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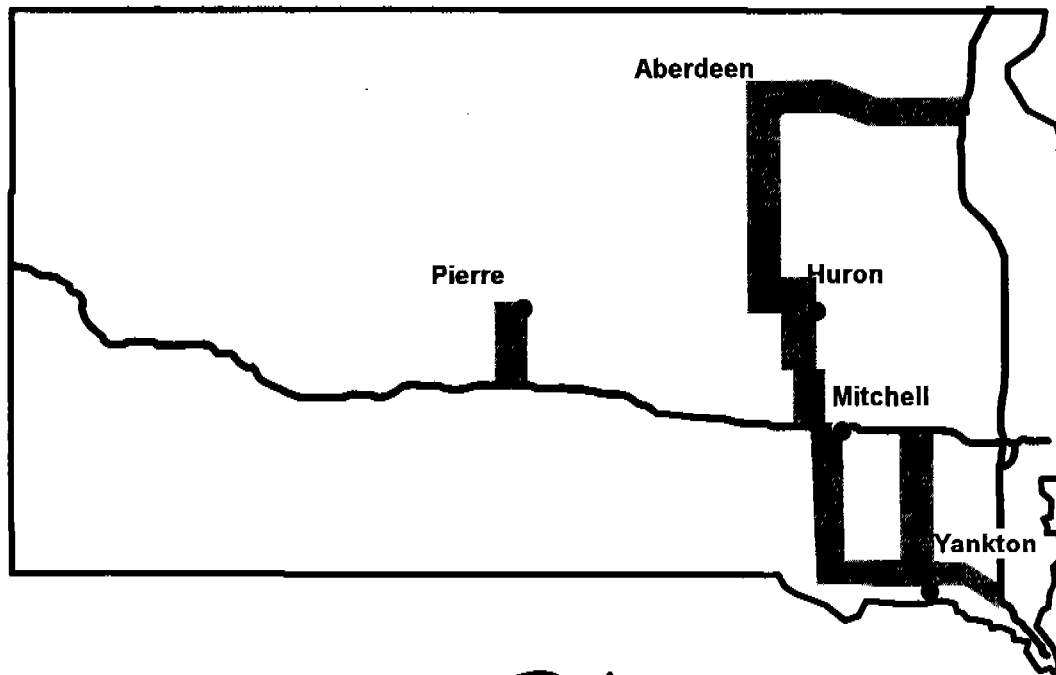
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# FINAL REPORT

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## ***EASTERN DAKOTA AND PIERRE TO I-90 EXPRESSWAY FEASIBILITY STUDY***



*South Dakota*

GREAT FACES. GREAT PLACES.

***Submitted to:  
South Dakota Department  
of Transportation***

***Submitted by:  
Wilbur Smith Associates  
and  
Banner Associates,  
Dr. Charles Lamberton***

**1994**

# FEASIBILITY STUDY PARTICIPANTS

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**EASTERN DAKOTA AND PIERRE TO I-90  
EXPRESSWAY FEASIBILITY STUDY**

**FINAL REPORT**

*Submitted to:*

**SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION**

*Submitted by:*

**WILBUR SMITH ASSOCIATES**

*and*

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February 1994



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### PREFACE TO THE EASTERN DAKOTA EXPRESSWAY STUDY

In early November 1992, Governor George S. Mickelson requested the Department of Transportation and the South Dakota Transportation Commission to initiate a feasibility study of the proposed Eastern Dakota/Pierre to I-90 Expressway.

The Eastern Dakota/Pierre to I-90 Expressway Study was initiated to investigate the economic feasibility of connecting population centers with the Interstate Highway System using freeways, expressways, or super two-lane routes. The South Dakota Department of Transportation retained Wilbur Smith Associates, Banner Associates, and Dr. Charles Lamberton of South Dakota State University to complete the study.

The study was directed by a Departmental Steering Committee and an eleven member citizens' Advisory Committee which represented the eastern and central South Dakota corridors which were being studied. The Advisory Committee provided valuable input to ensure that all options and potential alignments were considered and did a tremendous amount of work in facilitating the public meetings where the preliminary findings of the study were presented.

The study found that the Regional Trade Center Connection, consisting of three expressway segments, is economically feasible, and could be built, but additional funds would have to be secured to complete them. These segments are Huron to I-90 at Mitchell, Aberdeen to I-29, and Pierre to I-90. The study also found that the total Eastern Dakota Expressway constructed as a combination Super 2-lane and 4-lane expressway should be feasible by the year 2000. Shifting existing highway funds to these highways is not a viable consideration and would cause the existing State Highway System to deteriorate, impeding economic development and highway safety in the rest of the State. Because of the backlog of needed projects on the existing State Highway System, new sources of funds are needed to construct and maintain expressways.

The most advantageous method of funding would be to secure Federal demonstration funds. We have already begun to explore this with our Congressional delegation and have advised them of our support for those funds. Other State funding methods exist which would require the strong support of all South Dakotans.

This study does not make any recommendations or decisions regarding the construction of 4-lane expressways; it only provides objective and factual information that should be useful to the citizens and decision-makers of the State. We will respond to their wishes.

Sincerely,

Richard L. Howard  
Secretary of Transportation

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# Executive Summary Report

## EASTERN DAKOTA/PIERRE TO INTERSTATE 90 EXPRESSWAY FEASIBILITY STUDY

South Dakota is served by two Interstate Highways: Interstate 29 which runs north-south in the far eastern part of the State, and Interstate 90 which travels east-west across the central part of the State. These four-lane highways have proven to be very successful, not only in moving traffic but also in helping communities in proximity of the highways to grow and prosper.

In addition to the two Interstate highways, South Dakota has built several other rural four-lane expressway type highways. These are typically shorter highway segments, located adjacent to several of the State's communities. Because four-lane highways are typically built only when traffic volumes and traffic congestion warrant, and because South Dakota's highways at most locations have comparatively low traffic volumes, the State has not aggressively pursued rural four-lane highway construction. Lending additional credibility to this approach is the fact that South Dakota has a low population density, is limited in its ability to generate highway tax revenues, and the State's tax dollars need to be used wisely.

A number of communities have been left without four-lane access. Recognizing the economic development potential of four-lane highways, these communities have exhibited considerable interest in the State pursuing a Four-Lane Expressway Program. The Expressway Program's intent would be to tie major communities with the Interstate Highway System via a four-lane highway. Based on this interest for an Expressway Program, the South Dakota Department of Transportation conducted this feasibility study to investigate the need and feasibility of such a program.

### STUDY RATIONALE

The need for a feasibility study of this type is apparent, when one understands the economic consequences involved in making highway corridor investment decisions. There are economic costs associated with either underinvesting or overinvesting in highway construction in South Dakota. If the State underinvests in highways (does not build enough highways that

are needed), economic development will be inhibited because real and perceived travel costs will be greater and the corridor areas will be less able to compete for economic activity, etc. However, if the State overinvests in highways (builds too many highways that are not necessary), the overall economic situation of the State will suffer because those limited funds could have produced a higher return elsewhere.

The South Dakota Department of Transportation has an annual operating budget of \$182 million for highway construction and maintenance activities. This seems like a large amount of money. However, it is insufficient to support existing and programmed highway needs in South Dakota. Therefore, additional funds will be needed if a new four-lane highway program is to be adopted. Because of the long-term construction, maintenance, and rehabilitation expenses, rational, prudent and careful allocation of South Dakota highway funds is necessary.

### STUDY PURPOSES

This study analyzes the feasibility of the State constructing a series of new four-lane highways. It was conducted to provide analyses, information and insights to enable a series of decisions to be made concerning an Expressway Program. Final recommendations are not part of this study; rather, such decisions will be made later, by the State, based in part on the study's analyses. The study's purposes are:

1. To provide insights and information concerning whether or not a system of four-lane highways in the State is needed and feasible;
2. To provide insights and information concerning which specific Expressways are most feasible;
3. To determine the appropriate highway type needed; and
4. To analyze alternative ways to raise sufficient funds to pay for an Expressway Program.

## ROUTE ALTERNATIVES

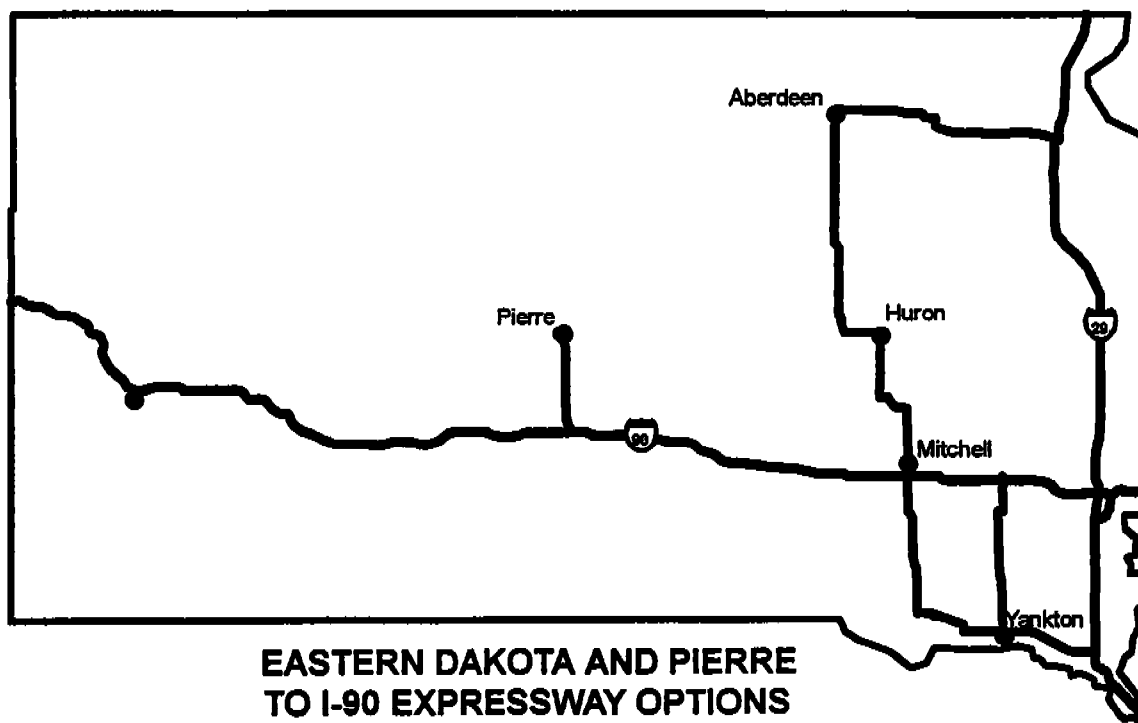
The Eastern Dakota/Pierre to I-90 Expressway Study examined improved highway alternatives in the eastern and central portions of the State. A concurrent study (Heartland Expressway Study) examined corridors in the west, southward from Rapid City. As a result of the two concurrent studies, expressways were evaluated in each region in South Dakota.

One goal of the Expressway Program could be to link all major communities in South Dakota (population of 10,000 or more) via a four-lane highway. The Eastern Dakota Expressway would virtually make a four-lane loop around the eastern part of the State, connecting all the major communities. The Pierre to I-90 Expressway would connect Pierre to Interstate 90. Pierre is the only State Capital in the continental United States not to be on the Interstate System or connected to an Interstate via a four-lane highway.

In the Eastern Dakota/Pierre to I-90 Expressway Study a variety of route alternatives were considered. Early in the study it was recognized that the most efficient approach to developing four-lane highways is to utilize and widen existing highways, wherever possible. This process led to the identification of the following highway corridor options:

- Pierre South to Interstate 90 via US 83
- Aberdeen East to Interstate 29 via US 12
- Aberdeen South to Mitchell via US 281 and SD 37
- Mitchell to Interstate 29 via Yankton (SD 37 and SD 50)
- Mitchell to Interstate 29 via Yankton (US 81 and SD 50)

These corridors are depicted below.





## FIFTEEN ROUTE EVALUATION OPTIONS

If the State builds the expressways, it will need to phase in the work over time because of limited funds. In addition, certain segments are more feasible than others.

This study considered possible partial implementation of the Expressway Program by logically defining fifteen different route combinations that might be considered for implementation. The fifteen route combinations are listed below. Each of the options was analyzed separately to determine which segments or combinations of segments are most feasible. Each of these route options was evaluated in terms of cost, traffic, and economic feasibility.

## THREE ALTERNATIVE LEVELS OF HIGHWAY IMPROVEMENT

The route options could be widened or otherwise improved to any number of alternative highway types and design standards. Three alternative highway types were considered for each route option.

1. **Four-Lane Freeway Type Highway** - This alternative is comparable to an Interstate highway, e.g., I-29 and I-90, and has complete access control. Access is controlled by grade separated interchanges and prohibits at-grade crossings and private driveway connections. Under current law this type of highway has a posted speed of 65 mph in rural areas.
2. **Four-Lane Expressway Type Highway** - This highway type provides partial access control. The highway is four-lane divided with some at-grade intersections and private driveway connections. Under current law this highway type is posted at 55 mph in rural areas.
3. **Super Two-Lane Highway** - This highway type is an improved two-lane highway with uphill passing lanes, left turn lanes, and paved wider shoulders.

Each design standard and each route option received equal treatment in the study.

## ROUTE LOCATION OPTIONS

1. **PIERRE TO I-90** - This option would connect Pierre with Interstate 90 via an improved US 83.
2. **TOTAL EASTERN DAKOTA EXPRESSWAY (EDE) VIA SD 37**  
This option would create a four-lane loop connecting Aberdeen, Huron, Mitchell, Yankton, and Vermillion in eastern South Dakota. This option would utilize SD 37 and SD 50 between Mitchell and Yankton.
3. **TOTAL EASTERN DAKOTA EXPRESSWAY (EDE) VIA US 81**  
This option is the same as route #2 except it utilizes US 81 between I-90 and Yankton.
4. **ABERDEEN EAST TO I-29** - This alternative connects Aberdeen to I-29 via an improved US 12.
5. **ABERDEEN SOUTH TO HURON** - This expressway would connect Aberdeen to Huron via an improved US 281 and US 14.
6. **HURON SOUTH TO I-90 VIA MITCHELL** - This alternative would connect Huron to I-90 at Mitchell via an improved SD 37.
7. **I-90 TO I-29 VIA SD 37 AND YANKTON** - This alternative would connect I-90 at Mitchell to I-29 east of Vermillion via SD 37, SD 50 and Yankton.
8. **I-90 TO I-29 VIA US 81 AND YANKTON** - This option would connect I-90 at the US 81 junction to I-29 east of Vermillion via US 81 and Yankton.
9. **ABERDEEN TO I-29 VIA SD 37 AND YANKTON** - This option would connect Aberdeen to I-29 just east of Vermillion via Mitchell, Yankton, using SD 37 and SD 50.
10. **ABERDEEN TO I-29 VIA US 81 AND YANKTON** - This route option is the same as #9 except it utilizes US 81 between I-90 and Yankton.
11. **I-90 TO YANKTON VIA SD 37** - This option would connect I-90 at Mitchell to Yankton via an improved SD 37 and SD 50.
12. **I-90 TO YANKTON VIA US 81** - This option would connect I-90 at Mitchell to Yankton via an improved US 81.
13. **REGIONAL TRADE CENTER CONNECTIONS** - This alternative would provide four-lane access to all communities in South Dakota with a population greater than 10,000. This would include Aberdeen to I-29 via US 12, Huron south to I-90 at Mitchell, and Pierre to I-90.
14. **EDE VIA SD 37 (SUPER 2/4 LANE)** - This alternative is a combination which includes the Regional Trade Center Connections built as four-lane expressways and the remainder of the EDE, via SD 37 and SD 50, as super two lane highways.
15. **EDE VIA US 81 (SUPER 2/4 LANE)** - This alternative is the same as option #14 except it utilizes US 81 between I-90 and Yankton.

## CONVENTIONAL FEASIBILITY EVALUATION

To determine whether portions or all of the Eastern Dakota/Pierre to I-90 Expressways are feasible, six "tests of feasibility" are applied:

- **Need Based on Traffic** - Are the Expressways warranted based on current and forecast traffic volumes?
- **Engineering and Cost Feasibility** - Are there any unusual engineering difficulties, and what would the Expressways cost to build and operate?
- **Environmental Feasibility** - Can the Expressways be constructed without undue harm to the environment?
- **Travel Efficiency Feasibility** - Will the Expressways cause sufficient highway user benefits to justify the investments?
- **Economic Development Feasibility** - Will the Expressways cause sufficient economic development to justify the investments?
- **Funding Feasibility** - Can the State afford to fund the Expressway program?

All fifteen route options and the three design standards were subjected to the six tests of feasibility. These tests are separate indicators of feasibility. A feasible option need not pass every test of feasibility.

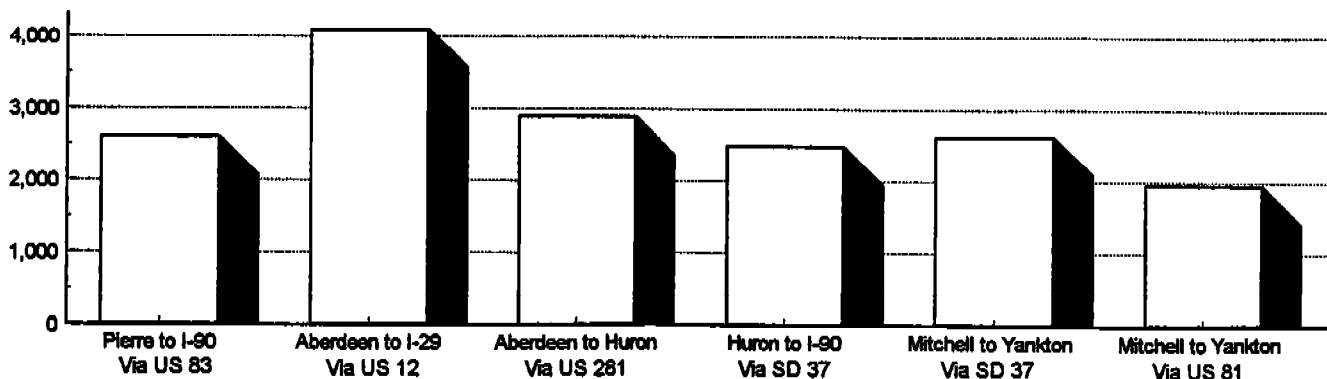
### NEED BASED ON TRAFFIC

This feasibility study included an extensive assessment of traffic in eastern and central South Dakota. Included were roadside origin and destination traffic surveys, Interstate highway rest area surveys, surveys and discussions with trucking and manufacturing firms who ship and receive goods and products in the area, agricultural surveys, and others. A computerized traffic model was developed and traffic forecasts were made for all Expressway options. The traffic analyses suggest the following:

- The various highway routes do not carry, and are not forecast to carry, sufficient traffic to warrant a four-lane highway. The traffic volumes, on average, are forecast to carry between 2,000 and 4,000 vehicles per day. This is less than the 5,000 to 6,000 vehicles typically needed before a four-lane is considered because of traffic.
- The Aberdeen to I-29 corridor via US 12 is forecast to carry the most traffic. Future traffic volumes are estimated to reach 7,000 vehicles per day on the existing four-lane section east of Aberdeen, and over 3,000 vehicles per day west of I-29.

The illustration below displays the estimated weighted average traffic volume for each Expressway corridor segment for the year 2015.

### FORECAST YEAR 2015 AVERAGE DAILY TRAFFIC



## ENGINEERING AND COST FEASIBILITY

A review of the Expressway Corridors indicated that the existing highways can be upgraded to four-lanes with minimal difficulty. However, more detailed alignment studies would need to be performed before construction could take place.

Any of the options (Freeway, Expressway, or Super Two) built in any of the Expressway Corridors will be quite expensive to build and maintain. Construction costs were estimated to determine the magnitude of funds necessary to build and maintain the expressways. The construction costs include right-of-way acquisition, planning, design, and construction. The total cost of constructing the entire Eastern Dakota and Pierre to I-90 Expressways equals the sum of Options 1 and 2 or 1 and 3, as shown below. Also included in the analysis is the cost for increased maintenance for the expressways.

## ENVIRONMENTAL FEASIBILITY

This study's environmental overview suggests that it is unlikely that the environmental impacts will be so severe in any corridor that they cannot be avoided, minimized or mitigated. The primary reason for the relatively low level of anticipated impacts, considering the length of the proposed expressway facilities, is the fact that most alignments are being proposed along existing highway routes. Land use patterns, transportation patterns, and ecological functions have adapted to the presence of highways along these routes. As a result, expansion, upgrade, or modest realignment of these highways is likely to be less harmful to the natural and manmade environments than would a new highway on a new location. However, in all corridors the State will have to be sensitive to environmental issues as it conducts its more detailed corridor analyses.

### CAPITAL COST ESTIMATES (\$ Million)

<u>ROUTE LOCATIONS</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2/4</u>	<u>SUPER TWO</u>
1. Pierre to I-90	100.6	31.9	--	9.5
2. Total Eastern Dakota Expressway Via SD 37	450.9	303.6	--	124.7
3. Total Eastern Dakota Expressway Via US 81	413.2	280.5	--	125.6
4. Aberdeen East to I-29	110.0	70.1	--	18.3
5. Aberdeen to Huron	131.0	102.4	--	53.8
6. Huron South to I-90	59.9	27.9	--	--
7. I-90 to I-29 via SD 37	149.9	103.3	--	24.7
8. I-90 to I-29 via US 81	112.2	80.2	--	25.6
9. Aberdeen to I-29 Via Mitchell, SD 37 and Yankton	340.9	233.5	--	106.4
10. Aberdeen to I-29 Via Mitchell, US 81 and Yankton	303.2	210.4	--	107.3
11. I-90 to Yankton via SD 37	121.2	85.3	--	11.4
12. I-90 to Yankton via US 81	83.6	62.2	--	12.2
13. Regional Trade Center Connections	270.5	129.9	--	55.7
14. EDE via SD 37 (Super 2/4 Lane)	--	--	182.8	--
15. EDE via US 81 (Super 2/4 Lane)	--	--	183.7	--

## TRAVEL EFFICIENCY FEASIBILITY

Highways are best thought of as "instruments" for moving goods and people from one place to another. In this sense, highways generate benefits to the extent that they lower real and perceived transportation costs. One way that transportation can contribute to economic development is by reducing the cost of moving people and goods, thereby increasing travel efficiency.

Travel efficiency assessment is the traditional method of determining whether or not a highway improvement is economically feasible. According to this test of feasibility, a highway improvement must be quite successful in reducing per vehicle operating cost (fuel consumption, etc.), travel time, and accident risk; and it needs to have sufficient traffic volumes to attain the necessary magnitude of highway benefits.

To determine whether or not the Eastern Dakota and Pierre to I-90 Expressway alternatives are feasible from the travel efficiency perspective, the highway user cost savings from the highway improvements (vehicle cost savings, travel time savings, and reduced accidents) are compared to the highway's costs.

According to this travel efficiency measure, any highway improvement with a "benefit/cost ratio" of 1.0 or more is economically feasible.

The benefit/cost ratios suggest the following conclusions from the travel efficiency perspective:

- None of the Eastern Dakota/Pierre to I-90 Expressway alternatives are feasible from the travel efficiency perspective. Existing and forecast traffic levels do not warrant an upgraded highway solely based on highway user benefits on any of the Expressway alternatives.
- The freeway type highway standard in each alternative is least feasible. The highways constructed to freeway standards are much too expensive compared to the benefits they produce.
- In several cases the Super Two option is more cost effective than the four-lane freeway and expressway alternatives. This indicates that, from the travel efficiency perspective and because of lower traffic volumes, minor improvements are more cost-effective than are additional highway lanes.

It should be noted that the travel efficiency analysis only includes benefits associated with highway use. Improvements to economic development are not included in travel efficiency. The economic development feasibility evaluation is discussed in the next section.

TRAVEL EFFICIENCY FEASIBILITY Benefit/Cost Ratios									
ROUTE LOCATIONS					ROUTE LOCATIONS				
	Freeway	Express.	Super 2/4	Super 2		Freeway	Express.	Super 2/4	Super 2
1. Pierre to I-90	0.18	0.38	--	0.34	8. I-90 to I-29 via US 81	0.33	0.42	--	0.42
2. Total Eastern Dakota Expressway Via SD 37	0.39	0.50	--	0.48	9. Aberdeen to I-29 Via Mitchell, SD 37 and Yankton	0.37	0.47	--	0.45
3. Total Eastern Dakota Expressway Via US 81	0.43	0.54	--	0.48	10. Aberdeen to I-29 Via Mitchell, US 81 and Yankton	0.41	0.52	--	0.45
4. Aberdeen East to I-29	0.48	0.64	--	0.66	11. I-90 to Yankton via SD 37	0.17	0.30	--	0.42
5. Aberdeen to Huron	0.39	0.45	--	0.35	12. I-90 to Yankton via US 81	0.21	0.32	--	0.43
6. Huron South to I-90	0.49	0.77	--	--	13. Reg. Trade Center	0.37	0.60	--	0.66
7. I-90 to I-29 via SD 37	0.27	0.37	--	0.46	14. EDE via SD 37 (Super 2/4)	--	--	0.59	--
					15. EDE via US 81 (Super 2/4)	--	--	0.59	--

Note: A Benefit/Cost Ratio of 1.0 or greater indicates a feasible project.

## ECONOMIC DEVELOPMENT FEASIBILITY

The Eastern Dakota and Pierre to I-90 Expressways are seen by many local residents as a way to stimulate economic activity along the expressway routes. Some of the larger communities along the Interstate System in South Dakota have experienced increases in jobs and economic activity. Community leaders and opposing the Eastern Dakota and Pierre to I-90 Expressways believe the four-lane Expressways will do the same for their communities.

The key issue addressed in this study is whether or not portions of or the entire Eastern Dakota and Pierre to I-90 Expressways will generate sufficient economic activity in the State to warrant the investments.

### ECONOMIC OBJECTIVE

One objective of this study is to determine what level of highway investment, if any, is justified in the Expressway Corridors. There are economic consequences of either underinvesting or overinvesting in highways. If South Dakota underinvests in the corridors, economic development will be inhibited because real and perceived travel costs will be greater, competitive position will be hindered, etc. There is therefore an economic cost associated with underinvestment in the corridors. If South Dakota overinvests in the corridors, overall efficiency will suffer because those funds could have been put to better and more efficient use elsewhere, and future generations will incur the cost of rehabilitating and maintaining these highways. There is therefore an economic cost associated with overinvestment in the corridors.

Recognizing these facts, this study seeks to define those highway investments, and those levels of investment, that are efficient (neither underinvested nor overinvested). This implies efficient and feasible use of tax dollars. The proper level of investment is calculated in terms of economic development benefits, compared with each highway's costs.

### ECONOMIC BASIS FOR A FEASIBLE HIGHWAY PROJECT

Investment in the Expressways contributes to economic development in that it will lower transportation costs which makes the corridor region increasingly attractive to other forms of investment. Such changes may be realized in numerous ways but, in the final analysis, all of the direct benefits from the Expressways, and therefore the justification for investing in it, flow from using it for transportation.

Benefits from the Expressways may not only accrue to persons and businesses whose vehicles use the highways. Lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may benefit from an Expressway without even traveling on it.

It is important to keep in mind that, for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the corridor area in terms of investment decisions. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if investment decisions do not change dramatically, a highway investment will not produce benefits that exceed its cost.

Investing in highway improvements that produce benefits which are less than the associated costs of the improvements inhibit economic development. The costs will be paid by users and other taxpayers in the form of higher taxes, or would be paid in a lost opportunity (an alternative highway would not get improved). These higher taxes work against economic growth within the taxing jurisdiction because they reduce post-tax return to businesses and households by lowering disposable income, and investment in the "wrong" highway project similarly inhibits overall economic growth. Therefore it is imperative that the highway investment be economically feasible; if it is not, it is economically counterproductive.

The following table summarizes the economic development feasibility results for each route and highway type option. Any option with a benefit/cost ratio of 1.0 or greater is feasible. Any option with a ratio of 0.95 or better will be feasible by 1995.

### ECONOMIC FEASIBILITY PERSPECTIVES

The amount of economic development created by the Eastern Dakota and Pierre to I-90 Expressways will vary by alternative and region. To measure the economic impact to all persons involved, two perspectives are considered in the

study: the Corridor Area Perspective and the Statewide Perspective. Impacts are estimated for both regions because the different regions reflect potentially different perspectives and different impact magnitudes. For example, some benefits for Aberdeen or Pierre might come at the expense of another region or community in South Dakota. When this is the case, they are benefits to Aberdeen or Pierre but are transfers of benefits within South Dakota and therefore do not comprise net benefits for the entire State. By recognizing both State and local perspectives in the analysis, feasibility from both perspectives is ascertained.

## ECONOMIC DEVELOPMENT FEASIBILITY Benefit/Cost Ratios

	<u>Corridor Perspective</u>				<u>Statewide Perspective</u>			
	<u>Freeway</u>	<u>Expwy. 2/4</u>	<u>Lane</u>	<u>Super 2</u>	<u>Freeway</u>	<u>Expwy. 2/4</u>	<u>Lane</u>	<u>Super 2</u>
1. Pierre to I-90	0.99	1.64	--	1.30	0.37	0.83	--	0.55
2. Total Eastern Dakota Expressway Via Route SD 37	1.26	1.36	--	1.34	0.60	0.72	--	0.74
3. Total Eastern Dakota Expressway Via Route US 81	1.23	1.32	--	1.30	0.60	0.72	--	0.72
4. Aberdeen East to I-29	1.32	1.54	--	1.41	0.73	0.95	--	0.81
5. Aberdeen South to Huron	1.21	1.24	--	1.09	0.62	0.70	--	0.69
6. Huron South to I-90 Via Mitchell	1.47	1.96	--	--	0.74	1.22	--	--
7. I-90 to I-29 via SD 37 and Yankton	1.07	1.31	--	1.49	0.46	0.55	--	0.77
8. I-90 to I-29 via US 81 and Yankton	1.14	1.15	--	1.11	0.42	0.50	--	0.50
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	1.29	1.39	--	1.39	0.61	0.72	--	0.79
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	1.26	1.30	--	1.31	0.60	0.69	--	0.73
11. I-90 to Yankton via SD 37	1.13	1.27	--	1.44	0.33	0.42	--	0.73
12. I-90 to Yankton via US 81	1.06	1.25	--	1.18	0.32	0.40	--	0.49
13. Regional Trade Center	1.23	1.66	--	1.67	0.60	0.98	--	0.97
14. EDE via 37 (Super 2/4 Lane)	--	--	1.59	--	--	--	0.92	--
15. EDE via 81 (Super 2/4 Lane)	--	--	1.49	--	--	--	0.89	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater. This table includes all benefits.

## **ECONOMIC FEASIBILITY FROM THE CORRIDOR PERSPECTIVE**

The people who live and work in proximity to the highway corridors stand to gain a great deal economically if the Expressways are built. The reason is that most of the economic benefits accrue to communities in proximity to the highways. If the Expressways are constructed to four-lane standard, those communities will be better able to compete for new firms and therefore new economic activity. The feasibility results from the corridor perspective suggest the following:

- From the perspective of each corridor's residents, the highway improvements are all economically feasible and justified.
- From the local perspective, the four-lane Expressway design standard is typically (but not always) more feasible than the four-lane Freeway or the Super Two highway.
- The rates of return on the investment are in the range of 9 to 18 percent indicating that, from the local corridor perspective, the projects are very worthwhile.

## **ECONOMIC FEASIBILITY FROM THE STATEWIDE PERSPECTIVE**

The State of South Dakota needs to be careful of relying on localized economic developments as a basis for its investment decisions. To do so could mean that the State would spend State tax dollars to enable South Dakota communities to compete with each other. The State of South Dakota should only invest in highway projects that provide sufficient benefits at the State level to justify the improvements.

At issue is whether the benefits accruing locally along the corridors are benefits brought into the State or are merely shifted from one location in South Dakota to another. If the highway improvements merely shift economic activity from one location to another, they are not net gains to the State as a whole.

The Statewide feasibility results suggest the following conclusions from the perspective of all areas in South Dakota:

- The Total Eastern Dakota/Pierre to I-90 Expressway is currently not economically feasible. However, individual segments of the Expressway are feasible.
- From the Statewide perspective, Huron to I-90 built as a four-lane expressway is economically feasible (B/C ratio of 1.22).
- Aberdeen East to I-29 built as a four-lane expressway has a benefit/cost ratio of 0.95 and is nearly feasible. This Expressway should be feasible by the year 1995.
- Pierre to I-90 at four-lane expressway standards (B/C ratio of 0.83) might also become feasible as planned tourist attractions in the area become more developed. Pierre is also the only State Capital in the continental U.S. not on an Interstate or connected to an Interstate via a four-lane highway.
- The Regional Trade Center Connections option, comprising Huron to I-90, Aberdeen to I-29, and Pierre to I-90, has a benefit/cost ratio of 0.98. This option should be economically feasible by the year 1995.
- The Eastern Dakota Expressway constructed as a combination super 2/4 lane highway (via SD 37 and SD 50) has a B/C ratio of 0.92 and should be feasible around the year 2000.

## **AVAILABLE EXPRESSWAY OPTIONS**

South Dakota could seek to build all of the Expressways, or could build only the economically feasible options (Huron to I-90, Aberdeen to I-29 and the Regional Trade Center Connections, which includes Pierre to I-90), or could build any other route combinations. This study only conducts a series of objective analyses; it does not make the decisions.

Which to build, if any, depends not only on the feasibility results, but also on whether there is a reasonable way to raise the additional money needed to pay for the Expressways. The next section discusses the funding options available for the State of South Dakota.

## EXPRESSWAY PROGRAM FUNDING OPTIONS

This study examined the feasibility of constructing a series of four-lane expressways in Eastern South Dakota and from Pierre to I-90. A concurrent study (the "Heartland Expressway Economic Feasibility Study," December 1993) examined the feasibility of constructing a four-lane expressway south from Rapid City. The estimated cost of the feasible combination super 2/4 lane expressway segments in the South Dakota is \$83.1 million. The funding analysis includes the results of both studies.

Those two studies found that the "full build" option at expressway standards would cost over \$448 million, at 1992 price levels. If built in the future, inflation can be added to those cost estimates. The studies also found that the super 2/4 lane combination in the Heartland Expressway and the Regional Trade Center Connections are economically feasible. This "Feasible Expressway Package:" is estimated to cost \$213 million at 1992 price levels. Also, this study analyzed the funding scenario of building the Eastern Dakota Expressway as a super 2/4 lane combination. This combination plus the feasible portions of the Heartland Expressway is estimated at \$266 million.

It is one thing to conclude that an expressway is feasible, needed, or desired. It is quite another thing for the State to raise sufficient new funds to build the expressway. It is not unusual for otherwise feasible projects to go unbuilt due to lack of a funding source.

For this reason, this study was also commissioned to review highway funding options in South Dakota for an Expressway Program. The intent was to determine whether the Expressways could be paid for through the use of existing funds and funding levels, or whether new funds must be sought. The analysis seeks to provide assistance by addressing the question:

How might the South Dakota Department of Transportation fund construction and maintenance of the expressways, given the Department's limited financial resources and growing reconstruction and maintenance needs of existing highways throughout the State?

### ANALYSIS OF THREE FUNDING PACKAGES

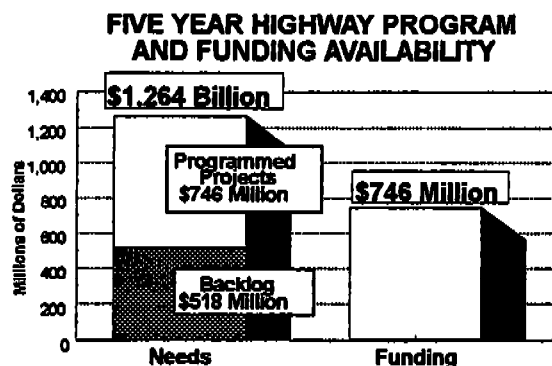
This study explored the funding options for three Expressway Programs:

1. **Full Build** - One option is for the State to build all of the Expressways examined in this study.
2. **Feasible Expressways** - Another option is to build the three Expressways in the Regional Trade Center Connections package as well as the feasible segments in the Heartland Expressway south from Rapid City.
3. **EDE (Super 2/4 Lane) and Heartland** - The last option analyzed is to build the Regional Trade Center Connections package as 4-lanes and the remaining Eastern Dakota Expressway as super 2 lane highways and the Heartland Expressway.

The State could opt to build fewer segments or other packages of segments as well. However, only these three packages were analyzed to determine the magnitude of funding required.

### NEED FOR ADDITIONAL FUNDING

The study examined existing funding needs and sources. The analyses found that South Dakota cannot pay for the Expressway Program using existing highway funds. These funds, depicted in the graph below, are fully and over committed to support bridge replacement, interstate highway reconstruction, and existing State highway maintenance and improvement projects. To divert funds from these programs would seriously degrade the quality and safety of the current State highway network.





As a result of the State's backlog of highway needs, additional funds are needed if the Expressways are to be built. These could include either higher tax rates from traditional highway funding sources, or the use of new funding sources, or both.

**FUNDING SOURCES**

The Expressway Program cannot receive priority over the State's current highway needs. As a result, additional funds will be needed to complete any of the Expressway Programs. In addition, funding must also be provided for future maintenance of any new Expressways.

Seven funding sources were examined, in various combinations:

1. Increase in South Dakota's motor fuels tax.
2. Elimination of the 2 cent per gallon exemption for ethanol blend fuels.
3. Increase in statewide sales tax.
4. Increase in motor vehicle excise tax.
5. Federal demonstration funds.
6. Use of local (sub-state) funding.
7. Lottery funds for highway purposes.

The most favorable funding source would be federal demonstration funds. It is conceivable, but by no means certain, that federal demonstration funding might be

obtained. Demonstration funds of this type would be subject to Congressional authorization, and would likely require a 20 percent State match.

If the State is unable to obtain federal demonstration funds sufficient to fund the Expressways, it could seek increased taxes as discussed below.

**TAX INCREASE OPTIONS**

Five candidate tax increase options were evaluated and are presented in the following table. The table indicates the magnitude of tax increases that would be needed to build and maintain the three expressway scenarios over a 14-year period of time.

All of these tax increase options assume that \$15 million in federal ISTEPA funds are available and used for the Heartland Expressway. The State sales tax is currently 4 percent; if it were 4 1/3 percent, the full build Expressway system could be built if the additional funds were dedicated to the Expressway Program. Similarly, by increasing the motor fuels tax from 18 cents to 25.5 cents per gallon, the full system could be built. If the State chooses to build only the feasible expressways or the Eastern Dakota Expressway as a combination Super 2/4 Lane highway, the tax increases needed would be less.

FIVE ALTERNATIVE TAX INCREASES IN ORDER TO BUILD THE EXPRESSWAYS OVER A 14-YEAR PERIOD						
Tax Increase Options	MAGNITUDE OF TAX INCREASE NEEDED TO BUILD					
	The Full Build		Feasible Expressways		EDE (Super 2/4 Lane)	
	Increase	Revenue (\$ Million)	Increase	Revenue (\$ Million)	Increase	Revenue (\$ Million)
Increase State Sales Tax	1/3 of 1%	\$26.0	1/8 of 1%	\$9.8	1/5 of 1%	\$15.6
Increase State Sales Tax and Motor Fuels Tax and Eliminate Ethanol Exemption	1/4 of 1% plus 1 cent per gal.	19.5 4.2 3.3	1/16 of 1% plus 1 cent per gal.	4.9 4.2 3.3	1/8 of 1% plus 1 cent per gal.	9.8 4.2 3.3
Increase Motor Fuels Tax and Eliminate Ethanol Exemption	7.5 cents per gal.	31.5 3.3	3 cents per gal.	12.6 3.3	4.5 cents per gal.	18.9 3.3
Increase Motor Vehicle Excise Tax	3.75% more	28.9	1.7% more	13.1	2.25% more	17.3
Increase Motor Vehicle Excise Tax and State Motor Fuels Tax and Eliminate Ethanol Exemption	2% more plus 3 cents per gal.	15.4 12.6 3.3	1% more plus 1 cent per gal.	7.7 4.2 3.3	1.33% more plus 1 cent per gal.	10.2 4.2 3.3

Note: Revenue figures indicate first year revenue only. The revenue figures within each option are different because of divergent revenue forecasts between the State sales tax and the State motor fuel tax. The State sales tax is increasing at a faster rate than the fuel tax, therefore less revenue is needed in the first year.

## OTHER REVENUE OPTIONS

Another possibility is for the local jurisdictions (municipalities and/or counties) to offer local funds for the Expressways. It is these local entities that, as shown in this study, will benefit the most from the Expressways.

Another option is for the State to dedicate some portion of the State Lottery funds for the Expressway Program. The Lottery currently generates \$50.8 million in State revenues. Over one-half of those funds would be needed to be able to construct the full build Expressway Program.

## IMPACT ON CONTINUING HIGHWAY NEEDS

Whatever funding mechanism or Expressway option is chosen by the State (if any), the Expressway Program should be developed so as not to affect South Dakota's committed five-year program. In addition, the Expressway Program should not divert funds away from future on-going highway needs or future five-year plans for the existing State highway system.

## DEBT VERSUS PAY-AS-YOU-GO OPTION

South Dakota has traditionally followed the safe but sure option of building highways only as the necessary funding has been available. This approach perhaps delays some construction but, at the same time, avoids debt. For completeness, this study also investigated the issuance of bonds as well as the pay-as-you-go method of funding the Expressway Program.

If the State were to issue Expressway bonds, it would be possible to construct the Expressways in the near-term. The bonds could generate the necessary funds. However, the State would then have to pay off those bonds, plus interest, and the only realistic way to accomplish this would be to raise taxes.

In order to build either the full build, feasible expressways, or the EDE (Super 2/4 Lane) option, the annual debt retirement schedules shown below would still require tax increases similar to those shown on the previous page.

ANNUAL DEBT RETIREMENT REQUIREMENTS IN ORDER TO BUILD THE EXPRESSWAYS OVER A SEVEN TO TEN YEAR PERIOD						
Interest Rate	ANNUAL DEBT SERVICE PAYMENTS (\$ MILLION)					
	Full Build Option		Feasible Expressway		EDE (Super 2/4 Lane)	
	Borrowed at		Borrowed at		Borrowed at	
	20 Years	12 Years	20 Years	12 Years	20 Years	12 Years
6%	\$33.1	\$45.3	\$15.0	\$20.6	\$20.4	\$27.9
7%	35.8	47.8	16.3	21.7	22.1	28.5
8%	38.7	50.4	17.6	22.9	23.8	31.1

## FUNDING CONCLUSION

This study examined various ways by which the Expressway Program might be funded. It found, unequivocally, that the South Dakota Department of Transportation does not have the necessary funds from its existing sources (state and federal). To divert construction and maintenance dollars from existing, economically productive highways, to fund new expressways, would be counterproductive. New funding will be needed.

## THE REMAINING DECISIONS

South Dakota will utilize this study's results to decide whether or not to construct one or more of the expressways. It could choose to build only those that are "economically feasible," or it could choose to build all of them, or it could choose to build none of them, or anything in between. This study does not make the decision; it only provides information that should be useful to the State in its decision process.

## Chapter 1

### INTRODUCTION AND STUDY INITIATIVE

South Dakota is served by two Interstate Highways: north-south I-29, and east-west I-90. These 4-lane highways have proven to be very successful, not only in moving traffic but also in helping communities in proximity to the highways to grow and prosper.

In addition to the two Interstate Highways, South Dakota has also built several other 4-lane highways. These are typically shorter segments, located in and close to several of the State's communities. Because 4-lane highways are typically built only when traffic volumes and traffic congestion warrant, and because South Dakota's highways at most locations have comparatively low traffic volumes, the State has not aggressively pursued 4-lane highway construction. Lending additional credibility to this approach is the fact that South Dakota has a low population density, is limited in its ability to generate highway tax revenues, and the State's tax payers' dollars need to be used wisely.

A number of communities, however, have been left without 4-lane access. Recognizing the economic value of 4-lane highways, there is considerable interest on the part of these communities for the State to build additional 4-lane highways. The issue is whether or not the State should initiate and therefore fund a new 4-lane Expressway Program. This Program's intent would be to tie, via 4-lane highway, additional South Dakota communities to the Interstate Highway System. For example, Pierre is the only state capitol in the continental U.S. without a 4-lane tie to the Interstate System. Such major communities as Aberdeen and Huron also have no such 4-lane tie, and there are other locations where there is considerable 4-lane expressway interest.

#### Study Purposes

This study analyzes the feasibility of the State constructing a series of new 4-lane highways. It was conducted to provide analyses, information and insights to enable a series of decisions to be made concerning an envisaged Expressway Program. Final recommendations and decisions are not a part of the study; rather, such decisions will be made later, by the State of South Dakota, based in part on the study's analyses. The study, within this advisory context, had the following purposes:

1. To provide insights and information concerning whether or not a system of 4-lane expressways in South Dakota is needed and feasible;
2. To provide insights and information concerning which specific expressways are most feasible, and why;
3. To analyze alternative highway types; and
4. To analyze alternative ways by which the State might raise sufficient funds to pay for an envisaged Expressway Program.

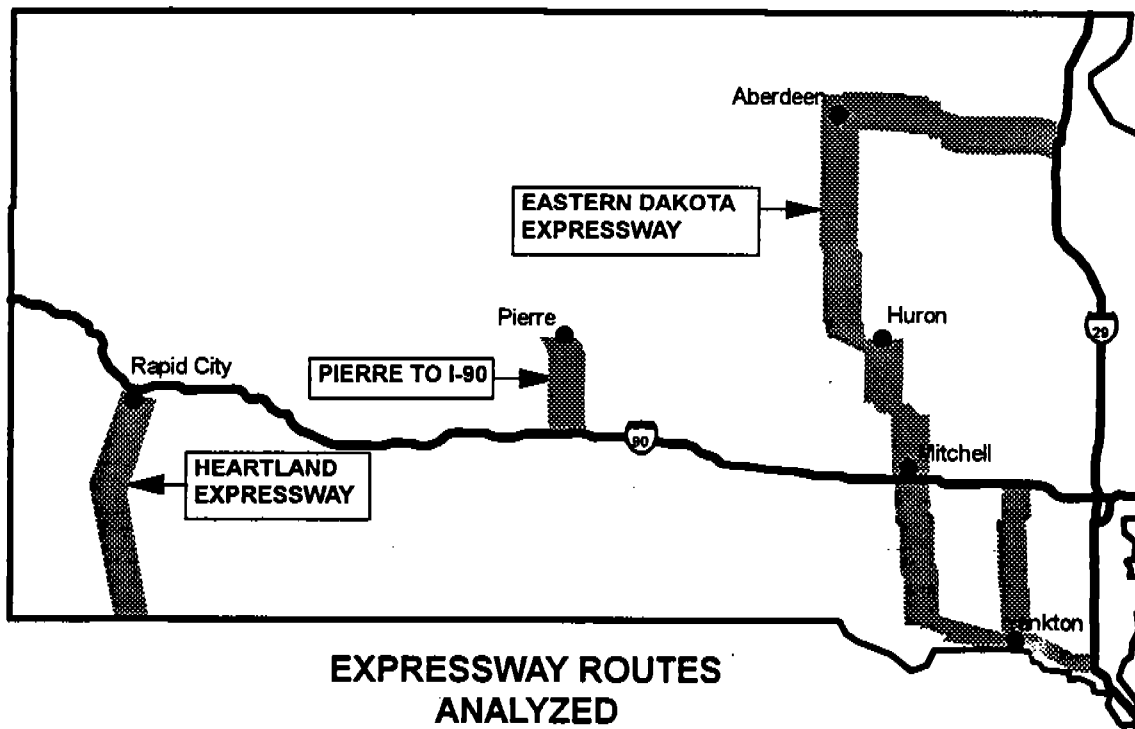
### Two Concurrent Feasibility Studies

In its deliberations concerning the feasibility of the Expressway Program, the South Dakota Department of Transportation (SDDOT) sponsored two studies:

- "Heartland Expressway Economic and Engineering Feasibility Study," 1993. That study explored the feasibility of constructing a 4-lane expressway north-south between Rapid City, South Dakota and Scottsbluff, Nebraska.
- "Eastern Dakota Expressway Feasibility Study," 1993. This study explored the feasibility of constructing a series of 4-lane expressways in eastern and central South Dakota.

### Potential Expressway Routes

Combined, these two studies examined the corridors depicted on Exhibit 1-1. This Final Report analyzes the corridors in central South Dakota (to Pierre) and eastern South Dakota (Aberdeen, Huron, Mitchell, Yankton, etc.). This Final Report also analyzes funding needs and possibilities for the total Expressway Program (including the Heartland Expressway).



### Study Context

Over the past 37 years the U.S. has been engaged in the construction of the Interstate Highway System. This multi-lane highway system has led to unsurpassed mobility and travel efficiency; it has also been of real economic value to the Nation, and to the communities located in proximity to the selected Interstate Highway routes. The problem is that the Interstate Highway System is now "complete," and several important South Dakota communities and regions have been left without direct 4-lane access. Available evidence suggests that communities that have 4-lane highways do better economically than those without 4-lane highways. As a result, a number of South Dakota's communities desire that the State, in this post-Interstate era, institute a new Expressway Program which could lead to the construction of additional 4-lane highways in the State.

### Study Rationale

The need for a feasibility study of this type is apparent, when one understands the perspectives of those involved in making highway corridor investment decisions. Clearly each corridor's residents and business community feel that they need upgraded highway facilities; also clearly, there are insufficient funds currently available in South Dakota's Highway Fund to institute a new Expressway Program. Rational, prudent and careful allocation of funds is therefore necessary.

The Corridor Perspective - Residents of each corridor area have long wanted their communities to be served by 4-lane highways. The corridor residents envision great benefits from such a highway -- increased intercity mobility, vehicular safety, increased tourism, improved goods transport, more efficient transport, better access to communities along the route, and economic development. Many advocates of the Expressway Program believe that the economic development benefits will exceed the costs associated with the road projects, and that a 4-lane freeway (or at least an expressway) must therefore be warranted and economically feasible.

The State and Federal Perspectives - The perspectives of the South Dakota DOT and the USDOT, however, are slightly different. These agencies, which are responsible for administering the highway program and funding, building, and maintaining the highway system, are literally inundated with requests for new 4-lane highways. The federal and state agencies simply do not have the funds that would be needed to respond in the affirmative to all of the requests for highway funding. Nor should these agencies respond affirmatively to every request. It is their duty to see to it that the limited highway monies be programmed for the most needed, most beneficial highways, highway corridors, and highway projects.

### Effective Use of South Dakota's Tax Dollars

An important objective of this study is to determine what level of highway investment, if any, is warranted in each of the study corridors. There are economic consequences of either underinvesting or overinvesting in highway construction in South Dakota. If the State underinvests in highways, economic development will be inhibited because real and perceived

travel costs will be greater, competitive position will be hindered, etc. There is therefore an economic cost associated with underinvestment in the corridors. If the State overinvests in the corridors, overall efficiency will suffer because those funds could have been put to better more efficient use elsewhere (other highways could have been built, or existing highways could be maintained to a higher level of maintenance, or schools could have been built, or the money could have been left in South Dakota's taxpayers pockets). There is therefore an economic cost associated with overinvestment in the highway corridors.

Recognizing these facts, this study seeks to define those highway investments, and those levels of investment, that are efficient (neither underinvested nor overinvested). This implies efficient and feasible use of tax dollars. The proper level of investment is calculated in terms of travel efficiency and economic development benefits, compared with each highway's costs.

### **Six Test of Feasibility**

The study examined the feasibility of constructing the expressways. Six tests of feasibility were applied:

1. **Need Based on Traffic** - Are the expressways needed based on existing or future travel demand?
2. **Engineering and Cost Feasibility** - Can the expressways be built from the engineering perspective, and what would they cost?
3. **Environmental Feasibility** - Can they be built without significant negative environmental impact?
4. **Travel Efficiency Feasibility** - Are the expressways economically feasible based on highway user benefits?
5. **Economic Development Feasibility** - Are the expressways feasible in terms of their economic impact on local and statewide economies?
6. **Funding Feasibility** - Can the State afford to fund the Expressway Program?

### **Study Participants**

The Eastern Dakota Expressway study was conducted by a team of technical consultants. The surveys, analyses, interpretation and documentation are therefore the work of that technical consultant team. The work was done under contract to the South Dakota Department of Transportation, with participation from the Federal Highway Administration.

**Steering Committee** - A Steering Committee, made up of transportation professionals from the South Dakota Department of Transportation and the Federal Highway Administration,

was established to advise, guide and steer the technical consultant team. The six member committee consisted of:

- Mr. James Jenssen, Director of Planning, SDDOT
- Mr. Dean Scofield, Deputy Secretary, SDDOT
- Mr. Clyde Pietz, Director of Operations, SDDOT
- Mr. Ben Orsbon, Planning/Data Analysis Engineer, SDDOT
- Mr. Joel Jundt, Engineering Supervisor, SDDOT
- Mr. James Iverson, Federal Highway Administration

**Advisory Committee** - An Advisory Committee, with members from communities in each of the designated expressway corridors, was established to provide local information and input needed throughout the study. Members of the Advisory Committee included:

- Mr. Jim Campbell, Aberdeen
- Mr. Roy Dulaney, Tulare
- Mr. Michael Held, Huron
- Mr. Van Johnson, Sioux Falls
- Mr. Jay Miller, Yankton
- Mr. James Robinson, Yankton
- Ms. Tona Rozum, Mitchell
- Mr. Lynn Schneider, Huron
- Mr. Loren Steele, Aberdeen
- Mr. Anton Wegner, Pierre
- Mr. Richard Wudel, Parkston

The Advisory Committee met at locations throughout the corridor region, to review the Consultant's work and to provide study guidance.

**Technical Study Team** - The study was conducted by a team of private consultants, led by Wilbur Smith Associates. Wilbur Smith Associates was assisted by Banner Associates of Brookings, South Dakota and Dr. Charles Lamberton of South Dakota State University.

### **Study Interim Reports**

Study conduct was divided into several work tasks. As the study progressed, the Study Team produced two interim reports which documented various phases of the study. These reports were then reviewed by the Study's Advisory and Steering Committees. Both of these interim reports are incorporated into this Final Report.

- **Report 1** - Traffic Forecasts, Cost Estimates and Environmental Review, July 27, 1993
- **Report 2** - Travel Efficiency and Economic Development Feasibility Analyses, September 17, 1993

### Public Meetings

Following Steering Committee and Advisory Committee review of the Interim Reports, the Consultant made a number of important changes to the analysis, and prepared a Preliminary Draft Final Report. This preliminary report was provided to all Committee members, was made available to the general public, and was reviewed at five public meetings. Those public meetings were held as follows:

December 1, 1993	Yankton	Yankton Inn
December 2, 1993	Mitchell	Holiday Inn
December 6, 1993	Pierre	Ramkota Inn
December 7, 1993	Huron	Crossroads
December 8, 1993	Aberdeen	Ramkota Inn

Those attending the public meetings had the opportunity to present oral or written comments during the meeting. Written comments were also accepted until December 18, 1993. Draft copies of the report were available for public review after November 28, 1993, at the South Dakota Department of Transportation region offices located in Aberdeen, Mitchell, Pierre and Rapid City, South Dakota. Copies were also available for review at the city offices in Aberdeen, Ft. Pierre, Freeman, Groton, Huron, Mitchell, Parkston, Pierre, Redfield, Tripp, Tyndall, Vermillion, Webster, and Yankton.



## Chapter 2

# HIGHWAY IMPROVEMENT ALTERNATIVES

The South Dakota Department of Transportation could pursue any of a number of alternative approaches in the development of an expressway system for Eastern Dakota. Some of these alternative approaches are mutually exclusive, e.g., if one approach is adopted the other approach is not adopted. Examples of mutually exclusive options include build either a freeway or an expressway, and build either this route or that route. In other cases, the approaches could be sequential, e.g., build this segment now, and that segment later. This report chapter identifies and describes the improvement alternatives examined in this study.

### Route Alternatives

The Eastern Dakota Expressway Study is examining expressway route alternatives in the eastern one-half of the state -- including Pierre and corridors to the east. A concurrent study (the Heartland Expressway Study) is examining corridors in the west, southward from Rapid City. As a result of the two concurrent studies, expressways were evaluated in the eastern, middle, and western portions of South Dakota.

**Routes Considered** - In the Eastern Dakota Expressway Study a variety of route alternatives are being considered. Early in the study it was recognized that the most efficient approach to freeway/expressway development is to utilize and widen existing highways, wherever possible, rather than going off cross country on new alignment. Traffic volumes, trip patterns and population centers were reviewed in an attempt to define the most logical places for freeway/expressway consideration.

**Routes Evaluated** - That process led to the identification of the following most logical candidate highway corridor options:

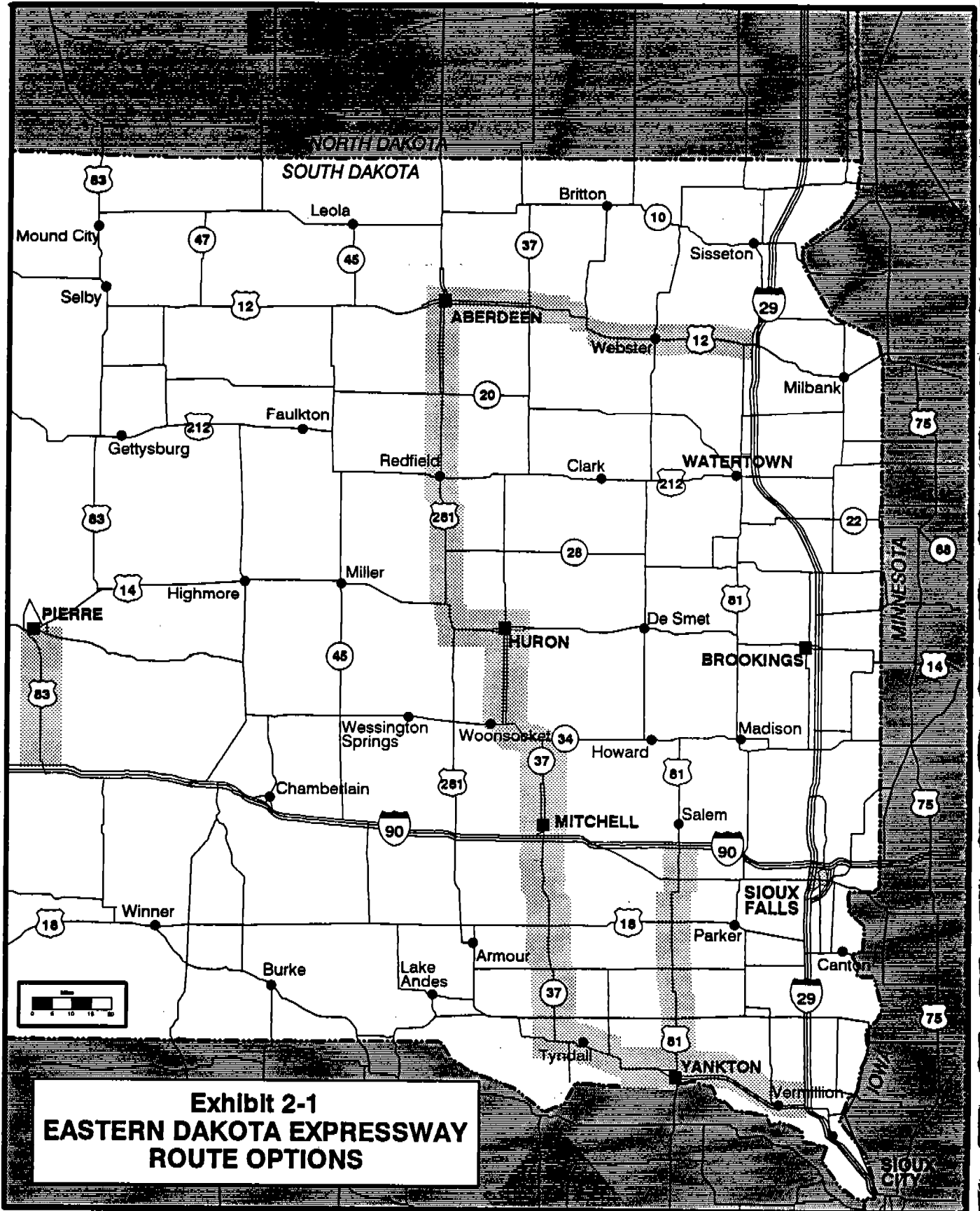
- Pierre southbound on US 83 to I-90
- Aberdeen eastbound on US 12 to I-29
- Aberdeen southbound on US 281 and SD 37 to Mitchell and I-90
- Mitchell and I-90 south to Yankton and I-29 via SD 37 and SD 50
- Mitchell and I-90 south to Yankton and I-29 via US 81 and SD 50.

These routes are depicted on Exhibit 2-1, and it is these routes that are evaluated in this Eastern Dakota Expressway Study.

### Three Alternative Levels of Highway Improvement

These Exhibit 2-1 routes could be widened or otherwise improved to any of a number of alternative highway types and design standards. Three alternative highway types are evaluated in this study.

1. Freeway (4-lane)
2. Expressway (4-lane)
3. Super 2 (2-lane)



These design standard alternatives are defined, for this study's purposes, as follows.

#### **4-Lane Freeway**

- a. Interstate highway standards.
- b. 65 mph posted speed, 55 mph in urban areas.
- c. Complete access control.
- d. Every community is bypassed.
- e. Interchanges at communities and at major arterials and at some minor arterials.
- f. No at grade railroad crossings.
- g. Grade separations at hard surfaced state and county road crossings.
- h. Use existing alignments when possible.

#### **4-Lane Expressway**

- a. 55 mph posted speed, reduced speed through communities.
- b. Partial access control.
- c. Interchanges only at selected locations based the local circumstances.
- d. No at grade railroad crossing unless local circumstances warrant due to extremely low railroad traffic.
- e. No stops along corridor, unless local circumstances warrant.
- f. Community bypasses on a case by case basis.
- g. Use existing alignment when possible.
- h. Utilize divided 4-lane in rural areas and undivided 4 lane in urban areas.

#### **Super 2-Lane (Combination of 4-lane and 2-lane)**

- a. 55 mph posted speed, reduced speed through communities.
- b. Provide 4-lane in areas where traffic conditions, economic conditions or community bypass conditions warrant.
- c. 4-lane segments would follow the same criteria as described for the 4-lane expressway.
- d. Provide 2-lane in areas where traffic conditions and economic conditions warrant.
- e. 2-lane segments would be designed as super two lane highways which is defined as follows:
  1. 12 foot lanes with paved 10 foot shoulders.
  2. Turn lanes at major and some minor arterial intersections.
  3. Passing lanes where conditions warrant.
- f. Use existing alignment where possible.

Each of these three design standards is receiving equal treatment in this study.

### Fifteen Route Evaluation Options

If the State builds the expressways, it will likely need to phase in the work over time because of limited revenue and the ability of the construction industry to handle extra construction loads. In addition, it is likely that certain segments are more feasible than are others.

This study considered possible partial implementation by logically defining fifteen different route combinations that might be considered for implementation. Each of these fifteen options is evaluated in terms of cost and traffic. These fifteen, or portions of them, are the subject of the economic evaluations.

The fifteen route evaluation options are depicted on Exhibit 2-2, and listed on Exhibit 2-3. The purpose of evaluating all fifteen is to determine whether or not any are individually feasible and/or which are more feasible than the others.

Exhibit 2-3 assigns a numbering/lettering system, for ease of identification. A total of 35 different alternatives are identified, with three design standards (freeway, expressway, super 2) considered for each of the route options. The only exception is Route Option 6 Huron south to I-90 via Mitchell, which was not considered for Super 2 since both ends are already built to 4-lane expressway standard.

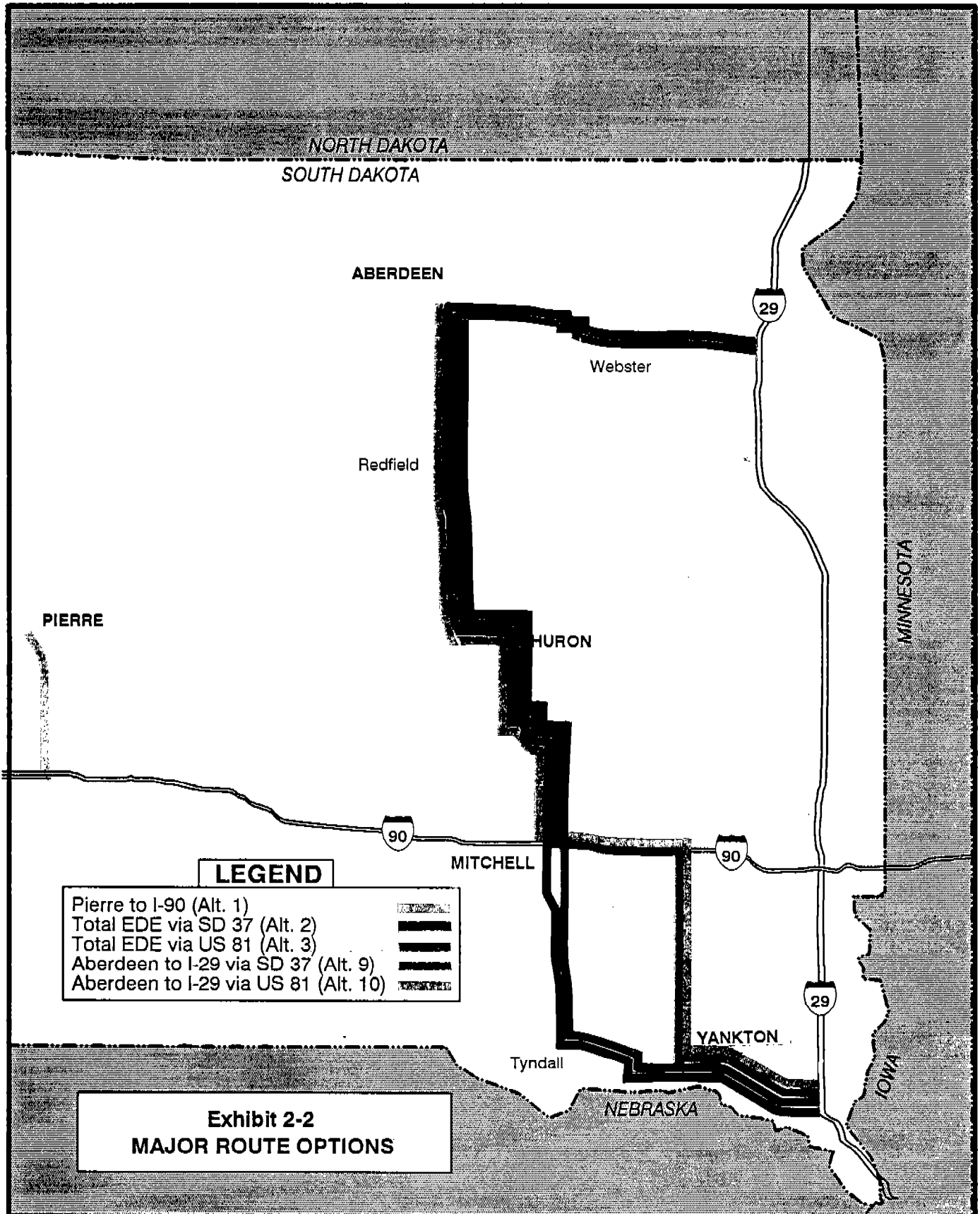
### Characteristics of Each Option

Each of the twelve route suboptions was evaluated in terms of what improvements would be needed to convert them to freeway, expressway or Super 2 status. The characteristics of each are listed on Exhibits 2-4 through 2-15. Based on these improvement needs, the capital costs of each were calculated (see Chapter 3) and traffic was also estimated for each (see Chapter 4).

Route option 14 combines expressway and super 2 roadways in the following manner.

Pierre to I-90:	Expressway type improvements
Aberdeen East to I-29:	Expressway type improvements with a bypass at Aberdeen
Aberdeen South to Huron:	Super 2 type improvements with no bypasses at Redfield, Huron or Wolsey and a 2-lane roadway between Wolsey and Huron
Huron South to I-90 at Mitchell:	Expressway type improvement
I-90 at Mitchell to I-29 via Route SD 37	Super 2 type improvements with a bypass at Yankton

Route option 15 combines 4-lane expressway and super 2 roadways in the same manner as route option 14 except that US 81 is utilized between Mitchell and Yankton.



**Exhibit 2-2  
MAJOR ROUTE OPTIONS**

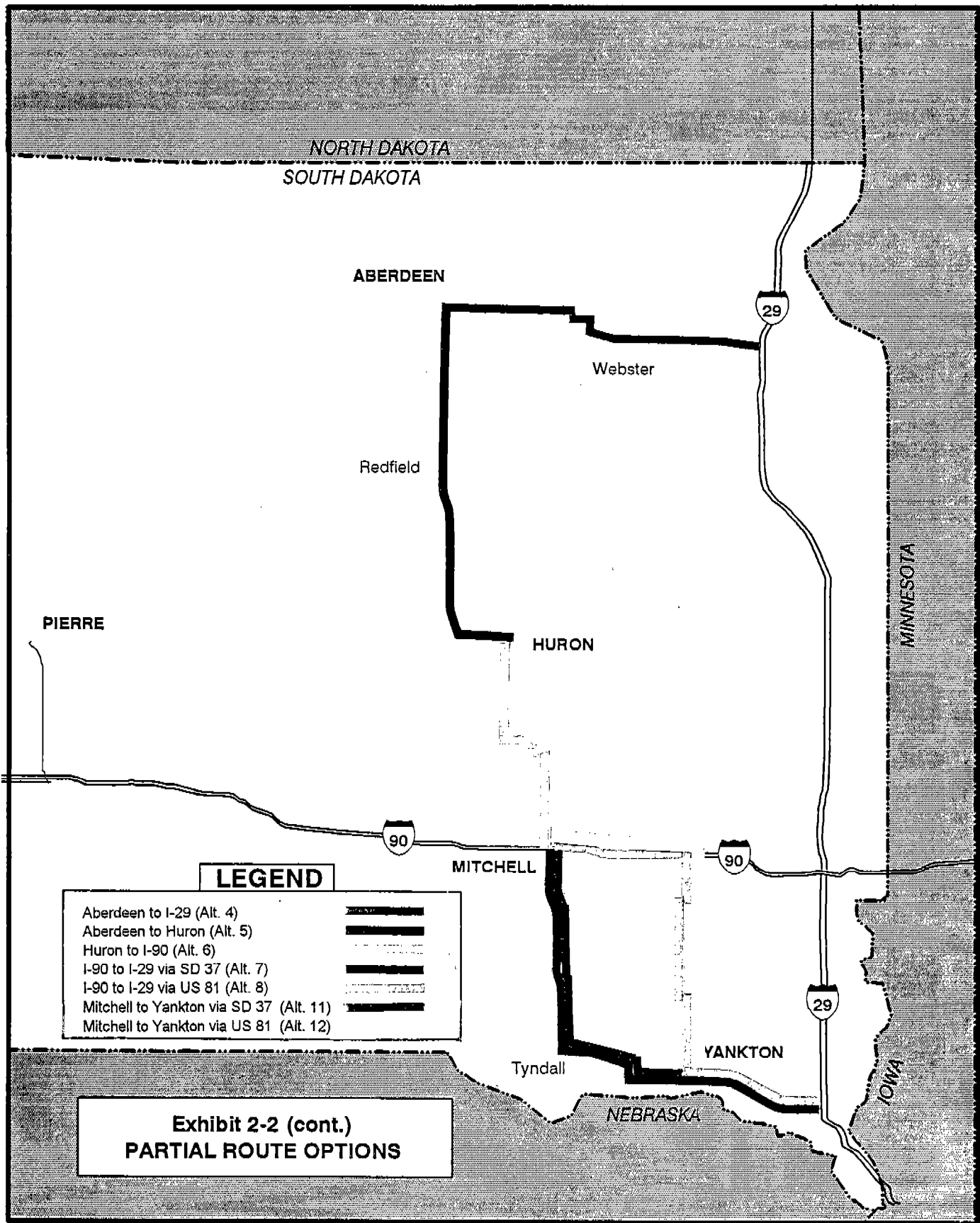


Exhibit 2-3  
ROUTE OPTIONS AND HIGHWAY IMPROVEMENT SUMMARY

<u>ROUTE LOCATION OPTION</u>	<u>TYPE OF HIGHWAY IMPROVEMENT</u>		
	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2-LANE</u>
1. Pierre to I-90	1A	1B	1C
2. Total Eastern Dakota Express Via Route SD 37	2A	2B	2C
3. Total Eastern Dakota Express Via Route US 81	3A	3B	3C
4. Aberdeen East to I-29	4A	4B	4C
5. Aberdeen South to Huron	5A	5B	5C
6. Huron South to I-90 Via Mitchell	6A	6B	
7. I-90 to I-29 Via SD 37 and Yankton	7A	7B	7C
8. I-90 to I-29 Via US 81 and Yankton	8A	8B	8C
9. Aberdeen to I-29 Via Mitchell SD 37 and Yankton	9A	9B	9C
10. Aberdeen to I-29 Via Mitchell, US 81 and Yankton	10A	10B	10C
11. I-90 to Yankton via SD 37	11A	11B	11C
12. I-90 to Yankton via US 81	12A	12B	12C
13. Regional Trade Center Connections: Aberdeen East to I-29 Huron South to I-90 Pierre South to I-90	13A	13B	13C
14. Total Eastern Dakota Express via SD 37 with combination expressway/super 2-lane		14 B/C	
15. Total Eastern Dakota Express via US 81 with combination expressway/super 2-lane		15 B/C	

Exhibit 2-4  
ALTERNATIVE NO. 1 IMPROVEMENTS

PIERRE TO I-90

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	2.1	0	0
New 2-Lane, miles	31.2	31.8	0
River Bridge, each	2	---	---
Stream Crossing, each	6	4	4
Railroad Overpass, each	4	---	---
Interchange, each	6	---	---
Shoulder Improvement, miles	---	---	---
Turn Lane, each	---	---	6
Passing Lane, miles	---	---	20.0
4-Lane Right of Way, miles	2.1	---	---
2-Lane Right of Way, miles	31.2	27.3	20.0
Communities Bypassed	Ft. Pierre	---	---

EXPRESSWAY ALTERNATE: No stop signs required.

SUPER 2-LANE ALTERNATE: No stop signs required.



Exhibit 2-5  
ALTERNATIVE NO. 2 IMPROVEMENTS

TOTAL EASTERN DAKOTA EXPRESS VIA ROUTE SD 37

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	37.0	31.1	31.1
New 2-Lane, miles	206.4	206.4	23.5
River Bridge, each	4	4	4
Stream Crossing, each	23	19	10
Grade Separation, each	9	2	---
Railroad Overpass, each	14	11	9
Interchange, each	51	3	---
Widen Interchange Structure, each	--- 1	---	---
Shoulder Improvements, miles	95.3	95.3	95.3
Resurfacing, miles	95.3	95.3	95.3
Turn Lane, each	---	---	46
Passing Lane, miles	---	---	---
4-Lane Right of Way, miles	37.0	31.1	31.1
2-Lane Right of Way, miles	206.4	206.4	23.5
Communities Bypassed	Aberdeen Groton Webster Redfield Wolsey Huron Mitchell Parkston Tripp Tyndall Tabor Yankton	Redfield Wolsey Huron Mitchell Tripp Tyndall Tabor Yankton	Redfield Wolsey Huron Mitchell Tripp Tyndall Tabor Yankton

EXPRESSWAY ALTERNATE: Stop signs required through Aberdeen  
and at SD Hwy. 34 (2)

SUPER 2-LANE ALTERNATE: Stop signs required through Aberdeen and at  
SD Hwy. 34 (2), US Hwy. 212, SD Hwy. 44 and SD Hwy. 50.

Exhibit 2-6  
ALTERNATIVE NO. 3 IMPROVEMENTS

TOTAL EASTERN DAKOTA EXPRESS VIA ROUTE US 81

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	37.0	31.1	31.1
New 2-Lane, miles	184.0	184.0	23.5
River Bridge, each	6	6	5
Stream Crossing, each	12	8	5
Grade Separation, each	7	2	---
Railroad Overpass, each	12	11	9
Interchange, each	47	3	---
Widen Interchange Structure, each	---	2	---
Shoulder Improvement, miles	91.9	91.9	91.9
Resurfacing, miles	91.9	91.9	91.9
Turn Lane, each	---	---	44
Passing Lane, miles	---	---	7.4
4-Lane Right of Way, miles	37.0	31.1	31.1
2-Lane Right of Way, miles	184.0	184.0	23.5
Communities Bypassed	Aberdeen Groton Webster Redfield Wolsey Huron Mitchell Yankton	Redfield Wolsey Huron Mitchell Yankton	Redfield Wolsey Huron Mitchell Yankton

EXPRESSWAY ALTERNATE: Stop signs required through Aberdeen and at SD Hwy. 34 (2).

SUPER 2-LANE ALTERNATE: Stop signs required through Aberdeen and at SD Hwy. 34 (2) and US Hwy. 212.

Exhibit 2-7  
ALTERNATIVE NO. 4 IMPROVEMENTS

ABERDEEN EAST TO I-29

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	5.9	---	---
New 2-Lane, miles	56.0	56.0	---
River Bridge, each	1	1	1
Stream Crossing, each	3	1	---
Grade Separation, each	2	---	---
Railroad Overpass, each	1	1	1
Interchange, each	11	1	---
Widen Interchange Structure, each	---	1	---
Shoulder Improvement, miles	48.0	48.0	48.0
Resurfacing, miles	48.0	48.0	48.0
Turn Lane, each	---	---	12
Passing Lane, miles	---	---	---
4-Lane Right of Way, miles	5.9	---	---
2-Lane Right of Way, miles	56.0	56.0	---
Communities Bypassed	Aberdeen Groton Webster	---	---

EXPRESSWAY ALTERNATE: Stop signs required through Aberdeen.

SUPER 2-LANE ALTERNATE: Stop signs required through Aberdeen.

Exhibit 2-8  
ALTERNATIVE NO. 5 IMPROVEMENTS

ABERDEEN SOUTH TO HURON

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	14.4	14.4	14.4
New 2-Lane, miles	58.9	58.9	23.5
River Bridge, each	---	---	---
Stream Crossing, each	7	5	4
Grade Separation, each	2	2	---
Railroad Overpass, each	5	6	5
Interchange, each	13	---	---
Shoulder Improvement, miles	29.3	29.3	29.3
Resurfacing, miles	29.3	29.3	29.3
Turn Lane, each	---	---	8
Passing Lane, miles	---	---	---
4-Lane Right of Way, miles	14.4	14.4	14.4
2-Lane Right of Way, miles	58.9	58.9	23.5
Communities Bypassed	Redfield Wolsey Huron	Redfield Wolsey Huron	Redfield Wolsey Huron

EXPRESSWAY ALTERNATE: No stop signs required.

SUPER 2-LANE ALTERNATE: Stop signs required at US Hwy. 212.

Exhibit 2-9  
ALTERNATIVE NO. 6 IMPROVEMENTS

HURON SOUTH TO I-90 VIA MITCHELL

	<u>A.</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>
New 4-Lane, miles	11.1	7.2
New 2-Lane, miles	13.2	13.2
River Bridge, each	3	3
Stream Crossing, each	---	---
Grade Separation, each	---	---
Railroad Overpass, each	2	---
Interchange, each	9	---
Shoulder Improvement, miles	---	---
Resurfacing, miles	---	---
Turn Lane, each	---	---
Passing Lane, miles	---	---
4-Lane Right of Way, miles	11.1	7.2
2-Lane Right of Way, miles	13.2	13.2
Communities Bypassed	Mitchell	Mitchell

EXPRESSWAY ALTERNATE: Stop signs required at SD Hwy. 34 (2).

**Exhibit 2-10  
ALTERNATIVE NO. 7 IMPROVEMENTS**

**I-90 TO I-29 VIA SD 37 AND YANKTON**

	<b><u>A: FREEWAY</u></b>	<b><u>B: EXPRESSWAY</u></b>	<b><u>C: SUPER 2-LANE</u></b>
New 4-Lane, miles	5.6	5.6	5.6
New 2-Lane, miles	78.3	78.3	---
River Bridge, each	---	---	---
Stream Crossing, each	13	13	6
Grade Separation, each	5	---	---
Railroad Overpass, each	6	4	3
Interchange, each	18	2	---
Shoulder Improvement, miles	18.0	18.0	18.0
Resurfacing, miles	18.0	18.0	18.0
Turn Lane, each	---	---	26
Passing Lane, miles	---	---	---
4-Lane Right of Way, miles	5.6	5.6	5.6
2-Lane Right of Way, miles	78.3	78.3	---
Communities Bypassed	Parkston Tripp Tyndall Tabor Yankton	Tripp Tyndall Tabor Yankton	Tripp Tyndall Tabor Yankton

**EXPRESSWAY ALTERNATE:** Stop signs required at SD Hwy 44 and SD Hwy 50

**SUPER 2-LANE ALTERNATE:** Stop signs required at SD Hwy 44 and SD Hwy 50.

Exhibit 2-11  
ALTERNATIVE NO. 8 IMPROVEMENTS

I-90 TO I-29 VIA US 81 AND YANKTON

	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2-LANE</u>
New 4-Lane, miles	5.6	5.6	5.6
New 2-Lane, miles	55.9	55.9	---
River Bridge, each	2	2	1
Stream Crossing, each	2	2	1
Grade Separation, each	3	---	---
Railroad Overpass, each	4	4	3
Interchange, each	14	2	---
Widen Interchange Structure, each	---	1	---
Shoulder Improvement, miles	14.6	14.6	14.6
Resurfacing, miles	14.6	14.6	14.6
Turn Lane, each	---	---	24
Passing Lane, miles	---	---	7.4
4-Lane Right of Way, miles	5.6	5.6	5.6
2-Lane Right of Way, miles	55.9	55.9	---
Communities Bypassed	Yankton	Yankton	Yankton

EXPRESSWAY ALTERNATE: No stop signs required.

SUPER 2-LANE ALTERNATE: No stop signs required.

Exhibit 2-12  
ALTERNATIVE NO. 9 IMPROVEMENTS

ABERDEEN TO I-29 VIA MITCHELL SD 37 AND YANKTON

	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2-LANE</u>
New 4-Lane, miles	31.1	31.1	31.1
New 2-Lane, miles	150.4	150.4	23.5
River Bridge, each	3	3	3
Stream Crossing, each	20	18	10
Grade Separation, each	7	2	---
Railroad Overpass, each	13	10	8
Interchange, each	40	2	---
Shoulder Improvement, miles	47.3	47.3	47.3
Resurfacing, miles	47.3	47.3	47.3
Turn Lane, each	---	---	34
Passing lane, miles	---	---	---
4-Lane Right of Way, miles	31.1	31.1	31.1
2-Lane Right of Way, miles	150.4	150.4	23.5
Community Bypassed	Redfield Wolsey Huron Mitchell Parkston Tripp Tyndall Tabor Yankton	Redfield Wolsey Huron Mitchell Tripp Tyndall Tabor Yankton	Redfield Wolsey Huron Mitchell Tripp Tyndall Tabor Yankton

EXPRESSWAY ALTERNATE: Stop signs required at SD Hwy. 34 (2).

SUPER 2-LANE ALTERNATE: Stop signs required at SD Hwy. 34 (2),  
US Hwy. 212, SD Hwy. 44 and SD Hwy. 50.



Exhibit 2-13  
ALTERNATIVE NO. 10 IMPROVEMENTS

ABERDEEN TO I-29 VIA MITCHELL, US 81 AND YANKTON

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 4-Lane, miles	31.1	31.1	31.1
New 2-Lane, miles	128.0	128.0	23.5
River Bridge, each	5	5	4
Stream Crossing, each	9	7	5
Grade Separation, each	5	2	---
Railroad Overpass, each	11	10	8
Interchange, each	36	2	---
Widen Interchange Structure, each	---	1	---
Shoulder Improvement, miles	43.9	43.9	43.9
Resurfacing, miles	43.9	43.9	43.9
Turn Lane, each	---	---	32
Passing Lane, miles	---	---	7.4
4-Lane Right of Way, miles	31.1	31.1	31.1
2-Lane Right of Way, miles	128.0	128.00	23.5
Communities Bypassed	Redfield Wolsey Huron Mitchell Yankton	Redfield Wolsey Huron Mitchell Yankton	Redfield Wolsey Huron Mitchell Yankton

EXPRESSWAY ALTERNATE: Stop signs required at SD Hwy. 34 (2).

SUPER 2-LANE ALTERNATE: Stop signs required at SD Hwy. 34 (2) and  
US Hwy. 212.

Exhibit 2-14  
ALTERNATIVE NO. 11 IMPROVEMENTS

I-90 TO YANKTON VIA SD 37

	<u>A:</u> <u>FREEWAY</u>	<u>B:</u> <u>EXPRESSWAY</u>	<u>C:</u> <u>SUPER 2-LANE</u>
New 2-Lane, miles	78.3	78.3	---
Stream Crossing, each	13	13	6
Grade Separation, each	4	---	---
Railroad Overpass, each	4	2	1
Interchange, each	12	---	---
Shoulder Improvement, miles	18.0	18.0	18.0
Resurfacing, miles	18.0	18.0	18.0
Turn Lane, each	---	---	26
Passing Lane, miles	---	---	---
4-Lane Right of Way, miles	5.6	5.6	5.6
2-Lane Right of Way, miles	78.3	78.3	---
Communities Bypassed	Parkston Tripp Tyndall Tabor	Tripp Tyndall Tabor	Tripp Tyndall Tabor

EXPRESSWAY ALTERNATE: Stop signs required at SD Hwy 44 and SD Hwy 50

SUPER 2-LANE ALTERNATE: Stop signs required at SD Hwy 44 and SD Hwy 50.

Exhibit 2-15  
ALTERNATIVE NO. 12 IMPROVEMENTS

I-90 TO I-29 YANKTON VIA US 81

	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2-LANE</u>
New 2-Lane, miles	55.9	55.9	---
River Bridge, each	2	2	1
Stream Crossing, each	2	2	1
Grade Separation, each	2	---	---
Railroad Overpass, each	2	2	1
Interchange, each	8	---	---
Widen Interchange Structure, each	---	1	---
Shoulder Improvement, miles	14.6	14.6	14.6
Resurfacing, miles	14.6	14.6	14.6
Turn Lane, each	---	---	24
Passing Lane, miles	---	---	7.4
4-Lane Right of Way, miles	5.6	5.6	5.6
2-Lane Right of Way, miles	55.9	55.9	---
Communities Bypassed			

EXPRESSWAY ALTERNATE: No stop signs required.

SUPER 2-LANE ALTERNATE: No stop signs required.

Exhibit 2-16  
ALTERNATIVE NO. 13 IMPROVEMENTS

REGIONAL TRADE CENTER CONNECTIONS  
ABERDEEN EAST TO I-29  
HURON SOUTH TO I-90  
PIERRE SOUTH TO I-90

	A: <u>FREEWAY</u>	B: <u>EXPRESSWAY</u>	C: <u>SUPER 2-LANE</u>
New 4-Lane, miles	19.1	7.2	7.2
New 2-Lane, miles	100.4	101.0	13.2
River Bridge, each	6	4	4
Stream Crossing, each	9	5	4
Grade Separation, each	2	---	---
Railroad Overpass, each	7	1	1
Interchange, each	26	3	---
Widen Interchange Structure, each	---	1	---
Shoulder Improvements, miles	48	48	48
Resurfacing, miles	48	48	48
Turn Lane, each	---	---	18
Passing Lane, miles	---	---	20
4-Lane Right of Way, miles	19.1	7.2	7.2
2-Lane Right of Way, miles	100.4	101.0	13.2
Communities Bypassed	Ft. Pierre Aberdeen Groton Wester Mitchell	Mitchell	

EXPRESSWAY ALTERNATE: Stop signs required through Aberdeen and at SD Hwy. 34 (2).

SUPER 2-LANE ALTERNATE: Stop signs required through Aberdeen and at SD Hwy. 34 (2).

Exhibit 2-17  
ALTERNATIVE NO. 14 IMPROVEMENTS

PIERRE TO I-90 AND TOTAL EASTERN DAKOTA EXPRESS VIA ROUTE SD 37  
EXPRESSWAY AND SUPER 2-LANE COMBINATION

New 4-Lane, miles	18.7
New 2-Lane, miles	101.0
River Bridge, each	4
Stream Crossing, each	13
Grade Separation, each	2
Railroad Overpass, each	5
Interchange, each	1
Widen Interchange Structure, each	1
Shoulder Improvements, miles	98.1
Resurfacing, miles	98.1
Turn Lane, each	38
Passing Lane, miles	---
4-Lane Right of Way, mile	18.7
2-Lane Right of Way, miles	101.0
Communities Bypassed	Aberdeen Mitchell Tripp Tyndall Tabor Yankton

Stop signs required through Redfield and Huron and at US 14, SD Hwy. 34 (2), SD Hwy. 44 and SD Hwy. 50.

Exhibit 2-18  
ALTERNATIVE NO. 15 IMPROVEMENTS

PIERRE TO I-90 AND TOTAL EASTERN DAKOTA EXPRESS VIA ROUTE US 81  
EXPRESSWAY AND SUPER 2-LANE COMBINATION

New 4-Lane, miles	18.7
New 2-Lane, miles	101.0
River Bridge, each	54
Stream Crossing, each	8
Grade Separation, each	2
Railroad Overpass, each	5
Interchange, each	1
Widen Interchange Structure, each	1
Shoulder Improvements, miles	94.7
Resurfacing, miles	94.7
Turn Lane, each	36
Passing Lane, miles	7.4
4-Lane Right of Way, mile	18.7
2-Lane Right of Way, miles	101.0
Communities Bypassed	Aberdeen Mitchell Yankton

Stop signs required through Redfield and Huron and at US 14, SD Hwy. 34 (2).

## Chapter 3

### COST ESTIMATES

Any of the candidate highway improvement options (Freeway, Expressway, or Super 2) built in any of the corridors identified in Chapter 2, will be quite expensive to build and maintain. This chapter presents the Consultant's cost estimates for each of these improvement options. The costs are based on South Dakota DOT cost experience, supplemented with experience from other states. The highways have not been designed, nor have detailed environmental studies been conducted. Consequently, the cost estimates should be viewed as "order-of-magnitude" estimates, suitable for feasibility testing purpose but certainly subject to refinement in any future more detailed study.

#### CAPITAL COST SUMMARY

Exhibit 3-1 summarizes the cost estimates for the various improvement options. The costs are expressed at constant 1992 price levels, meaning that they exclude any future inflation that might take place. If South Dakota were to seek an extensive expressway system by building the entire system (Pierre south to I-90, Aberdeen east to I-29, Aberdeen south to Mitchell, Yankton and I-29), the total cost at 1992 price levels would be any of the following, depending on which highway type is selected:

	<u>Via SD 37</u>	<u>Via US 81</u>
• Freeway	\$551.5	\$513.8
• Expressway	\$335.5	\$312.4
• Super 2	\$134.2	\$135.1

#### APPROACH TO COST ESTIMATING

The capital costs were estimated on the basis of improvement assumptions for each alternative improvement. The cost estimates are approximate order-of-magnitude costs of each alternative, based on unit costs times the assumed number of units for each alternative. These cost estimates are believed to be adequate for feasibility analysis. However, detailed design analysis would be expected to produce more refined cost estimates.

Exhibit 3-1  
CAPITAL COST ESTIMATES SUMMARY  
\$ MILLION

<u>ROUTE LOCATION OPTIONS</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2/4 LANE</u>	<u>SUPER 2</u>
1. Pierre to I-90	\$100.6	\$31.9	---	\$9.5
2. Total Eastern Dakota Express Via Route SD 37	450.9	303.6	---	124.7
3. Total Eastern Dakota Express Via Route US 81	413.2	280.5	---	125.6
4. Aberdeen East to I-29	131.0	102.4	---	53.8
5. Aberdeen South to Huron	191.0	130.2	---	81.7
6. Huron South to I-90 Via Mitchell	59.9	27.9	---	---
7. I-90 to I-29 Via SD 37 and Yankton	149.9	103.3	---	24.7
8. I-90 to I-29 Via US 81 and Yankton	112.2	80.2	---	25.6
9. Aberdeen to I-29 Via Mitchell SD 37 and Yankton	340.9	233.5	---	106.4
10. Aberdeen to I-29 Via Mitchell US 81 and Yankton	303.2	210.4	---	107.3
11. I-90 to Yankton via SD 37	121.2	85.3	---	11.4
12. I-90 to Yankton via US 81	83.6	62.2	---	12.2
13. Regional Trade Center	270.5	129.9	---	55.7
Connections:				
Aberdeen East to I-29				
Huron South to I-90				
Pierre South to I-90				
14. Pierre to I-90 and Total Eastern Dakota Express via SD 37 with Expressway/Super 2-Lane Combination	---	---	182.8	---
15. Pierre to I-90 and Total Eastern Dakota Express via US 81 with Expressway/Super 2-Lane Combination	---	---	183.7	---



Unit Capital Costs: The unit costs used in this study were obtained from SDDOT as representing current costs of construction. The specific unit costs are listed in Exhibit 3-2. These unit costs were applied to the number of miles of shoulder improvements, new 2- or 4-lane construction, etc. and the number of turning lanes, structures, interchanges, etc. to estimate the cost for each alternative under study.

**Exhibit 3-2  
SUMMARY OF UNIT COSTS**

<u>IMPROVEMENT TYPE</u>	<u>UNIT COST</u>
<b><u>ROADWAY</u></b>	
Shoulder Improvements	\$ 180,000/mile
Turn Lane	69,000 each
Passing Lane	324,000/mile
Construct 2-lane	800,000/mile
Construct 4-lane (divided)	1,631,000/mile
Resurfacing	95,000/mile
<b><u>STRUCTURES</u></b>	
River Bridge (2-lane, 1 way traffic)	\$ 650,000/each
River Bridge (2-lane, 2 way traffic)	700,000/each
Stream Crossing (2-lane, 1 way traffic)	311,000/each
Stream Crossing (2-lane, 2 way traffic)	340,000/each
Grade Separation (2-lane, 1 way traffic)	1,183,000/each
Grade Separation (2-lane, 2 way traffic)	1,214,000/each
Overpass of Railroad (2-lane, 1 way traffic)	1,183,000/each
Overpass of Railroad (2-lane, 2 way traffic)	1,214,000/each
Diamond Interchange (1-2 lane structure)	2,036,000/each
Diamond Interchange (2-2 lane structures)	2,505,000/each
Missouri River Crossing	\$92/S.F. + 216,000/Str.
Widen Grade Separation Structure	\$ 303,000/each
<b><u>RIGHT-OF-WAY</u></b>	
New 2-lane Highway (150 ft. wide new R.O.W.)	
New 4-lane Highway (300 ft. wide new R.O.W.)	See Exhibit 3-3
Widen from 2-lane to 4-lane (150 ft. wide new R.O.W.)	

Costs of passing lanes were estimated to be approximately \$324,000 per mile. The development of left-turn lanes with a minimum of 150-foot long left turn bays requires an equivalent of approximately 0.16 mile of 12-foot pavement per turning lane, estimated to cost \$69,000. Bridges were classified as either river crossings, stream crossings, grade separations, or overpass of railroads. For estimating purposes the structures were given

standard lengths and widths. River bridges were estimated to be 300 feet long, stream crossings 100 feet, grade separations 200 feet and railroad overpasses 200 feet. Bridge widths were also standardized. Two lane structures with one way traffic were estimated to be 43 feet wide which included 2-12 foot lanes, a 10-foot shoulder on the right side, a 6-foot shoulder on the left side and 1.5 feet on each side for curb. Two lane structures with two way traffic were estimated to be 47 feet wide. The configuration would be similar to the above description, except that both shoulders would be 10 feet wide. A unit price of \$42 per square foot of bridge plus a lump sum of \$108,000 was used for estimating the cost of structures. The cost for the Missouri River crossing was based on figures being used on similar structures currently being studied by the SDDOT.

In most locations, existing interchanges appear to be acceptable for use with the expressway and the super two-lane options. In some cases the general interchange design is adequate, however, the grade separation structure would need to be widened to comply with the expressway requirements. For estimating purposes, structures to be widened were assumed to be 260 feet long and to be widened 15 feet. A unit price of \$50 per square foot of additional width plus \$108,000 was used to establish the cost for widening a structure.

It was requested that a comparison be made between the cost of a four-lane divided rural roadway section with a median and a four-lane non-divided rural roadway section. The non-divided section consisted of 10-foot wide outside shoulders, 2-12 foot wide driving lanes in each direction and a 6-foot wide paved median with a Jersey barrier and glare screen. The cost for the non-divided four-lane roadway was estimated to be \$1,728,000 per mile. That figure was approximately \$97,000 per mile greater than for a divided four-lane section. Because of the estimated higher cost, no further consideration was given to utilizing a rural non-divided four-lane highway section.

Right-of-way costs were developed from land values obtained from the Economics Department at South Dakota State University. The land values are contained in the SDSU Economics Research Report 92-1, dated June 1992. The report indicates a range of land values from \$244 to \$847 per acre depending upon location. The right-of-way costs per mile for 300 feet and 150 feet right-of-way on a county by county basis are shown in Exhibit 3-3.

**Exhibit 3-3  
RIGHT-OF-WAY COSTS**

COUNTY	RIGHT-OF-WAY COST PER MILE	
	300-FT. R.O.W.	150-FT. R.O.W.
Beadle	\$ 13,600	\$ 6,800
Bon Homme	30,800	15,400
Brown	20,255	10,127
Davison	17,600	8,800
Day	19,018	9,509
Hutchinson	30,800	15,400
Lyman	13,564	6,782
McCook	25,491	12,745
Roberts	26,836	13,418
Sanborn	17,600	8,800
Spink	20,255	10,127
Stanley	8,873	4,436
Yankton	30,800	15,400

**Engineering and Administrative Costs** - To all capital costs are added engineering costs (including planning, design, right-of-way acquisition, contract administration, construction surveying and inspection work) which are estimated to be 13.5 percent of the construction costs.

**Capital Cost Estimates by Highway Segment**

To estimate the capital costs each highway was subdivided into segments, each segment was field inventoried, and the number of interchanges, bridges, lane miles, etc. were estimated. The unit costs were then applied. For costing purposes, four highway sections were defined:

- Pierre to I-90 (Exhibit 3-4)
- Aberdeen to I-29 (Exhibit 3-6)
- Aberdeen to I-90 near Mitchell (Exhibit 3-8)
- I-90 near Mitchell to I-29 near Vermillion (Exhibit 3-11).

Each of the sections was then subdivided into segments, as shown on Exhibits 3-5 through 3-15.

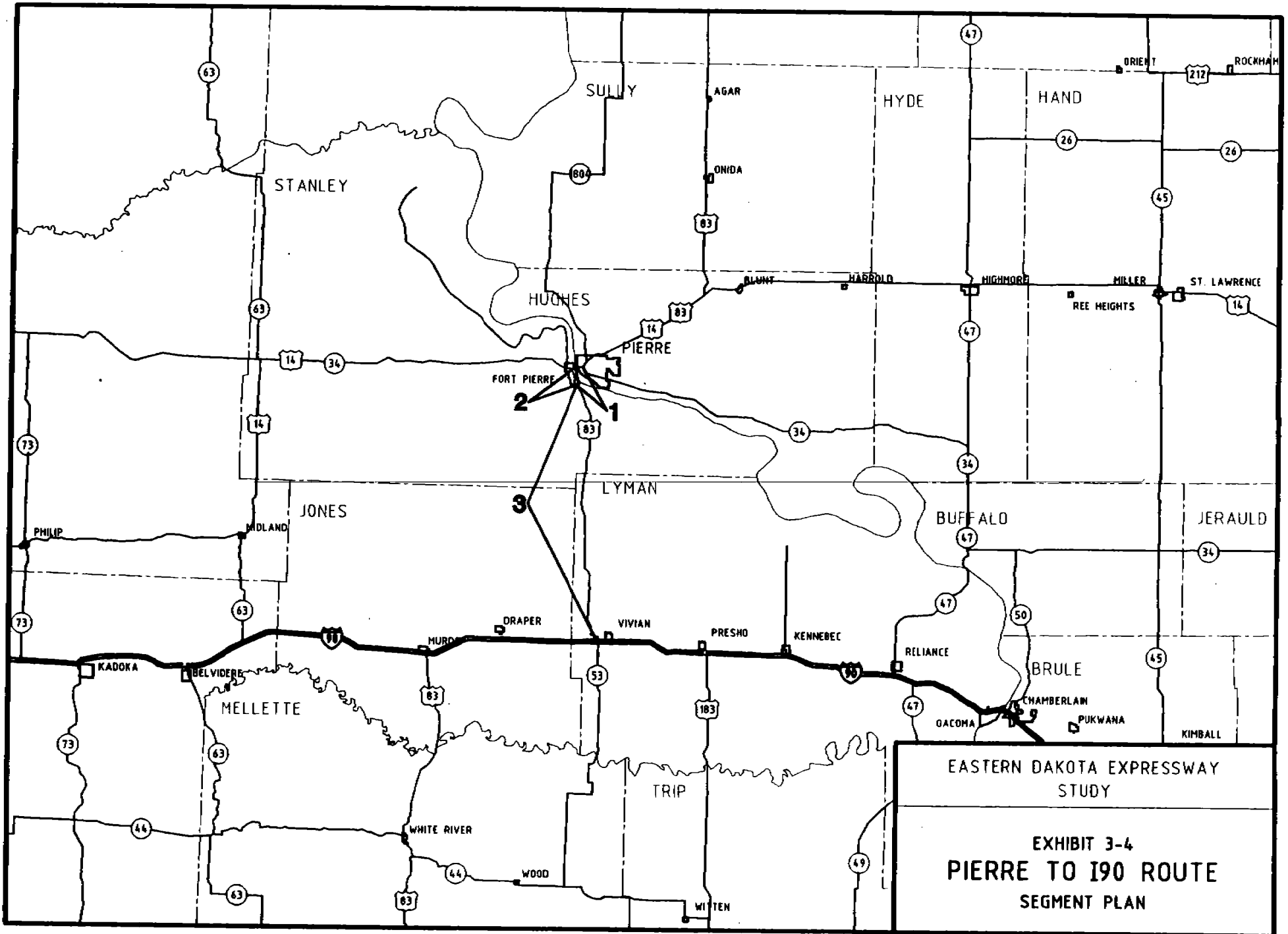
### **ADDITIONAL OPERATIONS COSTS**

At the time when any of the alternatives are built, South Dakota Department of Transportation will have additional miles of roadway to administer and maintain. In accordance with this study's life cycle cost approach, such costs are included by year of occurrence in the economic analysis.

**Annual Maintenance Costs:** Annual costs for roadway maintenance on selected sections of highways in eastern South Dakota were obtained for the years 1988 through 1992 from the SDDOT. From these records, the projected annual maintenance cost for 4-lane roadways was determined to be \$8,400 per mile and for 2-lane roadways \$4,200 per mile.

The unit maintenance costs were applied to all new roadway miles of 2-lane and 4-lane type. The results represent annual incremental cost increases to the South Dakota DOT. Bridge maintenance costs were estimated at \$0.15/square foot per year. Exhibits 3-16 through 3-19 are tabulations for annual maintenance costs that can be expected as a result of the added roadway miles and structures required for the various route location options.

**Periodic Maintenance Costs:** In addition to annual maintenance, portland cement concrete highways require joint sealing and spall repair at approximately ten-year intervals. A joint resealing project occurring ten years after construction is estimated to cost \$10,000 per 2-lane mile. At 20 years after construction, a joint resealing/spall repair project would occur, at an estimated cost of \$50,000 per 2-lane mile. At 30 years after construction, another joint resealing/spall repair project would take place. Generally, the 30-year project would not be as extensive as the 20-year project, and would have an estimated cost of \$30,000 per 2-lane mile. These costs are included in Exhibits 3-16 through 3-19.



**EXHIBIT 3-5**

**PIERRE TO I-90  
CAPITAL COST ESTIMATE  
(\$ Thousand)**

**4-LANE FREEWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Inter- Change</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1. Ft. Pierre By-Pass to SD HWY 34	3.03	3,393		39,992	622	2,366	4,072	27		50,472
3. Ft. Pierre By-Pass to Interstate HWY I-90	31.21		24,968		2,488	2,366	8,144		212	38,178
	<u>34.24</u>	<u>3,393</u>	<u>24,968</u>	<u>39,992</u>	<u>3,110</u>	<u>4,732</u>	<u>12,216</u>	<u>27</u>	<u>212</u>	<u>88,650</u>
Engineering and Administration, 13%										<u>11,968</u>
<b>Total Cost</b>										<b>100,618</b>

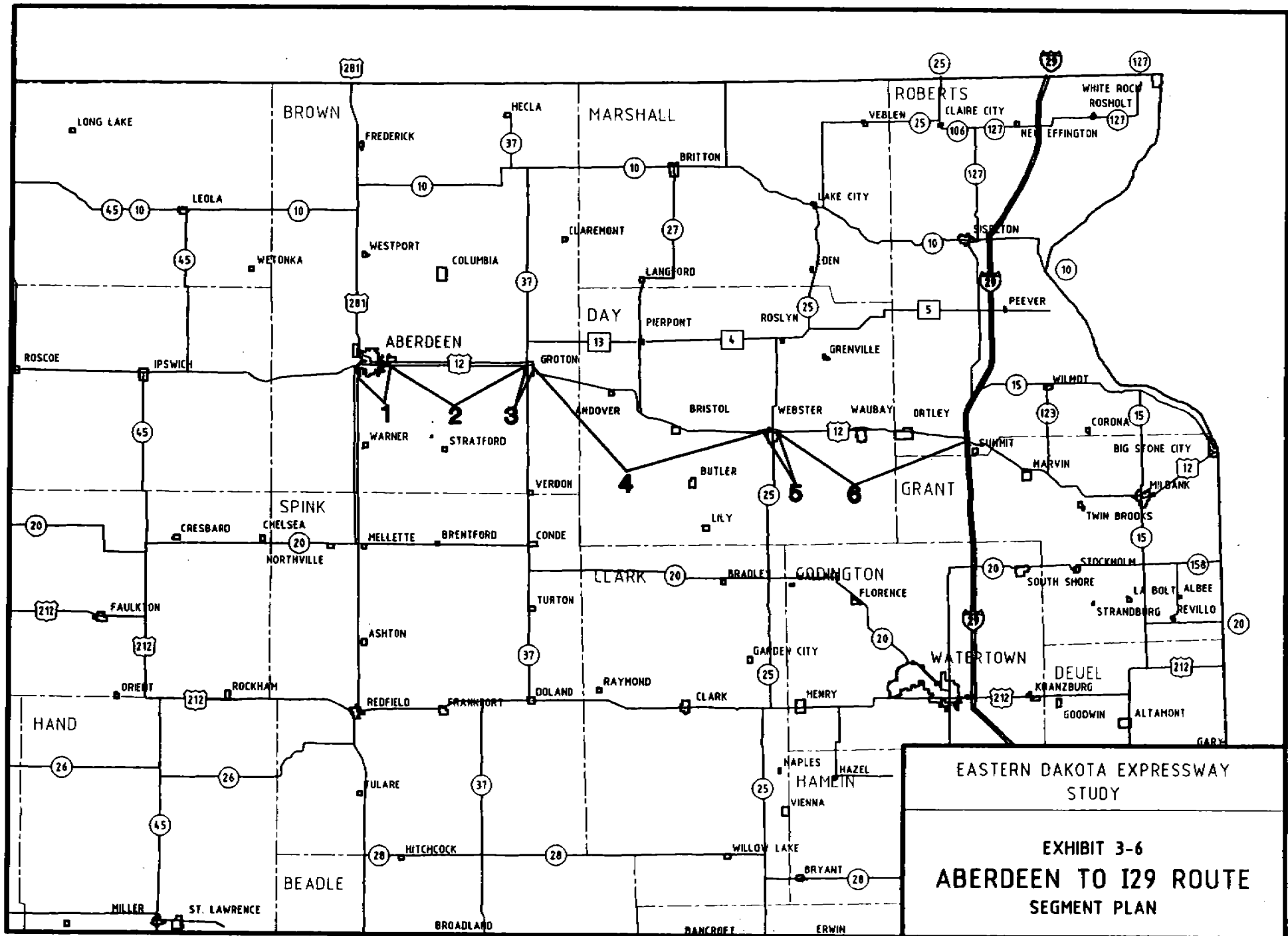
**4-LANE EXPRESSWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
3. Ft. Pierre Urban from Bad River Bridge to I-29	31.81	25,448	2,488	216	28,152
	<u>31.81</u>	<u>25,448</u>	<u>2,488</u>	<u>216</u>	<u>28,152</u>
Engineering and Administration, 13%					<u>3,800</u>
<b>Total Cost</b>					<b>31,952</b>

**SUPER 2-LANE**

	<u>Length Miles</u>	<u>Stream Crossing</u>	<u>R.O.W. 2-Lane</u>	<u>Turn Lanes</u>	<u>Passing Lanes</u>	<u>Total Cost</u>
3. Ft. Pierre Urban from Bad River Bridge to I-29	31.81	1,360	91	414	6,480	8,345
	<u>31.81</u>	<u>1,360</u>	<u>91</u>	<u>414</u>	<u>6,480</u>	<u>8,345</u>
Engineering and Administration, 13%						<u>1,127</u>
<b>Total Cost</b>						<b>9,472</b>

8-3



EASTERN DAKOTA EXPRESSWAY STUDY

EXHIBIT 3-6  
ABERDEEN TO I29 ROUTE  
SEGMENT PLAN





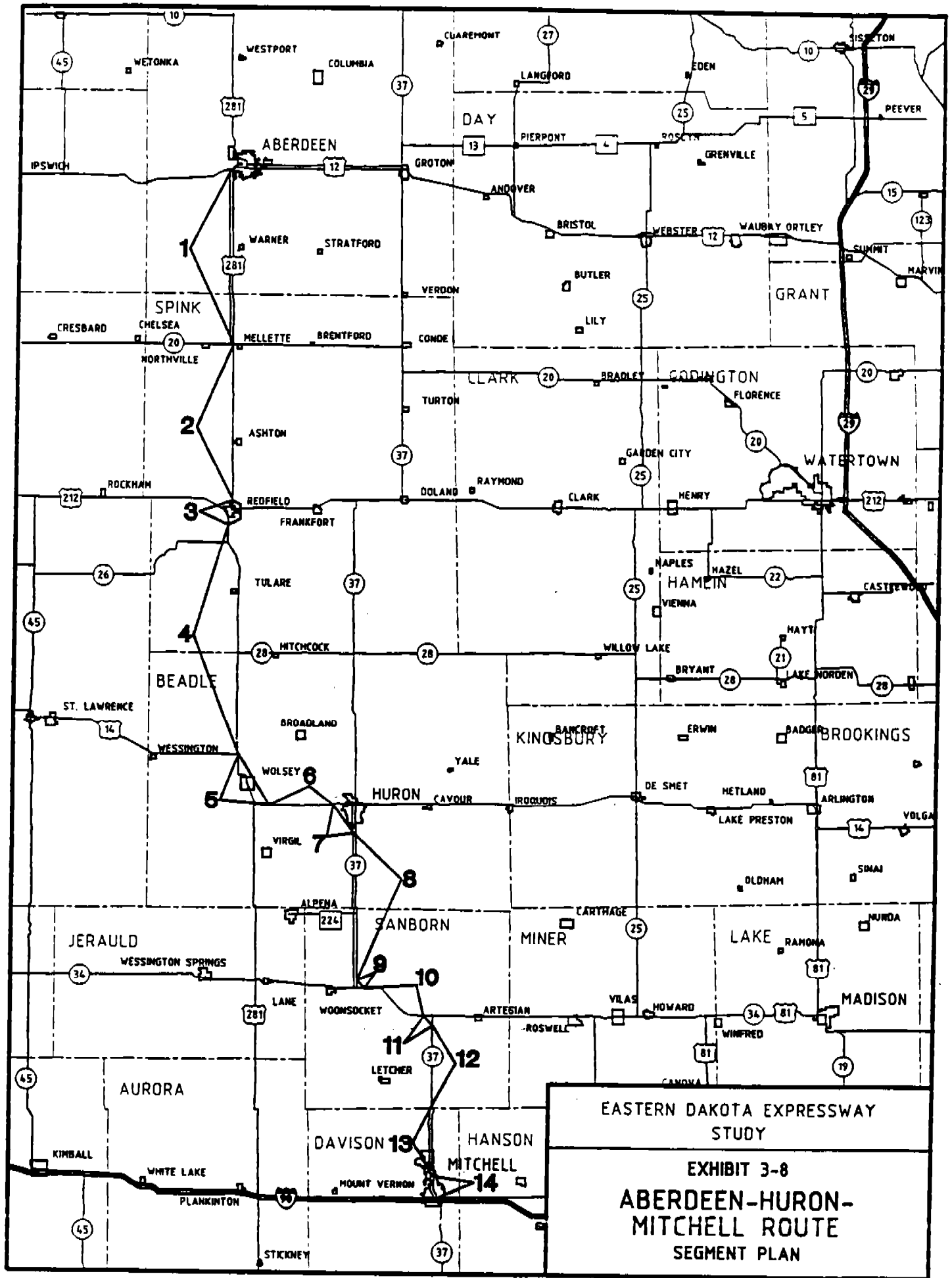
EXHIBIT 3-7 (Continued)

ABERDEEN EAST TO I-29

SUPER 2-LANE

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>River Bridge</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>Turn Lanes</u>	<u>Total Cost</u>
2. Aberdeen to Groton	16.37	2,947(1)	650	1,183	1,555(1)		6,335
4. Groton to Webster	32.46	5,843(2)			3,084(2)	414	9,341
6. Webster to I-29 @ Summit	24.05					414	414
	<hr/> 72.88	8,790	650	1,183	4,639	828	16,090
Engineering and Administration, 13%							<u>2,172</u>
<b>Total Cost</b>							<b>18,262</b>

(1) 16.37 miles  
(2) 32.46 miles



EASTERN DAKOTA EXPRESSWAY STUDY  
 EXHIBIT 3-8  
 ABERDEEN-HURON-MITCHELL ROUTE  
 SEGMENT PLAN

EXHIBIT 3-9

ABERDEEN SOUTH TO HURON  
CAPITAL COST ESTIMATE  
(\$ Thousand)

4-LANE FREEWAY

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>Grade Separation</u>	<u>RR Overpass</u>	<u>Inter- Change</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1. Aberdeen to Mellette	21.00					1,214		4,072				5,286
2. Mellette to Redfield By-Pass	19.36			15,488	311			4,072			196	20,067
3. Redfield By-Pass	2.45		3,996		622		2,366	2,036		50		9,070
4. Redfield By-Pass to US HWY 14	29.33	5,280(1)		23,464		1,214	1,183	6,108	2,786(1)		297	40,332
5. US HWY 14 - Wolsey By-Pass	6.97		11,368		622		2,366	4,072		95		18,523
6. Wolsey By-Pass to Huron By-Pass	10.23			8,184				2,036			70	10,290
7. Huron By-Pass	4.76		7,764					4,072		65		11,901
	94.10	5,280	23,128	47,136	1,555	2,428	5,915	26,468	2,786	210	563	115,469
Engineering and Administration, 13%												<u>15,588</u>
<b>Total Cost</b>												<b>131,057</b>

(1) 29.33 miles

EXHIBIT 3-9 (Continued)

ABERDEEN SOUTH TO HURON  
(\$ Thousand)

**4-LANE EXPRESSWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>Grade Separation</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1. Aberdeen to Mellette	21.00										
2. Mellette to Redfield By-Pass	19.36			15,488	311					196	15,995
3. Redfield By-Pass	2.45		3,996		622		2,366		50		7,034
4. Redfield By-Pass to US HWY 14	29.33	5,280(1)		23,464			2,366	2,786(1)		297	34,193
5. US HWY 14 - Wolsey By-Pass	6.97		11,368		622		2,366		95		14,451
6. Wolsey By-Pass to Huron By-Pass	10.23			8,184						70	8,254
7. Huron By-Pass	4.76		7,764			2,428			65		10,257
	<hr/>										
	94.10	5,280	23,128	47,136	1,555	2,428	7,098	2,786	210	563	90,184
Engineering and Administration, 13%											<u>12,175</u>
<b>Total Cost</b>											<b>102,359</b>

(1) 29.33 miles

EXHIBIT 3-9 (Continued)

ABERDEEN SOUTH TO HURON  
(\$ Thousand)

SUPER 2-LANE WITH BYPASS AT REDFIELD, WOLSEY AND HURON AND A 4-LANE FROM WOLSEY TO HURON

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Turn Lanes</u>	<u>Total Cost</u>
1. Aberdeen to Mellette	21.00										
2. Mellette to Redfield By-Pass	19.36									138	138
3. Redfield By-Pass	2.45		3,996		622	2,366		50			7,034
4. Redfield By-Pass to US HWY 14	29.33	5,280(1)				1,214	2,786(1)			414	9,694
5. US HWY 14 - Wolsey By-Pass	6.97		11,368		622	2,366		95			14,451
6. Wolsey By-Pass to Huron By-Pass	10.23			8,184					70		8,254
7. Huron By-Pass	4.76		7,764					65			7,829
	<hr/>										
	94.10	5,280	23,128	8,184	1,244	5,946	2,786	210	70	552	47,400
Engineering and Administration, 13%											<u>6,399</u>
<b>Total Cost</b>											<b>53,799</b>

(1) 29.33 miles

EXHIBIT 3-9 (Continued)

ABERDEEN SOUTH TO HURON  
(\$ Thousand)

SUPER 2-LANE WITHOUT BYPASS AT REDFIELD, WOLSEY AND HURON AND A 4-LANE FROM WOLSEY TO HURON

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>Turn Lanes</u>	<u>Total Cost</u>
1. Aberdeen to Mellette	21.00					
2. Mellette to Redfield	19.36				138	138
4. Redfield By-Pass to US HWY 14	29.7	5,280(1)	1,214	2,786(1)	414	9,694
5. US HWY 14 - to Wolsey By-Pass	3.8					
6. Wolsey to Huron	15.2	504(2)		266(2)	276	1,046
	89.1	5,784	1,214	3,052	828	10,878
Engineering and Administration, 13%						1,468
<b>Total Cost</b>						<b>12,346</b>

(1) 29.33 miles  
(2) 2.8 miles

EXHIBIT 3-10

HURON SOUTH TO I-90 VIA MITCHELL  
CAPITAL COST ESTIMATE  
(\$ Thousand)

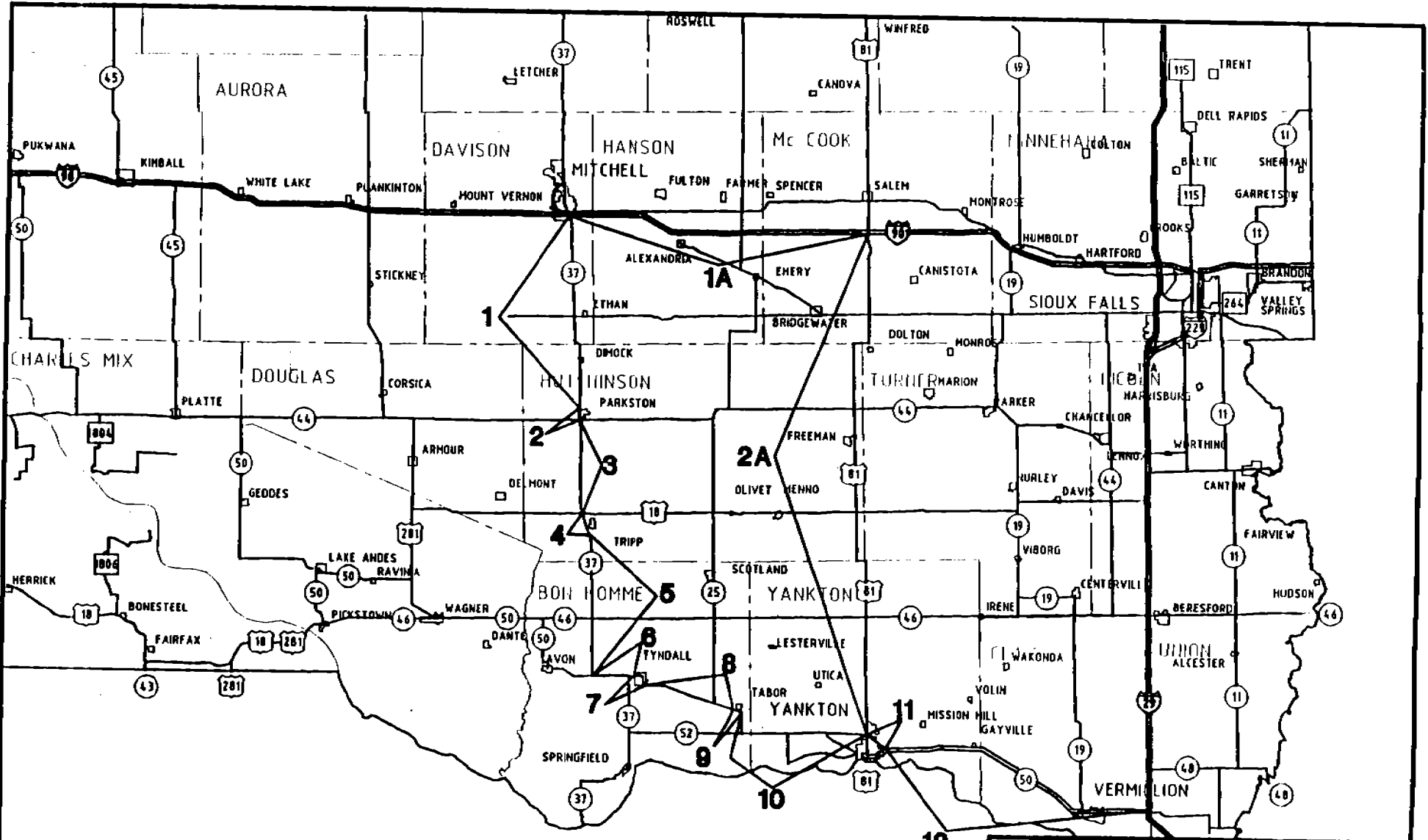
4-LANE FREEWAY

<u>Segments</u>	<u>Length Miles</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Inter- Change</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
8. Huron to SD HWY 34	20.11						4,072			4,072
9. SD HWY 37 to SD HWY 34 Cut-Off	3.61	5,888					2,036	64		7,988
10. SD 37/34 Cut-Off to SD 34/37 Cut-off	4.24		3,392	1,300			4,072		38	8,802
11. SD HWY 34 to SD HWY 37 Cut-Off	3.61	5,888						64		5,952
12. SD HWY 34 to Davison County Line	9.00		7,200	650			2,036		79	9,965
13. Davison County Line to Mitchell By-Pass	8.57						2,036			2,036
14. Mitchell By-Pass	3.92	6,394			622	2,366	4,541	69		13,992
	53.06	18,170	10,592	1,950	622	2,366	18,793	197	117	52,807
Engineering and Administration, 13% Total Cost										<u>7,129</u> 59,936

4-LANE EXPRESSWAY

<u>Segments</u>	<u>Length Miles</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
8. Huron to SD HWY 34	20.11						
9. SD HWY 37 to SD HWY 34 Cut-Off	3.61	5,888			64		5,952
10. SD 37/34 Cut-Off to SD HWY 37 Cut-Off	4.24		3,392	1,300		38	4,730
11. SD HWY 34 to SD HWY 37 Cut-Off	3.61	5,888			64		5,952
12. SD HWY 34 to Davison County Line	9.00		7,200	650		79	7,929
13. Davison County Line to Mitchell	8.57						
	49.14	11,776	10,592	1,950	128	117	24,563
Engineering and Administration, 13% Total Cost							<u>3,316</u> 27,879

3-18



EASTERN DAKOTA EXPRESSWAY  
STUDY

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EXHIBIT 3-11  
MITCHELL-YANKTON-  
I29 ROUTE  
SEGMENT PLAN



EXHIBIT 3-12

I-90 TO I-29 VIA SD 37 AND YANKTON  
CAPITAL COST ESTIMATE  
(\$ Thousand)

4-LANE FREEWAY

Segments	Length Miles	Impr. Shoulders	New 4-Lane	New 2-Lane	Stream Crossing	Grade Separation	RR Overpass	Inter- Change	Resurfacing	R.O.W. 4-Lane	R.O.W. 2-Lane	Total Cost
1. Mitchell to Parkston By-Pass	20.75	1,795(1)		16,600	622			4,072	947(1)		320	24,356
2. Parkston By-Pass	1.46							2,036				2,036
3. Parkston By-Pass to US HWY 18	10.04	1,447(2)		8,032		2,428		2,036	764(2)		155	14,862
4. Tripp By-Pass	4.41			3,528							68	3,596
5. Tripp By-Pass to SD HWY 50	13.30			10,640	1,244	1,214		4,072			205	17,375
6. SD HWY 37 to Tyndall By-Pass	5.04			4,032	1,244			2,036			78	7,390
7. Tyndall By-Pass	1.73						2,366					2,366
8. Tyndall By-Pass to Tabor By-Pass	9.71			7,768	622			2,036			150	10,576
9. Tabor By-Pass	1.41							2,036				2,036
10. Tabor By-Pass to Yankton	15.00			12,000	311	1,214	2,366	8,144			231	24,266
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264				2,366	2,036		175		13,841
12. Yankton By-Pass to Interstate Highway I-29	28.26					1,214		8,144				9,358
	116.79	3,242	9,264	62,600	4,043	6,070	7,098	36,648	1,711	175	1,207	132,058
Engineering and Administration, 13%												<u>17,828</u>
<b>Total Cost</b>												<b>149,886</b>

(1) 9.97 miles  
(2) 8.04 miles

3-19

EXHIBIT 3-12 (Continued)

I-90 TO I-29 VIA SD 37 AND YANKTON

**4-LANE EXPRESSWAY**

Segments	Length Miles	Impr. Shoulders	New 4-Lane	New 2-Lane	Stream Crossing	RR Overpass	Inter- Change	Resurfacing	R.O.W. 4-Lane	R.O.W. 2-Lane	Total Cost
1. Mitchell to Parkston	22.21	1,795(1)		16,600	622			947(1)		320	20,284
3. Parkston to US HWY 18	10.04	1,447(2)		8,032				764(2)		155	10,398
4. Tripp By-Pass	4.41			3,528						68	3,596
5. Tripp By-Pass to SD HWY 50	13.30			10,640	1,244					205	12,089
6. SD HWY 37 to Tyndall By-Pass	6.77			4,032(3)	1,244					78	5,354
8. Tyndall to Tabor	11.12			7,768(4)	622					150	8,540
10. Tabor to Yankton	15.00			12,000	311					231	16,944
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264			2,366	2,036		175		13,841
12. Yankton By-Pass to Interstate Highway I-29	28.26					2,366	2,036				
	116.79	3,242	9,264	62,600	4,043	4,732	4,072	1,711	175	1,207	91,046
Engineering and Administration, 13%%											12,291
<b>Total Cost</b>											<b>103,337</b>

- (1) 9.97 miles
- (2) 8.04 miles
- (3) 5.04 miles
- (4) 9.71 miles

EXHIBIT 3-12 (Continued)

I-90 TO I-29 VIA SD 37 AND YANKTON

SUPER 2-LANE

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>Turn Lanes</u>	<u>Total Cost</u>
1. Mitchell to Parkston	22.21	1,795(1)		340		947(1)		276	3,358
3. Parkston to US Hwy. 18	10.04	1,447(2)				764(2)		138	2,349
4. Tripp By-Pass	4.41							414	414
5. Tripp By-Pass to SD HWY 50	13.30			680				276	956
6. SD HWY 37 to Tyndall	6.77			680					680
8. Tyndall to Tabor	11.12			340				276	616
10. Tabor to Yankton	15.00				1,214			414	1,628
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264		2,366		175		11,805
12. Yankton By-Pass to Interstate Highway I-29	28.26								
<hr/>									
	116.79	3,242	9,264	2,040	3,580	1,711	175	1,794	21,806
Engineering and Administration, 13%									<u>2,944</u>
<b>Total Cost</b>									<b>24,750</b>
(1) 9.97 miles									
(2) 8.04 miles									

3-21

EXHIBIT 3-13

I-90 TO 1-29 VIA US 81 AND YANKTON  
CAPITAL COST ESTIMATE  
(\$ Thousand)

4-LANE FREEWAY

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>Grade Separation</u>	<u>RR Overpass</u>	<u>Inter-Change</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1A. Mitchell to Salem Exit	34.00		Existing Interstate Highway I-90										
2A. I-90 (Salem Exit) to Yankton	55.88	2,626(1)		44,704	1,300	1,244	2,428	2,366	16,757	1,386(1)		861	73,672
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264					2,366	4,072		175		15,877
12. Yankton By-Pass to Interstate HWY I-29	28.26						1,214		8,144				9,358
	123.82	2,626	9,264	44,704	1,300	1,244	3,642	4,732	28,973	1,386	175	861	98,907
Engineering and Administration, 13%													13,352
<b>Total Cost</b>													<b>112,259</b>
(1) 14.59													

4-LANE EXPRESSWAY

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Inter-Change</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>	
1A. Mitchell to Salem Exit	34.00		Existing Interstate Highway I-90										
2A. I-90 (Salem Exit) to Yankton	55.88	2,626(1)		44,704	1,300	1,244		2,366	303	1,386(1)		861	54,790
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264					2,366	4,072		175		15,877
12. Yankton By-Pass to Interstate HWY I-29	28.26												
	123.82	2,626	9,264	44,704	1,300	1,244		4,732	4,375	1,386	175	861	70,667
Engineering and Administration, 13%													9,540
<b>Total Cost</b>													<b>80,207</b>
(1) 14.59 miles													

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EXHIBIT 3-13 (Continued)

I-90 TO I-29 VIA US 81 AND YANKTON

SUPER 2-LANE

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 4-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.O.W. 4-Lane</u>	<u>R.O.W. 2-Lane</u>	<u>Turn Lanes</u>	<u>Passing Lanes</u>	<u>Total Cost</u>
1A. Mitchell to Salem Exit on I-90 (Mile 330 to 364)	34.00	Existing Interstate Highway I-90										
2A. Salem Exit @ I-90 to Yankton	55.88	2,626(1)		700	680	1,214	1,386(1)		76	1,656	2,398	10,736
11. US HWY 81 to SD HWY 50 (Yankton By-Pass)	5.68		9,264			2,366		175				11,805
12. Yankton By-Pass to Interstate Highway I-29	28.26											
	123.82	2,626	9,264	700	680	3,580	1,386	175	76	1,656	2,398	22,541
Engineering and Administration, 13%												3,043
<b>Total Cost</b>												<b>25,584</b>
(1) 14.59 miles												

EXHIBIT 3-14

I-90 TO YANKTON VIA SD 37  
CAPITAL COST ESTIMATE  
(\$ Thousand)

4-LANE FREEWAY

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>Grade Separation</u>	<u>RR Overpass</u>	<u>Inter- Change</u>	<u>Resurfacing</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1. Mitchell to Parkston By-Pass	20.75	1,795(1)	16,600	622			4,072	947(1)	320	24,356
2. Parkston By-Pass	1.46						2,036			2,036
3. Parkston By-Pass to US HWY 18	10.04	1,447(2)	8,032		2,428		2,036	764(2)	155	14,862
4. Tripp By-Pass	4.41		3,528						68	3,596
5. Tripp By-Pass to SD HWY 50	13.30		10,640	1,244	1,214		4,072		205	17,375
6. SD HWY 37 to Tyndall By-Pass	5.04		4,032	1,244			2,036		78	7,390
7. Tyndall By-Pass	1.73					2,366				2,366
8. Tyndall By-Pass to Tabor By-Pass	9.71		7,768	622			2,036		150	10,576
9. Tabor By-Pass	1.41						2,036			2,036
10. Tabor By-Pass to Yankton	15.00		12,000	311	1,214	2,366	6,108		231	22,230
<hr/>										
	82.85	3,242	62,600	4,043	4,856	4,732	24,432	1,711	1,207	106,823
Engineering and Administration, 13%										14,421
<b>Total Cost</b>										<b>121,244</b>

(1) 9.97 miles  
(2) 8.04 miles

**EXHIBIT 3-14 (continued)**  
**I-90 TO YANKTON VIA SD 37**

**4-LANE EXPRESSWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 2-Lane</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.D.W. 2-Lane</u>	<u>Total Cost</u>
1. Mitchell to Parkston	22.21	1,795(1)	16,600	622		947(1)	320	20,284
3. Parkston to US HWY 18	10.04	1,447(2)	8,032			764(2)	155	10,398
4. Tripp By-Pass	4.41		3,528				68	3,596
5. Tripp By-Pass to SD HWY 50	13.30		10,640	1,244			205	12,089
6. SD HWY 37 to Tyndall	6.77		4,032(3)	1,244			78	5,354
8. Tyndall to Tabor	11.12		7,768(4)	622			150	8,540
10. Tabor to Yankton	15.00		12,000	311	2,366		231	14,908
	82.85	3,242	62,600	4,043	2,366	1,711	1,207	75,169
Engineering and Administration, 13%								<u>10,148</u>
<b>Total Cost</b>								<b>85,317</b>

- (1) 9.97 miles
- (2) 8.04 miles
- (3) 5.04 miles
- (4) 9.71 miles

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**SUPER 2-LANE**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>Turn Lanes</u>	<u>Total Cost</u>
1. Mitchell to Parkston	22.21	1,795(1)	340		947(1)	276	3,358
3. Parkston to US HWY 18	10.04	1,447(2)			746(2)	138	2,349
4. Tripp By-Pass	4.41					414	414
5. Tripp By-Pass to SD HWY 50	13.30		680			276	956
6. SD HWY 37 to Tyndall	6.77		680				680
8. Tyndall to Tabor	11.12		340			276	616
10. Tabor to Yankton	15.00			1,214		414	1,628
	82.85	3,242	2,040	1,214	1,711	1,794	10,001
Engineering and Administration, 13%							<u>1,350</u>
<b>Total Cost</b>							<b>11,351</b>

- (1) 9.97 miles
- (2) 8.04 miles

**EXHIBIT 3-15**  
**I-90 TO YANKTON VIA US 81**  
**CAPITAL COST ESTIMATE**  
**(\$ THOUSAND)**

**4-LANE FREEWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>Grade Separation</u>	<u>RR Overpass</u>	<u>Inter-Change</u>	<u>Resurfacing</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>
1A. Mitchell to Salem Exit	34.00	Existing Interstate Highway I-90									
2A I-90 (Salem Exit) to Yankton	55.88	2,626(1)	44,704	1,300	1,244	2,428	2,366	16,757	1,386(1)	881	73,672
	89.88	2,626	44,704	1,300	1,244	2,428	2,366	16,757	1,386	861	73,672
Engineering and Administration, 13% Total Cost											<u>9,946</u>
(1) 14.59 miles											83,618

**4-LANE EXPRESSWAY**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>New 2-Lane</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Inter-Change</u>	<u>Resurfacing</u>	<u>R.O.W. 2-Lane</u>	<u>Total Cost</u>	
1A. Mitchell to Salem Exit	34.00	Existing Interstate Highway I-90									
2A I-90 (Salem Exit) to Yankton	55.88	2,626(1)	44,704	1,300	1,244	2,366	303	1,386(1)	861	54,790	
	89.88	2,626	44,704	1,300	1,244	2,366	303	1,386	861	54,790	
Engineering and Administration, 13% Total Cost											<u>7,397</u>
(1) 14.59 miles											62,187

**SUPER 2-LANE**

<u>Segments</u>	<u>Length Miles</u>	<u>Impr. Shoulders</u>	<u>River Bridge</u>	<u>Stream Crossing</u>	<u>RR Overpass</u>	<u>Resurfacing</u>	<u>R.O.W. 2-Lane</u>	<u>Turn Lanes</u>	<u>Passing Lanes</u>	<u>Total Cost</u>	
1A. Mitchell to Salem Exit on I-90 (Mile 330 to 364)	34.00	Existing Interstate Highway I-90									
2A. Salem Exit @ I-90 to Yankton	55.88	2,626(1)	700	680	1,214	1,386(1)	76	1,656	2,398	10,736	
	89.88	2,626	700	680	1,214	1,386	76	1,656	2,398	10,736	
Engineering and Administration, 13% Total Cost											<u>1,449</u>
(1) 14.59 miles											12,185



**Exhibit 3-16**  
**AVERAGE ANNUAL MAINTENANCE COST INCREASES (\$ MILLION)**  
**4-LANE FREEWAY**

ROUTE LOCATION OPTION	TOTAL MILES	ANNUAL MAINTENANCE COST		ANNUAL COST INCREASE	JOINT SEALING AT YEAR 10	JOINT SEALING AND SPALL REPAIR AT YEAR 20	JOINT SEALING AND SPALL REPAIR AT YEAR 30
		STRUCTURES	ROADWAY				
1. Pierre to I-90	34.24	0.09	0.15	0.24	0.35	1.77	1.06
2. Total Eastern Dakota Express Via Route SD 37	341.20	0.14	1.17	0.31	2.80	14.02	8.41
3. Total Eastern Dakota Express Via Route US 81	348.23	0.12	1.08	1.20	2.58	12.90	7.74
4. Aberdeen East to I-29	77.25	0.03	0.28	0.31	0.68	3.39	2.03
5. Aberdeen South to Huron	94.10	0.03	0.37	0.40	0.88	4.38	2.63
6. Huron South to I-90 Via Mitchell	53.06	0.02	0.19	0.21	0.35	1.77	1.06
7. I-90 to I-29 Via SD 37 and Yankton	116.79	0.06	0.37	0.43	0.89	4.48	2.68
8. I-90 to I-29 Via US 81 and Yankton	123.82	0.04	0.28	0.32	0.67	3.36	2.01
9. Aberdeen to I-29 Via Mitchell SD 37 and Yankton	263.95	0.11	0.89	1.00	2.13	10.63	6.38
10. Aberdeen I-29 Via Mitchell US 81 and Yankton	270.98	0.09	0.80	0.89	1.90	9.51	5.71
11. I-90 to Yankton via SD 37	82.05	0.04	0.33	0.37	0.78	3.91	2.35
12. I-90 to Yankton via US 81	89.88	0.02	0.23	0.25	0.56	2.79	1.68
13. Reg. Trade Center Connections	164.55	0.14	0.62	0.76	1.38	6.93	4.15

**Exhibit 3-17**  
**AVERAGE ANNUAL MAINTENANCE COST INCREASES (\$ MILLION)**  
**4-LANE EXPRESSWAY**

ROUTE LOCATION OPTION	TOTAL MILES	ANNUAL MAINTENANCE COST		ANNUAL COST INCREASE	JOINT SEALING AT YEAR 10	JOINT SEALING AND SPALL REPAIR AT YEAR 20	JOINT SEALING AND SPALL REPAIR AT YEAR 30
		STRUCTURES	ROADWAY				
1. Pierre to I-90	31.81	0.01	0.13	0.14	0.32	1.59	0.95
2. Total Eastern Dakota Express Via Route SD 37	336.83	0.06	1.12	1.18	2.69	13.43	8.06
3. Total Eastern Dakota Express Via Route US 81	343.86	0.05	1.03	1.08	2.46	12.31	7.39
4. Aberdeen East to I-29	72.88	0.01	0.23	0.24	0.56	2.80	1.68
5. Aberdeen South to Huron	94.10	0.01	0.37	0.38	0.88	4.38	2.63
6. Huron South to I-90 Via Mitchell	49.14	0.01	0.12	0.13	0.28	1.38	0.83
7. I-90 to I-29 Via SD 37 and Yankton	116.79	0.03	0.37	0.40	0.89	4.48	2.68
8. I-90 to I-29 Via US 81 and Yankton	123.82	0.02	0.28	0.30	0.67	3.36	2.01
9. Aberdeen to I-29 Via Mitchell SD 37 and Yankton	263.95	0.05	0.89	0.94	2.13	10.63	6.38
10. Aberdeen I-29 Via Mitchell US 81 and Yankton	270.98	0.04	0.80	0.84	1.90	9.51	5.71
11. I-90 to Yankton via SD 37	82.85	0.02	0.33	0.35	0.78	3.91	2.35
12. I-90 to Yankton via US 81	89.88	0.01	0.23	0.24	0.56	2.79	1.68
13. Regional Trade Center Connections	153.83	0.03	0.48	0.51	1.16	5.77	3.46

**Exhibit 3-18**  
**AVERAGE ANNUAL MAINTENANCE COST INCREASES (\$ MILLION)**  
**SUPER 2-LANE**

ROUTE LOCATION OPTION	TOTAL MILES	ANNUAL MAINTENANCE COST		ANNUAL COST INCREASE	JOINT SEALING AT YEAR 10	JOINT SEALING AND SPALL REPAIR AT YEAR 20	JOINT SEALING AND SPALL REPAIR AT YEAR 30
		STRUCTURES	ROADWAY				
1. Pierre to I-90	31.81	0.01	0.04	0.05	0.10	0.52	0.31
2. Total Eastern Dakota Express Via Route SD 37	336.83	0.04	0.37	0.41	0.89	4.47	2.68
3. Total Eastern Dakota Express Via Route US 81	343.86	0.04	0.39	0.43	0.93	4.65	2.79
4. Aberdeen East to I-29	72.88	0.01	0.01	0.02	0.01	0.05	0.03
5. Aberdeen South to Huron	94.10	0.01	0.22	0.23	0.53	2.65	1.59
6. Huron South to I-90 Via Mitchell	---	---	---	---	---	---	---
7. I-90 to I-29 Via SD 37 and Yankton	116.79	0.01	0.06	0.07	0.13	0.66	0.40
8. I-90 to I-29 Via US 81 and Yankton	123.82	0.01	0.07	0.08	0.17	0.84	0.50
9. Aberdeen to I-29 Via Mitchell SD 37 and Yankton	263.95	0.03	0.37	0.40	0.88	4.42	2.65
10. Aberdeen I-29 Via Mitchell US 81 and Yankton	270.98	0.03	0.38	0.41	0.92	4.60	2.76
11. I-90 to Yankton via SD 37	82.85	0.01	0.00	0.01	0.02	0.10	0.06
12. I-90 to Yankton via US 81	89.88	0.01	0.02	0.03	0.06	0.28	0.17
13. Regional Trade Center Connections	153.83	0.03	0.17	0.20	0.39	1.95	1.17

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EXHIBIT 3-19

AVERAGE ANNUAL MAINTENANCE COST INCREASES (\$ MILLION)  
EXPRESSWAY/SUPER 2-LANE COMBINATION

ROUTE LOCATION OPTION	TOTAL MILES	ANNUAL MAINTENANCE COST		ANNUAL COST INCREASE	JOINT SEALING AT YEAR 10	JOINT SEALING AND SPALL REPAIR AT YEAR 20	JOINT SEALING AND SPALL REPAIR AT YEAR 30
		STRUCTURES	ROADWAY				
14. Pierre to I-90 and Total Eastern Dakota Express Via SD37	364.09	0.05	0.76	0.81	1.82	9.08	5.45
15. Pierre to I-90 and Total Eastern Dakota Express Via US 81	371.12	0.05	0.77	0.82	1.86	9.26	5.55

## Chapter 4

# TRAFFIC ANALYSES

The Eastern Dakota Expressway highway investments are subjected to a variety of feasibility analyses. Several of the feasibility tests are directly or indirectly related to levels of traffic volumes and characteristics of the travelers. In order to evaluate the feasibility of the expressway projects, a variety of traffic analyses have been conducted. The feasibility study conducted rather exhaustive assessments of traffic, travelers and cargo that use, or could use, the highway corridors. Included are roadside origin and destination surveys, Interstate highway rest area surveys, surveys and discussions with trucking and manufacturing firms who ship and receive goods and products in the area, agricultural analyses, and others. These survey results are summarized in Appendix D. This chapter utilizes information from the surveys to formulate traffic forecasts for the Eastern Dakota Expressway alternatives.

This chapter first analyzes past traffic trends, then presents the estimated Base Case traffic forecasts, and concludes by summarizing the traffic that is estimated to use the Eastern Dakota Expressway alternatives.

### Existing Highway Traffic

Exhibit 4-1 illustrates rural 1990 average annual daily traffic (auto and truck) volumes for various highway segments in eastern and central South Dakota. Representative volumes are displayed for both route option segments and other major highways. Traffic volumes in the area vary significantly, with the highest volumes found on Interstates 29 and 90 just outside of Sioux Falls. Average daily traffic (ADT) volumes along the expressway corridors also vary significantly. Traffic volumes along the Mitchell to Yankton corridor range from 780 on SD 37 south of Tripp to 2,410 just north of Yankton on US 81. Between Aberdeen and Mitchell, traffic volumes vary between 1,035 in the middle of the corridor (just south of Tulare), to 3,875 on US 281 just north of Redfield. The highest traffic volumes on any of the study corridors can be found on US 12 between Aberdeen and Interstate 29. This 75 mile corridor ranges in daily traffic volumes from 1,800 just west of Interstate 29, to 4,720 vehicles per day on the four-lane divided segment just east of Aberdeen.

Most state departments of transportation do not start to plan widening two-lane highways to four-lane until rural traffic volumes reach 5,000 - 6,000 vehicles per day. Because the volumes in the expressway corridors are considerably less than this, the Eastern Dakota Expressways are not being considered because of traffic volumes or traffic congestion. Rather, they are being considered because of what they might do for the economy.

### Traffic Trends

Exhibits 4-2 through 4-4 depict the traffic volume trends in the expressway corridors for the years 1970, 1980 and 1990. The greatest percentage growth in traffic has occurred on US 83 in the Pierre to Interstate 90 corridor. Average traffic volumes in that corridor have increased by over 80 percent between 1970 and 1990, for an average annual increase of 3.1 percent.



## Exhibit 4-2 TRAFFIC VOLUME TRENDS (AADT) Mitchell to Yankton

**S.D. 37 Alternative**

	1970	1980	1990	Percent Change		
				70-80	80-90	70-90
MITCHELL						
37	1,530	2,190	2,950	43.1%	34.7%	92.8%
42	1,356	1,890	2,045	39.4	8.2	50.8
44 Parkston	1,009	1,135	1,915	12.5	68.7	89.8
18 Tripp	1,052	1,290	1,135	22.6	-12.0	7.9
46	505	405	935	-19.8	130.8	85.1
Tyndall	954	1,255	980	31.6	-21.9	2.7
YANKTON	1,695	1,675	1,735	-1.2	3.6	2.4
<b>Weighted Avg.</b>	<b>1,205</b>	<b>1,430</b>	<b>1,695</b>	<b>18.6%</b>	<b>18.5%</b>	<b>40.5%</b>

**U.S. 81 Alternative**

	1970	1980	1990	Percent Change		
				70-80	80-90	70-90
90						
81	753	825	580	9.6%	-29.7%	-23.0%
42 Stanley Corner	889	825	675	-7.2	-18.2	-24.1
44 Freeman	1,084	1,530	1,640	41.1	7.2	51.3
18	1,096	1,830	1,160	67.0	-36.6	5.8
46 Midway Stores	2,225	2,955	2,370	32.8	-19.8	6.5
50						
<b>Weighted Avg.</b>	<b>1,300</b>	<b>1,730</b>	<b>1,400</b>	<b>33.1%</b>	<b>-19.1%</b>	<b>7.7%</b>

## Exhibit 4-3 TRAFFIC VOLUME TRENDS (AADT)

### Aberdeen to Interstate 29

Location	1970	1980	1990	Percent Change		
				70-80	80-90	70-90
<b>ABERDEEN</b>	3,429	3,755	4,720	9.5%	25.7%	37.6%
Groton	2,876	3,040	3,650	5.7	20.1	26.9
Andover	1,111	1,215	2,075	9.4	70.8	86.8
Bristol	1,218	1,315	2,220	8.0	68.8	82.3
Webster	1,270	1,845	2,160	45.3	17.1	70.1
Ortley	1,033	1,420	1,800	37.5	26.8	74.2
<b>Weighted Avg.</b>	<b>1,630</b>	<b>1,905</b>	<b>2,530</b>	<b>16.9%</b>	<b>32.8%</b>	<b>55.2%</b>

### Pierre to Interstate 90

Location	1970	1980	1990	Percent Change		
				70-80	80-90	70-90
<b>PIERRE</b>	947	1,110	1,800	17.2%	62.2%	90.1%
Weighted Avg.	880	1,120	1,605	27.3%	43.3%	82.4%



## Exhibit 4-4 TRAFFIC VOLUME TRENDS (AADT) Aberdeen to Mitchell

				Percent Change		
	1970	1980	1990	70-80	80-90	70-90
Aberdeen	2,828	3,395	2,850	20.0%	-16.1%	0.8%
Mellette	1,614	1,625	2,010	0.7	23.7	24.5
Redfield	1,584	1,685	1,850	6.4	9.8	16.8
Tulare	2,932	2,310	3,875	-21.2	67.7	32.2
Wolsley	1,913	2,475	2,250	29.4	-9.1	17.6
Huron	1,006	1,175	1,135	16.8	-3.4	12.8
Woonsocket	2,573	2,045	1,980	-20.5	-3.2	-23.0
Forestburg	2,343	2,375	3,290	1.4	38.5	40.4
Mitchell	1,248	2,080	1,590	66.7	-23.6	27.4
Woonsocket	1,149	2,015	1,800	75.4	-10.7	56.7
Forestburg	1,675	1,950	1,815	16.4	-6.9	8.4
Mitchell	1,059	1,335	1,580	26.1	18.4	49.2
Mitchell	1,566	1,995	2,085	27.4	4.5	33.1
<b>Weighted Avg.</b>	<b>1,680</b>	<b>1,950</b>	<b>2,030</b>	<b>16.1%</b>	<b>4.1%</b>	<b>20.8%</b>

The next largest increase has occurred between Aberdeen and Interstate 29. In this corridor average traffic volumes have steadily increased from 1,630 in 1970 to 2,530 in 1990 for a 55.2 percent increase (2.2 percent annually). While the four-lane section of US 12 between Aberdeen and Groton experienced the largest increase in traffic volumes, the two lane sections between Groton and Interstate 29 all had over 70 percent increases in traffic during the twenty year period.

The 150 mile corridor between Aberdeen and Mitchell varied in traffic volume trends between 1970 and 1990. Overall, the corridor experienced a 20.8 percent increase in daily traffic volumes (1.0 percent annual growth rate). However, growth rates for segments within the corridor varied significantly. The section of the corridor near Wolsey (US 14 and US 281) experienced a 23 percent decline in traffic. At the same time traffic on most segments between Huron and Mitchell increased between 25 and 60 percent between 1970 and 1990.

The two route options between Mitchell and Yankton experienced dissimilar levels of traffic growth. The SD 37 alternative's average traffic volume increased from 1,280 in 1970 to 1,800 in 1990, for a 40.7 percent increase (1.7 annual growth rate). On the other hand, the US 81 alternative only experienced a 7.7 percent increase (0.4 annual growth rate), increasing from 1,300 in 1970 to 1,400 in 1990. Most of the traffic volume segments on US 81 have experienced traffic declines during the 1980's. On SD 37, the largest increases occurred in the northern end of the corridor, between Tripp and Mitchell. Traffic between Mitchell and Tripp grew at a rate of over 77 percent, resulting in one of the largest rates of growth in the Eastern Dakota Study Area.

#### **Base Case Traffic Forecasts**

An important part of the feasibility analysis is the amount of traffic expected to use each corridor. Therefore, traffic estimates and forecasts are made for each corridor.

The Base Case alternative assumes that the Eastern Dakota highway improvements are not constructed, but does include all improvements planned and programmed by the South Dakota Department of Transportation. The highway improvements included in the Base Case contain all major highway projects in the State as contained in the State's 1994 Transportation Improvement Program as well as the Springfield and Vermillion bridges across the Missouri River (See Appendix A for a description of the major planned and programmed improvements included in the study). The Eastern Dakota Expressway alternatives will be compared to the Base Case to determine economic benefits and feasibility. The programmed improvements are included in the both the existing and future Base Case networks as well as all of the alternatives to ensure that these improvements do not bias the impact that the Eastern Dakota Expressway has on travel efficiency and economic development.

Traffic analyses are conducted separately for automobiles and commercial trucks. This is done primarily because traffic patterns of automobiles and commercial trucks vary significantly. Also, for economic development purposes, it is very important to know the impact the Eastern Dakota Expressway would have on business travel. The traffic forecasts are first evaluated for automobiles followed by a discussion of the trucking forecasts.

**Automobile Traffic Model** - A computerized traffic procedure was used to simulate existing as well as future automobile traffic in eastern and central South Dakota. The TRANPLAN transportation modeling software was used to assist in the regional traffic simulation.

The computerized roadway network developed for this study included nearly all of the State of South Dakota, including small portions of Nebraska, Iowa, Minnesota, and North Dakota. The regional network was defined so as to include all of the possible trips that could conceivably divert or be impacted by the Eastern Dakota Expressway.

An automobile trip table was developed based on the roadside surveys. This trip table was assigned and calibrated, based on existing 1990 average daily traffic volumes provided by the South Dakota Department of Transportation for various links throughout the region. Exhibit 4-5 displays the model assignment compared with the existing (1990) average daily traffic volumes for the survey locations throughout the corridor.

<b>Exhibit 4-5</b>			
<b>COMPARISON OF OBSERVED VERUS ESTIMATE AUTO TRAFFIC VOLUMES</b>			
<u>LOCATION</u>	<u>NETWORK LINK</u>	<u>OBSERVED DAILY VOLUME</u> (Autos Only)	<u>MODEL APPLICATION</u> (Autos Only)
I-29 Near Sisseton	1191-1230	5,560	6,075
I-29 Near Brookings	1211-1214	6,000	6,419
US 14 E. of Lake Preston	1326-1348	1,410	1,347
US 81 S. of SD 28	1316-1321	990	920
I-29 Near Vermillion	1271-1248	2,260	2,420
SD 10 Brown/Marshall Co. Line	1437-1466	740	736
I-90 Near Mitchell	1395-1352	5,140	5,122
SD 34/37 E. of Forestburg	1456-1469	1,480	1,454
US 281 S. of Tulare	1513-1514	800	800
SD 45 S. of SD 26	1570-1571	720	754
US 212 E. of Doland	1416-1438	1,020	938
US 12 W. of Andover	1425-1440	2,100	2,184
US 81 S. of SD 46	1359-1360	1,470	1,397
US 83 S. of Pierre	1028-1035	1,560	1,560
SD 37/50 W. of Tyndall	1476-1442	1,600	1,742
		<u>32,850</u>	<u>33,868</u>

**Base Case Year 2015 Automobile Traffic Forecasts** - Automobile traffic in eastern and central South Dakota has slightly increased over the last twenty years. On average, traffic on the envisaged Eastern Dakota Expressway Corridors have experienced increases between 8 and 83 percent from 1970 to 1990. This increase in traffic has occurred while population and employment in the area have increased at much smaller rates. This indicates that frequency of trips and the number of trips per person have been increasing. This population and trip frequency information provided the basis for the year 2015 traffic forecasts.

Exhibits 4-6 through 4-8 depict the Base Case automobile forecasts for the year 2015 for each segment of the Eastern Dakota Expressway. The Base Case highway network includes all the planned and programmed highway improvements, including the Springfield and Vermillion bridges (See Appendix A).

Automobile traffic is forecast to increase, on average between 37 percent and 77 percent for all of the Eastern Dakota segments between 1990 and 2015. The largest traffic increases are forecast between Aberdeen and Interstate 29, where ADT is expected to increase between 2,400 just east of Aberdeen and 1,000 near Interstate 29. The Pierre to Interstate 90 link is forecast to increase just over 77 percent and the Aberdeen to Mitchell segment is projected to increase near 38 percent between 1990 and 2015. The S.D Highway 37 alternative between Mitchell and Yankton is forecast to increase by 37 percent, while the U.S. 81 alternative is forecast to increase 47 percent. The two alternatives are projected to have similar traffic volume increases; however, the volumes on U.S. 81 are considerably lower than that on S.D. 37, thereby accounting for the larger percentage increase.

**Base Case Commercial Truck Forecasts** - Commercial truck traffic in the Eastern Dakota corridor operates in a different manner from automobiles. For this reason, truck forecasts were developed in a separate analysis. The initial step was to develop Base Case forecasts to show the truck volumes in the year 2015 assuming no highway changes other than those that are currently programmed. The Base Case commercial truck forecasts are based on the 20 year historical trend, modified to account for the increase in manufacturing employment forecast for eastern and central South Dakota.

Forecasts for future truck volumes for the Base Case are primarily based on long-term (20 years) growth rates. A ten-year rate was also examined but was believed to be adversely affected by the recession, especially in the agricultural industry, during the early 1980's and the droughts of the late 1980's. Also, forecasts for the manufacturing industry in eastern South Dakota tend to confirm a return to the larger growth rates experienced in the 1970's (See Appendix C for manufacturing employment forecasts).

Exhibit 4-9 shows the average annual growth rates used for each major section of the corridor, compared to the 20 and 10 year trends. It is important to note that individual calculations were done on each segment of the corridor and the actual average annual growth rate is based on a weighted average.

## Exhibit 4-6 YEAR 2015 AUTO BASE CASE TRAFFIC FORECASTS (AADT) Mitchell to Yankton

**S.D. 37 Alternative**

	<u>1970</u>	<u>1990</u>	<u>2015</u>	Percent Change	
				<u>70-90</u>	<u>90-15</u>
Mitchell	1,287	2,465	3,550	91.5%	44.0%
42	1,140	1,745	2,535	53.1	45.3
44 Parkston	849	1,685	2,195	98.5	30.4
18 Tripp	923	975	1,235	5.6	26.6
46	410	720	905	75.6	26.1
Tyndall	792	860	1,175	8.6	36.5
Yankton	1,431	1,480	2,005	3.4	35.5
<b>Weighted Avg.</b>	<b>1,015</b>	<b>1,440</b>	<b>1,970</b>	<b>41.5%</b>	<b>37.1%</b>

**U.S. 81 Alternative**

	<u>1970</u>	<u>1990</u>	<u>2015</u>	Percent Change	
				<u>70-90</u>	<u>90-15</u>
90	624	490	775	-21.5%	58.6%
42 Stanley Corner	744	565	865	-24.1	53.2
44 Freeman	907	1,460	2,050	61.0	40.5
18	917	880	1,205	-4.0	36.8
46 Midway Stores	1,863	2,045	3,030	9.8	48.2
Yankton	1,090	1,180	1,740	8.3%	47.5%
<b>Weighted Avg.</b>	<b>1,090</b>	<b>1,180</b>	<b>1,740</b>	<b>8.3%</b>	<b>47.5%</b>

## Exhibit 4-7 YEAR 2015 AUTO BASE CASE TRAFFIC FORECASTS (AADT)

### Aberdeen to Interstate 29

Location	1970	1990	2015	Percent Change	
				70-90	90-15
<b>ABERDEEN</b>	3,114	4,295	6,700	37.9%	56.0%
Groton	2,612	3,260	5,085	24.8	56.0
Andover	1,009	1,775	2,785	75.9	57.0
Bristol	1,106	1,990	3,220	79.9	61.8
Webster	1,119	1,690	2,830	51.0	67.5
Ortley	910	1,450	2,450	59.3	69.0
<b>Weighted Avg.</b>	<b>1,465</b>	<b>2,175</b>	<b>3,490</b>	<b>48.5%</b>	<b>60.4%</b>

### Pierre to Interstate 90

Location	1970	1990	2015	Percent Change	
				70-90	90-15
<b>PIERRE</b>	835	1,560	2,745	86.8%	76.0%
	705	1,260	2,260	78.7	79.4
<b>Weighted Avg.</b>	<b>770</b>	<b>1,410</b>	<b>2,500</b>	<b>83.1%</b>	<b>77.3%</b>

## Exhibit 4-8 YEAR 2015 AUTO BASE CASE TRAFFIC FORECASTS (AADT) Aberdeen to Mitchell

				Percent Change	
	1970	1990	2015	70-90	90-15
Aberdeen	2,631	2,505	3,620	-4.8%	44.5%
Mellette	1,374	1,690	2,465	23.0	46.0
Redfield	1,348	1,560	2,370	15.7	51.9
Tulare	2,681	3,365	5,045	25.5	50.0
Wolsey	1,602	1,980	2,570	23.6	29.8
Huron	786	875	1,125	11.3	28.7
Woonsocket	2,321	1,630	2,270	-30.1	39.4
Forestburg	2,059	2,960	4,195	43.8	41.8
Mitchell	1,073	1,340	1,700	24.9	26.8
	988	1,520	1,925	53.8	26.8
	1,432	1,590	2,020	11.0	27.2
	922	1,395	1,845	51.3	32.3
	1,326	1,885	2,510	42.2	33.3
<b>Weighted Avg.</b>	<b>1,455</b>	<b>1,750</b>	<b>2,410</b>	<b>20.3%</b>	<b>37.7%</b>

**Exhibit 4-9**  
**ANNUAL TRUCK TRAFFIC GROWTH RATES**

<u>Corridor</u>	<u>Forecast Rate</u>	<u>Long-Term</u>	<u>Short-Term</u>
Mitchell to Yankton			
S.D. 37 Alternative	2.64%	1.25%	0.41%
U.S. 81 Alternative	0.65	0.0	-1.00
Aberdeen to Interstate 29	2.87	4.78	1.29
Pierre to Interstate 90	3.07	3.03	0.22
Aberdeen to Mitchell	1.72	1.02	-0.12

Exhibits 4-10 through 4-12 show the estimated commercial truck volumes for the year 2015 for each highway segment. The largest growth is expected to occur on Highway 12, between Aberdeen and Interstate 29, where commercial truck volumes are forecast to increase by 72 percent between 1990 and 2015. South Dakota Highway 83, between Pierre and Interstate 90 is estimated to increase by 85 percent; however the actual increase in trucks is forecast at 165 per day. Commercial truck volumes between Aberdeen and Mitchell are estimated to increase 43 percent between 1990 and 2015 or an average of 120 trucks per day. The Highway 37 alternative along the Mitchell to Yankton corridor is estimated to increase at 62.0 percent, while the U.S. Highway 81 alternative is forecast to increase by only 16 percent.

#### Eastern Dakota Expressway Traffic Forecasts

In the previous section the "Base Case" traffic volumes were presented. The Base Case alternative forecasts future traffic volumes for the existing highway system plus planned and programmed improvements, and assumes the Eastern Dakota Expressway alternatives are not constructed. This section utilizes that traffic forecast information and analyzes the Eastern Dakota Expressway alternatives from the traffic perspective. This evaluation addresses the traffic volumes that the Eastern Dakota Expressway is estimated to carry under each highway improvement type.



# Exhibit 4-10

## YEAR 2015 TRUCK BASE CASE TRAFFIC FORECASTS (AADT)

### Mitchell to Yankton

**S.D. 37 Alternative**

	<u>1970</u>	<u>1990</u>	<u>2015</u>	<u>Percent Change</u>	
				<u>70-90</u>	<u>90-15</u>
Mitchell	243	485	785	99.6%	61.9%
SD 42	216	300	400	38.9	33.3
Parkston	160	230	330	43.8	43.5
SD 18	129	160	240	24.0	50.0
SD 46	95	215	315	126.3	46.5
Tyndall	162	168	230	3.7	36.9
Yankton	264	255	540	-3.4	111.8
<b>Weighted Avg.</b>	<b>190</b>	<b>265</b>	<b>425</b>	<b>38.5%</b>	<b>61.9%</b>

**U.S. 81 Alternative**

	<u>1970</u>	<u>1990</u>	<u>2015</u>	<u>Percent Change</u>	
				<u>70-90</u>	<u>90-15</u>
Stanley Corner	129	90	105	-30.2%	16.6%
SD 42	145	110	120	-24.1	9.1
Freeman	177	180	185	1.7	8.3
SD 18	179	280	390	56.4	39.3
Midway Stores	362	325	350	-10.2	7.7
SD 46					
<b>Weighted Avg.</b>	<b>215</b>	<b>215</b>	<b>250</b>	<b>0.0%</b>	<b>16.3%</b>

# Exhibit 4-11 YEAR 2015 TRUCK BASE CASE TRAFFIC FORECASTS (AADT)

## Aberdeen to Interstate 29

Location	1970	1990	2015	Percent Change	
				70-90	90-15
Aberdeen	315	425	505	34.9%	18.8%
Groton	264	390	465	47.7	19.2
Andover	102	300	590	194.1	96.7
Bristol	112	230	540	105.4	134.8
Webster	151	470	805	211.3	71.3
Ortley	123	350	655	184.6	87.1
<b>Weighted Avg.</b>	<b>160</b>	<b>355</b>	<b>610</b>	<b>119.7%</b>	<b>71.8%</b>

## Pierre to Interstate 90

Location	1970	1990	2015	Percent Change	
				70-90	90-15
Pierre	112	240	400	114.3%	66.7%
Weighted Avg.	110	195	360	77.3%	84.6%

## Exhibit 4-12

### YEAR 2015 TRUCK BASE CASE TRAFFIC FORECASTS (AADT) Aberdeen to Mitchell

	1970	1990	2015	Percent Change	
				70-90	90-15
Aberdeen	197	345	550	75.1%	59.4%
Mellette	240	320	380	33.3	18.8
Redfield	236	290	340	22.9	17.2
Tulare	251	510	595	103.2	16.7
Wolsey	311	270	330	-13.2	22.2
Huron	220	260	350	18.2	34.6
Woonsocket	242	350	395	44.6	12.9
Forestburg	284	330	580	16.2	75.8
Mitchell	175	250	450	42.9	80.0
	161	280	450	73.9	60.7
	243	225	295	-7.4	31.1
	137	185	250	35.0	35.1
	240	280	350	-16.7	25.0
<b>Weighted Avg.</b>	<b>225</b>	<b>280</b>	<b>400</b>	<b>25.5%</b>	<b>42.9%</b>

**Causes of Eastern Dakota Expressway Traffic Use** - Future traffic use of the Eastern Dakota Expressway is a function of the following causes of traffic use:

1. **Normal Traffic Growth** - Some growth in traffic will occur in the region due to population growth, increased business and economic activity, increased per capita trip making, etc.
2. **Diversion from Other Roads** - If the highway is built, it will offer faster, more efficient and safer travel for other vehicles in the region. This will cause some cars and trucks to divert to the Eastern Dakota Expressway from other highways and roads in South Dakota.
3. **Induced Traffic** - In addition, there could be more traffic on the Eastern Dakota Expressway merely because the new roadway exists. If a new highway makes it faster and safer to travel between points in the corridor or the State, it may entice individuals to make more trips between these locations or encourage others to make the trip for the very first time.

All of these traffic sources were investigated and included in this study.

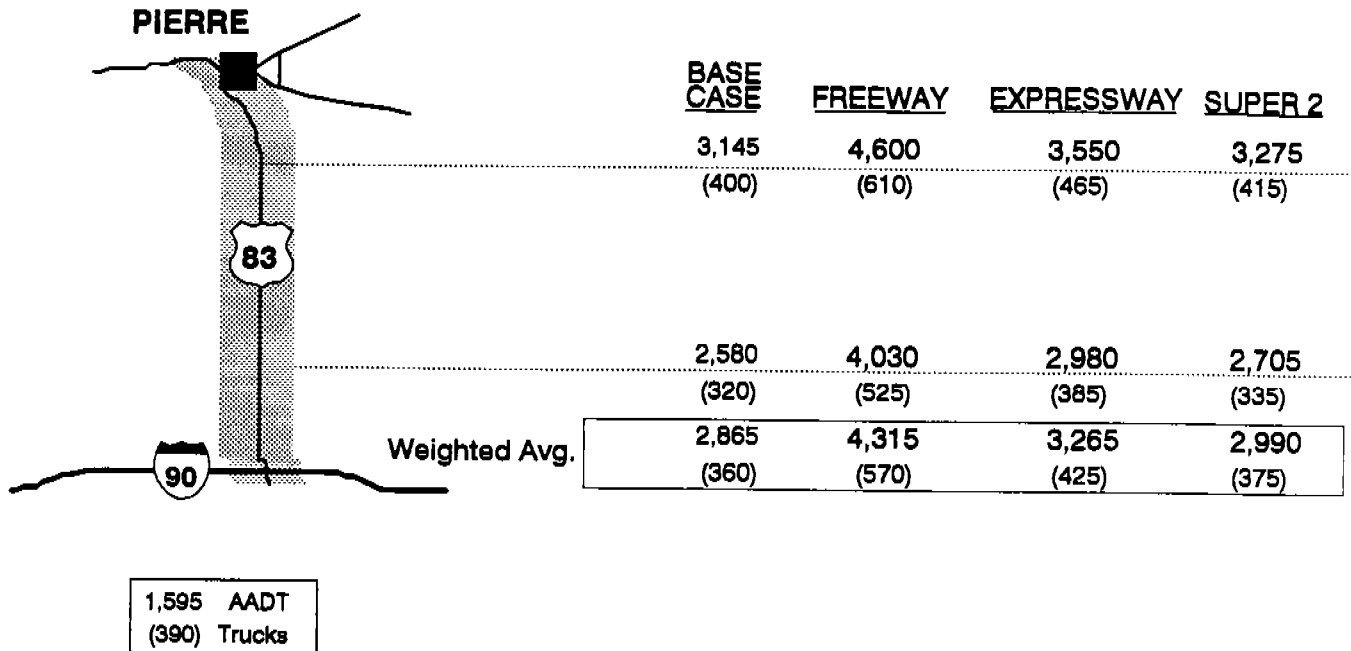
**Eastern Dakota Expressway Traffic Estimates** - This study is investigating the Eastern Dakota Expressway alternatives at three highway design standards:

- Freeway (65 mph)
- Expressway (55 mph)
- Super Two-Lane (55 mph)

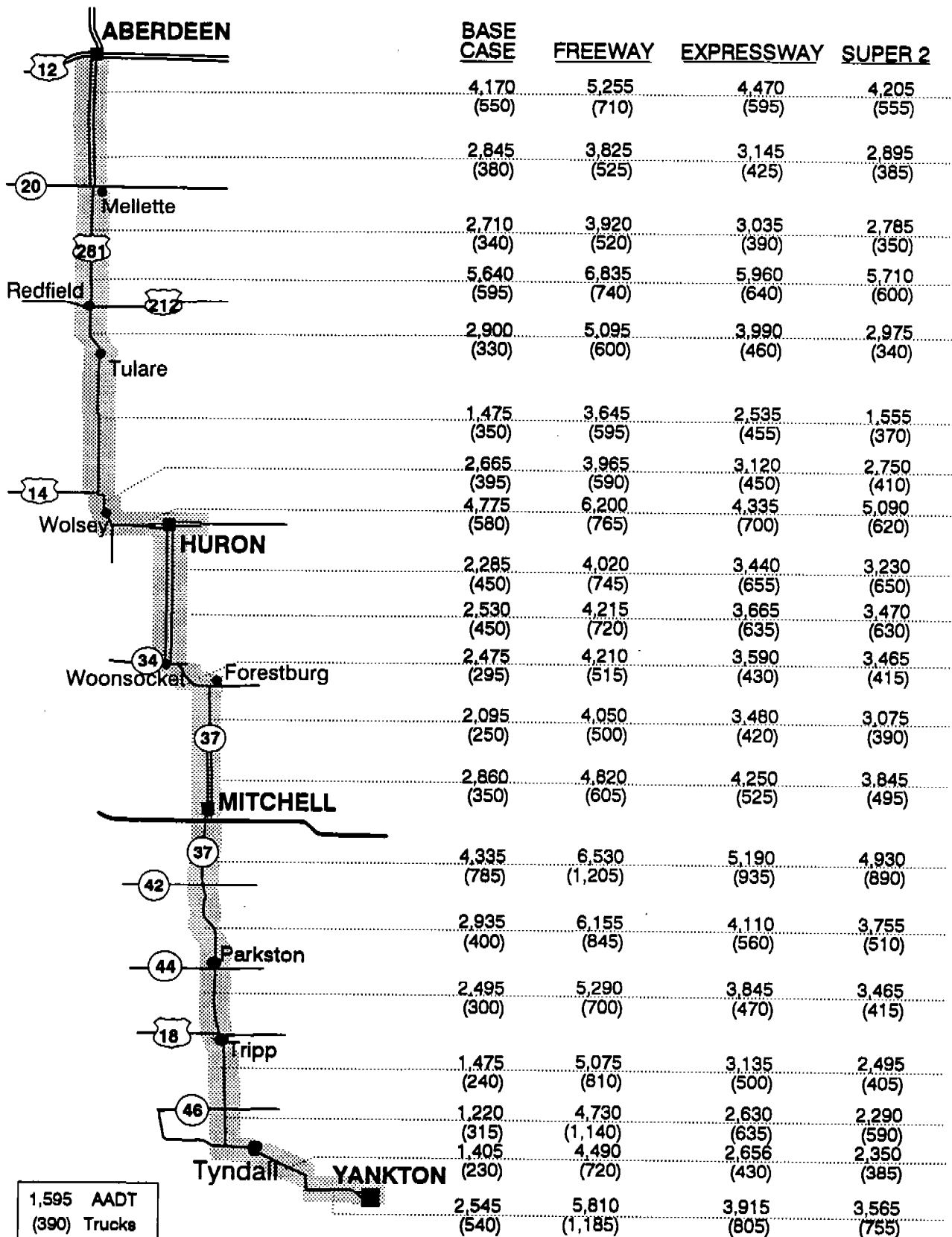
Exhibits 4-13 through 4-24 present the year 2015 traffic volume estimates for the Eastern Dakota Expressway alternatives and design standards. These traffic estimates suggest a number of things:

1. On an annual average daily traffic volume basis in the Base Case ("do nothing alternative"), none of the Eastern Dakota corridors carry sufficient traffic to warrant an end-to-end 4-lane highway. The traffic volumes, on average for the corridors, are between approximately 2,000 and 4,000 vehicles per day.
2. The 4-lane freeway is estimated to carry more traffic than the 4-lane expressway and the expressway is estimated to carry more traffic than the Super 2 option.
3. On average, the Aberdeen to Interstate 90 corridor carries the largest traffic volumes. However, under the freeway alternative the two alternatives between Mitchell and Yankton could divert a significant amount of traffic from Interstates 29 and 90.
4. The SD 37 alternative between Mitchell and Yankton is estimated to divert and carry more than the US 81 alternative.

**Exhibit 4-13**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Pierre to Interstate 90 (Alt. 1)**

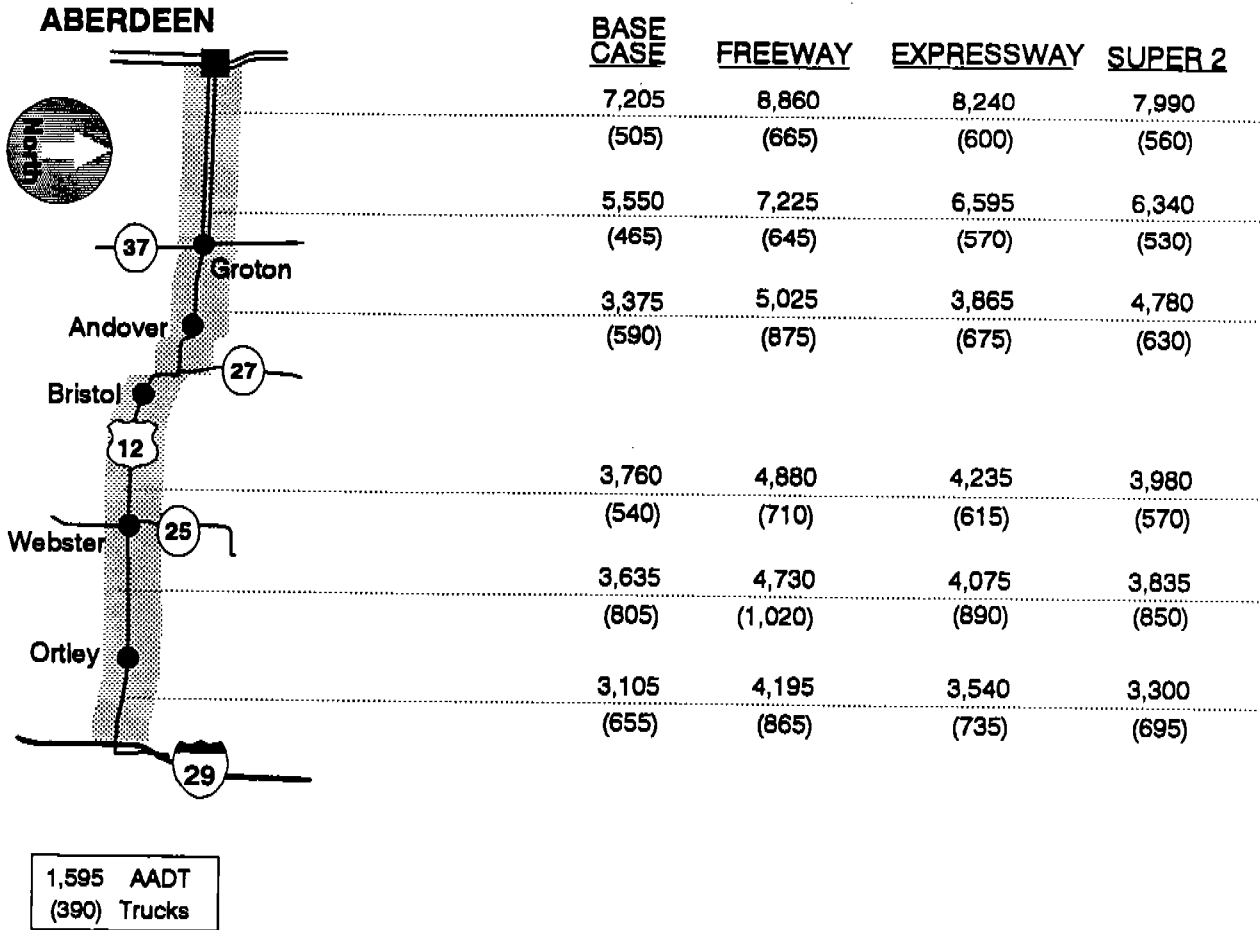


**Exhibit 4-14**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via S.D. 37 (Alt. 2)**

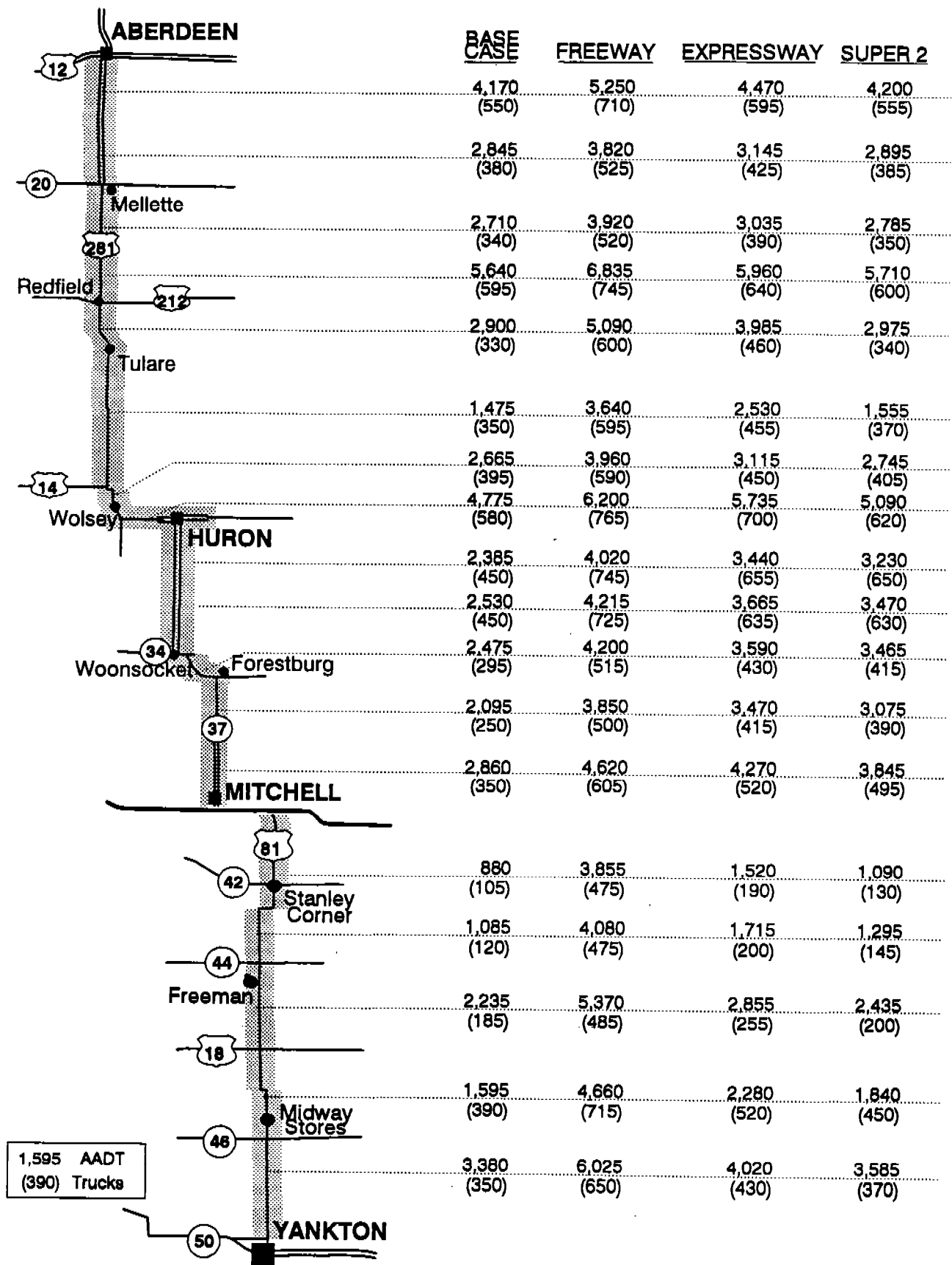


**Exhibit 4-14**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via S.D. 37 (Alt. 2)**

**Aberdeen to Interstate 29**



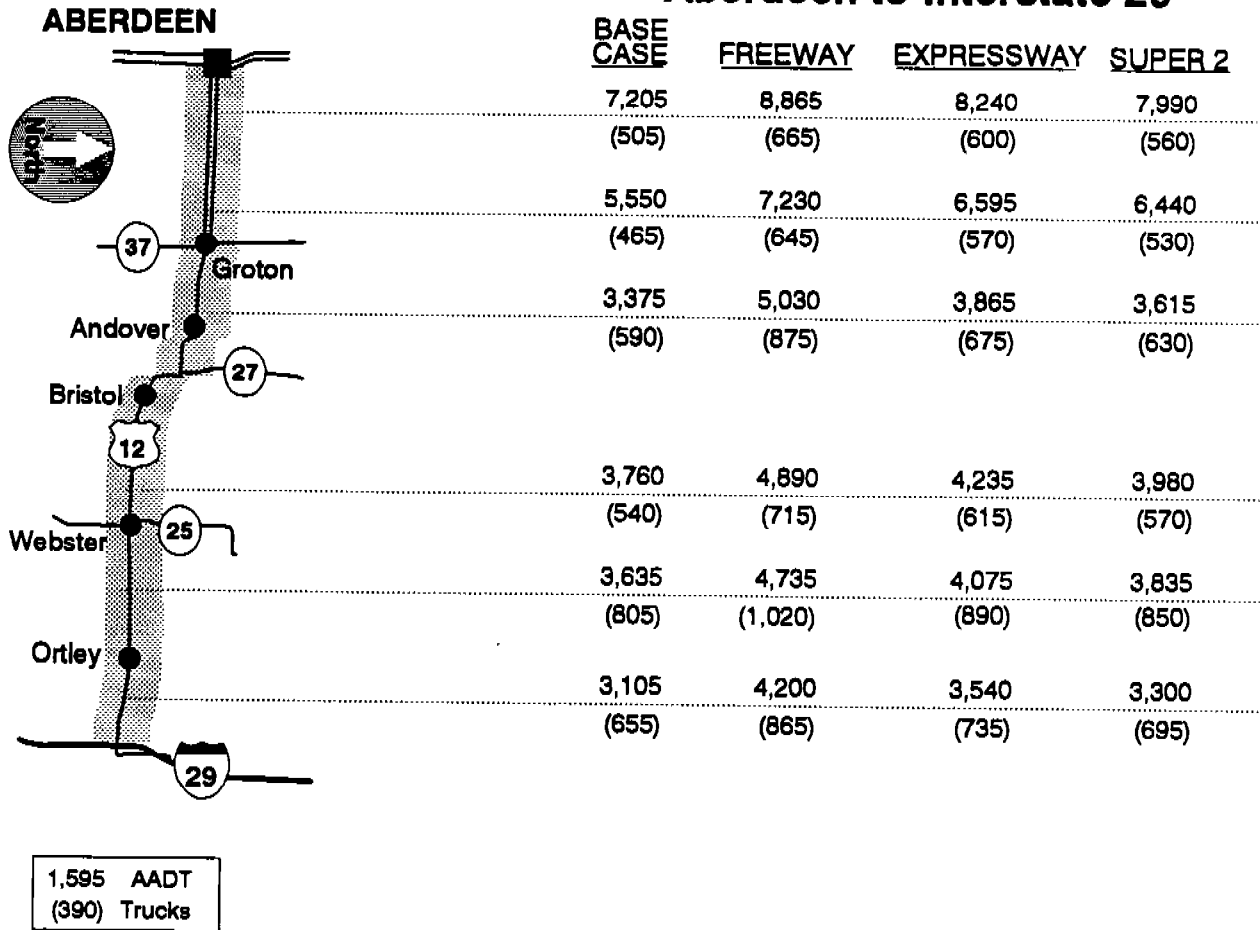
**Exhibit 4-15**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via U.S. 81 (Alt. 3)**





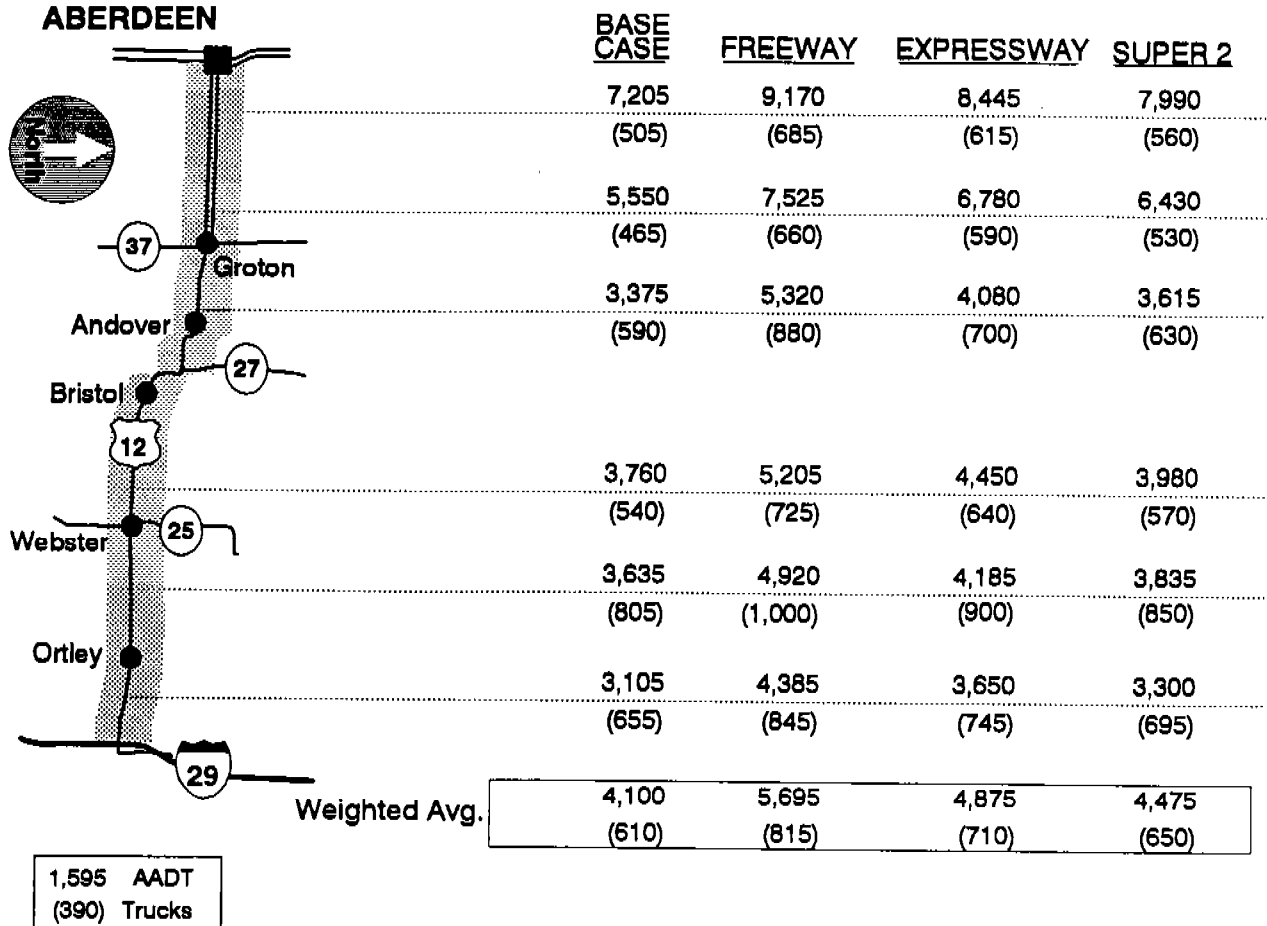
**Exhibit 4-15**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via S.D. 81 (Alt. 3)**

**Aberdeen to Interstate 29**



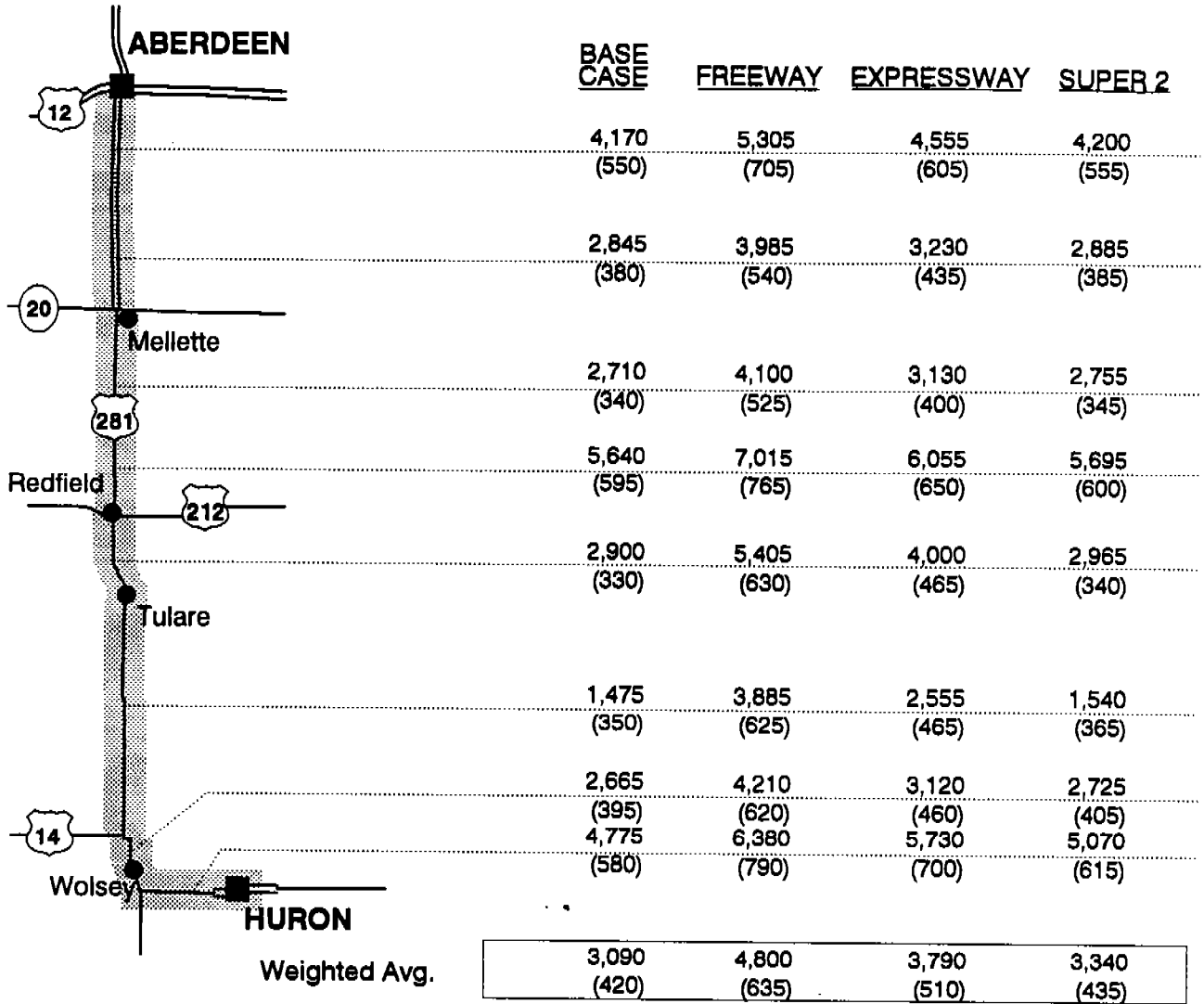
## Exhibit 4-16

### YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT) Aberdeen East to Interstate 29 (Alt. 4)



## Exhibit 4-17

### YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT) Aberdeen South to Huron (Alt. 5)



1,595 AADT  
(390) Trucks

**Exhibit 4-18**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Huron South to Interstate 90 Via Mitchell (Alt. 6)**

	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
HURON	2,285	3,845	3,230	-
	(450)	(720)	(650)	
Forestburg	2,375	4,070	3,470	-
	(295)	(700)	(630)	
Woonsocket	2,430	4,040	3,465	-
	(250)	(490)	(415)	
	2,095	3,780	3,075	-
	(250)	(460)	(390)	
MITCHELL	2,860	4,475	3,845	-
	(350)	(555)	(495)	
Weighted Avg.	2,485	4,035	3,410	-
	(400)	(585)	(515)	

1,595 AADT  
(390) Trucks

# Exhibit 4-19

## YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)

### Interstate 90 to Interstate 29 Via Yankton

#### S.D. 37 Alternative (Alt. 7)

	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
Mitchell	4,335	6,550	5,185	4,930
42	(785)	(1,210)	(935)	(890)
44	2,935	6,160	4,100	3,745
Parkston	(400)	(845)	(560)	(510)
18	2,495	5,305	3,835	3,455
Tripp	(300)	(725)	(470)	(415)
46	1,475	5,075	3,125	2,480
	(240)	(810)	(500)	(400)
Tyndall	1,215	4,735	2,620	2,265
	(315)	(1,140)	(635)	(585)
Yankton	1,405	4,495	2,680	2,330
	(230)	(720)	(430)	(380)
	2,545	5,805	3,905	3,550
	(540)	(1,180)	(805)	(750)
<b>Weighted Avg.</b>	<b>2,395</b>	<b>5,495</b>	<b>3,680</b>	<b>3,305</b>
	(420)	(980)	(645)	(585)

1,595 AADT  
(390) Trucks

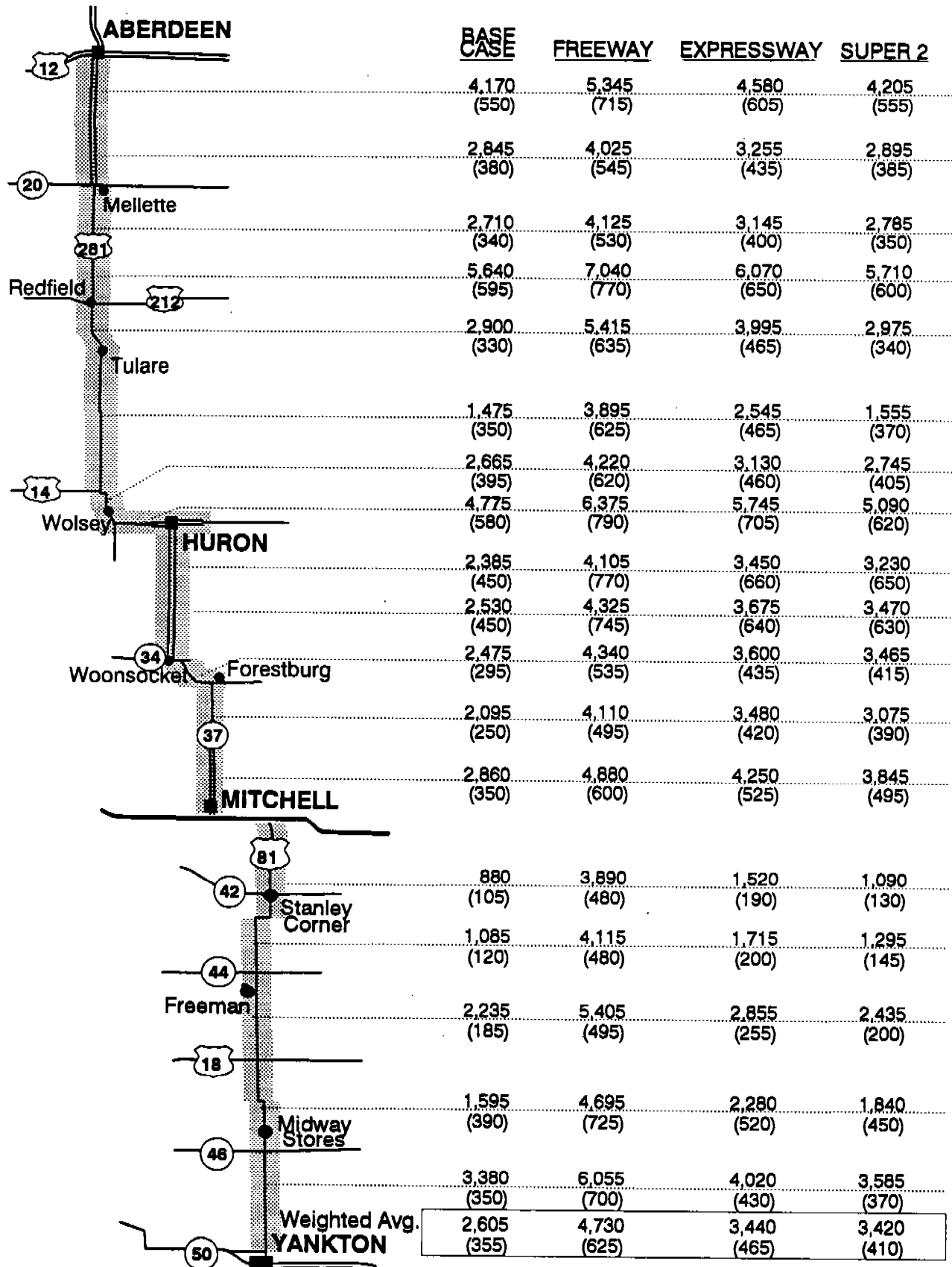
#### U.S. 81 Alternative (Alt. 8)

	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
Stanley Corner	875	3,875	1,510	1,080
42	(105)	(480)	(190)	(130)
44	1,085	4,095	1,710	1,280
Freeman	(120)	(475)	(200)	(140)
18	2,235	5,390	2,845	2,425
	(185)	(490)	(255)	(200)
46	1,595	4,680	2,270	1,825
Midway Stores	(390)	(720)	(520)	(445)
	3,380	6,045	4,010	3,575
	(350)	(655)	(430)	(370)
<b>Weighted Avg.</b>	<b>1,950</b>	<b>4,950</b>	<b>2,625</b>	<b>2,190</b>
	(250)	(575)	(335)	(275)

**Exhibit 4-20**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Aberdeen to Interstate 29 Via S.D. 37 and Yankton (Alt. 9)**

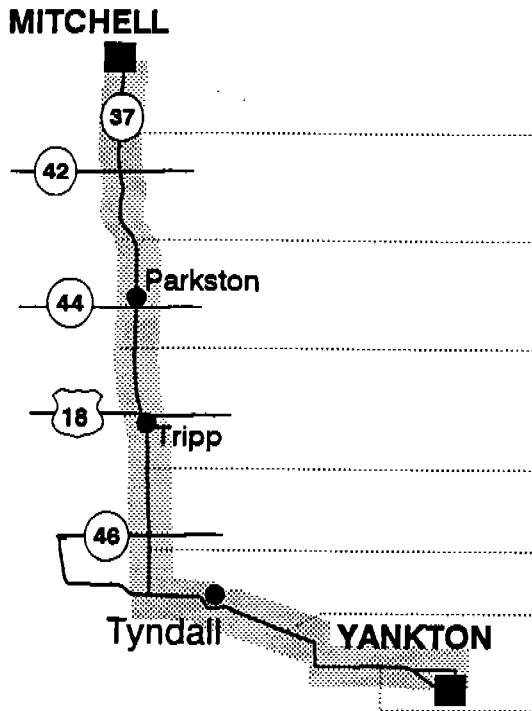
	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
Aberdeen	4,170 (550)	5,340 (710)	4,580 (605)	4,205 (555)
Mellette	2,845 (380)	4,020 (545)	3,255 (435)	2,895 (385)
Redfield	2,710 (340)	4,125 (530)	3,145 (400)	2,785 (350)
Tulare	5,640 (595)	7,040 (770)	6,070 (650)	5,710 (600)
Wolsley	2,900 (330)	5,415 (635)	3,995 (465)	2,975 (340)
Huron	1,475 (350)	3,895 (625)	2,545 (465)	1,555 (370)
Forestburg	2,665 (395)	4,220 (620)	3,130 (460)	2,745 (405)
Mitchell	4,775 (580)	6,390 (790)	5,745 (705)	5,090 (620)
Parkston	2,385 (450)	4,110 (770)	3,450 (660)	3,230 (650)
Tripp	2,530 (450)	4,330 (745)	3,675 (640)	3,470 (630)
Yankton	2,475 (295)	4,345 (535)	3,600 (435)	3,465 (415)
Tyndall	2,095 (250)	4,140 (510)	3,480 (420)	3,075 (390)
Forestburg	2,860 (350)	4,910 (615)	4,250 (525)	3,845 (495)
Mitchell	4,335 (785)	6,560 (1,215)	5,195 (935)	4,930 (890)
Parkston	2,935 (400)	6,180 (845)	4,110 (560)	3,755 (510)
Tripp	2,495 (300)	5,930 (730)	3,845 (470)	3,465 (415)
Tyndall	1,475 (240)	5,100 (815)	3,135 (500)	2,495 (405)
Yankton	1,215 (315)	4,765 (1,150)	2,630 (635)	2,290 (590)
Yankton	1,405 (230)	4,520 (725)	2,690 (430)	2,350 (385)
Yankton	2,545 (540)	5,835 (1,190)	3,915 (805)	3,565 (755)
<b>Weighted Avg.</b>	<b>2,680 (400)</b>	<b>5,000 (760)</b>	<b>3,735 (550)</b>	<b>3,290 (490)</b>

**Exhibit 4-21**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Aberdeen to Interstate 90 Via U.S. 81 and Yankton (Alt. 10)**



## Exhibit 4-22 YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT) Interstate 90 to Yankton

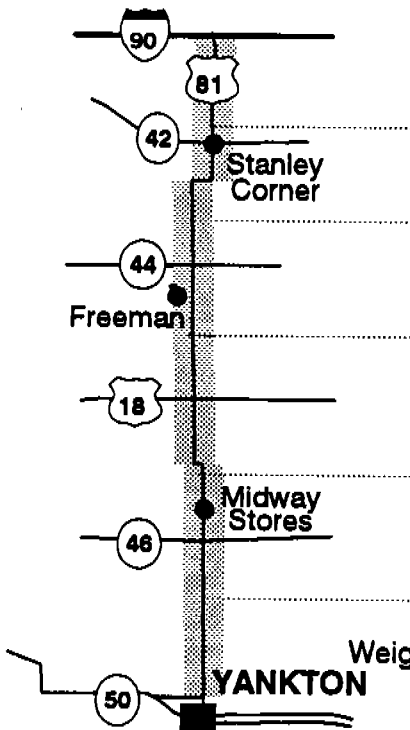
### S.D. 37 Alternative (Alt. 11)



	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
Mitchell	4,335	5,665	4,845	4,690
42	(785)	(1,040)	(875)	(850)
Parkston	2,935	4,870	3,635	3,420
44	(400)	(665)	(495)	(465)
Tripp	2,495	4,480	3,300	3,070
18	(300)	(555)	(400)	(370)
Tyndall	1,475	3,635	2,465	2,080
46	(240)	(580)	(395)	(335)
Yankton	1,215	3,325	2,060	1,845
	1,405	3,260	2,170	1,960
	(230)	(525)	(350)	(320)
	2,545	4,500	3,360	3,150
	(540)	(925)	(700)	(665)
<b>Weighted Avg.</b>	<b>2,395</b> (420)	<b>4,255</b> (755)	<b>3,165</b> (555)	<b>2,940</b> (520)

1,595 AADT  
(390) Trucks

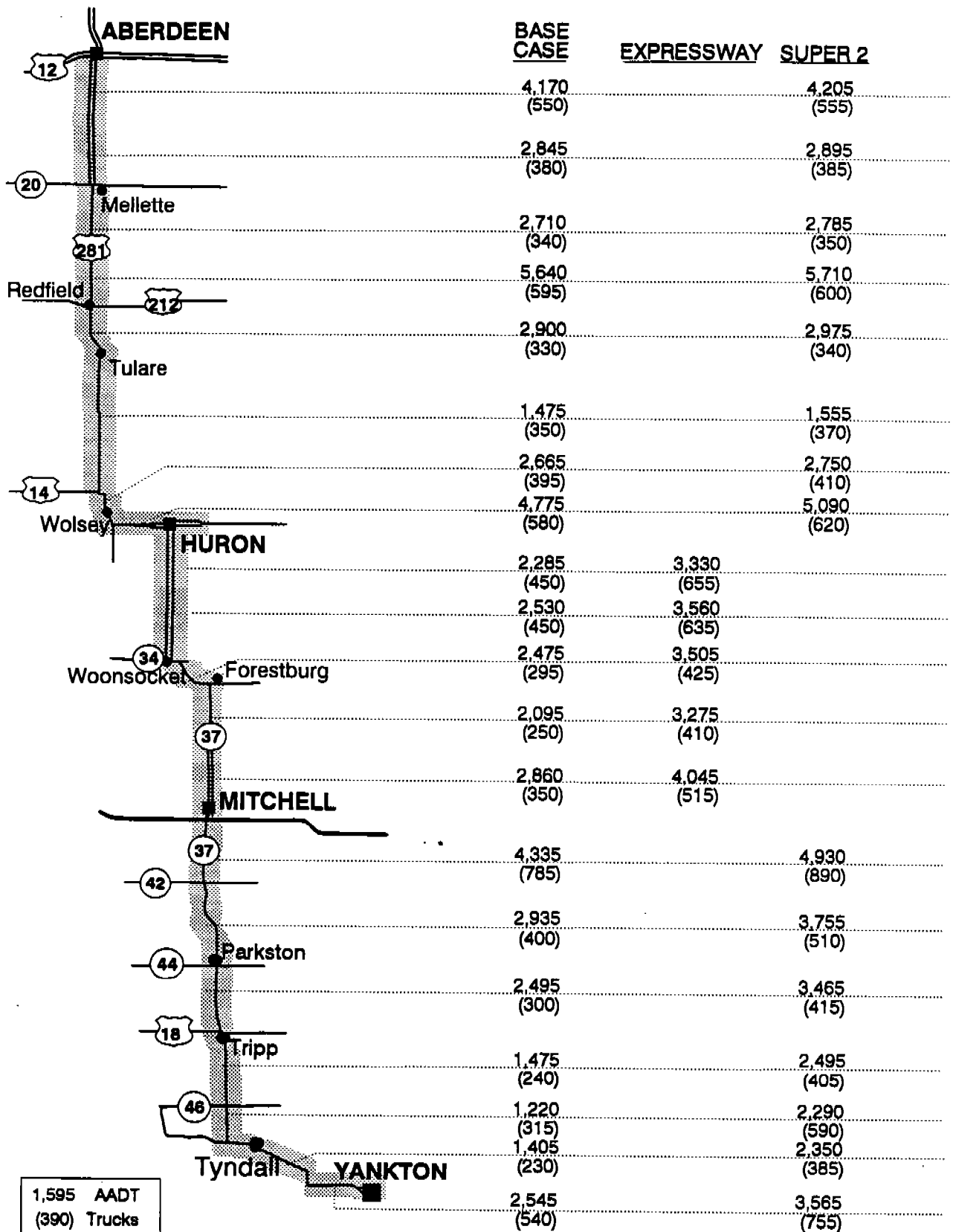
### U.S. 81 Alternative (Alt. 12)



	<u>BASE CASE</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
Stanley Corner	875	2,675	1,255	1,000
42	(105)	(330)	(155)	(120)
Freeman	1,085	2,890	1,460	1,200
44	(120)	(335)	(170)	(130)
Midway Stores	2,235	4,130	2,600	2,350
18	(185)	(370)	(225)	(195)
Yankton	1,595	3,445	2,000	1,735
46	(390)	(590)	(470)	(425)
	3,380	4,980	3,760	3,495
	(350)	(535)	(400)	(360)
<b>Weighted Avg.</b>	<b>1,950</b> (250)	<b>3,765</b> (445)	<b>2,370</b> (300)	<b>2,110</b> (265)



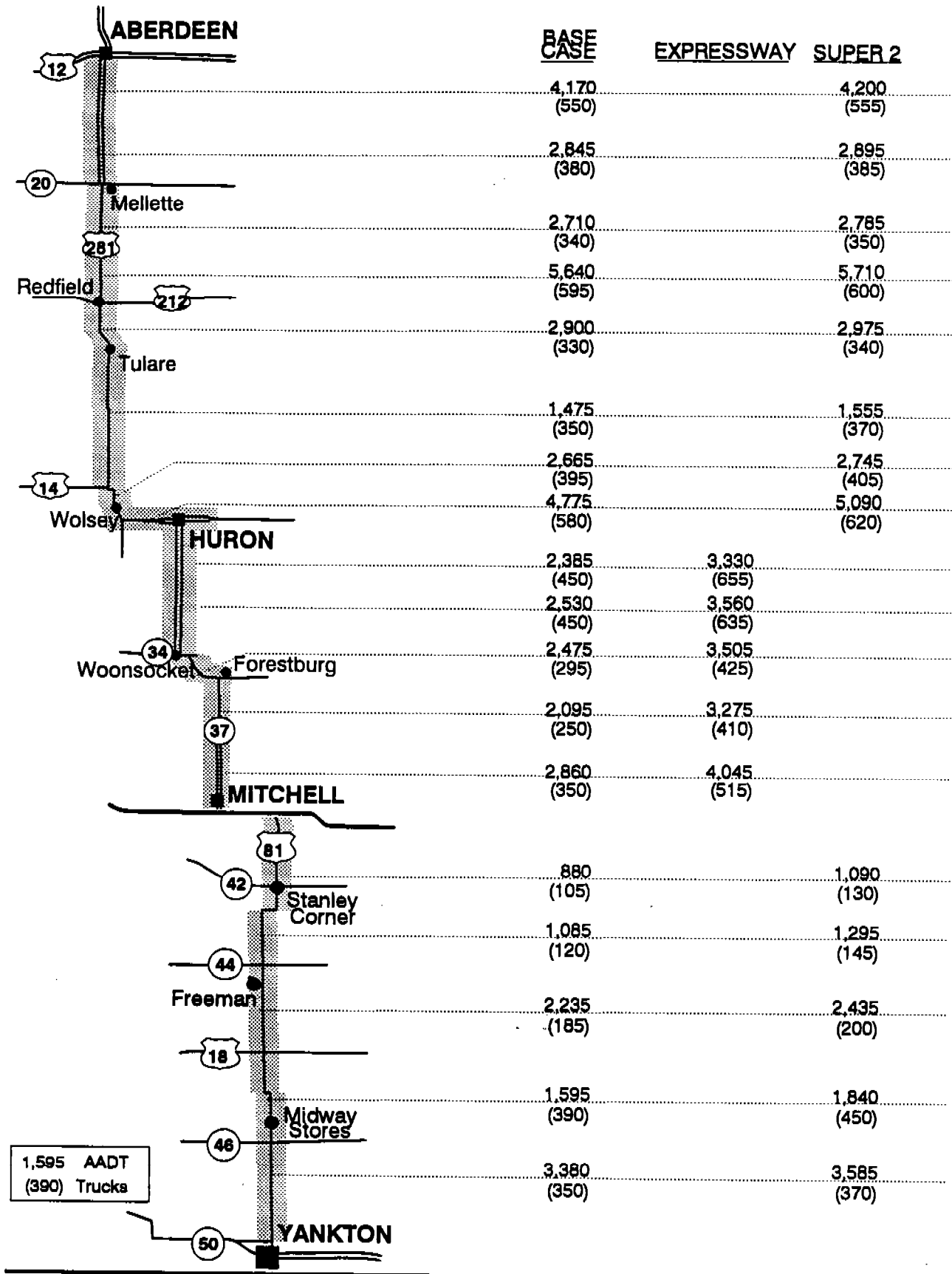
**Exhibit 4-23**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via S.D. 37 (Two/Four Lanes) (Alt. 14)**



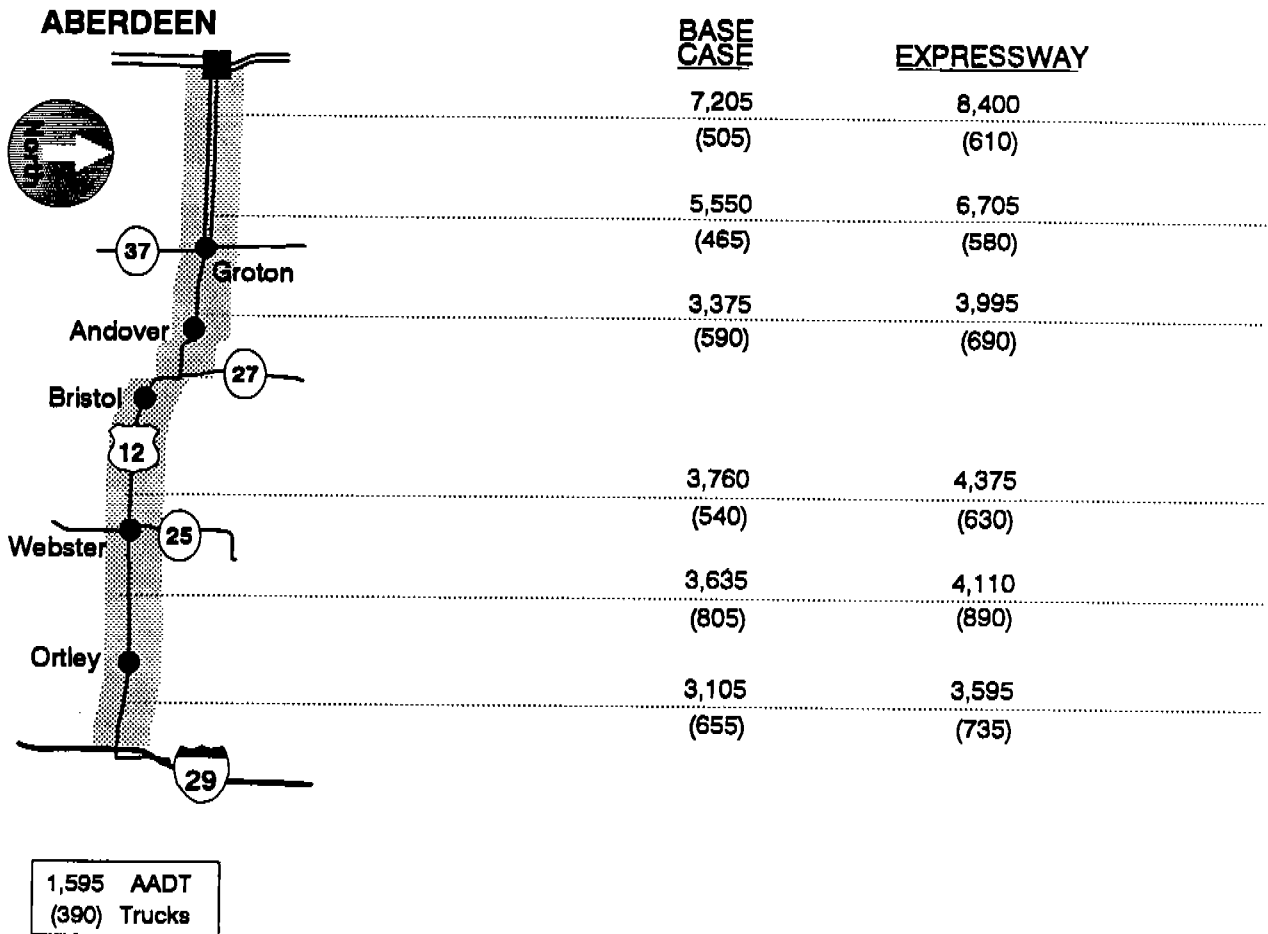
**Exhibit 4-23 (cont.)**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via S.D. 37 (Two/Four Lanes) (Alt. 14)**



**Exhibit 4-24**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via U.S. 81 (Two/Four Lanes) (Alt. 15)**



**Exhibit 4-24 (cont.)**  
**YEAR 2015 ALTERNATIVE TRAFFIC ASSIGNMENT (AADT)**  
**Eastern Dakota Expressway Via U.S. 81 (Two/Four Lanes) (Alt. 15)**



## Chapter 5

# ENVIRONMENTAL OVERVIEW

Regardless of the alignment and highway option selected for development of the Eastern Dakota Expressway, there will very likely be impacts in almost every category involving the natural, human, and cultural environments. The intensity of such impacts will depend, to a great extent, on the following:

1. **Highway Type** - A freeway will require more right-of-way than either an expressway or a high-type two-lane facility. As a result, related impacts are likely to be greater.
2. **New Location** - Improvements made on existing highway alignments are likely to have less impact on the environment than highways on new locations.
3. **Bridges** - Rivers and their associated riparian environments constitute an area of potential impact when new bridges are introduced.
4. **Bypasses** - On a number of study segments, bypasses around developed communities are under consideration. Such links require considerably more right-of-way than improvements to existing roadways, and would therefore result in greater levels of impacts to the natural environment.

Regardless of these potential variations in environmental impacts, the environmental overview process has determined that it is unlikely that any environmental impacts will be critical to the point that they cannot be either avoided, minimized or mitigated. The primary reason for the relatively low level of anticipated impacts, considering the length of the proposed facility, is the fact that most alignments are being proposed along existing highway routes. Land use patterns, transportation patterns, and ecological functions have adapted to the presence of a transportation facility along these routes. As a result, expansion, upgrade, or modest realignment of these facilities is likely to be less harmful to the natural and manmade environments than would a new facility on new location.

### Highway Options

There are three primary highway types being considered as portions of the Eastern Dakota Expressway. These are freeway, expressway, and a significantly upgraded two-lane facility.

**Freeway** - Freeway development along any of the proposed alignments would be the most ambitious. A freeway by definition is a multi-lane facility that only allows access at certain controlled interchange points. Indiscriminate access across a freeway is prohibited, which could be restrictive to social interaction, access to jobs and services, and the efficient management of farms and ranches that may occur on both sides of the highway facility. In addition to requiring additional land for expansion of an existing facility to freeway standards, even more land may be required for frontage systems at strategic locations in order to accommodate local circulation.

Freeway interchanges often require expansive acreage, compounded by the fact that interchanges are most desirable in developed areas where two major routes already intersect.

**Expressways** - Expressways are similar in some respects to freeways but do not have grade separated interchanges at every intersecting route, and are less restrictive to local circulation.

**"Super-Two"** - This designation refers to a significantly upgraded two-lane roadway, with intermittent four-lane sections, that under most circumstances would be the least environmentally disruptive, simply because less new right-of-way would be required. As a result, local environmental characteristics could remain virtually intact.

### **Impacts of the Project**

Regardless of which highway type is considered for each link in the Eastern Dakota Expressway, there are likely to be some impacts in each of the categories that are provided protection under Federal and State law. These impact areas are discussed in the paragraphs which follow. Subsequent sections of this chapter deal with the specific segments and their respective potentials for environmental impact.

**Land Use Impacts** - The introduction of modifications to or expansions of the existing transportation system can change the way land use patterns have developed over history and can influence the way they develop in the future. Because a freeway denies access except at interchange points, the more intense future land uses are very likely to develop around such points. Sites along a freeway facility will have somewhat diminished potential for development, as access is limited. Intensified development at a freeway interchange can be a problem for local government if appropriate land use controls are not applied. At the opposite end of the spectrum, however, the upgrade of an existing two-lane facility is likely to have only minor impacts on land uses. In the case of bypasses around urban centers, without proper land use controls, urban development will tend to gravitate to the bypass. In some instances bypasses have resulted in the decentralization of an otherwise cohesive urban environment.

**Prime Farmlands** - Certain soil types have been designated by the Soil Conservation Service of the U.S. Department of Agriculture as being important for agricultural purposes. The Soil Conservation Service undertakes a ranking evaluation for proposed new highway projects to determine the relevant impacts in removing such high quality soils from agricultural production, essentially in perpetuity. Most of the farm soils within the James River Valley are of a highly desirable type for agriculture. The impacts to prime farmlands can be minimized by the selection of a narrower cross-section facility and the utilization of existing roadways wherever possible. This of course has to be considered in the context of overall project purpose and transportation service.

**Socioeconomic Impacts** - While there may be some restrictions on local accessibility with the freeway option, most socioeconomic effects of new highways are positive. In terms of economics, improved accessibility to points of employment, shopping, community services, entertainment, and social interaction are benefits that accrue from transportation improvements.

**Communities and Neighborhoods** - Because almost all of the proposed Eastern Dakota Expressway alignments are along existing highway routes, little disruption to established communities and neighborhoods can be anticipated. These are long-standing transportation corridors around which the respective communities have been established and which utilize these routes as part of their local transportation systems. Routing the higher-speed through-traffic around the various communities along the route will also serve to maintain the integrity of communities and neighborhoods. It is unlikely that any severe impacts will result in this regard if the proposed alignments are pursued.

**Parks and Recreation Areas** - There is a profusion of state parks and other recreation sites in Eastern South Dakota. Fortunately, very few of these are located in close proximity to the study segments under consideration. The Environmental Overview did not identify any sites where conflict with roadway improvements would be unavoidable. When necessary, the opportunity exists to make highway improvements on the opposite side of existing facilities from recreation areas, thus preserving the integrity of such areas as well as improving access to them. Section 4(f) of the National Transportation Act mandates that parks and recreation areas established with public funds for public use may not be disturbed for highway construction unless there is no prudent or feasible alternative. There appear to be non-impacting alternatives throughout the project area in this regard.

**Community Services** - In general, the delivery of community services, including fire, police, ambulance, and utilities will be enhanced as a result of improved highway facilities. If freeways are constructed along certain segments, there may have to be some rerouting of service delivery, but this is a relative common practice in highway development and has not traditionally been shown to be a problem. Service routes are always considered in the location of freeway interchanges and grade separations.

**Utilities** - Water, sewer, electric power, natural gas, and other utilities commonly parallel major highway routes. The project, as currently proposed, would not present any unusual problems with regard to utilities. The relocation of utilities is traditionally a part of highway construction projects. No major transmission lines, electrical or gas, have been identified that would prohibit development of the project in accordance with any of the alternatives under consideration.

**Relocations** - It is likely that there will be some modest relocation of households and businesses along the proposed facility. These will be most frequent in developed areas, and in areas where new alignment is proposed, as in the case of bypasses. As in other considerations, the greater the additional right-of-way needs, the greater the incidence of relocations is likely to be. The judicious placement of expanded highway sections on sides of existing facilities where there is least development can help to minimize displacements. Considering the overall length of the project, and the relatively sparse development throughout much of the area, relocations should not be considered a critical impact area.

**Pedestrians and Bicyclists** - Federal guidelines require the consideration of cyclists, pedestrians, and other non-automotive transport modes. While special facilities would not be appropriate in rural areas for these individuals, there would be opportunities in the urban

communities to incorporate biking/pedestrian trails within the right-of-way of the proposed facility. This would have to be a part of the corporative effort with the respective communities involved. Specific funds have been allocated for such "transportation enhancements" as part of the ISTEA legislation.

**Air Quality** - Regional air quality is not a problem throughout the area, but improved flow of traffic at a good operating speed can help to forestall any future problems and to relieve any current trends. It has been clearly shown that stop-and-go traffic and frequent gear shifts by trucks contribute significantly to highway-generated air pollution. When traffic is allowed to flow with few interruptions, the air pollution burden is less. A freeway would be most beneficial, but any improvement that would allow traffic to flow with only occasional interruptions is more advantageous in terms of air quality.

**Noise** - Traffic noise, like air quality, is intensified when trucks have to shift gears more often and when large volumes of automobile traffic are brought in close proximity to sensitive land uses such as residential areas, schools, and hospitals. The effective use of by-passes in the Eastern Dakota Expressway project will remove the higher volumes of through traffic from these community areas and allow local traffic to flow better. It is difficult to mitigate excessive noise impacts from highways except in the case of freeways. This is because noise-attenuating barriers must be continuous in order to be effective. In the case of a two-lane arterial or a divided expressway, there would be at-grade intersections and periodic driveways that would cause regular interruptions in the noise barrier, thus allowing noise to "spill" through into sensitive areas. In the case of freeways, noise-attenuation barriers can be effective provided that they can be placed in close proximity to the travel lanes. The farther away such barriers are placed, the taller they must be, in order to be effective.

**Water Quality** - The proposed Eastern Dakota Expressway will cross a number of rivers and lakes. The quality of the water in these bodies is generally quite good and is used for multi-recreational purposes. The disturbance of adjacent soils or highway construction can cause siltation to these water bodies, unless appropriate construction measures are observed. Run-off will be increased as a result of increased paved surface for new highways. Proper construction and maintenance of detention/retention sites can help prevent the chemicals and residues contained in this run-off from reaching these water bodies. Riverbank stabilization will be important during bridge construction to prevent the long-term erosion of riverbanks and continued siltation of streams. No problems are foreseen with the Eastern Dakota Expressway in this regard so long as standard accepted design and construction practices are followed.

**Permits** - A number of Federal and State permits will have to be applied for prior to letting various sections of the project for construction. Results of the Environmental Overview indicate that, with judicious and sensitive planning of the facility, these permits can be obtained. One of the key permits will have to be obtained from the Army Corps of Engineers for placing construction fill in wetlands. These permits are not automatically forthcoming and the applicant is required to show evidence of attempts to avoid such impacts wherever possible. Mitigation plans are required as part of the permit application.



**Wetlands** - Wetlands are considered valuable for their ability to replenish ground water, as a key element in the biological food chain, and as habitat for a wide variety of plant and animal species. Eastern South Dakota is profuse with wetlands of several different types, including streams and rivers, lakes, drainage channels, and numerous isolated sinks. It is unlikely that, with a facility the length of the proposed Eastern Dakota Expressway, all wetlands can be avoided. However, given the fact that much of the new facility will be along existing highway routes, it should be possible to keep this impact to a minimum. Almost all segments under consideration have the potential for wetland involvement, but this should not be considered as a critical deterrence to project development. There would be numerous opportunities to mitigate impacts by restoring or creating additional wetlands near the corridors.

**Wildlife/Threatened and Endangered Species** - There are ten endangered or threatened species that have been identified in the overall study area. Of these, six are bird species, two are mammals, and there is one each of fish and plant species. Of the birds, all are considered endangered except the **Piping Plover**, which is a shorebird generally found along the Missouri River. The **Least Tern** is a bird species that utilizes breeding grounds along the Missouri River and often shares habitat with the Piping Plover. The **Whooping Crane** includes South Dakota only as part of its migratory range. Its preferred habitat is shallow wetlands.

The **Bald Eagle** includes South Dakota within its breeding range. Bald Eagles have been identified in recent years within the Sand Lake Wildlife Refuge area and along the Missouri River. The **Peregrine Falcon** utilizes Eastern South Dakota only in its migratory range which extends to include all of the United States. No nests have been identified in Eastern South Dakota. The **Eskimo Curlew** utilizes South Dakota as a spring stopover in its migratory route. Its preferred habitat is wet meadows and upland prairies. The highest likelihood for this particular bird is the Sand Lake Wildlife Refuge and this southeastern South Dakota along the Missouri River.

Two mammal species are listed as being potentially found in Eastern South Dakota. The **Black-Footed Ferret** actually may no longer exist in the wild as a result of the eradication of many colonies of **Prairie Dogs** which is the Ferret's primary food source. A second endangered mammal is the gray wolf which has been sighted as recently as 1992 in Brown and Tripp counties. The only species of fish listed as endangered is the **Pallid Sturgeon** which is an ancient species thought to still inhabit portions of the Missouri River and its larger tributaries where water is fast moving and the stream beds are gravel or silty. The only plant listed is a threatened species, the **Western Prairie Fringed Orchid**. This plant species may no longer be found in South Dakota but the potential is good for reestablishment along the Missouri and Big Sioux Rivers. These listed species cannot be protected from potential highway construction impacts on an individual basis, but their habitats can be respected and preserved during and after the construction process. None of the species listed is likely to be seriously impacted by roadway expansion and new construction.

**Floodplains** - Consideration of floodplains is important in highway improvement projects for two reasons: first, to ensure that floodwaters can pass under the highway facilities unobstructed, and second, to ensure that the roadway can continue to operate in times of flooding. Depending

on the elevation of 50-year and 100-year floods, the required separation can be achieved using either culverts or bridges. Consideration of floodplains is essentially a matter of appropriate engineering and is not likely to be a problem for development of the Eastern Dakota Expressway.

**Historic Sites** - One of the few drawbacks with the utilization of existing highways for the Eastern Dakota Expressway is the potential for impacting historic structures, particularly in the more urbanized areas. Human development has traditionally taken place along routes that would provide good access to trade, employment, and social interaction. Not all of South Dakota has been surveyed for historic resources, and such surveys would have to be undertaken for each individual segment when it is programmed for construction.

The most difficult occurrence for roadway construction in terms of historic resources would be in instances where the existing two-lane road is planned for widening to an additional two lanes with a median. Generally, widening can take place on one side or the other, depending on the potential for impacts, but in rare instances when there are historic structures on both sides of the roadway, it may be necessary to consider bypassing a whole district or, in extreme cases proceeding with some impacts to historic sites, along with appropriate mitigation and compensation. There appears to be sufficient flexibility, at this current stage of route planning, to avoid impacting many if not all historic sites along the planned routes.

**Archaeological Resources** - Similar to consideration of historic sites, archaeological resources have not been previously documented to a great extent along the proposed route alignments. During the route development process for each segment that is proposed for construction, a Phase I Archaeological Investigation will have to be conducted. This level of investigation includes literature search and sample testing in the field. When the alignment is more precisely defined, it may be necessary to undertake Phase II investigation which is more precise and more laborious.

Because there has historically been a strong Native American presence in South Dakota, there are likely to be sites, known and unknown, related to these native peoples that will have to be considered in the alignment process. Most archaeological sites identified can be excavated and documented without necessitating the realignment of a proposed roadway. In rare instances, a site may be of such outstanding value that its preservation, in situ, is mandated. Such an occurrence is rare, but given the length of the proposed facility and the diversity of human habitation therein, the potential does exist. There are no known sites that would preclude development of any of the corridor segments at the present time.

**Contaminated Sites** - Expansion of existing highways frequently necessitates the identification of any above-ground or underground storage sites that may have contaminated soil and ground water. A primary source of such sites is abandoned service stations, but there could also be some sites associated with electrical transmission substations, farm machinery, fueling sites, etc. Landfills, of both a formal and informal basis, may also present concerns. If state records are incomplete, the route development process will have to include some literature search and field investigations to determine if such sites exist. This category of concern is not usually critical in terms of highway development because of the ability to shift alignment or to excavate the contaminants.

### Environmental Impact Potential, By Segment

The following sections present a discussion of potential environmental impacts with regard to seven (7) study corridor segments. It is beneficial to discuss the overall Eastern Dakota Expressway in terms of corridor segments, because these discrete portions of the project could be constructed individually as stand-alone projects. It can be assumed that the overall Expressway Project will be implemented in an incremental format somewhat similar to the breakdown being utilized for analysis purposes. The seven study segments utilized for this discussion are as follows:

1. I-90 to Pierre
2. Yankton to I-29
3. Yankton to I-90 via U.S. 81
4. Yankton to Mitchell via S.D. 50, 37
5. Mitchell to Huron
6. Huron to Aberdeen
7. Aberdeen to I-29 via U.S. 12

While these various segments have much in common, each has unique characteristics, whether from the standpoint of environmental conditions or from its urban/rural setting. Potential impacts are identified only from the prospective of a generalized environmental overview. Specific environmental impacts will be quantified during project development and preliminary engineering phases.

**I-90 to Pierre** - The proposed route north from I-90 to Pierre would follow the alignment of U.S. 83 in its entirety. The route encounters no urbanized areas until it reaches Fort Pierre at the north end of the segment. Fort Pierre is located on the southwest side of the Missouri River opposite Pierre, the State Capital. Construction of this segment would involve a crossing of the Missouri River as does the current alignment of U.S. 83. The predominant land use throughout the corridor is rural/agricultural. In terms of the natural environment, numerous small drainageways, many of which are impounded, constitute wetlands that will have to be considered in the process. All the endangered species listed previously have been observed along this study segment, with the exception of Eskimo Curlew (bird) and the Fringed Orchid.

It is typical of highway location studies, that when the study corridor narrows and options are fewer, the potential for environmental impact increases. This would be the case around Fort Pierre and Pierre. A bypass around Fort Pierre with a new bridge providing direct connection into the city of Pierre would involve potential impacts to the river itself and its associated vegetative environment, potential impacts to parks and other public recreation facilities along the river, and possible relocation of households and businesses. Such improved access to the state Capital would probably justify a higher level of environmental impact than in rural areas where there is more flexibility and where access is not so critical.

A possible crossing location might be southeast of La Framboise Island and northwest of Farm Island State Recreation Area. A crossing any farther east along the river would involve State Game Production areas on the north bank of the river extending for some distance to the

east. A full environmental analysis would have to be prepared for this segment, but there are no other considerations, at this time, that would prohibit further development of this particular link. Through most of its length, this study segment passes through the Fort Pierre Natural Grassland. Roadway improvements along an existing facility should not present serious impacts to this national resource.

**Yankton to I-29** - All options proposed for this section would follow S.D. 50 which is already a multilane, divided high-type facility. The only environmental impacts that would result along this segment would be from implementation of a partial bypass around Yankton to the north and upgrading various intersections to interchanges for freeway standards. A bypass around Yankton would necessitate a new crossing of the James River and with such would be related natural environmental impacts. Other drainageways feeding into the James River, the Vermillion River and the Missouri River along S.D. 50 would have to be considered in terms of wetland values. As this study segment is more densely populated than some of the others, impacts related to human activity are potentially greater. The University of South Dakota at Vermillion, the town of Yankton, itself, and various recreation opportunities along the Missouri River in this area contribute to the potential for environmental conflict with regard to improved transportation.

**Yankton to I-90 via U.S. 81** - This study segment extends northward from Yankton to I-90 in almost a straight line with two brief exceptions where the road is offset approximately two miles to the west through Hutchinson County. The only urbanized area between Yankton and I-90 is the small community of Freeman, with fewer than 2,000 residents. Utilization of this segment would involve crossing of numerous drainage areas, creeks and several rivers including the James River in Yankton County and the Vermillion River in McCook County. There will likely be wetlands associated with these water courses as well as other isolated wetland areas.

On the west side of U.S. 81 about five miles north of Stanley Corner is a small Federal Wildlife Production Area. In Hutchinson County, a state recreation area is associated with Silver Lake on the east side of U.S. 81 about 12 miles north of Freeman. About five miles north of Freeman, also on the east side of U.S. 81, is a State Game Production area associated with two wetland areas. On the east side of U.S. 81 in Yankton County are adjacent Federal and State Wildlife Production Areas. These are about five miles north of Midway Stores.

At the current crossing of U.S. 81 over the James River there is a wayside park on the west side of the existing highway. The impacts for any bypass around Yankton would be the same as discussed previously. Generally, this is a very long route through essentially rural terrain with very sparse development and no urban areas. None of these specific impacts nor the general impacts discussed in the previous section would preclude highway development along this corridor.

**Yankton to Mitchell via S.D. 50, 37** - The alignment of this segment is not as direct, in configuration, between Yankton and I-90 as is U.S. 81. Instead, it utilizes portions of S.D. 50, 52, and 37 to link several developed communities and ultimately extend northward to the city of Mitchell at I-90. Because more urban areas are linked with this segment, there is the potential

for greater impacts in terms of human development. As a result, on the freeway option, four towns along the route are proposed for bypass facilities. These include Tabor, Tyndall, Tripp, and Parkston. The southeastern terminus of this study segment would be at another bypass north of Yankton. There appears to be sufficient undeveloped land adjacent to these communities that would facilitate a bypass, and thereby lessen the potential impacts.

The relatively flat terrain is interspersed with numerous small creeks and drainageways which will translate into wetland concerns. There would be no major river crossings along this route. All previously discussed threatened and endangered species are found along this segment with the exception the Whooping Crane and the Black Footed Ferrett. About eight miles south of Mitchell there is a State Game Production area on the west side of the highway and about two miles farther south there is a Federal Water Fowl Protection area on the east side of S.D. 37.

**Mitchell to Huron** - This segment, like the one discussed above, relies on a bypass around the city of Mitchell for a connection to I-90 under the freeway option. Because it is served by three interchanges on I-90, all within seven miles of each other, the city of Mitchell has experienced more urban sprawl than other communities along the proposed routes. As a result, it may be more difficult to find a bypass corridor around Mitchell that has few environmental impacts. North of Mitchell there is the constraint of Lake Mitchell. There is also a national cemetery in that same suburban area. It appears that the existing alignment of S.D. 37 traverses the dam which impounds Lake Mitchell.

Because S.D. 37 closely parallels the James River numerous creeks and drainage channels leading to this river are crossed by S.D. 37, the route which is parallel by the Eastern Dakota Expressway in this segment. In fact, the James River is crossed by S.D. 37 in Sanborn County north of Mitchell. Southwest of S.D. 37, in the vicinity of Forestburg, are several recreation areas, one of which is Ruskin Park adjacent to the James River and a State Game Production Area about two miles to the northwest. Directly opposite the State Game Area is a Wayside Park, the combination of which may limit alignment options in that area. Public recreation sites are provided south of Huron at Stoney Run Lake, but this is on the east side of S.D. 37, and the proposed bypass of Huron is in the southwest quadrant. Beadle County, which includes Huron, contains numerous isolated wetland areas in addition to streams and creeks that constitute headwaters for larger water courses. Only three of the listed endangered species have been identified in this study segment. They are the Bald Eagle, the Peregrine Falcon, and the Whooping Crane.

**Huron to Aberdeen** - In order to serve the communities along U.S. 281 and ultimately the city of Aberdeen, the study corridor extends westward along U.S. 14 to Huron, a distance of about 12 miles where it intersects with U.S. 281 about 3 miles south of the small village of Wolsey. This segment aligns with U.S. 281 northward, all the way to Aberdeen. The non-urban areas are distinctively rural and agricultural. About five miles south of the town of Redfield is a State Game Production Area, Twin Lakes, located to the west of U.S. 281. This wildlife preserve is not likely to influence highway improvements.

There seems to be sufficient open land on the east side of Redfield for a bypass should that be the selected option; however, on the north side, approximately where a bypass would rejoin the main U.S. 281 route, there is a historic monument to Abbie Gardner. Monuments are not generally considered historic sites, per se, but it is always more prudent to avoid them whenever possible.

North of Redfield are various roadside concerns that should be considered in the road development project, none of which constitute critical areas that would impede implementation. At the town of Ashton, there is a cemetery on the west side of U.S. 281. About four miles north of Ashton is a Wayside Park on the west side of U.S. 281, and a Federal Waterfowl Protection area on the east side along Moccasin Creek about five miles south of Aberdeen. Between this waterfowl area and the urbanized area of Aberdeen, a proposed bypass would proceed in a northeasterly direction to connect with U.S. 12 on the east side of Aberdeen.

There are no environmental constraints along this segment that would prohibit implementation of the project, although there are specific environmental concerns that will have to be addressed on a site-by-site basis. Four of the endangered bird species have been identified in this corridor segment. They are the Whooping Crane, the Bald Eagle, the Peregrine Falcon, and the Eskimo Curlew. The Fringed Orchid has also been identified previously in this segment.

**Aberdeen to I-29** - The area through which this segment passes is one of the most diverse in all of South Dakota, in terms of the natural environment. The Sand Lake National Wildlife Refuge in Brown County, just north of Aberdeen, is the site of two recent nesting attempts by the Bald Eagle. All the threatened and endangered species listed for the study area have been identified previously along this segment with the exception of the Whooping Crane, the Black-Footed Ferret and the Pallid Sturgeon.

The surface waters and drainage areas that nourish this refuge are tributaries of the James River which extends through South Dakota southward to the Missouri River. As the route progresses eastward, with a crossing of the James River, it encounters numerous wetland areas, of various types, especially in Day County and the western portion of Roberts County near I-29. Wetlands range from small drainage areas to marshes, dry lakes, standing-water, sinks with no outlet, larger lakes, and complexes of lakes, as in the area around the town of Waubay and the Waubay Migratory Waterfowl Refuge. Because of its size and complexity, this area is quite diverse in the types and numbers of waterfowl that utilize it for feeding, breeding, migratory stopovers, etc. When considering the importance of sites of such wide extent and high ecological complexity, it should be noted that the importance to migratory waterfowl is neither in a state or regional context, but has implications for flyways and migratory patterns that extend across portions of the North American and South American continents.

In addition to the larger areas, there are a number of smaller wildlife protection areas along this segment. Two are located west of Webster, a federal area to the north U.S. 12 and a state area to the south, both bordering U.S. 12. Two production areas are both located west of the small community of Ortle. Expansion of the existing causeway across Rush Lake is likely to

be of some concern to environmental agencies. It may be necessary to propose a reduced cross-section across this lake if the freeway option is selected. The actual boundaries of the National Water Fowl Refuge are centered around Spring Lake which is north of the town of Waubay, but the other lakes obviously are important to the regional ecosystem. There is a state fish hatchery associated with Blue Dog Lake near Waubay as well.

Further investigations may require consideration of a southern bypass around Rush Lake and the town of Waubay. This would be technically feasible but would necessitate two railroad separations. It should be noted that improved transportation facilities improve automotive safety. This is important for adjacent water bodies, in that when the likelihood of accidents is reduced, the potential for water pollution from chemical spills is correspondingly reduced.

### **Conclusions - Environmental Overview**

The Eastern Dakota Expressway is a very large and complex undertaking. The environmental investigations, to date, along with extensive agency coordination, revealed no environmental issues that would be so critical as to prohibit development of the project, generally along lines proposed. It should be noted that there are environmental trade-offs with each of the options. For instance, utilizing the existing roadways through communities might be more disruptive to the human environment, where expansion and resulting relocations are required. On the other hand, utilization of new bypasses around these communities might have more of an impact on the natural environment, as this would be all on new location. It will be important to continue the environmental analysis process as highway location and preliminary design studies progress.

## Chapter 6

# APPROACH TO THE ECONOMIC FEASIBILITY ANALYSIS

A public investment such as a two- or four-lane highway improvement is "economically feasible" if the economy is better off with the highway improvement than without it. Without question, a well planned investment will be a significant asset to the corridor areas, and will be of help to the economic future of communities and activities located in proximity to the highways. Ample evidence exists to support the contention that the corridor economies will benefit from the highways.

Government is often asked to make highway investments for "economic development" purposes. The rationale, and it is correct from the corridor perspective, is that the area will be better off due to greater transport efficiency, the possible attraction of new businesses, and the overall improved ability of the corridor region to compete for economic activity. If the improved corridor economy is sufficient to cause the overall economy to be better off, and if that economic improvement is more significant than the cost of the highway, then the highway project is an "economically feasible" investment.

### Definition of Economic Development

For purposes of the Eastern Dakota Expressway Study, economic development is defined as "an increase in the prosperity and incomes of people and institutions". Economic development of this nature in a given area occurs when the incomes and product generated in the area are caused to increase. Such increases occur in either of two ways:

1. **More Resources** - If output increases in the area, the increased output will require more resources (land, labor, materials, capital) which means that more people are employed, more incomes are earned and more profits are made. If the Eastern Dakota investments enable the attraction of additional business in the corridors (new firms, or expanded firms), then the highways have aided the economic development process, to the benefit of the corridor areas.
2. **Efficiency** - Even if the highways do not help to create increased output, they can still help economic development by causing the areas' output to be achieved at less total cost. Reduced transportation costs due to the highway improvements in this way yield increased prosperity and income.

The Eastern Dakota Expressway Study suggests that the highway investments will do both: they will enable the attraction of "more resources" and they will create greater "efficiency". As a result, the highway improvements will have very definite "economic development" roles to play. The issue, however, is whether the magnitude of the economic development is sufficiently large to warrant the investments. In other words, are the benefits caused by the expressways of a larger magnitude than the expressways' costs?



### Economic Basis for a Feasible Highway Project

Highways are essentially "tools" used in transporting goods and people from one place to another. Investments in highways contribute to economic development in that they lower transportation and/or logistics costs and/or improve people's perceptions of the corridor thereby causing them to want to settle/invest there, and/or divert traffic. Such changes may be realized in numerous ways, including improved safety, decreases in fuel and other vehicle operations costs, revised logistics or agricultural patterns, and reductions in noise or air pollution. But in the final analysis, all of the direct benefits of a highway, and therefore the justification for investing in it, flow from using it for transportation.

Benefits from an Eastern Dakota Expressway may not only accrue to persons and businesses whose vehicles use the highway. Lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may thus benefit from an expressway investment without traveling on the highway.

It is important to keep in mind that for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if peoples' perceptions do not change dramatically, the investment will not produce benefits that exceed its cost. Highway investment must be based on reasonable estimates of traffic volumes they will service, the cost savings travelers will experience, and a realistic assessment of revised manufacturing/tourism/logistics/agriculture/perceptions.

Investing in a highway improvement that produces benefits which are less than the associated costs of the improvement operates counter to economic development. The costs will be paid by users and other taxpayers in the form of higher taxes than otherwise would be the case, or would be paid in a lost opportunity (an alternative highway would not get improved). These higher taxes work against economic growth within the taxing jurisdiction because they reduce post-tax return to businesses and households, and investment in the "wrong" highway project similarly retards economic growth. Therefore it is imperative that the highway investment be economically feasible; if it is not, it is economically counterproductive.

### Economic Study Overview

The economic approach to analyze the Eastern Dakota Expressway corridors, while being tailored to the Eastern Dakota study, is one which has been used on previous corridor studies and one which has evolved over the years. It is the same methodology that was used on the Heartland Corridor study (south from Rapid City). The methodology is reasonably comprehensive and credible, and it is one which utilizes accepted economic principles.

Exhibit 6-1 on the following page summarizes the approach. It includes:

- A definition of the types of improvement considered in the corridors (2-lane and 4-lane options).
- A generalized estimate of each improvement's cost.
- Estimated use that will be made of the improved highways (existing and future use).
- Quantification of estimated economic benefits believed to be attributable to the highway improvements.
- A comparison of the economic costs and economic benefits attributable to the corridor improvements.
- Conclusions concerning the economic impact and feasibility of investing in the defined corridors.

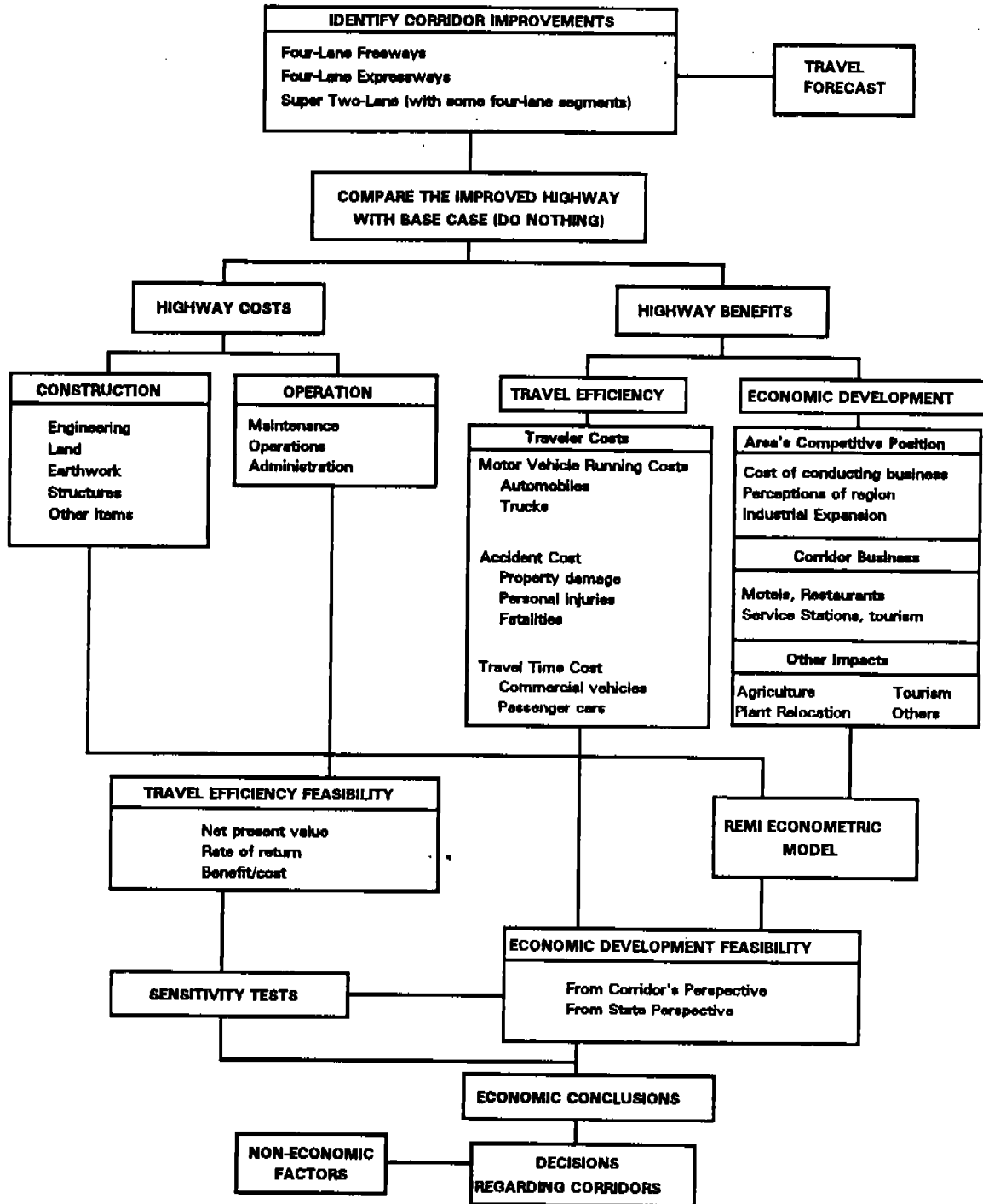
### The Economic Impact Areas

The highway investments will contribute to economic development if they significantly reduce transportation costs, or create other business efficiencies, or if they divert significant numbers of vehicles which, in turn, make it possible for businesses to obtain a better return. By improving the return relative to that at competing locations, the investment helps attract new businesses, and expand existing businesses. If the impact area of interest is a rather narrow corridor along the highway, an increase in economic activity is almost certain.

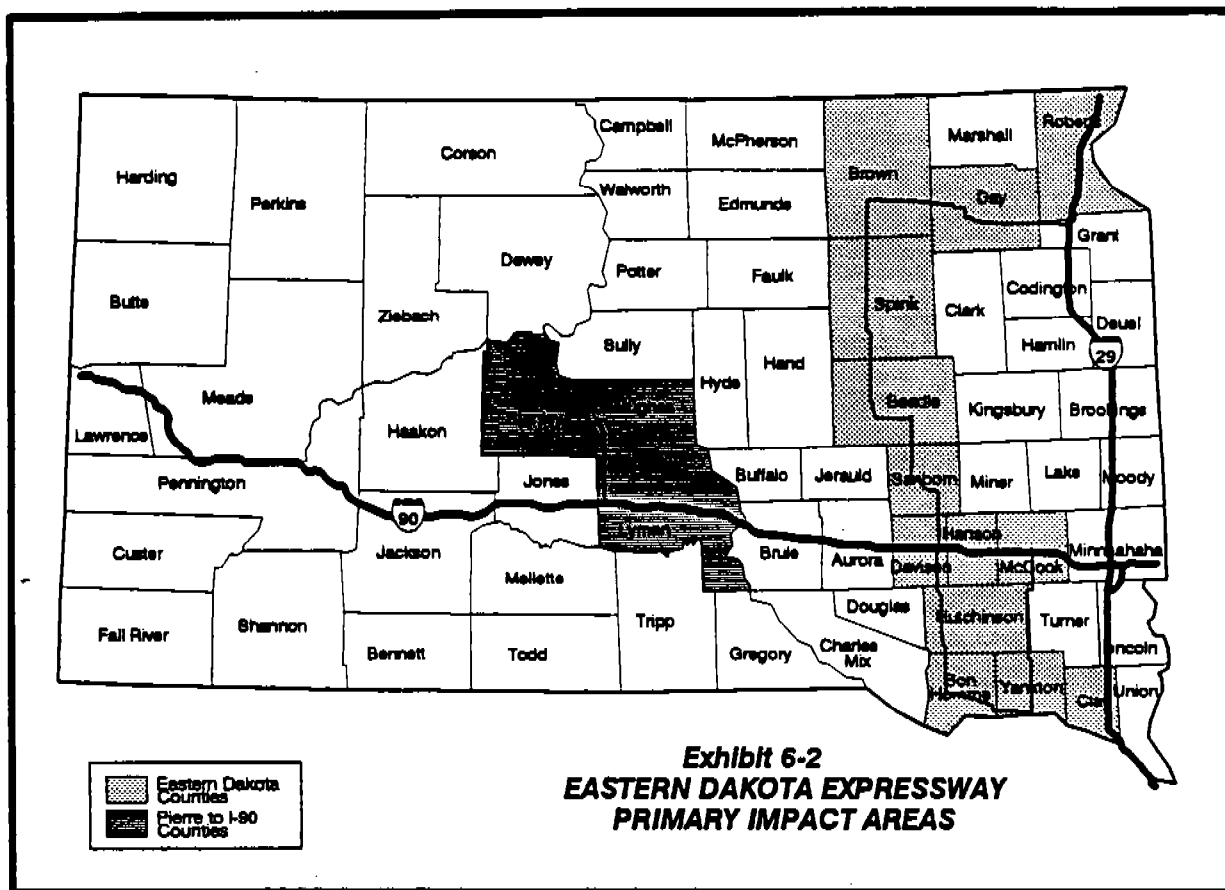
If instead the impact area of interest is the entire State of South Dakota, the overall amount of economic development resulting from the highway investment might be less. A certain number of businesses within the region, especially those that are relatively mobile, will relocate to higher access sites along the improved corridors. While an increase in economic activity may be evident near the highway, it may not be a net gain to the State if it is only a relocation from within the State.

From a state perspective, the highway investment contributes to economic growth if travel costs within the state are reduced or if it creates economic activity within the state. Lower travel costs help improve productivity which, in turn, increases income to firms and individuals. Productivity gains also help enable South Dakota produced goods to be more competitive in other states and even in international markets. The key point here is that for a highway investment to contribute to state economic growth, it must significantly reduce transportation costs, or draw economic activity to the state from other states.

**Exhibit 6-1  
EASTERN DAKOTA EXPRESSWAY  
ECONOMIC EVALUATION PROCESS**



In the Eastern Dakota Expressway Study, economic development impacts are examined for two impact areas: 1) the State of South Dakota, and 2) the corridor area's "primary impact area." The primary impact areas are shown on Exhibit 6-2 and comprise those counties through which each highway passes (thirteen counties for the Eastern Dakota corridor, and three counties for the Pierre corridor).



### Economic Evaluation Principles

The economic analysis of each corridor improvement follows an established set of evaluation principles.

**Comparisons With "Do-Nothing" Base Cases** - To calculate each corridor's costs and benefits, the "improved case" is compared with the "base case" (the base case is the existing transportation network plus programmed improvements). The benefits for each improvement option are calculated by comparing each corridor's "improved case" with the corridor's "base case." In this manner each improvement option's "feasibility" is determined and, implicitly, the improvement options can be compared one with the other.

**Economic Benefits to the State and Corridor Economies** - The study investigated ways the State and local corridor economies will benefit from the improved highway. These benefit types include the following.

- **Act of Highway Construction** - State or federal money spent in the corridor regions to build the highways are of economic value to the primary impact areas since wages are paid, gravel is purchased, etc. These, however, are not included as impacts at the State level.
- **Travel Efficiency** - Vehicle users will benefit due to faster average travel speeds (time savings), reduced accident rates (safety), and improved traffic flow (vehicle operating costs). Truck travel will similarly be faster, cheaper and more reliable. Such benefits are valuable at both the State and local level.
- **Improved Competitive Position** - Such transportation improvements will remove one impediment to economic activity attraction and growth. Reduced transportation costs should enable the corridor areas to better compete for economic activities, meaning that business activity will be expanded in, or otherwise attracted to, the local economies. The primary impact areas receive all of these benefits, and the State receives some of them.
- **Roadside Business** - Similarly, the highway improvements will divert traffic to the corridors, and this additional traffic will increase the local economy revenues of such roadside businesses as gasoline stations, motels, restaurants and others. All of these are beneficial at the local level, some are impacts at the State level.
- **Other Impacts** - Similarly, the highway improvements might change the pattern of elevator distribution, might create changes in agriculture production, might cause revised logistics patterns, etc.

Any and all of the above are of economic value to the primary impact area economy, all have economic development implications, and all are included in this study at the local economy level. Portions are included as impacts at the State level.

**Treatment of "Transfer" Impacts** - Only "net" changes are recognized. Transfers of economic value from one part of the corridor to another part of the corridor (from one group of people or firms to another), or from one part of the State to another part of the State, are excluded from the calculations.

**Underinvestment vs. Overinvestment** - One objective of this study is to determine that level of highway investment that is warranted (freeway, expressway, or Super 2). There are economic consequences of either underinvesting or overinvesting in the highway corridors. If South Dakota underinvests in the corridors, economic development will be inhibited because real and perceived travel costs will be greater, competitive position will be retarded, etc. There is therefore an economic cost associated with underinvestment in the corridors. If the State overinvests in the corridors, overall efficiency will suffer because those funds could have been put to better use elsewhere (put to more efficient use) in the State. There is therefore an economic cost associated with overinvestment in the corridors.

Recognizing these facts, this study seeks to define those highway investments, and those levels of investment, that are efficient (neither underinvested nor overinvested). This implies efficient and feasible use of tax dollars. The proper level of investment is calculated in terms of travel efficiency and economic development.

**Indicators of "Economic Feasibility"** - To determine whether the envisaged investments are economically feasible, the costs of building and operating the highway improvements are compared with the economic benefits estimated to be attributable to the highway improvement. This cost and benefit comparison yields three indicators of "economic feasibility:"

- **Net Present Value** - All costs and benefits in future years are discounted back to the base year using a seven percent discount rate. The future stream of discounted costs are subtracted from the future stream of discounted benefits. When the sum of the discounted benefits is greater than the sum of the discounted costs, the "net present value" is positive and the highway improvement is deemed to be "economically feasible."
- **Discounted Benefit/Cost Ratio** - After the future streams of costs and benefits are discounted, the sum of the discounted benefits is divided by the sum of the discounted costs. When the result is 1.0 or greater, the highway improvement is "economically feasible."
- **Internal Rate of Return** - This calculation determines that discount rate at which the net present value difference between costs and benefits is zero. If the rate of return, expressed as a percentage, is equal to or greater than seven percent, then the highway improvement is deemed to be "economically feasible."

Included in the above economic feasibility calculations are all quantifiable public sector financial costs attributable to the highway project (cost of planning, designing, building and maintaining the road improvements) and all quantifiable economic benefits including road user

benefits (vehicle operating costs savings, value of time savings, accident cost savings) and also including economic development benefits (competitive advantage benefits, roadside business benefits, travel and tourism benefits, etc.). Excluded from the cost-benefit calculations are the road improvement implications that cannot accurately be tabulated in monetary terms (environmental or social implications, impacts on other modes of transportation, etc.). As a result, the economic feasibility calculation should be important to the improvement and investment decision, but should not be viewed as the only criterion.

**Discount Rate** - Benefits and costs (present and future) are tabulated in constant dollars (inflation is not factored in). At the same time, it is important to recognize that future benefits and costs do not have the same value in the future as they do today. Therefore, all future costs and benefits are "discounted back" to a base year. Because future inflation is not included, the selected discount rate should also exclude future price level changes (inflation). A constant dollar discount rate of seven percent is used in this study.

**Residual Value** - A 30-year future study period is used. However, many components of the highway improvements can be expected to last longer than 30 years. To recognize this, the highway's lifespan is estimated, and the elements that will last longer than 30 years are added as economic benefits in the year 2023. For example, a bridge might be expected to have a life of 60 years, and therefore a residual value equal to 30/60 of its original price. Similarly, earthworks and others cost components have considerable remaining life for residual purposes, while pavement has little or no residual value after 30 years.

### **Travel Efficiency Evaluation**

Transportation efficiency is a legitimate local corridor, regional, state and even national goal. If a road improvement creates road user cost savings that, over time, exceed the cost of the road improvement, then that road improvement should be implemented. Therefore, travel efficiency is relevant to the funding decision for FHWA, the South Dakota Department of Transportation, and local agencies.

**Road Improvement Costs** - The cost side of the cost-benefit calculation includes two costs: 1) the "capital costs" of constructing the highway, and 2) the annual change in administration, operation, and maintenance costs. Only the capital costs attributable to the road sections that are not yet programmed for improvement are included.

- **Capital Costs** - Capital costs comprise the cost of improving the "not programmed" road sections, including right-of-way acquisition, planning, design, and construction.
- **Road Maintenance Cost** - Once the highway improvements are in place, there will be more road to maintain than previously. However, that will be "new" road. The resulting net change in maintenance and operations cost is used.

**Travel Efficiency Economic Benefits Attributable to the Highway Improvements** - The travel efficiency benefits of the highway improvements are of three types: vehicle operating cost

savings, accident cost savings, and value of travel time savings. Such benefits are calculated for two vehicle types: cars, and trucks. All benefits are assumed to start in the study's base year (the first year following the capital cost outlays) and are expressed by year of occurrence. Benefits are estimated for two analysis-years; intermediate year benefits are interpolated between the two analysis years in straight line fashion.

- **Vehicle Operating Cost Savings** - Car and truck operating cost savings estimates are made using standard procedures recommended by the American Association of State Highway and Transportation Officials and the Federal Highway Administration. The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, and other changes that affect vehicle operations.
- **Accident Cost Savings** - The highway improvements, can be expected to reduce accident potentials. Changes in accident rates are established by highway type based on accident histories provided by the state. Accident rates are established for three accident types (fatal, injury, property damage), and monetary values are established for each.
- **Travel Time Savings** - The highway improvements will also save car and truck travel time. Estimates of travel time savings are made for both common and diverted traffic. Appropriate monetary values are established for the time savings.

The calculation of all three types of transportation efficiency impacts (vehicle operating costs, accident costs, time value costs) is consistent with FHWA procedures and policies.

### **Economic Impact Evaluation**

A highway improvement of the type envisaged for these corridors will make travel faster, easier and more efficient. In the process it will divert traffic from various other highways to the improved corridors, and it could also generate traffic. All of these events would be most welcome, not only because of the travel efficiencies and the improved perception of the area but also because of what these travel efficiencies and perceptions could mean to the economies along the highway and to the State economy.

It is believed by some corridor residents and by portions of the business community that the corridor areas will be better off economically with the highway improvements than without them. Most certainly this is true; the issues are: 1) what magnitude of economic impact can be expected? and 2) is that impact sufficient cause to warrant a major highway investment in the corridors?

**REMI Econometric Model** - The economic impact portion of the feasibility study relies on an interregional model of South Dakota's counties. The "REMI" set of models are private sector models owned by Regional Economic Models, Inc. of Amherst, Massachusetts. This model package has also been applied to a number of highway corridor evaluations (including the Heartland Corridor south from Rapid City), and this model package has the advantage that it is dynamic in nature.



The REMI model is a comprehensive forecasting and simulation system useful for policy and investment analysis in a wide array of issues. The REMI model does have some similarities to Input-Output models. The model is structured to incorporate inter-industry transactions along with feedback from final demand activities. The proportion of intermediate and final demand that is fulfilled by producers in each corridor region is determined by the model. Demand not fulfilled by local production leads to imports. The REMI model differs from regular Input-Output models in its ability to allow substitution among factors of production in response to changes in relative factor costs over time. Within the model, wages are responsive to changes in labor market conditions, migration is responsive to changes in expected income, and the share of local and export markets responds to changes in regional profitability and export costs.

Simulations with the model can be used to estimate the economic and demographic effects of policy and investment interventions in the corridors such as economic development programs, infrastructure investments including new highway construction, energy and natural resource conservation programs, state and local tax changes, and other policies. The policy simulation compares the performance of a corridor after a policy intervention with the projected performance of the region based on national forecasts of industry growth, changing technology and estimates of the shifting competitive position of each industry in the corridor regions compared to that industry elsewhere in the country and elsewhere in South Dakota.

**Economic Impact Terms and Definitions** - The highway improvements will yield many different forms of benefit to local economies. In order to recognize these diverse impacts in a consistent fashion, a single set of "indicators of impact" and a single set of definitions are used throughout the economic impact calculations. The economic impacts are expressed in terms of four "indicators of economic impact:"

- **Value Added** - The value of each corridor area's firms' output minus the value of the inputs they purchase from other firms. In the corridor studies it is the value added by firms located in the defined corridor impact areas, including employee compensation, proprietary income, indirect business taxes, and other property income. The value added impact is used in the benefit/cost calculations.
- **Wages** - Total increases in payroll costs (wages and salaries and benefits) paid by local industries due to the improved highways.
- **Jobs** - Job impacts are expressed as "full-time equivalents" (FTE's) and include the number of person job years due to road construction and road use, plus the share of those that are employed in sectors that directly or indirectly support the construction process, the road users, and the firms that might expand in or locate to the corridor regions.
- **Population** - The net change in resident population attributable to the new highway.

**Economic Development Impact Types** - The highway investments and associated travel efficiencies could cause a number of events to occur, all of which will be beneficial to local

economies and some of which are valuable to the State economy. These events are categorized into four types.

- Act of Highway Construction
- Corridor Competitive Position
- Roadside Service Industries
- Other Impacts

**Economic Impacts of Highway Construction** - Any of the improvements will cost millions of dollars to build. The very act of spending large sums of construction money in an area is of economic value to that area, since contractors and construction workers are hired, gravel is purchased, etc. Economic value that is created in the corridors due to the act of spending such construction funds in the corridor is estimated.

The highway capital costs are estimated in terms of construction cost and right-of-way cost. The construction costs are treated as increases in final demand and input into the REMI model. The right-of-way costs are treated as transfers and not included. The construction costs are assumed to be spent, initially, within each corridor's defined primary impact area. The economic impacts due to the act of construction comprise the monies spent in the corridor and the flow of those monies in terms of respending. The impacts include the labor and expenses associated with planning, design and construction, plus the respending of those funds to the extent that such respending occurs within the corridor.

**Impact on Each Corridor Region's Competitive Position** - There is a desire for each region to expand existing businesses, to attract new businesses, and to diversify the area's economic base. To attract business, the corridors must be competitive with other areas.

The question arises as to whether and to what extent a highway investment in the corridors would benefit the businesses already in the corridors. A related question is what the highways could do to help foster growth of other, emerging industries. It is clear that competition will be great among regions to maintain as high a level of economic activity as possible and to attract activities demonstrating growth potential nationally. Keeping transportation costs as low as possible is one of the most effective actions government can take to make any corridor competitive.

Stated differently, the major economic transition that is taking place nationally creates unique opportunities because previous centers of economic activity will not necessarily continue to dominate. By reducing the cost of doing business, a state or region strengthens its business climate. Facilitating faster, safer travel along the corridors represents a logical means for increasing the competitive advantage of communities along them.

The ability to attain such economic growth is a function of many things, one of which is the ability of the area to compete for such diversification and growth. The ability to compete is also

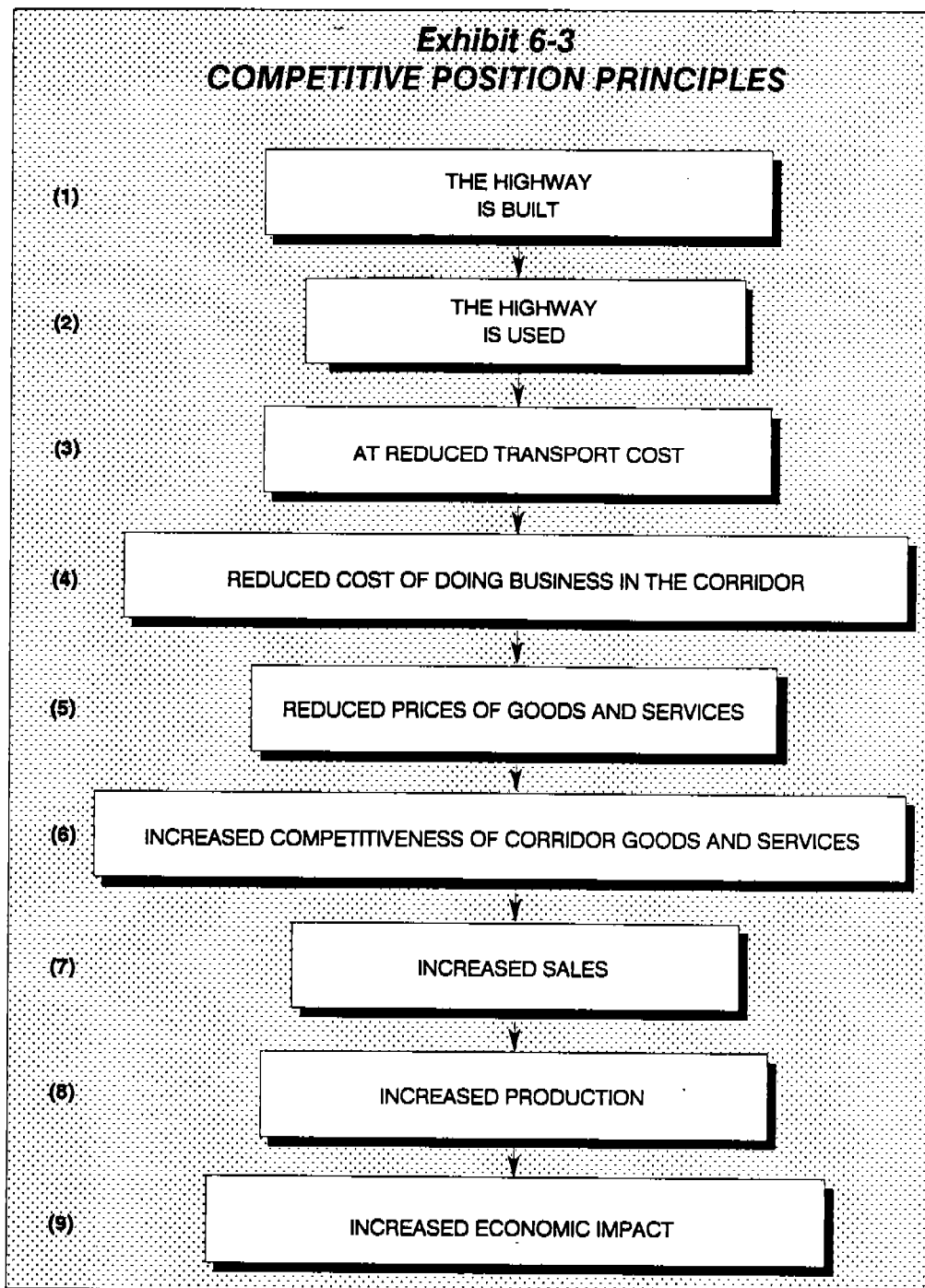
a function of many things, one of which is the cost of doing business in the corridor, and the cost of doing business is a function of many things, one of which is the cost of transportation.

By tracing this relationship, it is apparent that transportation does have a role in achieving each corridor region's economic development goals.

Exhibit 6-3 presents a sequential flow of activities involved in moving from the highway improvement itself to the economic impact of that improvement in terms of what it does for competitive position. The activities themselves are described as follows:

1. **The Highway Improvement** - The act of building the improved highway has a short-term economic impact; that impact is assessed.
2. **Use of the Improved Highway** - The improved road will be used by existing and diverted and possibly induced traffic. Traffic estimates with and without the highway improvement are developed.
3. **Reduced Transportation Cost** - The highway improvement leads to increased travel efficiency in the form of reduced travel time, increased travel reliability, reduced accidents and revised vehicle operating costs. The efficiencies themselves are quantified in the "user analyses" for cars and trucks.
4. **Reduced Costs of Doing Business in Each Corridor** - Transportation cost is one factor in the cost of doing business in the corridors. If transportation costs, especially trucking costs, decline in the corridors, this means that the total cost of doing business in the corridors will also slightly decline.
5. **Reduced Prices of Goods and Services** - If costs of production decline due to transportation cost reductions, the result will be reduced prices of goods and services, or increased profits, or both. Such reductions apply to goods produced in the corridors as well as goods shipped into the areas.
6. **Increased Competitiveness of Each Corridor's Goods and Services** - With slightly reduced costs and therefore prices, the goods and services produced in the corridors should be slightly more competitive with the improved highway than without it.
7. **Increased Sales** - If the region's goods and services become more competitive due to price decreases, the region's businesses should be able to make additional sales of those goods and services.
8. **Increased Production** - If sales increase, production of goods and services will increase by a like amount.
9. **Increased Economic Impact** - Increased production generally implies increased payroll, additional jobs, increased tax revenue and increased final demand, value added and output.

The above sequence makes sense, and it does occur.



**Impacts On Roadside Service Industries** - In addition to development caused by improved competitive position, the improved highways could also increase business for businesses along the highways that cater to traffic. For economic evaluation purposes "roadside services" are defined as businesses that serve the cars and trucks and their drivers/passengers such as gasoline stations, hotels/motels, restaurants, tourist visitation places, gift shops, etc. There is a general relationship between traffic density (volume), trip characteristics, and the number of roadside service establishments that exist, e.g., the higher the traffic volume, the greater the number of motels, etc. Selection of any of the highway improvements will cause greater traffic density and consequently the attraction of additional roadside services to serve those increased traffic volumes.

The issue to consider is, what increase might be expected due to new/diverted traffic associated with the highway improvement and whether that development represents a net increase suitable for use in the economic impact calculations.

Roadside business increases will be due to traffic increases. Over the next 20 years there will be normal traffic change, even if the road improvements are not made. In addition, there will be increased traffic due to the road improvement, which will principally be diverted from other highways. The percent change in vehicle miles of travel (VMT) is calculated. The traffic changes will bring with them comparable percent increases in roadside business in the form of increased roadside gas station, motel and restaurant activities. This increase could involve the attraction of new businesses, or could accrue in the form of increased sales by existing businesses, or both. In either event, however, the business increases are drawn from other regional highways and therefore from other regional businesses.

The direct impacts caused by increased traveler expenditures are run through the REMI model, to gauge the value of those expenditures to the local (primary impact area) economy and, to a lesser extent, to the State economy.

### **Impact on Employment**

The retention of existing jobs and the attraction of new job opportunities is an important goal of all jurisdictions in each corridor. An improved highway will aid in the achievement of this jobs goal. Jobs will be created in the impact area in four ways.

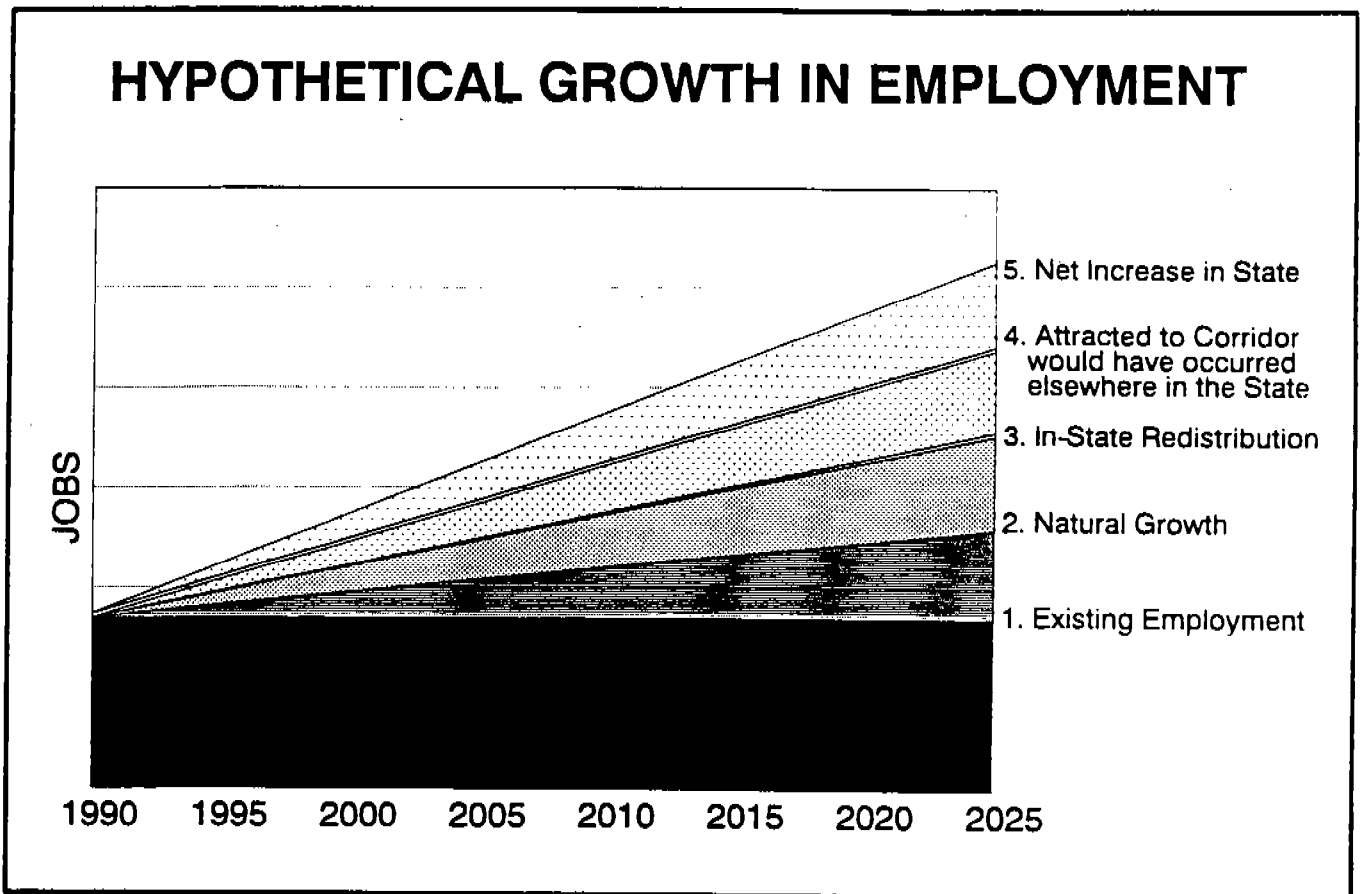
- **Construction Jobs** - The firms engaged to construct the highways will spend large sums of money in the area. These expenditures will be used to pay contractors, subcontractors and suppliers of goods and services. These construction caused jobs will exist only during the construction process itself.
- **Competitive Position Jobs** - By making the corridor areas more competitive, output will increase and with it existing firms might be expanded and new firms attracted. Both forms of business activity expansion will employ additional people.

- **Traveler Expenditure Jobs** - Increased traffic volumes on the improved routes will lead to increased business along the route for businesses that cater to vehicular traffic and tourists. These businesses will therefore employ increasing numbers of people.
- **Consumer Responding Jobs** - In each of the above three cases, the people in the new jobs will spend much of their income within the corridors. This responding will in turn create additional jobs.

Included in this study are estimates of the net jobs change attributable to the new highway. These estimates may, at first appearance, appear to be extraordinarily low. To utilize these job change estimates in the expressway decision process, it is important that they be understood.

The jobs change estimates for South Dakota calculated as attributable to the new highway should not be confused with future estimates of total jobs change either in a corridor or in the State. Exhibit 6-4 presents a hypothetical example of future job increases in an example corridor. It is interpreted as follows:

1. **Existing Employment (5,000)** - Assume that there are currently 5,000 jobs in a defined highway corridor.
2. **Natural Growth (1,000)** - Assume that the number of jobs in the corridor will increase over time by 1,000 if the new highway is not built.
3. **In-State Redistribution (1,000)** - Assume the new highway is built and, due to its existence, 1,000 jobs shift from somewhere else in South Dakota to the new highway's corridor area.
4. **Attracted to Corridor: Would Have Located Elsewhere in State (400)** - Assume that a Minnesota firm decided to relocate to Sioux Falls but, because of the new Eastern Dakota Expressway, it decided instead to locate in the new highway corridor.
5. **Net Increase in State (600)** - Assume that two out-of-state firms that, without the new expressway, did not consider South Dakota but now, with the new Eastern Dakota Expressway, decided to relocate to South Dakota.
6. **Total Jobs in Corridor (8,000)** - The total of jobs in the corridor would be 8,000 in the future (5,000 existing jobs, plus 3,000 new jobs). The net increase in the corridor due to the highway would be 2,000, but the net increase due to the highway statewide would be only 600.



In the above example, jobs increased in the corridor from 5,000 to 8,000. Of that increase, 2,000 was due to the new highway. However, the net change in jobs statewide was only 600, as explained. This net jobs change statewide may appear to be low, but it reflects only the real net change estimated by the models to be attributable to the new highway.

#### Two Tests of Economic Feasibility

In this report each expressway option is subjected to two benefit/cost tests. The initial test is from the travel efficiency perspective, as presented in Chapter 7. The second test is from the economic development perspective, as present in Chapter 8.

## **Chapter 7**

# **TRAVEL EFFICIENCY FEASIBILITY**

Highways are best thought of as "tools" for moving goods and people from one place to another. In this sense, highways generate benefits to the extent that they lower real and perceived transportation costs. The principal way that transportation can contribute to economic growth is by reducing the cost of moving people and goods, thereby increasing travel efficiency. This chapter estimates the extent to which the Eastern Dakota Expressway would improve travel efficiency, and compares those travel efficiencies with the cost of the highway improvement.

In the travel efficiency assessment, highway user efficiency is measured in terms of vehicle operating cost (fuel, tires, vehicle maintenance, etc.), value of time saved, and accident reduction. All three benefits are measured in monetary terms.

Transportation efficiency is a legitimate local, state and national goal. If a new highway creates road user cost savings that, over time, exceed the cost of the highway, then that road improvement should be implemented. Therefore, travel efficiency is relevant to the funding decision for the South Dakota Department of Transportation. However, travel efficiency is only one of a number of factors to consider when making the investment decision. Other factors include system continuity, the environment, funding availability (see Chapter 11), and economic development (see Chapter 8). It should be noted that the travel efficiency component of the Eastern Dakota Expressway feasibility study does not include the potential economic development benefits created from the highway improvements (see Chapter 8 for that evaluation).

The entire Eastern Dakota Expressway, as well as the individual highway segments (identified in Chapter 2), are subjected to the travel efficiency feasibility tests. Conventional benefit/cost indicators (benefit/cost ratio, net present value, and internal rate of return) are used to measure economic feasibility from the travel efficiency perspective.

### **Benefit/Cost Methodology**

In this assessment of travel efficiency feasibility, a life cycle cost approach is used. The costs of planning, building, and maintaining the highway over a 31 year period (1993-2023) are estimated. Then, the travel efficiency gains over that period are calculated, and compared with the costs to determine whether or not the highway is economically "feasible," from the travel efficiency perspective.

To evaluate the travel efficiency of a highway improvement, the costs and benefits are compared to the Base Case (existing highway system plus any planned or programmed improvements). Because the existing highway is already in place, it is already producing a certain level of benefits, and only the additional benefits (cost savings) brought about by the highway improvement should be considered.

### **Economic Costs**

The cost side of the benefit/cost calculation comprises the costs to the agency responsible for constructing and maintaining the highway. Since the Eastern Dakota Expressway would be



a state-administered highway, the costs are those that would be incurred by the South Dakota Department of Transportation, regardless of the source of funds.

**Construction Costs** - Capital costs, as used in the economic evaluation, comprise the one-time expenditures needed to build the highway. The total construction cost for the different improvement options include right-of-way acquisition, planning, design, and construction. Exhibit 7-1 summarizes the total construction costs for each of the Eastern Dakota Expressway alternatives. The total construction costs of each alternative were previously described in more detail in Chapter 3.

For benefit/cost purposes only, the construction costs were assumed to be spent in the study's initial analysis year (1993). This allows for an equitable treatment of the different Eastern Dakota Expressway alternatives.

**Residual Value** - The period of time over which the highway improvement would be open to travel, as used in this study, is 30 years (1994 to 2023). By the end of the 30 year period, portions of the highway improvements will have been depleted (used some or all of their useful life) while other elements will still have useful lives. To account for these differences, a residual value is assigned in the study's end year as a benefit. The residual value of the highway is the value of the remaining life of the facility. The residual lives used in this study for the major improvement cost components are as follows:

COST ELEMENT	USEFUL LIFE
Right-of-way	infinite
Bridges and Structures	60 years
Earthworks	100 years
Road Base	50 years
Pavement and Shoulders	30 years

To estimate the residual values, composite residual factors were developed based on the useful lives of the various construction cost elements within each construction item. The resultant residual (salvage) values for the Eastern Dakota Expressway alternatives are depicted in Exhibit 7-2. These are based on the capital costs, exclusive of engineering and administration costs.

**Exhibit 7-1**  
**CAPITAL COST ESTIMATES SUMMARY**  
**\$ Million**

<u>ROUTE LOCATION OPTIONS</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
1. Pierre to I-90	100.6	31.9	9.5
2. Total Eastern Dakota Express via Route SD 37	450.9	303.6	124.7
3. Total Eastern Dakota Express via Route US 81	413.2	280.5	125.6
4. Aberdeen East to I-29	110.0	70.1	18.3
5. Aberdeen South to Huron	131.0	102.4	53.8
6. Huron South to I-90 via Mitchell	59.9	27.9	---
7. I-90 to I-29 via SD 37 and Yankton	149.9	103.3	24.7
8. I-90 to I-29 via US 81 and Yankton	112.2	80.2	25.6
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	340.9	233.5	106.4
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	303.2	210.4	107.3
11. I-90 to Yankton via S.D. 37	121.2	85.3	11.4
12. I-90 to Yankton via US 81	83.6	62.2	12.2
13. Regional Trade Center Connections	270.5	129.9	55.7
14. Eastern Dakota Express via SD 37 (Super 2/4 Lanes)	---	182.8	---
15. Eastern Dakota Express via US 81 (Super 2/4 Lanes)	---	183.7	---

SOURCE: Banner Associates, Inc.  
 Wilbur Smith Associates

**Exhibit 7-2**  
**RESIDUAL VALUE ESTIMATES**  
**(\$ Thousand)**

<u>ROUTE LOCATION OPTIONS</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
1. Pierre to I-90	37,550.7	9,094.4	2,839.2
2. Total Eastern Dakota Express via Route SD 37	139,464.2	87,622.6	36,766.3
3. Total Eastern Dakota Express via Route US 81	127,250.6	80,997.2	36,908.0
4. Aberdeen Eastern to I-29	33,035.4	19,436.3	5,193.6
5. Aberdeen South to Huron	39,808.2	29,815.5	15,854.0
6. Huron South to I-90 via Mitchell	18,928.8	7,930.4	---
7. I-90 to I-29 via SD 37 and Yankton	47,691.8	30,443.4	7,788.3
8. I-90 to I-29 via US 81 and Yankton	35,478.2	23,818.0	7,930.0
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	106,428.8	68,186.3	31,572.7
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	94,215.2	61,560.9	31,714.4
11. I-90 to Yankton via S.D. 37	38,061.2	24,677.4	3,651.1
12. I-90 to Yankton via US 81	25,847.6	18,052.0	3,792.8
13. Regional Trade Center Connections	89,514.9	36,461.1	8,032.8
14. EDE via SD 37 (Super 2/4 Lanes)	---	54,033.3	---
15. EDE via US 81 (Super 2/4 Lanes)	---	54,175.0	---

SOURCE: Wilbur Smith Associates

**Highway Maintenance Costs** - At the time when any of the Eastern Dakota Expressway alternatives are built, the South Dakota Department of Transportation will have additional lane miles to administer and maintain. These additional maintenance costs include snow removal, mowing, crack sealing, patching and other work activities. Annual costs for roadway maintenance for the years 1988 through 1992 were obtained from the South Dakota Department of Transportation. From these records, the estimated annual maintenance cost include \$8,400 per mile for 4-lane highways and \$4,200 per mile for 2-lane highways. In addition, bridge maintenance costs were estimated at \$0.15/square foot per year.

### Travel Efficiency Benefits

The Eastern Dakota Expressway should create a more economically efficient route for highway transportation. By either creating four lanes of highway or by simply adding passing lanes, the highway will save the traveling public time, travel cost and accident risk. The travel efficiency benefits are intended to measure the total cost savings of tripmaking created by the highway improvement. These travel efficiency benefits are of three types: value of time savings, vehicle operating cost savings, and cost savings from reduced accident risk. Such highway user benefits were calculated for both passenger vehicles and commercial trucks.

The highway user benefits estimated for the Eastern Dakota Expressway used consumer surplus techniques. Whenever a highway improvement is expected to cause traffic diversion from one facility to another, or is expected to cause additional trips to be made (generated or induced travel), consumer surplus is used. Consumer surplus is the price (user cost) that travelers are willing to pay to use the new highway, rather than the price actually paid. Some of the diverted or generated traffic would have made the change with only a fraction of the cost change (the cost change created by the highway improvement), while others require the total cost change. Consumer surplus measures this difference in willingness to pay, as a measure of economic benefit.

Travel efficiency benefits were estimated for two years: 1991 and 2015. While the highway is not assumed to be open for traffic until 1994 (analysis purposes only), benefits were calculated for the year 1991 because accurate historical data were available. In each of these two years (1991 and 2015) the Eastern Dakota Expressway alternatives were evaluated against the Base Case (do nothing alternative). Intermediate and following year benefits were interpolated and extrapolated in straightline fashion. The following report sections identify total travel efficiency benefits in each of the two years (1991 and 2015).

**Vehicle Operating Cost Savings** - The Eastern Dakota Expressway would add additional traffic capacity to the existing highway system. By creating four lanes of traffic or by adding passing lanes, the alternatives would make passing much easier and safer. Also by eliminating vehicle stops, either through grade separation of intersections or by skirting communities, the highways create a more constant flow of traffic, resulting in increased vehicle operating efficiency and less travel cost. However, each Eastern Dakota Expressway alternative will increase travel speeds which result in decreased fuel efficiency. Therefore, the operating cost change involves the increased cost from higher travel speeds compared to the efficiency and cost savings from a more constant flow of traffic.

Passenger vehicle and commercial truck operating cost savings were estimated using the Federal Highway Administration's Technical Report: "Vehicle Operating Costs, Fuel Consumption, and Pavement Type and Conditions," updated to 1992 monetary values. The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, curvature and gradient changes, reduced number of speed change cycles, and other changes that affect vehicle operations.

Exhibit 7-3 displays the estimated vehicle operating cost changes for all of the Eastern Dakota Expressway alternatives. Some alternatives constructed to freeway standards would actually increase vehicle operating costs. This is created by the freeway's higher travel speeds (65 mph posted speed limit). The increase in freeway travel speeds is large enough to counter the cost reduction of the increased constant travel flow (less stop and go travel). The alternatives constructed to expressway standards create a constant flow of traffic, without creating the higher, less fuel efficient travel speed. The super two standard on the other hand, eliminates some stopping and slowing of vehicles, but significantly less than the expressway standard, thereby creating the smaller vehicle operating cost savings.

**Travel Time Savings** - The Eastern Dakota Expressway system could reduce delays by enabling vehicles to pass slower moving vehicles, avoid delays due to vehicles turning at major intersections, and limit vehicle stops as well as delays in urban areas by creating highway bypasses of areas with traffic signals and slower speed limits. By avoiding these delays, motorists will increase overall travel speeds, decreasing the amount of time motorists spend traveling.

All highway segments have speed limits which, while not always obeyed, tend to reduce speeds compared to the speeds that would occur if such speed limits were absent. Adding additional capacity to the roadway, such as wider shoulders, passing lanes, and/or additional lanes of traffic, tend to increase travel speeds. This study's analysis used actual speeds, rather than speed limits, in an attempt to be more realistic in measuring benefits.

To include time savings in the travel efficiency evaluation it is necessary that a monetary value be placed on time saved. The value of time varies from person to person and situation to situation. What is certain is that everyone is willing to pay something to reduce the amount of time spent on travel. For analysis purposes, the FHWA suggests that the method contained in the AASHTO publication "A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements" be used. In 1989 those values were \$8.00 per hour for passenger vehicles and \$15.00 per hour for commercial trucks. Using an inflationary index, these values in 1992 dollars are equivalent to \$9.00 for passenger vehicles and \$17.00 for commercial trucks.

Most non-business travelers are less concerned about time, and hence value its savings less than those travelers on business trips. To account for this difference in willingness to pay for time savings, a different monetary value was placed on time for business and non-business travelers. For auto business travelers, the FHWA recommended \$9.00 was used for each vehicle hour saved. For non-business travelers a value of \$4.50 per vehicle hour saved was used.

Applying these values of time to the estimated hours saved produces the travel time cost savings shown on Exhibit 7-4. Because of higher posted speeds and limiting access controls, the freeway highway standard would produce the largest time savings. For the entire Eastern Dakota Expressway system (including Pierre to I-90), a freeway would save nearly \$10 million worth of travel time savings by the year 2015. The expressway would save motorists approximately \$5 million by 2015, while the Super-2 lane alternative would create a time savings value just less than \$3 million.

**Exhibit 7-3**  
**ESTIMATED ANNUAL VEHICLE OPERATING COST SAVINGS**  
**Years 1991 and 2015**  
**(\$ Thousand)**

<u>ROUTE LOCATION OPTIONS</u>	<u>1991</u>			<u>2015</u>		
	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>
1. Pierre to I-90	32.1	332.2	101.8	-12.1	613.7	201.0
2. Total Eastern Dakota Express via Route SD 37	-1,651.8	2,694.8	1,143.8	-1,929.1	4,355.0	1,966.4
3. Total Eastern Dakota Express via Route US 81	-874.9	2,864.4	1,224.4	-1,324.6	4,201.3	2,004.4
4. Aberdeen Eastern to I-29	-880.7	183.7	56.8	-1,492.7	408.1	93.3
5. Aberdeen South to Huron	-382.1	972.9	262.2	-561.4	1,356.8	414.6
6. Huron South to I-90 via Mitchell	-56.7	468	---	-102.0	533	---
7. I-90 to I-29 via SD 37 and Yankton	-366.7	777.0	208.3	-213.7	1,329.4	363.0
8. I-90 to I-29 via US 81 and Yankton	219.1	985.4	296.6	95.0	1,231.3	374.9
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	-825.2	2,515.9	1,085.7	-511.0	4,055.1	1,902.9
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	-7.9	2,726.6	1,167.3	124.1	3,943.1	1,911.0
11. I-90 to Yankton via S.D. 37	-534.8	462.7	84.5	-753.4	752.9	131.4
12. I-90 to Yankton via US 81	-189.9	550.6	137.7	-274.1	651.8	163.0
13. Reg. Trade Center Connections	-905.3	983.9	158.6	-1,606.8	1,554.8	294.3
14. EDE via 37 (Super 2/4 Lanes)	---	1,442.9	---	---	2,309.9	---
15. EDE via 81 (Super 2/4 Lanes)	---	1,531.2	---	---	2,320.9	---

SOURCE: Wilbur Smith Associates

**Exhibit 7-4**  
**ESTIMATED VALUE OF TRAVEL TIME SAVED**  
**Years 1991 and 2015**

ROUTE LOCATION OPTIONS	1991			2015		
	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>
1. Pierre to I-90	446	141	24	891	283	47
2. Total Eastern Dakota Express via Route SD 37	6,649	3,407	1,677	9,710	4,934	2,419
3. Total Eastern Dakota Express via Route US 81	6,157	3,237	1,683	8,760	4,562	2,350
4. Aberdeen Eastern to I-29	1,351	570	206	2,183	1,156	337
5. Aberdeen South to Huron	2,213	1,210	741	3,070	1,670	1,036
6. Huron South to I-90 via Mitchell	1,019	474	---	1,348	616	---
7. I-90 to I-29 via SD 37 and Yankton	2,133	1,067	382	3,193	2,079	599
8. I-90 to I-29 via US 81 and Yankton	1,648	895	391	2,244	1,218	532
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	5,438	2,853	1,470	7,708	4,037	2,083
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	4,390	2,683	1,475	6,730	3,663	2,013
11. I-90 to Yankton via S.D. 37	1,365	698	164	1,970	1,512	234
12. I-90 to Yankton via US 81	759	462	145	1,036	630	198
13. Reg. Trade Center Connections	2,816	1,185	230	4,422	2,055	384
14. EDE via 37 (Super 2/4 Lanes)	---	2,108	---	---	3,542	---
15. EDE via 81 (Super 2/4 Lanes)	---	2,190	---	---	3,374	---

SOURCE: Wilbur Smith Associates

**Accident Cost Savings** - While no highway is totally "accident risk free," the Eastern Dakota Expressway alternatives should reduce the number of accidents which would occur compared to the existing highway system. By providing additional lanes of traffic, grade separating intersections, and/or bypassing communities along the route, the potentials for accidents should be significantly reduced.

To perform accident calculations, accident data was obtained from the South Dakota Department of Transportation's Accident Records Division. Accidents for the years 1990 through 1992 were identified and classified by three types: 1) fatality, 2) injury, and 3) property damage only. Rates by accident type were determined for the Base Case (do nothing alternative) and for each Eastern Dakota Expressway system alternative. Exhibit 7-5 summarizes the number of accidents which occurred between 1990 and 1992 for each of the existing Eastern Dakota Expressway route alternatives.

To include impacts related to reducing accidents in the travel efficiency evaluation, a monetary cost should be established for each accident type. Accident costs were obtained from the FHWA Technical Advisory T7570.1 as used by the South Dakota Department of Transportation. The monetary values by accident type consist of:

ACCIDENT TYPE	COST
Fatalities	\$1,500,000
Injury Accidents	\$41,000
Property Damage Only	\$2,000

Exhibit 7-6 summarizes the estimated monetary savings attributable to each Eastern Dakota Expressway alternative. All of the alternatives should reduce accidents in the corridors. The freeway alternative with limited access control and grade separated intersections would have the largest impact on reducing accidents followed by the expressway alternatives.

During 1990 through 1992, the Eastern Dakota Expressway highways experienced 12 fatalities, approximately 550 injury accidents and 1,100 personal damage only accidents. On a per mile basis, Aberdeen east to I-29 segment had the largest number of accidents with a total of 6 fatalities, 285 injury accidents and 472 personal damage only accidents. Pierre to I-90 had the least number of accidents between 1990 and 1992 with 46 total accidents (no fatalities).

**Total Travel Efficiency Benefits** - The total travel efficiency economic benefits for the years 1991 and 2015 are listed in Exhibit 7-7. Intermediate year benefits (1994-2015) are interpolated in straight-line fashion, and benefits for 2016-2023 were extrapolated in similar straight-line fashion.



**Exhibit 7-5**  
**NUMBER OF ACCIDENTS**  
**Years 1990 through 1992**

ROUTE LOCATION OPTIONS	Number of Fatalities	Injury Accidents	P.D.O.
1. Pierre to I-90	0	18	28
2. Total Eastern Dakota Express via Route SD 37	12	533	1,065
3. Total Eastern Dakota Express via Route US 81	11	533	1,054
4. Aberdeen Eastern to I-29	6	285	472
5. Aberdeen South to Huron	3	127	291
6. Huron South to I-90 via Mitchell	2	28	107
7. I-90 to I-29 via SD 37 and Yankton	1	93	195
8. I-90 to I-29 via US 81 and Yankton	2	93	184
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	6	248	593
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	7	248	582
11. I-90 to Yankton via S.D. 37	0	23	56
12. I-90 to Yankton via US 81	1	23	45
13. Reg. Trade Center Connections	8	331	607
14. EDE via SD 37 (Super 2/4 Lanes)	12	551	1,093
15. EDE via US 81 (Super 2/4 Lanes)	13	551	1,082

**SOURCE:** South Dakota Department of Transportation  
Wilbur Smith Associates

**Exhibit 7-6**  
**ESTIMATED ACCIDENT COST SAVINGS**  
**Years 1991 and 2015**  
**(\$ Thousand)**

ROUTE LOCATION OPTIONS	1991			2015		
	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>
1. Pierre to I-90	222	128	29	459	265	60
2. Total Eastern Dakota Express via Route SD 37	5,958	3,608	844	7,833	5,226	1,222
3. Total Eastern Dakota Express via Route US 81	6,100	3,727	872	8,056	4,389	1,261
4. Aberdeen Eastern to I-29	3,036	1,900	446	3,935	2,963	695
5. Aberdeen South to Huron	1,465	833	180	1,993	1,108	240
6. Huron South to I-90 via Mitchell	1,042	628	---	1,345	809	---
7. I-90 to I-29 via SD 37 and Yankton	416	245	56	589	348	79
8. I-90 to I-29 via US 81 and Yankton	557	364	85	783	510	119
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	2,923	1,708	398	3,947	2,264	527
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	3,064	1,827	426	4,121	2,426	566
11. I-90 to Yankton via S.D. 37	295	170	36	411	237	54
12. I-90 to Yankton via US 38	436	289	64	605	400	93
13. Reg. Trade Center Connections	4,300	2,656	475	5,739	4,037	755
14. EDE via 37 (Super 2/4 Lanes)	----	3,156	----	----	4,773	----
15. EDE via 81 (Super 2/4 Lanes)	----	3,184	----	----	4,772	----

SOURCE: Wilbur Smith Associates

**Exhibit 7-7**  
**TOTAL TRAVEL EFFICIENCY BENEFITS**  
**Year 1991 and 1995**  
**(\$ Thousand)**

ROUTE LOCATION OPTIONS	1991			2015		
	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>	<u>Freeway</u>	<u>Expressway</u>	<u>Super 2</u>
1. Pierre to I-90	689	601	155	1,337	1,161	308
2. Total Eastern Dakota Express via Route SD 37	10,955	9,710	3,665	15,664	14,515	5,637
3. Total Eastern Dakota Express via Route US 81	11,382	9,282	3,779	15,491	14,152	5,616
4. Aberdeen Eastern to I-29	3,506	2,654	709	4,625	4,526	1,125
5. Aberdeen South to Huron	3,296	3,016	1,184	4,500	4,135	1,690
6. Huron South to I-90 via Mitchell	2,004	1,570	---	3,591	1,958	---
7. I-90 to I-29 via SD 37 and Yankton	2,182	2,089	646	3,568	3,757	1,042
8. I-90 to I-29 via US 81 and Yankton	2,424	2,244	773	3,122	2,960	1,025
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	7,509	7,077	2,954	11,144	10,335	4,513
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	7,986	7,257	3,068	10,975	10,032	4,490
11. I-90 to Yankton via S.D. 37	1,125	1,331	285	1,627	2,502	420
12. I-90 to Yankton via US 38	1,005	1,302	347	1,377	1,682	454
13. Reg. Trade Center Connection	6,199	4,825	864	9,553	7,645	1,433
14. EDE via 37 (Super 2/4 Lane)	----	6,779	----	----	10,585	----
15. EDE via 81 (Super 2/4 Lane)	----	6,905	----	----	10,467	----

SOURCE: Wilbur Smith Associates

### Travel Efficiency Feasibility

Travel efficiency is the conventional and traditional method of defining whether or not a highway improvement is economically feasible. According to this test, a highway improvement must be successful in reducing vehicle operating costs, travel time, and accident potentials; and it needs to have sufficient traffic volumes on the highway to create the level of highway user economic benefits necessary to justify the investment (cost) in the improvement.

To calculate the economic feasibility in travel efficiency terms, all costs and benefits in constant (1992) dollars are determined by year 1993 through 2023, and then discounted back to 1992 using a discount rate of 7 percent. The benefits are then compared with the costs using conventional feasibility indicators. These indicators are benefit/cost ratios, net present value and internal rate of return.

To enable a direct comparison between the candidate improvement alternatives, all capital costs are assumed to be spent in one year (1993), and the highway improvement is assumed to open January 1 of the next year (1994). This of course is not possible, but these assumptions simplify the analysis without skewing the feasibility results.

The travel efficiency feasibility indicators are summarized on Exhibit 7-8. To interpret the indicators the following rules are appropriate:

- A feasible project is one which has a positive net present value (NPV), an internal rate of return (IRR) equal to or exceeding the discount rate (7 percent), and a discounted benefit/cost (B/C) ratio of 1.0 or higher.
- The higher the NPV, IRR and B/C the more feasible the project.

These exhibits suggest the following conclusions, from the travel efficiency perspective (exclusive of economic development benefits).

- None of the Eastern Dakota Expressway alternatives are feasible from the travel efficiency perspective alone. Existing and forecast traffic levels do not warrant an upgraded highway solely based on highway user benefits on any of the alternative alignments.
- The freeway highway standard in each alternative is the least feasible. The alternatives constructed to freeway standards are much too expensive compared to the benefits they would produce.
- In several cases the super two-lane option is more cost-effective than the freeway and expressway alternatives. This indicates that, from the travel efficiency perspective and because of lower forecast traffic volumes, minor improvements are more warranted than are additional highway lanes.

**Exhibit 7-8  
TRAVEL EFFICIENCY FEASIBILITY INDICATORS**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.18	-1.6%	-79.9	0.38	0.5%	-19.8	0.34	-0.1%	-6.4
2. Eastern Dakota Expressway Via Route SD 37	0.39	0.7%	-288.1	0.50	1.9%	-160.2	0.48	1.7%	-68.4
3. Eastern Dakota Expressway Via Route US 81	0.43	1.1%	-248.1	0.54	2.3%	137.9	0.48	1.7%	-69.1
4. Aberdeen East to I-29	0.48	1.7%	-59.8	0.64	3.6%	-26.4	0.66	3.8%	-6.4
5. Aberdeen South to Huron	0.39	6.0%	-78.3	0.45	1.2%	-56.3	0.35	-0.1%	-35.2
6. Huron South to I-90 via Mitchell	0.49	1.8%	-32.1	0.77	4.7%	-6.5	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	0.27	-0.8%	-114.8	0.37	0.4%	-69.0	0.45	1.5%	-14.2
8. I-90 to I-29 via US 81 and Yankton	0.33	-0.1%	-78.3	0.42	0.8%	-49.6	0.42	1.4%	-14.7
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	0.37	0.4%	-226.8	0.47	1.5%	-131.3	0.45	1.3%	-62.1
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	0.41	0.9%	-187.3	0.52	2.0%	-108.5	0.45	1.3%	-62.7
11. I-90 to Yankton via SD 37	0.17	-2.3%	-105.3	0.30	-0.6%	-63.8	0.42	1.3%	-6.7
12. I-90 to Yankton via US 81	0.21	-1.9%	-69.7	0.32	-0.6%	-45.3	0.43	1.2%	-7.2
13. Reg. Trade Center Connections	0.37	0.5%	-165.8	0.60	3.1%	-51.1	0.66	3.6%	-18.9
14 EDE via SD 37 (Super 2/4 Lanes)	--	--	--	0.59	2.9%	-75.0	--	--	--
15 EDE via US 81 (Super 2/4 Lanes)	--	--	--	0.59	2.8%	-76.1	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.  
This exhibit excludes economic development benefits.

SOURCE: Wilbur Smith Associates

It should be noted that travel efficiency is only one component of economic feasibility; the other is economic development feasibility (see Chapter 8). It should also be noted that travel efficiency benefits are included in the economic development benefits and the two should not be added together. In addition, there are engineering, environmental funding availability and political factors to consider.

## Chapter 8

# ECONOMIC DEVELOPMENT FEASIBILITY

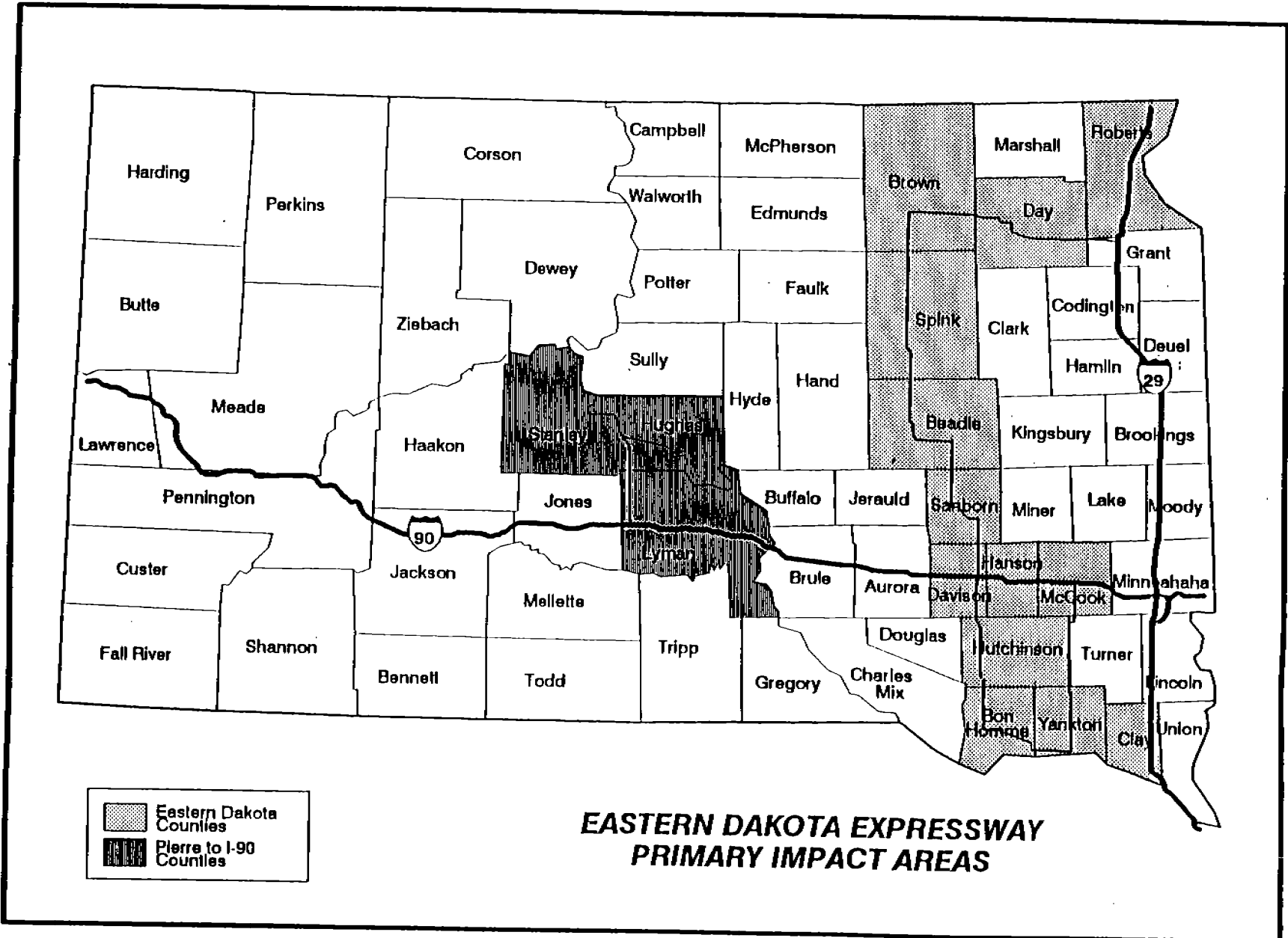
In the previous chapter it was determined that the Eastern Dakota Expressway alternatives do not carry sufficient traffic to justify widening them to 4-lane design standard. However, this conclusion is based solely on travel efficiency benefits to highway users (autos and trucks). Highway improvements can do more than merely improve travel efficiency; they can also create economic value by assisting in the economic development process. By reducing transportation costs in the region, the area could become more economically attractive and competitive, thereby attracting new industries and visitors into the area or enabling existing industries to expand. This chapter assesses those economic development possibilities, and measures each highway's economic feasibility in economic development terms.

The economic development impacts are estimated for two regions; the Eastern Dakota Expressway primary impact area, consisting of sixteen counties in eastern and central South Dakota (see Exhibit 8-1) and the entire State of South Dakota. Impacts are estimated for both regions because the regions reflect potentially different perspectives and different impact magnitudes. For example, some benefits for Aberdeen or Pierre might come at the expense of another region or community in South Dakota. When this is the case, they are benefits to Aberdeen or Pierre but are transfers of benefits within South Dakota and therefore do not comprise net benefits to the entire State. By recognizing both State and local perspectives in the analysis, feasibility from both perspectives is ascertained. The economic impact of each expressway option on every county and community in South Dakota is included in the analysis, regardless of whether or not a county is within the defined primary impact area.

### Economic Impact Model - REMI Model

To gauge the impact of the highway improvements on the primary impact area and State economies, the study utilized the REMI econometric model (Regional Economic Models, Inc.). The REMI model is a multi-regional dynamic economic and demographic forecasting model that estimates regional and national impacts associated with various governmental or private policy changes or investments. The REMI model simulates a regional economy and predicts demand as well as supply conditions across 53 sectors, 94 occupations, 25 final demand sectors, and 202 age/sex cohorts.

The highway improvements considered in this study create a number of events that serve as inputs to the model. These include trucking cost savings, business cost savings, additional roadside expenditures, agricultural changes, and others. These direct changes, in monetary terms, serve as inputs into the REMI economic model. For example, the model estimates the regional economic effect from increased profits for businesses and firms in the region created by more efficient truck travel on the highway. The REMI model requires separate regional inputs into the model. Therefore, to independently calculate the real economic gain to the primary impact area and the State, direct benefits were calculated for both the primary impact area and the State. The model utilized price levels and output levels for the year 1987; all results were then increased to 1992 price levels utilizing appropriate producer price inflators. The Consultant has used the REMI model in numerous other corridor studies throughout the United States, and the model has proven to provide accurate and reasonable results.



**EASTERN DAKOTA EXPRESSWAY  
PRIMARY IMPACT AREAS**



### Four Indicators of Economic Development Impact

The Eastern Dakota Expressway could yield many different forms of benefits to the sixteen-county corridor area and to South Dakota. In order to recognize these diverse impacts in a consistent fashion, a single set of "indicators of impact" and a single set of definitions were used throughout the economic impact calculations. The economic impacts are expressed in terms of four "indicators of economic development impact:"

**Value Added** - The value of the corridor's firms output minus the value of the inputs they purchase from other firms. In the corridor study, it is the value added by firms located in the defined corridor impact areas, including employee compensation, proprietary income, indirect business taxes, and other property income. The value added component is the most comprehensive and accurate measure of economic development impact and produces the values used in the economic development feasibility analysis (the "benefit" in the benefit/ cost analysis).

**Personal Income** - This measure consists of the total increases in payroll costs (wages, salaries and benefits) paid by local industries due to the improved highway, plus income from self-employment, other property income (interest and corporate profit), and transfer payments.

**Employment** - Total "new" jobs attributable to the highway improvement including the number of person job years due to road construction and road use, plus the share of those that are employed in sectors that directly or indirectly support the construction process, the road users, and the firms that might expand in or locate to the region. The jobs estimates are the "net" new jobs, exclusive of natural jobs growth and redistributed jobs (see Chapter 6).

**Population** - Additional population that is attracted to (or not lost from) the area as a result of the improved highway constitutes another economic indicator.

While all of these indicators are produced by the REMI Model, they should not be added together. Many of these indicators overlap each other. By adding them together "double counting" would occur.

### Four Economic Development Causes

By improving travel conditions in eastern and central South Dakota through reduced travel time and costs to the residents and businesses in the area, the Eastern Dakota Expressway could create additional economic development benefits to the State and primary impact area's economies. These additional impacts are categorized into four types, and economic development impacts were estimated for each. The transportation benefits calculated in the travel efficiency analysis are used as a portion of the inputs into the REMI model and therefore are included in the economic development benefits. Therefore, travel efficiency and economic development benefits should not be added together.

**Act of Highway Construction/Increased Maintenance** - The act of spending money in South Dakota to build the new highway will be of immediate economic benefit to the area within which they are spent. The construction impacts are temporary in nature, since they exist only during the construction period and terminate when the road construction is complete. However, the increased maintenance spent on snow removal, resurfacing the highway, etc., will occur annually and be of benefit to the primary impact area. Such construction and maintenance expenditures, however, are valuable statewide only if they cause a "net" increase in federal funds into the State.

**Competitive Position** - A 4-lane highway can help a community to compete for new businesses to be attracted to the area. A 4-lane highway is one criterion used by some firms in their site selection purchases. A 4-lane highway also reduces the cost of transportation. Reductions in transportation time and cost lead to reduced costs of production, which in turn lead to marginally reduced prices and/or increased profits, which can lead to increased production (expansion of existing firm production and/or attraction of new firms), which in turn generates economic impact value. These lower transportation costs, and the presence of a 4-lane highway, help the region compete against other areas of the country for economic development opportunities. These "competitive position" impacts are created by revised perceptions of the area and by the increased travel efficiency of the highway improvement and are benefits to both the primary impact area and the State. These are part of the REMI inputs and are included in the competitive position impact.

**Increased Roadside Business and Visitor Impacts** - The Eastern Dakota Expressway will most likely attract more traffic and visitors into the area. This increase in traffic and visitors will generate increased sales for such businesses in the primary impact area as motels, restaurants, gas stations, tourist visitation places, retail stores, and others who cater to highway users. These increased roadside business and visitor expenditures are net benefits to the primary impact area. However, the portion of the visitors that are diverted from other areas of South Dakota, are not net economic gains for the State of South Dakota.

**Non-Business Related Economic Activity** - A new and more efficient highway also creates benefits for non-business travelers. These non-business travelers receive travel time savings and operating cost savings as well as reduced numbers of accidents. These non-business benefits are amenity improvements in the quality of life in the area, and therefore are treated as "direct" impacts.

The direct monetary impacts in each of these four categories of impact were estimated external to the REMI model. The direct impacts consist of a portion of the travel efficiency benefits (the amount attributable to business travelers) and calculated impacts for the probability of attraction of new industry. Then most, but not all, were input into the REMI model. All of the impact categories are net impacts within the primary impact area; most, but not all, are also net impacts for the State of South Dakota. The manner by which each impact type is treated in the analysis is summarized on Exhibit 8-2.

Exhibit 8-2  
ECONOMIC DEVELOPMENT IMPACT TYPES

	<u>NET ECONOMIC IMPACT ON</u>		
	<u>Primary Area</u>	<u>South Dakota</u>	<u>Method of Analysis</u>
Construction Costs	Some	Some	REMI
Competitive Position			
Trucking/Logistics	Yes	Some	REMI
Auto Business Travel	Yes	Some	REMI
Roadside Business/Visitor Expenditures			
Tourism	Yes	Some	REMI
Roadside Expenditures	Yes	Some	REMI
Non-Business			
Passenger Time	Some	Yes	Direct
Veh. Operating Reduction	Some	Yes	REMI
Accident Reduction	Yes	Yes	Direct

-----  
 "Yes" indicates that this is a proper net impact on the region (primary impact area or state)

"Some" indicates that a portion of this impact is a net impact

"REMI" indicates this impact was input into the REMI model

"Direct" indicates this impact was not input into the REMI model but instead was treated as a direct impact, without any "multiplier" effect

SOURCE: Wilbur Smith Associates

**Estimated Economic Development Impact on the Primary Impact Area**

The people and businesses near the Eastern Dakota Expressway routes could gain economically if the existing highways are upgraded to four-lanes. Eastern and central South Dakota would be better able to compete for industrial and commercial businesses, more money would be spent in the area, and overall the regional economy should benefit. The following section measures the estimated economic development impacts on the sixteen-county primary impact area attributable to the Eastern Dakota Expressway. The impacts accrue from:

- The act of constructing the highway
- The improved ability of the region to compete for economic activity
- The attraction of tourists and businesses that cater to travellers

**Economic Impact of Highway Construction/Corridor** - The total construction cost for the Eastern Dakota Expressway varies significantly by corridor and highway standard. The spending of construction money in the area is of economic value to the primary impact area, since construction contractors and workers will be hired, construction materials will be purchased, etc. To assess the construction impacts, the estimated costs for each route option and highway standard alternative were input into the REMI model. The model was then used to estimate the economic development impacts that might occur in the primary impact area associated with the construction process itself.

The capital cost was estimated in terms of construction cost and right-of-way cost. The construction cost was treated as an increase in final demand and was input into the REMI model. The right-of-way cost was treated as a transfer payment (nothing is consumed, the land still exists) and was not included. The construction cost was treated as an increase in final demand within the primary impact area (this is proper since the REMI model determines which construction purchases can be spent in the area and which involve expenditures outside of South Dakota). The REMI model determines the amount of materials, labor, etc. that could be supplied locally and estimates the total economic development impacts to the corridor area created by the expenditure of the highway construction funds. For economic development analysis purposes it was assumed that construction would take 5 years to complete, and that the construction expenditures would be spent in equal amounts over the five year period.

The economic impacts due to construction comprise the expenditures spent in the primary impact area, the extent to which those funds employ local people and buy local goods and services, and the flow of those expenditures in terms of respending. The REMI model is updated annually with data for each county by industry sector. The model is able to simulate the impact that construction would have on the local economy. The REMI model determines what is needed in highway construction and determines how many local or state contractors can be hired, what materials can be purchased locally, etc. The impacts include labor and expenses associated with planning, design, and construction of the highway, plus the respending of those funds to the extent that such respending occurs within the primary impact area. The estimated economic development impacts to the primary impact area created by the act of highway construction are summarized on Exhibit 8-3.

**Exhibit 8-3**  
**HIGHWAY CONSTRUCTION ECONOMIC DEVELOPMENT IMPACTS**  
**Primary Impact Area**

Pierre to I-90			Aberdeen East to I-29		
<u>Economic Development Impacts</u>			<u>Economic Development Impacts</u>		
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$11,775	\$58,874	\$12,875	\$64,375	
Personal Income (\$000)	\$7,726	\$38,630	\$8,448	\$42,240	
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$3,734	\$18,669	\$8,205	\$41,025	
Personal Income (\$000)	\$2,450	\$12,250	\$5,384	\$26,918	
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$1,112	\$5,560	\$2,142	\$10,708	
Personal Income (\$000)	\$730	\$3,648	\$1,405	\$7,027	
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			<b>Aberdeen South To Huron</b>		
<u>Economic Development Impacts</u>			<u>Economic Development Impacts</u>		
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$52,776	\$263,880	\$12,582	\$62,908	
Personal Income (\$000)	\$34,629	\$173,144	\$8,185	\$40,926	
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$35,535	\$177,676	\$9,835	\$49,174	
Personal Income (\$000)	\$23,326	\$116,581	\$6,398	\$31,991	
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$14,596	\$72,978	\$5,167	\$25,836	
Personal Income (\$000)	\$9,577	\$47,884	\$16,808	\$84,040	
<b>Total Eastern Dakota Expressway Via Route US 81</b>			<b>Huron South To I-90</b>		
<u>Economic Development Impacts</u>			<u>Economic Development Impacts</u>		
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>	
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$48,363	\$241,817	\$7,011	\$35,055	
Personal Income (\$000)	\$31,734	\$158,668	\$4,600	\$23,001	
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$32,831	\$164,157	\$3,266	\$16,328	
Personal Income (\$000)	\$21,542	\$107,711	\$2,143	\$10,714	
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$14,701	\$73,505	--	--	
Personal Income (\$000)	\$9,646	\$48,230	--	--	

(a) This table includes only the economic benefits created in the primary impact area due to construction expenditures. It excludes other impact types.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-3 (cont.)**  
**HIGHWAY CONSTRUCTION ECONOMIC DEVELOPMENT IMPACTS**  
**Primary Impact Area**

<b>I-90 to I-29 Via SD 37 and Yankton</b>			<b>Aberdeen to Yankton Via Mitchell and US 81</b>		
	<b>Economic Development Impacts</b>			<b>Economic Development Impacts</b>	
	<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>		<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$17,545	\$67,726		\$35,488	\$177,442
Personal Income (\$000)	\$11,512	\$57,561		\$23,286	\$116,428
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$12,091	\$60,454		\$24,626	\$123,132
Personal Income (\$000)	\$7,933	\$39,667		\$16,159	\$80,793
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$2,891	\$14,455		\$12,559	\$62,795
Personal Income (\$000)	\$1,897	\$9,485		\$8,241	\$41,203
<b>I-90 to I-29 Via US 81 and Yankton</b>			<b>I-90 to Yankton Via SD 37</b>		
	<b>Economic Development Impacts</b>			<b>Economic Development Impacts</b>	
	<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>		<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$13,133	\$65,663		\$14,186	\$70,930
Personal Income (\$000)	\$8,617	\$43,084		\$9,308	\$46,540
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$9,387	\$46,935		\$9,984	\$49,920
Personal Income (\$000)	\$6,159	\$30,797		\$6,551	\$32,755
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$2,996	\$14,982		\$1,334	\$6,672
Personal Income (\$000)	\$1,966	\$9,830		\$876	\$4,378
<b>Aberdeen to Yankton Via Mitchell and SD 37</b>			<b>I-90 to Yankton Via US 81</b>		
	<b>Economic Development Impacts</b>			<b>Economic Development Impacts</b>	
	<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>		<b>Impact Per Year For Five Years</b>	<b>Total Impact Over Five Year Period</b>
<b><u>FREEWAY</u></b>					
Value Added (\$000)	\$39,901	\$199,505		\$9,785	\$48,925
Personal Income (\$000)	\$26,181	\$130,905		\$6,420	\$32,102
<b><u>EXPRESSWAY</u></b>					
Value Added (\$000)	\$27,223	\$136,651		\$7,280	\$36,401
Personal Income (\$000)	\$17,933	\$89,663		\$4,777	\$23,885
<b><u>SUPER 2 LANE</u></b>					
Value Added (\$000)	\$12,454	\$62,269		\$1,428	\$7,140
Personal Income (\$000)	\$8,171	\$40,857		\$937	\$4,685

(a) This table includes only the economic benefits created in the primary impact area due to construction expenditures. It excludes other impact types.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-3 (cont.)  
HIGHWAY CONSTRUCTION ECONOMIC DEVELOPMENT IMPACTS  
Primary Impact Area**

**Regional Trade Center Connections**

	<u>Economic Development Impacts</u>	
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>
<b><u>FREEWAY</u></b>		
Value Added (\$000)	\$31,660	\$158,305
Personal Income (\$000)	\$20,575	\$102,875
<b><u>EXPRESSWAY</u></b>		
Value Added (\$000)	\$15,204	\$76,021
Personal Income (\$000)	\$9,924	\$49,620
<b><u>SUPER 2 LANE</u></b>		
Value Added (\$000)	\$6,519	\$32,597
Personal Income (\$000)	\$4,172	\$20,860

**EDE via SD 37 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>	
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>
<b><u>SUPER 2/4 LANES</u></b>		
Value Added (\$000)	\$21,396	\$106,980
Personal Income (\$000)	\$13,923	\$69,644

**EDE via US 81 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>	
	<u>Impact Per Year For Five Years</u>	<u>Total Impact Over Five Year Period</u>
<b><u>SUPER 2/4 LANES</u></b>		
Value Added (\$000)	\$21,501	\$107,506
Personal Income (\$000)	\$13,996	\$69,991

(a) This table includes only the economic benefits created in the primary impact area due to construction expenditures. It excludes other impact types.

SOURCE: Wilbur Smith Associates, REMI Model

**Competitive Position Impacts** - The Eastern Dakota Expressway should increase the economic competitive position of the communities and towns located on or near the highway. A 4-lane highway could enable communities to pursue new industries which, without the 4-lane highway, would not have considered the community. In addition, reducing transportation costs and by making places in eastern and central South Dakota more accessible, the area's goods and services should become relatively more competitive, thereby making the area more attractive for economic investment.

The improved competitive position impacts are directly related to increased productivity. To quantify the anticipated competitive position impacts attributable to the Eastern Dakota Expressway, the reduced costs of doing business in the sixteen-county primary impact area were estimated (trucking/logistic and business traveler cost savings) and the direct impact of the probability of the area being able to attract new business activity were input into the REMI model. The lower costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses and firms as higher net income. The economic activity from the attraction of new business will result in increased employment and increased migration into the area. Therefore, persons may benefit from the highway improvement without even traveling on it.

The economic development impacts to the primary impact area from its increased ability to compete for economic activity are illustrated on Exhibit 8-4. The Exhibit displays competitive position impacts for two years; 1995 and 2015. The first year represents annual impacts just after completion of the highway, and year 2015 represents economic benefits twenty years after the highway is constructed. Also displayed on the Exhibit is the discounted 30 year stream of benefits. This represents total benefits from increased competitive position over the 30 year analysis period discounted to 1992.

It is estimated that over the 30 year analysis period, from the competitive position standpoint, the entire Eastern Dakota Expressway (including Pierre to I-90), constructed to freeway standards, will result in an economic impact of nearly \$140 million (value added impact) for the sixteen-county primary impact area. The economic impact for the Eastern Dakota Expressway constructed to expressway standards is \$118 million. The entire expressway constructed as super two-lane highway will have the smallest economic impact, estimated at \$50 million.

**Increased Roadside Business and Visitor Impacts** - Another component of the economic development impacts for the Eastern Dakota Expressway primary impact area is the economic benefit resulting from increased roadside business activity and increased visitor expenditures. Because of diverted and induced traffic onto the Eastern Dakota Expressway, the communities along the route will experience higher traffic volumes. Travelers on the highway will likely spend money along the corridor on lodging, restaurants, gas stations, retail establishments, amusement activities, etc. Tourists and travelers traveling south from Canada or motorists traveling to the Upper Lakes Region in South Dakota, diverted to the Eastern Dakota Expressway, are likely to stay overnight in Aberdeen or elsewhere in the corridor. These are all valuable and legitimate economic development benefits for the Eastern Dakota Expressway primary impact area.



<b>Exhibit 8-4</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>Primary Impact Area</b>			
<b>Pierre to I-90</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$522	\$2,498	\$17,120
Personal Income (\$000)	\$236	\$1,332	\$8,296
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$398	\$1,789	\$12,414
Personal Income (\$000)	\$198	\$1,003	\$7,028
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$72	\$326	\$2,244
Personal Income (\$000)	\$38	\$152	\$1,103
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$4,146	\$17,345	\$124,209
Personal Income (\$000)	\$2,064	\$9,837	\$70,586
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,409	\$15,334	\$106,871
Personal Income (\$000)	1,685	8,678	60,682
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,642	\$6,667	\$48,189
Personal Income (\$000)	\$798	\$3,788	\$27,371
<b>Total Eastern Dakota Expressway Via Route US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,514	\$13,958	\$101,767
Personal Income (\$000)	\$1,750	\$7,916	\$51,572
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,961	\$12,525	\$89,146
Personal Income (\$000)	\$1,464	\$7,088	\$45,508
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,421	\$5,807	\$41,969
Personal Income (\$000)	\$691	\$3,299	\$21,243
(a) This table includes only the impacts caused by the increased ability of the primary impact area to compete with other regions of the nation for economic activity. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

<b>Exhibit 8-4 (cont.)</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>Primary Impact Area</b>			
<b>Aberdeen East to I-29</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$691	\$3,849	\$27,302
Personal Income (\$000)	\$451	\$2,166	\$15,524
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$786	\$3,673	\$25,251
Personal Income (\$000)	\$361	\$2,081	\$14,310
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$157	\$720	\$5,009
Personal Income (\$000)	\$75	\$408	\$2,833
<b>Aberdeen South to Huron</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$902	\$5,653	\$40,663
Personal Income (\$000)	\$446	\$3,211	\$19,201
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,179	\$5,183	\$36,465
Personal Income (\$000)	\$585	\$2,935	\$18,705
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$762	\$3,431	\$24,005
Personal Income (\$000)	\$375	\$1,947	\$12,327
<b>Huron South to I-90 via Mitchell</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$835	\$2,741	\$24,461
Personal Income (\$000)	\$417	\$1,576	\$14,043
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$583	\$2,072	\$15,719
Personal Income (\$000)	\$292	\$1,191	\$9,016
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	--	--	--
Personal Income (\$000)	--	--	--
(a) This table includes only the impacts caused by the increased ability of the primary impact area to compete with other regions of the nation for economic activity. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-4 (cont.)  
INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)  
Primary Impact Area**

**I-90 to I-29 via SD 37 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,294	\$6,094	\$41,882
Personal Income (\$000)	\$645	\$3,445	\$23,767
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,023	\$5,134	\$34,506
Personal Income (\$000)	\$510	\$2,900	\$19,578
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$344	\$1,317	\$9,664
Personal Income (\$000)	\$160	\$753	\$5,482

**I-90 to I-29 via US 81 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$710	\$2,838	\$20,536
Personal Income (\$000)	\$345	\$1,609	\$11,667
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$584	\$2,317	\$16,846
Personal Income (\$000)	\$285	\$1,314	\$9,585
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$138	\$521	\$3,903
Personal Income (\$000)	\$71	\$297	\$2,225

**Aberdeen to I-29 via Mitchell, SD 37, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,676	\$15,253	\$109,503
Personal Income (\$000)	\$1,822	\$8,647	\$62,220
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,956	\$13,148	\$92,002
Personal Income (\$000)	\$1,468	\$7,438	\$52,268
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,629	\$6,529	\$47,391
Personal Income (\$000)	\$793	\$3,711	\$26,930

(a) This table includes only the impacts caused by the increased ability of the primary impact area to compete with other regions of the nation for economic activity. It excludes other impact types.  
(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-4 (cont.)</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>Primary Impact Area</b>			
<b>Aberdeen to I-29 via Mitchell, US 81, and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,021	\$11,682	\$85,955
Personal Income (\$000)	\$1,488	\$6,634	\$48,869
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,458	\$10,032	\$72,335
Personal Income (\$000)	\$1,214	\$5,683	\$41,136
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,424	\$5,741	\$41,691
Personal Income (\$000)	\$705	\$3,259	\$23,709
<b>I-90 to Yankton via SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$634	\$2,734	\$19,397
Personal Income (\$000)	\$312	\$1,553	\$11,028
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$651	\$3,500	\$22,900
Personal Income (\$000)	\$322	\$1,983	\$13,023
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$99	\$361	\$2,696
Personal Income (\$000)	\$49	\$205	\$1,533
<b>I-90 to Yankton via US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$237	\$1,064	\$7,371
Personal Income (\$000)	\$117	\$604	\$4,191
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$331	\$1,347	\$9,658
Personal Income (\$000)	\$163	\$763	\$5,492
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$64	\$235	\$1,757
Personal Income (\$000)	\$32	\$133	\$999
(a) This table includes only the impacts caused by the increased ability of the primary impact area to compete with other regions of the nation for economic activity. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

Exhibit 8-4 (cont.) INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a) - Primary Impact Area			
Regional Trade Center Connections			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,249	\$9,088	\$65,883
Personal Income (\$000)	\$1,104	\$5,094	\$37,863
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,767	\$7,534	\$53,384
Personal Income (\$000)	\$871	\$4,275	\$30,354
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$812	\$3,118	\$22,972
Personal Income (\$000)	\$405	\$1,751	\$12,952
EDE via SD 37 (Super 2/4 Lanes)			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$2,705	\$11,633	\$82,640
Personal Income (\$000)	\$1,335	\$6,610	\$47,005
EDE via US 81 (Super 2/4 Lanes)			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$2,357	\$10,171	\$71,840
Personal Income (\$000)	\$1,165	\$5,775	\$40,850
(a) This table includes only the impacts caused by the increased ability of the primary impact area to compete with other regions of the nation for economic activity. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

One portion of the visitor/tourism impacts consists of the estimated net increase in roadside expenditures from additional traffic on the new highway. Recent studies of comparable corridors in the midwest have indicated that roadside expenditures of value to local economies total approximately 16.7 cents per mile. To determine the increase in roadside sales, the increase in vehicle miles traveled (VMT) from diverted or induced traffic into the primary impact area were multiplied by the per vehicle mile expenditure of 16.7 cents.

Another element in the roadside business/visitor impact comprises increased expenditures from travelers visiting the area for tourism purposes. While the Black Hills Region is usually thought of as the major tourist destination in South Dakota, eastern and central South Dakota also have a relatively large tourism industry. According to the South Dakota Department of Tourism, eastern and central South Dakota (consisting of the Glacial Lakes and Prairies, Dakota Heritage and Lakes and the Great Lakes Regions) has 44.5 percent of the total tourism in the entire State, resulting in nearly \$175 million in annual visitor expenditures during 1992. The Eastern Dakota Expressway should assist in attracting additional visitors to such sites as the Lewis and Clark Reservoir near Yankton, Lake Oahe near Pierre, the Mitchell Corn Palace and the many other sites near the Eastern Dakota Expressway. In addition, planned tourist sites, such as the Native American Reconciliation Center near Pierre, should also experience an increase in economic activity resulting from the Eastern Dakota Expressway.

To estimate the economic development impacts, the direct expenditures from the increased roadside business expenditures and the expenditures attributable to the increased number of visitors were input through the REMI model as increases in final demand for lodging, eating and drinking establishments, amusement and recreation, and retail establishments. The REMI model then traced the respending of the expenditures through the regional economy.

The increased roadside business and visitor economic development impacts are summarized on Exhibit 8-5. Over the 30 year analysis period, from increased tourism and roadside business, the entire Eastern Dakota Expressway (including Pierre to I-90), constructed at freeway standards is estimated to increase economic activity by \$140 million (value added impacts). The economic impact for the entire expressway system constructed to expressway standards is \$95 million. The entire Expressway System constructed as a super two-lane highway will have the least impact on increasing tourism and roadside business in the corridor. The impact is estimated at \$29 million.

**Non-Business Impacts** - In addition to the above described economic development impacts, the Eastern Dakota Expressway will also create time and cost savings attributable to non-business travelers that are of economic value to the area. By decreasing the transportation costs of persons traveling to work, or for personal business or even vacation travelers, the highway enhances the perceived quality of life in the area. Since cost savings to non-business travelers is not of real monetary value (it represents willingness to pay for the highway improvements), the savings for accident reduction, vehicle operation and time savings for non-business travelers were not input into the REMI model; instead, the direct impacts were treated as an amenity value which also can help economic development. The non-business economic development impact for the Eastern Dakota Expressway primary impact area is displayed by route option on Exhibit 8-6.

<b>Exhibit 8-5</b>			
<b>INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)</b>			
<b>Primary Impact Area</b>			
<b>Pierre to I-90</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,083	\$2,820	\$21,558
Personal Income (\$000)	\$722	\$2,356	\$16,663
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$983	\$2,478	\$19,204
Personal Income (\$000)	\$655	\$2,070	\$14,777
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$210	\$529	\$4,105
Personal Income (\$000)	\$138	\$407	\$3,169
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$8,344	\$13,000	\$120,202
Personal Income (\$000)	\$5,081	\$9,419	\$85,139
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$4,818	\$9,035	\$76,798
Personal Income (\$000)	\$2,931	\$6,533	\$54,291
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,985	\$3,031	\$28,260
Personal Income (\$000)	\$1,213	\$2,198	\$20,032
<b>Total Eastern Dakota Expressway Via Route US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$7,048	\$11,031	\$101,763
Personal Income (\$000)	\$4,293	\$7,993	\$72,095
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$4,268	\$6,616	\$61,372
Personal Income (\$000)	\$2,597	\$4,799	\$43,473
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,737	\$2,635	\$24,783
Personal Income (\$000)	\$1,075	\$1,910	\$17,567
(a) This table only includes the impacts caused by the increased traveler expenditures from additional tourists and motorists in the area. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-5 (cont.)  
INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)  
Primary Impact Area**

**Aberdeen East to I-29**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,571	\$2,652	\$23,638
Personal Income (\$000)	\$953	\$1,924	\$16,733
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,160	\$1,952	\$17,459
Personal Income (\$000)	\$701	\$1,420	\$12,353
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$243	\$405	\$3,633
Personal Income (\$000)	\$148	\$294	\$2,571

**Aberdeen South to Huron**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,183	\$3,243	\$30,702
Personal Income (\$000)	\$1,331	\$2,348	\$20,593
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,245	\$1,849	\$17,478
Personal Income (\$000)	\$762	\$1,337	\$11,757
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$426	\$589	\$5,751
Personal Income (\$000)	\$261	\$427	\$3,870

**Huron South to I-90 via Mitchell**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,259	\$1,958	\$18,065
Personal Income (\$000)	\$779	\$1,441	\$13,012
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$828	\$1,275	\$11,845
Personal Income (\$000)	\$511	\$941	\$8,506
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	--	--	--
Personal Income (\$000)	--	--	--

(a) This table only includes the impacts caused by the increased traveler expenditures from additional tourists and motorists in the area. It excludes other impact types.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model



<b>Exhibit 8-5 (cont.)</b>			
<b>INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)</b>			
<b>Primary Impact Area</b>			
<b>I-90 to I-29 via SD 37 and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b>FREEWAY</b>			
Value Added (\$000)	\$3,634	\$5,623	\$52,159
Personal Income (\$000)	\$2,214	\$4,073	\$36,949
<b>EXPRESSWAY</b>			
Value Added (\$000)	\$1,964	\$4,633	\$35,900
Personal Income (\$000)	\$1,191	\$3,343	\$25,313
<b>SUPER 2 LANE</b>			
Value Added (\$000)	\$626	\$965	\$8,959
Personal Income (\$000)	\$381	\$699	\$6,340
<b>I-90 to I-29 via US 81 and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b>FREEWAY</b>			
Value Added (\$000)	\$2,283	\$3,573	\$32,951
Personal Income (\$000)	\$1,394	\$2,588	\$23,363
<b>EXPRESSWAY</b>			
Value Added (\$000)	\$1,400	\$2,136	\$19,990
Personal Income (\$000)	\$847	\$1,553	\$14,156
<b>SUPER 2 LANE</b>			
Value Added (\$000)	\$368	\$552	\$5,337
Personal Income (\$000)	\$238	\$398	\$3,772
<b>Aberdeen to I-29 via Mitchell, SD 37, and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b>FREEWAY</b>			
Value Added (\$000)	\$7,203	\$11,015	\$102,744
Personal Income (\$000)	\$4,390	\$7,978	\$72,783
<b>EXPRESSWAY</b>			
Value Added (\$000)	\$4,127	\$7,922	\$66,637
Personal Income (\$000)	\$2,515	\$5,722	\$47,099
<b>SUPER 2 LANE</b>			
Value Added (\$000)	\$1,843	\$2,780	\$26,067
Personal Income (\$000)	\$1,126	\$2,016	\$18,482
<p>(a) This table only includes the impacts caused by the increased traveler expenditures from additional tourists and motorists in the area. It excludes other impact types.</p> <p>(b) Discounted at 7 percent.</p> <p>SOURCE: Wilbur Smith Associates, REMI Model</p>			

**Exhibit 8-5 (cont.)  
INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)  
Primary Impact Area**

**Aberdeen to I-29 via Mitchell, US 81, and Yankton**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits (b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$5,775	\$8,847	\$82,432
Personal Income (\$000)	\$3,522	\$6,407	\$58,414
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,544	\$5,369	\$50,330
Personal Income (\$000)	\$2,160	\$3,891	\$35,662
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,579	\$2,359	\$22,364
Personal Income (\$000)	\$980	\$1,709	\$15,857

**I-90 to Yankton via SD 37**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits (b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,247	\$5,130	\$47,085
Personal Income (\$000)	\$1,980	\$3,715	\$33,366
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,811	\$4,448	\$34,521
Personal Income (\$000)	\$1,104	\$3,224	\$24,460
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$353	\$505	\$4,735
Personal Income (\$000)	\$219	\$366	\$3,357

**I-90 to Yankton via US 81**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits (b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,839	\$2,912	\$26,662
Personal Income (\$000)	\$1,122	\$2,109	\$18,894
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,872	\$2,496	\$24,958
Personal Income (\$000)	\$1,141	\$1,809	\$17,684
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$240	\$342	\$3,248
Personal Income (\$000)	\$149	\$248	\$2,303

(a) This table only includes the impacts caused by the increased traveler expenditures from additional tourists and motorists in the area. It excludes other impact types.

(b) Discounted at 7 percent.

SOURCE: Wibur Smith Associates, REMI Model

<b>Exhibit 8-5 (cont.)</b>			
<b>INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)</b>			
<b>-- Primary Impact Area</b>			
<b>Regional Trade Center Connections</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,913	\$7,430	\$63,282
Personal Income (\$000)	\$2,454	\$5,721	\$46,408
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,971	\$5,705	\$45,508
Personal Income (\$000)	\$1,867	\$4,431	\$35,636
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,282	\$2,210	\$19,583
Personal Income (\$000)	\$797	\$1,642	\$14,246
<b>EDE via SD 37 (Super 2/4 Lanes)</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$3,833	\$6,854	\$59,512
Personal Income (\$000)	\$2,415	\$5,330	\$46,610
<b>EDE via US 81 (Super 2/4 Lanes)</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$3,397	\$5,373	\$49,342
Personal Income (\$000)	\$2,139	\$4,175	\$38,640
<p>(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the area.</p> <p>(b) Discounted at 7 percent.</p> <p>SOURCE: Wilbur Smith Associates, REMI Model</p>			

**Exhibit 8-6**  
**NON-BUSINESS ECONOMIC DEVELOPMENT IMPACTS (a)**  
**Primary Impact Area**

**Value Added Impacts (\$ Thousand)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>Pierre to I-90</u></b>			
Freeway	\$289	\$567	\$4,732
Expressway	275	525	4,437
Super 2	71	163	1,288
<b><u>Entire EDE Via SD 37</u></b>			
Freeway	\$6,152	\$7,499	\$78,180
Expressway	5,337	7,285	71,779
Super 2	1,853	2,456	24,548
<b><u>Entire EDE Via US 81</u></b>			
Freeway	\$6,305	\$8,001	\$81,725
Expressway	5,462	7,499	73,480
Super 2	1,917	3,207	28,776
<b><u>Aberdeen East to I-29</u></b>			
Freeway	\$2,652	\$3,241	\$33,744
Expressway	1,949	3,040	28,138
Super 2	471	676	6,500
<b><u>Aberdeen South to Huron</u></b>			
Freeway	\$1,154	\$1,930	\$17,317
Expressway	1,510	1,980	19,893
Super 2	77	185	1,440
<b><u>Huron to I-90 Via Mitchell</u></b>			
Freeway	\$1,250	\$1,564	\$16,094
Expressway	1,036	1,266	13,180
Super 2	--	--	--
<b><u>I-90 to I-29 Via Mitchell, Yankton, SD 37</u></b>			
Freeway	\$546	\$720	\$7,214
Expressway	746	1,069	10,291
Super 2	340	440	4,449

(a) This table includes only the impacts attributable to nonbusiness travel. It excludes other impact types.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-6 (cont.)  
NON-BUSINESS ECONOMIC DEVELOPMENT IMPACTS (a)  
Primary Impact Area**

**Value Added Impacts (\$ Thousand)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<u>I-90 to I-29 Via Mitchell, Yankton, US 81</u>			
Freeway	\$973	\$1,352	\$13,205
Expressway	1,005	1,354	13,421
Super 2	425	507	5,348
<u>Aberdeen to I-29 Via Mitchell, Yankton, SD 37</u>			
Freeway	\$3,308	\$4,245	\$43,114
Expressway	3,395	4,352	44,230
Super 2	1,445	1,870	18,915
<u>Aberdeen to I-29 Via Mitchell, Yankton, US 81</u>			
Freeway	\$3,803	\$4,719	\$48,904
Expressway	3,571	4,508	46,165
Super 2	1,517	1,994	20,015
<u>I-90 to Yankton via SD 37</u>			
Freeway	\$387	\$502	\$5,073
Expressway	517	730	7,081
Super 2	153	240	2,202
<u>I-90 to Yankton via US 81</u>			
Freeway	\$761	\$1,007	\$10,074
Expressway	797	1,061	10,584
Super 2	195	274	2,657
<u>Regional Trade Center Connections</u>			
Freeway	\$4,131	\$5,372	\$54,570
Expressway	3,259	4,831	45,755
Super 2	1,578	2,105	20,968
<u>EDE via SD 37 (Super 2/4 Lanes)</u>			
Super 2/4 Lanes	\$4,234	\$5,527	\$55,340
<u>EDE via US 81 (Super 2/4 Lanes)</u>			
Super 2/4 Lanes	\$4,347	\$6,090	\$59,212

(a) This table includes only the impacts attributable to nonbusiness travel. It excludes other impact types.  
(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Total Economic Development Impacts on the Primary Impact Area** - Exhibit 8-7 summarizes the total estimated economic development impacts on the primary impact area. It is estimated that, over the 30 year analysis period, the Eastern Dakota Expressway if constructed to freeway standards would create \$600 million in economic development benefits (value added) for the counties along the highway. The expressway option is estimated to increase economic activity by nearly \$450 million and the entire expressway system constructed as a super two-lane highway would result in just over \$173 million in economic development benefits.

**Job Creation in the Primary Impact Area** - One of the economic development objectives of all jurisdictions in proximity to the highway corridors is job creation. The extent to which the improved highways might help attract employment opportunities is therefore important to the decision process. One of the advantages of the REMI econometric model is that it estimates net job creation and population migration from increased employment.

In any of the corridors the number of jobs in the corridor could increase, over time, without the highway being improved. New firms could be attracted, and existing firms could expand. Such job increases are not included, because they are not attributable to the highway. The job creation estimates include only the net new jobs believed attributable to the highway.

Highways, in and of themselves, help to create jobs only very indirectly. If a firm decides to expand or relocate to a corridor because of the sudden existence of the highway, then those jobs are included in the job creation estimates. If such expansion or relocation would have occurred anyway, without the new highway, then those new jobs are excluded from the estimates.

In addition, the job creation estimates reflect what typically occurs, over time, due to such interventions as a new highway. Speculative new job creation is excluded. For example, it is conceivable that an out-of-state firm might suddenly decide to relocate to a South Dakota community because of the 4-lane. That firm might be new to the State, and be a one time decision. That new firm might employ 500 people. This type of one-time plant relocation is excluded from the estimates because it is pure speculation; it could happen, but no one knows with any degree of certainty that it will happen, and no one can know where the firm would go (what corridor). It must be remembered that such firms already have their choice of South Dakota (and other states) communities that already have 4-lanes. Because the jobs estimates exclude such unknowns, some would feel that the jobs estimates in this study are conservative. This Consultant feels they are reasonable, and attainable, and not prime to exaggeration. If new plants employing hundreds or thousands of people were to be assumed in all communities, the State would need to pave 4-lane highways everywhere in the State, on the off-hand chance that they might somehow influence some firm's site location decision. This would be a very poor use of South Dakota's resident's tax dollars.

The net new jobs estimated to be attributable to the highway options and increased population are listed on Exhibit 8-8. If the total Eastern Dakota Expressway were built to Freeway standards, approximately 2,700 new jobs are estimated. If built to Expressway standards, 1,900 to 2,100 new jobs are estimated. Many of these would be transfers from elsewhere in South Dakota.

**Exhibit 8-7**  
**TOTAL ECONOMIC DEVELOPMENT BENEFITS**  
**Primary Impact Area**

**Pierre to I-90**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$13,677	\$5,884	\$96,028
Personal Income (\$000)	\$8,663	\$3,251	\$55,857
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$5,392	\$4,791	\$52,418
Personal Income (\$000)	\$3,293	\$2,903	\$31,795
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,466	\$1,019	\$12,525
Personal Income (\$000)	\$906	\$559	\$7,240

**Total Eastern Dakota Expressway Via Route SD 37**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$71,459	\$37,844	\$555,121
Personal Income (\$000)	\$41,774	\$19,256	\$296,593
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$49,127	\$31,654	\$411,293
Personal Income (\$000)	\$27,932	\$15,211	\$209,822
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$20,087	\$12,154	\$165,099
Personal Income (\$000)	\$11,588	\$5,986	\$86,361

**Total Eastern Dakota Expressway Via Route SD 81**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$65,268	\$32,991	\$498,279
Personal Income (\$000)	\$38,091	\$17,830	\$271,771
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$44,479	\$26,640	\$368,186
Personal Income (\$000)	\$25,824	\$13,477	\$191,788
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$19,787	\$11,649	\$160,078
Personal Income (\$000)	\$11,519	\$5,698	\$84,177

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-7 (cont.)</b>			
<b>TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)</b>			
<b>Primary Impact Area</b>			
<b>Aberdeen East to I-29</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$18,000	\$9,742	\$141,298
Personal Income (\$000)	\$9,852	\$4,110	\$66,623
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$12,106	\$8,665	\$106,741
Personal Income (\$000)	\$6,466	\$3,501	\$48,563
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$3,014	\$1,801	\$24,526
Personal Income (\$000)	\$1,628	\$702	\$11,121
<b>Aberdeen South to Huron</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$20,043	\$10,825	\$156,156
Personal Income (\$000)	\$11,438	\$6,042	\$72,648
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$15,929	\$9,012	\$126,430
Personal Income (\$000)	\$8,430	\$5,210	\$69,485
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$7,567	\$4,206	\$58,851
Personal Income (\$000)	\$4,025	\$2,436	\$32,410
<b>Huron South to I-90 via Mitchell</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$10,362	\$6,263	\$86,577
Personal Income (\$000)	\$5,796	\$3,017	\$45,769
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$5,715	\$4,613	\$55,051
Personal Income (\$000)	\$2,946	\$2,132	\$26,239
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	--	--	--
Personal Income (\$000)	--	--	--
(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			



**Exhibit 8-7 (cont.)  
TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)  
Primary Impact Area**

**I-90 to I-29 via SD 37 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$17,574	\$12,437	\$156,332
Personal Income (\$000)	\$14,371	\$7,518	\$107,547
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$15,833	\$10,836	\$133,796
Personal Income (\$000)	\$9,634	\$6,243	\$77,164
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$4,204	\$2,722	\$35,826
Personal Income (\$000)	\$2,438	\$1,452	\$19,539

**I-90 to I-29 via US 81 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$17,109	\$7,763	\$124,643
Personal Income (\$000)	\$10,356	\$4,197	\$70,083
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$12,383	\$5,807	\$91,503
Personal Income (\$000)	\$7,291	\$2,867	\$46,797
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$3,930	\$1,580	\$27,792
Personal Income (\$000)	\$2,275	\$695	\$13,995

**Aberdeen to I-29 via Mitchell, SD 37, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$54,118	\$30,513	\$431,277
Personal Income (\$000)	\$32,393	\$16,625	\$241,506
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$37,830	\$25,422	\$322,823
Personal Income (\$000)	\$21,916	\$13,160	\$172,316
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$17,381	\$11,179	\$147,090
Personal Income (\$000)	\$10,090	\$5,727	\$78,653

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-7 (cont.)</b>			
<b>TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)</b>			
<b>Primary Impact Area</b>			
<b>Aberdeen to I-29 via Mitchell, US 81, and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$48,115	\$25,278	\$373,561
Personal Income (\$000)	\$28,296	\$13,041	\$202,007
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$34,219	\$19,909	\$277,085
Personal Income (\$000)	\$19,533	\$9,574	\$142,530
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$17,090	\$10,094	\$139,237
Personal Income (\$000)	\$9,926	\$4,968	\$73,088
<b>I-90 to Yankton via SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$18,468	\$8,366	\$134,124
Personal Income (\$000)	\$11,601	\$5,268	\$82,259
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$12,970	\$8,678	\$108,294
Personal Income (\$000)	\$7,976	\$5,206	\$64,132
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,939	\$1,106	\$15,527
Personal Income (\$000)	\$1,144	\$571	\$8,452
<b>I-90 to Yankton via US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$12,629	\$4,983	\$87,218
Personal Income (\$000)	\$7,658	\$2,713	\$49,202
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$10,286	\$4,904	\$77,140
Personal Income (\$000)	\$6,081	\$2,572	\$42,609
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,928	\$851	\$13,956
Personal Income (\$000)	\$1,118	\$381	\$7,113
(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-7 (cont.)**  
**TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)**  
**Primary Impact Area**

**Regional Trade Center Connections**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$42,039	\$21,889	\$323,903
Personal Income (\$000)	\$24,296	\$10,560	\$172,807
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$23,213	\$18,070	\$214,210
Personal Income (\$000)	\$14,503	\$8,945	\$124,525
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$10,195	\$7,432	\$92,102
Personal Income (\$000)	\$6,425	\$3,505	\$50,405

**EDE via SD 37 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$32,173	\$23,508	\$291,694
Personal Income (\$000)	\$17,673	\$11,940	\$163,259

**EDE via US 81 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$31,618	\$21,644	\$274,826
Personal Income (\$000)	\$17,300	\$9,950	\$149,481

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-8  
JOB CREATION IN CORRIDOR AREAS  
Primary Impact Area**

<u>ALTERNATIVE</u>	<u>NET NEW JOBS DUE TO HIGHWAY</u>	<u>NET NEW POPULATION</u>	<u>ALTERNATIVE</u>	<u>NET NEW JOBS DUE TO HIGHWAY</u>	<u>NET NEW POPULATION</u>
1. <u>Pierre to I-90</u>			8. <u>I-90 to I-29 Via Mitchell, Yankton, US 81</u>		
Freeway	515	581	Freeway	549	702
Expressway	256	301	Expressway	385	494
Super 2	62	72	Super 2	110	142
2. <u>Total EDE Via SD 37</u>			9. <u>Aberdeen to I-29 Via Mitchell</u>		
Freeway	2,291	2,983	Freeway	1,820	2,389
Expressway	1,655	2,142	Expressway	1,341	1,781
Super 2	656	865	Super 2	585	734
3. <u>Total EDE Via US 81</u>			10. <u>Aberdeen to I-29 Via Mitchell, Yankton, US 81</u>		
Freeway	2,102	2,746	Freeway	1,538	2,000
Expressway	1,581	2,087	Expressway	1,085	1,428
Super 2	643		Super 2	552	732
4. <u>Aberdeen East to I-29</u>			11. <u>I-90 to Yankton via SD 37</u>		
Freeway	535	693	Freeway	624	797
Expressway	380	506	Expressway	474	619
Super 2	90	117	Super 2	62	81
5. <u>Aberdeen South to Huron</u>			12. <u>I-90 to Yankton via US 81</u>		
Freeway	544	705	Freeway	390	489
Expressway	402	525	Expressway	323	413
Super 2	240	295	Super 2	56	71
6. <u>Huron to I-90 Via Mitchell</u>			13. <u>Regional Trade Center Connections</u>		
Freeway	331	437	Freeway	1,381	1,711
Expressway	182	247	Expressway	818	1,054
Super 2	---	---	Super 2	334	436
7. <u>I-90 to I-29 Via Mitchell, Yankton, SD 37</u>			14. <u>EDE via SD 37 (Super 2/4 Lanes)</u>		
Freeway	820	1,074	Super 2/4 Lanes	1,179	1,488
Expressway	630	832	15. <u>EDE via US 81 (Super 2/4 Lanes)</u>		
Super 2	143	190	Super 2/4 Lanes	1,110	1,402

### Economic Development Impact on the State of South Dakota

The Eastern Dakota Expressway will have a significant impact on the communities and towns on and near the improved highway alternatives, as discussed above. However, the economic development benefits discussed in the previous section are impacts only attributable to the sixteen-county primary impact area. Because of transfers from within the state of South Dakota to the primary impact area, the economic development benefits from the Eastern Dakota Expressway to the entire State are considerably different. The key point is that the State economy will benefit, but not by as much as the local economy of the primary impact area. This is because some of the primary impact area benefits are transfers from elsewhere within the State.

**Statewide Competitive Position Impacts** - The Eastern Dakota Expressway will improve the competitive position of the primary impact area. To a lesser extent, it could also help the statewide South Dakota economy. Reducing the cost of doing business in eastern and central South Dakota could improve the economic situation of firms in other areas in the State. For example, businesses in Rapid City or Sioux Falls which supply stores in Aberdeen could receive benefits from the Eastern Dakota Expressway. Also, the entire State of South Dakota could benefit from the improved competitive position benefits of eastern and central South Dakota, to the extent that the highway causes firms to relocate to South Dakota from other states. Therefore, the competitive position impacts for the entire State of South Dakota are comprised of primary impact area's impacts, plus the benefits from the rest of State. However, jobs and activity diverted from other locations in South Dakota to the primary impact area are not a net benefit to the entire State and therefore are excluded from the study's impact estimates.

The effect of enhancing South Dakota's statewide competitive position through the Eastern Dakota Expressway is displayed on Exhibit 8-9. Over the 30 year analysis period, the entire Eastern Dakota Expressway system (including Pierre to I-90) constructed to freeway standards is estimated to have an economic impact of \$151 million (value added benefits). The 30 year economic impact for the Eastern Dakota Expressway constructed to expressway standards is estimated at \$130 million while the super two-lane alternative is estimated increase economic activity by \$55 million.

**Statewide Increased Roadside Business Activity and Visitor Expenditures** - The impact on the entire State of South Dakota from increased roadside business and visitor expenditures in the primary impact area are considerably less than the impact on the local level. This is because of transfers from within the State to the primary impact area. For example, many of the tourists presently traveling on Interstate 90 to the Black Hills could use the new expressway to visit some of Pierre's attractions such as the State Capital, Lake Oahe, and in the near future the Native American Reconciliation Center. However, the tourist is likely to cut short his visit to the Black Hills by one day because of his or her overnight stop at Pierre. Therefore, much of the economic activity resulting from tourism in the primary impact area

<b>Exhibit 8-9</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>State of South Dakota</b>			
<b>Pierre to I-90</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$542	\$2,594	\$17,783
Personal Income (\$000)	\$274	\$1,393	\$9,783
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$429	\$1,928	\$13,380
Personal Income (\$000)	\$214	\$1,061	\$7,575
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$75	\$340	\$2,342
Personal Income (\$000)	\$40	\$189	\$1,315
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$4,575	\$18,746	\$134,569
Personal Income (\$000)	\$2,294	\$10,777	\$77,246
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,844	\$16,808	\$117,850
Personal Income (\$000)	\$1,945	\$9,746	\$68,149
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,842	\$7,298	\$52,917
Personal Income (\$000)	\$917	\$4,204	\$30,383
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,958	\$15,472	\$112,879
Personal Income (\$000)	\$1,985	\$8,884	\$64,740
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,413	\$14,108	\$100,763
Personal Income (\$000)	\$1,705	\$8,098	\$57,743
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,641	\$6,503	\$47,172
Personal Income (\$000)	\$815	\$3,738	\$27,028
<p>(a) This table includes only the impacts caused by the increased ability of the State of South Dakota to compete with other regions of the nation for economic activity. It excludes other impact types.</p> <p>(b) Discounted at 7 percent.</p> <p>SOURCE: Wilbur Smith Associates, REMI Model</p>			

<b>Exhibit 8-9 (cont.)</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>State of South Dakota</b>			
<b>Aberdeen East to I-29</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,019	\$4,309	\$30,550
Personal Income (\$000)	\$512	\$2,469	\$17,490
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$933	\$4,248	\$29,320
Personal Income (\$000)	\$468	\$2,431	\$16,770
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$178	\$786	\$5,482
Personal Income (\$000)	\$88	\$451	\$3,135
<b>Aberdeen South to Huron</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,662	\$6,570	\$47,695
Personal Income (\$000)	\$825	\$4,050	\$28,854
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,396	\$5,891	\$41,752
Personal Income (\$000)	\$648	\$3,247	\$26,810
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,024	\$4,360	\$30,750
Personal Income (\$000)	\$510	\$2,710	\$18,435
<b>Huron South to I-90 via Mitchell</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$755	\$2,476	\$19,388
Personal Income (\$000)	\$378	\$1,423	\$11,131
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$624	\$2,218	\$16,824
Personal Income (\$000)	\$313	\$709	\$9,651
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	---	---	---
Personal Income (\$000)	---	---	---
(a) This table includes only the impacts caused by the increased ability of the State of South Dakota to compete with other regions of the nation for economic activity. It excludes other impact types.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-9 (cont.)  
INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)  
State of South Dakota**

**I-90 to I-29 via SD 37 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,433	\$6,627	\$45,686
Personal Income (\$000)	\$582	\$3,242	\$21,878
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,123	\$5,495	\$37,168
Personal Income (\$000)	\$723	\$3,817	\$26,310
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$396	\$1,511	\$11,092
Personal Income (\$000)	\$194	\$865	\$6,302

**I-90 to I-29 via US 81 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$786	\$3,143	\$22,747
Personal Income (\$000)	\$397	\$1,805	\$13,038
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$663	\$2,590	\$18,858
Personal Income (\$000)	\$326	\$1,488	\$10,808
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$172	\$620	\$4,663
Personal Income (\$000)	\$84	\$359	\$2,664

**Aberdeen to I-29 via Mitchell, SD 37, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$4,119	\$16,732	\$120,520
Personal Income (\$000)	\$2,063	\$9,626	\$69,214
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,332	\$14,399	\$101,429
Personal Income (\$000)	\$1,689	\$8,370	\$58,768
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,864	\$7,303	\$53,176
Personal Income (\$000)	\$928	\$4,208	\$30,539

(a) This table includes only the impacts caused by the increased ability of the State of South Dakota to compete with other regions of the nation for economic activity. It excludes other impact types.  
(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model



<b>Exhibit 8-9 (cont.)</b>			
<b>INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)</b>			
<b>State of South Dakota</b>			
<b>Aberdeen to I-29 via Mitchell, US 81, and Yankton</b>			
<b>Economic Development Impacts</b>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,387	\$12,905	\$95,067
Personal Income (\$000)	\$1,698	\$7,416	\$54,556
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,804	\$11,187	\$80,952
Personal Income (\$000)	\$1,399	\$6,428	\$46,425
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,649	\$6,450	\$47,012
Personal Income (\$000)	\$820	\$3,708	\$26,343
<b>I-90 to Yankton via SD 37</b>			
<b>Economic Development Impacts</b>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$731	\$3,035	\$21,796
Personal Income (\$000)	\$366	\$1,744	\$12,508
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$602	\$3,139	\$20,760
Personal Income (\$000)	\$300	\$1,804	\$11,906
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$149	\$520	\$3,959
Personal Income (\$000)	\$74	\$299	\$2,218
<b>I-90 to Yankton via US 81</b>			
<b>Economic Development Impacts</b>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$271	\$1,182	\$8,280
Personal Income (\$000)	\$136	\$679	\$4,752
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$276	\$1,087	\$7,890
Personal Income (\$000)	\$138	\$625	\$4,525
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$78	\$271	\$2,064
Personal Income (\$000)	\$39	\$156	\$1,157
<p>(a) This table includes only the impacts caused by the increased ability of the State of South Dakota to compete with other regions of the nation for economic activity. It excludes other impact types.</p> <p>(b) Discounted at 7 percent.</p> <p>SOURCE: Wilbur Smith Associates, REMI Model</p>			

**Exhibit 8-9 (cont.)  
INCREASED COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS (a)  
State of South Dakota**

**Regional Trade Center Connections**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,316	\$9,379	\$67,716
Personal Income (\$000)	\$1,164	\$5,285	\$38,404
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,986	\$8,393	\$59,524
Personal Income (\$000)	\$995	\$4,221	\$33,996
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$877	\$3,344	\$24,648
Personal Income (\$000)	\$441	\$1,349	\$14,101

**EDE via SD 37 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$3,152	\$13,200	\$93,805
Personal Income (\$000)	\$1,540	\$6,615	\$47,010

**EDE via US 81 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$2,973	\$12,492	\$88,683
Personal Income (\$000)	\$1,470	\$7,095	\$50,429

(a) This table includes only the impacts caused by the increased ability of the State of South Dakota to compete with other regions of the nation for economic activity. It excludes other impact types.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

will be a transfer from within the State. Until communities like Pierre can develop into a primary tourist destination, the resulting economic activity from tourism is likely to be from pass through traffic and thus not a net gain for the entire State of South Dakota. Also, roadside expenditures spent in the primary impact area by traffic diverted from other highways in the State, such as Canadian traffic diverted from Interstate 29 to S.D. Highway 281, is not a net benefit to the State of South Dakota. Only the expenditures from visitors or travelers who were not previously spending the money elsewhere in South Dakota is of benefit to the State.

The Statewide impacts from increased roadside business activity and visitor expenditures from the Eastern Dakota Expressway are summarized on Exhibit 8-10. If the entire Eastern Dakota Expressway system is constructed as a freeway the net economic impact to the State of South Dakota will result in \$35 million (value added), the expressway system constructed as a four-lane expressway the State will be better off by \$21 million, and a super two-lane Eastern Dakota Expressway system is estimated to increase economic activity by \$10 million.

**Statewide Non-Business Impacts** - Just as many businesses and firms from other areas of South Dakota would use the Eastern Dakota Expressway, so will many non-business travelers. Therefore, motorists traveling to or from other areas in South Dakota benefit from the new highway. Similar to the competitive position impacts, the non-business economic development benefits equal the primary impact area's benefits plus the benefits to other residents in the State, less any transfer effects. The non-business economic development impacts for each route option and highway standard alternative are summarized on Exhibit 8-11.

**Total Statewide Economic Development Impacts** - The total statewide economic development impacts estimated for the entire State of South Dakota are displayed on Exhibit 8-12. South Dakota's total benefits are less than the total primary impact area benefits since some of the primary impact area benefits are transfers from elsewhere in South Dakota. Despite this, the economic development benefits are similar. This is because the State has a larger multiplier (more responding) than does the primary impact area. There are significant transfers from within the State; however, the impacts that are of net benefit to the entire State of South Dakota remain in the economy longer because of the State's larger multipliers.

#### **Economic Development Feasibility**

To determine whether the Eastern Dakota Expressway is feasible from the economic development perspective, each highway improvement's costs are compared with its economic development benefits using benefit/cost analysis. The cost side of the equation comprises the same capital and maintenance costs as used in the travel efficiency evaluation. The economic development impacts already include the proper share of the travel efficiency benefits; therefore the travel efficiency benefits (of Chapter 7) and the economic development impacts (of Chapter 8) should not be added together.

**Exhibit 8-10**  
**INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)**  
**State of South Dakota**

**Pierre to I-90**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$441	\$1,148	\$8,776
Personal Income (\$000)	\$287	\$846	\$6,588
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$370	\$933	\$7,234
Personal Income (\$000)	\$243	\$716	\$5,576
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$68	\$158	\$1,277
Personal Income (\$000)	\$41	\$122	\$948

**Total Eastern Dakota Expressway Via Route SD 37**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,868	\$2,942	\$27,043
Personal Income (\$000)	\$1,162	\$2,168	\$19,497
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$895	\$1,683	\$14,317
Personal Income (\$000)	\$553	\$1,242	\$10,308
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$449	\$684	\$6,385
Personal Income (\$000)	\$277	\$502	\$4,572

**Total Eastern Dakota Expressway Via Route US 81**

Economic Development Impacts

	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,672	\$2,635	\$24,208
Personal Income (\$000)	\$1,035	\$1,940	\$17,411
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$916	\$1,423	\$13,165
Personal Income (\$000)	\$564	\$1,051	\$9,456
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$411	\$619	\$5,793
Personal Income (\$000)	\$251	\$449	\$4,114

(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the State.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-10 (cont.)</b>			
<b>INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)</b>			
<b>State of South Dakota</b>			
<b>Aberdeen East to I-29</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$430	\$730	\$6,490
Personal Income (\$000)	\$267	\$538	\$4,666
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$282	\$479	\$4,254
Personal Income (\$000)	\$173	\$353	\$3,057
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$55	\$94	\$828
Personal Income (\$000)	\$34	\$69	\$595
<b>Aberdeen South to Huron</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$620	\$933	\$8,756
Personal Income (\$000)	\$385	\$684	\$5,642
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$305	\$454	\$4,290
Personal Income (\$000)	\$172	\$305	\$2,855
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$164	\$235	\$2,255
Personal Income (\$000)	\$90	\$145	\$1,490
<b>Huron South to I-90 via Mitchell</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$302	\$470	\$4,339
Personal Income (\$000)	\$187	\$346	\$3,122
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$171	\$263	\$2,439
Personal Income (\$000)	\$105	\$194	\$1,752
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	--	--	--
Personal Income (\$000)	--	--	--
(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the State.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-10 (cont.)  
INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)  
State of South Dakota**

**I-90 to I-29 via SD 37 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$562	\$883	\$8,129
Personal Income (\$000)	\$353	\$652	\$5,890
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$236	\$664	\$4,866
Personal Income (\$000)	\$147	\$489	\$3,516
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$114	\$176	\$1,632
Personal Income (\$000)	\$71	\$130	\$1,178

**I-90 to I-29 via US 81 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$358	\$563	\$5,171
Personal Income (\$000)	\$221	\$414	\$3,717
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$258	\$393	\$3,668
Personal Income (\$000)	\$159	\$291	\$2,634
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$74	\$104	\$995
Personal Income (\$000)	\$44	\$75	\$701

**Aberdeen to I-29 via Mitchell, SD 37, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,534	\$2,361	\$21,932
Personal Income (\$000)	\$955	\$1,740	\$15,824
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$727	\$1,408	\$11,839
Personal Income (\$000)	\$450	\$1,039	\$8,527
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$417	\$626	\$5,884
Personal Income (\$000)	\$257	\$459	\$4,210

(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the State.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-10 (cont.)</b>			
<b>INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)</b>			
<b>State of South Dakota</b>			
<b>Aberdeen to I-29 via Mitchell, US 81, and Yankton</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,323	\$2,031	\$18,879
Personal Income (\$000)	\$818	\$1,495	\$13,580
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$748	\$1,131	\$10,600
Personal Income (\$000)	\$461	\$836	\$7,612
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$376	\$556	\$5,249
Personal Income (\$000)	\$229	\$402	\$3,720
<b>I-90 to Yankton via SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$509	\$808	\$7,398
Personal Income (\$000)	\$315	\$595	\$5,322
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$223	\$634	\$4,627
Personal Income (\$000)	\$137	\$469	\$3,323
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$90	\$128	\$1,204
Personal Income (\$000)	\$55	\$93	\$853
<b>I-90 to Yankton via US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$288	\$459	\$4,189
Personal Income (\$000)	\$178	\$338	\$3,013
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$231	\$355	\$3,301
Personal Income (\$000)	\$142	\$262	\$2,370
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$44	\$63	\$595
Personal Income (\$000)	\$27	\$46	\$42
<p>(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the State.</p> <p>(b) Discounted at 7 percent.</p> <p>SOURCE: Wilbur Smith Associates, REMI Model</p>			

**Exhibit 8-10 (cont.)  
INCREASED ROADSIDE BUSINESS AND VISITOR EXPENDITURE IMPACTS (a)  
State of South Dakota**

**Regional Trade Center Connections**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,173	\$2,348	\$19,605
Personal Income (\$000)	\$741	\$1,730	\$14,376
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$823	\$1,675	\$13,927
Personal Income (\$000)	\$521	\$1,263	\$10,385
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$269	\$514	\$4,494
Personal Income (\$000)	\$180	\$385	\$3,295

**EDE via SD 37 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$1,019	\$1,930	\$16,485
Personal Income (\$000)	\$645	\$1,500	\$12,910

**EDE via US 81 (Super 2/4 Lanes)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$991	\$1,881	\$16,045
Personal Income (\$000)	\$625	\$1,460	\$12,565

(a) This table includes only the impacts caused by the increased traveler expenditures from additional tourists and motorists in the State.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model



**Exhibit 8-11**  
**NON-BUSINESS ECONOMIC DEVELOPMENT IMPACTS (a)**  
**State of South Dakota**

**Value Added Impacts (\$ Thousand)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<u>Pierre to I-90</u>			
Freeway	\$314	\$616	\$5,143
Expressway	292	559	4,721
Super 2	78	180	1,415
<u>Entire EDE Via SD 37</u>			
Freeway	\$6,835	\$8,333	\$86,867
Expressway	5,678	7,750	76,361
Super 2	2,059	2,729	27,276
<u>Entire EDE Via US 81</u>			
Freeway	\$7,006	\$8,890	\$90,805
Expressway	5,810	7,978	78,378
Super 2	2,130	3,563	31,973
<u>Aberdeen East to I-29</u>			
Freeway	\$2,947	\$3,601	\$37,494
Expressway	2,073	3,234	29,934
Super 2	523	751	7,223
<u>Aberdeen South to Huron</u>			
Freeway	\$1,243	\$2,079	\$18,651
Expressway	1,643	2,153	21,639
Super 2	157	304	2,563
<u>Huron to I-90 Via Mitchell</u>			
Freeway	\$1,389	\$1,738	\$17,882
Expressway	1,102	1,347	14,020
Super 2	--	--	--
<u>I-90 to I-29 Via Mitchell, Yankton, SD 37</u>			
Freeway	\$607	\$800	\$8,015
Expressway	794	1,138	10,948
Super 2	378	489	4,943

(a) This table includes only the impacts attributable to non-business travel. It excludes other impact types.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-11 (Cont.)**  
**NON-BUSINESS ECONOMIC DEVELOPMENT IMPACTS (a)**  
**State of South Dakota**

**Value Added Impacts (\$ Thousand)**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>I-90 to I-29 Via Mitchell, Yankton, US 81</u></b>			
Freeway	\$1,081	\$1,447	\$14,394
Expressway	1,069	1,440	14,278
Super 2	473	564	5,943
<b><u>Aberdeen to I-29 Via Mitchell, Yankton, SD 37</u></b>			
Freeway	\$3,675	\$4,717	\$47,904
Expressway	3,537	4,534	46,073
Super 2	1,605	2,078	21,017
<b><u>Aberdeen to I-29 Via Mitchell, Yankton, US 81</u></b>			
Freeway	\$4,226	\$5,276	\$54,337
Expressway	3,799	4,796	49,111
Super 2	1,686	2,216	22,239
<b><u>I-90 to Yankton via SD 37</u></b>			
Freeway	\$430	\$558	\$5,636
Expressway	550	777	7,533
Super 2	169	233	2,277
<b><u>I-90 to Yankton via US 81</u></b>			
Freeway	\$845	\$1,119	\$11,193
Expressway	848	1,129	11,260
Super 2	215	266	2,753
<b><u>Regional Trade Center Connections</u></b>			
Freeway	\$4,560	\$5,955	\$60,519
Expressway	3,467	5,139	48,675
Super 2	1,704	2,277	22,658
<b><u>EDE via SD 37 (Super 2/4 Lanes)</u></b>			
Super 2/4 Lanes	\$3,703	\$5,489	\$51,989
<b><u>EDE via US 81 (Super 2/4 Lanes)</u></b>			
Super 2/4 Lanes	\$3,827	\$5,611	\$53,414

(a) This table includes only the impacts attributable to non-business travel. It excludes other impact types.  
 (b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

<b>Exhibit 8-12</b>			
<b>TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)</b>			
<b>State of South Dakota</b>			
<b>Pierre to I-90</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,297	\$4,358	\$31,702
Personal Income (\$000)	\$561	\$2,239	\$16,371
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,091	\$3,420	\$25,335
Personal Income (\$000)	\$457	\$1,797	\$13,151
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$221	\$678	\$5,034
Personal Income (\$000)	\$81	\$311	\$2,262
<b>Total Eastern Dakota Expressway Via Route SD 37</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$13,278	\$30,021	\$248,479
Personal Income (\$000)	\$3,456	\$12,945	\$96,743
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$10,417	\$26,241	\$208,528
Personal Income (\$000)	\$2,498	\$10,988	\$78,457
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$4,350	\$10,711	\$86,578
Personal Income (\$000)	\$1,194	\$4,706	\$34,955
<b>Total Eastern Dakota Expressway Via Route US 81</b>			
<b>Economic Development Impacts</b>			
	<b>1995</b>	<b>2015</b>	<b>Discounted 30 Yr. Benefits(b)</b>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$12,636	\$26,997	\$227,892
Personal Income (\$000)	\$3,020	\$10,824	\$82,151
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$10,139	\$23,509	\$192,306
Personal Income (\$000)	\$2,269	\$9,149	\$67,199
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$4,182	\$10,685	\$84,938
Personal Income (\$000)	\$1,066	\$4,187	\$31,142
(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.			
(b) Discounted at 7 percent.			
SOURCE: Wilbur Smith Associates, REMI Model			

**Exhibit 8-12 (cont.)  
TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)  
State of South Dakota**

**Aberdeen East to I-29**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$4,396	\$8,640	\$74,534
Personal Income (\$000)	\$779	\$3,007	\$22,156
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,288	\$7,961	\$63,508
Personal Income (\$000)	\$641	\$2,784	\$19,827
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$756	\$1,631	\$13,533
Personal Income (\$000)	\$122	\$520	\$3,730

**Aberdeen South to Huron**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$3,525	\$9,582	\$75,102
Personal Income (\$000)	\$1,210	\$4,734	\$34,496
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$3,344	\$8,498	\$67,681
Personal Income (\$000)	\$820	\$3,552	\$29,665
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$1,345	\$4,899	\$35,568
Personal Income (\$000)	\$600	\$2,855	\$19,925

**Huron South to I-90 via Mitchell**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,446	\$4,684	\$41,609
Personal Income (\$000)	\$565	\$1,770	\$14,253
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,897	\$3,828	\$33,283
Personal Income (\$000)	\$418	\$903	\$11,403
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	--	--	--
Personal Income (\$000)	--	--	--

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-12 (cont.)  
TOTAL ECONOMIC DEVELOPMENT IMPACTS (a)  
State of South Dakota**

**I-90 to I-29 via SD 37 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,602	\$6,310	\$61,830
Personal Income (\$000)	\$935	\$3,894	\$27,768
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$2,153	\$7,297	\$52,982
Personal Income (\$000)	\$870	\$4,306	\$29,826
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$888	\$2,176	\$17,667
Personal Income (\$000)	\$265	\$995	\$7,480

**I-90 to I-29 via US 81 and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$2,225	\$5,153	\$42,312
Personal Income (\$000)	\$618	\$2,219	\$16,755
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,990	\$4,423	\$36,804
Personal Income (\$000)	\$485	\$1,779	\$13,442
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$719	\$1,288	\$11,601
Personal Income (\$000)	\$128	\$434	\$3,365

**Aberdeen to I-29 via Mitchell, SD 37, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$9,328	\$23,810	\$190,356
Personal Income (\$000)	\$3,018	\$11,366	\$85,038
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$7,596	\$20,341	\$159,341
Personal Income (\$000)	\$2,139	\$9,409	\$67,295
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$3,886	\$10,007	\$80,077
Personal Income (\$000)	\$1,185	\$4,667	\$34,749

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-12 (cont.)  
TOTAL ECONOMIC DEVELOPMENT IMPACTS (a)  
State of South Dakota**

**Aberdeen to I-29 via Mitchell, US 81, and Yankton**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$8,936	\$20,212	\$168,283
Personal Income (\$000)	\$2,516	\$8,911	\$68,136
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$7,351	\$17,114	\$140,663
Personal Income (\$000)	\$1,860	\$7,264	\$54,037
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$3,711	\$9,222	\$74,500
Personal Income (\$000)	\$1,049	\$4,110	\$30,063

**I-90 to Yankton via SD 37**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,670	\$4,401	\$34,830
Personal Income (\$000)	\$681	\$2,339	\$17,830
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,375	\$4,550	\$32,920
Personal Income (\$000)	\$438	\$2,272	\$15,228
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$408	\$881	\$7,440
Personal Income (\$000)	\$129	\$391	\$3,072

**I-90 to Yankton via US 81**

	<u>Economic Development Impacts</u>		
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$1,404	\$2,760	\$23,662
Personal Income (\$000)	\$314	\$1,017	\$7,765
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$1,355	\$2,571	\$22,451
Personal Income (\$000)	\$280	\$887	\$6,895
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$337	\$600	\$5,412
Personal Income (\$000)	\$66	\$201	\$1,198

(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.

(b) Discounted at 7 percent.

SOURCE: Wilbur Smith Associates, REMI Model

**Exhibit 8-12 (cont.)  
TOTAL ECONOMIC DEVELOPMENT BENEFITS (a)  
State of South Dakota**

**Regional Trade Center Connections**

<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>FREEWAY</u></b>			
Value Added (\$000)	\$8,049	\$17,682	\$158,112
Personal Income (\$000)	\$1,905	\$7,015	\$52,780
<b><u>EXPRESSWAY</u></b>			
Value Added (\$000)	\$6,276	\$15,207	\$126,310
Personal Income (\$000)	\$1,516	\$5,484	\$44,381
<b><u>SUPER 2 LANE</u></b>			
Value Added (\$000)	\$2,870	\$6,135	\$53,631
Personal Income (\$000)	\$621	\$1,734	\$17,396
<b>EDE via SD 37 (Super 2/4 Lanes)</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$7,874	\$20,619	\$168,479
Personal Income (\$000)	\$2,185	\$8,115	\$59,920
<b>EDE via US 81 (Super 2/4 Lanes)</b>			
<u>Economic Development Impacts</u>			
	<u>1995</u>	<u>2015</u>	<u>Discounted 30 Yr. Benefits(b)</u>
<b><u>SUPER 2/4 LANES</u></b>			
Value Added (\$000)	\$7,790	\$19,984	\$164,357
Personal Income (\$000)	\$2,095	\$8,555	\$62,994
<p>(a) This table lists the total estimated economic development benefits attributable to the highway improvements in two example years.            (b) Discounted at 7 percent.            SOURCE: Wilbur Smith Associates, REMI Model</p>			

**Economic Development Feasibility** - The cost and benefit calculations are contained in Appendix E. In making the calculations, all costs are assumed to be spent in one year (1993), followed by 30 years of benefits. The feasibility results are presented in terms of three calculations:

- Discounted benefit/cost ratio
- Internal rate of return terms of three
- Net present value

To interpret these results, the following rules apply:

- A project with a benefit/cost ratio of 1.0 or more is an economically feasible project.
- A project with a rate of return in excess of 7% is economically feasible. If the project's rate of return is significantly less than 7 percent, then the money would better be spent elsewhere.
- A project with a positive net present value is an economically feasible investment. An investment with a negative net present value is not an economically feasible project.

**Economic Feasibility from Each Corridor's Perspective** - The people who live and work in proximity to each of the highway corridors stand to gain a great deal economically if the various highways are built. The reason is that most of the economic benefits accrue to communities in proximity to the highways. If the highways are built to 4-lane standard, those communities will suddenly be better able to compete for new firms and therefore for new economic activity.

To determine whether or not the highways are economically feasible from the local corridor perspectives, the local primary impact area economic development benefits were compared with each highway's costs. The results are presented on Exhibit 8-13. These indicators of economic feasibility suggest the following:

- From the perspective of each corridor's residents, the highway improvements are all economically feasible and justified.
- From the local perspective, the 4-lane expressway design standard is typically more feasible than is the 4-lane freeway or the combination 2-lane and 4-lane (although in a couple of instances the 2-and 4-lane option is slightly superior).
- The rates of return are in the range of 9 to 18 percent indicating that, from the local corridor residents perspective, the projects are very worthwhile.

These statistics indicate that the local residents are wise to be pursuing the 4-lane concept; if they can persuade the State and/or federal government to fund the projects, the local economies in proximity to the corridors will benefit.



**Exhibit 8-13**  
**ECONOMIC DEVELOPMENT FEASIBILITY INDICATORS**  
**Corridor Perspective**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.99	6.8%	-1.4	1.64	14.0%	20.5	1.30	10.6%	2.9
2. Total Eastern Dakota Expressway Via Route SD 37	1.26	10.3%	113.8	1.36	11.5%	109.3	1.34	11.3%	42.3
3. Total Eastern Dakota Expressway Via Route US 81	1.23	10.0%	93.9	1.32	11.1%	89.4	1.30	10.7%	36.5
4. Aberdeen East to I-29	1.32	11.1%	34.0	1.54	13.4%	37.5	1.41	11.9%	7.2
5. Aberdeen South to Huron	1.21	9.8%	27.6	1.24	10.1%	24.8	1.09	8.2%	5.0
6. Huron South to I-90 via Mitchell	1.47	12.8%	27.6	1.96	18.1%	27.0	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	1.07	7.7%	9.7	1.31	10.7%	31.3	1.49	12.8%	11.7
8. I-90 to I-29 via US 81 and Yankton	1.14	8.8%	14.9	1.15	9.1%	11.9	1.11	8.5%	2.7
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	1.29	10.7%	97.5	1.39	11.7%	90.1	1.39	11.8%	41.5
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	1.26	10.4%	76.7	1.30	10.8%	63.8	1.31	10.9%	32.7
11. I-90 to Yankton via SD 37	1.13	8.7%	15.2	1.27	10.3%	23.2	1.44	12.3%	4.7
12. I-90 to Yankton via US 81	1.06	7.9%	5.2	1.25	10.4%	15.3	1.18	9.4%	2.1
13. Reg. Trade Center Connections	1.23	9.9%	60.2	1.66	14.6%	85.0	1.67	14.9%	37.1
14. EDE via SD 37 (Super 2/4 Lanes)	--	--	--	1.59	14.0%	108.4	--	--	--
15. EDE via US 81 (Super 2/4 Lanes)	--	--	--	1.49	13.0%	90.5	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.

SOURCE: Wilbur Smith Associates

**Economic Feasibility from the State's Perspective** - The highway projects are clearly feasible and beneficial from the perspective of people who live and work in proximity to the highways. This, however, is true of most highway projects. The State of South Dakota needs to be careful of relying on localized economic developments as a basis for its investment decisions because, to do so, would mean that the State would spend the residents' tax dollars simply in an attempt to enable all communities to better compete with each other. While perhaps resulting in an equitable situation, e.g., all communities would have 4-lane highways and therefore be able to equitably compete with each other, the State would have used the residents' taxes to build highways which, from a statewide perspective, may have been uneconomic.

At issue is whether the benefits accruing locally along a corridor are benefits brought into the State or whether they are benefits that merely shifted from one South Dakota place to another. If they merely comprise a shift from one place to another, they are not net gains to South Dakota, they are only net gains to the specific highway corridor.

To gauge the extent to which the projects might be feasible from the Statewide perspective, the statewide benefits were compared with the project's costs. The results are presented on Exhibits 8-16, 17 and 18. These exhibits suggest the following conclusions, from the statewide perspective.

1. The total Eastern Dakota Expressway via either S.D. 37 or U.S. 81 is currently not an economically feasible project. The benefit/cost ratios for the project range from 0.60 to 0.74, with negative net present values. However, individual segments of the Expressway are more viable.
2. From the statewide perspective, Huron to Interstate 90 built as a 4-lane Expressway is an economically feasible highway project (B/C ratio of 1.22), and Aberdeen East to Interstate 29 also built as a 4-lane Expressway has a benefit/cost ratio of 0.95 and is nearly feasible. This analysis looks at feasibility in the year 1993. By delaying construction, the Aberdeen cost to I-29 section would be feasible in the year 1995. Therefore, the State may want to consider this project in the near future.
3. The section of the Eastern Dakota Expressway from Aberdeen South to Huron constructed to expressway standards has a benefit cost ratio of 0.70. This indicates that this section of highway is currently not feasible as a four-lane highway.
4. Pierre to Interstate 90 (Expressway) is also not currently feasible (B/C ratio of 0.83). However, once planned tourist attractions in the area are developed and the Pierre/Ft. Pierre area develops into more of a primary tourist destination, this section of highway might also become feasible.

**Exhibit 8-14**  
**ECONOMIC DEVELOPMENT FEASIBILITY INDICATORS**  
**State of South Dakota Perspective**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.37	1.2%	-61.4	0.83	5.6%	-5.6	0.55	2.9%	-4.3
2. Total Eastern Dakota Expressway Via Route SD 37	0.60	3.4%	-176.8	0.72	4.6%	-83.4	0.74	4.7%	-32.0
3. Total Eastern Dakota Expressway Via Route US 81	0.60	3.3%	-161.9	0.72	4.5%	-77.2	0.72	4.6%	-34.8
4. Aberdeen East to I-29	0.73	4.6%	-28.9	0.95	6.6%	-3.5	0.81	5.5%	-3.2
5. Aberdeen South to Huron	0.62	3.6%	-48.9	0.70	4.4%	-30.5	0.69	4.4%	-16.5
6. Huron South to I-90 Via Mitchell	0.74	4.7%	-15.2	1.22	8.8%	6.1	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	0.46	2.1%	-79.3	0.55	3.0%	-46.0	0.77	5.0%	-5.6
8. I-90 to I-29 via US 81 and Yankton	0.42	1.4%	-63.3	0.50	2.2%	-40.0	0.50	2.1%	-12.6
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	0.61	3.5%	-131.2	0.72	4.6%	-65.5	0.79	5.2%	-21.9
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	0.60	3.4%	-117.8	0.69	4.2%	-65.6	0.73	4.7%	-28.4
11. I-90 to Yankton via SD 37	0.33	0.3%	-79.7	0.42	1.5%	-49.3	0.73	4.7%	-2.9
12. I-90 to Yankton via US 81	0.32	0.1%	-55.3	0.40	0.8%	-37.3	0.49	2.1%	-6.0
13. Reg. Trade Center Connections	0.60	3.4%	-105.5	0.98	6.8%	-2.9	0.97	6.8%	-1.4
14 EDE Via SD 37 (Super 2/4 Lanes)	--	--	--	0.92	6.3%	-14.8	--	--	--
15 EDE Via US 81 (Super 2/4 Lanes)	--	--	--	0.89	6.1%	-20.0	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.

SOURCE: Wilbur Smith Associates

5. The section of the Eastern Dakota Expressway from Interstate 90 to Interstate 29 via Mitchell and Yankton is least feasible from the State's perspective. The larger communities within this section (Mitchell, Yankton and Vermillion) are currently located on or connected to the interstate highway system via a four-lane highway. Therefore, this section of highway's primary purpose would be to provide more reliable and efficient transportation for existing and future business traffic. With the amount of traffic volumes forecast for this segment of highway, a four-lane expressway is not feasible.
6. The Regional Trade Center Connections option, comprising Huron to I-90, Aberdeen to I-29, and Pierre to I-90, has a benefit/cost ratio of 0.98. This package of options should be economically feasible by the year 1995.
7. The total Eastern Expressway constructed as a combination Super 2/4 Lane highway (via SD 37 and SD 50) has a B/C ratio of 0.92 and should be feasible around the year 2000.

### Economic Feasibility Results

These economic development oriented calculations suggest the following:

1. In terms of economic value to eastern and central South Dakota, the Eastern Dakota Expressway would add significantly to the region's economy.
2. In terms of economic value to the State South Dakota, the entire Eastern Dakota Expressway system is not economically feasible. Only the section of the Expressway between Huron to Interstate 90 constructed as a four-lane expressway is currently feasible. However, the Regional Trade Center connections and Aberdeen East to I-29 alternatives constructed as four-lane expressways should become feasible in the near future (by the year 1995).

## Chapter 9

# FEASIBILITY CONCLUSIONS

Chapters 1-9 of this study analyzed the need for, and feasibility of, implementing an Expressway Program in the State of South Dakota. The feasibility of the Eastern Dakota and Pierre to I-90 Expressways, as well as individual segments of the proposed expressways, were investigated. The study examined various highway standards to determine the appropriate level of investment for the Expressway Program. All of the Eastern Dakota and Pierre to I-90 Expressway options were subjected to five tests of feasibility:

- **Need Based on Traffic** - Are the Eastern Dakota and Pierre to I-90 Expressways needed based on current and forecast traffic volumes?
- **Engineering and Cost Feasibility** - Are there any unusual engineering difficulties, and what would the Expressway alternatives cost to build and operate?
- **Environmental Feasibility** - Can the Eastern Dakota and Pierre to I-90 Expressways be constructed without undue harm to the environment?
- **Travel Efficiency Feasibility** - Will the Expressways cause sufficient highway user benefits to justify the investments?
- **Economic Development Feasibility** - Will the Eastern Dakota and Pierre to I-90 Expressways cause sufficient economic development to justify the investments?

### Need Based on Traffic

This feasibility study included an extensive assessment of traffic in eastern and central South Dakota. Included were roadside origin and destination traffic surveys, Interstate highway rest area surveys, surveys and discussions with trucking and manufacturing firms who ship and receive goods and products in the area, agricultural surveys, and others. Based on this information, a computerized traffic model was developed and traffic forecasts were made for all of the Eastern Dakota/Pierre to I-90 Expressway corridors. The traffic analyses suggest the following:

- The forecast (year 2015) average annual daily traffic volumes for the Eastern Dakota/Pierre to I-90 Corridors are insufficient to warrant construction of new four-lane highways. The highway corridors, on average, are forecast to carry between 2,000 and 4,000 vehicles per day. These volumes are much less than the 5,000 to 6,000 vehicles typically needed before a four-lane is considered because of traffic.
- Of all of the corridors being considered, the Aberdeen to Interstate 29 corridor via US Highway 12 is forecast to carry the most traffic. Future traffic volumes are estimated to reach 7,000 vehicles per day on the existing four-lane section east of Aberdeen, and just over 3,000 vehicles per day just west of Interstate 29.
- There are, however, individual segments within each corridor that have experienced larger traffic increases. Some of these segments include SD 37 between Mitchell

and Tripp, US 12 between Groton and Webster and US 83 between Pierre and I-90.

Because of these comparatively low traffic volumes, there is little traffic congestion in the corridors and, to handle the forecast volumes, passing lanes and similar spot improvements would likely be sufficient, from a traffic operations perspective.

Therefore, if there is a rationale for building any of the 4-lane highways, it would have to be an economic rationale rather than a traffic rationale.

### Engineering and Cost Feasibility

An inventory of physical highway conditions was conducted to assist in determining the engineering feasibility of constructing additional lanes or improving existing two-lane highways in the Expressway Corridors. The engineering review indicated that the majority of the existing highways can be upgraded to four-lanes. However, more detailed alignment studies would need to be performed, and public hearings would need to be conducted, before actual construction could take place.

Any of the highway improvement options (Freeway, Expressway, or Super Two) built in any of the Expressway Corridors will be quite expensive to build and maintain. Construction costs for each of the thirteen route combinations and design standards were estimated to determine the magnitude of funds necessary to build and maintain the expressways. The construction costs include right-of-way acquisition, planning, design, and construction. The entire Eastern Dakota and Pierre to I-90 Expressways constructed at interstate (Freeway) standards is estimated to cost approximately \$550 million. The expressway type highway is estimated at approximately \$330 million, and a super-two lane highway is estimated at \$135 million. Exhibit 9-1 displays the capital cost estimates for each of the thirteen alternatives.

### Environmental Feasibility

Regardless of the route(s) or design standards ultimately selected, the environmental overview for this study has determined that it is unlikely that the environmental impacts will be critical to the point that they cannot be either avoided, minimized or mitigated. The primary reason for the relatively low level of anticipated impacts, considering the length of the proposed expressway facilities, is the fact that most alignments are being proposed along existing highway routes. Land use patterns, transportation patterns, and ecological functions have already adapted to the presence of the existing highway along these routes. As a result, expansion, upgrade, or modest realignment of these facilities is likely to be less harmful to the environment than would a new highway on a new location. There are, however, several community bypasses proposed in the Expressway Corridors. These highways would most likely be constructed on new right-of-way. Proper care must be taken on these locations to minimize negative impacts. In any of the corridors, greater environmental analysis will be required, before final decisions are made.

**Exhibit 9-1**  
**CAPITAL COST ESTIMATES SUMMARY**  
**\$ Million**

<u>ROUTE LOCATION OPTIONS</u>	<u>FREEWAY</u>	<u>EXPRESSWAY</u>	<u>SUPER 2</u>
1. Pierre to I-90	100.6	31.9	9.5
2. Total Eastern Dakota Express via Route SD 37	450.9	303.6	124.7
3. Total Eastern Dakota Express via Route US 81	413.2	280.5	125.6
4. Aberdeen East to I-29	110.0	70.1	18.3
5. Aberdeen South to Huron	131.0	102.4	53.8
6. Huron South to I-90 via Mitchell	59.9	27.9	---
7. I-90 to I-29 via SD 37 and Yankton	149.9	103.3	24.7
8. I-90 to I-29 via US 81 and Yankton	112.2	80.2	25.6
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	340.9	233.5	106.4
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	303.2	210.4	107.3
11. I-90 to Yankton via S.D. 37	121.2	85.3	11.4
12. I-90 to Yankton via US 81	83.6	62.2	12.2
13. Regional Trade Center Connections	270.5	129.9	55.7
14. Eastern Dakota Express via SD 37 (Super 2/4 Lanes)	---	182.8	---
15. Eastern Dakota Express via US 81 (Super 2/4 Lanes)	---	183.7	---

SOURCE: Banner Associates, Inc.  
Wilbur Smith Associates

### Travel Efficiency Feasibility

Highways are best thought of as "tools" for moving goods and people from one place to another. In this sense, highways generate benefits to the extent that they lower real and perceived transportation costs. The principal way that transportation can contribute to economic development is by reducing the cost of moving people and goods, thereby increasing travel efficiency.

The travel efficiency assessment is the traditional method of determining whether or not a highway improvement is economically feasible. According to this test of feasibility, a highway improvement must be quite successful in reducing per vehicle operating cost (fuel consumption, etc.), travel time, and accident risk; and it needs to have sufficient traffic volumes to attain the necessary magnitude of highway benefits.

To determine whether or not the Eastern Dakota and Pierre to I-90 Expressways are feasible from the travel efficiency perspective, the highway user cost savings from the highway improvements (vehicle cost savings, travel time savings, and reduced accidents) are compared to the highway's costs. Exhibit 9-2 displays the travel efficiency feasibility indicators. According to this travel efficiency measure, any highway improvement with a "benefit/cost ratio" of 1.0 or more, an "internal rate of return" of 7.0 percent or greater, and a positive net present value is economically feasible.

The travel efficiency indicators in the right column suggest that none of the Eastern Dakota/Pierre to I-90 Expressway alternatives are feasible from the travel efficiency perspective. Existing and forecast traffic levels do not warrant an upgraded highway solely based on highway user benefits on any of the Expressway alternatives.

It should be noted that the travel efficiency analysis only includes benefits associated with highway use. Economic development benefits are not included in travel efficiency. The economic development feasibility evaluation is discussed in the next section.

### Economic Development Feasibility

The key issue addressed in this study, and the key feasibility test, is whether or not an Expressway Program in South Dakota will generate sufficient economic development benefits to warrant the investment. The remainder of this chapter deals with this economic development test of feasibility.

**Economic Basis For a Feasible Highway Project** - The Eastern Dakota and Pierre to I-90 Expressways would be used to transport goods and people from one place to another. Investment in the Expressways contributes to economic development in that it will lower transportation costs which makes the corridor region increasingly attractive to other forms of investment. Such changes may be realized in numerous ways, including improved traffic safety, decreases in fuel and other vehicle operating costs, increased tourism, attraction of new industry, revised logistics, and changes in noise and air pollution. But in the final analysis, all of the direct benefits from the Expressways, and therefore the justification for investing in them, flow from using them for transportation.



**Exhibit 9-2**  
**TRAVEL EFFICIENCY FEASIBILITY INDICATORS**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.18	-1.6%	-79.9	0.38	0.5%	-19.8	0.34	-0.1%	-6.4
2. Eastern Dakota Expressway Via Route SD 37	0.39	0.7%	-288.1	0.50	1.9%	-160.2	0.48	1.7%	-68.4
3. Eastern Dakota Expressway Via Route US 81	0.43	1.1%	-248.1	0.54	2.3%	137.9	0.48	1.7%	-69.1
4. Aberdeen East to I-29	0.48	1.7%	-59.8	0.64	3.6%	-26.4	0.66	3.8%	-6.4
5. Aberdeen South to Huron	0.39	6.0%	-78.3	0.45	1.2%	-56.3	0.35	-0.1%	-35.2
6. Huron South to I-90 via Mitchell	0.49	1.8%	-32.1	0.77	4.7%	-6.5	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	0.27	-0.8%	-114.8	0.37	0.4%	-69.0	0.45	1.5%	-14.2
8. I-90 to I-29 via US 81 and Yankton	0.33	-0.1%	-78.3	0.42	0.8%	-49.6	0.42	1.4%	-14.7
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	0.37	0.4%	-226.8	0.47	1.5%	-131.3	0.45	1.3%	-62.1
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	0.41	0.9%	-187.3	0.52	2.0%	-108.5	0.45	1.3%	-62.7
11. I-90 to Yankton via SD 37	0.17	-2.3%	-105.3	0.30	-0.6%	-63.8	0.42	1.3%	-6.7
12. I-90 to Yankton via US 81	0.21	-1.9%	-69.7	0.32	-0.6%	-45.3	0.43	1.2%	-7.2
13. Reg. Trade Center Connections	0.37	0.5%	-165.8	0.60	3.1%	-51.1	0.66	3.6%	-18.9
14. EDE via SD 37 (Super 2/4 Lanes)	--	--	--	0.59	2.9%	-75.0	--	--	--
15. EDE via US 81 (Super 2/4 Lanes)	--	--	--	0.59	2.8%	-76.1	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.  
This exhibit excludes economic development benefits.

SOURCE: Wilbur Smith Associates

Benefits from the Expressways may not only accrue to persons and businesses whose vehicles use the highway. Lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may thus benefit from the Eastern Dakota and Pierre to I-90 Expressways without even traveling on them.

It is important to keep in mind that for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if perceptions do not change dramatically, the investment will not produce benefits that exceed its cost. Highway investment must be based on reasonable estimates of traffic volumes they will service, the cost savings travelers will experience, and a realistic assessment of revised business practices.

Investing in a highway improvement that produces benefits which are less than the associated costs of the improvements inhibit economic development. The costs will be paid by users and other taxpayers in the form of higher taxes, or would be paid in a lost opportunity (an alternative highway would not get improved). These higher taxes work against economic growth within the taxing jurisdiction because they reduce post-tax return to businesses and households by lowering disposable income, and investment in the "wrong" highway project similarly inhibits overall economic growth. Therefore it is imperative that the highway investment be economically feasible; if it is not, it is economically counterproductive.

**Feasibility Perspectives** - The amount of economic development created from the Eastern Dakota and Pierre to I-90 Expressways will vary by alternative and region. To measure the economic impact to all persons involved, two perspectives are considered in the study: the Corridor Area Perspective, and the State of South Dakota perspective. Impacts are estimated for both regions because the different regions reflect potentially different perspectives and different impact magnitudes. For example, some benefits for Aberdeen or Pierre might come at the expense of another region or community in South Dakota. When this is the case, they are benefits to Aberdeen or Pierre but are transfers of benefits within South Dakota and therefore do not comprise net benefits for the entire State. By recognizing both State and local perspectives in the analysis, feasibility from both perspectives is ascertained.

The economic development feasibility results from these two different perspectives are summarized in Exhibits 9-3 and 9-4. Included in the economic feasibility calculations are all quantifiable public sector financial costs attributable to the highway projects (cost of planning, designing, constructing and maintaining the highway improvements) and all quantifiable economic benefits including road user benefits (vehicle operating cost savings, value of time savings, accident cost savings) and also economic development benefits (economic activity from increased competitive advantage, increased roadside and tourism benefits, etc.). Excluded from the cost/benefit calculations are the road improvement implications that cannot reasonably be tabulated in monetary terms.

**Exhibit 9-3**  
**ECONOMIC DEVELOPMENT FEASIBILITY INDICATORS**  
**Corridor Perspective**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.99	6.8%	-1.4	1.64	14.0%	20.5	1.30	10.6%	2.9
2. Total Eastern Dakota Expressway Via Route SD 37	1.26	10.3%	113.8	1.36	11.5%	109.3	1.34	11.3%	42.3
3. Total Eastern Dakota Expressway Via Route US 81	1.23	10.0%	93.9	1.32	11.1%	89.4	1.30	10.7%	36.5
4. Aberdeen East to I-29	1.32	11.1%	34.0	1.54	13.4%	37.5	1.41	11.9%	7.2
5. Aberdeen South to Huron	1.21	9.8%	27.6	1.24	10.1%	24.8	1.09	8.2%	5.0
6. Huron South to I-90 via Mitchell	1.47	12.8%	27.6	1.96	18.1%	27.0	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	1.07	7.7%	9.7	1.31	10.7%	31.3	1.49	12.8%	11.7
8. I-90 to I-29 via US 81 and Yankton	1.14	8.8%	14.9	1.15	9.1%	11.9	1.11	8.5%	2.7
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	1.29	10.7%	97.5	1.39	11.7%	90.1	1.39	11.8%	41.5
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	1.26	10.4%	76.7	1.30	10.8%	63.8	1.31	10.9%	32.7
11. I-90 to Yankton via SD 37	1.13	8.7%	15.2	1.27	10.3%	23.2	1.44	12.3%	4.7
12. I-90 to Yankton via US 81	1.06	7.9%	5.2	1.25	10.4%	15.3	1.18	9.4%	2.1
13. Reg. Trade Center Connections	1.23	9.9%	60.2	1.66	14.6%	85.0	1.67	14.9%	37.1
14. EDE via SD 37 (Super 2/4 Lanes)	--	--	--	1.59	14.0%	108.4	--	--	--
15. EDE via US 81 (Super 2/4 Lanes)	--	--	--	1.49	13.0%	90.5	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.

SOURCE: Wilbur Smith Associates

**Exhibit 9-4**  
**ECONOMIC DEVELOPMENT FEASIBILITY INDICATORS**  
**State of South Dakota Perspective**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.37	1.2%	-61.4	0.83	5.6%	-5.6	0.55	2.9%	-4.3
2. Total Eastern Dakota Expressway Via Route SD 37	0.60	3.4%	-176.8	0.72	4.6%	-83.4	0.74	4.7%	-32.0
3. Total Eastern Dakota Expressway Via Route US 81	0.60	3.3%	-161.9	0.72	4.5%	-77.2	0.72	4.6%	-34.8
4. Aberdeen East to I-29	0.73	4.6%	-28.9	0.95	6.6%	-3.5	0.81	5.5%	-3.2
5. Aberdeen South to Huron	0.62	3.6%	-48.9	0.70	4.4%	-30.5	0.69	4.4%	-16.5
6. Huron South to I-90 Via Mitchell	0.74	4.7%	-15.2	1.22	8.8%	6.1	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	0.46	2.1%	-79.3	0.55	3.0%	-46.0	0.77	5.0%	-5.6
8. I-90 to I-29 via US 81 and Yankton	0.42	1.4%	-63.3	0.50	2.2%	-40.0	0.50	2.1%	-12.6
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	0.61	3.5%	-131.2	0.72	4.6%	-65.5	0.79	5.2%	-21.9
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	0.60	3.4%	-117.8	0.69	4.2%	-65.6	0.73	4.7%	-28.4
11. I-90 to Yankton via SD 37	0.33	0.3%	-79.7	0.42	1.5%	-49.3	0.73	4.7%	-2.9
12. I-90 to Yankton via US 81	0.32	0.1%	-55.3	0.40	0.8%	-37.3	0.49	2.1%	-6.0
13. Reg. Trade Center Connections	0.60	3.4%	-105.5	0.98	6.8%	-2.9	0.97	6.8%	-1.4
14 EDE Via SD 37 (Super 2/4 Lanes)	--	--	--	0.92	6.3%	-14.8	--	--	--
15 EDE Via US 81 (Super 2/4 Lanes)	--	--	--	0.89	6.1%	-20.0	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.

SOURCE: Wilbur Smith Associates

**Feasibility from the Corridor Perspective** - The people who live and work in the proximity to each of the highway corridors stand to gain a great deal economically if the various highways are built. The reason is that most of the economic benefits accrue to communities in proximity to the highways. If the Expressways are constructed to four-lane standards, those communities will be better able to compete for new firms and therefore new economic activity. Therefore, from the corridor perspective, all of the highway improvements are economically feasible and justified. The feasibility statistics in Exhibit 9-3 indicate that the local residents are wise to be pursuing the four-lane concept. If they can persuade the State and/or federal government to fund the projects, the local economies in proximity to the highways will benefit.

**Economic Feasibility From South Dakota's Perspective** - The State of South Dakota needs to be careful of relying on localized economic developments as a basis for its investment decisions because, to do so, would mean that the State would spend State tax dollars simply in an attempt to enable all communities to better compete with each other. The State of South Dakota should only invest in highway projects that provide sufficient benefits at the State level to justify the improvements.

The Statewide feasibility results of Exhibit 9-4 suggest that the "full build" Eastern Dakota and Pierre to I-90 Expressways are currently not economically feasible. However, individual segments and various combinations of the Expressways are feasible. From the statewide perspective, Huron to I-90 built as a four-lane expressway is economically feasible (B/C ratio of 1.22), and Aberdeen East to I-29 also built as a four-lane expressway has a benefit/cost ratio of 0.95 and should be feasible by the year 1995. The Regional Trade Center Connections (connecting all communities with a population greater than 10,000 to the Interstate Highway System via a four-lane highway) has a benefit/cost ratio of 0.98, indicating that this combination of highways should be feasible by the year 1995. The Eastern Dakota Expressway constructed as a combination Super 2/4-lane highway (via SD 37 and SD 50) has a benefit/cost ratio of 0.92 and should be feasible around the year 2000.

#### **Economic Development Feasibility With Federal Demonstration Funds**

This feasibility study finds that only portions of the Eastern Dakota and Pierre to I-90 Expressways are currently economically feasible from the perspective of the entire State of South Dakota. However, this feasibility test assumes residents of South Dakota pay for the entire construction and maintenance of the Expressways. If residents of South Dakota can receive funding assistance from Federal demonstration sources, the Expressways become more attractive from the State's perspective. Exhibit 9-5 displays the feasibility results of adding 80 percent federal demonstration funds into the economy of South Dakota.

#### **Study Results: For Analyses and Comparisons Only**

This study analyzed the feasibility of constructing various highway improvements in eastern and central South Dakota. It developed traffic, economic and other statistics for each alternative. Based on these statistics and comparisons, the state will make its final determination as to what improvements, if any should be built. This study does not make that decision, nor does it conclude or recommend a particular course of action. Rather, it only presents information which might be useful to the State's decision-makers.

**Exhibit 9-5**  
**ECONOMIC DEVELOPMENT FEASIBILITY INDICATORS**  
**With Federal Demonstration Assistance**

	FREEWAY			EXPRESSWAY			SUPER 2		
	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)	B/C	IRR	NPV (\$ Million)
1. Pierre to I-90	0.87	5.2%	-13.1	1.31	10.6%	9.8	1.02	7.3%	0.2
2. Total Eastern Dakota Expressway Via Route SD 37	1.07	7.9%	28.7	1.18	9.3%	55.0	1.20	9.5%	24.8
3. Total Eastern Dakota Expressway Via Route US 81	1.07	7.9%	26.4	1.18	9.3%	50.7	1.18	9.3%	22.5
4. Aberdeen East to I-29	1.20	9.5%	21.2	1.41	11.8%	28.5	1.30	10.5%	5.1
5. Aberdeen South to Huron	1.01	7.1%	1.4	1.09	8.0%	8.9	1.08	7.9%	4.2
6. Huron South to I-90 Via Mitchell	1.20	9.7%	12.1	1.67	14.8%	18.9	--	--	--
7. I-90 to I-29 via SD 37 and Yankton	0.93	6.0%	-11.0	1.01	7.1%	1.1	1.24	9.9%	5.7
8. I-90 to I-29 via US 81 and Yankton	0.89	5.4%	-12.2	0.96	6.4%	-3.5	0.96	6.5%	-1.0
9. Aberdeen to I-29 via Mitchell SD 37 and Yankton	1.07	7.9%	24.2	1.18	9.2%	40.9	1.25	10.1%	26.6
10. Aberdeen to I-29 via Mitchell US 81 and Yankton	1.07	7.9%	20.4	1.14	8.8%	30.3	1.19	9.4%	20.5
11. I-90 to Yankton via SD 37	0.79	4.0%	-24.4	0.94	6.2%	-5.3	1.21	9.5%	2.3
12. I-90 to Yankton via US 81	0.79	3.8%	-17.2	0.90	5.6%	-5.9	0.96	6.5%	-0.4
13. Regional Trade Center Connections	1.09	8.2%	24.4	1.46	12.5%	59.5	1.46	12.6%	25.3
14 EDE Via SD 37 (Super 2/4 Lanes)	--	--	--	1.38	11.5%	50.3	--	--	--
15 EDE Via US 81 (Super 2/4 Lanes)	--	--	--	1.35	11.0%	43.6	--	--	--

Note: For a project to be economically feasible, it should have a benefit/cost ratio of 1.0 or greater, an internal rate of return of 7.0% or greater, and a positive net present value.

SOURCE: Wilbur Smith Associates

**The Funding Issue**

All of the preceding analyses are intended to help the State decide whether or not it should try to build any of the 4-lane highway segments. The analyses suggest that some segments are feasible.

However, while the highways perhaps "should" be built, the remaining issue is whether or not the highways "can" be built. The problem is the lack of available State funding to enable these highways to be programmed. If funding cannot be found, the highways cannot be built, even if they are economically feasible. This is the issue addressed in Chapters 10 and 11.





## Chapter 10

### OTHER STATE EXPRESSWAY FUNDING PROGRAMS

If South Dakota decides to seek the construction of a series of 4-lane expressways, a cost burden of potentially several hundred million dollars will be superimposed over the State's current highway programs. If any of the expressways are to be built, the needed funds must come from somewhere. If the funds are to be drawn from the existing fund sources at the existing funding levels, maintenance of South Dakota's existing highways will suffer, and the new Expressway Program would be delayed well into the 21st Century. Alternatively, a new Expressway funding program could be instituted.

Many people in South Dakota desire an Expressway system, but funds are scarce. Consequently, the segments constructed should represent an investment as compared to a consumption of resources. All segments should have a positive return. South Dakota is not the first state to be confronted by this problem. Other states have considered expressway programs, and some have implemented them using a number of alternative approaches to the funding issue.

In order to describe the range of funding programs that South Dakota might consider, this study contacted 24 selected states to determine whether or not they have such expressway programs and, if they do, how they funded them. These states were selected if it was known that they have such programs and/or based on them being somewhat comparable to South Dakota, in terms of climate, geography and/or demographics. The main thrust of the states' survey was to ascertain:

- Whether Economic Development Highway Programs had ever been considered;
- The program characteristics;
- How the program is funded; and
- What lessons were learned that might be applicable to South Dakota.

Of the 24 surveyed states shown in Exhibit 10-1, fifteen were found to have some form of Economic Development Highway Program in place, three more are currently engaged in the planning for such a program, and six have no such program. Survey results of relevance to the South Dakota decision are as follows.

#### Other State Programs

**Alabama** - In 1991, the Alabama Highway Department proposed a 1,000 mile system of 4-lane highways which essentially would form a big ring around the State. Because the proposed system was largely rural in nature, the fuel tax increase which was proposed to fund the system was opposed by legislators representing urban areas. The funding bill was rejected by the Legislature. Ironically, the following year the Highway Department went back to the Legislature with the same five cent per gallon motor fuels tax increase, but no multi-lane highway plan. That tax increase was passed.

## STATES SURVEYED

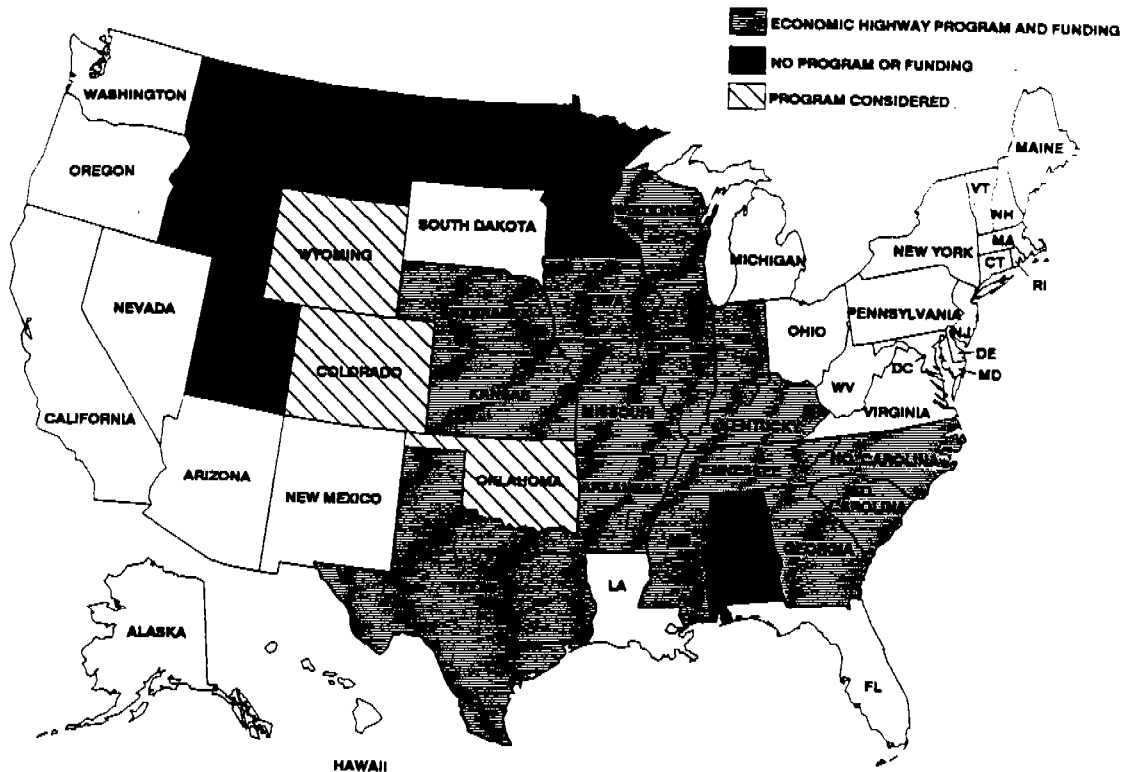


FIGURE -1

**Arkansas** - The \$2.5 billion Highway Improvement Program of 1991 approved by the State Legislature was a 12 to 15 year plan to meet statewide highway needs. These program elements were identified in an inventory/highway needs study performed by the Arkansas State Highway and Transportation Department. Key program elements included:

- 210 miles of new 4-lane highway
- 625 miles of widening 2- to 4-lane highway
- 250 miles of passing lanes, and
- 250 miles of maintenance and rehabilitation.

This program was funded through a five cent per gallon increase in gasoline taxes and a two cent per gallon increase in diesel fuel taxes (the diesel fuel tax had recently been increased by four cents per gallon to account for the loss of the weight distance taxes).

**Colorado** - Colorado is in the process of developing a proposal for an economic development highway program called the Core System. Among other characteristics, this program will likely include the improvement of highways to a 4-lane cross-section which will link the state's three gaming towns to the existing multilane network. Additionally, highways serving all national parks and monuments will be improved to a multilane status, and the existing multi-lane highway network will be expanded so that all county seats are within 50 miles of a multilane highway.

The Colorado DOT concept is to upgrade all arterials with an average daily traffic volume of 500 or more. Other criteria might include all arterials with a high percentage (greater than 10 percent) of commercial truck traffic. The ultimate goal would be to provide a multilane highway system necessary to serve 50 percent of the total vehicle miles of travel in the state.

This ambitious program has not yet been finalized. The State is very concerned about the manner in which this program is to be funded. Proposals have been considered to dedicate all STP construction monies to the Core System, or to obtain as much as a 10 cent per gallon increase in the State's motor fuels tax. Regardless of the revenue sources used to expand the Core System, snow and ice removal coupled with the preservation of existing pavement surface conditions, will continue to be given top priority by the Colorado DOT.

**Georgia** - The Governor's Road Improvement Program (GRIP) was initiated in May of 1986. It will result in the construction or improvement of 1,757 miles of highway during its 17 to 20 year life. Originally, GRIP was proposed for funding with a 5 cent per gallon gas tax increase dedicated to such highway improvements, but the legislature turned down that funding request. Instead the State Legislature chose to make annual general fund contributions to the Program. These annual contributions average about \$125 million. In this fashion, the Legislature has more power over the process, by appropriating money by line item for both design and construction.

Ultimately, the goal of GRIP is to connect every town with a population of more than 5,000 to the 4-lane highway system. Georgia DOT would have preferred dedicated funding and the authority to prioritize the improvements internally. DOT staff feels that such policies would have permitted the construction of larger/higher volume segments of the system first. Instead, the Program focuses on short sections distributed throughout the State. DOT staff does not feel that GRIP has had a negative impact on ongoing highway maintenance activities, because all highway funds support the existing highway program and major construction is funded out of the general fund. As a result, Georgia has one of the lowest state excise taxes on motor fuels (7.5 cents per gallon).

**Idaho** - Over the past 20 years, the Idaho Transportation Department has been working on the expansion of U.S. 20 in the eastern part of the state as an economic development project to link I-15 with Yellowstone National Park. The highway has been widened to 4-lanes as part of the normal construction program using Federal Aid Highway Funding. Now that the project is completed, the Idaho TD wishes that it had included interchanges in the original design. It would be very difficult to upgrade the design now, because induced development has occurred immediately adjacent to the existing right-of-way.

Illinois - The most recent highway initiative of the Illinois DOT was the 1989 "Lifelines of the Economy" which was financed through a five cent per gallon increase in the fuel tax phased in over time, plus an increased bonding authority. The Program identified sections of highway improvements outlined in Wilbur Smith Associates Highway Needs Study conducted for the State in the mid 1960's. There is a deliberate effort on the part of the Illinois DOT to avoid attempting more ambitious plans so that the construction program can be maintained at about ten percent of total highway funding. This permits the State to keep high maintenance standards.

While Illinois DOT would like to have a revenue mechanism with built-in adjustments for inflation, the State's political leadership prefers to have the DOT make periodic funding requests. In 1983 a license plate fee increase was adopted, and previous to that a sales tax increase was used to fund highway improvements in 1979.

Indiana - In 1988 the State Highway Agency initiated a \$400 million accelerated construction effort nicknamed ACE. This program was made possible by a one cent per gallon increase in the statewide motor fuels tax. The revenues from this increase were bonded to permit the State to accelerate construction of a number of projects designed to relieve congestion in urban and rural areas throughout the State.

While the program may not have had a negative impact on highway maintenance functions or funds because no monies were shifted away from those activities, there is some concern now about where funding will come from to maintain the large increase in lane miles on the state system.

Iowa - RISE (Revitalize Iowa's Sound Economy) was a highway improvement program developed in 1985 to improve all highways throughout the State. The State DOT received revenues from a one cent per gallon motor fuels tax. These monies were to be spent on economic development related highway improvements to the state system. A second one cent per gallon tax increase was divided equally between city and county jurisdictions. These monies were also to be spent on economic development highway improvements. Because of the rural nature of Iowa's counties, few economic development highway improvements could be identified. As money accumulated in the county fund, it became clear that changes would have to be made. Therefore, 4/10 of the county's half cent motor fuels tax revenue was shifted into the secondary highway system fund.

In 1989 the State Legislature endorsed a highway plan called the Commercial and Industrial Network (CIN). This plan identified a 2,331 mile network of highways which are of critical importance to the economic well being of the State. This network is the second of five subsets of Iowa's primary highway system (the Interstate Highway System is the first). The criteria used to designate the network are:

- Service to regional growth centers
- Continuity with major primary highways in adjacent states
- Current annual ADT and changes in ADT since 1980
- Current annual average daily large truck traffic and changes since 1980
- Area coverage

When completed, this network of modern, high speed, 2- and 4-lane highways will bring all 150 of Iowa cities with more than 2,000 residents within 10 miles of the commercial and industrial network.

Kansas - Kansas DOT's Comprehensive Highway Program was passed in 1990. This eight year program is expected to cost \$3.4 billion. It was funded via the following sources:

- Vehicle registration fee increase
- 7 cent per gallon motor fuels tax increase
- \$900 million authority for bonds
- Increased sales tax transfer, and
- 1/4 cent dedicated sales tax.

Those funds were dedicated to the construction of substantial highway improvements throughout the State's system as well as a substantial increase in funding for maintenance activities performed by private contractors. Additionally, \$900 million of the Program monies were reserved for projects called "System Enhancements". Cities and counties throughout the State were invited to submit applications detailing highway improvements they wanted to see built with these monies. This competition resulted in the selection of a wide assortment of projects, including bridges, interchanges, and highway segments (principally bypasses).

At the halfway point of the Program, Kansas DOT officials report that it has gone well. They admit that many of the enhancement projects were not well planned prior to their approval, and their cost estimates were too low. In retrospect, greater detail about such projects should have been required on the application forms.

Kentucky - When Kentucky wanted to undertake a major highway expansion program to connect the interstate system to various population centers, it created a turnpike authority. The turnpike authority received permission to issue revenue bonds backed by the State's road funds. Tolls are collected on the turnpikes, but these only cover a part of the debt service on the bonds. This arrangement has permitted the State to build the desired highways, but the Kentucky Transportation Cabinet budget is somewhat constrained by the fact that top priority must go to meeting debt service requirements, followed by ongoing maintenance activities. This leaves little money for further system expansion.

Minnesota - In response to state legislation, the Minnesota DOT conducted a feasibility study of multilane highways connecting regional centers to the Twin Cities (Minneapolis/St. Paul). The most interesting aspect of the study was the number of definitions and descriptions which could be used to identify regional centers. The Center for Urban and Regional Affairs developed a process whereby each town in a seven state area centered on Minnesota was rated using criteria that scored the number and diversity of business establishments in each place. These scores were then used to define a community as one of the following:

- Metro area
- Primary regional
- Secondary regional

- Complete shopping
- Partial shopping
- Full convenience
- Minimum convenience; and
- Hamlet.

A related technique, developed by MNDOT involved the identification of significant centers of population and commerce. Criteria were established and used to strategy communities. These criteria included:

- Population of 5,000 or more
- \$50 million or more in annual retail sales
- 450 or more manufacturing employees
- \$50 million or more in annual wholesales, and
- Cities of surrounding states and Canadian Provinces with populations of 50,000 or more people.

Cities which met all four criteria were deemed truly significant, and communities which met 3 out of 4 of the criteria were also deemed to be significant.

Using the different schemes, a variety of ambitious highway improvement programs were identified and a report was forwarded to the Legislature with mild hints about the need for additional funding. The Legislature has not responded to date.

**Mississippi** - The Mississippi State Highway Department developed a program to construct 1,077 miles of four-lane highways over a 14 year period. The program, titled "Highways of Tomorrow", was estimated to cost \$1.6 billion when initially conceived in 1987. The largest part of these revenues came from a compromise on fuel taxes. The 6 percent sales tax on motor fuels was converted to a 6-cent per gallon excise tax on gasoline and 5-cent per gallon excise tax on diesel in 1987. The excise taxes were then raised by 2 cents in 1988 and 1 cent in 1989. Approximately half of the federal funds available for the primary highway system were to be dedicated to the 4-lane program. Other revenues were derived from a \$5 increase in vehicle registration tag fees, a contractors tax imposed on highway construction contracts associated with the 1987 highway program, and a prepayment of bond debts associated with the previous highway program.

The legislature organized the proposed program into three phases as detailed below:

#### Mississippi Three Phase Program

<u>Time Period</u>	<u>Type</u>	<u>Description/Key Qualifications</u>
1987 - 1993	Critical Segments	.04 Volume/Capacity or Greater
1991 - 1998	Urgent Group	.25 - .40 Volume/Capacity
1996 - 1999	Connecting Routes	Correctivity

The Mississippi program has been reasonably successful, with almost 500 miles of 4-lane highway completed to date. However, in retrospect the Department wishes it had included more of an allowance for inflation in its initial cost estimates. The detailed planning, design and actual construction costs have been significantly higher than expected. One problem was understating the costs associated with preserving the environment. Additionally, there is some feeling that the emphasis on the construction of a 4-lane expressway system has had a negative impact on the ability of the State to maintain the secondary road system.

**Missouri** - Following up on the highly successful "Proposition A" Highway Program (funded by a 4-cent per gallon gas tax increase), a 15-year highway program was presented to the State Legislature in 1992. This \$12.6 billion program includes:

- 1,682 miles of new dual-lane (4-lane divided) highways;
- 892 bridges replaced or rehabilitated;
- 494 bridges strengthened;
- 3,060 miles of shoulder improvements;
- 1,500 safety projects;
- 21,197 miles of resurfacing;
- A 50 percent increase in city and county road funds; and
- 40,000 additional jobs in construction.

The Legislature approved this 15 year program, funding it with a 6-cent gas tax increase phased in over 6 years. The major criterion to be eligible for the 4-lane highway improvements was the desire to connect all communities with a population of 5,000 or more (as well as all major recreational lakes) to the 4-lane highway system. Despite an uncertain beginning due to unanticipated cutbacks in Federal Aid Highway Programs, the program appears to have the potential to be as successful as the soon-to-be completed Proposition A Program. By incorporating preservation and maintenance needs into the funding package, the integrity of the existing system will be maintained.

**Nebraska** - In response to a legislative request, the Department of Roads conducted a highway needs study. The study identified the need for a number of highway improvements including a north-south interstate. The State's Chamber of Commerce put its support behind the study findings and a \$1.1 billion highway program was born. The plan features 603 miles of 4-lane highway (of which only 150 miles presently exist) as well as 3,300 miles of modern 2-lane highways with paved shoulders. One of the goals of this program is to connect every town with a population of 15,000 or more via a 4-lane highway to the interstate system. Additional consideration was given to state routes with more than 500 daily commercial truck trips.

The Nebraska Legislature decided to fund the state match of the Federal Aid Highway monies with a variable rate motor fuels tax. This tax rate is set annually by the Legislature to cover the State Highway budget.

**North Carolina** - In 1989 the State Legislature established a special trust fund to support a strategic highway corridor system called the Intrastate Highway Program. The purpose of the program is to encourage economic development in depressed areas, and to put

every community throughout the State within 10 miles of a 4-lane highway. The \$9.2 billion program was also expected to result in the paving of all secondary roads with an ADT of 50 or more throughout the State.

The revenues in the trust fund come from a variety of sources. These include:

- A 4 cent per gallon motor fuels tax increase
- Increase in the wholesale motor fuels price tax (from 3 to 7 percent)
- An increase in license fees, and
- An increase in the tax on titles for motor vehicles.

This last mechanism is essentially a road use tax applied at the point of sale. Three percent of the sales price of every new or used vehicle is collected as a tax. There is a \$40 minimum and a \$1,500 maximum cap on this tax (with a one time \$150 tax for the transfer of vehicles from out of state).

Unfortunately, the anticipated boom in highway construction has been smaller than initially expected because the State entered into a recession shortly after the trust fund was established. This has led to smaller than anticipated revenue yields, particularly from the vehicle registration fees. Additionally, because other state programs have experienced revenue shortfalls, the trust fund has been raided several times. This means that what was initially conceived as a 13 year highway program will now probably take as long as 20 years now.

**Oklahoma** - Under the direction of the Governor, the Oklahoma Turnpike Authority is conducting a feasibility study of extending the existing 563 miles of turnpike by between 120 and 130 miles. These extensions have been identified to stimulate economic development in rural areas by increasing mobility, and to provide bypasses around urban areas which will permit future urban expansion. Preliminary estimates of the cost for this effort are approximately \$1.7 billion.

**South Carolina** - In 1987 the Legislature approved an economic development highway program called SHIMS (Strategic Highways to Improve Mobility and Safety). This system of 4-lane highways was designed to connect every county with a 4-lane highway. Originally, the program was to be prioritized with a special formula which utilized a series of transportation and socio-economic factors. In this fashion, both transportation need and economic development considerations would be weighed in the prioritization process. However, the legislature reworked the process so that half of all SHIMS money would be spent on the highest ranked transportation need projects and half on economic development projects.

The funding package for the program included a 2.5 cents per gallon motor fuels tax increase (an additional 1/2 cent was dedicated to the transit program). However, there was an initial \$10 million set aside for the State Economic Development Board to use on highway improvements related to attracting specific industries. This set aside grew each year, finally reaching \$18 million in 1992.



After the legislation passed, state highway revenue growth began to stabilize, while SCDOT costs continued to escalate. In addition, the socioeconomically justified SHIMS projects were not eligible for Federal Aid, and thus the number of miles of highway which could be constructed each year turned out to be far less than originally anticipated. As economic conditions throughout the state deteriorated because of the recession and the impact of Hurricane Hugo, revenue shortfalls appeared in many state programs, including the state match for Federal Aid Highway monies. The Legislature then decided to terminate SHIMS prematurely, transferring the balance of the trust fund to other state needs (principally paying off debts related to hurricane relief) and permitting SCDOT to use future SHIMS revenues for ongoing highway programs.

Tennessee - In 1984, Tenn DOT began planning for a major expansion of its highway program. This program was implemented in 1986 as an accelerated construction program. Previously, the State had been building desired improvements on a piecemeal basis. Using the proceeds of a 3.5 cents per gallon motor fuels tax increase in 1986, coupled with an additional 3.5 cents increase three years later, the State was able to accelerate the construction schedule which created a continuous system. Included in this program were 178 miles of parkways (new access controlled facilities) and 96 miles of widening existing arterials to a 4-lane cross section. Significant funds were also dedicated toward enhancing maintenance and preservation functions.

Texas - The Texas DOT is performing the preliminary planning for a rural, 4-lane divided highway network that will complement the interstate system. This trunk system was originally conceived in the mid-1980's as a means of encouraging increased commerce and travel. The preliminary goal in building the trunk system is to provide a high quality network of highways that facilitate travel within Texas. This would be accomplished by:

- Providing 4-lane divided highways to improve mobility and safety
- Connecting major activity centers within Texas, and
- Providing access to major ports of entry.

Within this framework, research was conducted that showed that 75 percent of all the Texas City Pairs in the 50,000 and larger populations were linked by routes no more than 20 percent longer than the airline distance between the cities. Using this information, criteria were established that routes selected for the trunk system that linked city pairs were to be no more than 20 percent longer than the direct air miles between city pairs. Additionally, it was determined that connecting all of the urban areas with a population of 50,000 or more to the three largest urban areas of the State (the MSAs of Dallas - Fort Worth, Houston and Austin which have populations of more than one million) was necessary to provide a basic network for intrastate travel.

Secondary criteria used to complete the trunk system initially included:

- All cities of at least 25,000 population were provided access to the network
- Cities with at least 10,000 population were provided access to the network if they were located more than 25 miles from the trunk system

- Routes connecting with principal roadways of adjacent states were added if they served more than 1,000 ADT at the State line
- Deepwater ports along the Gulf of Mexico with 40 foot drafts and handling at least 1.5 million tons of goods annually were provided access to the network
- International crossings with Mexico were connected to the network if they carried a minimum of 5,000 ADT
- Major truck routes were added to the network if they carried more than 1,850 trucks per day, and
- Major recreational/tourist areas as well as significant military bases were also provided access to the network.

During an extensive public involvement program following the development of an initial trunk system, some of the criteria described above were relaxed to include routes which had just missed qualifying. In 1990 the trunk system was adopted by the Transportation Commission. This system consists of 10,532 miles of which about 5,100 miles will need to be constructed or upgraded to 4-lane divided cross sections. In 1990 the total cost of the system was estimated at \$10.2 billion. Assuming that the system would be completed by the year 2020, Texas DOT realized (without considering the effects of inflation) that such an effort would consume about 22 percent of the current construction program. That would mean displacing one-fifth of the projects that have already been identified as being needed. This was not viewed as being acceptable, so additional sources of funding are being explored. These include an expanded Federal Aid Program for the NHS System, and the raising of the State's motor fuel tax. In the meantime, a minimum of \$75 million of highway monies is being allocated to the trunk system each year.

Utah - Economic development is not part of the Utah DOT mission. Consequently a highway program oriented to economic development does not exist.

Wisconsin - In 1988, the State's Governor announced a new Long Range Highway Economic Development Plan called Corridors 2020. The Plan has two critical elements:

- A backbone system of multilane divided highways connecting all major population and economic centers to each other, as well as to the national transportation system, and
- A system of 2- and 4-lane connectors directly linking other significant economic and tourism centers to the backbone system.

The Plan called for the addition of 550 miles of multilane highway to the backbone system, and 350 miles of multilane plus 1,130 miles of modern, high speed 2-lane highways to the connector system. When completed, nearly all cities and villages in Wisconsin with a population over 5,000 will be within five miles of either a backbone or connector route. In 1988, this expansion of the highway program was estimated to require \$627 million more

than the \$1.17 billion the State expected to have available for funding such improvements between the years of 1990 and 2005. Therefore, a decision was made, after considering numerous funding options, to bond future motor vehicle fuel taxes.

#### Conclusions Concerning Other State Programs

Based on this review of other states' experiences with economic development highway programs, several factors have been identified which contributed to the success or failure of the efforts. These factors, which may be useful to South Dakota in its deliberations, are summarized as follows:

Program Comprehensiveness - Many states created a comprehensive package of highway needs, including both new construction as well as maintenance of existing and new highways within the comprehensive program. In this fashion, the states not only reduced their backlog of maintenance projects, but also developed a source of funding for future maintenance needs related to the expansion of the current system. Many states were also successful in obtaining an increased highway budget by addressing city as well as county highway program needs within the same funding package.

Protection of Existing Highway Needs - The states found that they had to be very careful in adding new highway needs (new highway construction and maintenance programs), so that money was not diverted from the existing highway operations and maintenance budgets. Generally new sources of revenue, or higher taxes, or both were required in order to avoid this problem.

Caution - Many of the states which have undertaken such highway improvements wish they had done a better job of long range planning. Successful planning of such improvements is measured in the ability to diminish future regret. Some states experienced regret over the inability to account for the effects of inflation and economic downturns. The cost escalation of constructing the decrease in tax revenue because of recession strained the resources of these other state highway programs. Often, maintenance of existing highways had to be deferred to service debt on new construction leading to higher tax burdens in later years to pay for problems caused by deferred maintenance. In hindsight, they wish the forecasts of revenue projections and system costs had been more conservative in nature, thereby providing a cushion to absorb unanticipated needs. Several states also acknowledged the need to consider environmental impacts in a more detailed fashion. Once a program was approved, the unanticipated remediation requirements of constructing the promised improvements were a significant drain on program resources. Finally, not identifying future needs (like interchanges) during initial planning and making provisions for their future construction has been a factor in limiting the effectiveness of the system when development is induced.

Funding Creativity - Thinking beyond the standard strategies of State Highway Trust Funds, many of the states introduced creativity into the process of designing their highway program. While transportation planning has traditionally relied on quantifiable factors of speed, safety, and congestion, many of the current programs embrace economic development. The resulting multilane highway systems tend to serve places (most popularly communities of 10,000 or more population), rather than meet anticipated capacity needs. The impacts on

existing economies are emphasized (as Missouri's 40,000 construction jobs attest). Recognizing the crucial role that trucking plays on industry (through just-in-time deliveries), many states are also identifying improvements based on truck volumes. Creating labels for communities which describe their role in the state's economy (as Minnesota did) is another way to identify desired improvements.

This creativity explains the manner in which these highway programs are being funded, ranging from bonding of existing revenues (Wisconsin) to obtaining annual General Fund Contributions (Georgia). The following is a summary listing of revenue measures used:

- Accelerated Construction Program (simple bonding) Wisconsin
- Increased Gas Tax (bonded) Indiana, Kansas, Illinois
- Increased Gas Tax (TN, IA, KS, MS, NC, AK, MO, SC)
- Dedicated Sales Tax (KS)
- Out of General Fund - Georgia
- Additional Tax on Lubricating Oil (MS)
- Tolls (Partial or comingled) (KY, OK)
- Tax on Vehicle Titles (NC)
- Increase License Fees (NC, IL)
- Annual Variable Tax from Legislature's Budget (NE)

Many of these mechanisms are uniquely appropriate to the states which proposed them. As a result, some may be more appropriate for South Dakota than others. The magnitude and appropriateness of several measures is explored in the next chapter.

## Chapter 11

### EXPRESSWAY PROGRAM FUNDING OPTIONS

This Eastern Dakota and Pierre to I-90 Expressway Study examined the feasibility of constructing a series of 4-lane expressways in eastern and central South Dakota. A concurrent study (the "Heartland Expressway Economic and Engineering Feasibility Study," December 1993) examined the feasibility of constructing a 4-lane expressway south from Rapid City. In Chapter 11 funding options for the expressways studied in both studies are examined.

The Heartland Expressway, Eastern Dakota Expressway and Pierre to I-90 Expressway, in combination, are estimated to cost over \$448 million to build at 1992 price levels. Of the \$448 million, the Heartland Expressway and the Regional Trade Center Connections which were found to be "economically feasible" from the statewide perspective, would cost over \$213 million to build at 1992 price levels. A third option, building the Eastern Dakota Expressway as a combination super 2/4-lane highway (Regional Trade Center connections as 4 lanes, remainder as a super 2-lane highway) and the Heartland Expressway is estimated to cost over \$266 million at 1992 price levels. If built, inflation would have to be added to these cost estimates because of the length of time required to design and construct the highways.

At the same time that there is interest in pursuing the development of expressways, South Dakota also has the responsibility to preserve the condition of the existing state highway system, which has an unfunded \$518 million backlog of needed improvements. Given competing uses for limited funds, just being economically feasible will not necessarily get the expressway projects built. It is one thing to determine that an expressway is feasible, needed, or desired. It is quite another thing for the State to raise sufficient funds to build the expressway. It is not unusual for otherwise feasible projects to go unbuilt due to lack of a funding source. Additional sources of funding are needed if an Expressway Program is to be implemented in South Dakota.

South Dakota will utilize this study's results to decide whether or not to construct one or more of the expressways. The Expressway Program could include only those expressways that are "economically feasible," or it could include all of them, or it could include none of them, or anything in between. This study does not make the decision to build the expressways. This study only provides information that should be useful to the State in its decision making process.

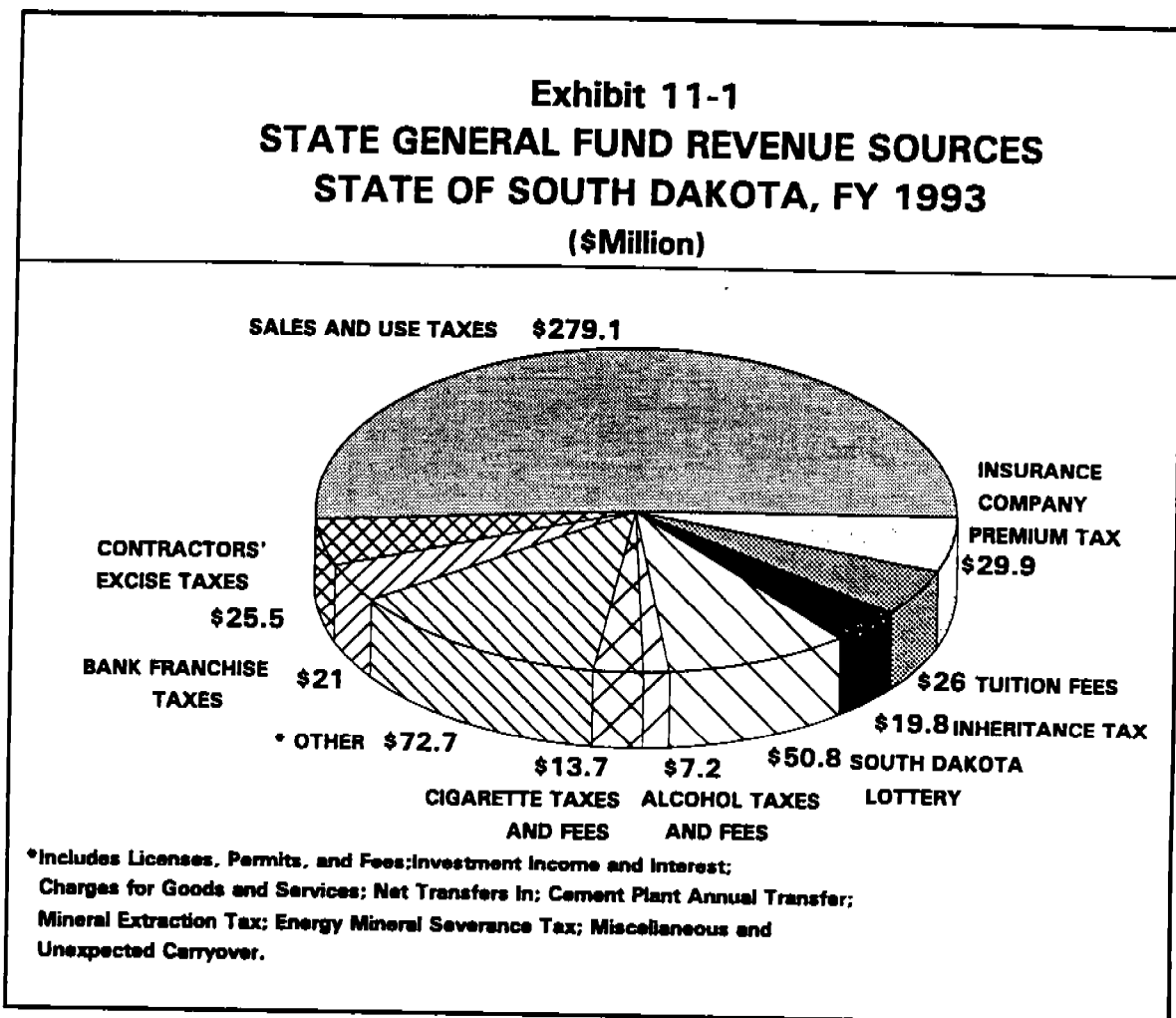
This chapter reviews the highway funding situation in South Dakota relative to the development of a 4-lane Expressway Program. The analysis seeks to provide assistance by addressing the question:

How might the South Dakota Department of Transportation fund construction and maintenance of the expressways, given the Department's limited financial resources and growing maintenance needs for highways throughout the State?

Existing State General Fund Revenues

South Dakota relies on a variety of taxes to fund the general administration of state government, to support the education and social needs of the state's residents, and to construct and maintain highways and bridges in the state.

The principal general purpose fund available for State Government is the General Fund. This fund is typically not used to pay for highway projects, although it could be used for such purposes. The principal State General Fund sources of tax revenue are listed on Exhibit 11-1 and include Sales, Use and Contractors' Excise Taxes; Special Taxes and Fees, and transfers from the South Dakota Lottery.



**Sales and Use Taxes** - The primary source of State General Fund revenue is Sales, Use and Contractors' Excise taxes. South Dakota collected over \$263 million in sales and use tax revenue in FY1992 and \$279 million in FY1993. The state general retail sales tax rate is 4 percent of taxable purchases and accounts for nearly 51 percent of all General Fund ordinary revenue receipts. Since 1980, sales tax revenue has been increasing at an average annual rate of 5.4 percent.

**Contractors' Excise Taxes** - The Contractors' Excise Tax is imposed on gross receipts of prime and subcontractors on various types of realty improvement contracts performed for certain companies. This source of tax revenue generated over \$23 million in FY1992 and \$25 million in FY1993. The combined Sales, Use and Contractors' Excise taxes amounted to over \$287 million in FY1992 and \$304 million in FY1993.

**Special Taxes and Fees** - This category of tax generated over \$84 million and \$85 million in FY 1992 and 1993. This tax category includes: cigarette excise tax; inheritance tax; bank franchise tax; ore tax; mineral severance tax; coin operated laundromat license fees; beer, wine and distilled spirits tax; gaming excise tax; beer and liquor license fees; and alcohol beverage brand registration fees. Special tax revenues have increased 100 percent over the last ten years. Taxes on alcoholic beverages and tobacco generated over \$21 million in FY1992 and FY1993. In FY1992, bank franchise taxes generated over \$29 million of State General Fund revenue. In FY1993, bank franchise taxes collected were only \$21 million for a nearly 28 percent reduction in receipts.

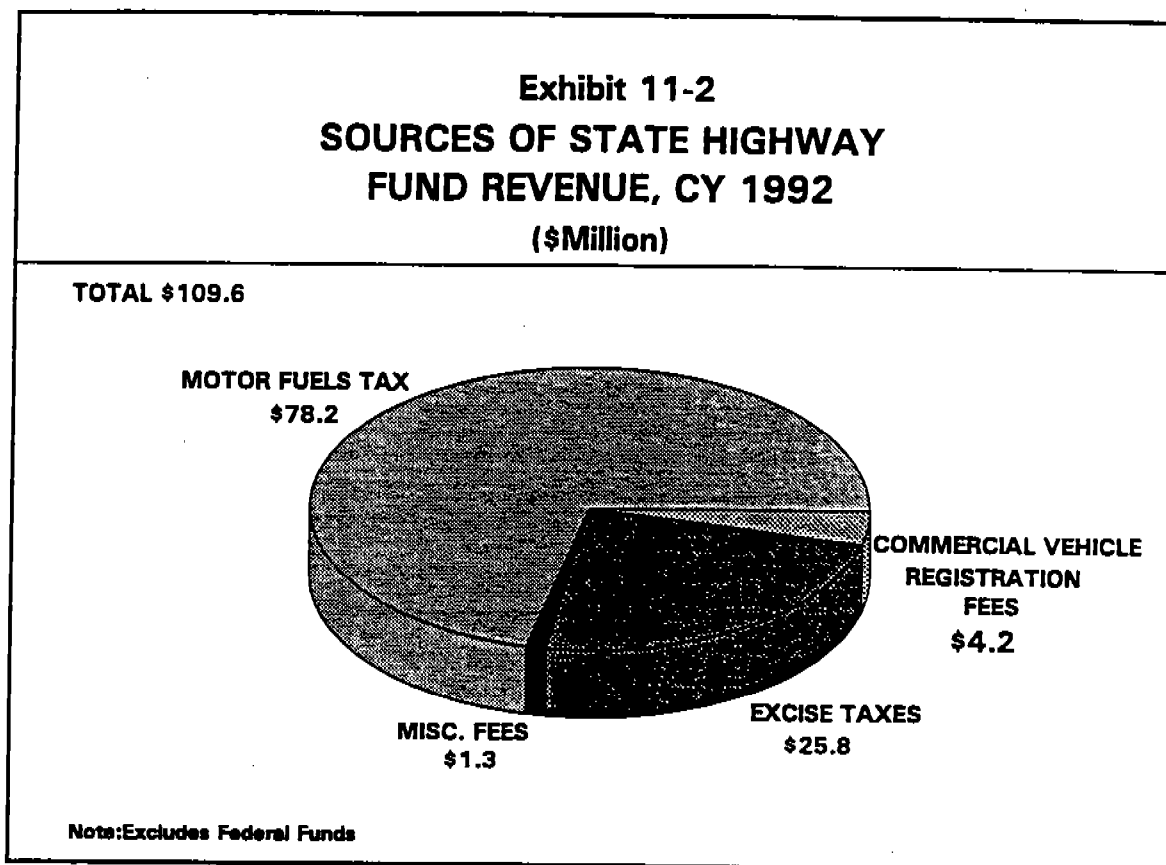
**State Lottery Revenue** - In November, 1986, the South Dakota electorate voted in a statewide referendum to amend the state constitution to allow for a state operated lottery. In 1987, the South Dakota Lottery was created by the legislature. The Lottery is a totally self-funded agency. Net proceeds from this enterprise fund are transferred to the state's General Fund. The net proceeds transferred to the General Fund in FY1993 were over \$50 million.

There are no corporate income taxes levied in the State of South Dakota. Banks and financial institutions are assessed franchise fees. The absence of a corporate income tax is a stimulant to economic development that encourages businesses to relocate or build plant additions in South Dakota. There is no personal income tax in the State, which is a pleasant fact of life enjoyed by residents and another attribute that encourages business relocation and expansion.

The revenue produced from the above sources is increasing at a rate that can barely keep pace with the growing demands of the programs they support. Current and forecast tax receipts from these revenue sources is fully committed to support the general administration of State programs. To divert funds from these necessary and important educational and social service programs to finance construction of an Expressway Program is probably not a viable option. If that is the case, funds for a new Expressway Program will have to be generated by expanding the existing highway funding programs, or by selecting new financing mechanisms that permit phased construction of the Expressways, or by increasing the General Fund revenues and potentially dedicating the increases to the Expressway Program.

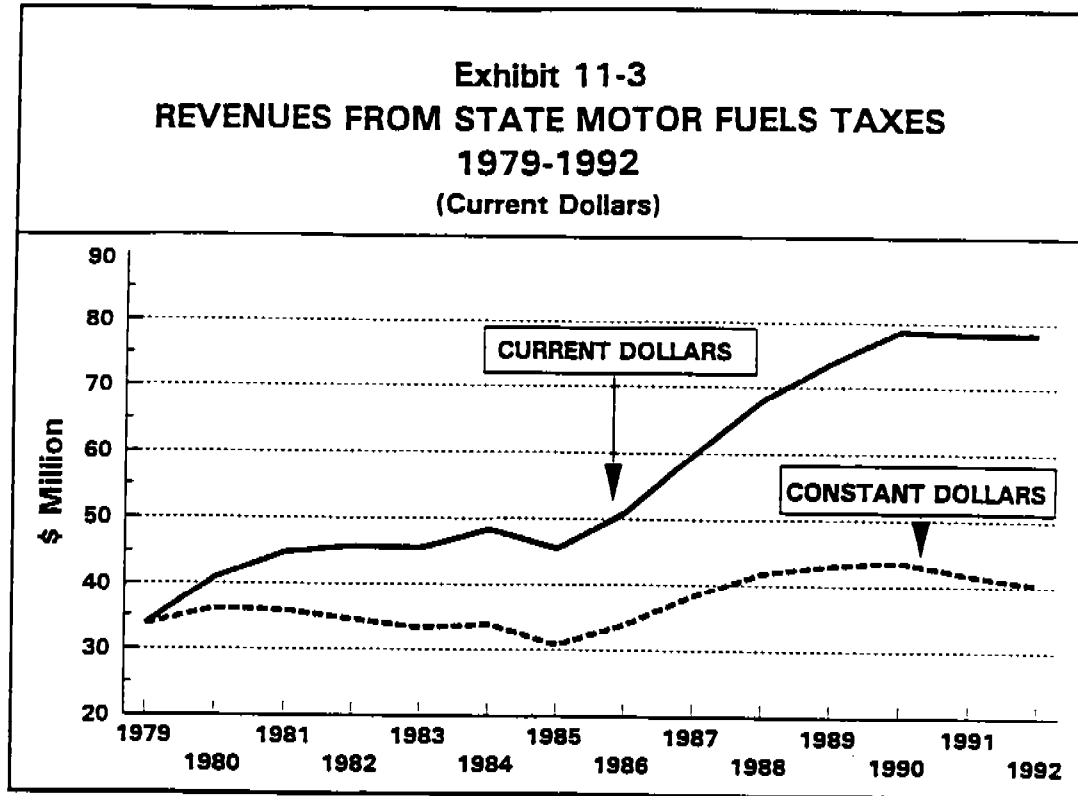
**Existing Sources of State Highway Funds**

There are five sources of revenue for funding South Dakota highway programs. Four are statewide revenue measures, the other is federal aid generated by the federal excise tax on motor fuels and related automotive products. The magnitude of revenue generated by each in FY1992 (excluding the federal share) is depicted on Exhibit 11-2.



**State Motor Fuels Tax** - Motor fuels taxes include taxes on gasoline, ethanol blends, liquified petroleum gas (LPG) and diesel fuel. In fiscal year 1992 there were 1,397 licensed fuel distributors in South Dakota. South Dakota currently collects 18 cents per gallon on gasoline and diesel fuels, and 16 cents per gallon on alternative fuels such as ethanol blends and LPG. These revenues (after refunds) amounted to over \$78 million in CY1992. If past trends relating to increased vehicle miles traveled and increased vehicle fuel efficiency continue, it is likely that only very modest increases in fuel consumption will occur over the next 25 years. If alternative fuels continue to enjoy production and taxation exemptions, while fuel consumption increases moderately overall, Highway Fund revenues from this source could stagnate. Escalating costs of highway maintenance in the future will require a continuing adjustment of the tax rate to keep pace with inflation, even if the Expressway system is not built. Exhibit 11-3 shows motor fuel tax revenue trends for the period 1979 to 1992.





**Motor Vehicle Excise Taxes** - In addition to all other license and registration fees for the use of the highways, South Dakota levies a 3 percent excise tax on the purchase price of every vehicle sold in the state. All tax receipts from this revenue source flow into the state Highway Fund. In CY1992, this revenue source has yielded slightly more than \$25 million to the state Highway Fund (almost 14 percent of total state Highway Fund revenues). Because of the *ad valorem* nature of this tax, tax receipts will increase as the purchase price of motor vehicles increases over time.

**Commercial Vehicle Registration Fees** - Commercial registration fees are licensing fees levied on interstate motor carriers which travel on state highways. The amount of the fee is prorated based on the percentage of miles the carrier travels in South Dakota compared to miles traveled in other states. The fees collected from interstate commercial vehicles (trucks principally) in FY1992 amounted to nearly \$8 million. In fiscal year 1992, 41.5 percent of the commercial registration fees were distributed to county governments for local highway improvements. The state Highway Fund received approximately \$4 million in FY1992 from these fees accounting for approximately 2 percent of total Highway Fund annual revenues.

**Titles and Registration Revenue** - Any vehicle operated on South Dakota's roadways, including mobile homes, trailers and snowmobiles, must have a title verifying ownership. If used on public highways, the vehicle must also be registered. Registration is confirmed by the issuance of a license plate, decal or permit. Title, registration and other associated fees produced revenues of over \$40 million in FY1992. This was 7 percent more than in FY1991, which was an increase of 2.7 percent over FY1990. These title and registration fees flow into the local government highway and bridge funds to support county, township and municipal highway and bridge improvement programs and projects.

**Special Transfers and Miscellaneous Fees** - Like all other states, South Dakota has a series of other small sources of revenue, including non-recurring transfers of money related to special highway permits, contractor overcharges, sale of surplus equipment, etc. These accounted for less than \$1.3 million in revenue during CY1992.

**Federal Highway Assistance** - South Dakota's share of the various federal tax revenues dedicated to highways and bridges has averaged \$105 million for FY 1992 and 1993. Part of these monies are suballocated by the State to county and municipal highway accounts. Given recent congressional actions related to obligations, authorizations and the increasing use of dedicated highway tax sources for non-highway purposes, it is very difficult to forecast future federal aid levels.

### **Sufficiency of State Highway Fund Revenues**

State Highway Fund revenues are used to finance construction, maintenance and administrative activities in support of the South Dakota State Highway Network. The state Highway Fund supports an annual operating budget in excess of \$190 million for highway and bridge construction and maintenance activities. Although this seems like a large amount of money, it is insufficient to support existing and programmed highway needs. A real danger in implementing a major new construction program is the temptation to divert current revenue for the construction program by deferring maintenance and programmed improvements to the existing highway network. There is a real need to protect the integrity of the existing highway network before new construction programs can be developed and implemented. Rational, prudent and careful allocation of State Highway Fund resources is therefore necessary.

According to State highway inventories and inspections, there are 126 functionally obsolete bridges and 96 structurally deficient bridges on the South Dakota State Trunk Highway System that are in need of replacement or substantial rehabilitation. A functionally obsolete bridge no longer meets accepted standards of design. The deck width may be too narrow, clearance may not be sufficient for today's larger vehicles, and approach alignments may be unsafe. A structurally deficient bridge no longer meets accepted standards of functionality due to its deteriorated physical condition. The minimum estimated cost of replacing or rehabilitating these deficient bridges alone is over \$156 million.

The Interstate Highway network in South Dakota is aging. The estimated useful life of concrete pavement is 33 years. There are 150 miles of the Interstate system in South Dakota now over 30 years old and in need of rehabilitation or replacement. Approximately 227 miles of the system are 25 - 30 years old and will be in need of rehabilitation or replacement within 3 - 8 years. Although Federal Interstate Highway Maintenance and National Highway System funds provide financial assistance to support this reconstruction program, the State needs to provide matching funds.

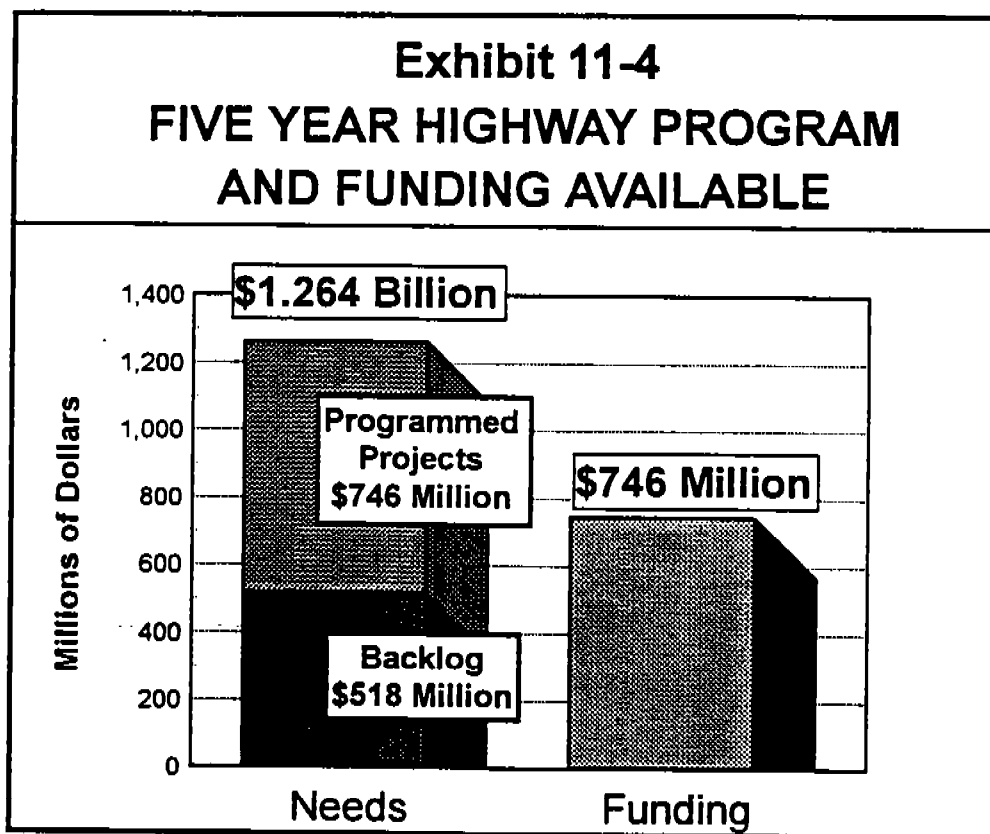
Many State primary and secondary highways also are in need of major improvements and rehabilitation. There are 106 miles of concrete State highways older than 33 years in need of repaving. Asphalt pavement design life is approximately 18 years. There are over 718 miles of asphalt surfaced State highways that are in need of resurfacing. Because of emergent highway design safety standards, roadways with a width of less than 26 feet must

be widened to accommodate today's traffic safely. South Dakota needs to widen 795 miles of state highways to bring them into compliance with current design standards.

It is estimated that the cost to replace one mile of interstate Portland Cement Concrete highway is \$1.4 million. The average cost of resurfacing an asphalt 2-lane State highway is \$70,000 per mile. The cost to resurface just those segments of the highway network in need of immediate attention is in excess of \$218 million for the interstate system and \$51 million for other highways on the State highway system.

Over the next five years, the South Dakota DOT estimates that it will need \$1.264 billion to finance backloged and programmed highway improvement projects on the existing State highway system. As shown on Exhibit 11-4, the existing revenue sources during this same time period are estimated to generate approximately \$746 million, leaving a funding shortfall of over \$518 million.

As a result of this funding shortfall, existing highway funding sources and levels will not be able to support existing and currently planned programs plus finance the development of a new Expressway Program. Alternate funding sources, innovative financing mechanisms, and perhaps tax increases must be considered to alleviate both the shortfall in existing planned highway construction and maintenance programs and the desire to stimulate economic development by constructing segments of the Eastern Dakota, Pierre to I-90, and Heartland Expressways.



**Anticipated Cost of Expressway Options**

Based on the previous chapters, several expressway options have been identified for State consideration. The first option consists of only those portions of the expressway system found to be "economically feasible." The facilities in this category include the Heartland Expressway from Rapid City to Hot Springs, and the Regional Trade Center Connections, which include the Eastern Dakota Expressway from Aberdeen east to I-29 and Huron south to I-90, and the Pierre to I-90 Expressway. The full build option includes construction of all the segments of the Eastern Dakota Expressway, which includes the previous segments listed and connecting I-90 at Mitchell to I-29 near Vermillion via either Route 37 or Route 81 and Aberdeen south to Huron.

The cost estimates for these expressway options based on 1992 price levels were presented in Chapter 3. If South Dakota were to approve any of the options early in 1994, it might be possible to complete detailed design and environmental studies on at least some of these projects within three years. Thus, at the earliest, construction of portions of the envisioned expressway system might begin during 1997. At least this is the date assumed in the funding calculations. Assuming an estimated average inflation rate of 5 percent per year, the preliminary cost estimates could be expected to increase over 27 percent prior to actual construction. These cost estimates are summarized on Exhibit 11-5.

Exhibit 11-5  
ESTIMATED CONSTRUCTION COST OF  
EXPRESSWAY PROGRAMS

Project	Cost in \$ Thousands (1992)		
	Feasible Expressways	Combination Super 2/4 Lane	Full Build Expressways
Heartland Expressway	\$83,153	83,193	\$113,146
Regional Trade Center Expressway Program	\$129,900		\$129,900
Remaining Eastern Dakota Expressway	0	182,800	\$205,700
Total 1992 Cost Estimate	\$213,053	265,553	\$448,746
Anticipated 1997 Cost <sup>(a)</sup>	\$271,915	339,481	\$572,726
Present Value of Future Expressway Maintenance Costs <sup>(b)</sup>	\$30,648	39,051	\$53,298

(a) Based on an assumed 5 percent annual inflation

(b) Based on an assumed 5 percent annual inflation rate, construction period of fourteen (14) years, and a discount rate of 7 percent.

### Potential Revenue Sources for the Proposed Expressway Program

If the State is to pursue an Expressway Program costing between \$271 - \$572 million, it needs to develop a viable and stable source of funds for construction and maintenance of the new highways. Potential revenue sources need to be identified that would generate sufficient revenue to sustain the Expressway Program either on a pay-as-you-go or on a bonded indebtedness basis. In doing so, two measures of revenue efficiency must be considered. The primary emphasis needs to be placed on revenue generation. Secondary emphasis needs to be placed on administrative simplicity. In other words, the state needs to identify stable streams of revenue sufficient to support existing programs and the expanded highway improvement program, but at low tax collection and administration costs.

Another consideration in examining the imposition of tax adjustments is that the taxes should neither constitute an excessive burden on taxpayers nor result in private sector resource allocation behavioral changes. In other words, the tax changes should be neutral. The tax changes should not alter the satisfaction-motivated behavior of consumers and the profit-motivated behavior of businesses in the market segment of the regional economy. The taxes should reflect the relationship between economic development goals of the highway construction program and the direct beneficiaries of the South Dakota Expressway Program.

Considering the breadth of the various new revenue generating mechanisms available, and the unique economic characteristics of South Dakota, the following mechanisms were identified for potential use in financing the South Dakota Expressway Program.

1. Direct User Charges (tolls)
2. Administrative Fees (vehicle registration and drivers license fees)
3. Motor Vehicle Excise Taxes
4. Motor Fuels Tax Adjustments
5. Increased Sales Taxes
6. State Lottery Receipts
7. Local Option Taxes
8. Federal Assistance Funds

Direct User Charges (Tolls) - The imposition of tolls on the Expressways are very appealing theoretically because they place the economic responsibility for funding improvements squarely on those people who use and, therefore, directly benefit from the improvements. Unfortunately, experience throughout the nation has shown that most motorists will not use toll facilities if there are reasonable alternatives which do not require tolls. Unless congestion and/or speed limits vary drastically between toll and toll free routes, motorists will use the toll free routes. Thus, if tolls were imposed on the Expressways, traffic levels would be significantly lower than forecast in Chapter 4 (those forecasts were predicated on the Expressways operating without tolls). Tolls are not believed to be a viable funding option in South Dakota, and therefore tolls were not evaluated as a viable funding source.

Administrative Fees - Increased license tag registration fees are frequently one component of a revenue enhancing program used in other states to finance highway improvements. However, the small size of South Dakota's vehicle and driver populations are such that large increases in such existing fees would be necessary to fund the Expressway

Program solely from these sources. For example, if the State increased its fee schedule by \$25, an additional \$15.8 million of State Highway Fund revenue could be generated annually. Also, with the exception of commercial vehicles, all other registration fees have historically gone to local governments.

Additional revenue could be generated by increasing the fees charged residents when renewing their individual driver's license. Drivers' license fees have been used to defray administrative costs of regulating, testing and educating drivers. There are 507,782 licensed drivers in the State of South Dakota who are required to renew their driver's license every four years. In order to raise \$20 million annually for highway improvement programs, the license fees would have to be raised from \$6 per renewal to over \$163 per renewal. This is an extremely regressive tax because it places a burden on those least able to pay the increase in license fees.

Finally, such fees cause state residents to pay for the improvements in their entirety, while out-of-state motorists do not pay such fees but enjoy the benefits of improved highways. Such fee increases were not analyzed in detail.

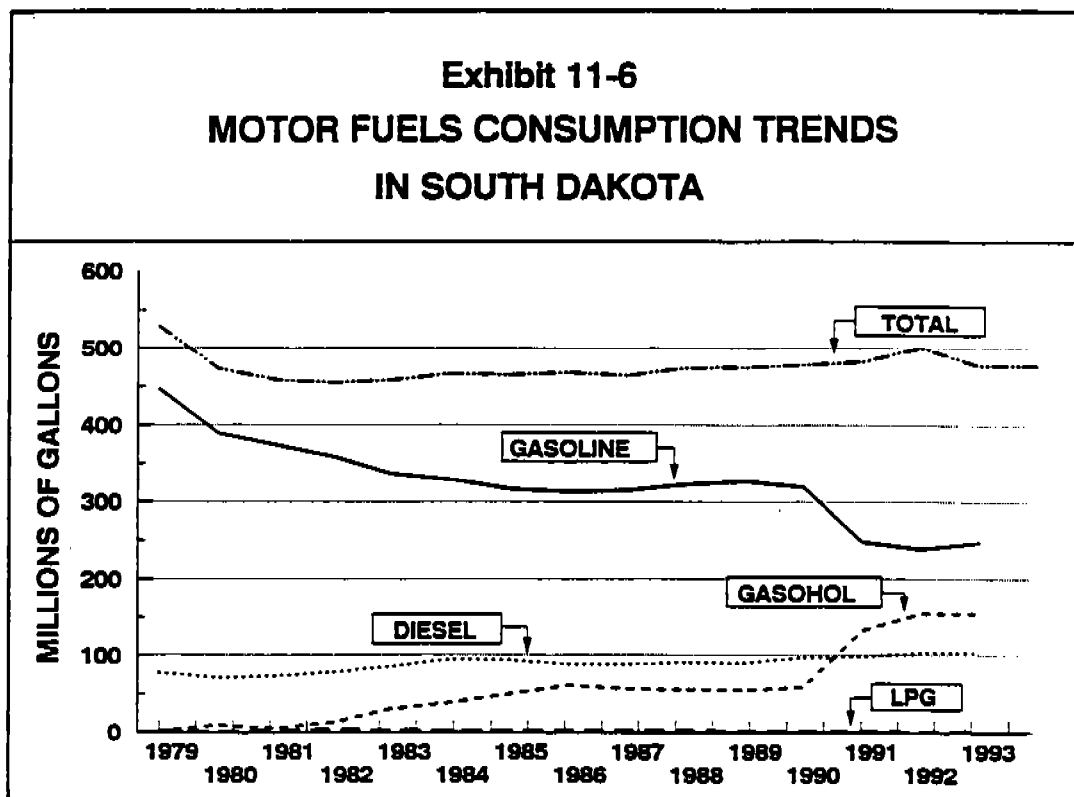
**Motor Vehicle Excise Tax Increase** - Another funding option is to increase the motor vehicle excise tax rate. Highway Fund revenue derived from the 3 percent excise tax on the purchase price of any motor vehicle defined by SDCL 32-5-1 has averaged over \$23.4 million for the past five years. Total revenue collected in CY1992 from the motor vehicle excise tax exceeded \$25 million and was 5.61 percent higher than CY1991 tax receipts. The increase in tax receipts reflects both an increase in the volume and general price level of vehicles sold in the State. The prices of cars are expected to continue to increase an average of 3.16 percent annually for the next several years. All things being equal, the car that costs \$15,000 in 1992 will cost nearly \$16,470 in 1995. By increasing the excise tax rate from 3 percent to 4 percent and assuming that the annual volume of vehicles sold remains constant, the annual tax yield at the higher rate in 1995 could be over \$36 million. This tax, relative to funding of the Expressway Program, was evaluated in detail.

**Motor Fuels Tax Adjustments** - Another funding option is to revise and/or increase the South Dakota motor fuels tax. Three motor fuel tax options were addressed in this study:

1. Elimination of Alternative Fuel Tax Exemptions
2. Increasing the State's Motor Fuels Tax
3. Converting the Motor Fuels Excise Tax to an *Ad Valorem* Tax

1. **Elimination of Alternative Fuel Tax Exemptions** would increase state Highway Fund revenues by more than \$3 million per year based on 1992 fuel consumption levels. The historical trend has seen a reduction in gasoline as well as diesel consumption in favor of alternative fuels (principally LPG and ethanol blends), as shown on Exhibit 11-6. This shift in consumption patterns has been related to price subsidies and the state 2 cents per gallon tax exemptions for alternative fuels. Such economic incentives have been popular as a means of encouraging consumption of more environmentally friendly fuels and a means of supporting the

agricultural sector of the economy. Unfortunately, such economic and environmental policies weaken highway funding mechanisms leading to a reduction in revenue yields. Elimination of the 2 cent per gallon ethanol/LPG exemption is considered in this study as a partial source of funds for the Expressway Program.



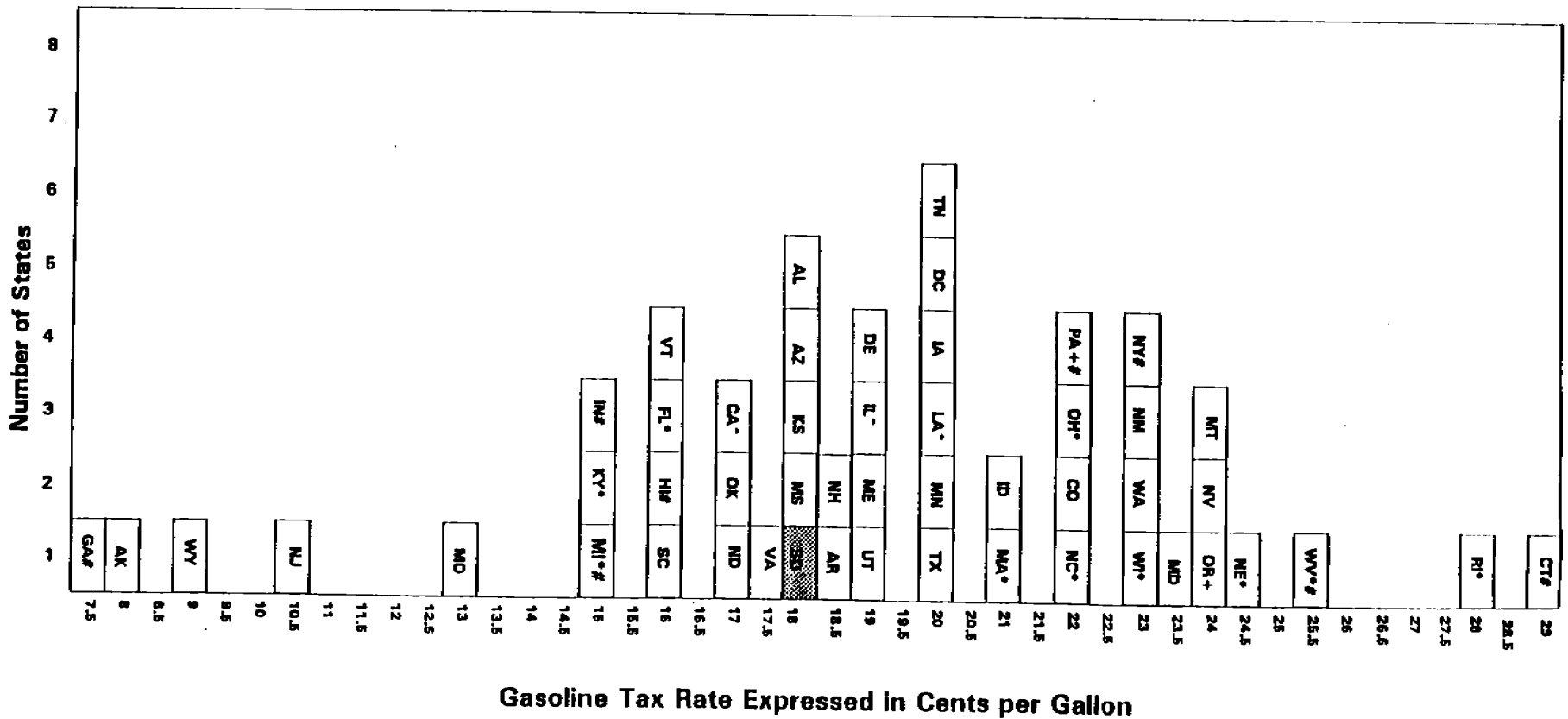
2. **Increasing the State's Motor Fuels Tax** would also be a means of raising additional revenues for the Expressway Program. Such a tax is spread over a large tax base, including out-of-state motorists. Despite a recent 4.3 cents per gallon increase in the federal gas tax, many other states are contemplating their own increases. As illustrated on Exhibit 11-7, twenty-nine (29) States and the District of Columbia have fuel tax rates higher than South Dakota's tax of 18 cents per gallon. Only sixteen (16) States have fuel taxes lower than South Dakota. Fuel taxes range from 29 cents per gallon in Connecticut to 7.5 cents per gallon in Georgia. The average tax rate is 19 cents per gallon with a standard deviation from the average of 4.5 cents per gallon. South Dakota's tax rate is significantly less than its immediate neighbors (with the exception of Wyoming and North Dakota). Each one cent increase in the South Dakota motor fuels tax would generate slightly more than \$4 million annually, assuming little price elasticity. Such an increase would not require additional administrative costs to collect the revenue, making such a mechanism even more attractive. This tax rate increase needs to be seriously considered in South Dakota if the Expressway Program is to be built.

# Exhibit 11-7

## STATE MOTOR FUEL TAXES THROUGHOUT THE U.S.

### OCTOBER 1993

11-12



- \* - Variable tax expressed in cents per gallon.
- + - PA: includes wholesale tax of 6%;  
OR: diesel taxed through ton-mile structure.
- # - Added tax is levied on average price per gallon & federal tax.
- - Added tax is levied on average price per gallon, federal tax & state tax.

SOURCE: Highway Users' Federation



3. Conversion of the Motor Fuels Excise Tax to an *Ad Valorem* Tax would not necessarily increase state highway revenues, but would allow existing revenues to keep up with inflationary pressures. An *ad valorem* tax would provide higher revenues as fuel prices increase. Under the current tax structure, an increase in the retail price of motor fuel does not increase revenues. If the current 18 cent excise tax were converted to an 18 percent *ad valorem* tax, when fuel prices increase, so would the revenues flowing into the state highway fund. However, fuel prices are highly volatile because of market conditions. Some states tried this revenue measure in the early 1980's and suffered losses when the price of fuel fell. Therefore, while this strategy might not procure additional funding in current dollars, it could help the state Highway Fund to keep pace with inflation when fuel prices are rising. To protect revenues when fuel prices are falling, the *ad valorem* tax could revert to an excise tax when fuel prices drop below a target price. This mechanism is complex to administer, and was not evaluated in detail in this study.

Increased Sales Tax Rate - Given the pressures placed on the state's general revenue, contributions to the Highway Fund from the existing General Fund may not be reasonable or prudent. However, raising the sales tax rate and dedicating this additional revenue to the Expressway Program might be considered.

The State of South Dakota first enacted a general retail sales tax in 1933. The last general increase in the sales tax rate occurred in 1969 when the tax rate was raised from 3 percent to the present 4 percent. The 4 percent retail sales tax generates approximately half of the revenue flowing into the state General Fund. The statewide general retail sales tax rate has been temporarily raised twice in the history of the State. The sales tax rate was temporarily increased from 4 percent to 5 percent in April 1980 to pay for railroad infrastructure improvements. The temporary tax increase remained in effect for one year. The second temporary increase occurred in May 1987. The tax rate again was increased from 4 percent to 5 percent and was used to pay for a \$40 million economic development program. The temporary tax was removed in March 1988 when the \$40 million necessary for the program was collected. The 1 percentage point increase in the sales tax rate generated the required \$40 million in only eight months. In both instances, the tax was temporary and funded a specific program. It is interesting to note that transportation improvement and economic development projects were supported by this temporary increase in the general sales tax rate. Therefore, the Expressway Program, given its economic development orientation, might be appropriate for this type of temporary or even permanent sales tax increase.

Statewide per capita income increased at an average annual rate of 5.78 percent between 1985 and 1992. Most recently, between 1988 and 1992, the average annual rate of growth in per capita income was nearly 9 percent. The Eastern Dakota Expressway regional economy mirrored the statewide economic success. Since 1988, the study area's per capita income rose at an annual average rate of nearly 8 percent, just slightly less than the rest of the State. This growth in per capita income is reflected in substantial growth in retail sales activity. Retail sales in the state increase by 6.68 percent annually between 1985 and 1992. This is indicative of a healthy statewide economy.

Important for study consideration is the effect that increasing per capita income is likely to have on general sales tax revenue. Because the size and composition of a regional economy's total gross product is dependent upon the size and composition of the flow of consumer spending, it is important to understand how consumers divide their expenditures. Consumer expenditures may be classified among three categories:

1. expenditures for durable goods
2. expenditures for nondurable goods
3. expenditures for services

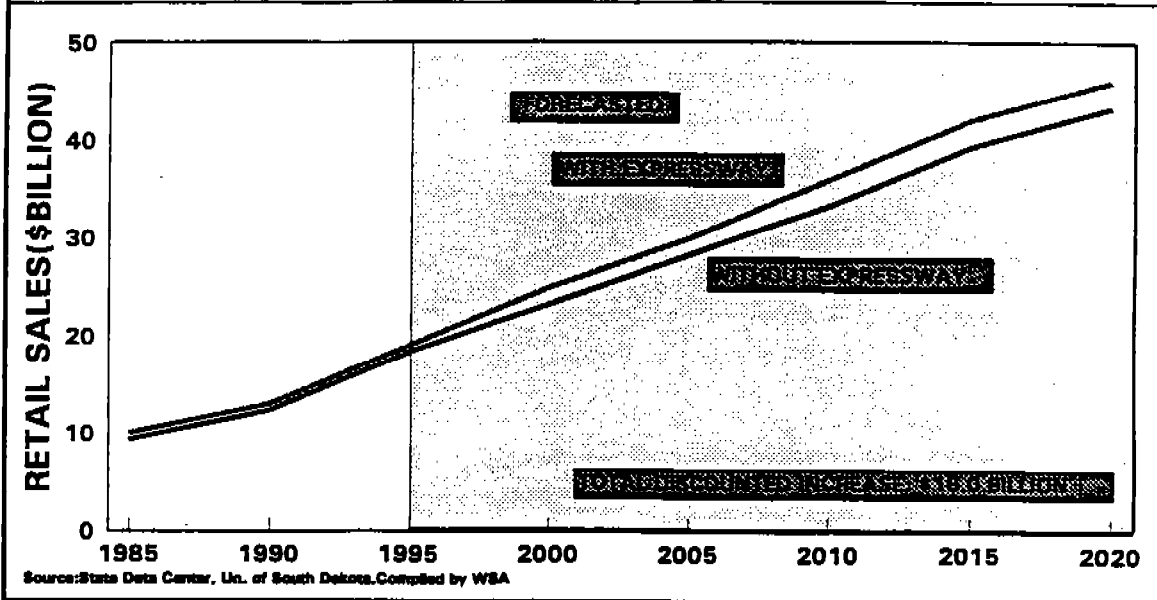
Automobiles, refrigerators, furniture and television sets are considered durable goods. Food and clothing are nondurable goods. Services refer to the services of barbers, mechanics, doctors, dentists and lawyers.

It is known that consumers spend most of their income on a combination of durable, nondurable goods and services. That fraction, or percentage, of any given income that is consumed is called the average propensity to consume. This means that if a family with total annual household income of \$20,000 after taxes is spending \$19,200, then the average propensity to consume is 96 percent. However, the more important question to consider is what happens to each additional dollar of income. This question acknowledges that there is no guarantee that this family will always consume 96 percent of any change in after tax income. The proportion of any change in income which is consumed is called the marginal propensity to consume. This is the ratio of a change in consumer spending to the change in income.

There is significant disagreement among economists as to the exact behavior of the marginal propensity to consume as income increases. For many years it was presumed that the marginal propensity to consume actually declined as incomes rose. This would mean that wealthy people tend to save more of their rising income and poor people tend to spend more of their rising income. Many economists now believe that the marginal propensity to consume remains constant. Statistical evidence tends to support this position. Therefore, with rising per capita incomes in South Dakota, the marginal propensity to consume will continue to drive retail sales activity higher. Even after considering ordinary price inflation, the impact on sales tax revenue will continue to be positive and will contribute significantly to growth in State general revenue.

Building the economically feasible segments of the Expressway Program will have a stimulative effect on the regional and statewide economy. The jobs created and gross regional product will generate more retail spending. The total discounted increase in retail sales is over \$16 billion. This increased spending will result in ever increasing sales tax receipts, which is directly and indirectly related to the highway program. Exhibit 11-8 illustrates the estimated trend of statewide gross retail sales with and without construction of the feasible segments of these highway improvements. A case could be made that this incremental retail sales tax revenue created by the stimulus of economic development caused by the highway improvement could be used to fund the Expressway Program.

**Exhibit 11-8**  
**FORECASTED GROSS RETAIL SALES**  
**WITH AND WITHOUT FEASIBLE EXPRESSWAY PROGRAM**  
**(Current Dollars)**



While in theory this makes sense, in practice the identification of incremental sales tax receipts directly attributable to the highway improvement program and the fair and equitable distribution of this revenue is administratively difficult. The more practical solution to this problem would be to divert a proportion of the total statewide sales tax collected based upon an agreed upon benefit allocation methodology.

The development of an adequate formula that recognizes the difference between benefits of the highway to the residents of the primary impact area and the remainder of the State is difficult and subject to considerable debate. The assessment of taxes among those people and local government units most affected by the impact of the Expressway Program has merit and could be examined.

However, the better solution might be to fund the Expressway Program by raising the tax rate, as was done in 1980 and 1987 for other special projects. If the statewide sales tax rate were raised from 4 percent to 5 percent, it is estimated that \$76 million additional revenue would be generated in 1994 that could be set aside for the Expressway Program. This additional revenue would increase in each subsequent year by the rate of growth in retail sales volume and the increase in market prices of goods and services subject to taxation. This represents a significant pool of additional funding that could also support other necessary highway improvement and economic development programs.

**State Lottery Proceeds** - The state's General Fund and Capitol Construction Fund receives a transfer of net proceeds from the South Dakota Lottery. Proceeds from the instant ticket game, video lottery and "Dakota Cash" are transferred to the General Fund. Proceeds from "Powerball" are earmarked for the Capitol Construction Fund. Proceeds from the Lottery

have averaged over \$42 million for the fiscal years 1992 and 1993. Proceeds in FY1993 were over \$50 million. The State could consider using a portion of the Lottery funds for highway purposes.

**Local Option Taxes** - Cities and Indian reservations may set their own tax rates. However, municipalities are limited in the sales tax rate it may levy. The maximum local option sales and use tax rate is 3 percent. There are approximately 151 local governments in South Dakota that have enacted sales and use taxes. In FY1992, over \$90 million in local option Sales, Use and Excise Taxes were collected. This represented only 2.2 percent more than the \$88.5 million collected in FY1991. Sales tax revenues at the local level do not necessarily indicate the magnitude of economic activity, because municipalities and Indian reservations vary in their tax rates and the size of their tax bases. Any attempt to forecast tax receipts at the local level is subject to wide variation and prone to error.

Property taxes are other local option taxes. Property taxes are the primary source of revenue for school districts, counties, municipalities, townships and other local government units. Three major variables affect the taxes on individual pieces of property:

- the size of the combined budgets of the governmental units taxing the property;
- the value of the property in the governmental unit;
- the value of the individual piece of property.

Although local governmental budgets control the size of a political subdivision's taxes, there are limits on the amount of taxes that can be levied. Each unit of local government is limited in the dollars per thousand of taxable value it may tax. The maximum rate for municipalities is \$27 per thousand, while the maximum for townships is \$3 per thousand dollars of taxable property value.

Local option funding sources are an attractive option for the Expressway Program because it clearly addresses the benefit principle of tax equity considerations. The benefit principle directly relates revenues and expenditures based upon a *quid pro quo* arrangement whereby local government units contribute to the cost of construction of programs designed to benefit local communities. However attractive this is in theory, the collective "consumption" of public highways is characterized by the exclusion principle. Highway benefits derived from travel efficiency and economic development in the corridors apply collectively and are nearly indivisible. People from all across the North American free trade zone will benefit to some degree from the improvements in these highways. The benefit theory is not comprehensive enough in its application to serve as a general bench mark of equity in the distribution of tax burdens though it does possess merit. Therefore, local option taxes would be an appropriate mechanism to fund a *pro rata* share of the cost of constructing and maintaining the Expressway Program.

**Federal Assistance Funds** - In addition to the federal funding allotted to South Dakota in the existing highway programs, there might conceivably be demonstration funds available. Federal demonstration funds have been a popular means to fund major highway projects in other states in the past decade. To accomplish this, the state's congressional delegation would insert specific funding provisions into national highway funding bills. However, the new Public Works and Transportation Committee chairman has created a set of guidelines

designed to severely restrict such demonstration projects in the future. Under these new guidelines, only the economically feasible segments of the Expressway Program would likely be considered for such funding, and dependence on demonstration funding is speculative at best. The Heartland Expressway was designated as a high priority national highway in the Intermodal Surface Transportation Efficiency Act (ISTEA) and \$29.4 million has been authorized for corridor improvements in Nebraska and South Dakota. It is expected that South Dakota will receive at least 50 percent of these funds. Therefore, these "earmarked" funds are taken into account in all the funding options outlined in the remaining sections of this chapter.

### Identification of State Tax Increase Options

The estimates of costs to design, construct and maintain the Expressway Program were outlined in Exhibit 11-5. These costs contemplated a program that would take many years to complete. An Expressway Program of this size clearly dictates the need to identify funding options that can support such an ambitious construction program in addition to supporting the maintenance of the existing highway network and its necessary planned improvements.

The State should pursue federal demonstration funds. If that attempt is successful, then the State will still have to provide a 20 percent match which, by itself, is still a sizeable cost that will require funding. If the federal demonstration funds are not forthcoming, then the State may have no option to increasing existing tax rates.

The tax increase options that would likely generate the most stable revenue streams capable of fully funding the Expressway Program on either a pay-as-you-go or bonded indebtedness basis of financing are listed below:

- Increase Traditional Highway Fund Sources
  - Elimination of Ethanol Fuel Tax Exemption
  - Increasing the Motor Fuel Tax
  - Increasing the Motor Vehicle Excise Tax
- Increase Statewide Sales, Use and Excise Tax

Each of these tax rate increase options satisfies the requirements established for sources of funds. The taxes are essentially neutral. No major behavioral changes are contemplated because the taxes already exist and the rate increases contemplated would have marginal effects on the regional economy. More importantly, there would be no additional administrative burden since the taxes are currently being collected. A change in the rate assumes negligible changes in the cost of collection. Moreover, the effect of changes in the tax rates can be predicted with some degree of accuracy based upon the overall level of economic activity in South Dakota.

Exhibit 11-9 illustrates the revenue generation capacity of each of these tax rate changes. In order to build the "full build" Expressways over a 14-year period, the State would need to raise almost \$30 million per year in new revenues. In order to build the "feasible" expressways over a 14-year period, the State would need to raise approximately \$14 million per year in new revenues, and in order to build the Eastern Dakota Expressway as a

combination super 2/4-lane highway and the Heartland Expressway over a 14-year period, \$18 million per year is needed.

**Exhibit 11-9**  
**ABILITY OF TAX INCREASES TO GENERATE REVENUE**

**TRADITIONAL HIGHWAY FUND SOURCES**

<b><u>TAXES</u></b>	<b><u>FIRST YEAR INCREASE</u></b>
Elimination of Fuel Tax Exemptions	\$3,300,000
1 cent (\$.01) per gallon increase in fuel tax	4,200,000
1 percent increase in motor vehicle excise tax	8,000,000

**INCREASE STATEWIDE SALES, USE AND EXCISE TAX**

1 percent	\$76,000,000
1/2 percent	39,000,000
1/4 percent	19,180,000

Analysis of State "Pay-As-You-Go" Funding Options

Financing the construction and maintenance of the Expressway Program requires finding the optimum use of the funding sources identified by varying the capital structure of programs and Expressway projects under consideration. The Expressway Programs, for example, can be financed on a "pay-as-you-go" basis or through borrowing the funds needed and pledging future tax receipts for debt service requirements. South Dakota has traditionally followed the safe but sure option of building highways only as the necessary funding has been available. This approach perhaps delays some construction; but at the same time it avoids debt.

This study examined several different combinations of tax increases that South Dakota could consider if it needs to fund the Expressway Program itself. Exhibit 11-10 identifies the magnitude of tax increases that would be needed under a "pay-as-you-go" funding scenario. On that exhibit five different funding combinations are shown, for both the "full build" (all expressways) and the "feasible expressways" options.

Exhibit 11-10 FIVE ALTERNATIVE TAX INCREASES IN ORDER TO BUILD THE EXPRESSWAYS OVER A 14-YEAR PERIOD						
Tax Increase Options	MAGNITUDE OF TAX INCREASE NEEDED TO BUILD					
	The Full Build		Feasible Expressways		EDE (Super 2/4 Lane)	
	Increase	Revenue (\$ Million)	Increase	Revenue (\$ Million)	Increase	Revenue (\$ Million)
Increase State Sales Tax	1/3 of 1%	\$26.0	1/8 of 1%	\$9.8	1/5 of 1%	\$15.6
Increase State Sales Tax and Motor Fuels Tax and Eliminate Ethanol Exemption	1/4 of 1% plus 1 cent per gal.	19.5 4.2 3.3	1/16 of 1% plus 1 cent per gal.	4.9 4.2 3.3	1/8 of 1% plus 1 cent per gal.	9.8 4.2 3.3
Increase Motor Fuels Tax and Eliminate Ethanol Exemption	7.5 cents per gal.	31.5 3.3	3 cents per gal.	12.6 3.3	4.5 cents per gal.	18.9 3.3
Increase Motor Vehicle Excise Tax	3.75% more	28.9	1.7% more	13.1	2.25% more	17.3
Increase Motor Vehicle Excise Tax and State Motor Fuels Tax and Eliminate Ethanol Exemption	2% more plus 3 cents per gal.	15.4 12.6 3.3	1% more plus 1 cent per gal.	7.7 4.2 3.3	1.33% more plus 1 cent per gal.	10.2 4.2 3.3

Note: Revenue figures indicate first year revenue only.  
The revenue figures within each option are different because of divergent revenue forecasts between the State sales tax and the State motor fuel tax. The State sales tax is increasing at a faster rate than the fuel tax, therefore less revenue is needed in the first year.

**Full Build Expressway Program** - If the State of South Dakota decided to build the full Expressway Program, the estimated total cost for design and construction at 1992 price levels is over \$448 million. On a "pay-as-you-go" financing basis, the construction and maintenance costs will inflate over time.

Because a good estimate of cash expenditures for construction costs is dependent on the phasing of each segment of the Expressway Program, there is no useful way to forecast total expenditures unless certain assumptions are made. Therefore, it was assumed that

construction phasing as a percent of project completion would be equal for each time period. In other words, if the program was phased over a 14 year time horizon, one-fourteenth of the project would be constructed in each of 14 consecutive years. Financing includes the \$15 million earmarked for the Heartland Expressway within the federal ISTEA appropriations.

There are several financing options available to the State to fully fund construction of the expressway system on a pay-as-you-go basis. The study examined the revenue streams of changing the rate and structure of motor fuels taxation, motor vehicle excise tax, and state retail sales taxes. The tax receipts collected from these sources of funds are assumed to be dedicated and deposited in an Expressway Program Trust Fund.

By changing the tax rate on motor fuels by 7½ cents (\$.075) per gallon and by eliminating the 2 cent (\$.02) per gallon exemption on certain alternate motor fuels, the State of South Dakota could generate approximately \$35 million annually in current dollars. Assuming a motor fuels tax growth rate of 1½ percent per year, the State of South Dakota could in this way generate sufficient revenue to fully construct and maintain the expressway system.

To fully construct the Expressway Program using motor vehicle excise taxes, the tax rate would have to be increased over 100 percent. The tax rate would have to be increased to 6.75 percent from the current rate of 3 percent on the purchase price of vehicles subject to the tax. This increase would result in an additional \$29 million per year in revenue. The tax growth rate for the motor vehicle excise tax is estimated to be 3 percent per year.

It is estimated that a 1 percent increase in the general statewide Sales, Use and Excise tax could generate approximately \$76 million in 1994. The growth in this tax base is estimated at 5.4 percent per year but the analysis used tax growth rate of 5 percent. Even with the lower growth rate assumption, the 1 percent sales tax will generate sufficient revenues to pay for complete construction of the expressway program on a pay-as-you-go basis. In fact the revenue generated by the 1 percent sales tax when reinvested grows at a geometric rate. Therefore, it was determined to test this revenue source for other tax rates.

The range of sales tax rate increases tested were a ¼ of 1 percent to ½ of 1 percent increase. These changes generated an estimated \$21 to \$38 million respectively. This is sufficient revenue to pay for construction and maintenance of the full build program (with FHWA earmarked aid for the Heartland Expressway segment) within the 14 year construction cycle. In each instance, construction expenditures could be increased to speed construction completion without placing the Expressway Program Trust Fund in jeopardy.

In addition, as shown on Exhibit 11-10, several different tax rate combinations were tested.

**Feasible Expressway Program** - The economically feasible segments of the Expressway Program can be built using less money for construction and maintenance. Therefore, using the same base assumptions for the full build program, similar results are obtained. The only difference is that less tax revenue needs to be generated.



By changing the tax rate of motor fuels by 3 cents (\$.03) per gallon and by eliminating the 2 cent (\$.02) per gallon exemption on certain alternate motor fuels, the State of South Dakota could generate approximately \$16 million annually in current dollars. Assuming a motor fuels tax growth rate of 1 ½ percent per year, the State of South Dakota could generate sufficient revenue to fully construct and maintain the feasible expressway system.

To construct the feasible segments of the Expressway Program using motor vehicle excise taxes, the tax rate would have to be increased over 25 percent. The tax rate would have to be increased to 4.7 percent from the current rate of 3 percent on the purchase price of vehicles subject to the tax. This increase would result in an additional \$13 million per year in revenue. The tax growth rate for the motor vehicle excise tax is estimated to be 3 percent per year.

The range of sales tax rate increases tested for the feasible segments of the Expressway Program were a 1/16th of 1 percent to 1/8th of 1 percent increase. These changes generated an estimated \$6 to \$11.8 million respectively. This is sufficient revenue to pay for construction and maintenance of the feasible segments of the Expressway Program.

**Eastern Dakota Expressway (Super 2/4-Lane) Program** - In order to fund this project the State sales tax would need to be increased by one-fifth of one percent. This would generate an estimated \$15.6 million in 1994, and with a growth of 5 percent per year, this would be sufficient to fund construction and maintenance of this type of facility.

By changing the tax rate of motor fuels by 4.5 cents (\$.45) per gallon and by eliminating the two cent (\$.02) per gallon exemption on certain alternate fuels, the State could generate approximately \$22 million in 1994. Assuming a motor fuels tax growth of one and one-half percent per year, the State of South Dakota could generate sufficient revenue to construct the Eastern Dakota Expressway as a Super 2/4-lane highway.

To construct the Eastern Dakota Expressway as a Super 2/4-lane highway using motor vehicle excise taxes, the tax rate would need to be increased from its current rate of three percent to 5.25 percent. This increase is estimated to generate an additional \$17.3 million. Based on an estimated growth rate of three percent, this could be sufficient to fund construction and maintenance of a Super 2/4-lane expressway program.

#### **Accelerated Construction Phasing through Revenue Bonding**

The South Dakota Constitution prohibits the State from issuing general obligation bonds backed by the full faith and credit of the State. This nearly absolute prohibition against general obligation indebtedness creates some unique problems for financing large public infrastructure improvements in South Dakota. Construction of large projects must be phased to account for the timing of funding resources. To alleviate some of the burdens created by the pay-as-you-go basis of financing large public works projects, the South Dakota Legislature created the South Dakota Building Authority under Chapter 276 of the Sessions Law of 1967.

The South Dakota Building Authority has the power to issue revenue bonds to build hospitals, penitentiaries, classroom buildings, administrative office structures, field houses, recreational facilities, parking structures and "similar facilities." Although there is no direct

mention of highway improvements in the charter of the Building Authority, the subject of what "*similar facilities*" may constitute is open to question and further definition.

The relevance of the South Dakota Building Authority to the possible financing of the Expressway Program could be considered. The Building Authority has an existing administrative governance structure with resident expertise in financing other large scale public works projects. The existence of this expertise would be beneficial if the Expressway Program were approved by the legislature and the highway improvements were to be financed by the issuance of General Revenue Expressway Development Bonds.

The role of public sector borrowing is that of providing access to sufficient funds for immediate use through the anticipation of future streams of tax revenue. In the case of large capital improvement programs like the Expressway Program, large expenditures for design and construction occur in the first several years of the life-cycle of the project with a gradual decline in construction activity. The heavy expenditure burden could not be achieved in the early years of the construction cycle except through the advance accumulation of reserve funds that often become the target of other State agencies competing for scarce funding resources.

The use of borrowing permits the leveling out of the burden of payments without the requirement to accumulate extraordinary cash reserves. As tax growth rates provide additional revenue in the future, the difference between tax receipts and debt service requirements creates marginal revenue that can be programmed to fund the \$518 million in backlogged highway improvement projects.

The leveling of the expenditures is accomplished through the use of serial annuity bonds. This permits annual debt service payments so that the sum of interest and principal payments in each of the years of the bond term are equal. Serial bonds are the most popular form of public debt because they avoid the necessity of sinking fund management. The possibilities for variations of installment payments are almost endless and can be tailored to the cash flow expectations of the project to be financed.

Another advantage of borrowing funds is that the construction program can be accelerated. By accelerating construction, South Dakota will realize the full impact of highway benefits sooner. Additionally, the cost of constructing the highway is reduced because adverse effects of inflationary cost escalation is mitigated. Construction of the Expressway Program can be accelerated and has been assumed to take approximately 7 to 10 years in acknowledgement of the contracting capacity of South Dakota highway construction companies.

Because the nature of the public debt market requires that the borrower obtain sufficient funds to pay for a given project all at one time, there is also an investment opportunity assigned to each project. Generally, bond proceeds must be invested until they are actually needed for construction purposes. This generates additional funds through interest income on idle bond proceeds. This investment income helps reduce the overall cost of the public borrowing. Interest earned on funds invested was assumed to be 6 percent. Investment of bond proceeds is net of federal funds because of the use of Letters of Credit to pay for construction costs when incurred. Because each bond issue requires that a Debt

Service Retirement Fund (DSRF) be established, which is usually 10 percent of the capital needs, the cost of borrowed capital is reduced by the amount of investment income earned on the idle DSRF bond proceeds.

The amount of the bond proceeds include sufficient funds to finance the present value of construction and on-going maintenance of the Expressway Program. Depending on the strategy employed by the South Dakota DOT in managing these funds and phasing construction and maintenance expenditures, the investment income can be quite substantial. In some cases, the State could actually earn more interest over a twenty year time horizon than it will have paid to borrow the funds for 12 years. The DSRF could support on-going maintenance of some segments of the highway in perpetuity assuming the interest earned on DSRF funds are used and the principal is not diminished.

The amount of money borrowed is always calculated net of federal highway assistance and local option contributions. The bond terms vary between 12 and 20 years. The cost of capital (funds borrowed) assumed for analysis ranged between 6 percent to 8 percent.

<b>Interest Rate</b>	<b>ANNUAL DEBT SERVICE PAYMENTS (\$ MILLION)</b>					
	<b>Full Build Option Borrowed at</b>		<b>Feasible Expressway Borrowed at</b>		<b>EDE (Super 2/4 Lane) Borrowed at</b>	
	<b>20 Years</b>	<b>12 Years</b>	<b>20 Years</b>	<b>12 Years</b>	<b>20 Years</b>	<b>12 Years</b>
6%	\$33.1	\$45.3	\$15.0	\$20.6	\$20.4	\$27.9
7%	35.8	47.8	16.3	21.7	22.1	28.5
8%	38.7	50.4	17.6	22.9	23.8	31.1

Assuming that the full build Expressway Program would be paid with state funds, less the earmarked ISTEAs for the Heartland Expressway, the annual debt service requirement would range between \$33 million annually for 20 years at a 6 percent coupon rate and \$50 million for 12 years at an 8 percent cost of capital. If the State were to receive a Federal Highway Administration (FHWA) demonstration grant, the cost to the state would be reduced by as much as 80 percent.

The cost of borrowing is reduced by building only the feasible segments of the Expressway Program. The annual debt service payments would range from \$15 million at a 6 percent cost of capital for 20 years to nearly \$23 million per year for 12 years at an 8 percent coupon rate. The annual debt service payments required for the Super 2/4-lane option would range from \$20.4 million at a six percent cost of capital for 20 years to over \$31 million in 12 years at an eight percent coupon rate.

There would be sufficient revenues generated from a variety of funding sources that could be pledged to support public borrowing to construct improved highways in South

Dakota. The various motor fuel tax adjustments, motor vehicle excise tax increases, increases in statewide Sales, Use and Excise tax, Lottery receipts and local option tax contributions could be used to underwrite the Expressway Program public borrowing.

Changes in state law or favorable interpretations of existing state law would permit the Department of Transportation to borrow funds administered by the Building Authority.

### **Funding Conclusions**

The Study has examined sources and uses of general and highway fund revenues. The Study has found that South Dakota cannot pay for the Expressway Program using existing highway funds. These funds are fully and over committed to support bridge replacement, interstate highway reconstruction, and existing State highway maintenance and improvement projects. To divert funds from these programs would degrade the quality and safety of the current State highway network.

It is also clear from this examination that South Dakota has historically supported highway improvements from dedicated revenue sources and has not diverted general fund revenue for such purposes. Rather than divert general fund revenue from existing programs, South Dakota has imposed a temporary increase in general sales tax rates on two separate occasions to generate sufficient funds to finance railroad improvements and economic development programs on a pay-as-you-go basis. Based upon this legislative history, it is most likely that new funding sources must be found to provide a stable revenue stream in support of the new expressway construction program and the economic development realized by these transportation improvements.

New taxes or increases to existing tax rates are the primary funding sources available to the State of South Dakota. This study examined various funding source options and identified several that would generate sufficient streams of stable revenue to support the expressway program on either a pay-as-you-go basis or through issuance of revenue bonds.

### **Impact on Continuing Highway Needs**

Whatever funding mechanism or Expressway option is chosen by the State (if any), the Expressway Program should be developed so as not to affect South Dakota's committed five-year program. In addition, the Expressway Program should not divert funds away from future on-going highway needs or future five-year plans for the existing State highway system.

### **The Remaining Expressway Decision**

South Dakota will utilize this study's results to decide whether or not to construct one or more of the expressways. It could choose to build only those that are "economically feasible," or it could choose to build all of them, or it could choose to build none of them, or anything in between. This study does not make the decision; it only provides information that should be useful to the State in its decision process.

# APPENDICES



## Appendix A

### EXISTING HIGHWAY CONDITIONS AND PLANNED HIGHWAY IMPROVEMENTS

This Appendix describes each existing highway that was considered for expressway status as well as other relevant highways from which traffic might divert. The Appendix describes the physical condition of the highways, followed by a discussion of programmed highway improvements that are relevant to the study.

#### Existing Highway Conditions

An inventory of physical conditions was compiled to assist in describing and determining the condition of various highways that lie within the general areas of the route corridors included in the expressway feasibility study. In most cases there are several existing highways that could be utilized to travel between the beginning and end destinations of the corridors. Highways that were considered to be possible route alternatives were traveled to record field observations of their conditions and physical characteristics.

Routes within each corridor were divided into segments. Each segment was evaluated according to the following criteria.

**Roadway and Shoulders** - Lane widths of 12 feet were considered standard, and anything less than that was considered narrow. Current design standards provide for 6 to 10 feet wide shoulders. Many of the highways that were evaluated had shoulders that were less than 6 feet. Those were noted as being narrow.

**Structures** - Structures include bridges and reinforced concrete box culverts. Current standards provide for a bridge width that is as wide as the roadway and properly designed shoulders. Bridges that were observed to be less than the above width were recorded as narrow. Box culverts are presently designed so that the headwalls are beyond the roadway clear zone, usually 30 feet beyond the edge of the driving lane. Box culverts with headwalls within the clear zone were noted as such.

**Horizontal Alignment** - Horizontal alignment considers how the roadway lies in the plan view. Curves that cause a reduction in vehicular speed were considered a deficiency.

**Vertical Alignment** - The vertical alignment considers highway grades and the sight distance on hills. Vertical curves that restricted stopping sight distance were considered a deficiency. Steep grades that caused a reduction in vehicular speed were also considered a deficiency.

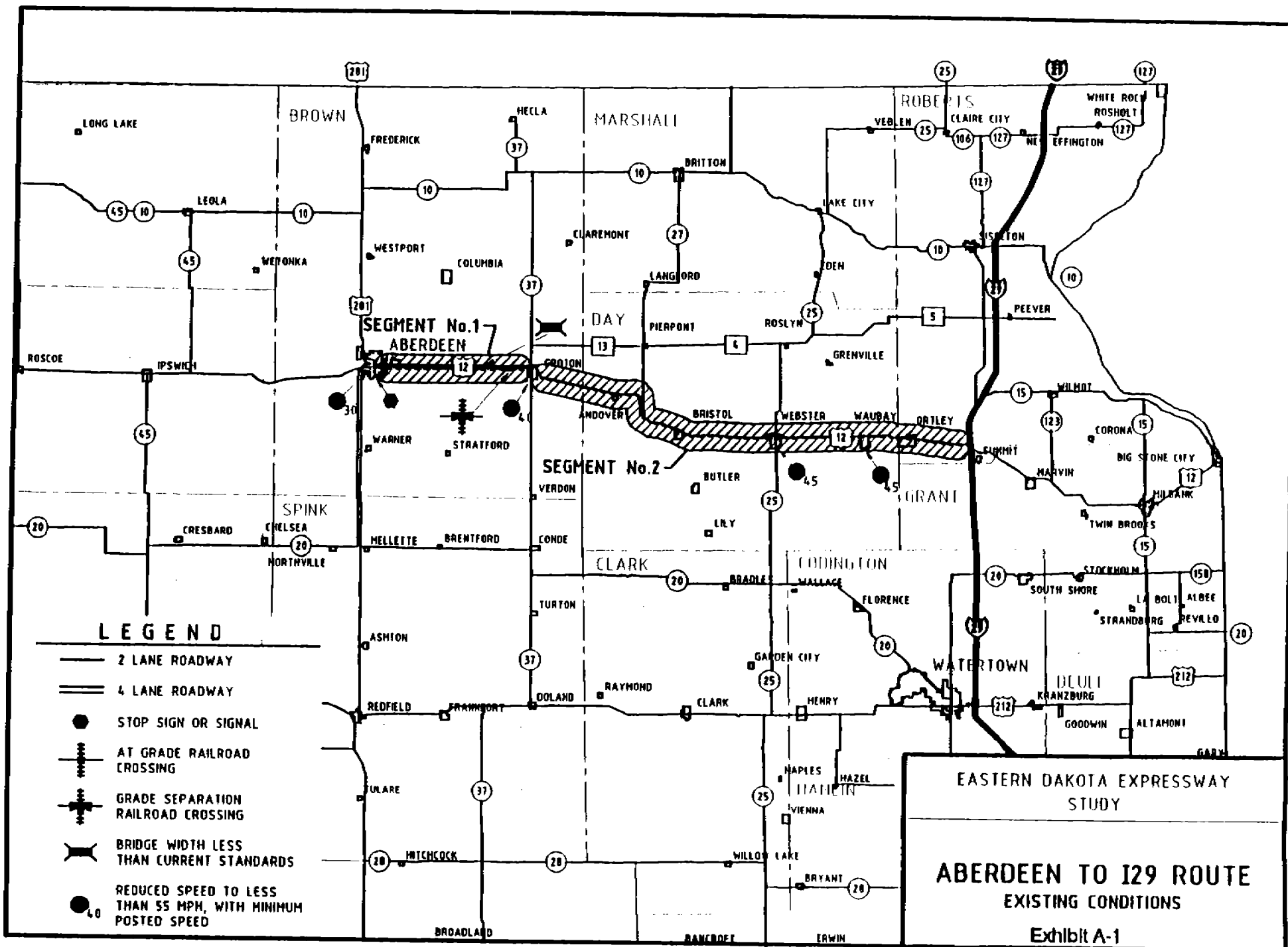
**Existing Right-of-Way** - The width of existing right-of-way is a factor in determining how much additional right-of-way may be required for the alternative expressways.

**Route Constraints** - This portion of the evaluation considered items not covered under the above headings. Factors such as at-grade railroad crossings, stop signs and travel through urban areas were noted under this heading.

Following the inventory of physical conditions, several segments were eliminated from further consideration in the feasibility study. The narrative portion of this Appendix discusses each segment that was evaluated; however, the maps show only the segments that are analyzed in the traffic, cost and economic investigations.

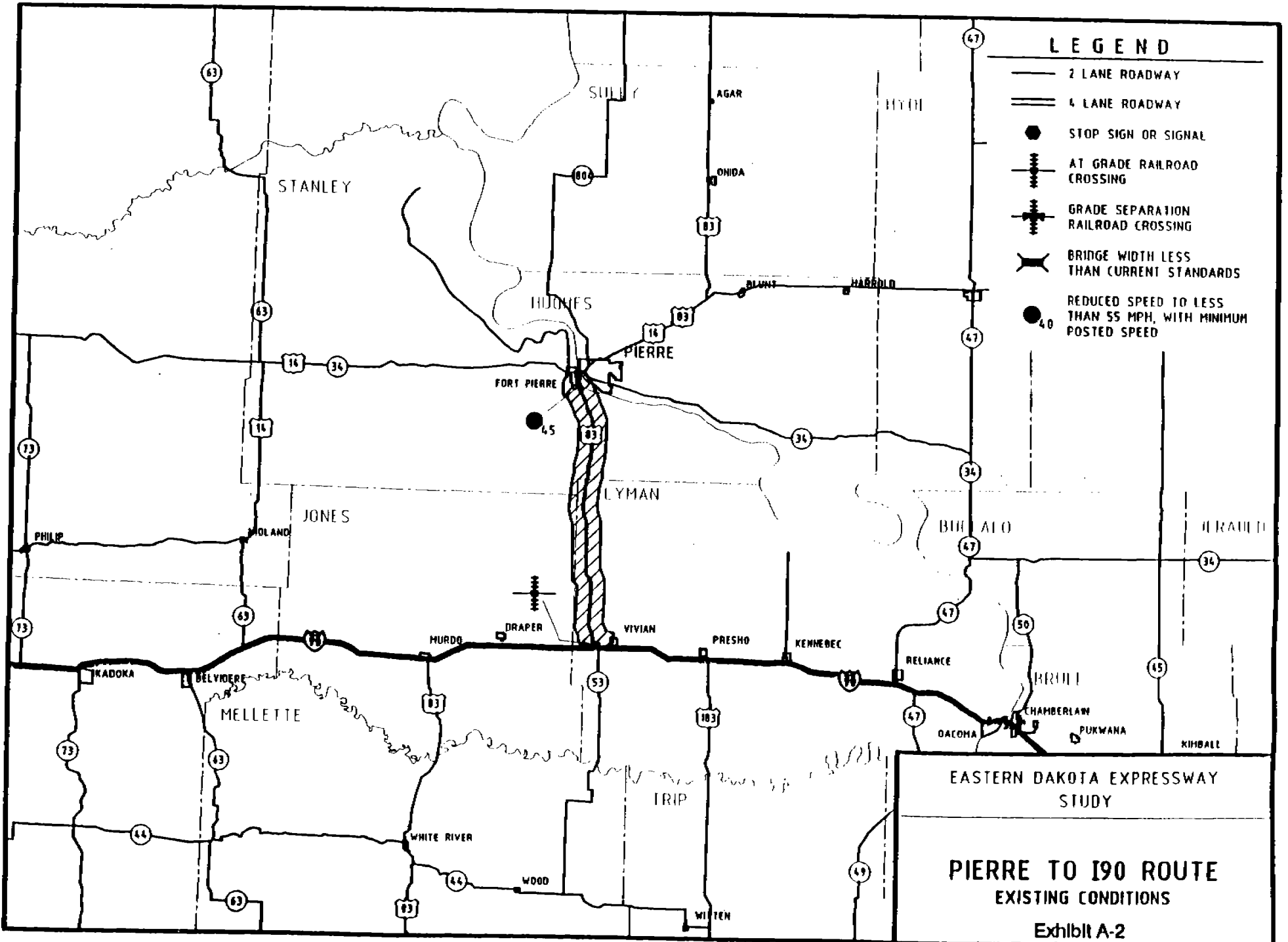
- I. **ABERDEEN TO I-29** - This portion of the inventory examines the existing roadway between Aberdeen and I-29. The roadway shown on Exhibit A-1 is the analysis route inspected.
  - A. **Segment No. 1 Description** - Segment No. 1 is a portion of U.S. Highway No. 12 between Aberdeen and Groton. The segment is approximately 20 miles long.
    1. **Roadway and Shoulders** - The segment is a 4-lane highway with a grass median ditch dividing eastbound and westbound lanes. The eastbound lanes have adequate roadway width and the surface is good. Eastbound shoulders are narrow and generally inadequate. The westbound lanes are of more recent construction with good roadway width and a better surface than the eastbound lanes. Westbound shoulders are of adequate width and are surfaced.
    2. **Structures** - There are two major structures on each set of roadways. The eastbound bridge over the James River is old and narrow. The westbound bridge over the James River is newer and wider than the eastbound bridge; however, it is narrow based on present day standards. Grade separation structures allow vehicles to pass over a railroad crossing three miles west of Groton. The structure for the eastbound lanes is old and narrow with restricted sight distance. The grade separation structure for the westbound lanes is newer than that on the eastbound lanes. Sight distance appears adequate and the bridge is wider than the eastbound structure, however not as wide as adjacent roadway shoulders.
    3. **Horizontal Alignment** - This segment is straight with good horizontal alignment.
    4. **Vertical Alignment** - The eastbound lanes are flat to gently rolling with some areas having restricted sight distance. The grades on each side of the railroad crossing structure are steep by modern standards and sight distance is restricted. The westbound lanes are flat to gently rolling with generally good vertical alignment. The grades and sight distance on the railroad overpass structure appear adequate.
    5. **Existing Right-of-Way** - Existing right-of-way is adequate for a 4-lane divided highway.
    6. **Route Constraints** - The segment between Aberdeen and Groton is a good roadway with few restrictions. The major problem area is at the west end where the route passes through Aberdeen. That portion is very congested and through traffic must compete with local urban traffic. A bypass around the south side of Aberdeen would greatly improve driving conditions for through traffic and also reduce congestion on the urban streets. A bypass route could begin on the south side of Aberdeen at U.S. Highway 281, then go east beyond the south side of the airport at which point it could turn northeast to join with the present U.S. Highway 12 roadway.





- B. **Segment No. 2 Description** - Segment No. 2 is a portion of U.S. Highway No. 12 between Groton and I29. The segment is approximately 56 miles long.
1. **Roadway and Shoulders** - The segment is a 2-lane highway that has been upgraded in recent years and appears to meet most current design standards. The roadway and shoulders are of adequate width and inslopes are free of clear zone restrictions. Four-lane roadways have been constructed through the highway business areas of Groton and Webster.
  2. **Structures** - There are no major structures on this segment.
  3. **Horizontal Alignment** - The segment is generally straight and has good horizontal alignment.
  4. **Vertical Alignment** - The roadway is flat to gently rolling with good vertical alignment.
  5. **Existing Right-of-Way** - The existing right-of-way is adequate for a two-lane highway.
  6. **Route Constraints** - The roadway has few restrictions. The road passes through highway business developments on the edges of several communities and these areas are posted with reduced speed zones. The roadway serves several of the larger communities along the proposed corridor and the basic alignment appears more desirable than other existing roadways. There is lakeside development along portions of the highway and there are several large wetland areas that would impact additional right-of-way acquisition in some areas.
- C. **Segment No. 3 Description** - Segment No. 3 was reviewed as a possible alternative to Segment No. 2 as a route between Groton and I29. The segment follows Brown County Highway No. 13, Day County Highway No. 4 and Roberts County Highway No. 5. The segment is approximately 61 miles long.
1. **Roadway and Shoulders** - Roadway width is generally adequate, however shoulders on about 50 miles of the segment are narrow. Portions of the roadway surface are in poor condition and require traffic to reduce speed.
  2. **Structures** - There is one bridge and approximately 20 box culverts that are not designed to current standards. The width of the bridge is inadequate. The box culverts are narrow with headwalls all located well within the clear zone safety area.
  3. **Horizontal Alignment** - Horizontal alignment on the west 40 miles is generally adequate. The east one third of the segment has several curves, some of which require reducing speed.
  4. **Vertical Alignment** - The vertical profile changes from flat on the west, to gently rolling through the central portion, to very rolling in the eastern portion. Sight distance is restricted on the central and eastern roadways and passing is limited in some areas.

5. **Existing Right-of-Way** - It appears that there is 100 feet of right-of-way throughout a majority of the segment. Any upgrading would require additional right-of-way acquisition.
  6. **Route Constraints** - Developing this segment into an expressway would require major changes in horizontal and vertical alignment. The existing roadway passes through some lakeside development areas and some large wetlands. Additional right-of-way would be required for upgrading the roadway, and wetlands would impact acquisition in some areas.
- II. **PIERRE TO I-90** - This portion of the study examines the existing roadway between Pierre and I-90. The roadway is contained in one segment and is shown on Exhibit A-2.
- A. **Segment Description** - The segment is a portion of U.S. Highway No. 83 between Pierre and I-90. The segment is approximately 33 miles long.
1. **Roadway and Shoulders** - The roadway has good lane width and wide paved shoulders. The roadway, shoulders and inslopes appear to meet current design standards. There are 4 through lanes with a center turn lane and parking lanes on each side of the roadway on the portion of the segment that passes through Ft. Pierre.
  2. **Structures** - There are five bridges on the segment between Ft. Pierre and I-90. Construction dates on the bridges range from 1948 to 1961. All are narrow when compared to current standards. Between Ft. Pierre and Pierre there is a major four-lane bridge across the Missouri River, and a grade separation structure of the intersection of U.S. 14 and U.S. 83. The shoulder widths on these structures are narrow when compared to current standards.
  3. **Horizontal Alignment** - The segment is generally straight and has good horizontal alignment.
  4. **Vertical Alignment** - The segment has a rolling vertical alignment throughout its length. Passing is restricted on much of the segment.
  5. **Existing Right-of-Way** - The existing right-of-way is adequate for a two-lane highway. There are approximately 10 miles on the south end of the segment where the present highway was constructed adjacent to the previous roadway. The right-of-way for the old road in that area has been retained and appears adequate for construction of an additional set of lanes on the west side of the present highway.
  6. **Route Constraints** - The rolling vertical profile slows traffic by restricting passing. An at grade railroad crossing is located at the south end of the segment. Travel through Ft. Pierre and across the Missouri River bridge is slowed by local traffic and the high number of vehicles. A bypass south of Ft. Pierre would divert the through traffic heading to Pierre and points east from Ft. Pierre and the present Missouri River bridge. A bypass route could begin at a point on U.S. Highway 83 south of Ft. Pierre and then travel northeast across the Missouri River to join with S.D. Highway 34 at some point in or east of Pierre.



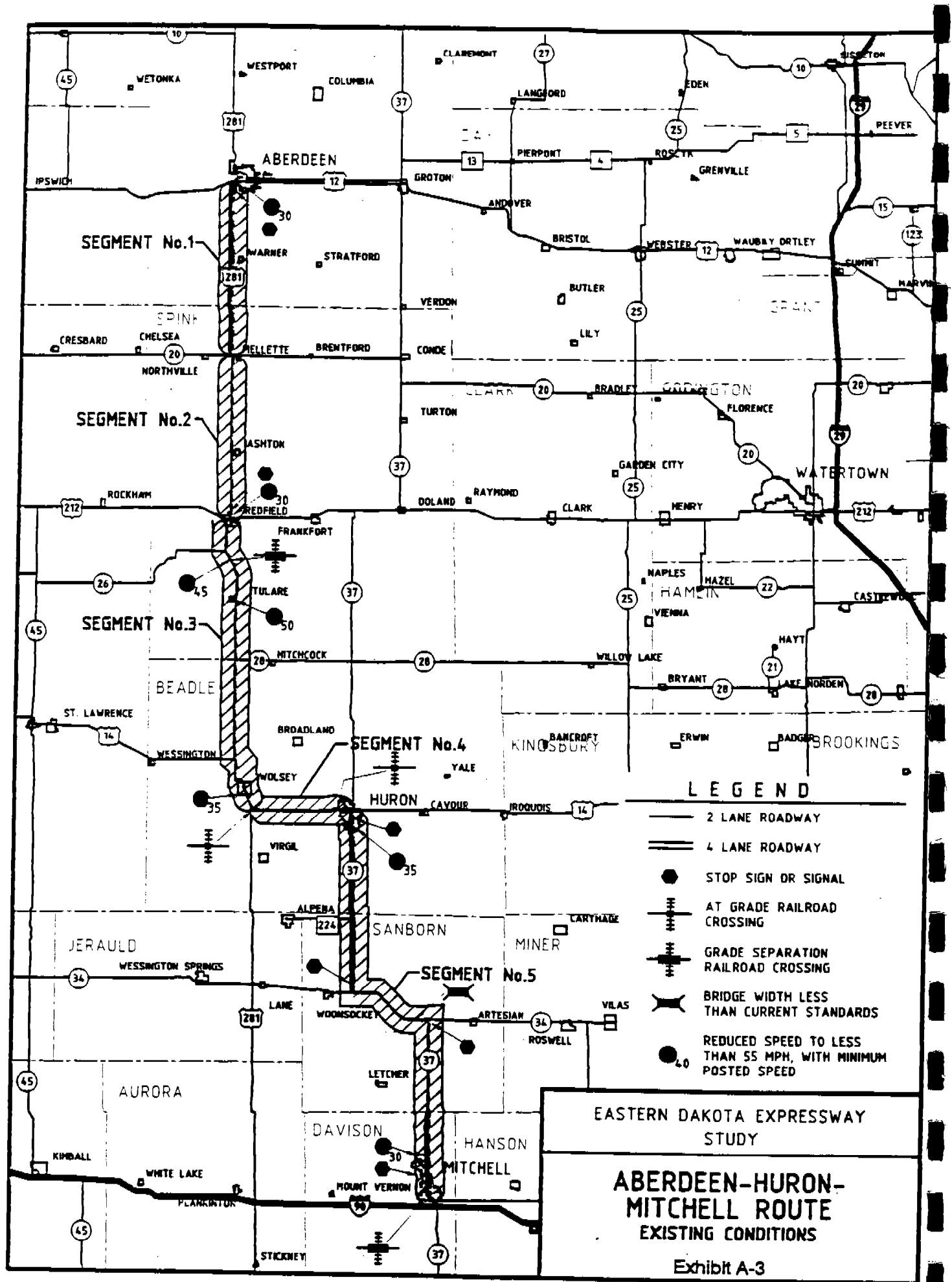
III. **ABERDEEN TO I-90 VIA MITCHELL** - This portion of the inventory examines the existing roadways between Aberdeen and I-90 near Mitchell. Several routes were reviewed. The segments being analyzed in this study are shown on Exhibit A-3.

A. **Segment No. 1 Description** - Segment No. 1 is a portion of U.S. Highway No. 281 between Aberdeen and Mellette. The segment is approximately 23 miles long.

1. **Roadway and Shoulders** - The segment is a 4-lane divided highway with a grass median. Lanes are adequate width and shoulders are wide and in good condition.
2. **Structures** - There are two bridges on this segment and both are adequate in width.
3. **Horizontal Alignment** - The segment is straight with good horizontal alignment.
4. **Vertical Alignment** - The highway has a level profile with good vertical alignment.
5. **Existing Right-of-Way** - Existing right-of-way is adequate for a four-lane divided highway.
6. **Route Constraints** - The segment is a good roadway and appears adequate to meet future needs.

B. **Segment No. 2 Description** - Segment No. 2 is a portion of U.S. Highway No. 281 between Mellette and Redfield. The segment is approximately 23 miles long.

1. **Roadway and Shoulders** - The segment is a two-lane road with adequate roadway width and shoulders.
2. **Structures** - There are two structures on the segment and both appear adequate in width.
3. **Horizontal Alignment** - The segment is straight with good horizontal alignment.
4. **Vertical Alignment** - The profile is generally level with good vertical alignment.
5. **Existing Right-of-Way** - The existing right-of-way is adequate for a two-lane roadway.
6. **Route Constraints** - The segment is an adequate two-lane roadway north of Redfield. The highway passes through Redfield and is restricted within the city. There are several turns and stop signs. Local urban traffic causes interference with through traffic. A bypass around the city would improve the efficiency of travel for those passing by the city. There are grain elevators and livestock sales facilities on the west side of the city, and therefore a bypass on the west side would appear to be the most desirable.



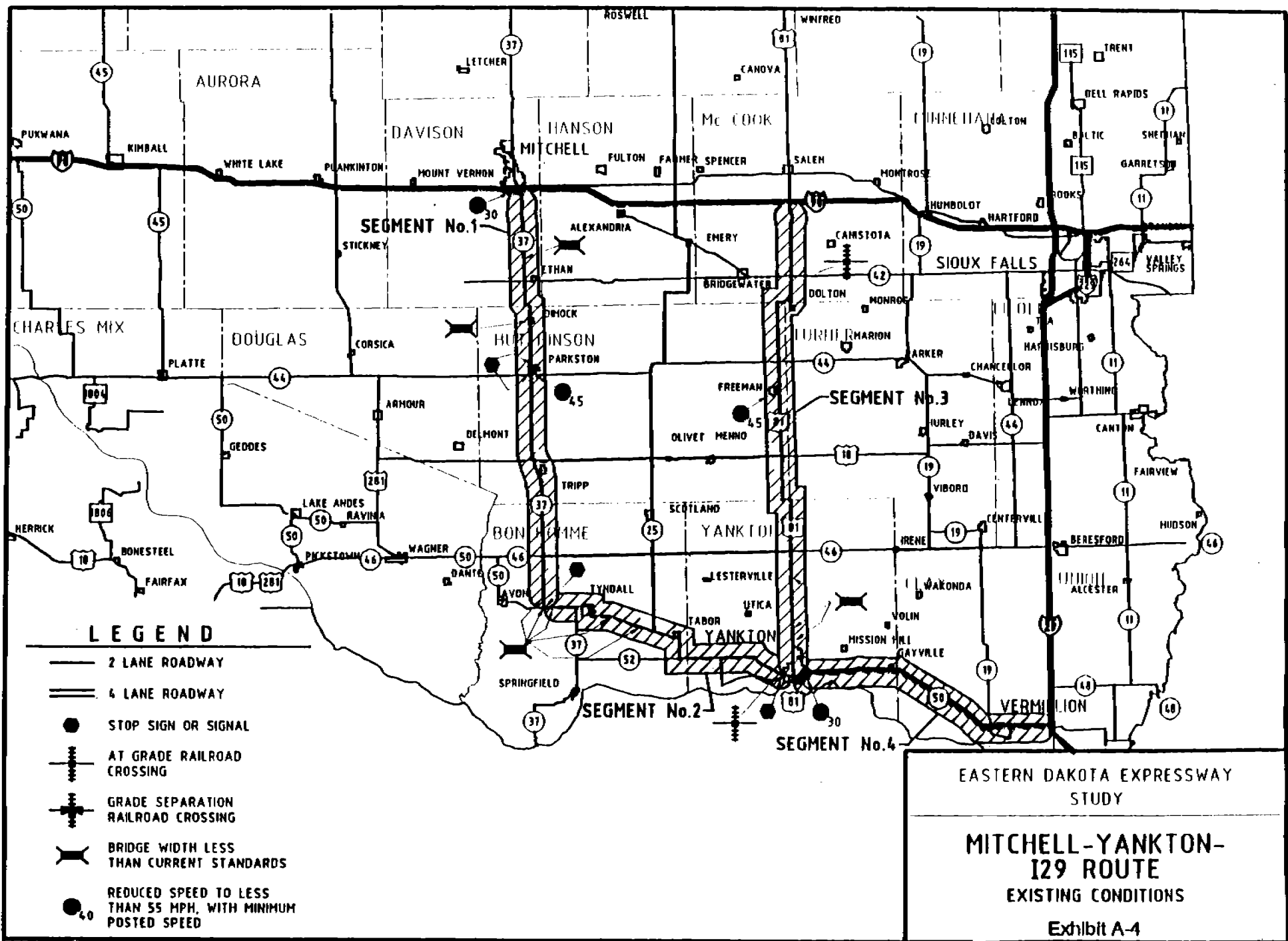
- C. **Segment No. 3 Description** - Segment No. 3 is a portion of U.S. Highway No. 281 between Redfield and the intersection of U.S. Highway 14 south of Wolsey. The segment is approximately 35 miles long.
1. **Roadway and Shoulders** - The roadway width is adequate; however, shoulders are narrow. Some inslopes are not graded to current design standards. A four-mile segment north of Wolsey has been reconstructed in recent years and is designed to current standards.
  2. **Structures** - North of Tulare is a railroad grade separation structure where the highway passes over the railroad. The structure is old and narrow and obsolete. North of Wolsey is a new bridge that is designed to current standards.
  3. **Horizontal Alignment** - The horizontal alignment is generally good. A few curves on older sections of the highway are below current design standards. The railroad grade separation structure is on an S curve that is sharp and very inadequate.
  4. **Vertical Alignment** - The vertical alignment ranges from flat to rolling. There are some sight distance restrictions resulting in areas of no passing zones that can slow traffic. The vertical alignment at the grade separation structure is inadequate with poor sight distance.
  5. **Existing Right-of-Way** - Right-of-way appears adequate for existing conditions. Additional right-of-way would be required in many areas if improvements were to be made to the roadway.
  6. **Route Constraints** - The highway passes through Wolsey which slows through traffic. A bypass around the town would improve the efficiency of travel of those not wishing to stop. The grade separation structure north of Tulare is a problem that causes traffic to slow down.
- D. **Segment No. 4 Description** - Segment No. 4 is a portion of U.S. Highway No. 14 between Huron and U.S. Highway No. 281. The segment is approximately 12 miles long.
1. **Roadway and Shoulders** - The segment is a two-lane highway with an adequate roadway width and wide shoulders.
  2. **Structures** - There are no major structures on this segment of highway.
  3. **Horizontal Alignment** - The roadway is straight with good horizontal alignment.
  4. **Vertical Alignment** - The roadway is level with good vertical alignment and sight distance.
  5. **Existing Right-of-Way** - The right-of-way is adequate for a two-lane road. Any improvements to the roadway would require additional right-of-way. There is a considerable amount of wetland adjacent to the right-of-way that would need to be taken into account if additional right-of-way were to be acquired.

6. **Route Constraints** - Although the highway is straight and level, traffic flow is somewhat restricted due to the large amount of vehicles, many of which are slow moving. Passing is limited due to traffic.
- E. **Segment No. 5 Description** - Segment No. 5 is a portion of S.D. Highway No. 37 between Mitchell and Huron. The segment is approximately 58 miles long.
1. **Roadway and Shoulders** - The south 12 miles and the north 22 miles are 4-lane divided highway with a grass median. These sections have standard lane widths and wide shoulders. A 10-mile section in the vicinity of Forestburg is two-lane highway with wide shoulders. The 12-mile section south of the intersection with S.D. Highway 34 was under construction at the time of the evaluation survey.
  2. **Structures** - There are several bridges on the segment. One of the bridges is within the construction area and is being replaced. Two bridges are narrow by current design standards. Bridges on the 4-lane section south of Huron appear adequate.
  3. **Horizontal Alignment** - Horizontal alignment through the segment is good.
  4. **Vertical Alignment** - The roadway is generally level and vertical alignment and sight distance are good.
  5. **Existing Right-of-Way** - The existing right-of-way appears adequate with no restrictions noted.
  6. **Route Constraints** - The rural sections of the segment are in good condition and offer no restrictions. The south end of the segment enters the City of Mitchell and the north end enters the City of Huron. Both of these situations result in the traffic passing through the business districts of the cities. The through traffic is slowed and restricted by urban traffic and stop signs. A north-south bypass around Mitchell and around Huron would greatly improve the efficiency of travel for those not wishing to stop in either of those cities.
- F. **Segment No. 6 Description** - Segment No. 6 is a portion of U.S. Highway No. 281 between the intersection of U.S. Highway 14 south of Wolsey and Interstate Highway No. 90. The segment is approximately 49 miles long. The segment is not being considered for further evaluation in this study.
1. **Roadway and Shoulders** - The roadway width and shoulder widths are adequate. Some sections have been upgraded in recent years.
  2. **Structures** - There are three bridges on this segment. All are narrow.
  3. **Horizontal Alignment** - Horizontal alignment is good.
  4. **Vertical Alignment** - The roadway is generally level and has good vertical alignment and sight distance.
  5. **Existing Right-of-Way** - Right-of-way is adequate for a two-lane road.



6. **Route Constraints** - There are two at grade railroad crossings on this segment of highway. In general, the highway has few restrictions.
- G. **Segment No. 7 Description** - Segment No. 7 is a portion of South Dakota Highway No. 37 between Huron and Groton. The segment is approximately 80 miles long. The segment is not being considered for further evaluation in this study.
1. **Roadway and Shoulders** - The south one mile of the segment is within the city of Huron and consists of a four-lane urban section with curb and gutter. North of the city the section becomes a two-lane highway with wide paved shoulders. The roadway and shoulders appear to meet current design standards.
  2. **Structures** - There are 14 bridges on the segment, all of which were constructed in the 1950's. All of the bridges are narrow and have been modified by the addition of steel beam guard rail through the bridge and out beyond the ends.
  3. **Horizontal Alignment** - In general the horizontal alignment is good. There is a stop sign and a right-hand turn midway through segment, and a curve at Doland that appears to be somewhat below current design standards.
  4. **Vertical Alignment** - The entire segment is level with good sight distance.
  5. **Existing Right-of-Way** - It appears that there is 150 feet of right-of-way along the entire segment. Approximately 13 miles south of Groton there is a cemetery on the east side of the highway right-of-way.
  6. **Route Constraints** - There are two at grade railroad crossings on this segment. One is at Huron and one is at Groton. In general the highway is in good condition and has few restrictions.
- H. **Segment No. 8 Description** - Segment No. 8 is a portion of South Dakota Highway No. 34 between U.S. Highway No. 281 and S.D. Highway No. 37. The segment is approximately 12 miles long. The segment is not being considered for further evaluation in this study.
1. **Roadway and Shoulders** - The segment is a two-lane highway with an adequate roadway width and wide shoulders. There is a 4-lane roadway section through the town of Woonsocket.
  2. **Structures** - There are no structures on this segment of highway.
  3. **Horizontal Alignment** - The roadway is generally straight and horizontal alignment is good.
  4. **Vertical Alignment** - The roadway is level with good vertical alignment and sight distance.
  5. **Existing Right-of-Way** - The right-of-way is adequate for a two-lane road. There are areas of wetland adjacent to the roadway that would need to be taken into account if additional right-of-way were to be acquired.

6. **Route Constraints** - The only route constraint is a reduction in the speed limit on the roadway section passing through Woonsocket.
- IV. **MITCHELL TO YANKTON TO I-29** - This portion of the inventory examines the existing highways between Mitchell and Yankton, and then between Yankton and Interstate Highway I29. Several routes were reviewed, and the roadways being analyzed in the study are shown on Exhibit A-4.
- A. **Segment No. 1 Description** - Segment No. 1 is a portion of S.D. Highway No. 37 between Mitchell and S.D. Highway No. 50. The segment is approximately 50 miles long.
1. **Roadway and Shoulders** - The segment is a two-lane highway. The north 10 miles and the south 20 miles have good roadway width and wide paved shoulders. A 20-mile section midway through the segment has narrow shoulders and areas with steep inslopes. A new roadway section has been constructed through the highway business area of Parkston. The section includes through lanes, a center turn lane and provisions for parking on each side.
  2. **Structures** - There are three bridges and one large box culvert on the segment. All are old structures and are narrow compared to current design standards. All four of the structures have been modified by the addition of steel beam guardrail along the edge of the driving lanes.
  3. **Horizontal Alignment** - The segment is generally straight with good horizontal alignment.
  4. **Vertical Alignment** - The segment is level with good vertical alignment and sight distance.
  5. **Existing Right-of-Way** - The north and south portions of the segment have 150 feet right-of-way widths. The central portion has narrow right-of-way, approximately 100 feet wide. At the north end of the segment there are a number of rural housing developments that have houses close to the existing right-of-way line. A large cemetery is located on the east side of the right-of-way in Dimock, S.D. A small, one-acre rural cemetery is located on the east side of the right-of-way at about the halfway point of the segment.
  6. **Route Constraints** - The only route constraints are reduced speed limits on sections passing through the highway business districts of Parkston and Dimock.
- B. **Segment No. 2 Description** - Segment No. 2 is a portion of S.D. Highway No. 50 between S.D. Highway 37 and U.S. Highway No. 81. The segment is approximately 33 miles long.



1. **Roadway and Shoulders** - The segment is generally a two-lane highway. There is a four-lane divided highway at the City of Tyndall bypass, the City of Tabor bypass and at the intersection with S.D. Highway No. 25. There is a four-lane undivided highway with curb and gutter at the east end of the segment as it enters Yankton. Roadway widths and shoulder widths are good throughout the segment. The highway has been reconstructed in recent years.
2. **Structures** - There are four bridges on the segment. Three of the bridges are of an outdated design and are narrow. One bridge is of more recent construction and has adequate width.
3. **Horizontal Alignment** - Horizontal alignment for the entire segment is good.
4. **Vertical Alignment** - The entire segment has good vertical alignment and sight distance.
5. **Existing Right-of-Way** - The entire segment has a minimum of 150 feet of right-of-way.
6. **Route Constraints** - An at-grade railroad crossing is located at the east end of the segment. At the east end of the segment the highway enters the north edge of Yankton. Traffic continuing east on Highway 50 must pass through the center of Yankton which offers severe restrictions to free flow. There is heavy urban traffic, several turns and many stop lights and signs. A bypass around the city from north to east would greatly improve the efficiency of through traffic not wishing to stop in Yankton.

C. **Segment No. 3 Description** - Segment No. 3 is a portion of U.S. Highway No. 81 located between Interstate Highway 190 and Yankton. The segment is approximately 60 miles long.

1. **Roadway and Shoulders** - The segment is a two-lane highway. The portion of the segment from Freeman south has adequate lane width and wide shoulders. The portion of the highway north of Freeman has adequate lane width, but narrow shoulders. The northern portion is in poor condition with a rough and deteriorated surface. The portion of the highway from I-90 south 10 miles was under construction at the time of the inspection and was closed to traffic.
2. **Structures** - There are three bridges on this highway segment. All are old and are narrow when compared to current design standards.
3. **Horizontal Alignment** - The segment is generally straight with good horizontal alignment. Two curves on the roadway in the north half of the segment should be reconstructed with a lower degree of curve.
4. **Vertical Alignment** - The profile is rolling with some long grades on the south half of the segment. Passing lanes are provided on several of the long grades. There is restricted passing in several areas.

5. **Existing Right-of-Way** - Right-of-way is adequate for a two-lane highway. A small rural cemetery is on the east side of the right-of-way about midway along the segment.
  6. **Route Constraints** - An at-grade railroad crossing is in the north portion in the segment. Through traffic must slow as it passes the highway business district of Freeman. At the south end of the segment the highway enters Yankton. Through traffic desiring to travel east must mix with urban vehicles and wind through a number of turns. There are also many stop signs and lights that are encountered. A bypass around Yankton from north to east would greatly improve the flow of vehicles not wishing to stop in Yankton.
- D. **Segment No. 4 Description** - Segment No. 4 is a portion of S.D. Highway No. 50 between U.S. Highway 81 and Interstate Highway No. I-29. The segment is approximately 34 miles long.
1. **Roadway and Shoulders** - The entire segment east of Yankton to the Interstate is 4-lane divided highway. Portions of the highway are old, but lane width and shoulder width are good. A bypass is located at Vermillion that allows through traffic to go around the north side of the city.
  2. **Structures** - There are major bridges over the James River. The bridges appear to have adequate width.
  3. **Horizontal Alignment** - Horizontal alignment on the entire segment is good.
  4. **Vertical Alignment** - The entire segment is flat and vertical alignment and sight distance is good.
  5. **Existing Right-of-Way** - The existing right-of-way appears adequate for a 4-lane highway.
  6. **Route Constraints** - The major route constraint is at the west end where the highway passes through Yankton. As previously stated, a bypass around the city from north to east would enhance travel for through traffic.
- E. **Segment No. 5 Description** - Segment No. 5 is a portion of S.D. Highway No. 25 located between Interstate Highway I-90 and S.D. Highway No. 50. The segment is approximately 58 miles long. The segment is not being considered for further evaluation in this study.
1. **Roadway and Shoulders** - The segment is a two-lane highway with narrow shoulders and areas with steep inslopes. The south two miles have been reconstructed and have wide paved shoulders.
  2. **Structures** - There are three bridges on the segment. All are old and are narrow compared to current design standards.

3. **Horizontal Alignment** - Alignment through the segment is generally good. There are several curves in the north portion that are below current standards and require a reduction in speed to traverse.
  4. **Vertical Alignment** - The profile varies from level to gently rolling. Several portions of the segment have restricted passing.
  5. **Existing Right-of-Way** - The existing right-of-way is 100 feet wide throughout most of the segment. There are three small rural cemeteries adjacent to the right-of-ways.
  6. **Route Constraints** - There are two at-grade railroad crossings at the south end of the segment. Several stop signs are located along the route. The entire segment is below current design standards and contains more deficiencies than other routes under consideration
- F. **Segment No. 6 Description** - Segment No. 6 is a portion of U.S. Highway No. 18 between S.D. Highway No. 37 and U.S. Highway No. 81. The segment is approximately 30 miles along. The segment is not being considered for further evaluation in this study.
1. **Roadway and Structures** - The segment is a two-lane highway. The roadway width is adequate; however, shoulders are narrow. The highway passes through the towns of Olivet and Menno, and the roadway widens within the towns.
  2. **Structures** - There are two bridges on the segment. Both are old and narrow.
  3. **Horizontal Alignment** - The highway is generally straight with good horizontal alignment.
  4. **Vertical Alignment** - The majority of the segment is level with good vertical alignment and sight distance. Grades on either side of the James River valley are steeper than on other portions of the segment, and sight distance and passing is restricted.
  5. **Existing Right-of-Way** - The right-of-way appears to be 100 feet wide. Any improvements to the highway would require acquisition of additional right-of-way.
  6. **Route Constraints** - An at-grade railroad crossing is located on the west end of the segment. Traffic must slow when it passes through Olivet and Menno. If the highway was to be improved, it would be desirable to construct a bypass around those two communities.
- G. **Segment No. 7 Description** - Segment No. 7 is a portion of S.D. Highway No. 46 between S.D. Highway No. 37 and U.S. Highway No. 81. The segment is approximately 30 miles long. The segment is not being considered for further evaluation in this study.
1. **Roadway and Shoulders** - The segment is a two-lane highway. The west 14 miles and the east 9 miles has good roadway width and wide paved shoulders.

A 7-mile section near the middle of the segment has adequate roadway width; however, shoulders are very narrow.

2. **Structures** - There are two bridges and four large box culverts on the segment. The bridges were constructed in the 1960's and are narrow based on current standards. The box culvert head walls are within the roadway clear zone. The bridges and the box culverts have been retrofitted with steel beam guard rails located along the edge of the roadway.
3. **Horizontal Alignment** - Horizontal alignment is good throughout the entire segment.
4. **Vertical Alignment** - The western two-thirds of the segment is level with good vertical alignment and sight distance. The east one-third is rolling and has areas where sight distance and passing is restricted.
5. **Existing Right-of-Way** - The portions of the highway that have wide shoulders have 150 feet of right-of-way. The mid-section with narrow shoulders has 100 feet of right-of-way. Upgrading the mid-section would require acquisition of additional right-of-way. A small rural cemetery is located on the south side of the right-of-way at the west end.
6. **Route Constraints** - An at-grade railroad crossing is located near the middle of the segment.

### **Programmed Highway Improvements**

As part of the 1994 Transportation Improvement Program (TIP), the South Dakota Department of Transportation outlined a priority listing of highway improvements. The TIP is based on projects that could reasonably be completed under estimated annual state and federal funding. All projects outlined are expected to be completed within a five year time period, barring unforeseen circumstances.

Several of these improvements are within the study corridor. Exhibit A-5 briefly describes each project. The committed projects are not expected to significantly impact the feasibility of the expressway. Current plans under way to rebuild a portion of U.S. 81, between Freeman and Salem, should not alter traffic projections. Other major improvements are limited to resurfacing and grading. Additional capacity or alternative alignments are not planned. Not included in the TIP, but listed under the Intermodal Surface Transportation Efficiency Act (ISTEA) are two bridges over the Missouri River. The Vermillion and Springfield bridges are assumed to be a given, and are included in the study's base case.

**Exhibit A-5  
STUDY AREA PLANNED AND PROGRAMMED IMPROVEMENTS**

<u>PCN</u>	<u>COUNTY</u>	<u>LENGTH</u>	<u>ROUTE NUMBER</u>	<u>LOCATION OF PROJECT</u>	<u>TYPE OF IMPROVEMENT</u>	<u>TOTAL COST (MI.)</u>
3882	Clay	5.3	SD50	From Vermillion to Union Co.	AC Resurfacing	0.784
2879	McCook	12.1	US81	From Stanley Corner N. to Jct. SD38 at Salem	Surfacing	4.049
2662	Hutchinson/McCook	14.0	US81	From Freeman north	Grading, Structure & Interim Surfacing	4.449
2663	Hutchinson/McCook	14.0	US81	From Freeman Corner north	Surfacing	6.140
3870	Yankton	1.9	US81	From Approx. 0.9 mi. south of the North Jct. US81/SD 50, N	Reconstruction	3.000
3871	Yankton	8.1	US81	From Approx. 1 ml. north of DI Hwy north of Yankton to SD46 & Slope Flate	AC Resurfacing	0.896
3709	Davison	3.3	SD37	From I90 N & E to Sanborn	Shoulder Widening, Str. Grading & Int. Surfacing	4.535
3753	Davison	3.3	SD37	From I90 N & E to Sanborn Blvd. in Mitchell	Surfacing	3.3000
3198	Davison	3.1	SD37	From Hutchinson Co. north to SD 42	Grading & Surfacing	2.584
3511	Hutchinson	8.0	SD37	From north of US18 to SD44	Grading & Surfacing	6.194
3834	Spink	1.0	US281	From west int. of US212 south	Grade, SS C&G Int. Imp. & PCCP Surfacing	1.500
2674	Brown	4.5	US12	EBL from Bath Corner east	Grading	1.351
5974	Brown	8.1	US12	EBL from Bath Corner east	Surfacing & Resurfacing	2.363
0569	Brown	0.7	US12	In Aberdeen from 16th St. East to 5th Street	Grading & Surfacing	2.073



## **Appendix B**

### **REGIONAL CHARACTERISTICS AND FORECASTS**

The reason for investing in improved highways in eastern and central South Dakota would be to serve the travel needs and economic needs of people and businesses that use them and depend on them. In order to more fully understand the potential relationship between each corridor region and each highway, and to serve as a basis for the traffic analyses, the regional characteristics for the eastern South Dakota and the Pierre corridor areas were reviewed. This Appendix defines the impact regions and discusses existing, historical, and future demographic and economic trends.

#### **Impact Areas**

The Eastern Dakota Expressway would connect the communities of Aberdeen, Huron, Mitchell, and Yankton (Exhibit B-1). The highway would also connect Aberdeen with Interstate 29. Although the expressways could benefit rather large portions of South Dakota, there are 13 counties that would most directly be impacted by the Eastern Dakota Expressway (Exhibit B-2). The counties are defined as that expressway's "primary impact area." The Pierre to Interstate 90 Expressway would travel along the existing U.S. Highway 83 corridor and would directly impact three South Dakota Counties (Exhibit B-2). These two "Impact Areas" are the basis for the regional characteristics analyses, and it is these counties for which the economic development impacts are calculated.

Population and employment trends are two indicators of a county's or region's economic well being. This Appendix describes the demographic and economic conditions for the two impact areas, compares them with the other regions and the State of South Dakota, and summarizes the demographic and economic forecasts that are used in the study.

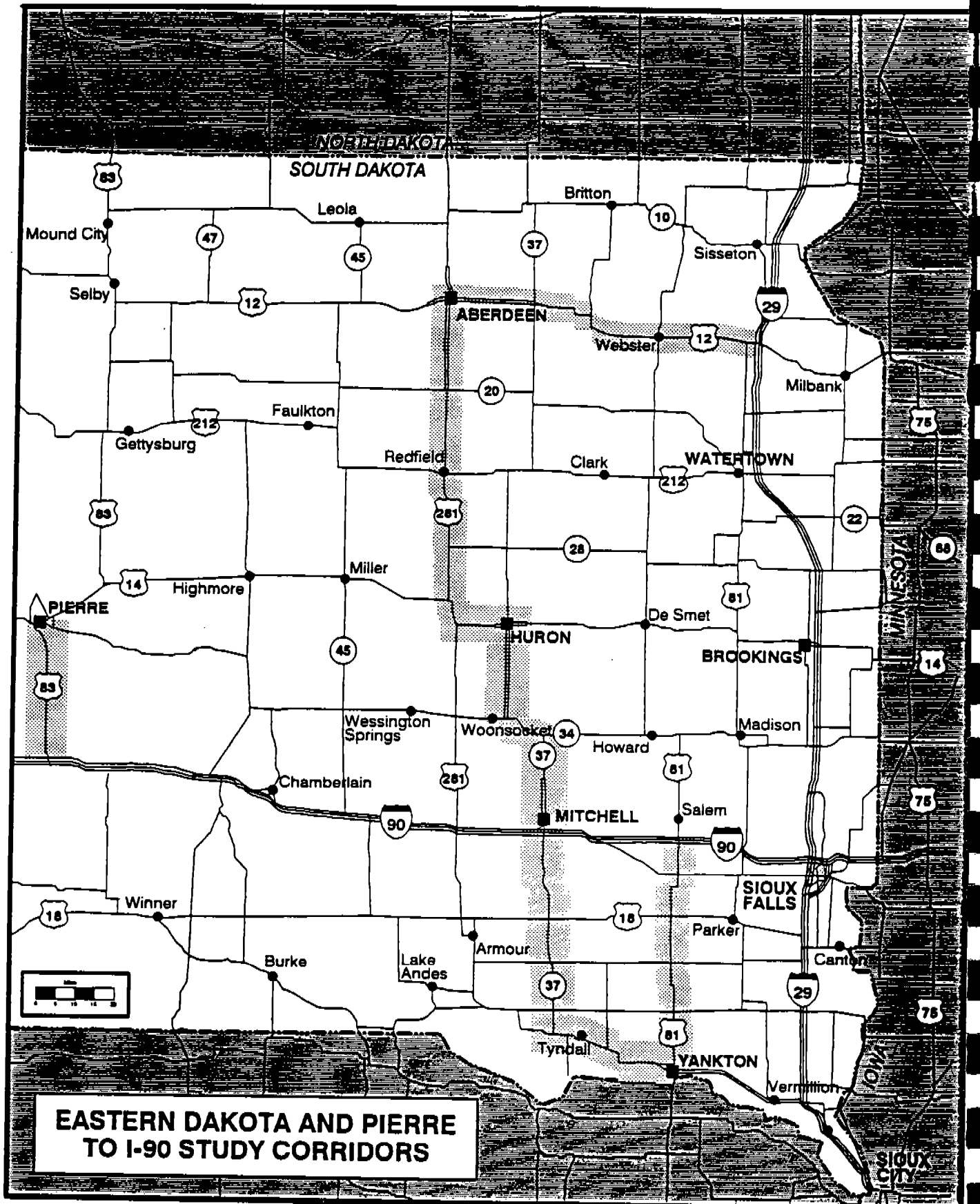


Exhibit B-1



## Population Trends

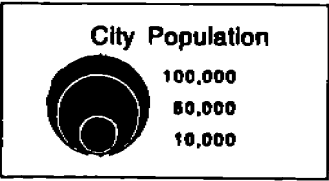
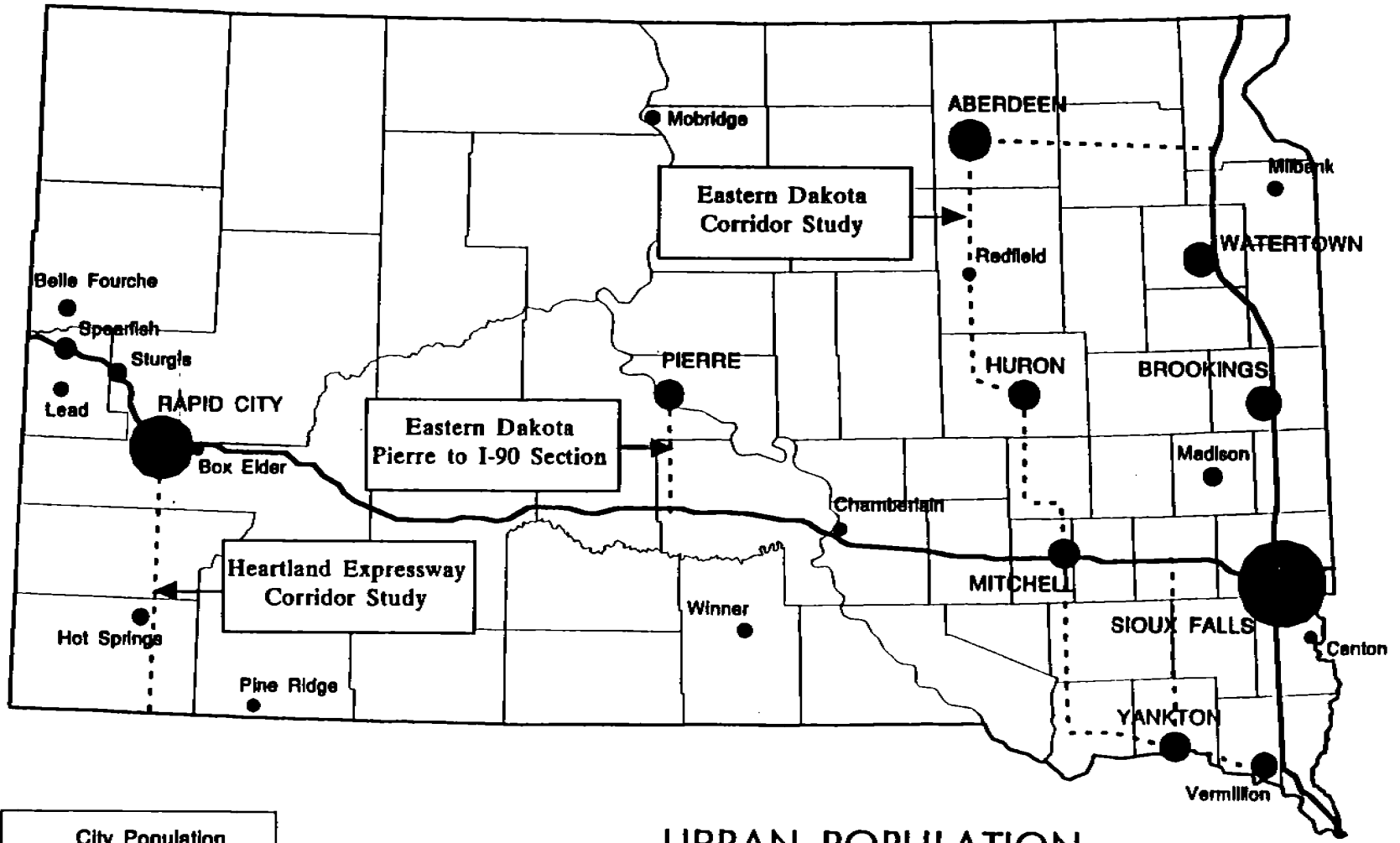
In 1990, the State of South Dakota had a population of 696,004. While the State is considered primarily rural, 46.1 percent of its residents live in urban areas.<sup>1</sup> Exhibit B-3 displays the urban centers in South Dakota. A large number of these towns and cities are located within the Eastern Dakota and Pierre to I-90 Impact Areas. The largest city in the Impact Areas is Aberdeen (1990 pop. - 24,927) followed by Mitchell (13,798), Pierre (12,906), Yankton (12,703), and Huron (12,448). However, the communities of Sioux Falls (1990 pop. - 100,814), Watertown (17,592), and Brookings (16,270) are near the corridor and are major influences on traffic within eastern South Dakota.

In 1970, the State of South Dakota had a population of 666,257. In 1990, population increased to 696,004, for an increase of 4.5 percent or a 0.22 percent annual compound growth rate. While the entire State of South Dakota experienced a small increase in population, regional population varied significantly around the State. Exhibit B-4 illustrates the population change from 1970 to 1990 for the 66 South Dakota counties. Exhibit B-5 displays the South Dakota Counties with the largest increases in population from 1970 to 1990. Minnehaha (Sioux Falls) and Pennington (Rapid City) Counties had the largest increases in population at 28,600 and 21,994 respectively.

The 13-county Eastern Dakota Impact Area had a 1990 population of 155,513. This was a 9.5 percent decrease from 1970's population of 171,744. Only three of the 13 counties in the Eastern Dakota Impact Area experienced an increase in population over the 20 year period: Clay County (Vermillion), Davison County (Mitchell) and Yankton County (Yankton). These three counties only had small increases in population, all between 1 and 2 percent, below the statewide total of 4.5 percent for the same 20 year period. The remaining ten counties all had population decreases, with Beadle (Huron), Spink (Redfield), and Hutchinson Counties all experiencing the largest decreases in population. Exhibit B-6 displays the population trends for all of the counties in the Eastern Dakota Impact Area.

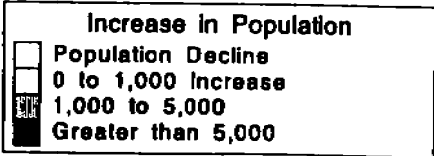
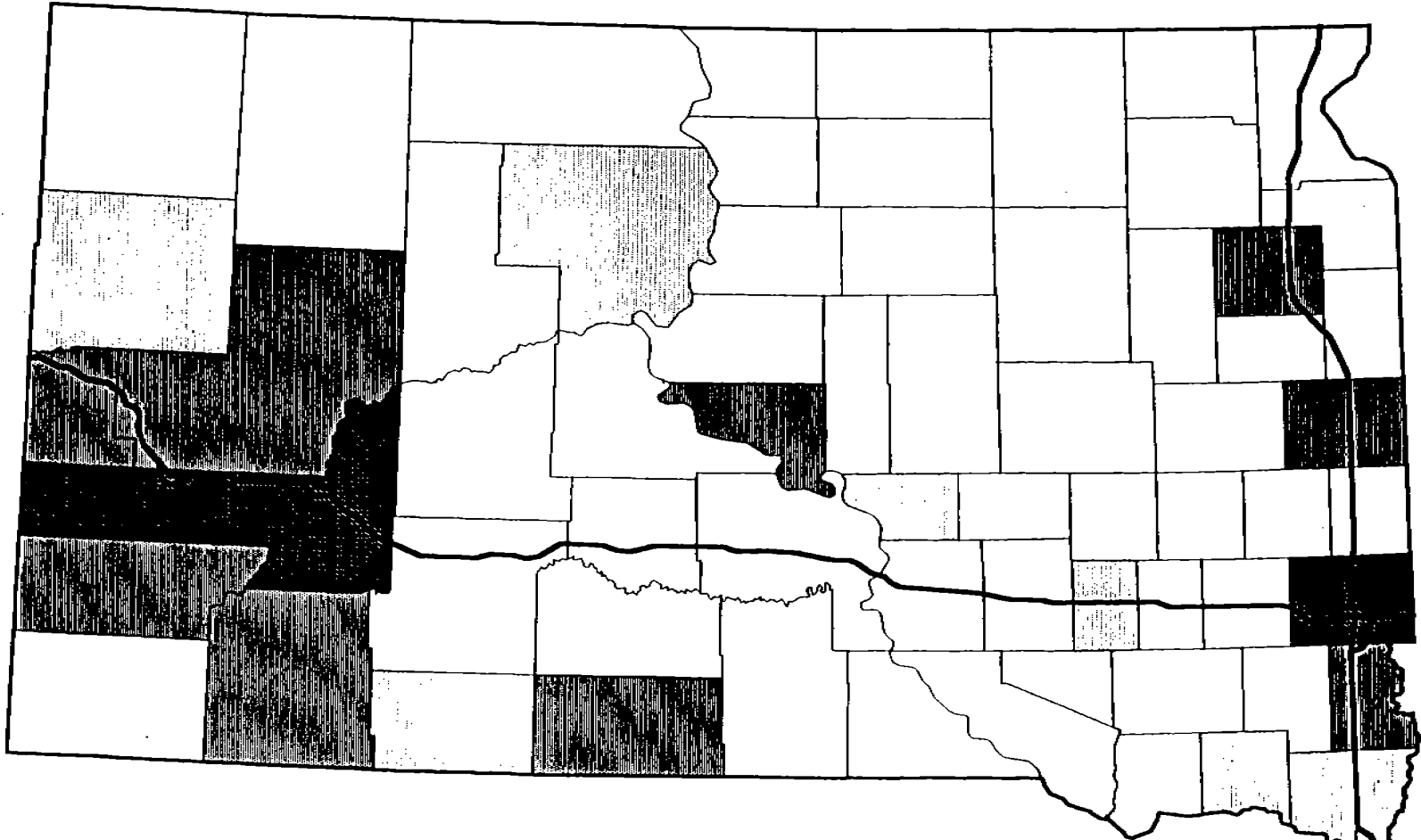
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<sup>1</sup> The U.S. Census Bureau defines an urban area as a town or a city having a population of 2,500 or greater.



**URBAN POPULATION  
State of South Dakota  
1990**

NOTE: US Census Bureau defines an urban area as population greater than 2,500



### CHANGE IN POPULATION State of South Dakota 1970 - 1990

**Exhibit B-5**  
**SOUTH DAKOTA COUNTIES WITH LARGEST POPULATION INCREASES**

<u>COUNTY</u>	<u>POPULATION</u>			<u>1970-1990 CHANGE</u>	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>POP.</u>	<u>PERCENT</u>
Minnehaha	95,209	109,435	123,809	28,600	30.0%
Pennington	59,349	70,361	81,343	21,994	37.1
Meade	17,020	20,717	21,878	4,858	28.5
Lincoln	11,761	13,942	15,427	3,666	31.2
Codington	19,140	20,885	22,698	3,558	18.6
Lawrence	17,453	18,339	20,655	3,202	18.3
Hughes	11,632	14,220	14,817	3,185	27.4
Brookings	22,158	24,332	25,207	3,049	13.8
Custer	4,698	6,000	6,179	1,481	31.5

SOURCES: U.S. Census Bureau,  
 Wilbur Smith Associates

While the Eastern Dakota Impact Area has experienced a population decline, the Pierre to I-90 Impact Area, has experienced a population increase greater than the statewide total (see Exhibit B-6). The three county Pierre to I-90 Impact area had a population increase of 15.2 percent (2,759 persons) between 1970 and 1990. The Impact Area's population increase is due to the increase in Hughes County (Pierre). Hughes County's population increased 27.4 percent from 1970 to 1990, while Lyman County decreased 10.4 percent and Stanley County did not change (only a 4 person decrease from 1970 to 1990).

**Exhibit B-6**  
**POPULATION TRENDS FOR IMPACT AREAS**

	POPULATION			1970-1990 CHANGE	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>Pop.</u>	<u>Percent</u>
<b><u>EASTERN DAKOTA COUNTIES</u></b>					
Beadle	20,877	19,195	18,253	- 2,624	-12.6%
Bon Homme	8,577	8,059	7,089	-1,488	-17.4
Brown	36,920	36,962	35,580	-1,340	-3.6
Clay	12,923	13,689	13,186	263	2.0
Davison	17,319	17,820	17,503	184	1.1
Day	8,713	8,133	6,978	-1,735	-19.9
Hanson	3,781	3,415	2,994	-787	-20.8
Hutchinson	10,379	9,350	8,262	-2,117	-20.4
McCook	7,246	6,444	5,688	-1,558	-21.5
Roberts	11,678	10,911	9,914	-1,764	-15.1
Sanborn	3,697	3,213	2,833	-864	-23.4
Spink	10,595	9,201	7,981	-2,614	-24.7
Yankton	<u>19,039</u>	<u>18,952</u>	<u>19,252</u>	<u>213</u>	<u>1.1</u>
<b>Eastern Dakota</b>	<b>171,744</b>	<b>165,344</b>	<b>155,513</b>	<b>-16,231</b>	<b>-9.5%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>					
Hughes	11,632	14,220	14,817	3,185	27.4%
Lyman	4,060	3,864	3,638	-422	-10.4
Stanley	<u>2,457</u>	<u>2,533</u>	<u>2,453</u>	<u>4-</u>	<u>-0.2</u>
<b>Pierre to I-90</b>	<b>18,149</b>	<b>20,617</b>	<b>20,908</b>	<b>2,759</b>	<b>15.2%</b>
<b>Rest of S. Dakota</b>	<b>476,364</b>	<b>504,807</b>	<b>519,583</b>	<b>43,219</b>	<b>9.1%</b>
<b>State of S Dakota</b>	<b>666,257</b>	<b>690,768</b>	<b>696,004</b>	<b>29,747</b>	<b>4.5%</b>

Sources: U.S. Census Bureau, Wilbur Smith Associates

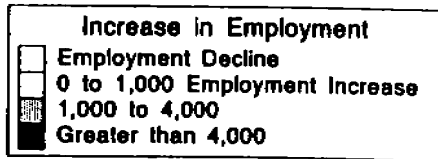
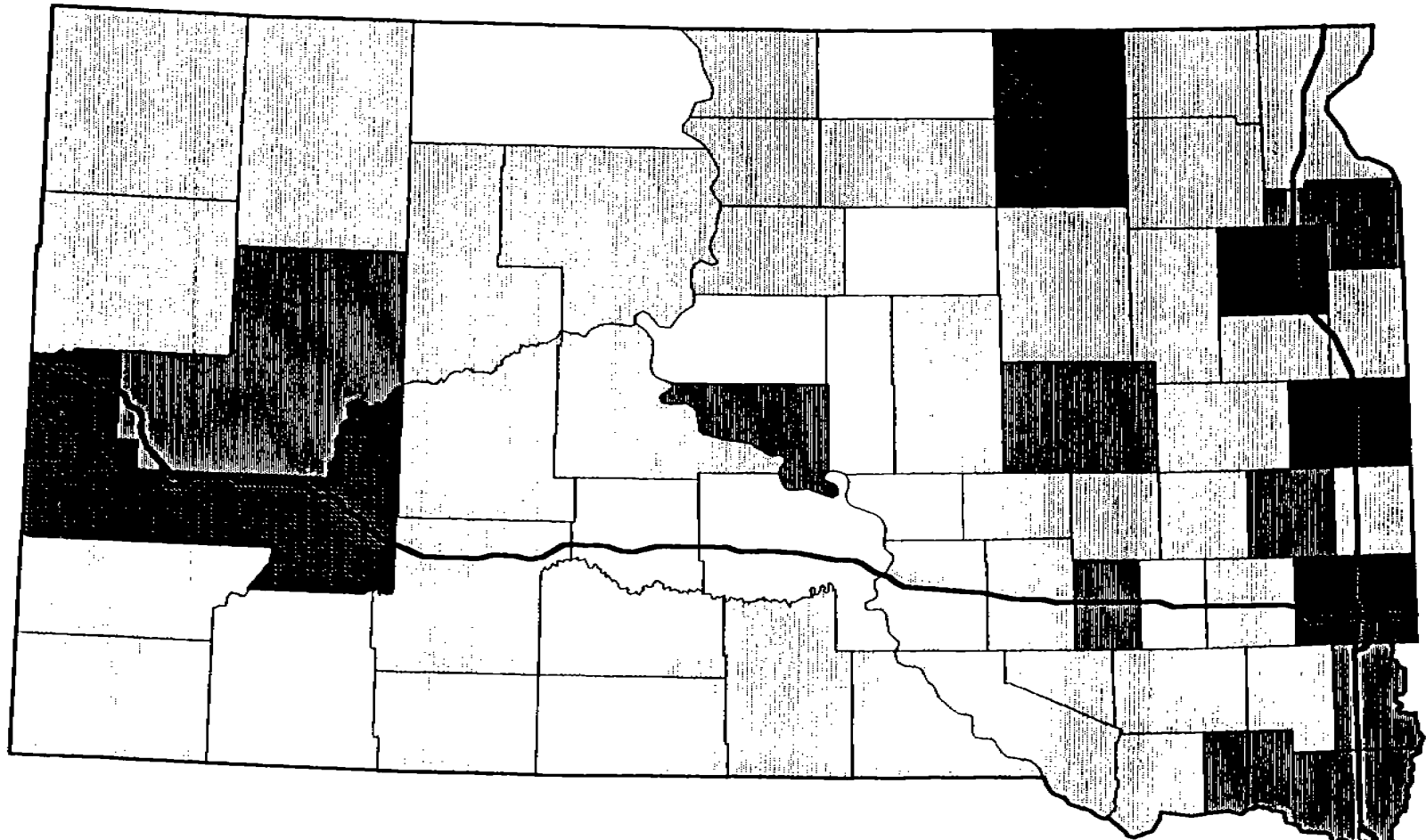


## Employment Trends

The number of employed persons is a reasonable indicator of the overall soundness of the economy. Because a greater percentage of the total population is now working, employment has been increasing at a much faster rate than population (both nationally and in South Dakota). Therefore, if employment figures are decreasing or increasing at a slow rate, the local economy is most likely to be in decline or a little sluggish.

This section focuses on manufacturing, retail/wholesale trade and service industry employment as well as total employment. Besides demonstrating the overall well-being of the local economy, trends in these industries are indicators of automobile and truck traffic volume change. The manufacturing and retail/wholesale trade sectors usually produce significant amounts of truck and commercial traffic, and the service and retail/wholesale trade industries generate considerable automobile traffic. The manufacturing sector is also considered a "basic" or export industry. Basic industries produce output that is not consumed locally, but is exported out of the region for national and international consumption. In contrast, "non-basic" sectors (retail, service, transportation, construction, etc.) produce products or provide services that are consumed locally. The growth of the "non-basic" industries largely depends on the growth of the "basic" industries that form the basis of the region's economy. Therefore, the behavior of the manufacturing industry is usually a good indicator of the overall status of the local or regional economy.

**Total Employment** - Total employment in South Dakota in 1990 was 288,700, an increase of 65.0 percent from 1970. Exhibit B-7 illustrates the regional differences in employment between 1970 and 1990 in South Dakota. Nearly all of the 66 counties experienced increases in total employment change between 1970 and 1990. The largest increases tended to occur in the urban counties, with the predominant increases occurring in the two largest populated counties of Minnehaha (Sioux Falls) and Pennington (Rapid City). Exhibit B-8 displays the ten South Dakota counties with the largest employment growth between 1970 and 1990.



CHANGE IN EMPLOYMENT  
State of South Dakota  
1970 - 1990

**Exhibit B-8**  
**SOUTH DAKOTA COUNTIES WITH LARGEST EMPLOYMENT INCREASES**

<u>COUNTY</u>	<u>EMPLOYED PERSONS</u>			<u>1970-1990 CHANGE</u>	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>EMP.</u>	<u>PERCENT</u>
Minnehaha	34,600	54,300	75,200	40,600	117.3%
Pennington	18,400	29,392	38,500	20,100	109.2
Brookings	5,922	9,415	11,991	6,069	102.5
Brown	11,362	15,689	17,026	5,664	49.9
Lawrence	5,311	6,820	10,174	4,863	91.6
Codington	6,352	8,362	11,066	4,714	74.2
Hughes	4,810	7,218	8,060	3,250	67.6
Davison	5,799	7,719	8,816	3,017	52.0
Clay	2,733	4,223	5,205	2,472	90.5
Union	1,932	2,905	3,741	1,809	93.6

**SOURCES:** South Dakota Department of Labor,  
 Wilbur Smith Associates

The Eastern Dakota Impact Area's 1990 employment increased from 44,937 in 1970 to 63,337 in 1990, for a 41.0 percent increase, just over half of the State's employment growth rate. None of the counties in the impact area increased at the State's rate, although, Clay, Yankton, Davison, and Brown Counties all increased their employment base by 50 percent or greater. Exhibit B-9 displays the total employment figures for all of the counties in the Eastern Dakota Impact Area.

The three county Pierre to Interstate 90 Impact Area's employment base increased from 6,340 in 1970 to 9,805 in 1990, an increase of 54.7 percent. While this figure is less than the State total, it still indicates a significant increase in employment. The majority of the increase in employment occurred in Hughes County, where employment increased 67.6 percent (Exhibit B-9).

**Exhibit B-9**  
**TOTAL EMPLOYMENT TRENDS FOR IMPACT AREAS**

<b><u>EASTERN DAKOTA COUNTIES</u></b>	<b>EMPLOYED PERSONS</b>			<b>1970-1990 CHANGE</b>	
	<b><u>1970</u></b>	<b><u>1980</u></b>	<b><u>1990</u></b>	<b><u>Jobs</u></b>	<b><u>Percent</u></b>
Beadle	6,618	7,764	7,801	1,183	17.9%
Bon Homme	1,632	1,947	1,985	353	21.6
Brown	11,362	15,689	17,026	5,664	49.9
Clay	2,733	4,223	5,205	2,475	90.6
Davison	5,799	7,719	8,816	3,017	52.0
Day	1,899	2,121	2,041	142	7.5
Hanson	620	491	558	-62	-10.0
Hutchinson	1,683	2,225	2,482	799	47.5
McCook	1,243	1,490	1,600	357	28.7
Roberts	2,300	2,595	2,782	482	21.0
Sanborn	575	585	579	4	0.7
Spink	2,176	2,553	2,383	207	9.5
Yankton	<u>6,297</u>	<u>8,805</u>	<u>10,079</u>	<u>3,782</u>	<u>60.1</u>
<b>Eastern Dakota</b>	<b>44,937</b>	<b>58,207</b>	<b>63,337</b>	<b>18,403</b>	<b>41.0%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>					
Hughes	4,810	7,218	8,060	3,250	67.6%
Lyman	1,029	951	964	-65	-6.3
Stanley	<u>501</u>	<u>735</u>	<u>781</u>	<u>280</u>	<u>55.9</u>
<b>Pierre to I-90</b>	<b>6,340</b>	<b>8,904</b>	<b>9,805</b>	<b>3,465</b>	<b>54.7%</b>
<b>Rest of S. Dakota</b>	<b>123,723</b>	<b>170,889</b>	<b>215,558</b>	<b>91,835</b>	<b>74.2%</b>
<b>State of S. Dakota</b>	<b>175,000</b>	<b>238,000</b>	<b>288,700</b>	<b>113,700</b>	<b>65.0%</b>

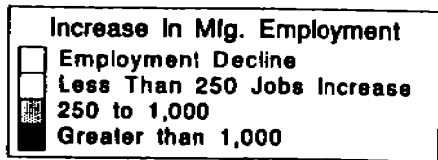
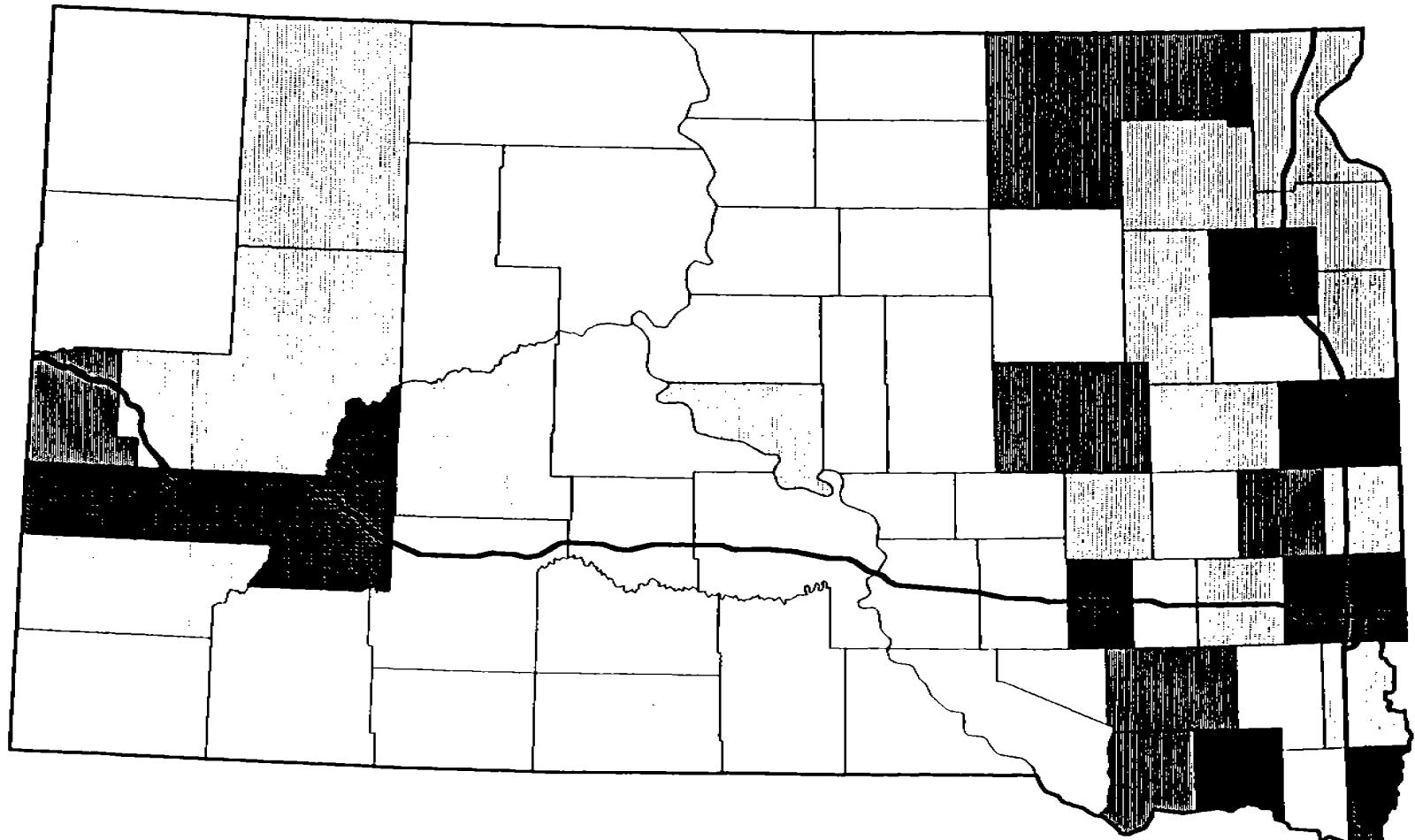
SOURCE: South Dakota Department of Labor, Wilbur Smith Associates

**Manufacturing Employment** - The manufacturing industry is primarily recognized as the major export or "basic" sector of a regional economy. Usually a region with a strong and growing manufacturing sector indicates a strong and expanding local economy. An area with a large manufacturing base usually has a variety of service and retail industries to provide services for the manufacturing industries and their employees. The definition of manufacturing includes establishments engaged in the mechanical or chemical transformation of materials or substances into new products. Included are establishments engaged in assembling component parts not associated with structures and in blending materials.

In 1990 South Dakota had a manufacturing base of 34,400 employees. This is more than double the 15,700 total in 1970 (an increase of 119.1 percent). The largest concentration of manufacturing industries are in Minnehaha and Pennington Counties. However, significant percent increases in manufacturing employment also occurred in Brookings, Union, Codington and Davison Counties. These four counties went from a very small manufacturing base to a comparatively large number of manufacturing employees. Exhibit B-10 displays the growth in manufacturing employees for counties in South Dakota, while Exhibit B-11 depicts the 10 counties with the largest increases in manufacturing employment.

Similar to the State, the Eastern Dakota Impact Area experienced a doubling of manufacturing employees between 1970 and 1990 (Exhibit B-12). However, the Eastern Dakota impact region's percentage of total manufacturing employees in South Dakota slipped from 28 percent to 26 percent between 1970 and 1990, indicating a somewhat slower growth than the rest of the State. The majority of the growth occurred in Davison, Yankton, and Brown Counties, although all counties in the Impact Area experienced increases in manufacturing employment.

The Pierre to Interstate 90 Impact Area, however, did not experience much growth in manufacturing between 1970 and 1990. Hughes County, the only county with any significant manufacturing, added only 91 employees over the 20 year period (Exhibit B-12). This was a 72.2 percent increase, but contrasted to a small employment base.



# CHANGE IN MANUFACTURING EMPLOYMENT

## State of South Dakota

### 1970 - 1990

Note: Counties with manufacturing employment of less than 100 are not included.

**Exhibit B-11**  
**SOUTH DAKOTA COUNTIES WITH LARGEST MANUFACTURING**  
**EMPLOYMENT INCREASES**

<u>COUNTY</u>	<u>MANUFACTURING EMPLOYMENT</u>			<u>1970-1990 CHANGE</u>	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>MFG.</u>	<u>PERCENT</u>
Minnehaha	6,000	7,700	9,000	3,000	50.0%
Pennington	1,800	2,811	4,000	2,200	122.2
Codington	782	1,593	2,844	2,062	263.7
Brookings	159	1,226	2,059	1,900	1,195.0
Union	139	843	1,412	1,273	915.8
Davison	484	747	1,651	1,167	241.1
Yankton	1,071	1,589	2,146	1,075	100.4
Brown	1,322	2,342	2,078	756	57.2
Lawrence	185	388	683	498	269.2
Beadle	839	1,145	1,302	463	55.2

**SOURCES:** South Dakota Department of Labor,  
 Wilbur Smith Associates

**Exhibit B-12  
MANUFACTURING EMPLOYMENT TRENDS FOR THE IMPACT AREAS**

	MANUFACTURING EMPLOYMENT			1970-1990 CHANGE	
	1970	1980	1990	EMP.	PERCENT
<b><u>EASTERN DAKOTA COUNTIES</u></b>					
Beadle	839	1,145	1,302	463	55.2%
Bon Homme	38	291	371	333	876.3
Brown	1,322	2,343	2,078	756	57.2
Clay	200	215	155	-45	-22.5
Davison	484	747	1,651	1,167	241.1
Day	122	306	256	134	109.8
Hanson	--	--	--	--	--
Hutchinson	62	279	330	268	432.3
McCook	84	205	230	146	173.8
Roberts	28	109	269	241	860.7
Sanborn	66	108	136	70	106.1
Spink	--	--	--	--	--
Yankton	<u>1,071</u>	<u>1,598</u>	<u>2,146</u>	<u>1,075</u>	<u>100.4</u>
<b>Eastern Dakota</b>	<b>4,316</b>	<b>7,346</b>	<b>8,924</b>	<b>4,608</b>	<b>106.8%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>					
Hughes	126	130	217	91	72.2
Lyman	--	--	--	--	--
Stanley	--	--	--	--	--
<b>Pierre to I-90</b>	<b>126</b>	<b>130</b>	<b>217</b>	<b>91</b>	<b>72.2</b>
<b>Rest of S. Dakota</b>	<b>11,258</b>	<b>18,624</b>	<b>25,259</b>	<b>14,001</b>	<b>124.4%</b>
<b>State of S Dakota</b>	<b>15,700</b>	<b>26,100</b>	<b>34,400</b>	<b>18,700</b>	<b>119.1%</b>

SOURCES: South Dakota Department of Labor, Wilbur Smith Associates



**Retail/Wholesale Trade and Service Employment** - The retail trade and service industries are also good indicators of the status of regional and/or local economies. To support a growing population and manufacturing base, service and retail establishments are needed to provide goods and services to area residents and employees. Both the retail trade and service industries are often agglomerated together, which serves as a regional market for the area's smaller communities, which creates intercity traffic, including shipping of goods by truck.

**Exhibit B-13**

**SOUTH DAKOTA COUNTIES WITH LARGEST WHOLESALE/RETAIL TRADE AND SERVICE INDUSTRY EMPLOYMENT INCREASES**

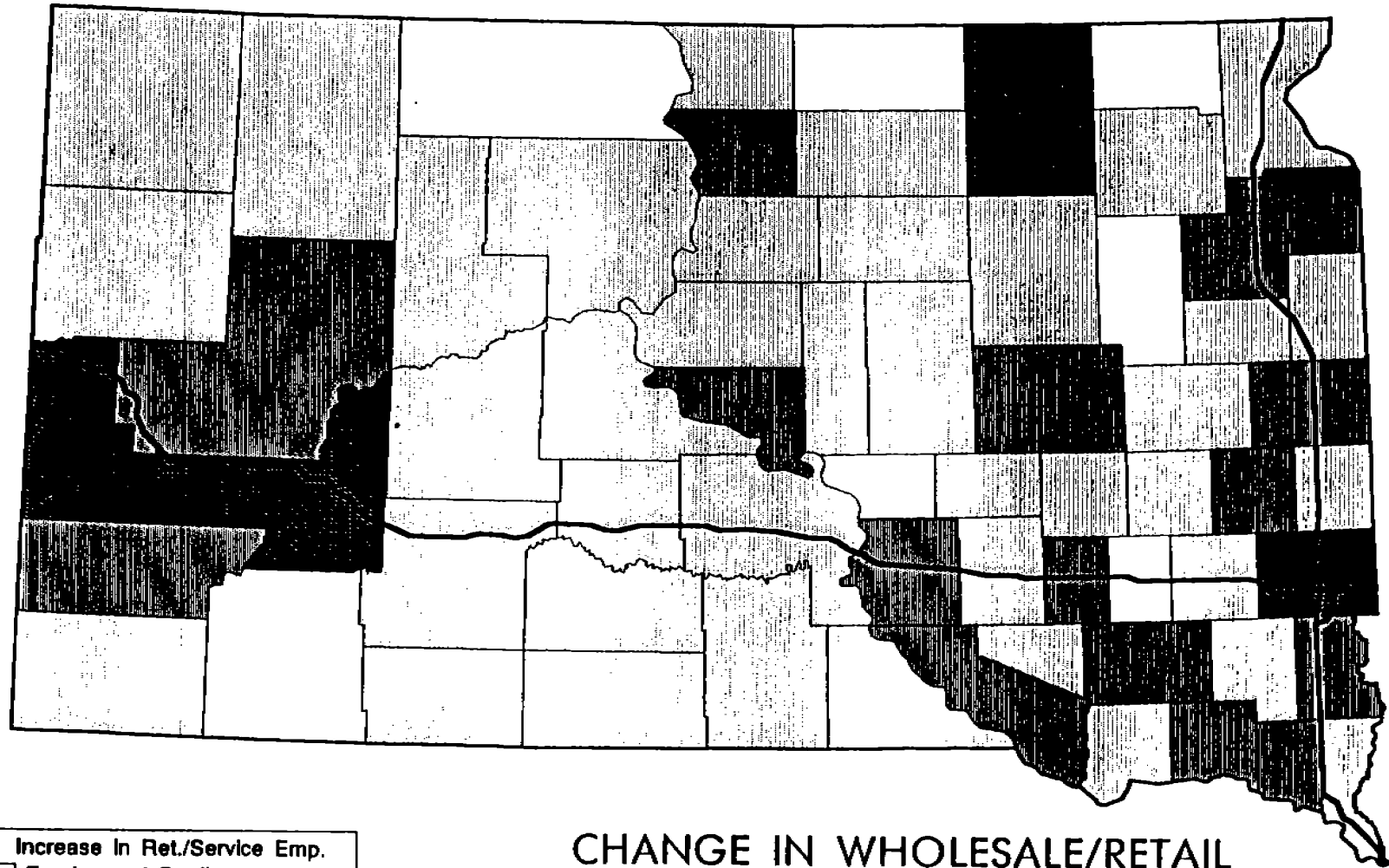
<u>COUNTY</u>	<u>EMPLOYMENT</u>			<u>1970-1990 CHANGE</u>	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>EMP.</u>	<u>PERCENT</u>
Minnehaha	17,300	29,200	42,000	24,700	142.8%
Pennington	8,700	15,120	21,400	12,700	146.0
Brown	5,547	7,937	9,757	4,210	75.9
Lawrence	1,755	2,636	4,907	3,152	179.6
Brookings	1,997	3,650	4,472	2,475	123.9
Codington	3,153	4,187	5,591	2,438	77.3
Yankton	3,006	4,644	5,332	2,326	77.4
Hughes	1,836	2,843	3,921	2,085	113.6
Davison	3,472	4,735	4,989	1,517	43.7
Clay	800	1,413	1,819	1,019	127.4

SOURCES: South Dakota Department of Labor,  
Wilbur Smith Associates

The wholesale/retail trade and service industries have been the fastest growing sectors of South Dakota's economy. In 1970 these industries accounted for 44.9 percent of the total nonfarm employment in South Dakota; by 1990 this percentage had increased to 53.6 percent. Total employment in these sectors increased from 78,500 in 1970 to 147,900 in 1990, an 88.4 percent increase (Exhibit B-13). Minnehaha (Sioux Falls) and Pennington (Rapid City) counties have experienced the largest increases in employment. However, Brown (Aberdeen), Codington (Watertown), Yankton (Yankton), Davison (Mitchell) Brookings (Brookings), and Hughes (Pierre) have all established themselves as regional retail and service market centers (Exhibit B-14).

The Eastern Dakota Impact Area includes a number of regional market centers. Aberdeen serves a large portion of northern South Dakota, while Mitchell and Huron serve east central part of the State and Yankton provides goods and services for parts of southeast South Dakota. The 13-county Impact Area increased its wholesale/retail trade and service employment by 53.5 percent from 1970 to 1990. However, this is a little less than the rest of South Dakota's and the entire State's percentages. Brown and Yankton Counties experienced the largest increases in wholesale/retail and service employment, while Hanson County was the only county in the Impact Area to have a employment decrease. Exhibit B-15 illustrates the wholesale/retail and service industry employment trends for the 13-county Eastern Dakota Impact Area.

Pierre has not witnessed a large increase in manufacturing, although the area has still experienced a moderate growth in population over the last 20 years. This is primarily because of the growth in the retail trade and service industry. Pierre, being the capital of South Dakota, has a large government employment base, and the area also has a strong and growing wholesale/retail trade and service industry. In 1970 the three county area had a retail trade and service employment of 2,326. In 1990, this employment more than doubled to 4,767, for an increase of 104.9 percent. Exhibit 15 displays the wholesale/retail trade and service employment trends for the Pierre to Interstate 90 Impact Area.



Increase in Ret./Service Emp.  
□ Employment Decline  
▨ Less Than 500  
▧ 500 to 2,500  
■ Greater than 2,500

### CHANGE IN WHOLESALE/RETAIL TRADE AND SERVICE EMPLOYMENT State of South Dakota 1970 - 1990

**Exhibit B-15**  
**WHOLESALE/RETAIL AND SERVICE INDUSTRY EMPLOYMENT**

	EMPLOYMENT			1970-1990 CHANGE	
	1970	1980	1990	EMP.	PERCENT
<b><u>EASTERN DAKOTA COUNTIES</u></b>					
Beadle	3,189	3,755	4,015	826	25.9%
Bon Homme	587	688	765	178	30.3
Brown	5,547	7,937	9,757	4,210	75.9
Clay	800	1,413	1,819	1,019	127.4
Davison	3,472	4,735	4,989	1,517	43.7
Day	809	836	981	172	21.3
Hanson	298	262	153	-145	-48.7
Hutchinson	841	1,234	1,348	507	60.3
McCook	533	809	721	188	35.3
Roberts	1,092	1,362	1,497	405	37.1
Sanborn	157	184	177	20	12.7
Spink	822	863	923	101	12.3
Yankton	<u>3,006</u>	<u>4,644</u>	<u>5,332</u>	<u>2,326</u>	<u>77.4</u>
<b>Eastern Dakota</b>	<b>21,153</b>	<b>28,722</b>	<b>32,477</b>	<b>11,324</b>	<b>53.5%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>					
Hughes	1,836	2,843	3,921	2,085	113.6
Lyman	313	487	561	248	79.2
Stanley	<u>177</u>	<u>289</u>	<u>285</u>	<u>108</u>	<u>61.0</u>
<b>Pierre to I-90</b>	<b>2,326</b>	<b>3,619</b>	<b>4,767</b>	<b>2,441</b>	<b>104.9%</b>
<b>Rest of S. Dakota</b>	<b>55,021</b>	<b>83,059</b>	<b>110,656</b>	<b>55,635</b>	<b>101.1%</b>
<b>State of S Dakota</b>	<b>78,500</b>	<b>115,400</b>	<b>147,900</b>	<b>69,400</b>	<b>88.4%</b>

SOURCES: South Dakota Department of Labor, Wilbur Smith Associates

## **Population and Employment Forecasts**

As input into the traffic forecasting and economic models, population and employment forecasts have been created for the Eastern Dakota Expressway Study Area. Population and employment are indicators of a region's economic growth or decline. Employment and population are particularly important for three reasons: 1) they reflect the flow of economic activity as industries emerge or relocate in growing areas, 2) they indicate migration patterns in relation to job opportunities, and 3) they create local and regional traffic levels between communities.

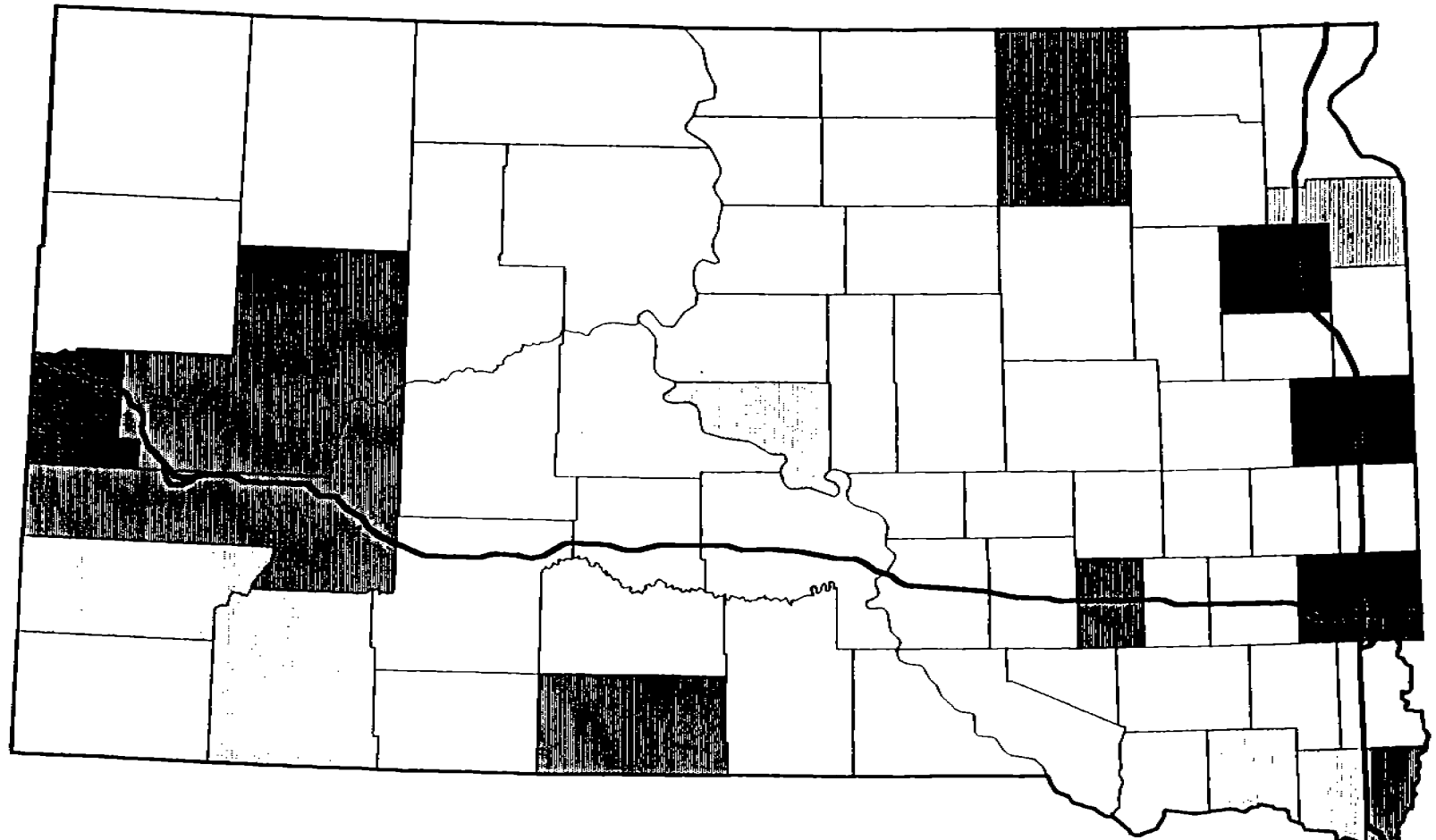
**Source of Forecasts** - The forecast analyses rely on projections and growth rates produced by Woods and Poole Economics, Inc. The specific economic forecasting models used by Woods and Poole to generate population and employment forecasts for each county follow a standard economic base approach. The methodology employs a comprehensive county base which integrates the economic activities of each county to capture regional flows.

**Population Forecasts** - According to the Woods and Poole population forecasts the State of South Dakota is to experience a 6.3 percent increase in population from 1990 to the year 2015. This forecast increase is slightly greater than the past trend over the last 20 years (1970 to 1990 population increased 4.5 percent). However, this estimated increase in population is not forecast to occur evenly throughout the State. Only 16 of the 66 South Dakota counties are forecast to experience population increases. Exhibit B-16 displays the population forecasts the counties with the largest forecast population increases and Exhibit B-17 graphically displays forecast population change for all counties in South Dakota.

**Exhibit B-16**  
**SOUTH DAKOTA COUNTIES WITH LARGEST FORECAST POPULATION INCREASES**

<b>COUNTY</b>	<b>POPULATION</b>		<b>1990-2015 CHANGES</b>	
	<u>1990</u>	<u>2015</u>	<u>Pop.</u>	<u>Percent</u>
Minnehaha	123,809	152,010	28,201	22.8%
Brookings	25,207	40,420	15,213	60.4
Lawrence	20,655	26,670	6,015	29.1
Codington	22,698	28,670	5,972	26.3
Pennington	81,343	85,180	3,837	4.7
Meade	21,878	24,280	2,402	11.0
Union	10,189	12,390	2,201	21.6
Brown	35,580	37,350	1,770	5.0
Davison	17,503	18,930	1,427	8.2

Overall, the 13 counties within the Eastern Dakota Expressway Study Area are forecast to continue a decline in population. However, the population decline is estimated to be not as severe as past trends and four of the 13 counties are forecast to increase in population. Brown and Davison counties are forecast to increase the largest with 5.5 and 8.2 percent increases respectively (Exhibit B-18).



Increase in Population  
Population Decline  
0 to 1,000 Increase  
1,000 to 5,000  
Greater than 5,000

### FORECAST CHANGE IN POPULATION State of South Dakota 1990 - 2015

Exhibit B-18  
POPULATION FORECASTS FOR IMPACT AREAS

	POPULATION		1990-2015 CHANGES	
	1990	2015	Pop.	Percent
<b><u>EASTERN DAKOTA COUNTIES</u></b>				
Beadle	18,253	16,530	-1,723	-9.4%
Bon Homme	7,089	6,440	-649	-9.2
Brown	35,580	37,530	1,950	5.5
Clay	13,186	13,230	44	0.3
Davison	17,503	18,930	1,427	8.2
Day	6,978	6,930	-48	-0.7
Hanson	2,994	2,470	-524	-17.5
Hutchinson	8,262	6,980	-1,282	-15.5
McCook	5,688	4,950	-738	-13.0
Roberts	9,914	8,630	-1,284	-13.0
Sanborn	2,833	2,430	-403	-14.2
Spink	7,981	6,630	-1,351	-16.9
Yankton	<u>19,252</u>	<u>20,160</u>	<u>908</u>	<u>4.7</u>
<b>Eastern Dakota</b>	<b>155,513</b>	<b>151,120</b>	<b>-3,673</b>	<b>-2.4%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>				
Hughes	14,817	17,210	2,393	16.2%
Lyman	3,638	3,300	-338	-9.3
Stanley	<u>2,453</u>	<u>2,210</u>	<u>243</u>	<u>9.9</u>
<b>Pierre to I-90</b>	<b>20,908</b>	<b>22,720</b>	<b>1,812</b>	<b>8.7%</b>
<b>Rest of S. Dakota</b>	<b>519,583</b>	<b>567,840</b>	<b>47,537</b>	<b>9.1%</b>
<b>State of S. Dakota</b>	<b>696,004</b>	<b>741,680</b>	<b>45,676</b>	<b>6.6%</b>

SOURCE: Woods and Poole Economics, Inc.



The three counties in the Pierre to Interstate 90 portion of the Eastern Dakota Expressway Study Area are forecast to remain fairly stable in population. Hughes County is estimated to increase at 3.2 percent, while Lyman and Stanley County are forecast to decrease in population by just over nine percent each (Exhibit B-8).

**Employment Forecasts** - Over the last 20 years, the State of South Dakota has experienced a 65 percent increase in total non-farm employment. This large increase can, for the most part, be explained by the increase of females in the work force and the movement of employees in the agriculture sector into the manufacture and service industries. However, in the future these factors are expected to stabilize and employment in South Dakota is forecast to increase at a slower rate. Overall, the State's total employment is forecast to increase by over 36,000 from 1990 to 2010 for a 12.6 percent increase. Exhibits B-19 and B-20 display the total employment forecasts by county.

Overall, the 13 counties in the Eastern Dakota Expressway Study area are forecast to experience a slight increase in total employment between 1990 and 2015. Brown, Davison and Clay Counties are the only three counties forecast to have employment increases. The remaining ten counties are forecast to experience slight employment decreases (Exhibit B-21).

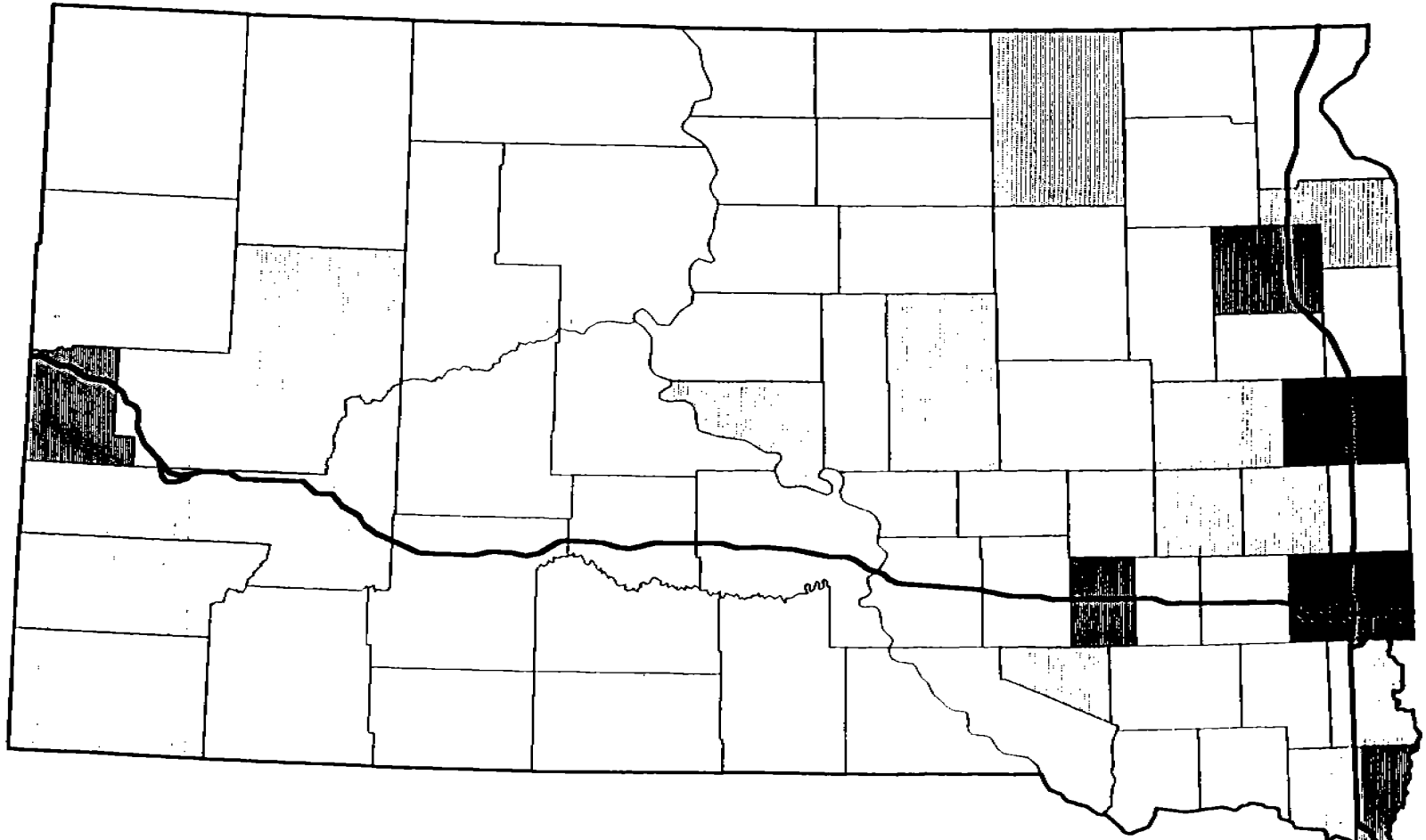
The three counties in the Pierre to Interstate 90 portion are forecast to experience a slight increase in employment (6.7 percent) between 1990 and 2015. All the employment growth is expected in Hughes County. Both Lyman and Stanley counties are forecast to have slight employment declines (Exhibit B-21).

**Relevance to the Eastern Dakota Expressway** - The population and employment forecasts assume that the Eastern Dakota Expressway is not built. If the Expressway is built, that could cause additional population and employment growth.

The significance of these estimates is that traffic volumes generally reflect population size and past trends have indicated that vehicle miles of travel is increasing faster than population and employment. Therefore, traffic growth is likely to occur in the corridors, especially between faster growing areas.

**Exhibit B-19**  
**SOUTH DAKOTA COUNTIES WITH LARGEST FORECAST EMPLOYMENT INCREASES**

<b><u>EASTERN DAKOTA COUNTIES</u></b>	<b>EMPLOYMENT</b>		<b>1990-2015 CHANGES</b>	
	<b><u>1990</u></b>	<b><u>2015</u></b>	<b><u>Employ.</u></b>	<b><u>Percent</u></b>
Minnehaha	75,200	96,920	21,720	28.9%
Brookings	11,991	21,640	9,649	80.5
Lawrence	10,174	13,310	3,136	30.8
Codington	11,066	14,190	3,124	28.2
Davison	8,816	10,210	1,394	15.8
Union	3,741	4,800	1,059	28.3
Brown	17,026	17,900	874	5.1
Pennington	38,500	38,980	480	1.2
Custer	2,113	2,480	367	17.4



**Increase in Employment**  
□ Employment Decline  
□ 0 to 1,000 Employment Increase  
▨ 1,000 to 4,000  
■ Greater than 4,000

### FORECAST CHANGE IN EMPLOYMENT State of South Dakota 1990 - 2015

Exhibit B-21  
EMPLOYMENT FORECASTS FOR IMPACT AREAS

<b>EASTERN DAKOTA COUNTIES</b>	<b>EMPLOYMENT</b>		<b>1990-2015 CHANGES</b>	
	<u>1990</u>	<u>2015</u>	<u>Pop.</u>	<u>Percent</u>
Beadle	7,801	7,480	-321	-4.1%
Bon Homme	1,985	1,830	-155	-7.8
Brown	17,026	17,900	874	5.1
Clay	5,205	5,420	215	4.1
Davison	8,816	10,210	1,394	15.8
Day	2,041	2,000	-41	-2.0
Hanson	558	540	-18	-3.2
Hutchinson	2,482	2,310	-172	-6.9
McCook	1,600	1,540	-60	-3.8
Roberts	2,782	2,570	-212	-7.6
Sanborn	579	560	-19	-3.3
Spink	2,383	2,100	-282	-11.9
Yankton	<u>10,079</u>	<u>9,780</u>	<u>-299</u>	<u>-3.0</u>
<b>Eastern Dakota</b>	<b>63,337</b>	<b>64,240</b>	<b>903</b>	<b>1.4%</b>
<b><u>PIERRE TO I-90 COUNTIES</u></b>				
Hughes	10,230	11,320	1,090	10.7%
Lyman	964	920	-44	-4.6
Stanley	<u>781</u>	<u>720</u>	<u>-61</u>	<u>-7.8</u>
<b>Pierre to I-90</b>	<b>11,975</b>	<b>12,960</b>	<b>985</b>	<b>8.2%</b>
<b>Rest of S. Dakota</b>	<b>215,558</b>	<b>250,480</b>	<b>34,922</b>	<b>16.2%</b>
<b>State of S. Dakota</b>	<b>290,870</b>	<b>327,680</b>	<b>36,810</b>	<b>12.6%</b>

SOURCE: Woods and Poole Economics, Inc.

## Appendix C

# THE VALUE OF THE EASTERN DAKOTA AND PIERRE TO I-90 EXPRESSWAYS TO SOUTH DAKOTA AGRICULTURE

Agriculture is a major user of the South Dakota system of farm to market roads, and state and interstate highways. Consequently, construction of the Eastern Dakota Expressway will affect agriculture and the cost of agriculturally related industries. The Expressway will also cause some diversion of current agriculturally related traffic from the current traffic patterns. These changes will enhance the ability of South Dakota agricultural products to compete in national and international markets and the ability of the state's communities to attract agricultural products processing industries.

### Transportation Cost Reduction and Benefits to South Dakota Agriculture

The principal benefit of improved highways is the reduction in the cost of transporting goods and services which results in a higher standard of living for society. The reduction in transportation costs occurs in the form of shorter transportation times as well as lower vehicle operating and maintenance expenses. Construction of the Eastern Dakota Expressway will have such effects on the cost of transportation in South Dakota and these will cause South Dakota commodities and products to become more competitive in national and world markets.

National markets for agricultural commodities are perfectly competitive markets where prices are not significantly influenced by the production volume of producers in a particular region. A consequence of this market structure is that South Dakota agricultural producers, like those from all other regions, must sell their products at these market determined prices. The resulting net revenue received by farmers is the market determined price less the cost of handling and transporting the commodities to processors.

South Dakota is relatively isolated and geographically distant from the large consumer markets. Therefore, South Dakota agricultural commodities tend to require longer movements to reach those markets and the resulting cost of transportation is higher for South Dakota commodities than those of agricultural regions closer to the consumer. Since the market price is the same for all producers, the net price received by South Dakota producers is often less than net prices realized by farmers in other regions.

Transportation technology; i.e., highways, trucks, and railroads, has evolved so that it costs less to transport bulk commodities than processed commodities. As a result, processing industries have been located closer to final consumer markets and South Dakota commodities have been transported in bulk unprocessed form long distances to the processors.

By reducing the cost of transporting South Dakota commodities, the Expressway can result in a gain to those providing the transportation or handling services, or the farmer. Unregulated trucking of agricultural commodities is also a perfectly competitive industry which is relatively easy to enter requiring only a small investment. Should the reduced cost of trucking be retained as profit by agricultural commodity carriers, existing trucking firms would expand their operations and new firms would quickly be formed. The flow of capital into the trucking industry would increase competition to provide transportation services. The greater competition would cause the rates charged to be bid down to the level of trucking costs.

Therefore, the gain from reduced costs could not be retained as profits by the trucking industry but would be competed back to the handling or producing industries.

The commodity handling industries, while not as readily entered as trucking, are relatively competitive. In addition, significant competitors in these industries are the farmer owned cooperatives. This competition means that the handling industries would not be able to capture the reduced transportation costs in the form of handling profits. Therefore, indirectly through the competition for business in the handling and trucking industries or directly through cooperative dividends, most of the gains from the reduction in the cost of transporting agricultural commodities would be passed on to South Dakota farmers as the recipients of the residual between the market determined price and the costs of handling and transportation.

The national and world markets for processed agricultural commodities are also relatively competitive so that commodities processed in South Dakota must compete in the urban consumer markets with those processed closer to those markets. Transportation technology resulting in the relatively lower cost of bulk commodity movements has resulted in relatively little processing of commodities being done within South Dakota.

The proposed Expressway, by reducing transportation costs within South Dakota, will enhance the relative competitiveness of commodities processed within South Dakota. This will, at the margin, result in additional investment in processing facilities and greater employment and income in the state. Whether a significant increase will occur depends upon the current relative cost disadvantage of South Dakota processing. Those processes which have only a small current cost disadvantage will be those to gain from the reduced transportation costs.

The economic gains of agricultural producers and the additional employees of commodity processing industries will be respent in the South Dakota economy. The respending will translate these gains into additional income and economic activity through the multiplier process thus contributing to further expansion of the state's economy.

### **South Dakota Agriculture**

Agriculture is a more diverse industry in South Dakota than in many other states. Crop and livestock production varies considerably across the regions of the state. The southeast quarter is part of the corn belt region with significant production of corn, soybeans, hogs, and fed cattle. Toward the northeast, dairying is more important and barley production increases. At the edge of the corn belt region oats and sorghum become more important and, moving west, wheat becomes the primary crop in the central regions of the state. Even in the wheat producing central regions the state is divided between winter wheat and spring wheat regions.

In the eastern half of the state cattle feeding is an important industry while cow - calf operations tend to prevail in the western grassland regions. These differences cause significant movement of livestock through auctions and directly to feedlots and packing plants in South Dakota and throughout much of the United States.

**Agricultural Traffic on the Proposed Eastern Dakota Expressway**

To estimate future crop and livestock production and transportation quantities in the year 2015, historical data were used and extrapolated using regression analysis, local information, and judgment. Crop production data for the years 1981 through 1992 were taken from the annually published data of the South Dakota Agricultural Statistics Service. A reduction in funding of the Ag Statistics Service several years ago caused the office to cease collecting and publishing livestock production data. The livestock production data used in this work are taken from the 1982 and 1987 quinquennial Census of Agriculture published by the U. S. Bureau of the Census.

Crop and livestock data are available only at the county and state levels. For the purpose of this analysis county level data were used for those counties in which the Expressway would be located. Production in some adjacent counties was also included where the natural traffic flows would involve the highways which would be part of the Expressway system.

To determine the pattern and volume of grain flows in the collection and distribution system, a mail survey of elevators in the region was conducted. Fifty-five elevators were sent the survey form with twenty-three (42%) returned. The survey asked for the volume of various commodities received at and shipped from the elevator, the mode and routing of shipments into and out of the elevator, the annual tonnage of feed and fertilizer received by the elevator and shipped to customers, and the routing of the feed and fertilizer flows.

The mail survey was followed up by a telephone survey and interview of twenty-seven of the elevators, including some of those responding to the mail survey and some nonrespondents. The telephone interviews provided additional information on the volumes handled in the elevators and the routing of grain assembly. This information was used to estimate the proportion of each county's grain production routed over the highways which would comprise the components of the Expressway system.

Grain volumes were converted to truckloads or trips assuming that grain was assembled in four hundred bushel truckloads and shipped out in eight hundred bushel truckloads. Feed and fertilizer deliveries were assumed to be made in five ton loads while receipts arrived in twenty-four ton loads.

The number of truckloads of livestock were estimated by conversion of the Census of Agriculture production and marketing data. Fat cattle were assumed to be marketed at an average weight of 1,100 pounds per head in 40,000 pound truckloads or approximately thirty-six head per truckload. Calves were assumed marketed at six hundred pounds in 50,000 pound loads or about eighty head per load. The number of calves shipped was determined by using the number of cows and heifers that calved and allowing for a five percent death loss and a twenty percent replacement rate.

Hogs were assumed shipped in 50,000 pound lots at an average weight of 240 pounds with approximately 208 head per truckload. Feeder pigs are shipped in a variety of smaller vehicles; e.g., straight trucks and pickup trucks with gooseneck trailers. It was assumed that the average load contained thirty-five pigs at an average weight of fifty pounds.

## *The Value of the Expressway to South Dakota Agriculture*

Data on the annual volume of livestock handled at each of the state's forty-seven auctions in fiscal years 1990 - 92 was obtained from the South Dakota Livestock Sanitary Board. Auction barns located on the Expressway system were interviewed by telephone to determine an estimate of the number of truckloads and routings into and out of the auctions. Auctions located in communities not on the Expressway also ship by way of these highways and estimates for this through traffic were also obtained by telephone interview.

Agricultural processing plants, and fertilizer and farm chemical distributors in Aberdeen, Huron, Mitchell, and Freeman were also surveyed for traffic information.

Because of the diversity of the state's agriculture and the expanse of the proposed Expressway, for purposes of estimating agriculture traffic the project was divided into five components: Pierre to Vivian; Summit to Aberdeen; Aberdeen to Huron; Huron to Mitchell; and, Mitchell to Yankton. The Mitchell to Yankton component is subdivided into the two alternative routes considered, SD 37 and US 81.

The following paragraphs include brief descriptions of the agriculture in the counties included in each of the Expressway components and an estimate of the agricultural traffic.

### **Pierre - Vivian Region Agriculture and Highway Use**

The Pierre to Vivian expressway would follow the current thirty-one miles of U.S. Highway 83 between Fort Pierre and Interstate 90 at Vivian.

There is no processing of agricultural products in the region with the exception of local feed. The primary crop, wheat, moves to the elevators at Ft. Pierre and Pierre and is transported out of the region by the Dakota, Minnesota and Eastern Railroad. Other crops and all livestock move by truck.

The principal crops produced are wheat, sorghum, corn, oats, and sunflowers. Most of Stanley County lies west of U.S. 83 and production from this area is marketed through Ft. Pierre and Pierre elevators by way of U.S. 14. Production from southern Jones and Lyman counties moves primarily on I-90 or by the Dakota Southern Railroad.

As shown in Exhibit C-1, crop harvested acreage and production varies from year to year but there are no strong trends over the twelve year period in the major commodities. The production region for soybeans has been shifting west during the last decade but this trend is unlikely to reach this region or provide a significant volume of traffic.

Livestock is the most important agricultural commodity in the region. U.S. 83 livestock traffic attributable to local production is augmented by traffic from a major livestock auction in Ft. Pierre. Most cattle move south to feedlots and slaughter and most hogs move to slaughter. Large numbers of cattle and hogs from north central South Dakota, North Dakota, and Canada move down U.S. 83 to I-90, Nebraska, Kansas, and other destinations.



**Exhibit C-1**  
**PIERRE TO VIVIAN REGION**  
**CROP ACREAGE AND PRODUCTION**  
**(000)**

<b>WHEAT</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Jones	71.8	69.0	62.5	76.0	68.2	64.2	61.7	51.1	51.4	51.4	48.2	52.3	60.7
Lyman	127.9	119.5	99.8	114.2	123.0	123.0	112.0	99.9	93.8	83.1	93.6	94.7	107.0
Stanley	87.6	76.4	76.0	90.0	98.1	95.5	86.9	36.9	85.5	61.8	75.9	86.2	79.7
<b>Bushels</b>													
Jones	2,103.0	2,253.0	2,778.0	2,493.0	2,044.0	2,214.7	2,196.5	815.2	1,424.2	2,138.8	1,827.4	927.8	1,934.6
Lyman	2,982.0	4,051.7	4,222.2	4,944.0	4,117.0	4,636.0	4,351.5	1,795.2	2,710.0	3,067.5	3,457.6	2,189.8	3,543.7
Stanley	2,150.0	1,910.0	3,400.0	2,700.0	2,943.0	3,151.5	3,041.5	402.7	2,148.0	1,723.2	2,886.4	1,637.8	2,341.2
Total Bushels	7,235.0	8,214.7	10,400.2	10,137.0	9,104.0	10,002.2	9,589.5	3,013.1	6,282.2	6,929.5	8,171.4	4,755.4	7,819.5
<b>SORGHUM</b>													
<b>Acres</b>													
Jones	13.2	10.3	11.7	20.7	18.7	12.8	14.2	10.5	9.1	8.0	8.7	13.0	12.6
Lyman	59.0	50.1	43.4	67.8	64.0	56.1	46.8	36.8	26.1	33.0	41.2	37.0	46.8
Stanley	21.2	4.8	8.5	14.6	8.9	18.6	18.2	7.6	9.5	6.5	3.7	3.0	10.4
<b>Bushels</b>													
Jones	737.0	441.0	430.0	844.0	504.9	416.0	667.4	294.0	273.0	408.0	330.6	247.0	466.1
Lyman	2,449.8	1,977.0	1,519.0	3,139.0	1,881.6	2,451.0	2,433.6	1,140.8	730.8	1,980.0	1,895.2	814.0	1,867.7
Stanley	918.0	206.0	233.0	454.4	271.5	681.0	673.4	182.4	237.5	260.0	133.2	60.0	359.2
Total Bushels	4,104.8	2,624.0	2,182.0	4,437.4	2,658.0	3,548.0	3,774.4	1,617.2	1,241.3	2,648.0	2,359.0	1,121.0	2,692.9
<b>SUNFLOWERS</b>													
<b>Acres</b>													
Jones	--	--	--	1.3	0.7	--	1.0	0.6	0.5	--	0.6	--	0.4
Lyman	--	1.3	1.5	3.7	5.0	3.4	4.1	4.2	3.0	2.5	5.3	3.7	3.1
Stanley	--	1.6	0.9	1.5	1.8	1.3	1.2	2.2	0.7	1.5	--	--	1.1
<b>Pounds</b>													
Jones	--	--	--	1,623.0	630.0	--	900.0	300.0	300.0	--	570.0	--	360.3
Lyman	--	1,583.0	1,440.0	4,377.0	5,398.0	3,570.0	5,740.0	3,192.0	2,160.0	3,500.0	6,413.0	5,217.0	3,549.2
Stanley	--	1,853.0	882.0	1,200.0	1,370.0	1,170.0	840.0	1,144.0	462.0	1,350.0	--	--	855.9
Total Lbs	--	3,436.0	2,322.0	7,200.0	7,398.0	4,740.0	7,480.0	4,636.0	2,922.0	4,850.0	6,983.0	5,217.0	4,765.3

**Exhibit C-1 (cont.)  
PIERRE TO VIVIAN REGION  
CROP ACREAGE AND PRODUCTION  
(000)**

<b>CORN</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Jones	0.4	1.3	1.2	1.1	0.7	1.3	1.3	1.2	0.3	0.2	0.8	0.5	0.9
Lyman	7.4	9.5	6.0	6.8	6.2	5.1	11.3	4.4	6.1	8.3	10.3	9.7	7.6
Stanley	1.5	1.4	1.0	2.0	0.6	1.2	1.7	1.1	0.9	1.9	1.4	0.6	1.3
<b>Bushels</b>													
Jones	40.7	131.0	77.0	56.0	35.0	65.0	85.8	26.4	18.0	19.0	43.0	27.5	52.0
Lyman	814.0	933.0	434.0	629.0	496.0	681.1	949.2	409.0	713.7	803.6	901.0	855.3	718.2
Stanley	145.5	154.0	115.0	186.0	54.0	108.0	134.3	63.8	81.0	234.5	205.0	75.1	129.7
Total Bushels	1,000.2	1,218.0	626.0	871.0	585.0	854.1	1,169.3	499.2	812.7	1,057.1	1,149.0	957.9	900.0
<b>OATS</b>													
<b>Acres</b>													
Jones	9.2	8.0	6.5	8.2	9.7	2.9	10.9	3.4	1.1	1.9	3.1	4.6	5.8
Lyman	7.0	11.0	8.4	11.1	8.1	11.8	8.6	6.4	4.1	3.5	5.2	4.7	7.5
Stanley	4.5	6.9	3.2	7.9	4.3	6.2	5.2	0.9	2.8	2.5	2.0	1.3	4.0
<b>Bushels</b>													
Jones	270.0	439.0	244.0	399.0	309.0	101.5	457.8	71.4	19.8	87.4	145.7	303.6	237.4
Lyman	280.0	560.0	309.0	588.0	270.0	438.8	361.2	153.6	82.0	154.0	254.8	197.4	304.1
Stanley	204.0	403.0	110.0	351.0	117.0	241.8	197.6	17.1	67.2	85.0	92.0	52.0	161.5
Total Bushels	754.0	1,402.0	663.0	1,338.0	696.0	782.1	1,016.6	242.1	169.0	326.4	492.5	553.0	702.9
<b>BARLEY</b>													
<b>Acres</b>													
Jones	1.0	1.4	0.0	1.1	1.5	1.0	0.9	0.3	0.0	0.0	0.0	0.5	0.6
Lyman	1.8	0.7	0.0	0.7	1.0	1.7	0.7	0.6	0.0	0.0	0.0	0.0	0.6
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2
<b>Bushels</b>													
Jones	20.0	49.0	0.0	34.0	57.3	24.0	29.7	3.9	0.0	0.0	0.0	25.0	20.2
Lyman	56.5	33.1	0.0	25.0	31.3	56.1	22.4	6.6	0.0	0.0	0.0	0.0	19.3
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.0	6.8
Total Bushels	76.5	82.1	0.0	59.0	88.6	80.1	52.1	10.5	0.0	0.0	0.0	106.0	46.2

C  
6

**Crop Production and Traffic** - Exhibit C-2 shows the principal crops produced in the three counties for the last twelve years. Wheat is the largest commodity and virtually all of the production is shipped out of the region. Approximately 1,700 truckloads of wheat move north annually on U.S. 83 to the elevators and rail service in Ft. Pierre and Pierre. In addition, some 700 truckloads of feed grains travel both into and out of the Ft. Pierre/Pierre elevators and 120 truckloads of feed is brought into the elevators by that route.

**Livestock Traffic** - Traffic on U.S. 83 from local livestock production is relatively light. It consists of approximately 45 truckloads of fat cattle, 625 truckloads of calves, 45 loads of hogs, and 375 loads of feeder pigs. Feeder pigs are often transported by gooseneck trailer rather than trucks.

The livestock auction at Ft. Pierre handles some 210,000 cattle annually. Approximately one-half of these are brought to the auction by U.S. 83 and virtually all move south from the auction over U.S. 83 to feedlots and slaughter. These cattle generate some 8,500 truckloads over the highway.

A significant share of cattle from other South Dakota auctions in Faith, Lemmon, Mobridge, Herried, McLaughlin, Gettysburg, and Bowdle as well as cattle imported from North Dakota and Canada also use the U.S. 83 transit route to Nebraska, Colorado, Kansas, and other states. These South Dakota auctions handle some 500,000 head of cattle, hogs, and sheep annually. One third of this traffic, if routed south over U.S. 83, would mean another 4,000 to 5,000 truckloads per year using the highway.

**Total Pierre - Vivian Commodities Traffic** - The results above indicate that there are 16,000 to 17,000 annual truckloads of grain, feed, and livestock transported over the Pierre to Vivian section of U.S. 83. This would amount to six or seven trucks per hour during ten hour weekdays.

#### **Summit - Aberdeen Region Agriculture and Highway Use**

The seventy-five mile expressway between Summit and Aberdeen would include the twenty miles of four lane highway already in place between Groton and Aberdeen. Therefore, the agricultural region affected by the additional fifty-five miles of expressway will be primarily Day County. The expressway would have an impact on all through traffic of commodities. This traffic is accounted for in the traffic surveys.

Addition of the expressway in eastern Brown County would benefit some westbound local agricultural traffic from Day County into Groton. Offsetting eastbound traffic from eastern Brown County moving to Andover and Bristol suggests that including Brown County data would overestimate the agricultural traffic affected by the expressway.

U.S. 12 is paralleled by the mainline track of the Burlington Northern Railroad and most of the elevators affected by the construction of an expressway have rail service. Much of the grain exported from the area and fertilizer brought into the area are moved by rail.

**Exhibit C-2  
PIERRE - VIVIAN REGION  
LIVESTOCK SALES**

<u>County</u>	<u>Fat Cattle Sold</u>		<u>Calf Crop</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Stanley	1,276		17,445	15,065
Jones		292	17,725	19,723
Lyman	<u>2,278</u>	<u>2,885</u>	<u>35,516</u>	<u>29,960</u>
Total	3,554	3,177	70686	64748

<u>County</u>	<u>Hogs Sold</u>		<u>Feeder Pigs Sold</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Stanley	780	771	833	418
Jones	1,987	4,097	3,433	3,620
Lyman	<u>10,352</u>	<u>17,638</u>	<u>7,255</u>	<u>9,116</u>
Total	13,119	22,506	11,521	13,154

The principal crop produced in the region is wheat with significant production also of corn, barley, and oats. Exhibit C-3 shows that an average of some nine million bushels of these commodities are produced annually in Day County. While harvested acreage and crop production vary annually, there is no significant trend in the crop pattern.

Most wheat is delivered to local elevators by way of the local road system. Corn and oats are also assembled over the local roads and much is delivered back as feed over the same system. In addition, corn is transported by truck to a new ethanol plant in Aberdeen. Barley tends to move to rail facilities which specialize in handling barley at Aberdeen and east of I-29.

Annual sales of cattle and hogs are shown in Exhibit C-4 for the years 1982 and 1987. The data are from the quinquennial Census of Agriculture. Livestock traffic over U.S. 12 also includes shipments in and out of auctions at Aberdeen.

**Crop Production and Traffic** - Local elevators indicate that some ten million bushels of grain are received or shipped out over U.S. 12. Because the elevators are located adjacent to the highway, most grain receipts must travel over U.S. 12 for at least a short distance even if the principal routing is by the local road system. This volume indicates that some 13,000 truckloads annually move in or out of the elevators by way of U.S. 12. Approximately two-thirds of this traffic is inbound to the elevators and, because of the short distance use of the highway, would receive limited benefits from the expressway.

Approximately 3,500 truckloads of feed are hauled by way of U.S. 12 annually. Most of these loads are smaller delivery loads which make limited use of the highway. There are 1,500 to 2,000 truckloads of fertilizer moving over U.S. 12. Most of this traffic is also local and makes only short distance use of the highway.

**Livestock Traffic** - Local livestock production makes only light use of U.S. 12. Little of the Brown County production moves over the highway east of Aberdeen. Traffic from local production in Day County consists of approximately 250 truckloads of fat cattle, 200 truckloads of calves, 85 loads of hogs, and 275 loads of feeder pigs.

Livestock auctions in Aberdeen ship approximately 1,500 truckloads annually over U.S. 12.

**Total Aberdeen - Summit Agricultural Traffic** - Total crop and livestock traffic using U.S. 12 is approximately 20,000 truckloads annually. At least two-thirds of these are local traffic making only short distance use of the highway.

**Exhibit C-3  
 ABERDEEN - SUMMIT REGION  
 CROP ACREAGE AND PRODUCTION  
 (000)**

<b>CORN</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Brown	85.6	80.9	63.7	100.0	110.0	93.7	94.4	79.8	102.7	120.4	140.9	140.8	109.2
Day	20.6	16.9	19.2	28.9	27.9	30.8	27.7	19.5	30.8	34.0	38.1	36.4	30.5
<b>Bushels</b>													
Brown	4,912.0	3,233.0	4,150.0	6,549.0	8,954.0	8,148.0	7,174.0	3,950.1	6,983.6	10,264.8	12,916.9	8,940.9	8,209.0
Day	1,206.0	852.0	1,146.0	1,731.0	1,763.0	2,465.5	1,800.5	712.2	2,063.6	2,642.8	3,406.8	1,764.8	2,038.9
Total Bushels	15,499.0	4,085.0	5,296.0	8,280.0	10,717.0	10,613.5	8,974.5	4,662.3	9,047.2	12,907.6	16,323.7	10,705.7	10,247.9
<b>WHEAT</b>													
<b>Acres</b>													
Brown	274.4	262.1	178.4	233.2	270.0	273.0	236.0	166.0	266.0	294.4	216.3	248.2	243.2
Day	134.6	126.9	94.7	128.0	139.1	131.0	120.0	114.0	128.0	140.0	111.2	124.3	124.3
<b>Bushels</b>													
Brown	6,005.0	6,058.4	5,316.6	8,751.0	9,713.0	6,903.0	7,024.4	1,863.8	6,883.0	10,309.4	7,199.2	9,535.8	7,130.2
Day	3,423.6	3,044.5	2,755.0	4,763.0	4,828.0	3,786.6	3,515.3	1,612.7	3,754.2	5,738.2	3,310.4	4,195.8	3,727.3
Total Bushels	9,428.6	9,102.9	8,071.6	13,514.0	14,541.0	10,689.6	10,539.7	3,476.5	10,637.2	16,047.6	10,509.6	13,731.6	10,857.5
<b>OATS</b>													
<b>Acres</b>													
Brown	37.0	51.9	44.0	34.0	24.5	19.8	22.3	8.5	30.7	20.2	14.1	11.7	26.6
Day	40.0	40.3	39.6	34.6	26.6	23.8	19.7	21.0	23.6	20.0	11.6	10.4	25.9
<b>Bushels</b>													
Brown	1,410.0	2,018.0	2,442.0	2,025.0	1,373.0	851.4	1,092.7	144.5	1,228.0	1,191.8	747.3	713.7	1,269.8
Day	1,965.0	1,927.0	2,136.0	2,257.0	1,422.0	999.0	985.0	399.0	1,274.4	1,400.0	626.4	769.6	1,346.7
Total Bushels	3,375.0	3,945.0	4,578.0	4,282.0	2,795.0	1,850.4	2,077.7	543.5	2,502.4	2,591.8	1,373.7	1,483.3	2,616.5

C-10

Exhibit C-3 (cont.)  
**ABERDEEN - SUMMIT REGION**  
**CROP ACREAGE AND PRODUCTION**  
(000)

<b>BARLEY</b>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>Average</u>
<b>Acres</b>													
Brown	54.1	52.1	54.6	58.9	74.5	75.6	69.0	35.6	57.4	50.5	41.1	30.7	54.5
Day	45.4	39.5	44.9	41.3	48.8	50.9	45.8	33.7	34.3	33.5	23.8	17.6	38.3
<b>Bushels</b>													
Brown	1,894.0	2,035.0	2,820.0	3,682.0	4,319.0	3,856.1	3,312.0	462.8	2,353.4	2,727.0	1,931.7	1,872.7	2,605.5
Day	1,919.0	1,504.0	1,930.0	2,135.2	2,347.0	2,392.0	1,832.0	572.9	1,543.5	1,842.5	999.6	1,073.6	1,674.3
Total Bushels	3,813.0	3,539.0	4,750.0	5,817.2	6,666.0	6,248.1	5,144.0	1,035.7	3,896.9	4,569.5	2,931.3	2,946.3	4,279.8
<b>SOYBEANS</b>													
<b>Acres</b>													
Brown	4.8	2.7	2.9	11.3	10.0	13.1	23.0	34.0	44.0	56.6	98.3	117.0	34.8
Day	0.8	1.0	0.0	7.3	6.3	4.5	8.9	15.8	19.5	23.4	37.0	58.0	15.2
<b>Bushels</b>													
Brown	96.0	41.0	75.1	270.0	280.0	393.0	529.0	544.0	1,012.0	1,754.6	2,850.7	2,574.0	868.3
Day	21.0	17.5	0.0	167.0	115.0	108.0	204.7	300.2	487.5	608.4	1,036.0	870.0	327.9
Total Bushels	117.0	58.5	75.1	437.0	395.0	501.0	733.7	844.2	1,499.5	2,363.0	3,886.7	3,444.0	1,196.2
<b>SUNFLOWERS</b>													
<b>Acres</b>													
Brown	59.5	76.4	54.4	55.5	35.7	33.0	23.9	13.9	14.1	20.1	36.3	30.4	37.8
Day	14.0	23.4	16.7	19.9	13.0	8.1	7.6	6.4	8.4	7.7	11.7	9.4	12.2
<b>Pounds</b>													
Brown	65,442.0	77,510.0	49,082.0	60,125.0	53,550.0	51,150.0	33,460.0	11,537.0	14,946.0	29,547.0	53,361.0	37,392.0	44,758.5
Day	18,089.0	27,190.0	19,042.0	19,488.0	18,035.0	11,745.0	9,880.0	7,488.0	9,996.0	11,011.0	17,316.0	12,220.0	15,125.0
Total Lbs	83,531.0	104,700.0	68,124.0	79,613.0	71,585.0	62,895.0	43,340.0	19,025.0	19,025.0	40,558.0	70,677.0	49,612.0	59,390.4

**Exhibit C-4  
 ABERDEEN - SUMMIT REGION  
 LIVESTOCK SALES**

<u>County</u>	<u>Fat Cattle Sold</u>		<u>Calf Crop</u>		<u>Beef Cows</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Day	3,599	9,224	24,061	22,837	16,789	16,582
Brown	<u>50,593</u>	<u>44,226</u>	<u>45,454</u>	<u>44,092</u>	<u>42,240</u>	<u>41,465</u>
Total	54,192	53,450	69,515	66,929	59,029	58,047

<u>County</u>	<u>Hogs Sold</u>		<u>Feeder Pigs Sold</u>		<u>Hog &amp; Pig Inv</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Day	20,603	18,285	12,212	7,791	14,932	15,126
Brown	<u>67,716</u>	<u>69,413</u>	<u>8,065</u>	<u>13,691</u>	<u>37,459</u>	<u>45,356</u>
Total	88,319	87,698	20,277	21,482	52,391	60,482



**Aberdeen - Huron Region Agriculture and Highway Use**

The expressway between Aberdeen and Huron would follow U.S. 281 and serve producers in southern Brown County, western Spink County, and northwestern Beadle County. In addition to the elevators and farm supply firms directly in Aberdeen and Huron, there are ten elevators which would be served closely along U.S. 281.

Exhibit C-5 indicates that corn and wheat are the principal crops along with significant amounts of oats, barley, sunflowers, and soybeans. Approximately fifteen million bushels are produced in the region which would be directly affected by the expressway.

Sales of locally produced cattle, calves, hogs, and feeder pigs are shown on Exhibit C-6. Of these figures, approximately 28,000 cattle, 38,000 calves, 67,000 hogs, and 14,000 feeder pigs are sold from the region affected by the expressway.

Livestock moved through auctions in Aberdeen, Redfield, and Huron are also transported by way of U.S. 281. Approximately 250,000 cattle and 25,000 hogs move through these auctions annually. U.S. 281 is also used to transport hogs to Huron for processing.

There are no large plants processing commodities in the region served by the highway between Aberdeen and Huron. A pork processing plant as well as feed, fertilizer, and chemical firms are located in Huron.

**Crop Production and Traffic** - Of the fifteen million bushels of grain produced in the area, local elevators along U.S. 281 report that one-half is received by way of U.S. 281. A similar share of the grain handled is shipped out on 281. The rest is moved by rail over the BN service parallel to the highway. Most grain delivered into Aberdeen and Huron is shipped out by rail. The local grain collection and distribution represents some 25,000 truck movements annually in and out of the elevators.

Approximately 3,000 truckloads of feed and 3,300 loads of fertilizer are shipped over U.S. 281. Agricultural chemicals represent some 400 truckloads annually moving north from Huron by way of 281.

**Livestock Traffic** - Locally produced livestock represent some 750 loads of fat cattle, 345 loads of calves, 320 loads of hogs, and 400 loads of feeder pigs which are shipped by U.S. 281.

Approximately 4,000 truckloads of cattle and 250 loads of hogs travel this highway from the auctions in Aberdeen and Redfield. There are 350 truckloads of cattle brought into the Huron auction by U.S. 281. Most hogs brought into Huron for processing are delivered by U.S. 14 and 212. About 100 truckloads of hopper material are shipped north from Huron pork plant over 281.

**Exhibit C-5**  
**ABERDEEN - HURON REGION**  
**CROP ACREAGE AND PRODUCTION**  
**(000)**

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>Average</u>
<b>CORN</b>													
<u>Acres</u>													
Brown	85.6	80.9	63.7	100.0	110.0	93.7	94.4	79.8	102.7	120.4	140.9	140.8	109.2
Spink	62.0	73.8	69.6	97.6	104.0	96.5	94.7	76.3	91.0	112.0	125.9	124.9	102.5
Beadle	55.5	86.2	52.9	86.7	96.2	81.4	88.8	82.9	93.3	101.8	113.5	107.9	94.7
<u>Bushels</u>													
Brown	4,912.0	3,233.0	4,150.0	6,549.0	8,954.0	8,148.0	7,174.0	3,950.1	6,983.6	10,264.8	12,916.9	8,940.9	8,209.0
Spink	2,372.0	4,169.0	3,936.0	7,015.0	7,876.0	8,878.1	6,629.0	3,355.7	5,187.0	8,890.0	9,565.6	7,874.2	7,252.3
Beadle	3,200.0	6,451.0	2,659.0	6,146.0	7,164.0	6,758.3	7,015.2	4,224.2	6,064.5	7,241.0	8,218.1	7,265.2	6,677.4
Total Bushels	10,484.0	13,853.0	10,745.0	19,710.0	23,994.0	23,784.4	20,818.2	11,530.0	18,235.1	26,395.8	30,700.6	24,080.3	22,138.7
<b>WHEAT</b>													
<u>Acres</u>													
Brown	274.4	262.1	178.4	233.2	270.0	273.0	236.0	166.0	266.0	294.4	216.3	248.2	243.2
Spink	257.8	225.6	152.8	197.8	209.6	200.0	196.0	199.0	223.0	244.9	186.9	229.9	210.3
Beadle	106.3	95.5	72.5	102.9	113.5	105.0	101.0	105.0	113.0	114.6	85.9	123.0	103.2
<u>Bushels</u>													
Brown	6,005.0	6,058.4	5,316.6	8,751.0	9,713.0	6,903.0	7,024.4	1,863.8	6,883.0	10,309.4	7,199.2	9,535.8	7,130.2
Spink	4,944.6	5,452.0	4,335.0	6,675.0	6,706.0	5,345.6	5,712.8	2,262.0	4,968.1	8,380.0	5,762.7	6,896.5	5,620.0
Beadle	1,728.9	2,536.9	2,135.9	3,212.0	4,040.6	2,825.4	3,063.7	1,828.9	3,347.0	3,806.6	2,441.9	3,596.0	2,880.3
Total Bushels	12,678.5	14,047.3	11,787.5	18,638.0	20,459.6	15,074.0	15,800.9	5,954.7	15,198.1	22,496.0	15,403.8	20,028.3	15,630.6
<b>OATS</b>													
<u>Acres</u>													
Brown	37.0	51.9	44.0	34.0	24.5	19.8	22.3	8.5	30.7	20.2	14.1	11.7	26.6
Spink	22.3	52.3	43.3	33.6	25.1	16.5	20.8	22.9	29.5	20.1	13.1	10.7	25.9
Beadle	25.0	63.8	40.9	54.6	43.3	22.4	33.1	28.1	38.9	25.1	15.4	15.2	33.8
<u>Bushels</u>													
Brown	1,410.0	2,018.0	2,442.0	2,025.0	1,373.0	851.4	1,092.7	144.5	1,228.0	1,191.8	747.3	713.7	1,269.8
Spink	674.0	2,507.0	2,361.0	2,093.0	1,316.0	792.0	1,081.6	572.5	1,150.5	1,266.3	746.7	588.5	1,262.4
Beadle	850.0	3,567.0	2,125.0	3,166.0	2,458.0	1,052.0	1,621.9	618.2	1,556.0	1,581.3	816.2	851.2	1,688.6
Total Bushels	2,934.0	8,092.0	6,928.0	7,284.0	5,147.0	2,695.4	3,796.2	1,335.2	3,934.5	4,039.4	2,310.2	2,153.4	4,220.8

Exhibit C-5 (cont.)  
 ABERDEEN - HURON REGION  
 CROP ACREAGE AND PRODUCTION  
 (000)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>Average</u>
<b>BARLEY</b>													
<u>Acres</u>													
Brown	54.1	52.1	54.6	58.9	74.5	75.6	69.0	35.6	57.4	50.5	41.1	30.7	54.5
Spink	24.2	23.3	23.0	28.3	33.0	36.4	36.0	27.0	25.5	23.9	18.5	11.9	25.9
Beadle	13.6	11.8	9.9	14.4	16.2	19.8	23.8	16.8	13.2	10.9	8.2	4.6	13.6
<u>Bushels</u>													
Brown	1,894.0	2,035.0	2,820.0	3,682.0	4,319.0	3,856.1	3,312.0	462.8	2,353.4	2,727.0	1,931.7	1,872.7	2,605.5
Spink	693.0	1,005.0	997.0	1,427.0	1,639.0	1,528.8	1,476.0	459.0	918.0	1,266.7	703.0	583.1	1,058.0
Beadle	245.3	578.0	420.0	722.0	897.0	891.0	952.0	336.0	396.0	588.6	287.0	211.6	543.7
Total Bushels	2,832.3	3,618.0	4,237.0	5,831.0	6,855.0	6,275.9	5,740.0	1,257.8	3,667.4	7,504.0	2,921.7	2,667.4	4,450.6
<b>SOYBEANS</b>													
<u>Acres</u>													
Brown	4.8	2.7	2.9	11.3	10.0	13.1	23.0	34.0	44.0	56.6	98.3	117.0	34.8
Spink	2.4	3.9	8.8	21.1	27.3	37.5	61.3	75.6	87.8	75.1	89.6	97.5	49.0
Beadle	1.4	2.2	2.4	4.3	5.3	7.2	14.9	28.2	36.3	24.5	27.1	22.0	14.7
<u>Bushels</u>													
Brown	96.0	41.0	75.1	270.0	280.0	393.0	529.0	544.0	1,012.0	1,754.6	2,850.7	2,574.0	868.3
Spink	67.0	93.6	236.7	583.0	734.0	1,200.0	1,409.9	1,209.6	1,492.6	1,952.6	2,419.2	2,145.0	1,128.6
Beadle	49.0	76.0	73.0	92.4	154.5	252.0	417.2	507.6	798.6	490.0	650.4	140.8	308.5
Total Bushels	212.0	210.6	384.8	945.4	1,168.5	1,845.0	2,356.1	2,261.2	3,303.2	4,197.2	5,920.3	4,859.8	2,305.3
<b>SUNFLOWERS</b>													
<u>Acres</u>													
Brown	59.5	76.4	54.4	55.5	35.7	33.0	23.9	13.9	14.1	20.1	36.3	30.4	37.8
Spink	74.6	80.9	54.9	48.9	40.5	34.7	21.8	17.5	22.3	27.3	40.3	38.1	41.8
Beadle	9.2	15.0	11.9	26.7	27.2	17.3	14.9	11.3	16.1	23.7	38.2	35.5	20.6
<u>Pounds</u>													
Brown	65,442.0	77,510.0	49,082.0	60,125.0	53,550.0	51,150.0	33,460.0	11,537.0	14,946.0	29,547.0	53,361.0	37,392.0	44,758.5
Spink	67,225.0	75,561.0	56,610.0	54,462.0	53,881.0	50,315.0	29,430.0	15,925.0	23,415.0	39,585.0	53,599.0	47,244.0	47,271.0
Beadle	7,820.0	17,702.0	10,591.0	31,579.0	35,548.0	25,950.0	21,605.0	13,899.0	17,710.0	36,024.0	53,862.0	46,860.0	26,595.8
Total Lbs	140,487.0	170,773.0	116,283.0	146,166.0	142,979.0	127,415.0	84,495.0	41,361.0	41,361.0	105,156.0	160,822.0	131,496.0	117,399.5

**Exhibit C-6  
ABERDEEN - HURON REGION  
Livestock Sales**

<u>County</u>	<u>Fat Cattle Sold</u>		<u>Calf Crop</u>		<u>Beef Cows</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Brown	50,593	44,226	45,454	44,092	42,240	41,465
Spink	15,088	33,420	36,823	33,467	35,091	32,547
Beadle	<u>25,062</u>	<u>22,387</u>	<u>46,243</u>	<u>44,452</u>	<u>41,380</u>	<u>40,765</u>
Total	90,743	100,033	128,520	122,011	118,711	114,777

<u>County</u>	<u>Hogs Sold</u>		<u>Feeder Pigs Sold</u>		<u>Hog &amp; Pig Inv</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Brown	67,716	69,413	8,065	13,691	37,459	45,356
Spink	69,268	71,441	10,912	20,876	45,778	57,882
Beadle	<u>70,643</u>	<u>71,306</u>	<u>15,605</u>	<u>17,771</u>	<u>53,005</u>	<u>49,313</u>
Total	207,627	212,160	34,582	52,338	136,242	152,551

**Total Aberdeen - Huron Agricultural Traffic** - Local production of grain and livestock, delivery of farm feed and chemicals, and shipments of livestock and processed agriculture products generate some 39,000 truckload movements of commodities over U.S. 281 annually.

**Huron - Mitchell Region Agriculture and Highway Use**

The Huron to Mitchell section of the proposed expressway would follow S.D. 37 and S.D. 34 through south central Beadle County and northeast Davison County while serving most of Sanborn County. It would also attract some agricultural traffic from eastern Jerauld County. The route is already four lane highway with the exception of some twenty miles in Sanborn County.

At the north end of this section, Huron is served by the DM & E Railroad. The BN Railroad serves elevators just west of U.S. 37 at Alpena, Woonsocket, and Letcher as well Mitchell. The BN also serves several industries in Huron.

This section of the expressway is at the western edge of the Corn Belt. Exhibit C-7 shows that the four counties produce approximately fifteen million bushels of corn annually. The other principal crops are wheat and oats with 4.5 million bushels of annual production. Less important crops are barley, soybeans, and sorghum.

Annual sales of cattle, calves, hogs, and feeder pigs are shown in Exhibit C-8 from the 1982 and 1987 Census of Agriculture. This section of the expressway would also be used to transport livestock in and out of auctions in Huron and Mitchell.

The principal processing occurs in Huron where a pork plant as well as feed, fertilizer, and chemical firms make significant use of S.D. 37. The livestock auction in Huron also receives and ships cattle over the highway.

**Crop Production and Traffic** - Approximately 8.7 million bushels of grain are produced annually in the area served by the expressway. Local elevator estimates of grain receipts suggest that there are 12,000 farm to market truck movements on this S.D. 37/34 highway system. Parallel rail service is available and one of the larger grain handlers is at Mitchell with access to both rail and I-90 highway service. Therefore, much of the local grain production is exported from the region by these means. Grain exports over S.D. 37/34 are approximately 4,500 truckloads annually.

Local elevators bring an estimated 250 truckloads of fertilizer annually on S.D. 37. Most feed deliveries to local producers occur in smaller truckloads and by way of the local road system. Elevators estimated some 300 truckloads make some use of the highway in making deliveries.

The feed mills in Huron bring most of the meal and hulls from the south by S.D. 37. Much of the traffic comes from Sioux City, Iowa, by I-29 and I-90 to Mitchell. An estimated 825 truckloads move northbound. Shipments out of Huron south on S.D. 37 consist of some 200 loads annually.

**Exhibit C-7  
HURON - MITCHELL REGION  
CROP ACREAGE AND PRODUCTION  
(000)**

<b>CORN</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Beadle	55.5	86.2	52.9	86.7	96.2	81.4	88.8	82.9	93.3	101.8	113.5	107.9	94.7
Jerauld	12.9	21.4	18.3	23.7	23.8	24.4	23.7	20.4	22.4	26.6	25.5	24.2	23.9
Sanborn	36.9	50.0	39.0	48.5	61.2	58.0	52.0	45.5	53.6	55.0	60.9	52.4	54.1
Davison	41.2	52.8	47.6	50.9	62.7	58.3	53.6	53.1	57.0	59.3	66.8	64.7	58.5
<b>Bushels</b>													
Beadle	3,200.0	6,451.0	2,659.0	6,146.0	7,164.0	6,758.3	7,015.2	4,224.2	6,064.5	7,241.0	8,218.1	7,265.2	6,677.4
Jerauld	529.0	1,317.0	869.0	1,348.0	1,417.0	1,659.2	1,659.0	724.4	1,276.8	1,597.4	1,458.4	1,628.7	1,418.8
Sanborn	1,502.0	3,226.0	1,685.0	2,344.0	4,717.0	8,396.9	3,380.0	1,590.2	2,894.4	3,432.8	3,125.5	3,877.6	3,750.9
Davison	1,980.0	3,240.0	2,243.0	2,813.0	4,859.0	4,139.0	3,805.6	2,231.8	3,021.0	3,588.7	2,358.6	6,132.4	3,661.0
Total Bushels	7,211.0	14,234.0	7,456.0	12,651.0	18,157.0	20,953.4	15,859.8	8,770.6	13,256.7	15,859.9	15,160.6	18,903.9	15,508.1
<b>WHEAT</b>													
<b>Acres</b>													
Beadle	106.3	95.5	72.5	102.9	113.5	105.0	101.0	105.0	113.0	114.6	85.9	123.0	103.2
Jerauld	21.8	24.4	16.3	22.3	23.3	26.5	25.7	24.8	25.5	25.6	23.2	30.1	24.1
Sanborn	13.3	13.0	8.6	10.1	14.6	14.9	13.2	13.4	13.4	14.0	8.8	14.5	12.7
Davison	5.7	6.2	3.4	4.6	7.6	5.9	8.1	8.7	11.2	14.8	13.9	25.9	9.7
<b>Bushels</b>													
Beadle	1,728.9	2,536.9	2,135.9	3,212.0	4,040.6	2,825.4	3,063.7	1,828.9	3,347.0	3,806.6	2,441.9	3,596.0	2,880.3
Jerauld	352.5	704.0	434.0	667.0	904.0	738.6	818.1	380.8	523.5	966.4	862.4	1,003.1	696.2
Sanborn	176.5	343.8	201.1	298.8	539.3	386.3	324.3	209.6	324.4	417.0	259.8	484.9	330.5
Davison	93.8	168.0	83.6	143.0	264.0	165.3	247.5	208.4	331.7	481.7	585.0	1,029.7	316.8
Total Bushels	2,351.7	3,752.7	2,854.6	4,320.8	5,747.9	4,115.6	4,453.6	2,627.7	4,526.6	5,671.7	4,149.1	6,113.7	4,223.8

C-18

Exhibit C-7 (cont.)  
HURON - MITCHELL REGION  
CROP ACREAGE AND PRODUCTION  
(000)

OATS	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average
<b>Acres</b>													
Beadle	25.0	63.8	40.9	54.6	43.3	22.4	33.1	28.1	38.9	25.1	15.4	15.2	33.8
Jerauld	4.0	17.9	17.3	18.1	17.6	8.6	8.1	8.7	6.4	9.4	4.6	5.6	10.5
Sanborn	13.3	30.5	21.9	20.8	22.9	11.5	18.9	15.9	17.9	16.2	11.2	9.9	17.6
Davison	46.0	61.8	45.1	35.2	43.1	19.5	28.0	26.2	29.1	31.5	20.3	22.9	34.1
<b>Bushels</b>													
Beadle	850.0	3,567.0	2,125.0	3,166.0	2,458.0	1,052.0	1,621.9	618.2	1,556.8	1,581.3	816.2	851.2	1,688.6
Jerauld	116.0	1,043.0	823.0	990.0	979.0	284.0	396.9	243.6	172.8	488.8	262.2	336.0	511.3
Sanborn	383.0	1,799.0	947.0	910.0	1,357.0	425.5	756.0	302.1	608.6	745.2	638.4	584.1	788.0
Davison	1,422.0	3,945.0	1,945.0	1,671.0	2,812.0	682.6	1,120.0	681.2	989.4	1,638.0	1,177.4	1,534.3	1,634.8
Total Bushels	2,771.0	10,354.0	5,840.0	6,737.0	7,606.0	2,444.1	3,894.8	1,845.1	3,327.6	4,453.3	2,894.2	3,305.6	4,622.7

C-19

BARLEY	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average
<b>Acres</b>													
Beadle	13.6	11.8	9.9	14.4	16.2	19.8	23.8	16.8	13.2	10.9	8.2	4.6	13.6
Jerauld	6.2	6.7	6.4	8.2	9.5	10.6	11.3	8.4	5.9	5.3	5.4	4.6	7.4
Sanborn	4.6	3.9	3.6	3.9	4.8	7.1	7.9	4.3	3.9	2.3	2.9	1.2	4.2
Davison	8.9	6.3	5.5	2.9	5.6	4.0	9.3	4.9	3.5	4.9	5.6	3.3	5.4
<b>Bushels</b>													
Beadle	245.3	578.0	420.0	722.0	897.0	891.0	952.0	336.0	396.0	588.6	287.0	211.6	543.7
Jerauld	124.0	328.0	220.0	373.0	497.0	487.6	463.3	159.6	112.1	249.1	221.4	197.8	286.1
Sanborn	82.8	185.0	136.0	141.0	259.0	276.9	300.2	68.8	120.9	105.8	87.0	60.0	152.0
Davison	205.0	350.0	168.0	142.1	337.0	176.0	288.3	137.2	119.0	245.0	207.2	178.2	212.8
Total Bushels	657.1	1,441.0	944.0	1,378.1	1,990.0	1,831.5	2,003.8	701.6	748.0	1,188.5	802.6	647.6	1,194.5

**Exhibit C-7 (cont.)**  
**HURON - MITCHELL REGION**  
**CROP ACREAGE AND PRODUCTION**  
**(000)**

<b>SOYBEANS</b>	<b><u>1981</u></b>	<b><u>1982</u></b>	<b><u>1983</u></b>	<b><u>1984</u></b>	<b><u>1985</u></b>	<b><u>1986</u></b>	<b><u>1987</u></b>	<b><u>1988</u></b>	<b><u>1989</u></b>	<b><u>1990</u></b>	<b><u>1991</u></b>	<b><u>1992</u></b>	<b><u>Average</u></b>
<b><u>Acres</u></b>													
Beadle	1.4	2.2	2.4	4.3	5.3	7.2	14.9	28.2	36.3	24.5	27.1	22.0	14.7
Jerauld	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.4	1.8	1.0	0.0	1.0	0.6
Sanborn	0.0	0.0	0.6	2.8	1.9	1.8	3.4	8.9	10.8	7.1	9.3	6.5	4.4
Davison	1.4	0.0	4.8	10.8	11.1	14.8	16.6	25.8	31.3	30.4	35.8	27.6	17.5
<b><u>Bushels</u></b>													
Beadle	49.0	76.0	73.0	92.4	154.5	252.0	417.2	507.6	798.6	490.0	650.4	140.8	308.5
Jerauld	0.0	0.0	0.0	0.0	0.0	0.0	14.0	38.4	25.2	24.0	0.0	21.0	10.2
Sanborn	0.0	0.0	12.0	49.4	50.0	50.4	88.4	133.5	194.4	163.3	176.7	156.0	89.5
Davison	31.5	0.0	130.0	242.0	348.0	384.8	464.8	541.8	563.4	790.4	572.8	966.0	419.6
Total Bushels	80.5	76.0	215.0	383.8	552.5	687.2	984.4	1,221.3	1,581.6	1,467.7	1,399.9	1,283.8	827.8
<b>SORGHUM</b>													
<b><u>Acres</u></b>													
Beadle	5.9	13.8	7.2	8.1	10.5	3.5	3.3	3.4	7.0	3.0	5.4	7.6	6.6
Jerauld	3.6	4.7	5.9	3.0	4.0	1.7	1.7	2.1	3.5	1.5	2.8	1.5	3.0
Sanborn	8.2	17.0	3.5	7.9	5.8	0.3	1.8	0.5	1.9	2.5	4.7	7.6	5.1
Davison	6.7	6.0	3.7	2.6	3.5	2.1	1.2	0.4	2.0	0.7	2.5	8.6	3.3
<b><u>Bushels</u></b>													
Beadle	223.0	766.0	353.0	457.7	493.5	213.0	221.1	190.4	378.0	180.0	291.6	205.2	331.0
Jerauld	108.0	253.0	387.0	190.2	200.0	119.0	115.6	107.1	147.0	94.5	140.0	58.5	160.0
Sanborn	264.0	920.0	166.0	308.0	272.6	12.5	104.4	25.5	85.5	147.5	216.2	281.2	233.6
Davison	320.0	290.0	201.0	1,601.0	203.0	109.0	70.8	22.0	90.0	35.0	115.0	404.2	288.4
Total Bushels	915.0	2,229.0	1,107.0	2,556.9	1,169.1	453.5	511.9	345.0	700.5	457.0	762.8	949.1	1,013.1

C-20



Exhibit C-7 (cont.)  
**HURON - MITCHELL REGION**  
**CROP ACREAGE AND PRODUCTION**  
(000)

<b>SUNFLOWER</b>	<b><u>1981</u></b>	<b><u>1982</u></b>	<b><u>1983</u></b>	<b><u>1984</u></b>	<b><u>1985</u></b>	<b><u>1986</u></b>	<b><u>1987</u></b>	<b><u>1988</u></b>	<b><u>1989</u></b>	<b><u>1990</u></b>	<b><u>1991</u></b>	<b><u>1992</u></b>	<b><u>Average</u></b>
<b><u>Acres</u></b>													
Beadle	9.2	15.0	11.9	26.7	27.2	17.3	14.9	11.3	16.1	23.7	38.2	35.5	20.6
Jerauld	0.0	0.0	0.0	1.6	3.3	2.6	4.4	1.9	6.9	3.8	4.1	2.7	2.6
Sanborn	0.7	4.2	3.2	1.3	2.7	2.0	0.7	0.0	0.0	0.9	2.4	1.6	1.6
Davison	0.6	0.9	2.5	7.7	2.8	2.4	1.0	0.7	1.0	2.1	2.5	1.4	2.1
<b><u>Pounds</u></b>													
Beadle	7,820.0	17,702.0	10,591.0	31,579.0	35,548.0	25,950.0	21,605.0	13,899.0	17,710.0	36,024.0	53,862.0	46,860.0	26,595.8
Jerauld	0.0	0.0	0.0	1,969.0	415.9	3,770.0	6,600.0	1,691.0	5,244.0	4,940.0	4,510.0	3,969.0	2,759.1
Sanborn	420.0	5,569.0	3,520.0	1,105.0	3,780.0	2,600.0	840.0	0.0	0.0	1,395.0	3,192.0	2,544.0	2,080.4
Davison	720.0	1,147.0	2,725.0	7,130.0	3,920.0	2,400.0	1,000.0	630.0	990.0	3,360.0	2,600.0	1,834.0	2,371.3
Total Lbs	8,960.0	24,418.0	16,836.0	41,783.0	43,663.9	34,720.0	30,045.0	16,220.0	23,944.0	45,719.0	64,164.0	55,207.0	33,806.7

**Exhibit C-8  
HURON - MITCHELL REGION  
LIVESTOCK SALES**

<u>County</u>	<u>Fat Cattle Sold</u>		<u>Calf Crop</u>		<u>Beef Cows</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Beadle	25,062	22,387	46,243	44,452	41,380	40,765
Jerauld	11,239	13,980	18,761	18,137	17,661	17,351
Sanborn	18,795	25,364	19,741	19,737	18,785	19,228
Davison	<u>6,136</u>	<u>4,500</u>	<u>18,073</u>	<u>15,015</u>	<u>16,087</u>	<u>13,051</u>
Total	61,232	66,231	102,818	97,341	93,913	90,395

<u>County</u>	<u>Hogs Sold</u>		<u>Feeder Pigs Sold</u>		<u>Hog &amp; Pig Inv</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Beadle	70,643	71,306	15,605	17,771	53,005	49,313
Jerauld	21,487	34,833	13,134	14,155	19,952	24,594
Sanborn	23,242	26,693	6,863	1,828	18,421	19,055
Davison	<u>45,984</u>	<u>47,766</u>	<u>11,856</u>	<u>9,855</u>	<u>31,608</u>	<u>30,353</u>
Total	161,356	180,598	47,458	43,609	122,986	123,315

Most farm fertilizer is brought into the area from the east by U.S. 14 and I-90. Delivery is over the local road system. Approximately 350 truckloads of chemicals are moved north between Mitchell and Huron and some 400 truckloads are shipped south from Huron.

**Livestock Traffic** - The table shows that some 65,000 fat cattle, 100,000 calves, 175,000 hogs, and 45,000 feeder pigs are sold annually from farms in the four counties. This local production provides approximately 725 truckloads of cattle, 285 loads of calves, 235 loads of hogs, and 300 loads of feeder pigs moved over the S.D. 37 and 34 highways.

Live hogs brought into Huron for processing are assembled primarily from the east and northeast. An estimated 300 truckloads are delivered by S.D. 37 from buying stations in Nebraska and southern South Dakota. Processed pork products are shipped out of Huron to several regions. Approximately 9,000 truckloads are moved south over S.D. 37 annually. Another 900 truckloads are shipped north from Mitchell to Huron over the highway.

Cattle sold at the auction market in Huron are primarily shipped south on S.D. 37. This traffic amounts to some 3,000 truckloads each year. Cattle shipped into the auctions in both Huron and Mitchell are included in the local production data above. Hogs shipped from the Mitchell auction for processing in Huron are included in the inbound processing data above.

**Total Huron - Mitchell Agricultural Traffic** - The agriculture industries provide some 33,500 truckloads of traffic annually on at least some part of this section of the proposed expressway. Some of this usage is traffic which might have used other highways if some two-thirds of the Huron to Mitchell route were not already four lane highway.

#### **Routes 37/50 Mitchell - Yankton Region Agriculture and Highway Use**

The two alternative routes being considered for the Mitchell to Yankton section of the proposed expressway are on the west and east sides of the James River. The western route would follow S.D. 37 south of Mitchell to S.D. 50 near Avon and then follow S.D. 50 east to Yankton. This route would serve the agricultural assembly and distribution system in southeast Davison County, western Hutchinson County, northwest and southeast Bon Homme County and southwest Yankton County.

Corn, soybeans, and oats are the principal crops produced in the area serve by this route. Exhibit C-9 table shows that the average production of six major crops during the last twelve years has been some 38 million bushels. Reports from local elevators and production patterns result in an estimate of approximately fourteen million bushels routed to market annually by way of S.D. 37 and 50.

Most of the soybeans from the region are trucked south to the processing plant at Sergeant Bluff, Iowa. Wheat, oats, and corn are also trucked south through Yankton although most corn is returned locally as feed.

**Exhibit C-9**  
**MITCHELL - YANKTON REGION**  
**CROP ACREAGE AND PRODUCTION**  
**(000)**

<b>CORN</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Bon Homme	88.0	89.5	69.4	77.6	95.6	86.9	78.4	80.0	79.0	81.2	87.1	93.7	84.4
Davison	41.2	52.8	47.6	50.9	62.7	58.3	53.6	53.1	57.0	59.3	66.8	64.7	58.5
Douglas	47.2	50.0	44.8	61.0	60.5	58.9	55.4	57.2	44.0	56.1	58.1	56.9	56.5
Hutchinson	116.0	129.0	97.7	112.0	144.0	139.5	117.4	120.3	120.0	131.5	120.6	142.9	127.6
McCook	89.8	86.8	63.3	93.4	95.5	88.3	76.6	73.3	76.8	89.6	94.1	97.7	87.3
Turner	114.1	110.0	72.6	116.0	132.0	129.7	108.4	119.9	111.0	124.9	125.2	137.3	122.7
Yankton	83.2	76.5	52.5	63.4	87.2	75.5	67.1	71.5	75.0	79.8	84.7	87.9	76.9
<b>Bushels</b>													
Bon Homme	6,300.0	5,859.0	3,781.0	4,730.0	7,795.0	5,998.5	6,036.8	3,999.2	3,950.0	4,666.0	3,993.5	8,373.6	5,504.7
Davison	1,980.0	3,240.0	2,243.0	2,813.0	4,859.0	4,139.0	3,805.6	2,231.8	3,021.0	3,588.7	2,358.6	6,132.4	3,661.0
Douglas	2,353.0	3,131.0	2,294.0	3,565.0	4,347.0	3,122.0	3,988.8	3,317.6	1,893.0	2,903.0	1,613.5	4,856.0	3,289.5
Hutchinson	6,300.0	8,525.0	4,779.0	6,599.0	13,683.0	10,044.9	9,274.6	6,129.0	6,725.0	7,310.6	3,679.6	13,486.5	8,548.0
McCook	6,450.0	6,801.0	3,036.0	5,884.0	8,899.0	7,240.0	6,204.6	4,031.5	3,993.6	6,988.8	5,740.1	9,086.1	6,452.0
Turner	8,885.0	8,740.0	3,971.0	8,026.0	13,135.0	11,419.0	10,081.2	6,592.6	9,327.0	10,327.1	8,388.8	15,202.1	10,277.6
Yankton	6,680.0	5,555.0	2,804.0	4,042.0	8,201.0	7,025.2	6,039.0	3,929.6	5,025.0	5,216.4	5,924.0	9,057.9	6,051.1
<b>Total</b>	<b>38,948.0</b>	<b>41,851.0</b>	<b>22,908.0</b>	<b>35,659.0</b>	<b>60,919.0</b>	<b>48,988.6</b>	<b>45,430.6</b>	<b>30,231.3</b>	<b>33,934.6</b>	<b>41,000.6</b>	<b>31,698.1</b>	<b>66,194.6</b>	<b>43,784.0</b>
<b>WHEAT</b>													
<b>Acres</b>													
Bon Homme	5.7	5.8	1.0	1.8	5.9	6.8	4.1	4.2	4.2	4.0	4.0	8.1	4.6
Davison	5.7	6.2	3.4	4.6	7.6	5.9	8.1	8.7	11.2	14.8	13.9	25.9	9.7
Douglas	9.4	6.7	4.0	5.7	7.3	9.2	8.6	8.2	11.6	14.8	13.5	22.3	10.1
Hutchinson	11.7	10.6	4.7	5.1	7.4	7.4	9.1	9.1	9.5	12.1	10.8	21.0	9.9
McCook	6.5	3.3	0.7	2.5	2.2	4.4	3.7	3.5	3.2	4.6	4.6	7.8	3.9
Turner	2.2	1.8	0.0	0.0	0.0	0.0	2.5	1.7	1.3	2.2	0.7	2.0	1.2
Yankton	2.0	1.7	0.0	0.7	1.7	4.5	0.7	0.9	0.5	0.5	1.0	1.5	1.3
<b>Bushels</b>													
Bon Homme	131.0	179.5	21.8	45.0	177.4	207.6	112.1	64.8	93.8	111.2	118.4	374.9	136.5
Davison	93.8	168.0	83.6	143.0	264.0	165.3	247.5	208.4	331.7	481.7	585.0	1,029.7	316.8
Douglas	275.8	229.1	121.2	179.4	279.3	253.2	264.1	179.0	251.7	452.4	412.7	787.0	307.1
Hutchinson	274.4	362.6	98.3	125.0	298.0	201.6	270.4	237.4	273.8	440.1	347.2	877.0	317.2
McCook	124.5	89.8	14.0	70.0	66.0	151.6	130.1	50.5	86.0	120.6	127.0	303.0	111.1
Turner	46.2	62.5	0.0	0.0	0.0	0.0	72.5	30.6	32.5	52.2	17.5	92.8	33.9
Yankton	41.2	56.5	0.0	25.0	70.0	96.1	20.3	13.5	14.0	17.5	29.5	63.5	37.3
<b>Total</b>	<b>986.9</b>	<b>1,148.0</b>	<b>338.9</b>	<b>587.4</b>	<b>1,154.7</b>	<b>1,075.4</b>	<b>1,117.0</b>	<b>784.2</b>	<b>1,083.5</b>	<b>1,675.7</b>	<b>1,637.3</b>	<b>3,527.9</b>	<b>1,259.7</b>

C-24

Exhibit C-9 (cont.)  
 MITCHELL - YANKTON REGION  
 CROP ACREAGE AND PRODUCTION  
 (000)

OATS	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average
<b>Acres</b>													
Bon Homme	45.6	60.5	27.5	16.6	37.0	27.5	29.5	18.9	24.2	25.4	17.8	18.1	29.1
Davison	46.0	61.8	45.1	35.2	43.1	19.5	28.0	26.2	29.1	31.5	20.3	22.9	34.1
Douglas	47.0	56.7	43.1	36.7	47.1	18.7	24.8	29.9	25.0	30.0	17.0	21.3	33.1
Hutchinson	74.3	97.0	49.6	30.7	63.7	23.3	40.3	29.0	34.7	31.2	17.2	19.4	42.5
McCook	64.5	62.6	35.6	23.7	41.8	23.4	20.7	15.4	20.3	18.8	10.7	11.5	29.1
Turner	53.0	58.6	19.7	18.9	39.2	18.4	23.8	18.1	19.5	17.6	12.1	11.1	25.8
Yankton	34.0	36.7	22.2	17.6	25.0	15.8	17.2	11.9	10.7	15.3	9.4	8.8	18.7
<b>Bushels</b>													
Bon Homme	1,608.0	4,138.0	1,051.0	804.0	2,388.0	134.7	1,239.0	510.3	919.6	1,193.8	1,050.2	1,267.0	1,358.6
Davison	1,422.0	3,945.0	1,945.0	1,671.0	2,812.0	682.6	1,120.0	681.2	989.4	1,638.0	1,177.4	1,534.3	1,634.8
Douglas	2,128.0	3,623.0	1,872.0	1,856.0	2,584.0	617.1	942.4	657.8	800.0	1,290.0	952.0	1,363.2	1,557.1
Hutchinson	2,468.0	6,615.0	1,954.0	1,077.0	4,451.0	815.5	1,571.7	754.0	1,353.3	1,341.6	877.2	1,396.8	2,056.3
McCook	2,676.0	4,488.0	1,299.0	1,056.0	2,788.0	912.6	931.5	492.8	954.1	1,109.2	556.4	931.5	1,516.3
Turner	2,200.0	4,381.0	782.0	762.0	2,681.0	754.4	1,023.4	814.5	936.0	862.4	689.7	876.9	1,396.9
Yankton	1,505.0	2,381.0	789.0	786.1	1,632.0	805.8	808.4	380.8	342.4	642.6	582.8	695.2	945.9
Total	14,007.0	29,571.0	9,692.0	8,012.1	19,336.0	4,722.7	7,636.4	4,291.4	6,294.8	8,077.6	5,885.7	8,064.9	10,466.0
<b>BARLEY</b>													
<b>Acres</b>													
Bon Homme	4.7	2.1	0.4	0.6	1.3	2.3	2.5	1.1	0.8	0.9	0.9	1.5	1.6
Davison	8.9	6.3	5.5	2.9	5.6	4.0	9.3	4.9	3.5	4.9	5.6	3.3	5.4
Douglas	6.2	3.9	3.3	2.4	4.7	7.6	11.9	7.6	4.6	5.2	6.1	5.1	5.7
Hutchinson	6.7	6.7	3.7	0.9	6.4	4.3	8.0	3.5	3.7	4.0	3.2	3.4	4.5
McCook	14.9	7.4	4.1	1.9	4.8	14.9	15.9	7.3	5.0	5.4	2.5	2.1	7.2
Turner	2.6	0.9	0.5	0.0	0.9	1.5	1.7	0.9	0.7	0.7	0.7	0.5	1.0
Yankton	0.9	0.5	0.0	0.0	0.5	1.0	1.4	0.6	0.7	0.0	0.0	0.0	0.5
<b>Bushels</b>													
Bon Homme	113.0	107.0	14.0	21.0	84.2	105.8	97.5	25.3	23.2	45.9	43.2	90.0	64.2
Davison	205.0	350.0	168.0	142.1	337.0	176.0	288.3	137.2	119.0	245.0	207.2	178.2	212.8
Douglas	236.0	202.0	129.0	96.3	245.0	296.4	404.6	190.0	128.8	213.2	219.6	249.9	217.6
Hutchinson	167.5	357.0	132.0	35.8	347.0	193.5	280.0	98.0	118.4	180.0	112.0	187.0	184.0
McCook	396.0	420.0	161.0	76.7	269.0	700.3	620.1	175.2	210.0	264.6	105.0	132.3	294.2
Turner	84.5	54.2	18.0	0.0	58.2	52.5	71.4	25.2	23.8	36.4	25.2	33.0	40.2
Yankton	27.0	21.2	0.0	0.0	28.0	55.0	57.4	15.6	21.0	0.0	0.0	0.0	18.8
Total	1,229.0	1,511.4	622.0	371.9	1,368.4	1,579.5	1,819.3	666.5	644.2	1,697.3	712.2	870.4	1,091.0

C-25

Exhibit C-9 (cont.)  
**MITCHELL - YANKTON REGION**  
**CROP ACREAGE AND PRODUCTION**  
(000)

<b>SOYBEANS</b>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>Average</u>
<b>Acres</b>													
Bon Homme	32.8	31.0	42.5	69.0	56.6	58.8	57.6	66.6	64.2	66.2	68.4	69.5	56.9
Davison	1.4	0.0	4.8	10.8	11.1	14.8	16.6	25.8	31.9	30.4	35.8	27.6	17.5
Douglas	2.0	2.1	4.5	10.6	9.7	14.0	12.8	18.4	21.8	21.8	26.4	20.1	13.7
Hutchinson	42.1	43.6	61.7	103.0	79.7	95.2	84.9	105.3	105.9	107.7	116.8	114.5	88.4
McCook	21.4	24.4	39.2	68.8	59.6	60.8	59.7	77.6	84.6	81.6	88.1	85.0	62.6
Turner	72.4	68.6	84.4	113.9	111.6	116.0	111.5	118.3	118.9	119.9	125.7	124.0	107.1
Yankton	48.0	50.4	46.7	61.0	59.3	65.2	67.7	72.8	72.0	73.9	76.6	77.2	64.2
<b>Bushels</b>													
Bon Homme	826.6	902.0	1,119.0	1,171.0	1,753.0	1,587.6	1,728.0	1,398.6	1,284.0	1,390.2	1,231.2	2,502.0	1,407.8
Davison	31.5	0.0	130.0	242.0	348.0	364.8	464.8	541.8	563.4	790.4	572.8	966.0	419.6
Douglas	35.0	70.0	96.0	198.0	290.0	252.0	396.8	478.4	414.2	501.4	422.4	643.2	316.5
Hutchinson	938.8	1,308.0	1,408.0	1,891.0	2,823.0	2,284.8	2,801.7	2,527.2	2,329.8	2,261.7	1,868.8	4,351.0	2,232.8
McCook	610.0	721.0	1,079.0	1,378.0	2,032.0	1,824.0	1,970.1	2,095.2	1,776.6	2,203.2	1,673.9	2,805.0	1,680.7
Turner	1,983.8	2,127.0	2,164.0	2,337.0	3,851.0	3,712.0	3,902.5	3,194.1	3,448.1	3,347.2	2,891.1	4,588.0	3,128.8
Yankton	1,368.0	1,487.0	1,107.0	1,089.0	1,939.0	2,151.6	2,166.4	1,601.6	1,872.0	1,699.7	1,915.0	2,856.4	1,771.1
<b>Total</b>	<b>5,793.7</b>	<b>6,615.0</b>	<b>7,103.0</b>	<b>8,306.0</b>	<b>13,036.0</b>	<b>12,196.8</b>	<b>13,430.3</b>	<b>11,836.9</b>	<b>11,688.1</b>	<b>12,193.8</b>	<b>10,575.2</b>	<b>18,711.6</b>	<b>10,957.2</b>
<b>SORGHUM</b>													
<b>Acres</b>													
Bon Homme	11.8	5.3	4.2	2.0	2.8	1.5	0.9	0.4	3.0	2.0	2.0	5.0	3.4
Davison	6.7	6.0	3.7	2.6	3.5	2.1	1.2	0.4	2.0	0.7	2.5	6.5	3.2
Douglas	15.8	11.1	9.9	8.8	12.0	3.7	5.0	6.6	10.0	9.0	11.5	18.0	10.1
Hutchinson	14.8	7.7	5.0	1.2	3.5	0.6	0.7	0.2	4.0	2.0	1.5	8.0	4.1
McCook	5.9	2.0	0.9	2.9	2.9	0.9	0.8	0.7	1.9	4.0	3.5	7.0	2.8
Turner	0.5	0.4	0.9	0.5	0.4	0.1	0.0	0.1	0.5	0.0	0.0	0.5	0.3
Yankton	3.5	3.4	2.4	1.3	0.7	0.7	0.3	0.2	0.7	0.4	0.5	1.3	1.3
<b>Bushels</b>													
Bon Homme	6,969.0	233.0	243.0	71.5	133.0	75.5	59.4	16.8	195.0	126.0	100.0	285.0	708.9
Davison	320.0	290.0	201.0	1,601.0	203.0	109.0	70.8	22.0	90.0	35.0	115.0	377.0	286.2
Douglas	892.0	637.0	685.0	435.9	636.0	176.0	340.0	442.2	560.0	513.0	540.5	756.0	551.1
Hutchinson	758.0	399.0	272.0	64.0	238.0	23.0	66.5	12.0	248.0	132.0	40.5	592.0	237.1
McCook	285.0	110.0	54.4	115.7	174.0	54.0	60.0	43.4	129.2	280.0	220.5	329.0	154.6
Turner	26.0	19.5	36.0	19.5	24.8	6.0	0.0	4.0	37.5	0.0	0.0	16.0	15.8
Yankton	243.0	209.0	152.0	70.7	46.9	43.5	19.5	10.0	42.0	24.4	27.5	63.7	79.4
<b>Total</b>	<b>9,493.0</b>	<b>1,897.5</b>	<b>1,643.4</b>	<b>2,378.3</b>	<b>1,455.7</b>	<b>487.0</b>	<b>616.2</b>	<b>550.4</b>	<b>1,301.7</b>	<b>1,110.4</b>	<b>1,044.0</b>	<b>2,418.7</b>	<b>2,033.0</b>

Exhibit C-9 (cont.)  
**MITCHELL - YANKTON REGION**  
**CROP ACREAGE AND PRODUCTION**  
**(000)**

<b>SUNFLOWER</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average</b>
<b>Acres</b>													
Bon Homme	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Davison	0.6	0.9	2.5	7.7	2.8	2.4	1.0	0.7	1.0	2.1	2.5	3.1	2.3
Douglas	1.5	0.8	1.7	5.0	4.0	2.9	1.9	0.0	0.0	0.8	1.0	0.5	1.7
Hutchinson	0.5	0.0	0.0	1.3	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
McCook	1.1	1.5	2.9	3.6	1.6	0.8	0.0	0.0	0.0	0.0	0.5	1.5	1.1
Turner	0.0	0.0	0.0	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Yankton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Pounds</b>													
Bon Homme	0.0	0.0	0.0	400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3
Davison	720.0	1,147.0	2,725.0	7,130.0	3,920.0	2,400.0	1,000.0	630.0	990.0	3,360.0	2,600.0	1,834.0	2,371.3
Douglas	750.0	961.0	1,666.0	4,500.0	5,200.0	3,480.0	2,090.0	0.0	0.0	744.0	1,490.0	645.0	1,793.6
Hutchinson	450.0	0.0	0.0	1,433.0	1,040.0	600.0	0.0	0.0	0.0	0.0	0.0	0.0	293.6
McCook	1,357.0	2,142.0	3,161.0	2,975.0	2,400.0	960.0	0.0	0.0	0.0	0.0	835.0	2,535.0	1,363.8
Turner	0.0	0.0	0.0	1,433.0	13,231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,222.0
Yankton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>3,277.0</b>	<b>4,250.0</b>	<b>7,552.0</b>	<b>17,871.0</b>	<b>25,791.0</b>	<b>7,440.0</b>	<b>3,090.0</b>	<b>630.0</b>	<b>630.0</b>	<b>4,104.0</b>	<b>4,925.0</b>	<b>5,014.0</b>	<b>7,047.8</b>

**Exhibit C-10  
MITCHELL - YANKTON REGION  
LIVESTOCK SALES**

<u>County</u>	<u>Fat Cattle Sold</u>		<u>Calf Crop</u>		<u>Beef Cows</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Bon Homme	24,160	22,057	19,414	17,492	16,059	14,511
Davison	6,136	4,500	24,061	22,837	39,658	35,522
Douglas	7,394	6,628	18,498	16,790	16,087	13,051
Hutchinson	18,809	16,940	38,903	33,188	15,035	13,379
McCook	8,762	6,258	24,493	20,570	31,427	27,260
Turner	31,305	45,976	21,445	16,720	14,687	11,290
Yankton	<u>17,510</u>	<u>14,529</u>	<u>13,921</u>	<u>12,740</u>	<u>12,124</u>	<u>11,280</u>
Total	114,076	116,888	160,735	140,337	145,077	126,293

<u>County</u>	<u>Hogs Sold</u>		<u>Feeder Pigs Sold</u>		<u>Hog &amp; Pig Inv</u>	
	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>	<u>1982</u>	<u>1987</u>
Bon Homme	78,580	85,570	21,542	24,356	60,456	66,028
Davison	45,984	47,766	11,856	9,855	72,836	70,567
Douglas	64,051	78,712	25,203	39,812	31,608	30,353
Hutchinson	136,426	126,638	24,676	34,911	55,579	63,595
McCook	80,357	78,739	19,478	9,030	103,359	92,086
Turner	105,083	112,462	20,106	14,422	83,379	75,559
Yankton	<u>93,727</u>	<u>101,602</u>	<u>10,813</u>	<u>15,170</u>	<u>63,198</u>	<u>66,083</u>
Total	604,208	631,489	133,674	147,556	470,415	464,271



**US 81 Mitchell - Yankton Region Agriculture and Highway Use**

The eastern route would follow U.S. 81 from I-90 near Salem south to Yankton. This would serve agriculture in south central McCook County, eastern Hutchinson County, and central Yankton County.

In the area of the proposed route east of the James River the principal crops are also corn, soybeans, and oats. Production in the area served by U.S. 81 is thirty-three million bushels annually. Analysis of local elevator responses arrives at an estimate of 7.5 million bushels transported to elevators in the area over short stretches of U.S. 81.

The area served by the northern half of the U.S. 81 route is crossed by Burlington Northern rail service with nearby loading facilities at Emery and Marion. A significant amount of corn and soybeans assembled at elevators on U.S. 81 is subsequently trucked a short distance on the route to these loading facilities just west and east of U.S. 81.

Soybeans are also trucked south on U.S. 81 from local elevators to the processor near Sioux City. Much of the corn and oats are trucked from these elevators back to local farmers as feed. Some is assembled in Yankton for loading in railcars.

In the area served by U.S. 81, the estimated livestock sales off farms include 11,000 cattle, 14,000 calves, 75,000 hogs, and 12,000 feeder pigs.

**Crop Production and Traffic** - Local grain production provides an estimated 18,500 loads transported annually for short distances on U.S. 81. Elevators along the highway ship some 650 truckloads of grain out over the route.

Feed dealers receive 1,050 truckloads of feed each year from Sioux City and Sioux Falls. Most of their 4,500 local delivery trips travel at least a few miles on U.S. 81. Annual receipts of fertilizer and fuel are some 500 truckloads. All of this is delivered locally and uses U.S. 81 for at least short distances. These deliveries require 2,000 loads.

**Livestock Traffic** - Locally produced livestock sales result in some 315 truckloads of cattle, 130 loads of calves, 365 loads of hogs, and 350 loads of feeder pigs delivered by U.S. 81. Most of the hogs are assembled at the hog buying station in Freeman which ships 450 truckloads south to Nebraska.

The milk processing plant at Freeman has several collection routes which use U.S. 81. Inbound supplies are also brought by this route. These traffic flows result in 2,600 truckloads into Freeman each year over 81. Over a year's time the plant will export approximately 650 truckloads of milk products and powder by this route.

**Total US 81 Mitchell to Yankton Agricultural Traffic** - The data above shows 19,150 loads of grain moving over U.S. 81. Most of the traffic uses 81 for only short distances to local elevators or rail loading facilities. Feed, fertilizer, and fuel imported over the highway amounts to 1,550 annual truckloads. Delivery of these products puts another 6,500 short distance loads.

***The Value of the Expressway to South Dakota Agriculture***

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Local livestock production requires 1,160 loads on U.S. 81 and exports are an additional 450 truckloads. The dairy processing plant puts another 3,250 trucks on the highway each year.

## **Appendix D**

### **SURVEY RESULTS**

In order to gain an understanding of travel demand and travel characteristics in each corridor, a series of surveys was conducted. These include:

- Roadside origin and destination traffic surveys
- Interstate highway license plate observations
- Interstate highway surveys at rest areas
- Trucking company surveys
- Shipper/receiver surveys.

The survey results were used in developing traffic forecasts for each of the Eastern Dakota Expressway alternatives, and also, assisted in the economic analyses. This section describes the results of each of these surveys.

#### **Roadside Origin and Destination Surveys**

The roadside surveys were conducted at eleven locations throughout eastern and central South Dakota. The eleven survey sites were selected at strategic locations to identify which highways would be impacted and to intercept all traffic that could conceivably divert to one of the Eastern Dakota Expressway alternatives. Exhibits D-1 and D-2 display the locations of the eleven survey sites.

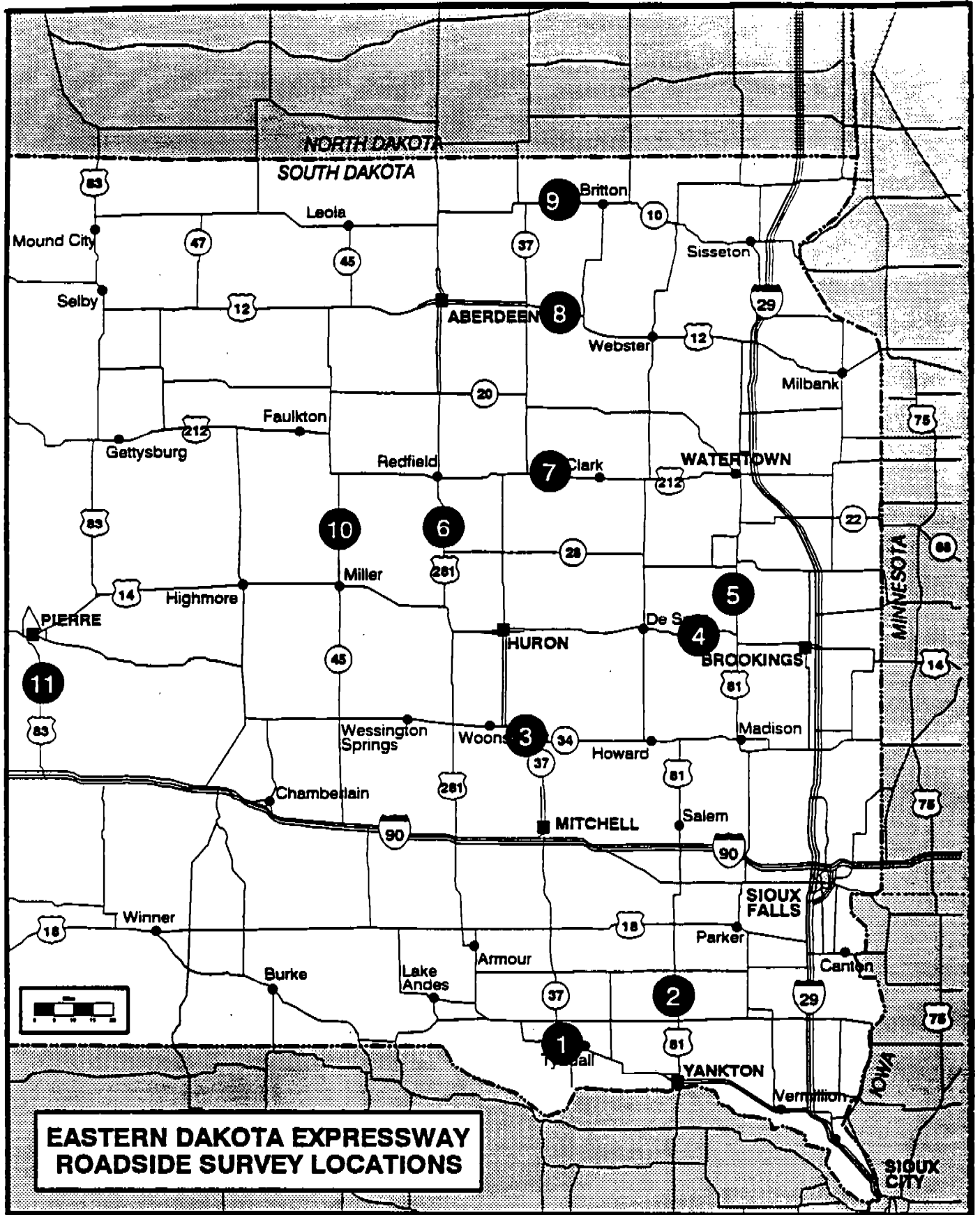
Surveys were conducted from 7 a.m. to 7 p.m., between Tuesday April 13, 1993 and Wednesday April 21, 1993. All vehicles were stopped and information was obtained regarding:

- Trip Origin
- Trip Destination
- Trip Purpose
- Type of Vehicle
- Number of Occupants
- License Plate of Vehicle

**Exhibit D-1  
ROADSIDE SURVEY LOCATIONS**

<u>STATION NO.</u>	<u>STATION LOCATION</u>
1	SD 37/50 Between Avon and Tyndall
2	US 81 South of SD 46
3	SD 34/37 East of Forestburg
4	US 14 East of Lake Preston
5	US 81 South of SD 28
6	US 281 South of Tulare
7	US 212 East of Doland
8	US 12 West of Andover
9	SD 10 Brown/Marshall Co. Line
10	SD 45 South of SD 26
11	US 83 Lyman/Stanley Line

The survey form is depicted on Exhibit D-3.



**EASTERN DAKOTA EXPRESSWAY  
ROADSIDE SURVEY LOCATIONS**

Exhibit D-2

Sheet Number:

Date:

# EASTERN DAKOTA O&D STUDY

STATION LOCATION: Station Number: \_\_\_\_\_

Direction: EB WB  
NB SB

Hour starting: _____
Interviewer: _____

VEH. TYPE	NUMBER OF PERSONS	ORIGIN <i>Where did this trip begin ?</i>	DESTINATION <i>Where will this trip end ?</i>	TRIP PURPOSE	State of License Plate Commodity Hauled
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	City: State: County: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

D-4

Exhibit D-3

VEHICLE TYPE		TRIP PURPOSE	
C = Passenger Car Pick-ups & Vans	L = Light Truck H = Heavy Truck O = Others	W = To/From Work B = On Business	V = Vacation O = Others

**Survey Response Rate** - A total of 4,979 vehicles were surveyed during the roadside surveys. Due to modest traffic volumes, a high sampling rate was achieved during the twelve hour survey period. Exhibit D-4 depicts the total number of vehicles surveyed by station location along with the average daily traffic volume.

**Exhibit D-4  
SURVEY RESPONSE RATE**

<u>STATION NO.</u>	<u>PASS. VEH. SURVEYED</u>	<u>TRUCKS SURVEYED</u>	<u>ADT</u>	<u>RESPONSE RATE</u>
1	584	61	1,800	35.8%
2	426	89	1,700	30.3
3	332	137	1,820	25.8
4	385	80	1,610	28.9
5	241	49	1,050	27.6
6	264	67	1,040	31.8
7	379	70	1,280	35.1
8	614	147	2,500	30.4
9	174	31	740	27.7
10	193	31	830	27.0
11	<u>563</u>	<u>62</u>	<u>1,800</u>	<u>34.7</u>
	4,155	824	16,170	30.8%

NOTE: Surveys were conducted in one direction only.

**Data Expansion** - Since the roadside surveys were only conducted for 12 hours each day, the survey information was factored to represent total daily traffic volumes. To represent the daily number of trips, the survey trip records were entered into a computerized data base and expanded to the average daily traffic volume based on vehicle type and survey hour for each survey location.

**Vehicle Type** - The roadside survey classified vehicles by type; passenger vehicles (automobiles, pickup trucks, recreational vehicles, buses and motorcycles), heavy trucks (multi-axle, trailer tractor combinations), and light trucks (single axle trucks). The survey results reveal that 84 percent of all trips in the corridor are made by passenger vehicles (Exhibit D-5). Commercial trucks make up remaining 16 percent, with the majority of these vehicles being the heavy, multi-axle trucks. It should be noted that these figures are an average of the eleven survey locations, and that the percentages vary by survey location.

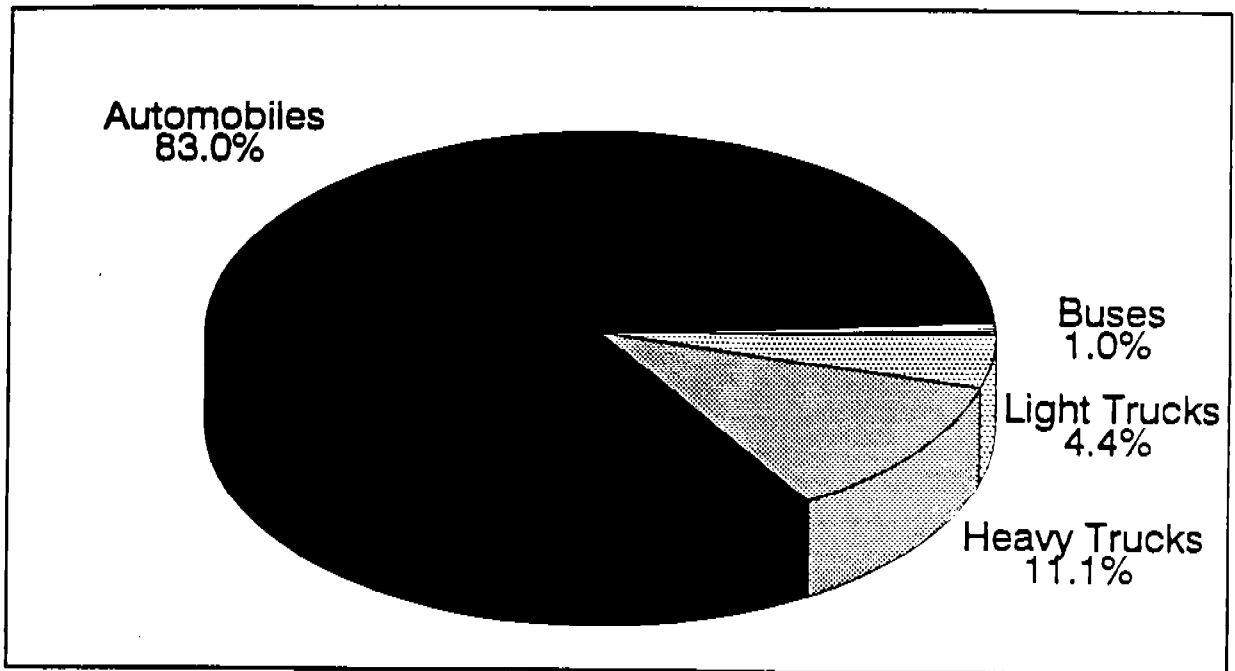
**Trip Purpose** - The roadside surveys also requested information concerning trip purpose of the occupants in the the vehicle (Exhibit D-6). Since all commercial truck trips are business related trips, the analysis only include passenger vehicle trips. The survey results reveal that the largest percentage of passenger vehicle trips are business related trips, which account for 39.8 percent. Other or personal business trips make up 33.4 percent, while commuting trips to and from work account for 20.0 percent. Vacation and recreational trips account for 6.8 percent.

**Vehicle Occupancy** - The roadside survey also tabulated the number of occupants in each vehicle. From the survey, the average number of persons per passenger vehicle is 1.59. The majority of vehicles in the corridor had only one occupant in the vehicle (58.6 percent). Two occupant vehicles accounted for 30.9 percent, while vehicles with three or more occupants accounted for only 10.5 percent.

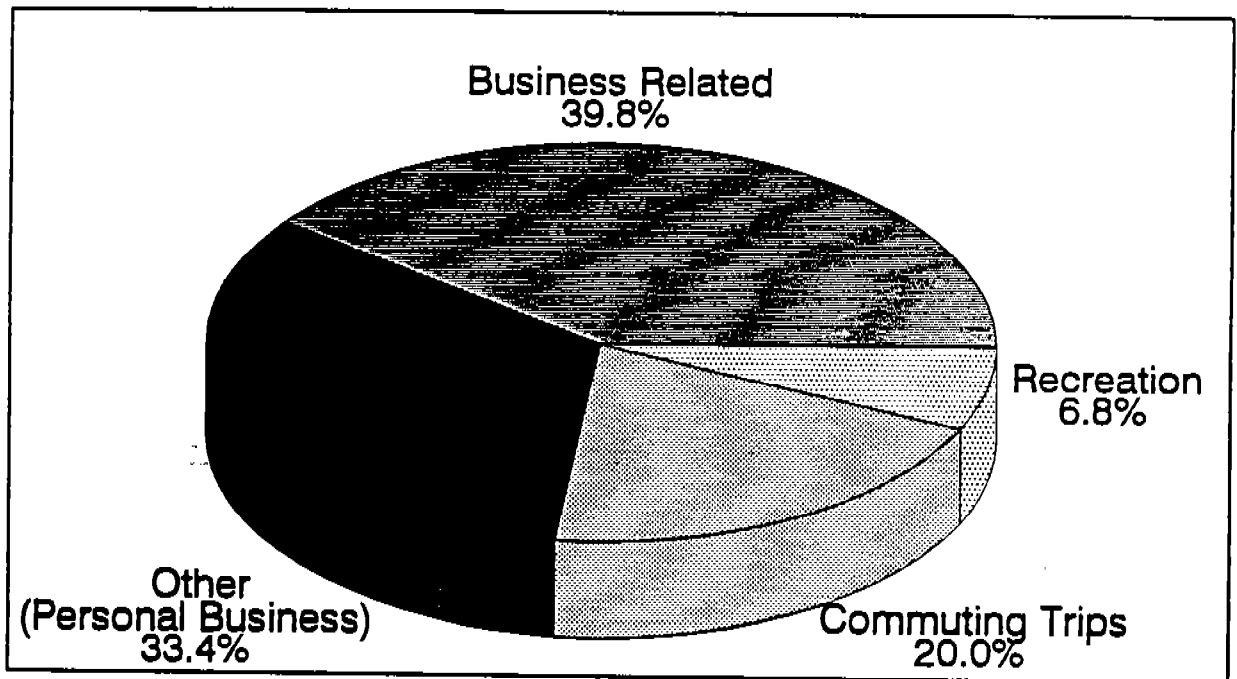
Vehicle occupancy by trip purpose varied significantly, however. Vehicles with occupants traveling for recreational or vacation purposes had an average of 1.99 persons per vehicle, motorists traveling for business had a vehicle occupancy of 1.44, and vehicles traveling to/from work had the least persons per vehicle, with an average of 1.29.



### Exhibit D-5 VEHICLE TYPE DISTRIBUTION



### Exhibit D-6 TRIP PURPOSE DISTRIBUTION



**Traffic Sectors** - Traffic sectors were established for the study corridor. These traffic sectors were defined in order to present the roadside origin and destination survey results. The State of South Dakota is divided into five geographical sectors. The surrounding adjacent states were defined as a sector each, with the rest of the country divided into regions. The traffic sectors are graphically displayed on Exhibit D-7.

**Origin and Destination Patterns** - Some of the most important elements obtained from the roadside surveys are the origin and destination patterns of motorists traveling in the corridor. This information provides data concerning the travel desires of motorists in the corridor and provides an indication of the potential of existing trips that would use the Eastern Dakota Expressway alternatives.

Exhibits D-8 through D-29 display the origin and destination results by survey location for both passenger vehicles and commercial trucks. In summary, the origin and destination patterns in the corridor indicate that the majority of traffic in the area is local traffic, traveling to and from points within eastern and South Dakota. However, the survey revealed that there are many different routes travelers are taking in the area. Therefore, there is potential for the Eastern Dakota Expressway to divert these travelers by providing a better and reliable route.

**License Plate Distribution** - The roadside survey also tabulated the license plate of each vehicle that passed through each survey station. This information will be used to help determine the distribution of local versus non-local traffic in the corridor. Exhibit D-30 depicts the distribution of license plates observed at the eleven survey locations by state or region.

# STUDY SECTORS

## Eastern Dakota Expressway Feasibility Study

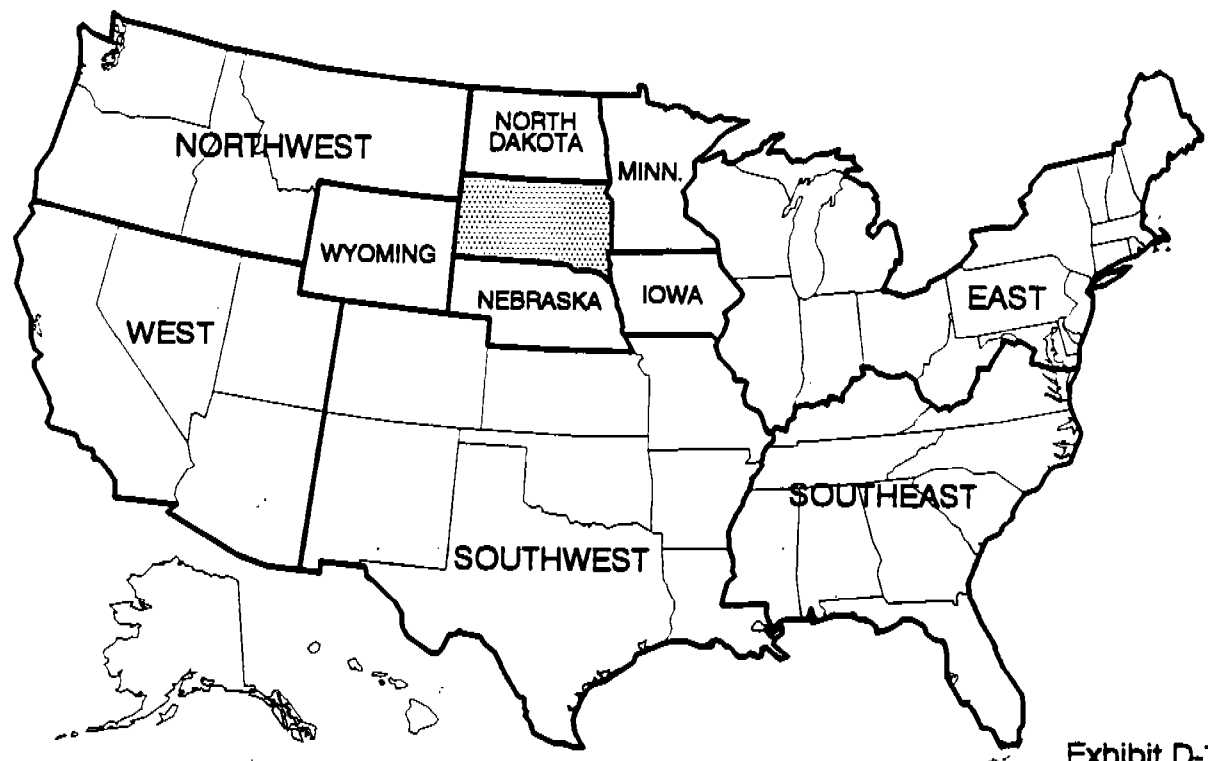
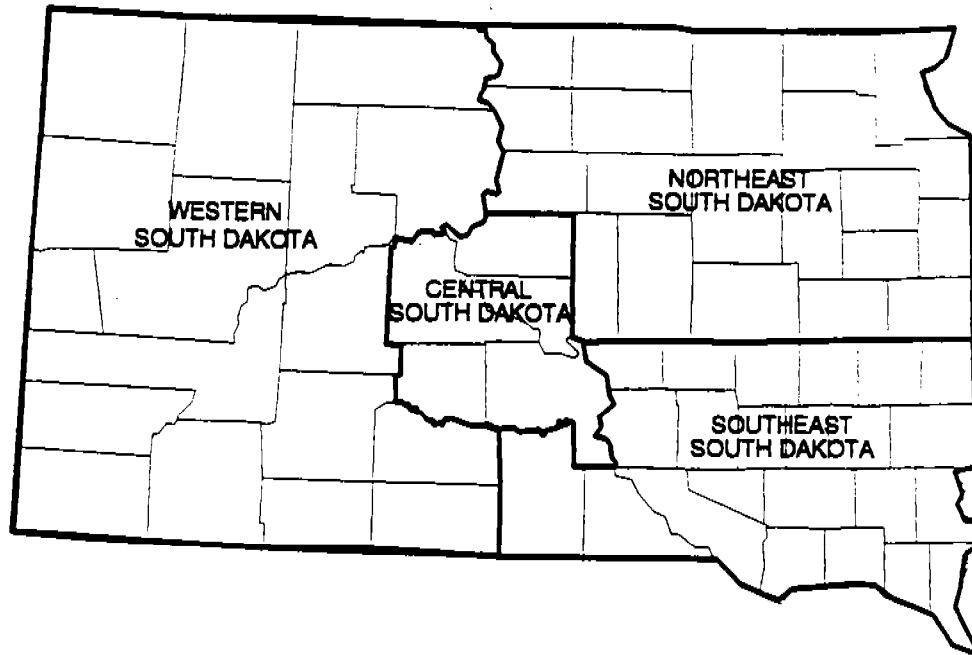


Exhibit D-7

**Exhibit D-8**  
**Origins and Destinations Observed at Survey Station #1 - SD 37/50 Between Avon and Tyndall**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	610				100		
NE S. Dakota	12				6		
Central S. Dakota	6						
West S. Dakota	8						
Nebraska	6						
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.	4						
Southeast U.S.							
Southwest U.S.	4						
Western U.S.							
<b>TOTAL</b>	<b>650</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>106</b>	<b>0</b>	<b>0</b>
<b>PERCENT</b>	<b>81.3%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>13.3%</b>	<b>0.0%</b>	<b>0.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota	20	2		2	8		742	92.8%
NE S. Dakota					4		22	2.8%
Central S. Dakota							6	0.8%
West S. Dakota			4				12	1.5%
Nebraska	4						10	1.3%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							4	0.5%
Southwest U.S.							0	0.0%
Western U.S.							4	0.5%
<b>TOTAL</b>	<b>24</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>12</b>	<b>0</b>	<b>800</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>3.0%</b>	<b>0.3%</b>	<b>0.5%</b>	<b>0.3%</b>	<b>1.5%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	76.3%
Int. - Ext. =	21.5%
Through =	2.3%

**Exhibit D-9**

**Origins and Destinations Observed at Survey Station #1 - SD 37/50 Between Avon and Tyndall Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	56				21		
NE S. Dakota	5						
Central S. Dakota							
West S. Dakota							
Nebraska	5						
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.					2		
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>66</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>0</b>
<b>PERCENT</b>	<b>66.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>23.0%</b>	<b>0.0%</b>	<b>0.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota	8				3		88
NE S. Dakota							5	5.0%
Central S. Dakota							0	0.0%
West S. Dakota							0	0.0%
Nebraska							5	5.0%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							2	2.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>100</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>8.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>3.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	56.0%
Int.-Ext. =	42.0%
Through =	2.0%

**Exhibit D-10**  
**Origins and Destinations Observed at Survey Station #2 – US 81 South of SD 46**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	533	35	5	16		9	2
NE S. Dakota						2	
Central S. Dakota							
West S. Dakota							
Nebraska	46	15	3	5		8	13
Minnesota							
North Dakota							
Iowa	10	3	3				
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.	3	3		2		3	
Western U.S.							
<b>TOTAL</b>	<b>592</b>	<b>56</b>	<b>11</b>	<b>23</b>	<b>0</b>	<b>22</b>	<b>15</b>
<b>PERCENT</b>	<b>80.5%</b>	<b>7.6%</b>	<b>1.5%</b>	<b>3.1%</b>	<b>0.0%</b>	<b>3.0%</b>	<b>2.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota			3				603	82.0%
NE S. Dakota							2	0.3%
Central S. Dakota							0	0.0%
West S. Dakota							0	0.0%
Nebraska			7				97	13.2%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							16	2.2%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.		2	2				15	2.0%
Western U.S.		2					2	0.3%
<b>TOTAL</b>	<b>0</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>735</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.5%</b>	<b>1.6%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	72.5%
Int. - Ext. =	17.6%
Through =	9.9%

**Exhibit D-11**  
**Origins and Destinations Observed at Survey Station #2 - US 81 South of SD 46**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	41	9				1	5
NE S. Dakota							
Central S. Dakota							
West S. Dakota							
Nebraska	25	7				3	1
Minnesota							
North Dakota							
Iowa	18	3					
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.	1						
Western U.S.							
<b>TOTAL</b>	<b>85</b>	<b>19</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>6</b>
<b>PERCENT</b>	<b>73.9%</b>	<b>16.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>3.5%</b>	<b>5.2%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							56	48.7%
NE S. Dakota							0	0.0%
Central S. Dakota							0	0.0%
West S. Dakota							0	0.0%
Nebraska				1			37	32.2%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							21	18.3%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							1	0.9%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>115</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	35.7%
Int. - Ext. =	51.3%
Through =	13.0%

**Exhibit D-12**  
**Origins and Destinations Observed at Survey Station #3 - SD 34/37 East of Forestburg**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	284	3				2	
NE S. Dakota	371				3	7	
Central S. Dakota	30	3				3	
West S. Dakota	4						
Nebraska	9						
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>698</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>12</b>	<b>0</b>
<b>PERCENT</b>	<b>95.0%</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.4%</b>	<b>1.6%</b>	<b>0.0%</b>

ORIGIN	DESTINATION						TOTAL	PERCENT
	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.		
SE S. Dakota							289	39.3%
NE S. Dakota	5	3				5	394	53.6%
Central S. Dakota							36	4.9%
West S. Dakota		3					7	1.0%
Nebraska							9	1.2%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>5</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>735</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.7%</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.7%</b>	<b>0.0%</b>	<b>100%</b>	



**Exhibit D-13**  
**Origins and Destinations Observed at Survey Station #3 - SD 34/37 East of Forestburg**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota	1	99				4	
NE S. Dakota	54			1	2		
Central S. Dakota	1						
West S. Dakota							
Nebraska							
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>56</b>	<b>99</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>0</b>
<b>PERCENT</b>	<b>32.9%</b>	<b>58.2%</b>	<b>0.0%</b>	<b>0.6%</b>	<b>1.2%</b>	<b>2.4%</b>	<b>0.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota			1				105
NE S. Dakota	5	1				1	64	37.6%
Central S. Dakota							1	0.6%
West S. Dakota							0	0.0%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>170</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>2.9%</b>	<b>1.2%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.6%</b>	<b>0.0%</b>	<b>100%</b>	

**Exhibit D-14**  
**Origins and Destinations Observed at Survey Station #4 - US 14 East of Lake Preston**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		35					1
NE S. Dakota	135	449				31	1
Central S. Dakota	4	24				4	
West S. Dakota		7				4	
Nebraska		1					
Minnesota		1					
North Dakota							
Iowa		1					
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>139</b>	<b>518</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>39</b>	<b>2</b>
<b>PERCENT</b>	<b>19.7%</b>	<b>73.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>5.5%</b>	<b>0.3%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							36	5.1%
NE S. Dakota	2	4					622	88.2%
Central S. Dakota		1					33	4.7%
West S. Dakota							11	1.6%
Nebraska							1	0.1%
Minnesota							1	0.1%
North Dakota							0	0.0%
Iowa							1	0.1%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>705</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.3%</b>	<b>0.7%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

Distribution of Trips	
Internal =	63.7%
Int. - Ext. =	34.3%
Through =	2.0%

**Exhibit D-15**  
**Origins and Destinations Observed at Survey Station #4 - US 14 East of Lake Preston**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		6				1	
NE S. Dakota	18	35				31	
Central S. Dakota		3					
West S. Dakota							
Nebraska		1					
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>18</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32</b>	<b>0</b>
<b>PERCENT</b>	<b>18.0%</b>	<b>45.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>32.0%</b>	<b>0.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							7
NE S. Dakota	3	1				1	89	89.0%
Central S. Dakota							3	3.0%
West S. Dakota							0	0.0%
Nebraska							1	1.0%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>100</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>3.0%</b>	<b>1.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	35.0%
Int. - Ext. =	64.0%
Through =	1.0%

**Exhibit D-16**  
**Origins and Destinations Observed at Survey Station #5 – US 81 South of SD 28**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		116	2			5	9
NE S. Dakota		284				2	4
Central S. Dakota		2					2
West S. Dakota		4					
Nebraska		5			2		2
Minnesota							
North Dakota							
Iowa		2					
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>413</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>7</b>	<b>17</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>92.8%</b>	<b>0.4%</b>	<b>0.0%</b>	<b>0.4%</b>	<b>1.6%</b>	<b>3.8%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							132
NE S. Dakota					2		292	65.6%
Central S. Dakota							4	0.9%
West S. Dakota					2		6	1.3%
Nebraska							9	2.0%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							2	0.4%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>445</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>0.0%</b>	<b>100%</b>	

Distribution of Trips	
Internal =	63.8%
Int. - Ext. =	30.8%
Through =	5.4%

**Exhibit D-17**  
**Origins and Destinations Observed at Survey Station #5 - US 81 South of SD 28**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		12					
NE S. Dakota	3	49				12	
Central S. Dakota							
West S. Dakota							
Nebraska		2					
Minnesota		2					
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>3</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>0</b>
<b>PERCENT</b>	<b>3.8%</b>	<b>81.3%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>15.0%</b>	<b>0.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							12
NE S. Dakota							64	80.0%
Central S. Dakota							0	0.0%
West S. Dakota							0	0.0%
Nebraska							2	2.5%
Minnesota							2	2.5%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>80</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	61.3%
Int. - Ext. =	38.8%
Through =	0.0%

**Exhibit D-18**  
**Origins and Destinations Observed at Survey Station #6 - US 281 South of Tulare**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		63					17
NE S. Dakota		260		3			10
Central S. Dakota		4					
West S. Dakota		11			1	1	1
Nebraska		7				3	7
Minnesota		1					
North Dakota							
Iowa		1					1
Eastern U.S.							
Northwest U.S.							1
Southeast U.S.		3					5
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>42</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>87.5%</b>	<b>0.0%</b>	<b>0.8%</b>	<b>0.3%</b>	<b>1.0%</b>	<b>10.5%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							80	20.0%
NE S. Dakota							273	68.3%
Central S. Dakota							4	1.0%
West S. Dakota							14	3.5%
Nebraska							17	4.3%
Minnesota							1	0.3%
North Dakota							0	0.0%
Iowa							2	0.5%
Eastern U.S.							0	0.0%
Northwest U.S.							1	0.3%
Southeast U.S.							8	2.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

Distribution of Trips	
Internal =	65.0%
Int. - Ext. =	25.8%
Through =	9.2%

**Exhibit D-19**  
**Origins and Destinations Observed at Survey Station #6 - US 281 South of Tulare**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		26					6
NE S. Dakota	3	56				2	2
Central S. Dakota							
West S. Dakota		2					
Nebraska		6					6
Minnesota							
North Dakota							
Iowa		6					
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.		5					
Western U.S.							
<b>TOTAL</b>	<b>3</b>	<b>101</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>14</b>
<b>PERCENT</b>	<b>2.5%</b>	<b>84.2%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.7%</b>	<b>0.0%</b>	<b>11.7%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							32	26.7%
NE S. Dakota							63	52.5%
Central S. Dakota							0	0.0%
West S. Dakota							2	1.7%
Nebraska							12	10.0%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							6	5.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							5	4.2%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>120</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	46.7%
Int. - Ext. =	43.3%
Through =	10.0%

**Exhibit D-20**  
**Origins and Destinations Observed at Survey Station #7 -- US 212 East of Doland**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		7				3	2
NE S. Dakota	42	320			3	30	10
Central S. Dakota		34				7	4
West S. Dakota		24				7	
Nebraska							
Minnesota							
North Dakota	2	2					
Iowa							
Eastern U.S.							
Northwest U.S.						3	2
Southeast U.S.							
Southwest U.S.							
Western U.S.		1					
<b>TOTAL</b>	<b>44</b>	<b>388</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>50</b>	<b>18</b>
<b>PERCENT</b>	<b>8.6%</b>	<b>76.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.6%</b>	<b>9.8%</b>	<b>3.5%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							12	2.4%
NE S. Dakota	3	3					411	80.6%
Central S. Dakota							45	8.8%
West S. Dakota							31	6.1%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota		1					5	1.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							5	1.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							1	0.2%
<b>TOTAL</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>510</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.6%</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

Distribution of Trips	
Internal =	62.7%
Int. - Ext. =	31.2%
Through =	6.1%



**Exhibit D-21**  
**Origins and Destinations Observed at Survey Station #7 - US 212 East of Doland**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		2					
NE S. Dakota	6	83			3	8	2
Central S. Dakota		3					
West S. Dakota		2					
Nebraska							
Minnesota							
North Dakota	2					2	
Iowa							
Eastern U.S.							
Northwest U.S.		2				2	
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>8</b>	<b>92</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>12</b>	<b>2</b>
<b>PERCENT</b>	<b>6.2%</b>	<b>70.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.3%</b>	<b>9.2%</b>	<b>1.5%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							2
NE S. Dakota	6	3				2	113	86.9%
Central S. Dakota							3	2.3%
West S. Dakota							2	1.5%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota	2						6	4.6%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							4	3.1%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>130</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>6.2%</b>	<b>2.3%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.5%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	63.8%
Int. - Ext. =	30.0%
Through =	6.2%

**Exhibit D-22**  
**Origins and Destinations Observed at Survey Station #8 – US 12 West of Andover**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota							
NE S. Dakota	134	660			10	118	38
Central S. Dakota		2				2	
West S. Dakota	2	5				5	
Nebraska							
Minnesota							
North Dakota	6	18			3	7	
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.						3	
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>142</b>	<b>685</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>135</b>	<b>38</b>
<b>PERCENT</b>	<b>13.5%</b>	<b>65.2%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.2%</b>	<b>12.9%</b>	<b>3.6%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							0
NE S. Dakota	14	11				3	988	94.1%
Central S. Dakota							4	0.4%
West S. Dakota						2	14	1.3%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota	5					2	41	3.9%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							3	0.3%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>19</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>1050</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>1.8%</b>	<b>1.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.7%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	62.9%
Int. - Ext. =	33.6%
Through =	3.5%

**Exhibit D-23**  
**Origins and Destinations Observed at Survey Station #8 – US 12 West of Andover**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota							
NE S. Dakota	14	89			6	41	7
Central S. Dakota							
West S. Dakota		1				3	
Nebraska							
Minnesota							
North Dakota	3	6			1	1	
Iowa							
Eastern U.S.							
Northwest U.S.		1				3	
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>17</b>	<b>97</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>48</b>	<b>7</b>
<b>PERCENT</b>	<b>8.5%</b>	<b>48.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>3.5%</b>	<b>24.0%</b>	<b>3.5%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							0	0.0%
NE S. Dakota	5	10		3	3		178	89.0%
Central S. Dakota							0	0.0%
West S. Dakota	1	1					6	3.0%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota				1			12	6.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							4	2.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>6</b>	<b>11</b>	<b>0</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>200</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>3.0%</b>	<b>5.5%</b>	<b>0.0%</b>	<b>2.0%</b>	<b>1.5%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	44.5%
Int. - Ext. =	48.5%
Through =	7.0%

**Exhibit D-24**  
**Origins and Destinations Observed at Survey Station #9 – SD 10 Brown/Marshall Co. Line**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota							
NE S. Dakota		235				13	44
Central S. Dakota							
West S. Dakota		3				2	
Nebraska							
Minnesota							
North Dakota	3	10					3
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.		3					2
<b>TOTAL</b>	<b>3</b>	<b>251</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>49</b>
<b>PERCENT</b>	<b>0.9%</b>	<b>78.4%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>4.7%</b>	<b>15.3%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL PERCENT	
	SE S. Dakota							0
NE S. Dakota		2					294	91.9%
Central S. Dakota							0	0.0%
West S. Dakota							5	1.6%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota							16	5.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							5	1.6%
<b>TOTAL</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>320</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.6%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	73.4%
Int.-Ext =	23.4%
Through =	3.1%

**Exhibit D-25**  
**Origins and Destinations Observed at Survey Station #9 – SD 10 Brown/Marshall Co. Line**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota							
NE S. Dakota		30				4	10
Central S. Dakota							2
West S. Dakota							
Nebraska							
Minnesota							
North Dakota		4					
Iowa							
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>34</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>12</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>68.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>8.0%</b>	<b>24.0%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							0
NE S. Dakota							44	88.0%
Central S. Dakota							2	4.0%
West S. Dakota							0	0.0%
Nebraska							0	0.0%
Minnesota							0	0.0%
North Dakota							4	8.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	60.0%
Int - Ext =	36.0%
Through =	4.0%

**Exhibit D-26**  
**Origins and Destinations Observed at Survey Station #10 - SD 45 South of SD 26**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		16					
NE S. Dakota		199		4		4	4
Central S. Dakota		73				16	4
West S. Dakota		22				6	
Nebraska		4					2
Minnesota							
North Dakota							
Iowa							
Eastern U.S.							
Northwest U.S.		2					
Southeast U.S.							
Southwest U.S.		2				2	
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>318</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>28</b>	<b>10</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>88.3%</b>	<b>0.0%</b>	<b>1.1%</b>	<b>0.0%</b>	<b>7.8%</b>	<b>2.8%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							16	4.4%
NE S. Dakota							211	58.6%
Central S. Dakota							93	25.8%
West S. Dakota							28	7.8%
Nebraska							6	1.7%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							0	0.0%
Eastern U.S.							0	0.0%
Northwest U.S.							2	0.6%
Southeast U.S.							0	0.0%
Southwest U.S.							4	1.1%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>360</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	55.3%
Int. - Ext. =	36.4%
Through =	8.3%

**Exhibit D-27**

**Origins and Destinations Observed at Survey Station #10 - SD 45 South of SD 26  
Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		8		1			
NE S. Dakota		28				1	3
Central S. Dakota		3				3	2
West S. Dakota		2					1
Nebraska		2					
Minnesota							
North Dakota							
Iowa		1					
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.							
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>44</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>6</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>80.0%</b>	<b>0.0%</b>	<b>1.8%</b>	<b>0.0%</b>	<b>7.3%</b>	<b>10.9%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
SE S. Dakota							9	16.4%
NE S. Dakota							32	58.2%
Central S. Dakota							8	14.5%
West S. Dakota							3	5.5%
Nebraska							2	3.6%
Minnesota							0	0.0%
North Dakota							0	0.0%
Iowa							1	1.8%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							0	0.0%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	50.9%
Int. - Ext. =	36.4%
Through =	12.7%

**Exhibit D-28**  
**Origins and Destinations Observed at Survey Station #11 – US 83 Lyman/Stanley Co. Line**  
**Passenger Vehicles Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		1	259	3			9
NE S. Dakota			6				
Central S. Dakota	1	7	261	1			3
West S. Dakota	1	37	120			4	9
Nebraska		7	17			1	11
Minnesota			2				
North Dakota							
Iowa	4	1	3	1			
Eastern U.S.							
Northwest U.S.		1				1	
Southeast U.S.							
Southwest U.S.		4	4				1
Western U.S.							
<b>TOTAL</b>	<b>6</b>	<b>58</b>	<b>672</b>	<b>5</b>	<b>0</b>	<b>6</b>	<b>33</b>
<b>PERCENT</b>	<b>0.8%</b>	<b>7.4%</b>	<b>66.2%</b>	<b>0.6%</b>	<b>0.0%</b>	<b>0.8%</b>	<b>4.2%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							272
NE S. Dakota							6	0.8%
Central S. Dakota							273	35.0%
West S. Dakota							171	21.9%
Nebraska							36	4.6%
Minnesota							2	0.3%
North Dakota							0	0.0%
Iowa							9	1.2%
Eastern U.S.							0	0.0%
Northwest U.S.							2	0.3%
Southeast U.S.							0	0.0%
Southwest U.S.							9	1.2%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>780</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	33.5%
Int. - Ext. =	54.2%
Through =	12.3%



**Exhibit D-29**  
**Origins and Destinations Observed at Survey Station #11 - US 83 Lyman/Stanley Co. Line**  
**Commercial Trucks Only**

ORIGIN	DESTINATION						
	SE S.D.	NE S.D.	Central S.D.	West S.D.	Nebraska	Minnesota	North Dakota
SE S. Dakota		5	26	8			
NE S. Dakota							
Central S. Dakota			40				5
West S. Dakota			13				
Nebraska			2				9
Minnesota		6	2				
North Dakota							
Iowa							2
Eastern U.S.							
Northwest U.S.							
Southeast U.S.							
Southwest U.S.			2				
Western U.S.							
<b>TOTAL</b>	<b>0</b>	<b>11</b>	<b>85</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>16</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>9.2%</b>	<b>70.8%</b>	<b>6.7%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>13.3%</b>

	Iowa	East U.S.	NW U.S.	SE U.S.	SW U.S.	West U.S.	TOTAL	PERCENT
	SE S. Dakota							39
NE S. Dakota							0	0.0%
Central S. Dakota							45	37.5%
West S. Dakota							13	10.8%
Nebraska							11	9.2%
Minnesota							8	6.7%
North Dakota							0	0.0%
Iowa							2	1.7%
Eastern U.S.							0	0.0%
Northwest U.S.							0	0.0%
Southeast U.S.							0	0.0%
Southwest U.S.							2	1.7%
Western U.S.							0	0.0%
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>120</b>	<b>100.0%</b>
<b>PERCENT</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100%</b>	

**Distribution of Trips**

Internal =	33.3%
Int. - Ext. =	41.7%
Through =	25.0%

**Exhibit D-30**  
**LICENSE PLATE DISTRIBUTION**  
**Roadside Survey**

<u>STATION REGION</u>	<u>PERCENT</u>
South Dakota	86.1%
Minnesota	3.6
Nebraska	2.4
North Dakota	2.4
Iowa	1.1
Southwest U.S.	0.9
Western U.S.	0.9
Eastern U.S.	0.7
Canada	0.7
Others	0.6
Northwestern U.S.	0.4
Southwestern U.S.	<u>0.2</u>
	100.0%

## Interstate Highway Surveys

In addition to the roadside surveys, rest area and license plate surveys were conducted at four locations on Interstate 29 and Interstate 90. Three surveys were conducted on Interstate 29; 1) the rest area near Sisseton, 2) the rest area near Brookings, and 3) the rest area near Vermillion. The Interstate 90 survey was conducted at the rest area near Mitchell. License plate counts were also conducted of passing vehicles on the interstates to factor the rest area surveys to the total number trips traveling on the interstates. These interstate surveys were conducted to help determine the number of long distance trips, currently using the interstate system, that could conceivably divert to the Eastern Dakota Expressway alternatives.

**Trip Purpose** - The interstate survey requested from the motorists the primary purpose for making the trip. The survey revealed a slight different trip purpose distribution compared to the roadside survey results. Other or personal business trips accounted for the largest trip purpose (36.5 percent) followed closely by business related trips (30.0 percent) and vacation/recreation trips (28.6 percent). Only 4.9 percent of the motorists stated they were commuting to or from work.

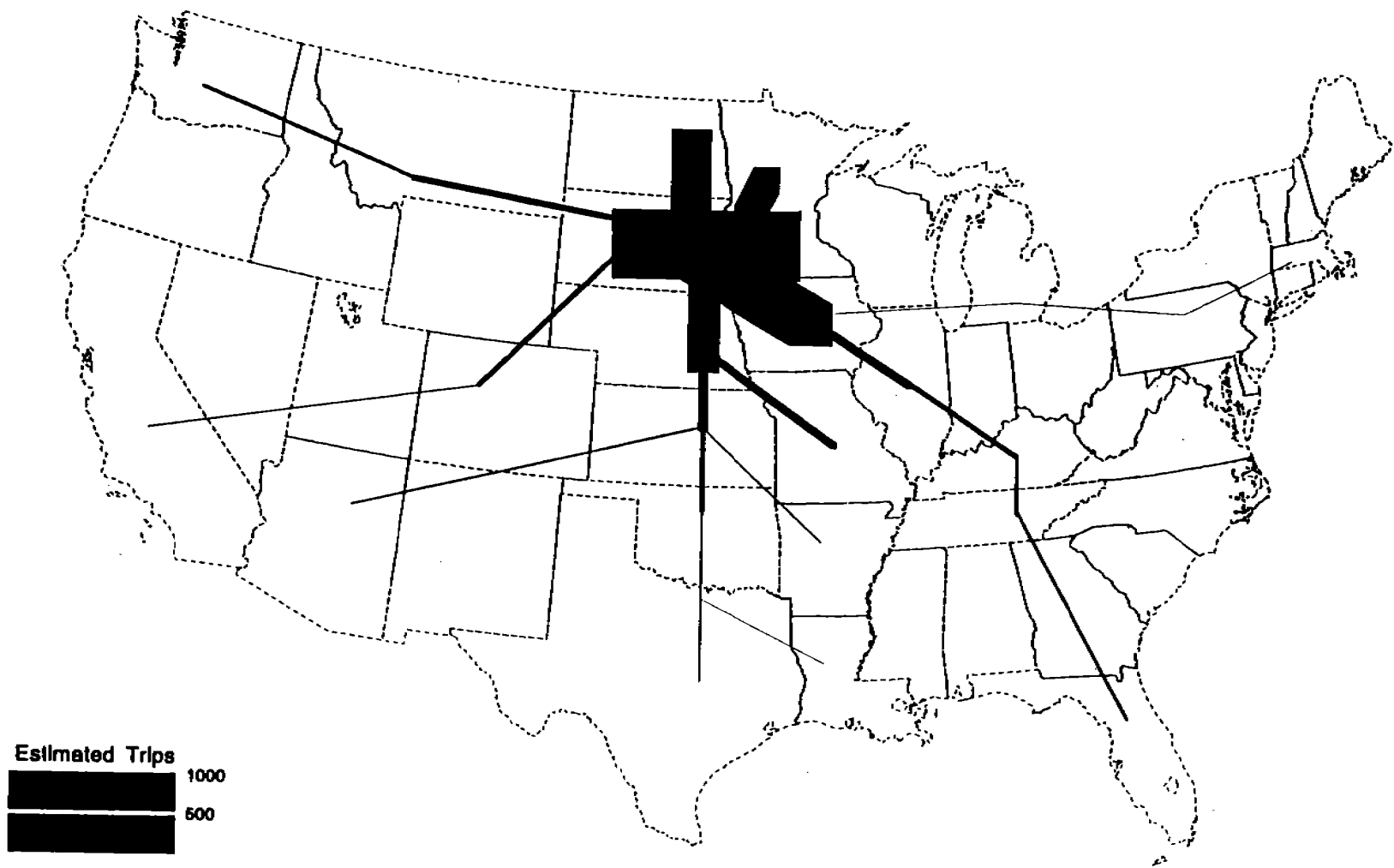
**Vehicle Occupancy** - The interstate survey also recorded the number of occupants in each vehicle. From the survey, the average number of persons per passenger vehicle traveling on the interstates is 1.91. The majority of vehicles in the corridor had either one or two occupants in the vehicle. One occupant vehicles accounted for 41.4 percent, while two occupant vehicles made up 41.2 percent. Vehicles with three or more occupants accounted for only 17.4 percent of the total vehicles on the interstates.

**Origin and Destination Pattern** - The interstate survey asked motorists questions concerning their trip origin and destination. The answers to these questions assisted in formulating the traffic model for the study. Not surprisingly, the trip lengths on Interstate 29 and Interstate 90 are much longer than the trip lengths found in the roadside survey. Exhibits D-31 and D-32 graphically display the trip origins and destinations by state for the two interstates.

Exhibit D-31

INTERSTATE 29 AUTOMOBILE TRAFFIC DESIRES MAP

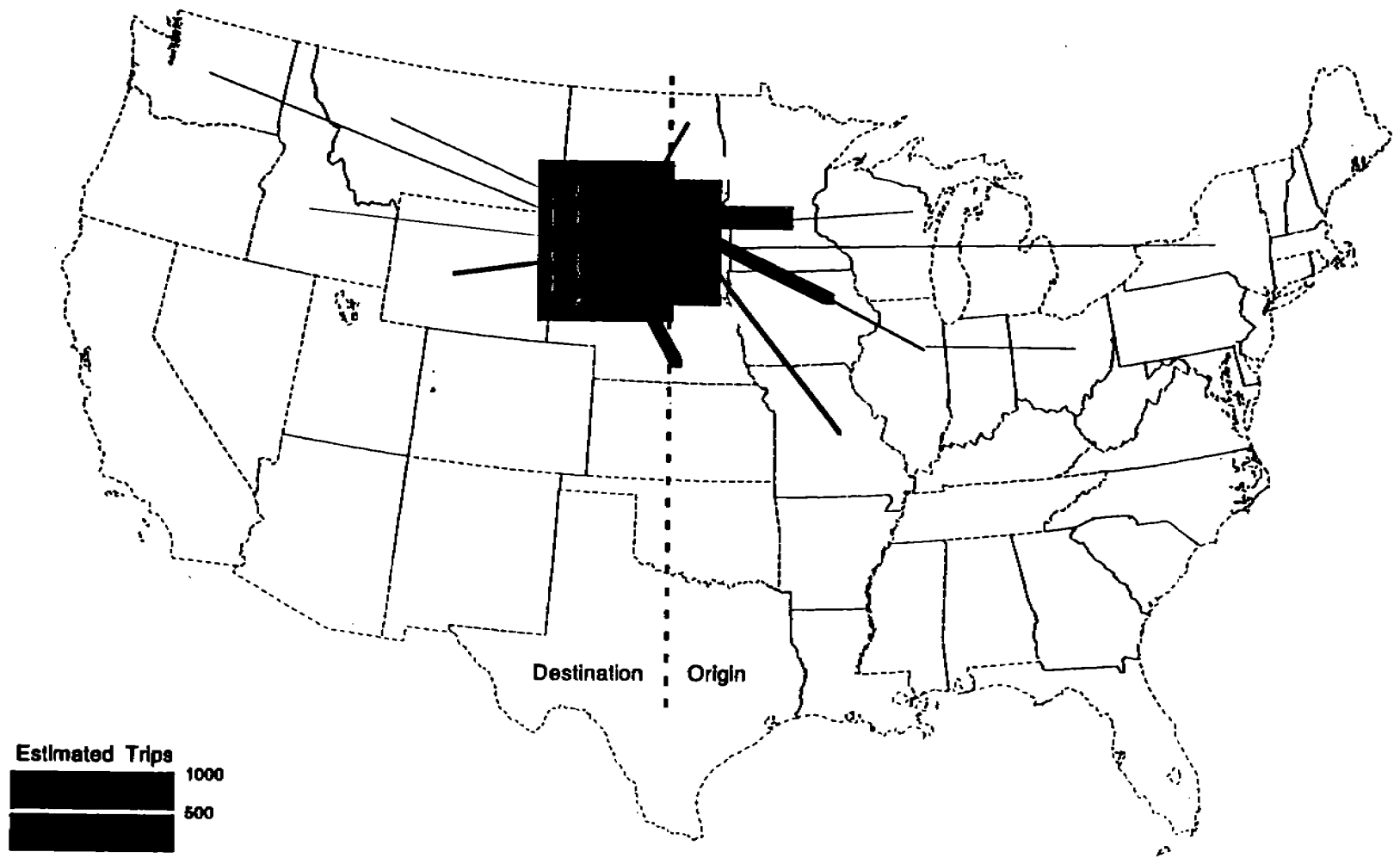
Destination and Origin of Auto Traffic



D-34

Source: Eastern Dakota Expressway Interstate Survey, 1993

Exhibit D-32  
INTERSTATE 90 AUTOMOBILE TRAFFIC DESIRES MAP  
Destination and Origin of Auto Traffic



Source: Eastern Dakota Expressway Interstate Survey, 1993

**License Plate Distribution** - Exhibit D-33 displays the percentage distribution of license plates found traveling on both Interstate 29 and Interstate 90. The distribution indicates that a large number of out-of-state vehicles and individuals are traveling to South Dakota or traveling through the State onto their final destination. These out-of-state travelers spend dollars on lodging, restaurants, and other retail items within the State. If some of these motorists could divert to the Eastern Dakota Expressway, it would bring increased roadside expenditure revenue into the towns and communities along the Expressway.

**Exhibit D-33  
LICENSE PLATE DISTRIBUTION  
Interstate Survey**

<u>STATE OR REGION</u>	<u>INTERSTATE 29</u>	<u>INTERSTATE 90</u>
South Dakota	32.1%	86.0%
Minnesota	15.5	3.6
North Dakota	11.6	2.4
Nebraska	8.5	2.4
Iowa	13.7	1.1
Northwest U.S.	4.3	0.4
Western U.S.	1.3	0.9
Eastern U.S.	4.1	0.7
Southwestern U.S.	4.7	0.9
Southeastern U.S.	0.9	0.2
Canada	3.3	0.7
Others	0.0	0.7
	100.0%	100.0%

### Motor Carrier and Shipper/Receiver Surveys

In the interest of determining the economic impact the envisaged Eastern Dakota Expressway would have on local trucking firms and users of trucking firms, a mail back survey was sent to all motor carrier and shipper/receiver firms in the area. A series of questions were asked to determine the nature of their current trucking trips, the restrictions inherent in the existing highway network, and the potential benefits associated with an expanded highway system. Follow-up interviews were conducted for firms that could potentially benefit economically. The motor carrier and shipper/receiver survey forms are depicted in Exhibits D-34 and D-35.

A total of 95 motor carrier firms were isolated as potential users of the relevant highways and were sent surveys. All potential carriers were contacted regardless of carrier type, total annual trips made, or number of employees. Thirty-six firms responded (See Exhibit D-36). Of the 36 respondents, twelve indicated that highway improvements could potentially benefit their business and were contacted either in person or by telephone for follow-up interviews.

Surveys were also sent to 221 shipper/receiver firms in the eastern South Dakota area. Again, all potential shipper/receivers were contacted regardless of company size. Forty-seven firms (21 percent) completed the survey. The overall response rate was 36 percent, similar to the results of the motor carrier survey. Of the 47 firms responding, 21 believed the improvements would potentially effect their firm and were contacted for follow-up interviews.

**EASTERN DAKOTA EXPRESSWAY MOTOR CARRIER SURVEY**  
**Corridor Study Between Aberdeen and Yankton - 1993**

**YOUR FIRM'S EXISTING TRUCK OPERATIONS**

1. Your firm has been identified as one which trucks cargo/commodities. If some of those trucks operate on highways between Aberdeen and Yankton (See Attached Map) check here \_\_\_\_\_ and complete this survey. If your trucks (your own or for-hire motor carriers) do not use any portion of the corridor, merely finish question #1 and return this survey without answering the remaining questions.

Firm Name: \_\_\_\_\_  
 Your Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

2. Which of the following describe your firm's operations and cargoes in the corridor? (Check all that apply)

General Operations	_____ Truckload (TL)
	_____ Less-Than-Truckload (LTL)
	_____ Both TL and LTL
Specialized Cargo	_____ No Specialization
	_____ Heavy machinery
	_____ Liquid petroleum
	_____ Refrigerated products
	_____ Agricultural products
	_____ Motor Vehicles
	_____ Building materials
	_____ Household goods
	_____ Hazardous materials
	_____ Other _____

3. If your trucking firm has terminals in the corridor, where are they located, and about how many truck trips per year carry freight to or from these sites.

	<i>Truck Terminal or Site Location (town or nearest town)</i>	<i>No. of Annual Trip</i>
Site #1:	_____	_____
Site #2:	_____	_____
Site #3:	_____	_____
Site #4:	_____	_____
Site #5:	_____	_____

4. Of all the annual trucks entering/leaving the above sites, approximately what percent use:

\_\_\_\_\_ % use a portion of the corridor (Between Aberdeen and Yankton)  
 \_\_\_\_\_ % use the entire corridor distance (Between Aberdeen and Yankton)  
 \_\_\_\_\_ % do not use the corridor at all  
 100 % total trucks to/from the sites

5. What is the primary geographical coverage of the majority of your firm's trucking operations.

a. Local (in or around your community)                      c. Regional (Rest of SD and Neighboring States)  
 b. Corridor area (Eastern South Dakota)                      d. National, Outside Adjacent States

6. Which principal highways are used (please check):

\_\_\_12    \_\_\_281    \_\_\_34    \_\_\_37    \_\_\_81    \_\_\_50    \_\_\_Other



7. Please indicate any trucking problems and the degree to which they affect the following: (0 - no impact, 10 - worst impact)

Problem	(0-10)	Any Comments?
Speed (time in transit)	_____	_____
Reliability (variation in time of delivery)	_____	_____
Loss and Damage to Goods	_____	_____
Cost of operating your trucks	_____	_____
Other (specify)	_____	_____

8. Overall, how would you rate the existing corridor as a trucking route:

- a. excellent
- b. good
- c. average
- d. poor or unsatisfactory

**POSSIBLE IMPROVEMENTS TO THE CORRIDOR**

9. The state could build a new expressway by the most direct route, or improve existing highways and build new necessary segments, or route the expressway near large communities within the region. Recognizing that these are your tax dollars at work and money spent in one place cannot be used in another place, what (from your business use standpoint) do you think the state should do? Please explain why:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Would such an improvement help your firm? In what ways?

\_\_\_\_\_

\_\_\_\_\_

11. If a 4-lane expressway were built, what would your firm do that it is not currently doing?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**OTHER**

12. Do you have any other comments that would help the South Dakota Department of Transportation determine the best course of action for the corridor?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you for completing this survey. Your answers will remain confidential (not disclosed as attributable to your firm. All responses will be aggregated with results from other firms). If you have questions please call:

- Mr. Robert Zuelsdorf - Wilbur Smith Associates (803) 251-2029
- Mr. James Jenssen - South Dakota Department of Transportation (605) 773-3174

Please return this questionnaire in the enclosed prepaid envelope to:

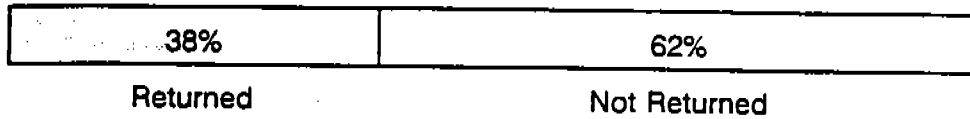
Mr. Stephen Wells  
 Wilbur Smith Associates  
 P.O. Box 92  
 Columbia, SC 29202



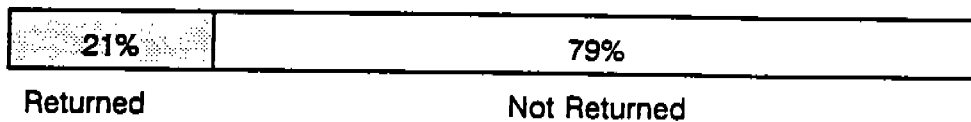


**Exhibit D-36  
SURVEY RESPONSE RATE**

**Motor Carriers**



**Shipper/Receivers**



The motor carrier and shipper/receiver firms surveyed were located throughout the study area (see Exhibit D-37). The major cities of Aberdeen, Yankton, Huron, and Mitchell were the most highly represented. The remaining firms were scattered across the survey area, with a slightly higher percent located in the more densely populated southern region.

<b>Exhibit D-37 LOCATION OF SURVEY RESPONDENTS</b>		
<u>Cities</u>	<u>Motor Carriers Responding</u>	<u>Shipper/Receivers Responding</u>
Yankton	3	10
Aberdeen	8	3
Mitchell	1	5
Huron	2	5
Others	22	24

The initial step in analyzing the survey results was to determine the general operations of the trucking firms, including cargo transported, frequency of trips, and origins and destinations. This information would then be used in conjunction with personal interviews and the firm's rating of the highway network to determine the possible economic impacts the proposed highway improvements would have on the region's trucking industry.

**Nature of Truck Travel** - Exhibit D-38 summarizes the type of trucking operations and the main cargo transported by the survey respondents. These statistics, like those in the remainder of this section, only reflect the nature of the firms responding and should not be extrapolated to include all trucking and shipping/receiver firms in the area.

<b>Exhibit D-38 CARGO TRANSPORTED</b>	
<b><u>Cargo</u></b>	<b><u>Motor Carrier Firms Responding*</u></b>
Agricultural Products	15
Liquid Petroleum	6
Refrigerated Products	3
Heavy Machinery	2
No Specialization	6

\*Note: Not add to thirty-six because some firms transport more than one cargo.

Source: Wilbur Smith Associates Motor Carrier Survey

Exhibit D-39 indicates that the majority of the motor carrier firms operate truckload trips. Only three firms utilize exclusively less-than-truckload trips. All three firms are parcel delivery services, similar to UPS but on a smaller scale.

**Exhibit D-39  
GENERAL TRUCKING OPERATIONS OF SURVEY  
RESPONDENTS**

<b>Operation</b>	<b>Motor Carrier Firms Responding</b>
Truckload (TL)	19
Less-Than-Truckload (LTL)	3
Both TL and LTL	14

Source: Wilbur Smith Associates Motor Carrier and  
Shipper/Receiver Surveys

As could probably be expected, the majority of the trucking firms transport agricultural products, including livestock and grain. Agricultural transportation is further discussed later in this section. Liquid petroleum and related products was the second most frequently cited cargo transported.

Exhibit D-40 shows that the majority of the trucking firms use some portion of the corridor highways. Sixty-six percent of all trucks entering and leaving the area use the study highways. There does not seem to be any statistical significance difference between motor carriers and shipper/receivers. However, shipper/receivers seem to have slightly more trucks that use the highways. The surveys support the notion that the highways isolated are the major trucking routes in the area.

During personal interviews, safety was discussed as a major factor in choosing routes for trucks. For example, one firm indicated they use highway 37 instead of highway 81 to travel between Mitchell and Yankton, because of heavy travel and safety concerns on highway 81, even though the interstate portion allows for faster travel time. Another firm in Webster indicated they would travel out of their way to travel on Interstate 29 and 90 to Mitchell, instead of traveling the shorter, but more dangerous, two-lane alternative.

**Exhibit D-40  
TRUCK USE OF CORRIDOR HIGHWAYS  
BY SURVEY RESPONDENTS**

	<b>Motor Carriers</b>		<b>Shipper/Receiver</b>		<b>Both</b>	
	<b><u>Trucks</u></b>	<b><u>Percent</u></b>	<b><u>Trucks</u></b>	<b><u>Percent</u></b>	<b><u>Trucks</u></b>	<b><u>Percent</u></b>
Use Highways	28,500	61%	34,600	72%	63,100	66%
Not Use Highways	<u>18,600</u>	<u>39%</u>	<u>13,700</u>	<u>28%</u>	<u>32,300</u>	<u>34%</u>
<b>Totals</b>	<b>47,100</b>	<b>100%</b>	<b>48,300</b>	<b>100%</b>	<b>95,400</b>	<b>100%</b>

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

**Origin and Destination of Truck Traffic** - The destinations of motor carriers and the origins and destinations of shipper/receivers seem to be fairly evenly split over all geographic regions, except for localized trips (See Exhibit D-41). Motor carriers tend to ship products on a regional basis, including western South Dakota and the adjacent states. Major movements include trips to Minneapolis, Sioux City, Fargo, and Rapid City. The second largest movement is within the study corridor, particularly to and from Sioux Falls. Localized and national trips do not occur as frequently.

Shipper/receivers tend to ship products fairly evenly between corridor, regional, and nation origins and destinations. Again, local trips are only a small portion of the total trips. It is interesting to note that while a higher percentage of trips come from adjacent states, the dispersal of goods is virtually the same between the corridor area, adjacent states, and the rest of the nation. It is also interesting that virtually twice as many shipper/receiver truck trips, as a percentage, transport to a national origin or destination compared to motor carrier truck trips. Likewise, considerably more motor carriers, as a percentage, transport to adjacent states compared to shipper/receivers.

**Exhibit D-41  
PRIMARY GEOGRAPHIC ORIGINS AND DESTINATIONS**

<u>Geographic Region</u>	<u>Motor Carriers</u>	<u>Shipper/Receivers</u>	
		<u>Inbound</u>	<u>Outbound</u>
Local Area	17%	17%	17%
Corridor Area	33%	26%	32%
Regional (Adjacent States)	56%	34%	30%
National	14%	28%	30%

Note: Values not sum to 100% because several firms marked more than one geographic region.

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

**Perceived Deficiencies** - The respondents were asked to analyze the existing route as a transportation corridor. Factors such as speed, reliability, loss and damage of goods, and operating costs were rated on a 10 point scale, with 10 indicating a severe problem. They were then asked to rate the overall corridor. Exhibits D-42 and D-43 summarize the results.

Operating costs were found to be the greatest problem with the existing roads. Specifically, the wear and tear on vehicles associated with start and stop travel on two-lane roads. All of the remaining variables were below five. Loss and damage of goods was not considered to be a problem.

Overall, the highway network was rated as average by 60 to 70 percent of the respondents and poor or unsatisfactory by another 10 to 15 percent. The perceived deficiencies were approximately the same for both motor carriers and shipper/receivers.



**Exhibit D-42**

**EXISTING HIGHWAYS IMPACT ON TRUCKING**

<b><u>PROBLEM</u></b>	<b>AVERAGE DEGREE OF SEVERITY</b>		
	<b><u>Motor Carriers</u></b>	<b><u>Shipper/Receiver</u></b>	<b><u>Both</u></b>
Speed (Time in Transit)	4.8	4.9	4.86
Reliability (Time of Delivery)	3.0	3.7	3.40
Loss and Damage	1.7	1.9	1.81
Operating Costs	6.0	4.7	5.26

Note: "0" is No Problem and "10" is Most Severe Problem

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

**Exhibit D-43**

**OVERALL RATING OF HIGHWAY CORRIDOR**

	<b>Motor Carrier</b>	<b>Shipper/Receiver</b>
Excellent	2.8%	4.4%
Good	19.4%	8.9%
Average	63.9%	71.1%
Poor or Unsatisfactory	13.9%	15.6%

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

**Impact on Competitiveness and Productivity** - The respondents were asked in what way the proposed improvements would help their firm and what changes in operations would likely result. Exhibit D-44 shows the perceived benefits and Exhibit D-45 shows the likely business alterations that would result from those benefits.

**Exhibit D-44**

**PERCEIVED BENEFITS OF HIGHWAY IMPROVEMENTS**

<u>Benefits</u>	<u>Motor Carriers</u>	<u>Shipper/Receivers</u>
Safety	12	4
Time	16	18
Wear and Tear	6	6
Operating Costs	1	1
None	10	15

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

**Exhibit D-45**

**EXPECTED CHANGES IN BUSINESS ACTIVITY  
WITH HIGHWAY MODIFICATIONS**

<u>Potential Change</u>	<u>Motor Carriers</u>	<u>Shipper/Receivers</u>
Change Highway Used	8	8
Increase Coverage Area	3	8
Improve Service Quality	1	-
Increase Truck Capacities	1	1
Nothing	16	26

Source: Wilbur Smith Associates Motor Carrier and Shipper/Receiver Surveys

The clear majority of both motor carriers and shipper/receivers indicated that the changes would have negligible impact on their firm. Several firms indicated time savings, improved safety, and reduced wear and tear on equipment would be the most likely direct effects. But only three motor carriers and eight shipper/receivers indicated they might potentially expand their market area as a result. Therefore, the majority of the benefits would come from travel time

savings in gas and labor, reduced cost for maintenance and operations, and improved safety conditions.

There were two firms concerned that the proposal would create a net negative advantage to their firm. One firm believed that additional taxes, mainly user taxes, would increase to help finance the improvements. The other firm was concerned that secondary roads would not receive the maintenance attention necessary.

**Transportation in Agricultural Products** - Forty-two percent of the motor carrier firms transport agricultural products, such as grain and livestock to market and processed food from market. Access from the rural farmland to the larger urban areas, especially Sioux Falls and Sioux City, is a vital concern.

Two-thirds of the firms that ship agricultural products transport their products to neighboring states. Fargo, Minneapolis, and Sioux City are the three main destinations. The remainder ship to locations within the study area, especially Sioux Falls, Aberdeen, Mitchell, and Yankton. No firms indicated they shipped products either locally or outside the adjacent states.

The agricultural trucking firms indicated that access to the area between the Missouri River in central South Dakota and I-29 is often tedious, time consuming, and unsafe. A better road would enable them to expand their market area. Both highway 12 between Aberdeen and I-29, and highway 281 south to Mitchell were isolated as two roads important to business productivity.

The highways used to transport agricultural products are fairly evenly divided. Each highway is used by approximately two-thirds of the firms surveyed, with the exception of highway 81 between Salem and Yankton. Every agricultural firm, with one exception in Aberdeen, uses highway 81. The majority of these firms are heading south to Sioux City.

**Role for Triple Trailers** - As an independent component of the trucking surveys, firms were asked if they use triple trailers or "triple pups" and if not, why? Twelve motor carriers and 21 shipper/receivers were questioned. Only two of the motor carriers and zero shipper/receivers utilize triple pups for transporting goods.

Several reasons were isolated to explain why triple pups were not used more extensively. The reasons include lack of adequate capacity to justify the expense and the added safety hazards, especially on the two-lane roads. The safety concern was centered mainly around the additional time to pass and stop.

**Conclusions** - The motor carrier and shipper/receiver survey suggest the following regarding the existing highway system and the envisioned Eastern Dakota Expressway:

- Safety is a vital concern for the transportation firms in the area. Decreased ability to pass and an increased presence of slow moving farm machinery creates an unsafe transportation environment on the existing two-lane roads.
- Overall, the current highway rated average to below average by approximately 80 percent of the respondents. However, the actual impact on travel time, time of delivery, and operating costs were only considered a slight problem.
- Trucking oriented firms indicated that the Eastern Dakota Expressway improvements will do relatively little to help expand or improve their ability to conduct business in the area.
- Improvements from the Eastern Dakota Expressway would come in the form of improved travel times, safety, and wear and tear on truck equipment.