FRA FY 14 OMNIBUS FUNDING PASSENGER RAIL CORRIDOR INVESTMENT PLAN GRANT APPLICATION:

FORT WORTH TO AUSTIN PASSENGER RAIL CORRIDOR PE/ NEPA

Project Title	Fort Worth to Austin Passenger Rail Corridor PE/ NEPA
Location	Corridor from Fort Worth, TX to Austin, TX
Application Type	Passenger Rail Corridor Investment Plan
Applicant	Texas Department of Transportation (TxDOT)
Funding Request	$8,000,000 federal request with a $2,000,000 non-federal match

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Funding Request & Project Cost

Federal Funding Requested	**$8,000,000 (80%)**
Non-Federal Matching Funds	$2,000,000 total non-federal match from TxDOT (20%)
Other Federal Funds	None
Total Project Cost	$10,000,000
Previous Federal Funding Requests	A planning grant for the Oklahoma City to South Texas corridor that included this corridor was submitted in May 2010 under the High-Speed Intercity Passenger Rail (HSIPR) Program number FR-HSR-10-001 was selected for award of funding.

Table 1: Fort Worth to Austin PE/ NEPA Funding Request and Project Cost Summary

Eligibility

TxDOT is the state agency responsible for planning, building and maintaining state-owned transportation infrastructure in the state of Texas and is eligible for funding under this Notice of Funding Availability (NOFA).

Project Summary

Texas' population and economy are booming, with much of its growth occurring in the already-congested I-35 corridor between Dallas/ Fort Worth and Austin. Safe, effective, and efficient means of mobility between these two regions is critical to the financial success of the state.

The Fort Worth to Austin corridor is part of the federally-designated South Central high-speed rail corridor and included in the Texas Rail Plan. It is also consistent and supportive of the regional transportation plans in the Austin and the Dallas/ Fort Worth regions. High-speed rail within the Fort Worth to Austin corridor would reduce vehicular trips along the I-35 corridor, leading to reduced automobile emissions, improved safety, and reduced roadway maintenance costs. Additionally, high-speed rail service would provide a potential lower cost alternative to flying with shorter travel times between the Dallas/ Fort Worth and Austin central business districts.

Providing high-speed rail service between Fort Worth and Austin, with continuing high-speed rail from Fort Worth to Dallas, for which TxDOT is currently completing preliminary engineering and the environmental impact statement (EIS), as well as continuing intercity passenger rail service between Austin and San Antonio planned by the Lone Star Rail District would serve the entire Dallas/ Fort Worth to San Antonio corridor. Furthermore, high-speed rail in this corridor along with plans in development to provide high-speed rail between Dallas and Houston and plans being evaluated for the Austin to Houston corridor, would provide would provide high-speed rail connections amongst all of the major metropolitan regions in the state accessible by over 17 million people.

Project Description

While TxDOT continues to explore roadway improvements to keep people and the economy moving, other options, such as passenger rail service, fit the needs of many travelers and would reduce demand on the state's roadways. Through the Texas-Oklahoma Passenger Rail Study (TOPRS), TxDOT is studying how passenger rail service could fit this corridor. The TOPRS, scheduled to conclude in early 2015, is an evaluation of passenger rail service options in an 850-mile corridor from Oklahoma City to South Texas, including the Fort Worth to Austin corridor as part of the central section of the TOPRS corridor as shown in Figure 1. This Passenger Rail Corridor Investment Plan grant application for preliminary engineering and project-level environmental documentation (PE/ NEPA) for the Fort Worth to Austin corridor would build upon the TOPRS work to advance high-speed rail within the corridor toward implementation and bring the corridor to the same level of advancement as the connecting Dallas to Fort Worth and Dallas to Houston high-speed rail corridors currently in the preliminary engineering/ EIS phase.

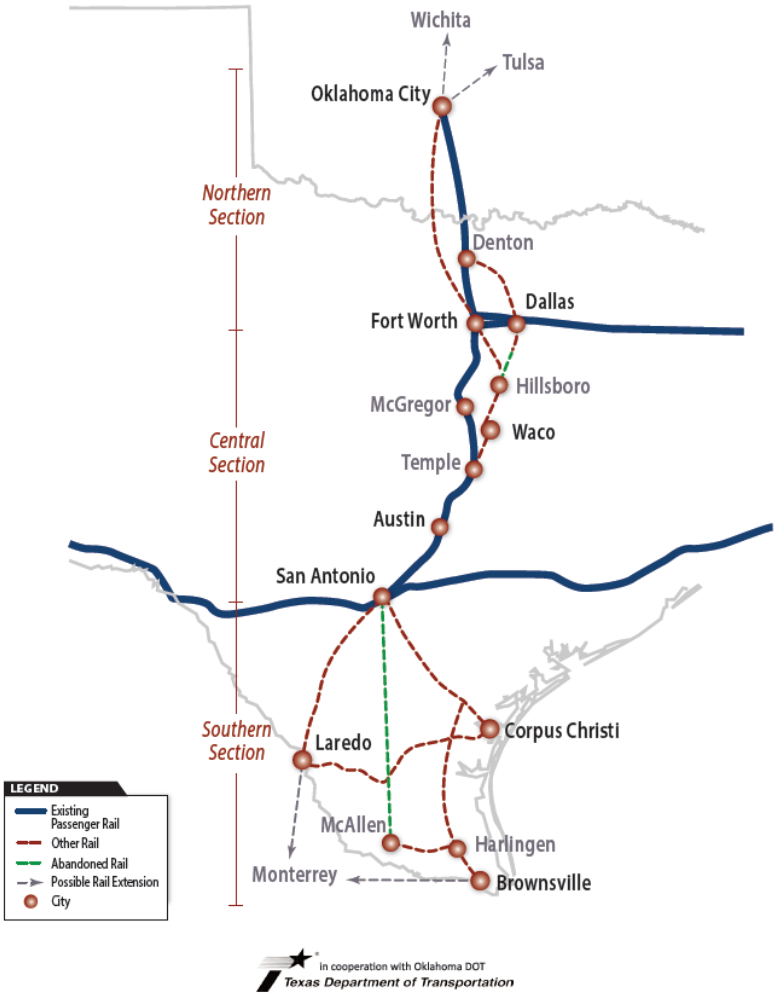

Figure 1: TOPRS Study Area

Austin had a metropolitan statistical area (MSA) population of approximately 1.7 million in 2010 and is home to one of the largest universities in the nation, the University of Texas (UT), state government agencies, many large companies, including the headquarters of Fortune 500 Whole Foods, technology businesses, and a vibrant media and music culture. Dallas/ Fort Worth had an MSA population of approximately 6.4 million in 2010 and has the 4th highest concentration of Fortune 500 headquarters in the United States. Fort Worth is home to top tourist destinations such as the 35-block downtown known as Sundance Square, world-renowned museums in the Cultural District, and the Stockyards National Historic District as well as large employers such as Lockheed Martin Aeronautics and Naval Air Station Joint Reserve Base. Fort Worth is also located only approximately 30 miles west of Dallas, the 9th most populous U.S. city. Together, the Dallas/ Fort Worth metropolitan area is the top tourist destination in Texas.

Since 2010, the Texas A&M Transportation Institute has annually compiled a list of the top 100 most congested roadways in Texas for the Texas Department of Transportation. For 2014, eleven sections of I-35, the major interstate corridor connecting Fort Worth and Austin, are included in the list of 100 most congested roadways in Texas. These congested conditions are only expected to worsen as Texas' rapidly growing population continues to place an even greater burden on I-35. Additionally, the Dallas/ Fort Worth region is designated as a serious non-attainment area for 8-hour ozone by the Environmental Protection Agency (EPA) and Austin is nearing non-attainment thresholds, indicating the need for an environmentally-friendly mode of travel that will help to improve air quality even as the population in Texas continues to grow. Fort Worth to Austin High-Speed Rail would provide an efficient and environmentally-friendly transportation alternative between these two major U.S. cities.

TxDOT is taking the planning steps to evaluate the corridor in the TOPRS by identifying order of magnitude capital and operating and maintenance costs as well as potential ridership associated with various service types ranging from conventional (79-90 mph) to high-speed (180-220 mph) high-speed rail. High-speed rail from Dallas/ Fort Worth to Austin Corridor, with an estimated capital cost of approximately $12 billion[1], showed potential 2035 annual ridership of up to 3.1 million for express high-speed rail service.[2]

The TOPRS includes a Route Alternatives Analysis and an evaluation of a NEPA Service-Level EIS for the Fort Worth to Austin corridor, as part of the TOPRS Central Section, with four route alternatives identified for evaluation that would provide new passenger rail service as shown in Figure 2. Each alternative included both a proposed route, some with minor route options, and possible service-level operating features:

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[1] TxDOT Statewide Ridership Analysis median probability cost, 2013.
[2] TOPRS Draft Alternatives Analysis, August 2014. Ridership based on results of FRA Connect sketch-level forecasting, projected to 2035.

conventional (emerging), higher speed rail (regional), or high-speed rail (core express) service. The study recommends three route alternatives with higher speed and high-speed service for the central section be carried forward into an EIS.

The Fort Worth to Austin Passenger Rail Corridor Investment Plan application for federal funding continues the advancement of high-speed rail corridors in Texas currently under development between Houston and Dallas, Dallas to Fort Worth, and Oklahoma City to Fort Worth and would extend a high-speed rail corridor from North Texas to the state's capital in Austin. This application requests funding for two project components: the completion of project NEPA documentation (EIS) and the corresponding preliminary engineering required to finalize the NEPA documentation component of the service development plan for the corridor being advanced under the Texas-Oklahoma Passenger Rail Study.

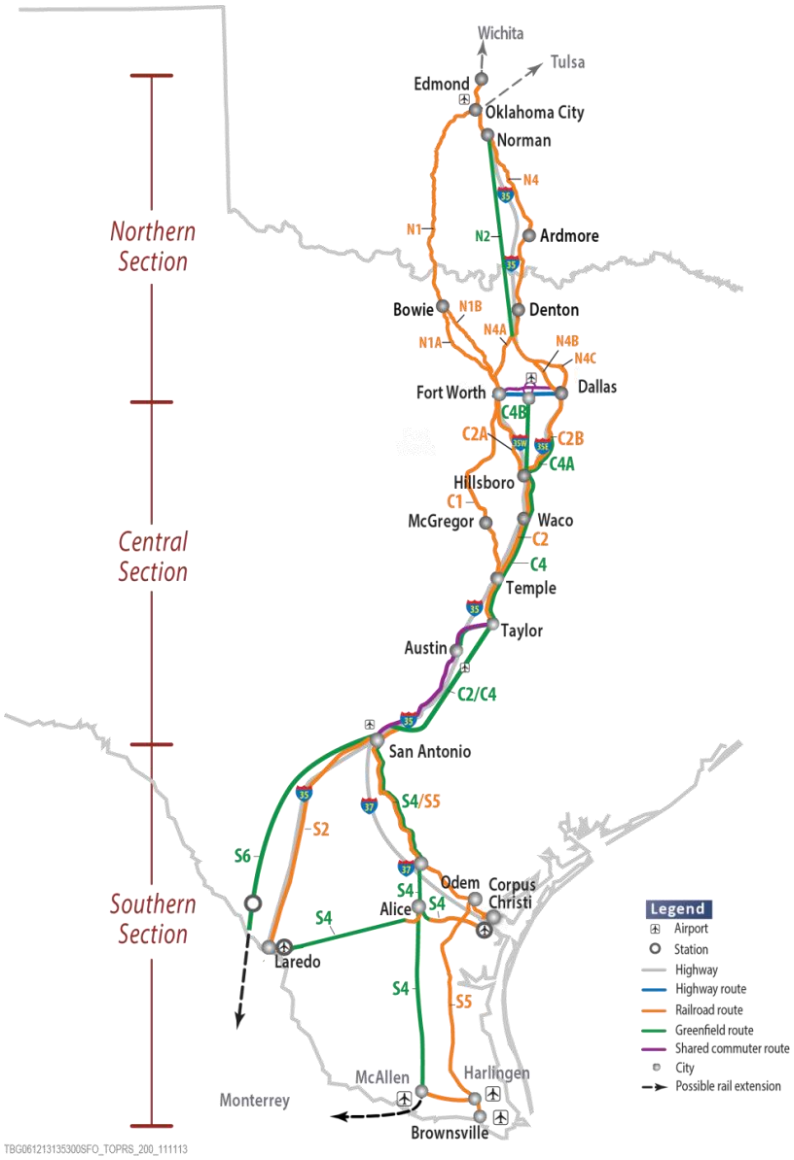

Figure 2: Routes Evaluated in the TOPRS Route Alternative Analysis

FY 2014 Grant Application Evaluation Criteria

Potential Transportation and Other Public Benefits

Transportation Need(s) to be Addressed

Fort Worth to Austin High-Speed Rail would provide an equitable and affordable intercity travel alternative to automobile, bus, and air service as well as enhance interregional access to employment, entertainment, recreation, health and shopping opportunities for existing and future residents in the corridor.

Texas is the second-most populous state in the U.S. (2010 U.S. Census Bureau data) and population within the state is expected to increase by 9.4 million by 2035, a 38.9 percent increase over 2010 levels. The Dallas/ Fort Worth and Austin Metropolitan Statistical Areas (MSA's) are expected to be center of the expansive growth, with respective population changes of 46 and 44 percent as shown in Table 2. In addition, population forecasts anticipate that the percentage of people who are 65 years old or older will grow from about 10 percent to more than 17 percent in Texas. This aging population will rely more heavily on public transportation such as intercity rail. Forecasts predict that economic growth in Texas will more than double from 2010 to 2035, with the manufacturing and information sectors expected to have the highest rates of growth. Long-range transportation plans in Texas and Oklahoma have identified the need to improve passenger rail services to meet the future demand brought on by these changes in population.

Statistical Area (MSA)	Total Pop (2010)	Total Pop (2035)	% Pop Change
Dallas/ Fort Worth-Arlington	6,426,214	9,360,983	45.6
Austin-Round Rock-San Marcos	1,716,289	2,466,185	43.6

Source: 2010 U.S. Census Bureau data and TxDOT 2035 Statewide Long-Range Transportation Plan

Table 2: Fort Worth to Austin MSA Data

The Fort Worth to Austin corridor is currently served by the Amtrak Texas Eagle service that provides service from Los Angeles to Chicago with stops in Austin, Taylor, Temple, Fort Worth and Dallas along the study corridor, though the total trip time is nearly 7 hours between Austin and Dallas with one daily trip in each direction. There is a need for faster, more reliable passenger rail service to enhance its attractiveness as an intercity modal alternative in order to move passengers from air travel and private vehicle travel modes, which would improve the efficiency of passenger rail by increasing the number of passengers per train. There is also a need to improve air quality along the corridor.

The high-speed rail service would result in trips being diverted from automobile and air modes of travel to high-speed rail, as shown in Table 3 for the Dallas/ Fort Worth to Austin corridor.

	Auto Mode Share	Air Mode Share	Express High-Speed Rail Mode Share
No Build	88%	12%	0%
With High-Speed Rail	72%	1%	27%

Table 3: 2035 Fort Worth to Austin Mode Share Data with Express High-Speed Rail[3]

The automobile trips diverted to the high-speed rail service would result in significant benefits including reduced vehicular congestion on the highways and associated reductions in emissions, automobile crashes, and roadway maintenance costs. The values of emissions reductions and accident reduction savings, based on reduced personal miles travelled associated with the high-speed rail service derived from the results of the Connect model ridership forecasting performed for the TOPRS Alternatives Analysis were evaluated in the benefit-cost analysis performed for this application and summarized in the *Summary of Benefits* section at the end of this Project Narrative.

Additionally, the high-speed rail service would result in significant travel time savings both for the high-speed rail users due to the higher average speed and resulting shorter travel time associated with high-speed rail versus automobile travel as well as those still using personal vehicles to make the trip due to reduced roadway congestion. The sketch-level ridership modeling showed a travel time savings of approximately 1 hour and 15 minutes as compared to driving and a travel time savings of 20 minutes as compared to flying. The value of travel time savings, based on reduced personal miles travelled and reduced trip times associated with the high-speed rail service derived from the results of the Connect model ridership forecasting performed for the TOPRS Alternatives Analysis were evaluated in the benefit-cost analysis performed for this application and summarized in the *Summary of Benefits* section at the end of this Project Narrative.

TxDOT was required by state law to coordinate a short-term and long-term statewide passenger rail plan as part of the Texas Rail Plan. This included coordination with other governmental entities as well as private entities. The Fort Worth to Austin passenger rail corridor was included in the Texas Rail Plan as part of the Oklahoma City to South Texas corridor being studied in the TOPRS. Furthermore, high-speed rail service within the Fort Worth to Austin corridor, would serve as a catalyst for other transit alternatives that are included in the regional transit plans to flourish.

Market Potential and High-Speed Rail Service Benefits of the Corridor

The travel market in the Fort Worth to Austin corridor shows favorable conditions for high-speed rail ridership potential, including high populations and employment bases of the corridor termini (Austin 2010 MSA population of 1.7 million with employment of

[3] Ridership based on results of FRA Connect sketch-level forecasting.

nearly 1 million and Dallas/ Fort Worth 2010 MSA population of 6.4 million and employment of 3.1 million) and a distance between termini (approximately 225 miles) suitable for high-speed rail service. Additionally, demographics show the largest percentage (30 to 42 percent, depending on direction of travel) of the long-distance trip makers in the corridor are in the *Business – High Income* category.[4]

Market potential for the Dallas/ Fort Worth to San Antonio corridor, which includes the Fort Worth to Austin segment, was also reported in the 2009 *Potential Development of an Intercity Passenger Transit System in Texas Report* completed by the Texas Transportation Institute (TTI), which is attached as supporting documentation to this application. The TTI study reported that the corridor ranked the highest in the state for intercity travel demand based on population and demographics, existing travel demand and capacity data. A noticeable trend along the corridor is the growth in the expected population over 65 years of age (an important potential market segment for rail ridership), which is expected to be increase to nearly 19 percent of the total corridor population by 2040.

The TOPRS preliminary results have shown the Dallas/ Fort Worth to Austin corridor could support express high-speed passenger rail service with a forecasted 2035 annual ridership of 3.1 million, which may increase to more than 4.5 million annual riders if operated in conjunction with a connection to Dallas to Houston high-speed rail service.[5] The annual revenue from fares was also shown to exceed estimated annual operating and maintenance costs of the Fort Worth to Austin high-speed rail service. The potential ridership demand was shown to support a frequency of service of between 12 and 20 round trips per day. The analysis efforts will benefit from and include a combination of estimated operating costs and the ridership/revenue forecasts from the pending Corridor-Specific Demand Model being completed as part of the TOPRS to provide a more precise determination of frequency and station stopping pattern recommendations.

The assumed train consist, based on preliminary capital/operating cost estimation would consist of a contemporary (UIC-standard) distributed-power, 25 kilovolt (KV) catenary-supplied integrated train-set. This would likely include a “control-cab-equipped” business-class car, a full-length café-lounge car, five coach cars, and a “control-cab-equipped” coach car. Estimated average capacity is 465 seats.

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[4] 2010 U.S. Census Bureau data.
[5] TOPRS Draft Alternatives Analysis, August 2014. Ridership based on results of FRA Connect sketch-level forecasting.

Other Public Benefits

Land Use & Economic Development

The Fort Worth to Austin corridor consists primarily of undeveloped agricultural land along the corridor once outside of the Dallas/ Fort Worth and Austin-Round Rock-Georgetown metropolitan areas, with areas of development located in the intermediate cities of Temple, Killeen, Waco, and Hillsboro. Figure 3 shows cities along the Fort Worth to Austin corridor.

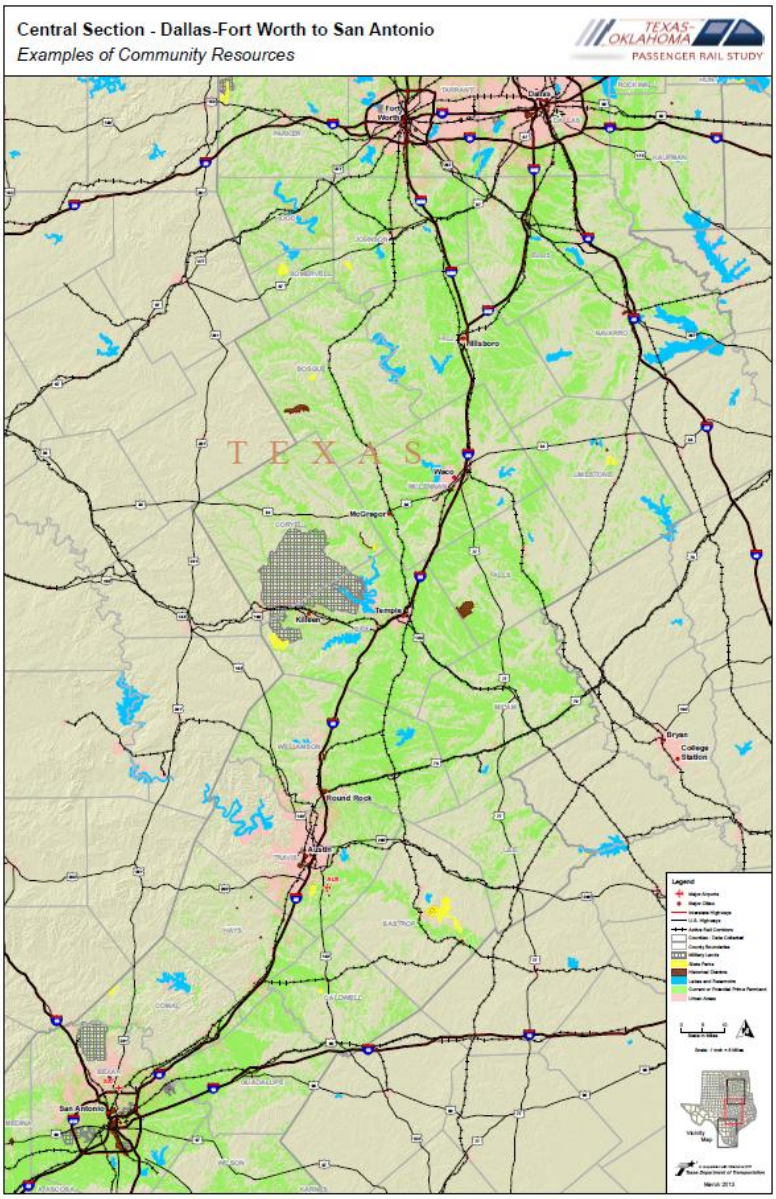

Figure 3: Land Use Map

Significant economic development opportunities would be associated with the high-speed rail terminals and stations. Recent redevelopment of Washington D.C.'s Union

Station has demonstrated that train terminals can become the focal point for commercial redevelopment and promote substantial new development in the surrounding area. Recently, a study for the City of Chicago estimated that revitalizing Chicago's Union Station along with High-Speed Rail would bring $8 – 10 billion of new economic activity to Chicago. Transit-oriented development opportunities around the high-speed terminals may include the creation of Class A office spaces, densely populated livable centers, and retail facilities.

Energy Efficiency & Environmental Quality

The ten counties in the Dallas/ Fort Worth region (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant and Wise) are designated as a nonattainment zone for 8-Hr Ozone by the EPA. The Austin-Round Rock area signed an Early Action Compact (EAC) agreement with the EPA in 2004 to avoid being designated a non-attainment area. The Austin-Round Rock area demonstrated attainment in 2004, though the threat of not achieving it is always looming, especially in light of significant urban growth. EPA proposals to change the defined limits for measuring various pollutants also put the Austin area at risk of entering non-attainment.

There are tangible air quality and congestion management benefits that accrue to the public from the existence of rail services and to highway users in the form of improved traffic flow on the existing roadway system. Intercity passenger rail service is shown to have an impact on congestion, and thus pollution, when targeted to areas where roads are at or near their design capacity. As more traffic uses these roads, travel time increases sharply and the delays are felt by all travelers. An intercity rail line that between Fort Worth and Austin would alleviate highway traffic along I-35 by diverting auto trips to the high-speed rail service.

According to Will Kempton, Director of the California Department of Transportation, in testimony provided to the House Committee on Transportation and Infrastructure on January 28, 2009, "Intercity passenger rail is estimated to use at least 15 percent less energy on a per passenger mile basis than the airlines and 21 percent less than the automobile." Mr. Kempton also noted that "the average intercity train produces 60 percent fewer CO_2 emissions on a per passenger mile basis than the average auto and about half the greenhouse gas emissions of an airplane."

Vehicles are a primary source of ozone-forming and greenhouse gas emissions in Central Texas and the Gulf Coast Region. Intercity high-speed passenger rail will benefit air quality in Texas by providing a viable, fuel efficient alternative to automobile or air travel, thereby reducing vehicle congestion, fuel consumption and emissions on interregional highways, as well as air traffic congestion and related emissions at airports. While alternatives to single occupant vehicle travel are available in the major cities, viable alternatives are few or non-existent between cities, leading to increased congestion and air pollution. A viable intercity rail system would also benefit the

environment by limiting urban sprawl and concentrating development in close proximity to the rail lines.

Fort Worth to Austin High-Speed Rail environmental benefit values associated with emissions reductions (based on reduced PMT) are summarized in the *Summary of Benefits* section at the end of this Project Narrative.

Transportation Network Resilience

The potential for urban areas to experience high-impact disruptions—whether caused by natural disasters, structural failures, or human-engineered terrorist events—continues to grow in our nation. High-speed rail can provide an additional means of travel between cities in the event of a high-impact disruption. High-speed rail not only alleviates the demand for travel on highway and air systems infrastructure, but also provides an alternative mode of travel in the event of an airport or interstate highway closure. Reduction in demand on the existing and aging interstate highway and airport systems will help all transportation systems be more resilient.

Social Equality and Environmental Justice and Opportunities for Upward Social Mobility

The Fort Worth to Austin High-Speed Rail Service would connect two major job centers with a shorter travel time, increasing the range of employment opportunities for residents of both Fort Worth and Austin and the surrounding communities. The wider economic benefits of this enhanced connection between regions, also known as agglomeration benefits, were also estimated. Agglomeration benefits are a fairly new area of inquiry in evaluating high-speed rail projects, and there is not yet a consensus approach or federal guidance on how to quantify them. Therefore, two simplified approaches were used for this preliminary benefit-cost analysis to illustrate the potential range of benefits as described in the *Summary of Benefits* section at the end of this Project Narrative.

The high-speed rail project would also create near-term jobs through the engineering design, environmental clearance, and construction efforts required to implement the project. Long-term jobs would also be associated with the operations and maintenance of the high-speed rail system. The Executive Office of the President, Council of Economic Advisers, estimated in 2011 that a job-year is created for every $76,923 in transportation infrastructure spending. This is equivalent to $82,694 in 2014 dollars. At an estimated capital cost of approximately $12 billion, the project would support more than 155,000 job-years during design construction.

Connectivity with Other Transportation Modes

The consideration and integration of other transportation modes will be an integral component in the planning process for the Fort Worth to Austin High-Speed Rail PE/NEPA project in order to maximize the proposed services' ability to foster a safe, connected, accessible transportation system for the multimodal movement of people and goods.

High-speed rail terminals for the Fort Worth to Austin corridor would be interconnected with the local rail and bus systems in both Austin and Fort Worth. In Austin, the high-speed rail terminal would connect to Austin's existing MetroRail commuter rail line as well as rail services that are planned for the region including a downtown rail system to be located in city streets (Austin Urban Rail), an intercity passenger rail service connecting Austin and San Antonio (LoneStar Rail), and a planned high-speed rail service from Austin to Houston Texas, if advanced. The Central Texas High-Capacity Transit Plan is shown in Figure 4.

Additionally, the high-speed rail terminal in Fort Worth would connect to the planned Dallas/ Fort Worth high-speed rail service currently being evaluated in the preliminary engineering/ EIS stage by TxDOT, under a grant from the FRA. The high-speed rail terminal would also connect with existing Trinity Railway Express (TRE) commuter rail service between Dallas and Fort Worth, as well as the planned TexRail commuter rail.

Figure 4: Central Texas High Capacity Transit Plan (Project Connect)

Austin's transit agency, the Capital Area Metropolitan Transportation Authority (Capital Metro), connects Austin to the surrounding towns of Lago Vista, Leander, Cedar Park, Georgetown, Round Rock, Pflugerville, and Del Valle via approximately 50 local bus routes and 8 express bus routes. It also connects Leander to downtown Austin via Capital Metro's 32-mile, 9-stop MetroRail commuter rail service known as the Red Line as shown in the Central Texas High-Capacity Transit Plan map (Figure 4). Downtown Austin is served by MetroRail, bus routes connecting to the University of Texas (UT) as well as the Austin Bergstrom International Airport (ABIA) and Amtrak. The Austin Amtrak station serves the Texas Eagle route that provides service from Los Angeles to Chicago through the Dallas to Austin corridor.

Fort Worth Transportation Authority (The T) serves Fort Worth and Richland Hills via approximately 27 different bus routes and 6 Express bus routes. The TRE connects downtown Fort Worth at the Intermodal Transit Center with Richland Hills, Arlington (CentrePoint), Irving, the Dallas Medical Center area, and Dallas' Amtrak's Union Station. The Fort Worth Amtrak station serves the Heartland Flyer route that provides service from Fort Worth to Oklahoma City as well as Texas Eagle route.

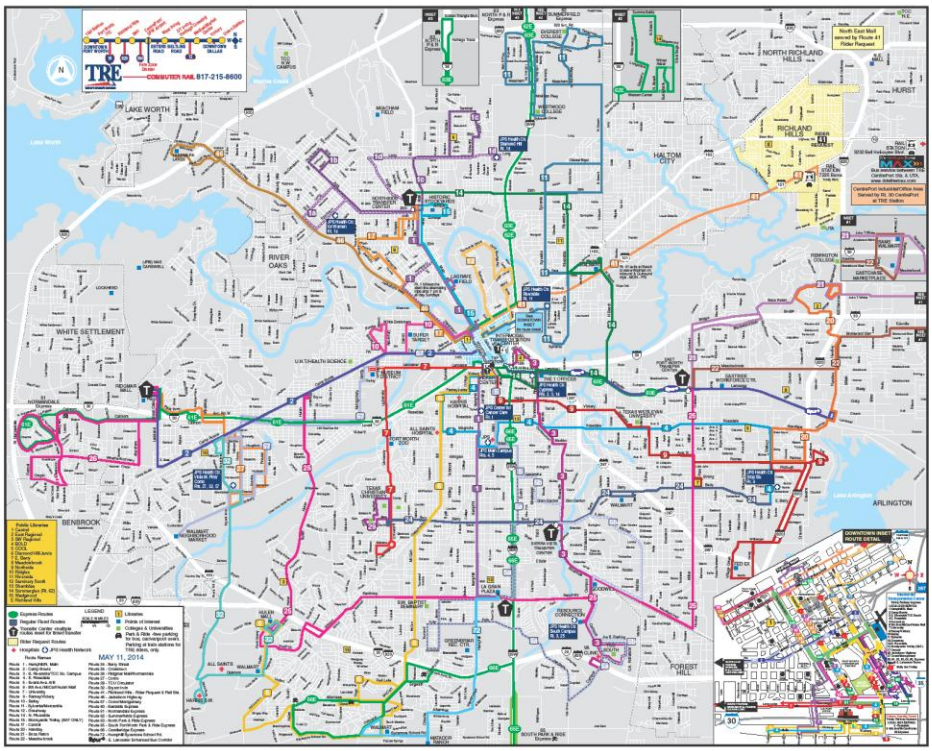

Figure 5: Fort Worth – The T System Map

Future Program Viability and Sustainability

TxDOT has demonstrated its ability to administer the planning, environmental documentation, and design stages of large scale corridor projects and is currently in the process of completing Alternatives Analysis and a Service Development Plan for the

TOPRS as well as the preliminary engineering and EIS for the Dallas to Fort Worth high-speed rail corridor. The role of the State for these high-speed rail projects will be to discover risk through the planning and environmental processes in order for private sponsors/ investors to make informed decisions and support the future capital and operating needs for the corridors being studied. The success of this approach is evidenced by the private investor (Texas Central Railway) participation in the Dallas to Houston high-speed rail corridor as described in the executed Memoranda of Understanding between the FRA, TxDOT, and the Texas Central Railway. The Fort Worth to Austin high-speed rail corridor, similarly to the Dallas to Houston corridor, shows potential for private investment.

TxDOT will work closely with its planning partners and stakeholders to make sure that the design and environmental processes meaningfully incorporate input from affected communities, local governments, regional councils and planning organizations, railroads, transportation modal partners, environmental interests, workforce investment boards, the public and other stakeholders—early and throughout the process. The NEPA process will include an extensive public outreach effort as specified the Statement of Work submitted with this application.

TxDOT has already demonstrated its willingness and commitment to communicating and coordinating with project stakeholders as part of the scoping process conducted in the TOPRS as part of the development of a service-level EIS. During the public scoping period, 12 public scoping meetings were held between March 25 and April 4, 2013, with a total of approximately 340 people attending. In addition, there were three agency meetings during the scoping period, three stakeholder meetings held in February 2013, and one environmental interest group meeting held on April 18, 2013. FRA also initiated government-to-government contact with federally recognized tribes. TxDOT and FRA received approximately 1,200 comments from agencies, organizations, and individuals regarding the TOPRS program.

The Fort Worth to Austin High-Speed Rail Project is supported by key stakeholders such as the Commission for High-Speed Rail in the Dallas/ Fort Worth Region as evidenced by the letter of support attached as supporting documentation with this application. The seven members of the Commission for High-Speed Rail in the Dallas/ Fort Worth Region unanimously voted their support for this grant application to further the development of high-speed rail in Texas.

As discussed in this application and evidenced by the results of previous studies of the corridor, the Fort Worth to Austin High-Speed Rail Project is anticipated to yield measurable service and public benefits. The results of preliminary ridership conducted in the TOPRS showed that the Dallas/ Fort Worth to Austin corridor could support express high-speed passenger rail service with cost effectiveness that would be attractive to private investors, meaning that annual operating and maintenance costs of

the high-speed rail service would be recovered by the fare box revenue and would result in a profit.

Public benefits associated with the high-speed rail service were also identified and evaluated using the TIGER Benefit-Cost Analysis Resource Guide. Including travel time savings, emission reductions, safety enhancements, the residual value of capital investments and wider economic benefits of agglomeration, the project has an estimated benefit-cost ratio of between 0.83 and 2.52, depending on the discount rate and the method used to estimate wider economic benefits used as shown in the *Summary of Benefits* section at the end of this Project Narrative.

Additional Selection Criteria

Alignment with DOT Strategic Goals and Priorities

Transportation Safety

Fort Worth to Austin High-Speed Rail would improve transportation safety by:

- Reducing vehicles on the road and resulting propensity for traffic accidents;
- Creating a pedestrian-friendly environment for transit patrons at terminals and stations with connectivity to multiple modes of transportation;
- Providing more visual opportunities to deter crime through the frequent presence of high-speed rail vehicles and transit police in downtown areas where stations may be located; and
- Crime Prevention Through Environmental Design techniques that will be incorporated into the project.

State of Good Repair

Reducing the number of automobile trips between Fort Worth to Austin by diverting such trips to high-speed rail would reduce wear of the roadway system, thereby prolonging the useful life of the highway system used for intercity travel and reducing roadway maintenance costs. The useful life of the rail infrastructure (30 to 50 years) is significantly longer than the typical life cycle for roadway infrastructure (20 to 30 years). The benefit of the residual value remaining from the high-speed rail capital investments made in the corridor was evaluated in the benefit-cost analysis as summarized in the *Summary of Benefits* section at the end of this Project Narrative.

Economic Competitiveness

The Fort Worth to Austin High-Speed Rail Service will enhance the competitiveness of the regional and national economy over the long term due to service's ability to provide a more efficient transportation alternative to the automobile and higher cost flights for trips between Dallas/ Fort Worth and Austin central business districts as well as encourage high-density development around the service terminals. These changes result in tangible economic benefits in the form of expanded range of employment

opportunities, commercial productivity increases, reduced automobile use, and increased property values. In addition to these long-term economic impacts, the high-speed rail line supports job creation through construction in the near-term and ongoing operations.

A variety of jobs are available in and near downtown Fort Worth and Austin with 3.9 million employees along the corridor Dallas/ Fort Worth to San Antonio corridor in 2005.[6]

These jobs range from low-wage, low-skill jobs servicing the downtown tourism industry to high-wage, high-skill jobs in the business, technology and financial centers of both major metropolitan cities. The Fort Worth and Austin areas are also home to major university systems such as the University of Texas at Austin and Texas Christian University (TCU). Including high speed rail service to Dallas, Southern Methodist University (SMU) would also be linked. Providing additional transit investment and offering alternatives to driving or flying, helps to increase the economic mobility of riders by affording them an opportunity to eliminate expensive transportation costs (vehicle ownership, parking fuel, airfare).

Environmentally Sustainable

As described in the *Energy Efficiency & Environmental Quality* section of this application, Fort Worth to Austin High-Speed Rail would improve air quality and congestion by diverting auto trips to the high-speed rail mode of travel. Additionally, the high-speed rail service would result in a fuel savings, since passenger rail vehicles use less energy on a passenger mile basis than both automobile and air modes.

Livability and Quality of Life

The following sections describe how the project aligns with the six Livability Principles identified by the U.S. Department of Transportation/Department of Housing and Urban Development (HUD)/EPA.

Principle 1. Provide more transportation choices.

Fort Worth to Austin High-Speed Rail would provide an efficient alternative for travel between the Dallas/ Fort Worth and Austin without requiring a personal vehicle or expensive flights. Most flights are currently accompanied by a commute to the airport by automobile, whereas high-speed rail terminals would be interconnected with the local transit systems in place and planned for the Fort Worth and Austin downtown areas as well as the intercity high-speed rail network planned for Texas as previously described in the *Connectivity with Other Modes* section of this application. Fort Worth to Austin High-Speed Rail would also serve as a catalyst for other regional transit alternatives such as commuter rail and light rail to grow and succeed.

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[6] TTI *Potential Development of an Intercity Passenger Transit System in Texas Report, 2009.*

In complement to this alternative mode of transportation, comes a localized reduction in highway use that improves the livability of communities affected by highway infrastructure and increases the lifespan of public works investments. These reductions in highway use not only ease congestion and create a safer environment within local communities, but generate economic benefits through reductions in gasoline consumption and dependence as well.

Principle 2. Promote equitable, affordable housing.

The linkages provided to suburbs by planned and constructed light and commuter rail lines in Fort Worth and Austin, provide access between lower cost residential areas and job opportunities at commercial centers within the urban core. Connection of these lines to the potential Texas high-speed rail network would enhance mobility between areas of affordable housing through improved intercity travel options, providing residents of modest wealth the same opportunities to form business alliances and achieve personal growth as those who are more economically advantaged.

Principle 3. Enhance economic competitiveness.

The high-speed rail service would provide a high frequency, reliable transit service that would be dedicated in a permanent location. The service would connect three major job centers (Dallas, Fort Worth and Austin), increasing the range of employment opportunities for residents of both the Dallas/ Fort Worth and Austin regions. The high-speed rail service would also increase accessibility to tourist attractions and major sporting events as well as medical facilities in both regions, with a significant economic impact to both cities. Fort Worth to Austin High-Speed Rail would support high-density development in both central business districts and would also raise property values in the areas surrounding the stations.

Principle 4. Support existing communities.

Fort Worth to Austin High-Speed Rail would provide intercity transportation alternatives to downtown residents without requiring the use of personal vehicles.

Principle 5. Coordinate policies and leverage investment.

This Fort Worth to Austin High-Speed Rail application for federal funding for Fort Worth to Austin builds upon the federal investment made for the alternatives analysis, service development plan and service-level EIS being completed in the TOPRS by advancing the Fort Worth to Austin segment of the TOPRS study area to the next stage of preliminary engineering and project-level EIS. Investing in the Fort Worth to Austin High-Speed Rail PE/NEPA project would also support the federal investment made through an FRA grant for the and Dallas to Fort Worth and Houston to Dallas corridors to develop preliminary engineering and an EIS. A Passenger Rail Corridor Investment Plan application requesting federal funds has been submitted for High-Speed Rail from Austin to Houston. These Texas high-speed rail corridors would form a network that would increase ridership and public benefits substantially from those associated with the stand-alone corridors.

Principle 6. Value communities and neighborhoods.

The Fort Worth to Austin High-Speed Rail Service would enhance the value of the downtown communities and neighborhoods of Fort Worth and Austin by providing additional mobility options for those who live, work, and play downtown. The service would also serve the economically disadvantaged populations of both cities by providing a lower cost alternative to airfare between the two cities, allowing for affordable access to employment centers, education centers, and medical facilities far beyond existing ranges of access without the requirement of a personal vehicle.

Ladders of Opportunity

High-speed rail between Fort Worth and Austin provides a number of benefits to increase opportunities within and between these cities. High-speed rail would provide a reliable, safe, and affordable transportation alternative to connect economically disadvantaged populations, senior citizens and non-drivers without access to personal vehicles or able to afford expensive flights with employment and education opportunities.

Business and state government travel often occurs between these city pairs for normal day-to-day activities, as Austin is the state capital. Employment in both cities is significant as both cities are leaders in the nation for finance, healthcare, and technology. A variety of jobs are available in and near the Fort Worth and Austin central business districts with 3.9 million employees along the corridor Dallas/ Fort Worth to San Antonio corridor in 2005 as reported in the TTI *Potential Development of an Intercity Passenger Transit System in Texas Report.* High-speed rail service to allow for riders to reduce their overall trip time and increase productivity during travel as passengers can conduct other business activities while traveling by train.

Additionally, more than 20 colleges, universities, and technical training centers are located in the Fort Worth, Waco, and Austin areas, with student enrollment totaling more than 200,000. The institutions with the highest enrollment (greater than 5,000) in these areas are listed in Table 4. The presence of these colleges and universities within the corridor provides the opportunity for students to travel between these cities to and from campus, reducing their need for costly air travel and vehicular travel between the cities. It also provides the opportunity to reduce congestion on roadways for parents and alumni to attend parental, continuing education needs, and sporting events.

Institutions of Higher Education	Enrollment
Fort Worth	
Texas Christian University	9,700
Tarleton State	10,000
Tarrant County College	50,000
Waco	
Baylor University	15,600
McLennan Community	9,900
Texas State Technical College	5,200
Austin	
St. Edward's University	5,100
Texas State University	34,200
University of Texas at Austin	52,200

Table 4: Major Institutions of Higher Education along Fort Worth to Austin Corridor (enrollment > 5,000)

Project Delivery Performance

As previously discussed, the Fort Worth to Austin High-Speed Rail application for federal funding continues the advancement of a high-speed rail network in Texas currently under development through two existing FRA grants.

TxDOT has been awarded a $5.6 million grant for the TOPRS to administer the development of a Service Development Plan and service-level EIS. TxDOT has secured non-federal matching funds for the TOPRS project and has also found innovative ways to maximize the use of funds through work completed under existing contracts. The original project statement of work has been revised and agreed upon by the FRA to include additional ridership modeling, adding $600,000 to the budget and extending the scheduled project completion to April 30, 2015.

TxDOT was awarded a $15 million grant from the FRA for the Dallas-Fort Worth to Houston Core Express Service PE/ Project-level NEPA project. Participation from a private entity, the Texas Central Railway, in developing the Dallas to Houston segment of the corridor has resulted in restructuring the grant to focus on the Dallas to Fort Worth corridor with $6.66 million of the $15 million grant being allocated to TxDOT for the segment between Dallas and Fort Worth. TxDOT has selected and contracted a consultant team to perform the PE/ Project-level NEPA (EIS) work and is also overseeing coordination with the Commission for High-Speed Rail for Dallas-Fort Worth, formed by the Texas Transportation Commission. The project is expected to be complete by September 30, 2017.

TxDOT is authorized to enter into a Comprehensive Development Agreements (CDAs) for rail projects. TxDOT has also executed Memoranda of Understanding for the Dallas to Houston High-Speed Corridor with the FRA and the Texas Central Railway.

Region/ Location

The Fort Worth to Austin corridor is part of the federally-designated South Central high-speed rail corridor and would be supportive of the regional transportation plans in the Fort Worth and Austin regions by integrating with other existing and planned regional transit systems as described in the *Connectivity with Other Transportation Modes* section of this application.

Innovation/ Resource Development

The Fort Worth to Austin High-Speed Rail Project, as part of the network of high-speed rail corridors planned in Texas, would bring high-speed rail technology to the state. An example of high-speed rail technology can be found in Japan, with high-speed rail service between Tokyo and Osaka, which has existed for 50 years and has been accident free during that time. It operates on secure, separated and closed tracks free from dangerous intersections. The technology uses an advanced regenerative braking system that converses and connects kinetic energy into electric power.

Additionally, TxDOT will take an innovative approach to financing by participating in public-private partnerships to execute the program once planning is complete. The State will administer the planning, environmental documentation, and early design stages of the project in order to identify risks and benefits needed for private sponsors to support the future capital and operating needs of the high-speed rail project.

TxDOT has taken an innovative and proactive approach to ridership modeling and forecasting with the development of its Statewide Ridership Model. The development of the statewide model included updating the existing TxDOT Statewide Analysis Model, which is used by the State to analyze and forecast passenger and freight travel throughout the state, in order to better address passenger rail travel and to expand the model, previously limited to Texas boundaries, to also include the immediate surrounding states of Louisiana, Arkansas, Oklahoma, and New Mexico. This statewide model was completed to provide a high level evaluation of forecasted ridership and cost effectiveness for various corridors in the state in order to determine which corridors may warrant further analysis, should funding become available, and what level(s) of passenger rail service may be supported by the different corridors. The creation of this model allows for a platform that can be used in the development of more detailed corridor models, potentially saving significant time and funds that would be needed to start each corridor model from scratch.

Partnerships

The Fort Worth to Austin High Speed Rail PE/ NEPA project would span multiple jurisdictions and would include coordination with the terminal cities and counties of Austin, Travis County and Fort Worth, Tarrant County, their respective metropolitan planning organizations (CAMPO, NCTCOG), as well as the cities and counties that are located along the route. A letters of support for the project has been provided by the

Commission for High-Speed Rail in the Dallas/ Fort Worth Region and is attached as supporting documentation to this application.

TxDOT will work closely with its planning partners and stakeholders to make sure that the study results will address the need to keep the citizens of Texas moving. The NEPA process will include an extensive public outreach effort, which will include identification of stakeholders, one-on-one meetings with affected railroads, and public meetings along the corridor. These stakeholders will be part of the development of the scope of the study and will provide direction throughout the study by reviewing and commenting on the study findings and final report. A Statement of Work will be developed through this application and further refined by the stakeholders and the FRA to describe the need for the project and the issues that the project will address.

Project Implementation and Project Management

Project Contracting, Oversight, and Technical Capacity

The Texas Department of Transportation has the legal responsibility for all statewide transportation planning and programming with an average annual budget of more than $8 billion. TxDOT is very familiar with all applicable federal regulations and has all necessary support functions to implement the planning project described in this application. TxDOT has a staff of highly trained professional engineers and planners devoted to transportation planning activities that manage multiple planning studies across the state annually. The Fort Worth to Austin High-Speed Rail PE/ NEPA project will be managed by TxDOT Rail Division personnel utilizing a procured consultant team with expertise in high-speed intercity passenger rail services as shown in the project organizational chart in Figure 6.

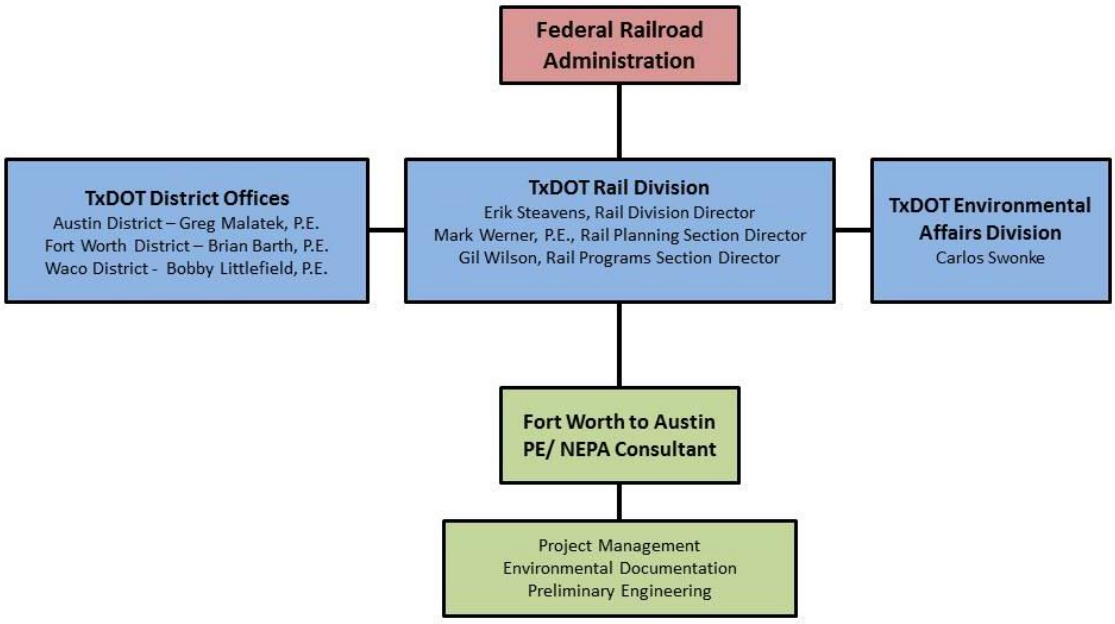

Figure 6: Fort Worth to Austin High-Speed Rail PE/ NEPA Organization Chart

In the selection and contracting of consultant teams to perform work for this project, TxDOT will adhere to the Disadvantaged Business Enterprise (DBE) requirements to provide maximum practicable opportunities for small businesses and implement best practices for ensuring that all individuals – regardless of race, gender, age, disability, and national origin – have an opportunity to benefit from activities funded through the grant agreement. Such practices will include setting a DBE contract goal on contracts funded under the grant agreement, which would reflect the amount of DBE participation that TxDOT would expect to obtain absent the effects of discrimination and consistent with the availability of certified DBE firms to perform work under the contract. TxDOT will provide the FRA with a plan for incorporating the above best practice into its implementation of the Project within 30 days following execution of the grant agreement.

The Statement of Work included in this application provides the necessary level of detail regarding scope, schedule, and budget to immediately advance the project to award. The Statement of Work was developed based on service development planning and NEPA documentation experience on previous intercity passenger rail projects. The scope of services provided includes sufficient detail for a contract of the work to be executed expeditiously once the project funds are awarded. Initiation of the program will not require agreements with any other key partners in the planning effort; those partners will be involved in the stakeholder groups.

Project Monitoring and Progress Reporting

TxDOT will meet the FRA reporting requirements throughout the life of the grant, including quarterly progress reports to the FRA relating the state of completion of items in the Statement of Work to expenditures of the relevant budget elements. TxDOT will also submit quarterly Federal financial reports in FRA's web-based grant management system GrantSolutions in accordance with federal requirements. Additionally, TxDOT will submit reports, presentations and other deliverables of a professional quality and suitable for their intended use for technical examination, administrative review, or publication, as appropriate per the Statement of Work. Lastly, TxDOT will submit a Final Performance Report to the FRA detailing the results and benefits of the Grantee's improvement efforts within 90 days after the period of performance end date of the grant or termination by FRA.

Tools that will be used to manage and monitor the progress of this Project will be included in the overall Project Management structure. The following items will be set up and used to report progress:

- Detailed Work Plan: Individual tasks identified for the execution of each phase of the work as identified in the Statement of Work of this application. The Work Plan will be monitored weekly, with work progress updates provided monthly.
- Detailed Schedule: A detailed project schedule will be developed to monitor progress of individual tasks and milestones. The schedule will be submitted with

the Work Plan. The schedule will also be monitored weekly, with monthly updates provided (See Statement of Work for preliminary project schedule).

- Program Budget: A detailed Project Budget will be developed, monitored weekly and an update will be provided monthly. Project Billings and reimbursement from FRA will be processed monthly.
- Quality Control Program: A QA/QC plan for the execution of this work will be provided within 60 calendar days of initiation.
- Document Control: the PE / NEPA consultant will be responsible for Document Control and providing an information exchange/ document storage application.
- Communications and Outreach Program: the PE / NEPA consultant will develop an Outreach and Communications program and will be responsible for providing relevant progress information for the project that is required as part of NEPA.

Assessment of Project Risks and Mitigation Strategies

The primary risks associated with the Fort Worth to Austin High-Speed Rail PE/ NEPA project include project funding limitations and budget management, public and stakeholder support, agreements with owning and operating railroads, and ridership forecasting/ revenue projection uncertainties as discussed with potential mitigation strategies below.

- The Texas Department of Transportation will provide any additional funds that may be required above those received from the FRA to complete the project scope of services specified in the statement of work. The Project Monitoring and Progress Reporting measures listed previously will be utilized in the management and oversight of the project to minimize change orders and complete the project within the planned budget. Upon completion of the PE/ NEPA phase, private funding sources will be evaluated in order to advance the project to implementation and service. It is anticipated that an appropriate agreement between public and private parties can be structured in the future to secure investment and minimize public risk.
- Public support risk will be mitigated by obtaining support from local, city, state, and federal leaders, whose constituents would benefit from this project. Additionally, public outreach and involvement efforts will be completed as part of the NEPA process as specified in the statement of work.
- Railroad operating agreements/financial exposure for potential use of existing railroad alignments will be vetted with the respective operating railroads.
- Ridership forecasting and revenue projection will include consideration of policies that encourage high-speed rail ridership, stations that provide cohesive connectivity to other modes of transit/transportation, and determining realistic rates of return on investment so fares can be competitively set.

Anticipated Environmental and Historic Preservation Impacts

Environmental issues were identified during the alternatives analysis phase of study for the Fort Worth to Austin passenger rail corridor as part of the TOPRS. Definition of alternatives included the avoidance of fatal flaw environmental impacts, however, environmental issues likely to be encountered as identified during the scoping process include: reduction in the amount of existing and prime farmland, the potential losses of natural habitat and systems, noise and vibration, and acquisition of private land. Environmental benefits such as improvements to air quality and energy efficiencies of high-speed rail are also expected.

Summary of Benefits

Benefits

The following benefits were evaluated as part of the benefit-cost analysis:

- **Travel time savings**: The Connect Model forecast for this corridor included an estimate of passenger-miles of travel (PMT) diverted from auto to rail in the years 2010 and 2035, as well as estimated travel times by car and rail. Aggregate travel time savings was estimated based on these inputs, assuming straight-line growth between the two years and a high-speed rail opening year of 2029. Time savings were monetized at $46.09 per hour, corresponding to the *2013 TIGER Benefit- Cost Analysis Resource Guide*, escalated to 2014 dollars.
- **Safety Improvements** were estimated based on assumed diversion of auto trips to high-speed rail. PMT diverted from auto to rail was converted to VMT based on an assumed vehicle occupancy rate of 1.13, derived from the 2009 National Household Travel Survey. Injuries and fatality rates per VMT were based on existing Texas crash statistics. The values of reduced injuries and fatalities were monetized based on the TIGER guidance, escalated to 2014 dollars.
- **Environmental Benefits** address reduced emissions of pollutants and greenhouse gases, estimated based on the same VMT diversion method used for safety improvements. Emission rates per VMT were derived from FTA New Starts guidance, and monetized based on the TIGER guidance, escalated to 2014 dollars.
- **Wider Economic Benefits** refer to the agglomeration effects and other productivity increases associated with high-speed rail reducing travel times between two separate metropolitan economies, thereby bringing them together. Lacking a detailed econometric study at this early phase of project development, two approaches were used to estimate the potential range of benefits:
    - Method 1 – Based on the results of a 1997 high-speed rail study conducted by the European Commission, a 0.25 percent increase in the combined gross regional products (GRPs) of the two regions was phased in over 25 years.

- Method 2 – Based on a World Bank Study of high-speed rail impacts in China, a 3.5 percent increase in economic activity for every doubling in "economic mass" was phased in over 25 years. The change in economic mass was estimated using a mode share-adjusted change in travel time.

Costs

Capital and operating costs was derived from the Statewide Ridership Analysis Report, with the median probability costs of $12 billion for capital cost and $137 million per year for operating and maintenance costs (in 2010 dollars) used, and an assumed opening date in 2029. The costs were escalated to 2014 dollars. Net present values of benefits were increased to account for the residual value of infrastructure investments with expected useful lives beyond the 20-year time horizon of the benefit-cost analysis. The life cycles of various infrastructure components were also derived from the Statewide Ridership Analysis Report.

Results

Table 5 summarizes the results of the benefit-cost analysis. Using Method 1 for including wider economic effects, the project's benefits exceed its costs at a 3 percent discount rate. Using Method 2, the project's benefits exceed its costs at both 3 percent and 7 percent discount rates.

Benefits (millions of dollars)	**3% Discount Rate**	**7% Discount Rate**
Travel time savings	$1,736	$661
Accident reduction savings	$1,649	$637
Emissions reductions	$96	$38
Residual value	$1,917	$486
Total Benefits	**$5,398**	**$1,823**
Costs		
Capital	$9,525	$6,338
O&M	$1,308	$538
Total Costs	**$10,832**	**$6,876**
***Benefit-Cost Ratio* without Wider Economic Benefits**	***0.50***	***0.27***
Wider Economic Benefits		
Method 1	$11,350	$3,885
Method 2	$21,928	$7,505
Benefit-Cost Ratio with Wider Economic Benefits (Method 1)	***1.55***	***0.83***
Benefit-Cost Ratio with Wider Economic Benefits (Method 2)	***2.52***	***1.36***

Table 5: Summary of Benefit-Cost Analysis