

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

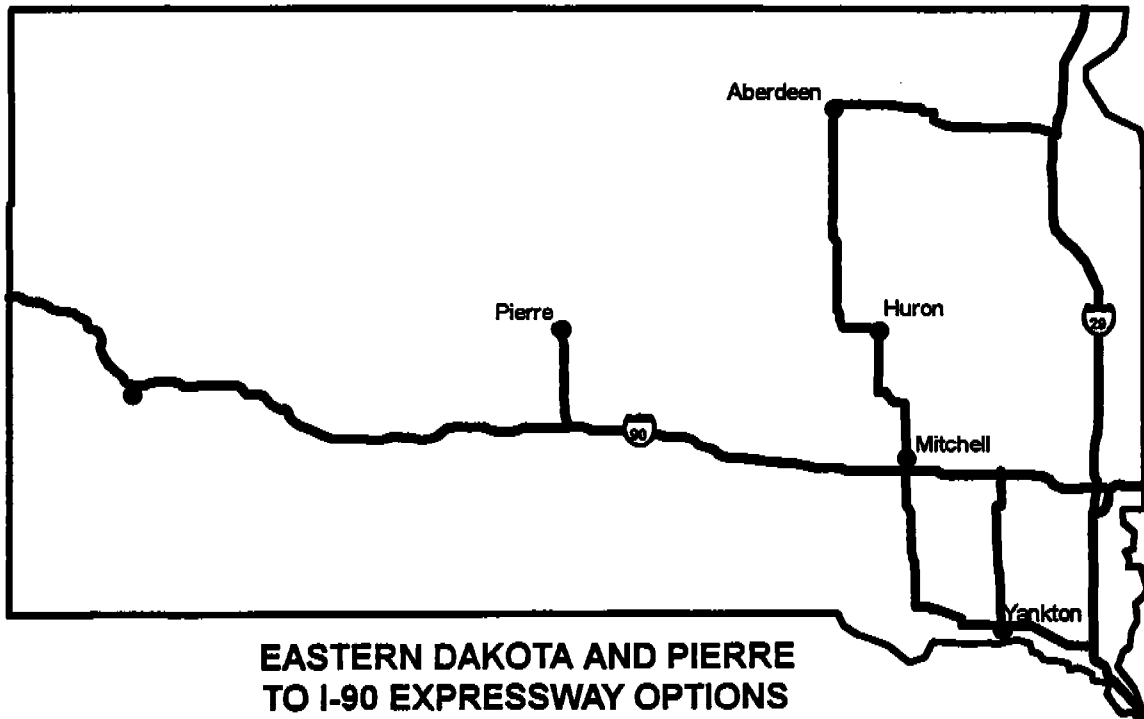
The Eastern Dakota/Pierre to I-90 Expressway Study examined improved highway alternatives in the eastern and central portions of the State. A concurrent study (Heartland Expressway Study) examined corridors in the west, southward from Rapid City. As a result of the two concurrent studies, expressways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



**EASTERN DAKOTA AND PIERRE
TO I-90 EXPRESSWAY OPTIONS**

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.

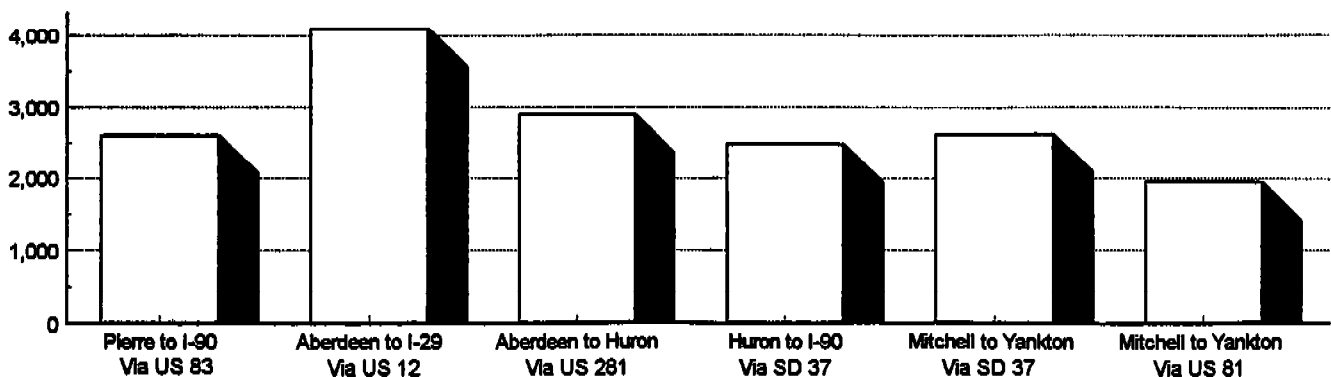
NEED BASED ON TRAFFIC

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 | Freeway | Express. | Super 2/4 | Super 2 | ROUTE LOCATIONS | 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 | 0.84 | -- | 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 | 0.48 | 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 | --- | 0.45 | 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 proposing 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 Lane</u> | <u>Super 2</u> | | <u>Freeway</u> | <u>Expwy. 2/4 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

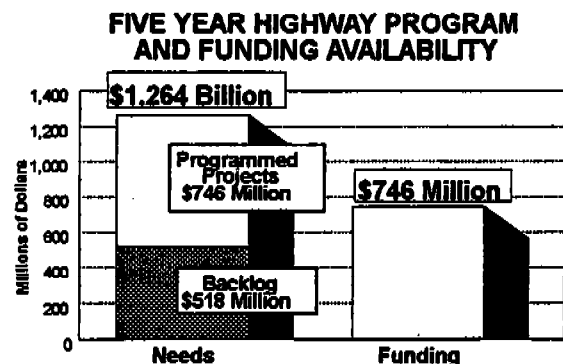
This study explored the funding options for three Expressway Programs:

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.