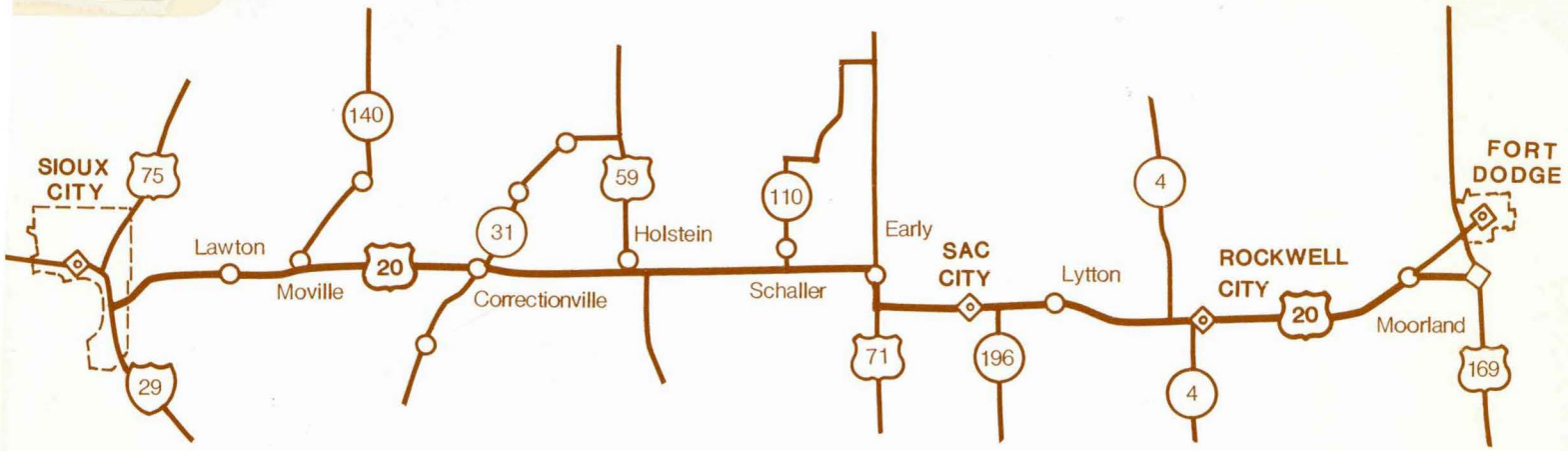
EXECUTIVE SUMMARY



U.S. HIGHWAY 20 CORRIDOR DEVELOPMENT STUDY

Prepared for

IOWA DEPARTMENT OF TRANSPORTATION

Prepared by

WILBUR SMITH ASSOCIATES and
BRICE, PETRIDES-SEC DONOHUE

1992

WILBUR
SMITH
ASSOCIATES

ENGINEERS • ARCHITECTS • ECONOMISTS • PLANNERS

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December 23, 1992

Mr. Martin J. Sankey
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Mr. Sankey:

Wilbur Smith Associates is pleased to submit this Executive Summary Report which briefly summarizes our evaluation of U.S. 20 between Sioux City and Fort Dodge, Iowa. The complete analysis is more thoroughly discussed in the study's Final Report.

This study was conducted by a consultant team, under contract to the Iowa Department of Transportation. The consultant team was comprised of:

- Wilbur Smith Associates
- Brice, Petrides - SEC Donohue
- Robinson Engineering Company
- David Forkenbrock, Ph.D.
- C. Phillip Baumel, Ph.D.
- Daniel Otto, Ph.D.
- Benjamin Allen, Ph.D.

The study examines the feasibility of making alternative improvements to U.S. 20. It quantitatively evaluates and compares the alternatives. However, it does not reach conclusions nor does it make recommendations. Instead, it provides information which should be useful in the decision process.

We appreciate being afforded the opportunity to conduct this analysis.

Respectfully submitted,

WILBUR SMITH ASSOCIATES

Robert J. Zuelsdorf
Senior Vice President

RJZ/mr

EXECUTIVE SUMMARY

This study examines the feasibility of making a major financial investment in the improvement of U.S. 20 between Sioux City and Fort Dodge, Iowa. This 119-mile highway segment of U.S. 20 currently includes 97 miles of 2-lane highway and 22 miles of 4-lane highway (on the west end near Sioux City and a short section near Holstein). This 119 mile segment is predominantly rural in nature, and serves a region of Iowa that has not been economically prospering.

STUDY RATIONALE

The reasons for this study are clear, when one understands the history of the corridor and the perspectives of those involved in making highway corridor investment decisions.

The Corridor Perspective - Residents of the U.S. 20 Corridor have expended great efforts in their attempt to create an improved east-west 4-lane highway. The corridor residents envision great benefits from such a highway -- increased intercity mobility, vehicular safety, increased tourism, improved goods transport, more efficient transport, better rural access and, most important, economic development. Many advocates of the corridor believe that the economic development benefits will exceed the costs associated with the road project, and that a four-lane highway would therefore be warranted and economically feasible.

The State Perspective - The State needs to make certain that limited highway monies are programmed for the most warranted, most beneficial highway corridors and projects. This corridor therefore is, in a sense, in competition with other state highway corridors and corridor projects for limited funding. Because it is responsible for state highway funds administration, the Iowa Department of Transportation (DOT) must make certain that a major investment in the corridor is prudent and that the State and regional economies will be better off with the investment than without the investment. There are economic penalties associated with either underinvesting, or overinvesting, in highways. Therefore, the State must identify those highway projects, project types and investment levels that are most warranted and most efficient.

That is the reason for this study -- to determine whether major investments in U.S. 20 comprise a prudent and feasible use of tax dollars.

STUDY APPROACH

The study was designed to determine whether or not major investment in U.S. 20 between Sioux City and Fort Dodge makes sense from the economic development and traffic perspectives, and whether such an investment can be made without doing significant environmental harm. The study focused on travel demand and travel patterns, costs, economic development benefits, and overall impacts and implications. The study considered impacts pertaining to development, the economy, the

feasible between Sioux City and Fort Dodge. If U.S. 20 was a 4 lane highway all the way from Chicago, through Sioux City and perhaps with a connection to I-80 near Grand Island, then a 4-lane section Sioux City to Fort Dodge could be conceivable.

This study therefore analyzed the Sioux City to Fort Dodge segment in accordance with two distinct assumptions:

1. U.S. 20 improvements that might be implemented regardless of what is done in Illinois, Nebraska and in Iowa east of I-35; and

2. U.S. 20 improvements (4-lane) that might require similar standards to the east and possibly to the west.

U.S. 20 Study Segment - Of the 119 miles of U.S. 20 between Sioux City and Fort Dodge, 97 miles are 2-lane highways and 22 miles are already 4-lane (between Sioux City and Moville and near Holstein).

The 2-lane segments are typically posted for 55 mph speed limits, with lower speeds of 25-45 mph as the highway approaches and passes through communities. The 2-lane sections currently pass through Correctionville (45 mph), Early (45 mph), Sac City (25-35 mph), Lytton (35 mph), and Rockwell City (25-45 mph). In Sac City there are two traffic signals on U.S. 20, and a stop sign in Moville. In addition, of the 88.4 miles of rural 2-lane, there are passing restrictions (no passing allowed) on more than one-half of the distance.

This U.S. 20 segment is therefore a typical rural 2-lane highway, intended for regional (local) use rather than long-distance interstate travel. The Moville to Sioux City section (approximately 20 miles) has been built to 4-lane standard due to the higher traffic volumes on this section which involve travel into Sioux City. A 1.4-mile section near Holstein is 4-lane because U.S. 59 and U.S. 20 share this segment.

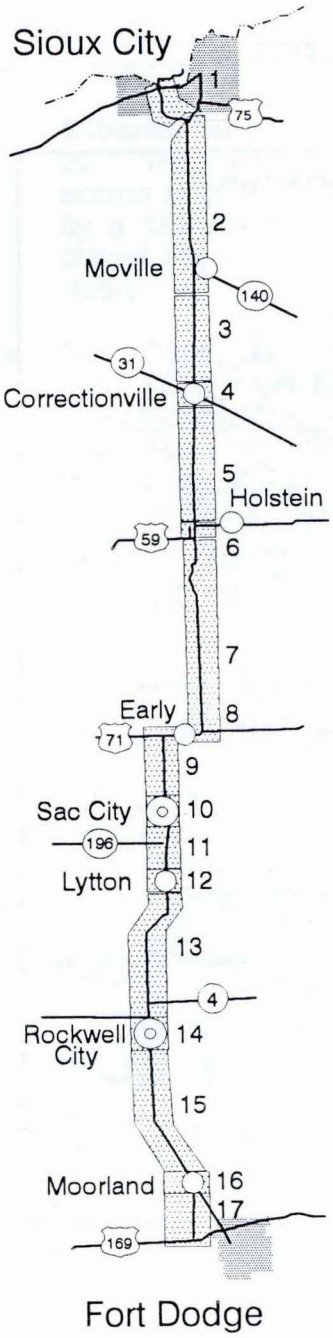
Traffic Use of U.S. 20 Study Segment - Due to the nature of the highway, and the availability of I-80 and I-90, it is not surprising that U.S. 20 is lightly traveled. Exhibit 3 lists average daily traffic in 1990 for various locations along the highway. Total ADT on the rural sections is typically 2,000 to 3,000 vehicles daily, with slightly higher volumes in and near the towns.

The vast majority of traffic on this section is local traffic (only 8 percent of traffic is "through" traffic, with an origin/destination west of Sioux City and a destination/origin east of Fort Dodge). Of total vehicle miles of travel on the highway, 16 percent is by trucks and 84 percent by automobile.

Traffic volumes on U.S. 20 between 1976 and 1984 declined by 7.1 percent (0.89 percent decrease per year), and since 1984 (1984-1990) increased by 10.1 percent (1.62 percent increase per year).

From a traffic volume perspective, therefore, major changes to U.S. 20 are perhaps not warranted. The volumes are low, and the volume growth rate is slight. This is the case, however, only if the highway's role remains unchanged. If the highway were to be improved regionally (multi-state), then higher volumes would be attracted to it, as estimated in this study.

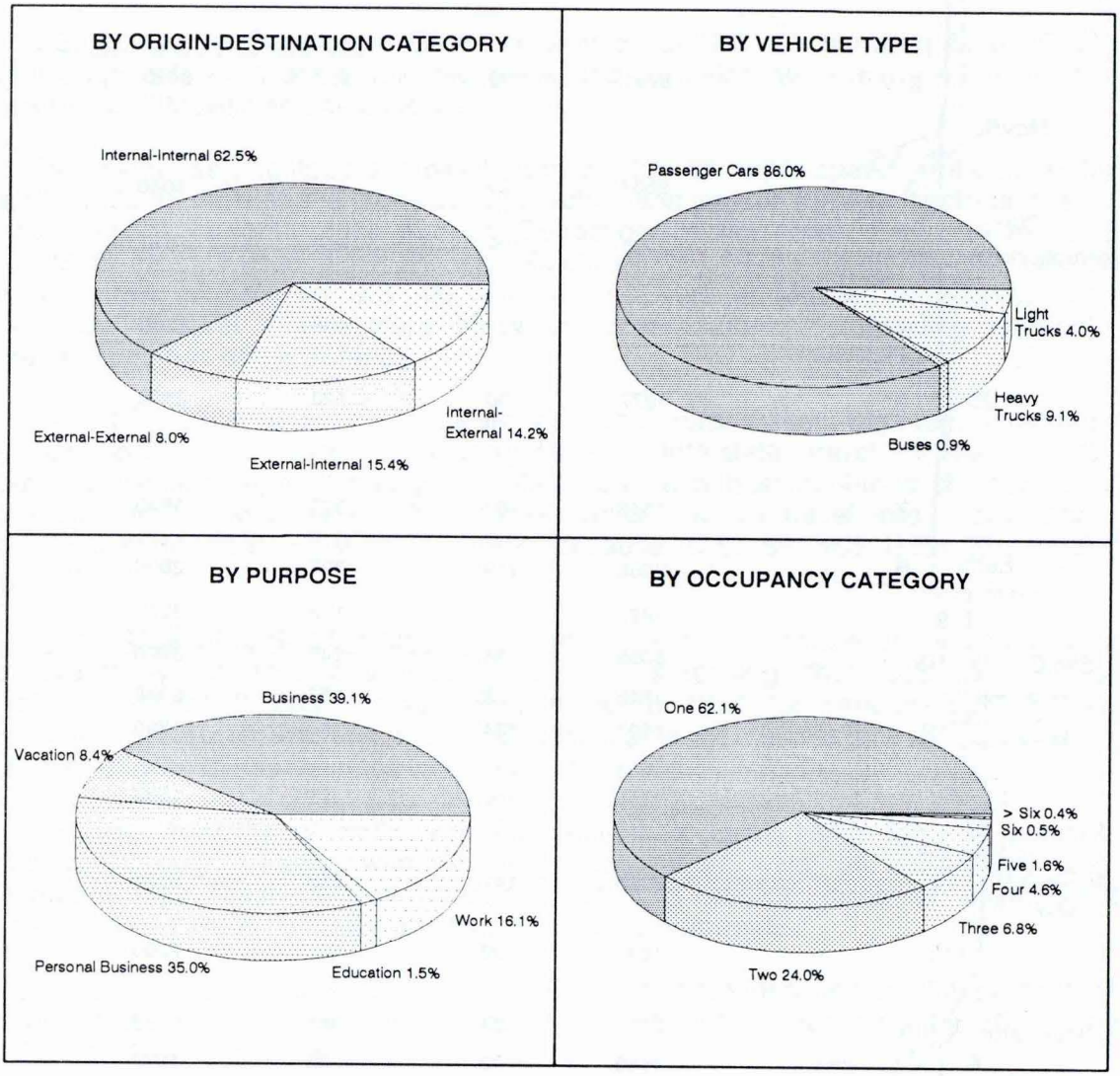
Exhibit 3
EXISTING TRAFFIC USE OF U.S. 20
1990



	AVERAGE DAILY TRAFFIC VOLUME			
	Autos	Lt. Trucks	Hvy. Trucks	Total
1	9144	250	486	9880
2	5731	229	520	6480
3	2537	129	374	3040
4	2285	199	406	2890
5	1773	201	406	2380
6	1977	190	523	2690
7	1148	67	325	1540
8	2356	119	325	2800
9	1921	96	193	2210
10	5085	188	147	5420
11	1848	128	164	2140
12	1591	134	165	1890
13	1259	150	171	1580
14	3196	141	239	3576
15	1847	98	255	2200
16	2752	134	284	3170
17	1666	102	202	1970

Exhibit 4 summarizes vehicle trip characteristics from the roadside surveys conducted in Northwest Iowa. The surveys revealed that the majority of vehicles in the corridor are passenger vehicles with one or two occupants traveling short distances who are traveling for business or personal business reasons.

Exhibit 4
U.S. 20 AUTOMOBILE TRIP CHARACTERISTICS
Results of 1991 Roadside Survey



U.S. 20 IMPROVEMENT ALTERNATIVES

The State of Iowa could pursue any of a number of alternative approaches in improving U.S. 20. Some of these alternative approaches are mutually exclusive, e.g., if one approach is selected, the other approach is not selected. In other cases, the approaches could be sequential, e.g., a more limited improvement now, followed by a more significant improvement later.

In devising the alternative improvements, it is recognized that U.S. 20 could serve two possible roles:

- **Subarea Highway** - This is the role currently played by existing U.S. 20. The highway serves a region of Iowa, principally as an intermediate access road to the area between I-80 and I-90. Such a role could be played by a two-lane U.S. 20 as well as by a four-lane U.S. 20. This role can be played regardless of what is done to U.S. 20 elsewhere in Iowa, Illinois or Nebraska.

- **Multi-State Regional Highway** - This role would cause U.S. 20 to become more of a major highway that autos and trucks will use for longer distance trips. Under this scenario, the highway would become more of a competitor with I-80 and I-90. Traffic analyses suggest that, for U.S. 20 to play this role, it would have to be a four-lane highway and, to be most effective in this role, U.S. 20 improvements would also be needed in other states, especially Illinois, as well as in Iowa to the east of I-35.

To determine what alternatives might be best, the study evaluated a broad range of alternative improvement types, ranging from doing nothing (the "Existing Condition") to minor improvements (the "Base Case"), all the way to a fully grade-separated four-lane freeway (the "Freeway" option). Seven alternatives were selected for evaluation as listed on Exhibit 5.

U.S. 20 as it presently exists is not evaluated because Iowa DOT is currently planning to make several improvements to U.S. 20. These currently planned improvements are included in "Alternative 1: Base Case." It is this Base Case with which all other improvements are compared.

As a result of adopting "Alternative 1: Base Case" as the do nothing option, the feasibility study analyzed six alternatives (Alternatives 2 through 7). Alternatives 2, 3 and 4 are various two-lane highway improvements; Alternatives 5, 6 and 7 are various four-lane highway improvements.

As shown on Exhibit 6, all seven either follow the existing highway alignment, or include bypasses around communities, or entail limited new right-of-way acquisition, e.g., between Early and Moorland. Only the "Freeway" option is built entirely on new right-of-way and even this would likely be near the existing alignment.

Exhibit 5
U.S. 20 ALTERNATIVES

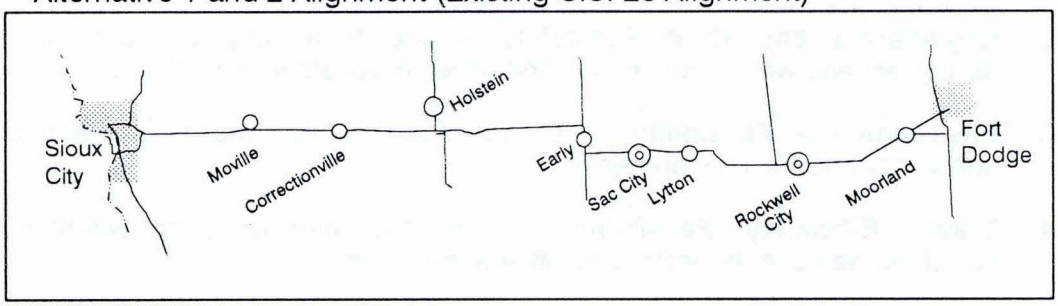
HIGHWAY 20 ALTERNATIVE	DESCRIPTION
1. BASE CASE	a. U.S. 20 resurfaced Early to Moorland b. U.S. 20 minor improvements (lighting, drains, etc.) c. U.S. 20 2-lanes Iowa Falls to Waterloo, new alignment d. Existing posted speed limits on U.S. 20 e. Several improvements to U.S. 30
2. IMPROVED TWO-LANE	a. "Base Case #1," plus such U.S. 20 improvements as: b. Build passing lanes and spot reconstruction c. Left turn lanes, at every state highway and some paved county roads d. Widened granular shoulders (10 ft.) e. Improvements through communities f. Acceptable value "Arterial B," access "Priority 3"
3. IMPROVED TWO-LANE WITH BYPASSES	a. "Improved Two-Lane #2" plus Two-Lane Bypasses on Four-Lane right-of-way around: b. Correctionville c. Early d. Sac City e. Rockwell City
4. NEW ALIGNMENT TWO-LANE	a. "Improved Two-Lane with Town Bypasses #3" west of Early, plus b. New two-lane highway built on new four-lane alignment between Early and Fort Dodge c. 55 mph speed on new segment, access control Priority 2"
5. FOUR-LANE ARTERIAL HIGHWAY	a. New four-lane highway built on new alignment between Early and Fort Dodge b. Existing U.S. 20 between Early and Sioux City widened to four-lanes, on existing alignment c. 55 mph on both sections d. Both sections built at-grade. Access control "Priority 3" on old sections, "Priority 3" on new sections (O interchanges)
6. EXPRESSWAY FOUR-LANE	a. "Four-Lane Arterial Highway #5," plus b. Partial access control "Priority 2" (5 interchanges) c. 55 mph speed limit d. "Expressway B" acceptable value e. Expressway built across Illinois and Iowa except in Dubuque. No Nebraska improvements.
7. FREEWAY	a. Four-Lane on new alignment entire length b. Full access control c. 16 grade separated interchanges d. 65 mph speed limit e. "Expressway B" acceptable value f. Design exceptions, e.g., 4+% grades g. Freeway across Illinois, Iowa and Nebraska

Exhibit 6

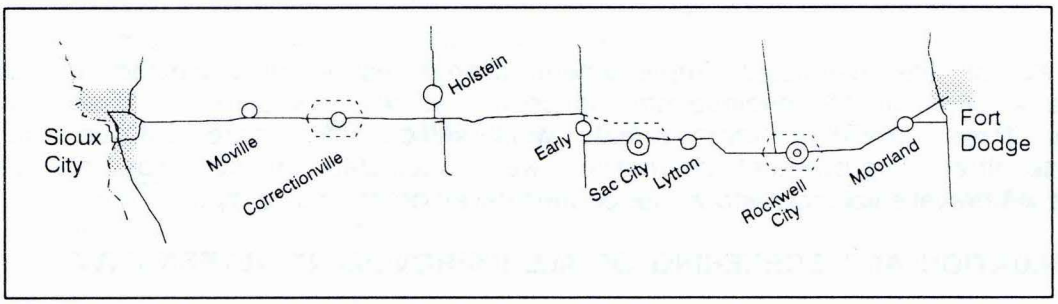
CONCEPTUAL MAPS

(Not Drawn to Scale)

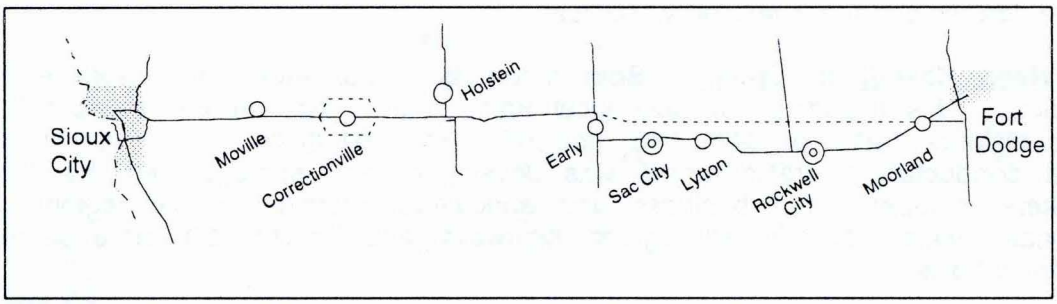
Alternative 1 and 2 Alignment (Existing U.S. 20 Alignment)



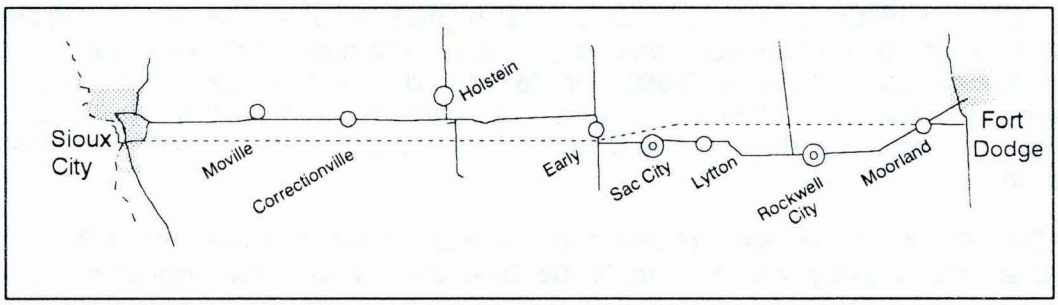
Alternative 3 Alignment (Improved 2-Lane with Bypasses)



Alternative 4, 5 & 6 Alignment (New Alignment East of Early)



Alternative 7 Alignment (Freeway Entirely on New Alignment)



FIVE TESTS OF FEASIBILITY

To gauge the feasibility of the improvement alternatives, five "tests of feasibility" were applied.

1. **Need Based on Traffic** -- Does the highway need to be improved to be able to handle its current and forecast traffic volumes?

2. **Engineering and Cost Feasibility** -- Are there any unusual engineering difficulties, and what would each alternative improvement cost?

3. **Environmental Feasibility** -- Could U.S. 20 be improved without doing undue harm to the environment?

4. **Travel Efficiency Feasibility** -- Will the highway improvement cause sufficient road user benefits to justify the investment?

5. **Economic Development Feasibility** -- Will the highway improvement cause sufficient economic activity to justify the investment?

All of the candidate improvement alternatives were subjected to feasibility tests #1 (traffic), #2 (engineering and cost), and #3) environment. Based on those tests, three candidate improvements were selected for more detailed evaluation. Those three improvement alternatives were subjected to the economic feasibility tests #4 (travel efficiency) and #5 (economic development feasibility).

EVALUATION AND SCREENING OF ALL IMPROVEMENT ALTERNATIVES

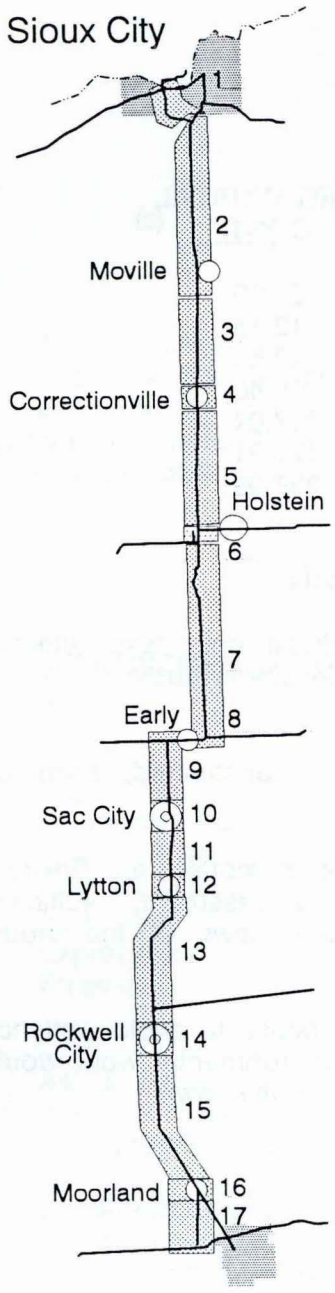
The three 2-lane improvement options and the three 4-lane improvements options were evaluated and compared, to determine which of them should be subjected to the more detailed economic feasibility analyses.

Need Based on Traffic - Both automobile and truck traffic were extensively studied. This included not only local traffic that is now in the corridor but also long distance traffic on I-80, I-90, and other regional highways. Roadside surveys were conducted, a traffic model was developed, and surveys were conducted of truckers, shippers, and business and agriculture interests in the region. Traffic estimates were made for all regional highways, and for U.S. 20, on a segment-by-segment basis.

The resulting traffic forecasts through the year 2010 for the various improvement alternatives are presented on Exhibit 7. Most State Departments of Transportation start planning to widen rural 2-lane highways to 4-lane when existing daily volumes reach 5,000 to 6,000 vehicles per day. Alternative #6: 4-Lane Expressway is estimated to carry 3,210 to 5,960 vehicles per day in the year 2010 on the 2-lane sections if they are widened to 4-lane standard. These volumes are insufficient to warrant 4-lane expressway consideration at this time, based on the traffic criterion.

The 65 mph freeway (Alternative 7) has greater estimated traffic volumes; however, the freeway would have to be built entirely on new right-of-way such that

Exhibit 7
ESTIMATED TRAFFIC USE OF U.S. 20
2010



	Two-Lane Alternatives				Four-Lane Alternatives		
	Alt-1	Alt-2	Alt-3	Alt-4	Alt-5	Alt-6	Alt-7
1	11,500	11,510	11,740	11,900	12,850	13,200	14,040
2	7,570	7,590	7,830	7,990	8,980	9,300	12,090
3	3,600	3,620	3,880	4,040	4,760	4,990	8,910
4	3,520	3,550	3,290	3,500	4,370	4,620	9,690
5	3,060	3,100	3,480	3,690	4,600	5,070	9,240
6	3,500	3,540	3,920	4,130	5,620	5,960	9,920
7	2,090	2,110	2,560	2,760	3,820	4,280	7,150
8	3,690	3,710	2,070	2,480	3,060	3,340	7,370
9	2,920	2,940	2,030	2,370	2,930	3,210	7,150
10	6,670	6,690	2,400	2,540	3,100	3,400	7,280
11	2,880	2,890	3,640	2,700	3,210	3,530	7,480
12	2,640	2,640	3,200	3,000	3,500	3,830	7,790
13	2,280	2,290	2,910	3,380	3,900	4,220	8,130
14	4,830	4,830	3,100	3,760	4,350	4,680	8,650
15	3,290	3,300	3,390	3,410	3,970	4,290	8,230
16	4,510	4,520	4,620	4,580	5,220	5,540	9,720
17	2,500	2,510	2,610	3,760	4,210	4,580	8,370

its cost would be prohibitive. It would also require freeway standard in Illinois and Nebraska, which presently is not contemplated by either state.

Engineering and Cost Feasibility - Iowa DOT has already programmed some improvements to U.S. 20, e.g., resurfacing, etc. These programmed improvements are a "given," and are not analyzed in this study. Capital cost estimates, summarized on Exhibit 8, were developed for each of the improvement alternatives.

Exhibit 8
NET CAPITAL COST[a]
U.S. 20 Improvement Alternatives
$ Million

IMPROVEMENT ALTERNATIVE	TOTAL COST[b]	NET CAPITAL COST[c]
1. Base Case	$27.38	$0.00
2. Improved 2-Lane	39.53	12.15
3. With Bypasses	70.93	43.55
4. New 2-Lane	92.78	65.40
5. 4-Lane Arterial	184.42	157.04
6. Expressway	200.59	173.21
7. Freeway	364.47	337.09

(a) Capital costs, including engineering and administrative costs.
(b) Cost of each alternative plus the Base Case cost.
(c) Incremental cost of each alternative improvement (total cost less Alternative 1 Base Case cost). This is the cost that is evaluated in this feasibility study.

Given sufficient funds any of the alternatives can be constructed, from an engineering perspective.

Environmental Feasibility - While this study did not comprise an Environmental Impact Statement or even an Environmental Assessment, sufficient environmental review work was done to imply that, in the views of the study, Alternatives 1 through 6 are environmentally feasible.

This is true as long as care is taken in the alignment process to avoid wetlands and other environmentally sensitive places. More detailed environmental work would be needed before a final determination of environmental impact can be known.

Screening of Improvement Alternatives - The various candidate improvement alternatives were compared and contrasted in accordance with the following screening criteria:

Screening Criteria

Miles of new highway involved
Construction cost
Average traffic volumes
Capacity compared with estimated traffic use
Average travel speed
Cost effectiveness
Safety
Environmental issues
Agricultural issues
Other states implications
Four-lane phasing opportunity

Based on these comparisons, the Study's Technical Advisory Committee found that three of the alternatives could be eliminated from further consideration, and that three should be subjected to the more detailed economic analyses. The three selected for detailed analysis, plus the Base Case with which they are compared, are listed on Exhibit 9.

Exhibit 9
INTERMEDIATE SCREENING RESULTS
U.S. 20 Improvement Alternatives

IMPROVEMENT ALTERNATIVE	SCREENING CONCLUSION	
	Eliminate From Consideration	Candidate Alternatives
1. Base Case		X
2. Improved Two-Lane	X	
3. Improved Two-Lane With Bypasses		X
4. New Alignment Two-Lane		X
5. Four-Lane Arterial Highway	X	
6. Expressway		X
7. Freeway	X	

As a result of this intermediate screening exercise, three of the candidate improvement alternatives (plus the Base Case) were selected as "finalist" options, to be analyzed from the economic feasibility perspective:

- **Alternative 3: Improved 2-Lane with Bypasses** - This 2-lane option would build passing lanes and turning lanes and would also bypass all communities (except Lytton) along the route. While costing $43.55 currently over programmed improvements, it is the single remaining improvement option which makes extensive use of the existing U.S. 20.

- **Alternative 4: New 2-Lane** - This option involves the construction of a new 2-lane U.S. 20, on 4-lane right-of-way, between Early and Moorland. In addition, it includes passing lanes, turning lanes, shoulder improvements and a bypass of Correctionville.

- **Alternative 6: 4-Lane Expressway** - This alternative would construct a continuous 4-lane highway from Sioux City to Ft. Dodge, on a reasonably direct alignment, with interchanges built at five primary highways.

ECONOMIC OBJECTIVE

A very important objective of this study is to determine what level of highway investment is warranted on U.S. 20. There are economic consequences of either underinvesting or overinvesting in the highway corridor. If the State underinvests in the corridor, economic development will be inhibited because real and perceived travel costs will be greater, and the ability of the corridor region to compete for economic activity will be retarded. There is therefore an economic cost associated with underinvestment in the U.S. 20 corridor. If the State overinvests in the corridor, 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 U.S. 20 corridor.

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

ECONOMIC BASIS FOR A FEASIBLE HIGHWAY PROJECT

U.S. 20 is essentially a "tool" used in transporting goods and people from one place to another. Investment in improvements to U.S. 20 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 operations costs, increased tourism, attraction of new industry, revised logistics or agricultural patterns, and reductions in noise or air pollution. But in the final analysis, all of the direct benefits of U.S. 20, and therefore the justification for investing in it, flow from using it for transportation.

Benefits from a U.S. 20 improvement 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 and farms as higher net income. Persons may thus benefit from an improved U.S. 20 without traveling on it.

It is important to keep in mind that for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if 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 business practices.

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 overall economic growth. Therefore it is imperative that the highway investment be economically feasible; if it is not, it is economically counterproductive.

TRAVEL EFFICIENCY FEASIBILITY

Any of the candidate U.S. 20 improvements will lead to safer and more efficient travel. If these travel efficiencies (travel time, vehicle operating costs, accidents) are greater (over a 30-year analysis period) than the costs, then the project is viewed as feasible from this perspective.

Exhibit 10 summarizes the travel efficiency feasibility indicators.

Exhibit 10
TRAVEL EFFICIENCY FEASIBILITY
U.S. 20

ECONOMIC INDICATORS	Alternative #3: With Bypasses	Alternative #4 New Two-Lane	Alternative #6: 55 mph Expressway
Net Present Value ($ Thousand) (a)	($16,361)	($21,727)	($76,710)
Internal Rate of Return	2.75%	3.16%	2.12%
Discounted Benefit/Cost (a)	.64	.68	.58

(a) Discounted at 6%

SOURCE: Wilbur Smith Associates

Since it takes a benefit/cost ratio of 1.0 or greater, a rate of return of 6% or greater, and a positive net present value to be judged "feasible," it is seen that none of the alternatives subjected to this test of feasibility can be viewed as feasible, from this perspective. Even if the capital costs were 20 percent less, or traffic were 20 percent more, or even if other favorable assumptions were made, the improvements are still not feasible, from the travel efficiency perspective.

Therefore, if any of the improvements are to be made, they would have to be justified on an economic development basis.

ECONOMIC DEVELOPMENT FEASIBILITY

The key issue addressed in this study, and the key feasibility test, is whether or not an improved U.S. 20 will generate sufficient net economic development impacts to warrant the investment. Whether or not the U.S. 20 highway improvements are viewed as "economically feasible" depends on one's perspective.

National Perspective - Any of the alternatives will likely be partially funded by the federal government. The federal economic perspective has two issues: efficiency, and the ability of the nation to compete. This study analyzed these issues in the form of travel efficiency feasibility.

State Perspective - The state perspective, as represented by Iowa DOT, is that efficiency is important, and so is statewide economic development. The state is concerned with the ability of Iowa to be competitive with other states. The study examined the highway improvements' economic feasibility from this perspective.

Corridor Perspective - The people and businesses in proximity to U.S. 20 are interested in efficiency but they are also interested in the economic development and economic diversification of their region. The study examined the highway improvements' economic feasibility from this perspective.

The study finds that any of the U.S. 20 improvement options will generate economic benefits. Over a 30 year period the nine counties near U.S. 20 will benefit the most (by $96 to $312 million, depending which improvement option is selected). The state and nation are also shown to benefit, according to Exhibit 11.

Exhibit 11
U.S. 20 ECONOMIC BENEFITS SUMMARY [a]
($ Million)

THREE PERSPECTIVES	ALT. #3 WITH BYPASSES	ALT. #4 NEW TWO-LANE	ALT. #6 FOUR-LANE EXPRESSWAY
National Economy	$29.5	$46.9	$104.3
Iowa Statewide	$39.0	$63.1	$129.4
U.S. 20 Corridor	$96.1	$135.3	$312.0

(a) 30 years of economic benefits, discounted at 6%
SOURCE: Wilbur Smith Associates

While the economic benefits of an improved U.S. 20 are considerable, to determine whether a U.S. 20 investment is economically feasible, the costs of building and operating the highway improvements must be compared with those economic benefits. Included in the 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, logistics, agriculture, etc.). Excluded from the cost-benefit calculations are the road improvement implications that cannot reasonably be tabulated in monetary terms.

The economic development feasibility tests are summarized on Exhibit 12.

Exhibit 12
ECONOMIC FEASIBILITY SUMMARY
U.S. 20 Corridor Study

FEASIBILITY INDICATORS	TWO-LANE		FOUR-LANE
	ALT. #3 WITH BYPASSES	ALT. #4 NEW TWO-LANE	ALT. #6 FOUR-LANE EXPRESSWAY
NATIONAL PERSPECTIVE[a]			
Benefit/Cost	.64	.68	.58
Rate of Return	2.75%	3.16%	2.12%
Net Present Value (million)	(-$16.4)	(-$21.7)	(-$76.7)
STATE PERSPECTIVE[b]			
Benefit/Cost	.85	.92	.71
Rate of Return	4.8%	5.3%	3.4%
Net Present Value (million)	(-$6.8)	(-$5.5)	(-$51.6)
CORRIDOR PERSPECTIVE[c]			
Benefit/Cost	2.10	1.97	1.72
Rate of Return	18.0%	16.9%	14.5%
Net Present Value (million)	$50.3	$66.7	$131.0

(a) Travel efficiency feasibility

(b) REMI model, economic development impacts statewide in Iowa, includes travel efficiency benefits.

(c) REMI model, economic development impacts on 9-county "Primary Impact Area," includes travel efficiency benefits.

SOURCE: Wilbur Smith Associates

Travel Efficiency Feasibility (the National Perspective) - Based on the travel efficiency approach to economic feasibility, none of the three improvement alternatives are feasible. The benefit/cost ratios are less than 1.0 (.58 to .68), the internal rates of return are moderate (2.1% to 3.2%), and the net present values are all negative. Therefore, implementation of any of the candidate options does not appear economically justified at this time from the travel efficiency perspective. This is because of the relatively low traffic volumes estimated to use the highway.

State Economic Development Feasibility - From the State of Iowa perspective, when potential economic development impacts on the State are included, the results are more positive but still not feasible. The benefit/cost ratios are all less than 1.0 (.71 to .92), the internal rates of return are in the range of 3.4% to 5.3%, and the net present values are negative. From the statewide economic feasibility perspective, Alternative #4: New Two-Lane, comes the closest to being economically feasible because it has the highest benefit/cost ratio (.92), the best rate of return (5.3%), and the highest net present value ($-5.5 million).

Corridor Economic Development Feasibility - From the corridor region's perspective, when potential local economic development impacts in the nine county corridor area are included, all three improvement alternatives are economically feasible. The benefit/cost ratios are all over 1.0 (1.72 to 2.10), the rates of return are in the range of 14.5% to 18.0%, and the net present values are all positive. This means that the people, communities and businesses in proximity to U.S. 20 will benefit and, from their perspective, the improvements are economically feasible. From the corridor area's perspective, the 4-lane Expressway is best, because the corridor area will be better off by an estimated $312.0 million over the 30 year analysis period if the 4-lane highway is built.

While the U.S. 20 improvements are feasible from the corridor perspective, the same improvements are not feasible from the State perspective. This is because many of the corridor benefits are benefits that shifted from other locations in Iowa. Benefits that merely shift from one location in Iowa to another are "economic transfers," and such transfers are not net impacts from the Statewide perspective.

STUDY RESULTS: ANALYSES AND COMPARISONS ONLY

This study identified alternative ways that U.S. 20 between Sioux City and Fort Dodge might be improved. It then developed traffic, economic and other statistics for each candidate improvement option. The various candidate improvements are compared with a Base Case and, implicitly, with each other.

Based on these statistics and comparisons, the Iowa DOT will make its determination as to what improvements, if any, are warranted on U.S. 20. 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 Iowa DOT in making its decision.

While this study analyzed U.S. 20 as to cost and benefits, it must be recognized that any U.S. 20 decision must be made within the context of available funds and competing uses for those limited funds.