Draft Report for the Theodore Roosevelt Expressway Corridor Study

Project No. SPR-P030(015) PCN 17625
South Dakota State Line to Montana State Line

Prepared by
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
BISMARCK, NORTH DAKOTA
http://www.dot.nd.gov/

DIRECTOR
Francis G. Ziegler, P.E.

LOCAL GOVERNMENT INTERIM DIVISION DIRECTOR
Paul Benning, P. E.

Principal Authors: Kadrmas, Lee & Jackson and Ulteig Engineering

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NDDOT Reserves All Objections
# TABLE OF CONTENTS

Table of Contents .................................................................................................................. i
Exhibits .................................................................................................................................. ii
Tables ...................................................................................................................................... iii

## EXECUTIVE SUMMARY

I. Introduction .......................................................................................................................... 1
II. Phase I Conclusions ............................................................................................................ 1
III. Phase II Action Items ....................................................................................................... 2

## CHAPTER 1  CORRIDOR STUDY OVERVIEW

I. Introduction .......................................................................................................................... 4
II. Purpose of the Corridor Study ............................................................................................ 4
III. Corridor Study Area .......................................................................................................... 4
IV. Study Process ..................................................................................................................... 6
V. Previous Studies ................................................................................................................. 6

## CHAPTER 2  EXISTING CORRIDOR STUDY CONDITIONS

I. Introduction .......................................................................................................................... 9
II. Socioeconomic Conditions ................................................................................................. 9
   a. Population ......................................................................................................................... 9
   b. Employment ...................................................................................................................... 10
   c. Households and Income ................................................................................................. 14
   d. Industrial Influences ....................................................................................................... 15
      i. Canadian Traffic and Influences .............................................................................. 16
      ii. Renewable Energy ................................................................................................. 17
      iii. Oil & Natural Gas ................................................................................................. 17
      iv. Agriculture and Livestock .................................................................................... 20
      v. Manufacturing ......................................................................................................... 21
      vi. Tourism ..................................................................................................................... 21
III. Transportation System ....................................................................................................... 22
   a. Roadway Classification ................................................................................................. 22
   b. Interregional System ..................................................................................................... 22
   c. Roadway Characteristics .............................................................................................. 23
      i. Load Restrictions ..................................................................................................... 23
      ii. Design Characteristics ............................................................................................ 23
      iii. Shoulders ................................................................................................................ 24
      iv. Pavement Conditions ............................................................................................. 27
1. International Roughness Index ......................................................................................... 27
2. Rut ....................................................................................................................................... 28
   v. Existing Traffic Conditions ........................................................................................... 29
1. North Dakota .................................................................................................................... 29
2. South Dakota ................................................................................................................... 33
3. GPITC ............................................................................................................................... 34
d. Forecast Traffic Conditions ............................................................................................. 35
e. Traffic Operations ................................................................. 37
   i. Right-of-way Preservation and Access Management .............. 37
   ii. Right-of-way Preservation ............................................... 37
   iii. Access Management ..................................................... 39

CHAPTER 3 PUBLIC AND AGENCY INVOLVEMENT ................................................. 41
I. Introduction ........................................................................... 41
II. Communications Plan .......................................................... 41
III. Technical Advisory Committee ............................................ 41
IV. Public and Agency Involvement ............................................ 41
   a. Scoping Letters ............................................................... 42
   b. Public Input Meetings .................................................... 44
   c. Public Input Survey ......................................................... 45

CHAPTER 4 Recommendations RECOMMENDATIONS ........................................ 50
I. Purpose and Need for Future Improvements ......................... 50
IV. Existing or Planned Projects .............................................. 51
V. Phase II Action Items .......................................................... 54

EXHIBITS

Exhibit 1: Corridor Study Location Map ........................................ 5
Exhibit 2: Study Area County Population by State .......................... 9
Exhibit 3: Study Area Rural-Urban County Population by State ......... 10
Exhibit 5: Employment Rates by County (North Dakota) ................ 11
Exhibit 6: Employment Rates by County (South Dakota) ............... 12
Exhibit 7: Unemployment Rates by County (Montana) .................... 12
Exhibit 8: Unemployment Rates by County (North Dakota) .......... 13
Exhibit 9: Unemployment Rates by County (South Dakota) .......... 13
Exhibit 10: Study Area Households by State ............................... 14
Exhibit 11: Study Area Persons per Households by State ............... 14
Exhibit 12: North Dakota Primary Industries Estimated Revenue .... 15
Exhibit 13: Annual Number of New Oil Producing Wells in North Dakota 18
Exhibit 14: Existing Shoulder Widths ...................................... 25
Exhibit 15: Existing Shoulder Widths Continued .......................... 26
Exhibit 16: Section Locations ................................................... 30
Exhibit 17: 2030 Traffic Projection Scenarios by Section ............... 36
Exhibit 18: Location of Respondent .......................................... 45
Exhibit 19: Type of Respondents .............................................. 46
Exhibit 20: Composition of Business, Government, and Community Representatives 46
Exhibit 21: Use of Corridor ...................................................... 47
Exhibit 22: Frequency of Use ................................................... 47
Exhibit 23: Corridor Concerns .................................................. 48
# TABLES

Table 1: Traffic Fluctuations Incoming from Canada .......................................................... 16  
Table 2: Oversize/Overweight Truck Permits Processed by County .................................. 19  
Table 3: Existing Shoulder Widths .................................................................................. 24  
Table 4: IRI .................................................................................................................. 27  
Table 5: Poor IRI Ratings ............................................................................................... 27  
Table 6: Rut Categories ................................................................................................... 28  
Table 7: Poor Rut Ratings ............................................................................................... 28  
Table 8: ND Traffic Volumes ........................................................................................... 31  
Table 9: Peak Hour Volumes ........................................................................................... 31  
Table 10: Average Annual Growth from 1998 to 2008 ................................................... 32  
Table 11: Traffic Volume Growth Before and During Oil Boom ........................................ 32  
Table 12: Regional Truckloads Generated by Industry ....................................................... 33  
Table 13: 2007 South Dakota Average Traffic Volumes ..................................................... 33  
Table 14: Highway Traffic Characteristics ........................................................................ 34  
Table 15: Existing or Planned Projects ............................................................................. 51
EXECUTIVE SUMMARY

I. Introduction

The Great Plains International Trade Corridor (GPITC) extends from Mexico to Canada and is composed of three segments: (1) Ports-to-Plains Corridor; (2) Heartland Expressway; and (3) Theodore Roosevelt Expressway. The focus of this Corridor Study is the Theodore Roosevelt Expressway (TRE). This begins in Rapid City, SD and continues to the Port of Raymond at the Montana/Canada border.

This Corridor Study was developed on behalf of the North Dakota Department of Transportation (NDDOT) and Williams County. The Corridor Study is being conducted in three phases. This document addresses Phase I of the study and focuses on socioeconomic and traffic conditions, right-of-way preservation strategies, and public involvement conducted during Phase I. The primary purpose of the Corridor Study is to examine socioeconomic data for the North Dakota portion of the TRE in order to allow the development of an accurate estimation of future traffic along the TRE Corridor.

II. Phase I Conclusions

Following the analysis of socioeconomic data and traffic conditions, the following conclusions were made:

- Existing and projected traffic volumes are highest along the TRE Corridor north of I-94, primarily between Williston and Watford City. The localized increases in traffic are primarily the result of oil traffic resulting from oil and gas development. South of I-94 and into South Dakota, traffic volumes are relatively low and significant traffic increases are not expected.
- No development was identified that would lead to a significant increase in non-truck traffic along the TRE Corridor. Localized increases may occur due to growth near cities and towns, oil activity or new industrial facilities. Two projection scenarios for year 2030 were prepared that included increased passenger vehicle usage (Scenarios 4 and 5) to account for this potential increase.
- Most foreseeable truck traffic growth is attributed to the oil and gas industry. It is difficult to predict a most likely scenario for this industry’s growth due to economic fluctuations. Three projection scenarios for year 2030 were prepared to cover a range of potential outcomes related to the oil industry.
- An analysis of oil lease patterns suggests that oil-related traffic may increase on portions of the TRE Corridor, but will likely not occur along the entire length of the Corridor. The current oil traffic patterns seem to be concentrated in an area surrounded by the communities of Williston, Watford City, New Town, Stanley, Tioga, and Ray.
- No evidence was found to indicate that growth in agriculture or manufacturing will have a significant future impact on traffic along the TRE Corridor. Similarly, the growth in tourism related traffic, which is mainly passenger vehicles, is included in the historical traffic growth rates.
• There are other industries that exist within North Dakota, such as wind energy and ethanol production, although the associated traffic does not seem to be highly significant since most of that development is presently further east than the TRE Corridor.
• There does not seem to be any significant findings to support that traffic increases on other segments of the GPITC beyond North Dakota’s borders would result in significant traffic increases on the TRE Corridor.
• Relatively flat population growth in the study area over the last few decades does not provide a basis for understanding impacts of future population growth on the TRE Corridor. However, preliminary census estimates do show some population increases in some areas along the TRE Corridor.

III. Phase II Action Items

The NDDOT will make the determination if Phase II of the Corridor Study should be initiated. This report provides the following recommendations for consideration in Phase II of the Corridor Study:

• Conduct a crash analysis along the TRE Corridor, especially where the truck volumes are significantly increasing. The results of the analysis may indicate locations where safety improvements are needed. Currently, none of the TRE Corridor that encompasses US Highway 85 has been identified in NDDOT’s Critical Crash Segment List.
• Safety considerations pertaining to shoulder width, cross section, and other geometric elements should be compared with NDDOT’s standard for this corridor designation.
• Conduct travel time studies to determine the free flow speed (FFS). The FFS is the starting point to analyzing capacity and Level of Service (LOS) for uninterrupted flow conditions.
• Determine the existing and projected LOS for the TRE Corridor. Highway Capacity Manual formulas should be applied to account for heavy vehicle conversion and other correction factors.
• Conduct further analysis to determine whether passing zone opportunities can be introduced within the TRE Corridor to reduce the number of miles for which a no-passing condition exists. The need for climbing lanes, turn lanes, and acceleration or deceleration lanes could also be examined.
• Consider analysis to determine the number and size of oversize loads, and need and feasibility for upgrading bridges along the TRE Corridor to handle oversized loads.
• Consider completing an independent detailed demographic and origin destination travel study to identify specific travel patterns which would influence traffic on the TRE Corridor.
• Prepare some “typical” development setback and backage road drawings that could be used by townships, cities, and counties in revising their development codes. Another option is for NDDOT to provide uniform recommended development codes to the local jurisdictions for their consideration.
• The development of an access control policy that recognizes minimum required intersection spacing may reduce the need for costly or potentially disruptive access revisions in the future. It is recommended that the existing policy of allowing no more than five access points per mile of highway frontage be modified to also specify a minimum spacing. For access requests outside the extraterritorial planning boundary of communities, the recommended minimum spacing is
that which meets the reconstruction design speed requirements. For access requests within the extraterritorial boundary of communities (which is where the majority of strip development occurs), the minimum access spacing is recommended to be based upon a 40 mph design speed, or the posted speed limit at the access location, whichever is greater. New access point requests within an existing community should consider a traffic operations analysis to determine if there would be any impacts resulting from inadequate traffic signal spacing now or in the future.

- Develop an appropriate urban access control policy that could be provided to communities along US and state highways.

Although beyond the authority of the NDDOT, and the potential scope of Phase II, a general recommendation is to create a task force to investigate and recommend how to construct additional oil pipelines in western North Dakota. A financial analysis between pipeline investment and transportation infrastructure investment would help prioritize where dollars should be spent.
CHAPTER 1  
CORRIDOR STUDY OVERVIEW

I. Introduction

The Great Plains International Trade Corridor (GPITC) extends from Mexico to Canada and is composed of three segments: (1) Ports-to-Plains Corridor; (2) Heartland Expressway; and (3) Theodore Roosevelt Expressway. The focus of this Corridor Study is the Theodore Roosevelt Expressway (TRE). This begins in Rapid City, SD and continues to the Port of Raymond at the Montana/Canada border. See Exhibit 1: Corridor Study Location Map.

This Corridor Study was developed on behalf of the North Dakota Department of Transportation (NDDOT) and Williams County. The Corridor Study is being conducted in three phases. This document addresses Phase I of the study and focuses on socioeconomic and traffic conditions, right-of-way preservation strategies, and public involvement conducted during Phase I. For a more in depth discussion of socioeconomic conditions and traffic conditions, please refer to the Technical Memorandum: Socioeconomic and Traffic Conditions (January 2010).

II. Purpose of the Corridor Study

The primary purpose of the Corridor Study is to examine socioeconomic data for the North Dakota portion of the TRE in order to allow the development of an accurate estimation of future traffic along the TRE Corridor. Ultimately the objective is to develop a corridor master plan and environmental document that identifies and defines the purpose of recommended improvements and prepares projects for entry into North Dakota’s Statewide Transportation Improvement Program or other implementation strategies. The recommendations provided within this study are the first step in developing a package of strategies and proposed improvements to achieve the guidelines identified by the NDDOT as the Interregional System, such as the TRE Corridor along US Highway 85 & US Highway 2. Projects that may arise as a result of this corridor master plan would be subject to the National Environmental Policy Act of 1969, as amended and other applicable regulations.

III. Corridor Study Area

The TRE is comprised of approximately 445 miles in South Dakota, North Dakota, and Montana. The TRE Corridor follows I-90 northwest to Spearfish, SD, where it connects with US Highway 85. The Corridor then follows US Highway 85 north into North Dakota and passes through the cities of Bowman, Belfield, and Watford City before it junctions with US Highway 2 west of Williston, ND. At Williston, the Corridor turns west toward Montana following US Highway 2 to Culbertson, MT. From Culbertson, the Corridor follows MT Highway 16 north through Plentywood before terminating at the Port of Raymond where it connects to the Saskatchewan highway network. While the TRE Corridor traverses three states, the primary focus of this Corridor Study is a portion of the TRE within North Dakota.
Exhibit 1: Corridor Study Location Map
IV. Study Process

The Corridor Study has been divided into three separate phases. At the end of each phase, the North Dakota Department of Transportation (NDDOT) will make a decision on whether or not to proceed (if necessary) with additional phases. The focus of this report is on Phase I of the study. The scope of each phase is as follows:

- **Phase 1**
  - Identify transportation needs in the TRE Corridor
  - Identify a draft purpose and need for any potential Corridor improvements
  - Conduct public input meetings (2 meetings in each of four communities at 10% and 90% completion of this study)
  - Existing and forecast vehicle traffic volumes
  - Overview of types and volumes of freight movements
  - Identify transportation facilities and characteristics within the TRE Corridor study area (such as load restrictions, etc)
  - Identify potential right-of-way preservation and access management strategies
  - Provide a recommendation of whether to proceed with Phase 2
  - Identify a detailed scope for Phase 2

- **Phase 2**
  - Analyze traffic data from Phase 1
  - Identify safety issues
  - Collect additional data to further define purpose and need for future improvements
  - Develop preliminary Corridor improvement alternatives

- **Phase 3**
  - Refine and identify preferred alternatives
  - Prepare environmental document, either Environmental Assessment or Environmental Impact Statement
  - Conduct additional public meetings

V. Previous Studies

Over the last few years a number of studies examining the infrastructure needs and opportunities related to segments of the GPITC have been completed. These include the Great Plains International Trade Corridor Assessment, US 2/MT 16 Transportation Regional Economic Development Study, and the US 85 Corridor Study.

The Great Plains International Trade Corridor Assessment was completed in 2008 on behalf of the Texas Department of Transportation (TXDOT).

The study provided an overview of the entire GPITC Corridor. The findings determined that in 2006 approximately 90 million tons of freight was transported by truck between the corridor states, although it is unknown how much of this freight was transported through North Dakota.
Between 2006 and 2035, FHWA forecasts total truck freight (by weight) between the nine states traversed by the Corridor will increase by 114% to 193 million tons. However, it is not known how much growth may occur along the North Dakota portion of the TRE Corridor. In both 2006 and 2035, the top four commodities in terms of total tonnage moved by truck include:

- Cereal Grains
- Nonmetal mineral products
- Gravel
- Coal

Note that the above items are often more economically shipped long distances by rail.

The commodities transported by truck experiencing the highest growth (in terms of weight) between 2006 and 2035 include:

- Transport equipment (increasing 393%)
- Manufactured products (increasing 381%)
- Fuel oils (increasing 329%)

The US 2/MT 16 Transportation Regional Economic Development Study was completed in April 2007 for the Montana Department of Transportation. The purpose of the study was to identify economic, regulatory, and operational changes that would result in traffic and safety conditions to warrant building a four-lane roadway on the TRE in Montana. The study concluded:

- Economic development may incrementally increase if the infrastructure expands from two-lanes to four-lanes.
- Opportunities related to the agriculture and energy sectors in the region have a higher likelihood of being realized with a four-lane configuration than with a two-lane configuration.
- An improved two-lane configuration would provide a reasonably adequate future level of service but would not address system continuity issues.
- Four-lane continuity with adjoining segments of the US Highway 2 four-lane across ND (which compares a portion of the TRE Corridor) would provide regional interconnectivity by better positioning the Corridor from the strategic, competitive, user expectation, and design continuity perspectives.

The Montana 2009–2013 Statewide Transportation Improvement Program anticipates completion of preliminary engineering for a four-lane highway design from the North Dakota border to approximately eight miles west.

The US 85 Corridor Study was completed in December 2007 by the NDDOT’s Planning and Programming Division – Traffic Operations Section. The purpose of the study was to evaluate US 85 from the south junction of ND 200, north to the junction with US 2. This section of US 85 has recently seen an increase in traffic volumes (especially truck volumes), mostly due to the increase of regional oil activity.

The study analyzed existing (2007) and projected (2027) traffic conditions. The annual growth rates for the total traffic ranged from 1% to 2.5%, with an average of 1.5%. The annual growth rates for the truck traffic ranged from 2.0% to 3.5%, with an average of 2.7%. It was not stated whether the growth rates were based on historical growth, or whether they were adjusted for increased oil activity.
The study considered potential traffic safety and operations improvements to address present and future traffic demands. Key study conclusions were:

- Existing traffic control and speed zones are acceptable.
- Safety measures such as rumble strips, guardrail, pavement markings, and recovery approaches should be installed in specific areas.
- Turn lanes for higher traffic intersections (mainly near the urban areas) should be installed.
CHAPTER 2  EXISTING CORRIDOR STUDY CONDITIONS

I. Introduction

The purpose of this chapter is to identify the existing conditions along the TRE Corridor in order to understand potential transportation-related demands and influences within the study area.

II. Socioeconomic Conditions

Socioeconomic data provides information about the Corridor and what is happening within it. The TRE Corridor serves as a key north-south linkage between many communities in western North Dakota. The socioeconomic character of the study area both influences the traffic patterns on the Corridor and is influenced by the characteristics of the Corridor. This section summarizes key indicators that define the demographic and economic character of the study area.

a. Population

The population within the study area grew rapidly between 1900 and 1930 as the region was settled. Over the decades following 1930, the study area population began to subside but grew to reach a new peak in 1960 during the Baby Boom years. Since then the study area’s rural population has generally been declining while there has been continuing growth in the urban areas, especially in South Dakota. See Exhibit 2, Study Area County Population by State.
The population of the study area was still largely rural in the 1960s but it was beginning to urbanize. By the 1990 census, the rural population was smaller than the urban population and by 2000 there was 28% more urban than rural population in the study area. While the growth of urban cities accounts for a significant part of this change, the largest factor is the loss of rural population by over 60,000 from 1960 to 2000. See Exhibit 3, Study Area Rural-Urban County Population by State.

With the exception of Butte, Lawrence, and Pennington Counties in South Dakota, all of the counties within the study area are anticipated to have a population decrease between the 2000 census and the 2008 census estimates. The recent oil boom, which began in 2005, is generally believed to have resulted in population increases in many of the study area counties. However, 2008 US Census Bureau population estimates do not take into account temporary workers or regional oil and gas boom impacts. It is reasonable to conclude that recent activity in parts of the study area has had an impact on its demographic characteristics.

b. Employment

Employment and unemployment rates are common indicators of economic health. Employment change among the study area counties for the period between 2004 and 2008 ranged from a decline of over 13% to an increase of 75%. Generally, it is believed that employment has risen throughout much of the study area. Four counties had employment increases of 13% or more. The average employment change among all study area counties was just over 13%. Employment rates are illustrated in Exhibits 4–6.
Exhibit 4: Employment Rates by County (Montana)

Exhibit 5: Employment Rates by County (North Dakota)
Unemployment rates for the counties within the TRE Corridor Study are summarized in Exhibits 7–9. Roosevelt County in Montana and Mountrail County in North Dakota both appear to be anomalies in an otherwise close clustering of rates. Their higher rates appear related to the historically high unemployment rates on American Indian reservations located in those counties.
Exhibit 8: Unemployment Rates by County (North Dakota)

Exhibit 9: Unemployment Rates by County (South Dakota)
c. Households and Income

Households are considered a primary economic unit, in that they consume and provide demand for products. Households within the study area have been following a national trend where the number of households has been increasing while the number of persons per household has been decreasing. See Exhibit 10, Study Area Households by State, and Exhibit 11, Study Area Persons Per Household by State.

Exhibit 10: Study Area Households by State

Exhibit 11: Study Area Persons per Households by State
In addition, income has generally increased within the study area. Based on data from the US Census Bureau and the US Department of Agriculture Economic Research Service, between 2000 and 2007 the income in study area counties in Montana has increased an average of 29.6%, in North Dakota an average of 32.9%, and within South Dakota an average of 27.1% (Note: these numbers were not adjusted for inflation). The analysis did not include a comparison of the income trends outside the study area. The impacts of this on TRE Corridor traffic are unknown.

d. Industrial Influences

The primary industries in North Dakota are agriculture, manufacturing, coal mining and conversion, oil and gas exploration, extraction and refining, tourism, and exported services. A study regarding North Dakota’s economic base\(^1\) indicates that all primary industries grew during the period from 1990 through 2007. However, the oil and gas industry grew by approximately 280%, outpacing all other primary industries; besides tourism; which grew by approximately 671%. Between 2005 and 2007, exported services and the oil and gas industry outpaced other primary industries, with exported services growing by approximately 134% and the oil and gas industry growing by approximately 40%. See Exhibit 12, North Dakota Primary Industries Estimated Revenue. From this data, it is anticipated that oil and gas development has the largest impact on employment change and economic growth in the study area.

Key industries influencing the TRE Corridor, such as renewable energy, oil and natural gas, agriculture and livestock, manufacturing, and tourism, were analyzed further. There are other industries that are active in the western part of North Dakota, like the coal industry, but they were considered to have minimal impacts on the TRE Corridor.

i. Canadian Traffic and Influences

According to the US Commercial Service, the trade promotion unit of the International Trade Administration, over 70% of Canada-United States trade is transported by truck. The inland port of entry on the Canadian border serving the states that contain the GPITC is the Port of Raymond. The nearest port of entry along major north-south corridors include Sweetgrass, MT along I-15 to the west; and Portal, ND along US Highway 52 to the east. Port of Raymond, which is located on the TRE Corridor, is Montana’s third largest port based on traffic volume. Portal is the second largest port in North Dakota and serves trips southeast of Portal, ND.

Table 1 shows traffic fluctuations coming from Canada. There are many factors that influence the truck traffic at ports. Factors include port hours of operation, exchange rate fluctuations, security changes (especially after September 11, 2001), improvements to customs facilities, and highway improvements.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Portal — Autos</td>
<td>—</td>
<td>65,186</td>
<td>104,360</td>
</tr>
<tr>
<td>Portal — Trucks</td>
<td>64,581</td>
<td>53,356</td>
<td>84,883</td>
</tr>
</tbody>
</table>


The TRE Corridor connects to the Canadian province of Saskatchewan and leads to Regina and Saskatoon, two primary cities in the province. Saskatoon is the largest city in Saskatchewan, having a population of 226,000. Regina, Saskatchewan’s Capital, is the second largest city with a population of 193,000. Regina is located approximately 100 miles north of the Port of Raymond, making it the nearest trade center.

Saskatchewan’s Highway 6 connects Regina to the TRE Corridor. It is a two-lane roadway with ADTs ranging from 300 at the Port of Raymond to 4,200 near Regina according to the 2007 Traffic Volume Map created by the Saskatchewan Ministry of Highways and Infrastructure.
ii. Renewable Energy

As carbon energy sources have become more costly, and identified as more environmentally unfriendly, the renewable energy market is on the rise. Renewable energy is generated using natural resources such as biomass, wind, water, and solar. Renewable energy production is occurring in the TRE study area and its impacts on the traffic volumes along the TRE Corridor have been considered.

Ethanol is currently produced in western North Dakota. An existing 55 million gallon ethanol plant is located in Richardton and a new plant is being planned in Williston. The potential truck traffic associated with an ethanol plant may be significant. A 100 million gallon plant can consume/produce the following annually:

- 35.6 million bushels of corn (122 truckloads/day)
- 300,000 tons of coal (37 truckloads/day)
- 300,000 tons of distiller grains (37 truckloads/day)

In total, if all the corn, coal, and distiller grains were moved by truck it would require nearly 200 truckloads daily. However, most of the input and output products for an ethanol plant in western North Dakota would be transported by rail.2

Rail is most cost-effective over medium to long range distances (between 300 to 2,000 miles), while trucks economically cover distances under 300 miles. Trucks are also required for delivering ethanol to terminals that do not have rail accommodations.

Depending on a plant’s production capacity, rail shipments may be as small as one rail car (with approximate capacity of 29,000 gallons) to multi-car movements. Comparatively, trucks transport approximately 8,000 gallons.3

Wind energy is another renewable energy that has potential in the TRE region. North Dakota and South Dakota have been identified within the top five states for potential wind energy production. Wind energy impacts the highway system through the transportation of the wind turbines. Transport of wind turbine components requires approximately 15 trucks, the majority of which require oversize/overweight permits.4

Much of North Dakota’s wind generation potential is not expected to generate significant traffic on the TRE Corridor since both the origin and destination of the wind turbine components are mostly to the east of the TRE Corridor.

iii. Oil & Natural Gas

Oil and natural gas exploration and production have had a large impact on western North Dakota. The state’s Three Forks-Sanish Formation could rival the nearby Bakken Formation. Together they could produce 30 years towards US oil needs. Today new drilling and recovery technologies make these fields

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2 NDDOT Presentation to the Interim Taxation Committee on Extraordinary Road & Bridge Impacts. July 2008.
3 Ibid.
ripe for production. Drilling and commercial production from the Three Forks-Sanish Formation is currently underway, though not to the level of the Bakken Formation.

Recent growth in the oil and gas industry has been documented by the North Dakota Oil and Gas Division of the Industrial Commission. *Exhibit 13, Annual Number of New Oil Producing Wells in North Dakota, illustrates the resurgence of oil exploration and development in (primarily) western North Dakota.*

To bring an average well on line requires 20,000 to 30,000 barrels of water which is equivalent to 150 to 230 truckloads. This water comes from wells scattered throughout the oil production area and local municipal sources. It also requires 1 to 2 million pounds of sand which is equivalent to 24 to 48 truckloads. Sand is trucked in from Canada, or railed in to a transload facility in Williston, and then trucked to individual well sites.\(^5\) It is not known how much of this traffic is directly attributable to oil and gas development near the TRE Corridor.

Manufacturing and transport of specialized drilling and rigging equipment is another transportation dimension to the oil and natural gas drilling. Many different pieces of equipment are necessary to bring an oil well into production. Several loads involve oversize and overweight movements. Of the 40 to 50 loads necessary to move a drilling rig, almost half require permits since they exceed legal weights, and 3 out of every 4 loads are oversized.\(^6\)

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\(^5\) NDDOT Presentation to the Interim Taxation Committee on Extraordinary Road & Bridge Impacts. July 2008.

\(^6\) Ibid.
With the four-year history of truck permits shown in the table, it can be seen that counties with high oil and gas industry activity such as Dunn, McKenzie, Mountrail and Williams Counties; have experienced marked increases in the number of oversize/overweight truck traffic. The oversize/overweight trucks tend to travel at slower speeds, and their speeds may be more affected by uphill climbs, possibly contributing to increased motorist delay and/or a desire for faster vehicles to pass the trucks. However, these permits are issued for oversize/overweight trucks that use county roads. It is unknown how many of these permits also used the US and State highways, and the amount of oversize/overweight trucks traveling on the TRE Corridor. Information from the ND Association of Oil & Gas Producing Counties on the number of oversized/overweight truck permits is shown in Table 2.

<table>
<thead>
<tr>
<th>County</th>
<th>Jul 05 – Jun 06 TOTAL</th>
<th>Jul 06 – Jun 07 TOTAL</th>
<th>Jul 07 – Jun 08 TOTAL</th>
<th>Jul 08 – Jun 09 YTD TOTAL</th>
<th>5 Months FY10 YTD TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAMS</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>BILLINGS</td>
<td>2,001</td>
<td>2,752</td>
<td>1,941</td>
<td>1,439</td>
<td>436</td>
</tr>
<tr>
<td>BOTTINEAU</td>
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<td>133</td>
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<td>97</td>
<td>55</td>
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<tr>
<td>DIVIDE</td>
<td>393</td>
<td>281</td>
<td>326</td>
<td>620</td>
<td>262</td>
</tr>
<tr>
<td>DUNN</td>
<td>505</td>
<td>1,701</td>
<td>4,110</td>
<td>4,656</td>
<td>2673</td>
</tr>
<tr>
<td>GOLDEN VALLEY</td>
<td>872</td>
<td>666</td>
<td>586</td>
<td>399</td>
<td>211</td>
</tr>
<tr>
<td>MCKENZIE</td>
<td>1,603</td>
<td>2,687</td>
<td>3,143</td>
<td>4,276</td>
<td>1984</td>
</tr>
<tr>
<td>McLEAN</td>
<td>39</td>
<td>11</td>
<td>12</td>
<td>76</td>
<td>128</td>
</tr>
<tr>
<td>MERCER</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>107</td>
<td>24</td>
</tr>
<tr>
<td>MOUNTRAIL</td>
<td>267</td>
<td>396</td>
<td>4,074</td>
<td>7,660</td>
<td>3647</td>
</tr>
<tr>
<td>RENVILLE</td>
<td>158</td>
<td>202</td>
<td>198</td>
<td>119</td>
<td>65</td>
</tr>
<tr>
<td>SLOPE</td>
<td>597</td>
<td>512</td>
<td>482</td>
<td>549</td>
<td>172</td>
</tr>
<tr>
<td>STARK</td>
<td>533</td>
<td>878</td>
<td>1,595</td>
<td>1,617</td>
<td>689</td>
</tr>
<tr>
<td>WARD</td>
<td>81</td>
<td>101</td>
<td>137</td>
<td>180</td>
<td>419</td>
</tr>
<tr>
<td>WILLIAMS</td>
<td>1,236</td>
<td>1,471</td>
<td>2,109</td>
<td>2,320</td>
<td>1380</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10,662</td>
<td>14,008</td>
<td>20,642</td>
<td>26,244</td>
<td>12,917</td>
</tr>
</tbody>
</table>
While pipelines provide the most efficient and cost effective method for transporting crude oil and refined products, trucks and rail also transport oil from production sites to refineries and ultimately to consumers. In 2008, oil from 65% of the state’s wells was transported to tank farms by truck. Oil from the remaining 35% of wells was transported by pipeline.\(^7\)

In addition to oil, almost all wells produce saltwater which needs to be disposed of at a permitted saltwater disposal site. The amount of saltwater varies significantly from one geologic formation to another, and may be up to 10 times the amount of oil produced. The Bakken oil wells typically produce four barrels of oil per barrel of saltwater, while the non-Bakken wells typically produce one barrel of oil per four barrels of saltwater.

In March of 2008 the oil extraction process produced more than 8.5 million barrels of saltwater. Approximately 3 million barrels, or 35% of the saltwater, was transported by truck to permitted disposal sites. This is equivalent to 23,127 truckloads during that month, or almost 750 truckloads per day.\(^8\)

Oil production also produces natural gas. Currently there are 8 natural gas plants operating in North Dakota, with 4 more proposed. When all 12 plants are on-line they will generate between 25 and 35 total truckloads per day.\(^9\)

Without more pipeline capacity, it is not possible to transport all of the oil being produced in the region to domestic refineries except by trucking and rail. Trucking and rail transport of oil to refineries significantly cuts producer’s profits and dampens investment in the area. Highway transportation is important for the oil industry primarily for movement of supplies, equipment and workers. A large proportion of supply transportation and personnel travel to work occurs on local roads in remote areas.

iv. Agriculture and Livestock

The agriculture and livestock industry is a key industry in the TRE region and relies heavily on trucking. Even those products which will ultimately be transported via rail need to first be initially trucked to a loading facility. In 2006, the North Dakota agricultural production was 57.0 billion pounds, which is approximately 1.3 million truckloads.\(^10\) Of the 57 billion pounds, 8.2% originated in the counties served by the TRE Corridor.

Modal transportation of grain from an elevator is primarily by rail or truck. The distribution by mode depends on the commodity being shipped, price, and the proximity to processing plants. Other factors influencing the choice of mode include the reliability of service, availability of equipment, and customer preference.

The recent trend toward consolidating grain elevators along Class 1 Railroad\(^11\) mainlines has changed truck traffic patterns.

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\(^7\) Ibid.
\(^8\) Ibid.
\(^9\) Ibid.
\(^10\) Ibid.

\(^11\) According to the Association of American Railroads, Class 1 railroads are those with operating revenue greater than $401.4 million (2008).
Another factor contributing to a high use of truck transportation is the production of certain specialized high-value crop varieties, such as organic grains, seed and pulse crops. These higher value crops are typically shipped by truck.\textsuperscript{12} Shipment of specialty crops by truck is primarily due to the fact that intermodal container service is not readily available in North Dakota.

The typical modal flow for grain movement is from producer to storage to user. A 2001 survey of grain elevators in Colorado, Kansas, Minnesota, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas indicated that 54% of the grain delivered to the surveyed elevators arrived via truck.\textsuperscript{13}

\section*{v. Manufacturing}

North Dakota is one of only three states to experience a growth in manufacturing between 2000 and 2006.\textsuperscript{14} While most of the manufacturing activity occurs on the eastern side of the state (in the urban areas), there are several manufacturing companies located in western North Dakota most of which employ less than 25 people.

Approximately 80% of the manufactured goods produced in North Dakota are transported by truck. The other 20% are transported by rail. Statewide, the annual truckloads generated from the manufacturing industry are nearing one million.\textsuperscript{15} Currently, we do not know how much traffic on the TRE Corridor is attributable to manufacturing.

\section*{vi. Tourism}

Many of the Upper Great Plains tourist destinations are located in rural areas, including the region’s state and national parks (Custer State Park, Mount Rushmore National Memorial, Badlands National Park, and Theodore Roosevelt National Park), reservoirs (Fort Peck Lake and Lake Sakakawea), and other recreational areas (Black Hills National Forest).

According to the North Dakota tourism website, there were 2.3 million visitors in the western region of North Dakota in 2006. Of the 2.3 million, 1.1 million were visiting family and friends, 0.8 million were visiting for pleasure and 0.4 million were visiting for business. The most common pleasure trips for this state’s western region include:

\begin{itemize}
  \item Touring (41%)
  \item Outdoor Activities (23%)
  \item Special Event (16%)
\end{itemize}

In South Dakota, seven of the State’s top nine target markets for tourism are located on or near the TRE Corridor. These include Rapid City, Custer, Keystone, Hill City, Deadwood, Spearfish, and Black Hills.

\textsuperscript{12} \textit{Transportation Regional Economic Development: Theodore Roosevelt Expressway-Summary and Conclusions: Final.} Montana Department of Transportation. April 2007.


\textsuperscript{14} \textit{NDDOT Presentation to the Interim Taxation Committee on Extraordinary Road & Bridge Impacts.} July 2008.

\textsuperscript{15} \textit{Ibid.}
Tourism is South Dakota’s second-largest industry, and Mount Rushmore is its top tourist attraction. According to the National Park Service statistics, in 2008 almost 2.1 million visitors traveled to Mount Rushmore.

No data was found to indicate how much tourism traffic uses the TRE Corridor. Most of the traffic generated by the tourism industry is passenger vehicles and RVs. This traffic does not impact the condition of the pavement to the same extent as a loaded tractor-trailer, but it does impact the operation of a road. Tourists tend to drive slower and frequently pull over for site-seeing opportunities.

III. Transportation System

a. Roadway Classification

The TRE Corridor through North Dakota is comprised of US Highway 85 and US Highway 2, and is classified as rural principal arterials. In addition, the Federal Highway Administration has classified these routes along the TRE as part of the National Highway System (NHS), which recognizes the national significance of the route with regard to national economic importance. As such, the NHS designation introduces additional federal design requirements when federal funding is used for certain types of improvements.

The NDDOT has taken the federal functional classification system further, and has classified all of the rural state highways into a roadway hierarchy system tailored specifically to North Dakota’s transportation system performance needs. The performance classifications are as follows:

- Interstate System
- Interregional System
- State Corridor
- District Corridor
- District Collector

The entire length of the Theodore Roosevelt Expressway contained on US Highway 85 and US Highway 2 in North Dakota is classified as Interregional System. The guidelines for the highway fall under the Interregional System.

b. Interregional System

The Interregional System consists of highways that function as Principal Arterials and provide a low degree of land access. Maintaining a high degree of reliability and mobility on these highways is critical since they support and promote international, national, regional and state trade and economic activity. Some segments of the state’s interregional system comprise portions of other national and regional priority systems. Passenger, commodity and freight movements on these highways are primarily long-distance, interstate and intrastate traffic. Interregional System highways are either two-lane or multiple lane facilities. Segments or specific locations may have partially controlled access. Not more than five access points (including section line accesses) per mile per side are desirable.

The NDDOT has determined the following performance guidelines for the Interregional System in North Dakota:
• Load Restrictions—Year round load limits are restricted by legal weights (105,500 lbs.)

• Design Characteristics—Referencing the Interregional System Classification, one can determine a number of design guidelines for the TRE. If the existing roadway was redesigned as a new two-lane expressway it would, for the most part, maintain the current design speed of 65 mph. Other factors such as terrain, traffic volumes and urban settings could require a change in the design speed throughout the entire length of the expressway, similar to what exists today. The optimum shoulder design for these criteria could be an 8’ wide shoulder with a maximum cross-slope of 6%. Passing lanes would be considered in areas of varying terrain. The frequency of the passing areas would be every 3-5 miles based on local traffic volumes (Refer to the NDDOT Design Manual Section I-06.03 Design Guidelines for design criteria).

• Ride/Distress—Strive to maintain an excellent Ride on all segments.

• Bridge Sufficiency—Bridges and overhead structures provide for the unrestricted movement of legal loads.

• Access Control—Partial access control may be acquired near urban areas, some rural communities or major intersections. Not more than five approaches per mile per side (with opposite side alignment preferred) are desirable.

• Safety—New or reconstruction projects will include all necessary safety improvements. The Interregional System goals are to have truck pullouts, rest areas, and separated or signalized at-grade rail crossings. Crash rates are below the statewide average.

• Operational Reliability—The Interregional System is highly reliable with only isolated or limited closures due to seasonal occurrences such as blizzards, spring flooding, excessive rainfall, and construction or surface blowups. After the Interstate System, these highways are the first priority to receive weather-related maintenance.

c. Roadway Characteristics

The following sections discuss the existing roadway characteristics as they relate to the identified guidelines of the Interregional System.

i. Load Restrictions

The existing roadway currently supports year round legal loads of 105,500 lbs. There are typically no more restrictive spring load restrictions imposed upon the highways along the TRE.

ii. Design Characteristics

The existing roadway has a rural posted speed limit of 65 mph, consistent with Interregional System goals. The speed limit is reduced through the steep terrain of the Little Missouri River valley, where truck climbing lanes are provided on both the north and south sides of the valley. Truck turnarounds are provided on either side of the valley before trucks proceed down the hill. Outside the valley, there are no additional passing lanes added alongside the highway (Note: an in-depth analysis of passing zones was outside the scope of this report).
Speed limits and roadway designs vary through communities along the TRE, ranging from 25 mph speed limits through curbed streets in towns such as Bowman and Watford City, and 45 mph rural highway segments such as in Fairfield and Arnegard. There are no bypasses provided around any of the seven communities that travelers must slow down to pass through. Grassy Butte is located immediately adjacent to the TRE, but has no speed reduction zone.

iii. Shoulers

NDDOT shoulder width guidelines for Interregional Roadways are 8 feet wide. A review of existing conditions identified shoulder widths along US Highway 85 which are summarized in Table 3, and Exhibits 14 and 15.

<table>
<thead>
<tr>
<th>Shoulder Width</th>
<th>Miles</th>
<th>Percent of TRE Corridor in ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 feet</td>
<td>0.8</td>
<td>0.5%</td>
</tr>
<tr>
<td>4 to 6 feet</td>
<td>32.8</td>
<td>18%</td>
</tr>
<tr>
<td>6 to 8 feet</td>
<td>85.8</td>
<td>46.5%</td>
</tr>
<tr>
<td>≥ 8 feet</td>
<td>64.3</td>
<td>35%</td>
</tr>
</tbody>
</table>

What function does a shoulder serve?

- Safety buffer before a vehicle would leave the road
- Space for emergency stops outside of travel lanes
- Additional room for slower agricultural machinery to keep right
- Additional visibility and reaction time for a motorist when an animal enters the roadway
- May accommodate pedestrians and bicyclists when on pedestrian/bicycle facilities are available
- Wider shoulders may function as in informal right turn lane for turning traffic to move out of higher speed through lane
Exhibit 14: Existing Shoulder Widths
Exhibit 15: Existing Shoulder Widths Continued
iv. Pavement Conditions

Two of the tools the NDDOT uses to evaluate the condition of roadways are International Roughness Index (IRI) and Rut Depth (Rut). The IRI scores are divided into four categories: excellent, good, fair, and poor. See Table 4, IRI. Once a roadway has scores in the poor category, it is considered for a project to improve the roadway. An evaluation of those segments of US Highway 85 and US Highway 2 which comprise the TRE in North Dakota was done in June of 2009.

1. International Roughness Index

Motorists often judge the quality of a highway by how smooth or rough riding the road feels. The quality of the ride is measured using the IRI, which is determined by computerized measurements taken from a specially equipped vehicle. If a highway was perfectly smooth, the IRI would be zero (i.e., no vertical movement or bumps felt by the vehicle). In the real world, however, roughness in the form of dips and bumps exist and vertical movement of vehicles occurs, even on a brand new surface. As a result, the IRI is always greater than zero. A higher IRI number indicates increasing roughness on the roadway.

The majority of the TRE is in the good and fair categories with a small amount in the excellent and poor categories. Those segments in the poor category in accordance with NDDOT Design Manual Guidelines are summarized in Table 5, Poor IRI Ratings.

<table>
<thead>
<tr>
<th>US Highway</th>
<th>Location</th>
<th>Reference Point</th>
<th>IRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>Between Fairfield and the Little Missouri River Bridge</td>
<td>97–98</td>
<td>147.3</td>
</tr>
<tr>
<td>85</td>
<td>Little Missouri River Valley</td>
<td>122–123</td>
<td>168.2</td>
</tr>
<tr>
<td>85</td>
<td>Little Missouri River Valley</td>
<td>123–124</td>
<td>170.4</td>
</tr>
<tr>
<td>85</td>
<td>Little Missouri River Valley</td>
<td>125–126</td>
<td>177.9</td>
</tr>
<tr>
<td>85</td>
<td>Little Missouri River Valley</td>
<td>126–127</td>
<td>199.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IRI Number</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–60</td>
<td>Excellent</td>
</tr>
<tr>
<td>61–99</td>
<td>Good</td>
</tr>
<tr>
<td>100–145</td>
<td>Fair</td>
</tr>
<tr>
<td>&gt; 145</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Table 4: IRI
Note that the areas between Reference Points (RP) 122 and RP 127 are where US Highway 85 passes through an area of the Badlands where unstable soils are present. The highway has experienced continued movement in the soils underlying the highway in this area, which has been difficult to stabilize.

2. Rut

Ruts, also known as depressed wheel tracks, are a result of repeated heavy loads on asphalt pavements. Rut depth is measured to determine the severity of rutting. Severe rutting may have an influence on a motorist’s control of a vehicle, particularly on wet pavements when water ponds in the ruts. Rut depth is divided into four categories, similar to IRI: excellent, good, fair, and poor. See Table 6, Rut Categories.

The majority of the TRE Corridor is in the good and fair categories with a small amount in the excellent and poor categories. Those segments in the poor category in accordance with NDDOT Design Manual Guidelines are summarized in Table 7, Poor Rut Ratings.

<table>
<thead>
<tr>
<th>Table 6: Rut Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rut Depth</strong></td>
</tr>
<tr>
<td>&lt; 0.25”</td>
</tr>
<tr>
<td>0.25”–0.37”</td>
</tr>
<tr>
<td>0.38”–0.50”</td>
</tr>
<tr>
<td>&gt; 0.50”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7: Poor Rut Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US Highway</strong></td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>85</td>
</tr>
</tbody>
</table>
v. Existing Traffic Conditions

1. North Dakota

In order to fully understand the TRE Corridor, existing traffic conditions were analyzed. Existing traffic conditions can be used to identify possible short range improvements, to compare what is occurring on the TRE Corridor with regional or national trends, and to project future traffic volumes.

To evaluate the TRE Corridor through North Dakota, the Corridor was split into three sections:

- Section 1—Montana border to 10 miles north of Grassy Butte
- Section 2—Ten miles north of Grassy Butte to the Slope/Stark county line
- Section 3—Slope/Stark county line to the South Dakota border

These sections were chosen because they have dissimilar traffic conditions and are influenced by specific industries independently as shown in the growth patterns. See Exhibit 16, Section Locations, and Table 8, ND Traffic Volumes.
Table 8: ND Traffic Volumes

<table>
<thead>
<tr>
<th>TRE Section</th>
<th>2008 Average AADT(^{16})</th>
<th>2008 Average TAADTT(^{17})</th>
<th>2008 % Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>2,100</td>
<td>470</td>
<td>22%</td>
</tr>
<tr>
<td>Section 2</td>
<td>1,560</td>
<td>370</td>
<td>24%</td>
</tr>
<tr>
<td>Section 3</td>
<td>1,250</td>
<td>230</td>
<td>18%</td>
</tr>
</tbody>
</table>

The TRE Corridor hourly volumes were analyzed to determine whether the energy activity influenced the level and time for peak hour traffic. This information was compared with peak travel volumes and times along the US 281 Corridor, which has minimal influence from energy industry. US Highway 281 was used as a comparison because it is also a north-south route and has similar daily traffic volumes. Analysis revealed that peak hours and volumes were similar; however, percentage of heavy vehicles was greater on US Highway 85. See Table 9, Peak Hour Volumes.

Table 9: Peak Hour Volumes

<table>
<thead>
<tr>
<th>Category</th>
<th>US Highway 85</th>
<th>US Highway 281</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak Time</td>
<td>10:00–11:00</td>
<td>10:00–11:00</td>
</tr>
<tr>
<td>AM Peak Volume</td>
<td>135</td>
<td>145</td>
</tr>
<tr>
<td>% Heavy Vehicles</td>
<td>28.9%</td>
<td>24.8%</td>
</tr>
<tr>
<td>% of Daily Traffic</td>
<td>6.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>PM Peak Time</td>
<td>4:00–5:00</td>
<td>3:00–4:00</td>
</tr>
<tr>
<td>PM Peak Volume</td>
<td>167</td>
<td>174</td>
</tr>
<tr>
<td>% Heavy Vehicles</td>
<td>25.7%</td>
<td>16.7%</td>
</tr>
<tr>
<td>% of Daily Traffic (Heavy Vehicles)</td>
<td>27.4%</td>
<td>18.5%</td>
</tr>
<tr>
<td>Total Daily Traffic</td>
<td>(2,027)</td>
<td>(2,057)</td>
</tr>
</tbody>
</table>

\(^{16}\) Annual Average Daily Traffic

\(^{17}\) Truck Annual Average Daily Traffic
Over the last 10 years the truck traffic on US 85 has been increasing at a faster rate than estimated by the US 85 Corridor Study completed by NDDOT in December 2007. Since the increase in truck traffic was the greatest in the northwestern part of North Dakota, the major contributor was identified as the oil and gas industry. See Table 10, Average Annual Growth from 1998 to 2008.

<table>
<thead>
<tr>
<th>TRE Section</th>
<th>Total Traffic</th>
<th>Truck Traffic</th>
<th>Non-Truck Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>1.6%</td>
<td>8.1%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Section 2</td>
<td>1.1%</td>
<td>6.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Section 3</td>
<td>-0.1%</td>
<td>1.9%</td>
<td>-0.4%</td>
</tr>
</tbody>
</table>

The 10-year historical traffic volume growth for the TRE Corridor through North Dakota was split into two different time periods—1998 to 2005 and 2005 to 2008—to see how this recent oil boom effected the traffic growth. See Table 11, Traffic Growth Before and During Oil Boom. In addition, the truck traffic generating industries (oil, agriculture, and manufacturing) were analyzed independently to determine the total estimated amount of truck traffic generated in each county within the study area. See Table 12, Regional Truckloads Generated by Industry.

<table>
<thead>
<tr>
<th>TRE Sections</th>
<th>Average Annual Growth from 1998 to 2005</th>
<th>Average Annual Growth from 2005 to 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Traffic</td>
<td>Truck Traffic</td>
</tr>
<tr>
<td>Section 1</td>
<td>-0.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Section 2</td>
<td>-1.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Section 3</td>
<td>1.0%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>
### Table 12: Regional Truckloads Generated by Industry

<table>
<thead>
<tr>
<th>2008 Daily Truckloads Generated</th>
<th>Oil</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Through</th>
<th>Local</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1 Region</td>
<td>2,627</td>
<td>775</td>
<td>37</td>
<td>50</td>
<td>24</td>
<td>3,512</td>
</tr>
<tr>
<td>% of Total Trucks</td>
<td>75%</td>
<td>22%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Section 2 Region</td>
<td>897</td>
<td>385</td>
<td>54</td>
<td>50</td>
<td>18</td>
<td>1,405</td>
</tr>
<tr>
<td>% of Total Trucks</td>
<td>64%</td>
<td>27%</td>
<td>4%</td>
<td>4%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Section 3 Region</td>
<td>430</td>
<td>356</td>
<td>8</td>
<td>50</td>
<td>12</td>
<td>856</td>
</tr>
<tr>
<td>% of Total Trucks</td>
<td>50%</td>
<td>42%</td>
<td>1%</td>
<td>6%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

2. **South Dakota**

The TRE Corridor enters South Dakota from the north along US 85 and continues south to Belle Fourche. The Corridor (US 85) expands into a four-lane roadway from Belle Fourche to Spearfish, where it meets I-90. From there the TRE Corridor follows I-90 southeast to Rapid City, where it meets the north end of the Heartland Expressway.

Since the South Dakota section of the TRE Corridor changes from a two-lane highway to a four-lane highway to an interstate, it has very diverse traffic conditions. See **Table 13, 2007 South Dakota Average Traffic Volumes**.

### Table 13: 2007 South Dakota Average Traffic Volumes

<table>
<thead>
<tr>
<th>TRE Corridor in South Dakota</th>
<th>Length (Miles)</th>
<th>Average ADT</th>
<th>Average ADTT</th>
<th>% Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 85 (two-lane)</td>
<td>100</td>
<td>1,050</td>
<td>200</td>
<td>19%</td>
</tr>
<tr>
<td>US 85 (four-lane)</td>
<td>10</td>
<td>6,500</td>
<td>700</td>
<td>11%</td>
</tr>
<tr>
<td>Interstate 90</td>
<td>45</td>
<td>16,700</td>
<td>2,400</td>
<td>14%</td>
</tr>
</tbody>
</table>

Western South Dakota does not have major energy resource traffic generated as western North Dakota, but it does have a multitude of tourism attractions and events including the Badlands, Black Hills, Mount Rushmore, and the Sturgis bike rally.

It is expected that the South Dakota portion of the TRE will continue to grow at approximately the same rate as it has in the past. If significant improvements are made to the TRE Corridor in North Dakota or to the Heartland Expressway south of Rapid City, this may impact the traffic growth.
3. **GPITC**

The GPITC traverses over 2,300 miles through Texas, New Mexico, Oklahoma, Colorado, Nebraska, Wyoming, South Dakota, North Dakota and Montana. With the exception of the Corridor’s linkage to Denver, Colorado, the Corridor primarily serves rural areas and cities and towns with populations under 300,000. Currently, the majority of the route is a two-lane highway.

The traffic volumes on some segments of the GPITC are forecasted to grow 140% by 2030, which corresponds to a compound annual growth rate of approximately 4%. In contrast, annual vehicle miles traveled (rural) decreased nationwide. *See Table 14, Highway Traffic Characteristics.*

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<tbody>
<tr>
<td>Annual Vehicle-Miles of Travel (Millions)-Rural</td>
<td>5,372</td>
<td>5,627</td>
<td>+4.7%</td>
<td></td>
<td></td>
<td>6,519</td>
<td>6,416</td>
<td>-1.6%</td>
<td></td>
<td></td>
<td>1,084,961</td>
<td>1,035,303</td>
<td>-4.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Trucks-Rural</td>
<td>15.0%</td>
<td>21.2%</td>
<td>+41.3%</td>
<td></td>
<td></td>
<td>15.9%</td>
<td>14.3%</td>
<td>-10.1%</td>
<td></td>
<td></td>
<td>14.8%</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>Annual Vehicle-Miles of Travel (Millions)-Urban</td>
<td>1,845</td>
<td>2,217</td>
<td>+20.2%</td>
<td></td>
<td></td>
<td>1,913</td>
<td>2,589</td>
<td>+35.3%</td>
<td></td>
<td></td>
<td>1,664,842</td>
<td>1,994,519</td>
<td>+19.8%</td>
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<tr>
<td>Percent Trucks-Urban</td>
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<td>18.0%</td>
<td>+318.6%</td>
<td></td>
<td></td>
<td>6.6%</td>
<td>9.4%</td>
<td>+42.4%</td>
<td></td>
<td></td>
<td>7.0%</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</table>

*Source: Highway Statistics, 2000 and 2007 issues*

The North Dakota and South Dakota growth rates are higher than the national growth rate. However, it should also be noted that regional amount of miles traveled are relatively low. The TRE Corridor is the longest stretch of the GPITC with the lowest existing traffic volumes.
**d. Forecast Traffic Conditions**

Due to analysis of regional truckloads generated by industry, it was determined that the oil industry is the main variable for developing future traffic projections. Since the oil industry is the main truck traffic generator and is so dynamic, it is very difficult to predict the future regarding traffic impacts. Therefore, multiple scenarios were developed to give a range of potential outcomes.

1. Baseline  
2. Moderate Oil Boom  
3. Oil Boom  
4. Moderate Oil Boom with Increased Passenger Vehicle Usage  
5. Oil Boom with Increased Passenger Vehicle Usage

Assumptions that pertain to each of the Average Daily Truck Traffic (ADTT) projection scenarios are:

- The Baseline scenario is based on oil truck traffic growth similar to what occurred prior to the recent boom (1995–2005)  
- The Moderate Oil Boom scenario is halfway between the Baseline and Oil Boom scenarios  
- The Oil Boom scenario is based on a projection of oil truck traffic growth similar to what occurred during the recent oil boom (2005–2008)  
- Through, local and agricultural truck traffic will each increase by 50% (just over 2% per year). This follows historical baseline growth of traffic along the US 85 Corridor.  
- Manufacturing truck traffic in the region will increase by 118% (accounts for a proposed ethanol plant in Williston)  
- The same percentage of regional truckloads that use US 85 today will continue in the future.

See Exhibit 17, 2030 Traffic Projection Scenarios by Section.
Exhibit 17: 2030 Traffic Projection Scenarios by Section
e. **Traffic Operations**

According to the Highway Capacity Manual, the LOS for a two-lane highway is measured by the percent of time spent following another vehicle and the average travel speed. Accordingly, if the average travel speed along the Corridor is greater than 45 mph, a Class I facility is estimated to have a LOS C.

It is believed that this is currently the case for the majority of the Corridor. For future scenarios, it was determined that:

- The 2030 Baseline scenario operates at a LOS B
- The 2030 Oil Boom scenario operates at a LOS C
- The 2030 Oil Boom with Increased Passenger Vehicle Usage scenario operates at LOS C

i. **Right-of-way Preservation and Access Management**

Right-of-way preservation and access management are tools used in planning for the expansion of roadways and safe management of the traveling public. The following discussion summarizes right-of-way preservation and access management issues specific to the TRE Corridor.

ii. **Right-of-way Preservation**

Public input gathered in the early part of Phase I of the TRE Corridor Study indicated a public desire for improved truck passing opportunities, more turn lanes to remove slowing/turning vehicles from the paths of through vehicles, increased length of truck climbing lanes and the addition of more climbing lanes, as well as a desire by some to reconstruct the roadway to four lanes. The scope of Phase I of the TRE Corridor Study does not include the development of roadway improvement alternatives. However, it may is be desirable to consider if right-of-way preservation strategies that may be implemented today in order to minimize the impacts of any future roadway improvements.
Since the roadway alternatives have not been identified yet, it would be premature to acquire any additional right-of-way through direct purchase. However, other strategies such as building setbacks might be used effectively to minimize future impacts of road widening to accommodate wider shoulders, turn lanes, climbing lanes or even through lanes. For example, each organized Township in North Dakota has the authority to regulate orderly development, or to defer that authority to the County. The Counties have the authority to regulate development in unorganized townships. Existing development setbacks may vary by jurisdiction, and typically amount to restrictions on the placement of the front building line a specified distance from the front lot line, but may or may not have restrictions on “non-building” improvements such as storage tanks, fuel islands, etc. Any new right-of-way acquisition then may result in existing developments not meeting minimum development standards due to a reduction in lot size (such as minimum parking spaces, minimum lot size, hard surface vs. green space requirements, etc) which in the end may compromise the future value of some properties, or may render the remaining lot unsuitable for the existing use.

The TRE Corridor also passes through several communities where urban development flanks the highway right-of-way. Many of the urban developments are smaller lot sizes with less flexibility to accommodate right-of-way acquisition without impacting the current use of some properties. These mature development areas may best be handled through the typical right-of-way process used when a project is developed and right-of-way is purchased to meet the project needs at that time. The greatest value to right-of-way preservation will be where the adjacent property is not yet developed but may be likely to be developed, such as strip development along the highway approaching a community.

Another right-of-way preservation issue relates to strip development along a highway that is serviced by a frontage road along the highway right-of-way. The acquisition of additional right-of-way along an area served by a frontage road may result in the frontage road intersections being too close to the highway to provide adequate vehicle stacking distance for vehicles waiting to access the highway. Remedies for closely spaced frontage roads can be costly, sometimes requiring relocation of the adjacent development to accommodate orderly access/egress with the highway.

Without direct purchase, NDDOT authority to preserve any right-of-way would amount to encouraging the Counties and Townships to adopt adequate development setbacks for minimization of future right-of-way impacts. The setbacks would preclude the installation of new buildings, storage tanks, fuel islands, etc. within some specified distance from the existing highway right-of-way. Another option would be to not allow the use of frontage roads in new platted developments, requiring new strip developments to use backage roads and internal circulation roadways instead of the more problematic frontage roads. Backage roads allow the land between the highway and adjacent developments to basically function as the back yard of the developments, where additional right-of-way acquisition typically has less impact on the development.
The challenge is to determine where the restrictions should be applied, how much additional setback is adequate without imposing a taking upon the property owner, and how to convince the local jurisdictions to follow through with a new proposed development code. One way to approach this is to consider if additional right-of-way may someday be needed to add turn lanes on the highway at a particular intersection or driveway. It could be argued that future turn lanes into a local road or development could provide a benefit to the users of the site; therefore, it may be reasonable to impose an additional development setback for those purposes. On the other extreme, it may be determined that it is unreasonable to restrict development along the highway within a setback area that might accommodate a future multi-lane expansion of the roadway. The sheer size of the setback might be determined to comprise a taking based upon a court’s interpretation.

iii. Access Management

Access management seeks to limit and consolidate access along major roadways while promoting a supporting street system, unified access, and internal circulation systems for new development. The NDDOT current access management policy allows up to five access points per mile of highway frontage (each side of the road) including the section lines.

If someone requests an access point, typically the NDDOT reviews the location for sight distance issues and drainage impacts. If sight distance is acceptable, an access permit is typically granted for rural locations serving primarily agriculture or rural residence use. The issue may become more complicated when a developer requests several access points for a new strip development on the fringe areas of a community. Questions may arise such as, if the approved access points would accommodate any installation of future turn lanes that may be desired for safety or capacity reasons.
Access control issues along TRE within low speed (< 40 mph) urban sections of communities are typically related to existing development. The access control issues are then identified when an improvement project is programmed, with access revisions constrained by the ability to provide reasonable access to the property while still meeting the goals of the proposed improvements. In low speed urban conditions, turn lanes are typically provided only at major intersections for roadway capacity reasons. In high speed rural areas and transition areas (40 mph +) the turn lanes are often installed for safety reasons to minimize differential speed conflicts between turning and through traffic.
CHAPTER 3  PUBLIC AND AGENCY INVOLVEMENT

I. Introduction

Public and agency involvement was conducted throughout the development of Phase I of the Corridor Study. The following sections summarize the coordination process.

II. Communications Plan

A Communications Plan was developed to identify protocols for communicating internally and with agencies, the public, and the media. The plan included:

- Primary contacts for the project
- Communication pieces
- Internal review procedures and timelines for communication reviews
- Agency and public communication protocols
- Internal and external information dissemination.

The primary methods of communicating with agencies, public/industry, and other interested parties was through the following methods:

- Solicitations of Views Package
- Public Meeting Materials
- News Ads, Press Releases, and Public Meeting Notices
- Public Meeting Summaries and Notices of Availability
- Public Survey, Flyers, and Survey Results Summary
- TRE Website

III. Technical Advisory Committee

A Technical Advisory Committee (TAC) was formed in order to provide direction of key issue resolution and development of the Corridor Study. The TAC was comprised of the Federal Highway Administration, North Dakota Department of Transportation, Williams County, and the TRE Association. Meetings were held in July and September of 2009.

IV. Public and Agency Involvement

Three methods were used to collect agency and public input regarding potential concerns or needs along the TRE Corridor: scoping letters, public input meetings, and a public input survey.
a. Scoping Letters

A scoping package, which consisted of a brief description of the study and a corridor study location map, was distributed to 215 agencies and interested parties on April 7, 2009. The package served as a notification to entities and individuals that a corridor study was being conducted, what the TRE is, and requested any information regarding concerns or needs along the Corridor. At the end of the 30-day comment period, 26 responses were received.

Commenters consisted of eight federal agencies; four state agencies; eleven local/private agencies, including utility companies and non-profits; and three citizens. The substantive comments can generally be divided into eight categories:

1. General;
2. Route considerations;
3. Economic considerations;
4. Environmental concerns;
5. Purpose and Need;
6. Safety concerns;
7. Suggested improvements; and
8. Theodore Roosevelt National Park (TRNP) concerns.

Eleven of the agencies and/or individuals provided comments that were general in nature. General comments received consisted of information regarding potential permit requirements for future projects, requests for additions to the mailing list, identification of utilities along the Corridor, information regarding land ownership and/or existing environmental conditions, and direction to useful studies/information.

Six of the commenters addressed economic considerations. These comments consisted of information regarding the economic drive of the TRE Corridor and potential detriments to small town economies. Two commenters expressed concern specifically for the economy of Plentywood, MT and one for the economy of Bowman, ND if these towns were bypassed, while one commenter expressed general concern over failure of small town economies if the TRE Corridor were to bypass them. Comments expressing the economic drive of US Highway 85 are summarized as follows:

- TRE Corridor is integral to Nebraska’s export driven economy, with 28% of their total exports going to Canada
- US Highway 85 is one of the less weight restricted highways in North Dakota, so it provides needed route for energy transport
- TRE Corridor is major route for transport of goods and is used as the gateway to the Black Hills
- TRE Corridor provides major north/south route for travelers to and from North Dakota
- TRE Corridor is integral to the Ports to Plains and Heartland Expressway Corridors
- Oil and gas, renewable wind power, and agricultural exports rely on transportation
- TRE Corridor would benefit North Dakota economically (included specific economic projections)
Two of the commenters addressed environmental concerns. These concerns dealt with many environmental considerations that would generally be addressed through the National Environmental Policy Act process if future phases of the Corridor Study were to be pursued and projects would be programmed along the TRE Corridor. These environmental concerns dealt with urban sprawl/land use, wildlife and habitat, environmental justice, historic and cultural properties, aesthetics, noise, socioeconomics, air quality, and conservation potential along the Corridor. One commenter specifically expressed concern over if the Long X Bridge would be replaced, due to its historic significance.

Addressing the driving force behind potential future projects along the TRE Corridor, three commenters specifically commented on the purpose and need of the Corridor Study and potential future projects. One comment pointed to the need for the Corridor Study purpose and need to address long-term needs and advancing technology. Another stated that the TRE Corridor may not be the answer to needs that are an “immediate, local need.” Additionally, two commenters specifically requested a cost/benefit analysis be conducted.

Three comments were provided suggesting alternative routes or modifications to the TRE Corridor. These were as follows:

- Reroute US Highway 85 around the TRNP North Unit
- Route south of Plentywood, south of Railroad Avenue on the southern side of the railroad tracks
- Use the old Interstate 27 Corridor, including a bypass four miles west of Williston to approximately 5 miles north of US Highway 85

Seven of the commenters addressed safety concerns along the TRE Corridor. These safety considerations mainly consisted of concerns with the increased traffic due to energy development. Specifically, a number of commenters pointed out the difficulty of passing the large, slow-moving vehicles. One commenter also noted that indirect negative impacts to safety need to be considered with potential improvements along the Corridor, which may also result in increased traffic and vehicle speeds.

From these safety concerns, as well as the aforementioned economic considerations, seven commenters provided suggestions for improvements along the Corridor. Following is a summary of the suggested improvements. Each suggestion was made once, with the exception of the last bullet which was made by two commenters.

- Wider shoulders
- Additional passing lanes
- Allow for car pool areas
- At least provide a “Super 2”
- Additional passing lanes
- Provide a four-lane roadway
Lastly, two commenters brought up concerns about potential impacts to the TRNP North Unit. These comments addressed concerns over any potential expansions of the roadway near the TRNP North Unit and the potential for increased noise or visual impacts. The National Park Service stated that a four-lane highway is not appropriate within or adjacent to the TRNP North Unit.

b. Public Input Meetings

Four public input meetings were held on May 13 and 14, 2009; one in each of the following cities: Belfield, Bowman, Watford City, and Williston. Following the 15-day comment period, eleven comments were received from the public. The substantive comments did mirror some of the comments received during the scoping period. The public input meeting substantive comments can generally be divided into eight categories:

1. General;
2. Environmental concerns;
3. Environmental documentation;
4. Purpose and need;
5. Public and agency involvement;
6. Route considerations;
7. Suggested improvements; and
8. TRNP North Unit concerns.

General comments from the public input meetings consisted mainly of support or opposition statements. Four commenters provided general comments. One viewed potential improvements of the Corridor as mainly positive changes; one was in favor of a trucking corridor; one was opposed to a “Super 2” or a four-lane roadway; and one provided information regarding a housing study and employment.

Four commenters expressed concerns about environmental impacts. These were similar to those expressed during the scoping period, including specific concerns about impacts to the Long X Bridge, big horn sheep, aesthetics, noise, land use, economics, animal-vehicle collisions, air quality, and community disruption. Similar to these comments, five commenters expressed concern about impacts to the TRNP North Unit.

One commenter requested that an Environmental Impact Statement be developed before any projects are proposed along the TRE Corridor. Similar to this, three commenters addressed the need for future projects and the purpose of future projects. These comments requested a comprehensive needs assessment, including a cost/benefit analysis; questioned the need for a four-lane roadway proposal; and specifically stated that there is no need for a four-lane roadway.

One commenter also had concerns regarding public and agency involvement. Specifically, they did not believe the public meetings in North Dakota provided an adequate opportunity for agencies and/or individuals in Montana to express their views. They also desired the public comment period to be extended or rescheduled to provide cities an opportunity to obtain consensus regarding the route, or potential alternatives to the route, and also the need to allow Montana’s Congressional delegates to study any proposals.
In addition, one commenter suggested an alternative to the TRE Corridor, which would bypass North Dakota. The route would go south through Culbertson, Sidney, Glendive, Wibaux, Baker, and Ekalaka, MT and continue east to Belle Fourche and Rapid City, SD.

Lastly, three commenters suggested improvements for the Corridor. They are summarized as follows:

- Place a heavier “mat” on the roadway to handle heavy truck traffic
- Improvements needed on Green River Bridge
- Separate the Corridor into a truck portion and a light vehicle portion
- Set a 55 mph speed limit from the top of the north end of badlands to top of south end of badlands
- Provide a “Super 2” in moderation

**c. Public Input Survey**

An input survey was distributed at the public input meetings and available online at the TRE Association website (www.trexpressway.com), with a comment period of 45 days following the public input meetings. A total of 32 individuals responded to the public input survey. The location of respondents included Colorado, Montana, Nebraska, and North Dakota; with the majority (88%) of respondents residing in North Dakota. See Exhibit 18, Location of Respondents.
Additionally, 40% of individuals who responded identified themselves as a resident.\textsuperscript{18} When reviewing responses, some individuals should likely be categorized differently (e.g., some categorized themselves only as residents but then answer agency/government/community representative questions).

This information reflects the individuals as they categorized themselves. Those that considered themselves in the “Other” category were either non-profit representatives or responding as a business representatives as well as a resident. See Exhibit 19, Types of Respondents.

Half of the business, government, and community representatives were able to categorize themselves while the other half categorized them as “Other”. See Exhibit 20, Composition of Business, Government, and Community Representatives. Those categorized as “Other” primarily consisted of economic development representatives, including visitor bureaus and city council members, with the exception of one individual who was a health care representative.

\textsuperscript{18} Note: The majority of respondents categorized themselves under multiple categories.
Respondents were asked two questions regarding their use and frequency of use of the Corridor. Most respondents use the corridor for multiple uses. Those categorized as “Other” mainly consisted of individuals or companies using the Corridor for business travel, such as to attend meetings. In addition, individuals use the Corridor for school bus travel, leisure, and medical services. See Exhibit 21, Use of Corridor. Those using the TRE Corridor primarily use the Corridor on a daily basis. See Exhibit 22, Frequency of Use.

A series of open-ended questions regarding benefits of the TRE Corridor, concerns, and needed improvements were also components of the public input survey. A variety of responses were received regarding the benefit of the Corridor. They are summarized as follows:

- Provides tourist access to Williston and McKenzie County
- Connects portions of the state north and south of Interstate 94
- Important to the transport of agricultural goods, particularly McKenzie County which transports goods via truck due to lack of rail system or air transport
- Provides designated access across the Dakotas into Montana
- Important to the travel industry
- Provides major access point between southwest North Dakota and Interstate 94
- Corridor brings in tourists and energy, which increases retail sales

Comments about the Corridor were broken into subcategories of safety, mobility, load restrictions, width limitations, grades, passing lanes/zones, and other concerns. The primary concerns dealt with safety and passing lanes/zones. See Exhibit 23, Corridor Concerns.
Specific concerns are summarized as follows:

- Roadway is too narrow
- Roadway is not built to support the current loads and number of vehicles
- Roadway is rough with wheel depressions and pot holes
- Poor road condition results in damaged goods when shipping goods
- At night and in poor weather conditions, visibility is poor along the Corridor (e.g., cannot see edge of pavement)
- Slow-moving traffic and lack of passing lanes results in impatient drivers who pass multiple cars at a time; also results in backed up traffic
- Easy to hydroplane on Green River bridge
- Bridges south of Bowman are too narrow
- Current roadway conditions makes it difficult to maintain a constant speed (e.g., poor pavement condition, slow-moving vehicles)
- Steep slopes do not allow a steady flow of traffic when combining large energy and agricultural equipment and regular passenger vehicles
- Poor sight distance
- Unsafe for school buses, does not provide the space required for slower moving vehicles to pull onto the Corridor
- General concern over noise, safety, pollution, and roadway proximity
- Lack of weigh stations/vehicle inspection stations
• Suggested improvements for the Corridor were generic in nature and, with a few exceptions, generally did not provide specific locations for suggested improvements. Suggested improvements are summarized as follows:
  • Widen shoulders for bicyclists
  • Improve pavement conditions
  • Provide additional turn lanes
  • Widen lanes/roadway
  • Four-lane or upgrade to a “Super Two”
  • Add turnouts for slow vehicles
  • Add roadside delineator posts
  • Improve reflectors and striping
  • Widen bridges south of Bowman
  • Add passing lanes on hills
  • Widen or replace Green River bridge north of Belfield
  • Consider alternative methods of winter maintenance (e.g., aggregate, magnesium chloride)
  • Provide better internet-based road conditions
  • Add year-round rest area facilities
  • Only five respondents provided information regarding freight along the Corridor. Again, these responses were mainly generic in nature and did not provide specifics regarding types and volumes of freight. Responses are summarized as follows and only include responses regarding freight (i.e., exclude reiteration of safety concerns):
  • Traffic between Belfield and Williston is concentrated between 6:00 AM and 9:00 AM and 5:00 PM and 7:00 PM
  • McKenzie County Tourism Bureau only has visitor numbers that come through their visitor center
  • ABLE, Inc. ships their products via UPS, USPS, and Fed-Ex several times per month and receives shipments the same way averaging one shipment every two weeks. This is anticipated to increase through September 30, 2009 to once per week.
CHAPTER 4  RECOMMENDATIONS

I. Purpose and Need for Future Improvements

A purpose and need statement is a requirement of any project that falls under the National Environmental Policy Act (NEPA) of 1969, as amended. All NEPA projects must analyze a range of reasonable alternatives. The purpose and need of a project helps to define what the range of reasonable alternatives may be for a project by identifying deficiencies and the goals to resolve those deficiencies. If a reasonable alternative meets the purpose and need of a project, then it needs to be analyzed in the environmental document. Phase I did not include a detailed analysis of needs along the TRE Corridor, as that would be conducted in Phase II of the study. As such, the purpose and need of future improvements will evolve as the effort progresses through the next phase.

The purpose of any proposed improvement project along the TRE is to provide for the safe and efficient movement of people and commerce. The NDDOT classifies state and federal highways into groups of various levels, with Interstate highways having the highest level of safe and efficient transportation. The NDDOT’s second highest level of highway is an Interregional System highway, which includes US Highways 85 and 2 along the TRE. The NDDOT guidelines for Interregional Corridors are to achieve the following characteristics:

- Legal Load Limits Year Round
- Legal Load Clearances at Structures
- Safety Issues (if any)
- Capacity/Geometric Issues (if any)
- Pavement Conditions (as a system)

The need for any future improvements will be driven by portions of the TRE Corridor which do not reasonably meet the guidelines of an Interregional Corridor. The purpose of future projects would be to improve substandard segments of the Corridor to meet the goals of the Interregional System as well as NDDOT design standards. Potential projects will be identified when ride or distress scores fall below the fair category or a segment has a load restriction. Potential bridge projects will be identified when a structure has an operating rating less than HS 20, less than 16-foot vertical clearance, or is eligible for Bridge Rehabilitation/Replacement funding.

Many highways were constructed decades ago, long before the NDDOT adopted its Highway Performance Classification System (HPCS) guidelines for Interregional System highways. Since NDDOT does not have enough funding to upgrade and maintain all roadways to HPCS guidelines, projects are not initiated solely on the basis of a segment having poor ride or distress scores, inadequate horizontal clearance, or load restrictions. Bridge projects are not initiated solely on the basis of a bridge having inadequate vertical clearance or less than an operating rating of HS 20. To achieve the most “bang for the buck”, road improvements are typically scheduled to maximize the use of existing pavement life and other roadway investments.
For example, it may not be a prudent expenditure of public funds to merely add wider shoulders now to a roadway that may need more comprehensive reconstruction a few years later after the pavement has provided its maximum service life, when other priorities allow for those additional investments in a particular roadway, or when additional funding becomes available to the road jurisdiction.

This continual financial juggling act must be intensively managed to maximize safety and economic efficiency, and to avoid having any sections of roadways drop well below the traveling publics’ expectations and transportation needs.

IV. Existing or Planned Projects

Table 15 summarizes the existing or planned projects along the TRE Corridor as shown in the North Dakota 2010–13 Statewide Transportation Improvement Program (STIP) (as of October 2009) and the South Dakota Department of Transportation 2010–14 STIP (Note: no projects were identified in the Montana 2009–13 STIP along the Montana portion of the TRE Corridor). Many of the projects within North Dakota will address some of the identified needs along the Corridor, such as improving areas of poor IRI and rut scores as well as meeting the need for additional turn lanes.

<table>
<thead>
<tr>
<th>Highway</th>
<th>Location</th>
<th>Length (Miles)</th>
<th>Type</th>
<th>Year</th>
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<td>85</td>
<td>Jct ND 200 N to Grassy Butte</td>
<td>5.3</td>
<td>Turn Lanes</td>
<td>2010</td>
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<td>85</td>
<td>Belfield N to Near Gorham Jct</td>
<td>14.61</td>
<td>Thin Overlay</td>
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<tr>
<td>85</td>
<td>State Line N to W Jct 12 — Bowman</td>
<td>16.5</td>
<td>Thin Overlay</td>
<td>2010</td>
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<tr>
<td>85</td>
<td>N Jct ND 200 N to Grassy Butte</td>
<td>5.3</td>
<td>Hot Bituminous Pavement</td>
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<tr>
<td>85</td>
<td>Bowman City Section N 2.1 Mi</td>
<td>2.5</td>
<td>Thin Overlay</td>
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<tr>
<td>85</td>
<td>4 S of Jct I-94</td>
<td>0</td>
<td>Structure Repair/Incidentals</td>
<td>2011–13</td>
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<tr>
<td>85</td>
<td>1 S of Jct I-94</td>
<td>0</td>
<td>Structure Repair</td>
<td>2011–13</td>
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### Table 15: Existing or Planned Projects

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<th>Route</th>
<th>Description</th>
<th>Length</th>
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<tr>
<td>85</td>
<td>Belfield N to Near Gorham Jct</td>
<td>14.6</td>
<td>Slurry Seal</td>
<td>2011–13</td>
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<tr>
<td>85</td>
<td>N 7.5 Mi N Grassy Butte to N End BR</td>
<td>6.3</td>
<td>Aggregate Base and Grading</td>
<td>2010</td>
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<tr>
<td>85</td>
<td>N 7.5 Mi N Grassy Butte to N End BR</td>
<td>6.3</td>
<td>Hot Bituminous Pavement</td>
<td>2011</td>
</tr>
<tr>
<td>85</td>
<td>Grassy Butte N 7.5 Mi</td>
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<td>Turn Lanes</td>
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<td>L&amp;C Bridge N to US 2 &amp; Rest Area</td>
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<td>Structural Repair, Turn Lanes, Widening</td>
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<td>Thin Overlay</td>
<td>2011–13</td>
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<td>Route</td>
<td>Project Details</td>
<td>Length (ft)</td>
<td>Type of Work</td>
<td>Year</td>
</tr>
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<td>85</td>
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<td>CPR</td>
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<td>85</td>
<td>E Jct 5 W to W Jct ND 5</td>
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<td>2010</td>
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<td>2</td>
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<td>W Renton Corner E to Jct 85</td>
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<td>Hot Bituminous Pavement &amp; Milling</td>
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## Table 15: Existing or Planned Projects

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<tr>
<th>Highway</th>
<th>Location</th>
<th>Length (Miles)</th>
<th>Type</th>
<th>Year</th>
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<tr>
<td>85</td>
<td>From N of Buffalo to ND State Line</td>
<td>20.3</td>
<td>Mill and AC Resurfacing</td>
<td>2010</td>
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<tr>
<td>85</td>
<td>8.9 mi NE of Buffalo over June Creek</td>
<td>—</td>
<td>Deck Overlay, Approach Guard Rail, Approach slabs and replace rail</td>
<td>2013</td>
</tr>
<tr>
<td>85</td>
<td>17 S of SD 20E over Sank Creek, 10 N of Butte Co over N Branch Moreau River, 2.9 S of SD 20E over Buffalo Creek, &amp; 3.6 N of Buffalo over Sheep Creek</td>
<td>—</td>
<td>Deck Overlay, Bridge Rail Retrofit, Joint Modification, Approach Slabs, Approach Guardrail &amp; Approach Pavement</td>
<td>2014</td>
</tr>
<tr>
<td>85</td>
<td>13.3, 12.7, 8.4, &amp; 5.8 mi S of Harding Co line over East Branch of Antelope Creek, Battle Creek, Four Mile Creek, &amp; Moreau River</td>
<td>—</td>
<td>Structure Repairs</td>
<td>2010/2011</td>
</tr>
<tr>
<td>85</td>
<td>Hay Creek to Faulk Street including intersection of National St in Belle Fourche</td>
<td>1.1</td>
<td>Grading, PCC Paving, Storm Sewer, Curb &amp; Gutter, Structure Repair, Roadway Lighting</td>
<td>2010</td>
</tr>
<tr>
<td>90</td>
<td>I-90 3.1 mi NW of SD 231 Interchange</td>
<td>—</td>
<td>Structure Repair</td>
<td>2010</td>
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</table>

### V. Phase II Action Items

The NDDOT will make the determination if Phase II of the Corridor Study should be initiated. Should Phase II be initiated, the following considerations are suggested for Phase II of the Corridor Study:

- Conduct a crash analysis along the TRE Corridor, especially where the truck volumes are significantly increasing. The results of the analysis may indicate locations where safety improvements are needed. Currently, none of the TRE Corridor that encompasses US Highway 85 has been identified in NDDOT’s Critical Crash Segment List.
• Review safety considerations pertaining to shoulder width, cross section, and other geometric elements should be compared with NDDOT’s guidelines for this corridor designation.

• Conduct travel time studies to determine the free flow speed (FFS). The FFS is the starting point to analyzing capacity and LOS for uninterrupted flow conditions.

• Determine the existing and projected LOS for the Corridor. Apply Highway Capacity Manual formulas to account for heavy vehicle conversion and other correction factors.

• Conduct further analysis to determine whether passing zone opportunities can be introduced within the TRE Corridor to reduce the number of miles for which a no-passing condition exists. Adding climbing lanes turn lanes, and acceleration or deceleration lanes may also be examined.

• Consider an analysis to determine the need and feasibility for upgrading bridges along the TRE Corridor to handle oversized loads.

• Consider completing an independent detailed demographic and origin destination travel study to identify specific travel patterns which would influence traffic on the TRE Corridor.

• Prepare some “typical” development setback and backage road drawings that may be adopted by various townships, cities, and counties to use in revising their development codes. Another option is for NDDOT to provide uniform recommended development codes to the local jurisdictions.

• The development of an access control policy that recognizes minimum required intersection spacing may reduce the need for costly or potentially disruptive access revisions in the future. It is recommended that the existing policy of allowing no more than five access points per mile of highway frontage be modified to also specify a minimum spacing. For access requests outside the extraterritorial planning boundary of communities, the recommended minimum spacing is that which meets the reconstruction design speed requirements. For access requests within the extraterritorial boundary of communities (which is where the majority of strip development occurs), the minimum access spacing is recommended to be based upon a 40 mph design speed, or the posted speed limit at the access location, whichever is greater. New access point requests within an existing community should consider a traffic operations analysis to determine if there would be any impacts resulting from inadequate traffic signal spacing now or in the future.

• Develop an appropriate urban access control policy that could be provided to communities along US and state highways.

Although beyond the authority of the NDDOT, and the potential scope of Phase II, a general recommendation is to create a task force to investigate and recommend how to construct additional oil pipelines in western North Dakota. A financial analysis between pipeline investment and transportation infrastructure investment could help prioritize where dollars should be spent.