

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 AECOM². 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 of 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 time⁵. 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 time⁸, 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 signs⁹.

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 improvements¹¹. 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 Guidance¹³ and the NHTSA¹⁴ 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 Motor 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 2035¹⁵.

Table 11: Daily Truck VMT Removed from Neighboring States in 2035 (Net of No Build)

	Heartland	Heartland & Intensified Energy Resource Development	Entire P2P	Entire P2P & Intensified Energy Resource Development
Users				
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 FHWA¹⁶ 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 Data¹⁷. 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 include¹⁸:

- 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 above¹⁹.

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

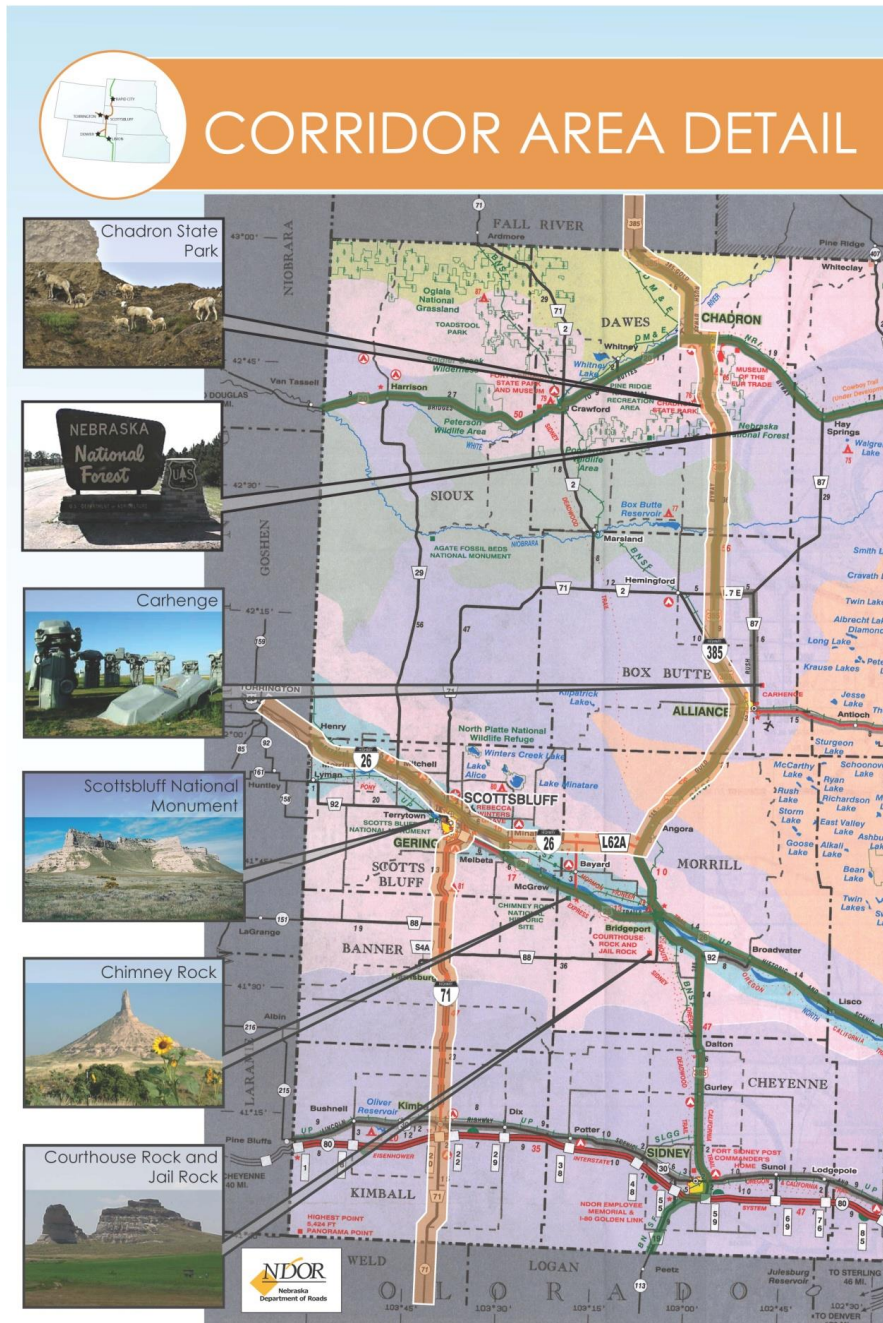
The Heartland Expressway Corridor, as shown below in **Figure 1**, generally follows:

- 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 result 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

²¹http://www.arc.gov/assets/research_reports/AppalachianDevelopmentHighwaysEconomicImpactStudies3c_hap2.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)

Year	Employment (in job-years)						Earnings (\$2012M)							
	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)

Year	Employment (in job-years)						Earnings (\$2012M)							
	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)

Year	Employment (in job-years)						Earnings (\$2012M)							
	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)

Year	Employment (in job-years)						Earnings (\$2012M)							
	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 line 19. 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 Analytics²². 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 Development²³ 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 Analytics²⁴. By contrast, the estimated cost in Denver is 94 percent of the national average, yielding a significant savings to those firms that can be 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 attendees²⁵.

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