

**Texas Department of Transportation
Texas Turnpike Authority**

IH-35 Traffic Diversion to TTC-35

October 23, 2006

TRANS-TEXAS CORRIDOR TTC-35

IH-35 Traffic Diversion to TTC-35

Table of Contents

1 Overview 1
2 Modeling Assumptions and Methodology 1
3 Results of the Modeling..... 5
4 Conclusions..... 6
5 References..... 7

TRANS-TEXAS CORRIDOR TTC-35

IH-35 Traffic Diversion to TTC-35

1 Overview

This technical report summarizes the analysis of the maximum diversion potential for traffic diverted off IH-35 to a Trans-Texas Corridor-35 (TTC-35) facility paralleling IH-35.

In order to arrive at potential traffic diversion, preliminary travel demand modeling was performed. Travel demand models allow a traffic engineer to test road alternatives (what-if scenarios) and compare results between those alternatives. The potential traffic diversion from IH-35 to a TTC-35 facility was calculated as the difference between the vehicle carrying capacity of IH-35 and the total vehicular demand for IH-35 which is limited by the number of lanes. When vehicle demand approaches or exceeds the design of a roadway, congestion results and vehicles will seek other routes within the system. As population and demand for IH-35 continues to increase, more vehicles will divert to surrounding roadways. This phenomenon causes congestion to spread outward from IH-35 to other roadways thus increasing congestion throughout the entire system. As part of this effort, traffic modeling was used to quantify the amount of vehicles that would leave IH-35 as a result of insufficient capacity on IH-35 as demand increases over time.

The results of this analysis show the potential traffic that a TTC-35 facility could divert from IH-35. In 2014, the diversion for total vehicles ranges between 5 and 18 percent with trucks ranging between 7 and 22 percent. The percentage of diversion in 2030 for total vehicles ranges between 11 and 24 percent and with trucks ranging from 25 to 36 percent. In 2060, the percentage of diversion ranges from 14 to 44 percent for all vehicles and between 27 and 46 percent for trucks.

2 Modeling Assumptions and Methodology

Maximum diversion potential was defined for this report as the percent difference between the modeled unconstrained and constrained traffic volume on IH-35 within the limits of analysis along the IH-35 corridor. It was assumed that this difference represents the maximum amount of traffic that could potentially divert to a parallel TTC-35 facility. The unconstrained IH-35 scenario assumes no capacity constraints associated with the IH-35 facility. The constrained IH-35 scenario assumes capacity constraints based on current and planned capacity improvements of IH-35.

TRANS-TEXAS CORRIDOR TTC-35

IH-35 Traffic Diversion to TTC-35

A sketch level analysis was performed using the Texas Statewide Analysis Model (SAM¹) to estimate both unconstrained and constrained traffic volumes on IH-35 for the 2014, 2030 and 2060 time horizons. The sketch level analysis is generally used to provide a sense of a project's feasibility in a gross nature. The process is very general in nature and subject to interpretation of factors such as travel time savings, traffic congestion, future socioeconomic development, value of time, income distribution, highway geometric configuration, and availability of competing facilities.

As SAM is a statewide model, modifications were required to localize the analysis by focusing on IH-35 so as not to diffuse potential benefits. One of the modifications made to focus on IH-35 was validating SAM by using the socioeconomic and traffic growth potentials from the local Metropolitan Planning Organizations (MPO) within the IH-35 corridor. Traffic counts from the Texas Department of Transportation (TxDOT) Transportation Planning and Programming (TPP) Division were used in conjunction with estimated growth trends from the MPO sources to assist in providing a gauge of the future travel demand along the IH-35 corridor. The following models were used for this validation exercise:

- Sherman – Denison MPO
- North Texas Council of Governments (NCTCOG) in the northern regions of Dallas
- Waco MPO
- Killeen - Temple MPO between Dallas and Austin
- Capital Area Metropolitan Planning Organization (CAMPO)
- San Antonio MPO in the Austin/San Antonio region
- The super regional model developed for the Austin and San Antonio region.

¹The full details of the SAM model are highlighted in the "Texas Statewide Analysis Model, 2.12.2 Theory Report" dated May 17, 2003.

TRANS-TEXAS CORRIDOR TTC-35

IH-35 Traffic Diversion to TTC-35

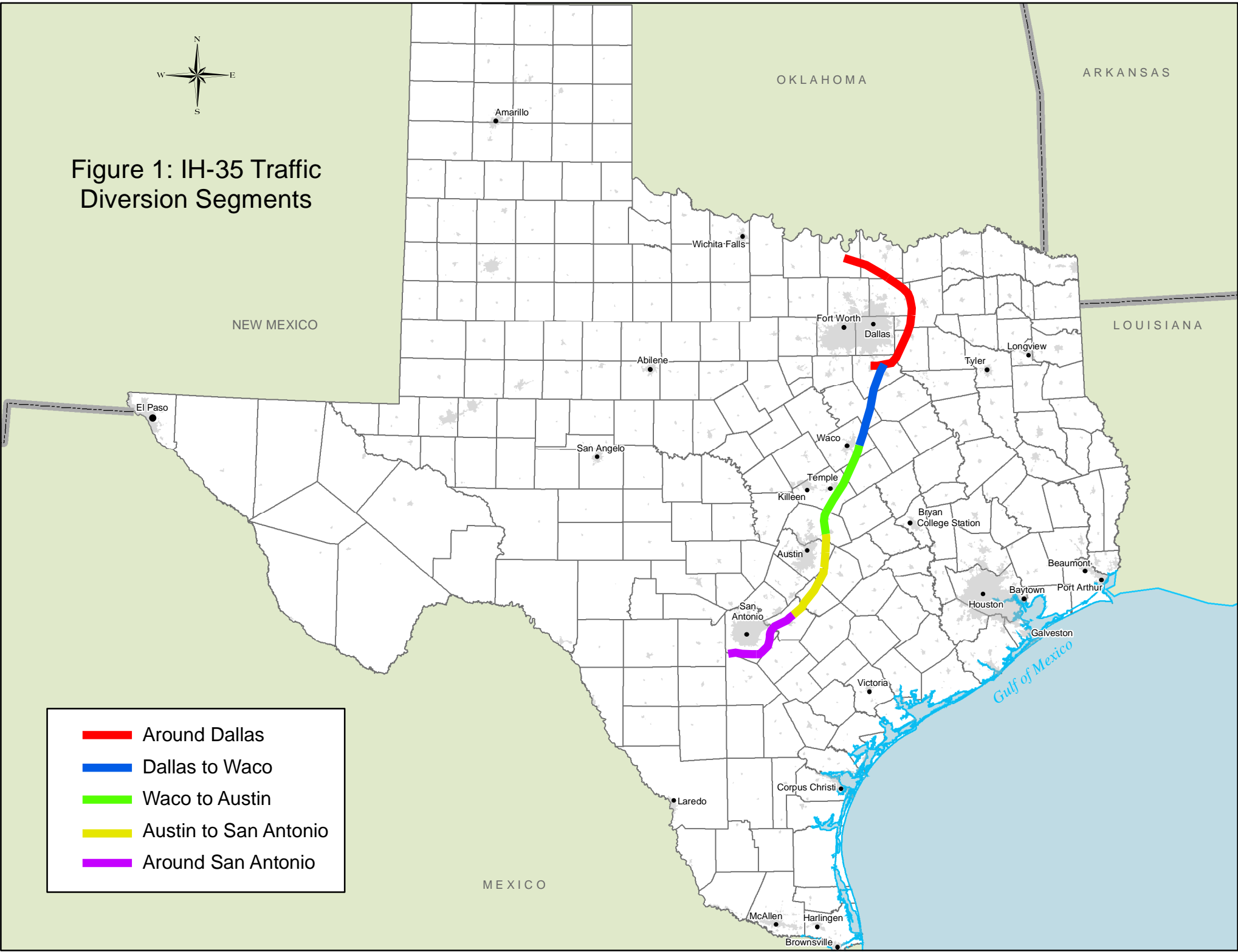
Other modifications to SAM are as follows:

- a) The SAM networks and trip tables were used to evaluate the overall intercity traffic demands that would likely be generated.
- b) The SAM zonal structure was modified to refine the IH-35 corridor for purposes of the analysis.
- c) The traffic analysis zones outside the immediate IH-35 corridor were aggregated into county wide zones and the trip tables were aggregated accordingly for these areas.
- d) The networks were also aggregated for major routes outside the IH-35 corridor while maintaining the SAM network density within the IH-35 corridor influence region.

Unconstrained and constrained scenarios were independently analyzed for five segments of the TTC-35 study area – around Dallas, Dallas to Waco, Waco to Austin, Austin to San Antonio, and around San Antonio. These segments are illustrated in Figure 1. The segment between Laredo and San Antonio was not evaluated because preliminary analysis indicated that the existing facility may have sufficient capacity to accommodate future transportation demand.



Figure 1: IH-35 Traffic Diversion Segments



3 Results of the Modeling

Tables 1 through 3 summarize the percent difference between the unconstrained and constrained scenarios for total vehicles (auto and truck) and broken out by mode for each of the years 2014, 2030 and 2060. Percents reported in Tables 1 through 3 represent the estimated amounts of unconstrained IH-35 traffic volumes that would be diverted to TTC-35. The estimates below represent the maximum diversion potential for each segment of IH-35 that could potentially use TTC-35.

Table 1 – IH-35 Traffic Diversion to TTC-35 (2014)			
Segment	Total Vehicles (%)	Auto (%)	Truck (%)
Around Dallas	5	5	7
Dallas to Waco	9	8	11
Waco to Austin	15	15	15
Austin to San Antonio	18	17	22
Around San Antonio	6	4	18

Table 2 – IH-35 Traffic Diversion to TTC-35 (2030)			
Segment	Total Vehicles (%)	Auto (%)	Truck (%)
Around Dallas	11	10	27
Dallas to Waco	20	14	26
Waco to Austin	23	22	25
Austin to San Antonio	24	21	36
Around San Antonio	11	8	34

Table 3 – IH-35 Traffic Diversion to TTC-35 (2060)			
Segment	Total Vehicles (%)	Auto (%)	Truck (%)
Around Dallas	14	13	27
Dallas to Waco	39	39	39
Waco to Austin	44	42	46
Austin to San Antonio	26	23	40
Around San Antonio	19	16	31

4 Conclusions

The maximum diversion potential results are presented within the narrow context of the assumptions, methodology and scenarios outlined in this report. Given that a final alignment for TTC-35 has yet to be determined, this analysis provides the maximum diversion potential that TTC-35 could capture from IH-35 only. A significant portion of urban and local traffic adjacent to TTC-35 could also potentially be served and is likely to provide benefits such as expected reductions in the overall transportation system’s travel time and traffic congestion.

The sketch level analyses estimated that the maximum potential diversion from IH-35 to TTC-35 could range between 5 and 44 percent dependent on the corridor segment location and choice of travel mode. The potential truck traffic diversion appears to be higher than that for automobile diversion particularly along the rural segments. This is likely due to the cumulative time savings of longer haul trips. However, the urban segments show a higher percentage of automobile diversion compared to the rural segments.

Given the anticipated high volumes of traffic within the urban region by 2060, the percentage of traffic diverted from IH-35 to TTC-35 over time could become a lower share of the total traffic along IH-35. This diminishing share could also be affected by the highly congested urban feeders/arterials to TTC-35 which could limit the ability of vehicles to efficiently access TTC-35.

TRANS-TEXAS CORRIDOR TTC-35

IH-35 Traffic Diversion to TTC-35

TTC-35 could attract traffic from other heavily used facilities within the IH-35 corridor by providing additional capacity to the overall transportation system. This increase in capacity within the IH-35 corridor could enable the existing urban and local transportation systems to accommodate traffic growth that could strain the overall transportation system and cause congestion pressures beyond those currently experienced on IH-35.

System-wide mobility benefits other than those summarized in this report could be realized as a result of TTC-35. Such benefits could include improved travel times, congestion relief for local facilities, and other benefits. These could increase the overall benefit of TTC-35 in the context of maximum diversion potential.

5 References

“Texas Statewide Analysis Model, 2.12.2 Theory Report” dated May 17, 2003