



I-35 Capital Area Improvement Program
Corridor Implementation Plan
SH 45N to SH 45SE
Travis County, Texas

August 2013





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Executive Summary

Background

The existing Interstate 35 (I-35) corridor spans approximately 550 miles across the state of Texas from the Oklahoma state line to the international border with Mexico. In the Capital Area, I-35 provides the backbone of the local transportation network, and carries over 200,000 vehicles per day on some segments. Improvements to the existing I-35 facility have not kept pace with increasing population and traffic demand. Delay in implementation of long-term mobility solutions has resulted in severe congestion for many sections of I-35 in the Capital Area. In fact, the section of I-35 from US 183 to SH 71 is currently the 4th most congested roadway in the State.

I-35 Capital Area Improvement Program

The Texas Department of Transportation (TxDOT), in coordination with the local Rider 42 Local Working Group and other transportation partners, implemented the I-35 Capital Area Improvement Program (CAIP) for Hays, Travis and Williamson Counties. Efforts for the I-35 CAIP are delineated by five phases generally described as: Phase 1 Conceptual Planning; Phase 2 Implementation Plan; Phase 3 Schematic and Environmental Coordination; Phase 4 Construction Plans, Right-of-Way, and Utility Coordination; Phase 5 Letting and Construction.

This report details efforts to develop a Corridor Implementation Plan for the Travis County portion of the I-35 CAIP. The area included in the Implementation Plan extends 28 miles along existing I-35 from SH 45 North (SH 45N) just within the southern city limits of Round Rock, Texas, to State Highway 45 Southeast (SH 45SE) located just north of Buda, Texas. This plan focuses on identifying feasible and effective short- and mid-term improvements along and across I-35 within those limits that would improve local and through traffic mobility along and across the corridor, while considering longer term corridor needs. Concepts advanced through this Plan are fully vetted through stakeholders and the public via an extensive public involvement program. Specific items addressed include: environmental constraints; engineering evaluation; traffic operational assessment; timing for improvements; developing preliminary cost estimates; identifying funding opportunities and limitations; and public outreach. These Phase 2 efforts build on Phase 1 efforts performed by the City of Austin (COA) beginning in 2011. In addition, this report summarizes other projects already in Phase 3, 4 and 5 development along I-35 in the study area.

Implementation Plan Concepts

A refined program of projects for I-35 mobility improvements in Travis County has been developed. This refined program of projects is based on corridor assessments that are conceptual and subject to change. This plan provides for the following general types of improvements:

- An additional I-35 travel lane in each direction, called the Future Transportation Corridor (FTC).
- Changes to I-35 ramping, including addition of auxiliary lanes.

- Development of collector-distributor roads for portions of the corridor.
- Frontage road and intersection mobility improvements.
- New turn-around bridges and other local mobility improvements.
- Use of innovative solutions, such as roundabouts and diverging diamond intersections.
- Implementation of a Texas super street for part of the frontage road system.
- Bicycle, pedestrian, and transit improvements.

The program of proposed projects, grouped geographically as North, Central, and South, includes the following:

North	Central
Ramp Reversal: SH 45 to Grand Avenue	51st Street
Grand Avenue Parkway	Ramp Modifications: US 290 to Airport
Wells Branch Parkway	Airport Boulevard
Howard Lane	Decks: Airport to MLK
Lamar Realignment	Downtown: Depressed Section w/Caps
Parmer Lane	MLK Boulevard
Braker Lane	Central FTC
Pedestrian Bridge: Rundberg to US 183	
US 183 Direct Connectors	
Ramp Modifications: US 183 to US 290	
St. Johns	
North FTC	
South	Corridor Wide
Riverside Drive	ITS
Oltorf Street: Woodland to Woodward	
William Cannon and Stassney	
Slaughter Lane	
Slaughter Creek Overpass	
South FTC	

Anticipated preliminary development cost for the corridor is estimated between \$1.25 and \$1.91 billion. The difference is attributable to the scope of options developed for the downtown core, as well as potential direct connector ramps at US 183. At this time, \$259.4 million in potential funding is identified. Other potential funding sources include local entity bond elections, State Infrastructure Bank (SIB) and/or Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, and toll financing, in combination with traditional local, state and federal funding.



Next Steps

Project development will continue to move forward for those projects currently under development within the study area. As funding is identified, more projects identified in this plan will progress into Phases 3 – 5 of development.

It is anticipated that Phase 3 will include activities aimed at identifying a mode-choice (type of use) for the FTC, identifying segments of independent utility for the FTC, and on-going preliminary engineering and public involvement. Phase 2 planning efforts have been initiated for I-35 in Williamson and Hays Counties. Public outreach will be integral to the ongoing I-35 CAIP projects.

This Implementation Plan will be updated on an annual basis for the corridor.



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1.0 Background and Objectives

The existing Interstate 35 (I-35) corridor spans approximately 550 miles across the state of Texas from the Oklahoma state line to the international border with Mexico. Constructed as part of the original Interstate Highway System in the 1950s, I-35 is the hub of transportation in Texas, serving a variety of daily users including commuters, freight trucks, and business travelers. As the only Interstate Highway connecting Mexico and Canada through the U.S. heartland, the majority of North American Free Trade Agreement trade passes through Texas along the I-35 corridor via commercial trucks and rail. In addition to serving many major population centers, the I-35 corridor is the backbone of the Texas economy and it plays a critical role in facilitating economic activity and business productivity in the state.

The I-35 corridor is considered to be one of the most important corridors in the state of Texas in terms of future growth and economic development. The diverse users of I-35 create substantial demand, with some sections of I-35 currently seeing over 200,000 vehicles per day. Seventeen segments of I-35 are on the Texas A&M Transportation Institute's (TTI's) 2012 Top 100 Most Congested Roadways list, indicating more congestion than any other roadway in the State. Four Texas cities along the I-35 corridor, Dallas, Fort Worth, Austin, and San Antonio, are in the top twenty largest cities in the United States. These cities are expected to see robust population growth in the future, which will place an even greater strain on the existing I-35 corridor.

In the Capital Area, improvements to the existing I-35 facility have not kept pace with increasing population and traffic demand. Previous improvement studies and recommendations for I-35 in this region have focused primarily on large-scale, long-term solutions, which have presented numerous financing, environmental, and political challenges to implementation. Delay in implementation of these long-term solutions has resulted in severe congestion for many sections of I-35 in the Capital Area. In fact, the section of I-35 between US 183 and SH 71 is currently the 4th most congested roadway in the State.

1.1 I-35 Capital Area Improvement Program

In light of these challenges, the Texas Department of Transportation (TxDOT) implemented the I-35 Capital Area Improvement Program (CAIP) for Hays, Travis and Williamson Counties. The I-35 CAIP program focuses on feasible and effective short- and mid-term strategies that can be implemented to improve mobility and connectivity along and across the I-35 corridor (while considering long-term corridor needs). Using past I-35 studies as background, partner agencies and stakeholders are working together to develop mobility solutions that are implementable, that are cost-effective, and that generally do not require wholesale reconstruction of the corridor or substantial additional right-of-way. This report focuses on I-35 CAIP efforts from State Highway 45 North (SH 45N) to State Highway 45 Southeast (SH 45SE), a 28-mile corridor primarily in Travis County.

1.1.1 Phases of Project Development

Multiple efforts are underway as part of the I-35 CAIP; these efforts fall into various phases of the project development process. In order to ensure consistent use of terminology, for purposes of the I-35 program, these phases are defined as:

- **Phase 1: Conceptual Planning** – Perform high-level concept planning; identify project need and scope; and public outreach.
- **Phase 2: Implementation Plan** – Identify issues and constraints; assess project scope, critical components and geometrics; operational assessment; fatal flaw analysis; develop preliminary cost estimates; identify funding opportunities; and public outreach.
- **Phase 3: Schematic and Environmental Coordination** – Prepare preliminary schematic (30%); determine right-of-way needs; develop and process environmental documentation; public involvement and agency coordination.
- **Phase 4: Construction Plans, Right-of-Way, and Utility Coordination** – Prepare detailed construction plans; acquire necessary right-of-way; adjust utilities; and prepare detailed cost estimates.
- **Phase 5: Letting and Construction** – Final approval of Plan Specifications and Estimates (PS&E), secure funding, release final proposal, advertise request for bids, review bids and award contract, and initiate project construction.

1.1.2 Current I-35 CAIP Efforts in Travis County

A number of concurrent efforts are underway under the I-35 CAIP within Travis County. Items under development include:

- **Phase 1 Corridor Improvement Study from SH 45N to SH 45SE** (funded by the City of Austin and by Rider 42 of the General Appropriations Act).
- **Phase 2 Corridor Implementation Plan from SH 45N to SH 45SE** (funded by TxDOT and by Rider 42 of the General Appropriations Act).
- **Phase 3 efforts from north of Stassney Lane to south of William Cannon Drive** (funded by TxDOT).
- **Phase 3 efforts from Woodland Avenue to Woodward Street** (funded by TxDOT).
- **Phase 4 and 5 efforts from Howard to Parmer Lane** (funded by TxDOT and private parties).
- **Phase 4 and 5 efforts at 51st Street** (funded by TxDOT and the City of Austin).

1.2 Project Objective

The I-35 CAIP Travis County Corridor Implementation Plan (Implementation Plan) development includes engineering, public involvement, and environmental services to identify a program of improvements to I-35 from SH 45N to SH 45SE. Conceptually, the improvements are generally described as an additional lane on I-35 in each direction and associated ramping, interchange, frontage road and multi-modal modifications and improvements to enhance overall mobility along and across the corridor.

General guiding considerations for this effort include:

- Maintaining the existing number of general purpose lanes and auxiliary lanes.
- Determining a feasible method for including additional mainlane capacity (one lane in each direction), defined as a Future Transportation Corridor (FTC).
- Accounting for what has been tried in the past, incorporating ideas and lessons learned from previous studies. In particular, build upon the I-35 Phase 1 efforts from the City of Austin (COA).
- Wholesale corridor reconstruction is generally beyond the scope of Phase 2 efforts; however, proposed concepts should consider long-term needs to minimize “throw-away” improvements.
- Mobility concepts should be multi-modal, with identification of opportunities for improved bicycle/pedestrian accommodations and consideration of transit, including bus and rail.
- Considering freight movements.
- Reviewing environmental constraints for potential issues.
- Minimizing right-of-way takes.
- Developing order-of-magnitude estimates of probable cost for feasible concepts.
- Developing a conceptual implementation schedule.

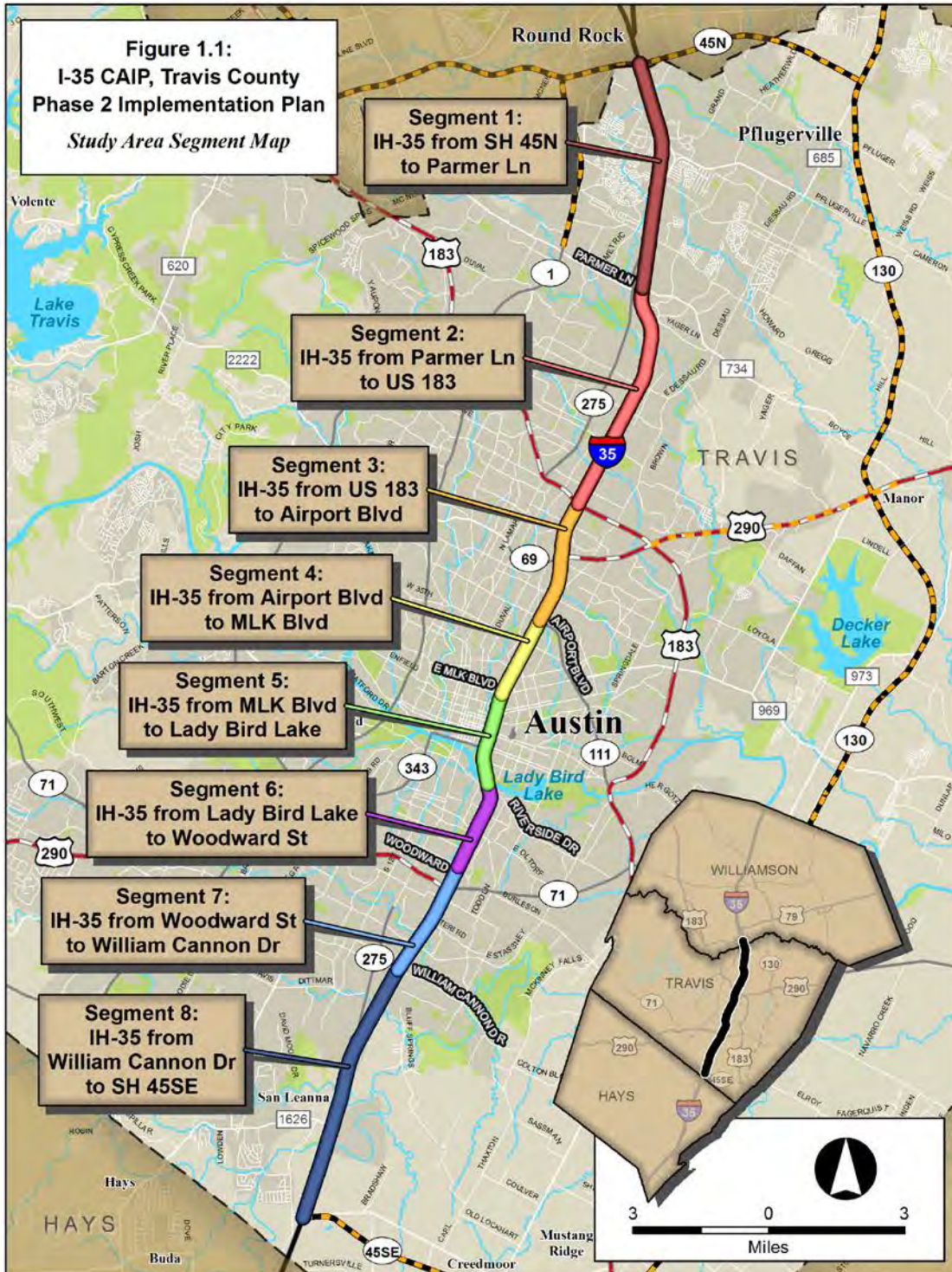
1.3 Definition of Corridor Planning Area

The planning area for this Implementation Plan extends 28 miles along existing I-35 from SH 45N just within the southern city limits of Round Rock, Texas, to SH 45SE located just north of Buda, Texas. For planning and evaluation purposes this corridor is broken into eight segments, shown in **Figure 1.1**:

- **Segment 1** – SH 45N to Parmer Lane.
- **Segment 2** – Parmer Lane to US 183.
- **Segment 3** – US 183 to Airport Boulevard.
- **Segment 4** – Airport Boulevard to Martin Luther King Boulevard (MLK).
- **Segment 5** – MLK to Lady Bird Lake.
- **Segment 6** – Lady Bird Lake to Woodward Street.
- **Segment 7** – Woodward Street to William Cannon Drive.
- **Segment 8** – William Cannon Drive to SH 45SE.

1.4 Project Funding

Funding for Implementation Plan development was provided by a combination of Rider 42 of the Texas General Appropriations Act, and directly from the TxDOT annual appropriations budget. Rider 42, administered via TTI’s Mobility Improvement Planning efforts, directs TxDOT to work with local agencies to address the most congested roadway segments in the major metropolitan areas of the State. The intent of Rider 42 is to ensure metropolitan areas incorporate the best congestion reduction practices so funding is spent as efficiently as possible.



2.0 Corridor History and Improvement Efforts

In 1927, United States Highway 81 (US 81) was authorized from the Oklahoma/Texas border, south of Terrell, through Fort Worth, Waco, Austin, San Marcos, and Laredo to the Texas/Mexico border. In the 1930s, US 81 was completed in Travis County. In the 1950s, I-35 was completed through Austin as a 4-lane highway. I-35 generally followed the alignment of US 81 in Travis County, but veered to the east in what is now the Austin urban core. I-35 was upgraded to a controlled-access, 6-lane Interstate Highway through downtown Austin by 1962.

In 1975, a two-mile I-35 upper deck was added from Airport Boulevard to Eleventh Street in downtown Austin in an effort to relieve congestion. Subsequent improvements have involved addition of mainlane capacity north and south of the urban core, improvements to system-to-system interchanges at US 183, US 290E and SH 71, changes to ramps, intersection improvements, and the addition of some U-turn overpasses.

2.1 Population and Employment

Since the construction of the Interstate Highway system in the 1950s, the population in Travis County has experienced a steady growth rate, ranging from 26.1% to 42% per decade. As shown in **Table 2.1**, the population of Travis County increased from 160,980 people in 1950 to 1,024,266 people in 2010.

Table 2.1: Historical Population Growth in Travis County, 1950-2010		
Year	Travis County Population	% Change
1950	160,980	--
1960	212,136	31.8%
1970	295,516	39.3%
1980	419,573	42.0%
1990	576,407	37.4%
2000	812,280	40.9%
2010	1,024,266	26.1%

Source: U.S. Census Bureau (1950, 1960, 1970, 1980, 1990, 2000, 2010)

The robust population growth in Travis County is forecasted to continue into the future, as current estimates project 2035 population in Travis County to reach over 1.5 million residents. **Table 2.2** presents forecasted Travis County population levels and growth rates for 2015-2035.

Table 2.2: Future Projected Population Growth in Travis County, 2015-2035		
Year	Travis County Population	% Change
2015	1,105,000	--
2025	1,318,000	19.3%
2035	1,555,300	18.0%

Source: CAMPO 2035 Regional Transportation Plan (2010)

In addition to being a major population center and the State Capitol, the greater Austin metropolitan area plays host to many major employers and has become known nationally as a leader for technology

sector employment. In addition to local, state and federal government functions, and the University of Texas, major private sector employers¹ in the Austin-area include:

- Dell.
- IBM Corporation.
- Seton Family of Hospitals.
- St. David’s Healthcare Partnership.
- Advanced Micro Devices.
- Apple Computer.
- Applied Materials.
- AT&T, Flextronics.
- Freescale Semiconductor.
- National Instruments.

Estimated employment levels in Travis County are expected to nearly double over the 30-year period from 2005 to 2035, to over 1,000,000 jobs. **Table 2.3** provides information regarding forecasted employment growth for Travis County to the year 2035.

Table 2.3: Future Projected Employment Growth in Travis County, 2005-2035		
Year	Travis County Employment	% Change
2005	536,900	--
2015	707,200	31.7%
2025	843,500	19.3%
2035	1,026,500	21.7%

Source: CAMPO 2035 Regional Transportation Plan (2010)

2.2 Corridor Traffic

As population and employment in Travis County have increased, so have demands on the regional highway system, including I-35. However, in many cases transportation improvements have not kept pace with population growth, resulting in heavy congestion at many locations along I-35 in Travis County, especially during peak travel periods. Average Annual Daily Traffic (AADT) is shown in **Table 2.4**. Nationally, vehicle miles travelled have declined from 2007 – 2011 as a result of economic conditions. A marked reduction in AADT occurred for certain locations in the I-35 corridor between 2005 and 2010. This reduction also coincided with the opening of SH 130 and SH 45 as additional routes within the planning area in 2005.

¹ Defined as employing over 2,000 employees. Source: Austin Chamber of Commerce, <http://www.austinchamber.com/austin/work/employers.php>

Location	1980	1985	1990	1995	2000	2005	2010	2035*
North of US 183	56,000	106,000	131,000	173,000	180,000	229,970	193,000	221,000
South of US 183	79,000	131,000	148,000	180,000	220,000	249,960	205,000	309,000
At Lady Bird Lake	108,000	149,000	163,000	192,000	201,000	194,880	175,000	302,000
North of SH 71	76,000	114,000	131,000	150,000	167,000	158,380	183,000	270,000
South of SH 71	52,000	86,000	114,000	142,000	161,000	169,740	176,000	241,000

Source: TxDOT Annual Count Data

* Projected

2.3 Non-motorized Travel Considerations

As the population density along the I-35 corridor continues to grow in Travis County, the need for a comprehensive, sustainable, multi-modal transportation network increases, particularly where the I-35 corridor bisects the urban core of Austin. Within the planning area, I-35 can present a physical barrier to many bicyclists and pedestrians. Existing parallel bicycle and pedestrian routes are discontinuous, and cross-connectivity is uneven. Improved, safe, continuous routes along and within the I-35 corridor would increase the opportunities for cycling or walking trips within the corridor, as well as for short trip and end-of-trip travel. These bicycle and pedestrian trips, in turn, could reduce vehicular traffic within the corridor.

Short trips are generally defined as 1.5 miles one-way for bicyclists and 0.5 miles one-way for pedestrians. End-of-trip travel relates to transportation needs once someone arrives at or departs from a transit mode such as a bus or light rail. Short trip distances, end-of-trip needs, existing demographics and land uses help drive the development of bicycle and pedestrian improvements throughout the corridor with these key goals steering the design:

- Provide safer bicycle/pedestrian routes.
- Increase corridor east-west permeability.
- Provide continuous routes.
- Support multi-modalism.
- Improve corridor safety.

These goals are based on the repeated themes of non-motorized planning efforts by the Capital Area Metropolitan Planning Organization (CAMPO), the Capital Metropolitan Transportation Authority (Capital Metro), the COA and several other local organizations. CAMPO’s *2035 Regional Transportation Plan* recognizes bicycle and pedestrian accommodations as a part of “Building a Multimodal Transportation System.”

Capital Metro has worked with the COA to create Transit Oriented Development (TOD) Districts. TODs are intended to create transit-friendly walkable communities with a mix of people, jobs, and services. Typically these districts are centered on one or more modes of transit, and are connected via sidewalks and bicycle facilities to nearby areas. Three of these districts - North I-35 Park and Ride (Segment 1),

Convention Center and Plaza Saltillo (Segment 5) - connect to the I-35 corridor. Two future districts - Highland Mall (Segment 4) and South I-35 Park and Ride (Segment 8) - will likely connect as well. The COA has plans and studies specific to bicycle and pedestrian networks, including the *Austin 2020 Bicycle Plan Update*.

2.4 Previous Plans and Studies

By the mid-1980s, TxDOT identified the need to address congestion on I-35 through Austin. Several studies have been conducted by TxDOT to try to find appropriate solutions.

2.4.1 1987 Feasibility Study

In 1987, TxDOT hired a consultant to perform a feasibility study to determine how best to upgrade I-35 from Martin Luther King Boulevard Ben White Boulevard (SH 71/US 290). In 1988, the study was terminated because of concerns that the concepts under development would not effectively address the transportation needs and would not be accepted by the community due to the extensive use of elevated structures and the large amount of right-of-way that would be required to implement the concepts.

2.4.2 TxDOT Austin District I-35 Major Investment Study

In 1989, TxDOT began an in-house feasibility study to determine a way to upgrade I-35 that addressed public concerns more effectively than the 1987 study. The study limits were along I-35 from US 183 to Ben White Boulevard (SH 71/US 290). With the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), TxDOT determined that the study should be expanded into a Major Investment Study (MIS) as required by ISTEA. The expanded study included all of the Austin Transportation Study (ATS)² area and added High Occupancy Vehicle (HOV) lanes as a possible design feature. The I-35 MIS was included in the ATS plan adopted in December 1994. Eleven possible strategies were studied. Of the eleven strategies studied, the MIS recommended three possible strategies be carried forward for detailed engineering and environmental analysis. These three strategies were:

- Strategy 1 – No Action Alternative
- Strategy 5-B1 – Major construction on I-35 to construct new HOV lanes within the existing I-35 corridor, assuming construction of light rail as proposed by Capital Metro, and providing travel demand measures in the ATS area.
- Strategy 6-E –Major reconstruction of I-35 between certain limits within the ATS area, integrating transportation system mobility improvements, assuming construction of light rail as proposed by Capital Metro, and providing travel demand measures in the ATS area.

² The ATS was the predecessor organization to CAMPO, and included all of Travis County.



The MIS process was completed in 2004. Due to funding limitations and other hurdles to implementation, none of the major improvements identified in the MIS were advanced to construction.

2.4.3 I-35 Corridor Advisory Committee Plan (My 35)

In 2008, the Texas Transportation Commission established the I-35 Corridor Advisory Committee (CAC) to engage the citizens of Texas and develop a plan to address transportation challenges along the I-35 corridor from the Oklahoma/Texas border to the Texas/Mexico border. Membership of the CAC included business professionals, environmental planners, rail advocates, professors, local officials, and residents that lived and did business in the I-35 corridor. In order to engage the public at the local level and to better understand the local needs associated with I-35, the Texas Transportation Commission enlisted assistance from four I-35 Corridor Segment Committees (CSCs) located geographically along the I-35 corridor to report to the CAC. The CAC considered the recommendations of the CSCs and developed the I-35 Corridor Advisory Committee Plan (My 35 Plan) to address mobility challenges along I-35. The plan made the following general recommendations for the I-35 Corridor in Texas:

- Freight and passenger rail projects to alleviate freight demands on roadways.
- Roadway design to separate cars and trucks to increase safety.
- Managed lanes to ease congestion and provide relief to transportation funding.
- Integrated, real-time traffic information systems that alert drivers to delays and provide alternate routes.

In the Capital Area, the plan recommended re-designating and re-naming parts of I-35 to divert interstate traffic away from metropolitan areas and onto SH 130.

The CAC planning effort was a needs-based planning effort and was financially unconstrained. Recommendations also did not include any dedicated funding sources for improvements. Thus recommendations made by the CAC could only be pursued by other agencies – TxDOT, Regional Mobility Authorities (RMAs), cities and counties. My 35 recommendations have been considered as part of this current effort.

2.4.4 City of Austin I-35 Phase 1 Study

The I-35 Corridor Improvement Program is a COA-led conceptual planning (Phase 1) study initiated in August 2011. This was one of several initiatives funded by the 2010 City of Austin Mobility Bond Program. As noted previously, Phase 1 efforts include high-level concept planning and feasibility assessment. This study initially covered the area between US 290E on the north and William Cannon Drive on the south. Study efforts included extensive public outreach with dozens of stakeholder meetings, multiple open houses, and regular engagements with partnering agencies. The outreach generated a large number of corridor improvement ideas, which were considered for further development and implementation. The study limits were expanded in July 2012 to include examination of express lanes and other potential short- and mid-term improvements between SH 45N and US 290E, and between William Cannon Drive and SH 45SE. The COA planning effort is anticipated to be complete in August 2013. Feasible ideas and concepts that have emerged from this effort were incorporated into

the Implementation Plan efforts detailed in this report. Stakeholder, technical and public outreach efforts between the Phase 1 study and the Phase 2 Implementation Plan are coordinated through a Project Management Team and Technical Steering Committee (TSC) common to both efforts.

2.5 Current Projects on I-35

In addition to the planning efforts currently underway as part of the My 35 Plan and the I-35 CAIP, there are two I-35 improvement projects in Travis County that are presently under development and expected to go to construction in 2013. In addition, two early action projects, identified through the COA's Phase 1 efforts, are under development. A brief overview of these projects is provided below.

2.5.1 I-35 from Howard Lane to Parmer Lane

TxDOT is working with a private developer to prepare the environmental document (Phase 3) as well as plans, specifications and estimates (Phase 4) for improvements to I-35 from Howard Lane to south of Parmer Lane. This project involves the construction of a northbound frontage road collector-distributor roadway at Parmer Lane and associated ramps to improve safety/access along the frontage road. This project will also help to alleviate congestion at the Parmer Lane intersection, improve access to adjacent businesses, and enhance access to Capital Metro's Tech Ridge Park and Ride facility located south of Howard Lane. Construction of the project is anticipated to cost \$3 million and will be funded by Proposition 12 funds. The project is anticipated to begin Phase 5, construction, in late 2013.

2.5.2 I-35 at 51st Street

TxDOT is developing the environmental document (Phase 3) and plans, specifications, and estimates (Phase 4) for improvements on the northbound side of I-35 in the vicinity of 51st Street. The project will involve the construction of a slip-ramp from the frontage road to the intersection at 53rd Street and construction of operational enhancements along Cameron Road and 51st Street. The project is intended to provide improved access to commercial and residential areas without having to travel through the Mueller Development area. TxDOT is providing the project development funds for these improvements. It is anticipated that the COA will provide funds for construction. The project is estimated to cost \$3 million with Phase 5, construction, anticipated to begin in late 2013.

2.5.3 I-35 from Woodland Avenue to Woodward Street

TxDOT has initiated development of environmental documents and schematic engineering (Phase 3) for mobility improvements to I-35 from Woodland Avenue to Woodward Street. This project would include the addition of turnaround bridges at Oltorf Street, frontage road improvements for local mobility, and addition of I-35 mainlane auxiliary lanes between existing ramps. Phase 3 is anticipated to be complete by February 2014. There are currently no funds identified for development of Phase 4 or Phase 5 of this project.



2.5.4 I-35 from north of Stassney Lane to south of William Cannon Drive

TxDOT has initiated development of environmental documents and schematic engineering (Phase 3) for improvement to I-35 from Stassney Lane to William Cannon Drive. This project would include the addition of turnaround bridges at both Stassney Lane and William Cannon Drive, frontage road improvements for local mobility, widening existing frontage road bridges at Williamson Creek for bicycle access, addition of I-35 mainlane auxiliary lanes between ramps, and potential changes to existing ramping. Phase 3 is anticipated to be complete by February 2014. There are currently no funds identified for development of Phase 4 or Phase 5 of this project.

2.6 Regional Projects

Improvements under development as part of the I-35 CAIP are part of a regional effort to enhance the primary corridor system. Other regional mobility initiatives currently underway are shown in **Figure 2.1**. Collectively, these improvements are intended to improve regional mobility beyond the impact to any single corridor.

Consideration of all regional mobility projects is crucial in evaluating the phasing of improvements along I-35. For example, the downtown portion of the project must be staged so that a major reconstruction is not underway at the same time as a major effort on one or more of the potential alternate routes. Potential phasing of the I-35 projects discussed later in this document is based upon anticipated completion of regional projects to ensure this scenario does not occur. Regardless of when actual construction of I-35 occurs, construction phasing between corridors would be coordinated to ensure overall impacts to regional travel stay at an acceptable level. Further, development of parallel facilities would mitigate the impacts of major construction activities on a particular corridor during its construction. For example, a project to add a direct ramp connection from southbound I-35 to southbound US 183 will (in part) facilitate the use of US 183 as a potential alternate route during I-35 construction. TxDOT is also exploring enhancements to the connection of southbound US 183 to westbound SH 71 to further facilitate those benefits for construction and other incidents. Additional discussion of the impact of regional project on I-35 phasing may be found in **Section 4.3**.

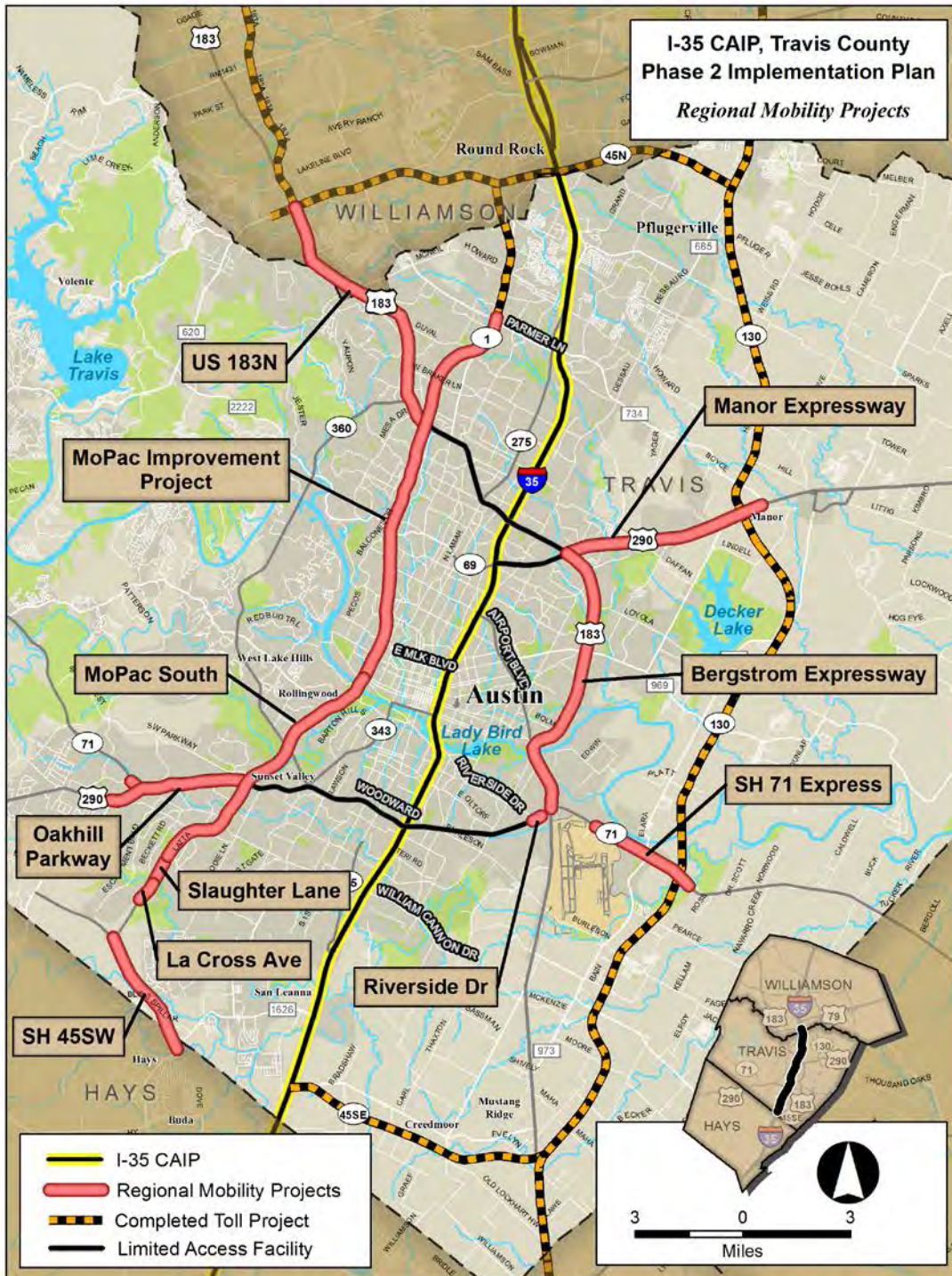


Figure 2.1 Regional Mobility Projects

3.0 Implementation Plan Development

Implementation Plan development included technical evaluations and public outreach. These efforts included both stand-alone and coordinated efforts. This section describes these efforts, as well as the improvement concepts developed and refined as part of implementation development.

3.1 Relationship of Phase 1 and Phase 2 Efforts

Efforts for the Implementation Plan have built upon the COA Phase 1 efforts. Phase 1 study efforts entailed a high-level feasibility assessment of mobility improvements for the corridor, based on limited engineering and operational information. Phase 2 planning efforts were able to build directly upon the Phase 1 results to provide additional engineering and operational analysis of corridor concepts. Phase 2 efforts have expanded on these initial efforts to include environmental, surveying and other efforts that were not part of Phase 1 analysis. Phase 2 also developed traffic operational analysis to technically vet the effectiveness of identified concepts. Where appropriate, Phase 2 efforts have developed additional concepts for evaluation.

Phase 1 efforts included robust public/stakeholder involvement and outreach efforts to generate public input and feedback for development of improvement concepts. Public and stakeholder outreach activities were expanded to encompass both Phase 1 and Phase 2 corridor planning.

3.2 Concept Refinement Charette

Feasible mobility concepts developed by the Phase 1 study, as well as additional concepts from the initial Phase 2 investigation served as a starting point for a Concept Refinement Charette held in Austin October 30, 2012, through November 2, 2012. The charette brought together subject matter experts from across the country, engaging many of the best minds in the industry to work on the difficult challenge of bringing meaningful improvements to the I-35 Corridor through Travis County. As planning area Segments 1 and 2 were not sufficiently advanced through Phase 1 development for meaningful concept development as of the date of the charette, the charette evaluated corridor Segments 3 through 8 (See **Figure 1.1**).

The goal of the Concept Refinement Charette was to develop the best concepts for improvements in each area using the concepts developed to date as a starting point, but with the ability to evaluate any solution that met corridor criteria. Evaluation considerations included basic analysis of timeline, constructability/maintenance of traffic, and cost parameters as well as engineering, operational, environmental and right-of-way criteria. At completion of the charette, charette participants recommended one or more concepts for further investigation in each studied segment.

While these recommendations were based upon limited information and short working duration, they represented good, viable solutions to the corridor challenges, and were accepted by the planning team as working solutions for the corridor. Full discussion of the charette may be found in the *I-35 CAIP Concept Refinement Charette Summary, Travis County*. After the charette, the Phase 2 team continued to refine the recommended concepts and develop additional concepts that appeared to have merit.

3.3 Limitations

Phase 2 efforts are subject to further evaluation and refinement. Concepts shown in this section are subject to revision in subsequent project phases. No final decisions have been made regarding implementation of any specific improvements on the I-35 corridor. All concepts recommended in this Implementation Plan must undergo Phase 3 (NEPA) and Phase 4 (PS&E) development prior to possible implementation of Phase 5 (construction).

3.4 Public and Agency Involvement

The I-35 CAIP has included an extensive public and stakeholder outreach effort. This effort began as part of the COA Phase 1 effort, and was expanded with Phase 2 planning efforts. This effort will continue into subsequent project development phases. The intent is to provide stakeholders, resource and partner agencies and the public with a unified and coordinated corridor outreach effort that provides consistent input opportunity and information for the corridor. This ongoing public involvement is multi-jurisdictional and includes one-on-one meetings, small group meetings, large group meetings, open houses and online efforts. Public input received to date, when appropriate, has been incorporated into development of the Phase 2 improvement concepts.

3.4.1 Technical Steering Committee

A Technical Steering Committee (TSC) provides coordination and guidance to the I-35 CAIP. This body was initially established to advise the COA during Phase 1, and was continued with the addition of Phase 2 planning efforts. It is anticipated that this body will continue throughout the duration of the I-35 CAIP, and evolve as additional efforts commence in Hays and Williamson Counties. Partnering agencies as of the date of this report include:

- CAMPO.
- Capital Metro.
- Central Texas Regional Mobility Authority (CTRMA).
- COA.
- City of Pflugerville.
- City of Round Rock (CORR).
- Federal Highway Administration (FHWA).
- Hays, Travis, and Williamson Counties.
- TTI.
- TxDOT.



3.4.2 Stakeholder Outreach

Stakeholder outreach for Phase 1 and 2 efforts has included five primary outreach methods: public open houses (including online virtual open houses), small group presentations, website updates, social media postings, and community events.

Public Open Houses

Numerous public open houses have been conducted to provide opportunities for public input and comment for the corridor. The first two open houses, held in 2011, were geared toward gathering information for the COA Phase 1 efforts. In May 2012, the COA held a series of open houses to present preliminary conceptual improvements to the public for the urban core from US 290E to William Cannon Drive. In September and October 2012, after the expansion of Phase 1 efforts and the commencement of Phase 2 efforts, an additional series of three meetings was held along the corridor to garner additional stakeholder input to the expanded limits. Three open houses were held in April of 2013 to present draft Phase 2 project concepts. In association with the April open houses, a virtual open house was also implemented to gather additional input and reach additional members of the public. An additional series of three open houses was held in June 2013, with an associated virtual open house. These meetings presented the refined concepts contained in this Implementation Plan for public review and comment.

Stakeholder Meetings

The COA and TxDOT planning team members have participated in nearly 70 small group meetings with stakeholders. Generally these meetings are 45 to 90 minutes in length and allow the stakeholder group to both learn about the I-35 program and provide thoughts and comments regarding corridor development. Stakeholders have included neighborhood associations, civic organizations, businesses, local government officials, adjacent property owners and other interested parties. Stakeholder meetings will continue throughout the planning process as part of the future phases of the I-35 CAIP development.

Online Information

The I-35 CAIP is represented online via an integrated website for all I-35 CAIP efforts. This website is located at www.mobility35.org. Website content as of the date of this report is focused on products of the Travis County Phase 1 and 2 efforts. Site administration will soon be transferred from the COA to TxDOT, and will thereafter be updated as needed to incorporate new information for all program efforts in Williamson, Hays and Travis counties. It is anticipated that the website will eventually reside under the "My 35" umbrella website, located at www.my35.org.

The Mobility35 website provides information about the I-35 CAIP's history, purpose, goals and objectives, limits, process, participants and ways to contact the I-35 CAIP team and submit comments. It also offers downloadable handouts and presentations from public meetings, a list of "Frequently Asked



Questions” and links to a virtual open house (when open for public comment), news articles and the program’s interactive forum and social media sites.

As previously mentioned, a “virtual” open house was available from April 1, 2013—May 19, 2013 as part of the April 2013 open house public outreach efforts. A second virtual open house was available from June 24, 2013—July 12, 2013 to correspond with the physical open houses held in June 2013. The materials presented on these sites were essentially the same as those presented at the physical open houses, though they were formatted specifically for online users. Users could first view an introductory PowerPoint presentation, and then navigate through the virtual open house by clicking on links to overarching concept boards or location-specific boards. Users could also submit comments through forms provided on the pages.

In the fall of 2012, the COA and TxDOT launched an interactive “Town Hall” forum as a pilot program for the I-35 CAIP, located at www.speakup4mobility.org. This site allowed users to provide interactive ideas and commentary regarding mobility improvements for the corridor. As this is one of the first times a site like this has been used for an effort of this type, the planning team has been actively monitoring the site and assessing its effectiveness as a public outreach and input gathering tool. Due to periodic technical glitches and a lack of consistent use or interest by the public, TxDOT does not intend to renew the contract for Speakup4mobility in the future, choosing instead to focus on other means of online communication with the public.

In December 2012, Mobility 35 created Twitter and Facebook accounts to provide program information and announcements to social media users, as well as to direct additional online traffic to the Mobility35 website. The Mobility35 Facebook page received 150 “Likes,” while the Twitter page developed 483 followers. These applications were used to announce and generate interest in the April 2013 and June 2013 open houses. Moving forward, these efforts will be integrated into TxDOT – Austin District Facebook and Twitter outreach efforts.

Community Events

The CAIP team participated in six local community events to generate awareness and interest in the program. These events included a family Easter festival in Pflugerville, an activity-oriented event in downtown Austin, a family concert event in South Austin, a neighborhood event in Kyle, a Farmer’s Market in Round Rock, and HOPE Farmers Market at Plaza Saltillo Market in east Austin. CAIP staff hosted booths at each these events, where they distributed I-35 CAIP open house announcements, brochures, and kids’ activity sheets, talked one-on-one with event participants, and signed people up for the I-35 CAIP mailing list. Approximately 400—450 individuals have either spoken with staff or received informational materials through these events thus far. The I-35 CAIP team will continue to target future community events to continue these successful outreach efforts.



3.5 Environmental Resources

As part of the Phase 2 efforts, an inventory and preliminary evaluation of the social, economic and natural environment (environmental resources) in and along the I-35 corridor in Travis County has been developed. This effort provides information on the existing environmental resources in the corridor, and a planning-level assessment of potential impacts from concepts developed in this study with a focus on “fatal flaws” that might be present.

Environmental resources were examined at the planning level of analysis using information that was readily available. Available information was supplemented through windshield surveys. Resources and features examined included biological, parklands, water, historic, archeological, socioeconomics, hazardous materials, and community resources. More detailed evaluation of environmental resources will be required as identified concepts are further advanced into Phase 3. Additional detailed information regarding environmental resource locations and associated regulatory contexts can be found in the *I-35 CAIP Travis County Environmental Technical Report (Draft)*. A map depicting locations of some notable environmental features and potential constraints to development in the I-35 corridor can be found in **Appendix A: Notable Environmental Constraints**.

The planning area is centered on the highly developed COA urban core (Segments 3-6), which includes commercial, residential, government and civic development. Extensive commercial development characterizes the Segments 1, 2 and 7. Undeveloped rural areas occur mainly in Segment 8, south of Onion Creek.

The planning area is located in a rolling upland setting, at the boundary of Central Texas’ Edwards Plateau and Blackland Prairies natural regions. Plants and animals common to both regions and typical of urbanized and suburban areas occur in the planning area. Plants and animals occupying undeveloped habitats also occur within the natural vegetation corridors along the major streams, which traverse the planning area generally west-to-east, including Onion, Slaughter, Williamson and Walnut Creeks. Lady Bird Lake is a managed recreational fishery and home to native aquatic species. Bat colonies occur under a number of bridges along I-35 in the planning area.

Major aesthetic resources of the planning area include Lady Bird Lake and associated parkland extending into downtown Austin, major stream crossings and associated natural riparian habitats, architecture of downtown Austin historic buildings, and the Texas State Capitol Building with associated Capitol View Corridors intersecting the planning area.

A review of socioeconomic data and community resources in the planning area indicate that the minority population of the 84 census block groups intersecting the planning area is 94,416, or 61.8% of the total population of 152,726, and includes eight minority environmental justice (EJ) populations. The poverty rate for Travis County is 16.2%, while that of the 84 census block groups intersecting the planning area is 21.5%. All planning area segments except Segment 1 intersect block groups containing households living below the poverty level.

Results of the preliminary environmental investigation indicate several environmental and cultural concerns that would be considered as individual projects are developed. These concerns include parkland which could be an impediment to right-of-way acquisition, historic properties and potential archeological sites, and the Capitol View Corridors that extend to or cross existing I-35. In addition, demographics of the I-35 corridor indicate that early planning activities are critical to avoiding disproportionately high and adverse effects to EJ populations resulting from future activities. Meaningful opportunities for involvement by members of minority and low-income populations should continue to be provided throughout the planning process and development of future projects.

Potential major impacts to environmental resources were examined and considered at a planning-level as concepts were developed for this Implementation Plan. Environmental investigations undertaken as part of this Implementation Plan did not indicate the presence of any fatal flaws that would preclude future project development, provided the environmental concerns noted are properly considered as part of the project development process.

3.6 Bicycle and Pedestrian Considerations

A bicycle and pedestrian needs assessment for the corridor was completed as part of Phase 2 planning efforts. In addition, the planning team reviewed the COA's proposed improvements in the *Austin 2020 Bicycle Plan Update* as a basis for bicycle and pedestrian needs. These proposals include I-35 cross-connectivity improvements and are based on existing roadway conditions.

For parallel or north-south bicycle travel, it is preferred to shift bicycle travel onto a parallel corridor such as Red River within the University of Texas campus. In limited areas along frontage roads, one-way shared lanes were developed to allow for continuous routes. In Segments 1 and 8, right-of-way was evaluated for the inclusion of a shared use path, and included where feasible.

For sidewalks, east-west connectivity improvements would largely be provided through protected paths parallel to the crossing roadway and would be aligned to connect with existing sidewalks. Bicycle and pedestrian-specific crossings were recommended at multiple locations, and are included in the recommendations discussed in **Section 3.8**.

3.7 Traffic and Operational Analysis

Traffic and operational analysis is a critical component to understanding the impact of potential improvements on the overall mobility of the I-35 corridor. Phase 2 efforts have included crash data analysis, traffic data collection and operational modeling of proposed improvement concepts as part of development of the refined concepts. Full information about traffic operational analysis may be found in the *I-35 CAIP Travis County Operational Analysis from SH 45N to SH 45SE (Draft)*.



3.7.1 Measure of Effectiveness

To ensure an apples-to-apples comparison is performed on various operational scenarios, standard measures of effectiveness (MOEs) are used throughout the project. These MOEs included Level of Service (LOS) in the form of delay for the intersections, speed for the arterial roadways and interstate mainlanes, and vehicle miles of travel and vehicle hours of travel for the interstate mainlanes. A description of the MOEs follows.

Intersection Level of Service/Delay

Delay is evaluated primarily through a calculation of LOS as defined in the *2010 Highway Capacity Manual* (HCM). The HCM uses LOS as the method by which the quality of traffic flow is described. LOS describes operational conditions in six levels (A through F) based on speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. These six levels are given the letters "A" (good traffic flow conditions) through "F" (traffic conditions consistent with failure) and are given different descriptions and defining criteria depending on the roadway element analyzed. The criteria used to determine LOS for intersections is based on the time it takes to get through an intersection.

Speeds

Since delay is not always the best indicator of the net effects of a series of improvements, average travel speeds provide an indication of change. As speeds increase, congestion lessens.

Vehicle Miles of Travel and Vehicle Hours of Travel

Vehicle miles of travel (VMT) and vehicle hours of travel (VHT) provide an indication of overall congestion levels. Specifically, an increase in VMT and decrease in VHT indicates reduced congestion levels with more miles travelled in a shorter time span (expressed in minutes per mile). Increased VMT also shows the increased carrying capacity of the roadway network.

3.7.2 Traffic Projections

Field traffic data was collected along I-35 in the Fall of 2012. Once the various traffic counts were collected, reviewed, and processed, the traffic was projected to a "horizon year" for future conditions. The horizon year of 2025 was selected. In consultation with the Transportation Planning and Programming Division of TxDOT the traffic counts were grown by 2% per year to emulate future year traffic conditions.

3.7.3 Travel Demand Modeling and Operational Analysis

Travel demand modeling and operational analysis has been developed for all segments studied as part of this Implementation Plan. These efforts included development of multiple traffic models to evaluate improvement concepts for current and future volumes, and assessment and refinement of improvement concepts against the MOEs defined above. Summary operational analysis results for the corridor are shown in **Table 3.1**. Results have been summarized for four (4) conditions: 1) the future "no-build"

which assumes no change from existing conditions today; 2) base concepts which include only the operational concepts; 3) base concepts plus one lane of general purpose capacity in each direction; and 4) base concept plus one managed lane of capacity in each direction. As no determination has been made at this time regarding the use of the FTC, conditions 3 and 4 allow the evaluation of multiple potential usages.

Table 3.1: Corridor Simulation Comparison							
Option	Peak	MOEs			Vs. Future No-Build		
		Avg. Speed (mph)	Veh-Miles	Veh-Hrs	Avg. Speed (mph)	Veh-Miles	Veh-Hrs
Future No-Build	AM	23	438,099	19,315	-	-	-
	PM	21	466,907	22,011	-	-	-
Base Concepts (BC)	AM	29	492,030	17,251	+6	+53,931	-2,063
	PM	29	506,526	17,576	+8	+39,619	-4,435
BC + 1 Lane Capacity	AM	32	521,853	16,338	+9	+83,755	-2,977
	PM	31	533,204	16,971	+10	+66,297	-5,041
BC + Managed Lane	AM	31	511,950	16,290	+9	+73,851	-3,024
	PM	30	506,238	16,998	+9	+39,331	-5,013

Summary results for the corridor intersections are in **Tables 3.2** and **3.3** for both the AM and PM peaks. Operational recommendations have been incorporated into the refined concepts included in this Implementation Plan.

Table 3.2: AM Peak - Intersection LOS Summary Statistics						
Intersection LOS	Existing		No-Build (future)		Base Concepts (future)	
	Number	%	Number	%	Number	%
A-C	46	57%	36	44%	36	56%
D	14	17%	11	14%	19	30%
E	14	17%	11	14%	7	11%
F	7	9%	23	28%	2	3%
Totals						
LOS A-D	60	74%	47	58%	55	86%
LOS E-F	21	26%	34	42%	9	14%

Table 3.3: PM Peak - Intersection LOS Summary Statistics						
Intersection LOS	Existing		No-Build (future)		Base Concepts (future)	
	Number	%	Number	%	Number	%
A-C	35	43%	21	26%	34	53%
D	23	28%	11	14%	16	25%
E	11	14%	14	17%	12	19%
F	12	15%	35	43%	2	3%
Totals						
LOS A-D	58	72%	32	40%	50	78%
LOS E-F	23	28%	49	60%	14	22%

In general, operational analysis has confirmed the following:

- Developing the FTC to enhance mainlane mobility through the corridor provides the single largest mobility gain for I-35 through the corridor.
- Reconfiguring ramps to optimize and consolidate mainlane access locations improves overall corridor mobility.
- Adding or extending mainlane auxiliary lanes and adding collector-distributor road segments to improve merging/weaving also improves corridor mobility.

- Improving frontage road intersections as well as east/west vehicular cross streets improves frontage road and cross street operations.
- Development of a Texas super street concept for frontage road operations within the urban core increases frontage road and cross street mobility.
- Improving existing interchange configurations, including use of innovative concepts such as roundabouts and diverging diamond intersections improves frontage road and local mobility.

3.7.4 Crash Analysis

Three year historical crash data was collected and compiled for I-35 from SH 45N to SH 45SE. The preliminary crash analysis included a summary of crashes based on severity and location. Crash rates were then developed for the implementation segments within the limits of this analysis. The 2010 statewide average crash rate for urban interstate facilities is 101.82 crashes per 100 million vehicle miles. Based on preliminary review of the I-35 crash data, the 2010 crash rates appear to be higher than the statewide averages for Segments 3 through 7. A summary of the total crashes and crash rates by segment are shown in **Table 3.4**.

Segment	Total Crashes	Length (miles)	AADT	Traffic Crashes per 100 million vehicle miles
1 – SH 45N to Parmer Lane	223	5.27	165,000	70.26
2 – Parmer Lane to US 183	199	4.99	162,000	67.44
3 – US 183 to Airport Boulevard	282	2.76	204,000	136.88
4 – Airport Boulevard to MLK Boulevard	198	1.84	214,000	137.77
5 – MLK Boulevard to Lady Bird Lake	342	2.18	185,333	231.95
6 – Lady Bird Lake to Woodward Street	229	2.07	183,500	165.17
7 – Woodward Street to William Cannon Drive	209	2.65	177,000	122.08
8 – William Cannon Drive to SH 45SE	145	5.79	130,000	52.78
Study Corridor (SH 45N to SH 45SE)	1,827	27.55	168,500	107.83

Source: TxDOT CRIS Database

3.7.5 Incident Management and ITS

Intelligent Transportation Systems (ITS) projects use technology and communications to improve management and operations of a transportation system. ITS typically involve moderate scale operational improvements that can have compounding benefits on transportation system efficiency. Most ITS projects are relatively moderate in cost and are often included as part of larger capital programs, similar to the I-35 Capital Area Improvement Program. Full discussion of the ITS recommendation for Travis County are in the separate *I-35 Integrated Operations and Intelligent Transportation Systems (ITS) Deployment Plan (Draft)*. The incident management and ITS projects recommended for the I-35 CAIP fall into the following four categories and are shown in **Table 3.5**:

Table 3.5 - Incident Management and ITS Project Summary
ATMS - Advanced Traffic Management Systems
Expansion and replacement of Dynamic Messaging Signs (DMS)
Deployment and upgrade of Closed Circuit Television Cameras (CCTV)
Deploy vehicle detection systems (Bluetooth, video, and inductive loops)
Apply vehicle detection systems at ramps, system to system ramps, frontage roads, and mainlanes
ATIS - Advanced Traveler Information Systems
Flood Warning Systems in areas inside FEMA flood plains
Road Weather Information Systems (RWIS)
Enhance TX DOT traveler information website
TIM - Traffic Incident Management
Connected Vehicle Roadside Integration
Use smart work zones
Upgrade HERO patrol fleet
Program DMS from HERO Vehicles
Video to/from HERO and other emergency vehicles
Coordination
Coordinate with the City of Austin to Implement Signal Control Strategies on Frontage Roads Intersections
Support Regional Weigh Enforcement
Combined Transportation, Emergency & Communications Center (CTECC) Software Consolidation
Support Regional Communication Program
Implement adequate ITS bandwidth and redundancy on I-35
Develop an ITS Maintenance and Project Planning Plan
Implement a new ITS Maintenance Program
Develop an ITS Asset Management System
Develop Special Event Traffic Management Plans
Virtual integration of CTECC and City of Austin
Additional incident management training for first responders

Advanced Traffic Management System (ATMS) provides a top-down system for using technology to improve the flow of vehicle traffic and improve safety. Real-time traffic data from cameras, speed sensors, etc. flows into a Transportation Management Center (TMC) where it is integrated and processed (e.g. for incident detection), and may result in actions taken (e.g. traffic routing, placing informational messages on dynamic message signs (DMS) and so forth. The overall goal of ATMS is to improve traffic flow.

An **Advanced Traveler Information System (ATIS)** is any system that acquires, analyzes, and presents information to assist surface transportation travelers in moving from a starting location (origin) to their desired destination. An ATIS may operate through information supplied entirely within the vehicle (autonomous system) or it can also use data supplied by the traffic management centers. Relevant information may include locations of incidents, weather and road conditions, optimal routes, recommended speeds, and lane restrictions.

Traffic Incident Management (TIM) is the process of coordinating the resources of a number of different partner agencies and private sector companies to detect, respond to, and clear traffic incidents as quickly as possible to reduce the impacts of incidents on safety and congestion, while protecting the safety of on-scene responders and the traveling public.

ITS Coordination projects or policies include those items that will require the support of agencies and jurisdictions outside of TxDOT in order to accomplish corridor-wide ITS improvements.

Total capital costs to implement the ITS improvements is estimated to be total \$49.1 million, shown in **Table 3.6**. These improvements could be implemented as part of segment improvements or as individual stand-alone projects. Please note that ITS improvements require ongoing maintenance and operation funding, which is not included in the capital costs shown above.

Table 3.6: ITS Capital Improvement Costs	
Segment	Capital Costs
1 – SH 45N to Parmer Lane	\$3,500,000
2 – Parmer Lane to US 183	\$1,800,000
3 – US 183 to Airport Boulevard	\$2,600,000
4 – Airport Boulevard to MLK Boulevard	\$1,800,000
5 – MLK Boulevard to Lady Bird Lake	\$5,000,000
6 – Lady Bird Lake to Woodward Street	\$1,800,000
7 – Woodward Street to William Cannon Drive	\$1,800,000
8 – William Cannon Drive to SH 45SE	\$1,800,000
System wide	\$29,000,000
Total for Study Corridor (SH 45N to SH 45SE)	\$49,100,000

3.8 Engineering Analysis

Phase 2 engineering analysis efforts focused on refining concepts developed during the COA Phase 1 efforts, as well as developing additional concepts where appropriate. This section presents general guidelines being used to review and refine corridor concepts.

3.8.1 General Design Considerations

Concepts have been developed in accordance with the TxDOT *Roadway Design Manual*, the TxDOT *Hydraulic Design Manual*, FHWA design requirements, and other applicable federal, state, and local regulations. Development of corridor concepts requires design exceptions from FHWA to implement improvements in some sections due to existing constraints. The TSC provided guidance on acceptable and reasonable trade-offs required to implement corridor improvements without wholesale reconstruction of the existing facility.

Geometric Design Considerations

A draft Design Summary Report (DSR) was prepared as part of the Phase 2 Efforts. The DSR documents the existing conditions, basic constraints, general design criteria, and geometry for potential corridor improvements.

3.8.2 Improvement Concepts

Types of improvements considered for the corridor include ramping modifications, addition of auxiliary lanes, addition of U-turns at intersections, and intersection turn lanes. The concepts also include bicycle-pedestrian and transit considerations. Several new or innovative concepts are also included in the corridor concepts. These are described below. Specific discussion of where these types of improvements would be utilized is found in the segment-specific descriptions in **Section 3.9**.

Future Transportation Corridor

Additional mainlane capacity, specifically identified as one lane in each direction, is a primary goal of the I-35 CAIP. At this time, no assumption is made as to the nature of this future lane, dubbed a Future Transportation Corridor (FTC). The future capacity could be general purpose, managed lane, express lane, high occupancy vehicle, or some other type of special use lane. For the purposes of this Phase 2 effort, to represent the widest potential cross section, the footprint of a managed lane was utilized to plan for the FTC. A managed lane is considered the widest footprint because it would include required buffers, additional shoulders and physical separation from the general purpose lane; therefore, any of the potential lane options would fit within the footprint developed for the FTC presented herein. The parameters used for the FTC are shown in **Figure 3.1**.

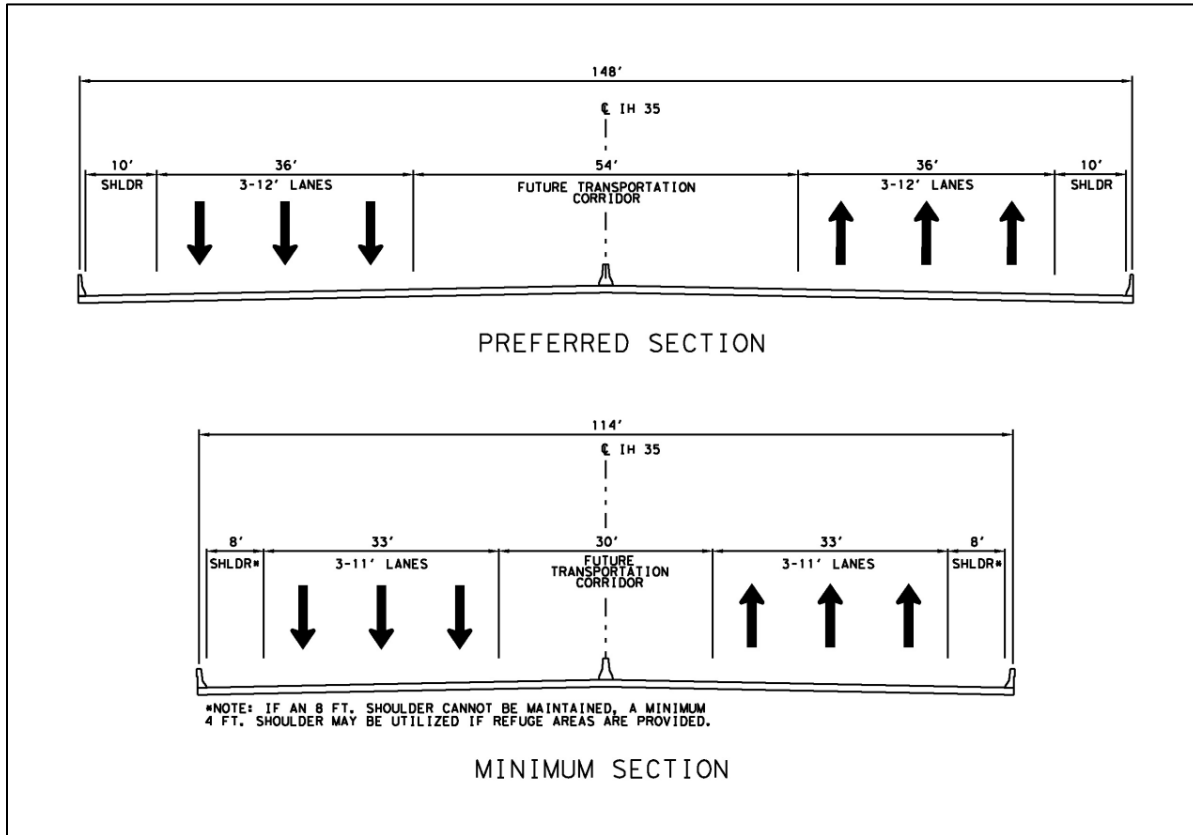


Figure 3.1: FTC Parameters

Collector-Distributor Roads

Collector-distributor (C-D) roads help manage traffic flow along a corridor by allowing through traffic on a frontage road to bypass signalized intersections without having to stop. C-D roads can also improve safety by providing safer opportunities for merging and speed changes. C-D roads are typically located between the mainlanes of a freeway and frontage roads.

Diverging Diamond Intersection

A diverging diamond intersection (DDI) as shown in **Figure 3.2** handles higher traffic volumes, reduces travel times, and improves safety for vehicles, bicycles, and pedestrians. It is a solution for locations with a high volume of left turns. This innovative design shifts traffic to the left at intersections, allowing safer left turns. It also incorporates a collector-distributor road, allowing through traffic to bypass signalized intersections.

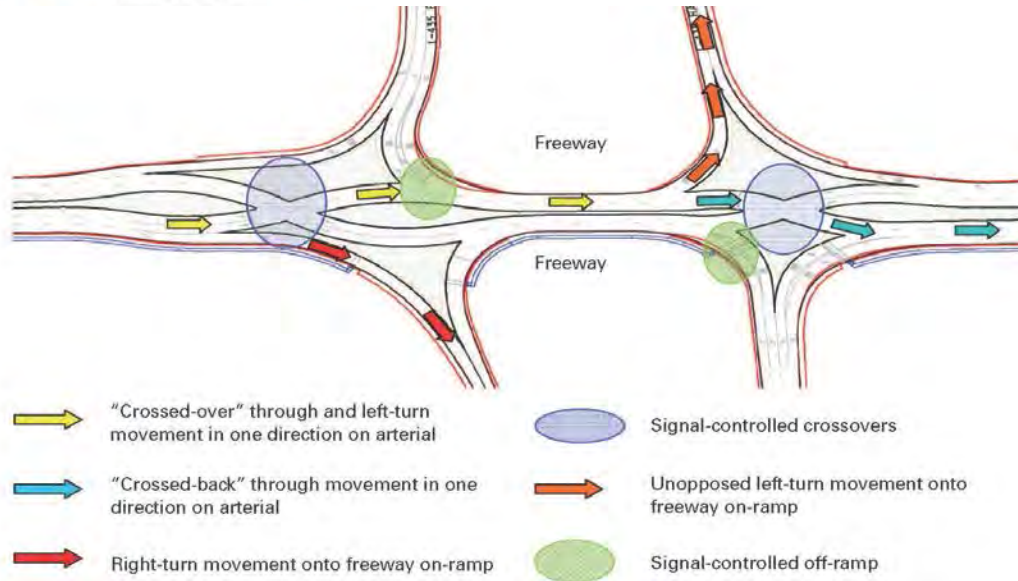


Figure 3.2 Diverging Diamond Intersection

Source: FHWA Publication Number FHWA-HRT-09-054

Roundabout

Well-designed, modern roundabouts provide more efficient movement at intersections by eliminating the need for stop signs or traffic signals. They also improve safety by reducing vehicle conflict points. **Figure 3.3** shows an example of a roundabout.



Figure 3.3 Roundabout

Texas Super Street

A Texas Super Street would reduce congestion along the frontage roads and intersecting cross-streets and provide safer crossings for bicyclists and pedestrians. Its design would allow some roads to maintain east-west access, while at other roads cross-street traffic would turn right. This reduces the number of traffic signal phases – allowing for longer green times on the super street frontage road – thus reducing congestion caused by traffic signals. This concept is illustrated in **Figure 3.4**.

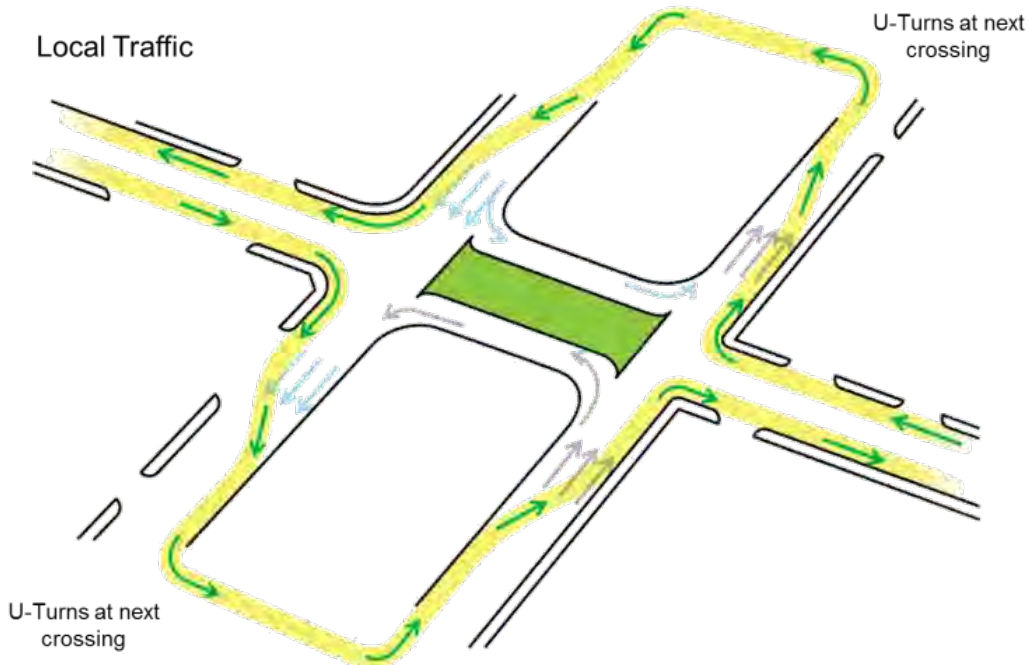
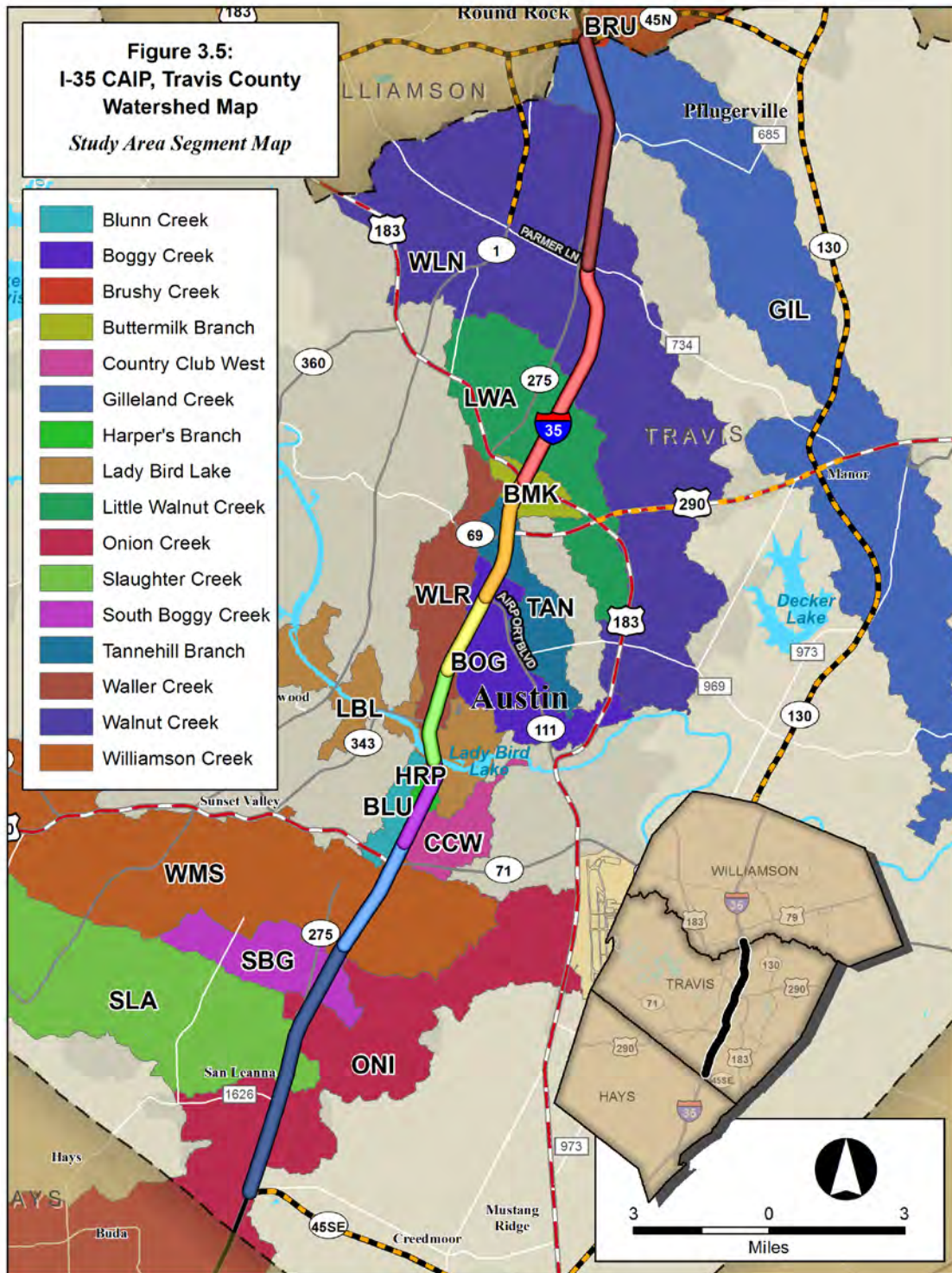


Figure 3.4 Texas Super Street

3.8.3 Drainage Considerations

Drainage considerations are a key component to the development of improvement concepts as part of the Implementation Plan. Drainage considerations were evaluated to determine major impacts to proposed concepts and to identify any fatal flaws. The assessment looked at the major watersheds affecting the corridor to understand how I-35 was being drained in order to determine any potential impacts. From this assessment 16 watersheds were identified along the corridor, with all tributaries out-falling into the Colorado River. The watersheds are shown graphically in **Figure 3.5**



At this time, the following drainage concerns have been identified:

- In Segments 1, 2, and 3, crossing of streams with FEMA-delineated floodplains would require appropriate coordination.
- In Segment 4, any changes to the lower deck must be evaluated for impacts to the existing storm sewer system running beneath the center median.
- In Segment 5, the Waller Creek floodplain encroaches into the I-35 right-of-way between 10th Street and 6th Street. It is anticipated that the Waller Creek Tunnel, currently under construction, will reduce the floodplain in this area.
- In Segment 5 the Depressed Concept for I-35 requires extensive modification to existing drainage structures. Water currently flowing into Waller Creek from the east must be rerouted to Lady Bird Lake. In addition, the depressed portion of the interstate would require a separate drainage system with a pump station.
- In Segment 6, the existing cross structure at Riverside Drive would require expansion.
- In Segment 7, crossing of Williamson Creek will require coordination with appropriate entities for additional runoff and construction of new frontage road bridges.
- In Segment 8, crossing of streams with FEMA-delineated floodplains would require appropriate coordination.

3.9 Segment Improvement Concepts

This section presents improvement concepts. More detailed information and supporting material for each concept is located in the separate *I-35 CAIP Travis County Preliminary Engineering Report (Draft)*. In all segments, multiple improvement concepts have been evaluated and vetted through the operational and geometric analysis. In many segments of the corridor, the analysis has yielded one concept to carry forward into future phases of the project. In other segments there are multiple viable options that have been identified and developed to carry forward. In all cases, no final decisions have been made at this time regarding what improvement concepts should be constructed, and further evaluation and analysis will continue through Phases 3 and 4 of project development. In addition, concepts will be refined for coordination with additional I-35 CAIP projects in Williamson and Hays Counties as those efforts progress. Within each segment, concepts are presented. Concepts discussed in this section are shown in **Appendix B: Refined Improvement Concepts**.

3.9.1 Segment 1 – SH 45N to Parmer Lane

Segment 1 is shown in **Figure 3.6**. Overall improvement concepts for this segment include adding the FTC, improving frontage road traffic flow, and improving bicycle and pedestrian mobility.

Ramp Reversals – SH 45N to Grand Avenue Parkway

The concept for improvements being considered in this area of the corridor includes reversing/reconstructing the existing ramps into a full X-pattern. The two entrance ramps located in the section will be flipped to exit ramps and the two exit ramps will be flipped to entrance ramps.

Grand Avenue Parkway Improvements

The concept for improvements being considered at the intersection of I-35 and Grand Avenue Parkway is a modified conventional intersection. The modified conventional intersection consists of widening the frontage road and cross street approaches to accommodate additional turn lanes and improved signal timing. The concept would also include reconstruction of the existing overpass to improve substandard vertical clearance, and the construction of additional/reconfigured bike and pedestrian improvements through the intersection to increase east-west mobility.

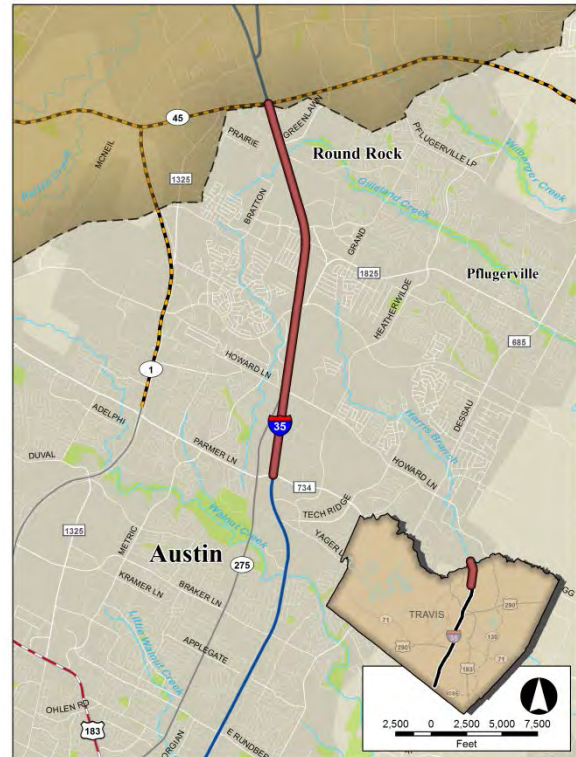


Figure 3.6: Segments 1

Wells Branch Parkway Improvements

Several concepts have been vetted at the Wells Branch Parkway intersection with I-35 and the intersection with FM 1825 just to the east of I-35. Due to the three closely spaced intersections, the high traffic volumes, and the high turning movements in this intersection, most of the concepts failed during the operational analysis. The concept for Wells Branch Parkway includes the installation of multiple roundabouts at the intersections of the frontage roads of I-35 as well as at the intersection with FM 1825. This option removes the traffic signals from these three intersections, which currently account for the majority of the delays in the area. Bicycle and pedestrian facilities would be upgraded through the intersection to improve east-west mobility. The proposed concept for Wells Branch is shown in **Figure 3.7**.

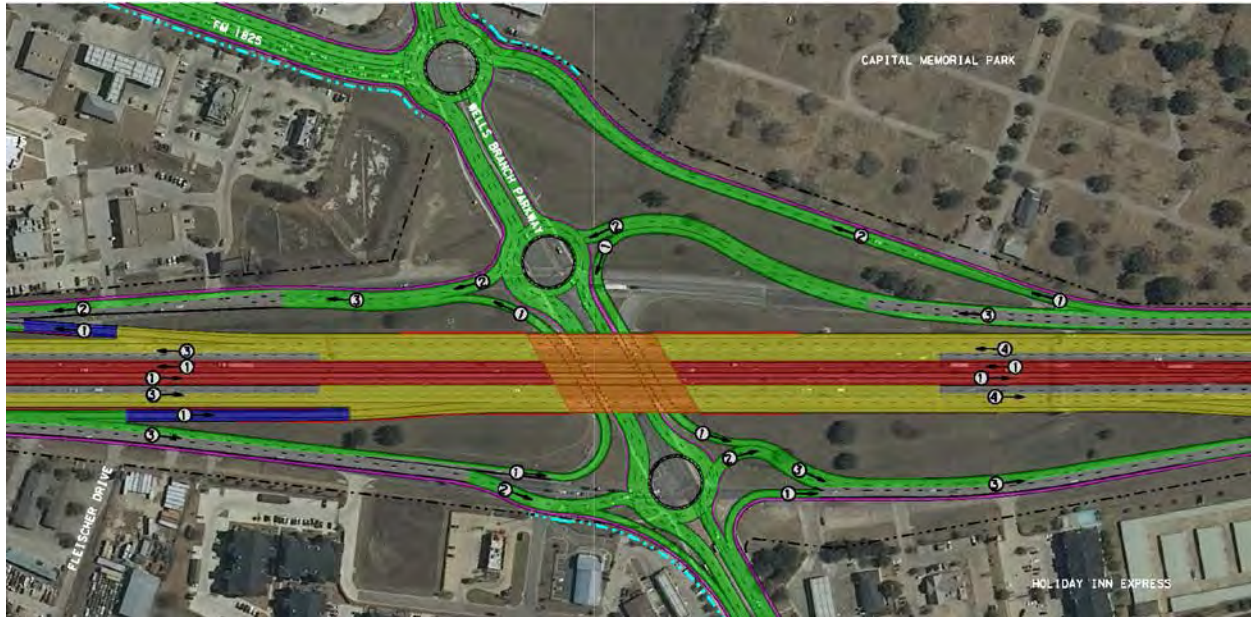


Figure 3.7 Wells Branch Parkway

Howard Lane Improvements

Several options were evaluated to address the issues at the Howard lane intersection with I-35 and the possible reconnection of Lamar Boulevard on the east side of the corridor. Through analysis, these options have been pared down to two recommended options which build upon one another. The primary concept consists of constructing a double roundabout at the intersection of I-35 and Howard Lane. This concept would connect Lamar Boulevard to Howard Lane much as it does now in a one way northbound configuration. As a stand-alone future action, Lamar Boulevard could also be realigned west to tie directly into Howard Lane as a two-way roadway further west of I-35. This realignment, by restoring two way traffic on Lamar, would improve overall mobility in the area. Since this second concept requires a significant amount of right-of-way acquisition to accommodate the realignment, and is not required for the I-35 mobility, it is considered a future action.

Incorporation of the FTC

The FTC would be incorporated throughout the length of Segment 1. The FTC would generally fit within existing right-of-way without requiring major freeway reconstruction. The FTC can be fit within the corridor throughout this segment; however, further operational analysis would be required to determine the north starting point for the FTC to achieve the most benefit for the corridor.

3.9.2 Segment 2 – Parmer Lane to US 183

Segment 2 is shown in **Figure 3.8**. Overall improvement concepts for this segment include adding the FTC, improving frontage road traffic flow, and improving bicycle and pedestrian mobility.

Parmer Lane Improvements

At Parmer Lane, large turning movement volumes cause significant queuing and travel delays. At this location, a DDI provides significant improvements in operations. A conceptual example of DDI operations at this location is shown in **Figure 3.9**. The DDI includes adding collector-distributor roads under the intersection to process through traffic, and improving the intersection of Parmer Lane and Lamar Boulevard to include Median U-turns. This improvement would allow the project to address all of the traffic needs of the intersection without the need to reconstruct the Parmer Lane bridge or the need to add turnaround structures to handle the U-turns in the intersection. The DDI also allows for better accommodations for bicycle and pedestrian users than currently exists, which would increase east-west mobility for these users.

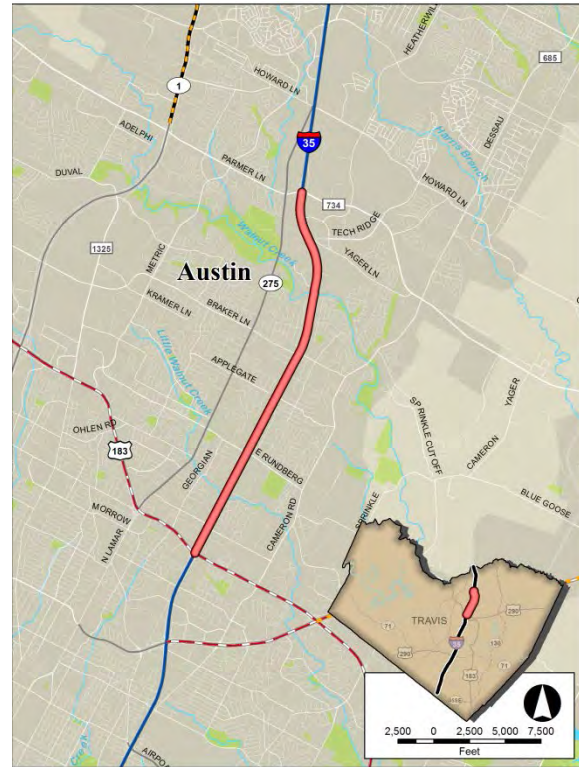


Figure 3.8: Segment 2

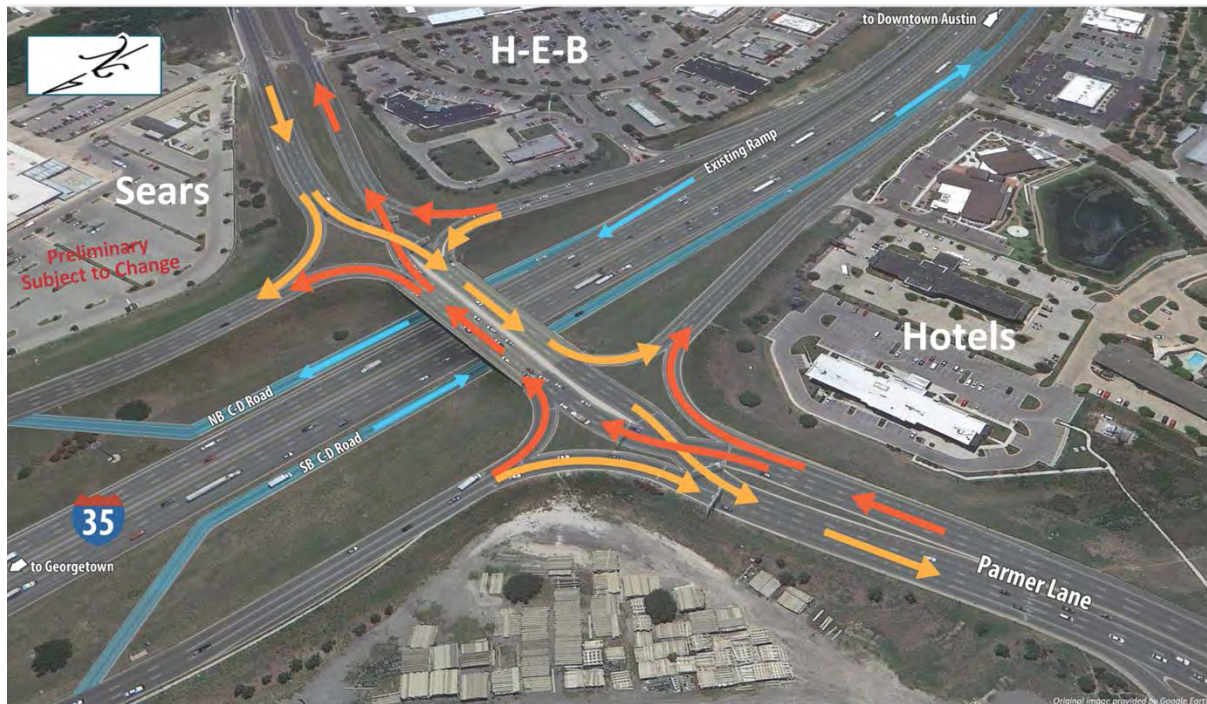


Figure 3.9: Diverging Diamond Interchange at Parmer Lane

Braker Lane Improvements

The proposed concept at the intersection of I-35 and Braker Lane consists of modifying the existing conventional intersection. The proposed improvements would include minor frontage road improvements for turn lanes, the addition of U-turn bridges in both directions, reconstruction of the Braker Lane bridge to increase vertical clearance on the mainlanes, and the improvement of the existing bicycle and pedestrian facilities across the interchange.

Pedestrian Bridge

In addition to the bicycle and pedestrian improvements at the existing intersections and along I-35, the bicycle and pedestrian analysis has shown some deficiencies in east-west connections between the intersections. Recommended concepts include an additional bicycle and pedestrian connection across I-35 between Rundberg Lane and US 183. The proposed bridge is located in the vicinity of Powell Lane north of US 183 to address the demand in this area.

Incorporation of the FTC

The FTC would be incorporated throughout the length of Segment 2. The FTC would generally fit within existing right-of-way without requiring major freeway reconstruction.

3.9.3 Segment 3 – US 183 to Airport Boulevard

Overall improvement of Segment 3, shown in **Figure 3.10**, includes adding the FTC, improving I-35 northbound to US 183 northbound mobility, improving US 290 westbound to I-35 northbound mobility, improving frontage road traffic flow, and improving bicycle and pedestrian mobility.

US 183 Direct Connectors

The US 183/I-35 interchange has two direct connectors. Recommended concepts include construction of additional direct connectors. The concept proposes to connect the southbound I-35 to southbound US 183 and the northbound US 183 to northbound I-35 direct connectors. The conceptual layout of the two direct connectors can be seen in **Figure 3.11**. Discussion of project phasing and constructability has indicated these connectors are critical for enabling an alternate traffic route for I-35 mainlane traffic during construction of Segments 4 and 5 through the Austin urban core.

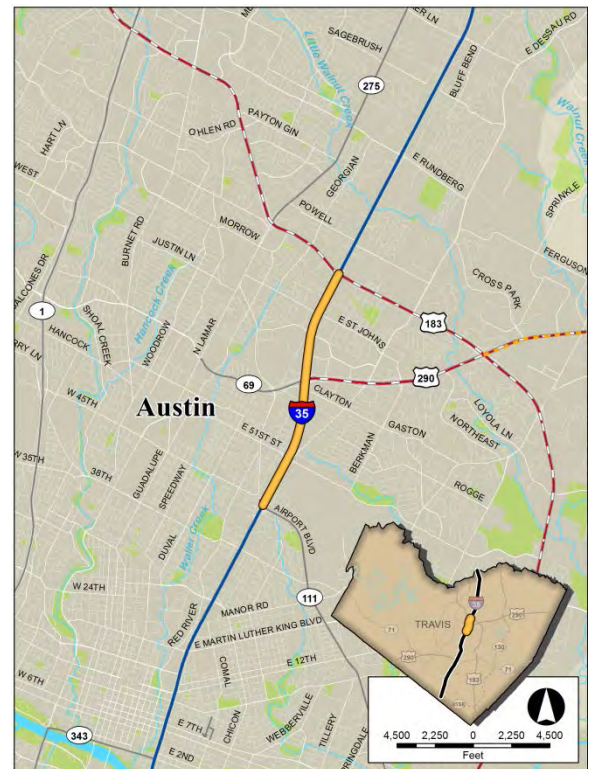


Figure 3.10: Segment 3



Figure 3.11: I-35 to US 183 Direct Connectors

Ramp Modifications – US 183 to US 290

Several concepts have been evaluated to improve traffic through this section of I-35. Initially, the concept would have developed a collector-distributor road to accommodate the movement of westbound US 290 traffic onto northbound I-35, and northbound I-35 traffic onto northbound US 183. Through operational analysis of the concepts, the collector-distributor concept failed and new concepts were developed. The recommended concept consists of relocating the existing northbound entrance ramp just north of US 290 to just south of US 183. This ramp relocation would remove a majority of the merging and weaving that currently occurs on the mainlanes by pushing the entrance ramp past the exit for the direct-connector to US 183 northbound. To accommodate the new entrance ramp, the first portion of the existing direct-connector would be reconstructed to allow the new ramp to pass underneath the direct-connector with proper vertical clearances. With the required reconstruction on the direct-connector, the existing grade on the direct-connector would also be reduced, which would further improve traffic flow on the mainlanes of I-35.

St. Johns Avenue Improvements

The concept at St. Johns Avenue includes installing a southbound to northbound U-turn bridge, closing St. Johns to through traffic, implementing a Texas super street from US 183 to US 290 to accommodate additional traffic flow on the frontage roads, and repurposing the existing St. Johns bridge to accommodate only bicycle and pedestrian users, emergency vehicles, and potentially bus service.

The concept at St. Johns will need to be further evaluated in Phase 3 to address community concerns regarding the improvements and east-west connectivity including bikes and pedestrians, transit, and general traffic at St. Johns. The operational model shows that the current configuration works with an acceptable level of service; however, further options including a potential two-phase signal, modified roundabout, and other configurations should be evaluated and vetted through the public during further project development in Phase 3.

51st Street Improvements

The concept to address the existing challenges at 51st Street and I-35 includes the installation of a roundabout at the intersection between the southbound frontage road and I-35 as shown in **Figure 3.12**. The concept would include realignment of the exiting southbound frontage road to remove severe curves, the addition of a southbound collector-distributor road under 51st Street, improvement of the frontage road connection to the existing U-turn structure, and reversal of the existing southbound ramps between 51st Street and Airport Boulevard. The concept would work with the project currently under development by TxDOT and the COA to address connectivity from the northbound frontage road to Cameron Road as described in **Section 2.5**. The concept would include improved bicycle and pedestrian connectivity through the intersection.

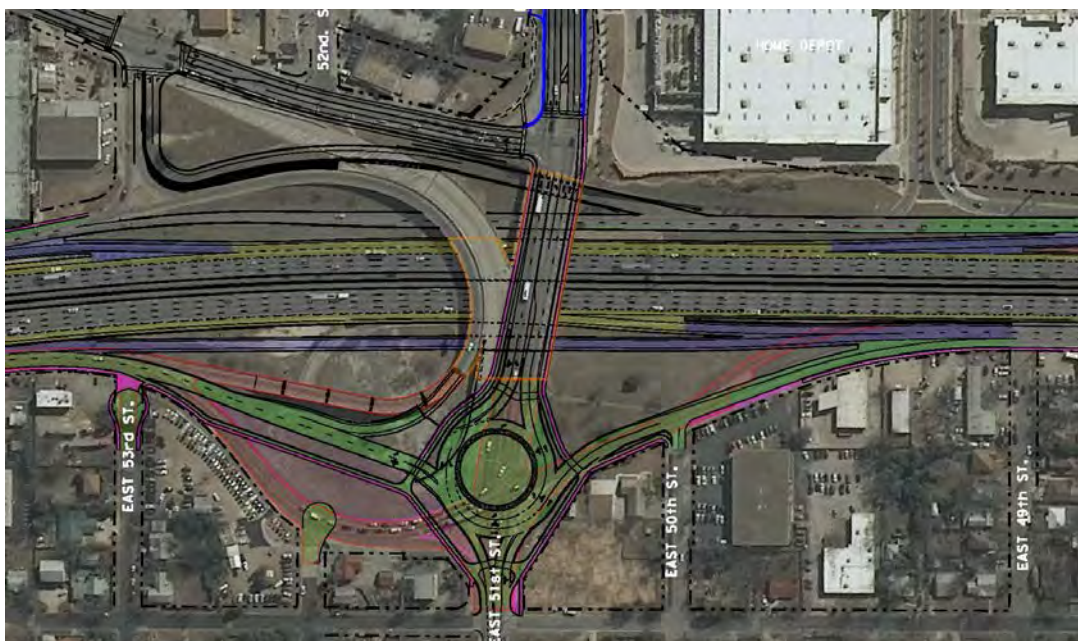


Figure 3.12: Roundabout Concept I-35 at 51st Street

Incorporation of the FTC

The FTC would be incorporated throughout the length of Segment 4. The FTC would generally fit within existing right-of-way without requiring major freeway reconstruction. One exception to this is the area between 51st Street and Airport Boulevard, where a small strip of right-of-way will be required along the east side of the corridor.

3.9.4 Segment 4 –Airport Boulevard to MLK Boulevard

Segment 4 is shown in **Figure 3.13**. Concepts under evaluation in Segment 4 include implementation of the FTC, improvements to the intersection at Airport Boulevard, local mobility improvements associated with the reduction/relocation of ramps, elimination of duplicate ramps, and frontage road improvements. Major challenges considered as part of the development of this segment include modifications to the existing upper and lower decks, fully developed right-of-way, historic properties, the Capitol View Corridor from the southbound Upper Deck, and access to St. David’s Hospital and the University of Texas.

Airport Boulevard Improvements

At Airport Boulevard, the recommended concept would replace the existing intersection with a DDI. The DDI would allow for a reduction in existing footprint for intersection by removing redundant movements, allow for future accommodation of potential Urban Rail along Airport, improve ramping to/from the Upper Deck, and widen the existing intersection bypass lanes to two lanes in each direction to act as collector-distributor roads for through traffic. See **Figure 3.14** for the current Airport Boulevard concept.

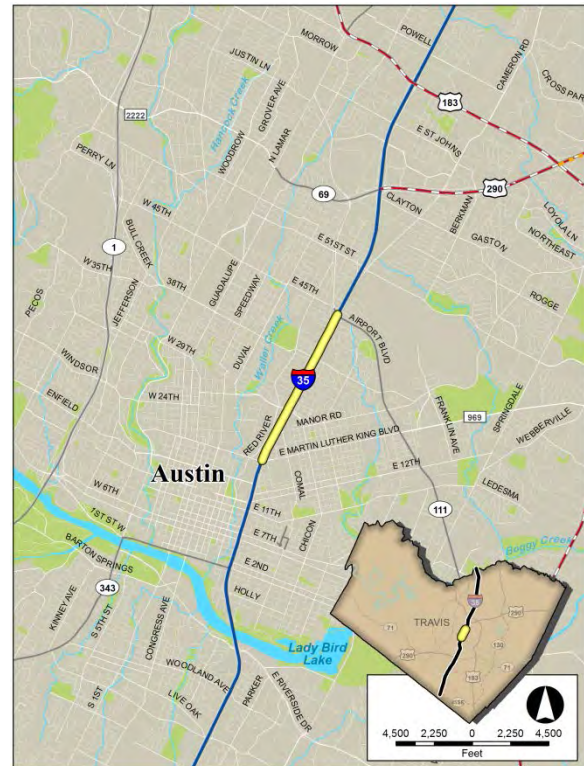


Figure 3.13: Segment 4

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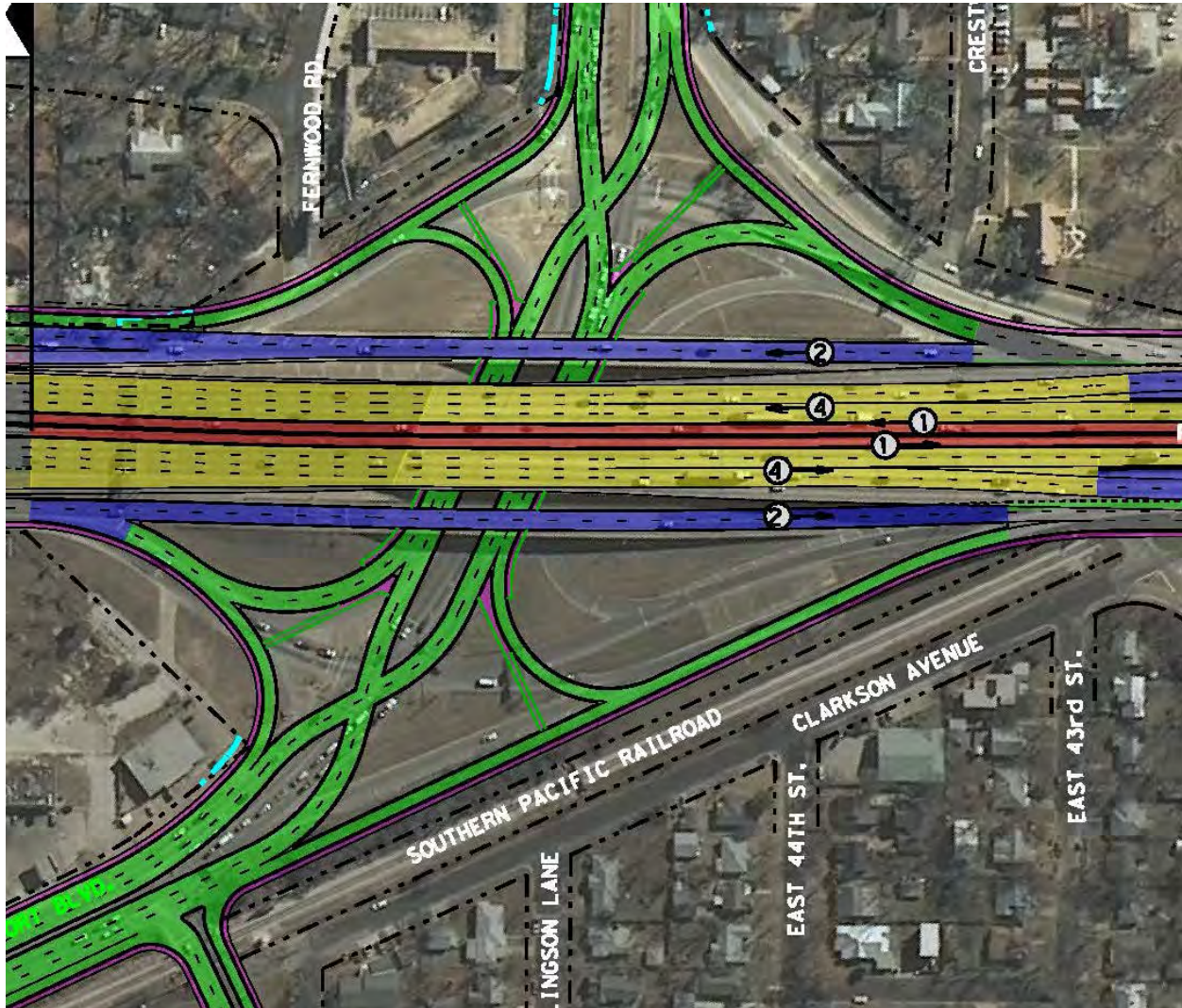


Figure 3.14: DDI Concept I-35 at Airport Boulevard

Ramp Modifications – 51st Street to Airport

Part of the concept to improve operations in the area of Airport Boulevard includes the reversal of the exit ramp north of Airport to an entrance ramp and the elimination of the existing upper deck exit to Airport. While this concept works operationally and improves traffic flow on the upper deck, the community has voiced concerns regarding northbound access to the Mueller development and Dell Children’s Hospital. In response to the concern, a concept was developed to repurpose the existing upper deck exit to airport into an exit that would allow traffic to exit the upper deck and access the bypass over Airport Boulevard, thus providing access to the area north of Airport. While this concept works geometrically, there are several operational concerns that result, including potential delays on the upper deck. Further evaluation of this concept and the access to the area north of Airport Boulevard will need to be further analyzed during Phase 3 of project development.

MLK Boulevard Improvements

Several local mobility improvements would be included as part of all concepts for this segment. The existing southbound upper deck ramp to MLK Boulevard modified so that the ramp would tie directly to the collector-distributor road under MLK to access 15th Street. The northbound entrance ramp from south of MLK to I-35 would be modified to operate as a collector-distributor road to provide a bypass of the MLK intersection while maintaining the entrance ramp.

Direct access to the FTC at MLK Boulevard has been evaluated for transit vehicles. There are both geometric and operational issues that would have to be further evaluated in Phase 3 to fully vet the ability to provide transit; however, preliminary evaluations show that there is the potential to provide a bidirectional transit ramp both north of and south of MLK Boulevard.

Incorporation of the FTC

Two concepts have been developed to implement the FTC through this segment. These are: widen the lower deck, and build a new center structure. The existing upper decks cannot be expanded to accommodate additional lanes due to structural limitations of these structures.

Widen Lower Deck

This concept widens the existing lower deck to accommodate the FTC. This concept results in the section for the lower deck being modified to include two general purpose lanes and the FTC in each direction (6 total lanes). No changes to the existing upper deck would be required. **Figure 3.15** shows a typical section for the widened lower deck. This concept requires closure of existing freeway ramps within the limits of the decks. This is the recommended concept for future implementation.

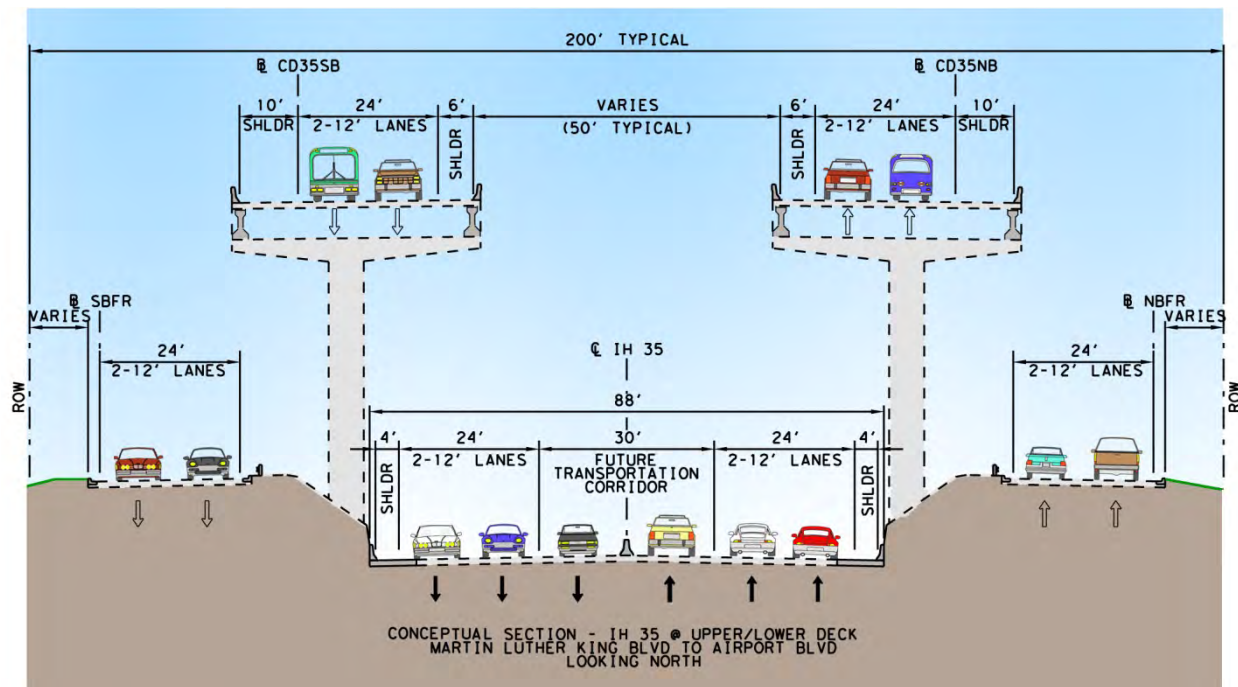


Figure 3.15: Widened Lower Deck Typical Section

New Center Structure

This concept would include the construction of a new center structure located between the two existing upper deck structures to accommodate the FTC. This concept results in the section for the lower deck being modified to maintain the existing 4-lane configuration while providing space for the new columns required for the new center structure. No changes would be made to the existing upper decks. The resulting new typical section would be four general purpose lanes on the existing upper deck structures and four general purpose lanes on the lower deck. The new center structure would provide two lanes for the FTC, and allows development of the full preferred FTC cross section. **Figure 3.16** shows a typical section with a new center structure. This concept requires closure of existing ramps within the limits of the decks. This concept provides the maximum future flexibility for this segment, and would allow for future expansion of the center structure at such time as the existing upper decks required replacement in the future. This concept would incur significantly higher construction costs, and take significantly longer to construct, when compared to widening the lower deck. As such, this concept is not currently recommended for further action. However, study team recommends carrying both options forward into Phase 3.

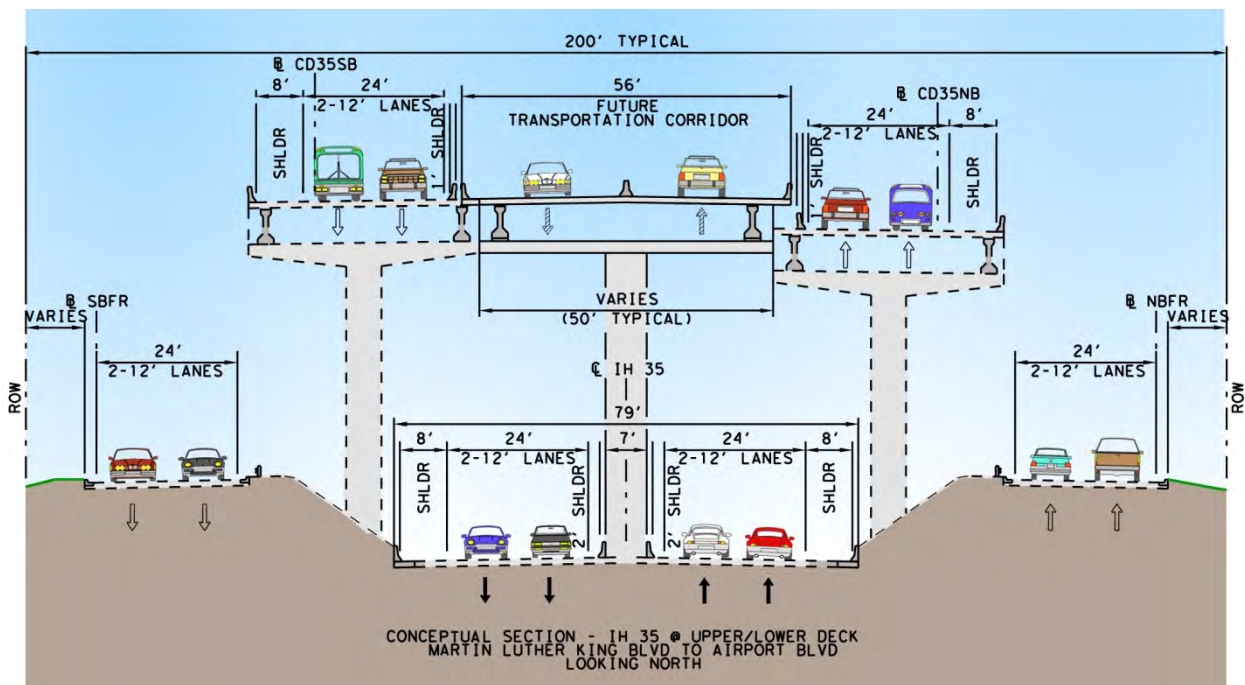


Figure 3.16: New Center Structure Typical Section

Both concepts require widening of the lower deck to accommodate either the additional lane pair or the columns for the new structure. To accommodate this widening, the ramps for local access would be removed; local traffic would remain on the frontage roads. Cross street bridges would be replaced to achieve minimum clearances on the lower deck. As part of the cross street bridge replacement, bicycle and pedestrian access would be enhanced. To minimize the impacts to local mobility and maximize

frontage road mobility, the concepts propose the installation of a Texas super street concept for the frontage roads throughout the segment.

Both concepts have significant constructability and maintenance of traffic concerns associated with the required modifications. Through utilization of extensive night/weekend closures, possible temporary restriping of the existing upper deck to accommodate additional construction phase traffic, and innovative construction methods, this section should be able to be constructed while maintaining traffic flows similar to the existing condition.

3.9.5 Segment 5 –MLK Boulevard to Lady Bird Lake

Overall concepts for Segment 5, shown in **Figure 3.17**, include implementation of the FTC, local mobility improvements associated with the reduction of ramps and frontage road improvements, implementation of collector-distributor roads, and direct connections to the FTC for increased mobility. Major constraints assessed include high volumes of local traffic, numerous entrance and exit ramps, fully built-out right-of-way, historic buildings and districts, the Capitol View Corridor from the northbound mainlanes, and bike and pedestrian mobility.

General Segment Improvements

For this segment a single set of mobility improvements have been developed with respect to laneage, ramp locations, use of collector-distributor roads and overall horizontal improvements. The FTC would be implemented throughout the segment. For local mobility, a modified Texas super street concept would improve traffic flow on the frontage roads by eliminating direct cross traffic movements on several streets and allowing for the frontage road traffic to proceed with limited interruption; signals at these locations would be converted to be pedestrian actuated or side-street queue actuated only, allowing for maximum green time for frontage roads. 6th Street is still under evaluation to determine how it would be used in the concept. Not all streets would be converted – Cesar Chavez, 7th St. and others would remain open to cross traffic. Finally, the implementation of collector-distributor roads from south of Riverside Drive into Segment 5, combined with ramp relocations, would reduce weaving movements on the mainlanes and reduce the number of entrance and exit points, both reducing the traffic conflicts throughout the Downtown.

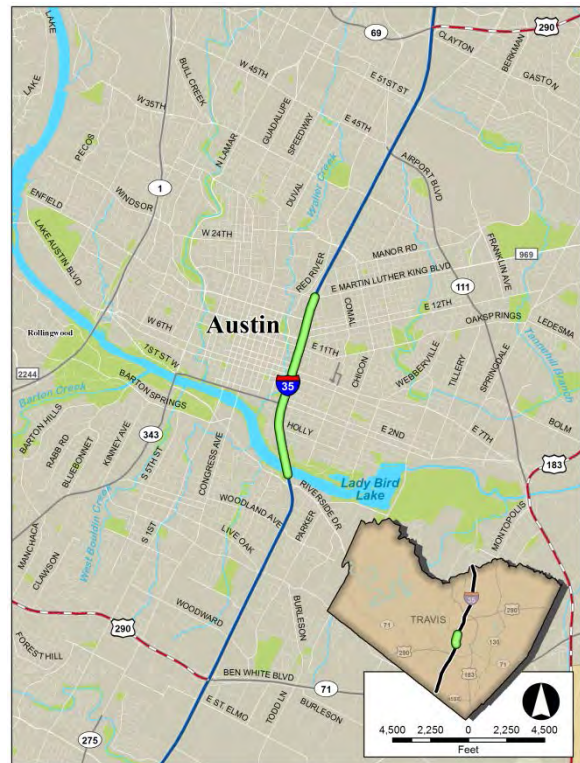


Figure 3.17: Segment 5

Downtown Concepts

To implement the mobility improvements above, two roadway configurations have been developed for the area between Cesar Chavez and 12th Street. The two concepts include a Modified Existing Configuration and a Fully Depressed Configuration.

Modified Existing Configuration

The modified existing configuration consists of normalizing the freeway at Cesar Chavez so that all of the main lanes go over Cesar Chavez rather than the split configuration (southbound under, northbound over) that currently exists. The modified existing configuration would consist of widening the roadway to accommodate the FTC and collector-distributor roads, reconstruction of the existing structures (4th Street and 6th - 8th Streets) to widen the structures, increase span lengths to increase east-west mobility and bicycle and pedestrian facilities, and improve aesthetics with context sensitive design. In addition the existing Capital Metro crossing would be rebuilt to accommodate future transit plans and to better accommodate the existing bike/pedestrian trail. North of 8th Street, the existing roadway would be widened to accommodate mobility improvements and pass under both 11th and 12th Streets as it does in the current configuration. A rendering of the potential modified existing concept at Cesar Chavez is shown in **Figure 3.18**.



Figure 3.18 Modified Existing Concept at Cesar Chavez

Depressed Configuration

The depressed configuration includes normalizing the freeway at Cesar Chavez so that all of the main lanes go under Cesar Chavez. Moving north the roadway would remain depressed under 4th Street and 6th – 8th Streets. North of 8th Street the roadway would begin merging back with its current alignment and pass under 11th and 12th Streets as it does in the current configuration. It is anticipated that the depressed section would be constructed with wider bridges at the crossing streets to improve east-west connectivity and bicycle and pedestrian facilities. Further, it is anticipated that the section would be constructed in a manner to allow for future caps in limited locations without major rework of the depressed section. Renderings of the Depressed Concept in the area near Cesar Chavez with and without caps are shown in **Figures 3.19 and 3.20** respectively.



Figure 3.19 Depressed Concept at Cesar Chavez



Figure 3.20: Depressed Concept at Cesar Chavez with Possible Future Cap

There are significant differences in construction time requirements and constructability between the two configurations. The modified existing configuration would take less time to construct and, because most of the roadway alignment would remain unchanged, require minimal disruption to east-west traffic apart from Cesar Chavez Avenue. The fully depressed configuration would require significantly longer time to construct. All cross streets would require closure for some portion of the construction duration in order to build the depressed section. Under either configuration three lanes of mainlane traffic would be required throughout the construction duration.

Drainage requirements also differ between configurations. The modified existing configuration would maintain existing drainage patterns. The depressed configuration would require two major modifications. First, existing drainage from east of I-35 to Waller Creek would require diversion to Lady Bird Lake. Second, the depressed freeway would require a new drainage system, including a pump station, to drain the lowered roadway.

Operationally, both proposed configurations provide similar benefit and operate substantively the same way. There are several issues that will need to be further vetted during Phase 3 development regarding potential tradeoffs and operational improvements. One such location is 6th Street across I-35. Currently, the concept calls for 6th Street to be discontinuous across the corridor to allow for an exit ramp from the C-D road. This exit is required for operational access into downtown from the south. Several options have been evaluated, and currently the best operational option is to cut off cross access at 6th Street to allow for the ramp; however, there are community concerns to severing this connection. The operations in this area will need to be further evaluated during Phase 3.

3.9.6 Segment 6 –Lady Bird Lake to Woodward Street

Segment 6 is shown in **Figure 3.21**. Overall improvements for Segment 6 included implementation of the FTC, frontage road improvements, implementation of collector-distributor roads, horizontal and vertical alignment improvements, and access points to the FTC for increased mobility. Major constraints assessed as part of the recommendation include horizontal and vertical alignment deficiencies, parkland, historical properties, environmental constraints, and bicycle and pedestrian cross-access concerns.

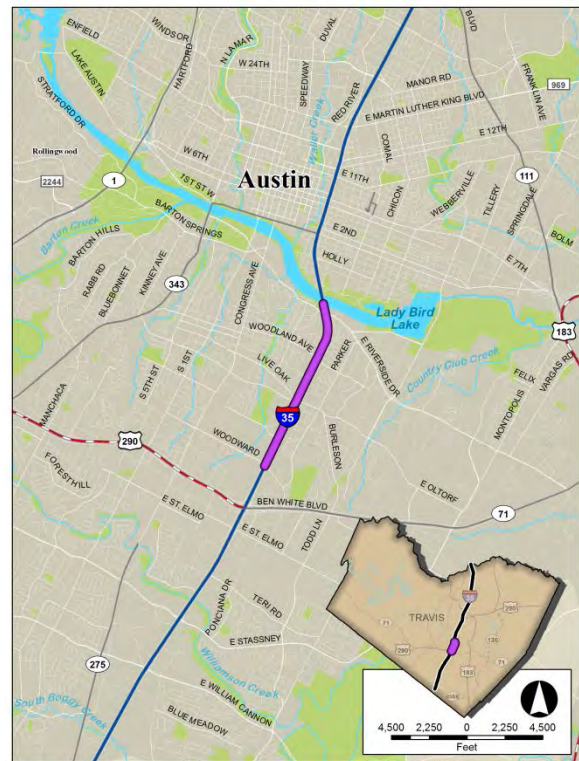


Figure 3.21: Segment 6

I-35 Mainlanes and FTC

In an effort to increase capacity along the I-35 main lanes and minimize potential conflict points at the existing/conceptual ramp locations, the following items were incorporated into this concept: add a 4th lane in each direction between Riverside and Ben White, reconfigure ramps, realign I-35 between Riverside and Woodland, and adjust the vertical profile between Riverside and Woodland. In association with the adjustment of the vertical profile, the concept would close Woodland to through traffic and construct a bicycle and pedestrian only bridge over I-35 to maintain bicycle and pedestrian connectivity at this location. Horizontally, improved geometry south of Riverside would be accommodated to the extent allowable without incurring right-of-way acquisition.

Riverside Drive Improvements

The concept to improve traffic flow at I-35 and Riverside Drive includes adding northbound collector-distributor lanes between Lady Bird Lake and Woodland; southbound collector-distributor lanes between Lady Bird Lake and Woodland; a U-turn structure at Riverside Drive (northbound to southbound); and reconstructing the Riverside bridge to accommodate additional width of auxiliary lanes and collector-distributor road and to accommodate future Urban Rail. The improvements at Riverside would also include improvements to bicycle and pedestrian facilities through the intersection.

Figure 3.22 shows the proposed configuration for I-35 at Riverside Drive.

The key to this concept is the development of collector-distributor roads under Riverside Drive for downtown access, allowing ramp consolidation and use of existing bridge capacity over Lady Bird Lake. In addition, existing horizontal and vertical mainlane alignment deficiencies south of Riverside Drive would be improved.

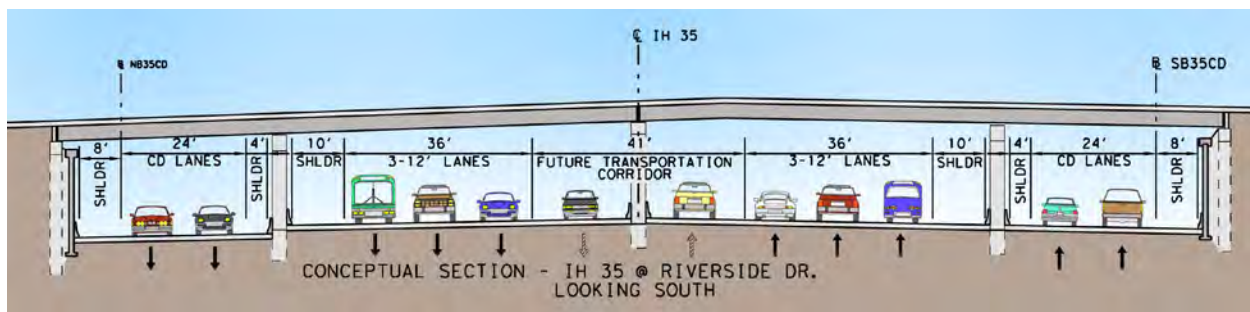


Figure 3.22: Segment 6 Conceptual Typical Section for I-35 at Riverside Drive

Oltorf Street Improvements

The concept to improve traffic flow at I-35 and Oltorf Street includes modifying the ramping between Woodland and Woodward in both directions to improve substandard ramp configurations, installation of turn around bridges in both directions, reconstruction of the Oltorf Street bridge to accommodate additional width of auxiliary lanes and shoulders. Improvements also include improvements to laneage, signal timing, and bicycle and pedestrian facilities to improve east-west connectivity across the corridor. **Figures 3.23** shows conceptual typical sections for I-35 in the vicinity of Oltorf Street.

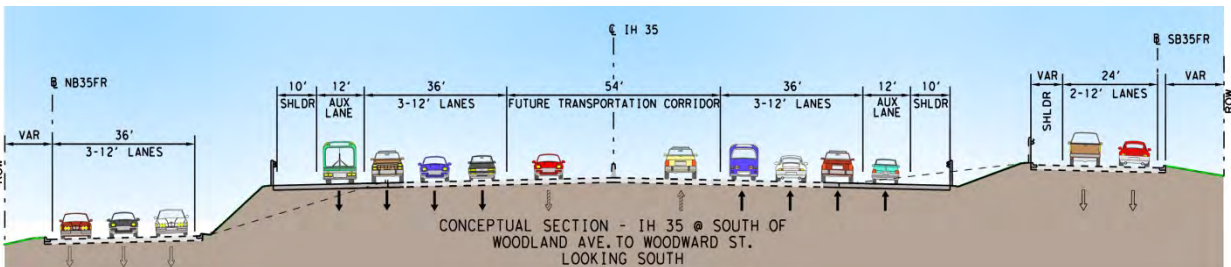


Figure 3.23: Segment 6 Conceptual Typical Section off-I-35 in the Vicinity of Oltorf

Constructability and maintenance of traffic for several of the improvements would be challenging; however, the improvements can be broken into several smaller implementation projects that could be linked together, reducing the overall impacts. Oltorf Street improvements, for example, are already being developed by TxDOT under a separate I-35 CAIP study.

3.9.7 Segment 7- Woodward Street to William Cannon Drive

Overall improvements to Segment 7, as shown in **Figure 3.24**, include improved weaving sections near the direct connectors for SH 71 (Ben White Boulevard) to I-35, addition of the FTC, and providing access to the FTC. A major issue for this segment of the corridor is the existing backup onto the direct connectors from SH 71 caused by the limited merge/weaving lengths onto the I-35 mainlanes.

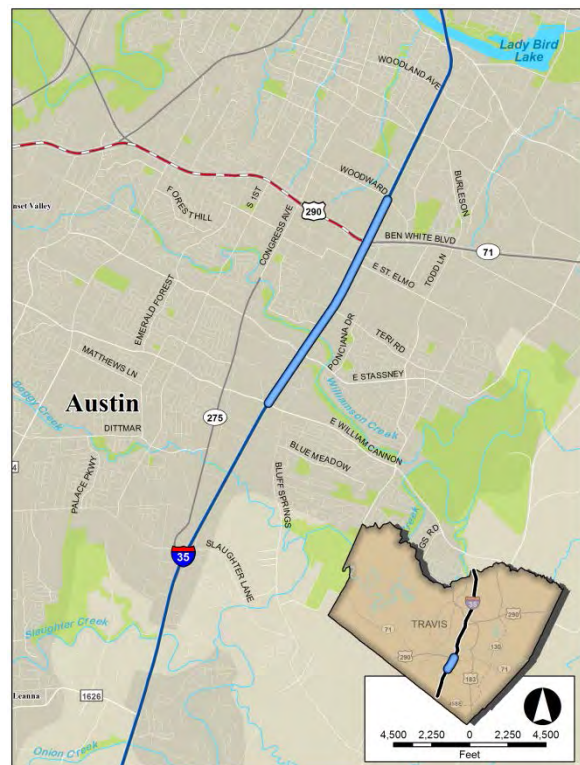


Figure 3.24: Segment 7

William Cannon and Stassney Improvements

Improvements to SH 71 Direct Connector to Southbound I-35

An auxiliary lane currently exists between southbound entrance ramp north of Stassney Lane and the southbound exit ramp to William Cannon Drive. This concept would utilize this existing auxiliary lane and extend it upstream (north) to SH 71, eliminating the current merge condition, and south of William Cannon. With the addition of this auxiliary lane, I-35 southbound would be four lanes between SH 71 and south of William Cannon Drive. A typical section for the auxiliary lane is shown in **Figure 3.25**. In addition to the auxiliary lane from the direct connectors to south of William Cannon, another auxiliary lane would be constructed between the entrance ramp just north of Stassney and the exit ramp to William Cannon.

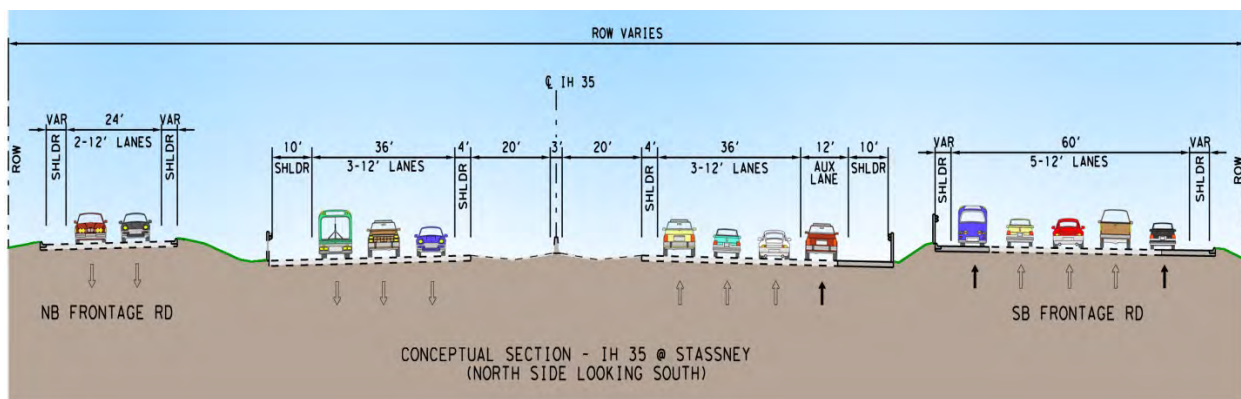


Figure 3.25 Auxiliary Lane for Southbound I-35

Improvements to Northbound I-35 Direct Connector to SH 71

This concept extends the existing auxiliary lane on northbound I-35 between the William Cannon Drive entrance and the SH 71 exit. With the extension of this auxiliary lane, I-35 northbound would be four lanes between William Cannon entrance ramp and SH 71 exit. This concept is contained within existing right-of-way. A typical section with the auxiliary lane is shown in **Figure 3.26**.

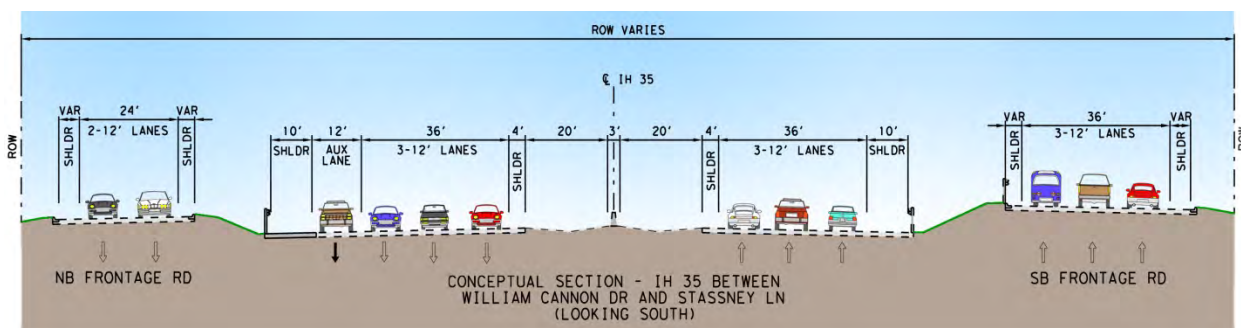


Figure 3.26: Auxiliary Lane for Northbound I-35

There are limited constructability and maintenance of traffic concerns associated with the implementation of the FTC as the majority of the work could be completed through widening of the existing roadway.

Stassney Lane

The concept at Stassney Lane consists of a modified conventional intersection to address current issues with delays at the intersection. The modifications include frontage road and approach widening to accommodate additional turn lanes, construction of turnaround bridges in both directions, and reconstruction of the Stassney Lane bridge to accommodate additional laneage and bicycle and pedestrian improvements.

William Cannon Drive

The concept at William Cannon is very similar to Stassney with a modified conventional intersection. The modifications would consist of frontage road and approach widening to accommodate additional turn lanes, construction of turnaround bridges in both directions, and reconstruction of the William Cannon bridge to accommodate additional mainlane width, additional laneage, and bicycle and pedestrian improvements.

Ramp Reversals – William Cannon to Slaughter

The concept includes the reversal/reconstruction of the southbound ramps between William Cannon and Slaughter. The reconstructed ramps would complete the X-pattern ramping by replacing the existing entrance ramp with an exit ramp and the existing exit ramp with an entrance ramp.

Incorporation of the Future Transportation Corridor

This concept adds the FTC to I-35 throughout the segment. This concept is contained within existing right-of-way. As discussed above, additional mainlane widening on the outside edges and some structure widening may be required to accommodate the FTC in the ideal typical section. A typical section of the FTC is shown in **Figure 3.27**.

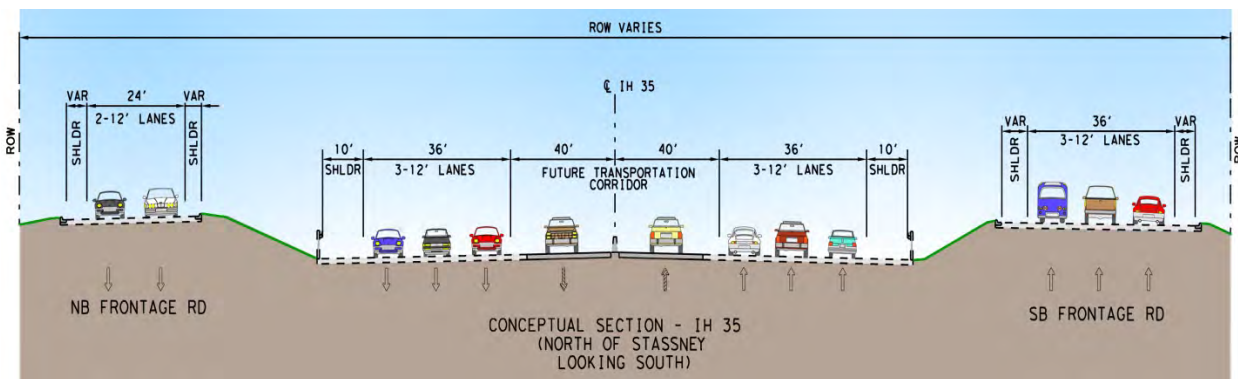


Figure 3.27: Typical Section with FTC

3.9.8 Segment 8 – William Cannon Drive to SH 45SE

Overall improvements to Segment 8, as shown in **Figure 3.28**, include improved implementation of the FTC, ramp modifications, and intersection modifications, and bicycle and pedestrian improvements.

Incorporation of Future Transportation Corridor

This concept adds the FTC to I-35 between SH 71 and William Cannon Drive. This concept is contained within existing right-of-way. As discussed above, additional mainlane widening on the outside edges and some structure widening may be required to accommodate the FTC in the ideal typical section. The typical section through this portion of the corridor will be the same as the section in Segment 7.

Slaughter Lane

Several improvements are proposed at Slaughter Lane to improve traffic flow. The concept includes modifications to the frontage roads to better accommodate turning movements, modifying Slaughter Lane to accommodate median U-turns to eliminate left turns from Slaughter Lane onto the frontage roads, and modification of the traffic patterns at the intersection of South Congress and Slaughter. With the implementation of the median U-turns, traffic on Slaughter wishing to access the frontage road would travel straight through the intersection, U-turn, and then turn right to access the frontage road. See **Figure 3.29** for an illustration of the median U-turns at Slaughter Lane.

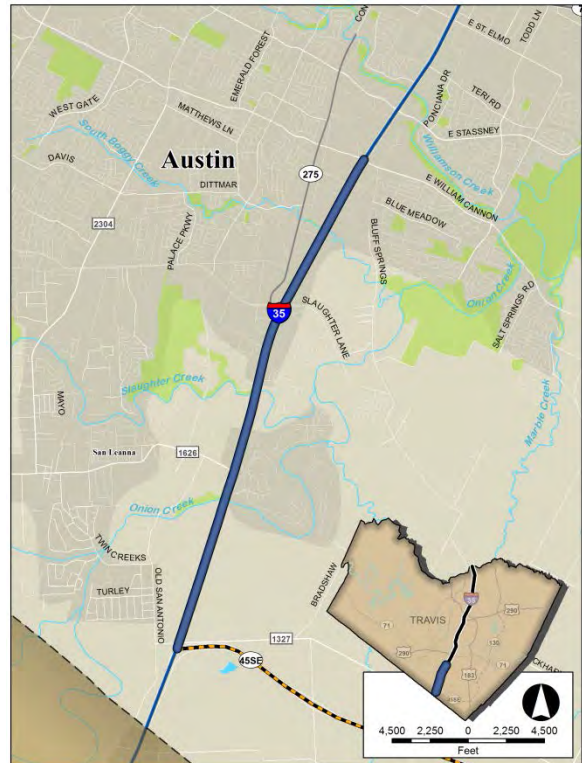


Figure 3.28: Segment 8



Figure 3.29 Slaughter Lane Median U-turns

Slaughter Creek Overpass

The existing Slaughter Creek overpass is in poor condition, has substandard vertical clearance, and has inadequate width to handle traffic. The concept includes reconstructing the overpass structure to widen the 2-lane section and add a dedicated southbound to northbound turn around, modification of the frontage roads to better process turn around traffic, and incorporation of bicycle and pedestrian elements across the bridge.



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4.0 Corridor Implementation Projects

A preliminary plan for implementing I-35 CAIP projects in Travis County has been developed. This program includes those refined improvement concepts delineated in **Section 3** of this report. As noted in that section, these concepts are subject to change, and will be required to undergo Phase 3 (NEPA) evaluation at such time as funds are identified to advance each proposed concept to further development. These refined concepts provide a blueprint for the overall corridor improvements and provide guidance as to how overall corridor improvements can be implemented.

The overall Travis County implementation effort includes all development phases as described in **Section 1**. With the completion of this Corridor Implementation Plan, the entire length of I-35 from SH 45N to SH 45SE Phase 2 development is complete. This section delineates development of Phases 3 through 5 for corridor improvements.

4.1 Assumptions and Limitations

For the purposes of this plan, the following assumptions were made:

- The improvement concepts delineated in **Section 3** form the basis for a program of projects to improve I-35. These concepts could change as further development occurs in Phase 3.
- Cost of implementation at this time is based on preliminary, order of magnitude assessment of the probable cost to implement the improvement concepts.
- All cost and funding numbers are based on 2013 dollars, without escalation or inflation.
- Historic numbers for TxDOT spending on I-35 in Travis County are based on a 10-year history of construction spending, with an assumed 16% project development cost.
- Payback numbers for the CAMPO – CTRMA interlocal agreement are taken from that document.

4.2 Program of Projects

For development of these implementation recommendations, the operational and mobility improvements under development as part of engineering evaluations have been grouped into projects. Each project is intended to have independent utility, but the effect of improvements is intended to be cumulative between projects. In addition, each project, to the extent possible, will be developed with an intent to facilitate future efforts to meet ongoing corridor needs, to minimize throw-away construction. Bicycle and pedestrian facilities are included within the individual projects. ITS improvements are shown as a separate stand-alone basket of improvements, but could also be combined with the individual projects. Project breakout sheets have been developed for each stand-alone project (except ITS projects), and are contained in **Appendix C: Project Development Summary Sheets**. A summary of these projects follows:

Segment 1 – SH 45N to Parmer Lane

- Ramp Reversals – SH 45N to Grand Avenue Parkway
 - Reverse southbound entrance ramp to an exit ramp.
 - Reverse southbound exit ramp to an entrance ramp.
 - Reverse northbound entrance ramp to an exit ramp.
 - Reverse northbound exit ramp to an entrance ramp.
- Grand Avenue Parkway Improvements
 - Northbound and southbound ramp modifications.
 - Intersection improvements at I-35 and Grand Avenue Parkway.
 - Option 1: Modified conventional intersection.
 - Option 2: Roundabouts.
 - Bridge modifications.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Wells Branch Parkway/FM 1825 Improvements
 - Northbound and southbound ramp modifications.
 - Intersection improvements.
 - Roundabout at northbound I-35 Frontage Road and Wells Branch Parkway.
 - Roundabout at southbound I-35 Frontage Road and Wells Branch Parkway.
 - Roundabout at Wells Branch Parkway and FM 1825.
 - Bridge replacement and widening.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Howard Lane Improvements
 - Northbound and southbound ramp modifications.
 - Intersection improvements.
 - Roundabout at northbound I-35 Frontage Road and Howard Lane.
 - Roundabout at southbound I-35 Frontage Road and Howard Lane.
 - Bridge replacement and widening.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor

Segment 2 – Parmer Lane to US 183

- Parmer Lane Improvements
 - New northbound and southbound collector-distributor roads.
 - Northbound and southbound ramp modifications.
 - Intersection Improvements.
 - Diverging Diamond Intersection at I-35 and Parmer Lane.
 - Southbound Collector-Distributor road.
 - Median U-turns on Lamar Boulevard near intersection with Parmer Lane (required for the proposed Diverging Diamond Intersection).
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.

- Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Braker Lane Improvements
 - New bridge over Walnut Creek.
 - Northbound and southbound ramp modifications.
 - U-turn bridges at Braker Lane.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor.

Segment 3 – US 183 to Airport Boulevard

- Ramp Modifications - US 183-US 290
 - Northbound and southbound ramp modifications.
 - Modified direct-connector from I-35N to US 183N.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- St. Johns Avenue Improvements
 - New northbound and southbound turnaround lanes.
 - Pedestrian-only bridge.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
 - Implement Texas Super Street concept
- 51st Street Improvements
 - Intersection improvements at I-35 and 51st Street including roundabout.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity
- Construct the Future Transportation Corridor
- Construct I-35 to US 183 direct connectors
- Construct Pedestrian Bridge
- Ramp Improvements – 51st Street to Airport
 - Reverse northbound exit ramp into an entrance ramp.

Segment 4 – Airport Boulevard to MLK Boulevard

- Airport Boulevard Improvements
 - Northbound and southbound ramp modifications.
 - Reconstruct northbound and southbound collector-distributor roads.
 - Intersection improvements at I-35 and Airport Boulevard.
 - Diverging Diamond Intersection.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.

- Decks – Airport to MLK
 - New northbound and southbound turnaround lanes.
 - Texas Super Street.
 - U-turn bridge construction at East 38 ½ Street, East 32nd Street, and Manor Road.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor.

Segment 5 – MLK Boulevard to Lady Bird Lake

- MLK Boulevard Improvements
 - Northbound and southbound ramp modifications.
 - New northbound collector-distributor road.
 - Bridge modifications.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Downtown – MLK to south of Holly
 - Northbound and southbound ramp modifications and reversals.
 - New northbound collector-distributor roads from 6th Street to Holly Street.
 - New southbound collector-distributor road from Cesar Chavez to south of Holly Street.
 - Mainlane reconstruction.
 - Option 1: Modified existing mainlanes (including widening existing elevated structure).
 - Option 2: Fully depressed mainlanes.
 - Potential future caps between 12th and 11th Streets; 8th and 6th Streets; and 4th and Driskill Streets.
 - Partial Texas Super Street.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor.

Segment 6 – Lady Bird Lake to Woodward Street

- Riverside Drive Improvements
 - New northbound and southbound collector-distributor roads under Riverside Drive.
 - New northbound to southbound turnaround lane.
 - New pedestrian/bicycle-only bridge at Woodland Avenue.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Oltorf Improvements – Woodland to Woodward
 - Northbound and southbound ramp modifications.
 - New turnaround lanes.

- Widen outside lanes of all I-35 Frontage Roads for bicycles.
- Complete sidewalk connections.
- Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor.

Segment 7 – Woodward Street to William Cannon Drive

- William Cannon and Stassney
 - Stassney Lane
 - Northbound and southbound ramp modifications.
 - New turnaround lanes.
 - New auxiliary lanes.
 - Bridge reconstruction.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
 - William Cannon Drive
 - Northbound and southbound ramp modifications.
 - New turnaround lanes.
 - New auxiliary lanes.
 - Bridge reconstruction.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Ramp Reversals – William Cannon to Slaughter
 - Reverse southbound entrance ramp to an exit ramp
 - Reverse southbound exit ramp to an entrance ramp
- Construct the Future Transportation Corridor.

Segment 8 – William Cannon Drive to SH 45SE

- Slaughter Lane
 - Northbound and southbound ramp modifications.
 - Intersection modifications.
 - Modified conventional intersection with median U-turns on Slaughter Lane.
 - Bridge reconstruction.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Slaughter Creek Overpass
 - Northbound and southbound ramp modifications.
 - New turnaround lane.
 - Bridge reconstruction.
 - Widen outside lanes of all I-35 Frontage Roads for bicycles.
 - Complete sidewalk connections.
 - Bicycle and pedestrian improvements for east-west connectivity.
- Construct the Future Transportation Corridor.

4.3 Project Prioritization and Schedule for Corridor Improvements

Generally, the program of improvements consists of stand-alone projects that could be advanced independently of one another as funding becomes available. From a corridor standpoint, the projects can be grouped into priorities, and considered for phased implementation. In addition, certain projects require some improvements to be in place prior to construction.

A hypothetical schedule for project implementation was developed without reference to fiscal year, as shown in **Appendix D: Preliminary Project Schedule**. This schedule indicates individual project development of Phases 3, 4 and 5 for the projects identified in **Section 4.2**. This schedule assumes:

- Phase 3 for most projects could be accomplished in 18 to 24 months.
- Phase 4 for most projects could be accomplished in 12 to 24 months.
- Phase 5 duration varies based on particular improvements identified.

Project prioritization assumes the following:

- The Future Transportation Corridor must be constructed north and south of the urban core prior to construction on I-35 in the urban core.
- Direct connectors at US 183 / I-35 must be constructed prior to any construction on I-35 in the urban core.
- Current projects under development on US 183 and MOPAC must be complete prior to construction on I-35 in the urban core.
- The Decks – Airport to MLK cannot be constructed at the same time as the Downtown – MLK to south of Holly section.

The preliminary project schedule outlines projects that are along critical path to complete the FTC along the entire corridor. Projects listed as “other projects” on the schedule are not critical path and may be progressed at any time that funding is available regardless of where it is shown on the schedule. These projects could be developed ahead, as part of, or after the FTC construction.

As funding is not currently identified, these programming examples are for illustrative purposes only. **If funding and resources are not available in the years identified, the implementation schedules for the projects will extend.**

4.4 Preliminary Project Costs

The recommended program of projects incorporates ongoing development efforts already authorized and funded by TxDOT and others. However, most implementation recommendations for the I-35 CAIP in Travis County are currently unfunded. For areas with more than one refined concept, the cost shown would cover all proposed concepts, with one significant exception. In Segment 5 the two refined concepts, Modified Existing and Depressed have significantly different costs. Current preliminary estimates of probable cost are shown by project in **Table 4.1** and **4.2**. More detailed preliminary



estimates of probable construction cost may be found in Appendix E: Preliminary Estimates. **Table 4.1** shows costs with the downtown Modified Existing concept; **Table 4.2** includes two direct connectors at US 183 in Segment 3, the Depressed Concept with caps in Segment 5 and the FTC direct connector in Segment 6. These two cost tables provide a low and high bookend of concepts under development. Both tables assume 6% of construction cost for Phase 3 development and 10% of construction cost for Phase 4 development.

Table 4.1: Cost Breakdown Modified Existing Concept

Project	Phase 3	Phase 4	Phase 5	Total
Ramp Reversal: SH 45 to Grand Avenue Parkway	\$1,701,660	\$2,836,100	\$28,361,000	\$32,898,760
Grand Avenue Parkway	\$970,740	\$1,617,900	\$16,179,000	\$18,767,640
Wells Branch Parkway	\$1,291,080	\$2,151,800	\$21,518,000	\$24,960,880
Howard Lane	\$1,779,300	\$2,965,500	\$29,655,000	\$34,399,800
Parmer Lane	\$1,241,100	\$2,068,500	\$20,685,000	\$23,994,600
Braker Lane	\$985,620	\$1,642,700	\$16,427,000	\$19,055,320
Pedestrian Bridge: Rundberg Lane to US 183	\$150,240	\$250,400	\$2,504,000	\$2,904,640
Ramp Modifications: US 183 to US 290	\$982,380	\$1,637,300	\$16,373,000	\$18,992,680
St. Johns Street	\$733,500	\$1,222,500	\$12,225,000	\$14,181,000
51st Street	\$774,000	\$1,290,000	\$12,900,000	\$14,964,000
Ramp Modifications: 51st to Airport Boulevard	\$590,100	\$983,500	\$9,835,000	\$11,408,600
Airport Boulevard	\$985,680	\$1,642,800	\$16,428,000	\$19,056,480
Decks: Airport Boulevard to MLK Boulevard	\$3,228,660	\$5,381,100	\$53,811,000	\$62,420,760
Downtown: Modified Existing	\$8,520,600	\$14,201,000	\$142,010,000	\$164,731,600
MLK Boulevard	\$95,280	\$158,800	\$1,588,000	\$1,842,080
Riverside Drive	\$4,067,340	\$6,778,900	\$67,789,000	\$78,635,240
Oltorf Street: Woodland Avenue to Woodward Street	\$3,299,040	\$5,498,400	\$54,984,000	\$63,781,440
William Cannon Drive and Stassney Lane	\$3,400,380	\$5,667,300	\$56,673,000	\$65,740,680
Slaughter Lane	\$383,520	\$639,200	\$6,392,000	\$7,414,720
Slaughter Creek Overpass	\$343,860	\$573,100	\$5,731,000	\$6,647,960
North FTC	\$14,885,820	\$24,809,700	\$248,097,000	\$287,792,520
Central FTC	\$1,245,360	\$2,075,600	\$20,756,000	\$24,076,960
South FTC	\$5,928,960	\$9,881,600	\$98,816,000	\$114,626,560
ITS	\$2,946,000	\$4,910,000	\$49,100,000	\$56,956,000
Total	\$60,530,220	\$100,883,700	\$1,008,837,000	\$1,170,250,920

Table 4.2: Cost Breakdown Depressed Concept

Project	Phase 3	Phase 4	Phase 5	Total
Ramp Reversal: SH 45 to Grand Avenue Parkway	\$1,701,660	\$2,836,100	\$28,361,000	\$32,898,760
Grand Avenue Parkway	\$970,740	\$1,617,900	\$16,179,000	\$18,767,640
Wells Branch Parkway	\$1,291,080	\$2,151,800	\$21,518,000	\$24,960,880
Howard Lane	\$1,779,300	\$2,965,500	\$29,655,000	\$34,399,800
Lamar Realignment	\$851,640	\$1,419,400	\$14,194,000	\$16,465,040
Parmer Lane	\$1,241,100	\$2,068,500	\$20,685,000	\$23,994,600
Braker Lane	\$985,620	\$1,642,700	\$16,427,000	\$19,055,320
Pedestrian Bridge: Rundberg Lane to US 183	\$150,240	\$250,400	\$2,504,000	\$2,904,640
US 183 Direct Connectors	\$5,904,780	\$9,841,300	\$98,413,000	\$114,159,080
Ramp Modifications: US 183 to US 290	\$982,380	\$1,637,300	\$16,373,000	\$18,992,680
St. Johns Street	\$733,500	\$1,222,500	\$12,225,000	\$14,181,000
51st Street	\$774,000	\$1,290,000	\$12,900,000	\$14,964,000
Ramp Modifications: US 290 to Airport Boulevard	\$590,100	\$983,500	\$9,835,000	\$11,408,600
Airport Boulevard	\$985,680	\$1,642,800	\$16,428,000	\$19,056,480
Decks: Airport Boulevard to MLK Boulevard	\$3,228,660	\$5,381,100	\$53,811,000	\$62,420,760
Downtown: Depressed Section w/Caps	\$8,520,600	\$61,331,000	\$613,310,000	\$683,161,600
MLK Boulevard	\$95,280	\$158,800	\$1,588,000	\$1,842,080
Riverside Drive	\$4,067,340	\$6,778,900	\$67,789,000	\$78,635,240
Oltorf Street: Woodland Avenue to Woodward Street	\$3,299,040	\$5,498,400	\$54,984,000	\$63,781,440
William Cannon Drive and Stassney Lane	\$3,400,380	\$5,667,300	\$56,673,000	\$65,740,680
Slaughter Lane	\$383,520	\$639,200	\$6,392,000	\$7,414,720
Slaughter Creek Overpass	\$343,860	\$573,100	\$5,731,000	\$6,647,960
North FTC	\$14,885,820	\$24,809,700	\$248,097,000	\$287,792,520
Central FTC	\$1,245,360	\$2,075,600	\$20,756,000	\$24,076,960
South FTC	\$6,858,960	\$11,431,600	\$114,316,000	\$132,606,560
ITS	\$2,946,000	\$4,910,000	\$49,100,000	\$56,956,000
Total	\$68,216,640	\$160,824,400	\$1,608,244,000	\$1,837,285,040

4.5 Project Funding

Identified project funding to date includes:

- \$11 million annual spending by TxDOT on projects in the I-35 corridor.
- \$15 million approved by City of Austin voters as part of the City of Austin 2012 Bond election.
- Funds that could be available as part of the interlocal agreement between CAMPO and CTRMA, as described later in this section.

A summary of anticipated funding needs for the Modified Existing configuration is shown in **Table 4.3**. Note that **Table 4.3** also shows additional the use of a General Engineering Consultant to facilitate implementation of these improvements, as well as some additional planning efforts and the anticipated cost of same. **Table 4.3** indicates a total project development cost of \$1.251 billion. Of this, current and projected funding noted above would cover \$259 million, leaving an unfunded amount of \$991 million. The yearly projected and unfunded costs are shown in **Figure 4.1**; the cumulative amounts are shown in **Figure 4.2**.

A summary of anticipated funding needs for the Depressed Concept with direct connectors at US 183 and the FTC direct connector south of the river is shown in **Table 4.4**. Note that **Table 4.4** also shows the use of a General Engineering Consultant to facilitate implementation of these improvements, and the anticipated cost of same. **Table 4.4** indicates a total project development cost of \$1.918 billion. Of this, current and projected funding noted above would cover \$259 million, leaving an unfunded amount of \$1.658 billion. The yearly projected and unfunded costs are shown in **Figure 4.3**; the cumulative amounts are shown in **Figure 4.4**. **If funding is unavailable, the timeframe and expenditure curve will be extended.**

Table 4.3: Total Funding Needs Modified Existing Concept (Preliminary)

Year	Phases 1-4	Phase 5	General Engineering Consultant	Needed FY Expenditure	Total Amount Allocated Funding***	Unfunded to Date	Annual TxDOT Expenditures I-35*	MoPac Repayment**	Current Available Funding	Total Unfunded
1	\$10,937,000	\$0.0	\$1,000,000.0	\$11,937,000	\$15,300,000	(\$3,363,000)	\$0	\$0	\$15,300,000	(\$3,363,000)
2	\$21,398,000	\$0	\$5,000,000.0	\$26,398,000	\$2,100,000	\$24,298,000	\$11,000,000	\$0	\$13,100,000	\$13,298,000
3	\$22,292,000	\$59,336,000	\$5,000,000.0	\$86,628,000	\$0	\$86,628,000	\$11,000,000	\$0	\$11,000,000	\$75,628,000
4	\$22,417,000	\$121,748,000	\$5,000,000.0	\$149,165,000	\$0	\$149,165,000	\$11,000,000	\$0	\$11,000,000	\$138,165,000
5	\$11,288,000	\$126,577,000	\$5,000,000.0	\$142,865,000	\$0	\$142,865,000	\$11,000,000	\$2,000,000	\$13,000,000	\$129,865,000
6	\$17,022,000	\$90,353,000	\$5,000,000.0	\$112,375,000	\$0	\$112,375,000	\$11,000,000	\$2,000,000	\$13,000,000	\$99,375,000
7	\$19,796,000	\$76,939,000	\$5,000,000.0	\$101,735,000	\$0	\$101,735,000	\$11,000,000	\$3,000,000	\$14,000,000	\$87,735,000
8	\$30,148,000.0	\$49,879,000	\$5,000,000.0	\$85,027,000	\$0	\$85,027,000	\$11,000,000	\$4,000,000	\$15,000,000	\$70,027,000
9	\$604,000.0	\$161,433,000	\$5,000,000.0	\$167,037,000	\$0	\$167,037,000	\$11,000,000	\$5,000,000	\$16,000,000	\$151,037,000
10	\$604,000.0	\$155,957,000	\$5,000,000.0	\$161,561,000	\$0	\$161,561,000	\$11,000,000	\$5,000,000	\$16,000,000	\$145,561,000
11	\$604,000.0	\$31,909,000	\$5,000,000.0	\$37,513,000	\$0	\$37,513,000	\$11,000,000	\$6,000,000	\$17,000,000	\$20,513,000
12	\$4,333,000.0	\$31,909,000	\$5,000,000.0	\$41,242,000	\$0	\$41,242,000	\$11,000,000	\$10,000,000	\$21,000,000	\$20,242,000
13	\$4,333,000.0	\$30,136,000	\$5,000,000.0	\$39,469,000	\$0	\$39,469,000	\$11,000,000	\$10,000,000	\$21,000,000	\$18,469,000
14		\$28,363,000	\$5,000,000.0	\$33,363,000	\$0	\$33,363,000	\$11,000,000	\$10,000,000	\$21,000,000	\$12,363,000
15		\$28,363,000	\$5,000,000.0	\$33,363,000	\$0	\$33,363,000	\$11,000,000	\$10,000,000	\$21,000,000	\$12,363,000
16		\$15,935,000	\$5,000,000.0	\$20,935,000	\$0	\$20,935,000	\$11,000,000	\$10,000,000	\$21,000,000	(\$65,000)
Totals:	\$165,776,000	\$1,008,837,000	\$76,000,000	\$1,250,613,000	\$17,400,000	\$1,233,213,000	\$165,000,000	\$77,000,000	\$259,400,000	\$991,213,000

* - Based upon historical average expenditures

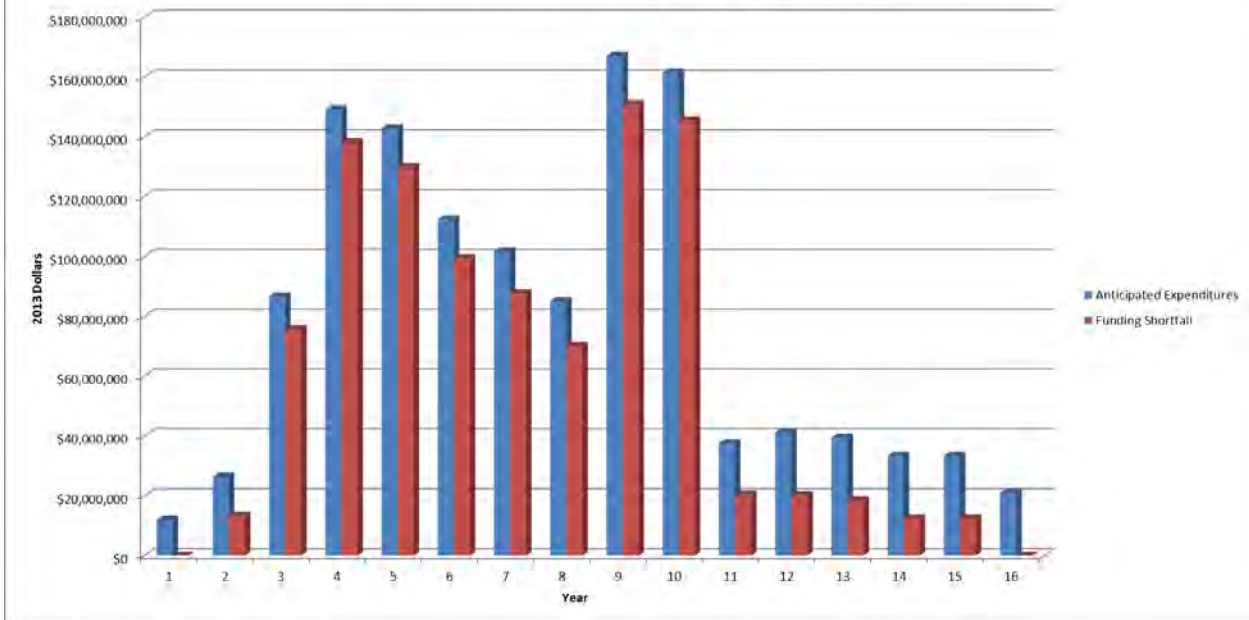
** - Based upon Interlocal Agreement between CAMPO and CTRMA, assumes Year 5 is Calendar Year 2017

*** - Assumes \$15 million COA 2012 Bond Funding Year 1

Note: All costs based upon 2013 dollars

Note: Timeframe based upon funding being available in years noted. If funding is unavailable, timeframe and expenditures will extend.

**Figure 4.1: Anticipated Expenditures and Funding Shortfall
Modified Existing Concept**



**Figure 4.2: Cumulative Anticipated Expenditures vs. Current Available Funding
Modified Existing Concept**

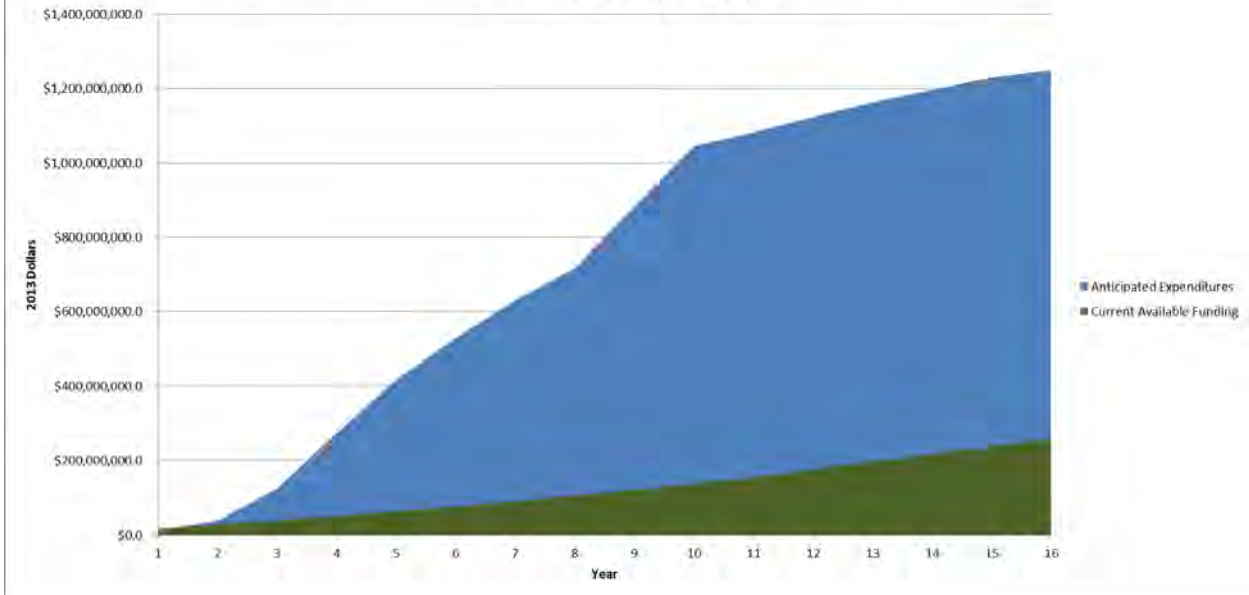


Table 4.4: Total Funding Needs Depressed Concept with Caps and Direct Connectors (Preliminary)

Year	Phases 1-4	Phase 5	General Engineering Consultant	Needed FY Expenditure	Total Amount Allocated Funding***	Unfunded to Date (M)	Annual TxDOT Expenditures I-35*	MoPac Repayment **	Current Available Funding	Total Unfunded
1	\$10,937,000	\$0.0	\$1,000,000	\$11,937,000	\$15,300,000	(\$3,363,000)	\$0	\$0	\$15,300,000	(\$3,363,000)
2	\$24,815,000	\$0	\$5,000,000	\$29,815,000	\$2,100,000	\$27,715,000	\$11,000,000	\$0	\$13,100,000	\$16,715,000
3	\$25,710,000	\$59,336,000	\$5,000,000	\$90,046,000	\$0	\$90,046,000	\$11,000,000	\$0	\$11,000,000	\$79,046,000
4	\$30,812,000	\$121,748,000	\$5,000,000	\$157,560,000	\$0	\$157,560,000	\$11,000,000	\$0	\$11,000,000	\$146,560,000
5	\$15,137,000	\$148,146,000	\$5,000,000	\$168,283,000	\$0	\$168,283,000	\$11,000,000	\$2,000,000	\$13,000,000	\$155,283,000
6	\$18,441,000	\$128,324,000	\$5,000,000	\$151,765,000	\$0	\$151,765,000	\$11,000,000	\$2,000,000	\$13,000,000	\$138,765,000
7	\$1,216,000	\$129,104,000	\$5,000,000	\$185,320,000	\$0	\$185,320,000	\$11,000,000	\$3,000,000	\$14,000,000	\$171,320,000
8	\$45,858,000.0	\$113,411,000	\$5,000,000	\$164,269,000	\$0	\$164,269,000	\$11,000,000	\$4,000,000	\$15,000,000	\$149,269,000
9	\$604,000.0	\$255,693,000	\$5,000,000	\$261,297,000	\$0	\$261,297,000	\$11,000,000	\$5,000,000	\$16,000,000	\$245,297,000
10	\$604,000.0	\$250,217,000	\$5,000,000	\$255,821,000	\$0	\$255,821,000	\$11,000,000	\$5,000,000	\$16,000,000	\$239,821,000
11	\$604,000.0	\$126,169,000	\$5,000,000	\$131,773,000	\$0	\$131,773,000	\$11,000,000	\$6,000,000	\$17,000,000	\$114,773,000
12	\$4,333,000.0	\$126,169,000	\$5,000,000	\$135,502,000	\$0	\$135,502,000	\$11,000,000	\$10,000,000	\$21,000,000	\$114,502,000
13	\$4,333,000.0	\$77,266,000	\$5,000,000	\$86,599,000	\$0	\$86,599,000	\$11,000,000	\$10,000,000	\$21,000,000	\$65,599,000
14		\$28,363,000	\$5,000,000	\$33,363,000	\$0	\$33,363,000	\$11,000,000	\$10,000,000	\$21,000,000	\$12,363,000
15		\$28,363,000	\$5,000,000	\$33,363,000	\$0	\$33,363,000	\$11,000,000	\$10,000,000	\$21,000,000	\$12,363,000
16		\$15,935,000	\$5,000,000	\$20,935,000	\$0	\$20,935,000	\$11,000,000	\$10,000,000	\$21,000,000	(\$65,000)
Totals:	\$233,404,000	\$1,608,244,000	\$76,000,000	\$1,917,648,000	\$17,400,000	\$1,900,248,000	\$165,000,000	\$77,000,000	\$259,400,000	\$1,658,248,000

* - Based upon historical average expenditures

** - Based upon Interlocal Agreement between CAMPO and CTRMA, assumes Year 5 is Calendar Year 2017

*** - Assumes \$15 million COA 2012 Bond Funding Year 1

Note: All costs based upon 2013 dollars

Note: Timeframe based upon funding being available in years noted. If funding is unavailable, timeframe and expenditures will extend.

Figure 4.3: Anticipated Expenditures and Funding Shortfall Depressed Concept with Caps and Direct Connectors

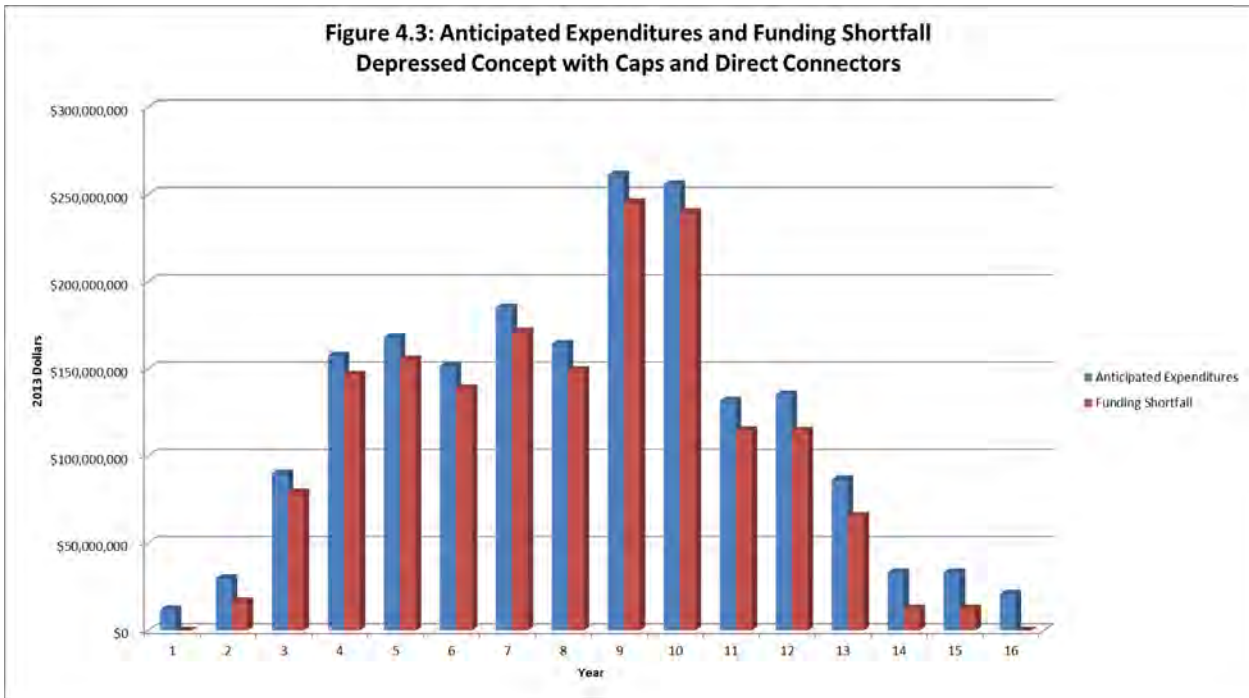
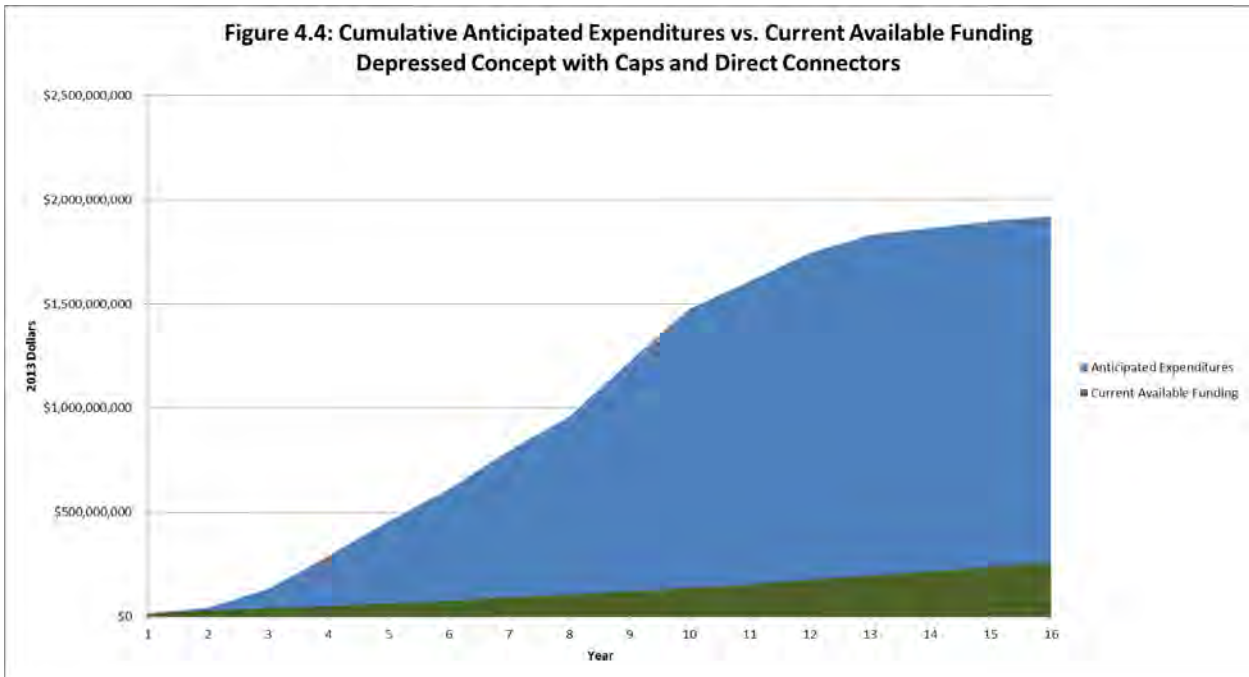


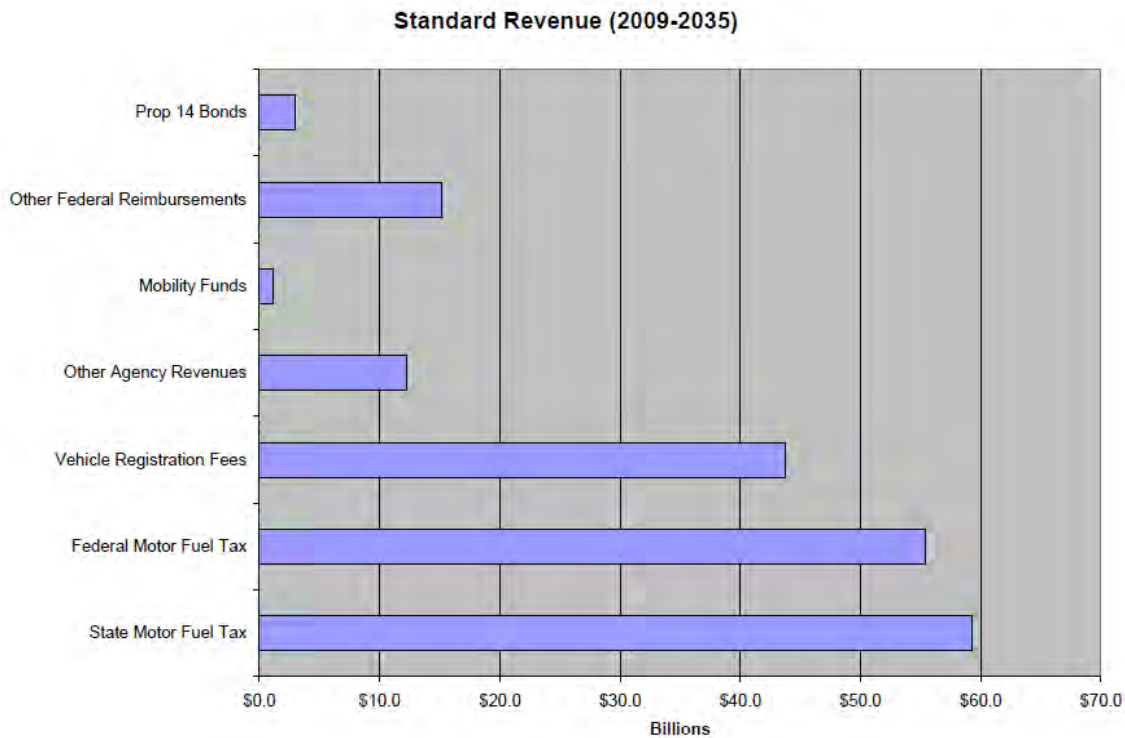
Figure 4.4: Cumulative Anticipated Expenditures vs. Current Available Funding Depressed Concept with Caps and Direct Connectors



4.5.1 Potential Funding Sources

Texas transportation revenues are generated by motor fuel taxes, vehicle registration fees, federal funds, bonds, and public-private partnerships as shown in **Figure 4.5**. Until 2002, TxDOT’s projects were funded entirely with state and federal revenues. Since 2002, revenues have been inadequate to keep up with demand and have been supplemented by allocations from private partners and borrowed funds generated by bond issues. As seen in **Figure 4.5**, currently the primary source of transportation funding is the federal and state motor fuel tax. The state tax on gasoline is \$0.20 per gallon and the federal tax is \$0.184 per gallon. Both are flat taxes and do not vary according to the price of gasoline. Many people are purchasing fewer gallons of fuel because they purchase increasingly fuel-efficient vehicles. Also, the purchasing power of the motor fuel tax is declining due to inflation.

A variety of funding mechanisms exist that could be applied to I-35 projects in Travis County. For this interim report, a list of potential funding sources has been identified. As part of continued implementation assessment, these funding options will be evaluated and recommendations for project financing developed. Currently, funding for transportation comes from governmental entities, private entities, and via district overlays, associations, and agreements.



Source: TxDOT

Figure 4.5: Standard Revenue (2009-2035).

Government Entities

Government funding may come from federal, state, county, or municipal sources. Federal and state funding are primarily motor fuel taxes, and are disbursed and administered by TxDOT. The \$11 million in annual historical spending on the I-35 corridor through Travis County is funded through TxDOT. Barring significant changes to the TxDOT budget, this funding should be expected to remain relatively constant.

Local governmental entities typically fund transportation projects through a Capital Improvement Plan (CIP) process. If the local entity requests state or federal assistance, the project must be placed on the State Transportation Improvement Plan (STIP). Funding for such projects can include regular CIP programming, inclusion in bond elections and/or use of pass-through or State Infrastructure Bank financing. Examples of funding through government entities are described below.

Federal Credit Assistance

The federal government provides assistance to states to lower interest rates and expand access to capital through the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program. Through TIFIA, the federal government provides federal credit assistance to projects that meet certain criteria (such as the use of public-private partnerships and/or advanced technology) for nationally or regionally significant projects. A project must be on the National Highway system, part of the Statewide Transportation Improvement Plan, and have a capital cost of at least \$50 million to be considered for TIFIA funding. TIFIA funding is limited to 33 percent of total eligible project cost. A project must also be supported in whole or in part by user charges or other non-federal dedicated funding sources. At present, no potential TIFIA applications are under development for this corridor.

State Infrastructure Banks

State Infrastructure Banks (SIB) may be used by states as a revolving fund mechanism to finance highway and transit projects. SIBs provide direct loans with attractive interest rates, with revenues from repayment and interest to fund additional loans. SIB projects require a local sponsor to act as a guarantor for the funding agreement. At present, no potential SIB applications are under development for this corridor.

Rider 42 of the General Appropriations Act

Rider 42 of the General Appropriations Act authorized TxDOT to use \$300 million of Proposition 12 bond proceeds to acquire right-of-way, conduct feasibility studies and project planning, and outsource engineering work for the most congested roadway segments in each of the four most congested regions in the state (Dallas-Fort Worth, Houston, Austin, and San Antonio metropolitan areas). Furthermore, Rider 42 required that TTI serve as a facilitator and project coordinator of studies conducted by the four most congested regions to: (1) determine which projects would have the greatest impacts considering such factors as congestion, economic benefits, user costs, safety and pavement quality; (2) identify funding options to support completion of the projects and suggest the best use of future revenues for



the projects; (3) include implementation of best traffic and demand management practices; (4) ensure open and transparent public participation; and (5) make recommendations to TxDOT at each major decision point for the projects.

In February 2012, TTI published, *Mobility Investment Priorities Project Early Recommendation Report*. The Texas Transportation Commission accepted the report on February 23, 2012. The recommendations for the Austin metropolitan area included \$1.2 million to “Expand study limits and scope to address potential express lane operations and to access travel option strategies for I-35 commuters.” This funding enabled the COA Phase 1 Study limits to expand to SH 45SE on the south and to SH 45N on the north. In August 2012, \$10.75 million in additional Rider 42 funds were dedicated to partially fund the Implementation Plan.

Mobility Bond Elections

A county or city government may issue bond funding, upon voter approval for corridor improvements. For example, the 2010 City of Austin Mobility Bond dedicated \$1 million to the Phase 1 Corridor Feasibility Study. In November 2012 the voters in the city of Austin passed additional infrastructure bonds, including a dedicated \$15 million for improvements along the I-35 corridor. At this time the use of this money within the corridor has not been determined, but is anticipated to fund some portion of the Phase 5 improvements. No other current bond initiatives for the I-35 corridor have been placed on a ballot for voter approval.

Private Funding

In some cases the public entity can partner with a private landowner to share project development costs on a segment of roadway if the private landowner desires such improvements to enhance their property or development of same. The governmental entity may also require the private landowner to pay for some or all of a mobility enhancement as part of the land development process to mitigate a development’s impact on the roadway network. In other cases a private entity may agree to pay for limited mobility improvements on a public facility to enhance access to, or value of, a private development. An example of the latter is the current project under development at I-35 from Howard Lane to Parmer Lane, described in **Section 2**. The Phase 1-4 development of this project was funded by a private entity. There are no similar projects under development within this corridor as of the date of this report.

District Overlays, Associations, and Agreements

There are several mechanisms that allow public agencies and associations of property owners to provide improvements in a corridor. These mechanisms require legislative authorization for implementation. Desired outcomes may include improved safety, increased consumer flow, and beautification.

Participation in a property owners association may be voluntary or required due to the location of the property in a special overlay district. Involuntary participation in association goals may include taxation or the taking of a property. Examples of types of associations are: Transportation Reinvestment Zones

(TRIZ), Tax Increment Finance (TIF) Zone, Transportation Corporations, and driveway sharing agreements. There are currently no known district overlays, associations or other entities active that seek to fund improvements in the corridor.

Public-Private Partnerships

Public-Private Partnerships (P3s) are contractual agreements formed between a public agency and a private sector entity that allow for greater private sector participation in the delivery and financing of transportation projects. There are many different P3 structures, and the degree to which the private sector assumes responsibility - including financial risk - differs from one application to another. Additionally, different types of P3s lend themselves to the development of new facilities and others to the operation or expansion of existing assets. Project-specific legislation would be required for the use of P3 development for any portion of the I-35 CAIP.

Tolling

Tolling may be used by a government entity, a P3 or a private developer to raise revenue to repay loans incurred in order to construct a transportation facility. Tolling may be collected electronically such as through a TxTag, or with a cash toll both or through the mail by photographing license plate numbers. Once construction costs are paid through tolls, the tolls could be used to maintain the facility. A sketch-level traffic and revenue study is presently underway for Travis County as part of COA Phase 1 efforts to ascertain if toll financing could be considered as a funding option for the FTC portion of corridor improvements.

Congestion Pricing

Congestion pricing may be used by the transportation facility owner or operator to regulate traffic. For example, a tolled lane may charge a relatively low toll when the traffic is light and a much higher toll during rush hour in order to reduce congestion on the toll facility and maintain an advertised speed for toll facility users. Congestion pricing may also apply to bridge tolls, parking fees, or any other transportation activity where driver behavior may be influenced by price. Congestion pricing may be used to encourage travelers to use transit and carpool rather than driving a single-occupant vehicle. Congestion pricing will be evaluated as part of the sketch-level traffic and revenue study.

Interlocal Agreements

Within statutory limitations, organizations charged with improving mobility may enter into interlocal agreements to fund transportation projects. An example is the interlocal agreement between the CAMPO and the CTRMA.



Interlocal Agreement between CAMPO and CTRMA

On June 28, 2012, CAMPO and CTRMA executed an interlocal agreement regarding anticipated Surplus Revenue identified from the MOPAC Improvement Project. According to the agreement, TxDOT was able to provide \$136,583,000 for the MOPAC Improvement Project due to the receipt of unanticipated federal funding and lower than anticipated borrowing and construction costs for current projects. In turn, the influx of money from TxDOT makes it possible for CTRMA to fund the MOPAC Improvement Project without issuing toll revenue bonds, thus reducing the total cost of constructing and operating the project by the projected cost of issuing and repaying toll revenue bonds.

CTRMA has agreed to establish a Regional Infrastructure Fund (RIF) to be used to fund other transportation projects in the region. CTRMA has agreed to deposit and hold the RIF in a dedicated interest-bearing account for the benefit of CAMPO. If all of the expected Surplus Revenue is realized, a total of \$230,000,000 will be deposited into the RIF by 2041 via annual deposits beginning in 2017 and ending in 2041 in accordance with an approved payment schedule. This is a potential source of revenue for I-35 CAIP. However, it should be noted that allocation of these funds to I-35 would require action by the CAMPO Policy Board. For the purposes of the plan, it is assumed that all scheduled RIF deposits occurring through FY 2021 will be used to fund improvements to I-35, and are reflected as a funding source in **Tables 4.3** and **4.4**.



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5.0 Next Steps

As part of the overarching I-35 CAIP, project development will continue to move forward for those projects currently under development as described in **Section 2.5**. As funding is identified, more projects identified in this plan will progress into Phases 3 – 5 of development. It is anticipated that Phase 3 will include activities aimed at identifying a mode-choice (type of use) for the FTC, identifying segments of independent utility for the FTC, and on-going preliminary engineering and public involvement to further refine the downtown options. The results of these activities will be used to inform the formal NEPA process.

Public outreach will continue to be a key ongoing process as project development progresses. Several of the concepts under development would result in major changes to the existing traffic operations within the corridor; public input on these concepts is very important to their continued refinement. The planning team intends to continue small group outreach efforts with additional stakeholders, as well as revisit many of those that have already been contacted to provide project updates. Continued update of social media and web resources will also provide updated information to the public.

It should be noted that with the initiation of Phase 2 efforts in Williamson and Hays Counties, the I-35 CAIP planning initiative will be effectively extended through the greater-Austin metropolitan area (spanning from SH 130 north of Georgetown to Posey Road south of San Marcos). Results of the expanded Phase 2 efforts, including recommended projects within the expanded limits, will be captured in future (annual) updates to this Implementation Plan.



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