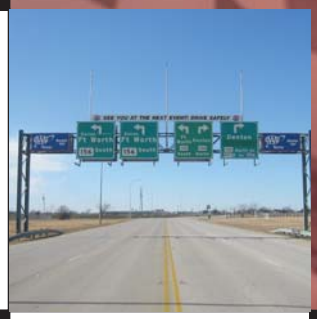
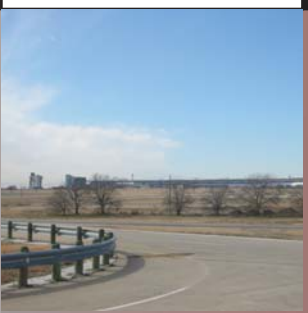
Texas Motor Speedway Area Transportation Plan

June 2008





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FORT WORTH

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Texas Motor Speedway Area
Transportation Plan

City of Fort Worth, Texas

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June 2008

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Table of Contents

SUMMARY ..... **iii**

I. Introduction **1**
- A. Overview and Methodology 1
- B. Process and Goals 1
- C. Thoroughfare Planning Process 2
- D. Stakeholder Involvement and Advisory Committee 5
- E. Methodology Overview 5

II. Alternative Demographic Scenario **7**
- A. Overview 7

III. Existing Transportation System **9**
- A. Summary 9
- B. 2015 Programmed Improvements 9
- C. Existing TMS Event Day Operations 11

IV. Modeling Observations and Results **13**
- A. Interim Year (2015) 13
- B. Horizon Year (2030) 15

V. Special Focus Areas **18**
- A. Thoroughfare Plan Consistency 18
- B. Special Event Rail 20
- C. SH 114 Schematic Review 23

VI. Project Prioritization Methodology **24**
- A. Prioritization 24
- B. Planning Level Project Costing 26

VII. Recommendations and Conclusions **30**

Appendices
- Appendix A. 2015 Modeling Exhibits
- Appendix B. 2030 Modeling Exhibits
- Appendix C. Commuter Rail Line Alignment Exhibits
- Appendix D. Conceptual Level Project Cost Projections

List of Exhibits

Exhibit 1 – Existing Daily Traffic Volumes 10
Exhibit 2 – TMS Total Lanes 2015 NCTCOG Demographics Run 1, Run 2, and Run 3 ..... Appendix A
Exhibit 3 – TMS Daily Volumes 2015 NCTCOG Demographics Run 1 ..... Appendix A
Exhibit 4 – TMS Level of Service (PM) 2015 NCTCOG Demographics Run 1 ..... Appendix A
Exhibit 5 – TMS Daily Volumes 2015 Alternative Demographics Run 2 ..... Appendix A
Exhibit 6 – TMS Level of Service (PM) 2015 Alternative Demographics Run 2 ..... Appendix A
Exhibit 7 – TMS Daily Volumes 2015 Alternative Demographics Run 3 - Unconstrained... Appendix A
Exhibit 8 – TMS Level of Service (PM) 2015 Alternative Demographics Run 3 – Unconstrained ..... Appendix A
Exhibit 9 – TMS Total Lanes 2030 NCTCOG Demographics Run 1 and Run 2 ..... Appendix B
Exhibit 10 – TMS Daily Volumes 2030 NCTCOG Demographics Run 1 ..... Appendix B
Exhibit 11 – TMS Level of Service (PM) 2030 NCTCOG Demographics Run 1 ..... Appendix B
Exhibit 12 – TMS Daily Volumes 2030 Alternative Demographics Run 2 ..... Appendix B
Exhibit 13 – TMS Level of Service (PM) 2030 Alternative Demographics Run 2 ..... Appendix B
Exhibit 14 – TMS Total Lanes 2030 Alternative Demographics Run 3 ..... Appendix B
Exhibit 15 – TMS Daily Volumes 2030 Alternative Demographics Run 3 ..... Appendix B
Exhibit 16 – TMS Level of Service (PM) 2030 Alternative Demographics Run 3 ..... Appendix B
Exhibit 17 – Recommended Transportation Plan Modifications 19
Exhibit 18 – TMS Prioritization 27

List of Tables

Table 1 – Demographic Projections within the Planning Study Area 8
Table 2 – Level of Service Criteria for Thoroughfare Capacity Analysis 13
Table 3 – Existing and 2015 Forecasted Volume Comparisons (vehicles per day) 14
Table 4 – Existing and 2030 Forecasted Volume Comparisons (vehicles per day) 16
Table 5 – Analysis of Rail Line Alignment Options 21
Table 6 – TxDOT Priority Ranking 25
Table 7 – Non-TxDOT Priority Ranking 26
Table 8 – TxDOT Estimated Cost 28
Table 9 – Town of Northlake Estimated Cost 28
Table 10 – City of Fort Worth Estimated Cost 28
Table 11 – City of Roanoke Estimated Cost 29
Table 12 – Town of Flower Mound Estimated Cost 29
Table 13 – City of Justin Estimated Cost 29

List of Frequently Used Acronyms

BNSF – Burlington Northern Santa Fe Railway
TMS – Texas Motor Speedway
NCTCOG – North Central Texas Council of Governments
MAQ Plan – City of Fort Worth Mobility and Air Quality Plan
The T – Fort Worth Transportation Authority
TxDOT – Texas Department of Transportation
TRE – Trinity Railway Express
ETJ – Extra Territorial Jurisdiction
MTP – Master Thoroughfare Plan
ADA – Americans with Disabilities Act

SUMMARY

The goal of the transportation study was to evaluate the existing and develop a revised Texas Motor Speedway Transportation Plan that can complement the Texas Motor Speedway area. The transportation plan resulted from the City of Fort Worth Planning & Development Department developing a complementary land use plan for the study area and demographic data set in attempt to accurately portray future development in the area. In general, the new demographics created by the City of Fort Worth showed approximately a 20% increase in population and a 5% increase in employment as compared to the regionally (NCTCOG) approved demographics.

The City of Fort Worth Transportation & Public Works Department retained Kimley-Horn and Associates, Inc., to develop the transportation plan. A primary task included analyzing year 2015 and 2030 transportation demand, based on forecast modeling work completed by the NCTCOG. The purpose of the transportation analysis was to determine if the proposed transportation system could support the alternative demographics, more intense demographics developed by the City. The study area defined for the transportation plan was FM 407 to the north, Eagle Parkway to the south, FM 156 to the west, and US 377 and the SH 114 / SH 170 interchange to the east. The study area encompasses portions of nine different municipalities. This study is also intended to serve as an extension of the existing Mobility / Air Quality Plan (MAQ), the goal of which is to "develop a balanced, strategically sound, financially feasible, and environmentally responsible approach to providing a high degree of mobility for the residents of Fort Worth and surrounding communities." The TMS Plan incorporates appropriate features of the MAQ plan, but focuses on a specific area. The challenges and goals of this transportation study are listed below.

The Challenges

- How is a **land use plan** developed and implemented to be **compatible** with the Texas Motor Speedway?
- How is a **transportation plan** developed and implemented to **support local circulation needs** and **regional transportation demands**?

The Goals

- Identify Existing Transportation System Deficiencies
- Identify Anticipated Transportation Deficiencies (2015 & 2030 with Alternative Demographics)
- Analyze the Transportation System Using Basic Measures of Effectiveness
- Develop a Regionally Consistent Area Master Transportation Plan in order to have continuity in the roadway network among governing municipalities.
- Generate a Prioritization Plan for Transportation Improvements
- Create the Framework for Special Event and Daily Commuter Rail Service to the Area.

This report analyzed six (6) modeling runs. Three (3) runs were conducted for an interim year 2015, with the remaining three (3) runs for a horizon year of 2030. The interim year model runs helped to determine the immediate needs and assist in prioritizing the needed transportation projects. The purpose of the modeling was to make planning level decisions regarding future transportation needs. Models estimate the overall demand on a roadway system based on the proposed land uses. Models are also used to answer questions such as the number of lanes required along a given roadway or the need for a new roadway or interchange.

In addition to the transportation modeling, this study examined various horizontal alignments for a potential commuter rail line to serve the Texas Motor Speedway. The Regional Rail Corridor Study identified a special event line serving Texas Motor Speedway; and this study is the first formal effort to determine the feasibility of this connection. Three (3) different alignment options were developed for future consideration.

This study also examined the various municipalities' Master Thoroughfare Plans to promote consistency between the various plans. Also, a cursory review of the proposed SH 114 schematic west of IH-35W was performed.

Throughout this report, several conclusions and recommendations were provided. These conclusions have been subdivided into six categories: Land Use, Roadway, Transit, Thoroughfare Planning, SH 114 Schematic Review, and Stakeholder Involvement (Advisory Committee, Municipalities, and Public & Private Entities). The following provides a summary of these recommendations and conclusions:

Recommendations and Conclusions

Land Use:

- Within a 6-mile radius of the TMS, alternative demographics were developed by City of Fort Worth staff to more accurately project anticipated growth patterns. The demographics showed a 20% increase in population and a 5% increase in employment compared to the NCTCOG regionally-approved demographics.
- We recommend local governments work with the NCTCOG during the ongoing 2040 Demographic Review to accurately reflect current and future demographics. Final approval of the new set of regional demographics is anticipated to be adopted in 2009.

Roadway:

- Under existing conditions, multiple roadways within the study area are operating at or above their capacity. SH 114 adjacent to the TMS and US 377 from FM 1171 to SH 114 are both over capacity. FM 156 from FM 407 to SH 114, and FM 1171 east of IH-35W also appear to be quickly approaching their capacities.
- The primary means for regional travel and connectivity is and will likely continue to be via the study area's TxDOT facilities. Nearly all of the existing and proposed City arterial facilities will serve local development and will likely only be constructed with adjacent development projects.
- The daily traffic volumes on IH-35W adjacent to the TMS are projected to approximately double between 2007 and 2015 (43,000 in 2007 and a projected 114,800 in 2015). IH-35W is projected to be significantly over capacity between Dale Earnhardt Lane and FM 1171.
- The daily traffic volumes on SH 114 adjacent to the TMS are projected to approximately double between 2007 and 2015 (22,000 in 2007 and a projected 41,700 in 2015).
- FM 156 and US 377 are projected to be deficient in their current two-lane configurations in all 2015 model runs.
- Traffic along the SH 114 frontage roads between IH-35W and US 377 begins to experience an unacceptable level of service in 2015.

- Based on an "unconstrained model run" (which allows trips to travel the route they wish to use regardless of the congestion level along the roadway), US 377 is clearly the preferred north-south route within the study area. When US 377 is widened from FM 1171 to SH 114, it should be constructed as a six-lane divided facility. US 377 could also provide for an alternate route when IH-35W is under construction during its transformation into the North Tarrant Express.
- Based on 2030 model runs, build out of the planned roadway network is projected to adequately support the future land use plan within the transportation study area.
- Cleveland Gibbs and Dale Earnhardt appear to be a bypass route for motorists wishing to avoid the SH 114 and FM 156 interchange, traveling north via Dale Earnhardt to FM 156.
- Litsey and Henrietta Creek are projected to serve local trips and provide little relief to SH 114 or SH 170.
- Although not in the transportation study area, SH 114 west of FM 156 is projected to operate at an unacceptable level of service in all model years especially with the alternative demographics in place.
- The 2030 model runs assume US 377 between SH 114 and FM 1171 and FM 156 between SH 114 and Mulkey will be four-lane facilities. As a result, these roadways begin to experience unacceptable level of service in the 2030. When reconstructed, US 377 and FM 156 should be considered for construction to their ultimate six-lane divided section.
- In order to construct the proposed 2030 roadway network, the total cost of these improvements (excluding IH-35W and SH 114) is approximately $297 million (in 2007 dollars). Approximately half of these improvements are located along TxDOT facilities.
- Many of the planned non-TxDOT thoroughfare facilities have large flood plain crossings. These crossings will result in a significant increase in construction costs (to provide the same capacity) and are unlikely to be constructed by the development community.

Transit:

- Three special event commuter rail options have been developed to serve TMS. ROW preservation should begin for these alignments, considering the rapid development in the area.
- The three proposed rail alignments for the commuter rail spur should be identified in the comprehensive plans of the respective involved municipalities.
- The special event commuter rail line should be established with the intent of providing a future daily commuter rail line from TMS.
- A Park-n-Ride facility could easily be established at TMS.
- Consider future options for a connection to the north for future service to Denton via Denton County Transportation Authority (DCTA).

Thoroughfare Planning:

- The Towns of Flower Mound and Northlake should coordinate with TxDOT to eliminate the inconsistencies between their respective thoroughfare plans at the future IH-35W crossing between FM 1171 and FM 407.
- The municipalities in the study area should continue to work together and coordinate their transportation planning efforts to develop consistent comprehensive and thoroughfare plans.

SH 114 Schematic Review:

- TxDOT should consider providing a dedicated eastbound right-turn lane on the SH 114 Eastbound Frontage Road at IH-35W.
- TxDOT should consider providing an additional future on-ramp from the eastbound frontage road to access the future eastbound SH 114 main lanes to better serve TMS, other adjacent existing and future development, and background traffic.

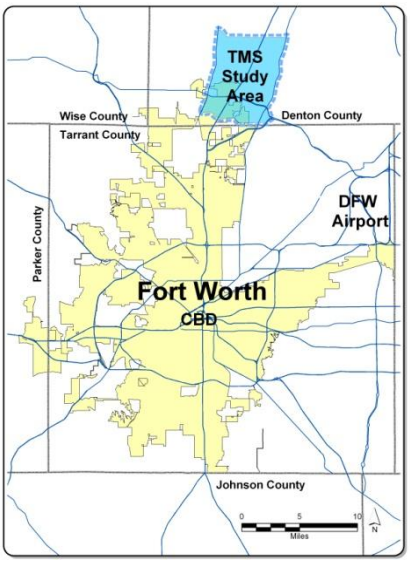
Stakeholder Involvement (Advisory Committee, Municipalities, and Public & Private Entities):

- The TMS Advisory Committee should continue to meet and work together to identify funding opportunities for regional roadway and transit facilities.
- The findings of this study should be presented to various city and town councils within the study area for their support.
- The various public and private entities should work together to identify opportunities for partnerships to facilitate regional and local thoroughfare projects.

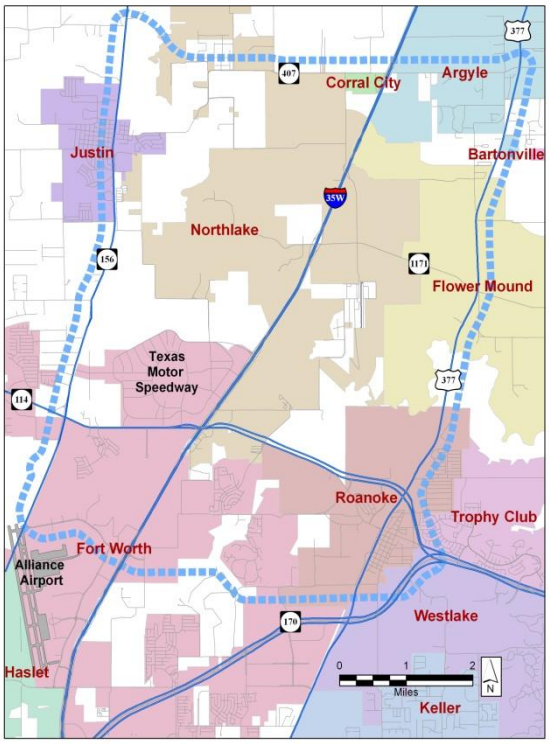
I. INTRODUCTION

A. OVERVIEW AND METHODOLOGY

The Far North sector of the City of Fort Worth includes a wide variety of land uses, landmarks, and attractions. While the area includes those suburban development types typical of those you would expect within a short distance of our regions' major employment areas (such as single-family residential developments, supporting neighborhood commercial areas, and numerous schools), the Far North sector also features a combination of unique attractions and transportation facilities. Alliance Airport, the BNSF Intermodal facility, IH-35W, SH 114, and SH 170 each provide a backbone to our regional transportation network. Distinctive land uses such as Texas Motor Speedway, Cabela's, and numerous major regional employers located within the Alliance Texas Industrial Mixed-Use Growth Center help to fuel the growth engine.



Location Map



Study Area

The Challenges

Due to this unique mix of land uses and transportation facilities, two significant challenges were created for the City of Fort Worth and neighboring cities:

- How is a **land use plan** developed and implemented that is **compatible** with the Texas Motor Speedway?

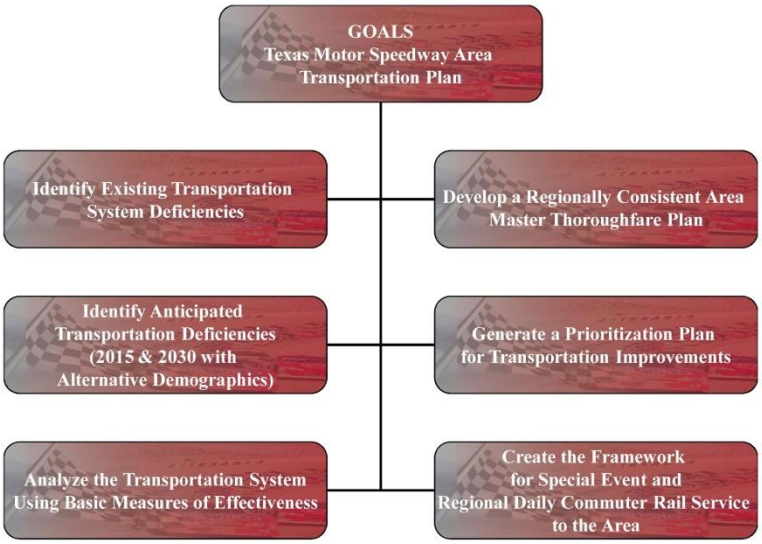
- How is a **transportation plan** developed and implemented to **support local circulation needs** and **regional transportation demands**?

B. PROCESS AND GOALS

The City of Fort Worth conducted a Texas Motor Speedway (TMS) Area Master Plan to address these land use and transportation challenges. The TMS Area Master Plan assessed economic and environmental impacts of the area and recommend compatible land use and transportation infrastructure improvements for future development surrounding TMS, in both the Far North sector of the City of the Fort Worth and neighboring communities.

The City of Fort Worth Planning & Development Department took the lead on the efforts related to land use planning. The primary goal of the land use planning effort is to maximize economic value for the City and the region while creating a compatible land use plan. This plan provides alternative demographics to reflect current and future growth within a six (6) mile radius of TMS. For the purposes of the alternative demographics, a larger planning study area was used as compared to the transportation planning study area in order to capture a more complete data set for transportation analysis. More information on the City's effort is contained in Section II of this document.

The City of Fort Worth Transportation & Public Works Department took the lead on the transportation planning to complement the land use master plan. The City retained Kimley-Horn and Associates, Inc. and obtained modeling support from the North Central Texas Council of Governments (NCTCOG), to assist with the development of the supporting transportation plan. The study area that was defined for the transportation plan is FM 407 to the north, Eagle Parkway to the south, FM 156 on the west, and US 377 and the SH 114 / SH 170 interchange on the east. The study area encompasses portions of nine (9) different municipalities. This study is an extension of the City's on-going Mobility & Air Quality Plan (MAQ), whose goal is to "develop a balanced, strategically sound, financially feasible and environmentally responsible approach to providing a high degree of mobility for the residents of Fort Worth and surrounding communities." The TMS plan is a microscopic view of the MAQ Plan that focuses on a specific area.

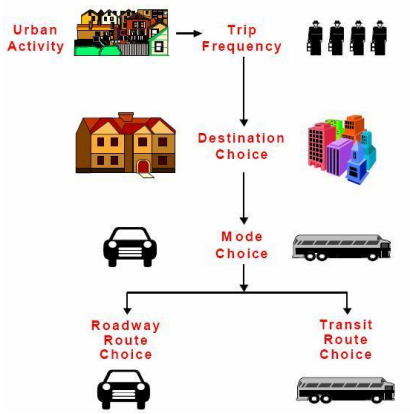


Goals Outline

C. THOROUGHFARE PLANNING PROCESS

One of the primary goals of the Texas Motor Speedway Area Transportation Plan was to identify existing and anticipated deficiencies in transportation services and transportation infrastructure within the study area. The first step involved the City's Planning & Development Department developing an alternative demographic data set to best match the growth patterns within the study area. Due to the rapid rate of growth that has occurred in the study area, Fort Worth's 2007 actual population has exceeded 2015 population previously developed by NCTCOG. To account for this rapid growth, the alternative demographics were applied to the NCTCOG regional travel demand model for years 2015 and 2030 to accurately account for the anticipated demand on the roadway system. Use of the NCTCOG regional travel demand model allowed for the testing of various roadway alignments, validation of roadway sizing, and the ability to forecast travel demand in 2015 and 2030. A detailed explanation of the thoroughfare modeling process is outlined below.

Travel Demand Modeling Methodology



Basic Travel Model

The travel demand model is a tool to predict travel demand on the transportation system given projected demographics. The more accurate the demographics, the more accurate the modeled demand on the future transportation system. The model enables an estimation of vehicle trips throughout the region. In the simplest terms, the model turns people and employees into trips, finds their origin and destination, accounts for mode of travel, and assigns a path to complete their trip (see adjacent graphic). The trip covers an entire 24-hour period during a typical weekday, so it accounts for all trip types: home to work, home to retail, and back to home, etc. With the use of a travel demand model, planners and engineers are able to estimate current and future travel demand. The proposed alternative demographics (2015 and 2030) were incorporated into the model to estimate the traffic demands. This model formed the basis for the analysis and recommendations in this report. The following section describes the basic theory of the travel demand model.

Basic Model Theory

By creating and using a travel model, one is attempting to produce a mathematical representation of an individual's decision-making process:

Why to make a trip
→ When to make the trip
→ Where to make the trip
→ How to make the trip
→ What route to follow to complete the trip.

These individual choices are then combined so that aggregate impacts can be determined. The model structure should also be manageable and supported with obtainable data.

As a transportation planning project develops, travel demand models may be used to make planning level decisions regarding future transportation needs. Models estimate the overall demand on a roadway system based on the proposed land uses. Models are also used to answer questions such as the projected number of people using a transit route, number of lanes required along a given roadway or the need for a new roadway or interchange. Travel models are best suited to provide a comparison between alternatives, and the traffic projections provided will show general trends between these alternatives.

Four Step Modeling Process

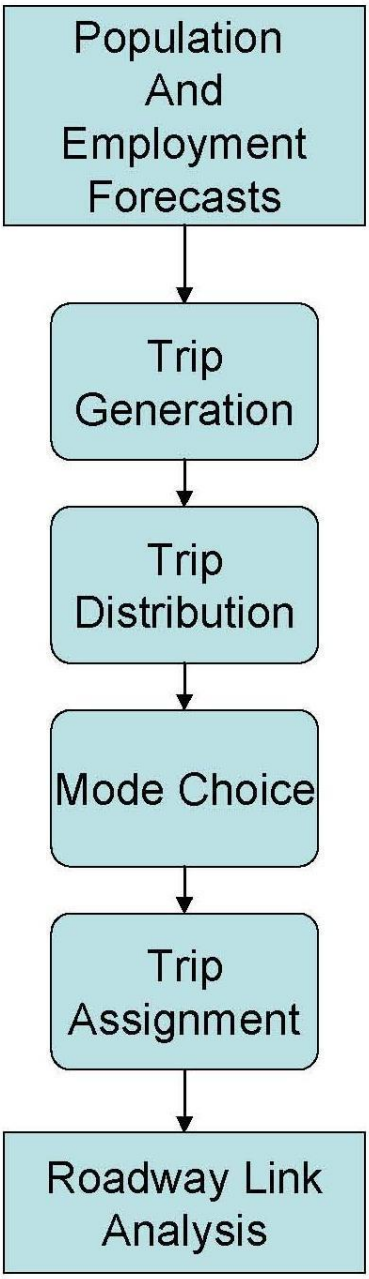
The model is comprised of a series of mathematical models that simulate travel on the transportation system. This macroscopic process encompasses the four (4) primary steps taken to estimate travel demand from a given land use and transportation network. The four steps in this approach are as follows:

Trip Generation is the estimation of the number of trip ends produced by or attracted to a zone or activity center. A trip end is defined as either the beginning or ending point of a trip. Trip generation rates based upon the number and type (basic, service, or retail) of employment are used to determine the number of trips expected to be attracted by a particular non-residential development. The number of households and population are used to determine the number of trips generated by residential land uses.

Trip Distribution is the estimation of the number of trips between each zone or activity center. The model uses calibrated mathematical formulas to determine how far a person is willing to travel to access a particular land use. As an example, a person is much more likely to drive outside of their respective zone to visit a regional shopping center as opposed to a grocery store.

Mode Choice determines the number of trips between each zone that will use each available form of transportation. The various modes include single-occupant vehicles, high-occupancy vehicles, transit, bicycling, and walking. Mode choice is determined based on regional factors that have been developed by NCTCOG through travel surveys that identify estimated vehicle occupancies for different types of trips.

Trip Assignment is the final step in the four-step process. Once the trips have been generated, distributed, and their mode of travel specified, the trip assignment process actually determines the route the person will take between the zones or activity centers. The assignment process can be dynamic where a traveler's first choice of route is not desirable due to increased congestion and resulting travel-time delays. The assignment process constantly calculates the shortest travel time between zone pairs along a multitude of available routes. It then assigns the trips to those paths that have the shortest calculated travel time.



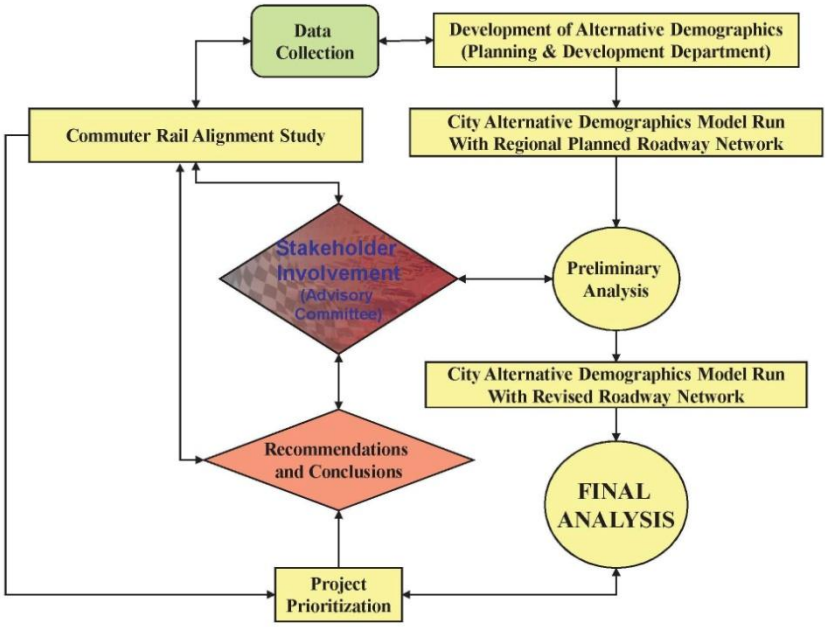
Four Step Model

D. STAKEHOLDER INVOLVEMENT AND ADVISORY COMMITTEE

Throughout the process, key stakeholders were involved in several meetings. A list of the primary stakeholders is seen on the inside cover of this report. An advisory committee was formed to address future growth and development surrounding Texas Motor Speedway and to oversee this project. This committee included property and business owners in the study area; public officials from the City of Fort Worth, Town of Northlake, and Denton County; the Texas Department of Transportation; the IH-35W Coalition, and other affected public and private parties.

E. METHODOLOGY OVERVIEW

The Texas Motor Speedway Area Transportation Plan was a multi-phased project with a number of focus areas. The first task was to perform the necessary data collection, which included the NCTCOG regionally approved demographic data for analysis years 2015 and 2030, as well as the NCTCOG Transportation model results based on these regionally approved demographics. These demographics and model results served as a baseline for comparisons between the alternative demographics and their respective model runs. When the City of Fort Worth Planning & Development Department completed their alternative demographic data set for analysis years 2015 and 2030, the data was provided to NCTCOG to model with the regionally planned roadway network. Upon review of these model runs, recommended modifications were made to the regionally planned roadway network to create an alternative demographic model run with a revised transportation network.



Study Process

Throughout the process, multiple stakeholder meetings were held with various municipalities, public entities, and private entities. It was a primary goal of the project to keep the stakeholders actively involved in order to successfully develop a widely accepted transportation plan for the study area. Use of this process created consistency among the various municipalities that are included in the study area. A TMS Advisory Committee meeting was held after the preliminary analysis was complete to inform all of the stakeholders of the results from the first model runs. Feedback from this meeting along with the analysis of the first model runs formed the basis for the second round of model runs. This second round of modeling, with alternative demographics and a revised transportation network, formed a primary basis for the recommendations and conclusions from this study.

Concurrent with the transportation modeling runs, the commuter rail alignment study was underway. Numerous additional stakeholder meetings were conducted with the representatives from the Texas Motor Speedway, Trinity Railway Express (TRE), the Fort Worth Transportation Authority (The T), Hillwood, the Denton County Transportation Authority (DCTA), and the NCTCOG to help determine the preferred alignment, the viability of commuter rail, and other considerations to serve the Texas Motor Speedway. Based on stakeholder feedback, three (3) alternative alignments were developed for future consideration.

At the conclusion of the study, the various projects were prioritized based on modeling results and stakeholder feedback.

II. ALTERNATIVE DEMOGRAPHIC SCENARIO

A. OVERVIEW

The City of Fort Worth Planning & Development Department took the lead related to land use planning for the TMS Area Master Plan. In order to develop and refine a transportation plan for the Texas Motor Speedway Area, accurate demographic projections were needed for input into the travel demand model. It was also the goal of the City of Fort Worth Planning & Development Department to ensure a land use plan was in place that would complement, not conflict with, the Texas Motor Speedway.

Land use planning ties directly into transportation planning. The demographics feed directly into the transportation model. The demographics are the source for trip generation, the first step in the four step modeling process. Incorrect land use types and/or intensities results in trip generation that does not accurately reflect actual or anticipated trip-making patterns. Given that the next three steps in the transportation process rely upon trip generation, this step was critical to the results. Over the past five to ten years, the study area has been growing at a rate that exceeded the demographic projections of NCTCOG, requiring the use of an alternative, more intense demographic set.

The initial land use study area was the same as the transportation planning study area, but was expanded to include an approximate six-mile radius from the perimeter of the Texas Motor Speedway in order to more accurately model the roadway network. This expanded planning study area resulted in provided demographic forecasts that covered sixteen (16) separate political subdivisions: Argyle, Bartonville, Denton, Denton County, Flower Mound, Fort Worth, Haslet, Justin, Keller, New Fairview, Northlake, Roanoke, Southlake, Tarrant County, Trophy Club and Westlake. The City of Fort Worth staff met with these entities to discuss the proposed land use plan, learn about significant proposed developments, and gather feedback of the alternative demographics.

In order to use the new land use plan within the transportation model, the City of Fort Worth modified the demographics contained within the study areas 117 traffic survey zones. Traffic Survey zones are geographic areas within the transportation model that contain both population (households) and employment (number of jobs). In general, the alternative demographics developed by the City of Fort Worth showed approximately a 20% increase in population and a 5% increase in employment as compared to the NCTCOG regionally approved demographics. **Table 1** shows the comparison between the NCTCOG demographic projections and the City of Fort Worth demographic projections.

Table 1 – Demographic Projections within the Planning Study Area

Demographic Projection Source	2015 Population	2015 Employment	2030 Population	2030 Employment
NCTCOG Regionally Approved Demographics*	207,488	123,627	303,994	183,930
City of Fort Worth Alternative Demographics	245,022	130,846	364,658	192,770
Percent Difference	18.1%	5.8%	20.0%	4.8%

*Approved by NCTCOG Executive Board in 2003

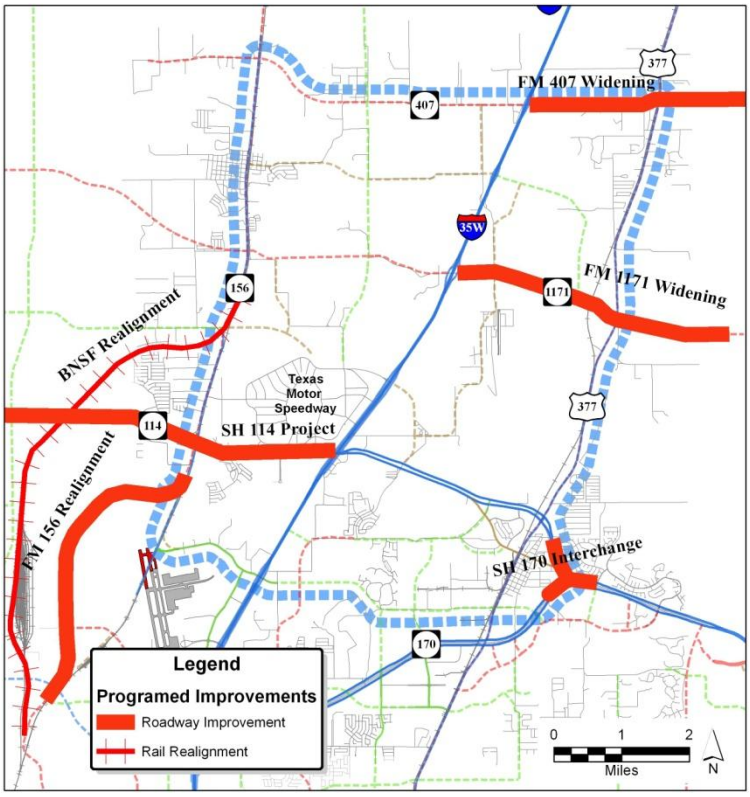
III. EXISTING TRANSPORTATION SYSTEM

A. SUMMARY

The current thoroughfare system in the Texas Motor Speedway Transportation Plan Study Area is primarily supported by the Texas Department of Transportation (TxDOT) facilities. North-South mobility occurs primarily on IH-35W, FM 156, and US 377. Within the study area, FM 156 and US 377 are both mainly two-lane facilities today. The primary east-west mobility is via SH 114. FM 407 and FM 1171 are two-lane facilities that also contribute to east-west mobility. There are a limited number of local facilities in the area, due primarily to the fact that a large portion of the study area is undeveloped land and in the floodplain.

Current Aerial of Study Area

As a result, the facilities that do exist are rural in nature. A majority of the planned local collectors and non-regional arterials have not been constructed. Existing daily traffic counts that have been collected from various sources can be seen in **Exhibit 1**. Based on these counts, SH 114 adjacent to the Texas Motor Speedway, US 377 from FM 1171 to SH 114, FM 156 from FM 407 to SH 114, and FM 1171 east of IH-35W appear to be quickly approaching their capacity limits.

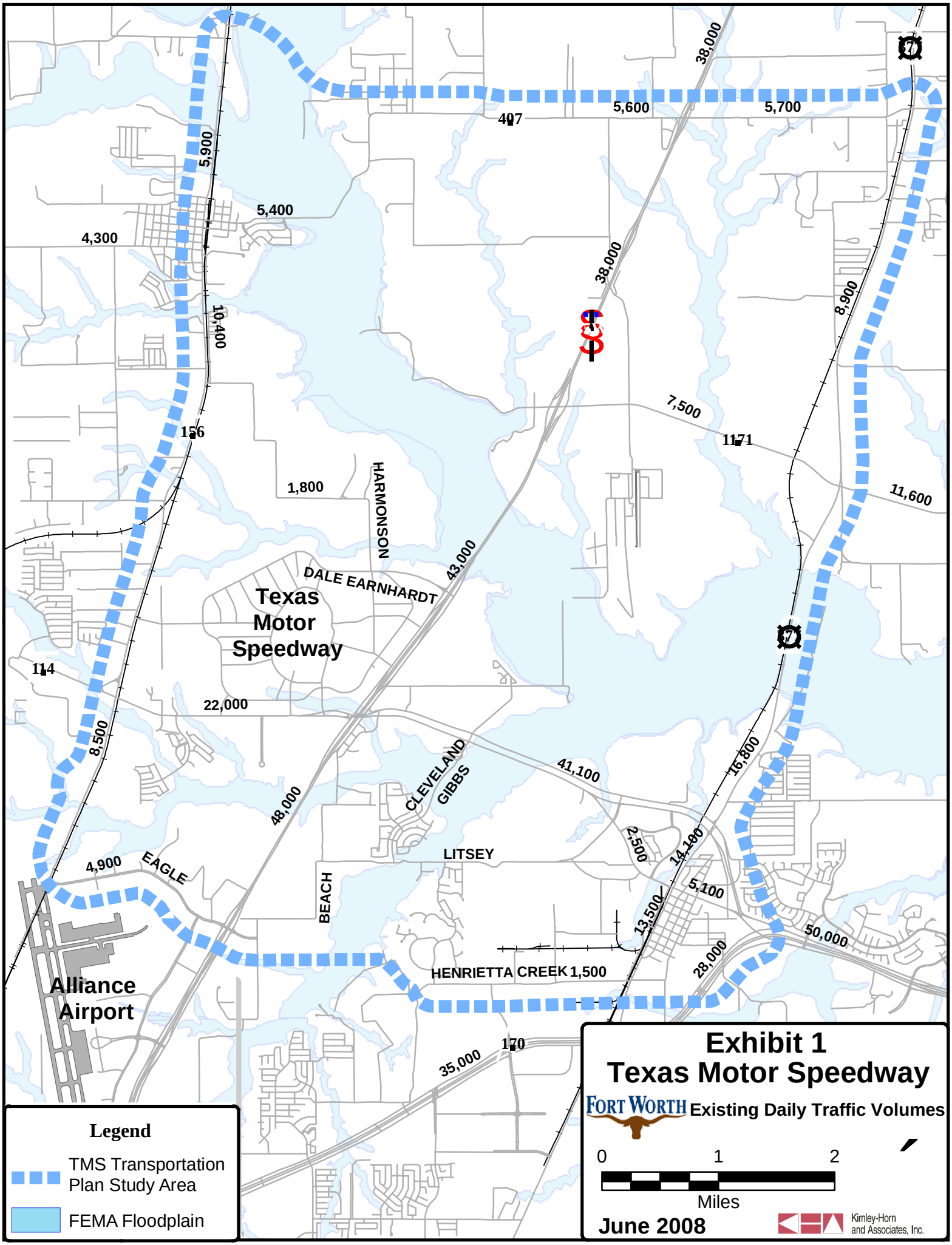


2015 Programmed Improvements

B. 2015 PROGRAMMED IMPROVEMENTS

The Texas Motor Speedway Study Area has several programmed improvements projected to occur prior to 2015. Although these improvements have been identified by NCTCOG, many are not fully funded. The major 2015 programmed improvements within the study area are as follows:

- SH 114 Frontage Roads west of IH-35W
- FM 156 / BNSF Realignment
- FM 1171 (East of IH-35W)
- FM 407 (East of IH-35W)
- SH 114 & SH 170 Interchange


38,000
5,600
5,700
407
5,900
5,400
4,300
38,000
8,900
10,400
7,500
156
1171
1,800
HARMONSON
11,600
43,000
DALE EARNHARDT
Texas
Motor
Speedway
114
22,000
8,500
41,100
16,800
CLEVELAND
GIBBS
48,000
2,500
14,100
LITSEY
4,900
EAGLE
5,100
BEACH
13,500
50,000
28,000
HENRIETTA CREEK
1,500
Alliance
Airport
170
35,000
Legend
TMS Transportation Plan Study Area
FEMA Floodplain
Exhibit 1
Texas Motor Speedway
FORT WORTH
Existing Daily Traffic Volumes
0
1
2
Miles
June 2008
Kimley-Horn and Associates, Inc.

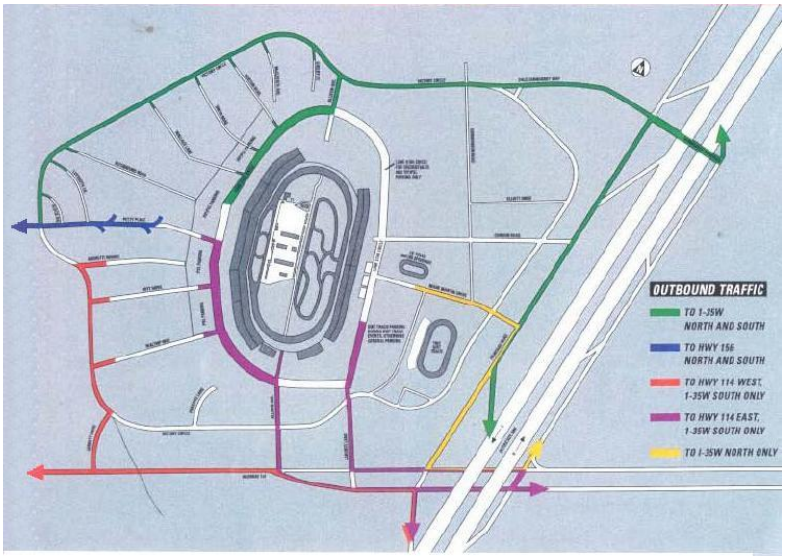
C. EXISTING TMS EVENT DAY OPERATIONS

Since 1997, the Texas Motor Speedway has been holding National Association for Stock Car Auto Racing (NASCAR) events, along with other auto racing events and concerts. Over the past few years, TMS has regularly held major events during three weekends: NASCAR events in April and November, with an Indy Racing League (IRL) event in June.

In its current configuration, the Texas Motor Speedwaycan accommodate over 200,000 spectators. Of the 1,500 acres of land that comprises the Texas Motor Speedway, 660 acres is dedicated to parking for up to 80,000 vehicles with additional room for 6,800 camp sites. The camp sites allow spectators to arrive prior to an event and stay past its completion. This helps reduce peak demand on the transportation system before and after events.

Visitors from the surrounding cities are recommended to travel to the venue by different routes. Patrons from Dallas are encouraged to use SH 114. Fort Worth area residents are shown three options: north on IH-35W to SH 114, north to FM 156 to Petty Place, and north on US 287 and then eastbound on SH 114. Those coming from Denton are shown to travel either southbound on IH-35W or take US 380 to FM 156.

In addition, the Texas Motor Speedway provides other options to those wishing to attend events. Partnerships were made available that allows for spectators to arrive via a bus using The T. This service shuttles approximately 800-900 riders for each race via a park-and-ride facility located at the Tarrant County College Northwest Campus (along Loop 820, west of IH-35W in Fort Worth). Although the entire weekend results in larger than normal traffic volumes in the study area, the highest volumes are experienced on Sunday during NASCAR events. After a typical Sunday NASCAR race, approximately 80,000 vehicles exit the site.



TMS Outbound Traffic Plan

The Texas Motor Speedway currently has inbound and outbound traffic flow plans. Presented is a copy of the current outbound traffic flow plan. Texas Motor Speedway event staff keeps different sections of the parking lot from conflicting and sends exiting vehicles along specific routes. These routes do not overlap other major routes, i.e. if a motorists exits the Texas Motor Speedway to the IH-35W southbound frontage road, they can not access SH 114. Coordination with TxDOT allows for contra-flow lanes on SH 114 during both the inbound (moving traffic westbound using the eastbound lanes) and outbound (moving traffic in an eastbound direction using the westbound lanes) periods. In addition, TxDOT provides advance warning on their changeable message signs throughout the DFW Region during the

week preceding an event for the traveling public to remind them to avoid the impacted roads if possible.

There are currently seven (7) access points serving the Texas Motor Speedway: three (3) on SH 114, three (3) on the IH-35W Southbound Frontage Road, and one (1) on FM 156. The objective is to empty the Speedway as quickly as possible. Bottlenecks both internal to the Speedway and external along the regional thoroughfare network affect the time required for the Speedway to empty. For example, traffic on IH-35W begins backing up to the south at these existing bottleneck at IH-35W and Loop 820, eventually causing traffic to slow throughout IH-35W up to the Speedway. The same backup effect occurs on SH 114 east of the Speedway. As a result, during a major event weekend the Texas Motor Speedway has to not only overcome the challenge of emptying 80,000 vehicles but must also battle roadway system inefficiencies miles away.

Based on discussions with TMS event staff, they have the ability to clear the parking area within three (3) hours for those spectators who wish to leave. Assuming a majority of the 80,000 vehicles leave during this time, the facility and adjacent roadway network can accommodate approximately 25,000 exiting vehicles per hour. Subjective evidence suggests that this value is limited both by the adjacent thoroughfare network and the speedway itself.

IV. MODELING OBSERVATIONS AND RESULTS

This report analyzes six (6) modeling runs. Three (3) runs were conducted for a short-term, interim target year of 2015. The short-term year will help determine the immediate needs and help assist in prioritizing the projects accordingly. Three (3) runs were conducted for a horizon year of 2030. The horizon year run will help determine the long-term adequacy of the network as well as assist in prioritizing the next tier of projects. A horizon year will also help in determining the ultimate size of each major facility to serve the future projected traffic. Widening a facility to four-lanes to solve an anticipated 2015 problem may only provide a temporary fix. By analyzing the horizon year, a facility can be evaluated as to whether it should be immediately widened to six (6) lanes or if four (4) lanes would provide sufficient capacity into the future.

The primary measure of effectiveness used in analyzing the various facilities is level of service (LOS). For this study, LOS was calculated using thoroughfare capacity criteria. LOS, which is a measure of the degree of congestion, ranges from LOS A (free flowing) to LOS F (a congested, forced flow condition). LOS D is considered to be the minimum acceptable level of service by the City of Fort Worth for design and evaluation purposes. Thoroughfare capacity analysis was completed using level of service criteria outlined by the North Central Texas Council of Governments (NCTCOG). **Table 2** provides a description of this criterion as it applies to thoroughfare facilities. For the purpose of this study, level of service analysis was completed based on PM peak hour volumes because the PM peak hour is the time with the greatest demand on the transportation system.

Table 2 – Level of Service Criteria for Thoroughfare Capacity Analysis

V/C Ratio	0.00	0.20	0.45	0.65	0.80	1.00
Level of Service	A	B	C	D	E	F

V = Peak Hour Volume (vehicles per hour)
C = Per Lane Capacity (vehicles per hour)

A. INTERIM YEAR (2015)

The NCTCOG regional travel model was used for the three (3) interim year (2015) model runs. The previously mentioned major programmed improvements included in this plan were the following:

- SH 114 Frontage Roads west of IH-35W
- FM 156 / BNSF Realignment
- FM 1171 (East of IH-35W)
- FM 407 (East of IH-35W)
- SH 114 & SH 170 Interchange

Exhibit 2 (see **Appendix A**) displays the number of lanes assumed in the 2015 model runs. It should be noted that modifications were made to the NCTCOG model for the City of Fort Worth Alternative Demographic Model Runs. These modifications addressed how the model distributed the traffic volumes onto the network. **Exhibit 3** through **Exhibit 8** (see

Appendix A) illustrates the various volumes and level of service results for each of the model runs.

The three 2015 model runs conducted were the NCTCOG demographics model run (Run 1), the alternative demographics run (Run 2), and the alternative demographics run with an unconstrained model (Run 3). The unconstrained model uses a different assignment process to allow trips to travel the route they wish to use regardless of the congestion level along the roadway. The unconstrained model allows for a confirmation of the high priority projects by understanding the desired primary routes of travel. The unconstrained model run was used as a basis for comparison to the NCTCOG model, existing volumes, and to form recommendations for the 2015 interim year. **Table 3** shows a comparison of existing volumes with the NCTCOG model run, the initial 2015 alternative demographic run, and the alternative demographic unconstrained model run.

Table 3 – Existing and 2015 Forecasted Volume Comparisons (vehicles per day)

TxDOT Facilities	Location	2006 Existing Conditions	2015 NCTCOG (Run 1)	2015 Alternative Demographics (Run 2)	2015 Alternative Demographics Unconstrained (Run 3)
IH-35W	North of FM 407	38,000	72,300	71,800	60,200
IH-35W	North of FM 1171	38,000	84,800	84,600	76,000
IH-35W	Adjacent to TMS	43,000	112,000	114,800	96,600
IH-35W	South of SH 114	48,000	80,600	80,800	83,800
FM 156	North of FM 407	5,900	21,600	16,700	13,100
FM 156	Adjacent to TMS	10,400	21,200	22,500	25,800
FM 156	South of SH 114	8,500	14,400	17,400	12,300
US 377	South of SH 114	14,100	14,200	15,000	22,600
US 377	North of SH 114	16,800	26,300	26,500	49,000
US 377	North of FM 1171	8,900	14,600	13,000	26,000
SH 114	West of IH-35W	22,000	20,400	41,700	37,200
SH 114	East of IH-35W	41,100	43,000	54,900	53,800
FM 1171	East of IH-35W	7,500	27,400	33,900	28,500
FM 407	West of IH-35W	5,600	8,500	11,400	4,300
FM 407	East of IH-35W	5,700	20,000	16,500	15,500
SH 170	South of SH 114	28,00	39,500	41,800	69,800
BUS 114	West of US 377	7,900	10,400	14,200	7,000

Each of the runs was compared to the other model runs and against existing traffic volumes. Based on this comparison, the following observations were made:

1. The primary means for regional travel and connectivity in the study area is and will continue to be via TxDOT facilities.

2. The daily volumes on IH-35W adjacent to the TMS are projected to approximately double between 2007 and 2015 (43,000 in 2007 and a projected 114,800 in 2015). IH-35W is projected to be significantly over capacity between Dale Earnhardt Lane and FM 1171.

3. The volumes on SH 114 adjacent to the TMS are projected to approximately double between 2007 and 2015 (22,000 in 2007 and a projected 41,700 in 2015).

4. FM 156 and US 377 are projected to be deficient in their current two-lane configurations in all 2015 model runs.

5. Traffic along the SH 114 frontage roads between IH-35W and US 377 begins to experience an unacceptable level of service in 2015.

6. Based on an "unconstrained" model run (desired path of travel based on the shortest travel time regardless of any traffic congestion on the roadway), US 377 is the preferred north-south route that provides the desired path and largest relief to IH-35W.

B. HORIZON YEAR (2030)

For the 2030 horizon year, a total of three (3) different model runs were performed. The initial model run used both the NCTCOG approved demographics (Run 1) and the NCTCOG regional model roadway network. The two additional runs used the City's alternative demographics. The second run (Run 2) included only minor changes to the roadway network. The third run (Run 3) was completed after the presentation to the TMS Advisory Committee and included additional fine-tuning and revisions to the roadway network.

Numerous improvements are included in the NCTCOG regional roadway network. These and can be seen in **Exhibit 9** (see **Appendix B),** which displays the total lanes analyzed in the 2030 NCTCOG model run (Run 1) and Alternative Demographic Model Run 2. The results of these model runs and level of service analysis can be seen in **Exhibit 10** through **Exhibit 13** (see **Appendix B**). For the Alternative Demographic Model Run 3, a majority of the local and minor thoroughfare facilities were added to the model. The total lanes for Alternative Demographic Model Run 3 can be seen in **Exhibit 14** (see **Appendix B**). The results of the Alternative Demographic Run 3 model run and level of service analysis can be seen in **Exhibit 15** through **Exhibit 16** (see **Appendix B**). The horizon year model serves two primary purposes: First, by including a build out scenario, it can be determined if the proposed thoroughfare plan provides sufficient ultimate capacity. Second, the build out scenario allows engineers and planners to understand long-term travel demands and can prioritize accordingly. **Table 4** shows a comparison of existing volumes with the 2030 NCTCOG model run and the alternative demographic model runs.

Table 4 – Existing and 2030 Forecasted Volume Comparisons (vehicles per day)

TxDOT Facilities	Location	2006 Existing Conditions	2030 NCTCOG (Run 1)	2030 Alternative Demographics (Run 2)	2030 Alternative Demographics (Run 3)
IH-35W	North of FM 407	38,000	79,000	82,400	84,000
IH-35W	North of FM 1171	38,000	97,300	97,000	92,600
IH-35W	Adjacent to TMS	43,000	168,100	177,000	165,500
IH-35W	South of SH 114	48,000	113,500	112,500	109,300
FM 156	North of FM 407	5,900	31,800	28,500	31,700
FM 156	Adjacent to TMS	10,400	36,500	34,800	36,600
FM 156	South of SH 114	8,500	32,300	32,500	33,600
US 377	South of SH 114	14,100	32,900	33,200	30,100
US 377	North of SH 114	16,800	45,900	46,600	47,300
US 377	North of FM 1171	8,900	32,400	31,000	30,700
SH 114	West of IH-35W	22,000	57,900	64,000	67,700
SH 114	East of IH-35W	41,100	95,500	88,300	86,100
FM 1171	West of IH-35W	n/a	47,300	47,200	39,700
FM 1171	East of IH-35W	7,500	38,000	42,600	56,000
FM 407	West of IH-35W	5,600	20,900	22,800	20,300
FM 407	East of IH-35W	5,700	34,100	32,100	32,100
SH 170	South of SH 114	28,00	50,400	56,100	56,300
BUS 114	West of US 377	7,900	5,500	9,000	8,900

Each of the runs was compared to the other model runs and against existing and 2015 traffic volumes. Based on this comparison, the following observations were made:

1. Based on the 2030 NCTCOG demographic model run, the overall roadway network is projected to operate at an acceptable level of service with the exception of US 377 from SH 114 to FM 1171, FM 156 from SH 114 to Mulkey, and FM 1171 from Florance to IH-35W. All of these facilities are planned to be principal arterials (six-lane divided facilities) and were not projected to be built to their ultimate cross section by 2030 (four-lanes instead of six-lanes). It is anticipated that if these facilities could be built to their ultimate section, the level of service would improve to an acceptable level.

2. Alternative Demographic Run 2 indicates similar results displayed in the NCTCOG model. Note that FM 1171 west of IH-35W and SH 114 west of FM 156 decreases in level of service from tolerable to severe.

3. Alternative Demographic Run 3 indicates that the build out of the roadway network is projected to adequately support the alternative demographic land use plan. US 377 from SH 114 to FM 1171 is approaching its capacity, but is only shown with four (4) of its ultimate six (6) lanes. Similarly, FM 156 from Dale Earnhardt to Mulkey is approaching capacity but could also be widened from four (4) to six (6) lanes.

4. Alternative Demographic Run 3 shows that Cleveland Gibbs (north of SH 114) appears to be used as a bypass route for motorists wishing to avoid the SH 114 and FM 156 interchange. They use Cleveland Gibbs and Dale Earnhardt to travel between SH 114 and FM 156.

5. Based on Alternative Demographic Run 3, Litsey and Henrietta Creek serve local trips only and provide little regional travel relief to SH 114 or SH 170.

6. Although not located within the transportation study area, SH 114 west of FM 156 is projected to operate at an unacceptable level of service in all models, especially with the alternative demographics in place.

   It should be noted that these results do not account for any incidents or TMS special events that might impact daily traffic.

V. SPECIAL FOCUS AREAS

A. THOROUGHFARE PLAN CONSISTENCY

When developing an overall transportation plan that incorporates several municipalities, it is critical that a consistent thoroughfare plan is adopted for all stakeholders to use and follow. This consistency between municipalities allows the traveling public to easily proceed between city boundaries. For example, it does not make sense for a roadway to change between a three-lane section to a four-lane divided section to a four-lane undivided section only because of a change in a governmental authority; the changes should instead be based on travel demand and surrounding land uses. Five master thoroughfare plans were consulted when developing the Texas Motor Speedway Area Transportation Plan. These included the City of Fort Worth, Town of Northlake, Town of Flower Mound, and City of Justin as well as the NCTCOG Regional Thoroughfare Plan.

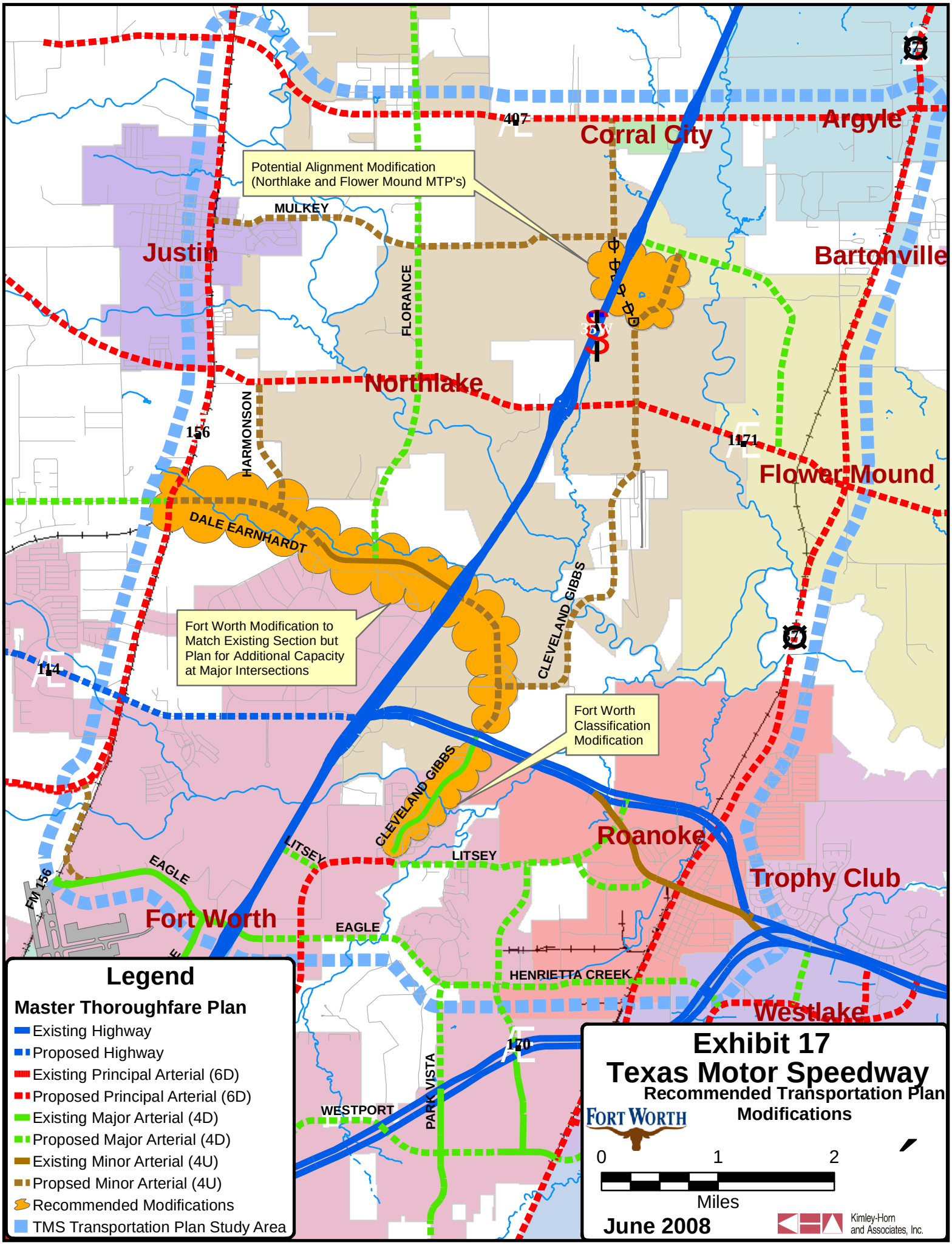
In order for the surrounding municipalities to establish consistent transportation plans, coordination and modifications need to be considered on the current thoroughfare plans. The modifications for discussion to allow for a consistent thoroughfare plan are listed below:

- The City of Fort Worth should modify Dale Earnhardt from a principal arterial (6D) to a minor arterial (4U) from FM 156 to SH 114. Based on Northlake's Master Thoroughfare Plan and conversations with the Texas Motor Speedway, this is the expected use of this facility. Additional capacity may be required to accommodate auxiliary lanes at the intersections of Dale Earnhardt with Cleveland Gibbs, the IH-35W Frontage Roads, Florance, Harmonson, and FM 156.

- The City of Fort Worth should consider modifying Cleveland Gibbs between SH 114 and Litsey from a principal arterial (6D) to a major arterial (4D). Based on the projected volumes, the existing cross-section is likely the ultimate section needed for this roadway.

- The Towns of Flower Mound and Northlake need to develop consistency on their master plans for how their roadway systems tie together at the future interchange between IH-35W & FM 1171 and IH-35W & FM 407. The Town of Northlake shows a north-south roadway crossing with IH-35W, while the Town of Flower Mound displays an east-west facility. It is unlikely that both crossings will be constructed. Based on our review of the regional thoroughfare network, it is recommended that the east-west option (Town of Flower Mound) be utilized. This recommendation is due to the fact that the proposed interchange would be located halfway between FM 1171 and FM 407, and the resulting arterial bridge over IH-35W would not result in multiple skewed intersections with the IH-35W Frontage Roads. This recommended alignment is presented in **Exhibit 17**.

Exhibit 17 presents the proposed regionally consistent transportation plan for the area. As discussed earlier, this plan is projected to provide enough capacity to support travel demands in the 2030 horizon year.


Potential Alignment Modification
(Northlake and Flower Mound MTP's)
Fort Worth Modification to
Match Existing Section but
Plan for Additional Capacity
at Major Intersections
Fort Worth
Classification
Modification
Corral City
Argyle
Justin
Bartonville
Northlake
Flower Mound
Roanoke
Trophy Club
Fort Worth
Westlake
MULKEY
FLORANCE
HARMONSON
DALE EARNHARDT
CLEVELAND GIBBS
LITSEY
EAGLE
HENRIETTA CREEK
WESTPORT
PARK VISTA
FM 156
407
156
1171
114
170
Legend
Master Thoroughfare Plan
Existing Highway
Proposed Highway
Existing Principal Arterial (6D)
Proposed Principal Arterial (6D)
Existing Major Arterial (4D)
Proposed Major Arterial (4D)
Existing Minor Arterial (4U)
Propsed Minor Arterial (4U)
Recommended Modifications
TMS Transportation Plan Study Area
Exhibit 17
Texas Motor Speedway
Recommended Transportation Plan
Modifications
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Miles
June 2008
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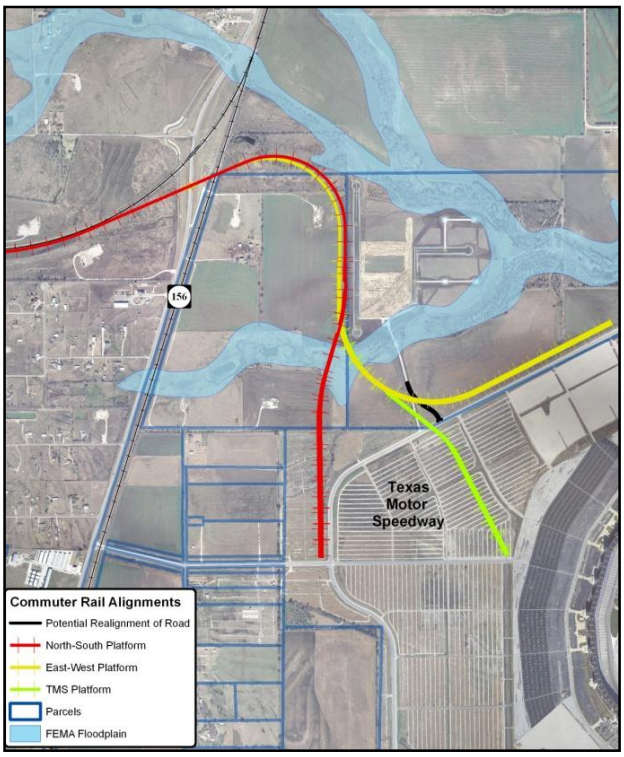
and Associates, Inc.

B. SPECIAL EVENT RAIL

A special event commuter rail line serving Texas Motor Speedway has been indicated on the NCTCOG Regional Rail Corridor Study plan, the Mobility 2030 plan, and the current Fort Worth Mobility and Air Quality (MAQ) Plan. At the time of this report, the MAQ Plan was still underway and adoption by Council was planned for late July or early August 2008. The Texas Motor Speedway special event commuter rail is currently shown as recommendation in the MAQ plan.

Alignment Study

Previous to this study, no detailed consideration was given to how a rail line could serve the Texas Motor Speedway. In some cases, it was thought that the existing rail line parallel to FM 156 could serve TMS; however, without shuttle service or construction of an additional rail spur, this would require a one mile walk to TMS. In addition, the runway expansion at Alliance Airport impacted the ability for this option to be considered. With this runway expansion, both FM 156 and the parallel railroad facility are to be relocated (as presented in III.B). This project, which is planned to be in place prior to 2015, will result in a realignment of FM 156 to the south of the TMS study area. The parallel rail line will be realigned towards the existing BNSF Intermodal facility. As a result, with the exception of a small portion of the rail line that will remain to serve local businesses, the option to serve TMS in this manner is no longer feasible.



Proposed Commuter Rail Alignments

Given the proposed realignment, this study examined three (3) preliminary horizontal alignment alternatives for a connection between the BNSF Railroad (located NW of the Speedway) and Texas Motor Speedway. The intent of this alignment study was to perform a cursory level analysis of the potential opportunities and constraints to providing this connection. While the focus is to develop feasible horizontal alignment(s), available contour and floodplain information was utilized to develop an alignment without significant vertical challenges. The study started with two options: a north-south platform option and an east-west platform option. After several meetings with stakeholders from the TRE, The T, Texas Motor Speedway, and the DCTA, these options evolved into three separate options: a north-south platform, a modified east-west platform, and a Texas Motor Speedway platform.

The three options are schematically presented with more detailed exhibits included in **Appendix C**. The original East-West platform concept is also included in **Appendix C**. This option was eliminated due to the impact on adjacent property and was replaced by the modified east-west platform which provided similar results. **Table 5** presents the pros and cons of each option as well as a planning level cost estimate (construction and right-of-way acquisition, assuming 2007 dollars). Each option presented requires a crossing of FM 156. Due to the existing topography of the area, the at-grade crossing was approximately the same cost as a grade separation option (the at-grade option would have required significant retaining walls). As a result, it was recommended by the stakeholders to only pursue the grade separation option. Also, this grade separation would be critical if the rail line were to become part of a daily commuter service to both minimize disruptions to FM 156 and to eliminate conflicts between auto and rail traffic. While the current regional rail corridor study only identifies this rail line for special event service, the ability for TMS to serve as a large park-and-ride facility was suggested by multiple stakeholders.

Table 5 – Analysis of Rail Line Alignment Options

Name	Planning Level Cost Estimate	Pros	Cons
Alignment # 2 North-South Platform (Grade Separation at FM 156)	$20.3 Million	• Drops off at TMS outbound traffic split (Petty Place) which will minimize pedestrian / vehicular conflict • The platform area is currently owned by the Texas Motor Speedway • Requires minimal splitting of adjacent property	• Longest Distance from Speedway to platform (3,500 ft) • Complicated to Provide ADA accessibility to the platform • Highest cost of the options • Difficult to provide shuttle to platform
Alignment # 3 Modified East-West Platform (Grade Separation at FM 156)	$18.5 Million	• Closer Drop off point than Alignment 2 • Lowest cost option • Could provide a shuttle to platform • Continuation North to Denton & North Lake	• Potential pedestrian / vehicular conflict due to current outbound traffic plan • Requires most significant property acquisition • Distance to Texas Motor Speedway is greater than ¼ of a mile
Alignment # 4 TMS Platform (Grade Separation at FM 156)	$18.7 Million	• Closest Drop off point • Easiest option for ADA accessibility • Option is consistent with TMS goals to provide improved shuttle service • The platform area is currently owned by TMS	• Outbound traffic on Victory Circle would have to be stopped to release trains • Requires splitting of one property • Higher safety measures would need to be taken to keep spectators from crossing the rail line

Currently, most of the rail alignment is located in Northlake's ETJ. It is recommended that the rail alignments be added to the local City's and the regions Master Plans to show support of the future intent to provide this rail connection. In order to preserve the ability to construct this line in the future, it is recommended that ROW is preserved (or acquired). If the ROW in this area is not preserved, the future feasibility of a rail line would be limited. The property owners directly affected by the proposed alignments should be contacted directly.

The City's MAQ plan has estimated the cost for the special event rail as $45.9 million, which includes $20 million for the construction of the connection, plus an additional $25.9 million to cover environmental mitigation and various other costs to make improvements to the rail network south of the TMS study area.

While there are no immediate plans to connect this rail service to the north, the long-term service plan for DCTA indicates potential rail service along the BNSF corridor roughly between Denton and TMS. This connection should be considered for future service.

Technical Considerations

Each option has a proposed 600 foot platform, which can hold up to a six-car train. Each of these six-car trains can carry approximately 900 people. During a special event, it is assumed that four trains could be used which could carry approximately 3,600 people out of the speedway. Assuming each car travels with two occupants to the Texas Motor Speedway, this could remove 1,800 vehicles from the roadway. This would be is equivalent to approximately the amount of vehicles that can use one freeway lane in one hour.

While meeting with various stakeholders involved in the operations and maintenance of a rail line, several items were brought up for future consideration. First, the service would need to meet ADA requirements. Spectators who need ADA facilities must be able to ride the train. This typically would mean either an ADA accessible route would need to be provided from the platform to the Texas Motor Speedway; or an ADA accessible shuttle service must be provided from the Texas Motor Speedway to the rail line platform. Secondly, the distance from the rail platform to the Speedway gates is critical – the shorter the distance, the greater the likelihood for increased ridership. Typically, a ¼ mile is the limit people will walk to and from a station; however, it was agreed that for a race event this acceptable walk distance could be slightly longer (up to ½ mile). The North-South Platform was thought to be on the edge of this acceptable walking distance. The third consideration was the need for an area to service the trains, especially if this area would ever serve as an 'end-of-line' option for commuter rail service. This area would need to have both a power source and a facility to store equipment on-site. Lastly, during these stakeholder meetings it was determined that during special events a train would only be able to make one outbound trip. As a result, as many trains as possible would be needed. Therefore, the platform provided should be as large as possible with the ability to expand the platform in the future to provide additional cars and/or trains.

C. SH 114 SCHEMATIC REVIEW

A preliminary schematic has been developed for SH 114 adjacent to the Texas Motor Speedway. These plans include both the frontage roads and main lanes. Adjacent to the Texas Motor Speedway, the frontage roads are proposed to be three lanes in each direction. A two-lane westbound off-ramp is planned to exit the main lanes just east of Championship Parkway, and a two-lane eastbound on-ramp is planned just east of Labonte Lane. It is anticipated that the construction of this facility will be similar to other sections of SH 114. The frontage roads will be built first, then when necessary and funding becomes available, the main lanes will be constructed. Based on the 2015 alternative demographics unconstrained model run, the frontage road lanes can accommodate the projected volumes at an acceptable level of service. The 2030 model assumes the main lanes will be in place. Based on review of the projected 2030 volumes, it is recommended that when the SH 114 main lanes and the North Tarrant Express are constructed, consideration is made for direct connect ramps for eastbound to southbound traffic and westbound to northbound traffic.

In 2007, Texas Motor Speedway commissioned an analysis to evaluate the SH 114 schematic relative to their special event operations. This analysis reviewed the proposed schematic and ramp placements. The study introduced seventeen (17) alternative schematic options for SH 114 adjacent to TMS. The report commissioned by TMS stated that the interim frontage road outbound operations would be less efficient than current operations with existing SH 114. While we agree in concept to the TMS study that there may be measures that can be taken to optimize event-day operations, it is difficult to understand how the addition of such a significant amount of capacity could have an overall detrimental effect on Speedway operations. It is recommended that when the new frontage roads are in place, Texas Motor Speedway staff work with TxDOT to form a revised traffic management plan. It is anticipated that with the extra capacity from the new frontage roads, a plan could be developed to improve overall operations for outbound traffic.

When the SH 114 main lanes are constructed, the only on-ramp to be used by traffic exiting the Texas Motor Speedway traveling eastbound on the SH 114 Eastbound Frontage Road is a two-lane on-ramp just west of IH-35W. There appears to be validity in the TMS commissioned study that the location of proposed on- and off-ramps is not ideal for events at the Texas Motor Speedway; however, given the uncertainty with the date of the SH 114 main lanes future construction, it is recommended the City study these proposed ramp locations in detail at a later date. Two distinct observations about the schematic were made that would assist in both event operations at the Texas Motor Speedway and future peak hour traffic utilizing this facility. These observations are as follows:

- Consider providing an eastbound right-turn lane on the SH 114 Eastbound Frontage Road at IH-35W. Without this extra lane, the outside eastbound lane would become a defacto right-turn lane during special events. When this happens the third lane within the interchange would become underutilized. To best serve special event traffic, it is anticipated this right-turn lane could be extended as far west as Championship Way.

- Consider providing an additional on-ramp to access EB SH 114 to better serve the Texas Motor Speedway, other adjacent existing and future development, and background traffic. This additional ramp could perhaps be a braided ramp just east of Championship Parkway. The previous report by the Texas Motor Speedway often indicated the ramp as a temporary ramp; however, it is anticipated that for the additional cost, the ramp could be used to better accommodate daily traffic volumes.

VI. PROJECT PRIORITIZATION METHODOLOGY

A. PRIORITIZATION

This section of the report summarizes the second major phase of the analysis. Thoroughfare planning enables a municipality to proactively prepare for future traffic conditions, accommodate growth and development, identify projects for the City's Capital Improvements Program (CIP), determine roadway right-of-way (ROW) requirements, and improve community aesthetics and safety. Therefore, thoroughfare plans are an integral part of the long-range planning process and are intended to serve as an overall guide to carry out the vision of the community. By utilizing the model runs developed for a thoroughfare plan, it is possible to also prioritize future projects in the Capital Improvement Programs. From the travel demand models and general data observations, several factors are used to prioritize projects. For the TMS Transportation Plan, the following are examples of the major factors considered when prioritizing projects:

- Roadway Construction Cost vs. Additional Capacity Provided;
- Functionality (Regional Arterial vs. Collector);
- Connectivity to other major facilities;
- Construction of a new roadway (filling gaps in the system);
- Programmed Improvement (funded vs. unfunded);
- Projected Change in Volume (projected future need); and
- Flood Plain / Stream Crossings (construction feasibility).

While examining the model runs and existing roadway facilities, it was observed that the primary means for regional travel and connectivity was via TxDOT facilities. A majority of the other planned thoroughfare facilities accommodate local and short trips that are traveling to and from the TxDOT facilities. Although many of the projects would provide connectivity within the study area, few would provide a significant relief to the TxDOT facilities. A majority of the non-TxDOT facilities will be likely developer driven projects – constructed only when adjacent development projects dictate their need. In addition, it is important to note that a majority of the non-TxDOT roadways will require large flood plain crossings. These crossings often require special drainage structures that will significant increase the cost of construction for many of the new facilities. The location of these more difficult crossings was considered in the prioritization of projects. The roadways in this area were subdivided into forty-two (42) unique projects. Nineteen (19) of these projects are required for TxDOT capacity improvements.

The projects were divided into three prioritization categories: high, medium, and low priority; for both TxDOT and non-TxDOT facilities. A majority of the high priority TxDOT facilities are programmed improvements with the exception of US 377 from FM 1171 to SH 114 and FM 156 from Mulkey to SH 114. As previously recommended, this section of US 377 should be considered for construction to its ultimate six-lane divided section when it is reconstructed. Consideration should also be given to FM 156 to be constructed as a six-lane divided section when it is widened. The low priority TxDOT facilities are primarily those projects that must cross a considerable amount of flood plain to be constructed and provide less regional benefit. **Table 6** outlines the priority ranking of the TxDOT facilities.

The non-TxDOT facilities will tend to be more developer driven – these facilities will likely only be constructed when required to serve adjacent development projects. These projects were divided evenly among the three categories and based mainly on future projected volumes, facilities that could provide some relief to the TxDOT network, new roads vs. existing roads, and what roads could provide internal connectivity to the local trips within the study area. The priority of a low project could become a high priority depending on development trends. **Table 7** outlines the priority ranking of the Non-TxDOT facilities. **Exhibit 18** graphically displays the prioritization of both TxDOT and local facilities.

Table 6 – TxDOT Priority Ranking

Priority	Class	Project	Limits
High	HWY	SH 114 Frontage Roads	FM 156 to IH-35W
	HWY	IH-35W (North Tarrant Express)	Through Study Area
	P6D	FM 1171 (4)	IH-35W NBFR to US 377
	P6D	US 377 (2)	FM 1171 to SH 114
	P6D	FM 156 (2)	Mulkey to FM 1171
	P6D	FM 156 (3)	FM 1171 to Dale Earnhardt
	P6D	FM 156 (4)	Dale Earnhardt to SH 114
	P6D	FM 156 (5)	SH 114 to Old FM 156
	MA4D	FM 407 (4)	IH-35W NBFR to US 377
Medium	HWY	SH 114 Main Lanes	IH-35W to US 377
	P6D	FM 1171 (3)	Future Florance to IH 35W SBFR
	MA4D	FM 1171 (1)	FM 156 to Future Harmonson
	MA4D	US 377 (3)	SH 114 to Henrietta Creek
	MA4D	US 377 (1)	FM 407 to FM 1171
	MA4D	FM 156 (1)	FM 407 to Mulkey
	MA4D	FM 407 (2)	Florance to Cleveland Gibbs
	MA4D	FM 407 (3)	Cleveland Gibbs to IH-35W SBFR
Low	MA4D	FM 407 (1)	FM 156 & FM 1384 to Florance
	MA4D	FM 1171 (2)	Future Harmonson to Future Florance

Note: Number listed in parentheses after the project name is intended to serve only as a unique identifying field.
HWY – Highway, P6D – Principal Arterial, MA4D – Major Arterial, M4U-Minor Arterial

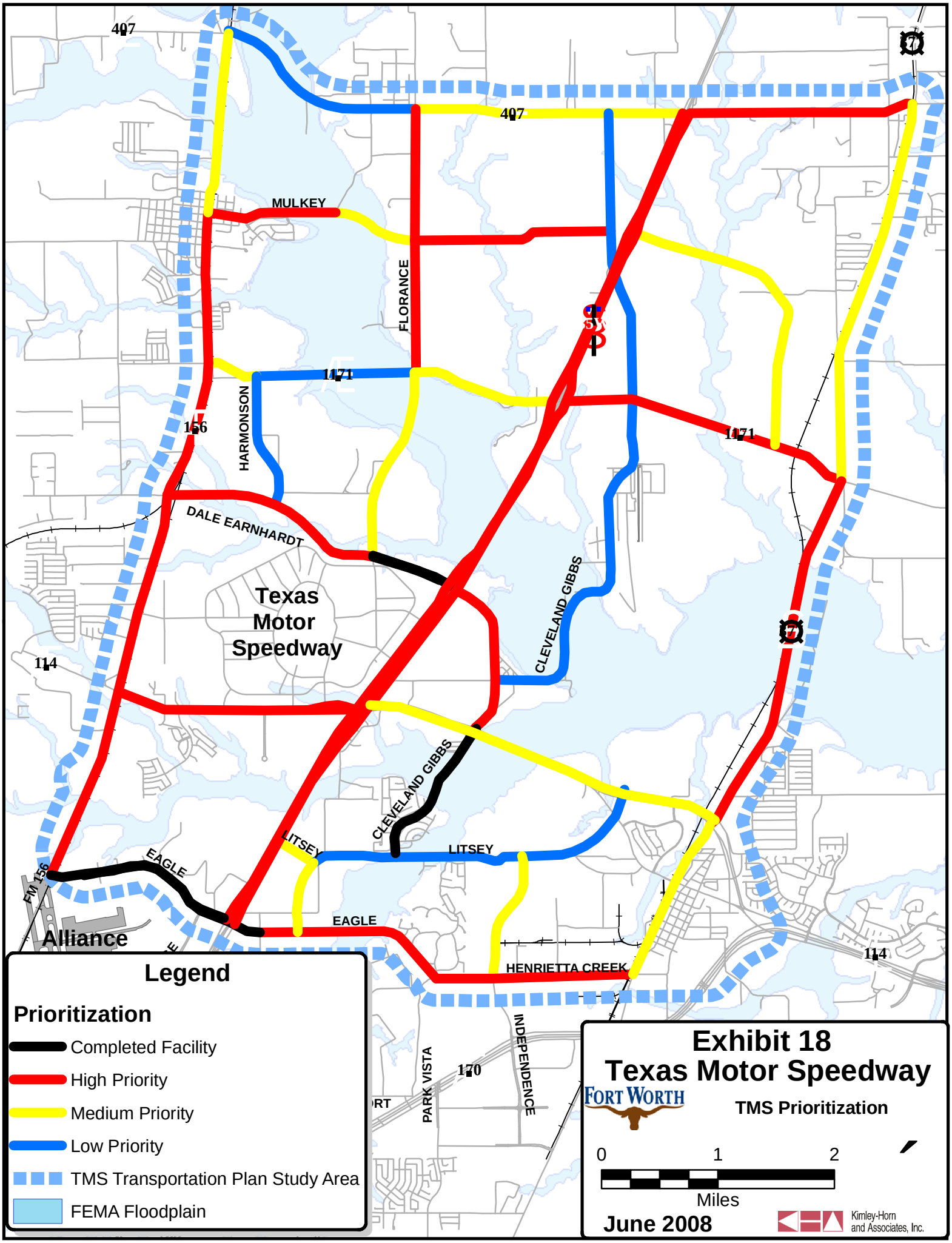
Table 7 – Non-TxDOT Priority Ranking

Priority	Class	Project	Limits
High	M4U	FM 407 (Mulkey)	FM 156 to FM 407 NE break off
	M4U	Mulkey (2)	Florance Rd. to IH-35W
	MA4D	Florance Rd.	FM 407 to Mulkey
	MA4D	Florance Rd. (2)	Mulkey to FM 1171
	M4U	Dale Earnhardt (1)	FM 156 to Future Harmonson Rd.
	M4U	Dale Earnhardt (2)	Future Harmonson Rd. to Existing Dale Earnhardt
	M4U	Dale Earnhardt (3)	IH-35W NBFR to Sam Lee Lane
	M4U	Cleveland Gibbs (4)	Sam Lee Lane to SH 114 WBFR
	MA4D	Eagle	Existing Eagle Dead End to Henrietta Creek
	MA4D	Henrietta Creek	Dead end of Henrietta Creek to US 377
Medium	MA4D	Florance Rd. (3)	FM 1171 to Dale Earnhardt
	MA4D	Litsey (1)	IH-35W NBFR to Future N. Beach St.
	MA4D	Independence	Litsey to Henrietta Creek
	MA4D	N. Beach	Eagle to Future Litsey
	MA4D	Future FM N-S Arterial	FM 1171 to IH-35W
	M4U	Mulkey (1)	FM 407 NE break off to Florance
Low	M4U	Cleveland Gibbs (1)	FM 407 to Mulkey
	M4U	Cleveland Gibbs (2)	Future FM N-S Arterial to FM 1171
	M4U	Cleveland Gibbs (3)	FM 1171 to Sam Lee Lane
	M4U	Harmonson	FM 1171 to Dale Earnhardt
	MA4D	Litsey (2)	N. Beach St. to Cleveland Gibbs
	MA4D	Litsey (3)	Cleveland Gibbs to E. Fort Worth City Limits
	MA4D	Litsey (4)	E. Fort Worth City Limits to SH 114

Note: Number listed in parentheses after the project name is intended to serve only as a unique identifying field.
HWY – Highway, P6D – Principal Arterial, MA4D – Major Arterial, M4U-Minor Arterial

B. PLANNING LEVEL PROJECT COSTING

As previously stated, it is possible to provide a roadway network that operates at an acceptable level of service in the horizon year, so long as all the needed facilities are constructed. A planning level cost estimate for the facilities necessary to provide this network has been estimated at $297 Million (2007 dollars) excluding the costs for SH 114 and IH-35W (North Tarrant Express). Approximately half of this cost ($152 million) is for needed TxDOT facilities. It should be noted that some of the non-TxDOT projects in the City of Fort Worth are transportation impact fee eligible and located in Service Area A. Transportation Impact fee dollars will be an additional funding source to assist in the construction of City roadways for the southern section of the Texas Motor Speedway Study Area. **Table 8** to **Table 13** provides a breakdown of planning level cost projects for each project based on what jurisdiction the facility is located within. Detailed conceptual level cost projection sheets are included in the **Appendix D**. It should be noted that all project costing was conducted using 2007 dollars and a standard City of Fort Worth cross-section, so the actual costs will likely vary by jurisdiction.


407
407
MULKEY
FLORANCE
1171
HARMONSON
156
1171
DALE EARNHARDT
Texas
Motor
Speedway
CLEVELAND GIBBS
114
CLEVELAND GIBBS
LITSEY
LITSEY
EAGLE
FM 156
EAGLE
Alliance
HENRIETTA CREEK
114
INDEPENDENCE
PARK VISTA
170
Legend
Prioritization
Completed Facility
High Priority
Medium Priority
Low Priority
TMS Transportation Plan Study Area
FEMA Floodplain
Exhibit 18
Texas Motor Speedway
FORT WORTH
TMS Prioritization
0
1
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Miles
June 2008
Kimley-Horn
and Associates, Inc.

Table 8 – TxDOT Estimated Cost

	Class	Project	Limits	Cost
TxDOT	HWY	SH 114 Frontage Roads	FM 156 to IH-35W	
	HWY	SH 114 Mainlanes	IH-35W to US 377	
	HWY	IH-35W	Through Study Area	
	MA4D	FM 407 (1)	FM 156 & FM 1384 to Florance	$ 11,300,000
	MA4D	FM 407 (2)	Florance to Cleveland Gibbs	$ 8,900,000
	MA4D	FM 407 (3)	Cleveland Gibbs to IH-35W SBFR	$ 3,600,000
	MA4D	FM 407 (4)	IH-35W NBFR to US 377	$ 10,600,000
	MA4D	FM 1171 (1)	FM 156 to Future Harmonson	$ 2,400,000
	MA4D	FM 1171 (2)	Future Harmonson to Future Florance	$ 9,000,000
	P6D	FM 1171 (3)	Future Florance to IH-35W SBFR	$ 9,000,000
	P6D	FM 1171 (4)	IH-35W NBFR to US 377	$ 17,100,000
	MA4D	US 377 (1)	FM 407 to FM 1171	$ 17,000,000
	P6D	US 377 (2)	FM 1171 to SH 114	$ 21,600,000
	MA4D	US 377 (3)	SH 114 to Henrietta Creek	$ 5,500,000
	MA4D	FM 156 (1)	FM 407 to Mulkey	$ 8,800,000
	P6D	FM 156 (2)	Mulkey to FM 1171	$ 8,200,000
	P6D	FM 156 (3)	FM 1171 to Dale Earnhardt	$ 8,800,000
	P6D	FM 156 (4)	Dale Earnhardt to SH 114	$ 2,000,000
	P6D	FM 156 (5)	SH 114 to Old FM 156	$ 8,800,000
			TOTAL	**$ 152,600,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

Table 9 – Town of Northlake Estimated Cost

	Class	Project	Limits	Cost
Northlake	M4U	Mulkey (1)	FM 407 NE break off to Florance	$ 4,300,000
	M4U	Mulkey (2)	Florance Rd. to IH-35W	$ 8,200,000
	M4U	Cleveland Gibbs (1)	FM 407 to Mulkey	$ 4,400,000
	M4U	Cleveland Gibbs (2)	Future FM N-S Arterial to FM 1171	$ 4,575,000
	M4U	Cleveland Gibbs (3)	FM 1171 to Sam Lee Lane	$ 14,900,000
	MA4D	Florance Rd. (1)	FM 407 to Mulkey	$ 6,100,000
	MA4D	Florance Rd. (2)	Mulkey to FM 1171	$ 5,900,000
	MA4D	Florance Rd. (3)	FM 1171 to Dale Earnhardt	$ 10,200,000
	M4U	Harmonson	FM 1171 to Dale Earnhardt	$ 5,200,000
	M4U	Dale Earnhardt (1)	FM 156 to Future Harmonson Rd.	$ 5,100,000
	M4U	Dale Earnhardt (2)	Future Harmonson Rd. to Existing Dale Earnhardt	$ 2,600,000
	M4U	Dale Earnhardt (3)	IH-35W NBFR to Sam Lee Lane	$ 3,900,000
	M4U	Cleveland Gibbs (4)	Sam Lee Lane to SH 114 WBFR	$ 1,900,000
			TOTAL	**$ 77,275,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

Table 10 – City of Fort Worth Estimated Cost

	Class	Project	Limits	Cost
Fort Worth	MA4D	Litsey (1)	IH-35W NBFR to Future N. Beach St.	$ 1,700,000
	MA4D	Litsey (2)	N. Beach St. to Cleveland Gibbs	$ 3,400,000
	MA4D	Litsey (3)	Cleveland Gibbs to E. Fort Worth City Limits	$ 6,200,000
	MA4D	Eagle	Existing Eagle Dead End to Henrietta Creek	$ 9,800,000
	MA4D	Henrietta Creek	Dead end of Henrietta Creek to US 377	$ 2,975,000
	MA4D	Independence	Litsey to Henrietta Creek	$ 5,900,000
	MA4D	N. Beach	Eagle to Future Litsey	$ 3,300,000
			TOTAL	**$ 33,275,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

Table 11 – City of Roanoke Estimated Cost

Roanoke	Class	Project	Limits	Cost
	MA4D	Litsey (4)	E. Fort Worth City Limits to SH 114	$ 6,200,000
	MA4D	Henrietta Creek	Dead end of Henrietta Creek to US 377	$ 5,525,000
			TOTAL	**$ 11,725,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

Table 12 – Town of Flower Mound Estimated Cost

Flower Mound	Class	Project	Limits	Cost
	M4U	Cleveland Gibbs (2)	Future FM N-S Arterial to FM 1171	$ 1,525,000
	MA4D	Future FM N-S Arterial	FM 1171 to IH-35W	$ 14,800,000
			TOTAL	**$ 16,325,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

Table 13 – City of Justin Estimated Cost

Justin	Class	Project	Limits	Cost
	M4U	FM 407 (Mulkey)	FM 156 to FM 407 NE break off	$ 5,800,000
			TOTAL	**$ 5,800,000**

NOTE: These cost projections listed in this appendix have been developed for prioritization purposes only and should not be used for any future Capital Improvement Planning.

VII. RECOMMENDATIONS AND CONCLUSIONS

Throughout this report, several conclusions and recommendations were provided. These conclusions have been subdivided into six categories: Land Use, Roadway, Transit, Thoroughfare Planning, SH 114 Schematic Review, and Stakeholder Involvement (Advisory Committee, Municipalities, and Public & Private Entities). The following provides a summary of these conclusions and recommendations:

Land Use:

- Within a 6-mile radius of the TMS, alternative demographics were developed by City of Fort Worth staff to more accurately project anticipated growth patterns. The demographics showed a 20% increase in population and a 5% increase in employment compared to the NCTCOG regionally-approved demographics.
- We recommend local governments work with the NCTCOG during the ongoing 2040 Demographic Review to accurately reflect current and future demographics. Final approval of the new set of regional demographics is anticipated to be adopted in 2009.

Roadway:

- Under existing conditions, multiple roadways within the study area are operating at or above their capacity. SH 114 adjacent to the TMS and US 377 from FM 1171 to SH 114 are both over capacity. FM 156 from FM 407 to SH 114, and FM 1171 east of IH-35W also appear to be quickly approaching their capacities.
- The primary means for regional travel and connectivity is and will likely continue to be via the study area's TxDOT facilities. Nearly all of the existing and proposed City arterial facilities will serve local development and will likely only be constructed with adjacent development projects.
- The daily traffic volumes on IH-35W adjacent to the TMS are projected to double between 2007 and 2015 (43,000 in 2007 and a projected 114,800 in 2015). IH-35W is projected to be significantly over capacity between Dale Earnhardt Lane and FM 1171.
- The daily traffic volumes on SH 114 adjacent to the TMS are projected to approximately double between 2007 and 2015 (22,000 in 2007 and a projected 41,700 in 2015).
- FM 156 and US 377 are projected to be deficient in their current two-lane configurations in all 2015 model runs.
- Traffic along the SH 114 frontage roads between IH-35W and US 377 begins to experience an unacceptable level of service in 2015.

- Based on an "unconstrained model run" (which allows trips to travel the route they wish to use regardless of the congestion level along the roadway), US 377 is clearly the preferred north-south route within the study area. When US 377 is widened from FM 1171 to SH 114, it should be constructed as a six-lane divided facility. US 377 could also provide for an alternate route when IH-35W is under construction during its transformation into the North Tarrant Express.

- Based on 2030 model runs, build out of the planned roadway network is projected to adequately support the future land use plan within the transportation study area.

- Cleveland Gibbs and Dale Earnhardt appear to be a bypass route for motorists wishing to avoid the SH 114 and FM 156 interchange, traveling north via Dale Earnhardt to FM 156.

- Litsey and Henrietta Creek are projected to serve local trips and provide little relief to SH 114 or SH 170.

- Although not in the transportation study area, SH 114 west of FM 156 is projected to operate at an unacceptable level of service in all model years especially with the alternative demographics in place.

- The 2030 model runs assume US 377 between SH 114 and FM 1171 and FM 156 between SH 114 and Mulkey will be four-lane facilities. As a result, these roadways begin to experience unacceptable level of service in the 2030. When reconstructed, US 377 and FM 156 should be considered for construction to their ultimate six-lane divided section.

- In order to construct the proposed 2030 roadway network, the total cost of these improvements (excluding IH-35W and SH 114) is approximately $297 million (in 2007 dollars). Approximately half of these improvements are located along TxDOT facilities.

- Many of the planned non-TxDOT thoroughfare facilities have large flood plain crossings. These crossings will result in a significant increase in construction costs (to provide the same capacity) and are unlikely to be constructed by the development community.

Transit:

- Three special event commuter rail options have been developed to serve TMS. ROW preservation should begin for these alignments, considering the rapid development in the area.

- The three proposed rail alignments for the commuter rail spur should be identified in the comprehensive plans of the respective involved municipalities.

- The special event commuter rail line should be established with the intent of providing a future daily commuter rail line from TMS.

- A Park-n-Ride facility could easily be established at TMS.

- Consider future options for a connection to the north for future service to Denton via Denton County Transportation Authority (DCTA).

Thoroughfare Planning:

- The Towns of Flower Mound and Northlake should coordinate with TxDOT to eliminate the inconsistencies between their respective thoroughfare plans at the future IH-35W crossing between FM 1171 and FM 407.
- The municipalities in the study area should continue to work together and coordinate their transportation planning efforts to develop consistent comprehensive and thoroughfare plans.

SH 114 Schematic Review:

- TxDOT should consider providing a dedicated eastbound right-turn lane on the SH 114 Eastbound Frontage Road at IH-35W.
- TxDOT should consider providing an additional future on-ramp from the eastbound frontage road to access the future eastbound SH 114 main lanes to better serve TMS, other adjacent existing and future development, and background traffic.

Stakeholder Involvement (Advisory Committee, Municipalities, and Public & Private Entities):

- The TMS Advisory Committee should continue to meet and work together to identify funding opportunities for regional roadway and transit facilities.
- The findings of this study should be presented to various city and town councils within the study area for their support.
- The various public and private entities should work together to identify opportunities for partnerships to facilitate regional and local thoroughfare projects.

APPENDICES

A. 2015 Modeling Exhibits

B. 2030 Modeling Exhibits

C. Commuter Rail Line Alignment Exhibits

D. Conceptual Level Project Cost Projections