

Executive Summary

A. Introduction

The Federal Highway Administration (FHWA) and the Departments of Transportation in Texas, Oklahoma, Kansas, Missouri, Iowa and Minnesota combined their efforts to conduct a study of Interstate Highway 35 (I-35) from Laredo, Texas to Duluth, Minnesota. The purpose of the study was to assess the need for improved local, intrastate, interstate, and international service on I-35 and to clearly define a general feasible improvement plan to address those needs

The I-35 Corridor is illustrated in Figure S-1. Its multimodal transportation hubs – where air, rail, river and truck cargo converge – make I-35 ideally positioned to be a major route for what is expected to be increasing levels of international trade activity.

Since January 1, 1994, when NAFTA went into effect, the heartland of America has become an increasingly important thoroughfare for trade among the United States, Mexico and Canada. Interstate 35 is the only interstate highway connecting Mexico, the U.S. and Canada through the heartland, and it carries a greater percentage of U.S.-Mexico trade among the NAFTA partners than any other U.S. interstate highway.

This Executive Summary highlights the analyses, findings and conclusions produced by the I-35 Trade Corridor Study for improvements to the existing I-35 Corridor. The study produced information regarding the existing interstate condition, trade flow, trade analysis, cost, economic feasibility, impacts on economic development, financial viability, and other applicable data for this macro-scale study.

The study concludes with a recommended investment strategy for the I-35 Corridor. **It must be emphasized that this is a general strategy. The purpose of the strategy is to guide future, potential improvements to I-35. Any decision to implement this strategy in a corridor state will be made by that state within their planning process and as conditions warrant and funds become available. Decisions regarding specific solutions such as the addition of lanes or the provision of relief routes will be made based on engineering studies conducted by the State Department of Transportation in consultation with other affected parties.** The strategy simply provides the participating states and FHWA with a planning tool to help guide decisions regarding future improvements to the I-35 Corridor.

B. Study Process

Six states and the FHWA combined their efforts to conduct this study. The study was conducted through the nine tasks described below.

- **Existing Conditions and Planned Improvements:** This first task was designed to gather, summarize and interpret existing data regarding the I-35 Trade Corridor.
- **Public Involvement:** The public involvement activities included public meetings and newsletters coinciding with major project milestones.
- **Current and Future Travel Demand:** Travel demand models for forecasting freight and passenger vehicle flows were developed considering national and international trade with both Mexico and Canada. The demand models included consideration of

current and future national and international trade and commodity flows. In addition, long-distance and local passenger flows were generalized and forecasted.

- **Evaluate Adequacy of Existing Facilities and Institutional Arrangements:** Largely based on the travel demand, this task evaluated the adequacy of existing highway, rail, border crossing, and customs facilities in the I-35 Trade Corridor.
- **Potential Corridor Strategies - Emerging Technologies:** This task provided a vision of I-35 to the year 2025. It identified emerging transportation and information technologies that may have applications in the corridor. Items investigated included:
 - Intelligent Transportation Systems (ITS) Applications
 - Freight Transportation Improvements
 - International Trade Services Centers
 - High Occupancy Vehicle Lanes
 - Super-Highways And Truck Ways
 - Fixed Guideway Passenger Rail Applications
 - Fiber Optics And Other Utilities
 - Commercial Vehicle Operations(CVO)/Seamless Travel
- **Potential Corridor Strategies - Innovative Financing:** Financing strategies were investigated. Items investigated included:
 - Tollway Opportunities
 - Congestion Pricing
 - Modal Joint-Use In Corridor
 - Multi-State Infrastructure Banking
 - Public/Private Partnerships
 - Credit Enhancements
 - Privatization
 - Design-Build
 - Leasebacks
 - Build-Operate-Transfer
- **Identify Investment Strategy Options:** This task identified a series of investment strategy options for the I-35 Trade Corridor. These strategies were illustrated in the form of infrastructure improvement options for highways and rail as well as intermodal connections.
- **Evaluate Investment Strategies:** Investment strategies were evaluated in this task. Benefits, costs, and impacts of each of the investment strategy options identified in the previous task were developed. Economic development benefits were estimated through the use of a REMI econometric model. Generalized cost estimates were used for each strategy and estimates of the impacts of environmental and socio-economic factors were made. A matrix comparison method was used to evaluate the different alternatives.
- **Recommended Corridor Investment Strategy:** This task concluded with a recommended investment strategy for the I-35 Trade Corridor.



FIGURE S-1
I-35 Trade Corridor

C. Study Team

The I-35 Trade Corridor Study Team was composed of representatives from each of the six participating states, the Federal Highway Administration, and a consultant team with experience in planning and design in each state. Assistance was also provided by the local Metropolitan Planning Organizations (MPO).

1. PUBLIC SECTOR

Representatives from the six participating states and FHWA were organized to form a Steering Committee. The committee was responsible for directing the consultant team, making key decisions for the study direction, reviewing the task reports, and conducting public meetings. The Steering Committee participants are shown in Table S-1.

The Texas Department of Transportation was the administrative agency for the study.

**Table S-1
Steering Committee**

State	Principal Member(s)	Alternate Member
Iowa	Tice, Dennis L. Director, Planning & Programming Division Iowa Department of Transportation	Ward, Donald Director, Office of Systems Planning Iowa Department of Transportation
Kansas	Slimmer, Dennis R. Assistant to Director Division of Planning & Development Kansas Department of Transportation	
Minnesota	Sanft, Charles The Office of Freight, Rail and Waterways Minnesota Department of Transportation	Schenkelberg, Allan Director, Office of Investment Management Minnesota Department of Transportation
Missouri	Martin, Fred A. Division Engineer, Preliminary Studies Division Missouri Department of Transportation	Harvey, Kathy Liaison Engineer Missouri Department of Transportation
Oklahoma	McFall, Terry G. State Planning Engineer Oklahoma Department of Transportation	Shehab, Sam Strategic Planning Branch Manager Oklahoma Department of Transportation
Texas	Luedecke, Alvin R. Director Transportation Planning & Programming Division Texas Department of Transportation Thurin, Peggy Transportation Planning & Programming Division Texas Department of Transportation	
FHWA	Rogers, Ronald J. Director, Office of Program Development Federal Highway Administration	Lombard, Peter Director, Office of Planning & Prog. Development Federal Highway Administration

2. CONSULTANT TEAM

The consultant team included multiple firms with HNTB Corporation as the prime consultant for the study. HNTB is a multi-discipline architectural, engineering and planning firm that specializes in the transportation market. Mr. Scott M. Smith, P.E., Vice President, served as the HNTB Project Manager.

Wilbur Smith Associates (WSA), the principal subconsultant, is an international consulting, engineering, economics, and planning firm. Mr. Robert P. Babineaux, Jr., P.E., Associate-in-Charge, is the Deputy Project Manager for the study.

D. Alternative Investment Strategies Considered

A base case and five Candidate Alternatives were developed based on an assessment of the best features of various scenarios, such as, efficiency improvements to the I-35 facility; increased use of railroads; expedite international freight processing; improve commercial vehicle operations; improve intermodal transfers; public transportation strategies; and a do little (base case) strategy.

The base case alternative is a Do Little Scenario. It includes maintenance of pavement and bridges; the implementation of committed improvements; other planned activities such as transit, demand management, ITS, and growth management. The five Candidate Alternatives were developed to meet the future year (2025) traffic projections.

The Base Case and five Candidate Alternatives were evaluated based on how they compared in achieving improvement objectives defined in the study. Based upon that evaluation, three alternatives which were considered the most viable, were selected for further study. These three alternatives are described below.

The viable alternatives have the following common features:

- ***Assumes Base Case Improvements are included.***
- ***Maximum Upgrade (within existing right-of-way):*** Assumes that lanes are added to I-35 to accommodate future public traffic volumes, to the maximum lateral capacity allowed by available right-of-way. However, since this component alone is not sufficient to meet the future year (2025) traffic projections, other improvements are included in all of the following viable alternatives.
- ***Comprehensive ITS:*** Comprehensive ITS was recommended throughout the corridor with an emphasis on the urban areas. Chapter V of the final report provides additional description of urban and rural ITS scenarios.
- ***Other Urban Considerations***

1. RELIEF ROUTES/DOUBLE DECKING STRATEGY (Alternative 2)

This alternative adds to the Maximum Upgrade (within existing right-of-way) the following:

- ***Relief Routes and/or Double Decking I-35:*** In nearly every urban area segment, the future year (2025) traffic needs cannot be met by lane additions in the existing right-of-way. In this alternative, additional needs are met by providing additional

lanes through some combination of urban area relief routes on new location, or elevated/depressed sections on existing I-35.

- **Comprehensive ITS:** The comprehensive ITS scenario is included in all urban areas.
- **Other Urban Area Considerations:** Increased transit use, demand management, and growth management policies in urban areas are also included in this alternative.

2. TRADE FOCUS STRATEGY (Alternative 4)

This alternative adds to the Maximum Upgrade (within existing right-of-way) the following:

- **Partial NAFTA Truckway (with Larger Truck Size and Weights):** For this alternative, the truckway and larger truck size and weights are to be used only where their implementation could result in lane savings to I-35. This is in the Southern portion of the corridor (between Dallas/Fort Worth, and Laredo, Texas) where the truck traffic demand projections are the highest. Two truckway options are possible - a separate facility and a truckway within the existing I-35 right-of-way. This strategy assumes the truckway is located within the I-35 right-of-way for environmental and cost purposes. This alternative also includes complete Intelligent Transportation Systems for commercial vehicle operators and pre-clearance centers for US, Canadian, and Mexican customs operations.
- **Relief Routes and/or Double Deck I-35:** In segments where lane deficiencies still exist, it is assumed that additional lanes are provided by this improvement strategy.
- **Comprehensive ITS:** The comprehensive ITS scenario is included in the urban areas.
- **Other Urban Area Considerations:** Increased transit use, demand management, and growth management policies in urban areas are also included in this alternative.

3. COMBINATION STRATEGY (Alternative 6)

This alternative adds to the Maximum Upgrade (within existing right-of-way) the following:

- **Lane Addition with Right-of-Way Acquisition:** Additional lanes are provided between Duluth and Kansas City by the acquisition of right-of-way in areas where such acquisition could eliminate the need for relief routes.
- **Relief Routes and/or Double Decking I-35:** The needs are met by this improvement strategy by providing additional lanes.
- **Rail Implementation (Kansas City to Laredo):** Cooperative rail services are promoted between Kansas City and Laredo, to decrease freight traffic on I-35.
- **Comprehensive ITS:** The comprehensive ITS scenario is included in the urban areas.
- **NAFTA Scenario Improvements:** This alternative does not include a truckway but does include all associated ITS and pre-clearance improvements included under the Trade Focus Strategy.
- **Other Urban Area Considerations:** Public transit, demand management, and growth management policies are implemented in urban areas.

E. Recommended Investment Strategy

Based upon a full analysis, the recommended strategy is the Trade Focus Strategy (Alternative 4). This alternative has a number of important advantages over the other alternatives. These include providing good overall movement of traffic in the corridor as well as the best economic benefits of the alternatives studied. Additional advantages include:

- Best reduction in travel times for traffic on I-35;
- Best reduction in accident costs;
- Best benefit-to-cost relationships; and
- Fewer environmental impacts.

The Trade Focus Strategy includes special provisions to accommodate truck traffic in that portion of the corridor with the highest percent truck volume. This occurs from the Dallas-Fort Worth area to Laredo.

Table S-2 describes the I-35 segments used for evaluation and the generalized number of lanes for the base year (1996) and the total future demand (2025). Additional segment description is provided in Chapter VII of the final report. The 2025 number of lanes requirement could be met through a combination of strategies as described in the Trade Focus Alternative. The number of lanes requirement listed in Table S-2 is for planning purposes only. Actual lanes required may be less depending on the provision of relief lanes and the results of specific, detailed engineering studies.

The following are components of the Trade Focus Strategy.

1. MAINTENANCE OF EXISTING FACILITY

Over the next few decades, about 65% of I-35 will require major upgrades, however the entire route will have a continued need for rehabilitating pavements, resurfacing sections of the highway, and providing replacements of some bridge decks. Bridge substructures and superstructures will also need to be maintained, requiring repairs to maintain the integrity of the bridges.

Therefore, routine maintenance and repair efforts for the I-35 Corridor are included in the Trade Focus Strategy. In addition, projects already committed for construction are included as well.

2. INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

The Trade Focus Strategy assumes implementation of a comprehensive ITS for commercial vehicle operations and pre-clearance technology throughout the corridor. An ITS program for the metropolitan areas is also included throughout the corridor. The type and scope of ITS services will be defined in detail in follow-up studies, and applications will vary.

3. WIDENING OF I-35

Analyses show that only about 35% of existing I-35 has a sufficient number of lanes to meet the needs in 2025. The remaining 65% will require substantial improvements to accommodate the anticipated traffic. The Trade Focus Strategy provides for the widening of 1,700 km (1,060 miles) of I-35 commensurate with this anticipated demand. The number of lanes needed reflects the implementation of ITS and relief routes thereby reducing the total number of additional lanes needed to meet the demand.

**Table S-2
Corridor Segments and Laneage¹**

Segment No.	Description	Segment Length		No. of Lanes	
		km	mi	1996	2025 ²
MN-1	Duluth Area	14	9	4	4
MN-2	Duluth to Northern Transition of Minneapolis/St. Paul	208	129	4	8
MN-3W ³	Northern Transition to Minneapolis/St. Paul (I-35 West)	24	15	6	12
MN-3E	Northern Transition to Minneapolis/St. Paul (I-35 East)	32	20	4	12
MN-4W	Minneapolis/St. Paul Urban Core (I-35 West)	8	5	6	12
MN-4E	Minneapolis/St. Paul Urban Core (I-35 East)	8	5	4	8
MN-5W	Minneapolis/St. Paul to Southern Transition (I-35 West)	27	17	6	16
MN-5E	Minneapolis/St. Paul to Southern Transition (I-35 East)	24	15	4	8
MN-6	Southern Transition of Minneapolis/St. Paul to I-90 Intersection	122	76	4	6
MN-7	I-90 Intersection to MN/IA border	21	13	4	4
IA-8	MN/IA border to Des Moines	212	132	4	4
IA-9	Des Moines Area	31	19	6	8
IA-10	Des Moines to IA/MO border	111	69	4	4
MO-11	IA/MO border to Northern Transition of Kansas City	156	97	4	6
MO-12 ³	Northern Transition to Kansas City	23	14	4	12
MO-13 ³	Kansas City Urban Core	6	4	6	12
KS-14 ³	Kansas City to Southern Transition	32	20	6	14
KS-15	Southern Transition of Kansas City to Wichita	262	163	4	4
KS-16	Wichita Area	16	10	4	4
KS-17	Wichita to KS/OK border	68	42	4	4
OK-18	KS/OK border to Northern Transition of Oklahoma City	138	86	4	6
OK-19 ³	Northern Transition to Oklahoma City	34	21	4	8
OK-20 ³	Oklahoma City Urban Core	3	2	6	10
OK-21 ³	Oklahoma City to Southern Transition	32	20	6	8
OK-22	Southern Transition of Oklahoma City to OK/TX border	171	106	4	8
TX-23	OK/TX border to Northern Transition of Dallas/Fort Worth	90	56	4	6
TX-24W ³	Northern Transition to Dallas/Fort Worth (I-35 West)	23	14	6	12
TX-24E ³	Northern Transition to Dallas/Fort Worth (I-35 East)	64	40	4	20
TX-25W ³	Dallas/Fort Worth Urban Core (I-35 West)	3	2	8	16
TX-25E ³	Dallas/Fort Worth Urban Core (I-35 East)	6	4	6	16
TX-26W	Dallas/Fort Worth to Southern Transition (I-35 West)	18	11	6	16
TX-26E	Dallas/Fort Worth to Southern Transition (I-35 East)	85	53	4	10
TX-27	Southern Transition of Dallas/Fort Worth to Waco	116	72	4	8
TX-28	Waco Area	13	8	4	12
TX-29	Waco to Temple	48	30	4	8
TX-30	Temple/Killeen Area	3	2	6	10
TX-31 ³	Temple/Killeen to Northern Transition of Austin	79	49	4	14
TX-32 ³	Northern Transition to Austin	21	13	6	16
TX-33 ³	Austin Urban Core	11	7	6	16
TX-34 ³	Austin to Southern Transition	13	8	6	18
TX-35 ³	Southern Transition of Austin to Northern Transition of San Antonio	84	52	6	12
TX-36 ³	Northern Transition to San Antonio	23	14	4	16
TX-37	San Antonio Urban Core	6	4	8	16
TX-38	San Antonio to Southern Transition	14	9	4	14
TX-39	Southern Transition of San Antonio to Laredo	225	140	4	4
TX-40	Laredo Area	6	4	4	4
Total		2523	1568		

¹ Number of lanes shown for 2025 is for planning purposes only and doesn't account for relief routes or the results of location specific engineering studies.

² Number of lanes required using LOS C for rural areas and LOS D for urban and transition areas for 2025. Number of lanes shown for maximum ADT in segment, actual required lanes may vary within a segment.

³ Relief route required in segment.

4. TRUCKWAY PROVISIONS

The anticipated truck volumes on I-35 under the Trade Focus Strategy are illustrated in Table S-3. The table provides estimates of international truck traffic as well as total trucks. It also shows the total traffic volumes for the same key points along the I-35 Corridor. Truck volumes single include semi and multi-trailer trucks.

**Table S-3
Projected Daily Truck Volumes in I-35 Corridor
Under Alternative 4**

Location	2025 Truck Volume on I-35			Volume on Truckway Lanes	All Vehicles
	International	Other	Total		
Laredo-San Antonio	3,700	600	4,300	3,400	12,400
San Antonio-Austin	3,350	14,750	18,100	14,200	82,100
Austin-Waco	3,010	11,590	14,600	11,400	69,100
Waco-Dallas	3,050	6,250	9,300	7,300	41,600
Dallas-Oklahoma City	610	9,490	9,900	N/A	42,200
Oklahoma City-Kansas City	600	5,700	6,300	N/A	27,100
Kansas City-Des Moines	110	6,490	6,400	N/A	20,700
Des Moines-Minneapolis/St. Paul	170	6,330	6,500	N/A	21,700
Minneapolis/St. Paul-Duluth	100	3,000	3,100	N/A	23,700

To accommodate truck traffic, the Trade Focus Strategy provides special features for trucks from the Dallas-Ft. Worth area south to Laredo. This involves about 785 km (490 miles). Options to consider include provisions for larger truck sizes and weights as well as the option of special lanes for trucks. The location for these lanes can be a separate facility near I-35 or special truck lanes within the I-35 right-of-way. The Trade Focus Strategy includes heavy duty pavement and bridges throughout the facility and inclusion of complete ITS for commercial vehicle operations. It also assumes the development of pre-clearance centers for U.S., Canadian, and Mexican Customs operations.

5. RELIEF ROUTES

In a number of urban areas, relief routes are recommended because of the inability to meet the travel demand within the existing right-of-way constraints. Any capacity needed that was not able to be met within the right-of-way limitations or other options discussed was assumed to be met by a separate relief route. As the specifics of relief routes is unknown, neither the benefits nor costs of these facilities were included in the analysis. The details of actual location and dimensions for specific relief routes of I-35 require local studies.

6. OTHER STRATEGIES

The Trade Focus Strategy includes incorporation of other transportation elements such as public transit services, travel demand management, and land use planning efforts such as growth management. Locations for new intermodal transfer facilities, U.S. Customs operations, and improved linkages to existing facilities would be additional refinements. These refinements should be addressed in comprehensive planning studies for cities and counties, statewide

transportation systems planning, and through comprehensive analyses of individual projects where major investments are required.

F. CONCLUSIONS

Analysis of the I-35 Corridor showed that benefits accrued for all three viable alternatives which were further studied. However, the Trade Focus Strategy had the best return of all the alternatives as measures by annual costs savings, economic impact, and cost/benefit. The benefits were calculated in annual cost savings, economic impact and cost/benefit.

1. ANNUAL COST SAVINGS

The following are the annual cost savings (in 1996 dollars) during the design year of the project year 2025, when compared with the base case alternative of "do little

- \$1.15 billion annual vehicle operating cost savings;
- \$1.08 billion annual travel time cost savings; and
- \$151 million annual accident cost savings; that totals to
- Almost \$2.38 billion annual travel efficiency benefits by 2025.

2. ECONOMIC IMPACT

The economic impact during the construction and operational life of the project, (calculated in 1996 dollars) for the primary impact area is projected to be:

- \$20.9 billion in discounted value added;
- 43,100 permanent jobs created that can be attributed to the I-35 Corridor improvements;
- Over \$30.8 billion in personal income added; and
- Over \$18.4 billion in added wages.

3. COST/BENEFIT

The cost estimate for the Trade Focus Strategy using 1996 cost data is \$10.9 billion. This includes costs for the following elements as described previously:

- Roadway;
- Structures;
- Intelligent Transportation Systems (ITS); and
- Engineering and administration.

When the total cost to implement the Trade Focus Strategy is compared to the benefits derived from it, the projection is that \$1.86 in benefits will be realized for each dollar expended. The net present value for the strategy is projected to be \$5.76 billion, which represents the net economic value of the project to the nation's economy.