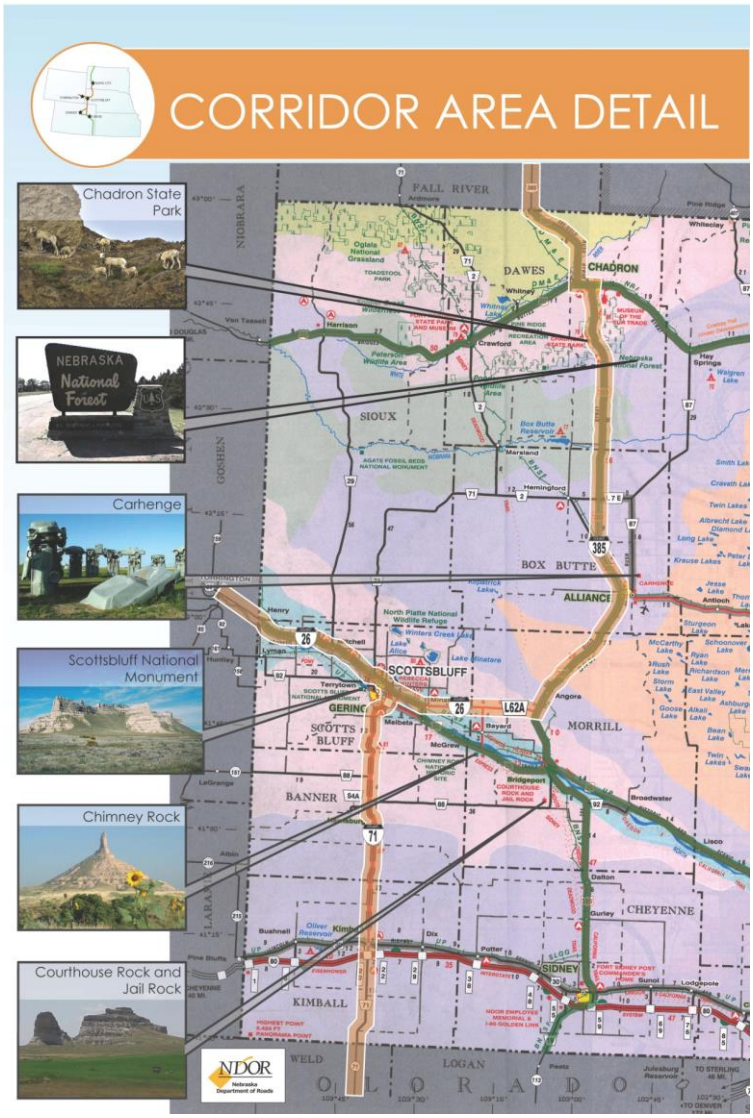
The Heartland Expressway Corridor, as shown below in **Figure 1**, generally follows:

- NE 71 from the border between the States of Colorado and Nebraska to Scottsbluff;
- US 26 from the border of the States of Nebraska and Wyoming to Scottsbluff.
- US 26 from Scottsbluff to the intersection with State Highway L62A;
- NE L62A from the intersection with US 26 to the intersection with US 385;
- US 385 to the border between the States of Nebraska and South Dakota.

The majority of the corridor is a two-lane undivided roadway that allows for passing when the driver feels it is safe. The roadways in the corridor are summarized below:

- NE 71 from Colorado/Nebraska state line to beginning of four-lane divided roadway north of Kimball, passing is allowed 95% of the time, except when driving through Kimball.
- US 26 from Wyoming/Nebraska state line to beginning of four-lane divided roadway east of Morrill, passing is allowed 75% of the time, except when driving through Henry and Morrill.
- NE 62A from US 26 to US 385, passing is allowed 75% of the time.
- US 385 from NE 62A to South Dakota/Nebraska state line, passing is allowed 75% of the time, except adjacent to Alliance, south of Chadron and through Chadron city limits. There are also two passing lanes on southbound US 385 south of Chadron as the roadway travels through Nebraska National Forest.

Figure 1: Map of the Heartland Expressway Corridor



Transportation Benefits

This section describes the transportation benefits that may occur as a result of the transportation infrastructure improvements along Nebraska's portion of the Heartland Expressway Corridor. Typically, these benefits are comprised of *travel time savings*, which may occur as motorists experience reduced travel times; *increased safety*, which may occur as the number of accidents that take place on the corridor are reduced; and *operating cost savings* that may occur as the distances driven by motorists on parallel facilities are reduced.

The travel time savings benefits are estimated for both commercial (truck) and non-commercial (non-truck) traffic. These benefits are calculated using estimated increases in travel speeds resulting from improved transportation infrastructure and the value of the time saved. The improved safety benefits are calculated by first estimating the accident avoidance that may occur as a result of improved transportation infrastructure, and then by estimating the cost of those avoided accidents. Because improvements along the corridor typically involve expansion from

two-lane facilities to four-lane facilities, it is assumed that there are no operating cost benefits for travelers. However, there would be operating cost savings associated with reduced maintenance costs for parallel roadways as travelers divert to the Heartland Expressway Corridor, thereby reducing the pavement wear and tear on parallel roadways. As a result, the transportation benefits associated with Heartland Expressway Corridor improvements in Nebraska are comprised of travel time, accident reduction, and pavement cost savings only.

Travel Time Savings

The reduction in travel times for autos and trucks that could be expected in 2035 due to the improved transportation infrastructure along Nebraska's portion of the Heartland Expressway Corridor was calculated and provided by AECOM[2]. This section uses the forecasted 2035 travel time savings to calculate the annual time saved for:

1. ***Existing users –*** those vehicles and passengers currently using the Heartland Corridor roadways without the improvements
2. ***Diverted users –*** those vehicles and passengers currently using parallel routes who divert to the improved Heartland Corridor roadways

These travel time savings are valued according to whether the time is saved by auto travelers or truck drivers; therefore, results are presented for both auto and truck traffic. The analysis begins with the calculation of travel time savings for existing users and is followed by the diverted user travel time savings.

Existing Traffic

Existing users of the Nebraska portion of the Heartland Expressway Corridor would experience a travel time savings associated with the improvement in speed and efficiency achieved with the transportation investments. The daily vehicle hours saved for each improvement scenario in comparison to the no build scenario in 2035 was estimated by AECOM and is summarized below in **Table 1**[3].

Table 1: Daily Vehicle and Truck Travel Time Savings for Existing Users in 2035 (Hours)

Users	Heartland		Heartland & Intensified Energy		Entire PTP		Entire PTP & Intensified Energy	
	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours
NE Background Traffic (Regardless or Improvements	2,451	761	2,422	752	2,431	755	2,375	737

Source: AECOM Travel Model

The vehicle time savings shown in **Table 1** assumes that all Heartland Expressway Corridor improvements in Nebraska are complete; therefore, the time saved between 2017 (year the first project is completed) and 2035 was interpolated assuming that the time saved increases equally

[2] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.
[3] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.

in each year until 2035. Additionally, for each year after 2035, the time savings were projected to increase 1% per year (conservatively less than the 1.5% forecasted growth in VMT) because the Heartland Corridor Expressway route is not expected to be capacity constrained and VMT is projected to increase.

The daily time savings in each year were then converted to annual hours saved by multiplying the daily numbers by 365 days per year. In addition, for auto travelers (total hours less truck hours) the annual vehicle hours saved were converted to annual passenger hours saved by multiplying hours saved by the average vehicle occupancy rate (1.67)[4].

The value of the annual passenger hours saved in each year for both autos and trucks was then estimated using US Department of Transportation (US DOT) departmental guidance on the value of time[5]. For truck drivers, the value of time is $25.57 ($2012) per hour. For auto travel, the all purpose values of time are different for intercity travel and local travel. Therefore, the analysis assumes that 73% of the time saved is associated with intercity travel and 27% is associated with local travel. This assumption is based on the distribution of rural VMT by functional class from the Bureau of Transportation Statistics for 2010. The resulting value of time for auto travel is $17.10 ($2012) per hour. **Table 2** summarizes the total discounted existing traveler time savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

Table 2: Value of Travel Time Savings for Existing Users between 2016 and 2054 ($2012M)

Scenarios	Auto	Truck	Total
Heartland			
Discounted @ 7%	$ 100.3	$ 40.5	$ 140.8
Discounted @ 3%	$ 247.7	$ 100.0	$ 347.7
Heartland & Intensified Energy Resource Development			
Discounted @ 7%	$ 99.1	$ 40.0	$ 139.1
Discounted @ 3%	$ 244.8	$ 98.8	$ 343.6
Entire P2P			
Discounted @ 7%	$ 99.5	$ 40.2	$ 139.6
Discounted @ 3%	$ 245.7	$ 99.2	$ 344.9
Entire P2P & Intensified Energy Resource Development			
Discounted @ 7%	$ 97.2	$ 39.2	$ 136.4
Discounted @ 3%	$ 240.1	$ 96.8	$ 336.9

Source: AECOM

Diverted Traffic

In addition to the time savings for existing users, a reduction in travel times also would occur for those users who divert to the Heartland Expressway Corridor from other parallel roads. These users divert to the improved Heartland Corridor due to the faster average speeds achievable on the improved roadway in comparison to their existing route. The diverted daily vehicle hours saved for each improvement scenario in comparison to the no build scenario in 2035 was estimated by AECOM and is summarized below in **Table 3**[6].

[4] The average vehicle occupancy is for all passenger vehicles and all trip purposes from the 2009 National Household Travel Survey.

[5] US DOT, *Revised Departmental Guidance on the Valuation of Travel Time in Economic Analysis*, Table 3, September 28, 2011.

[6] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.

Table 3: Daily Vehicle and Truck Travel Time Savings for Diverted Users in 2035 (Hours)

Users	Heartland		Heartland & Intensified Energy Resource Development		Entire P2P		Entire P2P & Intensified Energy Resource Development	
	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours	Total Hours	Truck Hours
Current CO Users Diverted to Improved Heartland Corridor in NE	2	2	2	2	2	2	2	2
Current WY Users Diverted to Improved Heartland Corridor in NE	11	2	10	2	11	2	10	2
Current NE Users Diverted to Improved Heartland in NE	6	4	6	4	6	4	6	3
Current Outside the Model Users Diverted to Improved Heartland Corridor in NE	-	-	-	-	419	82	381	74
Total Daily Hours Saved	**19**	**8**	**18**	**8**	**438**	**90**	**399**	**81**

Source: AECOM Travel Model

The vehicle time savings shown in **Table 3** assumes that all Heartland Expressway Corridor improvements in Nebraska are complete, therefore, the time saved between 2017 (year the first project is completed) and 2035 was interpolated assuming that the time saved increases equally in each year until 2035. Additionally, for each year after 2035, the time savings were projected to increase 1% per year (conservatively less than the 1.5% forecasted growth in VMT) because the Heartland Corridor Expressway route is not expected to be capacity constrained and VMT is projected to increase.

The daily time savings in each year were then converted to annual hours saved by multiplying the daily numbers by 365 days per year. In addition, for auto travelers (total hours less truck hours) the annual vehicle hours saved were converted to annual passenger hours saved by multiplying hours saved by the average auto vehicle occupancy rate (1.67)[7].

The value of the annual passenger hours saved in each year for both autos and trucks was then estimated using US DOT departmental guidance on the value of time[8], as described in the Existing Traffic Travel Time Savings section. **Table 4** summarizes the total discounted diverted traveler time savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

[7] The average vehicle occupancy is for all passenger vehicles and all trip purposes from the 2009 National Household Travel Survey.
[8] US DOT, *Revised Departmental Guidance on the Valuation of Travel Time in Economic Analysis*, Table 3, September 28, 2011.

Table 4: Value of Travel Time Savings for Diverted Users between 2016 and 2054 ($2012M)

Scenarios	Auto	Truck	Total
Heartland			
Discounted @ 7%	$ 0.6	$ 0.4	$ 1.0
Discounted @ 3%	$ 1.5	$ 1.0	$ 2.5
Heartland & Intensified Energy Resource Development			
Discounted @ 7%	$ 0.6	$ 0.4	$ 1.0
Discounted @ 3%	$ 1.4	$ 1.0	$ 2.4
Entire P2P			
Discounted @ 7%	$ 20.6	$ 4.8	$ 25.4
Discounted @ 3%	$ 50.9	$ 11.8	$ 62.7
Entire P2P & Intensified Energy Resource Development			
Discounted @ 7%	$ 18.8	$ 4.3	$ 23.1
Discounted @ 3%	$ 46.4	$ 10.7	$ 57.1

Source: AECOM

Accident Reduction Savings

Another transportation benefit of the Heartland Expressway Corridor improvements is the potential to reduce the number of accidents that could occur along the corridor due to roadway widening and the introduction of Intelligent Transportation Systems (ITS) variable message boards for incident management. The reduction in accidents in the project corridor that could be expected due to these investments was determined by reviewing crash rates and crash reduction factors from the Highway Safety Manual for rural two-lane, Super 2, and four-lane divided highways. These accident rates were then assigned to the Heartland Corridor Expressway roadways in Nebraska based on their average annual daily traffic (AADT) as shown in **Table 5**.

In addition, the introduction of dynamic variable accident and speed warning signs along roadways has been shown to reduce the likelihood of injury and property damage accidents. The Heartland Expressway Corridor improvements in Nebraska include the introduction of these signs throughout the corridor, further reducing the potential for crashes. The 2007 *FHWA Desktop Reference for Crash Reduction Factors* cites a 44% reduction in injury and property damage accidents due to the operation of dynamic variable warning signs[9].

[9] FHWA, *Desktop reference for Crash Reduction Factors*, 2007, p.80.

Table 5: Accident Rates for Nebraska Heartland Corridor Roadways

Location	FATAL			INJURY			PDO		
	Rural 2-lane Roadway	Rural Super 2's	Rural 4-lane Divided Roadway	Rural 2-lane Roadway	Rural Super 2's	Rural 4-lane Divided Roadway	Rural 2-lane Roadway	Rural Super 2's	Rural 4-lane Divided Roadway
US 385									
North of Sidney	0.8	0.8	0.6	20	19	14	48	46	34
South of SH 92	0.8	0.8	0.6	20	19	14	48	46	34
South of Angora	0.8	0.8	0.6	20	18	14	48	44	34
South of Alliance	0.8	0.8	0.6	20	18	14	48	44	34
North of SH 2	0.8	0.8	0.6	20	19	14	48	46	34
South of Chadron	0.8	0.8	0.6	20	18	14	48	44	34
At SD Border	0.8	0.8	0.6	20	19	14	48	47	33
Average	**0.8**	**0.8**	**0.6**	**20**	**19**	**14**	**48**	**45**	**34**
US 26									
East of Henry	0.8	0.8	0.6	20	18	14	48	44	35
West of NE 71	0.8	0.8	0.6	20	18	15	48	44	36
East of Scottsbluff	0.8	0.8	0.6	20	18	14	48	44	35
East of Melbeta	0.8	0.8	0.6	20	19	14	48	46	34
West of Bridgeport	0.8	0.8	0.6	20	18	14	48	44	34
West of Lisco	0.8	0.8	0.6	20	19	13	48	47	33
East of Oshkosh	0.8	0.8	0.6	20	19	14	48	47	33
Average	**0.8**	**0.8**	**0.6**	**20**	**18**	**14**	**48**	**45**	**34**
NE 71									
At CO Border	0.8	0.8	0.5	20	19	13	48	47	32
South of Kimball	0.8	0.8	0.6	20	19	14	48	47	33
North of Kimball	0.8	0.8	0.6	20	19	14	48	46	34
South of Gering	0.8	0.8	0.6	20	18	14	48	44	35
North of Scottsbluff	0.8	0.8	0.6	20	19	14	48	47	33
North of SH 2	0.8	0.8	0.5	20	19	13	48	47	32
Average	**0.8**	**0.8**	**0.6**	**20**	**19**	**14**	**48**	**46**	**33**
L62A									
Use US 385 South of Angora	0.8	0.8	0.6	20	18	14	48	44	34

Source: AECOM analysis of Highway Safety Manual

In order to estimate the reduction in accidents along the Nebraska portion of the Heartland Expressway Corridor, the total number of accidents that would occur on the corridor without any improvement was first estimated. That estimate was calculated by multiplying segment specific accident rates for each portion of the Heartland Corridor (shown in **Table 5**) by the estimated annual VMT on each segment between 2016 and 2054. The AECOM travel model estimated the VMT for the Heartland Corridor roadways without the improvements in 2035, which is shown below in **Table 6**[10].

[10] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.

Table 6: Nebraska Heartland Corridor Daily VMT without Improvements in 2035

Heartland Corridor Roadways	All Scenarios	
	Total VMT	Truck VMT
US 385	375,668	41,326
US 26	266,561	13,116
NE 71	170,213	16,237
NE 71 Bypass	2,366	310
L62A	106,327	8,871
Total Daily VMT	**921,135**	**79,860**

Source: AECOM Travel Model

The VMT shown in **Table 6** is for 2035; therefore, the VMT between 2017 (year the first project is completed) and 2035 was interpolated starting with the 2010 current VMT and assuming that the VMT increases equally in each year until 2035. Additionally, for each year after 2035, the VMT were projected to increase 1.5% per year based on the historic VMT growth in the corridor region. The daily VMT in each year were then converted to annual VMT by multiplying the daily numbers by 365 days per year.

Next, the lower accident rates associated with the completion of the Super 2 and/or four-lane divided roadways and the ITS improvements were applied to the same VMT forecasts (without improvements) to determine the number of accidents that would occur on the project corridor given transportation improvements[11]. A comparison of the number of accidents with and without transportation improvement allowed the reduction in accidents due to Nebraska's Heartland Corridor investment to be calculated. The improvement start dates for each facility are summarized in **Table 7**. The roadway improvement start date is the first year following project completion, while the ITS improvement start date is the first year after the costs begin. Due to the gradual introduction of the ITS equipment, the ITS improvements assume a four-year ramp up of benefits.

Table 7: Heartland Improvement Start Dates

Heartland Corridor Roadways	Improvement Type	Start Year
US 385	4-lane	2020
	ITS	2017
US 26	4-lane	2025
	ITS	2021
NE 71	Super 2	2022
	4-lane	2037
	ITS	2019
NE 71 Bypass	4-lane	2023
L62A	4-lane	2023

Source: AECOM based on Corridor Prioritization Worksheet

[11] The number of accidents was calculated using the 2035 VMT forecast without improvements as opposed to increased VMT with transportation improvement based on FHWA guidance. In FHWA's *The Safety Effects of the Conversion of Rural Two-Lane Roadways to Four-Lane Roadways* (http://www.fhwa.dot.gov/publications/research/safety/humanfac/pdfs/99206.pdf), it was noted that the more appropriate comparison is between baseline existing and projected traffic volumes without improvement where data for all affected streets in the system were not available. This analysis was only conducted on portions of the Heartland Expressway Corridor that were to be improved.

Before estimating the economic benefit associated with a reduction in accidents, the accidents that were avoided must be distributed into types of accidents. The accident rates applied (and shown in **Table 5**) were for fatal, injury, and property damage accidents only. These crash estimates were then converted to the Maximum Abbreviated Injury Scale (MAIS) accident types in order to apply US DOT Guidance on the value of avoiding an accident. The conversion is based on the National Highway Traffic Safety Administration (NHTSA) KABCO-AIS Conversion Table (July 2011) Injury (severity unknown) and No Injury accidents as shown in **Table 8**.

Table 8: NHTSA KABCO-AIS Conversion Table

AIS Level	O - No Injury	U - Injury Severity Unknown	K - Killed
0	0.92534	0.21538	0
1	0.07257	0.62728	0
2	0.00198	0.104	0
3	0.00008	0.03858	0
4	0	0.00442	0
5	0.00003	0.01034	0
Fatal	0	0	1

Source: NHTSA, July 2011

The values shown above are projections of annual fatalities and injuries avoided, while the crash rates applied in the analysis predicted the number of fatal, injury, and property damage accidents. Since the accident crash rates do not take into account vehicle occupancy, the number of fatal and injury accidents must be multiplied by the average vehicle occupancy (1.67)[12] to estimate the number of fatalities and injuries avoided.

Based on the comparison of the number of fatalities, injuries, and property damage incidents with the improvements and without the improvements, the accident reductions for each Heartland Expressway Corridor improvement scenario were estimated. The total value of the accidents avoided is based on US DOT Guidance[13] and the NHTSA[14] estimates for the value of avoiding an accident. The values applied in this analysis are summarized below in **Table 9**.

Table 9: Value of One Person Avoiding a Crash in 2012$

AIS Level	Fraction of VSL	Unit Value (2011$)	Unit Value (2012$)
0			$ 3,375
1	0.003	$ 18,600	$ 18,859
2	0.047	$ 291,400	$ 295,458
3	0.105	$ 651,000	$ 660,065
4	0.266	$1,649,200	$1,672,164
5	0.593	$3,676,600	$3,727,795
Fatal	1.000	$6,200,000	$6,286,333

Source: US DOT and NHTSA

[12] The average vehicle occupancy is for all passenger vehicles and all trip purposes from the 2009 National Household Travel Survey.
[13] US DOT, *Treatment of the Economic Value of a Statistical Life in Departmental Analyses*, 2008 revised guidance and 2011 update.
[14] NHTSA, *The Economic Impact of Moor Vehicle Crashes*, Table A-1, 2000.

Applying the value of the fatalities, injuries, and property damages to the annual avoided crashes by type, yields the accident reduction savings associated with Nebraska's Heartland Expressway Corridor improvements. **Table 10** summarizes the total discounted accident reduction savings for the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period. The benefits are the same for all scenarios because the analysis is based on the 2035 VMT without improvements and the impacts associated with the investments made; the transportation investments made are the same for each improvement scenario.

Table 10: Value of Accident Reduction Savings between 2016 and 2054 ($2012M)

Scenarios	Total
All Scenarios	
Discounted @ 7%	$ 94.8
Discounted @ 3%	$ 226.7

Source: AECOM

Pavement Cost Savings in Neighboring States

Another transportation benefit of the Heartland Expressway Corridor improvements is the potential reduction in VMT along parallel routes, as travelers divert to Nebraska's Heartland Corridor roadways. This reduction in traffic on alternate highway routes would reduce the pavement maintenance needs on those routes. Both auto and truck traffic would be diverted to the improved Heartland Corridor; however, the pavement benefits are realized only by truck diversions because the damaged caused by autos on a rural interstate is negligible. The daily truck VMT projected to be removed from neighboring states for each scenario in comparison to the no build are shown in **Table 11** for 2035[15].

Table 11: Daily Truck VMT Removed from Neighboring States in 2035 (Net of No Build)

Users	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
Current CO Users Diverted to Improved Heartland Corridor in NE	1,766	1,724	1,737	1,656
Current WY Users Diverted to Improved Heartland Corridor in NE	1,695	1,654	1,668	1,590
Total Daily Truck VMT Removed	**3,461**	**3,378**	**3,405**	**3,246**

Source: AECOM travel model

The VMT shown in **Table 11** assumes that all Heartland Expressway Corridor improvements in Nebraska are complete, therefore, the VMT removed between 2017 (year the first project is completed) and 2035 was interpolated assuming that the VMT removed increases equally in each year until 2035. Additionally, for each year after 2035, VMT were projected to increase 1.5% per year based on the historic VMT growth in the corridor region. The daily VMT in each year were then converted to annual VMT by multiplying the daily numbers by 365 days per year.

The annual reductions in VMT from the neighboring states of Colorado and Wyoming in each of the four scenarios were multiplied by marginal pavement costs per VMT of $0.06 ($2012) estimated by FHWA[16] for a 60 kip 4-axle single unit truck on a rural interstate. This yields the

[15] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.
[16] FHWA Cost Allocation Study, 2000 Addendum, Table 13.

savings in pavement maintenance on roads that would have otherwise seen higher VMT without the Nebraska Heartland Corridor investments. **Table 12** summarizes the total discounted pavement cost savings in neighboring states associated with the Nebraska component of the Heartland Expressway Corridor scenarios over the analysis period.

Table 12: Value of Pavement Cost Savings between 2016 and 2054 ($2012M)

Scenarios	Total
Heartland	
Discounted @ 7%	$ 0.44
Discounted @ 3%	$ 1.10
Heartland & Intensified Energy Resource Development	
Discounted @ 7%	$ 0.43
Discounted @ 3%	$ 1.07
Entire P2P	
Discounted @ 7%	$ 0.43
Discounted @ 3%	$ 1.08
Entire P2P & Intensified Energy Resource Development	
Discounted @ 7%	$ 0.41
Discounted @ 3%	$ 1.03

Source: AECOM

Economic Benefits

Agriculture and food processing activities anchor western Nebraska's economy. Soybeans, corn, dry beans, sugar beets and animals are mainstays of the region's farm economy and exports. Mexico is the third largest importer of agricultural goods from the US. Although rail is the dominant mode for such shipments, Nebraska shipped over $317 million in goods (of all types) to Mexico by truck through the Port of Laredo in 2011, the main route between western Nebraska and Mexico's markets, according to the Bureau of Transportation Statistics' TransBorder Freight Data[17]. Another $7 million in Nebraska goods (of all types) traveled north to Canada through the Port of Raymond.

While not all of those shipments originated in ***western*** Nebraska (it is not possible to divide the state's exports by truck into substate regions), knowing that the western part of the state is a rich agricultural center, that Mexico is a leading consumer of agricultural imports, and that the commodities entered via the Port of Laredo suggests that a significant portion of this trade originated in the Heartland Corridor region. This indicates that a significant flow of goods currently travel between western Nebraska and Mexico with much upside potential for additional exports as Mexican household incomes rise gradually over time.

Overland transportation offers several advantages over marine transport, beyond the direct routing between western Nebraska to Mexico that is facilitated by an improved Heartland Corridor. Using grain as the example, these include[18]:

- The avoidance of transfer upon entry into the country, resulting in less damage than to grain shipped by vessel, which has to be off-loaded;

[17] http://transborder.bts.gov/programs/international/transborder/TBDR_QuickSearchPC.html
[18] Summarized from Delmy L. Salin. *U.S. Grain and Soybean Exports to Mexico A Modal Share Transportation Analysis*, 2007-2010, USDA Agricultural Marketing Service, April 2011.

- Smaller lot sizes that permit more specialized purchasing, with less variation in shipment quality; and
- Lower inventory costs because smaller lots are purchased more frequently.

Road improvements that reduce travel times and improve reliability for truck freight improve the productivity of the logistics chain through the ability to use fleets more efficiently, reduce in inventory cost, and organize production more efficiently. If shipments are more reliable, then distribution facilities can be more centralized and enjoy greater scale economies in many cases. Collectively, this allows the economy to be more economically competitive.

The data needed to estimate many of these impacts turns on details specific to individual production operations and is not available for this analysis. An estimate of the inventory savings, however, can be developed as a proxy for the productivity gains that would accrue through the Panhandle economy. From stakeholder interviews, we know that most agricultural production travels by truck. Kelley Bean, a major domestic and foreign producer of dry edible beans, reports that their deliveries are often just-in-time to canneries, that on-time performance has deteriorated over the past 10 years, and that there are often shortages of trucks (excess freight demand) in the region.

The inventory savings associated with the Heartland improvements is proxied by the opportunity cost of holding assets in inventory rather than using them for another purpose. As a result, it is based on the annual value of the goods shipped by truck daily, annual hours of delay avoided, and an hourly commercial discount rate. This benefit only includes estimated time savings that accrue to the region.

The annual value of agricultural goods shipped by truck is derived from 2007 Census of Agriculture data—the market value of agricultural products sold in each of the counties in the corridor. While some goods sold are actually intermediate goods in the agricultural production process—corn sold to nearby feed lots—the estimate excludes similar inventory savings received by manufacturing, construction, and distribution operations for which shipment mode and value data are more difficult to isolate. As agriculture is the mainstay of the region, the productivity benefits estimated are concentrated on this segment of the economy. Not all agricultural shipments will travel via the corridor and some will use only part of the corridor for the trip. For that reason, the value of agricultural sales in Heartland counties is factored down. Because the time savings reflect about 1.5% of the time needed to make a long-distance trip by truck, 1.5 percent of the inventory savings is claimed. While this is a very conservative estimate, the results show that the corridor passes the BCA test even with these restrictive assumptions.

The annual hours of delay avoided due to the Heartland improvements were estimated and described as part of the truck travel time savings discussed above[19].

The inventory cost associated with the annual carloads and annual hours of delay is based on the commercial discount rate—the opportunity cost associated with holding assets in inventory rather than using them for another purpose. The analysis uses a commercial discount rate of 4.25%. Assuming 8,760 hours in a year (365 days * 24 hours), this yields an hourly discount rate of 0.00049%. Multiplying this hourly discount rate by value of freight shipped and the hours of delay avoided yields the annual value of inventory savings. A discount rate of 7% results in a total inventory savings of $215.4 million across all alternatives. A 3% rate results in a total inventory savings of $532.1 million across all alternatives.

[19] Please see the travel demand analysis presented in Chapter 2 and Appendix B of the CDMP for more details.

Project Costs

Project capital and operating costs for the Nebraska portion of the Heartland Expressway Corridor were developed by NDOR and are in 2012 dollars. **Table 13** summarizes the total capital costs for each project component and specifies a completion date. The total costs include costs for project development, engineering, and construction engineering; utilities; right-of-way; and construction. While, **Table 14** summarizes the total new operating and maintenance (O&M) costs for each project, which include annual O&M expenses as well as the joint sealing and new pavement cost required every eight years.

Table 13: Total Capital Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Highway	Segment	Type	Completion Year	Total Cost
Group 1 (2015-2020)				
US 385	Intersection with NE 20 (East)	Safety	2017	$ 0.80
US 385	L62A to Alliance	Roadway	2019	$ 66.00
US 385	Alliance to Chadron	Roadway	2020	$ 2.25
US 26	In Scottsbluff @ 5th Avenue	Safety	2020	$ 1.00
US 385	Chadron to SD	Roadway	2022	$ 48.00
US 26	L79E Intersection (Minatare)	Safety	2017	$ 0.15
NE 71	I-80		2022	$ 18.00
NE 71	Colorado Border to I-80	Roadway	2021	$ 15.00
NE 71	Clean Harbors (South of Kimball)	Safety	2020	$ 0.25
NE 71	I-80 (MP 22) Interchange	Truck Parking	2022	$ 5.00
	ITS Improvements			$ 2.82
Total Costs for Group 1				***$ 159.27***
Group 2 (2020-2025)				
L62A	US26 to US 385	Roadway	2022	$ 40.00
US 385	Alliance to L7E (Hemingford)	Roadway	2027	$ 48.00
US 385	Alliance to L7E (Hemingford)	Roadway	2027	$ 3.00
US 26	Wyoming State Line to Morrill	Roadway	2024	$ 21.00
US 26	Mitchell		2026	$ 1.00
US 26	Morrill Relief Route		2027	$ 20.00
	ITS Improvements			$ 0.85
Total Costs for Group 2				***$ 133.85***
Group 3 (2025-2030)				
US 385	L7E (Hemingford) to Chadron St Park	Roadway	2032	$ 66.00
US 26	Minatare to L62A intersection	Roadway	2027	$ 45.00
US 26	Minatare		2028	$ 1.00
Total Costs for Group 3				***$ 112.00***
Group 4 (2030-2035)				
US 385	Chadron		2033	$ 20.00
US 385	Chadron to S Edge of Chadron St Park	Roadway	2032	$ 42.00
US 26	Intersection with NE 71		2035	$ 5.00
US 385	Chadron	Truck Parking	2034	$ 5.00
US 26	Mitchell Relief Route		2037	$ 20.00
NE 71	Colorado Border to I-80	Roadway	2037	$ 45.00
Total Costs for Group 4				***$ 137.00***
Total Costs for Groups 1 - 4				**$ 542.12**

Source: NDOR

Table 14: Total New O&M Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Highway	Segment	O&M Start Year	Annual O&M Costs	Every 8 Year Costs	Total O&M Cost (2016-2054)
Group 1 (2015-2020)					
US 385	Intersection with NE 20 (East)	2018	$ -	$ -	$ -
US 385	L62A to Alliance	2020	$ 0.21	$ 0.55	$ 9.41
US 385	Alliance to Chadron	2021	$ 0.06	$ -	$ 1.91
US 26	In Scottsbluff @ 5th Avenue	2021	$ -	$ -	$ -
US 385	Chadron to SD	2023	$ 0.15	$ 0.40	$ 6.40
US 26	L79E Intersection (Minatare)	2018	$ -	$ -	$ -
NE 71	I-80	2023	$ 0.06	$ 0.15	$ 2.40
NE 71	Colorado Border to I-80	2022	$ 0.14	$ 0.38	$ 6.14
NE 71	Clean Harbors (South of Kimball)	2021	$ -	$ -	$ -
NE 71	I-80 (MP 22) Interchange	2023	$ 0.11	$ -	$ 3.52
	ITS Improvements		$ 0.42	$ -	$ 15.23
Total O&M Costs for Group 1					**$ 45.00**
Group 2 (2020-2025)					
L62A	US26 to US 385	2023	$ 0.15	$ 0.40	$ 6.40
US 385	Alliance to L7E (Hemingford)	2028	$ 0.15	$ 0.40	$ 5.25
US 385	Alliance to L7E (Hemingford)	2028	$ 0.07	$ 0.18	$ 2.30
US 26	Wyoming State Line to Morrill	2025	$ -	$ -	$ -
US 26	Mitchell	2027	$ 0.07	$ 0.20	$ 2.70
US 26	Morrill Relief Route	2028	$ -	$ -	$ -
	ITS Improvements		$ 0.13	$ -	$ 3.95
Total O&M Costs for Group 1					**$ 20.59**
Group 3 (2025-2030)					
US 385	L7E (Hemingford) to Chadron St Park	2033	$ 0.21	$ 0.55	$ 5.63
US 26	Minatare to L62A intersection	2028	$ 0.17	$ 0.45	$ 5.90
US 26	Minatare	2029	$ -	$ -	$ -
Total O&M Costs for Group 1					**$ 11.54**
Group 4 (2030-2035)					
US 385	Chadron	2034	$ 0.07	$ 0.20	$ 1.97
US 385	Chadron to S Edge of Chadron St Park	2033	$ 0.13	$ 0.35	$ 3.59
US 26	Intersection with NE 71	2036	$ -	$ -	$ -
US 385	Chadron	2035	$ 0.11	$ -	$ 2.20
US 26	Mitchell Relief Route	2037	$ -	$ -	$ -
NE 71	Colorado Border to I-80	2037	$ 0.14	$ 0.38	$ 3.28
Total O&M Costs for Group 1					**$ 11.04**
Total Costs for Groups 1 - 4					**$ 88.17**

Source: NDOR

In order to calculate the BCA, the capital and O&M costs must be discounted before they can be compared to the project benefits. To discount the costs, the capital and operating costs must be assigned to specific years, as discounting is a function of the year the expense occurs. The capital costs provided by NDOR did not include a construction schedule; they only had a total cost for each project and a completion year. As a result, the costs for each project were allocated over several years so that each project was complete in the year provided by NDOR. **Table 15** summarizes the annual discounted capital costs applied in the analysis. This allocation is just an estimate in order to provide a discounted cost; it is not intended to serve as a construction schedule or represent a cash flow for the project.

Table 15: Total Discounted Capital Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Year	Total Cost	Total Cost Discounted @ 7%	Total Cost Discounted @ 3%
2016	$ 0.96	$ 0.74	$ 0.86
2017	$ 23.11	$ 16.48	$ 19.94
2018	$ 22.56	$ 15.04	$ 18.90
2019	$ 28.69	$ 17.87	$ 23.33
2020	$ 43.27	$ 25.18	$ 34.16
2021	$ 40.50	$ 22.03	$ 31.04
2022	$ 47.50	$ 24.15	$ 35.35
2023	$ 7.17	$ 3.41	$ 5.18
2024	$ 7.17	$ 3.18	$ 5.03
2025	$ 37.84	$ 15.70	$ 25.76
2026	$ 38.67	$ 15.00	$ 25.56
2027	$ 40.67	$ 14.74	$ 26.10
2028	$ 1.00	$ 0.34	$ 0.62
2029	$ -	$ -	$ -
2030	$ 36.00	$ 10.65	$ 21.15
2031	$ 42.67	$ 11.80	$ 24.33
2032	$ 42.67	$ 11.03	$ 23.62
2033	$ 11.67	$ 2.82	$ 6.27
2034	$ 5.00	$ 1.13	$ 2.61
2035	$ 21.67	$ 4.57	$ 10.98
2036	$ 21.67	$ 4.27	$ 10.66
2037	$ 21.67	$ 3.99	$ 10.35
Total	**$ 542.12**	**$ 224.10**	**$ 361.80**

Source: AECOM calculation using NDOR costs

Similarly, the total expenditures for O&M were allocated over the analysis period so that the annual O&M expenses for each project component started in the year following project completion, as provided by NDOR. In addition, the joint sealing and new pavement expenses were incurred in the eighth year after operation began and every eight years thereafter through 2054. **Table 16** summarizes total discounted O&M costs applied for each year in the analysis. This allocation is just an estimate in order to provide a discounted cost; it is not intended to serve as a cash flow for the project.

Table 16: Total Discounted New O&M Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Year	Total Cost	Total Cost Discounted @ 7%	Total Cost Discounted @ 3%
2016	$ -	$ -	$ -
2017	$ 0.08	$ 0.06	$ 0.07
2018	$ 0.17	$ 0.11	$ 0.14
2019	$ 0.25	$ 0.16	$ 0.21
2020	$ 0.54	$ 0.32	$ 0.43
2021	$ 0.69	$ 0.37	$ 0.53
2022	$ 0.85	$ 0.43	$ 0.63
2023	$ 1.34	$ 0.64	$ 0.97
2024	$ 1.37	$ 0.61	$ 0.96
2025	$ 1.39	$ 0.58	$ 0.95
2026	$ 1.42	$ 0.55	$ 0.94
2027	$ 2.04	$ 0.74	$ 1.31
2028	$ 1.88	$ 0.64	$ 1.17
2029	$ 2.25	$ 0.71	$ 1.36
2030	$ 2.83	$ 0.84	$ 1.66
2031	$ 1.88	$ 0.52	$ 1.07
2032	$ 1.88	$ 0.49	$ 1.04
2033	$ 2.22	$ 0.54	$ 1.19
2034	$ 2.49	$ 0.56	$ 1.30
2035	$ 3.98	$ 0.84	$ 2.01
2036	$ 2.40	$ 0.47	$ 1.18
2037	$ 2.92	$ 0.54	$ 1.39
2038	$ 3.49	$ 0.60	$ 1.62
2039	$ 2.54	$ 0.41	$ 1.14
2040	$ 3.44	$ 0.52	$ 1.50
2041	$ 2.74	$ 0.39	$ 1.16
2042	$ 2.74	$ 0.36	$ 1.13
2043	$ 4.12	$ 0.51	$ 1.65
2044	$ 2.92	$ 0.33	$ 1.13
2045	$ 2.92	$ 0.31	$ 1.10
2046	$ 3.49	$ 0.35	$ 1.28
2047	$ 2.54	$ 0.24	$ 0.90
2048	$ 3.44	$ 0.30	$ 1.19
2049	$ 2.74	$ 0.22	$ 0.92
2050	$ 2.74	$ 0.21	$ 0.89
2051	$ 4.12	$ 0.29	$ 1.30
2052	$ 2.92	$ 0.19	$ 0.89
2053	$ 2.92	$ 0.18	$ 0.87
2054	$ 3.49	$ 0.20	$ 1.01
Total	**$ 88.17**	**$ 16.33**	**$ 40.21**

Source: AECOM calculation using NDOR costs

Benefit Cost Summary

The preceding discussion has illustrated the varied ways that the Nebraska components of the Heartland Expressway Corridor generate benefits. **Table 17** below summarizes the discounted value of the transportation and economic benefits discussed in this memorandum. Taken in total and using a 7% discount rate, the travel time savings, accident reduction savings, pavement cost savings, and economic benefits provide over $452 million dollars of benefits over the 2016 to 2054 analysis period. Compared to a similarly discounted cost estimate, the Benefit Cost Ratio for the project is 1.88.

Table 17: Summary of Discounted Benefits and Costs ($2012M)

	7% Discount Rate				3% Discount Rate			
	Heartland	Heartland & Intensified Energy Resource Development	Entire PTP	Entire PTP & Intensified Energy Resource Development	Heartland	Heartland & Intensified Energy Resource Development	Entire PTP	Entire PTP & Intensified Energy Resource Development
Benefits								
Travel Time								
Existing Traffic	$ 140.8	$ 139.1	$ 139.6	$ 136.4	$ 347.7	$ 343.6	$ 344.9	$ 336.9
Diverted Traffic	$ 1.0	$ 1.0	$ 25.4	$ 23.1	$ 2.5	$ 2.4	$ 62.7	$ 57.1
Pavement Savings	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 1.1	$ 1.1	$ 1.1	$ 1.0
Accident	$ 94.8	$ 94.8	$ 94.8	$ 94.8	$ 226.7	$ 226.7	$ 226.7	$ 226.7
Economic - Inventory Savings	$ 215.4	$ 215.4	$ 215.4	$ 215.4	$ 532.1	$ 532.1	$ 532.1	$ 532.1
Total	***$ 452.4***	***$ 450.7***	***$ 475.7***	***$ 470.2***	***$ 1,110.0***	***$ 1,105.8***	***$ 1,167.4***	***$ 1,153.8***
Costs								
Capital	$ 224.1	$ 224.1	$ 224.1	$ 224.1	$ 361.8	$ 361.8	$ 361.8	$ 361.8
O&M	$ 16.3	$ 16.3	$ 16.3	$ 16.3	$ 40.2	$ 40.2	$ 40.2	$ 40.2
Total	***$ 240.4***	***$ 240.4***	***$ 240.4***	***$ 240.4***	***$ 402.0***	***$ 402.0***	***$ 402.0***	***$ 402.0***
Benefit Cost Ratio	**1.88**	**1.87**	**1.98**	**1.96**	**2.76**	**2.75**	**2.90**	**2.87**

Source: AECOM

Draft Technical Memorandum: Economic Impact Analysis for the Heartland Expressway Corridor in Nebraska

Date: August 24, 2012

For: Nebraska Department of Roads (NDOR)

Introduction

This technical memorandum discusses the potential economic impacts of the Heartland Expressway Corridor in Nebraska through an examination of what changes would occur because of the project's construction and implementation and who is affected by these changes, regardless of whether they are a transfer or net incremental change.

The economic analysis relied on a variety of technical data sources and input obtained from the public, agency staff members, elected officials and business community representatives. The technical data sources and input from these sources are available in the Public Involvement Appendix. The first public information meeting was held on October 11, 2012, and included a workshop with business and City and County leaders from the region. This workshop focused on obtaining input from the business community. Economic issues and preliminary findings were discussed at the NDOR Highway Commission meeting on May 18, 2012 and at a June 7, 2012 public open house meeting on the CDMP. Input obtained from NDOR Highway Commissioners and from the public workshop attendees was incorporated into the analysis methodology and assumptions. A summary of the workshop is included in the Public Involvement Appendix.

The Heartland Expressway Corridor would generate economic impacts through its construction and daily operation for the Nebraska Heartland Corridor counties as well as the four-state Heartland Corridor counties. These economic impacts include:

- **Construction impacts**. Construction of the project would create jobs and expand payrolls for the duration of the project's construction cycle.
- **Operating impacts**. Since the project adds new lane miles, there would be hiring associated with the operation and maintenance of these new lane miles as well as the local purchases of goods and services necessary to operate and maintain the project. Unlike the one-time construction impacts, these new operations jobs and local purchases required to operate the project would be recurring impacts.
- **Economic development impacts**. Economic development would increase with the market's response to the operation of the improved facility. As described in the Benefit Cost Technical Memorandum, the improved road will improve travel times and reliability, which improves the productivity of the logistics chain through the ability to use fleets more efficiently. If shipments are more reliable, then businesses can reduce their inventories and organize their production processes to be more lean. Collectively, this allows the Heartland Corridor economy to be more economically competitive. In addition, traffic in the corridor would increase, increasing demand for roadside services in the corridor.
    - **Roadside services impacts**. Since the project attracts new long distance users to the corridor, demand for roadside services, including lodging, food, fuel, and other retail purchases would increase. The increase in demand would result in additional hiring and wages earned along the corridor. These would be recurring impacts.
    - **Competitive response**. It is not possible to predict the exact type of business relocation that might occur in response to the productivity improvement; likely

expansions would include food processing manufacturing to take advantage of the corridor's significant agricultural assets and distribution facilities that take advantage of the corridor's low costs and proximity to the larger urban areas.

The construction, operating, and economic development impacts associated with the project represent the direct effects of the Nebraska components of the Heartland Expressway Corridor investment on the Nebraska Heartland Corridor counties as well as the four-state corridor counties. The construction, operation, and economic development purchases associated with the project would stimulate demand for support industries. As a result, a further increase of new employment across a variety of industrial sectors and occupational categories is expected as employers hire to meet this increase in local consumer demand. Additionally, the earnings of these newly-hired construction, operations and maintenance, manufacturing/distribution, and roadside services workers would translate into a proportional increase in consumer demand as these workers purchase goods and services throughout the region. This latter hiring represents the project's indirect and induced impacts.

The direct, indirect, and induced economic impacts associated with the construction, operation, and economic development of the Nebraska portion of the Heartland Expressway Corridor are measured using regional multipliers from the Bureau of Economic Analysis (BEA) within the US Department of Commerce. Derived from the Regional Input-Output Modeling System (RIMSII), the RIMS II multipliers measure the total change (direct + indirect + induced effects) in employment and earnings that result from an incremental change to a particular industry. The multipliers are based on the 2008 Annual Series accounts data; they represent the most up to date version available at the time this analysis was prepared.

Study Area

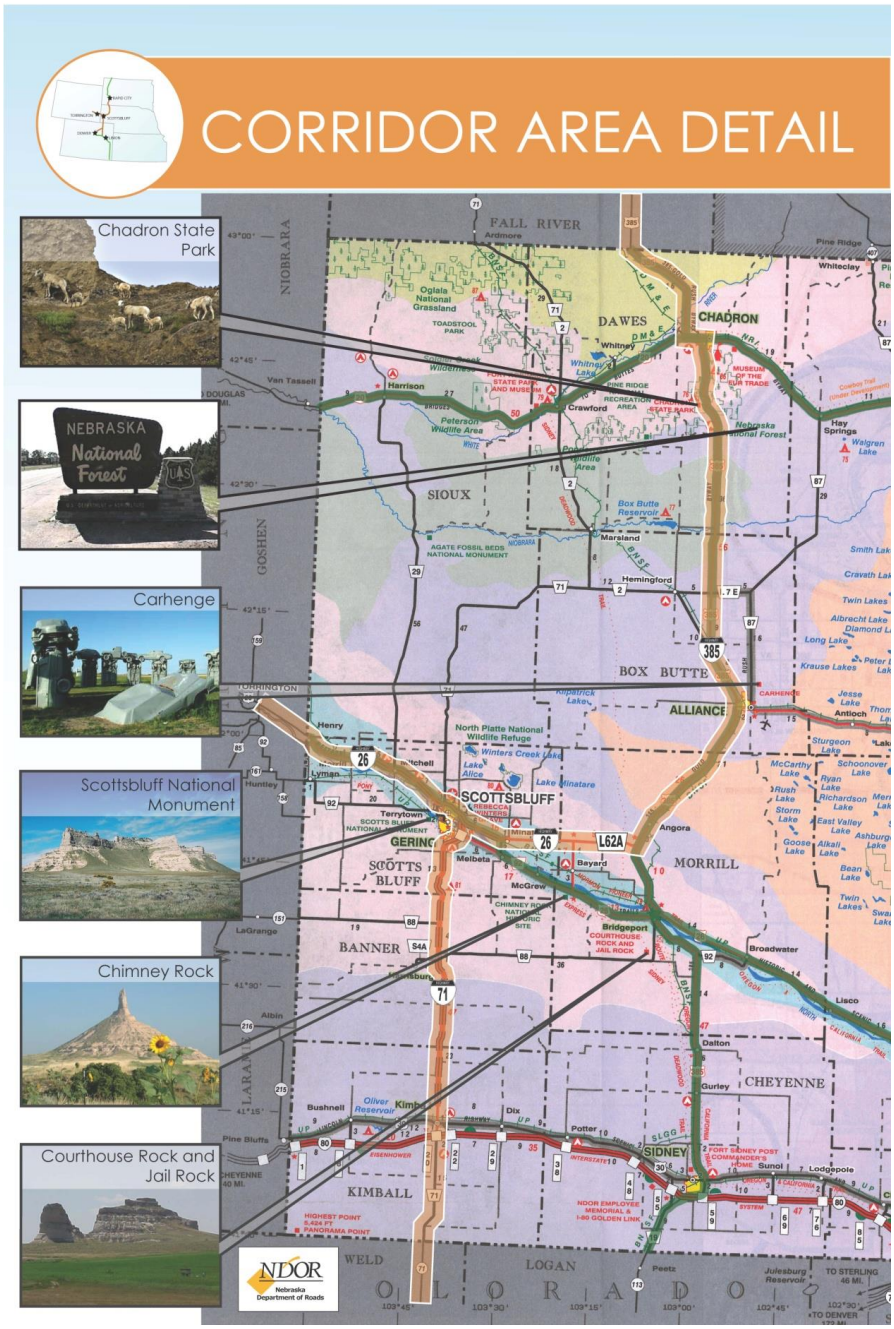
The Heartland Expressway Corridor, as shown below in **Figure 1**, generally follows:

- NE 71 from the border between the States of Colorado and Nebraska to Scottsbluff;
- US 26 from the border of the States of Nebraska and Wyoming to Scottsbluff.
- US 26 from Scottsbluff to the intersection with State Highway L62A;
- NE L62A from the intersection with US 26 to the intersection with US 385;
- US 385 to the border between the States of Nebraska and South Dakota.

The majority of the corridor is a two-lane undivided roadway that allows for passing when the driver feels it is safe. The roadways in the corridor are summarized below:

- NE 71 from Colorado/Nebraska state line to beginning of four-lane divided roadway north of Kimball, passing is allowed 95% of the time, except when driving through Kimball.
- US 26 from Wyoming/Nebraska state line to beginning of four-lane divided roadway east of Morrill, passing is allowed 75% of the time, except when driving through Henry and Morrill.
- NE 62A from US 26 to US 385, passing is allowed 75% of the time.
- US 385 from NE 62A to South Dakota/Nebraska state line, passing is allowed 75% of the time, except adjacent to Alliance, south of Chadron and through Chadron city limits. There are also two passing lanes on southbound US 385 south of Chadron as the roadway travels through Nebraska National Forest.

Figure 1: Map of the Heartland Expressway Corridor



While the improvement being studied all occur within Nebraska, the economic impact analysis includes two study areas: 1) Nebraska counties along the Heartland Expressway Corridor and 2) four-state counties along the Heartland Expressway Corridor. The Nebraska counties only area represents Nebraska's impacts associated with the construction and operation of the state's Heartland investments. However, many of the inputs, services, and employment used to construct and operate the Nebraska Heartland Corridor improvements will come from the larger region, including neighboring Heartland counties in Colorado, South Dakota, and Wyoming. As a result, the economic impacts shown in this memo include both areas as detailed below in **Table 1**.

Table 1: Economic Impact Study Areas

Nebraska Heartland Counties	4-State Heartland Counties
Arthur, NE	Nebraska Heartland Counties
Banner, NE	Adams, CO
Box Butte, NE	Boulder, CO
Cherry, NE	Larimer, CO
Cheyenne, NE	Logan, CO
Dawes, NE	Morgan, CO
Deuel, NE	Phillips, CO
Garden, NE	Sedgwick, CO
Grant, NE	Washington, CO
Keith, NE	Weld, CO
Kimball, NE	Bennett, SD
Morrill, NE	Butte, SD
Perkins, NE	Custer, SD
Scotts Bluff, NE	Fall River, SD
Sheridan, NE	Jackson, SD
Sioux, NE	Lawrence, SD
	Meade, SD
	Pennington, SD
	Shannon, SD
	Campbell, WY
	Converse, WY
	Crook, WY
	Goshen, WY
	Johnson, WY
	Laramie, WY
	Natrona, WY
	Niobrara, WY
	Platte, WY
	Weston, WY

Construction Impacts

Construction of the Heartland Expressway Corridor improvements in Nebraska may have a substantial impact on the regional and local economy due to new direct and indirect employment that would result from the capital expenditures associated with the investments. Direct employment consists of the construction-related employment in industries whose jobs and services are directly purchased to build the alternative. Indirect economic impacts are created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing the construction services. These indirect impacts are reflected in the economic multipliers for construction. The analysis estimates the number of construction jobs and earnings generated by the Heartland Corridor improvements in Nebraska based on construction cost estimates.

The analysis applies a consistent set of multipliers tailored to the structure of the four-state Heartland counties economy as well as the Nebraska Heartland counties only. The economic

impacts associated with construction expenditures are measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

Construction Expenditures

The capital expenditures for the Nebraska components of the Heartland Expressway Corridor improvements were provided by NDOR in 2012 dollars. **Table 2**, on the following page, summarizes the total capital costs for each project component and specifies a completion date. The total capital expenditures are divided into four major categories. These include:

- *General Construction*: guideway elements, stations, yards and shops, sitework, systems, and contingencies;
- *Utilities*: utility relocation and accommodation
- *Right-of-Way (ROW)*: all rights-of-way, land and existing improvements; and
- *Soft Costs*: project development, professional engineering, and construction engineering.

The economic impact of these expenditures would vary significantly by activity and depend on the amount of locally produced goods and services embodied in the purchases. Construction (including utilities) goods and services and professional services (soft costs) would be purchased in the local economy. Although every building material required for the improvements would not be produced locally, the RIMS II multipliers reflect the supplier linkages for the industry, and thus account for this leakage from the local economy.

Conversely, right-of-way expenditures are for real property only; the transaction costs associated with these expenditures are included in the soft cost category. As there is no labor associated with the ROW expenditures, there is no economic impact to the pure land costs.

As a result, only the construction (including utilities) and soft costs are expected to impact the local and regional economies. The total expenditures for these costs are allocated over several years so that each project was complete in the year provided by NDOR. **Table 3** summarizes capital costs applied in the analysis. This allocation is just an estimate in order to provide an annual cost and impact estimate; it is not intended to serve as a construction schedule or represent a cash flow for the project.

Table 2: Total Capital Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Highway	Segment	Completion Year	Soft Costs	Utility	ROW	Construction	Total Cost
Group 1 (Starting in 2015-2020)							
US 385	Intersection with NE 20 (East)	2017	$ 0.13	$ 0.02	$ 0.02	$ 0.62	**$ 0.80**
US 385	L62A to Alliance	2019	$ 10.56	$ 1.98	$ 1.98	$ 51.48	**$ 66.00**
US 385	Alliance to Chadron	2020	$ 0.36	$ 0.07	$ 0.07	$ 1.76	**$ 2.25**
US 26	In Scottsbluff @ 5th Avenue	2020	$ 0.16	$ 0.03	$ 0.03	$ 0.78	**$ 1.00**
US 385	Chadron to SD	2022	$ 7.68	$ 1.44	$ 1.44	$ 37.44	**$ 48.00**
US 26	L79E Intersection (Minatare)	2017	$ 0.02	$ 0.00	$ 0.00	$ 0.12	**$ 0.15**
NE 71	I-80	2022	$ 2.88	$ 0.54	$ 0.54	$ 14.04	**$ 18.00**
NE 71	Colorado Border to I-80	2021	$ 2.40	$ 0.45	$ 0.45	$ 11.70	**$ 15.00**
NE 71	Clean Harbors (South of Kimball)	2020	$ 0.04	$ 0.01	$ 0.01	$ 0.20	**$ 0.25**
NE 71	I-80 (MP 22) Interchange	2022	$ 0.80	$ 0.15	$ 0.15	$ 3.90	**$ 5.00**
	ITS Improvements		$ 0.20	$ -	$ -	$ 2.62	**$ 2.82**
Total Costs for Group 1			***$ 25.23***	***$ 4.69***	***$ 4.69***	***$ 124.65***	***$ 159.27***
Group 2 (Starting in 2020-2025)							
L62A	US26 to US 385	2022	$ 6.40	$ 1.20	$ 1.20	$ 31.20	**$ 40.00**
US 385	Alliance to L7E (Hemingford)	2027	$ 7.68	$ 1.44	$ 1.44	$ 37.44	**$ 48.00**
US 385	Alliance to L7E (Hemingford)	2027	$ 0.48	$ 0.09	$ 0.09	$ 2.34	**$ 3.00**
US 26	Wyoming State Line to Morrill	2024	$ 3.36	$ 0.63	$ 0.63	$ 16.38	**$ 21.00**
US 26	Mitchell	2026	$ 0.16	$ 0.03	$ 0.03	$ 0.78	**$ 1.00**
US 26	Morrill Relief Route	2027	$ 3.20	$ 0.60	$ 0.60	$ 15.60	**$ 20.00**
	ITS Improvements		$ 0.06	$ -	$ -	$ 0.79	**$ 0.85**
Total Costs for Group 2			***$ 21.34***	***$ 3.99***	***$ 3.99***	***$ 104.53***	***$ 133.85***
Group 3 (Starting in 2025-2030)							
US 385	L7E (Hemingford) to Chadron St Park	2032	$ 10.56	$ 1.98	$ 1.98	$ 51.48	**$ 66.00**
US 26	Minatare to L62A intersection	2027	$ 7.20	$ 1.35	$ 1.35	$ 35.10	**$ 45.00**
US 26	Minatare	2028	$ 0.16	$ 0.03	$ 0.03	$ 0.78	**$ 1.00**
Total Costs for Group 3			***$ 17.92***	***$ 3.36***	***$ 3.36***	***$ 87.36***	***$ 112.00***
Group 4 (Starting in 2030-2035)							
US 385	Chadron	2033	$ 3.20	$ 0.60	$ 0.60	$ 15.60	**$ 20.00**
US 385	Chadron to S Edge of Chadron St Park	2032	$ 6.72	$ 1.26	$ 1.26	$ 32.76	**$ 42.00**
US 26	Intersection with NE 71	2035	$ 0.80	$ 0.15	$ 0.15	$ 3.90	**$ 5.00**
US 385	Chadron	2034	$ 0.80	$ 0.15	$ 0.15	$ 3.90	**$ 5.00**
US 26	Mitchell Relief Route	2037	$ 3.20	$ 0.60	$ 0.60	$ 15.60	**$ 20.00**
NE 71	Colorado Border to I-80	2037	$ 7.20	$ 1.35	$ 1.35	$ 35.10	**$ 45.00**
Total Costs for Group 4			***$ 21.92***	***$ 4.11***	***$ 4.11***	***$ 106.86***	***$ 137.00***
Total Costs for Groups 1 - 4			**$ 86.41**	**$ 16.15**	**$ 16.15**	**$ 423.40**	**$ 542.12**

Source: NDOR

Table 3: Annual Construction and Soft Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Year	Total Construction Costs	Total Professional Services Costs
2016	$ 0.85	$ 0.10
2017	$ 18.79	$ 3.65
2018	$ 18.34	$ 3.56
2019	$ 23.31	$ 4.54
2020	$ 35.12	$ 6.87
2021	$ 32.83	$ 6.47
2022	$ 38.50	$ 7.59
2023	$ 5.83	$ 1.13
2024	$ 5.83	$ 1.13
2025	$ 30.67	$ 6.04
2026	$ 31.32	$ 6.19
2027	$ 32.94	$ 6.51
2028	$ 0.81	$ 0.16
2029	$ -	$ -
2030	$ 29.16	$ 5.76
2031	$ 34.56	$ 6.83
2032	$ 34.56	$ 6.83
2033	$ 9.45	$ 1.87
2034	$ 4.05	$ 0.80
2035	$ 17.55	$ 3.47
2036	$ 17.55	$ 3.47
2037	$ 17.55	$ 3.47
Total	**$ 439.56**	**$ 86.41**

Source: AECOM calculation using NDOR capital costs

Construction Jobs and Earnings Effects

RIMS II multipliers are used to translate capital expenditures for the Nebraska component of the Heartland Expressway Corridor improvements shown in **Table 3** into the associated job and income effects. The impacts are shown for the four-state Heartland counties and the Nebraska Heartland counties only. The impacts vary by the geographic area considered; impacts are greater for the four-state area relative to the Nebraska counties as there is less "leakage" associated with construction spending. Put another way, a larger economy captures a greater share of project spending as its greater size allows it to provide a greater share of the diverse range of services required for construction. **Table 4** shows the final demand construction and professional services RIMS II multipliers for the four-state Heartland Corridor counties and the Nebraska Heartland counties. These multipliers are described below the table.

Table 4: RIMS II Construction and Professional Services Multipliers (2008/2008)

	Final Demand Multipliers	
	Earnings (dollars)	Employment (jobs)
Nebraska Heartland Corridor Counties		
Construction	0.4557	12.9593
Professional, scientific, and technical services	0.5514	12.5857
4-State Heartland Corridor Counties		
Construction	0.5316	13.4040
Professional, scientific, and technical services	0.5978	12.6690

Source: Bureau of Economic Analysis, U.S. Department of Commerce

The **Final Demand Earnings Multiplier** represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the construction and professional, scientific, and technical services industries.

The **Final Demand Employment Multiplier** represents the total change in the number of jobs that occur in all industries for each $1 million of output delivered to final demand by the construction and professional, scientific, and technical services industries.

Applying the final demand multipliers for the construction and professional services industries to the amount of capital expenditures in each industry provides estimates of the earnings and employment impacts generated by the construction of the Heartland Expressway Corridor improvements in Nebraska. The results are summarized in **Tables 5 and 6**, showing the four-state corridor county impacts and Nebraska county impacts, respectively. Note that the impacts shown in **Tables 5 and 6** are not additive; as the Nebraska Heartland Corridor county impacts are included in the four-state Heartland county impacts. In addition, these are one-time impacts that last for the duration of the construction period only. One job is defined as a job for one person of one year's duration. As an example, a job for one person that had a duration of three years would be defined as three person-year jobs.

Table 5: Annual Construction Impacts for the Four-State Heartland County Region ($2012M)

Year	4-State Heartland Counties			
	Total Job-Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	12	$ 0.51	$ 0.39	$ 0.46
2017	288	$ 12.17	$ 8.68	$ 10.50
2018	281	$ 11.88	$ 7.92	$ 9.95
2019	358	$ 15.10	$ 9.41	$ 12.28
2020	539	$ 22.78	$ 13.26	$ 17.98
2021	505	$ 21.32	$ 11.59	$ 16.34
2022	592	$ 25.00	$ 12.71	$ 18.60
2023	89	$ 3.77	$ 1.79	$ 2.73
2024	89	$ 3.77	$ 1.68	$ 2.65
2025	471	$ 19.91	$ 8.26	$ 13.56
2026	482	$ 20.35	$ 7.89	$ 13.45
2027	507	$ 21.40	$ 7.76	$ 13.74
2028	12	$ 0.53	$ 0.18	$ 0.33
2029	-	$ -	$ -	$ -
2030	448	$ 18.94	$ 5.61	$ 11.13
2031	531	$ 22.45	$ 6.21	$ 12.80
2032	531	$ 22.45	$ 5.80	$ 12.43
2033	145	$ 6.14	$ 1.48	$ 3.30
2034	62	$ 2.63	$ 0.59	$ 1.37
2035	270	$ 11.40	$ 2.41	$ 5.78
2036	270	$ 11.40	$ 2.25	$ 5.61
2037	270	$ 11.40	$ 2.10	$ 5.45
Total	**6,754**	**$ 285.32**	**$ 117.95**	**$ 190.42**

Note: To use the final demand multiplier for employment, the construction expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

Table 6: Annual Construction Impacts for the Nebraska Heartland County Region ($2012M)

Year	NE Heartland Counties			
	Total Job-Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	12	$ 0.44	$ 0.34	$ 0.39
2017	280	$ 10.57	$ 7.54	$ 9.12
2018	273	$ 10.32	$ 6.88	$ 8.64
2019	347	$ 13.12	$ 8.17	$ 10.67
2020	524	$ 19.79	$ 11.52	$ 15.62
2021	490	$ 18.52	$ 10.08	$ 14.20
2022	575	$ 21.73	$ 11.04	$ 16.17
2023	87	$ 3.28	$ 1.56	$ 2.37
2024	87	$ 3.28	$ 1.46	$ 2.30
2025	458	$ 17.31	$ 7.18	$ 11.78
2026	468	$ 17.68	$ 6.86	$ 11.69
2027	492	$ 18.60	$ 6.74	$ 11.94
2028	12	$ 0.46	$ 0.15	$ 0.28
2029	-	$ -	$ -	$ -
2030	435	$ 16.46	$ 4.87	$ 9.67
2031	516	$ 19.51	$ 5.40	$ 11.13
2032	516	$ 19.51	$ 5.04	$ 10.80
2033	141	$ 5.34	$ 1.29	$ 2.87
2034	60	$ 2.29	$ 0.52	$ 1.19
2035	262	$ 9.91	$ 2.09	$ 5.02
2036	262	$ 9.91	$ 1.95	$ 4.87
2037	262	$ 9.91	$ 1.83	$ 4.73
Total	**6,558**	**$ 247.95**	**$ 102.50**	**$ 165.48**

Note: To use the final demand multiplier for employment, the construction expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by capital expenditures for the project, there are no long-term effects. Construction-related impacts last for the duration of the project's construction cycle. For the four-state region the effects of the Nebraska component of the Heartland Expressway Corridor construction would result in $285.3 million in earnings ($2012) and 6,754 person-year jobs for the 2016-2037 construction period. Similarly, for the Nebraska Heartland Corridor counties, the effects would results in $248.0 million in earnings ($2012) and 6,558 person-year jobs for the 2016-2037 construction period.

O&M Impacts

The operations and maintenance (O&M) of the Nebraska components of the Heartland Expressway Corridor improvements would have an impact on the regional and local economy due to new direct and indirect employment that would result from the O&M expenditures associated with the improvements. The new O&M expenditures are those expenditures

associated with the yearly maintenance and less frequent repaving costs for the additional lanes created by the Heartland Corridor investment. Direct employment consists of operations-related employment in industries whose jobs and services are purchased directly to operate and maintain the new lanes. Indirect economic impacts are those that would be created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing the O&M services. These indirect impacts are reflected in the economic multipliers for construction, as most roadway maintenance is construction related. The analysis estimates the number of O&M jobs and earnings generated by the Heartland Expressway Corridor improvements in Nebraska based on new (or additional) O&M cost estimates provided by NDOR.

The analysis applies a consistent set of multipliers tailored to the structure of the four-state Heartland counties economy as well as the Nebraska Heartland counties only. The economic impacts associated with O&M expenditures were measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

O&M Expenditures

The annual O&M expenditures as well as the less frequent joint sealing and new pavement costs (every eight years) for the new lane miles added in Nebraska as part of the Heartland Expressway Corridor improvements were provided by NDOR in 2012 dollars. **Table 7** summarizes the total O&M costs for each project component and specifies a start date. The capital costs of the ITS improvements are phased in over five years, therefore, the O&M costs are also phased in over five years. The total O&M expenditures are divided into two major categories. These include:

- *Annual*: yearly maintenance including snow removal, striping, etc.
- *Every Eight Years*: joint sealing and new pavement

The economic impact of these expenditures would vary by activity and depends on the amount of locally produced goods and services embodied in the purchases. Construction (the industry most associated with highway O&M) goods and services would be purchased in the local economy. Although every material required for O&M would not be produced locally, the RIMS II multipliers reflect the supplier linkages for the industry, and thus account for this leakage from the local economy.

The total expenditures for these costs are allocated over the analysis period so that the annual O&M expenses for each project component started in the year following project completed, as provided by NDOR. In addition, the joint sealing and new pavement expenses are incurred in the eighth year after operation begins and every eight years thereafter through 2054. **Table 8** summarizes total O&M costs for the Heartland Expressway Corridor applied for each year in the analysis. This allocation is just an estimate in order to provide an annual cost and impact estimate; it is not intended to represent a cash flow for the project.

Table 7: Total O&M Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Highway	Segment	O&M Start Year	Annual O&M Costs	Every 8 Year Costs	Total O&M Cost (2016-2054)
Group 1 (Starting in 2015-2020)					
US 385	Intersection with NE 20 (East)	2018	$ -	$ -	**$ -**
US 385	L62A to Alliance	2020	$ 0.21	$ 0.55	**$ 9.41**
US 385	Alliance to Chadron	2021	$ 0.06	$ -	**$ 1.91**
US 26	In Scottsbluff @ 5th Avenue	2021	$ -	$ -	**$ -**
US 385	Chadron to SD	2023	$ 0.15	$ 0.40	**$ 6.40**
US 26	L79E Intersection (Minatare)	2018	$ -	$ -	**$ -**
NE 71	I-80	2023	$ 0.06	$ 0.15	**$ 2.40**
NE 71	Colorado Border to I-80	2022	$ 0.14	$ 0.38	**$ 6.14**
NE 71	Clean Harbors (South of Kimball)	2021	$ -	$ -	**$ -**
NE 71	I-80 (MP 22) Interchange	2023	$ 0.11	$ -	**$ 3.52**
	ITS Improvements		$ 0.42	$ -	**$ 15.23**
Total O&M Costs for Group 1					***$ 45.00***
Group 2 (Starting in 2020-2025)					
L62A	US26 to US 385	2023	$ 0.15	$ 0.40	**$ 6.40**
US 385	Alliance to L7E (Hemingford)	2028	$ 0.15	$ 0.40	**$ 5.25**
US 385	Alliance to L7E (Hemingford)	2028	$ 0.07	$ 0.18	**$ 2.30**
US 26	Wyoming State Line to Morrill	2025	$ -	$ -	**$ -**
US 26	Mitchell	2027	$ 0.07	$ 0.20	**$ 2.70**
US 26	Morrill Relief Route	2028	$ -	$ -	**$ -**
	ITS Improvements		$ 0.13	$ -	**$ 3.95**
Total O&M Costs for Group 1					***$ 20.59***
Group 3 (Starting in 2025-2030)					
US 385	L7E (Hemingford) to Chadron St Park	2033	$ 0.21	$ 0.55	**$ 5.63**
US 26	Minatare to L62A intersection	2028	$ 0.17	$ 0.45	**$ 5.90**
US 26	Minatare	2029	$ -	$ -	**$ -**
Total O&M Costs for Group 1					***$ 11.54***
Group 4 (Starting in 2030-2035)					
US 385	Chadron	2034	$ 0.07	$ 0.20	**$ 1.97**
US 385	Chadron to S Edge of Chadron St Park	2033	$ 0.13	$ 0.35	**$ 3.59**
US 26	Intersection with NE 71	2036	$ -	$ -	**$ -**
US 385	Chadron	2035	$ 0.11	$ -	**$ 2.20**
US 26	Mitchell Relief Route	2037	$ -	$ -	**$ -**
NE 71	Colorado Border to I-80	2037	$ 0.14	$ 0.38	**$ 3.28**
Total O&M Costs for Group 1					***$ 11.04***
Total Costs for Groups 1 - 4					**$ 88.17**

Source: NDOR

Table 8: Annual O&M Costs for Nebraska Components of Heartland Expressway Corridor ($2012M)

Year	Total O&M Costs
2016	$ -
2017	$ 0.08
2018	$ 0.17
2019	$ 0.25
2020	$ 0.54
2021	$ 0.69
2022	$ 0.85
2023	$ 1.34
2024	$ 1.37
2025	$ 1.39
2026	$ 1.42
2027	$ 2.04
2028	$ 1.88
2029	$ 2.25
2030	$ 2.83
2031	$ 1.88
2032	$ 1.88
2033	$ 2.22
2034	$ 2.49
2035	$ 3.98
2036	$ 2.40
2037	$ 2.92
2038	$ 3.49
2039	$ 2.54
2040	$ 3.44
2041	$ 2.74
2042	$ 2.74
2043	$ 4.12
2044	$ 2.92
2045	$ 2.92
2046	$ 3.49
2047	$ 2.54
2048	$ 3.44
2049	$ 2.74
2050	$ 2.74
2051	$ 4.12
2052	$ 2.92
2053	$ 2.92
2054	$ 3.49
Total	**$ 88.17**

Source: AECOM calculation using NDOR O&M costs

O&M Jobs and Earnings Effects

RIMS II multipliers are used to translate the O&M expenditures for the Nebraska component of the Heartland Expressway Corridor improvements shown in **Table 8** into the associated job and income effects. The impacts are shown for the four-state Heartland counties and the Nebraska Heartland counties only. The impacts vary by the geographic area considered; impacts are greater for the four-state area relative to the Nebraska counties as there is less "leakage" associated with construction spending. Put another way, a larger economy captures a greater share of project spending as its greater size allows it to provide a greater share of the diverse range of services required for highway O&M activities. **Table 9** shows the final demand construction RIMS II multipliers for the four-state Heartland counties and the Nebraska Heartland counties. These multipliers are described below the table.

Table 9: RIMS II Construction Multipliers (2008/2008)

	Final Demand Multipliers	
	Earnings (dollars)	Employment (jobs)
Nebraska Heartland Corridor Counties		
Construction	0.4557	12.9593
4-State Heartland Corridor Counties		
Construction	0.5316	13.4040

Source: Bureau of Economic Analysis, U.S. Department of Commerce

The **Final Demand Earnings Multiplier** represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the construction industry.

The **Final Demand Employment Multiplier** represents the total change in the number of jobs that occur in all industries for each $1 million of output delivered to final demand by the construction industry.

Applying the final demand multipliers for the construction industry to the annual O&M expenditures shown in **Table 8** provides an estimate of the earnings and employment impacts generated by the new Nebraska components of the Heartland Expressway Corridor improvements. The results are summarized in **Tables 10 and 11**, showing the four-state Heartland county impacts and Nebraska Heartland county impacts, respectively. Note that the impacts shown in **Tables 10 and 11** are not additive; as the Nebraska Heartland county impacts are included in the four-state Heartland county impacts. It should be noted that the annual impacts are recurring impacts that last as long as the project is in operation. One job is defined as a job for one person of one year's duration. As an example, a job for one person that had a duration of three years would be defined as three person-year jobs.

Table 10: Annual O&M Impacts for the Four-State Heartland County Region ($2012M)

Year	4-State Heartland Counties			
	Total Job-Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	-	$ -	$ -	$ -
2017	1	$ 0.04	$ 0.03	$ 0.04
2018	2	$ 0.09	$ 0.06	$ 0.08
2019	3	$ 0.13	$ 0.08	$ 0.11
2020	7	$ 0.29	$ 0.17	$ 0.23
2021	9	$ 0.36	$ 0.20	$ 0.28
2022	11	$ 0.45	$ 0.23	$ 0.34
2023	17	$ 0.71	$ 0.34	$ 0.52
2024	18	$ 0.73	$ 0.32	$ 0.51
2025	18	$ 0.74	$ 0.31	$ 0.50
2026	18	$ 0.75	$ 0.29	$ 0.50
2027	27	$ 1.09	$ 0.39	$ 0.70
2028	24	$ 1.00	$ 0.34	$ 0.62
2029	29	$ 1.20	$ 0.38	$ 0.72
2030	37	$ 1.50	$ 0.44	$ 0.88
2031	24	$ 1.00	$ 0.28	$ 0.57
2032	24	$ 1.00	$ 0.26	$ 0.55
2033	29	$ 1.18	$ 0.28	$ 0.63
2034	32	$ 1.32	$ 0.30	$ 0.69
2035	52	$ 2.11	$ 0.45	$ 1.07
2036	31	$ 1.28	$ 0.25	$ 0.63
2037	38	$ 1.55	$ 0.29	$ 0.74
2038	45	$ 1.86	$ 0.32	$ 0.86
2039	33	$ 1.35	$ 0.22	$ 0.61
2040	45	$ 1.83	$ 0.28	$ 0.80
2041	36	$ 1.46	$ 0.20	$ 0.62
2042	36	$ 1.46	$ 0.19	$ 0.60
2043	53	$ 2.19	$ 0.27	$ 0.88
2044	38	$ 1.55	$ 0.18	$ 0.60
2045	38	$ 1.55	$ 0.17	$ 0.58
2046	45	$ 1.86	$ 0.19	$ 0.68
2047	33	$ 1.35	$ 0.13	$ 0.48
2048	45	$ 1.83	$ 0.16	$ 0.63
2049	36	$ 1.46	$ 0.12	$ 0.49
2050	36	$ 1.46	$ 0.11	$ 0.47
2051	53	$ 2.19	$ 0.16	$ 0.69
2052	38	$ 1.55	$ 0.10	$ 0.48
2053	38	$ 1.55	$ 0.10	$ 0.46
2054	45	$ 1.86	$ 0.11	$ 0.54
Total	**1,146**	**$ 46.87**	**$ 8.68**	**$ 21.38**

Note: To use the final demand multiplier for employment, the O&M expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

Table 11: Annual O&M Impacts for the Nebraska Heartland County Region ($2012M)

Year	NE Heartland Counties			
	Total Job-Years	Total Earnings	Total Earnings Discounted @ 7%	Total Earnings Discounted @ 3%
2016	-	$ -	$ -	$ -
2017	1	$ 0.04	$ 0.03	$ 0.03
2018	2	$ 0.08	$ 0.05	$ 0.06
2019	3	$ 0.12	$ 0.07	$ 0.09
2020	7	$ 0.25	$ 0.14	$ 0.20
2021	9	$ 0.31	$ 0.17	$ 0.24
2022	11	$ 0.39	$ 0.20	$ 0.29
2023	17	$ 0.61	$ 0.29	$ 0.44
2024	17	$ 0.62	$ 0.28	$ 0.44
2025	18	$ 0.64	$ 0.26	$ 0.43
2026	18	$ 0.65	$ 0.25	$ 0.43
2027	26	$ 0.93	$ 0.34	$ 0.60
2028	24	$ 0.86	$ 0.29	$ 0.53
2029	28	$ 1.03	$ 0.33	$ 0.62
2030	36	$ 1.29	$ 0.38	$ 0.76
2031	24	$ 0.86	$ 0.24	$ 0.49
2032	24	$ 0.86	$ 0.22	$ 0.47
2033	28	$ 1.01	$ 0.24	$ 0.54
2034	31	$ 1.13	$ 0.26	$ 0.59
2035	50	$ 1.81	$ 0.38	$ 0.92
2036	30	$ 1.09	$ 0.22	$ 0.54
2037	37	$ 1.33	$ 0.24	$ 0.63
2038	44	$ 1.59	$ 0.27	$ 0.74
2039	32	$ 1.16	$ 0.19	$ 0.52
2040	43	$ 1.57	$ 0.24	$ 0.69
2041	34	$ 1.25	$ 0.18	$ 0.53
2042	34	$ 1.25	$ 0.16	$ 0.51
2043	52	$ 1.88	$ 0.23	$ 0.75
2044	37	$ 1.33	$ 0.15	$ 0.52
2045	37	$ 1.33	$ 0.14	$ 0.50
2046	44	$ 1.59	$ 0.16	$ 0.58
2047	32	$ 1.16	$ 0.11	$ 0.41
2048	43	$ 1.57	$ 0.14	$ 0.54
2049	34	$ 1.25	$ 0.10	$ 0.42
2050	34	$ 1.25	$ 0.10	$ 0.41
2051	52	$ 1.88	$ 0.13	$ 0.59
2052	37	$ 1.33	$ 0.09	$ 0.41
2053	37	$ 1.33	$ 0.08	$ 0.40
2054	44	$ 1.59	$ 0.09	$ 0.46
Total	**1,108**	**$ 40.18**	**$ 7.44**	**$ 18.32**

Note: To use the final demand multiplier for employment, the O&M expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by O&M expenditures for the project, the annual impacts are recurring effects that last as long as the project is operating. In the results summarized below, one job year is defined as a job for one person for one year's duration. As an example, a job for one person for three years would be defined as three person-year jobs. For the four-state region, the effects of the Nebraska component of the Heartland Expressway Corridor operations and maintenance would result in $46.9 million in earnings ($2012) and 1,146 person-year jobs for the 2016-2054 analysis period. These jobs and earnings consists of operations-related employment in industries whose jobs and services are purchased directly to operate and maintain the new lanes as well as the secondary demand for goods and services across a broader spectrum of industrial sectors that support the industries providing the O&M services. Similarly, for the Nebraska Heartland Corridor counties, the effects would results in $40.2 million in earnings ($2012) and 1,108 person-year jobs for the 2016-2054 analysis period.

Economic Development Impacts

As the market recognizes and responds to the travel time and reliability improvements associated with the Heartland Expressway Corridor investments, long-term economic development would occur. For example, if shipments are more reliable and travel times are reduced, then businesses can reduce their inventories and organize their production processes to be more lean and can reach a larger market area than without the improvements. Collectively, this allows the Heartland Corridor economy to be more economically competitive. Food processing and other light manufacturing, as well as distribution are important opportunities for the corridor that would capitalize on the region's existing industrial base and the productivity improvements offered by the improved road network. The corridor's rail links, including rail connections to the West Coast ports, offer upside potential to this development strategy. In addition, auto traffic in the corridor would increase, increasing demand for roadside services in the corridor. This section describes the estimation of likely development impacts.

Roadside Services Impacts

Traffic along the Nebraska portion of the Heartland Expressway Corridor is expected to increase by at least 3.6%[20] with the completion of the transportation improvements due to the attraction of new users and diversions from parallel routes with slower travel times. This increase in traffic translates into increases in spending on lodging, food, gasoline, diesel, and other retail items by travelers along Nebraska's portion of the Heartland Corridor.

These new roadside service expenditures are important because they generate additional revenues for small businesses and result in additional direct and indirect employment and earnings for the corridor counties. Direct employment consists of accommodation, food services and drinking places, and retail trade employment in industries whose jobs and services are purchased by roadside travelers. Indirect economic impacts are those that would be created by the secondary demand for goods and services across a broader spectrum of industrial sectors to support the industries providing roadside services. These indirect impacts are reflected in the economic multipliers for accommodation, food services and drinking places, and retail trade industries. The analysis estimates the number of roadside service jobs and earnings generated by the Heartland Expressway Corridor improvements based on new roadside services expenditure estimates.

Unlike the construction and O&M impacts, the economic impacts associated with the new roadside services expenditures in the Heartland Expressway Corridor are only estimated for the local Nebraska counties. Since the traffic generating most of the new roadside service expenditures along the corridor is diverted traffic from slower routes, largely in neighboring states,

[20] Please see the travel demand analysis presented in Chapter 2 and Appendix D of the CDMP for more details.

the roadside service expenditures in the corridor would have been spent in these neighboring states, if the Nebraska portion of the Heartland Corridor project were not constructed. In other words, the impacts of roadside services are largely a transfer from parallel routes to Nebraska's portion of the Heartland Corridor. As a result, the analysis applies a consistent set of multipliers tailored to the structure of the Nebraska Heartland counties only. The economic impacts associated with roadside services expenditures were measured using regional multipliers from the BEA within the US Department of Commerce. Derived from RIMS II, the multipliers measure the total change (direct + indirect + induced impacts) in employment and earnings that result from an incremental change to a particular industry.

Roadside Services Expenditures

To estimate the increase in roadside services expenditures on lodging, food, gasoline, diesel, and other retail along Nebraska's Heartland Expressway Corridor, an estimate of expenditures per vehicle mile traveled (VMT) was developed based on an analysis from the Appalachian Regional Commission's (ARC) *Appalachian Development Highways Economic Impact Studies* (1998)[21]. The logic used to estimate lodging, food, gasoline, diesel, and other retail expenditures per VMT is the same as the ARC report; however, the dollar values assumed have been updated to reflect prices in 2012.

- **Lodging.** Lodging expenditures include motel or other lodging facility stays purchased by long-distance travelers along the Heartland Expressway Corridor in Nebraska. It is assumed that the only non-truck travelers spend money on motels and other lodging facilities, as truck travelers are likely to keep driving or pull off and sleep in their cabs. The lodging expenditures are derived using the following assumptions from the ARC Study: travelers stay in motels or other lodging facilities if they drive 500 miles or more and only 20 percent of the induced corridor traffic stays in a motel or lodging facility. The ARC Study assumes that the average cost of lodging facilities is $50 in 1995 dollars, which results in a lodging expenditure of $0.023 per VMT in 1995 dollars, or $0.032 per VMT in 2012 dollars using the US GDP Price Index Deflator.
- **Food.** Food expenditures include food purchases made by travelers as they stop for meals and snacks along the Heartland Corridor in Nebraska. These expenditures could be spent at restaurants as well as convenience centers. It is assumed that a portion of non-truck as well as truck traffic would stop for food while traveling along the corridor. The food expenditures are derived using the following assumptions from the ARC Study: there are 1.6 people per vehicle, they travel 500 miles, and only 30 percent of the travelers would stop for food. The ARC Study assumes that the average cost of food per person each day is $20 in 1995 dollars, which results in a food expenditure of $0.021 per VMT in 1995 dollars or $0.029 per VMT in 2012 dollars, using the US GDP Price Index Deflator.
- **Gasoline.** Gasoline roadside expenditures represent the gasoline sales for non-truck travelers along Nebraska's portion of the Heartland Corridor. The gasoline expenditures are derived using the following assumptions: gasoline costs $3.66 per gallon, the average price per gallon in the US during the first three months of 2012, as reported by the Department of Energy's Energy Information Administration (EIA), and gas vehicles average 23.6 miles per gallon, the average of fuel efficiency for on the road light duty vehicles from the EIA's *Annual Energy Outlook* 2012. Assuming a $3.66 cost per gallon and a fuel efficiency of 23.6 miles per gallon, the cost of gasoline per VMT is $0.16 in 2012 dollars.
- **Diesel.** Diesel roadside expenditures account for the fuel sales to diesel trucks traveling along Nebraska's portion of the Heartland Corridor. The annual expenditures on diesel fuel along the corridor are derived in a similar fashion as the gasoline expenditures and assume: diesel fuel cost $3.97 per gallon, the average price per gallon in the US reported

[21] http://www.arc.gov/assets/research_reports/AppalachianDevelopmentHighwaysEconomicImpactStudies3chap2.pdf

by the EIA for the first three months of 2012, and that freight trucks average 6.7 miles per gallon, the average of fuel efficiency for freight trucks from the EIA's *Annual Energy Outlook* 2012. Assuming diesel fuel costs $3.97 per gallon and freight trucks have a fuel efficiency of 6.7 miles per gallon, the cost of diesel per VMT is $0.59 in 2012 dollars.

- **Other Retail.** Other retail expenditures account for other vehicle user costs, such as tires and repairs, as well as retail purchases made by travelers along the Heartland Corridor in Nebraska. It is assumed that both non-tuck and truck travelers will incur these costs while traveling along the corridor. Estimates for other retail expenditures are derived using the assumptions from the ARC Study. Those estimates suggest that other retail expenditures were $0.077 per VMT in 1995 dollars, or $0.108 per VMT in 2012 dollars, using the US GDP Price Index Deflator.

Table 12 summarizes the annual lodging, food, gasoline, diesel, and other retail roadside expenditures per VMT used in the analysis.

Table 12: Roadside Services Expenditure per VMT

Expenditure Type	Expenditure per VMT ($1995)	Escalated to $2012
Lodging	$0.023	$0.032
Food	$0.021	$0.029
Gasoline	-	$0.155
Diesel	-	$0.593
Other Retail	$0.077	$0.108
Total	**$0.121**	**$0.917**

Sources: Wilbur Smith, ARC Appalachian Development Highway Economic Impact Studies, 1998. Gasoline and diesel based on EIA price and fuel efficiency data.

The roadside services expenditures per VMT are multiplied by the annual new or diverted VMT projected to occur along Nebraska's portion of the Heartland Expressway Corridor. The daily VMT projections for each Heartland scenario were provided by the AECOM travel model for 2035 and are summarized below in **Table 13**.

Table 13: New and Diverted Daily VMT in 2035

	Heartland		Heartland & Intensified Energy Resource Development		Entire P2P		Entire P2P & Intensified Energy Resource Development	
	Total VMT	Truck VMT	Total VMT	Truck VMT	Total VMT	Truck VMT	Total VMT	Truck VMT
New NE Heartland Corridor Users Only	-	-	134,775	10,608	-	-	129,516	10,194
Current CO Users (within the model) Diverted to Improved Heartland Corridor Facilities in NE	3,396	1,838	3,315	1,795	3,342	1,809	6,624	985
Current WY Users (within the model) Diverted to Improved Heartland Corridor Facilities in NE	18,772	1,765	18,325	1,723	18,473	1,737	36,615	945
Current Outside the Model Users Diverted to Improved Heartland Corridor Facilities in NE	-	-	-	-	148,021	17,730	141,106	16,902
Current NE Users (within the model) Diverted to Improved Heartland Corridor Facilities in NE	11,045	3,218	10,783	3,141	10,870	3,167	21,544	1,724

Source: AECOM Travel Model

The VMT shown in **Table 13** is for 2035; therefore, the VMT between 2017 (year the first project is completed) and 2035 are interpolated starting with the 2010 current VMT and assuming that the VMT increases equally in each year until 2035. Additionally, for each year after 2035, the VMT are projected to increase 1.5% per year based on the historic VMT growth in the corridor region. The daily VMT in each year are converted to annual VMT by multiplying the daily numbers by 365 days per year. The annual VMT for autos and trucks are then multiplied by the appropriate roadside services expenditures per VMT to arrive at the annual expenditures for lodging, food, gasoline, diesel, and other retail. These annual expenditures are summarized in **Tables 14 through 17**.

Table 14: Annual Lodging Expenditures ($2012M)

	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
2016	$ 0.07	$ 0.42	$ 0.44	$ 0.86
2017	$ 0.09	$ 0.49	$ 0.51	$ 1.00
2018	$ 0.10	$ 0.56	$ 0.59	$ 1.14
2019	$ 0.11	$ 0.63	$ 0.66	$ 1.29
2020	$ 0.12	$ 0.70	$ 0.73	$ 1.43
2021	$ 0.14	$ 0.77	$ 0.81	$ 1.57
2022	$ 0.15	$ 0.84	$ 0.88	$ 1.71
2023	$ 0.16	$ 0.91	$ 0.95	$ 1.86
2024	$ 0.17	$ 0.98	$ 1.03	$ 2.00
2025	$ 0.19	$ 1.05	$ 1.10	$ 2.14
2026	$ 0.20	$ 1.13	$ 1.17	$ 2.29
2027	$ 0.21	$ 1.20	$ 1.25	$ 2.43
2028	$ 0.22	$ 1.27	$ 1.32	$ 2.57
2029	$ 0.24	$ 1.34	$ 1.39	$ 2.72
2030	$ 0.25	$ 1.41	$ 1.47	$ 2.86
2031	$ 0.26	$ 1.48	$ 1.54	$ 3.00
2032	$ 0.27	$ 1.55	$ 1.61	$ 3.14
2033	$ 0.28	$ 1.62	$ 1.69	$ 3.29
2034	$ 0.30	$ 1.69	$ 1.76	$ 3.43
2035	$ 0.31	$ 1.76	$ 1.83	$ 3.57
2036	$ 0.31	$ 1.78	$ 1.86	$ 3.63
2037	$ 0.32	$ 1.81	$ 1.89	$ 3.68
2038	$ 0.32	$ 1.84	$ 1.92	$ 3.74
2039	$ 0.33	$ 1.87	$ 1.94	$ 3.79
2040	$ 0.33	$ 1.89	$ 1.97	$ 3.85
2041	$ 0.34	$ 1.92	$ 2.00	$ 3.91
2042	$ 0.34	$ 1.95	$ 2.03	$ 3.97
2043	$ 0.35	$ 1.98	$ 2.06	$ 4.02
2044	$ 0.35	$ 2.01	$ 2.10	$ 4.08
2045	$ 0.36	$ 2.04	$ 2.13	$ 4.15
2046	$ 0.36	$ 2.07	$ 2.16	$ 4.21
2047	$ 0.37	$ 2.10	$ 2.19	$ 4.27
2048	$ 0.38	$ 2.13	$ 2.22	$ 4.34
2049	$ 0.38	$ 2.17	$ 2.26	$ 4.40
2050	$ 0.39	$ 2.20	$ 2.29	$ 4.47
2051	$ 0.39	$ 2.23	$ 2.33	$ 4.53
2052	$ 0.40	$ 2.26	$ 2.36	$ 4.60
2053	$ 0.40	$ 2.30	$ 2.40	$ 4.67
2054	$ 0.41	$ 2.33	$ 2.43	$ 4.74
Total	**$ 10.68**	**$ 60.70**	**$ 63.26**	**$ 123.34**

Source: AECOM

Table 15: Annual Food Expenditures ($2012M)

	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
2016	$ 0.09	$ 0.43	$ 0.46	$ 0.86
2017	$ 0.10	$ 0.50	$ 0.54	$ 1.01
2018	$ 0.11	$ 0.57	$ 0.62	$ 1.15
2019	$ 0.13	$ 0.64	$ 0.70	$ 1.29
2020	$ 0.14	$ 0.72	$ 0.77	$ 1.44
2021	$ 0.16	$ 0.79	$ 0.85	$ 1.58
2022	$ 0.17	$ 0.86	$ 0.93	$ 1.72
2023	$ 0.18	$ 0.93	$ 1.01	$ 1.87
2024	$ 0.20	$ 1.00	$ 1.08	$ 2.01
2025	$ 0.21	$ 1.07	$ 1.16	$ 2.15
2026	$ 0.23	$ 1.15	$ 1.24	$ 2.30
2027	$ 0.24	$ 1.22	$ 1.32	$ 2.44
2028	$ 0.26	$ 1.29	$ 1.39	$ 2.59
2029	$ 0.27	$ 1.36	$ 1.47	$ 2.73
2030	$ 0.28	$ 1.43	$ 1.55	$ 2.87
2031	$ 0.30	$ 1.50	$ 1.63	$ 3.02
2032	$ 0.31	$ 1.58	$ 1.70	$ 3.16
2033	$ 0.33	$ 1.65	$ 1.78	$ 3.30
2034	$ 0.34	$ 1.72	$ 1.86	$ 3.45
2035	$ 0.36	$ 1.79	$ 1.93	$ 3.59
2036	$ 0.36	$ 1.82	$ 1.96	$ 3.65
2037	$ 0.37	$ 1.84	$ 1.99	$ 3.70
2038	$ 0.37	$ 1.87	$ 2.02	$ 3.76
2039	$ 0.38	$ 1.90	$ 2.05	$ 3.81
2040	$ 0.38	$ 1.93	$ 2.08	$ 3.87
2041	$ 0.39	$ 1.96	$ 2.12	$ 3.93
2042	$ 0.39	$ 1.99	$ 2.15	$ 3.99
2043	$ 0.40	$ 2.02	$ 2.18	$ 4.05
2044	$ 0.41	$ 2.05	$ 2.21	$ 4.11
2045	$ 0.41	$ 2.08	$ 2.25	$ 4.17
2046	$ 0.42	$ 2.11	$ 2.28	$ 4.23
2047	$ 0.43	$ 2.14	$ 2.31	$ 4.29
2048	$ 0.43	$ 2.17	$ 2.35	$ 4.36
2049	$ 0.44	$ 2.21	$ 2.38	$ 4.42
2050	$ 0.44	$ 2.24	$ 2.42	$ 4.49
2051	$ 0.45	$ 2.27	$ 2.46	$ 4.56
2052	$ 0.46	$ 2.31	$ 2.49	$ 4.63
2053	$ 0.46	$ 2.34	$ 2.53	$ 4.69
2054	$ 0.47	$ 2.38	$ 2.57	$ 4.77
Total	**$ 12.28**	**$ 61.80**	**$ 66.80**	**$ 123.98**

Source: AECOM

Table 16: Annual Fuel Expenditures ($2012M)

	Gasoline				Diesel			
	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
2016	$ 0.36	$ 2.04	$ 2.12	$ 4.14	$ 0.35	$ 0.90	$ 1.27	$ 1.60
2017	$ 0.42	$ 2.38	$ 2.48	$ 4.83	$ 0.41	$ 1.05	$ 1.48	$ 1.86
2018	$ 0.48	$ 2.72	$ 2.83	$ 5.52	$ 0.47	$ 1.20	$ 1.69	$ 2.13
2019	$ 0.54	$ 3.06	$ 3.18	$ 6.21	$ 0.53	$ 1.34	$ 1.90	$ 2.39
2020	$ 0.60	$ 3.39	$ 3.54	$ 6.90	$ 0.59	$ 1.49	$ 2.11	$ 2.66
2021	$ 0.66	$ 3.73	$ 3.89	$ 7.59	$ 0.65	$ 1.64	$ 2.33	$ 2.93
2022	$ 0.72	$ 4.07	$ 4.25	$ 8.28	$ 0.71	$ 1.79	$ 2.54	$ 3.19
2023	$ 0.78	$ 4.41	$ 4.60	$ 8.97	$ 0.77	$ 1.94	$ 2.75	$ 3.46
2024	$ 0.84	$ 4.75	$ 4.95	$ 9.66	$ 0.83	$ 2.09	$ 2.96	$ 3.72
2025	$ 0.90	$ 5.09	$ 5.31	$ 10.35	$ 0.89	$ 2.24	$ 3.17	$ 3.99
2026	$ 0.96	$ 5.43	$ 5.66	$ 11.04	$ 0.94	$ 2.39	$ 3.38	$ 4.26
2027	$ 1.02	$ 5.77	$ 6.01	$ 11.73	$ 1.00	$ 2.54	$ 3.59	$ 4.52
2028	$ 1.08	$ 6.11	$ 6.37	$ 12.42	$ 1.06	$ 2.69	$ 3.81	$ 4.79
2029	$ 1.14	$ 6.45	$ 6.72	$ 13.11	$ 1.12	$ 2.84	$ 4.02	$ 5.05
2030	$ 1.20	$ 6.79	$ 7.08	$ 13.80	$ 1.18	$ 2.99	$ 4.23	$ 5.32
2031	$ 1.25	$ 7.13	$ 7.43	$ 14.49	$ 1.24	$ 3.14	$ 4.44	$ 5.59
2032	$ 1.31	$ 7.47	$ 7.78	$ 15.18	$ 1.30	$ 3.29	$ 4.65	$ 5.85
2033	$ 1.37	$ 7.81	$ 8.14	$ 15.87	$ 1.36	$ 3.44	$ 4.86	$ 6.12
2034	$ 1.43	$ 8.15	$ 8.49	$ 16.56	$ 1.42	$ 3.59	$ 5.07	$ 6.38
2035	$ 1.49	$ 8.49	$ 8.85	$ 17.25	$ 1.48	$ 3.73	$ 5.29	$ 6.65
2036	$ 1.52	$ 8.61	$ 8.98	$ 17.50	$ 1.50	$ 3.79	$ 5.37	$ 6.75
2037	$ 1.54	$ 8.74	$ 9.11	$ 17.77	$ 1.52	$ 3.85	$ 5.45	$ 6.85
2038	$ 1.56	$ 8.87	$ 9.25	$ 18.03	$ 1.54	$ 3.91	$ 5.53	$ 6.95
2039	$ 1.59	$ 9.01	$ 9.39	$ 18.30	$ 1.57	$ 3.96	$ 5.61	$ 7.06
2040	$ 1.61	$ 9.14	$ 9.53	$ 18.58	$ 1.59	$ 4.02	$ 5.69	$ 7.16
2041	$ 1.63	$ 9.28	$ 9.67	$ 18.86	$ 1.61	$ 4.08	$ 5.78	$ 7.27
2042	$ 1.66	$ 9.42	$ 9.82	$ 19.14	$ 1.64	$ 4.14	$ 5.87	$ 7.38
2043	$ 1.68	$ 9.56	$ 9.96	$ 19.43	$ 1.66	$ 4.21	$ 5.96	$ 7.49
2044	$ 1.71	$ 9.70	$ 10.11	$ 19.72	$ 1.69	$ 4.27	$ 6.04	$ 7.60
2045	$ 1.73	$ 9.85	$ 10.27	$ 20.01	$ 1.71	$ 4.33	$ 6.14	$ 7.72
2046	$ 1.76	$ 10.00	$ 10.42	$ 20.31	$ 1.74	$ 4.40	$ 6.23	$ 7.83
2047	$ 1.79	$ 10.15	$ 10.58	$ 20.62	$ 1.76	$ 4.46	$ 6.32	$ 7.95
2048	$ 1.81	$ 10.30	$ 10.73	$ 20.93	$ 1.79	$ 4.53	$ 6.42	$ 8.07
2049	$ 1.84	$ 10.45	$ 10.90	$ 21.24	$ 1.82	$ 4.60	$ 6.51	$ 8.19
2050	$ 1.87	$ 10.61	$ 11.06	$ 21.56	$ 1.84	$ 4.67	$ 6.61	$ 8.31
2051	$ 1.90	$ 10.77	$ 11.22	$ 21.88	$ 1.87	$ 4.74	$ 6.71	$ 8.44
2052	$ 1.92	$ 10.93	$ 11.39	$ 22.21	$ 1.90	$ 4.81	$ 6.81	$ 8.57
2053	$ 1.95	$ 11.10	$ 11.56	$ 22.55	$ 1.93	$ 4.88	$ 6.91	$ 8.69
2054	$ 1.98	$ 11.26	$ 11.74	$ 22.88	$ 1.96	$ 4.96	$ 7.01	$ 8.82
Total	**$ 51.58**	**$ 293.00**	**$ 305.38**	**$ 595.37**	**$ 50.93**	**$ 128.93**	**$ 182.51**	**$ 229.60**

Source: AECOM

Table 17: Annual Other Retail Expenditures ($2012M)

	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
2016	$ 0.31	$ 1.58	$ 1.70	$ 3.16
2017	$ 0.37	$ 1.84	$ 1.99	$ 3.69
2018	$ 0.42	$ 2.10	$ 2.27	$ 4.21
2019	$ 0.47	$ 2.36	$ 2.55	$ 4.74
2020	$ 0.52	$ 2.63	$ 2.84	$ 5.27
2021	$ 0.57	$ 2.89	$ 3.12	$ 5.79
2022	$ 0.63	$ 3.15	$ 3.41	$ 6.32
2023	$ 0.68	$ 3.41	$ 3.69	$ 6.85
2024	$ 0.73	$ 3.68	$ 3.97	$ 7.37
2025	$ 0.78	$ 3.94	$ 4.26	$ 7.90
2026	$ 0.83	$ 4.20	$ 4.54	$ 8.43
2027	$ 0.89	$ 4.46	$ 4.82	$ 8.95
2028	$ 0.94	$ 4.73	$ 5.11	$ 9.48
2029	$ 0.99	$ 4.99	$ 5.39	$ 10.01
2030	$ 1.04	$ 5.25	$ 5.68	$ 10.53
2031	$ 1.10	$ 5.51	$ 5.96	$ 11.06
2032	$ 1.15	$ 5.78	$ 6.24	$ 11.59
2033	$ 1.20	$ 6.04	$ 6.53	$ 12.11
2034	$ 1.25	$ 6.30	$ 6.81	$ 12.64
2035	$ 1.30	$ 6.56	$ 7.09	$ 13.17
2036	$ 1.32	$ 6.66	$ 7.20	$ 13.37
2037	$ 1.34	$ 6.76	$ 7.31	$ 13.57
2038	$ 1.36	$ 6.86	$ 7.42	$ 13.77
2039	$ 1.38	$ 6.97	$ 7.53	$ 13.98
2040	$ 1.40	$ 7.07	$ 7.64	$ 14.19
2041	$ 1.43	$ 7.18	$ 7.76	$ 14.40
2042	$ 1.45	$ 7.29	$ 7.87	$ 14.61
2043	$ 1.47	$ 7.39	$ 7.99	$ 14.83
2044	$ 1.49	$ 7.51	$ 8.11	$ 15.06
2045	$ 1.51	$ 7.62	$ 8.23	$ 15.28
2046	$ 1.54	$ 7.73	$ 8.36	$ 15.51
2047	$ 1.56	$ 7.85	$ 8.48	$ 15.74
2048	$ 1.58	$ 7.97	$ 8.61	$ 15.98
2049	$ 1.61	$ 8.09	$ 8.74	$ 16.22
2050	$ 1.63	$ 8.21	$ 8.87	$ 16.46
2051	$ 1.65	$ 8.33	$ 9.00	$ 16.71
2052	$ 1.68	$ 8.45	$ 9.14	$ 16.96
2053	$ 1.70	$ 8.58	$ 9.27	$ 17.21
2054	$ 1.73	$ 8.71	$ 9.41	$ 17.47
Total	**$ 45.02**	**$ 226.61**	**$ 244.92**	**$ 454.60**

Source: AECOM

Roadside Services Jobs and Earnings Effects

RIMS II multipliers are used to translate the annual roadside services expenditures for the Nebraska component of the Heartland Expressway Corridor improvements shown in **Tables 14 through 17** into the associated job and income effects. The impacts are shown for the Nebraska Heartland Corridor counties only as these expenditures are largely diverted from neighboring areas. **Table 18** shows the final demand accommodation, food services and drinking places, and retail trade RIMS II multipliers for the Nebraska Heartland counties. These multipliers are described below the table.

Table 18: RIMS II Roadside Services Multipliers (2008/2008)

	Final Demand Multipliers	
	Earnings (dollars)	Employment (jobs)
Nebraska Heartland Corridor Counties		
Accommodation	0.3512	17.0217
Food services and drinking places	0.3996	26.0132
Retail trade	0.4393	19.1767

Source: Bureau of Economic Analysis, U.S. Department of Commerce

The **Final Demand Earnings Multiplier** represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the accommodation, food services and drinking places, and retail trade industries.

The **Final Demand Employment Multiplier** represents the total change in the number of jobs that occur in all industries for each $1 million of output delivered to final demand by the accommodation, food services and drinking places, and retail trade industries.

Applying the final demand multipliers for the appropriate industry to the annual roadside expenditures provides an estimate of the earnings and employment impacts generated by the new components of Nebraska's Heartland Expressway Corridor improvements. Accommodation multipliers are used for lodging expenditures; food services and drinking places multipliers are used for food expenditures; and retail trade multipliers are used for gasoline, diesel, and other retail expenditures. The results are summarized in **Tables 19 through 22**, showing the Nebraska county impacts for each Heartland Expressway scenario. It should be noted that the annual impacts are recurring impacts that last as long as the project is in operation. One job is defined as a job for one person of one year's duration. As an example, a job for one person that had a duration of three years would be defined as three person-year jobs.

Table 19: Annual Roadside Services Impacts for the Nebraska Heartland County Region with Heartland Travel Scenario ($2012M)

	Employment (in job-years)						Earnings ($2012M)							
Year	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Discounted @ 7%	Discounted @ 3%
2016	1	2	7	6	6	**22**	$ 0.03	$ 0.03	$ 0.16	$ 0.16	$ 0.14	**$ 0.51**	$ 0.39	$ 0.45
2017	1	2	8	8	7	**26**	$ 0.03	$ 0.04	$ 0.18	$ 0.18	$ 0.16	**$ 0.60**	$ 0.42	$ 0.51
2018	2	3	9	9	8	**29**	$ 0.03	$ 0.05	$ 0.21	$ 0.21	$ 0.18	**$ 0.68**	$ 0.45	$ 0.57
2019	2	3	10	10	9	**33**	$ 0.04	$ 0.05	$ 0.24	$ 0.23	$ 0.21	**$ 0.77**	$ 0.48	$ 0.62
2020	2	4	11	11	10	**37**	$ 0.04	$ 0.06	$ 0.26	$ 0.26	$ 0.23	**$ 0.85**	$ 0.50	$ 0.67
2021	2	4	12	12	10	**40**	$ 0.05	$ 0.06	$ 0.29	$ 0.29	$ 0.25	**$ 0.94**	$ 0.51	$ 0.72
2022	2	4	13	13	11	**44**	$ 0.05	$ 0.07	$ 0.32	$ 0.31	$ 0.27	**$ 1.02**	$ 0.52	$ 0.76
2023	3	5	14	14	12	**48**	$ 0.06	$ 0.07	$ 0.34	$ 0.34	$ 0.30	**$ 1.11**	$ 0.53	$ 0.80
2024	3	5	15	15	13	**51**	$ 0.06	$ 0.08	$ 0.37	$ 0.36	$ 0.32	**$ 1.19**	$ 0.53	$ 0.84
2025	3	5	16	16	14	**55**	$ 0.07	$ 0.09	$ 0.39	$ 0.39	$ 0.34	**$ 1.28**	$ 0.53	$ 0.87
2026	3	6	17	17	15	**59**	$ 0.07	$ 0.09	$ 0.42	$ 0.41	$ 0.37	**$ 1.36**	$ 0.53	$ 0.90
2027	3	6	19	18	16	**63**	$ 0.07	$ 0.10	$ 0.45	$ 0.44	$ 0.39	**$ 1.45**	$ 0.52	$ 0.93
2028	4	6	20	19	17	**66**	$ 0.08	$ 0.10	$ 0.47	$ 0.47	$ 0.41	**$ 1.53**	$ 0.52	$ 0.95
2029	4	7	21	20	18	**70**	$ 0.08	$ 0.11	$ 0.50	$ 0.49	$ 0.44	**$ 1.62**	$ 0.51	$ 0.98
2030	4	7	22	22	19	**74**	$ 0.09	$ 0.11	$ 0.53	$ 0.52	$ 0.46	**$ 1.70**	$ 0.50	$ 1.00
2031	4	7	23	23	20	**77**	$ 0.09	$ 0.12	$ 0.55	$ 0.54	$ 0.48	**$ 1.79**	$ 0.49	$ 1.02
2032	4	8	24	24	21	**81**	$ 0.10	$ 0.13	$ 0.58	$ 0.57	$ 0.50	**$ 1.87**	$ 0.48	$ 1.04
2033	5	8	25	25	22	**85**	$ 0.10	$ 0.13	$ 0.60	$ 0.60	$ 0.53	**$ 1.96**	$ 0.47	$ 1.05
2034	5	8	26	26	23	**88**	$ 0.10	$ 0.14	$ 0.63	$ 0.62	$ 0.55	**$ 2.04**	$ 0.46	$ 1.07
2035	5	9	27	27	24	**92**	$ 0.11	$ 0.14	$ 0.66	$ 0.65	$ 0.57	**$ 2.13**	$ 0.45	$ 1.08
2036	5	9	28	27	24	**93**	$ 0.11	$ 0.14	$ 0.67	$ 0.66	$ 0.58	**$ 2.16**	$ 0.43	$ 1.06
2037	5	9	28	28	25	**95**	$ 0.11	$ 0.15	$ 0.68	$ 0.67	$ 0.59	**$ 2.19**	$ 0.40	$ 1.05
2038	5	9	29	28	25	**96**	$ 0.11	$ 0.15	$ 0.69	$ 0.68	$ 0.60	**$ 2.23**	$ 0.38	$ 1.03
2039	5	9	29	29	25	**98**	$ 0.12	$ 0.15	$ 0.70	$ 0.69	$ 0.61	**$ 2.26**	$ 0.36	$ 1.02
2040	5	10	29	29	26	**99**	$ 0.12	$ 0.15	$ 0.71	$ 0.70	$ 0.62	**$ 2.29**	$ 0.34	$ 1.00
2041	5	10	30	29	26	**101**	$ 0.12	$ 0.16	$ 0.72	$ 0.71	$ 0.63	**$ 2.33**	$ 0.33	$ 0.99
2042	6	10	30	30	26	**102**	$ 0.12	$ 0.16	$ 0.73	$ 0.72	$ 0.64	**$ 2.36**	$ 0.31	$ 0.97
2043	6	10	31	30	27	**104**	$ 0.12	$ 0.16	$ 0.74	$ 0.73	$ 0.65	**$ 2.40**	$ 0.29	$ 0.96
2044	6	10	31	31	27	**105**	$ 0.12	$ 0.16	$ 0.75	$ 0.74	$ 0.65	**$ 2.43**	$ 0.28	$ 0.94
2045	6	10	32	31	28	**107**	$ 0.13	$ 0.16	$ 0.76	$ 0.75	$ 0.66	**$ 2.47**	$ 0.26	$ 0.93
2046	6	10	32	32	28	**108**	$ 0.13	$ 0.17	$ 0.77	$ 0.76	$ 0.67	**$ 2.51**	$ 0.25	$ 0.92
2047	6	11	33	32	28	**110**	$ 0.13	$ 0.17	$ 0.78	$ 0.77	$ 0.68	**$ 2.54**	$ 0.24	$ 0.90
2048	6	11	33	33	29	**112**	$ 0.13	$ 0.17	$ 0.80	$ 0.79	$ 0.70	**$ 2.58**	$ 0.23	$ 0.89
2049	6	11	34	33	29	**113**	$ 0.13	$ 0.18	$ 0.81	$ 0.80	$ 0.71	**$ 2.62**	$ 0.21	$ 0.88
2050	6	11	34	34	30	**115**	$ 0.14	$ 0.18	$ 0.82	$ 0.81	$ 0.72	**$ 2.66**	$ 0.20	$ 0.87
2051	6	11	35	34	30	**117**	$ 0.14	$ 0.18	$ 0.83	$ 0.82	$ 0.73	**$ 2.70**	$ 0.19	$ 0.85
2052	6	11	35	35	31	**118**	$ 0.14	$ 0.18	$ 0.85	$ 0.83	$ 0.74	**$ 2.74**	$ 0.18	$ 0.84
2053	7	12	36	35	31	**120**	$ 0.14	$ 0.19	$ 0.86	$ 0.85	$ 0.75	**$ 2.78**	$ 0.17	$ 0.83
2054	7	12	36	36	32	**122**	$ 0.14	$ 0.19	$ 0.87	$ 0.86	$ 0.76	**$ 2.82**	$ 0.16	$ 0.82
Total	**173**	**304**	**943**	**931**	**823**	**3,175**	**$ 3.75**	**$ 4.91**	**$ 22.66**	**$ 22.37**	**$ 19.78**	**$ 73.46**	**$ 15.05**	**$ 34.58**

Note: To use the final demand multiplier for employment, the roadside services expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by roadside services expenditures for the Heartland travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Heartland travel scenario would result in $73.5 million in earnings ($2012) and 3,175 person-year jobs for the 2016-2054 analysis period.

Table 20: Annual Roadside Services Impacts for the Nebraska Heartland County Region with Heartland & Intensified Energy Resource Development Travel Scenario ($2012M)

	Employment (in job-years)						Earnings ($2012M)							
Year	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Discounted @ 7%	Discounted @ 3%
2016	7	11	37	16	29	**100**	$ 0.15	$ 0.17	$ 0.89	$ 0.39	$ 0.69	**$ 2.30**	$ 1.76	$ 2.04
2017	8	12	43	19	34	**117**	$ 0.17	$ 0.20	$ 1.04	$ 0.46	$ 0.81	**$ 2.68**	$ 1.91	$ 2.32
2018	9	14	50	22	38	**133**	$ 0.20	$ 0.23	$ 1.19	$ 0.52	$ 0.92	**$ 3.07**	$ 2.04	$ 2.57
2019	10	16	56	25	43	**150**	$ 0.22	$ 0.26	$ 1.34	$ 0.59	$ 1.04	**$ 3.45**	$ 2.15	$ 2.81
2020	11	18	62	27	48	**167**	$ 0.25	$ 0.29	$ 1.49	$ 0.66	$ 1.15	**$ 3.83**	$ 2.23	$ 3.03
2021	13	20	68	30	53	**183**	$ 0.27	$ 0.31	$ 1.64	$ 0.72	$ 1.27	**$ 4.22**	$ 2.29	$ 3.23
2022	14	21	74	33	58	**200**	$ 0.30	$ 0.34	$ 1.79	$ 0.79	$ 1.38	**$ 4.60**	$ 2.34	$ 3.42
2023	15	23	81	35	62	**216**	$ 0.32	$ 0.37	$ 1.94	$ 0.85	$ 1.50	**$ 4.98**	$ 2.37	$ 3.60
2024	16	25	87	38	67	**233**	$ 0.35	$ 0.40	$ 2.09	$ 0.92	$ 1.61	**$ 5.37**	$ 2.38	$ 3.76
2025	17	27	93	41	72	**250**	$ 0.37	$ 0.43	$ 2.24	$ 0.98	$ 1.73	**$ 5.75**	$ 2.39	$ 3.92
2026	18	28	99	44	77	**266**	$ 0.40	$ 0.46	$ 2.39	$ 1.05	$ 1.85	**$ 6.13**	$ 2.38	$ 4.06
2027	19	30	106	46	82	**283**	$ 0.42	$ 0.49	$ 2.54	$ 1.12	$ 1.96	**$ 6.52**	$ 2.36	$ 4.18
2028	21	32	112	49	86	**300**	$ 0.44	$ 0.52	$ 2.68	$ 1.18	$ 2.08	**$ 6.90**	$ 2.34	$ 4.30
2029	22	34	118	52	91	**316**	$ 0.47	$ 0.54	$ 2.83	$ 1.25	$ 2.19	**$ 7.28**	$ 2.31	$ 4.41
2030	23	36	124	55	96	**333**	$ 0.49	$ 0.57	$ 2.98	$ 1.31	$ 2.31	**$ 7.67**	$ 2.27	$ 4.50
2031	24	37	130	57	101	**350**	$ 0.52	$ 0.60	$ 3.13	$ 1.38	$ 2.42	**$ 8.05**	$ 2.23	$ 4.59
2032	25	39	137	60	106	**366**	$ 0.54	$ 0.63	$ 3.28	$ 1.44	$ 2.54	**$ 8.44**	$ 2.18	$ 4.67
2033	26	41	143	63	110	**383**	$ 0.57	$ 0.66	$ 3.43	$ 1.51	$ 2.65	**$ 8.82**	$ 2.13	$ 4.74
2034	27	43	149	66	115	**400**	$ 0.59	$ 0.69	$ 3.58	$ 1.57	$ 2.77	**$ 9.20**	$ 2.08	$ 4.80
2035	29	44	155	68	120	**416**	$ 0.62	$ 0.72	$ 3.73	$ 1.64	$ 2.88	**$ 9.59**	$ 2.02	$ 4.86
2036	29	45	157	69	122	**423**	$ 0.63	$ 0.73	$ 3.78	$ 1.67	$ 2.93	**$ 9.73**	$ 1.92	$ 4.79
2037	29	46	160	70	124	**429**	$ 0.64	$ 0.74	$ 3.84	$ 1.69	$ 2.97	**$ 9.88**	$ 1.82	$ 4.72
2038	30	46	162	71	125	**435**	$ 0.65	$ 0.75	$ 3.90	$ 1.72	$ 3.02	**$ 10.02**	$ 1.73	$ 4.65
2039	30	47	165	72	127	**442**	$ 0.66	$ 0.76	$ 3.96	$ 1.74	$ 3.06	**$ 10.17**	$ 1.64	$ 4.58
2040	31	48	167	74	129	**449**	$ 0.67	$ 0.77	$ 4.02	$ 1.77	$ 3.11	**$ 10.33**	$ 1.55	$ 4.51
2041	31	49	170	75	131	**455**	$ 0.68	$ 0.78	$ 4.08	$ 1.79	$ 3.15	**$ 10.48**	$ 1.47	$ 4.45
2042	32	49	172	76	133	**462**	$ 0.69	$ 0.79	$ 4.14	$ 1.82	$ 3.20	**$ 10.64**	$ 1.40	$ 4.38
2043	32	50	175	77	135	**469**	$ 0.70	$ 0.81	$ 4.20	$ 1.85	$ 3.25	**$ 10.80**	$ 1.33	$ 4.32
2044	33	51	177	78	137	**476**	$ 0.71	$ 0.82	$ 4.26	$ 1.88	$ 3.30	**$ 10.96**	$ 1.26	$ 4.26
2045	33	52	180	79	139	**483**	$ 0.72	$ 0.83	$ 4.33	$ 1.90	$ 3.35	**$ 11.12**	$ 1.19	$ 4.19
2046	34	52	183	80	141	**490**	$ 0.73	$ 0.84	$ 4.39	$ 1.93	$ 3.40	**$ 11.29**	$ 1.13	$ 4.13
2047	34	53	186	82	143	**498**	$ 0.74	$ 0.86	$ 4.46	$ 1.96	$ 3.45	**$ 11.46**	$ 1.07	$ 4.07
2048	35	54	188	83	146	**505**	$ 0.75	$ 0.87	$ 4.52	$ 1.99	$ 3.50	**$ 11.63**	$ 1.02	$ 4.01
2049	35	55	191	84	148	**513**	$ 0.76	$ 0.88	$ 4.59	$ 2.02	$ 3.55	**$ 11.81**	$ 0.97	$ 3.96
2050	36	56	194	85	150	**521**	$ 0.77	$ 0.89	$ 4.66	$ 2.05	$ 3.61	**$ 11.98**	$ 0.92	$ 3.90
2051	36	56	197	87	152	**528**	$ 0.78	$ 0.91	$ 4.73	$ 2.08	$ 3.66	**$ 12.16**	$ 0.87	$ 3.84
2052	37	57	200	88	155	**536**	$ 0.80	$ 0.92	$ 4.80	$ 2.11	$ 3.71	**$ 12.35**	$ 0.82	$ 3.78
2053	37	58	203	89	157	**544**	$ 0.81	$ 0.94	$ 4.87	$ 2.14	$ 3.77	**$ 12.53**	$ 0.78	$ 3.73
2054	38	59	206	91	159	**552**	$ 0.82	$ 0.95	$ 4.95	$ 2.18	$ 3.83	**$ 12.72**	$ 0.74	$ 3.68
Total	**985**	**1,533**	**5,356**	**2,357**	**4,143**	**14,374**	**$ 21.32**	**$ 24.70**	**$128.72**	**$ 56.64**	**$ 99.55**	**$330.92**	**$ 67.78**	**$ 155.76**

Note: To use the final demand multiplier for employment, the roadside services expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by roadside services expenditures for the Heartland & Intensified Energy Resource Development travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Heartland & Intensified Energy Resource Development travel scenario would result in $330.9 million in earnings ($2012) and 14,374 person-year jobs for the 2016-2054 analysis period.

Table 21: Annual Roadside Services Impacts for the Nebraska Heartland County Region with Entire PTP Corridor Travel Scenario ($2012M)

	Employment (in job-years)						Earnings ($2012M)							
Year	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Discounted @ 7%	Discounted @ 3%
2016	7	12	39	23	31	**112**	$ 0.15	$ 0.19	$ 0.93	$ 0.56	$ 0.75	**$ 2.58**	$ 1.97	$ 2.29
2017	8	13	45	27	36	**130**	$ 0.18	$ 0.22	$ 1.09	$ 0.65	$ 0.87	**$ 3.01**	$ 2.14	$ 2.59
2018	10	15	52	31	42	**149**	$ 0.21	$ 0.25	$ 1.24	$ 0.74	$ 1.00	**$ 3.44**	$ 2.29	$ 2.88
2019	11	17	58	35	47	**168**	$ 0.23	$ 0.28	$ 1.40	$ 0.84	$ 1.12	**$ 3.87**	$ 2.41	$ 3.14
2020	12	19	65	39	52	**186**	$ 0.26	$ 0.31	$ 1.55	$ 0.93	$ 1.25	**$ 4.30**	$ 2.50	$ 3.39
2021	13	21	71	43	57	**205**	$ 0.28	$ 0.34	$ 1.71	$ 1.02	$ 1.37	**$ 4.73**	$ 2.57	$ 3.62
2022	14	23	78	46	62	**224**	$ 0.31	$ 0.37	$ 1.87	$ 1.11	$ 1.50	**$ 5.16**	$ 2.62	$ 3.84
2023	15	25	84	50	67	**242**	$ 0.33	$ 0.40	$ 2.02	$ 1.21	$ 1.62	**$ 5.59**	$ 2.65	$ 4.04
2024	17	27	91	54	73	**261**	$ 0.36	$ 0.43	$ 2.18	$ 1.30	$ 1.75	**$ 6.02**	$ 2.67	$ 4.22
2025	18	29	97	58	78	**279**	$ 0.39	$ 0.46	$ 2.33	$ 1.39	$ 1.87	**$ 6.44**	$ 2.67	$ 4.39
2026	19	31	103	62	83	**298**	$ 0.41	$ 0.49	$ 2.49	$ 1.49	$ 1.99	**$ 6.87**	$ 2.67	$ 4.54
2027	20	33	110	66	88	**317**	$ 0.44	$ 0.53	$ 2.64	$ 1.58	$ 2.12	**$ 7.30**	$ 2.65	$ 4.69
2028	21	35	116	70	93	**335**	$ 0.46	$ 0.56	$ 2.80	$ 1.67	$ 2.24	**$ 7.73**	$ 2.62	$ 4.82
2029	23	36	123	73	99	**354**	$ 0.49	$ 0.59	$ 2.95	$ 1.76	$ 2.37	**$ 8.16**	$ 2.58	$ 4.94
2030	24	38	129	77	104	**373**	$ 0.51	$ 0.62	$ 3.11	$ 1.86	$ 2.49	**$ 8.59**	$ 2.54	$ 5.05
2031	25	40	136	81	109	**391**	$ 0.54	$ 0.65	$ 3.26	$ 1.95	$ 2.62	**$ 9.02**	$ 2.49	$ 5.15
2032	26	42	142	85	114	**410**	$ 0.57	$ 0.68	$ 3.42	$ 2.04	$ 2.74	**$ 9.45**	$ 2.44	$ 5.23
2033	27	44	149	89	119	**428**	$ 0.59	$ 0.71	$ 3.57	$ 2.14	$ 2.87	**$ 9.88**	$ 2.39	$ 5.31
2034	29	46	155	93	125	**447**	$ 0.62	$ 0.74	$ 3.73	$ 2.23	$ 2.99	**$ 10.31**	$ 2.33	$ 5.38
2035	30	48	162	97	130	**466**	$ 0.64	$ 0.77	$ 3.89	$ 2.32	$ 3.12	**$ 10.74**	$ 2.27	$ 5.44
2036	30	49	164	98	132	**473**	$ 0.65	$ 0.78	$ 3.94	$ 2.36	$ 3.16	**$ 10.90**	$ 2.15	$ 5.36
2037	31	49	167	100	134	**480**	$ 0.66	$ 0.80	$ 4.00	$ 2.39	$ 3.21	**$ 11.07**	$ 2.04	$ 5.29
2038	31	50	169	101	136	**487**	$ 0.67	$ 0.81	$ 4.06	$ 2.43	$ 3.26	**$ 11.23**	$ 1.93	$ 5.21
2039	32	51	172	103	138	**494**	$ 0.68	$ 0.82	$ 4.12	$ 2.46	$ 3.31	**$ 11.40**	$ 1.83	$ 5.13
2040	32	52	174	104	140	**502**	$ 0.69	$ 0.83	$ 4.19	$ 2.50	$ 3.36	**$ 11.57**	$ 1.74	$ 5.06
2041	33	52	177	106	142	**509**	$ 0.70	$ 0.85	$ 4.25	$ 2.54	$ 3.41	**$ 11.75**	$ 1.65	$ 4.98
2042	33	53	179	107	144	**517**	$ 0.71	$ 0.86	$ 4.31	$ 2.58	$ 3.46	**$ 11.92**	$ 1.57	$ 4.91
2043	33	54	182	109	146	**525**	$ 0.72	$ 0.87	$ 4.38	$ 2.62	$ 3.51	**$ 12.10**	$ 1.49	$ 4.84
2044	34	55	185	110	148	**533**	$ 0.74	$ 0.88	$ 4.44	$ 2.66	$ 3.56	**$ 12.28**	$ 1.41	$ 4.77
2045	35	56	188	112	151	**541**	$ 0.75	$ 0.90	$ 4.51	$ 2.70	$ 3.62	**$ 12.47**	$ 1.34	$ 4.70
2046	35	57	190	114	153	**549**	$ 0.76	$ 0.91	$ 4.58	$ 2.74	$ 3.67	**$ 12.65**	$ 1.27	$ 4.63
2047	36	57	193	116	155	**557**	$ 0.77	$ 0.92	$ 4.65	$ 2.78	$ 3.73	**$ 12.84**	$ 1.20	$ 4.56
2048	36	58	196	117	157	**565**	$ 0.78	$ 0.94	$ 4.72	$ 2.82	$ 3.78	**$ 13.04**	$ 1.14	$ 4.50
2049	37	59	199	119	160	**574**	$ 0.79	$ 0.95	$ 4.79	$ 2.86	$ 3.84	**$ 13.23**	$ 1.08	$ 4.43
2050	37	60	202	121	162	**582**	$ 0.80	$ 0.97	$ 4.86	$ 2.90	$ 3.90	**$ 13.43**	$ 1.03	$ 4.37
2051	38	61	205	123	165	**591**	$ 0.82	$ 0.98	$ 4.93	$ 2.95	$ 3.95	**$ 13.63**	$ 0.97	$ 4.30
2052	38	62	208	124	167	**600**	$ 0.83	$ 1.00	$ 5.00	$ 2.99	$ 4.01	**$ 13.84**	$ 0.92	$ 4.24
2053	39	63	211	126	170	**609**	$ 0.84	$ 1.01	$ 5.08	$ 3.04	$ 4.07	**$ 14.04**	$ 0.88	$ 4.18
2054	39	64	215	128	172	**618**	$ 0.85	$ 1.03	$ 5.16	$ 3.08	$ 4.14	**$ 14.25**	$ 0.83	$ 4.12
Total	**1,027**	**1,656**	**5,583**	**3,336**	**4,477**	**16,079**	**$ 22.22**	**$ 26.69**	**$134.15**	**$ 80.18**	**$107.59**	**$370.83**	**$ 75.95**	**$ 174.54**

Note: To use the final demand multiplier for employment, the roadside services expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by roadside services expenditures for the Entire PTP Corridor travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Entire PTP Corridor travel scenario would result in $370.8 million in earnings ($2012) and 16,079 person-year jobs for the 2016-2054 analysis period.

Table 22: Annual Roadside Services Impacts for the Nebraska Heartland County Region with Entire PTP Corridor & Intensified Energy Resource Development Travel Scenario ($2012M)

	Employment (in job-years)						Earnings ($2012M)							
Year	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Lodging	Food	Gasoline	Diesel	Other Retail	Total	Discounted @ 7%	Discounted @ 3%
2016	14	21	76	29	58	**198**	$ 0.30	$ 0.34	$ 1.82	$ 0.70	$ 1.39	**$ 4.55**	$ 3.47	$ 4.05
2017	16	25	88	34	67	**231**	$ 0.35	$ 0.40	$ 2.12	$ 0.82	$ 1.62	**$ 5.31**	$ 3.79	$ 4.58
2018	19	28	101	39	77	**264**	$ 0.40	$ 0.46	$ 2.42	$ 0.93	$ 1.85	**$ 6.07**	$ 4.05	$ 5.08
2019	21	32	113	44	87	**297**	$ 0.45	$ 0.52	$ 2.73	$ 1.05	$ 2.08	**$ 6.83**	$ 4.25	$ 5.55
2020	23	36	126	49	96	**330**	$ 0.50	$ 0.57	$ 3.03	$ 1.17	$ 2.31	**$ 7.59**	$ 4.42	$ 5.99
2021	26	39	139	53	106	**363**	$ 0.55	$ 0.63	$ 3.33	$ 1.29	$ 2.55	**$ 8.35**	$ 4.54	$ 6.40
2022	28	43	151	58	116	**396**	$ 0.60	$ 0.69	$ 3.64	$ 1.40	$ 2.78	**$ 9.11**	$ 4.63	$ 6.78
2023	30	46	164	63	125	**429**	$ 0.65	$ 0.75	$ 3.94	$ 1.52	$ 3.01	**$ 9.87**	$ 4.69	$ 7.13
2024	32	50	177	68	135	**462**	$ 0.70	$ 0.80	$ 4.24	$ 1.64	$ 3.24	**$ 10.62**	$ 4.72	$ 7.45
2025	35	53	189	73	144	**495**	$ 0.75	$ 0.86	$ 4.55	$ 1.75	$ 3.47	**$ 11.38**	$ 4.72	$ 7.75
2026	37	57	202	78	154	**528**	$ 0.80	$ 0.92	$ 4.85	$ 1.87	$ 3.70	**$ 12.14**	$ 4.71	$ 8.03
2027	39	61	214	83	164	**561**	$ 0.85	$ 0.98	$ 5.15	$ 1.99	$ 3.93	**$ 12.90**	$ 4.68	$ 8.28
2028	42	64	227	88	173	**594**	$ 0.90	$ 1.03	$ 5.45	$ 2.10	$ 4.16	**$ 13.66**	$ 4.63	$ 8.51
2029	44	68	240	92	183	**627**	$ 0.95	$ 1.09	$ 5.76	$ 2.22	$ 4.40	**$ 14.42**	$ 4.56	$ 8.72
2030	46	71	252	97	193	**660**	$ 1.00	$ 1.15	$ 6.06	$ 2.34	$ 4.63	**$ 15.18**	$ 4.49	$ 8.92
2031	49	75	265	102	202	**693**	$ 1.05	$ 1.21	$ 6.36	$ 2.45	$ 4.86	**$ 15.94**	$ 4.41	$ 9.09
2032	51	78	277	107	212	**726**	$ 1.10	$ 1.26	$ 6.67	$ 2.57	$ 5.09	**$ 16.70**	$ 4.31	$ 9.24
2033	53	82	290	112	221	**759**	$ 1.15	$ 1.32	$ 6.97	$ 2.69	$ 5.32	**$ 17.45**	$ 4.22	$ 9.38
2034	56	85	303	117	231	**792**	$ 1.20	$ 1.38	$ 7.27	$ 2.80	$ 5.55	**$ 18.21**	$ 4.11	$ 9.51
2035	58	89	315	122	241	**825**	$ 1.25	$ 1.44	$ 7.58	$ 2.92	$ 5.78	**$ 18.97**	$ 4.00	$ 9.61
2036	59	90	320	123	244	**837**	$ 1.27	$ 1.46	$ 7.69	$ 2.97	$ 5.87	**$ 19.26**	$ 3.80	$ 9.47
2037	60	92	325	125	248	**850**	$ 1.29	$ 1.48	$ 7.80	$ 3.01	$ 5.96	**$ 19.55**	$ 3.60	$ 9.33
2038	61	93	330	127	252	**862**	$ 1.31	$ 1.50	$ 7.92	$ 3.06	$ 6.05	**$ 19.84**	$ 3.42	$ 9.20
2039	62	95	335	129	255	**875**	$ 1.33	$ 1.52	$ 8.04	$ 3.10	$ 6.14	**$ 20.14**	$ 3.24	$ 9.06
2040	62	96	340	131	259	**888**	$ 1.35	$ 1.55	$ 8.16	$ 3.15	$ 6.23	**$ 20.44**	$ 3.07	$ 8.93
2041	63	97	345	133	263	**902**	$ 1.37	$ 1.57	$ 8.28	$ 3.19	$ 6.33	**$ 20.74**	$ 2.92	$ 8.80
2042	64	99	350	135	267	**915**	$ 1.39	$ 1.59	$ 8.41	$ 3.24	$ 6.42	**$ 21.06**	$ 2.77	$ 8.67
2043	65	100	355	137	271	**929**	$ 1.41	$ 1.62	$ 8.53	$ 3.29	$ 6.52	**$ 21.37**	$ 2.62	$ 8.55
2044	66	102	360	139	275	**943**	$ 1.43	$ 1.64	$ 8.66	$ 3.34	$ 6.61	**$ 21.69**	$ 2.49	$ 8.42
2045	67	103	366	141	279	**957**	$ 1.46	$ 1.67	$ 8.79	$ 3.39	$ 6.71	**$ 22.02**	$ 2.36	$ 8.30
2046	68	105	371	143	284	**971**	$ 1.48	$ 1.69	$ 8.92	$ 3.44	$ 6.81	**$ 22.35**	$ 2.24	$ 8.18
2047	69	106	377	145	288	**986**	$ 1.50	$ 1.72	$ 9.06	$ 3.49	$ 6.92	**$ 22.68**	$ 2.12	$ 8.06
2048	70	108	383	148	292	**1,001**	$ 1.52	$ 1.74	$ 9.19	$ 3.55	$ 7.02	**$ 23.02**	$ 2.02	$ 7.94
2049	71	110	388	150	297	**1,016**	$ 1.55	$ 1.77	$ 9.33	$ 3.60	$ 7.13	**$ 23.37**	$ 1.91	$ 7.83
2050	72	111	394	152	301	**1,031**	$ 1.57	$ 1.79	$ 9.47	$ 3.65	$ 7.23	**$ 23.72**	$ 1.81	$ 7.71
2051	74	113	400	154	305	**1,046**	$ 1.59	$ 1.82	$ 9.61	$ 3.71	$ 7.34	**$ 24.07**	$ 1.72	$ 7.60
2052	75	115	406	157	310	**1,062**	$ 1.62	$ 1.85	$ 9.76	$ 3.76	$ 7.45	**$ 24.44**	$ 1.63	$ 7.49
2053	76	116	412	159	315	**1,078**	$ 1.64	$ 1.88	$ 9.90	$ 3.82	$ 7.56	**$ 24.80**	$ 1.55	$ 7.38
2054	77	118	418	161	319	**1,094**	$ 1.66	$ 1.90	$ 10.05	$ 3.88	$ 7.68	**$ 25.17**	$ 1.47	$ 7.27
Total	**2,001**	**3,074**	**10,884**	**4,197**	**8,310**	**28,468**	**$ 43.32**	**$ 49.54**	**$261.55**	**$100.86**	**$199.70**	**$654.97**	**$ 134.15**	**$ 308.28**

Note: To use the final demand multiplier for employment, the roadside services expenditures were deflated to 2008 dollars using the GDP Price Index Deflator because the RIMS II multipliers are based on 2008 data.

Source: AECOM

In the case of economic impacts generated by roadside services expenditures for the Entire PTP Corridor & Intensified Energy Resource Development travel scenario, the annual impacts are recurring effects that last as long as the project is operating. For the Nebraska Heartland Corridor region the effects of the roadside services expenditures associated with the Heartland Expressway Corridor Entire PTP Corridor & Intensified Energy Resource Development travel scenario would result in $655.0 million in earnings ($2012) and 28,468 person-year jobs for the 2016-2054 analysis period.

Competitive Impacts

Unlike the estimate of roadside services, which relies on projections of VMT, the assessment of relocations and expansions cannot be tied directly to travel time and VMT savings. It is possible, however, to estimate the typical impact of food processing and distribution expansions in the Heartland Expressway Corridor. Based on recent food processing relocations to the region such as KYS Foods and industry trends, the typical food processing plant employs between 20 and 50 employees directly. There are several established food processors in the corridor that are much larger, but these are at the upper end of the industry's size and not representative of a typical firm. Distribution facilities are also in that similar range based on data from the Bureau of Economic Analysis's County Business Patterns and information on specific distribution facilities currently operating in the corridor. The estimation assumes an average industry wage of $29,000 for food processing, an average wage of $35,000 for distribution activities, and an average wage of $40,000 for other services.

Table 23: Economic Impact of Typical Firm Relocation in Industries Likely to Capitalize on Heartland Improvements

	Direct Employment	Direct Earnings (000)	Final Demand Multipliers		Impact of a Typical Relocation	
			Earnings (dollars)	Employment (jobs)	Earnings (dollars)	Employment (jobs)
Industry Opportunity						
Food Processing	50	1,450	2.3664	2.2868	3,431	114
Distribution	35	1,225	1.1631	1.1564	1,425	40
Other services	35	1,400	1.1912	1.1962	1,668	42

Note: RIMS II multipliers line19. Food, beverage, and tobacco product manufacturing, line 36. Warehousing and storage, and 61. Other services

These are recurring jobs; the impacts shown in Table 23 are annual impacts that last for the duration of the firm's operation. Both industry opportunities are likely; the corridor has some established firms in each industry but has also been considered and ultimately not selected by other firms in the industry (based on stakeholder interviews) for expansions. Thus, the road improvements and associated accessibility gains created by the greater travel reliability and travel time savings is expected to improve the region's capture rate for these industries.

Table 23 contains an estimate for an additional industry opportunity beyond the corridor's traditional advantages, other services. Longer term, as the nearby Denver region continues to develop into the dominant urban economy in this region of the country, industries will increasingly seek lower cost locations with good access to this dense urban market. There is upside potential that some businesses will select locations in the Heartland Corridor. Nebraska's cost of doing business is estimated to be 85% below the US national average cost by Moody's Analytics[22]. By contrast, the estimated cost in Denver is 94% of the national average, yielding a significant savings to those firms that can located in the corridor and still access the Denver market as needed.

The expanding manufacturing base, combined with low cost proximity to Denver, offers opportunities to expand the range of services (and employment opportunities) in the corridor over time. Accessibility of mining jobs associated with the Intensified Energy Resource Development[23] scenario finds similarly offers support for an expanding service industry. Though the corridor is not expected to experience the direct employment impacts, workers in the corridor will more readily access the Intensified Energy Resource Development sites and the well-paying jobs associated with these opportunities. Thus, incomes in the Heartland Expressway Corridor are

[22] Value is for 2009, the most recent available. No specific cost for Scottsbluff is available but it is unlikely that costs in the panhandle region of the state exceed the national average which includes the state's main metropolitan centers. 2011 Edition, North American Business Cost Review.
[23] Please see the travel demand analysis presented in Chapter 2 of the CDMP for more details.

supported, which in turn translates into support for a greater range of services in the local economy.

Economic Impact Summary and Factors Supporting Success

The preceding discussion has illustrated the varied ways that the Nebraska components of the Heartland Expressway Corridor generate economic impacts in the form of jobs and earnings. Table 24 below summarizes the jobs and earnings created or supported by the Heartland Expressway Corridor investments that have been discussed. Taken in total the construction, operation and maintenance, and roadside services offered by the investment support between 10,840 and 36,133 job years and $362 to $943 million in earnings for the Nebraska Heartland Counties during the 2016 to 2054 analysis period. The range of results provided is based on the different roadside service scenarios analyzed.

Table 24: Summary of Economic Impacts for the Nebraska Heartland Counties 2016-2054 (2012 Dollars in Millions)

	Total Job-Years (2016-2054)	Total Earnings (2016-2054)
Construction	6,558	$ 248
O&M	1,108	$ 40
Roadside Services		
Heartland	3,175	$ 73
Heartland & Intensified Energy Resource Development	14,374	$ 331
Entire PTP	16,079	$ 371
Entire PTP & Intensified Energy Resource Development	28,468	$ 655
Total (Range provided based on the Roadside Services Scenarios)	**10,840 to 36,133**	**$362 to $943**

Source: AECOM

Over time, as the nearby Denver region continues to develop into the dominant urban economy in this region of the country, industries will increasingly seek lower cost locations with good access to this dense urban market. As a result, there is upside potential that some businesses will select locations in the Heartland Expressway Corridor. The expanding manufacturing base, combined with low cost proximity to Denver, offers opportunities to expand the range of services (and employment opportunities) in the corridor over time.

Food processing and distribution industry opportunities are likely in the Heartland Expressway Corridor; the corridor has some established firms in each industry but has also been considered and ultimately not selected by other firms in the industry (based on stakeholder interviews) for expansions. Thus, the road improvements and associated accessibility gains created by the greater travel reliability and travel time savings is expected to improve the region's capture rate for these industries. The attraction of one of these industry opportunities is likely to create between 40 and 114 annual jobs and $1.4 and $3.4 million in annual earnings. These jobs and earnings impacts include both the direct employment at the facility as well as in industries supporting the operation of the facility and its employees.

Researchers have found that any subset of the following factors supports highway investments' ability to generate meaningful economic growth. These include: high volumes of travel, travel time savings, improved connections among trade centers, better labor access, improved access to manufacturing centers, better connections between agricultural centers and markets, better

access between raw materials and processors, and better access for tourists. Of note, all relate to mobility or accessibility, the traditional role of transportation. In each case, transportation enables the firms and workers to capitalize on an existing strength or competitive advantage present in the community's economic structure. The transportation improvement connects a regional asset (broadly understood to be a resource, labor force or amenity) to a market for the asset. More directly, transportation investment is successful when addressing a transportation problem in the economy.

By contrast, transportation investment cannot overcome the economic disadvantages of a small labor pool, an unskilled or uneducated workforce, unreliable power or water supplies, nor can it attract industry where the requisite resources are not present. This perspective leads one to consider a collaborative approach to economic development, where investments of different types are bundled together to mitigate a region's economic disadvantages. For example, road improvements to support a desirable employer in a targeted industry might be combined with workforce training tailored to the needs of the employer, and tax incentives to permit a new industry to take hold in the region and demonstrate its success in a new location and can be marketed to other employers in the industry or to related industries. In this instance, road investment is part of a package of policies and investments that address the region's economic disadvantages; transportation investment is not the sole investment.

The Heartland Expressway Corridor has a number of ancillary qualities that allow it to leverage highway improvements. These include the following:

Advantageous costs. Nebraska's cost of doing business is estimated to be 85 percent below the US national average cost by Moody's Analytics[24]. By contrast, the estimated cost in Denver is 94 percent of the national average, yielding a significant savings to those firms that can located in the corridor and still access the Denver market as needed.

Educational programs aligned with the economy. Western Nebraska Community College offers course concentrations in Transportation, Distribution, and Logistics and Manufacturing Processes. These two areas accounted for 10 percent of attendees. Combined with the more general business curriculum, this accounted for over a quarter of attendees[25].

Complementary infrastructure. Stakeholder participants reported on the region's fiber optic network and excess supply of telecommunications capacity to support industry.

Strategic location. The corridor is strategically on major rail lines that feed to the west coast ports. These lines are gradually being upgraded to remove bottlenecks and to better connect the inland US to these Pacific gateways. The corridor benefits from these improvements along with the balance of the Midwest. In addition, the corridor is located in close proximity to the Intensified Energy Resource Development areas and along an emerging North-South trade link.

Collectively, these ancillary qualities provide support for a strategy of highway-led economic development in the Heartland Expressway Corridor.

[24] Value is for 2009, the most recent available. No specific cost for Scottsbluff is available but it is unlikely that costs in the panhandle region of the state exceed the national average which includes the state's main metropolitan centers. 2011 Edition, North American Business Cost Review
[25] Western Nebraska Community College 08-09 Perkins Report Card