

Chapter 1 - Introduction

Since the opening of Texas's first railroad, the Buffalo Bayou on September 7, 1853 (part of the Brazos and Colorado Railway in the Houston region), railroads have been a vital mode of transportation in Texas. By 1880, Texas had some 2,400 miles of railroad tracks, primarily confined to East and South Texas. Another 6,000 miles of tracks were added in Texas during the 1880s when active conflict between Native Americans and Texans ceased. By 1900, Texas had almost 10,000 miles of railroad tracks, and another 7,000 miles were added between 1900 and 1930. Texas had more rail miles than any other state by 1911, which is still the case today.¹

Railroad expansion provided routes for the dispersion of population throughout the state. Modern-day Texans can literally see the westward march of population across the state from 1860 to 1950 by viewing an animated succession of state population maps on the home page of the Texas State Data Center,² representing the changing percentages of the state's population among Texas counties. The spread of population into West Texas and the Panhandle between 1880 and 1930 follows the expansion of rail lines throughout the state. Railroads were a necessary element in the settlement and growth of the state. Faster, lower-cost, and regular transportation across long distances made it possible for agriculture, manufacturing, and population to spread throughout the state.

While post-World War II expansion of the interstate highway system decreased reliance on railroads for transportation of freight and people, events during the past three decades led to a renaissance of rail in Texas and across the nation. Economic deregulation of freight railroads in 1980 consolidated the number of major freight railroads and reduced rail networks as redundant and marginal lines were abandoned. This resulted in increases in revenues, labor productivity, and rail safety. Designation of high-speed rail corridors in the 1991 Intermodal Surface Transportation Efficiency Act encouraged states to pursue intercity passenger rail improvements and plan for high-speed rail service. By 2008, concerns about energy costs, climate change, and manufacturing base led to the passage of federal high-speed and intercity passenger rail federal legislation.

The Texas Railroad Commission (RRC) was originally responsible for rail planning. The Texas Department of Transportation (TxDOT) commenced transportation research studies on rail planning as early as 2000. TxDOT's first state rail plan, the Texas Rail System Plan, was published in October 2005. This plan, now simply known as the Texas Rail Plan (TRP), updates and expands upon that document. The TRP will meet planning requirements of state and federal law described in more detail in Section 1.3 of this chapter. Federal requirements are set forth in the Passenger Rail Investment and Improvement Act of 2008, or PRIIA (Pub. L. No. 110-432), while state requirements are set forth in S.B. 1382 passed by the 81st Texas Legislature (Section 201.6012-6013, Transportation Code).

A number of factors lead TxDOT to issue this TRP. These include increased financial prospects of freight railroads and their importance to the healthy Texas economy, expanded opportunities for a federal-state passenger rail partnership in connecting some of the nation's largest urban areas, and new state and federal legislative rail planning requirements. This Chapter outlines:

- demographic and economic factors that lead to increased need for passenger and freight rail service;
- environmental benefits of rail and the environmental considerations for particular rail projects;
- federal and state legislative requirements for state rail planning;
- links from the TRP to other TxDOT plans (Strategic Plan and Statewide Long-Range Transportation Plan);
- rail-related functions of TxDOT as applied to the agency as a whole; and
- contents of the TRP.

1.1 – Demographic and Economic Drivers of Rail Needs

This section presents general economic and demographic information to increase understanding of the role current passenger and freight rail transportation plays in the Texas economy and how demographic and economic trends in the future may increase rail's importance and give rise to the projects identified in this TRP.

Projected 2010 U.S. Census Bureau data suggests that Texas is the second-most populous state. The state's population is expected to increase by 9.4 million by 2035, a 38.9% increase over projected 2010 levels, as shown in Figure 1-1. The anticipated average annual percent per year increase is 1.56%. The combination of growth in business activity, measured by the gross state product (GSP), and the growth in population increases the number of Texas consumers and drivers.

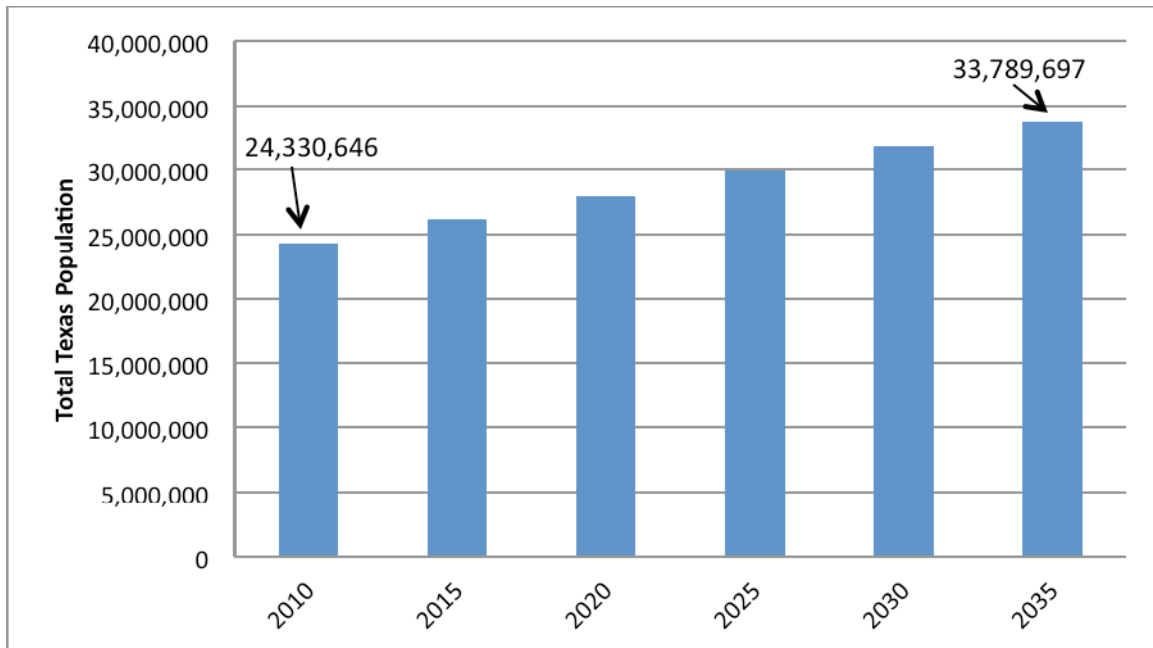
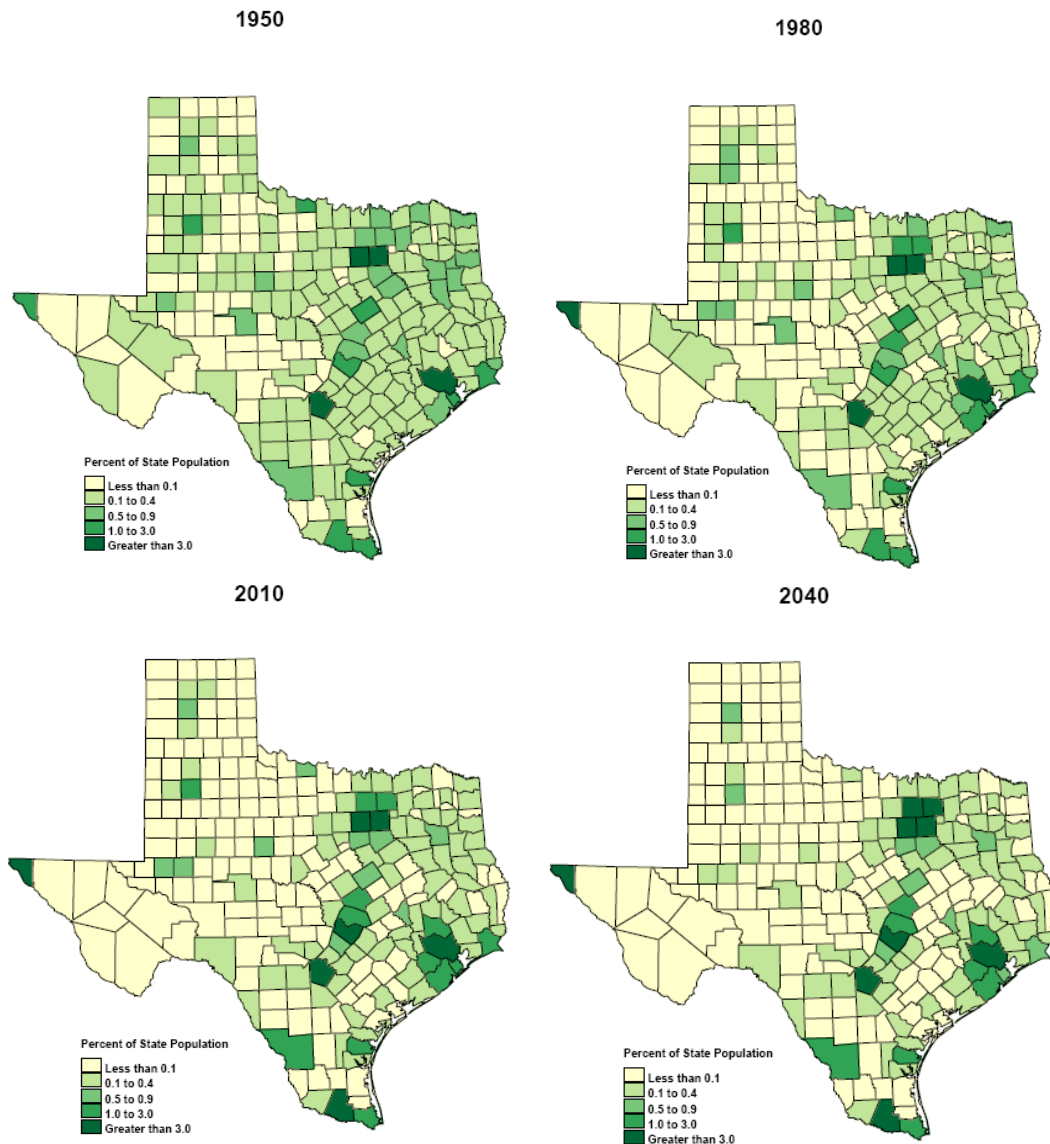


Figure 1-1: Texas Total Population Forecast 2010–2035

Source: Texas State Data Center, 0.5 Scenario

This population growth will not be distributed evenly across Texas. The Texas State Data Center estimates that 92% of the 2010–2035 population growth will occur in metropolitan counties (population > 50,000). Figure 1-2 shows the concentration of population in Texas counties growing from 1950 to 2040.



**Figure 1-2: Historic and Projected Texas Population Concentration:
County Percentage of Total State Population**
Source: Texas State Data Center

Historic and forecasted growth rates of 3.0% or more in the major metropolitan areas of Texas indicate a need for multimodal, intra- and intercity transportation systems, such as high-speed and intercity passenger rail. Currently, there are few competitive, viable alternatives to driving, especially between the large metropolitan areas of Texas. Driving

is an unproductive, slower and, for travel from city center to city center, more inefficient mode.

Texas travel patterns, particularly by motor vehicle, have outpaced the growth in the population. Figure 1-3 shows increases in daily vehicle miles traveled (VMT) and population from 1990 to 2035. The total increase in VMT outstrips population growth during this period, as does the annual rate of increase. Figure 1-4 shows VMT growth in three Texas city pairs.

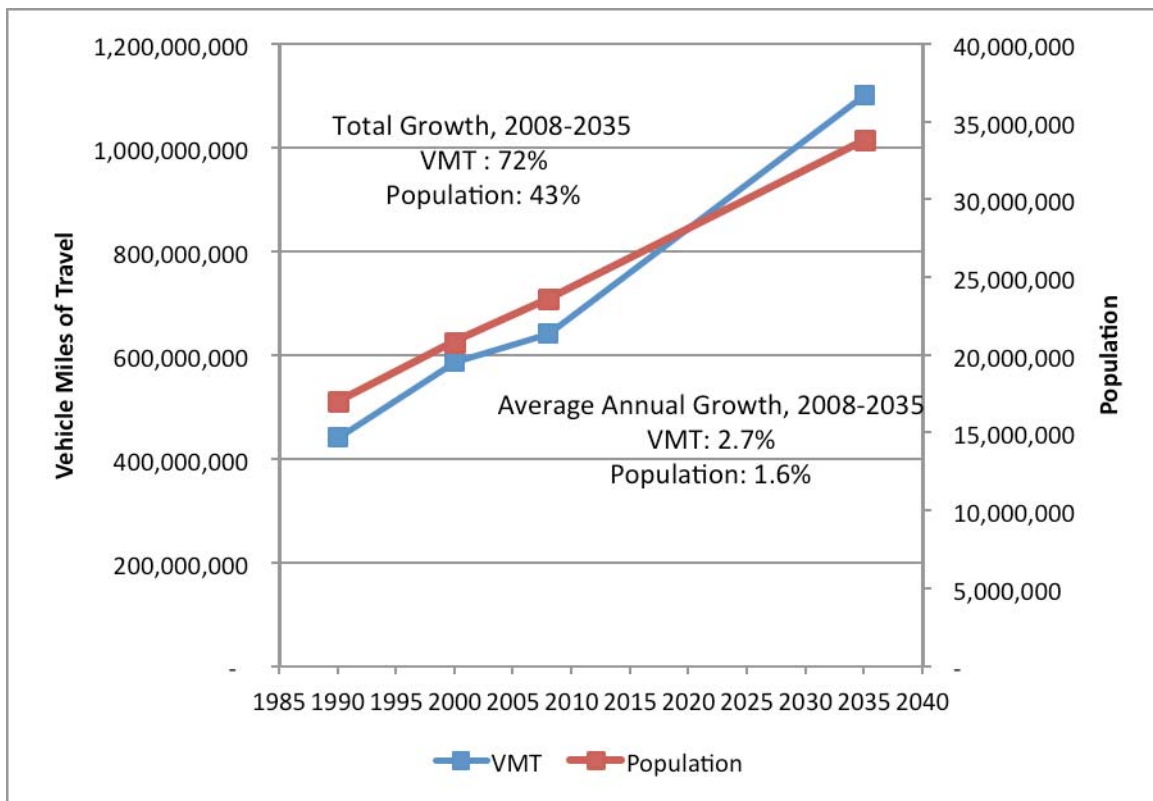


Figure 1-3: Daily VMT and Population, 1990–2035

Source: Roadway-Highway Inventory Network (RHINO) database 2028 forecast adjusted to 2035 and urban travel demand models; Texas State Data Center scenario 0.5 forecast population

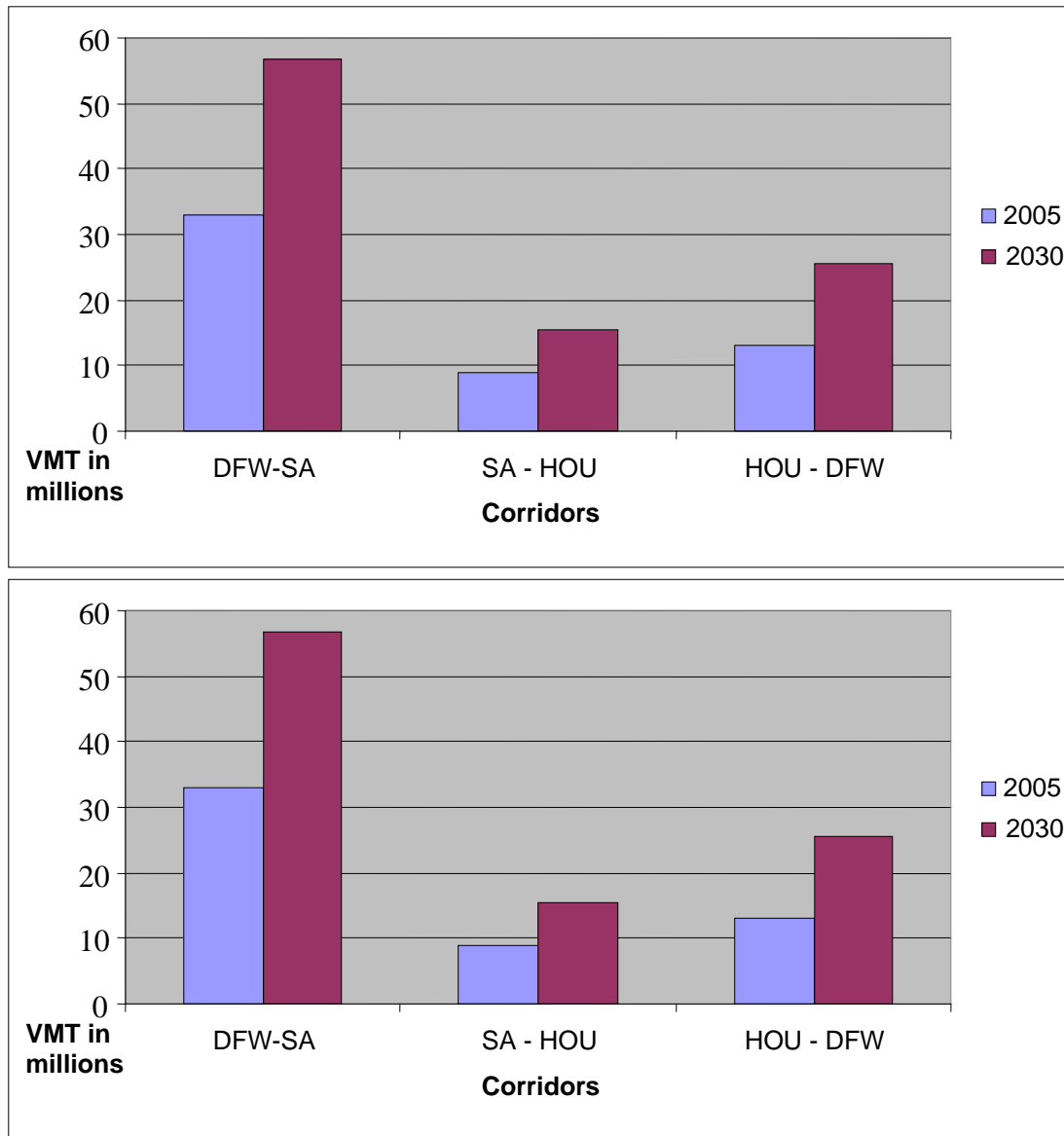


Figure 1-4: Forecast Growth in VMT on Inter-City Corridors 2005–2030

Source: VMT forecasts developed by TxDOT, Traffic Analysis.

Among the three corridors with the highest VMT in Texas, the growth in VMT along the Dallas/Ft. Worth to San Antonio corridor is forecast to increase by nearly 71%, while increases in the San Antonio to Houston and Houston to Dallas/Ft. Worth corridors are projected to grow by 72% and 94%, respectively.

In 2006, about 800,000 air passengers flew between Dallas and Houston on domestic carriers. While rail travel is not an option currently available in this corridor, the distance between Dallas and Houston, less than 250 miles, makes this a likely candidate for the provision of intercity rail service.

The need to integrate another option competitive with existing auto and air for intercity travelers is evidenced by:

- Projected growth in population, VMT, and congestion;
- Social and economic interconnectivity among many of Texas' urban areas;
- Increased interest in rail transportation as evidenced by the growth in intra-city and intercity rail ridership; and
- Accessibility rail offers to those not willing or able to drive or fly.

Overall economic activity in Texas has outpaced the national economic output, as measured by the growth in the Gross Domestic Product (GDP) and GSP, shown in Figure 1-5. With few exceptions, the Texas economy has grown at a faster rate than the national economy. Projections from the State Comptroller of Public Accounts suggest continued Texas growth in the next 25 years.

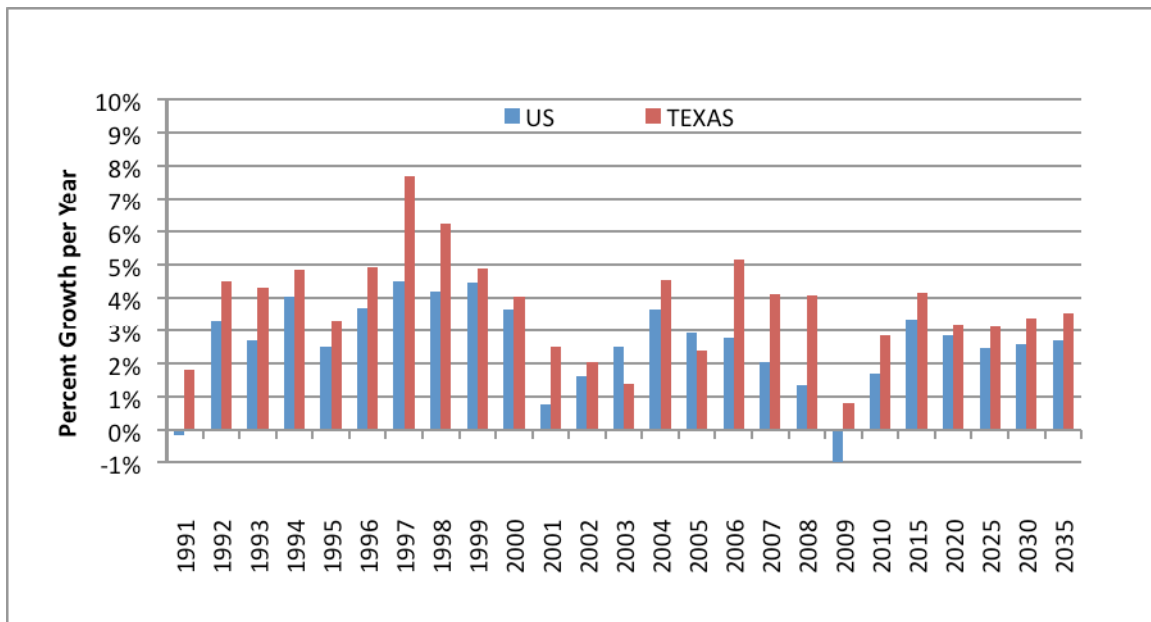


Figure 1-5: GDP and GSP Growth Rates, 1991 to 2035

Source: Texas Comptroller of Public Accounts and HIS Global Insight, Inc. Data is historical through 2007. Numbers are in 2000 dollars, as reported in the 2010 Texas Airport System Plan.

Table 1-1 lists a more detailed forecast of the state's economy in constant dollars. Overall, the state's economy grew 102% from 1990 to 2010, as measured by the growth in GSP. Robust growth is expected in the future, with total GSP reaching \$2 trillion by 2035. The manufacturing and information sectors are expected to have the highest growth rates through 2035, increasing by 191% and 249%, respectively. Economic activity in the agricultural and mining sectors is expected to decrease in the next 25 years, but overall activity in goods dependent industries—those that generate freight movements—are estimated to maintain the industries' relative share of the Texas economy by 2035.

**Table 1-1: Gross State Product by Industry
1990 to 2035 (Billions of Chained CY2000 Dollars)**

Industry Sector	1990	2000	2010	2035
Goods-Dependent	\$ 200.23	\$ 337.30	\$ 425.60	\$ 967.90
Agriculture	4.40	6.47	7.19	3.23
Mining (Oil and Gas)	49.27	45.18	42.92	50.24
Construction	22.51	36.88	33.25	51.92
Manufacturing	47.25	92.98	137.59	438.96
Trade/Transportation/Utilities	76.80	155.79	204.65	423.55
Services	\$ 261.76	\$ 389.94	\$ 508.42	\$ 1,108.28
Information	14.88	35.87	51.93	103.83
Financial Activities	80.08	117.20	135.57	240.06
Professional and Business Services	41.90	73.21	118.68	379.48
Educational and Health Services	31.49	42.36	62.81	139.03
Leisure and Hospitality	15.13	23.11	28.84	64.86
Other Services	14.29	17.60	17.70	23.15
Government	63.99	80.59	92.89	157.87
Total State GSP (Billions CY2000 \$)	\$ 461.99	\$ 727.24	\$ 934.02	\$ 2,076.18

Note: Because of the methods used by the U. S. Bureau of Economic Analysis in calculating real chained dollars, chained-dollar data for historical years do not necessarily equal category totals.

Source: Texas Comptroller of Public Accounts, 2009-2010 Forecast

Overall freight volumes in Texas are expected to grow by 2035. Currently, the Federal Railroad Administration's (FRA) analysis has shown that on average Americans require the freight system to move 40 tons of freight per person annually.³ Table 1-2 describes the current freight mix by transport mode both in tons and value and projects volume and value to 2035.

Table 1-2: Texas Freight Summary by Mode, 2008 to 2035

Mode	2008	% of Total	2035	% of Total	% Change
Tons (millions)					
Air, Air & Truck	0.8	0.03%	0.9	0.02%	12.50%
Other Intermodal	11.2	0.47%	30.6	0.70%	173.21%
Pipeline and Unknown	796.2	33.32%	1,351.1	31.07%	69.69%
Rail and Rail/Truck	307.7	12.88%	545.7	12.55%	77.35%
Truck	1,177.3	49.27%	2,251.2	51.77%	91.22%
Water	96.5	4.04%	168.9	3.88%	75.03%
Total	2,389.7	100.00%	4,348.4	100.00%	81.96%
Dollars (millions)					
Air, Air & Truck	73,102	4.19%	104,697	2.26%	43.22%
Other Intermodal	85,816	4.92%	744,670	16.08%	767.75%
Pipeline and Unknown	318,339	18.27%	409,725	8.85%	28.71%
Rail and Rail/Truck	96,605	5.54%	136,436	2.95%	41.23%
Truck	1,157,575	66.43%	3,198,219	69.06%	176.29%
Water	11,197	0.64%	37,609	0.81%	235.88%
Total	1,742,634	100.00%	4,631,356	100.00%	165.77%

Note: Pipeline and Unknown shipments are combined, because data on region-to-region flows by pipeline are statistically uncertain. Dollars are current 2002 values, based on the earliest report FAF² year.

Source: FHWA Freight Analysis Framework (FAF²) 2002-2035

The three corridors connecting the cities of Houston, San Antonio and Dallas/Ft. Worth are considered part of a larger "Texas Triangle mega-region" (see Figure 1-6). The mega-region's cities share economic, social, educational, and cultural ties. These ties, combined with strong population growth, have contributed to creating a larger regional economic area consisting of two large urban areas and smaller communities between them. The term "mega-region" is used to describe these regions of connected economic activity. Another region consists of the urban areas in the Lower Rio Grande Valley (between Brownsville and McAllen/Pharr/Edinburg) and along the Texas Gulf Coast that

together forms the Gulf Coast mega-region, which extends into the states of Louisiana, Mississippi, and Alabama.

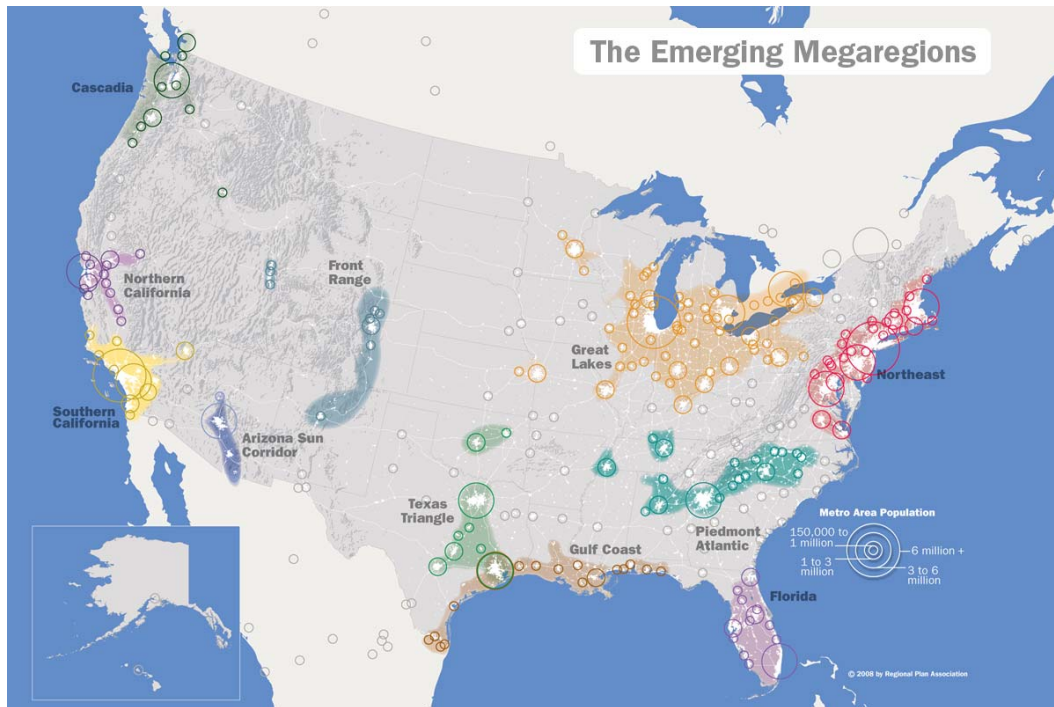


Figure 1-6: Mega-Regions Identified by America 2050

Mega-regions are connected internally and to the global economy via national transportation networks. Increasing the mobility of workers, business travelers, information, and goods between these cities provides these areas with a competitive advantage in the global economy due to the value created by regional time savings for both goods and people.

1.2 – Environmental Considerations

Freight and passenger rail offer significant environmental benefits over competing modes of travel. This section describes how rail fits in with other modal considerations of greenhouse gas emissions (GHG) and fuel use. The section also describes the general environmental analysis process governing any passenger or freight rail improvement projects receiving public funds.

Emissions and Fuel Efficiency

According to the Environmental Protection Agency (EPA), CO₂ emissions comprise 95% of transportation-related GHG⁴. The U.S. transportation sector accounts for 29% of domestic GHG emissions, shown in Figure 1-7.

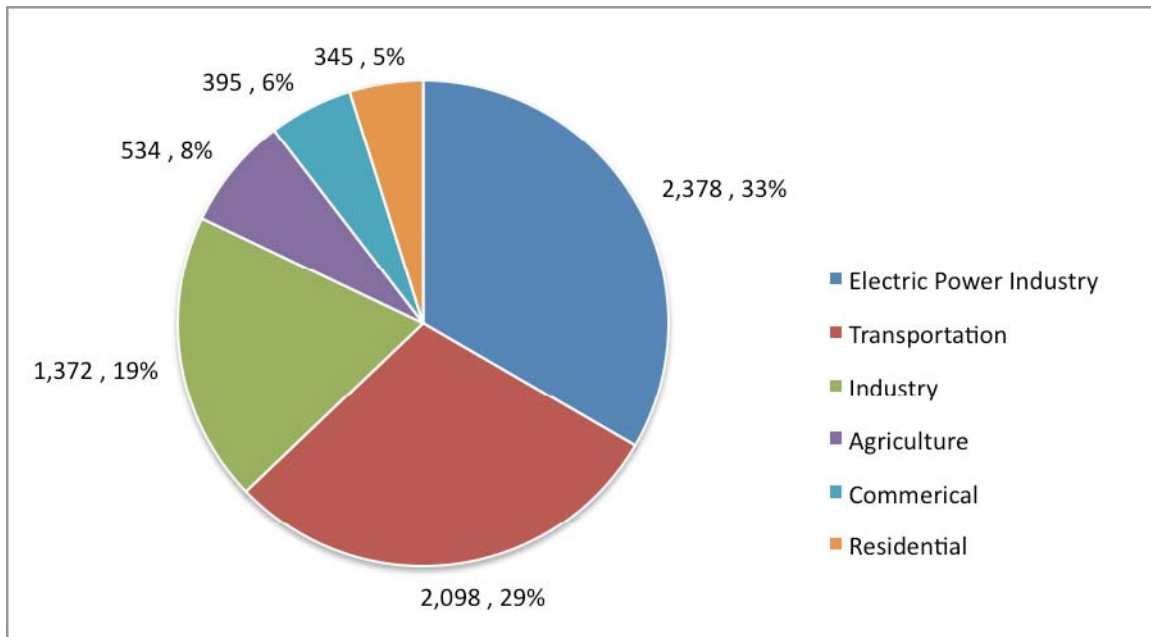


Figure 1-7: 2006 U.S. Greenhouse Gas Emissions by End Use Economic Sector, Million Metric Tons CO₂ Equivalent

Source: Transportation's Role in Reducing Greenhouse Gas Emissions, pg 2–6

Rail comprises a small part in the overall transportation GHG footprint, as shown in Table 1-3. According to this data, rail accounted for only 2.7% of U.S. transportation sector emissions in 2006.

Table 1-3: U.S. Transportation Sector GHG Emissions, 2006

Transportation Sources	Million Metric Tons CO ₂ Equivalent		Change from 1990 to 2006	
	1990	2006	Amount	Percent
On-Road Vehicles	1,231.9	1,653.9	422.0	34.3%
Light-Duty Vehicles	993.1	1,235.0	241.9	24.4%
Motorcycles	1.8	1.9	0.1	5.6%
Buses	8.5	12.5	4.0	47.1%
Medium/Heavy-Duty Trucks	228.6	404.6	176.0	77.0%
Aircraft	228.1	244.3	16.2	7.1%
Marine	115.6	104.2	(11.4)	-9.9%
Rail	38.5	57.9	19.4	50.4%
Pipelines	36.1	2.4	(3.7)	-10.2%
Lubricants	11.9	9.9	(2.0)	-16.8%
Total	1,662.1	2,102.6	440.5	26.5%

Note: These figures include direct emissions only; they do not include other fuel, vehicle, or infrastructure lifecycle emissions.

Source: Transportation's Role in Reducing Greenhouse Gas Emissions, pg 2–8.

According to the Association of American Railroads (AAR), one gallon of diesel fuel moved one ton of freight an average of 235 miles in 1980; by 2009, one gallon moved one ton of freight an average of 480 miles, a 104% improvement. The 2009 FRA study “Comparative Evaluation of Rail and Truck Efficiency on Competitive Corridors” estimates that rail-to-truck fuel efficiency ratios range across all studied freight movements from 1.9 to 5.5, meaning that in all types of freight movements, rail is more fuel-efficient than truck movements. The 23 movements identified in the 2009 FRA study consist of origin, destination, route, commodity, and service offerings, from which rail and truck equipment are configured. The calculation of line-haul fuel consumption for both modes take into consideration distance, circuitry, grade profile, speed profile, vehicle characteristics, vehicle weight, and vehicle aerodynamic profile, among other parameters.⁵

Further reductions in fuel efficiency and GHG emissions by rail are being accomplished by freight railroads. Railroads are replacing switching locomotives used in yard operations (many of the larger yards in Texas are located in non-attainment areas) with “genset” and hybrid locomotives. Genset locomotives have two or three independent engines that switch on and off depending on how much power are needed. Hybrids use

a small diesel engine and a large bank of batteries to provide electric motive power. According to the U.S. Department of Transportation's (USDOT) "Transportation's Role in Reducing U.S. Greenhouse Gas Emissions," genset engines offer 35–50% GHG reductions over conventional locomotives; hybrid yard engines offer 35–57% GHG emission reductions per vehicle. BNSF Railway Company (BNSF), Kansas City Southern Railroad (KCS), and Union Pacific Railroad (UP) all use genset locomotives in various locations in Texas.

Railroads are also testing the use of advanced top-of-rail lubrication techniques that reduce fuel use and GHG emissions, as well as reduce wheel and rail wear, without affecting braking distances. These lubrication systems may save an additional 4–6% in fuel use per train.

Future improvements in fuel use and GHG emissions could come from changes in train loading practices. Poor aerodynamics of freight trains, open areas between cars, and space between cars and the rail cause freight trains to use more energy. Due to these aerodynamic factors, a locomotive pulling open empty intermodal well cars can consume more energy than when pulling loaded double stack cars with a better profile. Intermodal trains are more fuel-efficient than mixed freight trains due to the increased handling of mixed-freight cars in classification yards. Enabling double stack container movements through improved clearances of structures (such as highway bridges) and rail bridges provides more fuel efficiency savings.

Keeping trains moving saves fuel and reduces GHG emissions. Bottleneck removal projects like the Tower 55 improvements in Ft. Worth can reduce engine idling and reduce fuel use and GHG emissions. These public benefits are being quantified for not only Tower 55 but for other freight capacity improvement projects like the Chicago Region Environmental and Transportation Efficiency (CREATE) project, the Heartland Corridor between Virginia and Ohio, and the Crescent Corridor along the I-81 corridor in the southeast.

Environmental Review of Projects

Although rail offers substantial environmental and energy efficiency benefits, rail improvement projects are subject to similar environmental analyses that are required for highway and transit projects, according to the National Environmental Protection Act (NEPA). New rail line construction that serves new shippers and rail mergers and acquisitions that affect existing shippers trigger economic regulation by the federal Surface Transportation Board (STB). Thus, these actions are subject to the STB's environmental jurisdiction. Environmental reports are required for actions subject to the STB's jurisdiction that result in a diversion of rail traffic to trucks of 1,000 or more rail carloads per year or 50 or more carloads per mile per year along a corridor. In most areas of the state, environmental review is required if the action results in an increase of rail traffic of 100% or more (in gross ton miles annually); an increase of eight or more

trains a day; an increase in yard activity of 100% or more; or an average increase of truck traffic of 10% or more of the average daily traffic. In non-attainment areas, those thresholds are reduced (50% rail traffic or three trains a day, or 20% yard activity).

The STB manages environmental reviews according to standard regulations of the STB Board and Council of Environmental Quality. This provides for independent review of all environmental impacts and includes extensive public involvement in the process. The STB's environmental rules are found in 49 C.F.R. Section 1105.

If a railroad's construction of new capacity lies wholly within its right-of-way, does not alter its shippers' access, and is privately funded, then no environmental review is required. For this reason, when BNSF expanded its transcontinental intermodal route to double tracks through the Panhandle, it did not need to conduct a public environmental review.

The FRA also administers NEPA reviews of major rail projects involving federal funds (loans or grants) or major federal regulatory actions. If the FRA was requested to permit the operation of a new passenger rail service over 125 mph, such new service would require a safety rule of particular applicability to permit a combination of rolling stock, train control, and signals and track maintenance to allow higher speeds. That safety regulation is considered a federal action that requires a NEPA review. Therefore, the Texas TGV (TTGV) project proposed in the early 1990's began a NEPA review with FRA oversight. The FRA excludes certain actions from detailed environmental review (categorical exclusions), including:

- Maintenance of existing railroad equipment, bridges or structures, communications, signaling, stations, and maintenance of way, and other existing facilities. Maintenance refers to work that does not change the existing character of the facility.
- Minor line additions including construction of side tracks, passing tracks, crossovers, and short connections between existing rail lines, provided that these changes do not involve significant right-of-way acquisition and do not significantly alter the traffic density characteristics of existing rail lines.
- Acquisition of rail equipment, track, and structures for the purpose of conducting rail operations similar to those already existing.

The FRA's Procedures for Considering Environmental Impacts are found in 64 C.F.R. Section 28545 (May 26, 1999). The recent authorization and appropriation of new federal passenger rail programs identified in Chapter 6 will fund significant new projects that will require environmental review. The FRA's lack of experience with sustained capital funding programs means that the agency has a reduced range of activities to exempt from environmental review through categorical exclusions, much less than the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA).

Therefore, more rail improvements will require environmental reviews, even if the improvements are on existing freight corridors or rights-of-way.

The FRA has established a tiered approach to environmental reviews of passenger rail projects. Service NEPA (similar to a programmatic review) typically covers broader issues of the passenger service being proposed on a corridor: Cities served, route alternatives, service levels, operations, ridership projections, and major infrastructure needs. This level of environmental review may precede major investments in passenger rail improvements (infrastructure or equipment) that are part of a larger corridor. Upon completion of a Service NEPA document, further assessments continue at the project level. As with all NEPA processes, the FRA requires standard public involvement procedures during these reviews.

1.3 – Rail Planning and Transportation Planning in Texas

Federal rail planning requirements were originally outlined in 49 C.F.R. Section 266 pursuant to federal law (49 U.S.C. Section 22102 US Code Section 22102). One of the original intents of these regulations was to provide clear and concise directions for states to compete for Local Rail Freight Assistance funds (which have not been appropriated by Congress since 1995). Section 266.15 is outlined in federal requirements for state rail plans and prescribes that they be “based on a comprehensive, coordinated, and continuing planning process for all transportation services within the State and shall be developed with an opportunity for participation by persons interested in rail activity in the State and adjacent states where appropriate.”

The Passenger Rail Investment and Improvement Act of 2008 (PRIIA) is the most recent federal law with state rail planning requirements for both freight and passenger rail. PRIIA links state rail planning requirements to federal high-speed intercity passenger rail (HSIPR) funding programs. New federal funding for HSIPR improvements, more fully discussed in Chapter 6 of this TRP, requires that potential improvement projects be included in state rail plans to be eligible for federal funds.

PRIIA requires the Secretary of Transportation to issue guidelines on what will be required in state rail plans and establishes a number of elements that should be included in state rail plans, shown in Table 1-4. Generally, the main components of a rail plan include establishing vision, goals, and objectives for the rail system and its integration into the state's multimodal transportation system. Other key components are an inventory of the freight and passenger rail infrastructure and performing a needs assessment. The final component is planning for the future by developing prioritized programs and financing strategies to achieve the state's vision, goals, and objectives.

Table 1-4: State Rail Plan Elements Outlined in PRIIA

(1) Inventory	Existing rail systems
	Role of rail in state's surface transportation system
(2) Review of rail lines	Proposed high-speed rail corridors
	Significant rail line segments not currently in service
(3) Passenger rail service objectives	Minimum service levels for all routes
(4) Transportation, economic, and environmental impacts of rail	Congestion mitigation
	Trade and economic development
	Air quality
	Land use
	Energy use
(5) Long-range rail investment program	Community impacts
	Freight capital projects with public and private benefits and correlation between
(6) Public financing issues	Consideration of funding
	Current capital and operating funding sources
(7) Rail infrastructure issues	Prospective capital and operating funding sources
	Reflecting consultation with all relevant stakeholders
(8) Review of intermodal connections and facilities	Freight intermodal
	Freight facilities
	Seaports
	Prioritized options to maximize integration of modes
(9) Review of publicly funded safety and security projects	Safety, including projects funded under 23 U.S.C. Section 130 (grade crossing protection)
(10) Performance evaluation of passenger rail	Evaluation of performance
	Possible improvements
	Strategies to achieve improvements
(11) High-speed rail plan	Compilation of high-speed rail studies
	Funding plan for recommended corridors
(12) Compliance with Section 22102	Demonstrate qualifications under 49 U.S.C. Section 22102 (State has organized itself to support rail planning)

Source: AASHTO State Rail Planning Best Practices, Appendix A

Guidance for state rail plan preparation and revision is expected from the USDOT early in 2011. In the absence of official guidance, this TRP is being prepared to meet the content requirements laid out in PRIIA and in consideration of the recommendations of the State Rail Planning Best Practices guidebook published in November 2009 by American Association of State Highway and Transportation Officials (AASHTO).

The TRP is also being prepared to be responsive to direction from the 81st Texas Legislature, which in 2009 enacted S.B. 1382, (Section 201.6012-6013, Transportation Code), which states:

“The department (TxDOT) shall prepare and update annually a long-term plan for a statewide passenger rail system. Information contained in the plan must include:

- (1) a description of existing and proposed passenger rail systems;
- (2) information regarding the status of passenger rail systems under construction;
- (3) an analysis of potential interconnectivity difficulties;
- (4) ridership projections for proposed passenger rail projects; and
- (5) ridership statistics for existing passenger rail systems.”

Chapter 4 discusses passenger rail issues in more detail, including performance data for existing intercity passenger rail systems. Chapter 7 discusses the corridor planning process by which TxDOT will develop information on possible high-speed intercity passenger rail services (HSIPR).

National Rail Plan

PRIIA also requires the development of a National Rail Plan by the FRA. Section 307 of the Act directs the Administrator of the FRA to:

“... develop a long-range national rail plan consistent with approved State rail plans and the rail needs of the Nation as determined by the Secretary [of Transportation] in order to promote an integrated, cohesive, efficient, and optimized national rail system for the movement of goods and people.”

In September 2010, the FRA issued a progress report, titled “National Rail Plan: Moving Forward.” A preliminary plan was published in October 2009. The FRA held a number of outreach sessions to gain more input into the National Rail Plan. The preliminary plan outlined the following objectives for rail as part of a national transportation system:

- Increase passenger and freight rail performance to improve national transportation system performance;
- Integrate all transportation modes for a more complementary transportation system;

- Identify projects of national significance; and
- Provide increased public awareness.

The 2010 Progress Report lists goals for the national rail system:

- Connect communities with HSIPR where population densities and competitive trip times create markets for success;
- Support the current freight rail market share and growth; and
- Develop strategies to attract 50% of all shipments 500 miles or more to intermodal rail.

Developing a national rail plan recognizes some of the societal benefits of freight and passenger rail, according to the FRA's Preliminary National Rail Plan:

- Safety: Railroads have become safer. As train miles have increased by 27% since 1980, rail accidents per million train miles have decreased by 71% in the same time period. FRA safety data shows that rail safety in Texas exhibits a similar trend. From 2000 to 2009, total rail accidents have decreased by 40%. Train accidents in Texas decreased 30% from 2000 to 2009, while highway rail grade crossing accidents have decreased 54% in that time period.
- Energy efficiency: Passengers using rail are 21% more fuel efficient (as measured by BTUs per mile) than those using automobiles and 17% more efficient than passengers traveling by short-haul commercial aviation. Depending on the commodity carried and the travel distance, freight rail is 1.9 to 5.5 times more fuel-efficient than trucks.
- Vehicle emissions: Environmental Protection Agency (EPA) standards call for heavy-duty diesel truck engines to emit no more than 15.5 grams per brake horsepower hour of carbon monoxide (CO), while EPA standards for locomotives call for 1.5 grams per brake horsepower hour of CO, a tenth of the truck standard.

To develop a National Rail Plan “consistent with approved state rail plans,” the FRA will look to state planning efforts that focus on issues of particular importance to each state. For example, the TRP discusses freight rail connectivity with seaports and rail traffic across Texas–Mexico border crossings, specific issues shared by only one other state (California). The FRA's challenge is to identify passenger and freight rail corridors of national significance that extend beyond state boundaries and outline how such corridors will be advanced. The National Rail Plan also addresses safety standards and economic issues that are national in nature.

The 2010 Progress Report also includes informative tables about the potential modal comparative advantages by market in terms of passengers and freight. Table 1-5 illustrates the comparative advantages of modes based on passenger market factors.

Table 1-5: Potential Modal Comparative Advantage by Passenger Market

Population Density	Intercity Distance in Miles			
		0-100	100-600	600-3,000
	Light	Auto and Bus	Auto and Bus Conventional Rail	Auto and Bus Air
	Moderate	Auto and Bus Commuter Rail	High-Speed Rail Auto and Bus	Auto and Bus Air
	High	Auto and Bus Commuter Rail	High-Speed Rail Air	Air

Source: Federal Railroad Administration, National Rail Plan Progress Report, September 2010, page 11

Table 1-6 describes the potential modal comparative advantage by freight market.

Table 1-6: Potential Modal Comparative Advantage by Freight Market

Weight	Intercity Distance in Miles					
		0-250	250-500	500-1,000	1,000-2,000	>2,000
	Light: Retail Goods	Truck	Truck	Truck Rail Intermodal	Truck Rail Intermodal	Truck Rail Intermodal
	Moderate: Consumer Durables and Other Manufactured Goods	Truck Rail	Truck Rail Rail Inter-modal	Truck Rail Rail Inter-modal	Truck Rail Rail Inter-modal	Truck Rail Rail Inter-modal
	Heavy: Bulk Goods	Truck Rail Water	Rail Water Truck	Rail Water	Rail Water	Rail Water

Source: Federal Railroad Administration, National Rail Plan Progress Report, September 2010, page 17

1.4 – Department Strategic Plan, 2011–2015

PRIIA requires that the TRP be developed in conjunction with other state transportation plans. The TRP is being developed in coordination with the Texas Transportation Commission's (TTC's) new Strategic Plan for 2011–2015.

The Strategic Plan establishes the following mission and vision for TxDOT:

Our Mission: Emphasizing cooperation, accountability, and transparency, we will provide a safe, efficient, cost-effective, and environmentally-sensitive multimodal statewide transportation system for the movement of people and goods.

Our Vision: To be a trusted, performance-driven organization committed to collaborating with internal and external partners to deliver a modern, interconnected, and multimodal transportation system that enhances the quality of life for Texas citizens and increases the competitive position for Texas industry.

The Strategic Plan establishes six overall goals:

- Goal 1 - Develop an organizational structure and strategies designed to address the future multimodal transportation needs of all Texans.
- Goal 2 - Enhance safety for all Texas transportation system users.
- Goal 3 - Maintain the existing Texas transportation system.
- Goal 4 - Promote congestion relief strategies.
- Goal 5 - Enhance system connectivity.
- Goal 6 - Facilitate the development and exchange of comprehensive multimodal transportation funding strategies with transportation program and project partners.

Rail planning fits within a number of these goals, objectives, and performance measures.

Goal 1: Develop an organizational structure and strategies designed to address the future multimodal transportation needs of all Texans.

Objectives:

- Develop a proactive internal and external communication plan that fosters transparency.
- Develop a comprehensive performance management program to enhance program evaluation, decision-making, resource utilization, and product delivery.

- Develop and nurture partnerships with communities, agencies, and other transportation stakeholders.
- Enhance workforce recruitment, retention, and leadership development efforts.

The creation of the Rail Division (RRD) within TxDOT in 2009 fits within the goal of an organizational structure that addresses future multimodal needs of the state. This chapter discusses the institutional roles and responsibilities of the RRD and TxDOT districts, as both share rail project delivery responsibilities. Program management capabilities of the RRD are an important qualification for future federal HSIPR funding programs described in Chapter 6 of the TRP.

This TRP is also produced with extensive public involvement with rail stakeholders and members of the general public. The linear nature of rail projects, which transcend municipal and county boundaries, requires the RRD to foster productive relationships with local and regional governments as rail projects are planned and delivered.

Freight and passenger rail projects identified in Chapter 7 of the TRP will be evaluated based on criteria that consider the benefits of rail projects in reducing the growth of congestion on Texas roadways. Rail projects have the potential to divert highway freight and passenger traffic, which in turn can minimize highway maintenance costs and future demands on the highway network. The evaluation criteria in Chapter 7 fit into this Strategic Goal to develop performance management programs.

Goal 2: Enhance safety for all Texas transportation system users.

Objectives:

- Reduce fatalities and serious injuries on the Texas transportation system.
- Partner with public and private entities to plan for, coordinate, and respond to disasters and emergencies.
- Promote work zone safety to protect roadway workers and the traveling public.
- Measure, monitor, and report performance in improving safety.

Safety is an integral part of the organizational culture of freight and passenger railroads, as both rail management and labor have shared interests in keeping rail movements safe for employees who work on railroad equipment and property, for shippers who are served, and for the communities in which railroads operate. The highest priority of the FRA is rail safety (Congress has established it as the FRA's highest mission, and the FRA Administrator must have a rail safety background). TxDOT partners with the FRA in providing a state inspection program to enforce federal safety regulations. TxDOT also partners with the FHWA, which funds improvements at highway/rail grade

crossings. Chapter 5 describes the significant reductions in rail accidents/incidents and in grade crossing accidents/incidents. Data in Chapter 3 illustrates that freight rail minimizes hazardous materials transportation on Texas roadways that are shared with millions of other users.

The RRD will have a role in two of the performance measures for this goal—reducing the numbers and rates of rail injuries and fatalities, and increasing the percentage of railroad crossings with signalization. The RRD is preparing an Action Plan for further reducing highway/rail grade crossing accidents/incidents, as required by the Rail Safety Improvement Act of 2008. Finally, freight railroad actions to comply with federal requirements to implement positive train control (discussed in Chapter 5, Safety and Security) should lead to rail safety benefits in Texas.

Goal 3: Maintain the existing Texas transportation system.

Objectives:

- Develop optimal asset management programs to protect existing infrastructure investments.
- Ensure timely and effective emergency maintenance response and damage repair.
- Measure, monitor, and report performance in maintaining the existing transportation system.

The bulk of the railroad network in Texas is privately owned. Railroads are directly responsible for maintenance of their physical infrastructure, unlike the road, transit, and airport systems that are owned and maintained by the public sector. However, as the owner of the South Orient Railroad and the Bonham Subdivision, TxDOT has inventoried these properties and has a responsibility to ensure that the railroad operator for the rail line meets its maintenance obligations.

In a more general sense, the level of capital investment in track, signal, and locomotive maintenance directly impacts a railroad's ability to effectively serve shippers and communities. When maintenance levels decrease, operating speeds decline and track-related derailments tend to increase. For these reasons, the RRD will monitor railroad industry capital investment trends in Texas and the general economic health of the national rail industry to identify issues that may affect railroad safety or goods movement in Texas. A thriving freight rail industry in Texas is necessary to maintain current and future freight volumes, as the state's roadway network could not serve as a substitute for freight carried by rail.

Goal 4: Promote congestion relief strategies.

Objectives:

- Implement multimodal infrastructure, operational, and technological solutions to congestion needs.
- Focus congestion relief efforts on the most severely congested elements of the state transportation system.
- Measure, monitor, and report performance in providing congestion relief.

TTC Chair Deirdre Delisi is quoted in the Strategic Plan regarding rail:

“Rail is going to be an important part of the solution. For many, many years, really since the creation of the Texas Department of Transportation, roads were seen as the only solution and we’re learning very quickly that ... we need to be thinking more of a multimodal approach. We’re behind in Texas, relative to other states that have more of a robust rail infrastructure. But we’re aggressively pursuing it where it makes sense, where it’s feasible, where folks want it, and where it makes good economic sense.”

Freight rail improvement projects included in Chapter 7 of the TRP have been identified in regional freight studies that examine rail operations and identify rail bottlenecks. Not only would such projects offer shipper benefits through more reliable and faster rail service, but expanded freight rail capacity can offer Texas businesses shipping alternatives that divert truck shipments to rail, thereby reducing highway congestion in certain intercity corridors. Chapter 7 also identifies a planning and prioritization process that guides future decisions about passenger rail improvements. This prioritization process will also identify beneficiaries of rail improvements, so that public investments in private freight rail infrastructure can be justified. These improvements facilitate the development of a high-speed passenger rail system that gives Texas travelers an efficient, cost-effective alternative to long automobile trips on congested interstate highways.

Goal 5: Enhance system connectivity.

Objectives:

- Ensure Texas industries can efficiently access statewide, regional, national, and international markets and gateways.
- Provide seamless, multimodal transportation facilities and networks to connect all statewide population, economic, recreational, and cultural centers.
- Measure, monitor, and report performance in enhancing system connectivity.

Chapter 3 discusses the extensive freight rail network in Texas and its economic function. Texas is among the top states in rail miles, carloads, and tons carried by rail. The high functionality of the Texas railroad network, combined with extensive commercial aviation options and use, and a high quality roadway network led Texas to being ranked as the number one state for transportation that enhances the business climate in CNBC's 2010 report on America's Top States for Business.⁶ Both Chapter 3 and 4 describe the intermodal connections between railroads, highways, seaports and inland ports, and transit systems.

One of the requirements in Section 201.6012-6013 of the Transportation Code is to determine interconnectivity issues with passenger rail. Chapter 4 explores this further.

Goal 6: Facilitate the development and exchange of comprehensive multimodal transportation funding strategies with transportation program and project partners.

Objectives:

- Assess and document transportation system needs and available revenues in periodic updates of the long-range Texas Transportation Plan.
- Explore all available multimodal financing options while not recommending any particular strategy.
- Regularly communicate with the Texas public about the program results that come from maximizing existing funding levels, as well as the consequences of alternative future funding levels.

Chapter 6 discusses current federal and state funding programs used by states to fund railroad improvements, both freight and passenger. The chapter also identifies alternatives for funding and project delivery. Many freight rail projects in Chapter 7 have public benefits identified with project investments. The passenger rail planning process described in Chapter 7 also specifies how HSIPR alternatives will include evaluations of public benefits such as community impacts, economic growth, air quality improvements, energy efficiency, and traveler benefits.

Outreach and communication described in Chapter 2 help link the needs and projects identified in the TRP with stakeholders and other Texans, as described in these objectives. The TRP is required by federal law to be updated every five years. The passenger chapter will be updated annually to meet state law requirements.

1.5 – Integration with Statewide Long-Range Transportation Plans

The TRP is not only connected to TxDOT's Strategic Plan, it is being developed in parallel to the Statewide Long-Range Transportation Plan (SLRTP) update for 2035. The two plans are being drafted so that they will be consistent in treatment of data, traffic projections, and major issues. The TRP will explore rail issues in greater detail than the SLRTP, which will only include relevant high-level information but will reference the TRP as additional documentation.

The purpose of the SLRTP is to examine the current transportation networks and address the need for improvements to all transportation modes in Texas:

- Roadways
- Pedestrian and bicycle facilities
- Transit
- Freight and passenger rail
- Airports
- Water ports
- Pipelines
- Intelligent Transportation Systems

The analysis helps Texas plan for improved connectivity between modes and between communities. It also enables our multimodal system to operate more efficiently. The SLRTP will encompass a 24-year time frame (2011–2035) and will include the following:

- Analysis of the existing transportation system that includes:
 - A description/inventory of existing systems
 - An analysis of current systems usage
 - A description of current needs
 - A description of existing funding sources
- Analysis of future needs by mode
- Projection of future funding by mode

Section 135(d)(1), 23 U.S.C. sets forth eight planning factors that must be addressed in transportation planning. The law states:

“Each State shall carry out a statewide transportation planning process that provides for consideration and implementation of projects, strategies, and services that will—:

- (A) support the economic vitality of the United States, the States, nonmetropolitan areas, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
- (B) increase the safety of the transportation system for motorized and nonmotorized users;
- (C) increase the security of the transportation system for motorized and nonmotorized users;
- (D) increase the accessibility and mobility of people and freight;
- (E) protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- (F) enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;
- (G) promote efficient system management and operation; and
- (H) emphasize the preservation of the existing transportation system.”

1.6 – TxDOT Rail Vision

As part of the development of the TRP, TxDOT held a series of seven workshops and invited rail stakeholders to solicit input into the creation of a vision statement for Texas freight and passenger rail for the future (described further in Chapter 2). The following vision statements summarize the input gained from Texas rail stakeholders.

Stakeholder-Developed Vision for Rail in Texas

The Texas Rail System will provide cost-effective, energy-efficient, sustainable personal mobility and goods movement that connects Texas communities and links Texas businesses with domestic and international markets, minimizing environmental impacts, reducing road congestion, improving air quality, and promoting economic growth.

Stakeholder-Developed Freight Rail Vision

Texas’ freight rail network will provide safe, reliable movements to and from Texas shippers and receivers, intermodal facilities, and ports of entry on international borders and along the Gulf Coast. Productive use of existing infrastructure will be maximized through the railroads’ use of sophisticated train control systems, wayside technologies, and maintenance planning. Public and private sector resources will resolve bottlenecks and congestion points to improve system fluidity. Investments in freight capacity to keep pace with demand can reduce adverse community impacts. Grade separations, grade

crossing improvements, and closures will improve highway/rail safety and enhance quality of life for communities bisected by increasingly busy rail lines.

Stakeholder-Developed Passenger Rail Vision

A variety of reliable passenger rail services will be offered to a broad section of the Texas population—regional and intercity, express and local. Passenger rail will be a viable transportation alternative which is cost and time competitive and connected to transit and other modes in city center stations—a product of market-driven studies of most promising corridors, offering the most appropriate service designs for those corridors. Passenger rail services and facilities will complement municipalities creating more livable, sustainable urban activity centers. Incremental expansion of frequency and reliability of passenger rail services on freight rail corridors will reduce environmental impacts of new service, will not inhibit current and future freight volumes, and will not place unmanageable risks on rail owners. As passenger rail traffic increases, new, higher speed rail services will be launched on separated, dedicated rights-of-way.

1.7 – TxDOT Organizational Structure

TxDOT was established as the Texas Highway Department in 1917 by the Texas Legislature with the primary goal of getting the farmers out of the mud. TxDOT has since grown to become a 12,000-person organization with responsibilities in all modes of transportation. The name of the department was changed to the Texas Department of Transportation or “TxDOT” in 1991 to reflect its multimodal scope of responsibility.

TxDOT is headquartered in Austin, Texas, where the TTC and TxDOT Administration have offices near the state capital. TxDOT’s 21 divisions and seven offices are also headquartered at facilities in the Austin area. There are 25 district offices located throughout the state, where approximately 75% of the department’s employees work. Districts are primarily responsible for roadway and bridge maintenance functions, project planning, engineering, and construction management. Four regional offices are strategically located across the state to provide support services for the districts for activities such as right-of-way management, purchasing, contracting, and accounting. The divisions and offices provide additional support services to the districts and manage statewide processes like finance, statewide planning, specialized design expertise, and environmental coordination and rail activities as defined below. TxDOT’s administrative offices provide unified direction across the department to carry out policies set out by the TTC and the Texas Legislature.

Rail Division

The development of the TRP is being led by TxDOT’s RRD. The RRD was established in December 2009 in response to a renewed and growing interest in rail transportation for both the movement of people and goods. The RRD has oversight of rail planning,

research, and development. As a state partner with the FRA, the, RRD has state oversight authority of the safety of railroad operations, infrastructure, equipment, and hazardous materials movements. The RRD also implements rail-related policies and legislation and administers federal and state funds allocated to rail projects in Texas. The RRD also monitors potential rail line abandonments in Texas, as well as coordinates the state's involvement in and response to abandonment filings.

The governor has assigned the responsibility for rail planning in the state to TxDOT. The 81st Texas Legislature assigned the coordination of all passenger rail activities within the state, including commuter and local transit to TxDOT in 2009, through the passage of S.B. 1382. These assignments have in turn been delegated to RRD. The RRD has specific responsibilities for the following rail functions in Texas:

- Performing infrastructure and operational analysis of both state and privately owned rail facilities to develop needs assessments as part of the project development process;
- Developing and planning for high speed rail and intercity passenger rail;
- Monitoring potential rail line abandonments in Texas, as well as coordinating the state's involvement and response to abandonment filings;
- Administering lease and operating agreements on state-owned facilities and managing construction contracts for state or federally funded projects on those facilities, as well as private facilities;
- Implementing rail improvements by entering into public-private partnership agreements to provide investments in freight rail relocation projects, rail facility improvements, rail line consolidations, or new passenger rail developments;
- Administering the state rail safety inspection program in conjunction with the FRA, including accident and complaint investigations. Also provides the state safety oversight function as required by the FTA.
- Improving highway-rail grade crossings to reduce accidents;
- Analyzing local, state, and national railroad/multimodal trends, policies, and legislation;
- Performing research to develop more efficient utilization of Texas rail freight systems; and
- Acting as the departmental liaison to railroad companies, intermodal interests, the FRA, local governments, and the public with regards to rail planning and project development in Texas.

Table 1-7 outlines rail related functions assigned to the RRD or TxDOT districts or shared between the two organizational levels.

Table 1-7: TxDOT Organizational Responsibility for Rail Issues

Issue/Area	Rail Division	Districts
Statewide rail planning, research	●	
Freight rail and passenger rail project planning and project development	●	
Rail project construction letting and contract administration/management	○	●
Highway–rail grade crossing project selection	●	
Grade crossing protection device installation performed by railroads	●	○
Rail safety inspection (freight, rail transit)	●	
Negotiating with railroads for access, air rights, right-of-way for highway construction projects	○	●

● represents primary responsibility
○ represents assistance and support

TxDOT Districts

Figure 1-8 shows the geographical breakdown of TxDOT's 25 districts. District staff, led by the TxDOT District Engineer, is familiar with the unique demands and local needs in their areas of responsibility. All 254 of the state's counties are assigned to one of the districts. Districts are further subdivided into area engineer offices and maintenance offices. Through this structure, TxDOT district offices offer local access to citizens who want to participate in the transportation development process. The district's Public Information Offices serve as a point of contact for citizens and the news media.

For purposes of the TRP, some issues pertaining to rail transportation may be analyzed at the TxDOT district level in coordination with Metropolitan Planning Organizations (MPOs) (with assistance from the RRD) based upon a classification of the district as either a metropolitan district or a non-metropolitan district. Metropolitan districts are defined as those that have one of the state's major metropolitan areas within their boundary. These larger districts often have rail transit and intercity passenger rail issues not shared by rural districts. Moreover, many of the larger MPOs conduct supplemental urban regional freight planning that involves rail capacity, service levels and bottlenecks, and rail capacity projects. Some rail projects identified in TxDOT Regional Freight Studies will be included in MPO transportation improvement plans. MPOs also can

advance TRP objectives by entering into successful long term financial agreements, coordinate with other jurisdictions to garner project support and facilitate crucial interaction with freight system users (shippers, carriers, and manufacturers).

The primary functions of both TxDOT district personnel and local and regional government agencies involved with rail planning are to monitor local rail transportation needs and, when necessary, initiate rail development projects by either working directly with the railroad or contacting RRD staff for assistance and/or guidance.

The evaluation and initiation of state purchases of financially underperforming freight rail lines to protect area economies and preserve transportation alternatives starts with RRD action with the STB, then the involvement of rural rail transportation districts, where they exist, and local citizen involvement. Additionally, local and regional governments serve as the “eyes and ears” for the implementation of improved safety measures for their highway-rail grade crossings. Through their efforts, recommended improvements to the local highway/railroad crossings can be executed to enhance the quality of life in their area.

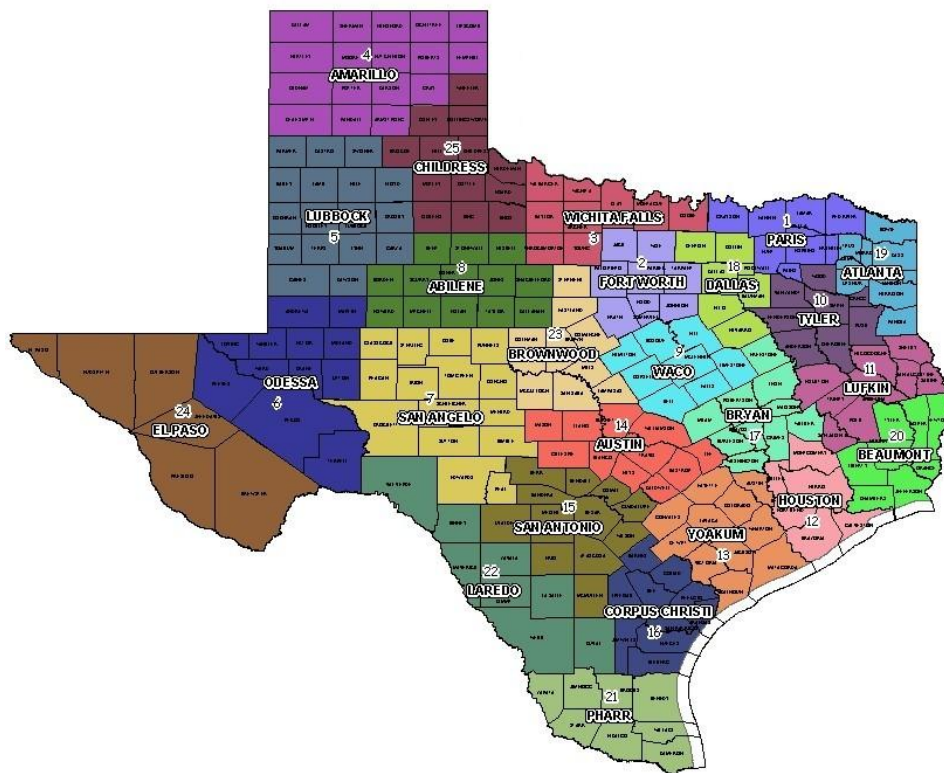


Figure 1-8: TxDOT Districts

TxDOT has also been involved in the purchase of railroad rights-of-way for use as highway rights-of-way. The purchases have usually followed abandonment of the rail lines, and have kept the rights-of-way intact for other transportation modes, including providing room for the expansion of existing roadways.

1.8 – Organization of Plan

The TRP is organized to address the major elements of a State Rail Plan in PRIIA, so Texas can submit a plan that can be approved by the FRA. This approval will position Texas to be eligible for financial assistance for HSIPR projects identified by the corridor planning process identified in this plan. The TRP also fully explains current freight and passenger rail networks in the state, and describes the public and private sector ownership and responsibilities for those networks. The plan will help Texans understand the institutional responsibilities among federal, state, and regional agencies that have jurisdiction over rail issues that may affect their communities. Finally, the TRP identifies a process for identifying and prioritizing freight and passenger rail projects, and lists possible funding alternatives for public officials to consider support for capital and operating investments.

The remaining TRP chapters are organized as follows:

- Chapter 2: Outreach Process, which describes the activities undertaken to engage the public in preparation of the rail plan;
- Chapter 3: Freight Rail, including system, use, capacity, condition, intermodal connections, and future issues;
- Chapter 4: Passenger Rail, including a description of existing network, proposed services, intermodal facilities, and performance of existing system;
- Chapter 5: Rail Safety and Security, including rail safety and security issues, and publicly-funded projects to address those issues;
- Chapter 6: Financing, describing funding and finance strategies to implement investment programs, and federal, state, private, and regional financing; and
- Chapter 7: Short and Long-Range Investment Program, establishing freight and passenger project priorities and addressing implementation issues.

¹ More history on railroads in Texas can be found in an article written by George C. Werner, "Railroads," (<http://www.tshaonline.org/handbook/online/articles/RR/eqr1.html>) in the *Handbook of Texas Online*, a publication of the Texas State Historical Association in partnership with the University of North Texas.

² Found on the lower left of the page at <http://txsdc.utsa.edu/>.

³ National Rail Plan Progress Report, Federal Railroad Administration, September 2010, page 4

⁴ These and other GHG figures come from Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, April 2010 report to the U.S. Congress, found at http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf.

⁵ ICF International, Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors, prepared for Federal Railroad Administration, September 2009, found at http://www.fra.dot.gov/Downloads/Comparative_Evaluation_Rail_Truck_Fuel_Efficiency.pdf.

⁶ Report and rankings found at <http://www.cnbc.com/id/37554006/>