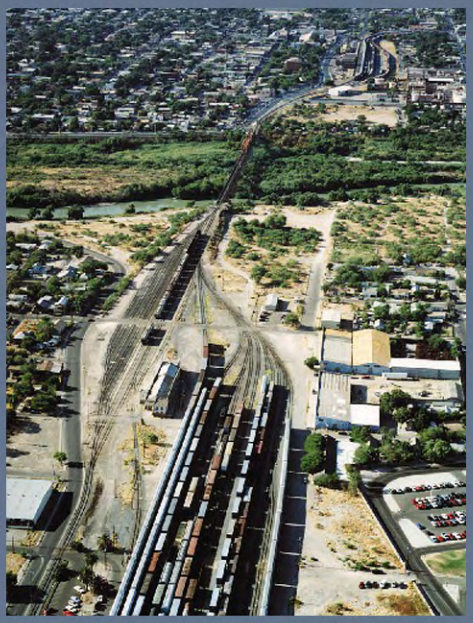

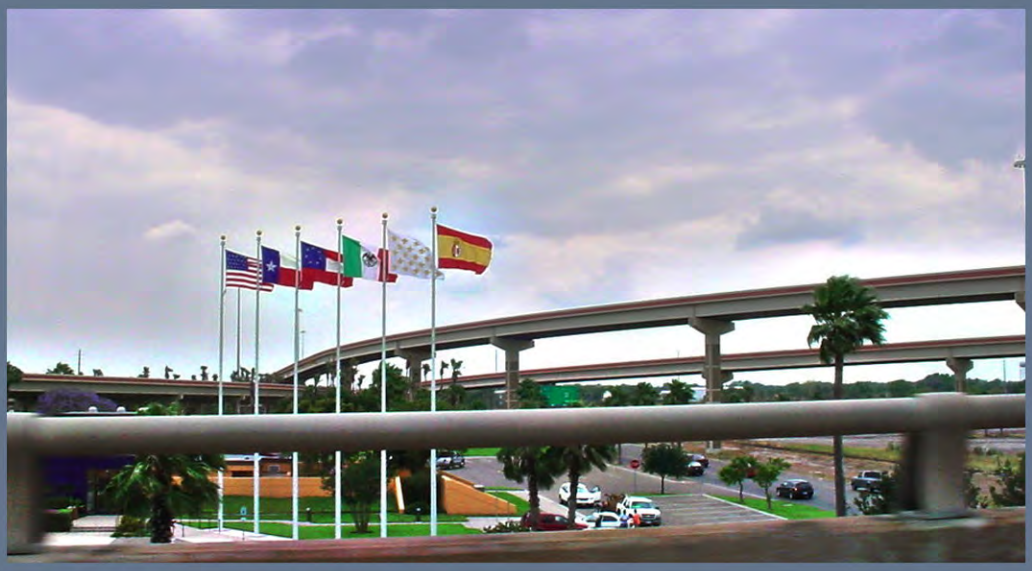

Lower Rio Grande Valley and Laredo Region Freight Study

Final Report

July 2011

Texas Department of Transportation

Prepared by

HNTB

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The *Lower Rio Grande Valley and Laredo Region Freight Study* could not be undertaken without the cooperative participation of public, private, and governmental representatives from the Lower Rio Grande Valley and Laredo region. Representatives from the agencies, organizations, and entities listed below participated in and contributed to the Steering Committees for this study.

BNSF Railway

Brownsville & Rio Grande International Railroad

Cameron County

Cameron County Regional Mobility Authority

Hidalgo County

Harlingen-San Benito Metropolitan Planning Organization

Kansas City Southern Railway

McAllen Economic Development Corporation

Mission Economic Development Association

Port of Brownsville

Rio Valley Switching Company

Texas Department of Transportation
Rail Division
Pharr District
Laredo District

Union Pacific Railroad

EXECUTIVE SUMMARY

The Lower Rio Grande Valley and Laredo Region Freight Study analyzed existing and projected truck and freight rail transportation operations, bottlenecks, and constraints with the goal of establishing a slate of potential infrastructure improvements geared toward providing solutions that may resolve the problems associated with rising congestion levels and the expected growth of commodity movements in the study region.

This study identifies improvements that may provide relief to residents and the traveling public adversely affected by delays, interruptions, and noise attributed to the movement of freight within the region. It also identifies alternatives that may improve regional freight capacity by enhancing the efficiency and operations of the freight transportation network. The study region consists of the TxDOT Laredo and Pharr Districts, as shown in Figure 1.

This report includes an inventory of the existing freight rail system, a region-wide freight (truck and rail) operational study, and analysis of freight transportation constraints in the region. The report also identifies alternatives and associated feasibility for rail system and roadway improvements within the region and summarizes the results of the rail operations modeling model and cost/benefit analysis completed for identified improvements.

This report includes up to $660 million of improvements for the 16-county study region. These improvements are categorized as:

- Grade Separations (bridges to separate the railroad from streets) - $141 million
- Grade Crossing Closures (closing and re-routing the street at the intersection with the railroad) - $150,000
- Rail Improvements – nearly $519 million (rail improvements to improve operating efficiency or add capacity)

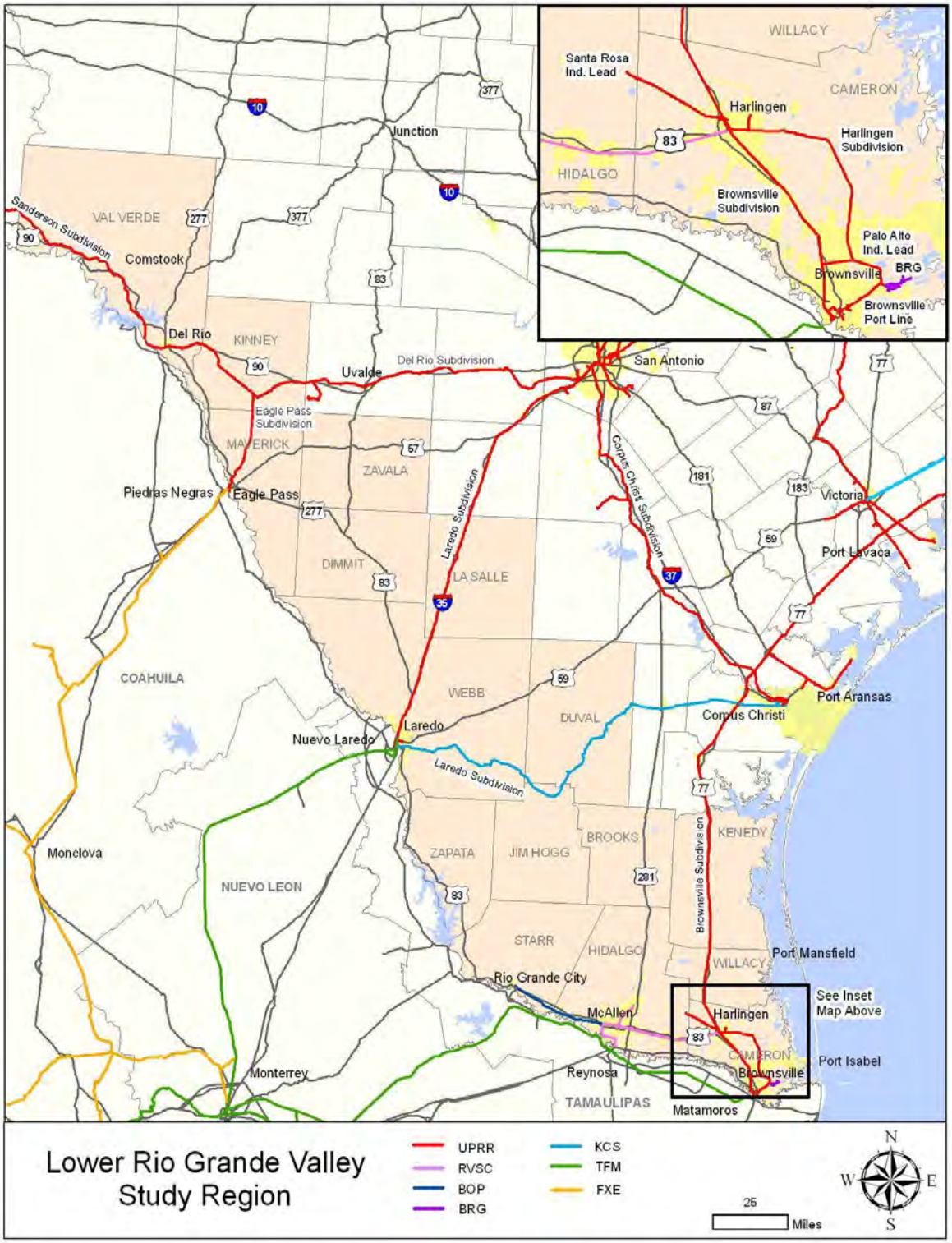


Figure 1: Study Region

Existing and Projected Freight Movements

The study region's truck freight movement is forecasted to double in volume between 2003 and 2035, while the rail tonnage is projected to increase by 64 percent between 2007 and 2035. The movement of freight by truck is the predominant method of freight transport within, into, and out of the Study Region in both 2003 and as projected in 2035.

Nearly 68 percent of truck freight to and from the study region remains in Texas, while 21 percent travels to or from Mexico, and the remainder travels to or from other U.S. states. Within Texas, large numbers of trucks were moving between the Study Region and Houston, the Dallas-Fort Worth Metroplex, Waco, San Antonio, and Corpus Christi in 2003 as well as projected in 2035. The primary U.S. destinations for truck freight outside of Texas from the Study Region are California, Tennessee, Georgia, North Carolina, Missouri, Illinois and Ohio.

Food, building materials, and secondary cargo are the leading commodities imported to, exported from, and transported within the Study Region in 2003 and projected in 2035.

Approximately 37 percent of rail freight to and from the study region remains in Texas, while 35 percent travels to or from the Eastern U.S., 21 percent travels to or from Mexico, and the remainder travels to or from the Northern and Western U.S. Within Texas, large volumes of rail tonnage were moving between the Study Region and Houston, the Dallas-Fort Worth Metroplex, San Antonio, and Corpus Christi in 2007 as well as projected in 2035. The primary U.S. destinations for rail freight outside of Texas from the Study Region are Illinois, Louisiana, California, Tennessee, and Florida. The primary U.S. origins for rail freight outside of Texas to the Study Region are Illinois, Iowa, Arkansas, Louisiana, and Nebraska.

The primary products being moved by rail in the region (in terms of tonnage) in 2003 and projected in 2035 are raw materials, food, machinery, and miscellaneous mixed loads.

Existing Infrastructure

The Lower Rio Grande Valley and Laredo Study area rail network is comprised of tracks owned by the Union Pacific Railroad (UP), the Kansas City Southern Railway Company (KCS), and multiple shortline railroads. The shortline railroads serving the region include the Border Pacific Railroad (BOP), the Brownsville and Rio Grande International Railroad (BRG), and the Rio Valley Switching Company (RVSC). The Burlington Northern Santa Fe Railway (BNSF) also has trackage rights allowing the railroad to operate between Brownsville and Houston as well as between Eagle Pass and San Antonio. The region's infrastructure includes more than 600 miles of mainline track.

The Study region includes three ports within the Study region (Ports of Brownsville, Port Isabel, and Harlingen), all of which are located in Cameron County. The Study Region also includes three rail border crossings with Mexico, which are located at Brownsville, Laredo, and Eagle Pass, and ten border crossings with Mexico that are used by freight trucks.

The Study Region includes several major U.S. and interstate highways, including I-35, U.S. 281, U.S. 59, U.S. 83, and U.S. 77; although, very few areas within the study region were shown to be congested with high volume to capacity ratios in the base year or in the future year. The few locations of projected congestion were located in McAllen and Laredo.

The Federal Railroad Administration (FRA) has reported 104 incidents between trains and vehicles at public and private railroad crossings occurring from 2005 through 2009 for the Lower Rio Grande Valley and Laredo Region, including 25 injuries and 8 fatalities. The grade separations and crossing closures identified in this report play an instrumental role in improving public safety at roadway-rail crossings within the region.

Existing Freight Rail Operations

Approximately 385 trains per week travel within the study region rail network in the base case, which represented conditions in 2008. About half of all trains in the simulation used the UP Brownsville Subdivision, another 37% used the UP Laredo Subdivision, and about 10% used the KCS between Robstown (near Corpus Christi) and Laredo.

The UP Brownsville has reached practical capacity based on the modeled train volumes. Expanded capacity is more likely to be required north of Robstown, through Odem and Sinton to Inari. This section of the Brownsville Subdivision is used by UP trains as well as KCS and BNSF trains operating across the UP line under trackage rights agreements. Since the 1979 abandonment of the SP line between Coleto Creek, Beeville, Skidmore, and Alice, there is no alternate route through this part of the state.

The UP has improved the Laredo Subdivision in recent years with CTC signals and longer sidings, which added capacity to the line. Based on the RTC modeled train counts and distribution frequency, the subdivision appears to be adequate to current demand.

The KCS Laredo Subdivision has available capacity for growth; however, through-trains using this route must also use the UP Brownsville Subdivision between Robstown and Bloomington (near Victoria) and are still affected by capacity constraints. While KCS' re-building of the abandoned line between Rosenberg and Victoria helps create capacity north of Bloomington, it does not address the bottleneck south of Bloomington.

The Brownsville border crossing likely has available capacity on the U.S. side, although the Mexican side is likely a constraint on the TFM line between Matamoros and Monterrey.

An improved rail system can promote continued growth in the local economy as well as support the shifting of truck cargo to rail cars, potentially providing congestion relief on regional freeways. It can strengthen the region's global competitiveness in goods movement and help citizens reap the benefits associated with economic growth and vitality. This report recognizes that improvements made to the region's transportation infrastructure must describe both public and private benefits, so that the costs for the improvements are apportioned in a fair and balanced manner to all parties involved.

Identified Improvements

At an estimated cost of $141.2 million, 15 identified potential grade separations would separate railroad lines from streets, thereby reducing safety hazards and delays. For the citizens that travel across these roadway-rail crossings, these projects could provide relief from blocked intersections and traffic congestion on the roadways. It also means improved safety by allowing emergency and law enforcement vehicles to respond without delay at the crossings, while improving the quality of life for residents in the impacted neighborhoods. The estimated public benefit of the identified grade separations totals nearly $196 million.

Also identified are 15 locations where grade crossings may be closed and rerouted to either an existing or potential grade separation for an estimated cost of $150 thousand. These safety improvements minimize conflict points between trains and cars by closing crossings and encouraging motorists to use grade-separated roadways or alternate streets, which have been better safety systems in place. The estimated public benefit value for the crossing closures totals approximately $7 million.

Since the modeling results indicated there were no significant constraints for existing rail operations in the study region, projected growth was modeled for several future year scenarios to determine rail improvements that would be needed to accommodate such growth. Planning Cases were modeled using Rail Traffic Controller (RTC) to test identified improvements intended to improve railroad operating efficiency and performance or add capacity in the region. The planning cases modeled are listed as follows:

- Base Case – Existing conditions
- Planning Case 1 (PC 1) – 10 year growth scenario
- Planning Case 2 (PC 2) – 15 to 20 year growth scenario
- Planning Case 3 (PC 3) – Updated Base Case to include recent improvements
- Planning Case 4 (PC 4) – 20 to 30 year growth scenario

- Planning Case 5 (PC 5) – Tested Harlingen Yard relocation and Commerce Street connection in Harlingen to improve vehicular mobility in Harlingen

Potential improvements to the existing rail network are listed in Table 1 along with implementation timeframes, estimated order-of-magnitude costs, estimated public and private benefits and associated planning cases. Some of the long-term improvements were not included in the modeled planning cases and should be investigated further in independent cost-benefit analyses if determined to be desired by the region.

Subdivision	Rail Improvement	Estimated Cost	Planning Case	Total Cost	Estimated Public Benefits	Estimated Private Benefits	Estimated Timeframe
Brownsville	CTC from Inari south to Sinton and from Odem south to Robstown	$82,900,000	PC 1 (10%, 5 to 10 year growth)	$107,500,000	n/a	$28,500,000	Near-Term
Brownsville	Sidings extensions at Woodsboro, Sarita, and Norias	$2,400,000					Near-Term
Brownsville	New siding at Kingsville	$5,000,000					Near-Term
Brownsville	Upgraded switches at sidings between Robstown and Harlingen	$5,300,000					Near-Term
KCS Laredo	Upgraded switches at sidings between Robstown and Laredo	$6,400,000					Near-Term
UP Laredo	New Sidings at Artesia Wells	$5,500,000					Near-Term
Brownsville	Sidings extensions at Sinton	$6,700,000	PC 2 (18%, 10 to 20 year growth)	$17,500,000	n/a	$37,200,000	Mid-Range
UP Laredo	New Sidings at Armour and Dilley	$10,800,000					Mid-Range
Brownsville	Bloomington to Placedo siding track extension	$10,150,000	PC 4 (25%, 20 to 30 year growth)	$47,785,000	n/a	$41,300,000	Long-Term
Brownsville	Sinton to Odem siding track extension	$13,550,000					Long-Term
Brownsville	New sidings at Bishop and Ricardo	$11,010,000					Long-Term
UP Laredo	New siding at Natalia	$7,495,000					Long-Term
UP Laredo	Siding extensions at Finley, Callaghan	$1,970,000					Long-Term
UP Laredo	Yard lead extension at Laredo	$3,610,000					Long-Term
Brownsville	Relocate Harlingen Yard	$25,000,000	PC 5	$30,500,000	$2,270,000	-$3,100,000	Mid-Range
Brownsville	Commerce Street Connection in Harlingen	$5,500,000					Mid-Range
Brownsville	RVSC Mission Subdivision Bypass Route	$66,800,000	n/a	n/a	n/a	n/a	Long-Term
Brownsville/ Harlingen	North Rail Relocation (Harlingen Bypass)	$100,000,000	n/a	n/a	n/a	n/a	Long-Term
Brownsville	Upgrade Bridges to Load Capability of 286k pounds	$35,700,000	n/a	n/a	n/a	n/a	Long-Term

Table 1: Railroad Improvements

Anticipated public benefits of identified improvements include reduced vehicular delay times due to passing trains at roadway-rail crossings, reduced vehicle fuel consumption, improved air quality, improved public safety, improved mobility for vehicular and freight traffic, reduced noise and vibration, and increased freight movement capacity. Anticipated private benefits of identified improvements consist of improved run times and reduced delay.

Next Steps

This study was conducted to establish a needs assessment report for the stakeholders in the Lower Rio Grande Valley and Laredo region as part of the Texas statewide analysis of freight mobility and outlines potential infrastructure

improvements with their associated order of magnitude costs. The study assists in understanding the movement of freight by rail and the inherent relationships that exist between rail and truck freight shipments.

The improvements outlined in this report are intended to provide the foundation for consideration of infrastructure and facility modifications that will benefit the quality of life in the local communities, reduce the public's exposure to freight movements, enhance economic growth and development, and improve passenger and freight mobility throughout the South Texas region.

This needs assessment ultimately will assist the Texas Transportation Commission, the State Legislature, and other stakeholders in understanding the magnitude and extent of the investment required to improve regional mobility, thus providing an overview of rail funding needs within the State.

Once funding is secured, regional agencies (such as the MPOs within South Texas), in cooperation with TxDOT and the freight railroads serving the region, and other public and private partners can work together to determine which improvements may become prioritized projects. The chosen improvements can then undergo the rigorous project development schedule that includes environmental and public involvement processes.

Meeting this region's transportation needs, for both people and goods, requires collaboration, cooperation, and an understanding that the region will continue to grow. The region requires a multi-modal solution that provides economic, efficient, and safe transportation infrastructure.

SECTION 1: PROJECT BACKGROUND

Regional Setting

The United States – Mexico border extends for nearly 2,000 miles from San Diego, California to Brownsville, Texas. A majority of these miles along the border are within Texas, with over one-half of the miles within Texas as a part of the Lower Rio Grande Valley and Laredo region. As a result of the expanse of border-miles and the North American Free Trade Agreement (NAFTA), numerous border crossings exist within the region that permit large amounts of freight traffic to travel between Mexico, ports and other destinations within the U.S.

The Lower Rio Grande Valley and Laredo region consists of largely urbanized areas along the U.S. – Mexico border (e.g., Laredo, Brownsville, etc) to vast, rural areas north of the border. Regional concerns for the movement of freight in the area include freight congestion, economic growth, and public safety. Major economic production in the region besides trade is in agribusiness, tourism, and retail sales due to the proximity of the border. The region is served by three Class I railroads (Union Pacific Railroad, Kansas-City Southern Railway, and the BNSF Railway, which has trackage rights) and three shortline railroads (Border Pacific Railroad, Brownsville & Rio Grande International Railroad, and the Rio Valley Switching Company).

Laredo, founded in 1755, is one of the oldest border crossing points along the United States – Mexico border and is currently the largest inland port of entry within the United States. The Laredo border crossing was initially established in the 1880s for pedestrian traffic with a bridge constructed to accommodate vehicles in 1932. Rail traffic began crossing the border at Laredo in 1920. Currently, Laredo has five border crossings, including a freight rail bridge.

Brownsville was established in 1849 at the location of a fort during the Mexican-American War. The initial border crossing in the city was constructed in 1910 and was jointly owned by the St. Louis, Brownsville, and Mexico railway and the Mexican National Railway. Since then, Brownsville has built two additional bridge crossings and reconstructed the initial crossing.

Previous Reports

One of the first tasks to be completed before proceeding with alternatives or concepts in this study was to locate and review any transportation studies previously performed within the last five years involving the Lower Rio Grande Valley and Laredo region. Additional studies or projects beyond the five year timeframe with impacts to this study were also reviewed. The studies that addressed transportation issues within the study region were identified and reviewed and are briefly summarized below:

West Rail Relocation, Cameron County, Ongoing

Cameron County, in conjunction with TxDOT and the Union Pacific Railroad (UP), is in the construction stage of the West Rail Relocation project. The relocation will create a new international border crossing with Mexico west of Brownsville and eliminate multiple grade crossings within the city of Brownsville, reducing traffic congestion within the area. The bypass alignment travels west from Olmito Yard north of Brownsville and turns south at Resaca de la Palma State Park before crossing over U.S. 281 and the Rio Grande River into Mexico. Construction of the West Rail Relocation project is scheduled to be complete in 2012.

I-35 and I-69 Corridor Studies, Texas Department of Transportation (TxDOT), Ongoing

TxDOT has been evaluating the I-35 corridor, between Laredo and the Dallas-Fort Worth area, and the I-69 corridor, extending from the Lower Rio Grande Valley or Laredo to the Texarkana/Shreveport area, for future multimodal projects that may be needed in those areas. Previously known as the Trans-Texas Corridor (TTC), the original concept has changed to smaller right-of-way widths and with focus on specific corridors. The environmental studies are ongoing from the previous TTC efforts.

Feasibility Study for Proposed International Rail Bridge, Kansas City Southern Railway (KCS), December 2007

KCS examined different alternative alignments to determine the feasibility of a freight rail border crossing near Laredo. Previously-studied locations were evaluated, including the Camino Columbia and Flecha Lane rail routes as well as three vehicular crossing sites. The Study analyzes whether a workable framework for rail could exist with these highway border crossings. Criteria for the feasibility of the border crossing alternatives include constructability, efficiency, a location outside of city centers, room for additional rail growth, and improvement of rail traffic.

An evaluation of the alternative locations reveals that the Camino Columbia location with associated track is not economically feasible. In addition, the study reveals that the Flecha Lane location and track does not address the expected future rail growth for the area and is not considered viable. Furthermore, two of the potential vehicular crossing sites near Mangana Hein Road would impact thousands of residences and businesses and are not considered viable options. One potential vehicular crossing

site, located between the cities of Rio Bravo and El Cenizo, Texas known as the East Loop location, met the criteria set for the Study.

Subsequently, the Department of State in the Volume 74, Number 17 issue of the Federal Register, dated January 28, 2009, gave notice that on December 31, 2008 it received notice from the KCS of an application for a Presidential permit to grant authorization to construct, operate, and maintain a new international rail bridge. According to the application, the proposed rail bridge would be approximately 12 miles south of the existing railroad bridge and would relocate rail traffic from the Laredo city center while providing for additional rail capacity. The application also stated the relocation would enhance corridor safety and improve the efficiency of cross-border rail crossings. Union Pacific Railroad has stated its opposition to this location since it would increase their route miles for interchanges with the KCS de Mexico.

The KCS Presidential permit application contradicts the UP and Webb County permits mentioned later in this section, and as such neither the UP or Webb County applications have advanced in their respective environmental and approval stages.

Trade Transportation Activities Report, TxDOT, December 2007

The TxDOT report discusses the freight transportation issues facing the agency and the potential solutions to transportation problems along the U.S.-Mexico border. In particular, it provides potential transportation solutions through the use of pass-through financing, new interstate-level corridors, truck-only tollways, freight rail initiatives, and efforts for improved border infrastructure and inspection for the El Paso, Laredo, and Pharr TxDOT Districts.

Pass-through financing projects in the report include the Loop 20 interchange and U.S. 277 Relief Route in the Laredo District and various roadways in Hidalgo County in the Pharr District. Two interstate-level corridors are being evaluated for the Pharr and Laredo Districts: one near the existing I-35 corridor and another along the existing U.S. 59/U.S. 77 corridor. Another project, a truck-only tollway from Laredo to Corpus Christi, would create a port-to-port route for truck freight. Also, freight rail projects mentioned include the rail connection along the Camino Columbia Toll Road, the Brownsville West Rail Relocation project, the North Cameron County Rail Relocation, and an intermodal project at McAllen.

Presidential Permit Application for the Proposed International Rail Bridge at Colombia, Webb County Rural Rail Transportation District, August 2007

The Presidential Permit application discusses the proposed double-track rail bridge at Colombia just south of the existing international bridge for the Camino Colombia Toll Road. The international rail bridge and connections would allow the city of Laredo to shift UP's rail operations outside of downtown and remove rail-related issues throughout the city. This effort is being coordinated with the Corporation for Border Development in Nuevo Leon, a state-governmental entity in Mexico tasked with planning and development.

Trans-Texas Corridor Rural Development Opportunities: Ports-to-Plains Case Study, TxDOT, April 2007

This report looks at the Ports-to-Plains Corridor's existing conditions and provides recommendations for the next steps in the development of the corridor. The Ports-to-Plains Corridor extends from Laredo at the southern terminus to Colorado at the north, encompassing the border crossings of Laredo, Eagle Pass, and Del Rio. The report delves into each major commodity's transportation demand and infrastructure inventory for the particular region.

Recommendations for the Ports-to-Plains Corridor include intermodal facilities within the Texas Panhandle region and rail connectivity, highway development south of I-20, and the establishment of Regional Mobility Authorities (RMAs) within the regions of the Corridor.

Port to Port Feasibility Study Report, TxDOT, January 2007

The report discusses the potential of a truck-only tollway (TOT) from the ports of entry in Laredo to the Port of Corpus Christi through existing and future commodity flow forecasts, an estimation of TOT demand with and without tolls, potential revenue and financing, environmental conditions, three potential and feasible routes with varying typical section designs, and order-of-magnitude construction costs.

The TOT would potentially reduce truck traffic on other highways between Laredo and Corpus Christi and potentially provide an alternative route to Houston via the terminus of the TOT. Of the three potentially-feasible alternatives shown in the report, the southern route is more desirable because of level terrain, connections to cities, and potential use of existing highway corridors. A development schedule shows environmental planning and preliminary engineering to take 3 to 5 years, final design and right-of-way acquisition for 2 to 3 years, and construction for 4 to 5 years.

U.S. 77 Interstate Tolled Truck Lane Study, TxDOT, December 2006

The Truck Lane Study provides analysis on two types of potential upgrades and modifications to the existing U.S. 77 corridor in southern Texas: upgrading the corridor to interstate standards and adding tolled truck lanes to the improved corridor. Analysis of the corridor upgrade to interstate standards includes reviews of horizontal and vertical geometric insufficiencies, access constraints, and, where applicable, alignments for bypasses. The addition of tolled truck lanes were considered alongside the improved corridor for a majority of the corridor length. Potential environmental constraints were also analyzed to identify fatal flaws for proposed improvements along the U.S. 77 corridor.

The report identifies two locations for potential bypass alignments at the towns of Riviera and Driscoll. As part of the evaluation, the existing multi-level intersection of U.S. 77 and U.S. 83 was a point of focus for the Study due to the complex structures and the impact from potential upgrades. In addition to these improvements, the report identifies alternative alignments for tolled truck lanes east of Harlingen toward the Free Trade Bridge at Los Indios, the Port of Brownsville, and the Port of

Brownsville Bridge to Mexico. Traffic projections reported in the study also show an increase in the percentage of truck traffic along the corridor for both the tolled and non-toll truck lanes scenarios.

Harlingen North Rail Relocation Study, Cameron County Regional Mobility Authority (CCRMA), October 2006

The Harlingen North Rail Relocation Study was completed in response to a CCRMA request to analyze the Cameron County Rail Relocation Project Summary Report completed by HDR Engineering in February 2006. The CCRMA report includes a review of the methodology, criteria, and assumptions of the previous report as well as further analysis on four of the rail relocation alternatives, including a no-build scenario. Also, two additional rail relocation alternatives were evaluated as part of the Study.

The Study identifies several options to meet the City of Harlingen's objective to relocate freight rail switching operations and relieve traffic congestion at road crossings. The alternative with the highest rating according to the evaluation criteria is an alignment that includes a new connecting track and interchange yard located just north of FM 106 near the Port of Harlingen. The report also included environmental constraints mapping, cost/benefit analysis, order-of-magnitude costs, and analysis of funding options for the alternative alignments that bypass Harlingen.

Track Rehabilitation of GHS&A MP 0.00 to 90.33 (Victoria to Rosenberg Line), KCS, February 2006

This publication provides a preliminary estimated cost of rehabilitation of an abandoned rail mainline from Victoria to Rosenberg, Texas. The estimate includes replacement of 24 bridges, repair of 16 bridges, removal of 4 bridges, replacement of existing drainage structures, installation of new rail, and other associated track and signal work. The estimated cost of this work as published in 2006 was $146 million. Construction of the line has been completed and KCS began operations on the upgraded Victoria to Rosenberg line on June 17, 2009.

Camino Columbia Corridor Freight Rail Feasibility Study, TxDOT, January 2006

The Camino Columbia Rail Study evaluated a new rail corridor along the Camino Columbia Toll Road that would create an alternative crossing and bypass around Laredo for potentially more efficient international movement of goods. The Camino Columbia Rail Study identifies actions and evaluations for a freight rail corridor with an international border crossing north of Laredo.

The report discussed required items for construction of the Camino Columbia rail corridor, including the international bridge, the necessary rail connections within Mexico and the U.S., and establishment of the necessary customs/inspection and railroad intermodal facilities. Additionally, three railroad configurations were evaluated, including single track without sidings, single track with sidings, and double track options, with costs ranging from $130 million to $161 million. The

report also analyzed a potential alternative that would reduce the class of track from Class 5 to Class 3 through geometric adjustments, which would decrease the costs by $1.1 million.

Hidalgo County Rail Study, Hidalgo County Metropolitan Planning Organization, February 2005

The Hidalgo County Rail Study examined 23 roadway-rail grade crossings with the Rio Valley Switching Company (RVSC) rail lines that restrict truck freight and vehicular movements due to the rapid growth of the area. These crossings, labeled as study focal points, were assessed for potential impacts to vehicular traffic and solutions were determined for improvements for vehicular safety, adjustments to rail sidings, potential grade separations, track upgrades, and track relocations. The solutions with order-of-magnitude costs are identified as short-term, mid-range, and long-term recommendations.

The Study determined that most of the grade crossings warranted additional safety measures, mainly signage upgrades. Also, six railroad siding adjustments are identified. The safety improvements and siding adjustments are considered short-term improvements to be implemented within 1 to 5 years. Mid-range improvements, implemented within 2 to 10 years, consist of grade separations at SH 107, Spur 115, Bicentennial Blvd, and U.S. 281 as well as upgrades to the class of track for RVSC to increase train speeds throughout the area. Track and yard relocations in McAllen and Pharr are considered long-term improvements, which are planned within 5 to 20 years.

Brazos Island Harbor Reconnaissance Report, U.S. Army Corps of Engineers, September 2004

The purpose of this report was to determine if there is a federal interest in widening and deepening the existing Port of Brownsville channel. The report presents concerns of potentially widening and deepening the channel, planning objectives and constraints, a preliminary evaluation of alternatives, a review of the potential economic benefits, and the next steps for the potential feasibility study. Through this report, the U.S. Army Corps of Engineers determined that there is a federal interest in widening and deepening the channel and that a feasibility study would be recommended to Congress.

Freight and Hazardous Materials Movement Study, Corpus Christi Metropolitan Planning Organization (CCMPO), June 2004

The report by CCMPO identifies key issues affecting freight movements within the region of Nueces and San Patricio Counties through interviews, previous studies, future and potential plans by regional and state planning agencies, and analysis through the Statewide Analysis Model (SAM). Although this Study focuses primarily on truck-related movements, other modes of transportation are considered within freight movements of the region.

The report discusses that improvements along U.S. 77 through the Rio Grande Valley, including improvements south of the border, could create a shift in truck traffic closer to the region. The U.S. 77 improvements may also be included in the I-69 corridor. Also, the Study mentions a potential improved connection from Laredo to Corpus Christi that could increase truck freight within the region.

Current and Future Rail Access Needs of Western Gulf – Texas Ports, Texas Transportation Institute, November 2003

The research project examined four seaports along the Texas coast and evaluated the anticipated needs for improved rail access based upon freight transportation demands. The rail solutions for the four ports of Port of Freeport, Port of Port Lavaca-Point Comfort, Port of Corpus Christi, and Port of Brownsville are focused on mainline limitations, connector needs, and other rail improvements, which include infrastructure needs at the ports, grade crossing studies, and development of inland intermodal facilities.

Multiple improvements are listed in the report for the Port of Brownsville. Due to expected increases in freight between central Mexico and the U.S., additional yard capacity would be needed around the connectors in the Brownsville and Harlingen areas. Also, the West Rail Relocation bypass west of Brownsville is listed because of the reduction in transit time and vehicular conflicts within Brownsville. Another potential improvement is a new freight-only bridge for rail and truck traffic connecting to the Port. Other items discussed as potential improvements consist of connections to the Port of Brownsville's planned container facility, modifications to track geometry, and the size of rail.

Union Pacific Railroad Presidential Permit, May 1995

The Department of State issued a Presidential permit to Union Pacific Railroad in May of 1995 for a new international rail bridge (referenced in the 2007 KCS feasibility study as the Flecha Lane location) based on UP's statement that the existing bridge was reaching capacity. Since the time of the award of the permit, the Mexican railroads with which UP connected were privatized, and this privatized entity (KCS) has made considerably more capital improvements that have increased the capacity of the existing bridge.

With the receipt of 2 additional Presidential permit requests for the Laredo region (Webb County in 2007, KCS in 2008) the Department of State deemed it necessary to determine the status of the existing permit granted to UP in 1995 to determine if the permit should be revoked, modified, or retained. Subsequently, in August 2009 the Department of State formally requested UP to outline its interest in maintaining the permit with documentation of current and planned activities to implement the project as well as coordination efforts with governmental agencies.

Union Pacific replied in September 2009, stating that both the KCS and UP have increased capacity at the rail yards (UP at Port Laredo, KCS at Sanchez Yard in Nuevo Laredo), have added Centralized Traffic Control signal systems, and

extended sidings allowing trains to flow more fluidly on their respective mainlines, all geared at reducing congestion at the rail bridge. UP stated that at this time the existing bridge is only at 50% capacity as a result of the infrastructure improvements made as well as improved customs processes and inspection procedures. UP also stated it is very interested in maintaining the permit as they've purchased right-of-way and planned extensively for the project, although no start date has been established. To date, the permit remains unused.

UP, in their September 2009 reply to the Department of State, stated their opposition to both the Webb County and the KCS Presidential permit applications.

SECTION 2: PURPOSE OF STUDY

The purpose of the Lower Rio Grande Valley and Laredo Region Freight Study is to provide a freight mobility report for the region, which is comprised of TxDOT's Laredo and Pharr Districts, with evaluations and recommendations for near-term, mid-range, and long-term improvements and/or activities that may reduce freight mobility impacts within the region. The overall concept of the Study is envisioned to evaluate freight movements and operations within the region and identify opportunities to increase freight movement efficiency, determine the physical and financial viability of potential improvements, and include an analysis of potential alternative or additional freight rail corridors.

This report document includes an inventory of the existing freight rail system, a region-wide freight (truck and rail) operational study, and identification of freight transportation constraints in the region. This report also identifies alternatives and associated feasibility for rail system/roadway improvements within the region and describes the operational modeling results with a cost/benefit analysis.

Project Approach

This study was completed to address the following goals:

- Inventory Existing Rail System
  - Review previous freight/passenger rail corridor studies conducted within the past 5 years that are applicable to the study area.
  - Determine the physical characteristics of the existing rail lines in order to create a rail network inventory.
- Conduct a Port Operational Study for the Region
  - Determine existing landside port freight volumes and their operational impacts within the study area.
  - Project landside port traffic and freight volumes to the year 2035 and analyze current and projected freight commodity movements.
- Conduct Region-Wide Freight Operational Study
  - Meet and coordinate with freight rail carriers within the region regarding existing traffic volumes and operational impacts within the study area.
  - Meet and coordinate with TxDOT, the MPOs within the study area, and/or truck freight carrier associations within the region regarding existing traffic volumes and operational impacts of truck traffic within the study area.
  - Project freight rail and truck volumes to the year 2035 and analyze freight commodity movements.
- Identification of Freight Constraints
  - Determine infrastructure constraints inhibiting freight rail efficiencies.
  - Determine vehicular freight movement constraints and/or conflicts that inhibit traffic mobility along the major and minor arterials within TxDOT's Pharr and Laredo Districts.

- Identify Freight Rail and Rail/ Roadway Interface Safety Issues
    - Provide data and statistics for train accidents and derailments as well as vehicle/ train accidents
- Develop Alternatives and Feasibilities for Rail Improvements
    - Identify potential improvements to increase efficiency of rail operations in the study region
- Model Improvements
    - Determine operational impacts of identified rail improvements
    - Estimate associated costs and benefits
- Conduct Roadway/ Rail Grade Crossing Impact Analysis
    - Identify grade crossings with the highest public cost associated with vehicular impedance (delay) and safety
    - Identify potential improvements at grade crossings
    - Estimate associated costs and benefits

SECTION 3: FREIGHT MOVEMENTS ANALYSIS

Introduction

As mentioned in the previous section of the report, the purpose of this study is to analyze freight movements and operations in the Lower Rio Grande Valley and Laredo region comprised of TxDOT's Laredo and Pharr Districts with the goal of identifying freight movement constraints and potential improvements. The Study Region is comprised of 15 counties as shown in Figure 3-1.

The process of exploring the future freight outlook for the region requires that the best available tools be used to examine current and future commodity flows within the region. This section of the study describes the available tools as well as the freight modeling process and methods to forecast truck and rail freight flows to and from the region. Following the modeling methods section, technical information is provided on truck and rail freight flows to, from, and within the region. This section of the report also describes freight movements to and from the ports and at border crossings located within the Study Region.

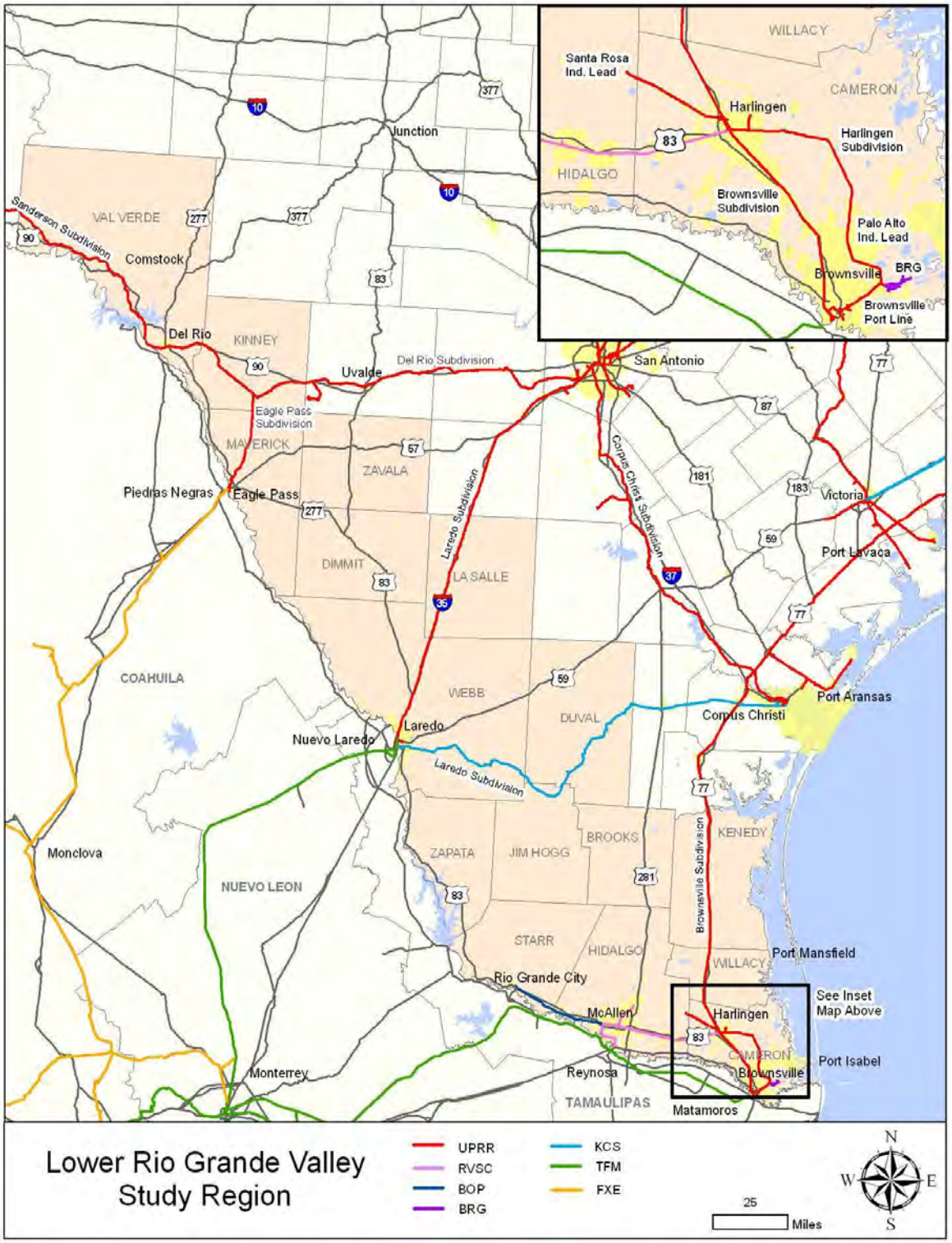


Figure 3-1: Study Region Map

Freight Modeling Methods

The transportation system was analyzed and evaluated in this study using the Texas Statewide Analysis Model (SAM) and its components. The Texas SAM is a data rich resource and the only readily available, validated planning tool that comprehensively covers the entire State of Texas. One component of the SAM is the Texas-North American Freight Flow Model (TX-NAFF model). The TX-NAFF consists of a roadway network, rail network and zone structure that covers North America. In the case of this study freight rail trip tables were developed from 2007 STB Waybill data in order to develop a data source with which to update the SAM base year freight rail flows.

The SAM is a critical tool for analyzing current and future freight movements for the study area in the context of all passenger and freight movements on the system.

The following sections briefly describe the use of the SAM and its companion models to assign 2003 and 2035 truck freight flows as well as 2007 and 2035 rail freight flows to the highway and rail systems.

One base year scenario and two forecast year scenarios were modeled for the current study. The base year run served to validate the model and establish the current conditions. The base year and forecast year scenarios are:

- 2003 Base Year for truck freight,
- 2007 Base Year for rail freight,
- 2035 No Build Scenario, and
- 2035 Network (Build) Scenario.

The 2035 No Build Scenario explores the consequences of 2035 traffic if no new facilities are constructed, while the 2035 Network (Build) scenario explores the benefits of planned new construction.

Texas Statewide Analysis Model (SAM)

The SAM is a travel demand model developed by TxDOT to analyze passenger and freight travel within the State of Texas. The SAM covers the entire state of Texas and includes tools to help evaluate traffic originating or terminating in other U.S. states and Mexico.

In its default implementation, the SAM was validated for a 1998 base year and a 2025 forecast year. The SAM was recently updated in support of the TxDOT study “Effect of the North American Free Trade Agreement on the Texas Highway System” to a base year of 2003 and forecast years including 2030 and 2035.

The SAM uses demographic data such as population and employment combined with inventories of existing multimodal transportation networks and facilities to

predict the number of trips that will be generated and how those trips are likely to be distributed on the transportation system. The input demographics are aggregated to traffic analysis zones (TAZ). The SAM's 4,472 TAZs are depicted in Figure 3-2.

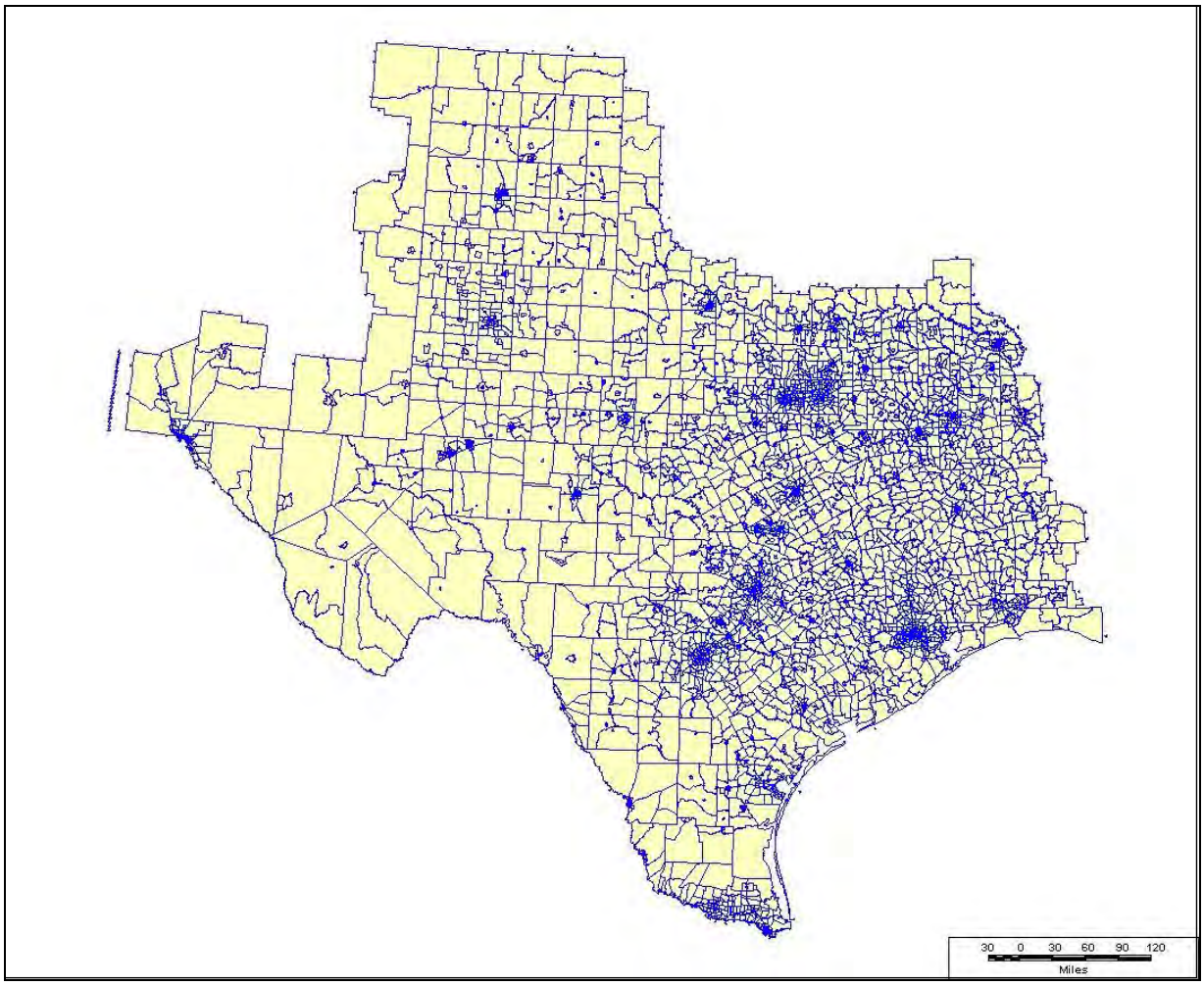


Figure 3-2: Texas SAM Zone Structure

The SAM is supported and supplemented by the Texas-North America Freight Flow Model (TX-NAFF) developed by TxDOT to account for external trips. The TX-NAFF is used to estimate trips from the Texas-Mexico external station locations to non-Texas states in the Continental United States.

The revised TX-NAFF zone structure has a total of 334 zones. These include:

- 254 Texas counties
- 48 U.S. states and the District of Columbia; and,
- 32 Mexican States

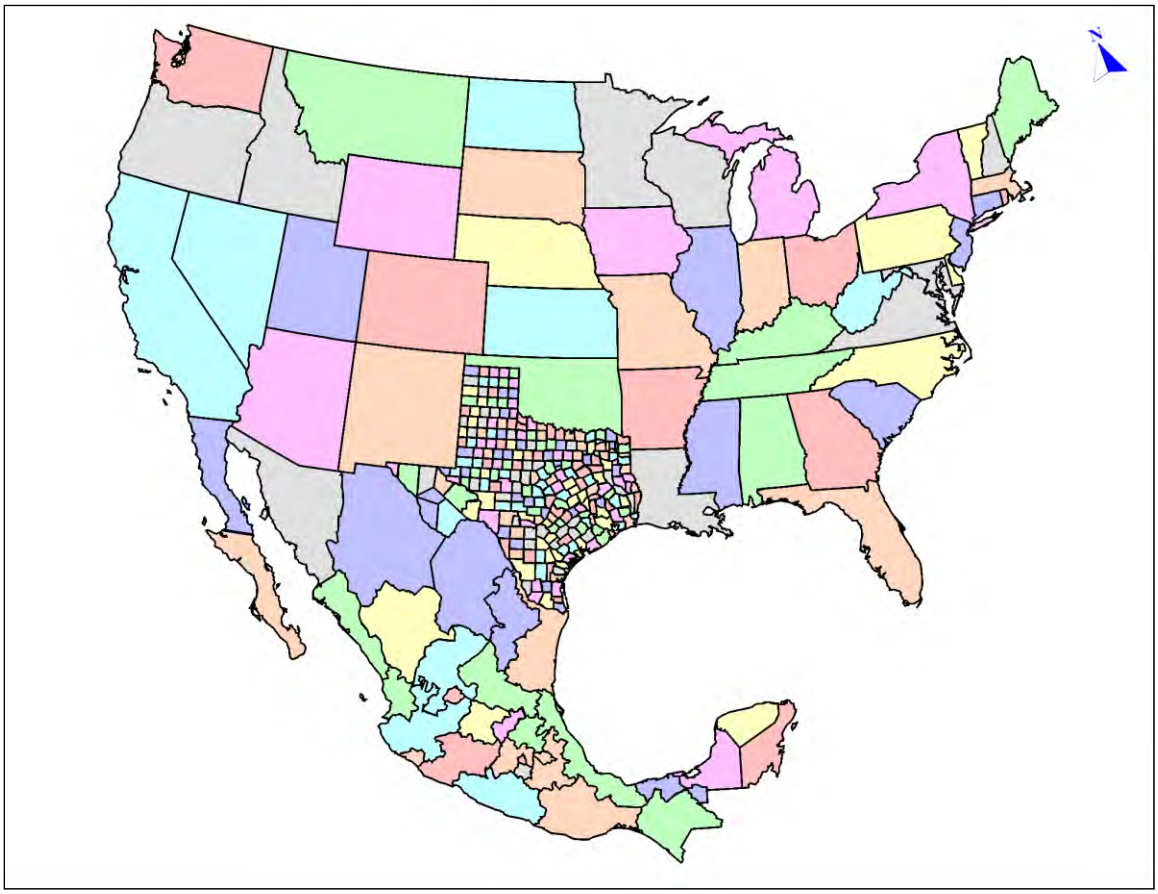


Figure 3-3: TX-NAFF Zone Structure

The SAM and TX-NAFF share a roadway network. This approach ensures network consistency across models since modifications and project additions need only be made to one network layer and further integrates the two models. The network is multi-modal in Texas containing the freight rail, passenger rail, and passenger air networks in addition to the roadway network. The roadway network is depicted in Figure 3-4.

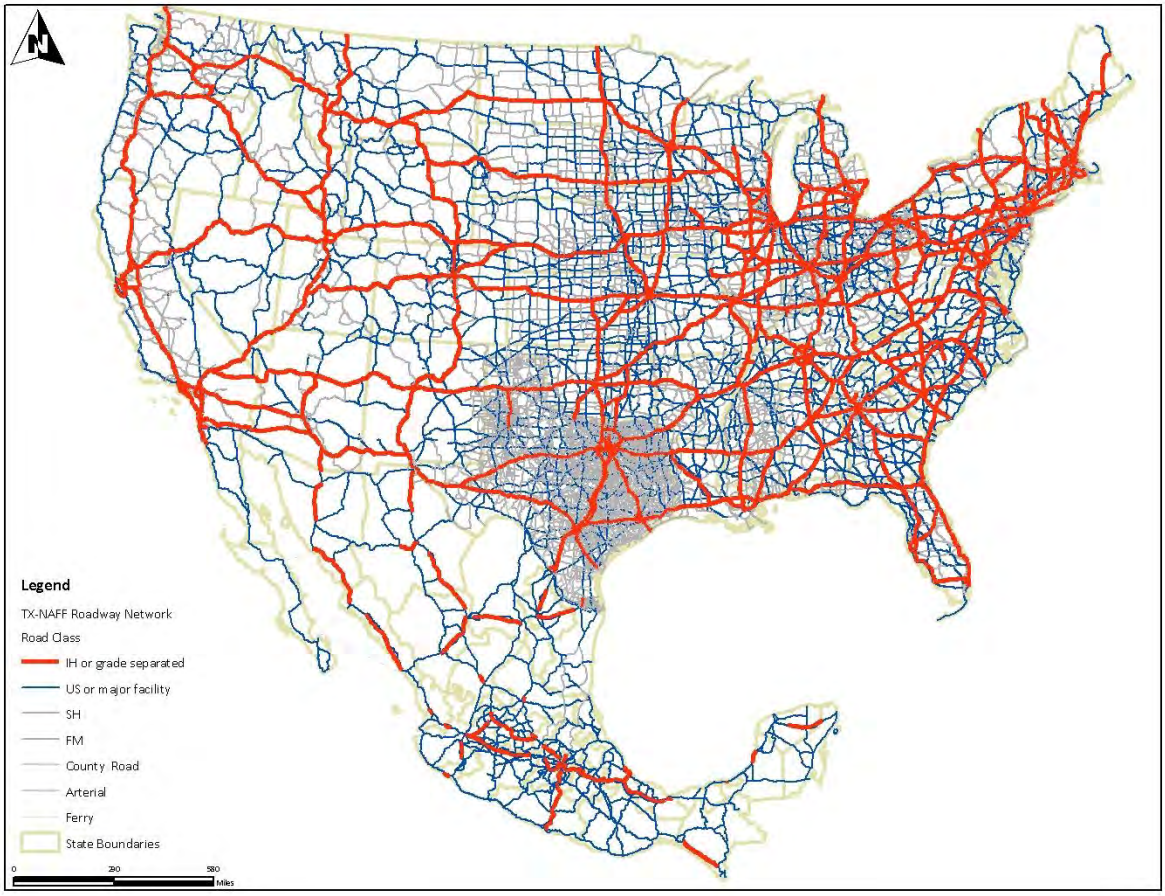


Figure 3-4: SAM and TX-NAFF Roadway Network by Road Class

2035 Roadway Network

The SAM includes roadway improvements through the year 2035. These improvements represent anticipated roadway improvements based on future growth and mobility needs. Roadway projects are based upon the information contained in MPO Long-range plans (MTPs), Transportation Improvement Plans (TIPs), and the Statewide TIP available in early 2009 prior to various Transportation Improvement Plan reductions that took place with the Fiscally Constrained version. The planned roadway projects for the Study Region, at the time the SAM analysis was performed, are shown in Figure 3-5.

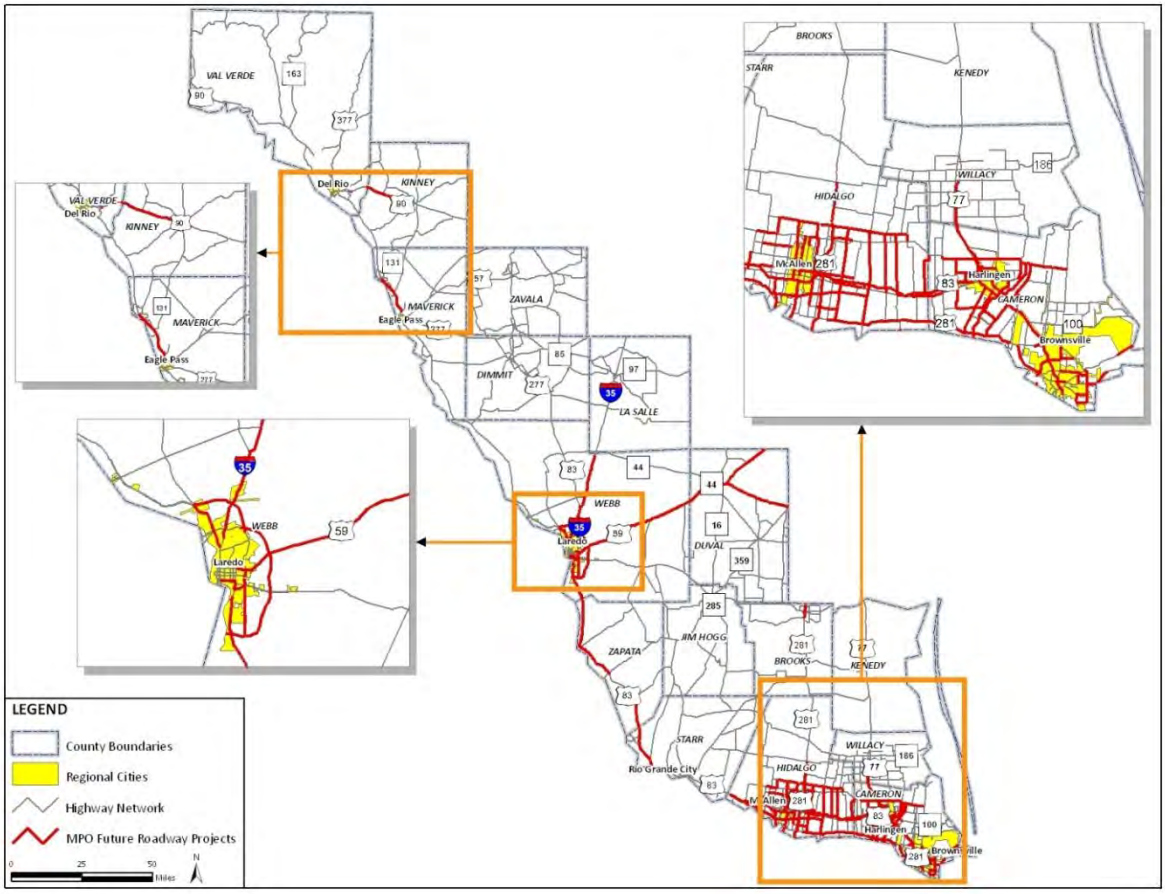


Figure 3-5: Planned Roadway Improvements

Counts

To provide a basis to validate the SAM and TX-NAFF models both vehicle classification and annual counts are included on the roadway network. TxDOT conducts many times more traditional counts, which record the total number of vehicles, than it does the vehicle classification counts used to validate the truck assignment. Over 1,400 vehicle counts were placed on the SAM network. These counts were used to review and validate the base year total traffic volumes, as well as the base year truck volumes. The structure and application of each of these freight models is described in the sections below.

Freight Generation and Distribution

The SAM freight models are based upon Transearch data. This 1998 dataset includes freight movements (within, to, from, and through the State) by transport mode (highway, rail, water).

The SAM uses Transearch data to build a travel forecasting model that can predict the amount of freight tonnage transported across the state by mode. The use of tons as the unit of measure in the origin destination table allows the quantities associated with each commodity group or movement type to be retained in the

dataset and makes it possible to analyze the data by commodity group or movement type. The SAM commodity groups are listed in Table 3-1.

Commodity Group	Commodity Type (STCC2)
1 - Agriculture	**1 – Farm Products** 8 – Forest Products 9 – Fresh Fish and Marine Products
2 – Raw Material	10 – Metallic Ores **11 – Coal** 13 – Crude Petroleum or Natural Gas **14 – Nonmetallic Minerals**
3 – Food	**20 – Food or Kindred Products** 21 – Tobacco Products
4 – Textiles	22 – Textile Mill Products 23 – Apparel or Related Products 30 – Rubber or Misc. Plastics 31 – Leather or Leather Products
5 – Wood	**24 – Lumber or Wood Products** 25 – Furniture or Fixtures **26 – Pulp, Paper or Allied Products** 27 – Printed Matter
6 – Chemicals/Petroleum	**28 – Chemicals or Allied Products** **29 – Petroleum or Coal Products**
7 – Building Materials	**32 – Clay, Concrete, Glass or Stone** **33 – Primary Metal Products** **34 – Fabricated Metal Products**
8 – Machinery	19 – Ordnance or Accessories 35 – Machinery 36 – Electrical Equipment 37 – Transportation Equipment 38 – Instruments, Photo and Optical Equip. 39 – Misc. Manufactured Products
9 – Miscellaneous Mixed	40 – Waste or Scrap Materials 41 – Misc. Freight Shipments 42 – Shipping Containers 43 – Mail or Contract Traffic 44 – Freight Forwarder Traffic 45 – Shipper Association Traffic **46 – Misc. Mixed Shipments** 47 – Small Packaged Freight Shipments
10 – Secondary	**50 – Secondary Traffic**
11 - Hazardous	48 – Waste Hazardous Materials 49 – Hazardous Materials or Substances

Table 3-1: SAM Commodity Groups

After generation the trips or tonnage are distributed between origins and destinations based upon average trip length information gathered in surveys and from patterns evident in the Transearch dataset.

Freight Mode Choice

The statewide freight flow tonnage estimates (produced at the county level) are allocated to highway, rail, and waterway modes by a mode choice model. The mode choice model is based on a LOGIT probability function that estimates the probable share of freight to a given mode based upon the utility or disutility of the mode's travel times and costs relative to the other modes available.

For each mode, the mode choice model estimates the relative change from the shares observed in the base year Transearch data for each non-base year condition presented. While rail and waterborne movements are assigned to their respective networks at the county level, the highway freight tonnage estimates are disaggregated to even smaller geographic areas (traffic analysis zones — TAZ) prior to being assigned to the road network.

Assignment

The output data produced by the highway truck model consist of various delivery of service characteristics. These characteristics relate to the changes in forecast truck volumes traversing the transportation system under the conditions presented by each of the modal alternatives. Based on the input-output requirements of the various modal alternative analyses being conducted, the highway truck model architecture has been designed to provide the following summary output data:

- Vehicle Miles of Travel (VMT) – by vehicle class (passenger, non-freight truck trips, freight truck) and highway class – in vehicle miles
- Daily truck trips by commodity and OD pair (trip table) – These data are in the form of a truck trip table or matrix.
- Truck travel time between OD pairs. These data are in the form of a travel time impedance matrix (SKIM matrix) with units in minutes of travel time.
- Speed and travel time attributes.

SAM Review and Adjustment

The full SAM allows trucks to be assigned on a more detailed roadway network on which the full effects of mixing with passenger vehicles can be evaluated. In order to effectively apply the SAM in the current study, the assignment results were reviewed and validated for the 2003 forecast year.

The SAM predicted Texas state system total Truck VMT of 61,901,552 for 2003. Total truck VMT is comprised of VMT from the freight models as well as the "other" truck trip purpose which include non freight carrying trucks. This combination of trucks is used because TxDOT's VMT estimate is derived from counts that record all trucks. Table 3-2 shows TxDOT's estimate of Truck VMT for Texas.

Year	Daily Truck VMT
1993	36,562,477
1994	39,895,216
1995	41,488,956
1996	43,993,630
1997	46,224,411
1998	50,695,578
1999	54,225,320
2000	57,071,230
2001	58,109,831
2002	59,703,543
2003	**60,793,785**

Table 3-2: TxDOT Estimated Texas State System Truck VMT

Although passenger volumes were not heavily used in this study it was important to ensure the passenger models continued to validate against 2003 counts. The 2003 validation check of the total SAM traffic volumes was found to be reasonable and consistent with the original 1998 base year validation.

Because the routing of rail traffic is complicated by ownership of specific rail lanes and the trackage rights between rail companies, the SAM in its basic configuration does not contain the ability to accurately route traffic. To enhance the SAM capability to address the routing forecast requirements of this study, the 2007 Surface Transportation Board (STB) Waybill data was used to enhance the routing abilities of the SAM. The STB collects freight flow information directly from freight management companies. The STB's waybill data is considered to be an accurate sampling of freight flow.

SAM rail flows were first updated to reflect the Waybill data. The SAM's forecasted rail tonnages, by commodity type, were then routed with rail capacities and travel times developed from the Waybill data.

Additionally, the STB data, along with actual rail tonnage maps for 2007 provided by the freight railroads, were compared as a process check to validate current rail freight volumes, thus establishing a valid prediction of rail freight movements throughout the State. The modified SAM was then applied to the 2035 forecast year to produce freight forecasts by mode.

Truck Freight Movements and Commodities

The movement of freight by truck is the predominant method of freight transport within, into, and out of the Study Region in both 2003 and as projected in 2035. The largest tonnages of truck freight for the Study Region move between the region and other Texas counties. The majority of the truck freight is exported from the Study Region, with the largest destinations (in terms of tonnage) located in other Texas counties and Mexico. Nearly 98 percent of imported truck freight into the Study Region originates in Texas counties outside of the Study Region, primarily from the Houston and Dallas-Fort Worth areas.

The distribution of truck freight by origin and destination, as described above, does not change significantly from 2003 projected to 2035 with the exception of truck freight exported from the Study Region to Mexico. Truck freight originating in the Study Region and destined for Mexico is projected to more than triple between 2003 and 2035.

Table 3-3 shows that while the movement of truck tons staying within the Study Region will increase by more than 445,000 tons, it pales in comparison to the projected increases in movements coming into (approximately 14 million tons) and out of (approximately 27 million tons) the Study Region.

Annual Truck Ton				
Origin	Destination	2003	2035	% Change
From Study Region				
Study Region	Other Texas Counties	14,150,510	24,485,527	73.04%
Study Region	Western US	438,740	1,047,057	138.65%
Study Region	Northern US	1,343,099	3,047,670	126.91%
Study Region	Eastern US	2,093,223	4,580,061	118.80%
Study Region	Mexico[1]	5,376,461	17,568,202	226.76%
	Total	23,402,033	50,728,517	116.77%
To Study Region				
Other Texas Counties	Study Region	17,530,760	31,494,896	79.66%
Western US	Study Region	46,644	57,202	22.64%
Northern US	Study Region	122,537	143,985	17.50%
Eastern US	Study Region	95,693	119,300	24.67%
Mexico[1]	Study Region	114,760	122,849	7.05%
	Total	17,910,395	31,938,232	78.32%
Within Study Region				
Study Region	Study Region	479,543	925,368	92.97%

Table 3-3: Truck Freight Movements for the Study Region[1]

Table 3-4 shows that truck freight between Mexico and the U.S. is projected to more than triple between 2003 and 2035, which will result in a large increase of truck traffic through the study region.

[1] Freight Movement to/from Mexico crossing Texas border.

Annual Truck Ton				
Origin	Destination	2003	2035	% Change
From Mexico				
Mexico[2]	Study Region	86,632	87,222	0.68%
Mexico[2]	Other Texas Counties	264,396	294,895	11.54%
Mexico[2]	US Regions Outside Texas	10,294,824	37,508,505	264.34%
	Total	10,645,852	37,890,622	255.92%
To Mexico				
Study Region	Mexico[2]	4,083,956	13,893,177	240.19%
Other Texas Counties	Mexico[2]	20,890,099	71,065,854	240.19%
US Regions Outside Texas	Mexico[2]	23,057,556	72,470,967	214.30%
	Total	48,031,611	157,429,998	227.76%

Table 3-4: Truck Freight Movements between Mexico and the U.S.[2]

Truck Movements within Texas

This section shows major origin and destinations for truck freight between the Study Region and other counties in Texas. Figure 3-6 illustrates that in 2003 large numbers of trucks were moving between the Study Region and Houston, the Dallas-Fort Worth Metroplex, Waco, San Antonio, and Corpus Christi. While the major cities that were the largest origins and destinations for truck freight in 2003 are projected to remain the largest in terms of tonnage in 2035, the Austin area as well as the counties immediately north and south, the counties south of Houston, the counties just north of Dallas-Fort Worth, and El Paso are projected to emerge as major origins and destinations. Figure 3-7 shows the truck movements to and from the Study Region within Texas as projected in 2035.

These trend maps begin to bring into focus the need to plan and accommodate for trucks along the major freeway corridors both inside and outside of the major urban centers.

[2] Freight Movement to/from Mexico crossing the border of the study region.

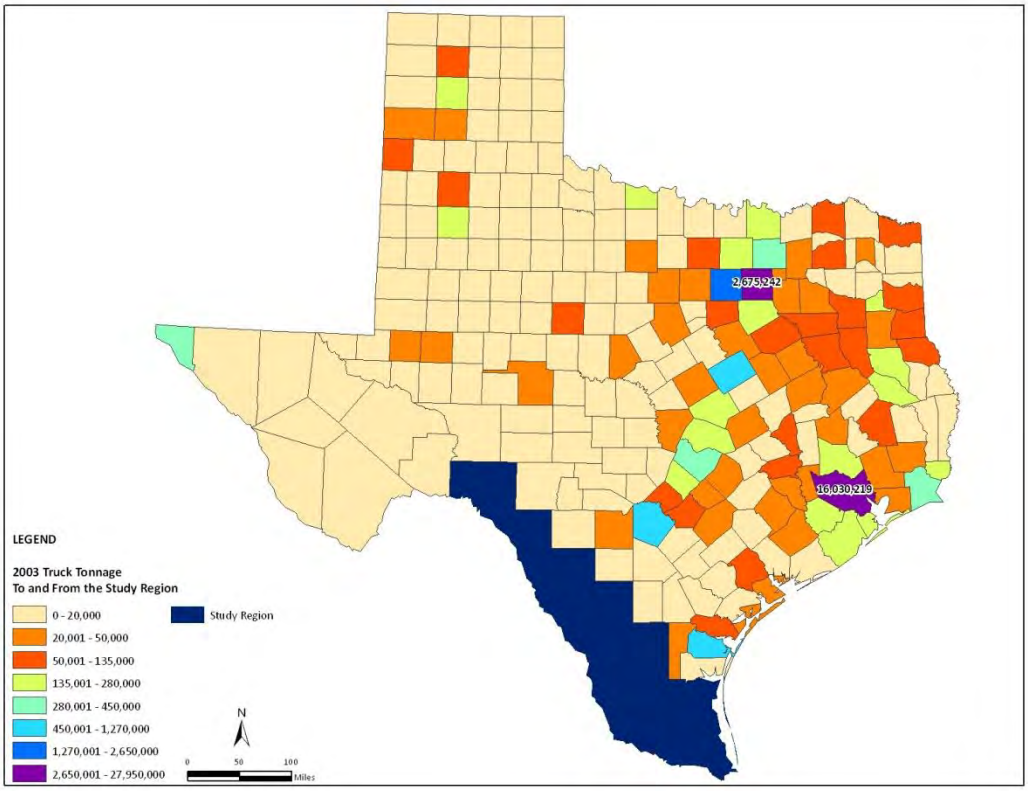


Figure 3-6: 2003 Truck Movements within Texas To and From the Study Region

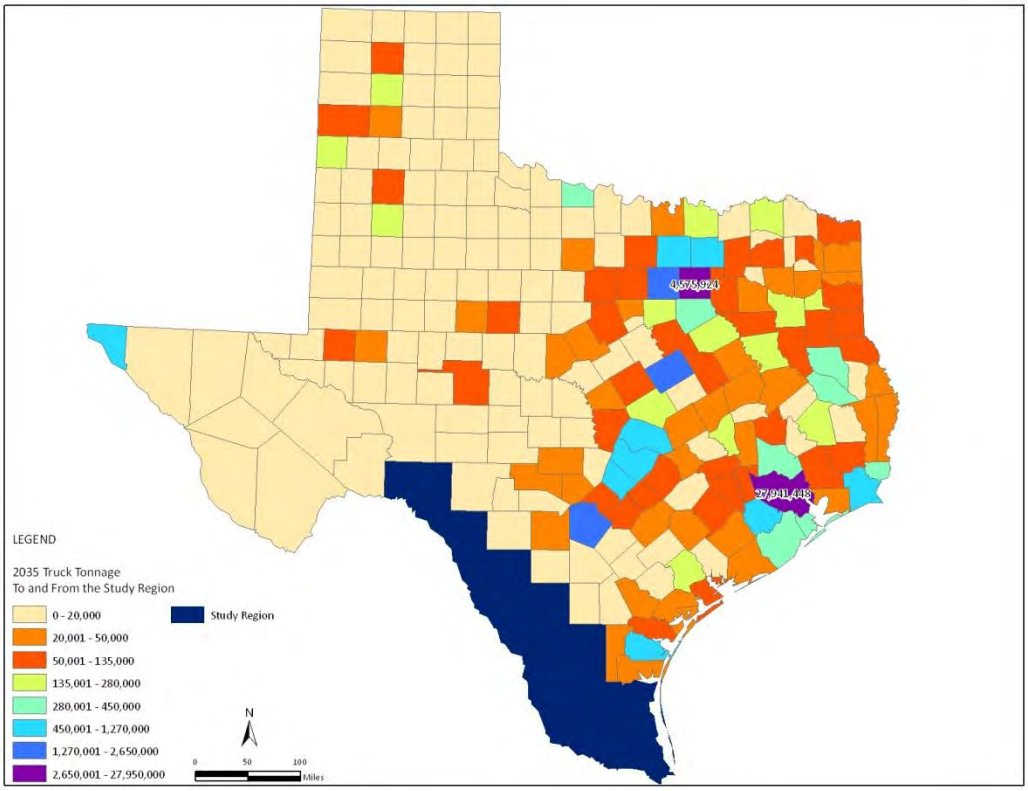


Figure 3-7: 2035 Truck Movements within Texas To and From the Study Region

Truck Movements Outside of Texas

Table 3-3 shows that truck freight activity exported from the Study Region to areas outside of Texas is projected to more than double by 2035. These movements represent trucks that are relegated to long haul trips. The majority of this traffic is destined for Mexico as shown in Figure 3-8. Figure 3-8 illustrates that nearly 68 percent of truck freight remains in Texas, the majority of which remains within 300 miles of the Study Region.

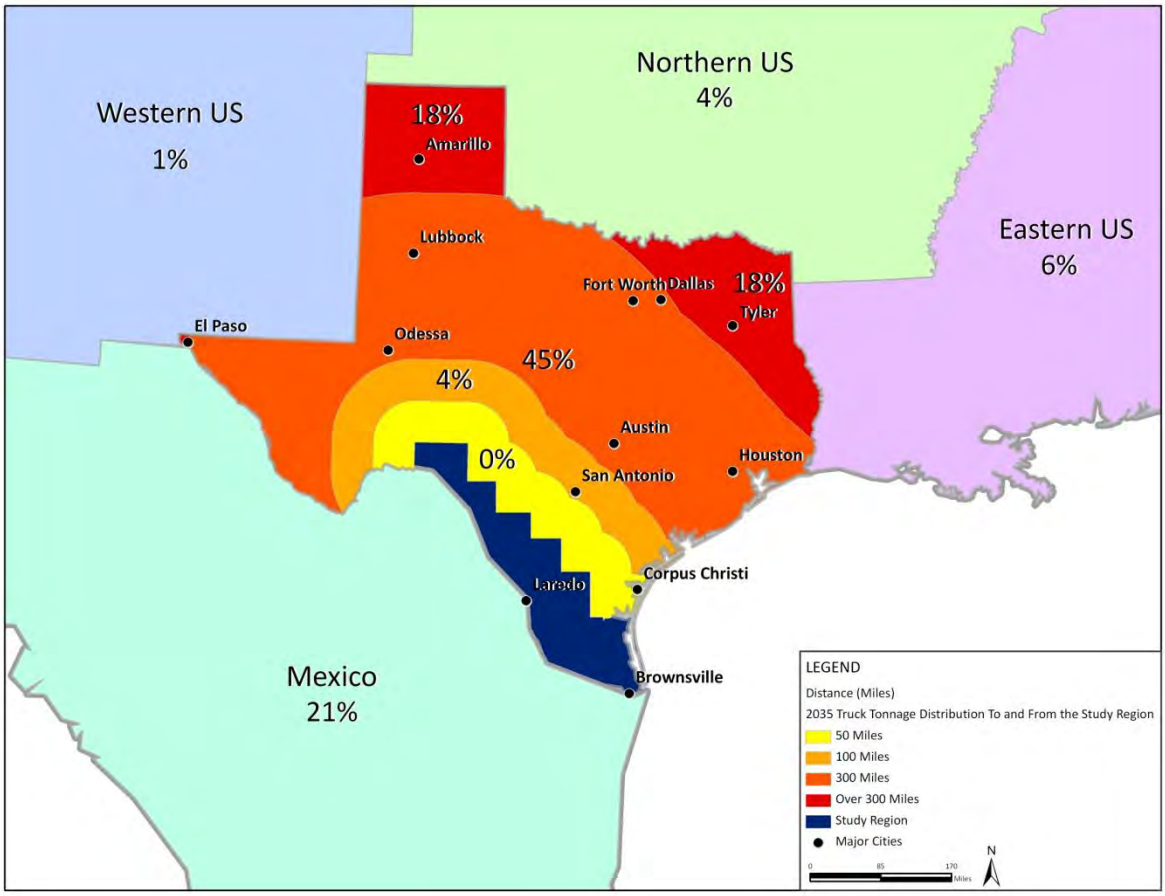


Figure 3-8: Truck Freight Distribution by Travel Distance

Figures 3-9 and 3-10 illustrate the directions of travel for truck freight between the Study Region and areas outside Texas. The majority of domestic truck freight that travels between the study region and states outside of Texas originates or is destined for the Eastern U.S. The primary U.S. destinations for truck freight outside of Texas from the Study Region are California, Tennessee, Georgia, North Carolina, Missouri, Illinois and Ohio.

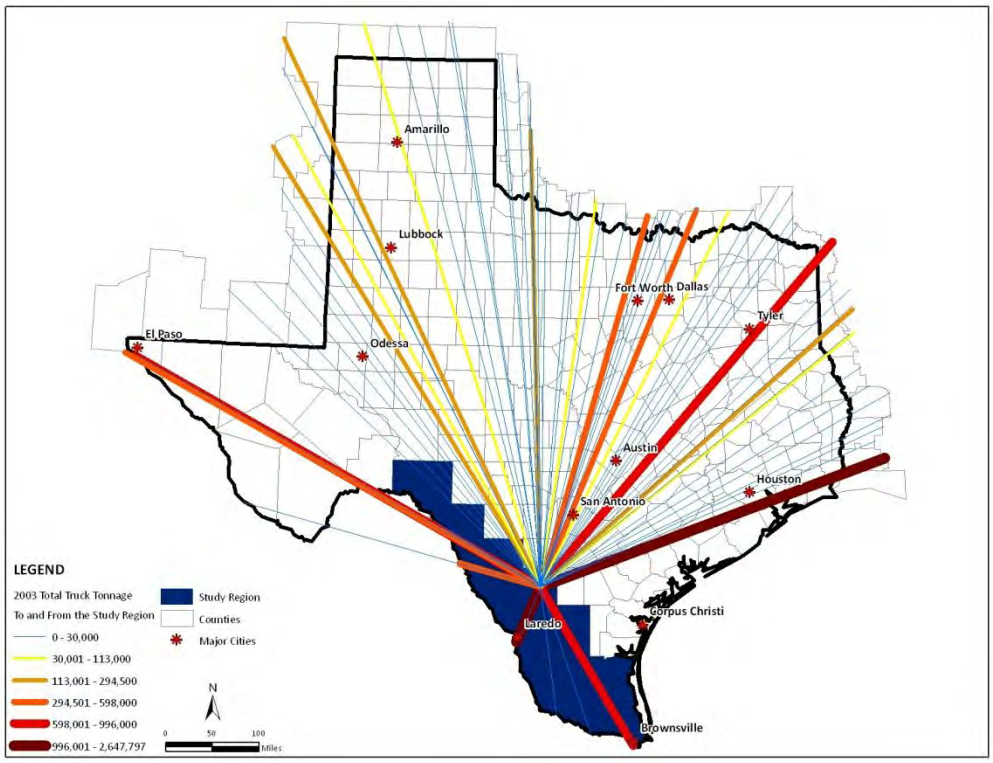


Figure 3-9: 2003 Truck Movements between the Study Region and States Outside of Texas

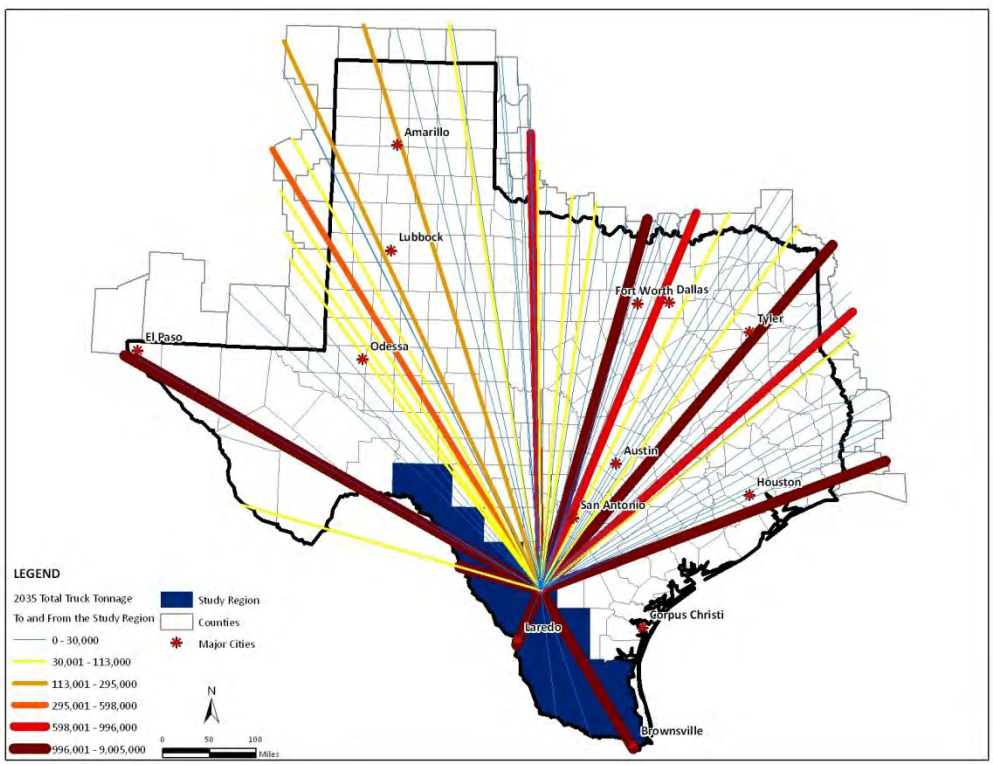


Figure 3-10: 2035 Truck Movements between the Study Region and States Outside of Texas

Truck Commodity Trends

The overall truck tonnage is projected to double within the Study Region between 2003 and 2035. Table 3-5 indicates that food, building materials, and secondary cargo are the leading commodities imported to, exported from, and transported within the Study Region in 2003 and 2035.

The greatest commodity volumes moving by truck are generally low value, bulk materials — consistent with traffic moving through bulk ports. Secondary materials consist of re-handled freight from warehouse or distribution centers, and the truck drayage portions of truck/rail or truck/air intermodal trips. Figures 3-11, 3-12, and 3-13 further illustrate the commodity tonnage distribution within the region for both 2003 and 2035.

The truck freight transported within the Study Region (internal movements) is composed primarily (more than 50 percent) of secondary products. Truck freight originating in the Study Region (exports) is more evenly distributed by commodity, with food, building materials and secondary products comprising the majority of the truck tonnage. Truck freight destined for the Study Region (imports) is similarly distributed by commodity as the exports, although Chemicals and Petroleum products make up a larger percent of the tonnage (24 percent). The distribution of truck freight by commodity in the Study Region does not change significantly between 2003 and 2035. Figures 3-14, 3-15, and 3-16 further illustrate the commodity tonnage distribution by movement type (internal, imports, exports) for 2003.

Commodity	Truck Tons To, From & Within Study Region		
	2003	2035	Study Region Annual Growth Rate
Agriculture	1,432,664	2,742,511	2.05%
Raw Material	448,295	868,464	2.09%
Food	11,420,835	22,459,202	2.14%
Textiles	974,603	2,928,418	3.50%
Wood	2,694,372	5,913,073	2.49%
Chemicals/Petroleum	6,852,722	12,860,349	1.99%
Building Material	8,236,254	15,618,468	2.02%
Machinery	1,331,514	3,604,798	3.16%
Secondary (Warehousing Cargo)	8,880,254	17,522,251	2.15%
Total	42,271,514	84,517,533	2.19%

Table 3-5: Truck Freight Commodity Distribution and Growth

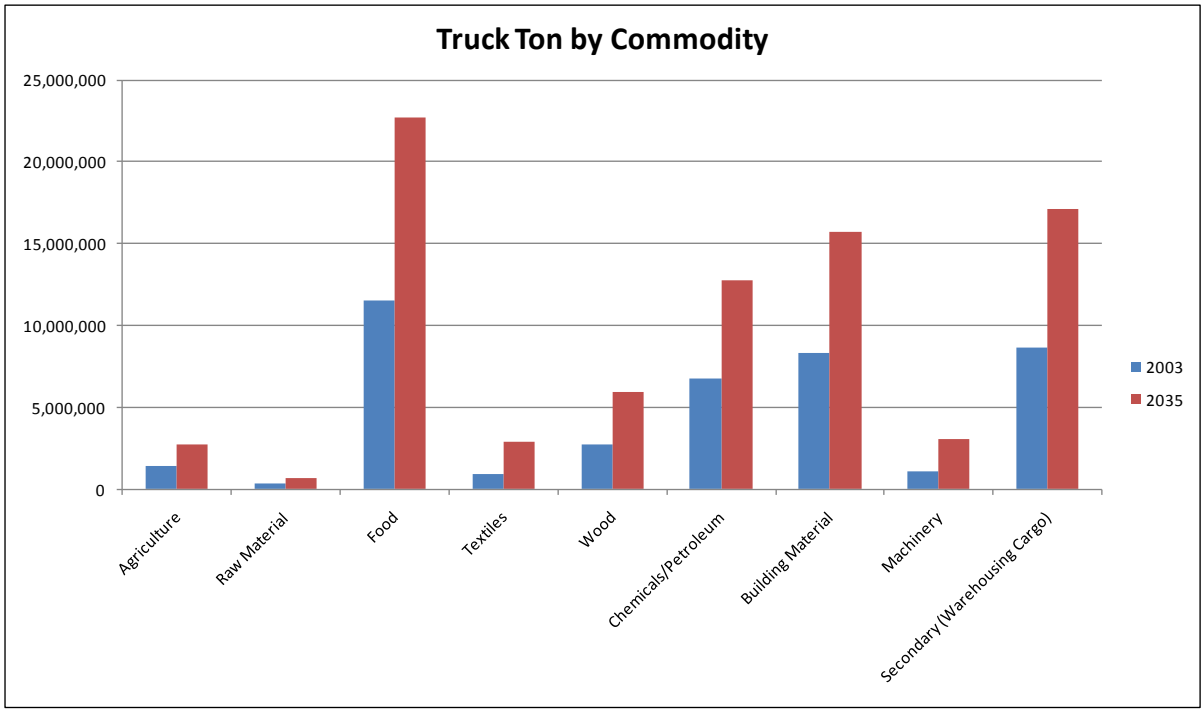


Figure 3-11: Truck Freight Commodity Distribution

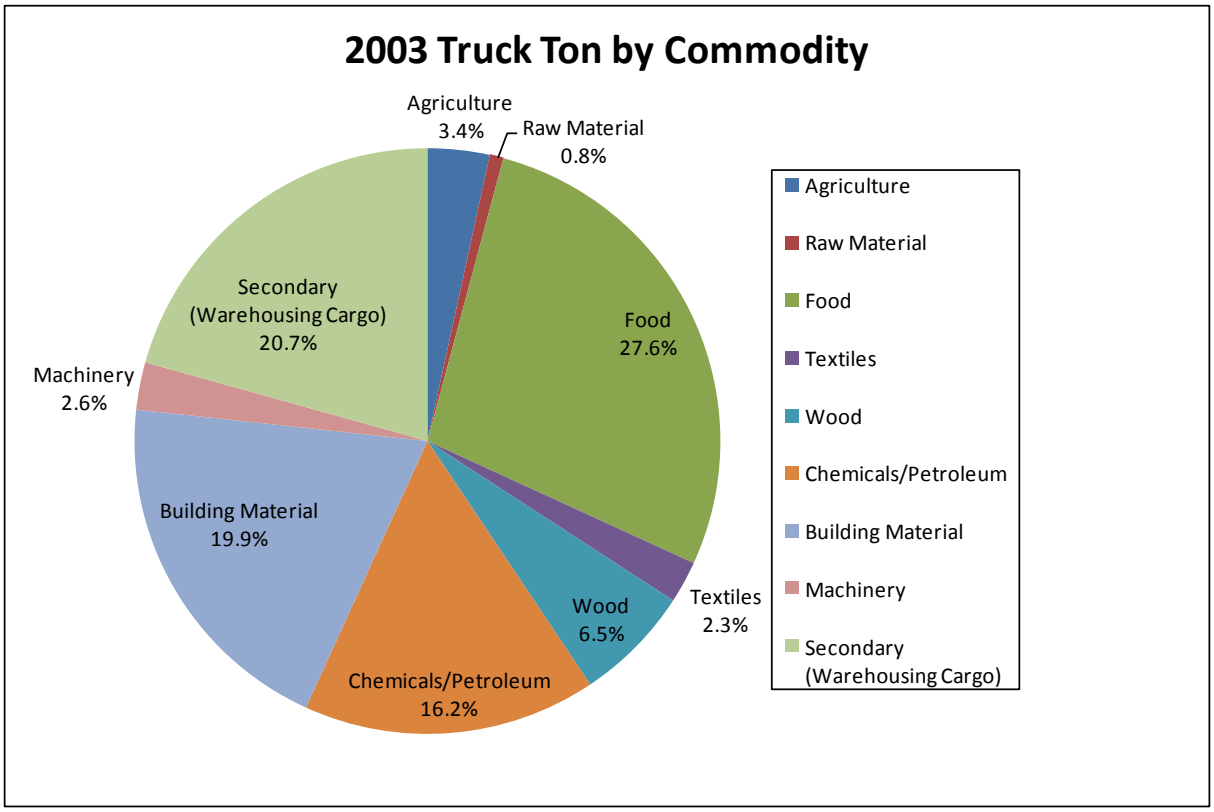


Figure 3-12: 2003 Truck Freight Into, Out Of, and Within the Study Region Commodity Distribution

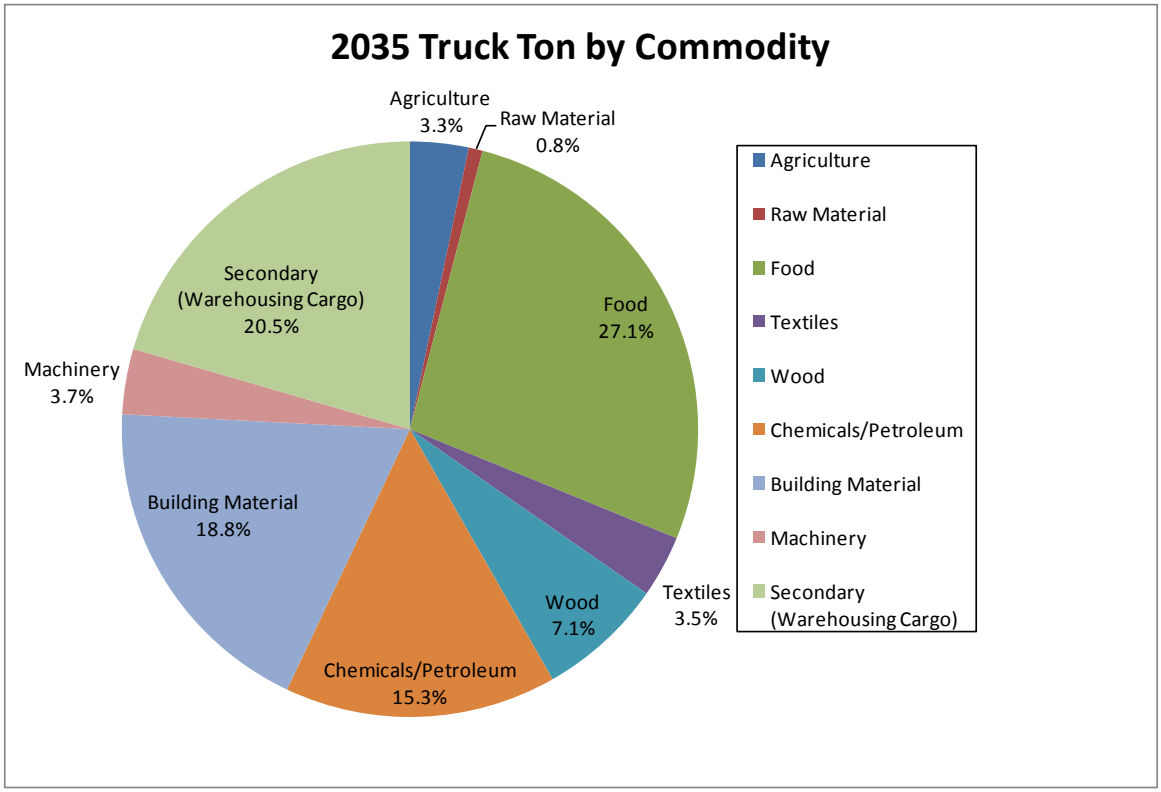


Figure 3-13: 2035 Truck Freight Into, Out Of, and Within the Study Region Commodity Distribution

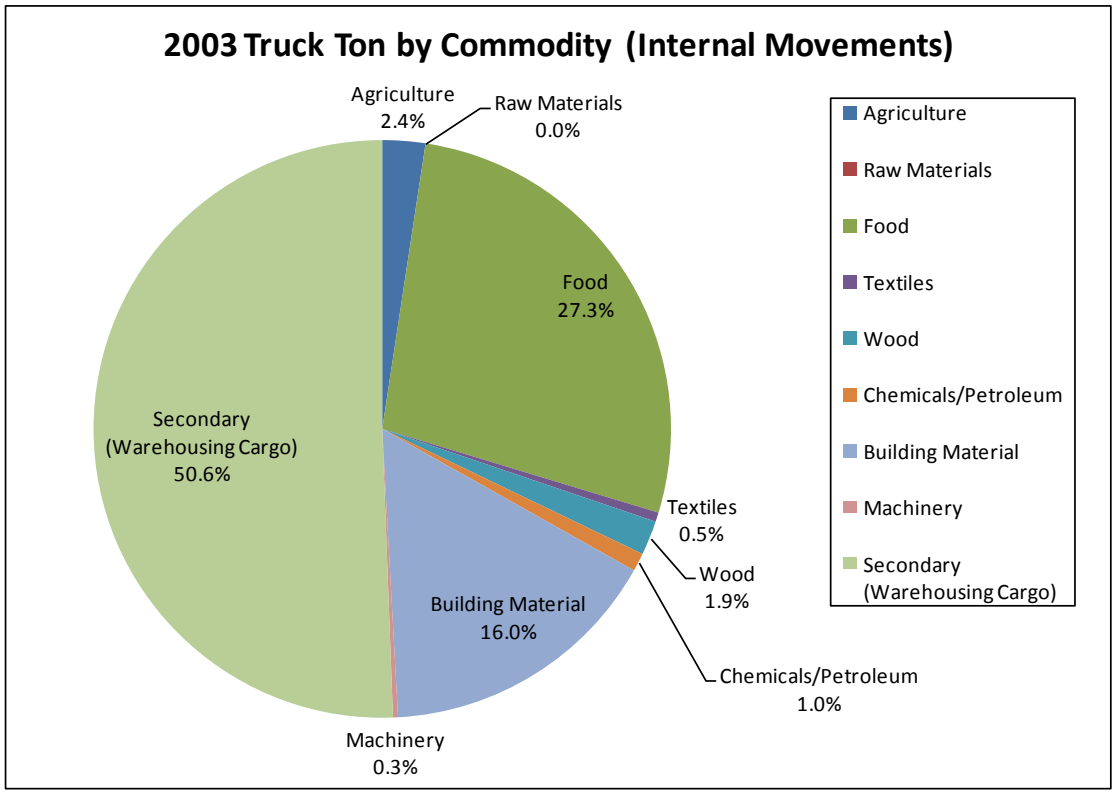


Figure 3-14: 2003 Truck Freight Within the Study Region Commodity Distribution

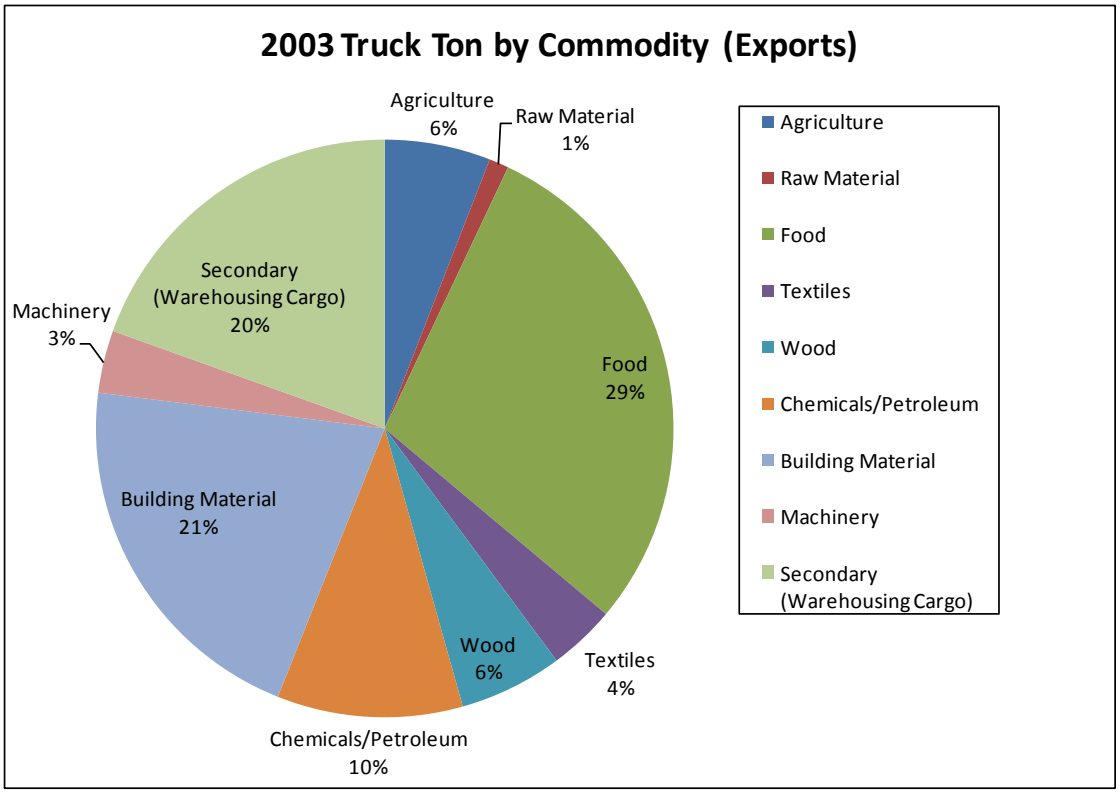


Figure 3-15: 2003 Truck Freight Out Of the Study Region Commodity Distribution

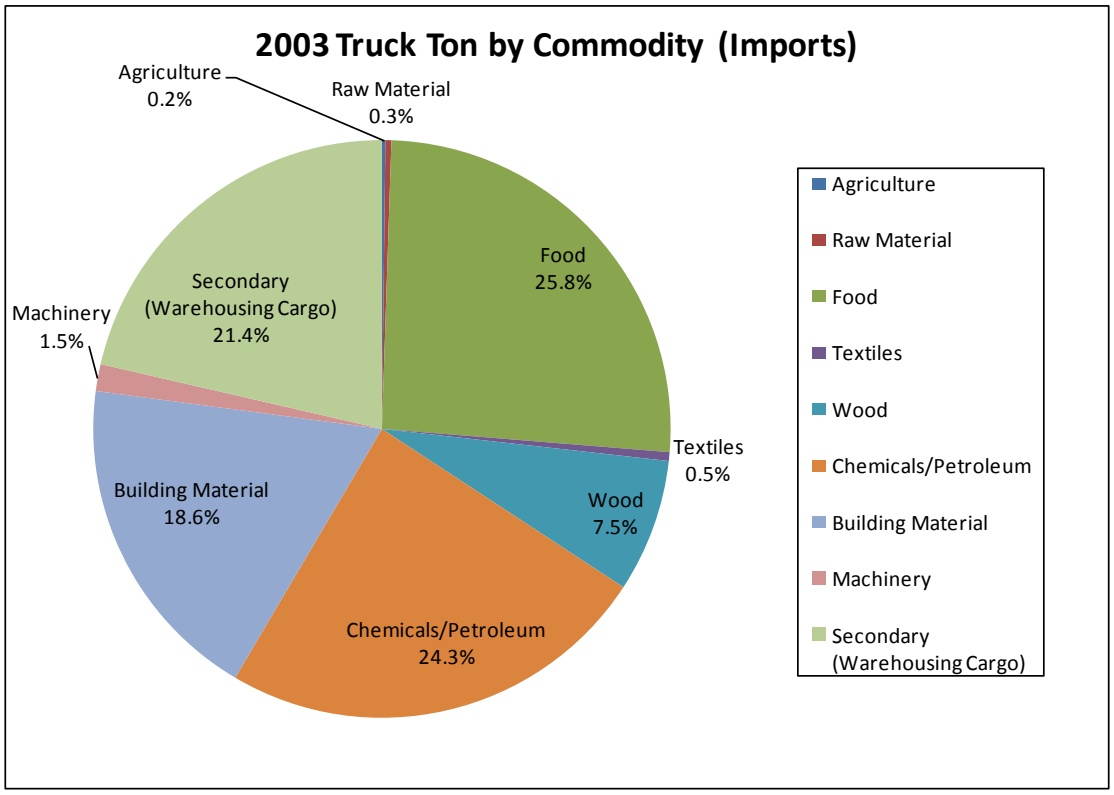


Figure 3-16: 2003 Truck Freight Into the Study Region Commodity Distribution

Rail Freight Movements and Commodities

In general, railways are best suited to hauling large, heavy, low-value loads that are not overly time-sensitive over distances greater than 700 miles. As shown in Figure 3-17, more than 63 percent of rail freight for the Study Region is transported to or from regions outside of Texas, primarily the Eastern U.S. and Mexico.

Table 3-6 shows the tonnages of freight transported by rail to and from the Study Region in 2007 and projected to 2035. In both 2007 and 2035, rail freight transported out of the Study Region (exports) is the predominant movement type. However, while a comparison of the tonnage of imports and exports is relatively close in 2007, exports are projected to double by 2035 and will be twice the tonnage of imports. The largest growth is expected in rail freight exported from the Study Region that is destined for Mexico.

Table 3-7 shows that rail freight between Mexico and the U.S. crossing the Texas-Mexico border within the Study Region is projected to more than double by 2035, which will result in a large increase of rail traffic through the study region.

Figure 3-18 shows the 2007 tonnage volumes distributed by rail line within the Study Region. The largest volumes of rail tonnage travel east-west through the Study Region on the Del Rio Subdivision. There is also a large volume of rail tonnage that travels north-south through the Study Region on the UPRR Laredo Subdivision between Mexico and points north of the Study Region.

Annual Rail Ton				
Origin	Destination	2007	2035	% Change from 2007 to 2035
From Study Region				
Study Region	Other Texas Counties	884,910	1,300,047	46.91%
Study Region	Western US	565,339	958,049	69.46%
Study Region	Northern US	187,926	280,796	49.42%
Study Region	Eastern US	3,862,314	6,536,657	69.24%
Study Region	Mexico[3]	1,617,758	3,675,003	127.17%
	Total	7,118,246	12,750,552	79.12%
To Study Region				
Other Texas Counties	Study Region	3,948,060	5,592,015	41.64%
Western US	Study Region	35,987	44,958	24.93%
Northern US	Study Region	72,193	102,760	42.34%
Eastern US	Study Region	79,779	94,513	18.47%
Mexico[3]	Study Region	187,257	233,399	24.64%
	Total	4,323,275	6,067,645	40.35%
Within Study Region				
Study Region	Study Region	13,168	18,917	43.66%

Table 3-6: Rail Freight Movements for the Study Region[3]

[3] Freight Movement to/from Mexico crossing Texas border.

Annual Rail Ton				
Origin	Destination	2007	2035	% Change from 2007 to 2035
From Mexico				
Mexico[4]	Study Region	122,142	166,742	36.52%
Mexico[4]	Other Texas Counties	434,702	529,958	21.91%
Mexico[4]	US Regions Outside Texas	4,493,502	12,244,218	172.49%
	Total	5,050,346	12,940,918	156.24%
To Mexico				
Study Region	Mexico[4]	801,044	2,129,396	62.38%
Other Texas Counties	Mexico[4]	4,097,489	10,892,202	62.38%
US Regions Outside Texas	Mexico[4]	17,550,234	42,419,068	58.63%
	Total	22,448,766	55,440,666	59.51%

Table 3-7: Rail Freight Movements between Mexico and the U.S.[4]

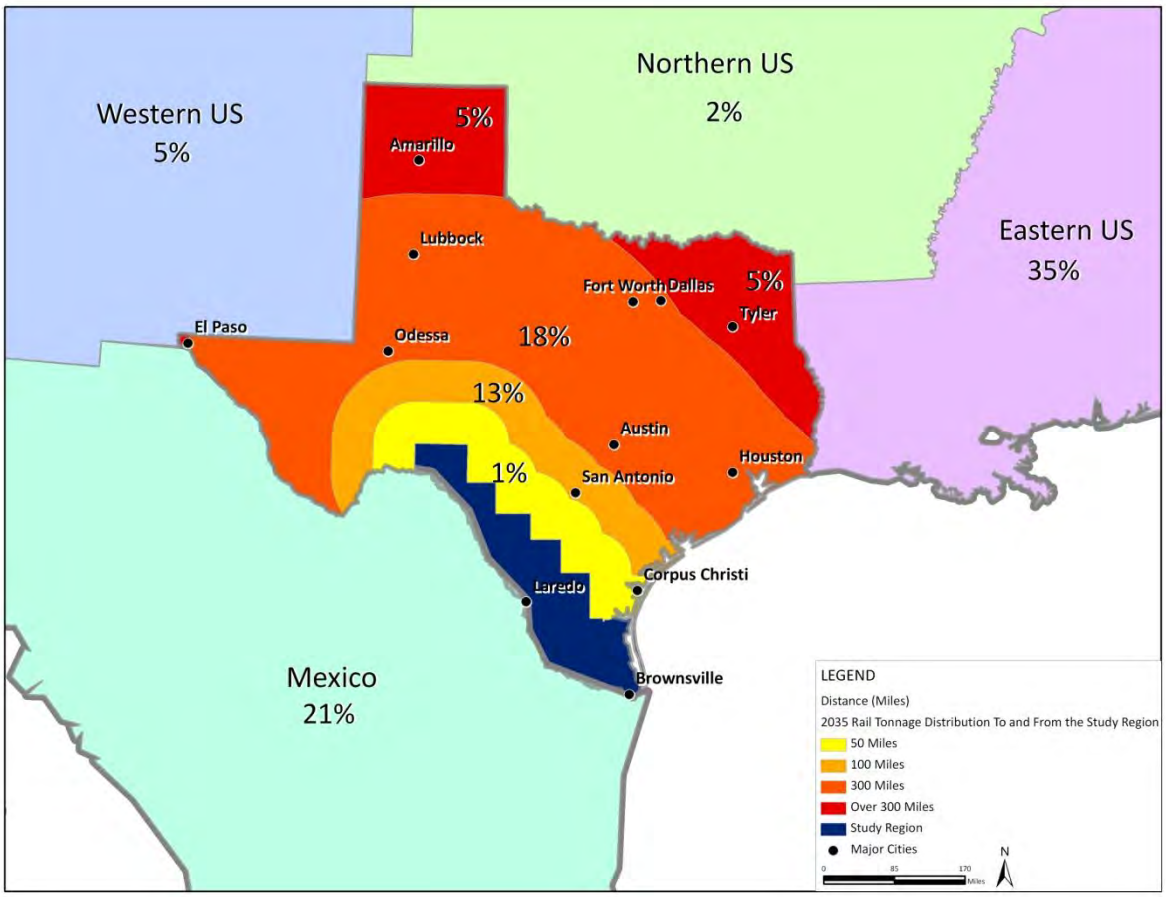


Figure 3-17: Rail Freight Distribution by Travel Distance

[4] Freight Movement to/from Mexico crossing the border of the study region.

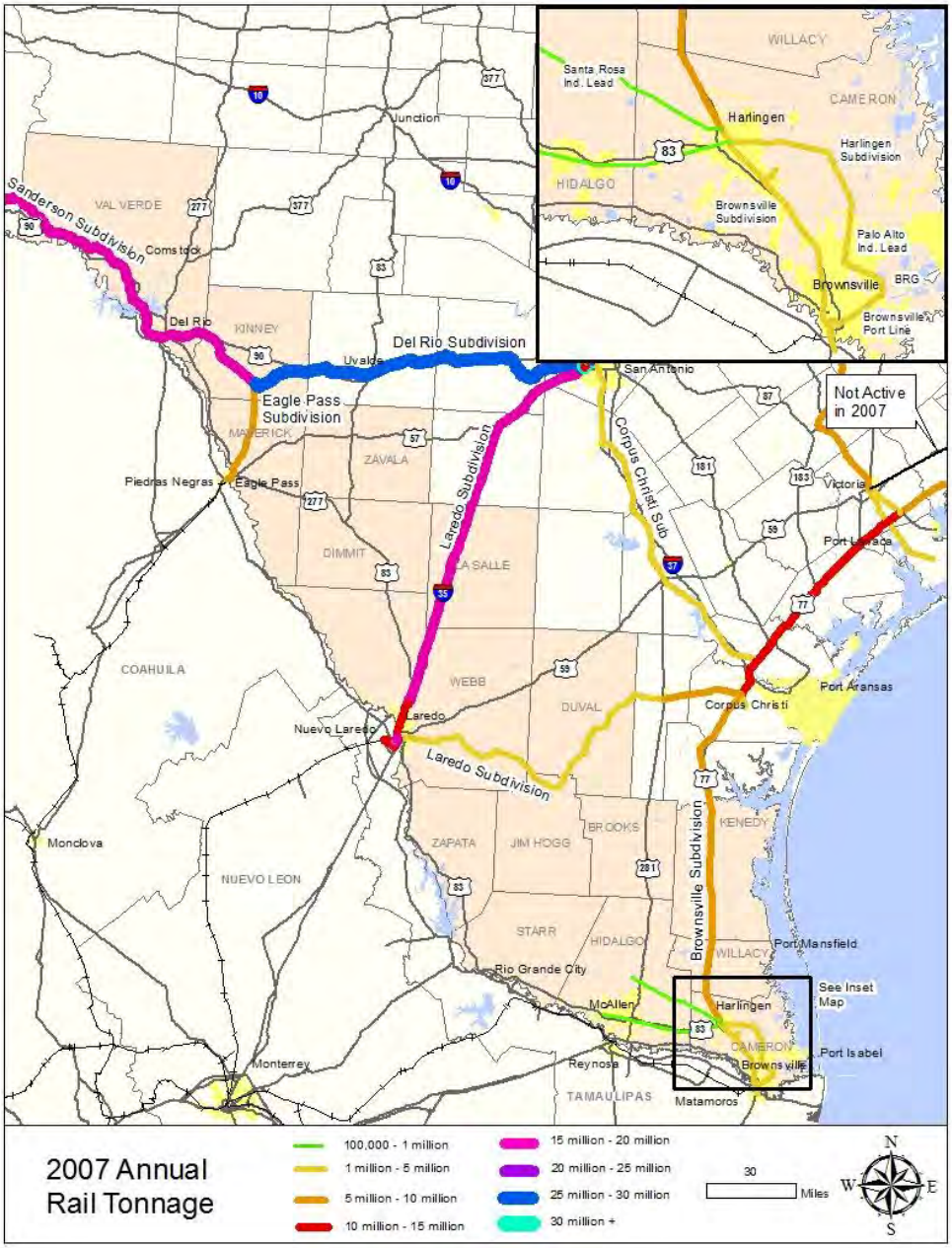


Figure 3-18: 2007 Rail Tonnage Volumes by Rail Line

Rail Freight Movements within Texas

Unlike truck freight, rail movements are limited in their ability to deliver door-to-door service. Intermodal centers, rail yards, and ports of entry are the primary locations in which rail freight can be either sent or received. Figures 3-19 and 3-20 illustrate the origins and destinations for freight rail movements between the Study Region and other Texas counties in 2007 and projected to 2035. Houston, San Antonio, and Corpus Christi were shown to be handling the largest Study Region movements in 2007 and 2035, while Dallas is projected to emerge as an additional major origin/ destination for movements to/ from the Study Region in the future.

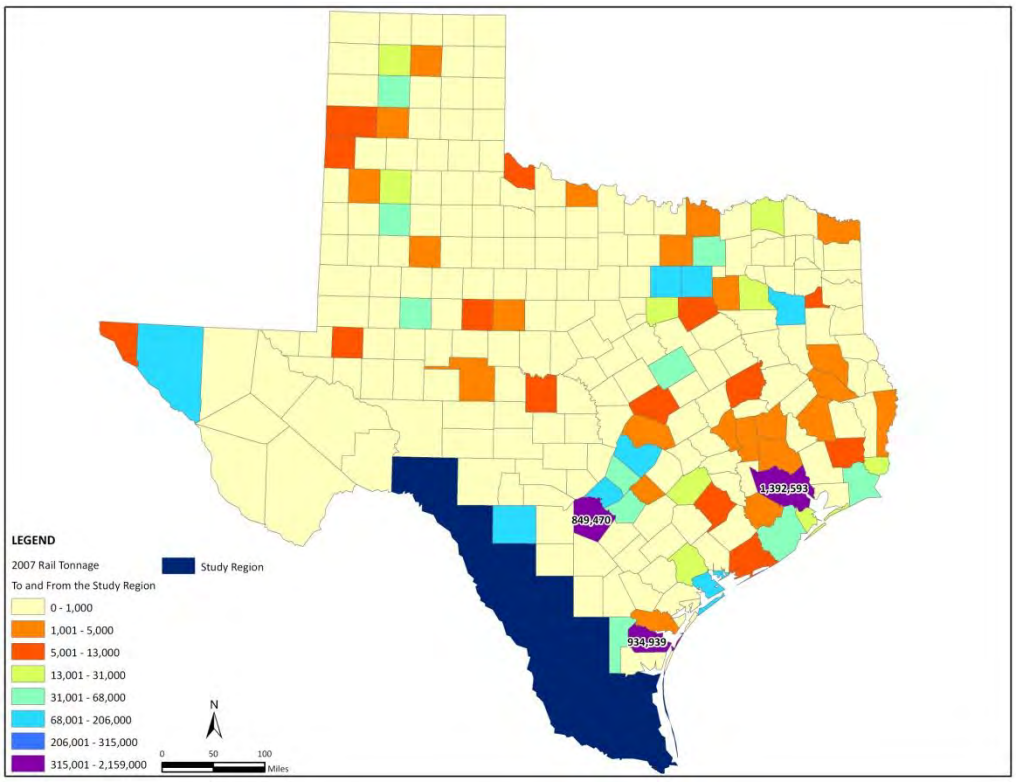


Figure 3-19: 2007 Rail Movements within Texas To and From the Study Region

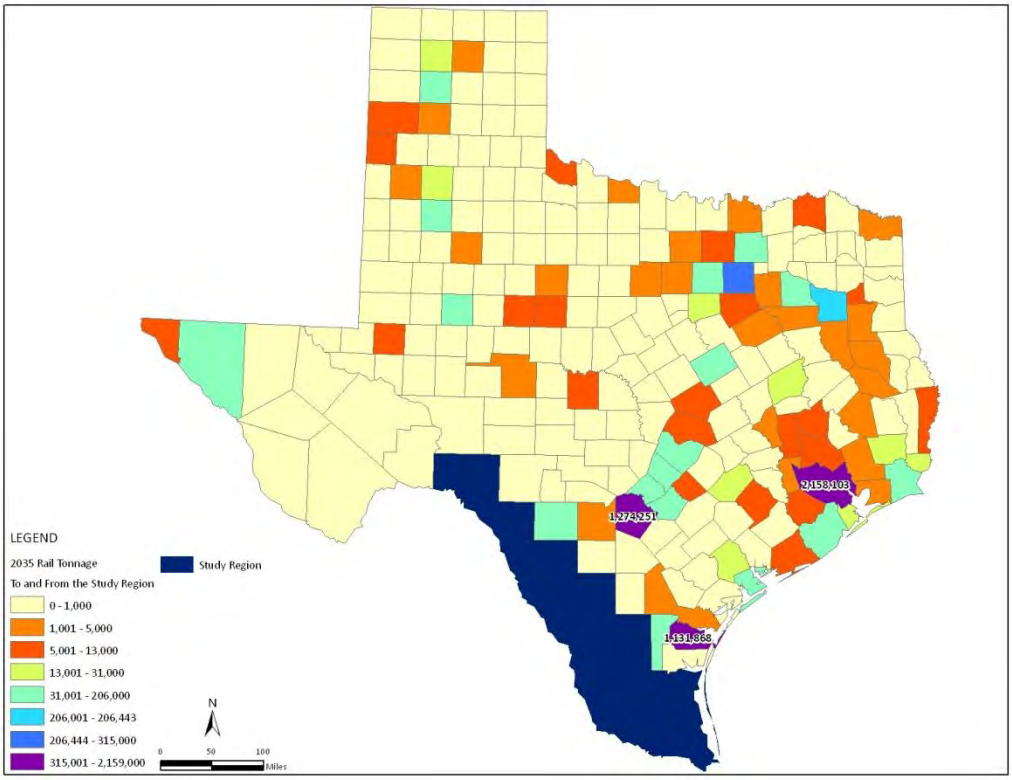


Figure 3-20: 2035 Rail Movements within Texas To and From the Study Region

Rail Freight Movements Outside of Texas

Rail freight is most effective when carrying long haul cargo. Table 3-6 shows rail freight activity exported from the Study Region to states outside of Texas are projected to more than double by 2035. The majority of domestic rail freight that travels between the study region and states outside of Texas originates or is destined for the Eastern U.S., as illustrated previously in Figure 3-17. The primary U.S. destinations for rail freight outside of Texas from the Study Region are Illinois, Louisiana, California, Tennessee, and Florida. The primary U.S. origins for rail freight outside of Texas to the Study Region are Illinois, Iowa, Arkansas, Louisiana, and Nebraska.

Figures 3-21 and 3-22 illustrate the directions of travel for rail freight between the Study Region and areas outside Texas.

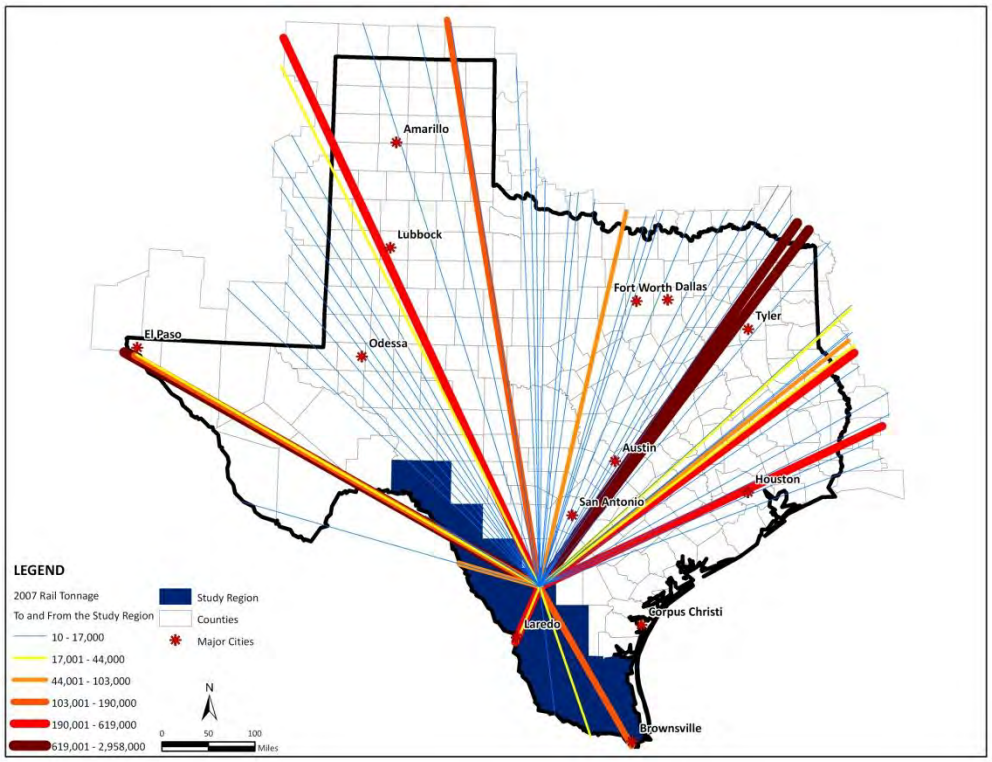


Figure 3-21: 2007 Rail Movements between the Study Region and States Outside of Texas

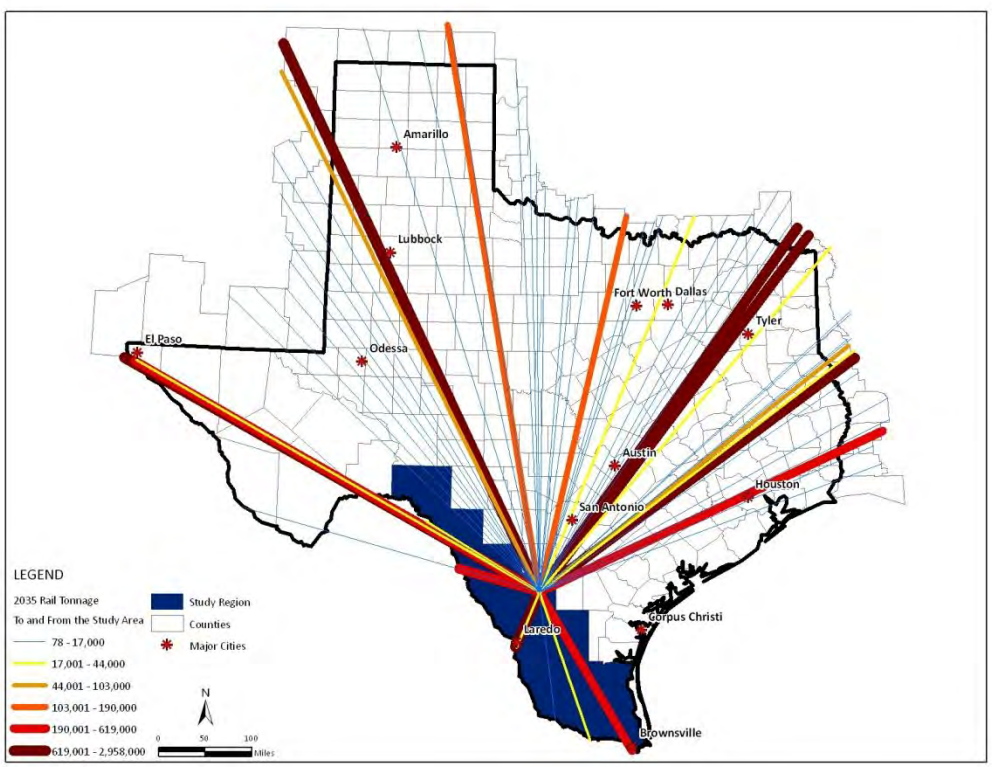


Figure 3-22: 2035 Rail Movements between the Study Region and States Outside of Texas

Rail Freight Commodity Trends

The overall rail tonnage into, out of, and within the Study Region is projected to increase by 64 percent between 2007 and 2035. Table 3-8 indicates that the primary products being moved by rail in the region (in terms of tonnage) are raw materials, food, machinery, and miscellaneous mixed loads. The overall annual growth rate in rail tonnage between 2007 and 2035 is projected to be 1.79 percent. Figures 3-23, 3-24, and 3-25 further illustrate the commodity tonnage distribution within the region for both 2007 and 2035.

The rail freight transported within the Study Region (internal movements) is composed primarily (nearly 65 percent) of miscellaneous mixed load shipments. Rail freight originating in the Study Region (exports) is more evenly distributed by commodity, with food, machinery and miscellaneous mixed loads comprising the majority of the rail tonnage. Rail freight destined for the Study Region (imports) is composed primarily of raw materials (26 percent) and chemicals/ petroleum products (25%). The distribution of rail freight by commodity in the Study Region does not change significantly between 2007 and 2035. Figures 3-26, 3-27, and 3-28 further illustrate the commodity tonnage distribution by movement type (internal, imports, exports) for 2007.

Commodity	Rail Tons Movement To, From & Within Study Region		
	2007	2035	Study Region Annual Growth Rate
Agriculture	813,624	923,124	0.45%
Raw Material	1,784,576	2,698,381	1.49%
Food	1,828,889	3,584,985	2.43%
Textiles	93,977	195,023	2.64%
Wood	310,681	557,228	2.11%
Chemicals/Petroleum	1,509,552	2,233,333	1.41%
Building Material	1,253,103	2,118,678	1.89%
Machinery	1,689,605	2,437,222	1.32%
Miscellaneous Mixed	2,129,940	4,031,577	2.30%
Hazard	40,744	57,547	1.24%
Total	11,454,689	18,837,099	1.79%

Table 3-8: Rail Freight Commodity Distribution and Growth

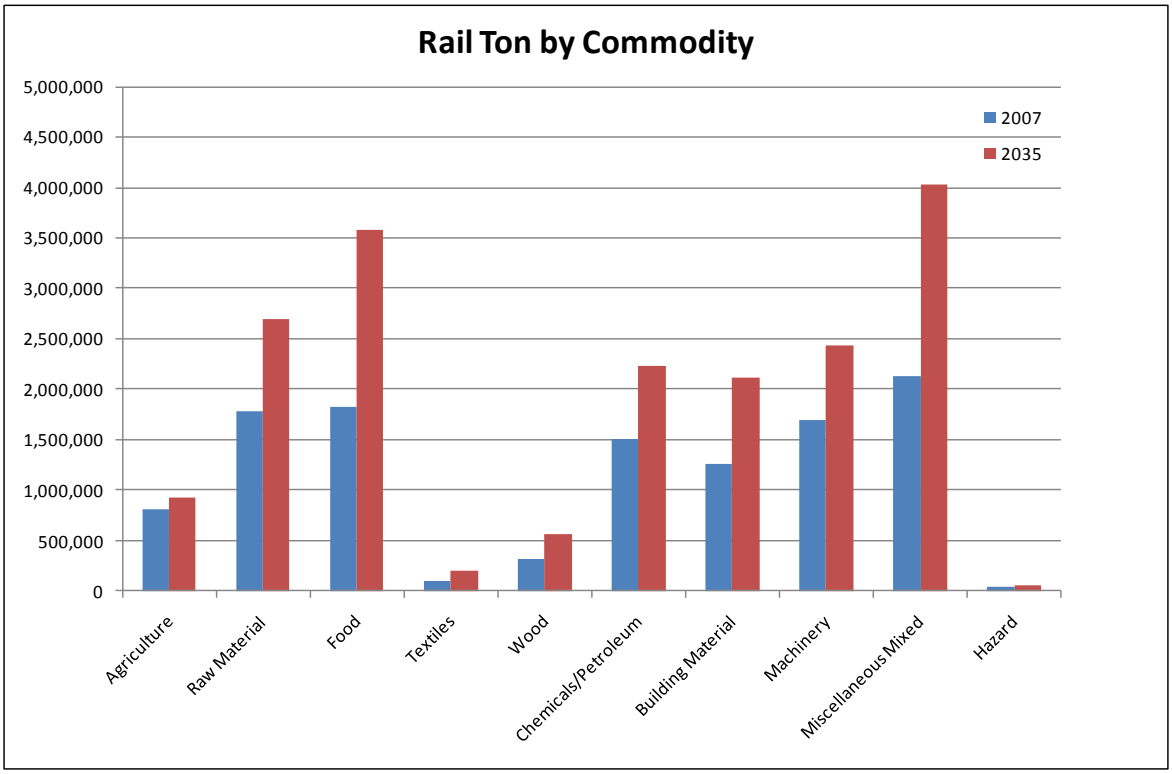


Figure 3-23: Rail Freight Commodity Distribution

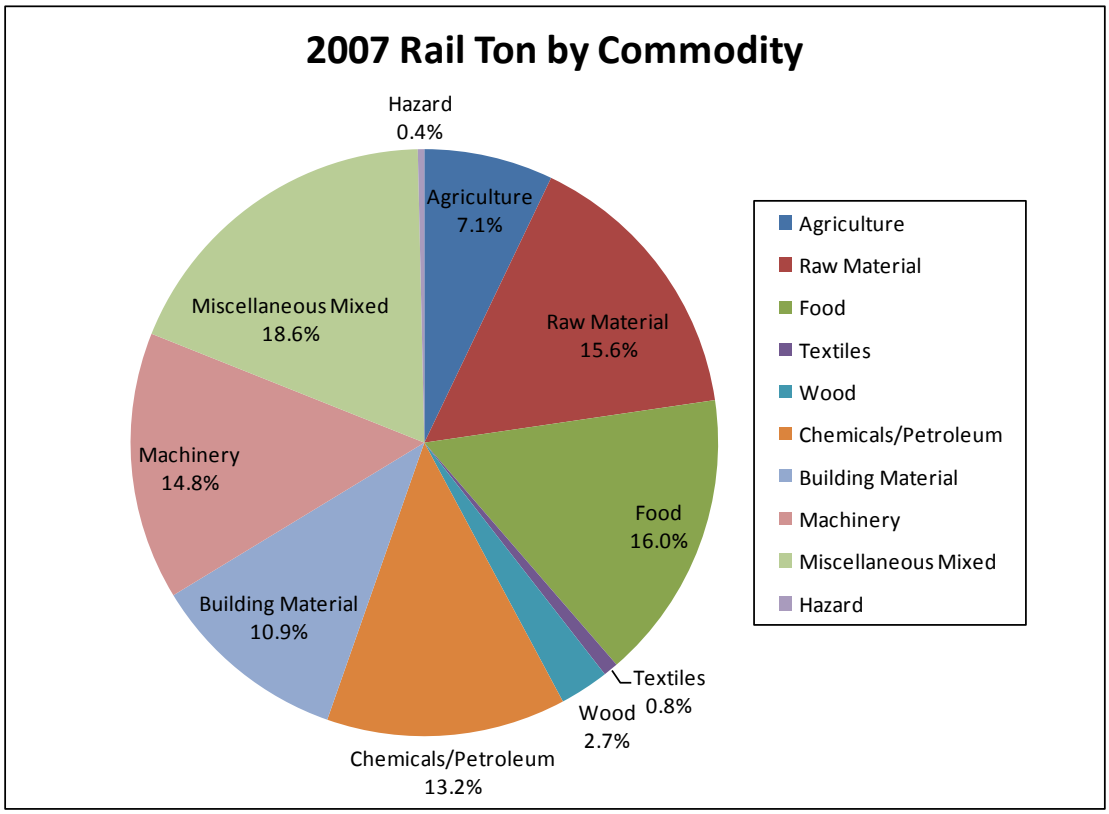


Figure 3-24: 2007 Rail Freight Into, Out Of, and Within the Study Region Commodity Distribution

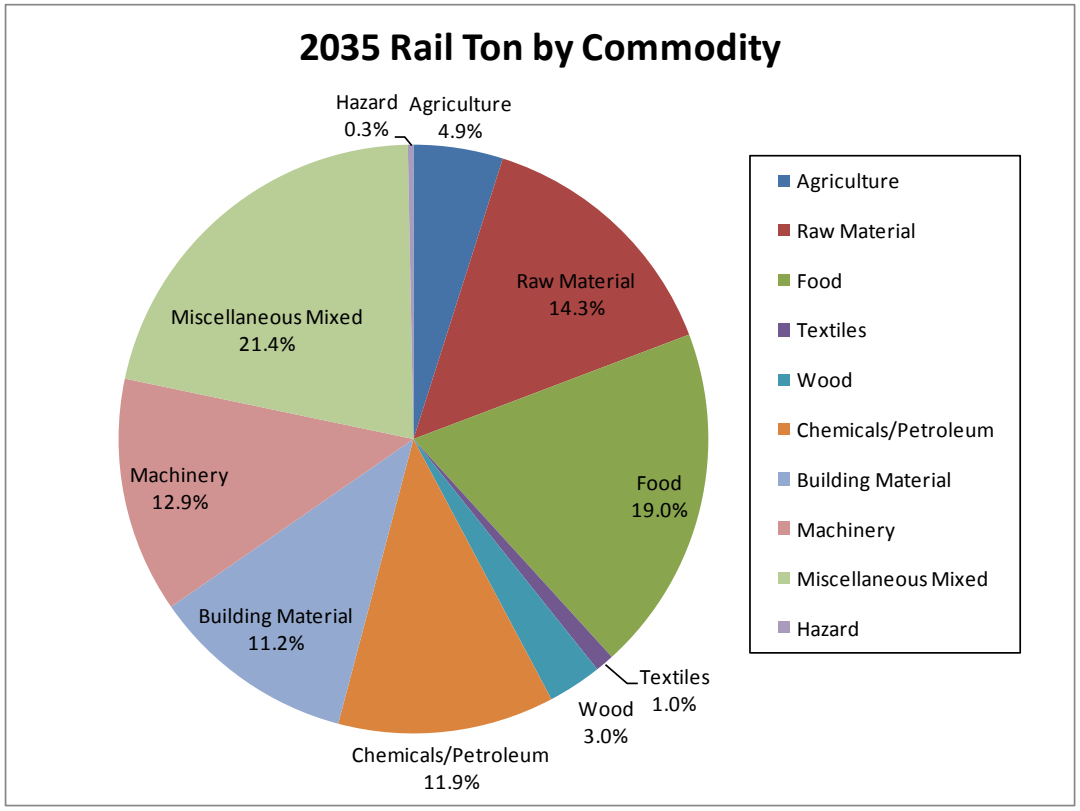


Figure 3-25: 2035 Rail Freight Into, Out Of, and Within the Study Region Commodity Distribution

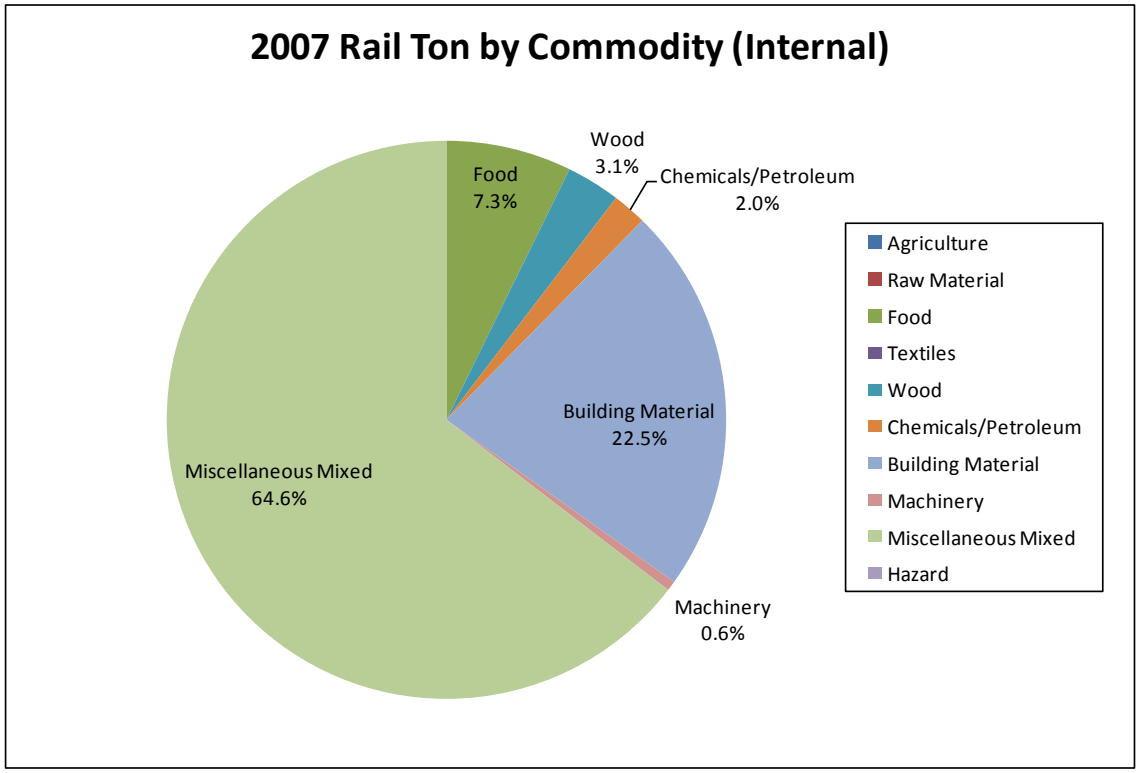


Figure 3-26: 2007 Rail Freight Within the Study Region Commodity Distribution

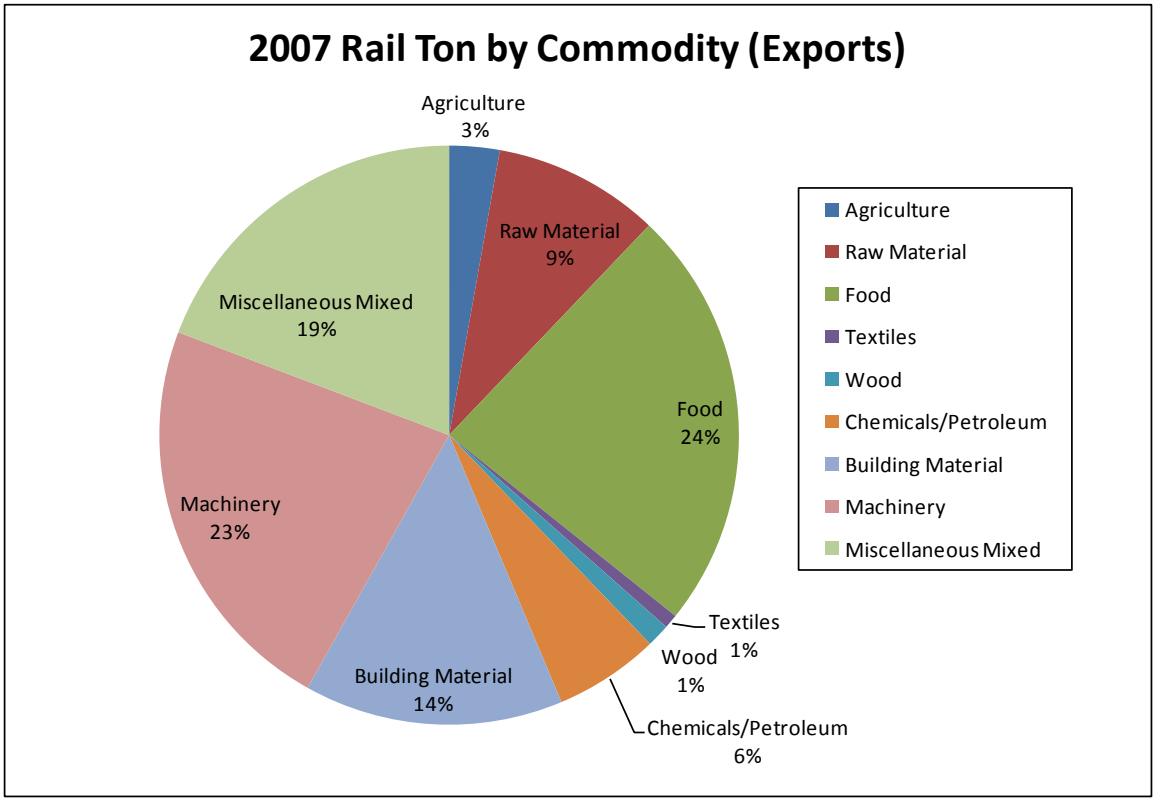


Figure 3-27: 2007 Rail Freight Out Of the Study Region Commodity Distribution

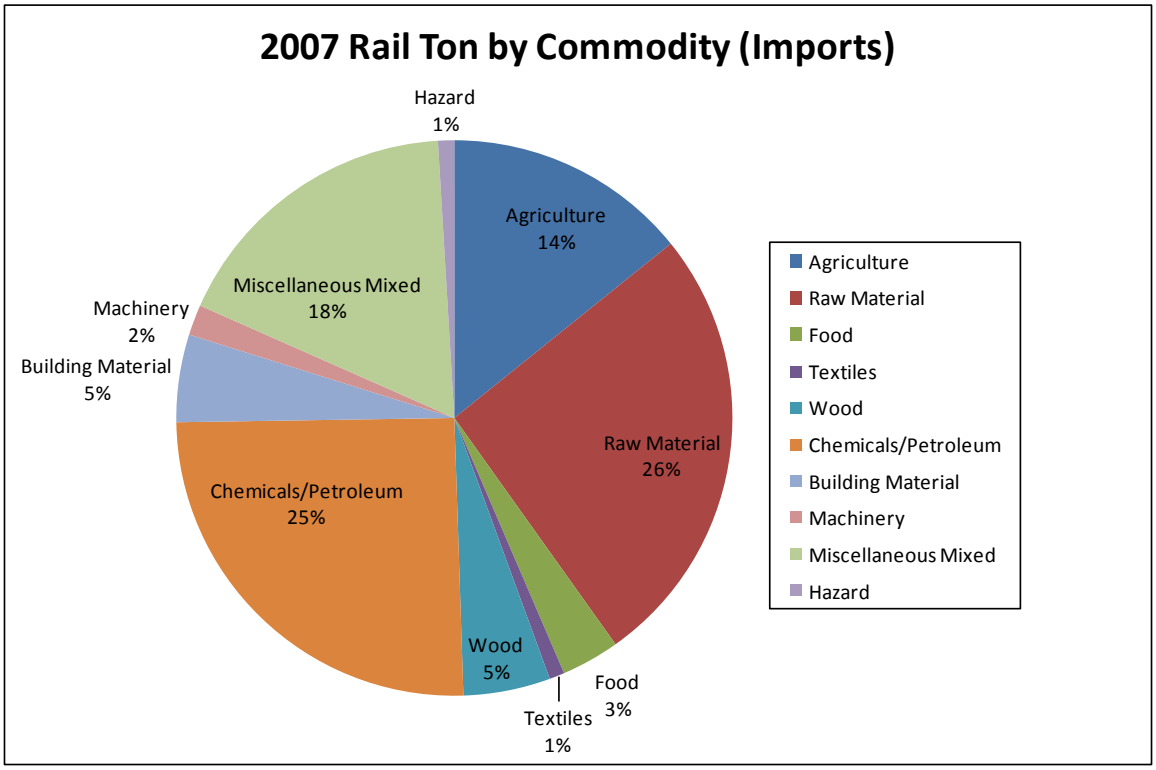


Figure 3-28: 2007 Rail Freight Into the Study Region Commodity Distribution

Rail and Truck Freight Comparison

Figure 3-29 provides the total truck and rail tons for the Study Region, including internal movements as well as freight tonnage imported to and exported from the region. The increase between 2003 and 2035 for truck tons is projected to be approximately 100 percent, while the rail tonnage is projected to increase by 64 percent between 2007 and 2035. Figure 3-29 also shows that the volume of truck tonnage is more than four times greater than the volume of rail tonnage for the region in the base year and as projected in 2035.

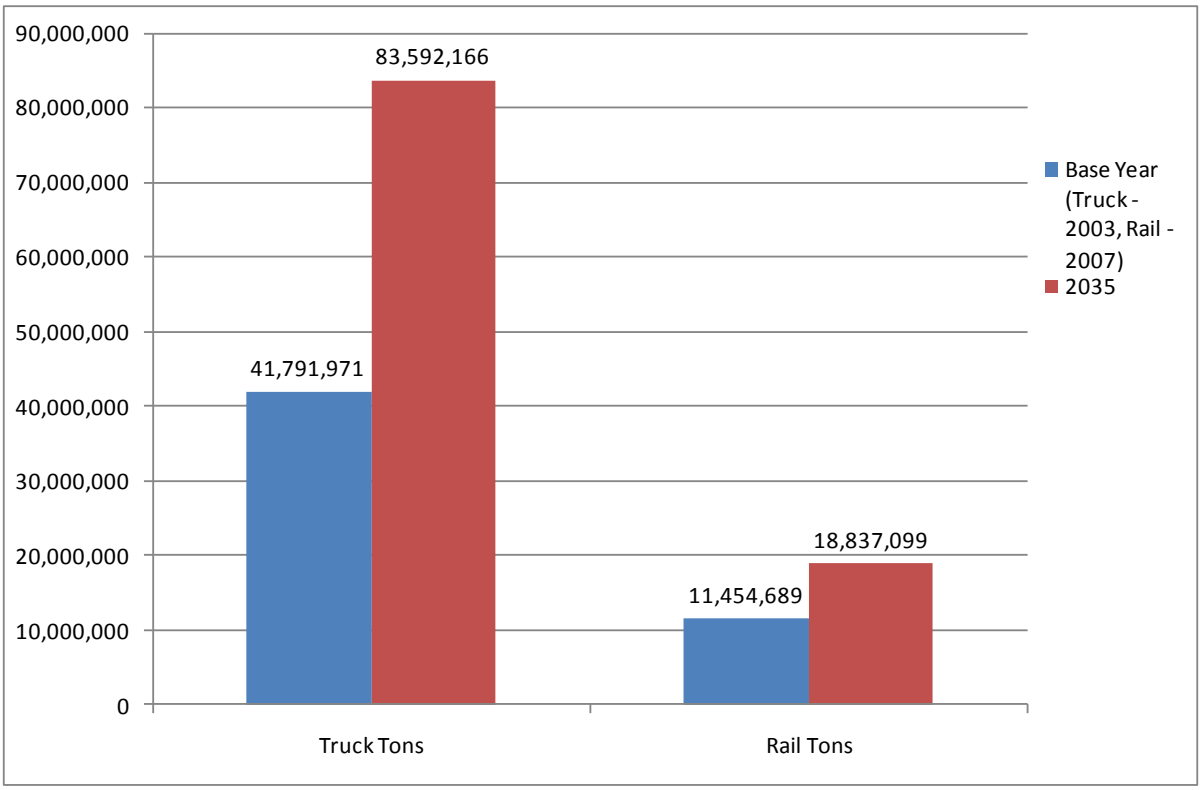


Figure 3-29: Truck and Rail Freight Tonnage Comparison

Ports within the Study Region

Data on the volumes of commodities handled at maritime ports and ports-of-entry are readily obtainable. The U.S. Army Corps of Engineers maintains the Waterborne Commerce of the United States database, which reports the tonnage of commodities handled by port, if it was domestic or foreign trade, and the direction of flow. The most recent data are for 2006, which show that the Port of Port Mansfield had no commerce, the Port of Port Isabel handled 1,000 tons of trade, the Port of Harlingen handled 349,000 tons of trade, and the Port of Brownsville handled 5,309,000 tons of trade. For the purpose of this study, three ports within the Study Region were analyzed consisting of the Ports of Brownsville, Port Isabel, and Harlingen, all of which are located in Cameron County as shown in Figure 3-30.

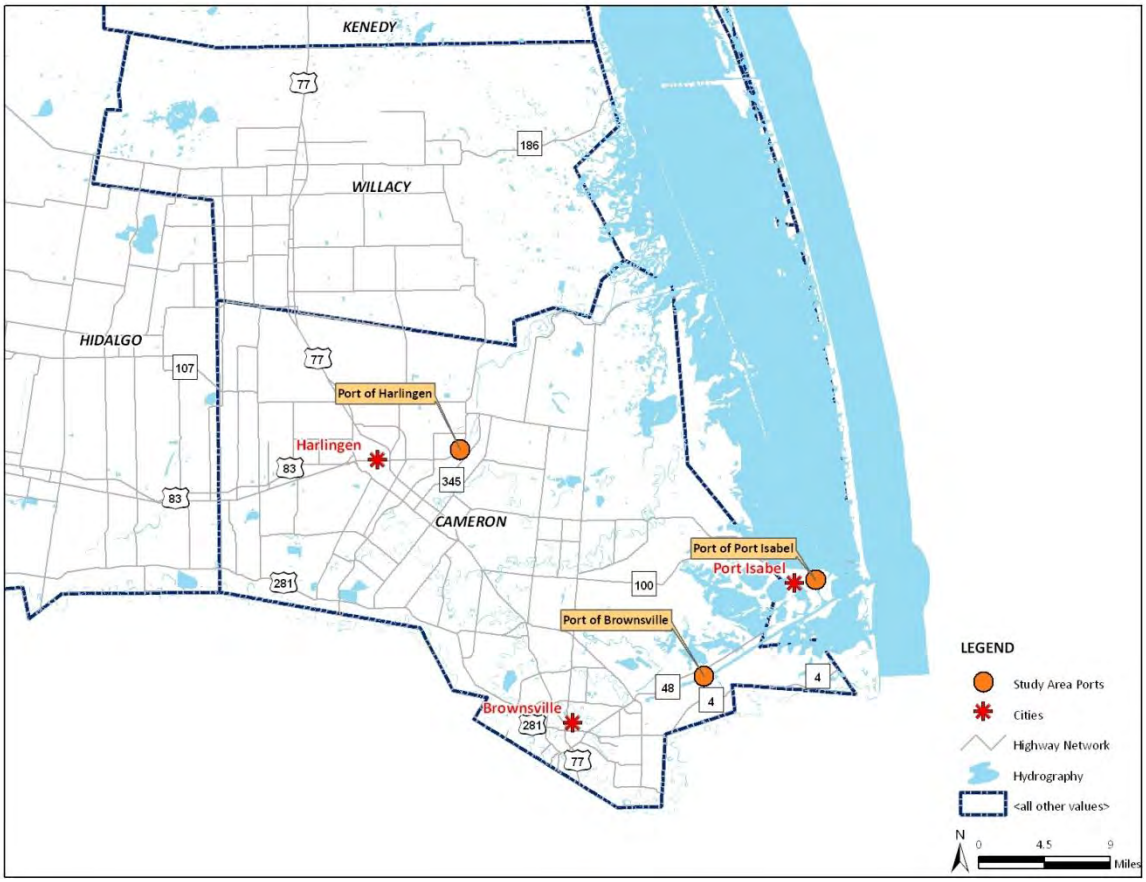


Figure 3-30: Study Region Ports

Port of Brownsville

As described by the U.S. Army Corps of Engineers, the Port of Brownsville is primarily a bulk commodity port that handles chemicals, liquid petroleum gas, clays, petroleum, grain, agricultural products, sulfur, steel, bulk minerals, ores, fertilizers and aluminum. Brownsville also serves as an in-transit port for cargo shipped between the U.S. and Mexico.

Rail freight traffic at the Port of Brownsville is handled by the Brownsville & Rio Grande International Railroad (see Figure 3-31), a shortline railroad owned by the Brownsville Navigation District (BND) that provides common carrier service to all facilities located within its jurisdictional boundaries. Trains at the Port interchange with the UPRR Brownsville Subdivision at Olmito Yard on the North Rail Loop. The Brownsville Subdivision runs from the Texas-Mexico border north toward Corpus Christi.

Roadway access to Brownsville from I-37 is available over U.S. 77 and U.S. 281. U.S. 77 extends from Brownsville to Corpus Christi where it connects to I-37, whereas U.S. 281 connects to I-37 south of San Antonio. FM 511 connects the Port to U.S. 77 at Olmito and SH 48 connects to Port to both U.S. 77 and U.S. 281 at points within the City of Brownsville.

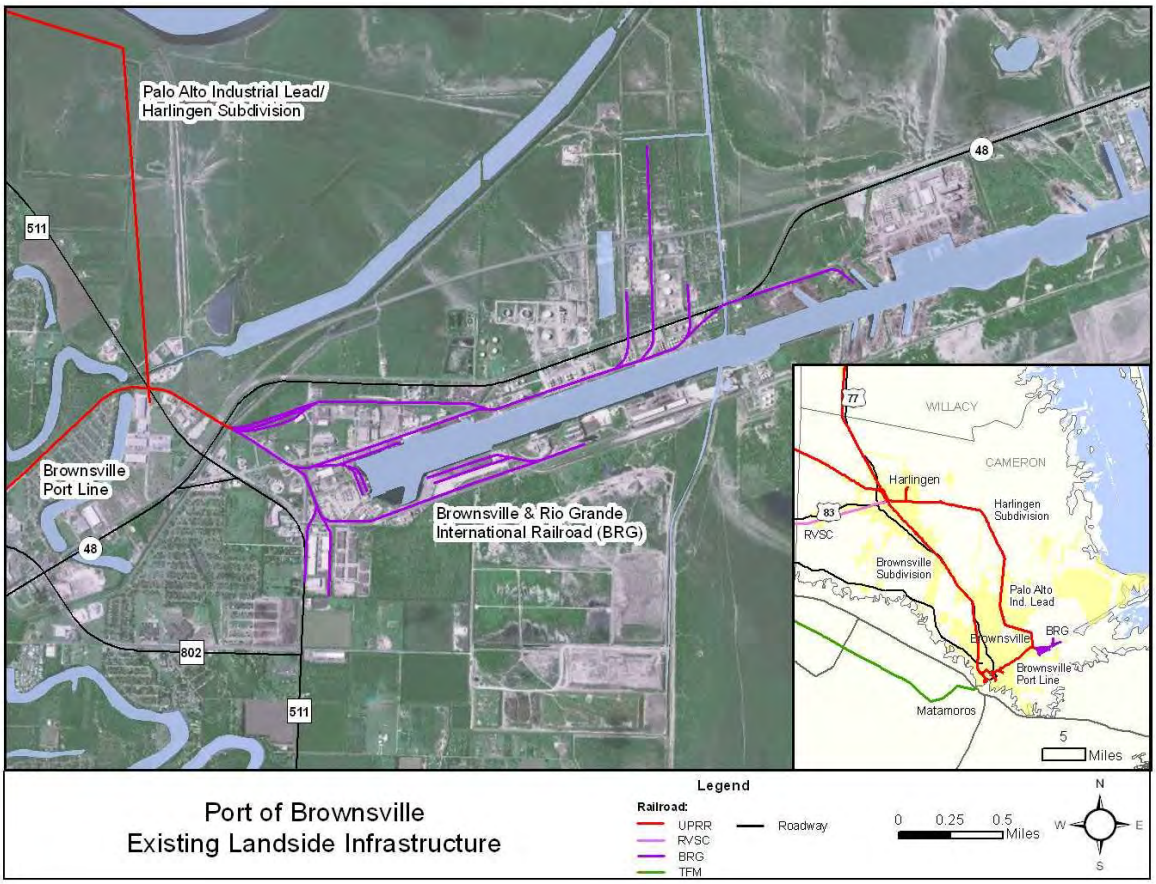


Figure 3-31: Port of Brownsville Infrastructure

Container traffic at the Port is limited to short sea shipping services, where containers enter the Port by water and subsequently leave by water. SeaBridge Freight, a provider of port-to-port container service based in Jacksonville, Florida, operates a bluewater container-on-barge (COB) operation between Port Manatee, Florida and Brownsville. Cargo such as Mexican tile and juice concentrate brought

to the port by rail is loaded into empty containers and hauled by SeaBridge to Florida. Inbound COB freight consists of bulk products such as concrete utility poles manufactured in Florida.

The Port of Brownsville is the closest deepwater port to the industrial centers in Northern Mexico. Consequently, the Brownsville & Matamoros International Bridge and road and rail infrastructure within South Texas are used extensively to move goods between the port and industrial sites in Matamoros, Mexico.

Table 3-9 shows the breakdown of tonnage into and out of the Port by commodity type for 2007. The table shows that approximately 65 percent of the freight traffic at the Port of Brownsville is foreign trade to or from Mexico, most of which consists of building materials. The majority of the domestic trade is comprised of chemicals and petroleum products.

Port of Brownsville	ALL TRAFFIC TYPES			DOMESTIC TRADE			FOREIGN TRADE		
Description	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**
Agriculture	38,907	10,829	28,078	0	0	0	38,907	10,829	28,078
Raw Materials	185,615	102,506	83,109	104,009	20,900	83,109	81,606	81,606	0
Textiles	5,070	5,070	0	0	0	0	5,070	5,070	0
Wood	148	148	0	0	0	0	148	148	0
Chemicals/Petroleum Products	1,928,514	1,124,141	804,373	1,001,690	488,199	513,491	926,824	635,942	290,882
Building Materials	2,255,251	2,070,051	185,200	376,533	367,540	8,993	1,878,718	1,702,511	176,207
Machinery	4,031	1,881	2,150	0	0	0	4,031	1,881	2,150
Miscellaneous Mixed	88,670	19,991	68,679	87,947	19,268	68,679	723	723	0
Total	**4,506,206**	**3,334,617**	**1,171,589**	**1,570,179**	**895,907**	**674,272**	**2,936,027**	**2,438,710**	**497,317**

Table 3-9: 2007 Port of Brownsville Tonnage Volumes by Commodity (Source: U.S. Army Corps of Engineers, 2007 Waterborne Commerce of the United States)

Martin Associates determined that, of the 2,671 jobs directly related to the Port of Brownsville in 2005, 1,077 jobs were associated with the movement of scrap and steel products, such as coils, billets, slab and plate, followed by 207 jobs associated with the movement of petroleum products. Transportation services at the port supported 45 rail-related jobs and 280 truck-related jobs.

The State of Texas and Cameron County are currently constructing the East Loop, a four-lane divided highway that begins at the intersection of U.S. 77 and FM 511 and extends east around the City of Brownsville toward the location of a planned new port access road (SH 550) at SH 48. From SH 48, the East Loop is planned to extend to the Veterans International Bridge at the Mexico border. This facility will provide trucks direct access from the port north to I-37 by way of U.S. 77 to the north and to Mexican industries to the south, minimizing the amount of hazardous materials and other liquid cargo from traveling near Brownsville's most populated centers.

Cameron County is also currently constructing a West Rail Bypass that would relocate the Brownsville Port of Entry from Mexico to the west of the city and would relocate through freight onto the bypass and out of Brownsville.

The port has 11 cargo docks, four oil docks, docks for both bulk and liquid cargoes, and an express dock. New bulk cargo and liquid cargo docks equipped with rail access are planned, which will provide access to the UPRR Brownsville Subdivision by way of the North Rail Loop. In terms of regional influences, UPRR will be relocating switching operations in Harlingen to the Olmito facility on the North Rail Loop and Brownsville Subdivision. This consolidation of switching operations will eliminate significant numbers of switching trains that block grade crossings with the City of Harlingen, and will provide greater efficiency for through trains that operate on the UPRR Harlingen Subdivision.

The Port's primary concern involving truck access to their facilities is the need for an interstate highway connection, such as an extension of I-37 from Corpus Christi to Brownsville (see Figure 3-31). The port believes there is opportunity for the railroads to coordinate train movements more efficiently over UPRR track on which BNSF has trackage rights. BNSF has indicated a willingness to offer intermodal container service to the area, but the investment in new rail infrastructure needed to support this service is economically infeasible. If a significant amount of container service to the U.S. interior is established at the port, some form of new rail infrastructure may be required, such as adding sidings on the North Rail Loop.

Port of Port Isabel

The Port of Port Isabel is a deep-draft port located in Cameron County at the southernmost point of the Laguna Madre. No rail infrastructure currently exists at Port Isabel, and the construction of track to the Port would likely connect with existing rail infrastructure that serves the Port of Brownsville to the west (see Figure 3-32). Consequently, any rail freight that might be moved between Port Isabel and the UPRR Brownsville Subdivision would parallel the inland approaches of the Brownsville Ship Channel itself. The infeasibility of this redundancy limits the practical use of the Port's facilities to water-only services, such as servicing offshore oil platforms and freight that can be economically transported by truck on state highways that connect with I-37.

Roadway access to the Port is provided by SH 48, which connects the Port with Brownsville to the southwest. SH 100 connects the Port to U.S. 77/83 north of Brownsville, which is also the main north-south highway accessed by SH 48 to the south. Therefore, access to the U.S. interior is essentially limited to U.S. 77/83 until reaching I-37 near Corpus Christi. The Port has plans for a reliever road between the Port and SH 48 that will bypass residential areas and public parks.

Table 3-10 shows the breakdown of tonnage into and out of the Port of Port Isabel by commodity type for 2007. As shown in the table, the traffic at Port Isabel is all domestic trade composed primarily of building materials. The primary commodities handled at the Port are cement and used vehicles for export to Central America. The Port's fishing industry has significantly declined during recent years. The Port of Port Isabel also serves the offshore drilling industry, probably more now than in the past, but most likely cyclically according to the price of oil.

Port of Port Isabel	ALL TRAFFIC TYPES			DOMESTIC TRADE		
Description	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**
Building Materials	7,231	3,031	4,200	7,231	3,031	4,200
Machinery	168	0	168	168	0	168
Total	**7,399**	**3,031**	**4,368**	**7,399**	**3,031**	**4,368**

Table 3-10: 2007 Port Isabel Tonnage Volumes by Commodity
(Source: U.S. Army Corps of Engineers, 2007 Waterborne Commerce of the United States)

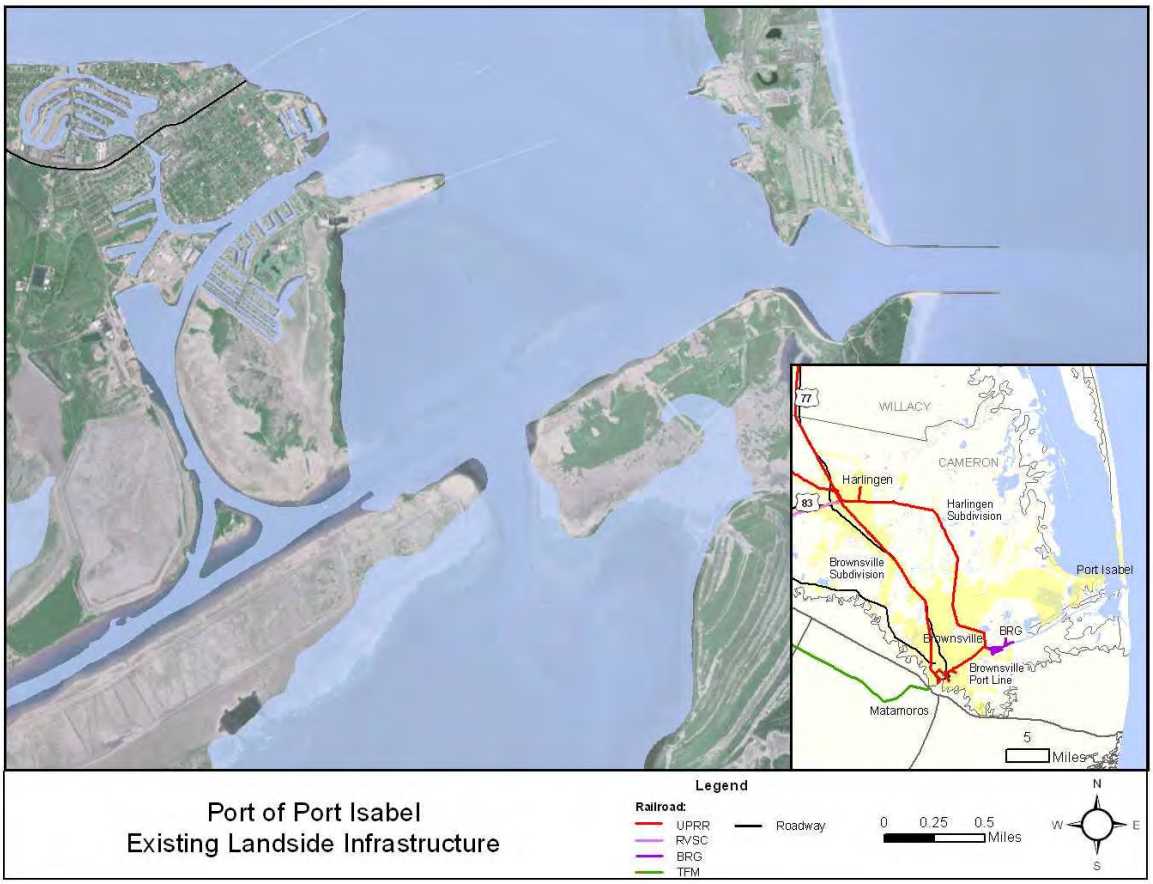


Figure 3-32: Port of Port Isabel Infrastructure

Port of Harlingen

The Port of Harlingen is a shallow draft barge port linked to the Gulf of Mexico by the Harlingen Channel, serving the South Texas and northern Mexico region. The port includes a general dry/liquid cargo wharf, a dry bulk wharf, and a series of small docks extending down Harlingen Channel. The largest export commodity is sugar, while imports consist of petroleum, cement, sand, and fertilizer.

Rail access to the Port is provided by spur tracks that extend off of the UPRR Harlingen Subdivision to the east of Harlingen, as shown in Figure 3-33. The Harlingen Subdivision connects with the UPRR Brownsville Subdivision at Harlingen Junction, providing a means of moving freight from the Port to the north and south.

The Combs Rio Hondo Road parallels the Port to the west, providing a roadway connection into Harlingen using U.S. 77/ SH 448.

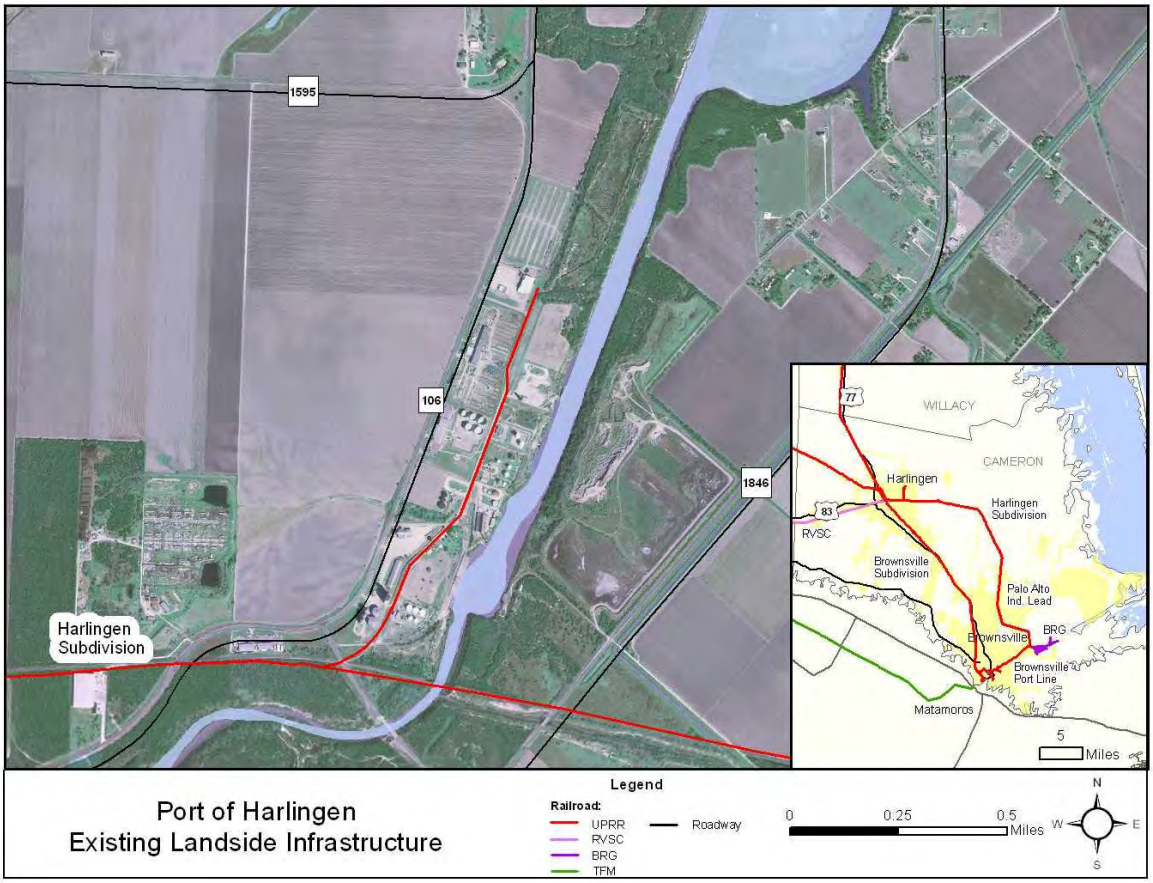


Figure 3-33: Port of Harlingen Infrastructure

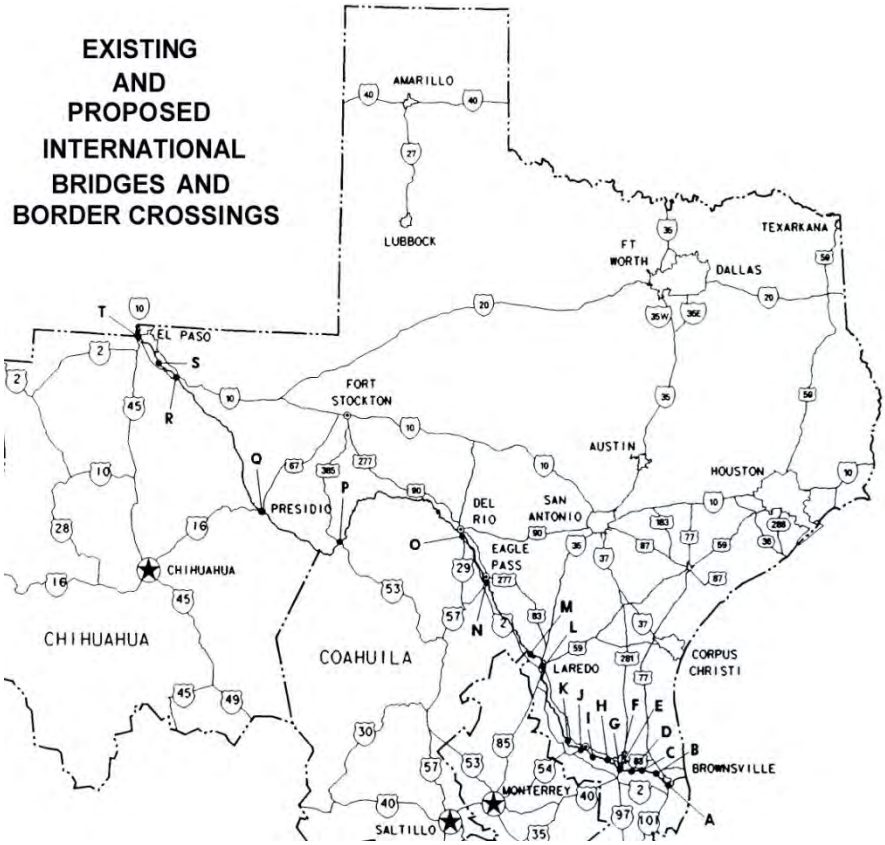
Table 3-11 shows the breakdown of tonnage into and out of the Port of Harlingen by commodity type for 2007. The freight traffic at the Port of Harlingen primarily consists of chemicals and petroleum products outbound from the Port. The port mostly handles commodities produced in the region or destined for the local market. The Port's primary export commodity is sugar and its primary import commodities are building materials (concrete, sand, etc.), fertilizers, pesticides, and fuel.

Port of Harlingen	TOTAL TONNAGE		
Description	**Total**	**Outbound**	**Inbound**
Raw Materials	63,000	0	63,000
Food	168,000	0	168,000
Chemical/Petroleum Products	353,000	349,000	4,000
Building Materials	31,000	31,000	0
Total	**615,000**	**380,000**	**235,000**

Table 3-11: 2007 Port of Harlingen Tonnage Volumes by Commodity
(Source: U.S. Army Corps of Engineers, 2007 Waterborne Commerce of the United States)

Border Crossings within the Study Region

There are 31 existing Texas-Mexico border crossings, including 5 rail-only crossings (Brownsville, Laredo, Eagle Pass, and 2 at El Paso), 23 vehicular border crossings, and 3 dam or ferry crossings. Additionally, there are 7 proposed crossings along the Texas-Mexico border, 3 of which are under construction including the new crossing for the West Rail Bypass. The locations of the existing, proposed, and closed crossings are shown in Figure 3-34 (note that several locations such as Brownsville, El Paso, and Laredo include more than one border crossing).



A	Brownsville-Matamoros	K	Falcon Heights-Ciudad Guerrero
B	Los Indios-Lucio Blanco	L	Laredo-Nuevo Laredo
C	Progreso-Nuevo Progreso	M	Laredo-Columbia
D	Donna-Rio Bravo (Proposed)	N	Eagle Pass-Piedras Negras
E	Pharr-Reynosa	O	Del Rio-Ciudad Acuna
F	Hidalgo-Reynosa	P	La Linda (Closed)
G	Mission-Reynosa (Proposed)	Q	Presidio-Ojinaga
H	Los Ebanos-Gustavo Diaz Ordaz	R	Fort Hancock-El Porvenir
I	Rio Grande City-Camargo	S	Fabens-Caseta
J	Roma-Ciudad Miguel Aleman	T	El Paso-Ciudad Juarez

Figure 3-34: U.S.-Mexico Border Crossings Along Texas Border[5]

[5] Source: Texas-Mexico International Bridges and Border Crossings Existing and Proposed, TxDOT, 2009.

The updated SAM base year contains external stations at all international bridges, including the two bridges that have been built since 1998: the World Trade Bridge in Laredo and the Veteran's International Bridge at Los Tomates in Brownsville. The Los Tomates Bridge began processing all northbound commercial traffic in the Brownsville area on May 1, 1999. Southbound commercial traffic from the Brownsville & Matamoros Bridge was not redirected to the Los Tomates Bridge until December 31, 1999. Southbound commercial traffic using the Gateway International Bridge was redirected to the Los Tomates Bridge on February 28, 2001.

The international bridges in Laredo are all operated by the City of Laredo. The Brownsville bridges, on the other hand, are owned by Cameron County (Gateway, Los Tomates, and Los Indios) or the Brownsville and Matamoros Bridge Company (Brownsville and Matamoros Bridge), which is a company half-owned by the Union Pacific Railroad and half-owned by the Mexican government.

The Study Region includes three rail border crossings with Mexico, which are located at Brownsville, Laredo, and Eagle Pass. As shown in Figure 3-35, the freight moved through the border crossings within the Study Region comprises 87 percent of all U.S. – Mexico rail trade across the Texas border. The remainder of the U.S. – Mexico rail trade across the Texas border is routed through two rail crossings at El Paso. Additional rail freight previously crossed the border at Presidio, although that crossing has since been closed due to a fire that destroyed the rail bridge. Approximately 86 percent of U.S.-Mexico rail trade crosses the Texas border, while the remainder crosses at the Arizona and California borders.

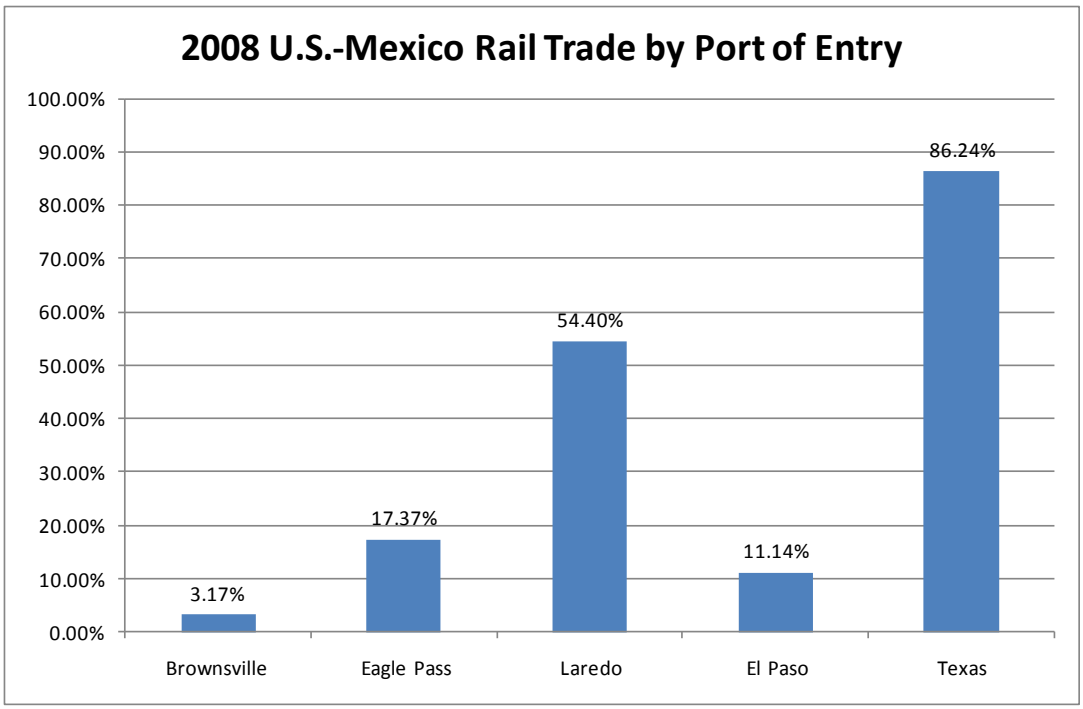


Figure 3-35: Percentage of Rail Trade ($ Value) by Texas Port of Entry
Source: North American TransBorder Freight Data
(http://www.bts.gov/programs/international/transborder/TBDR_QA.html)

Figure 3-36 shows the roadway border crossings located within the Study Region. Ten of the border crossings are used by freight trucks according to the *Texas-Mexico International Bridges and Border Crossings Existing and Proposed* report published by TxDOT in 2009.

Table 3-12 and Figure 3-37 show the average number of daily trucks at each border crossing used by trucks between Mexico and the U.S. More than 76 percent of all trucks traveling across the Texas border between Mexico and the U.S. cross the border within the Study Region, primarily at Laredo (48 percent of all Texas transborder trucks and 62 percent of transborder trucks within the Study Region). The majority of the remainder of the trucks crossing the U.S.-Mexico border within the Study Region cross at Pharr or Brownsville. Border crossings noted with (H) in Table 3-12 are hazardous materials crossings.

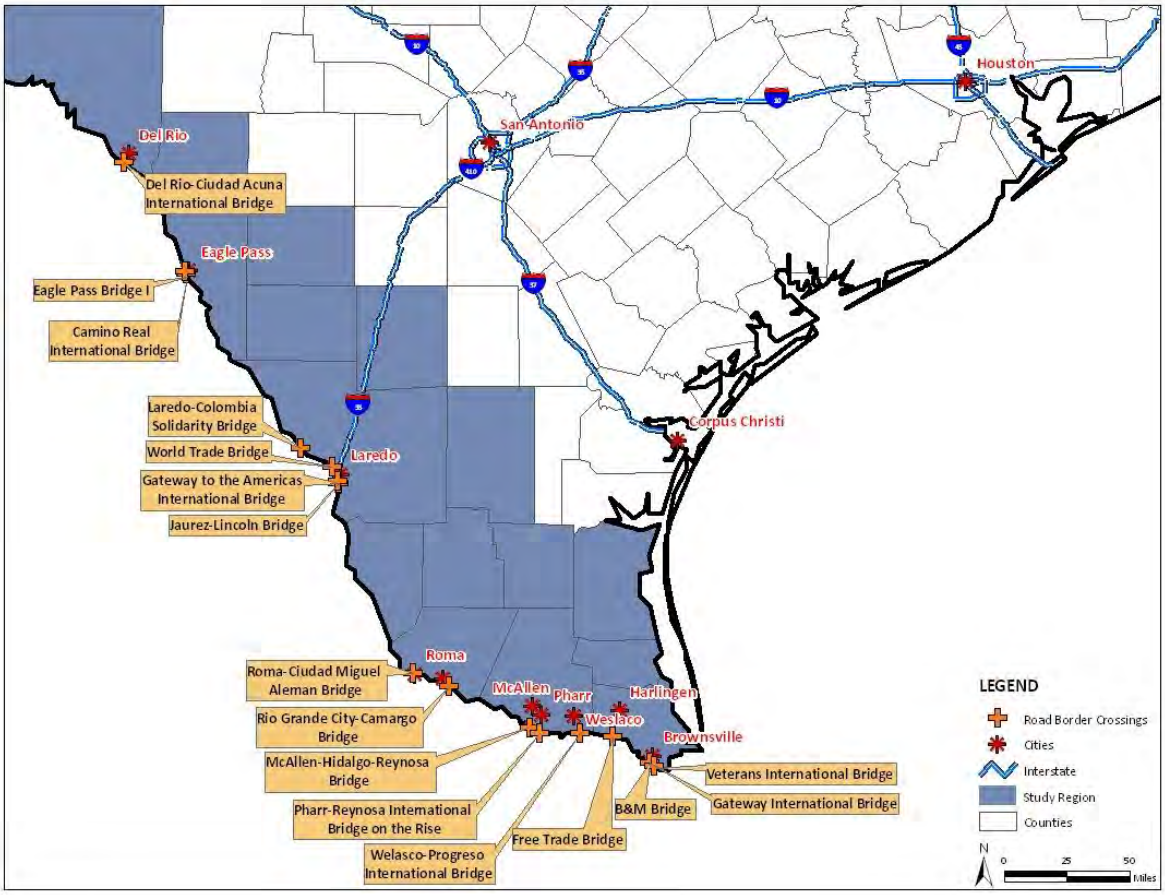


Figure 3-36: Truck Border Crossings within Study Region

Border Crossing	County	City	2008 Daily Trucks
Veterans International Bridge	Cameron	Brownsville	1,316
Free Trade Bridge (H)	Cameron	Los Indios	254
Progreso International Bridge (H)	Hidalgo	Progreso	326
Pharr-Reynosa Intl. Bridge on the Rise (H)	Hidalgo	Pharr	3,422
Rio Grande City-Camargo Bridge (H)	Starr	Rio Grande City	221
Roma-Ciudad Miguel Aleman Bridge	Starr	Roma	54
World Trade Bridge	Webb	Laredo	8,240
Laredo-Colombia Solidarity Bridge (H)	Webb	Laredo	2,840
Camino Real International Bridge	Maverick	Eagle Pass	733
Del Rio-Ciudad Acuna Intl. Bridge	Val Verde	Del Rio	408
Presidio Bridge	Presidio	Presidio	43
Ysleta-Zaragoza Bridge (H)	El Paso	El Paso	2,444
Bridge of the Americas (H)	El Paso	El Paso	2,899
Total 2008			**23,202**

Table 3-12: 2008 Average Daily Trucks per Border Crossing (Source: Texas-Mexico International Bridges and Border Crossings Existing and Proposed, TxDOT, 2009)

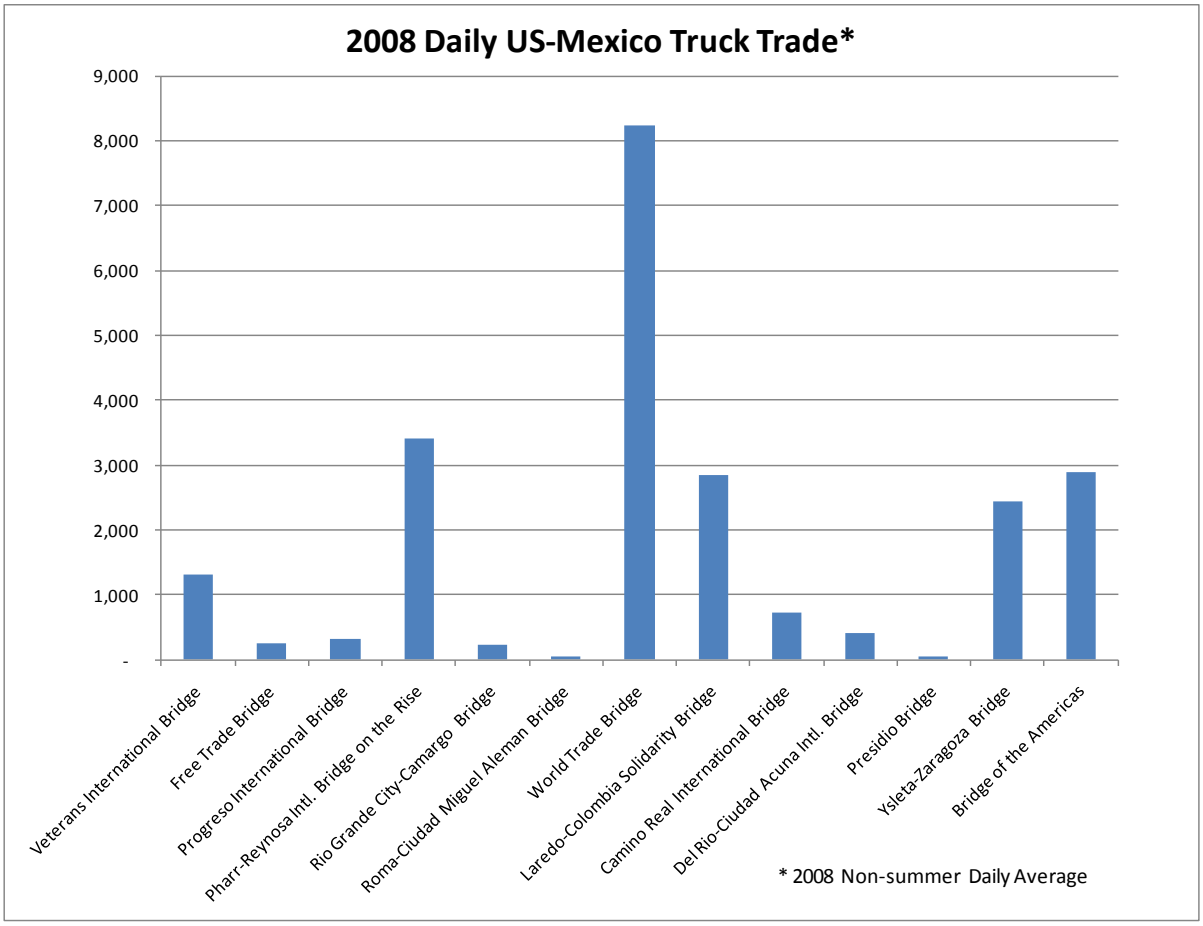


Figure 3-37: 2008 Average Daily Trucks per Border Crossing (Source: Texas-Mexico International Bridges and Border Crossings Existing and Proposed, TxDOT 2009)

Roadway Infrastructure Analysis

The following section illustrates the truck traffic volumes and identifies locations where truck traffic and congestion are the greatest. This section also identifies the projected impact of planned roadway improvements on congestion and delay.

Truck Traffic Volumes and Congestion Analysis

Roadway segments with the highest percentage of trucks were identified in order to analyze chokepoint areas within the Study Region that would hinder truck traffic movement. Truck volumes at permanent count stations within the Study Region were used to verify projected future truck volumes in the SAM. It is important to note that the 2035 model includes planned improvements for the roadways as shown in Figure 3-5 and listed in Appendix C.

Figures 3-38 and 3-39 show truck volumes within the Study Region for 2003 and projected to 2035, respectively. The largest increases in daily truck traffic volumes are projected to occur on U.S. 77, U.S. 281, and I-35.

Once the truck volumes were established, vehicular traffic was added and congestion levels were calculated using a volume to capacity ratio (V/C). The V/C ratio is a measure of the volume of vehicles compared to the capacity of the roadway. V/C ratios are used to define problem areas on major arterials and highways as well as intersections and on-ramps. A high V/C ratio indicates increased congestion, while a low V/C ratio indicates available capacity on the roadway. The following descriptions are typically used for the various levels of V/C ratios:

- V/C greater than 1.0 = Severe Congestion
- V/C of 0.75 to 1.0 = Heavy Congestion
- V/C of 0.6 to 0.75 = Moderate Congestion
- V/C of less than 0.6 = Low or No Congestion

Figures 3-40 and 3-41 show base year and projected levels of congestion on roadways within the Study Region. Even with the planned improvements, the congestion levels are projected to continue to grow significantly. The only area of congestion identified in 2003 is at the intersection of U.S. 83 and U.S. 281 in the city of McAllen. In 2035, areas of congested are expected along SH 495, FM 1924/ Buddy Owens Boulevard, and the intersection SH 107 and U.S. 281 in McAllen, along SH 48 in Brownsville, and along U.S. 83 and I-35 in Laredo.

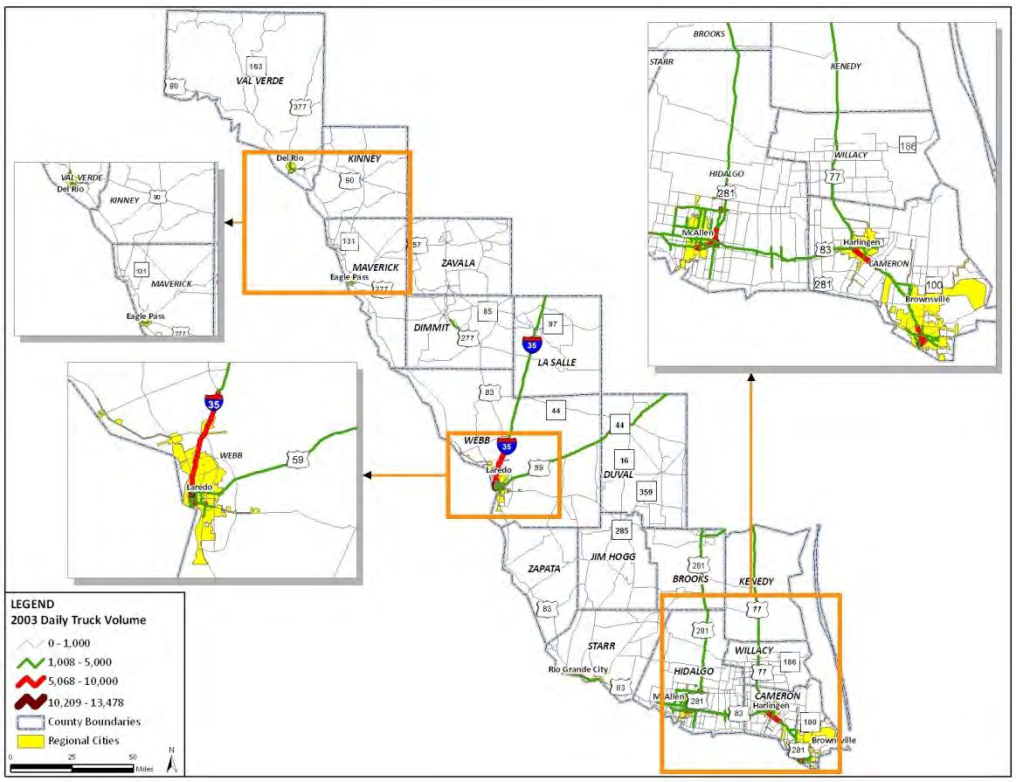


Figure 3-38: 2003 Daily Truck Volumes

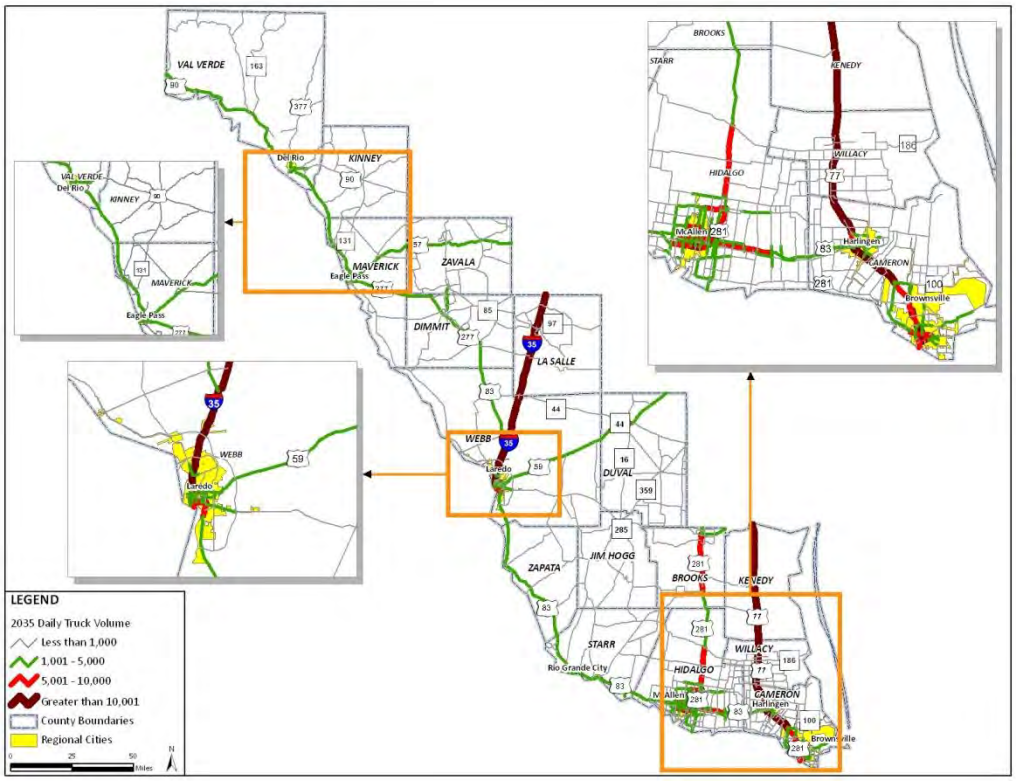


Figure 3-39: 2035 Daily Truck Volumes (with Planned Improvements)

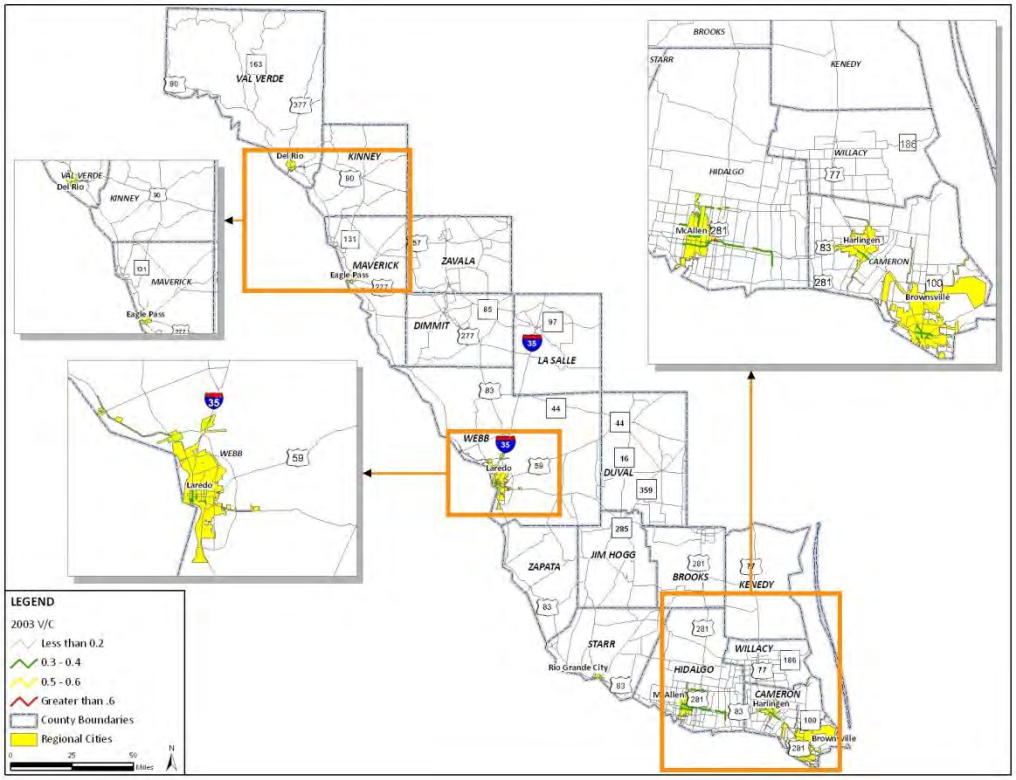


Figure 3-40: 2003 V/C Levels for Roadways within the Study Region

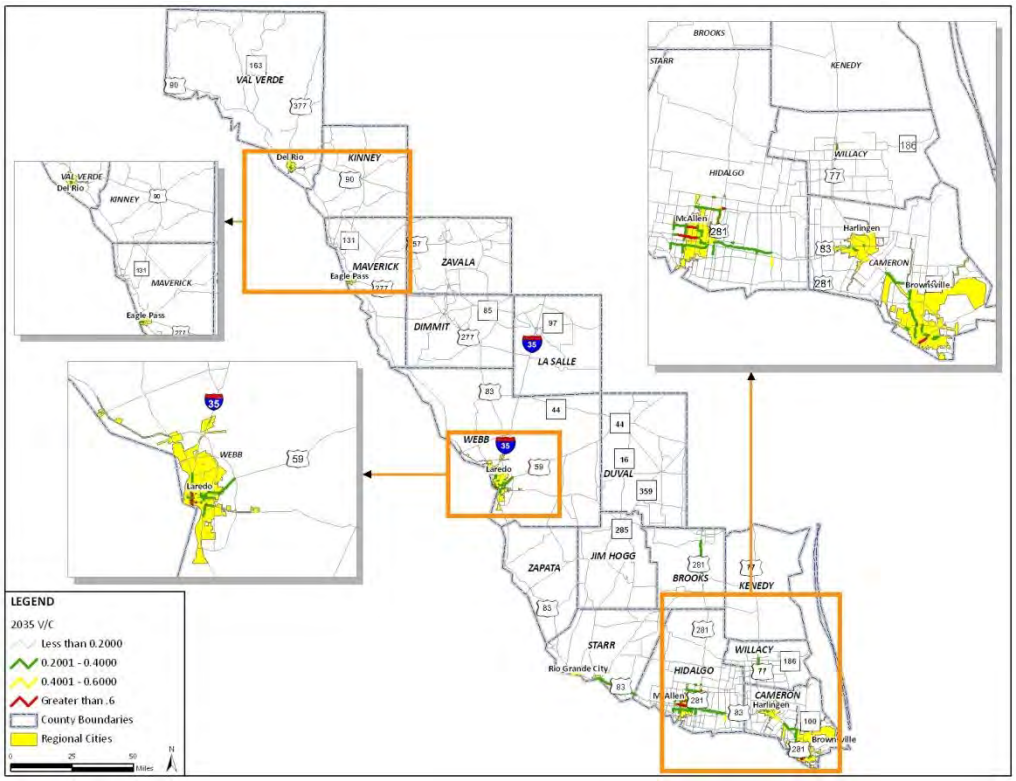


Figure 3-41: 2035 V/C Levels for Roadways within the Study Region (with Planned Improvements)

Roadway Capacity Improvements

The base case for the analysis was assumed to be the existing roadway network (No Build) with the projected 2035 traffic volumes. The No Build scenario was compared against the network with planned improvements as identified by the MPOs in the Study Region, which include a combination of roadway capacity upgrades and new location roadways. The locations of the planned improvements were shown previously in Figure 3-5 and are also listed in Appendix C.

Figures 3-42 through 3-47 compare the No Build network with the planned improvements in terms of travel time, vehicle miles of travel, vehicle hours of travel, and total delay for the entire Study Region. *Vehicle miles of travel (VMT)* is the regional total of all miles traveled in an average day. The VMT typically increase for scenarios that include adding lanes to the roadway system. However, new roadways generally help to reduce travel distances between origins and destinations, which will reduce the total number of miles traveled. *Vehicle hours of travel (VHT)* is the regional total time spent on the transportation network during an average day. It is the total travel time of every vehicle trip in the SAM. The travel time includes delay due to congestion. *Delay* is a transportation indicator that estimates the time spent in congestion by drivers, measured in minutes per day.

The planned roadway improvements make a minimal difference overall across the state in terms of travel times from the Study Region to other cities. However, without the planned improvements travel times from the Study Region to El Paso, Austin, Fort Worth, and Tyler would increase by approximately an hour between 2003 and 2025, while travel times to Houston would increase by up to 4 hours and to Dallas by up to 3 hours. The increase in travel times to Dallas and Houston is due primarily to large increases in congestion immediately surrounding those metropolitan areas. Figures 3-42 through 3-44 show that the planned improvements would reduce travel times from the Study Region to El Paso, Austin, Dallas, and Fort Worth by approximately an hour, and to Houston by up to two hours in 2035.

The vehicle miles of travel were reduced by approximately one percent between the No Build scenario and Planned Improvements scenario, and the vehicle hours of travel were reduced by two percent. The total delay for the Study Region was projected to decrease by approximately 64 percent with this same comparison. Based on a standard hourly cost of time for the average driver as set by TxDOT in 2008 ($19.35 per vehicle hour), it was estimated that the planned roadway improvements for the Study Region would save the traveling public approximately $2.5 million per year in reduced vehicle hours of travel, including more than $171,000 associated with reduced hours of delay per year. Assuming that 100 gallons of gas is spent for each 1,000 hours of delay and projecting that delay could be reduced by nearly 9,000 hours per year, it was estimated that approximately 900 gallons of gas would be saved per year when the planned improvements are constructed.

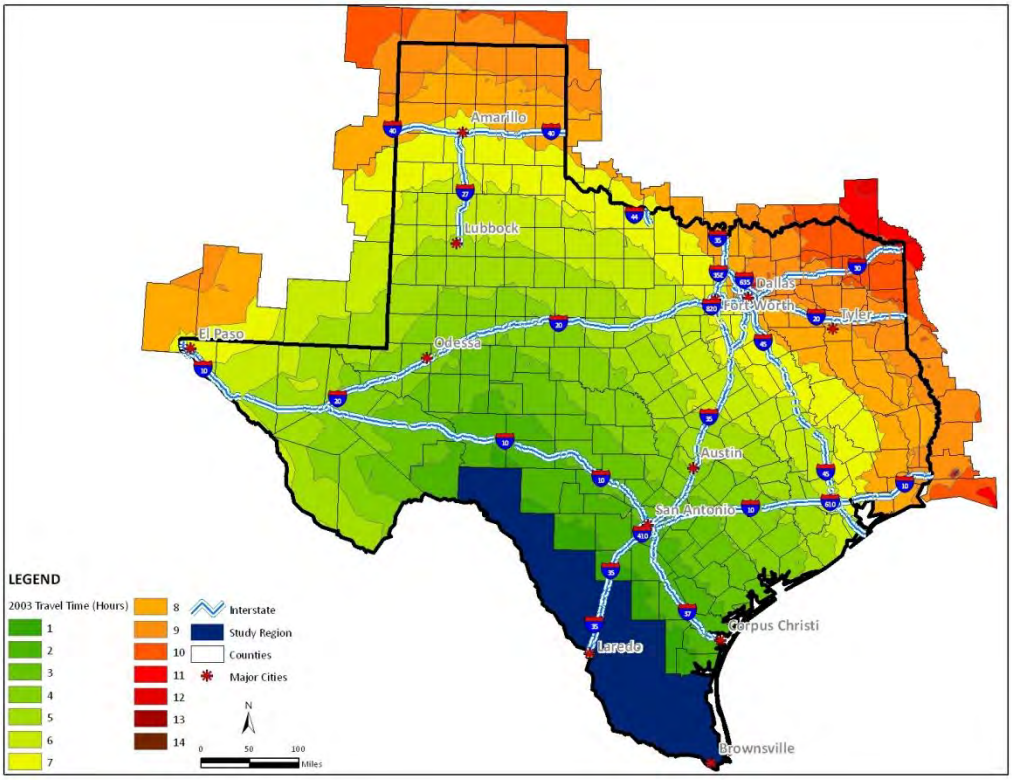


Figure 3-42: 2003 Travel Times from the Study Region

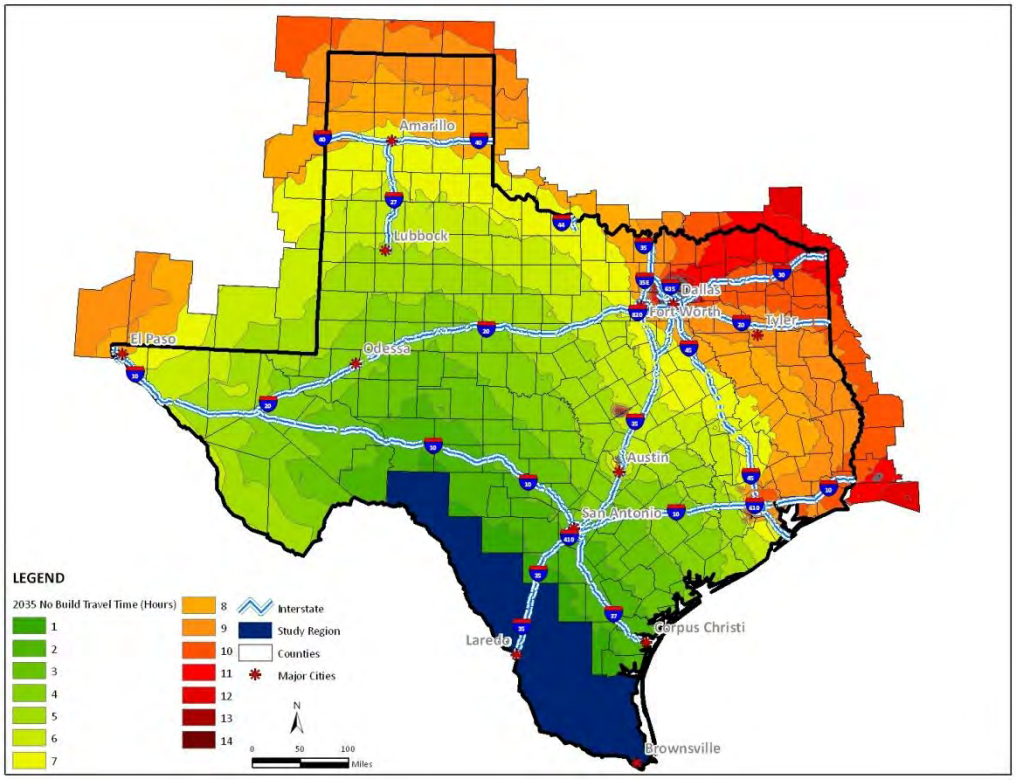


Figure 3-43: 2035 Travel Times from the Study Region (No Build)

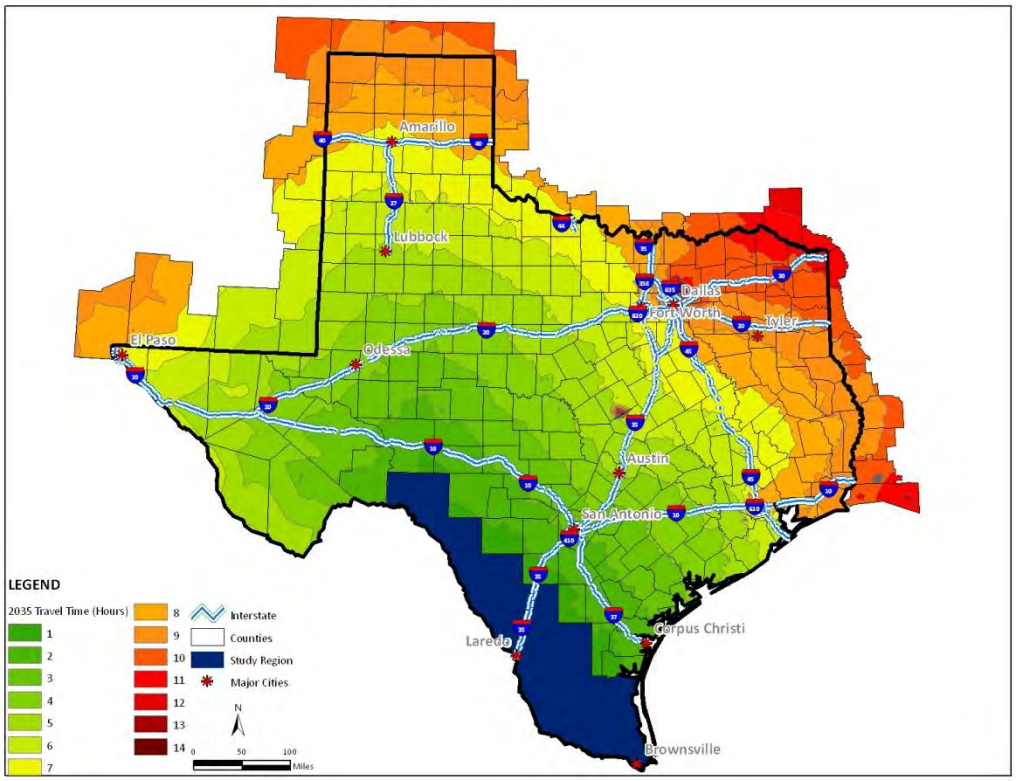


Figure 3-44: 2035 Travel Times from the Study Region (with Planned Improvements)

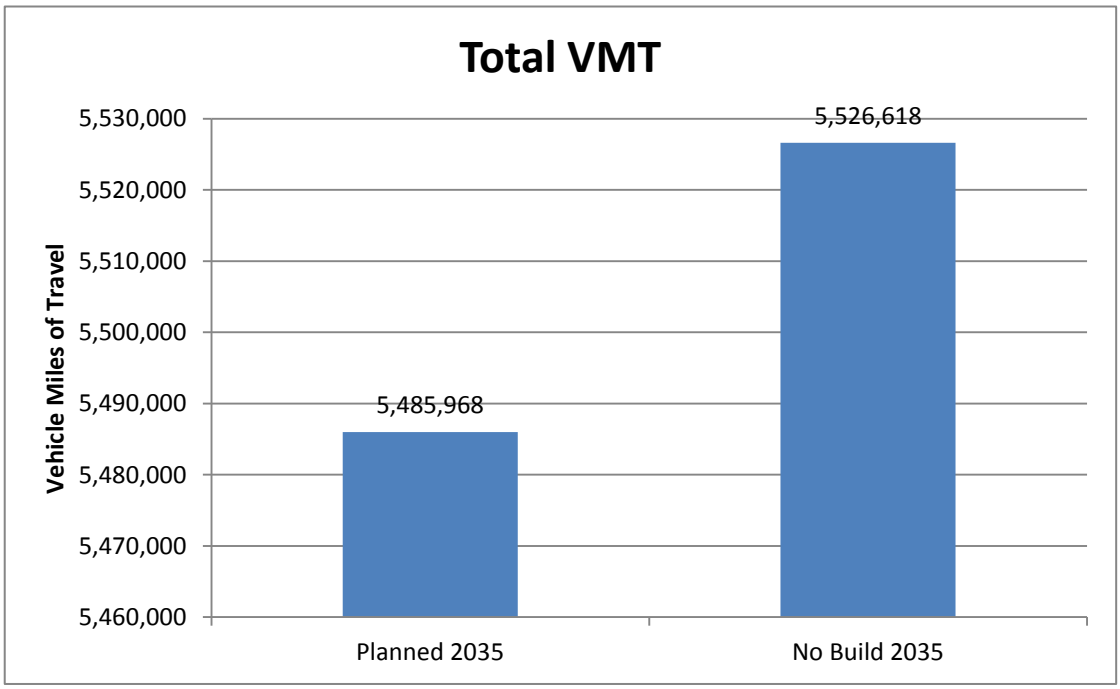


Figure 3-45: 2035 Daily Vehicle Miles of Travel for the Study Region

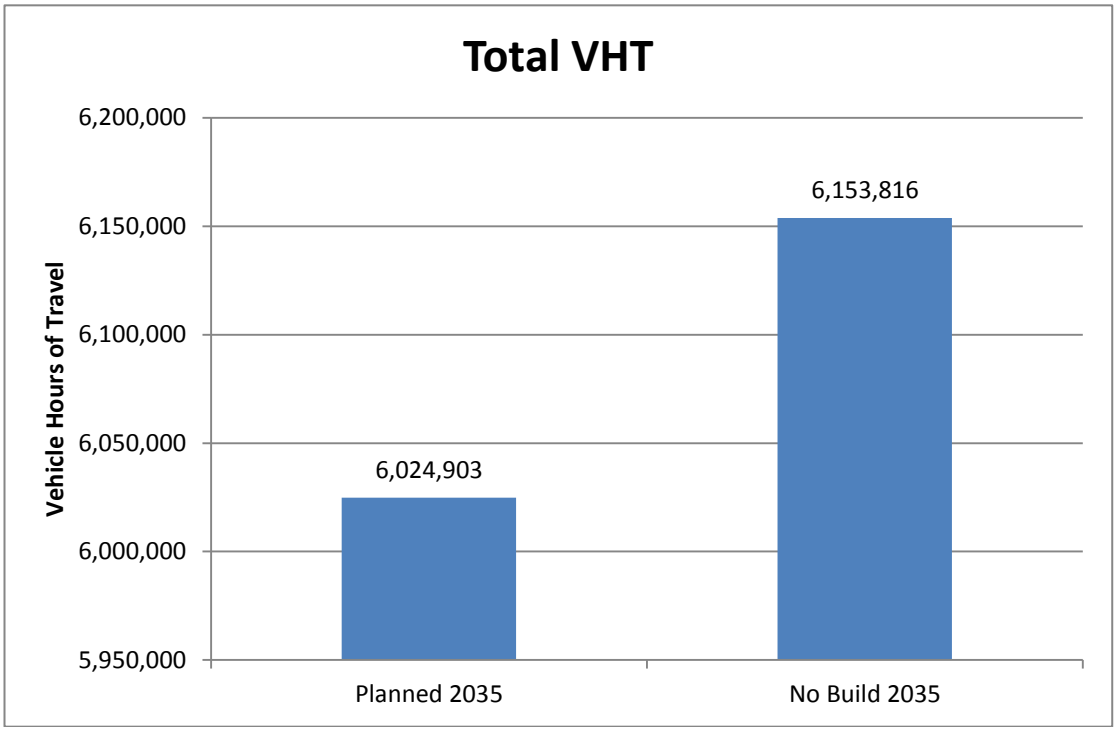


Figure 3-46: 2035 Daily Vehicle Hours of Travel for the Study Region

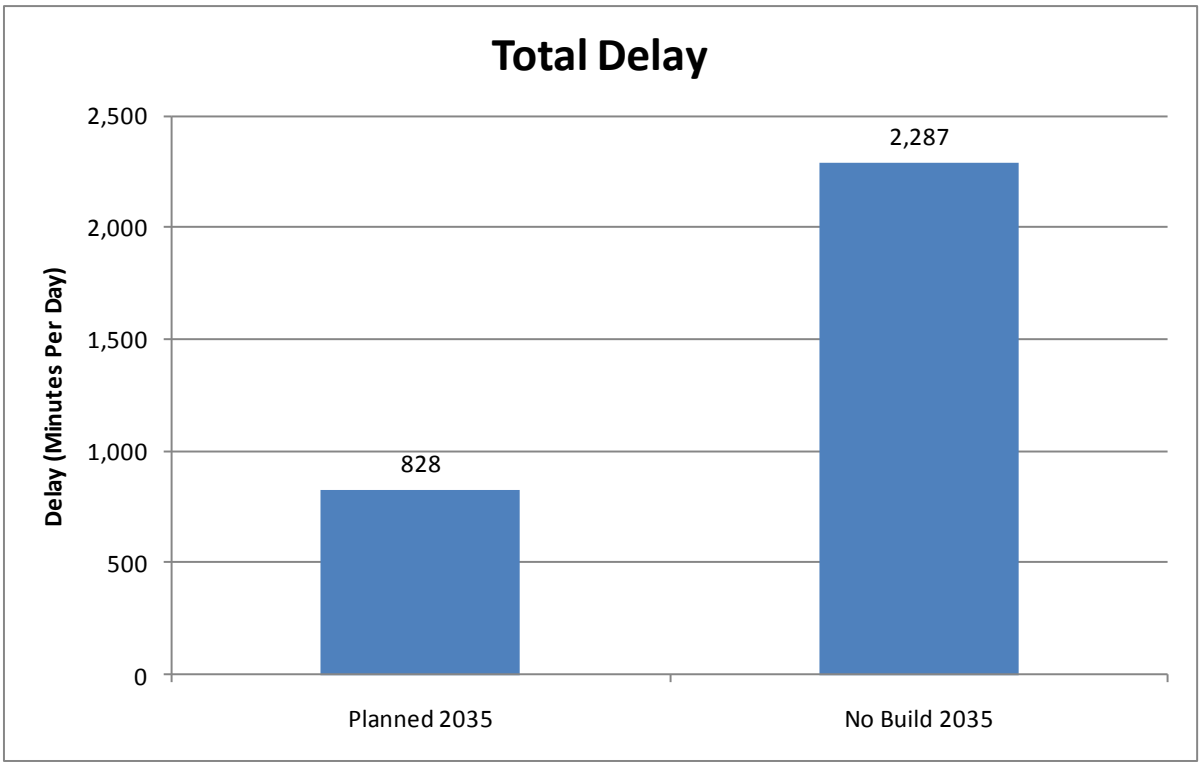


Figure 3-47: 2035 Daily Minutes of Delay for the Study Region

Figures 3-48 through 3-50 show the impacts of the planned improvements if implemented by 2035 for each county. The greatest reduction in vehicle miles of travel due to the planned improvements is projected to occur in LaSalle County (north of Laredo), while the greatest reduction in vehicle hours of travel would occur in Hidalgo County (includes McAllen). The only counties that are shown to experience any significant levels of delay are Webb (includes Laredo), Hidalgo, and Cameron (includes Brownsville and Harlingen) Counties. The greatest reduction in delay due to the planned improvements is projected to occur in Hidalgo County.

	Planned 2035			No Build 2035		
County	VMT	VHT	Delay	VMT	VHT	Delay
Brooks	201,683	212,043	3.7	203,487	213,331	3.7
Cameron	729,734	914,386	157	728,884	932,914	401
Dimmit	124,073	127,010	0.2	129,683	132,711	0.2
Duval	189,750	194,291	0.1	164,607	170,394	0.2
Hidalgo	1,098,016	1,363,377	360	1,099,853	1,494,991	1,375
Jim Hogg	9,579	12,087	0.6	12,804	14,678	0.6
Kenedy	479,983	495,699	0.7	476,272	491,203	0.7
Kinney	38,947	39,900	0.1	42,352	43,547	0.1
LaSalle	634,281	558,026	0.3	674,164	594,106	0.5
Maverick	165,246	175,315	23	171,691	179,878	25
Starr	130,966	146,600	18	134,288	145,400	18
Val Verde	178,783	185,188	2.6	188,640	193,041	2.6
Webb	1,096,385	1,161,954	261	1,093,447	1,109,585	457
Willacy	199,807	225,800	0.3	198,344	225,111	0.6
Zapata	94,470	96,712	0.3	99,163	101,740	1.4
Zavala	114,265	116,515	0.1	108,937	111,186	0.1

Table 3-13: Impacts of Planned Roadway Improvements by County

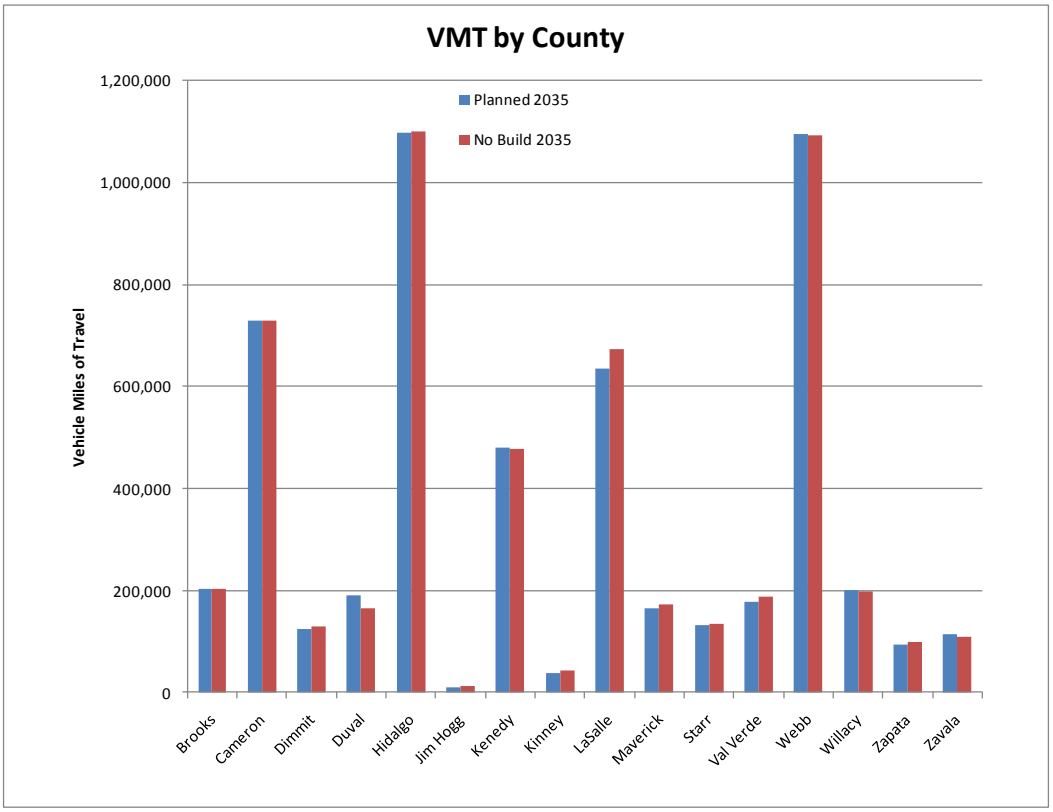


Figure 3-48: 2035 Vehicle Miles of Travel by County

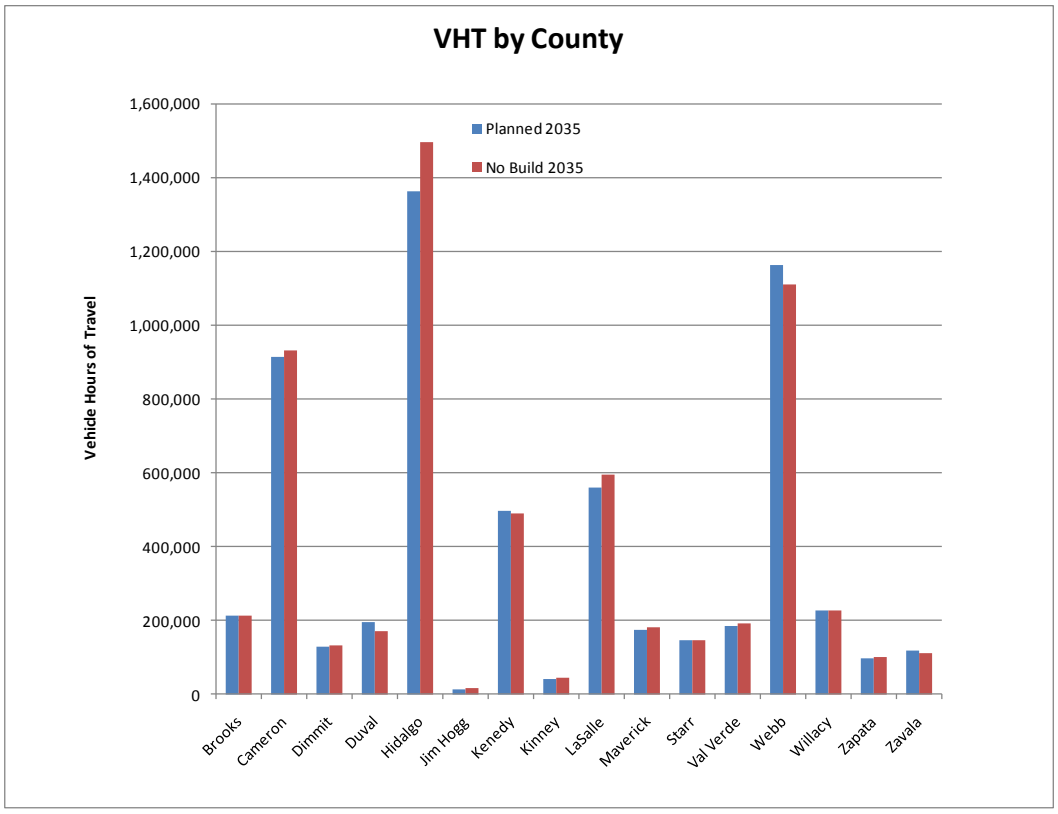


Figure 3-49: 2035 Vehicle Hours of Travel by County

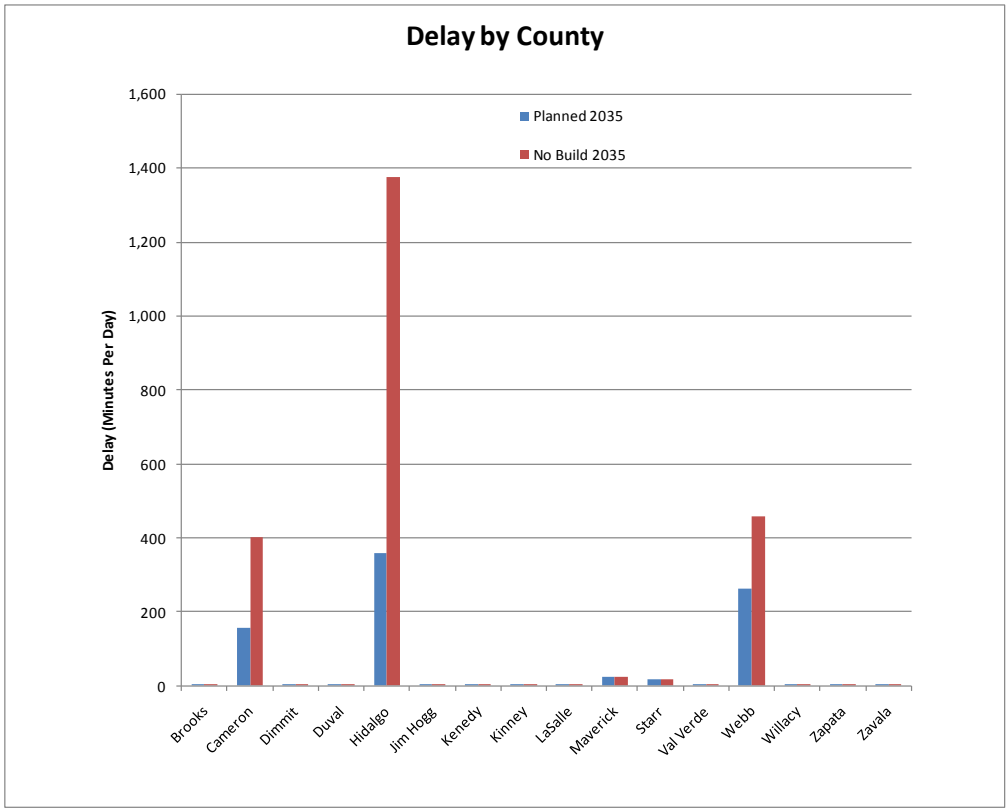


Figure 3-50: 2035 Daily Minutes of Delay for the Study Region

SECTION 4: EXISTING RAIL SYSTEM INVENTORY

Most of the original railroads in the Laredo and Del Rio areas were built in the late-1800s with the Lower Rio Grande Valley railroads constructed in the early 1900s. These rail lines are now owned by two Class I railroads and three shortline railroads. More than 600 miles of mainline tracks make up the rail network inside the Lower Rio Grande Valley and Laredo region boundaries. The region is home to water and inland ports, including the Port of Brownsville, Port of Laredo, and Port of Harlingen, as well as multiple crossings at the United States – Mexico border. The Class I railroads serving the region consist of the UP, KCS, and BNSF; BNSF has trackage rights within the Laredo and Lower Rio Grande Valley areas. The shortline railroads serving the region include the Border Pacific Railroad (BOP), the Brownsville and Rio Grande International Railroad (BRG), and the Rio Valley Switching Company (RVSC). Each of the rail lines and the corresponding railroad owner are listed as follows:

- Class I Railroads
  - UP
    - Brownsville Subdivision
    - Del Rio Subdivision
    - Eagle Pass Subdivision
    - Harlingen Subdivision
    - Laredo Subdivision
    - Sanderson Subdivision
    - Palo Alto Industrial Lead
    - Santa Rosa Industrial Lead
    - Brownsville Port Line
  - KCS
    - Laredo Subdivision
- Shortline Railroads:
  - BOP
  - BRG
  - RVSC

The physical characteristics of each subdivision will be summarized in this section, with detailed inventories for the track, bridges, and roadway-railroad crossings included in Appendix B of this report. Table 4-1 summarizes the mileage data for mainline, double track, and siding tracks in the Lower Rio Grande Valley and Laredo region. Figure 4-1 provides a map of the railroad subdivisions within the region. A complete listing of track infrastructure, bridges, and roadway-railroad crossings for each rail subdivision can be found in Appendix B.

Railroad Subdivision:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles (ML & Sidings)
UP			
Brownsville	101	6	107
Del Rio	56	9	65
Eagle Pass	33	6	39
Harlingen	26	0	26
Laredo	81	11	92
Sanderson	77	13	90
Santa Rosa	11	1	12
Brownsville Port Line	8	1	9
Subtotal:	*393*	*47*	*440*
KCS			
Laredo	114	9	123
Subtotal:	*114*	*9*	*123*
Shortline Railroads			
BOP	32	0	32
BRG	8	34	42
RVSC	69	0	69
Subtotal:	*109*	*34*	*143*
Total:	**616**	**90**	**706**

Table 4-1: Lower Rio Grande Valley and Laredo Region Track Inventory Summary

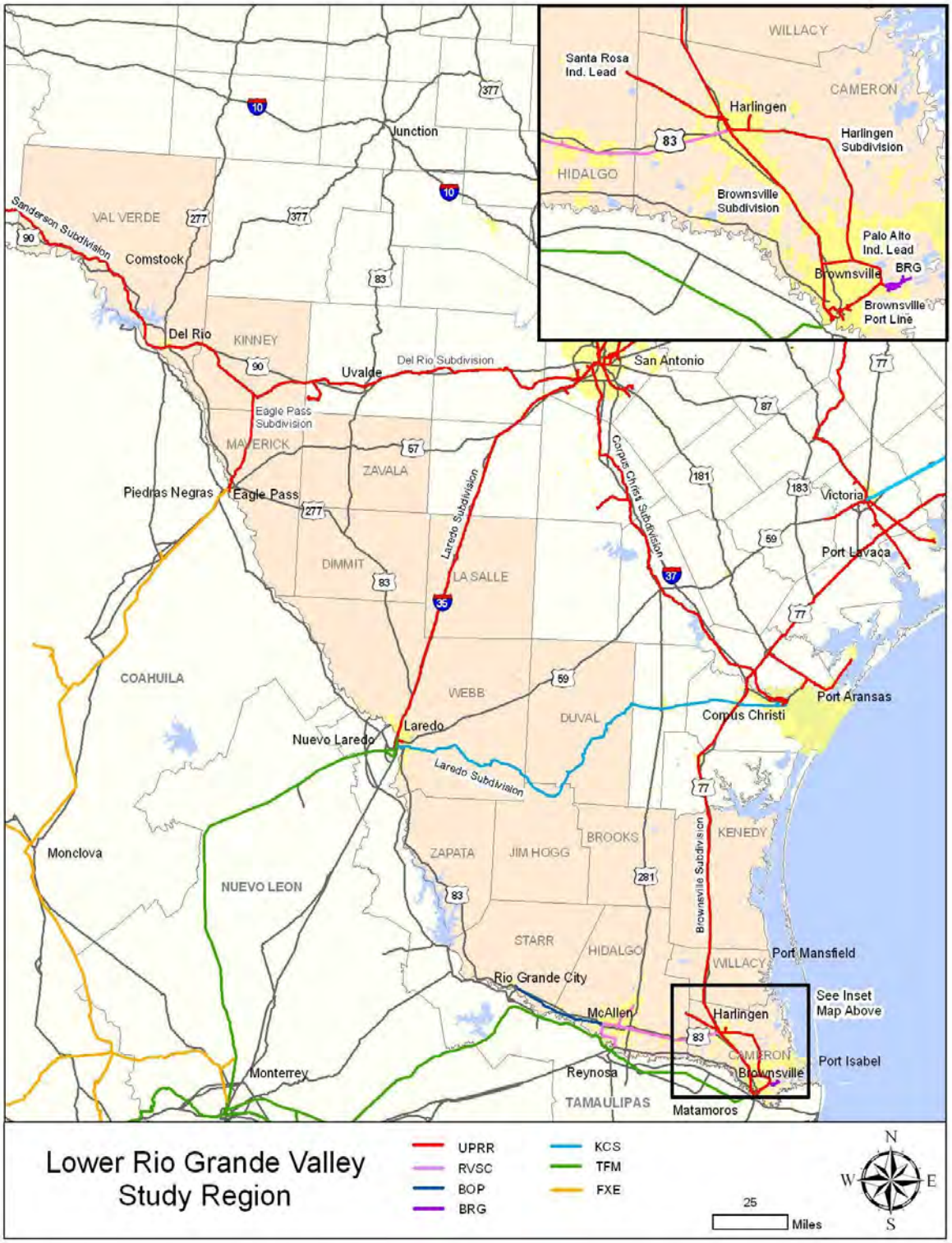


Figure 4-1: Lower Rio Grande Valley and Laredo Region Railroad Subdivisions

UP Brownsville Subdivision

The Brownsville Subdivision runs between Brownsville and Bloomington, Texas where the line connects to the UP Angleton Subdivision. The subdivision is approximately 221 miles in length, of which approximately 101 miles are within the limits of this study. Within the study area, the Brownsville Subdivision crosses through Cameron, Willacy, and Kenedy Counties and passes through the cities of Brownsville, San Benito, Harlingen, Sebastian, Lyford, Raymondville, Armstrong and Sarita.

The Brownsville Subdivision was constructed between 1904 and 1906 by the St. Louis, Brownsville, and Mexico Railway, which was later acquired by Missouri Pacific Railroad in 1925, and is now owned and operated by the UP with trackage rights granted to the BNSF from Brownsville to Bloomington. The rail line is single track with few sidings and rail yards located in Brownsville and Harlingen.

Important interchanges on the Brownsville Subdivision include the Northeast Brownsville Bypass at Olmito leading to the Port of Brownsville, the Harlingen Subdivision at Harlingen, and the connection to the KCS Laredo Subdivision at Robstown. The Brownsville Subdivision also connects to the Brownsville Port Line to provide service to the Port of Brownsville. A new rail bypass is currently under construction that will extend from the Brownsville Subdivision at Olmito to the west of Brownsville toward a new international rail bridge crossing the Rio Grande River into Mexico. The Brownsville Subdivision serves as a key route between South Texas and the Houston area.

Table 4-2 displays the locations and lengths of major bridges on the Brownsville Subdivision, while Table 4-3 summarizes the track mileage data for the subdivision by county, and Figure 4-2 shows the location of the subdivision.

Milepost:	Location Description:	County:
6.30	Waterway (150')	Cameron
23.60	Arroyo Colorado River (485')	Cameron
34.70	Floodway (2626')	Kenedy

Table 4-2: UP Brownsville Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	36.28	0.55	36.83
Willacy	18.17	1.21	19.38
Kenedy	46.37	3.76	50.13
Total	**100.82**	**5.52**	**106.34**

Table 4-3: UP Brownsville Subdivision Track Inventory Summary

Figure 4-2: UP Brownsville Subdivision Map

UP Del Rio Subdivision

The Del Rio Subdivision runs between Del Rio and Kirby just east of Kirby Yard near San Antonio. The rail line continues south as the UP Eagle Pass Subdivision and northwest as the UP Sanderson Subdivision. The subdivision is approximately 178 miles in length, of which approximately 56 miles are within the limits of this study from Del Rio to the Kinney – Uvalde County line. Within the study limits, the Del Rio Subdivision is located in Val Verde and Kinney Counties and passes through the cities of Del Rio, Johnstone, Amanda, Pinto, Spofford, Anacacho, and Odlaw.

The Del Rio Subdivision was constructed in 1881 by the Galveston, Harrisburg, and San Antonio Railway and is now owned and operated by the UP. The rail line is single track with limited sidings within the project limits and connects to the Sanderson Subdivision in Del Rio, to continue west to El Paso and then to the West Coast.

The National Railroad Passenger Corporation (Amtrak) also runs passenger trains along the Del Rio Subdivision along its Sunset Limited route. Amtrak runs an average of 3 trains per week in each direction over the subdivision.

Table 4-4 displays the locations and lengths of major bridges on the Del Rio Subdivision, while Table 4-5 summarizes the track mileage data for the subdivision by county, and Figure 4-3 shows the location of the subdivision.

Milepost:	Location Description:	County:
330.31	FM 1572 (226')	Kinney
334.48	West Elm Creek (220')	Kinney
339.53	Lindsay Creek (210')	Kinney
347.57	Las Moras Creek (405')	Kinney
347.77	Drainage Ditch (241')	Kinney
349.78	Dull Ditch (240')	Kinney
356.06	Pinto Creek (244')	Kinney
365.83	East Sycamore Creek (421')	Kinney
365.99	West Sycamore Creek (560')	Kinney

Table 4-4: UP Del Rio Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Laredo District			
Val Verde	11.46	1.71	13.17
Kinney	44.85	7.02	51.87
Total	**56.31**	**8.73**	**65.04**

Table 4-5: UP Del Rio Subdivision Track Inventory Summary

Figure 4-3: UP Del Rio Subdivision Map

UP Eagle Pass Subdivision

The Eagle Pass Subdivision runs between Eagle Pass and Spofford, where the line meets the Del Rio Subdivision. The rail line continues south of the border as Ferrocarril Mexicano, also known as Ferromex (FXE), in Eagle Pass. The subdivision is approximately 33 miles in length, all of which are within the limits of this study in Maverick and Kinney Counties. The rail line passes through the cities of Eagle Pass, Clarks Park, Ryans Ruin, Horan, Carl, and Spofford.

The Eagle Pass Subdivision was constructed in 1884 by the Galveston, Harrisburg, and San Antonio Railway and is now owned and operated by the UP with trackage rights granted to the BNSF within the entire subdivision limits. The rail line is single track with a maintenance facility in Eagle Pass, a yard and transload facility in Clarks Park, and limited sidings.

Table 4-6 displays the locations and lengths of major bridges on the Eagle Pass Subdivision, while Table 4-7 summarizes the track mileage data for the subdivision by county, and Figure 4-4 shows the location of the subdivision.

Milepost:	Location Description:	County:
19.44	Drainage Ditch (269')	Maverick
26.58	Elm Creek (293')	Maverick
26.77	(300')	Maverick
26.83	(346')	Maverick
34.42	Rio Grande River (1119')	Maverick

Table 4-6: UP Eagle Pass Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Laredo District			
Maverick	26.83	5.71	32.54
Kinney	5.67	0.77	6.44
Total	**32.50**	**6.48**	**38.98**

Table 4-7: UP Eagle Pass Subdivision Track Inventory Summary

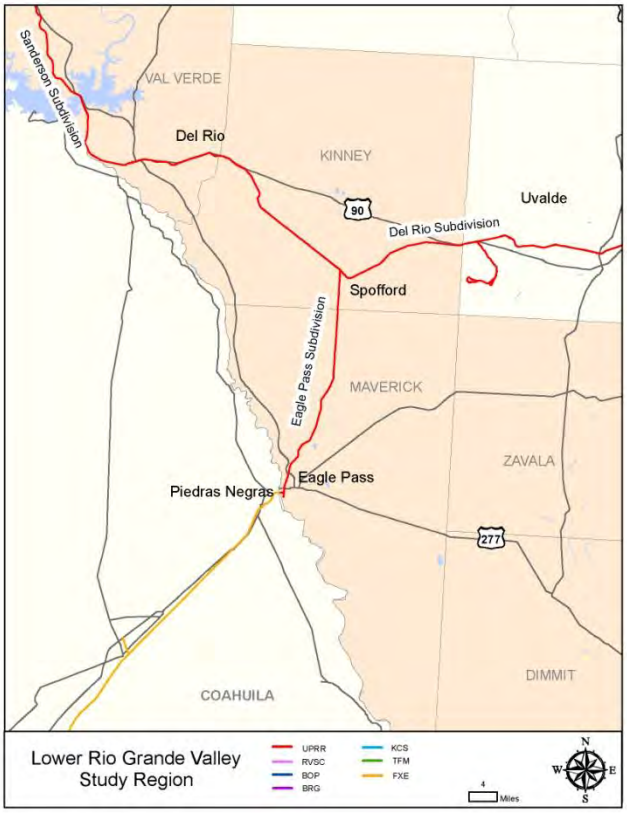


Figure 4-4: UP Eagle Pass Subdivision Map

UP Harlingen Subdivision

The Harlingen Subdivision runs between Harlingen and Palo Alto Junction, located 4 miles south of Los Fresnos, for a total distance of approximately 25 miles. The rail line continues south from Palo Alto Junction as the UP Palo Alto Industrial Lead to the Port of Brownsville. The Harlingen Subdivision is located entirely within Cameron County and passes through the cities of Harlingen, Lacoma, and Los Fresnos.

The Harlingen Subdivision was constructed in 1927 by the San Antonio and Aransas Pass Railway and is now owned and operated by the UP. The rail line is single track with limited sidings and connects to the Brownsville Subdivision in Harlingen near Harlingen Yard.

Table 4-8 displays the locations and lengths of major bridges on the Harlingen Subdivision, while Table 4-9 summarizes the track mileage data for the subdivision by county, and Figure 4-5 shows the location of the subdivision.

Milepost:	Location Description:	County:
3.97	(60')	Cameron
16.29	(75')	Cameron

Table 4-8: UP Harlingen Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	25.50	0.21	25.71
Total	**25.50**	**0.21**	**25.71**

Table 4-9: UP Harlingen Subdivision Track Inventory Summary

Figure 4-5: UP Harlingen Subdivision Map

UP Laredo Subdivision

The Laredo Subdivision runs from the United States – Mexico border in Laredo to Tower 105 in downtown San Antonio. The subdivision is approximately 152 miles in length, of which approximately 81 miles are within the limits of this study from Laredo to the La Salle – Frio County line. Within the study limits, the subdivision crosses through Webb and La Salle Counties and passes through the cities of Laredo, Unitec, Callaghan, Encinal, Finley, Altee, Cotulla and Gardendale.

The Laredo Subdivision was constructed in 1882 by the International and Great Northern Railroad and is now owned and operated by the UP. The rail line continues south of the border at Laredo as Transportacion Ferroviaria Mexicana (TFM) and connects to the UP Austin Subdivision at San Antonio. The subdivision is

single track with a yard facility and many industry tracks in Laredo as well as a large yard facility at Port Laredo, located approximately 12 miles north of Laredo. The subdivision also has several siding and industry tracks between Port Laredo and San Antonio.. The City of Laredo owns an approximately 5 mile line parallel to the UP Laredo Subdivision running north from Laredo, located a couple of city blocks to the east of the UP Laredo Subdivision line. The UP uses the City of Laredo owned RG run-around track to bypass the many industry and yard tracks through Laredo. There are approximately 20 switches located on the Laredo Subdivision that are bypassed by the RG run-around line. The UP Laredo Subdivision is currently being utilized as one of the major container transportation routes by the Port of Laredo.

Table 4-10 displays the locations and lengths of major bridges on the Laredo Subdivision, while Table 4-11 summarizes the track mileage data for the subdivision by county, and Figure 4-6 shows the location of the subdivision.

Milepost:	Location Description:	County:
346.20	Nueces River (1358')	LaSalle
393.20	I-35 (243')	Webb
405.60	I-35 (331')	Webb

Table 4-10: UP Laredo Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Laredo District			
Webb	38.12	7.70	45.82
LaSalle	43.31	3.77	47.08
Total	**81.43**	**11.47**	**92.90**

Table 4-11: UP Laredo Subdivision Track Inventory Summary

Figure 4-6: UP Laredo Subdivision Map

UP Sanderson Subdivision

The Sanderson Subdivision runs from Alpine Junction near Alpine to Del Rio, Texas. The subdivision is approximately 221 miles in length, of which approximately 77 miles are within the limits of this study from Del Rio to the Val Verde – Terrell County line. Within the study limits, the subdivision passes through Val Verde County and the cities of Del Rio, Amistad, Comstock, and Langtry.

The Sanderson Subdivision was constructed in 1882 by the Galveston, Harrisburg, and San Antonio Railway and is now owned and operated by the UP. The rail line continues northwest at Alpine as the Valentine Subdivision and southeast at Del Rio as the Del Rio Subdivision. The subdivision is single track with multiple sidings within the study limits.

Amtrak also uses the Sanderson Subdivision for passenger trains along its Sunset Limited route. Amtrak runs an average of 3 trains per week in each direction over the subdivision.

Table 4-12 displays the locations and lengths of major bridges on the Sanderson Subdivision, while Table 4-13 summarizes the track mileage data for the subdivision by county, and Figure 4-7 shows the location of the subdivision.

Milepost:	Location Description:	County:
393.14	Devil's River (2200')	Val Verde
415.87	Cow Creek (330')	Val Verde
427.97	Pecos River (1386')	Val Verde
441.25	Eagle Nest Canyon (304')	Val Verde

Table 4-12: UP Sanderson Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Laredo District			
Val Verde	77.14	13.22	90.36
Total	**77.14**	**13.22**	**90.36**

Table 4-13: UP Sanderson Subdivision Track Inventory Summary

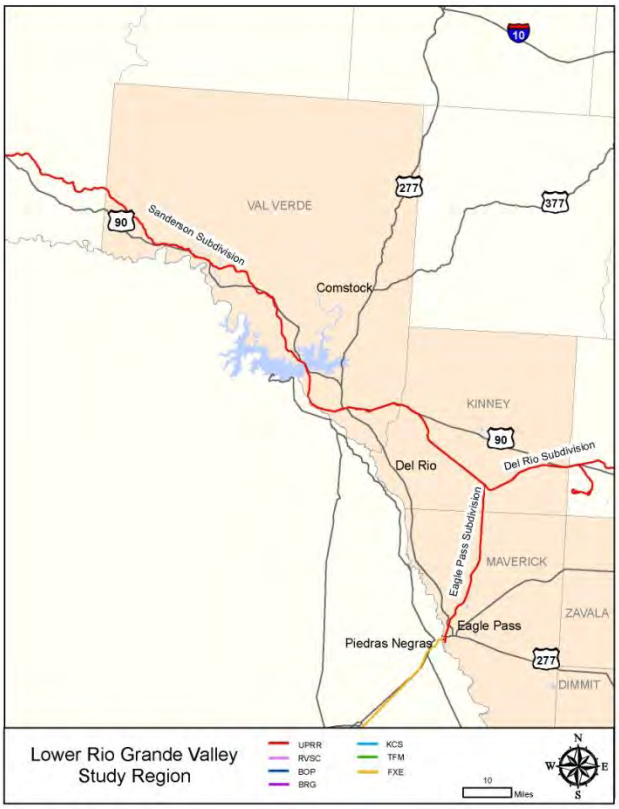


Figure 4-7: UP Sanderson Subdivision Map

UP Palo Alto Industrial Lead

The Palo Alto Industrial Lead runs from Palo Alto Junction to the Port of Brownsville north of Palo Alto Yard for a total distance of approximately 6 miles. The rail line continues north at Palo Alto Junction as the Harlingen Subdivision and connects to

the BRG and the Brownsville Port Line at the south end. The entire industrial lead is located in Cameron County and is single track.

There are not any bridges on the Palo Alto Industrial Lead. Table 4-14 summarizes the track mileage data for the industrial lead by county, and Figure 4-8 shows the location of the industrial lead.

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	6.43	0.30	6.73
Total	**6.43**	**0.30**	**6.73**

Table 4-14: UP Palo Alto Industrial Lead Track Inventory Summary

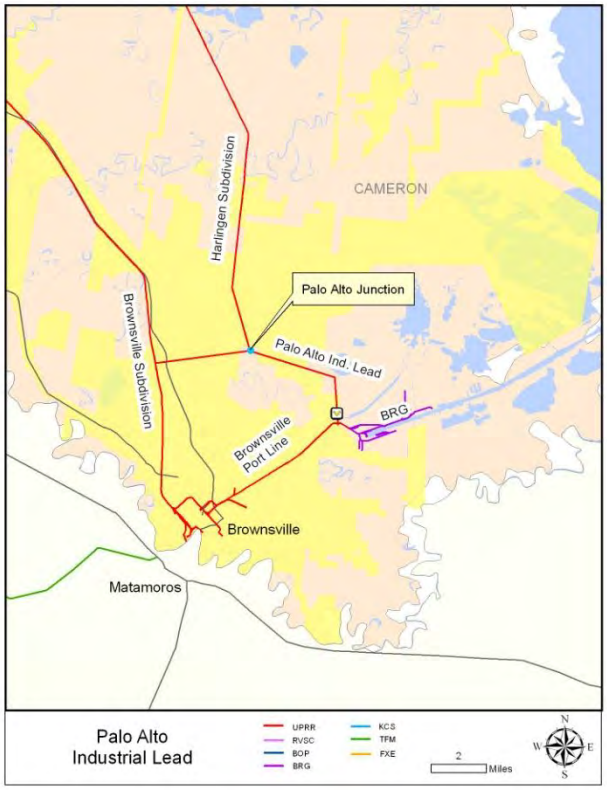


Figure 4-8: UP Palo Alto Industrial Lead Map

Santa Rosa Industrial Lead

The Santa Rosa Industrial lead is approximately 11 miles in length and runs between Rogers Lacy and Harlingen Junction in Harlingen to connect to the UP Brownsville and UP Harlingen Subdivisions. The rail line is located in Hidalgo and Cameron Counties near the city of Harlingen.

The Santa Rosa Industrial Lead was constructed by the San Antonio and Aransas Pass Railway in 1927 and is now owned and operated by UP. The rail line is single track with multiple industry tracks.

There are not any major bridges on the Santa Rosa Industrial Lead. Table 4-15 summarizes the track mileage data for the industrial lead by county, and Figure 4-9 shows the location of the industrial lead.

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	10.25	0.39	10.64
Hidalgo	1.13	0.34	1.47
Total	**11.38**	**0.73**	**12.11**

Table 4-15: UP Santa Rosa Industrial Lead Track Inventory Summary

Figure 4-9: UP Santa Rosa Industrial Lead Map

UP Brownsville Port Line

The Brownsville Port Line is approximately 8 miles in length and runs from the city of Brownsville at the connection with the Brownsville Subdivision to the Brownsville

Port Line connection and the Port of Brownsville. The entire rail line is located in Cameron County.

The Brownsville Port Line was constructed by the St. Louis, Brownsville, and Mexico Railway and is now owned and operated by UP with trackage rights granted to the BNSF. It was leased to Brownsville and Rio Grande International Railroad in 1997. The rail line is single track with multiple industry tracks.

There are not any major bridges on the Brownsville Port Line. Table 4-16 summarizes the track mileage data for the industrial lead by county, and Figure 4-10 shows the location of the industrial lead.

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	7.92	0.58	8.50
Total	**7.92**	**0.58**	**8.50**

Table 4-16: UP Brownsville Port Line Track Inventory Summary

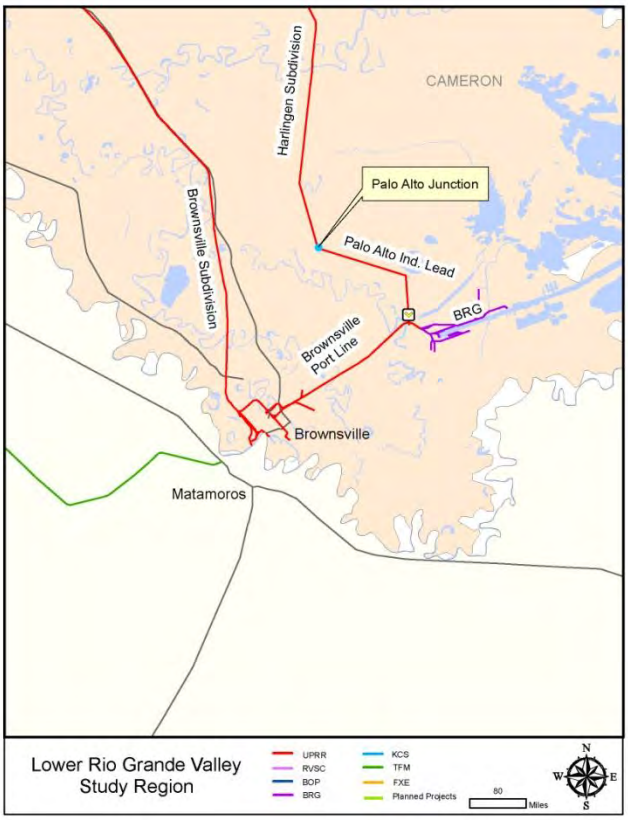


Figure 4-10: UP Brownsville Port Line Industrial Lead Map

KCS Laredo Subdivision

The KCS Laredo Subdivision runs between Laredo and Corpus Christi. The rail line is approximately 162 miles in length, of which approximately 114 miles are within the limits of this study from Laredo to the Duval – Jim Wells County line. The rail line connects to the UP Laredo Subdivision and TFM at Laredo, crosses the Brownsville Subdivision, and connects to the Corpus Christi Subdivision at Corpus Christi. The rail line passes through Webb and Duval Counties and the cities of Laredo, Killam, Aquilares, Mirando City, Bruni, Hebbronville, Realitos, Benavibes, and San Diego.

The Laredo Subdivision was constructed in 1875 by Corpus Christi, San Diego, and Rio Grande Narrow Gauge Railroad with the Texas-Mexican Railroad assuming ownership in 1881 under the control of the National Railways of Mexico. KCS acquired the railroad in 2005. The rail line is single track with two rail yards in Laredo and multiple sidings within the project limits.

Table 4-17 displays the locations and lengths of major bridges on the Laredo Subdivision, while Table 4-18 summarizes the track mileage data for the subdivision by county, and Figure 4-11 shows the location of the subdivision.

Milepost:	Location Description:	County:
0.00	Rio Grande River (1050')	Webb
1.57	I-35 (347')	Webb
20.10	(234')	Webb
23.10	(206')	Webb
84.00	(215')	Duval
108.19	(235')	Duval
111.69	(296')	Duval

Table 4-17: KCS Laredo Subdivision Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Laredo District			
Webb	52.05	3.25	55.30
Duval	51.85	4.10	55.95
TxDOT Pharr District			
Jim Hogg	10.40	1.80	12.20
Total	**114.30**	**9.15**	**123.45**

Table 4-18: KCS Laredo Subdivision Track Inventory Summary

Figure 4-11: KCS Laredo Subdivision Map

Border Pacific Railroad (BOP)

The Border Pacific Railroad operates on approximately 32 miles of track from Rio Grande City to Mission, where it interchanges with the RVSC for connection to the Brownsville Subdivision. The rail line passes through Starr and Hidalgo Counties and several cities between Rio Grande City and Mission.

Table 4-19 displays the locations and lengths of major bridges on the Border Pacific Railroad, while Table 4-20 summarizes the track mileage data for the subdivision by county, and Figure 4-12 shows the location of the subdivision.

Milepost:	Location Description:	County:
47.50	(100')	Hidalgo
53.50	(100')	Hidalgo
56.20	(150')	Hidalgo
57.00	(150')	Starr
71.00	(150')	Starr

Table 4-19: Border Pacific Railroad Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Hidalgo	14.97	0.00	14.97
Starr	16.63	0.00	16.63
Total	**31.60**	**0.00**	**31.60**

Table 4-20: Border Pacific Railroad Track Inventory Summary

Figure 4-12: Border Pacific Railroad Map

Brownsville & Rio Grande International Railroad (BRG)

The Brownsville & Rio Grande International Railroad runs from Brownsville to Dreadnaught and is approximately 8 miles in length. The rail line is located entirely within Cameron County and passes through the cities of Brownsville and Dreadnaught.

The BRG interchanges with Class I railroads at the UP Olmito Yard, where BNSF traffic from Houston has trackage rights by way of the UP Brownsville Subdivision. Interchanges with traffic on the TFM are made through an intermediate switch with UP at the Brownsville & International Matamoros Bridge.

The Missouri Pacific Railroad owned the track until 1984, when the Brownsville Navigation District claimed the line back from the Missouri Pacific Railroad. The rail line is single track with yards and sidings.

Table 4-21 displays the locations and lengths of major bridges on the Brownsville & Rio Grande International Railroad, while Table 4-22 summarizes the track mileage data for the subdivision by county, and Figure 4-13 shows the location of the subdivision.

Milepost:	Location Description:	County:
U. Carbide	(140')	Cameron

Table 4-21: Brownsville & Rio Grande International Railroad Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	8.00	34.00	42.00
Total	**8.00**	**34.00**	**42.00**

Table 4-22: Brownsville & Rio Grande International Railroad Track Inventory Summary

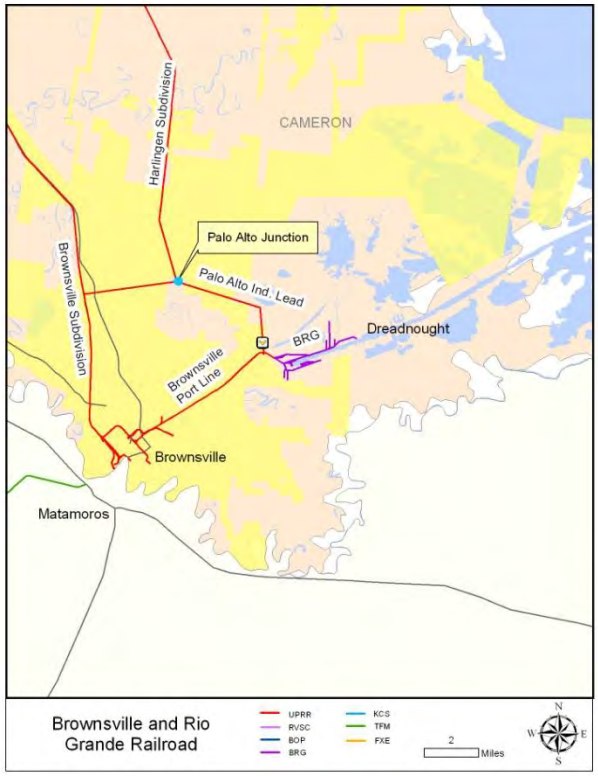


Figure 4-13: Brownsville & Rio Grande International Railroad Map

Rio Valley Switching Company (RVSC)

The Rio Valley Switching Company operates on 41 miles of track between Harlingen and Mission, where it interchanges with the Border Pacific Railroad. The RVSC also operates on 8 miles of track between Mission and Hidalgo, 13 miles of track between McAllen and Edinburg, and 11 miles of track between Harlingen and Santa Rosa. The entire rail line passes through Cameron and Hidalgo Counties and crosses the cities of Harlingen, Kipfer, La Feria, Mercedes, Weslaco, Donna, Val Verde, Alamo, San Juan, Pharr, Hauser, McColl, McAllen, Kane, Sharyland, Mission, Madero, Holts, Sammons, Hidalgo, Edinburg, and Santa Rosa.

The Rio Valley Switching Company was constructed in 1904 by St. Louis, Brownsville, and Mexico Railway. Different segments have been leased to the Rio Valley Railroad by UP from 1993 to 2004. The railroad interchanges with UP in Harlingen.

Table 4-23 displays the locations and lengths of major bridges on the Rio Valley Switching Company, while Table 4-24 summarizes the track mileage data for the subdivision by county, and Figure 4-14 shows the location of the subdivision.

Milepost:	Location Description:	County:
14.70	Floodway (1527')	Hidalgo

Table 4-23: Rio Valley Switching Company Major Bridge Inventory

County:	Miles of Mainline Track:	Miles of Siding Track:	Total Miles:
TxDOT Pharr District			
Cameron	10.49	0.00	10.49
Hidalgo	58.51	0.00	58.51
Total	**69.00**	**0.00**	**69.00**

Table 4-24: Rio Valley Switching Company Track Inventory Summary

Figure 4-14: Rio Valley Switching Company Map

SECTION 5: RAIL OPERATIONS MODELING

Rail Traffic Controller

Rail Traffic Controller (RTC) is a computer program created by Berkeley Simulation Software, LLC, which simulates the operation of trains over a railroad network. Variations can be made in network track layouts, train consists and schedules, and operating rules and constraints, which allows the testing of such changes before they are implemented. RTC is used by almost all North American Class I railroads to evaluate and plan their operations and capital expenditures. The Class I carriers whose track and trains are modeled in this study (BNSF, KCS, and UP) use the model, are familiar with the methodology, and accept the model's results when it is used to their standards.

RTC Input Files:

The simulation model consists primarily of two kinds of files:

- *Network files* include track, signals, grades, curves, bridges, road crossings, and railroad junctions or interlockings. These files can be as detailed as required to obtain accurate results; distances can be specified to within 6 feet, though that level of precision is seldom required. The network files also allow the simulation to reflect the specific time that segments of track must be withdrawn from service for maintenance-of-way activity.

- *Train files* include all information related to individual trains including their identity, type, weight, length, locomotives, time and day of operation, relative priority, origin and destination, route, railroad carrier, and intermediate work, if any. In all simulation cases run for this study, each train instance is treated individually. Additionally, no two days in the model are identical. Some freight trains operate on completely random schedules, according to traffic demands; or according to availability of resources, such as locomotives and crews. This variation in rail operations is fully captured in these RTC simulations.

RTC Dispatching Logic:

As the simulation "dispatcher" sends trains across the railroad network, the computer model resolves conflicts between trains in the same manner as an actual railroad dispatcher. The model's dispatcher resolves conflicts with full knowledge of all trains on the modeled network and with the look-ahead capability available to a computer program. Unless a train is badly delayed, or the crew is nearing the federally mandated 12 hours-of-continuous-service limit, both actual railroad dispatchers and the simulation program "dispatcher" will generally give preference to passenger trains over expedited freight trains, to expedited freight trains over lower priority manifest freight trains, and to through manifest trains over local freight trains or yard engines. These priorities are determined by the freight railroads and are incorporated into the meet-pass logic used to resolve train conflicts.

RTC and actual dispatchers make decisions based on many factors involved in train performance:

- Priority
- Type of train
- Time available for the train and engine crew to work
- Train length and weight
- Locomotive power
- Scheduled work

When there is a particularly complicated series of conflicts, the model, as well as actual dispatchers, discards normal priorities and seeks alternate solutions that will keep the railroad as fluid as possible under the circumstances. The RTC model fails occasionally, and repeated failures are a good sign that what's being attempted is impossible or at the very least unsustainable; which means that the rail demand being placed on the available infrastructure network and the practical capacity of that network are incompatible.

The model will generally minimize the total cost of delay for all trains involved in a conflict or a series of conflicts, with the capability of handling up to 30 trains involved in a related series of conflicts. These conflicts frequently arise around congested terminals or on high-density line segments. Every decision to advance one train and delay another has its own set of resulting impacts, and RTC sorts through these impacts and settles on the solution that seems to work best. However, there are times when the RTC model makes an incorrect or poor decision, just as in the case of actual dispatchers. RTC decisions are analyzed and left standing if they are realistic or have no significant impacts while others are rejected in a case "resolution" process, whereby the RTC user intervenes to change an initial RTC decision into a better or more realistic one.

In reality, dispatchers make decisions in real time without the knowledge possessed by RTC and without the luxury of revising decisions until the delay cost is minimized. As a result, RTC solutions may be more optimistic than can be expected in real life. In practice, RTC base cases designed to measure current performance under current conditions in order to establish a starting point for subsequent comparisons typically calibrate to within a small percentage of actual movement records. Consequently, the process of validating the base case model is an important part of ensuring that model outputs in planning cases are reliable.

RTC Performance Measures:

RTC is designed to measure railroad performance over a specified period of time. Measures such as fuel consumption are not specifically time-related, but all measures used can be considered time-related for most practical purposes. Some measures are absolute quantities, while others are ratios or normalized measures of performance.

The measures used and those shown in the following discussions of the simulation cases are as follows:

Train count – This is the number of train operations performed over a period of time (per day or per week) measured in the model. This number is always less than the number of trains in the case since trains that do not complete their entire run within the measured week are excluded from the statistics so that they do not distort the results. All trains in the case are dispatched; however, not all trains are measured.

Average speed – This is the average operating speed (in miles per hour) of the measured trains operating across the entire network or across a specific part of the network (i.e., a railroad Subdivision or District).

Delay Ratio – This is the ratio of congestion-related delay to "ideal" or "unimpeded" running time. Unimpeded time equals the time it would take to operate all the trains, including any en-route work they need to do or requirements they would have to meet (e.g., federally mandated brake system tests), without any congestion-related delay. The numerator of this ratio, which varies, is delay - meaning that a higher delay ratio indicates worse conditions. The denominator doesn't change within a case and represents the irreducible minimum amount of time that it would take to run the railroad. Delay ratio is a measure of "normalized" delay, allowing comparisons of performance between simulation cases or between segments of the railroad network where train counts are not the same. A low delay ratio is an indication that more sustainable train performance is expected.

Delay Hours/Day – This is the absolute number of train-hours per calendar day lost to congestion-related delay. A "train-hour" is a measure that has an associated economic value and, correspondingly, reductions in delay hours equate to reductions in cost. However, a freight-train hour represents one train either sitting still or running for one hour and does not, for example, account for the difference in value of one hour lost by a train comprised of 100 loaded cars of time-sensitive freight versus one hour lost by a local train switching 20 cars per shift. Generally, solutions that eliminate the largest number of delay hours per day turn out to also be the most effective at generating private benefits (i.e., cost savings).

Delay Minutes/100 Train-miles – This is an alternate railroad industry measure of normalized delay,serving in much the same way as the delay ratio except that the denominator represents the distance trains travel over time rather than time itself. These ratios often will be extremely high in terminal networks since switch engines that are prevalent in terminals do not operate over large distances. By the same token, a significant reduction in delay minutes per 100 train-miles will suggest a significant improvement in asset and labor productivity.

The RTC Base Case

Before the simulation model can be used to test alternative operating or investment plans, a base case in the model that represents the real world under current

conditions must be built. While simulation of current conditions in the model can be validated, this is not possible for the simulation of future or planning cases since there is no real world test that can be performed under proposed future conditions to ensure that planning case results are realistic.

As a result, base case data is used to construct the model, which is refined until network performance matches current operating conditions. Once it is verified that the current world is described correctly by the model, the model can be trusted to simulate proposed changes to the rail network. Subsequent simulations of planning cases then have the credibility to measure the effects of identified changes well enough that those results can be used to make investment decisions or to make changes to the operating plan.

The Rio Grande Valley and Laredo Region Base Case has 877 miles of railroad track and 385 trains per week. The network currently includes all principal rail lines and yards between Bloomington on the north and Brownsville/Mission/Rio Grande City on the south, between Corpus Christi on the east and Laredo on the west, and between San Antonio on the north and Laredo on the south.

The Base Case simulation network was constructed largely from railroad “track charts” supplied by the carriers. These schematic maps show the infrastructure network in sections, often in sheets showing five mile segments of track. The detail on these charts allows the proper location of signals, switches, grade crossings, sidings, and yard tracks, and conveys the correct distances and grades between points. These charts, along with railroad timetables, also show the proper speed limits for trains on various parts of the network.

In addition, for parts of the rail network in the Rio Grande Valley that were formerly part of the Missouri Pacific Lines and now operated under lease by the Rio Valley Switching Company and Border Pacific Railroad, old copies of Missouri Pacific documents such as operating timetables and maps were used to help locate stations, sidings, and distances since up-to-date copies of track charts were either not provided or were unavailable.

The Base Case train files were constructed partially from railroad records of through train movements. These records are taken from the dispatching system and include the identity of the train, its consist and route, and the day and clock time when it passed certain key recording points. Some of this kind of data was available for use in this exercise. In addition, train data from previous RTC exercises conducted for other TxDOT regional freight studies were extrapolated to cover parts of this network. Observational data was used where available to help make the train files as representative as possible. However, since the Class 1 railroads did not actively participate in this study, no formal interviews with railroad operating personnel were conducted, and therefore the information has not yet been confirmed as up-to-date or completely accurate. It should be accurate enough to describe the general relationship between demand, capacity, and performance.

Additionally, two of the shortline railroads (Brownsville and Rio Grande International and Rio Valley Switching Company) were asked to provide descriptions of local operations around Brownsville and in the Rio Grande Valley. This descriptive information was then used to approximate local train activity performed by these railroads and by the Border Pacific Railroad.

The Base Case includes the following trains by carrier (in a seven-day period):

- BNSF – 22
- Border Pacific – 2
- Brownsville and Rio Grande International – 7
- Corpus Christi Terminal – 8
- Kansas City Southern – 51
- Rio Valley Switching Company – 15
- Union Pacific – 280

Of these 385 trains, 333 have complete, and therefore measured, runs in the simulation. In the Base Case, for example, the 333 measured freight trains in the simulation week break down as follows by type of train:

- Expedited – 31
- Vehicles/Auto Parts – 53
- Manifest – 145
- Grain – 33
- Other Unit (chemicals, rock) – 13
- Locals – 38
- Yard Engines – 20

Approximately half of all trains in the simulation use the UP Brownsville Subdivision, another 37 percent use the UP Laredo Subdivision, and about 10 percent use the KCS between Robstown and Laredo.

Base Case Results

Table 5-1 below summarizes the Base Case train performance for all of the trains and track infrastructure modeled in the RTC network for one week, and for 3 selected railroad subdivisions (the UP Brownsville Subdivision, the KCS Laredo Subdivision, and the UP Laredo Subdivision) that are of particular interest to the study.

It is important to note that RTC measures all train delay only at the network level. When delay is measured in sub-sets of the network, such as individual subdivisions, the delay measured only accounts for trains that are stopped. The model has no way to attribute delay due to acceleration, deceleration, or slow running due to restrictive signals, when it is looking only at a specific train's performance across a piece of the network. Consequently, the subdivision-specific delay will typically

account for only 85 to 90 percent of what RTC at the network level calls True Delay. Thus, in Table 5-1, the network performance measures a delay of 73.8 minutes per 100 train-miles, which seems larger than the total should be if the delays on the three major subdivisions are considered. The difference is in RTC's statistical process, and is not the result of excessive delays being incurred on the shortlines or in the Corpus Christi, Harlingen, Brownsville, or Laredo terminals.

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
Network	330	16.6 mph	37.2%	66.1	71.2
UP Brownsville	162	16.8 mph	27.8%	20.1	51.2
KCS Laredo	87	17.3 mph	12.5%	4.4	28.7
UP Laredo	123	20.7 mph	33.1%	27.1	53.8

Table 5-1: Base Case Freight Train Performance

As a general rule, delay ratios higher than 30 percent on a terminal subdivision and higher than 12 to 15 percent on a mainline subdivision, suggest that the railroad may be suffering high levels of congestion-related delay. Delays of more than 70 minutes per 100 train-miles on a mainline subdivision also cause concern. Inside terminals, delays per 100 train-miles are a bit misleading because trains don’t travel very far under the best of circumstances, so the denominator is small.

Using those standards, the results of the Base Case model show that the UP Brownsville and Laredo Subdivisions have reached their practical capacity based on the modeled train volumes. The KCS Laredo Subdivision has available capacity for growth; however, through trains using this route must also use the UP Brownsville Subdivision between Robstown and Bloomington, and so are still affected by the capacity constraints on the UP. While KCS' re-building of the abandoned line between Rosenberg and Victoria helps create capacity north of Bloomington, it does not address the bottleneck south of Bloomington.

By contrast, the shortlines and CCTR at Corpus Christi have few or no capacity constraints. The international bridge at Laredo is known to be another bottleneck, but the detailed information needed to quantify the problem in RTC was not available for this study. The international bridge at Brownsville does not appear to be a significant capacity constraint, but the movement information currently available lacks detail for the bridge itself. The rail bridge at Brownsville will be retired once the new West Rail Bypass and international crossing west of Brownsville is completed.

Findings from the Base Case

The Base Case results suggest that investment will likely be needed in the mainline routes to the Mexican border if rail traffic grows substantially in the next 10 to 20 years. Based on the modeling, the Brownsville border crossing likely has available capacity on the U.S. side; although, the Mexican side is likely a constraint on the TFM line between Matamoros and Monterrey. The local rail network can likely

handle an increase in traffic volumes within the Study Region. Expanded capacity is more likely to be required north of Robstown, through Odem and Sinton to Inari, which is the first controlled siding south of Bloomington. This section of the Brownsville Subdivision is used by UP trains as well as KCS and BNSF trains operating across the UP line under trackage rights agreements. Since the 1979 abandonment of the SP line between Coleto Creek, Beeville, Skidmore, and Alice, there is no alternate route through this part of the state.

The UP has improved the Laredo Subdivision in recent years with CTC signals and longer sidings, which added capacity to the line. Based on the RTC modeled train counts and distribution frequency, the Subdivision appears to be adequate to meet current demand. If NAFTA traffic grows significantly, however, the capacity and performance of this line may require further analysis.

Two planning cases were also run in RTC to analyze the impacts of traffic growth based on industry projections over the next 10 or 20 years. As part of these cases, the existing rail infrastructure was modified and improved to absorb the growth without a significant decay in operating performance as compared to the Base Case. The improvements modeled may not be the same ones the carriers would build if traffic increases, but the exercise shows the general requirements for the study region for the future based on the growth projections.

Planning Case 1

The first planning case assumes that train counts increase by about 10 percent on each of the three main routes in the study (the UP Brownsville Subdivision between Bloomington and Brownsville, the UP Laredo Subdivision between San Antonio and Laredo, and the KCS Laredo Subdivision between Corpus Christi/Robstown and Laredo). In the Base Case, there are a total of 289 freight trains operating across those three subdivisions. In the first planning case, there are a total of 318 freight trains operating across the three principal subdivisions. The additional trains, by owner, type and route, are as follows (all counts are per measured week):

- UP Brownsville Subdivision (16 additional weekly trains)
    - 2 BNSF grain trains
    - 2 KCS grain trains
    - 2 KCS manifest trains
    - 2 UP expedited trains
    - 3 UP grain trains
    - 5 UP manifest trains
- UP Laredo Subdivision (13 additional weekly trains)
    - 5 UP expedited trains
    - 8 UP manifest trains
- KCS Laredo Subdivision (4 additional weekly trains)
    - 2 KCS grain trains
    - 2 KCS manifest trains

Planning Case 1 involved an iterative process in which new trains were added to the RTC model in proportions relative to the train types and routes that exist within the Base Case. This process insured that the addition of trains reflected the mix of trains and relative frequencies between origin-destination pairs in the Base Case. Consequently, this approach does not assume future trends that would deviate from existing rail operations.

The overall growth of approximately 10 percent in the first planning case is built into the model on top of Base Case train files, which reflect 2008 traffic volumes. The 2008 traffic volumes are about 15 to 20 percent higher than what is being handled in the first quarter of 2010. Consequently, the train counts in this planning case are likely to be 20 to 25 percent higher than train counts on these routes under existing conditions. Therefore, the demand reflected in Planning Case 1 (2008 traffic volumes + 10 percent) may represent train volumes in five to ten years from now, depending on how long traffic to the Rio Grande Valley and Mexico takes to recover.

Planning Case 1 Results

Planning Case 1 was modeled to add growth and enhance the capacity of the physical infrastructure as necessary to absorb that growth without performance degrading to levels significantly below that measured in the Base Case. Table 5-2 shows the results from Planning Case 1 as compared to the results from the Base Case. The results in Table 5-2 show that the performance of the planning case is near that of the Base Case, and in some cases slightly improved with certain infrastructure improvements.

Planning Case 1 included the following infrastructure improvements, listed by subdivision:

- UP Brownsville Subdivision
  - CTC extended from Inari south to Sinton, and from Odem south to Robstown
  - Sidings lengthened at Woodsboro, Sarita, and Norias to between 7700 and 8000 feet each
  - New siding at Kingsville
  - Crew-activated remote control turnouts placed on siding switches between Robstown (south of end of extended CTC) and Harlingen
- KCS Laredo Subdivision
  - Crew-activated remote control turnouts placed on siding switches between Robstown and Serrano Yard at Laredo
- UP Laredo Subdivision
  - Second running track added within control system between Tower 105 and Willhem Junction, south of SoSan Yard (approximately 5.9 miles in length)
  - New controlled 9,000 foot siding at Artesia Wells, MP 353.54 – MP 355.28

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
Network – Base	330	16.6 mph	37.2%	66.1	71.2
Network – Planning Case 1	359	17.3 mph	35.8%	69.6	65.9
UP Brownsville – Base	162	16.8 mph	27.8%	20.1	51.2
UP Brownsville – Planning Case 1	184	17.7 mph	29.5%	21.7	49.7
KCS Laredo – Base	87	17.3 mph	12.5%	4.4	28.7
KCS Laredo – Planning Case 1	94	17.6 mph	12.4%	4.8	28.2
UP Laredo – Base	123	20.7 mph	33.1%	27.1	53.8
UP Laredo – Planning Case 1	137	20.2 mph	38.8%	34.1	65.9

Table 5-2: Planning Case 1 Freight Train Performance (7 day period)

Findings from Planning Case 1

The most significant benefit to train performance on the UP Brownsville Subdivision is the extension of the existing CTC control system between Inari and Sinton, and the extension of the control system south to Robstown, including the turnouts to the KCS Laredo Subdivision. Traffic levels are higher north of Robstown, and still higher north of Odem because the KCS trains utilize trackage rights on the UP Brownsville Subdivision between Robstown and Bloomington. Additionally, BNSF utilizes rights between Odem and Bloomington, and both UP and BNSF have traffic to and from Corpus Christi on the Brownsville Subdivision north of Odem. There are also unit rock trains that use the Brownsville Subdivision between Odem and Sinton (to and from Gregory), and unit chemical trains between Bloomington and Sinton (also destined to/from Gregory).

The siding extension at Woodsboro creates three long controlled sidings between Sinton and Bloomington, which is a total distance of about 60 miles. Sinton is already in the CTC system, and Planning Case 1 adds the siding at Odem into CTC as well. The extended CTC makes local traffic and train staging work more efficiently at Sinton and Odem.

South of Robstown, the 10 percent growth in traffic was not enough to require installation of signals and control points; however, it required the extension of the sidings at Sarita and Norias to approximately 8000 feet each and a new similar siding at Kingsville. These three improvements, plus the provision of crew-activated switches at the ends of the five long sidings added in Planning Case 1, were sufficient to handle the 10 percent increase in trains between Brownsville/Harlingen and Robstown. Performance across this part of the subdivision was shown to improve with these siding enhancements, even with the traffic growth.

The existing single track across KCS' Laredo Subdivision from Robstown to Laredo with its six sidings (including Alice) is sufficient to handle a 10 percent increase in through-trains without any major changes. Crew-activated power turnouts were added at both ends of all the sidings to expedite meets, but no further enhancements were otherwise required to maintain performance at Base Case levels.

The UP Laredo Subdivision is already close to maximum practical capacity at Base Case demand and would require more significant improvements to handle increases in traffic. This route, as previously noted, has been extensively upgraded by UP and currently has eight controlled sidings in the 145 miles between Sosan and Laredo. However, there remain segments of the line where sidings are quite far apart, such as the 29.2 miles between Gardendale and Finley and 20.7 miles between Melon and Gardendale. Consequently, performance across this subdivision decayed significantly when the 10 percent growth in trains was initially added to the RTC train file. As a result, a new controlled siding was added at Artesia Wells, approximately half-way between Gardendale and Finley.

In addition, as traffic was increased in Planning Case 1, congestion delays around San Antonio became noticeably worse. The RTC network used for these cases does not show all the recent changes UP has made to the terminal complex on the southwest side of San Antonio (the specific information was not made available to the study), and it's quite possible that sufficient capacity has now been built to take care of significant growth in Mexico traffic. However, as a proxy for such required capacity, a second, long lead at Sosan was added to the RTC network in order to facilitate pick-ups, set-outs, and crew changes on through trains moving between Laredo and points north and east of Tower 105.

These two improvements resulted in a modeled UP Laredo Subdivision performance nearly equal to that of the Base Case, with an additional 14 trains per week, which is equivalent to 11 percent more trains than operated in the 2007-2008 period.

Planning Case 2

The second planning case assumes that train counts on the three principal subdivisions increase by a further 8 percent, for a total of 54 through trains per week operating across the UP Laredo and Brownsville Subdivisions and the KCS Laredo Subdivision in addition to the Base Case volumes. The additional trains, by owner, type, and route, are as follows (all counts are per measured week and do not add to 54 since some trains travel on more than one subdivision):

- UP Brownsville Subdivision (31 additional weekly trains)
    - 2 BNSF grain trains
    - 2 BNSF manifest trains
    - 3 KCS grain trains
    - 4 KCS manifest trains
    - 2 UP expedited trains

    - 4 UP grain trains
    - 14 UP manifest trains
- UP Laredo Subdivision (23 additional weekly trains)
    - 12 UP expedited trains
    - 11 UP manifest trains
- KCS Laredo Subdivision (7 additional weekly trains)
    - 3 KCS grain trains
    - 4 KCS manifest trains

The 54 trains were added to the train volumes in the Base Case, in proportions relative to the train types and routes that exist within the Base Case, adjusted for the expectation that rail freight to and from Mexico will likely grow somewhat faster than purely U.S. domestic freight.

The growth modeled in Planning Case 2 included the growth modeled in the first planning case, which is built into the model on top of Base Case train files reflecting 2008 traffic volumes. As previously mentioned, the 2008 traffic volumes are about 15 to 20 percent higher than what is being handled in the first quarter of 2010. Consequently, the train counts in Planning Case 2 are likely to be 30 to 33 percent higher than train counts on these routes under existing conditions. Therefore, the demand reflected in Planning Case 2 may represent train volumes in 15 to 20 years from now.

Planning Case 2 Results

Table 5-3 shows the results from Planning Case 2 as compared to the results from both the Base Case and Planning Case 1. As with Planning Case 1, the objective was to maintain or somewhat improve performance relative to the Base Case even with the added train counts.

The improvements added in Planning Case 2 were modest, consisting principally of three new controlled sidings, but those additions were sufficient to handle the incremental increase in traffic and still yield an overall improvement in velocity. If only two sidings are added, the resulting performance falls short of Base Case performance; with three, it is improved from the Base Case. Planning Case 2 included the following infrastructure improvements added to Planning Case 1 modeled improvements, listed by subdivision:

- UP Brownsville Subdivision
    - The existing short, non-controlled siding at Sinton, located north of the former SP crossing, extended north, lengthened to 9500 feet, and placed within the CTC system
- UP Laredo Subdivision
    - New controlled 9,000 foot siding at Armour, MP 306.26 – MP 308.28, between Yarbrough and Melon
    - New controlled 9,000 foot siding at Dilley, MP 328.04 – MP 329.86, between Melon and Gardendale

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
Network – Base	330	16.6 mph	37.2%	66.1	71.2
Network – Planning Case 1	359	17.3 mph	35.8%	69.6	65.9
Network – Planning Case 2	384	17.7 mph	35.4%	73.1	64.2
UP Brownsville – Base	162	16.8 mph	27.8%	20.1	51.2
UP Brownsville – Planning Case 1	184	17.7 mph	29.5%	21.7	49.7
UP Brownsville – Planning Case 2	199	18.2 mph	29.4%	24.4	48.4
KCS Laredo – Base	87	17.3 mph	12.5%	4.4	28.7
KCS Laredo – Planning Case 1	94	17.6 mph	12.4%	4.8	28.2
KCS Laredo – Planning Case 2	100	17.5 mph	13.1%	5.4	29.9
UP Laredo – Base	123	20.7 mph	33.1%	27.1	53.8
UP Laredo – Planning Case 1	137	20.2 mph	38.8%	34.1	65.9
UP Laredo – Planning Case 2	148	20.7 mph	32.3%	31.8	52.6

Table 5-3: Planning Case 2 Freight Train Performance (7 day period)

Findings from Planning Case 2

On the UP Brownsville Subdivision, the en route work at Sinton and Odem absorbs both main track capacity and the controlled sidings at Odem and Sinton. Adding another controlled siding at Sinton away from the yard solved the congestion in this area and benefits all trains using the UP Brownsville Subdivision between Bloomington and Robstown. Adding capacity at Sinton avoids the need for further improvements south and west of Robstown. No sidings were added to the KCS Laredo Subdivision west of Robstown, or to the UP Brownsville Subdivision south of Odem, beyond those improvements added in Planning Case 1. Performance across the KCS Laredo Subdivision declined with the extra traffic; however, the improvement in KCS train performance between Robstown and Bloomington compensated for the increased siding delays on the KCS Laredo Subdivision itself. As a result, adding more capacity between Robstown and Laredo didn't seem warranted.

The two controlled sidings added to the UP Laredo Subdivision are located halfway between pairs of sidings located more than 20 miles apart in the Base Case and in Planning Case 1. With both added sidings in the network, modeled performance improved beyond the Base Case levels, especially when the measures that adjust for increased train counts (such as delay minutes per 100 train-miles) are considered. These two sidings, in addition to the one added at Artesia Wells in

Planning Case 1, would create enough added capacity on the UP's Laredo Subdivision to allow even further increases in Mexico traffic beyond the already substantial increase in train volume modeled in Planning Case 2.

Planning Case 3

The third planning case was created to update the base case to include the Olmito Yard and West Rail projects that are currently underway and expected to be completed in the next two years. Planning Case 3 alters operations from the base case to relocate UP yard operations from Harlingen to Olmito and includes the addition of the West Rail Bypass from Olmito Junction to a new crossing of the Rio Grande west of New Carmen Road, near San Pedro. The existing UP Brownsville Subdivision was removed from south of Olmito Junction to the U.S.-Mexico border. Planning Case 3 also added infrastructure to reflect the recent expansion completed at Olmito Yard to accommodate the relocation of UP operations from Harlingen.

The trains in Planning Case 3 were then revised (with no increase in through train counts as compared to the Base Case) to show trains previously arriving and departing at Harlingen now arriving and departing Olmito. Two sets of existing UP locals that currently transfer traffic between Harlingen and Olmito were consolidated into a single transfer that interchanges with Rio Valley Switching Company at Harlingen Yard. In addition, northward UP through trains to the Brownsville Subdivision were directionally re-routed to the upgraded Harlingen Subdivision, so they depart east from Olmito, and run via Los Fresnos to Harlingen Junction.

The approximately 8 mile long West Rail Bypass was also added to the modeled infrastructure based on the final plans for the project that is currently under construction. Through-trains to and from Mexico were then rerouted in the model to use the bypass west of Brownsville instead of the existing Brownsville Subdivision through Brownsville, which will be removed south of Olmito. The existing interchanges with the Brownsville and Rio Grande International and their industrial and port-related track would be retained. Crew changes for through-trains from north of the study area to Mexico were modeled to take place in Harlingen or as trains cross into Mexico.

Planning Case 3 Results

The infrastructure and operational changes modeled between Harlingen and Olmito resulted in improved performance on the Brownsville Subdivision as shown in Table 5-4. The project modeled in Planning Case 3 resulted in an approximate 20 percent improvement in performance from the original Base Case, as measured by the change in delay minutes per 100 train-miles.

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
UP Brownsville – Base	162	16.8 mph	27.8%	20.1	51.2
UP Brownsville – Planning Case 3	156	17.1 mph	22.1%	15.3	41.2

Table 5-4: Planning Case 3 Freight Train Performance (7 day period)

Findings from Planning Case 3

Consolidating all the Harlingen work at Olmito has a significant impact on both capacity and performance, as compared with the original base case operations split between Harlingen and the old Olmito yard. The directional running between Olmito and Harlingen Junction contributes to the improvement, as does the reduction in local switching time between Harlingen and Olmito.

Planning Case 4

Planning Case 4 modeled a 25 percent increase in train volumes as compared to the Base Case on the UP Laredo and Brownsville Subdivisions and the KCS Laredo Subdivision. Planning Case 4 includes the infrastructure changes made to the revised Base Case in Planning Case 3. The additional trains, by owner, type, and route, are as follows (all counts are per measured week):

- UP Brownsville Subdivision (57 additional weekly trains)
  - 2 BNSF grain trains
  - 2 BNSF manifest trains
  - 7 KCS grain trains
  - 9 KCS manifest trains
  - 5 UP expedited trains
  - 10 UP grain trains
  - 22 UP manifest trains
- UP Laredo Subdivision (39 additional weekly trains)
  - 21 UP expedited trains
  - 4 UP grain trains
  - 14 UP manifest trains
- KCS Laredo Subdivision (16 additional weekly trains)
  - 7 KCS grain trains
  - 9 KCS manifest trains

The 97 trains were added to the train volumes in the Base Case, in proportions relative to the train types and routes that exist within the Base Case, adjusted for the expectation that rail freight to and from Mexico will likely grow somewhat faster than purely U.S. domestic freight. If the drop in cross-border traffic resulting from the 2009 recession is taken into account, the train counts modeled in Planning Case 4 (25 percent increase over 2008 Base Case) may represent a 40 to 50 percent increase over what is actually moving today and may represent train volumes in 20 to 30 years from now.

Planning Case 4 Results

As would be expected with adding trains without adding additional capacity, performance decayed significantly across much of the network in Planning Case 4, indicating that additional infrastructure improvements would be required to support such growth. Much of the increased delay and congestion that resulted from the growth modeled in Planning Case 4 occurred in the major terminal areas within the study area (San Antonio, Laredo, and Bloomington) as well as segments of track where sidings are located far apart (15 to 20 miles). As a result, infrastructure improvements were added to the modeled network to improve performance to equal or better levels than the Base Case. Table 5-5 shows the results from Planning Case 4 as compared to the results from the revised Base Case (Planning Case 3).

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
Network – Rev Base (PC3)	320	17.15 mph	33.2%	58.9	63.04
Network – Planning Case 4	418	18.4 mph	34.9%	83.7	62.4
UP Brownsville – Rev Base (PC3)	156	17.1 mph	22.1%	15.3	41.2
UP Brownsville – Planning Case 4	213	20.2 mph	21.2%	20.6	35.4
UP Laredo – Rev Base (PC3)	123	20.1 mph	36.8%	26.2	60.41
UP Laredo – Planning Case 4	164	21.1 mph	31.0%	28.9	50.0

Table 5-5: Planning Case 4 Freight Train Performance (7 day period)

Findings from Planning Case 4

The following improvements were modeled in Planning Case 4, in addition to those modeled in Planning Case 2, to accommodate the 25 percent growth over the base case without negatively impacting performance measurements.

- UP Brownsville Subdivision
  - Extension of Bloomington yard track north to Placedo and made into a controlled siding
  - Extension of South Sinton siding to North Odem
  - New siding with crew-operated power switches at Bishop, MP 124
  - New siding with crew-operated power switches at Ricardo, MP 108
- UP Laredo Subdivision
  - New siding at Natalia, MP 287
  - Extension of Finley siding to the south; to 9560 feet
  - Extension of Callaghan siding to the north; to 9400 feet
  - Extension of Laredo Yard lead north to MP 156.5 to connect with RG Runaround

The added infrastructure improvements listed above were sufficient to restore train performance to a somewhat better than Base Case level across the Laredo Subdivision, and to a level better than the Base Case across the Brownsville Subdivision. While performance decayed a bit across the KCS Laredo Subdivision in the model, the added delay was minimal and did not justify additional infrastructure. The growth in traffic on the KCS Laredo Subdivision might be better accommodated by gradually replacing the existing rail with heavier steel, re-ballasting and surfacing the line, and then increasing the maximum permitted train speeds.

The two UP subdivisions, however, are likely to require added capacity in the future if traffic grows to the modeled volumes in Planning Case 4. In particular, the existing bottlenecks at Bloomington, Sinton and Odem would get worse if no improvements are made. On the Laredo Subdivision, some sidings are still too far apart to prevent congestion and long wait times for meets between opposing trains.

Planning Case 5

Planning Case 5 included the West Rail and Olmito projects as modeled in the revised Base Case (Planning Case 3) and added a new connection between the Brownsville and Harlingen subdivisions at Brownsville Subdivision MP 25.1 (Commerce Street Connection) and a new yard to replace the existing Harlingen Yard. The relocated yard was modeled at Brownsville Subdivision MP 33.2, northwest of Harlingen. The UP local handling interchange between Olmito and the RVSC at Harlingen in Planning Case 3 was re-described to run between Olmito and the new interchange yard, and the RVSC local operating between Harlingen and McAllen was re-described to operate between the new yard and McAllen via a restored connection between the Brownsville Subdivision and the former Missouri Pacific line to Mission in the northwest quadrant at the new Harlingen Junction.

Planning Case 5 Results

The distance required between Harlingen Junction and the new yard modeled in Planning Case 5 increased the congestion delay on the Brownsville Subdivision by approximately 8.4 percent from the Base Case as shown in Table 5-6.

Subdivision	Trains	Average Speed	Delay Ratio	Delay Hours per Day	Delay Mins per 100 Train Miles
UP Brownsville – Rev. Base (PC3)	156	17.1 mph	22.1%	15.3	41.2
UP Brownsville – Planning Case 5	156	16.9 mph	24.1%	16.6	44.7

Table 5-6: Planning Case 5 Freight Train Performance (7 day period)

Findings from Planning Case 5

Relocating the RVSC interchange to a new location north of Harlingen, while maintaining local switching operations and classifying RVSC trains in Olmito, appears to be counterproductive viewed strictly from the perspective of railroad operations. This operating scenario would require all trains to or from Olmito to pass

by on the Brownsville Subdivision main track, regardless of which way they operate south of Harlingen Junction, adding route-miles and crew hours to each train.

An alternative that would mitigate the added operating costs and distance is to revert switching operations to current-day operations, in which switching and classification for RVSC trains is conducted at Harlingen Yard, although now the yard would be located approximately 8 miles north of the current Harlingen Yard location. The new North Yard would need to be configured in such a manner in which approximate 9,000 ft – 10,000 ft yard leads with remote-controlled turnouts off the main into the yard would need to be incorporated, so that it could also be used for meets between main line trains as well as for entry and exit to and from the new yard. This scenario may also support the North Rail Relocation project that would provide a bypass around the city of Harlingen northeast of the city, which is a proposal jointly under consideration by Cameron County and the City of Harlingen.

SECTION 6: FREIGHT RAIL AND RAIL-ROADWAY INTERFACE SAFETY ISSUES

Historically, many towns and cities established adjacent to the railroads and major truck routes have thrived and turned into large municipalities over time, and are now faced with the dilemma of having railroad and truck freight operations pass directly through their central business districts. Additionally, as the municipalities have grown and prospered, so has residential land use adjacent to the truck routes and rail lines. Truck and rail freight movement through populated areas brings with it a potential exposure to safety hazards.

Various data pertaining to train accidents/incidents including collisions, derailments, and other events causing reportable damage, injuries, or fatalities are reported to the FRA by the operating railroads across the country. Incidents, including those resulting in damage to rail cars transporting hazardous material or causing the release of the hazardous material, must be reported to the FRA if there is reportable damage resulting from the incident above a specified threshold ($6,700 in 2005) or if there are any injuries or evacuations ordered in response to the incident.[1]

Additionally, incidents must be immediately reported to the National Response Center for both rail and truck transport that result in any fatalities, personal injuries, public evacuations, closure of a major transportation artery, and fire, breakage, or spillage of radioactive or infectious materials.[2]

The trucking industry continues to remain the dominant mode of freight transport. Approximately 70 percent of the nation's freight tonnage is carried by trucks, far more than by any other mode. The annual reported number of incidents, property damage, reported personal injuries and fatalities is consistently larger for trucks as opposed to rail.

Safety hazards involving freight rail operations include rail-roadway crossing accidents, trespasser casualties, train accidents and derailments, and hazardous material spills. The following section provides reported annual safety statistics such as the number of incidents, the resulting injuries and fatalities, and, in some cases, estimated damages as reported by the railroads over the time period from January 2005 through December 2009.

Roadway-Rail At-Grade Crossing Accidents

Approximately 600 at-grade roadway-rail crossings are located in the 16-county Lower Rio Grande Valley and Laredo District. Table 6-1 depicts the number of public at-grade crossings for Texas and the Lower Rio Grande Valley and Laredo area sorted by the type of warning device. The crossings listed for the Lower Rio

[1] Code of Federal Regulations, Title 49, Part 225: Railroad Accidents/Incidents: Reports, Classification, and Investigations
[2] Code of Federal Regulations, Title 49, Part 171.15: Railroad Accidents/Incidents: Immediate Notice of Certain Hazardous Materials Incidents.

Grande Valley and Laredo area only include crossings with mainline tracks and exclude crossings at industry tracks and sidings. Note that there are four counties without track and, thus, without roadway-rail crossings (Brooks, Dimmit, Zapata, and Zavala Counties). Table 6-2 shows the number of public and private crossings in the study limits, sorted by county, and includes crossings at mainline, industry, and siding tracks.

Texas 2010		**Valley/Laredo Area 2010**	
Crossbucks (passive)	3589	Crossbucks (passive)	280
Lights only (active)	943	Lights only (active)	102
Gates (active)	4697	Gates (active)	198
Stop Signs	209	Stop Signs	11
Special Warning	65	Special Warning	1
Highway Traffic Signal	54	Highway Traffic Signal	1
Other (passive & active)	406	Other (passive & active)	31
Unknown	0	Unknown	0

Table 6-1: Public At-Grade Crossings for Texas and the Lower Rio Grande Valley and Laredo Study Area

Total At-Grade Roadway-Rail Crossings for Lower Rio Grande Valley/Laredo Area								
County	**Total**		**Pedestrian**		**Private Vehicle**		**Public**	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
Cameron	306	29.7%	1	100.0%	113	28.8%	192	30.2%
Duval	61	5.9%	0	0.0%	38	9.7%	23	3.6%
Hidalgo	285	27.7%	0	0.0%	73	18.6%	212	33.3%
Jim Hogg	15	1.5%	0	0.0%	8	2.0%	7	1.1%
Kenedy	24	2.3%	0	0.0%	22	5.6%	2	0.3%
Kinney	16	1.6%	0	0.0%	11	2.8%	5	0.8%
La Salle	40	3.9%	0	0.0%	26	6.6%	14	2.2%
Maverick	24	2.3%	0	0.0%	12	3.1%	12	1.9%
Starr	29	2.8%	0	0.0%	15	3.8%	14	2.2%
Val Verde	31	3.0%	0	0.0%	22	5.6%	9	1.4%
Webb	154	15.0%	0	0.0%	45	11.5%	109	17.1%
Willacy	44	4.3%	0	0.0%	7	1.8%	37	5.8%
Total:	1029	100.0%	1	100.0%	392	100.0%	636	100.0%

Table 6-2: Total At-Grade Roadway-Rail Crossings for Lower Rio Grande Valley and Laredo District

Figure 6-1 depicts the number of roadway-rail incidents in the state of Texas for the five-year time period from January 2005 through December 2009. As shown in the figure, the largest concentration of incidents within the study area over the five-year period occurred in Cameron, Hidalgo, and Webb Counties.

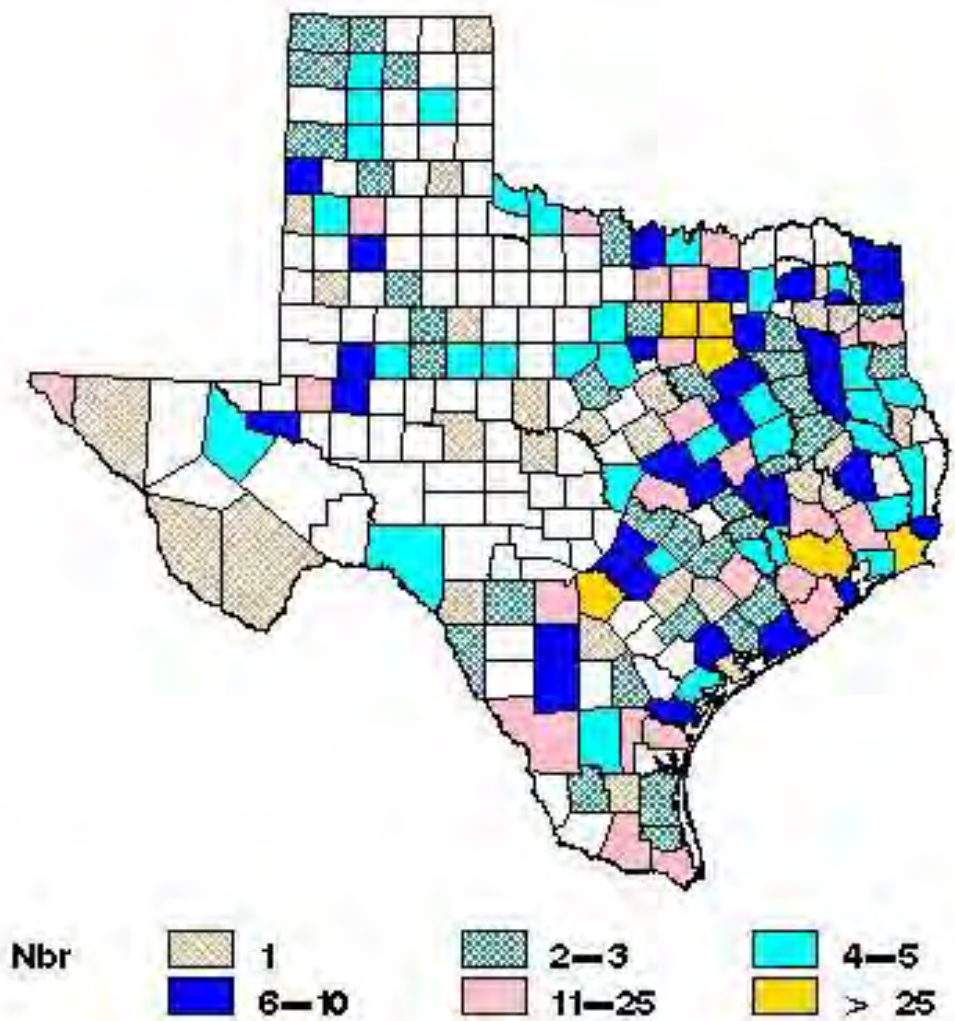


Figure 6-1: Roadway-Rail Incidents for Texas, January 2005 to December 2009

The 16-county Lower Rio Grande Valley and Laredo study area experienced 104 roadway-rail at-grade crossing accidents from January 2005 through December 2009, including 8 fatalities and 25 injuries, as shown in Table 6-3. Table 6-4 lists the number of incidents annually from 2005 through 2009 within the study limits by county. The roadway-rail incidents that occurred in Cameron, Hidalgo, and Webb Counties in the five-year timeframe accounted for over 60 percent of the total roadway-rail incidents within the 16-county study area.

Roadway-Rail Incidents for Lower Rio Grande Valley/Laredo District															
County	Totals			At Public Crossing						At Private Crossing					
				Motor Vehicle			Other			Motor Vehicle			Other		
	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj
Cameron	11	1	7	11	1	7	0	0	0	0	0	0	0	0	0
Duval	4	1	4	4	1	4	0	0	0	0	0	0	0	0	0
Hidalgo	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0
Jim Hogg	3	1	1	3	1	1	0	0	0	0	0	0	0	0	0
Kenedy	3	0	0	0	0	0	0	0	0	2	0	0	1	0	0
Kinney	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
La Salle	6	1	4	2	0	1	0	0	0	4	1	3	0	0	0
Maverick	2	0	1	2	0	1	0	0	0	0	0	0	0	0	0
Starr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Val Verde	4	0	2	2	0	1	0	0	0	2	0	1	0	0	0
Webb	21	4	3	19	3	2	0	0	0	2	1	1	0	0	0
Willacy	3	0	3	3	0	3	0	0	0	0	0	0	0	0	0
Total:	71	8	25	59	6	20	0	0	0	11	2	5	1	0	0
*Cnt = Incident Count, Kld = Fatalities, Inj = Injuries															

Table 6-3: Roadway-Rail Incidents for Lower Rio Grande Valley and Laredo District by County (2005 through 2009)

Annual Roadway-Rail Incidents for Lower Rio Grande Valley/Laredo District (2005-2009)																		
County	2005 Totals			2006 Totals			2007 Totals			2008 Totals			2009 Totals			2005-2009 Totals		
	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj	Cnt	Kld	Inj
Cameron	4	1	4	5	0	0	1	0	2	1	0	1	0	0	0	11	1	7
Duval	1	0	0	2	1	3	0	0	0	1	0	1	0	0	0	4	1	4
Hidalgo	2	0	0	5	0	0	4	0	0	1	0	0	1	0	0	13	0	0
Jim Hogg	0	0	0	1	0	1	1	0	0	1	1	0	0	0	0	3	1	1
Kenedy	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	3	0	0
Kinney	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
La Salle	2	0	1	0	0	0	3	1	3	1	0	0	0	0	0	6	1	4
Maverick	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	1
Starr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Val Verde	0	0	0	2	0	1	1	0	0	0	0	0	1	0	1	4	0	2
Webb	3	0	0	3	0	0	9	2	2	4	1	1	2	1	0	21	4	3
Willacy	0	0	0	0	0	0	2	0	2	1	0	1	0	0	0	3	0	3
Total:	14	1	5	19	1	5	22	3	9	11	2	5	5	1	1	71	8	25
*Cnt = Incident Count, Kld = Fatalities, Inj = Injuries																		

Table 6-4: Annual Roadway-Rail Incidents for Lower Rio Grande Valley and Laredo District (2005 through 2009)

Trespasser Incidents

Trespasser incidents consist of pedestrians either injured or killed while trespassing on railroad property and do not include roadway-rail incidents. Trespasser incidents may include collisions with on-track equipment, slipping/ stumbling/ falling, exposure to fumes, etc., with the majority of incidents consisting of being struck by on-track equipment or slipping/ stumbling/ falling. A total of 59 trespasser incidents occurred

in the Lower Rio Grande Valley and Laredo District study limits from 2005 through 2009, of which 23 occurred in Webb County. The number of trespasser incidents by county and year from 2005 through 2009 in the study area is listed in Table 6-5. Trespasser incidents consist of deaths and injuries caused by trespassing onto railroad property and do not include accidents associated with traffic at roadway-rail interfaces.

Trespasser Casualties (deaths and injuries) in Lower Rio Grande Valley and Laredo District (2005 through 2009)							
County	**Total**		**Total Year Counts**				
	Cases	**% of Total**	**2005**	**2006**	**2007**	**2008**	**2009**
Cameron	4	6.8%	1	0	2	1	0
Duval	2	3.4%	0	0	2	0	0
Hidalgo	2	3.4%	0	1	1	0	0
Jim Hogg	1	1.7%	0	0	0	0	1
Kenedy	5	8.5%	1	0	0	2	2
Kinney	3	5.1%	0	0	1	1	1
La Salle	7	11.9%	1	1	2	2	1
Maverick	9	15.3%	3	2	0	2	2
Starr	0	0.0%	0	0	0	0	0
Val Verde	1	1.7%	1	0	0	0	0
Webb	23	39.0%	4	5	5	8	1
Willacy	2	3.4%	0	1	0	1	0
Total:	59	100.0%	11	10	13	17	8

Table 6-5: Lower Rio Grande Valley and Laredo District Trespasser Incidents (2005 through 2009) by County

Train Incidents

There were 79 reported train incidents, which include derailments and train collisions, within the Lower Rio Grande Valley and Laredo study area from 2005 through 2009. Data provided by the railroads to the Federal Railroad Administration (FRA) shows the total cost of equipment and infrastructure damage was nearly $11 million within the study area over five years. Table 6-6 provides a summary of the train accident damage statistics in the Lower Rio Grande Valley and Laredo area.

Train Accidents (2005 through 2009)							
County	Totals				Type of Accident		
	Accidents	Killed	Injured	Reportable Damage	Collisions	Derailments	Other
Cameron	12	0	0	$577,718	0	9	3
Duval	7	0	2	$1,432,707	1	5	1
Hidalgo	3	0	0	$287,160	0	3	0
Jim Hogg	0	0	0	$0	0	0	0
Kenedy	0	0	0	$0	0	0	0
Kinney	2	0	0	$241,028	0	2	0
La Salle	0	0	0	$0	0	0	0
Maverick	15	0	0	$2,651,163	0	15	0
Starr	0	0	0	$0	0	0	0
Val Verde	2	0	0	$78,789	0	2	0
Webb	32	0	0	$3,597,859	1	24	7
Willacy	1	0	0	$2,100,000	0	1	0
Total:	74	0	2	$10,966,424	2	61	11

Table 6-6: Train Accidents in the Lower Rio Grande Valley and Laredo District by County (2005 through 2009)

Figure 6-2 depicts the number of train accidents, excluding roadway-rail incidents, in the state of Texas for the time period from January 2005 through December 2009.

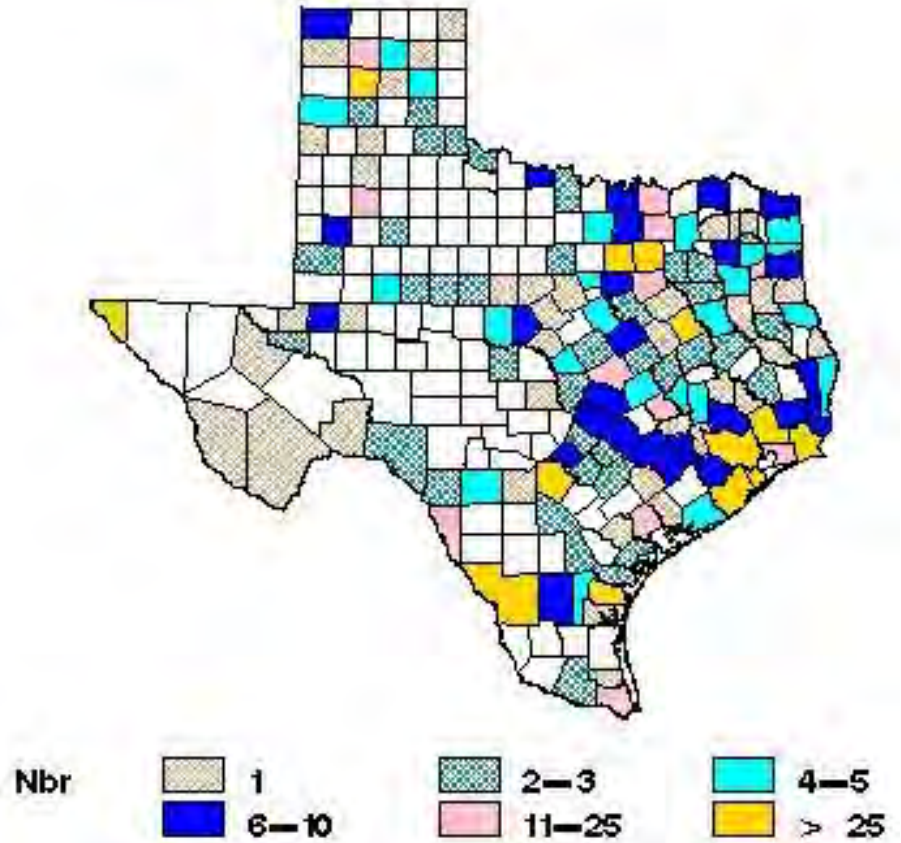


Figure 6-2: Train Accidents for Texas, January 2005 through December 2009

The Federal Railroad Administration (FRA) reports that the majority of serious events involving train derailments or train collisions have been associated with track conditions and human factors.[3] Figure 6-3 shows how track condition and human factors together make up almost 72 percent of these high-risk train accidents. Incidents caused by human factors may be the result of error on the part of railroad locomotive crew or precipitated by the actions of motorists at highway-rail grade crossings. Figure 6-3 also shows that signal and equipment failures together comprise 14 percent of rail incidents that pose harm to the public.

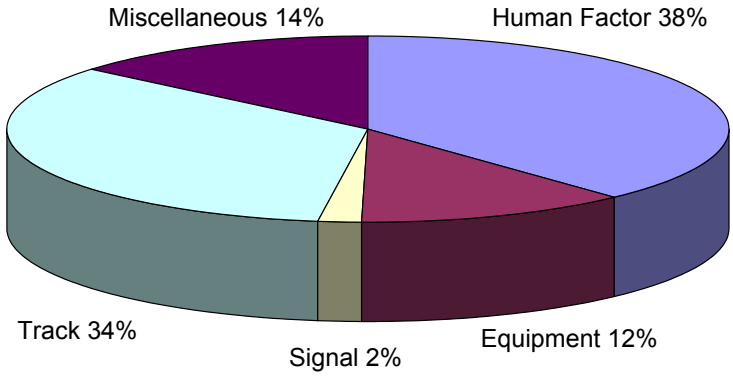


Figure 6-3: 2001-2006 Causes of Non-Grade Crossing Train Accidents

Since the FRA bases track class on specific track standards (e.g., number of good rail ties per defined length, consistency of track gauge, etc.) that relate to maximum allowable train speeds, records of maximum train speeds on each rail corridor can be used to infer track conditions without conducting an extensive and costly field inventory. Figure 6-4 shows the FRA class of track for each rail line in the study area based on the railroad operating timetables, which specify the maximum authorized operating speeds along the lines. The primary rail lines in the study area are all designated as class 3 or higher.

Table 6-7 lists the FRA-compiled accident rates for each track class in terms of cars derailed per billion freight car miles traveled.[4] One billion freight car miles is equivalent to a 100-car train traveling 100,000 times over a corridor distance of 100 miles. These statistics exclude incidents involving highway-rail grade crossing accidents and, thus, reflect the potential for track and operating conditions at each FRA track class (which may involve human factors) to cause a derailment. Derailments per billion freight car miles traveled during the 1992-2001 period are listed in Table 6-7 according to FRA track class and associated maximum track

[3] National Rail Safety Action Plan Progress Report 2005-2007, Federal Railroad Administration, U.S. Department of Transportation, May 2007.
[4] Anderson, R.T. and Barkan, C.P.L., Railroad Accident rates for Use in Transportation Risk Analysis, Transportation Research Record, No. 1863, National Research Council, Washington, D.C., 2004, pp. 88-98.

speed. Table 6-7 represents statistics collected nationwide and provides no indication of when or where an accident involving a derailment will actually occur.

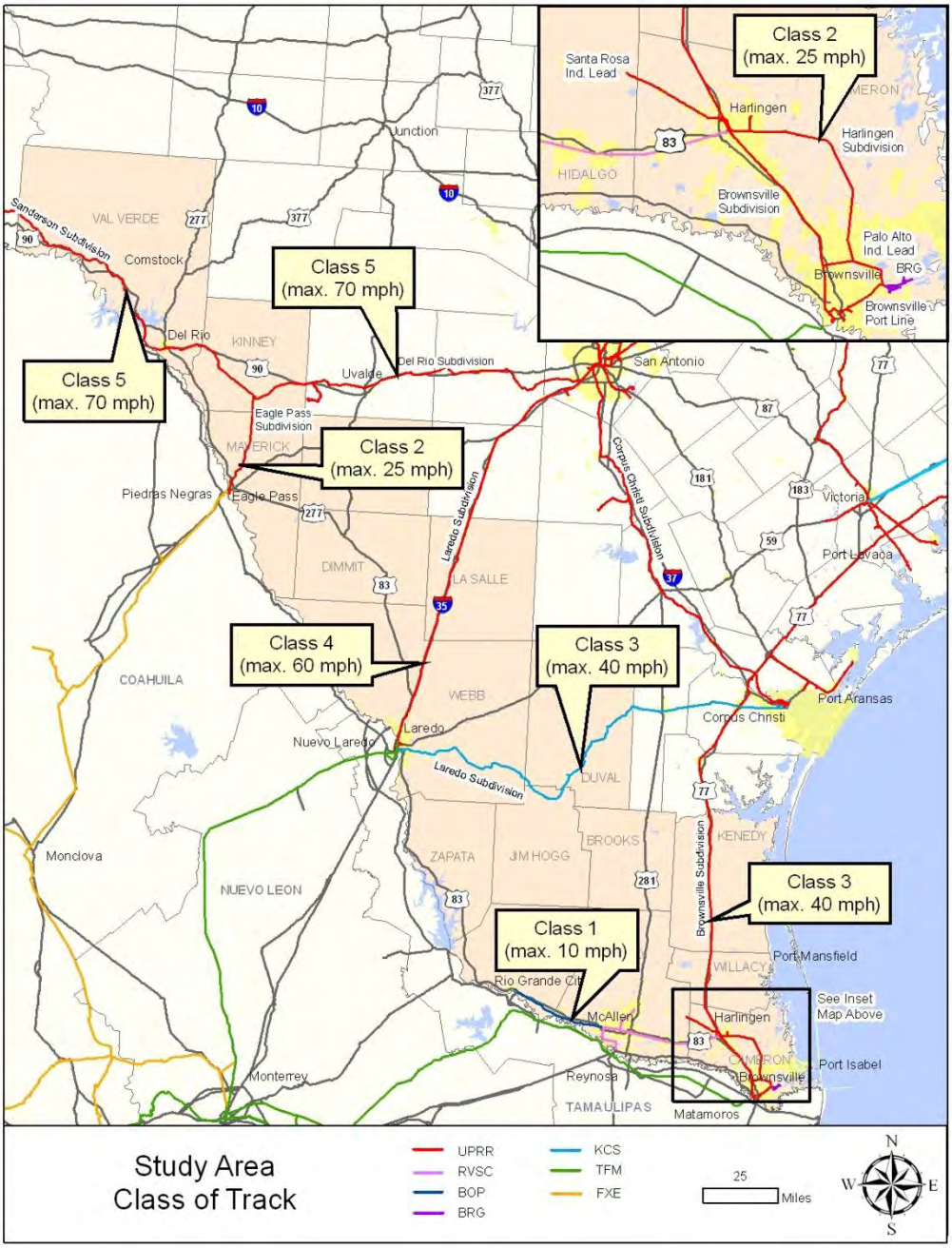


Figure 6-4: FRA Class of Track

Performance Measure	FRA Track Class				
	1	2	3	4	5
Maximum Track Speed (mph)	10	25	40	60	80
Cars Derailed per Billion Freight Car Miles	3979	726	300	77	42

Table 6-7: Relationship of Track Speed and Derailment Rate to FRA Track Class

Hazardous Materials and Truck vs. Rail Freight

In 1998, trucks were reported to account for nearly 43 percent of all hazardous material tonnage shipped in the U.S., while rail accounted for approximately 4 percent of hazardous material tonnage shipments. Pipelines, water, and air transport accounted for the remaining 52 percent of hazardous material tonnage.[5] Table 6-8 lists the shipments and tons shipped for all modes of hazardous material transport in the U.S. for the year 1998.

Mode	No. of Shipments	% by Mode	Tons Shipped	% by Mode
Truck	768,907	93.98	3,709,180	42.94
Rail	4,315	0.53	378,916	4.39
Pipeline	873	0.11	3,273,750	37.90
Water	335	0.04	1,272,925	14.73
Air	43,750	5.35	4,049	0.05
Daily Totals	818,180	100.00	8,638,820	100.00
Annual Totals	298,635,700		3,153,169,300	

Table 6-8: Hazardous Material Shipments and Tons Shipped in the U.S. by Mode[4]

Table 6-9 summarizes the highway and rail incidents involving hazardous material transported by truck and rail from 2000 through 2005.

[5] Hazardous Material Shipments, The Office of Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, Washington, DC, October 1998.

	2000	2001	2002	2003	2004	2005
Trucks						
Number of Truck Incidents in the U.S. involving hazmat	15,063	15,806	13,506	13,601	12,977	13,456
Injuries	164	109	118	105	156	175
Fatalities	16	9	8	15	10	24
Property Damage ($ million)	$40.9	$37.8	$34.0	$39.1	$29.2	$40.0
Number of Truck Incidents in Texas involving hazmat	1,210	1,055	1,035	1,097	1,124	1,267
Injuries	21	16	6	9	11	8
Fatalities	0	2	1	0	0	2
Property Damage ($ million)	$4.4	$4.0	$3.5	$3.9	$3.5	$4.3
Rail						
Number of Rail Incidents in the U.S. involving hazmat	1,058	899	870	802	753	745
Injuries	82	46	14	13	121	692
Fatalities	0	3	1	0	3	10
Property Damage ($ million)	$16.5	$21.2	$9.7	$4.1	$11.6	$15.5
Number of Rail Incidents in Texas involving hazmat	154	125	126	93	87	83
Injuries	23	2	1	2	92	7
Fatalities	0	0	0	0	3	0
Property Damage ($ million)	$0.26	$7.40	$1.30	$1.30	$5.90	$0.43

Table 6-9: 2000-2005 Truck and Rail Hazardous Material Incident Data[6]

More than 9.7 million carloads of freight were transported by rail in Texas in 2005.[7] Although not published for the state level, approximately 540,000 carloads are estimated to carry hazardous materials (assuming the national ratio of hazardous material carloads to total carloads applies to Texas as well). In 2005, a reported 2,057 carloads were involved in an incident, of which 11 released hazardous material. This means that approximately 1 out of every 882,000 carloads of freight was involved in an incident that resulted in a release of hazardous material. A total of 83 incidents (not necessarily releases) were reported involving hazardous materials transported by rail, which resulted in 7 injured people, no fatalities, and estimated damages of nearly $425,000.[8] Two of the incidents reported in 2005 (either damage to rail cars containing hazardous material or release of hazardous material) resulted in the evacuation of a total of 600 people.[9] The number of

[6] U.S. Department of Transportation Office of Hazardous Materials Safety: Hazardous Materials Incident Data
[7] http://www.aar.org/AboutTheIndustry/StateInformation.asp
[8] 2005 Hazardous Materials Incident Data, U.S. Department of Transportation Office of Hazardous Materials Safety (http://hazmat.dot.gov/pubs/inc/data/2005/2005frm.htm)
[9] Railroad Safety Statistics 2005 Annual Report, Federal Railroad Administration (http://safetydata.fra.dot.gov/officeofsafety/Forms/Default.asp)

reported incidents involving hazardous materials has decreased from 154 incidents in 2000 to 83 incidents in 2005.

As a comparison to rail incident statistics, the following summarizes statistics for trucks. A total of 13,346 incidents, 175 injuries, and 24 fatalities involving hazardous materials transported on highways were reported nationally in 2005. In Texas, 1,267 incidents, 8 injuries, and 2 fatalities involving hazardous materials transported on highways were reported with estimated damages reported to be more than $4.3 million. The incidents involving hazardous materials transported on highways reported in Texas comprise approximately nine percent of the national total for 2005.

The number of incidents and damages reported involving hazardous materials transported on highways is significantly larger than those reported for hazardous materials transported via rail. This may be partly because of the presence of personal vehicles on the same roadways as heavy trucks as well as the tendency for truck shipments to include more intermediate and transfer movements between the origin and destination than rail shipments. Additionally, the number of incidents per tonnage shipped is far lower for rail than highway shipments of freight. Average truck weights as determined from FHWA data were found to be approximately 30 tons (including the weight of the empty truck) as opposed to a typical loaded rail car weight of up to 143 tons.

The expected frequency of hazardous material releases, based on nationwide rail derailment data is shown in Table 6-10 as expected releases per billion railcar miles traveled. For example, based on FRA statistics, hazardous materials transported by rail on class 2 track could be expected to experience 4 releases per billion freight car miles traveled. Figure 6-5 plots the expected releases listed in Table 6-10 for each track class, illustrating how there is not a significant decrease in release frequencies from class 4 to class 5 track while release frequency drops significantly as track class increases from class 1 to class 4.

Frequency of Occurrence	FRA Track Class				
	1	2	3	4	5
Hazmat Releases per Billion Freight Car Miles*	8	4	2	1	0

* Decimals are rounded to the nearest whole number (class 5 release rate is actually 0.4)

Table 6-10: Hazardous Material Release Frequency per FRA Track Class

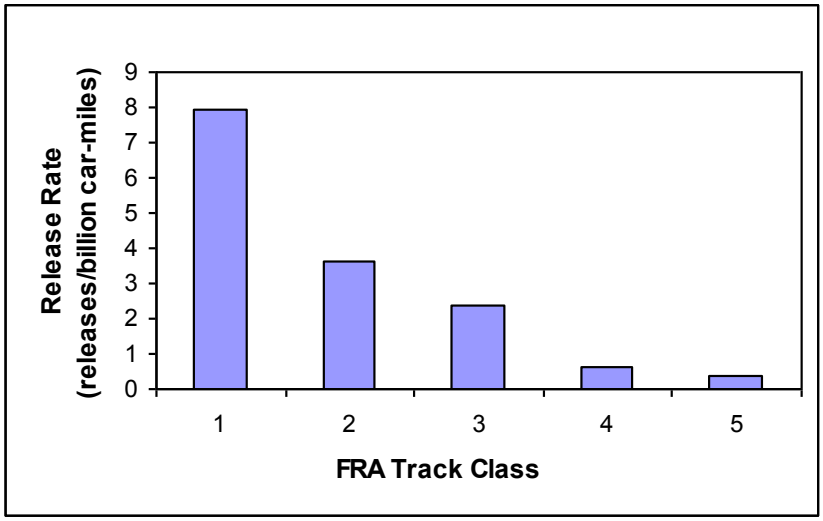


Figure 6-5: Rates of Hazmat Release by FRA Track Class

Safety Improvements

A combination of population increases, the number of people traveling on the roadway network, and an increase in the number of freight trains traveling through densely-populated locales has increased the exposure rate of the roadway-rail interface, stressing the importance of a more proactive approach to minimizing incidents and hazards associated with the movement of freight.

One method of increasing safety is to eliminate or minimize the number of potential incident locations within a particular area. Generally, safety is increased by eliminating roadway-rail crossings through the use of grade separations or by utilizing alternate rail routes from urbanized areas into more rural areas to limit the number of vehicle crossings per day. Cameron and Webb Counties are implementing these safety measures through the following projects:

- West Rail Relocation, Brownsville – The UPRR Brownsville Subdivision track currently resides in the downtown area of Brownsville. The West Rail Relocation project currently under construction will eliminate 13 roadway-rail crossings in the downtown area by shifting the track mainline west of Brownsville into a more rural area. In addition, the crossing at U.S. 281 will be grade-separated to remove any potential vehicular incidents at that location.

- Harlingen Yard Relocation, Harlingen – A switchyard used by UPRR and RVSC exists in downtown Harlingen along Commerce Street. UP has moved switching operations from this location to the Olmito Yard as the first phase in a plan to remove all rail traffic for downtown Harlingen, which would eliminate all roadway-rail crossings in Harlingen.

- Laredo – The North American Free Trade Agreement (NAFTA) has brought an increase international commerce through Laredo and Webb County. Increases in truck freight through Laredo, mainly along the I-35 corridor, and through additional rail traffic have not only slowed the movement of commerce but have also increased the potential for roadway-rail incidents within the region. The city of Laredo is looking into federal participation in funding to assist with projects to eliminate conflict points through grade separations and implement additional safety devices at roadway-rail crossings.

The U.S. Department of Transportation has developed federal regulations governing the transport of hazardous materials to avoid emergency situations that may pose dangers to those transporting the materials and to the public.

> The Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) specify requirements for the safe transportation of hazardous materials in commerce by rail car, aircraft, vessel, and motor vehicle. These comprehensive regulations govern transportation-related activities by offerors (e.g., shippers, brokers, forwarding agents, freight forwarders, and warehousers); carriers (i.e., common, contract, and private); packaging manufacturers, reconditioners, testers, and retesters; and independent inspection agencies. The HMR apply to each person who performs, or causes to be performed, functions related to the transportation of hazardous materials such as determination of, and compliance with, basic conditions for offering; filling packages; marking and labeling packages; preparing shipping papers; handling, loading, securing and segregating packages within a transport vehicle, freight container or cargo hold; and transporting hazardous materials.[10]

Currently, the Cities of Brownsville and Laredo have an Office of Emergency Management to prepare and mitigate the effects of emergencies and disasters in each region. Laredo currently uses classroom facilities for an Emergency Management Center when necessary to mitigate mid- to large-scale emergencies in the region. They have requested funding to assist in the construction and implementation of a new Emergency Operations Center since the city is approximately 150 miles from the nearest metropolitan area that could aid in a large-scale emergency.

In addition, the operating railroads also have emergency response guidebooks that include instructions on how to deal with accidents, collisions, derailments, and specific hazardous material accidents and exposures. BNSF and UP have sponsored a national outreach program, Transportation Community Awareness and Emergency Response (TRANSCAER) at multiple locations in the mid-western U.S. in recent years. The program aims to help communities prepare to respond to transportation incidents involving hazardous materials and includes training for proper tank-car loading and securement techniques.

[10] Overview of the Hazardous Materials Regulations, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation.

Operation Lifesaver was started by the state of Idaho in partnership with UP in 1972, when there were over 12,000 roadway-rail accidents nationally, as a one-time, one-state, six-week “safety blitz” educating the traveling public of the hazards of roadway-rail interface. The reduction in grade crossing accidents in Idaho was so astonishing that the program was continued and is now active in 49 states. The state of Texas became involved in this campaign in 1977.

SECTION 7: IMPROVEMENT ANALYSIS

This report is intended to provide the Lower Rio Grande Valley and Laredo region with an examination of the constraints within the region and a list of potential solutions from which the local governing agencies may choose to analyze in greater detail or move forward towards implementation. This section of the report identifies possible improvements, including roadway-rail grade separations and crossing closures as well as improvements to the existing railroad infrastructure such as additional mainline track, siding tracks, yard improvements and/ or relocations, possible bypass routes, and signal improvements. The rail infrastructure improvements are intended to have operational benefits to the operating railroads as well as public benefits in the form of improved safety and reduced vehicular impedance associated with moving trains through the region more efficiently.

Improvements identified for analysis were based on the results of the freight rail operations modeling utilizing RTC as discussed in further detail in section 5. Additional improvements described in this section were identified based on coordination with ongoing regional projects, and include projects currently under design, under construction, or expected to be designed in the near future.

The possible improvements were analyzed to determine the effects on efficiency, mobility, and safety for rail operations, as well as vehicular and pedestrian traffic in the region. This analysis included identifying the existing conditions, estimating the implementation cost and timeframe, and estimating the public and private benefits associated with the specific improvements.

The existing conditions identified for the locations of possible improvements include descriptions of property land use and estimated value, environmental constraints, traffic flow volumes for both vehicular and rail traffic, and traffic accident statistics.

The estimated implementation costs for each improvement are order-of-magnitude costs based on preliminary planning. The costs included in this study represent an estimate of probable costs prepared in good faith and with reasonable care. The study team has no control over the costs of construction labor, materials, or equipment, nor over competitive bidding or negotiating methods and does not make any commitment or assume any duty to assure that bids or negotiated prices will not vary from these estimates. The costs are subject to inflation, and in some cases will be calculated using current county appraisal district values for right-of-way acquisition, which may vary significantly from the eventual cost of acquiring property.

Classification levels based on estimated implementation timeframes were determined for the potential improvements and have been grouped in the following categories:

- Near-term railroad improvements
  - Improvements needed to accommodate projected 10-year growth including siding improvements and extensions, new sidings and signal upgrades
- Mid-range railroad improvements
  - Improvements needed to accommodate projected 20-year growth including siding improvements and extensions, new sidings and signal upgrades
- Near-term roadway improvements
  - Crossing closures that would reroute traffic to existing grade separations
- Mid-range roadway improvements
  - All identified grade separations and crossing closures that would reroute traffic to the potential grade separations
  - Individual project timeframes may vary due to environmental requirements and funding availability
- Long-range railroad improvements
  - Improvements needed to accommodate long-term projected growth (greater than 20-year) including siding improvements and extensions, new sidings and signal upgrades

Anticipated public benefits include reductions in vehicular delay times at existing at-grade crossings, reductions in vehicle and locomotive fuel consumption, improvements in air quality, improvements in public safety, improvements in mobility for vehicular and freight traffic due to changes in train operations from improvements, reductions in noise and vibration from rerouting of trains, and improved freight mobility from more efficient routes.

The estimated public benefits were determined by using a grade crossing "impedance" or delay model which takes into account the volume and frequency of vehicular and train traffic at roadway-rail grade crossings, estimating the amount of time motorists are delayed by rail traffic. The model measures the anticipated public costs (burden) associated with traffic delays and calculates the extra emissions and fuel usage experienced while delayed by a train at each of the rail crossings analyzed. The cost of collisions is added to time costs, emissions, and fuel used to provide an annualized estimate of total public burden per grade crossing. Forecasts for growth in both rail and vehicular traffic will be used to provide an annualized estimate of public costs projected for a 20-year study period. Public benefit values for improvements to roadway-rail crossings (grade separating or closing) based on current traffic volumes are organized by railroad subdivision and included in Appendix F.

Potential benefits that may be realized by the railroads as a result of the identified improvements may include improved train operating efficiency (including reductions in train delays) and improved train run-times, increased capacity for projected train volume growth, as well as reductions in accident exposure at roadway-rail crossings.

Analysis of private benefits was based on logical groupings of improvements into planning cases modeled in RTC. Additionally, the identified potential grade separations and crossing closures may provide a benefit to the railroad, but primarily benefit the public in the form of improved safety.

Identified Infrastructure Improvements

Improvements identified in this study for the 16-county Lower Rio Grande Valley and Laredo region are categorized as:

- Grade crossing improvements consisting of grade separations (bridges to separate the streets from the railroad) and grade crossing closures (closing and rerouting the street at the intersection with the railroad)
- Railroad infrastructure improvements to existing railroad infrastructure to improve capacity and connectivity on existing rail lines
- Existing and proposed projects in the region including a new rail bypass and yard relocation currently under construction

Grade Crossing Improvements

The analysis of grade crossing improvements was limited to those locations which the traffic data analysis (average traffic volumes of vehicles and trains) and estimates of public benefit warranted further review. The estimated public cost associated with vehicular impedance (delay, emissions) and safety was estimated at each at-grade crossing within the region based on existing rail operations and roadway characteristics (vehicular traffic volume, number of lanes, etc.).

Each of the crossings was initially evaluated for potential grade separation based on the public cost associated with the at-grade crossing as well as the average daily traffic (ADT) counts along the roadway. Grade separations consist of roadway overpasses and underpasses that separate vehicular traffic from rail traffic, minimizing the safety exposure associated with the roadway/rail interface. The list of potential grade separations was then further analyzed based on the feasibility of construction of an overpass or underpass structure at each location. Potential crossing closures were then identified that could be implemented in conjunction with the identified grade separations. Lastly, crossing closures that could reroute traffic to existing grade separations were identified.

There are multiple crossings initially identified as candidates for grade separations or closures that may remain at-grade due to lower vehicular traffic volumes and/or an excessive additional travel distance required to reroute traffic. The identification of grade separations or closures should not be misconstrued as a final listing, but rather as a list of improvements that may ultimately require additional analysis and additions.

The roadways identified as potential grade separations are listed in Table 7-1 with estimated costs and public benefits. All potential grade separations are classified as

mid-range roadway improvements and may be ranked by the ratio of estimated public benefit to the estimated cost of implementation.

Subdivision	Grade Crossing Street Name	City	ADT	Estimated Cost	Estimated Public Benefit
KCS Laredo	Guadalupe Street	Laredo	31,000	$4,730,000	$54,385,000
KCS Laredo	Chihuahua Street	Laredo	31,000	$6,310,000	$53,325,000
KCS Laredo	Arkansas Avenue	Laredo	18,550	$9,390,000	$17,404,000
KCS Laredo	Market Street (west crossing)	Laredo	13,800	$8,200,000	$10,819,000
Harlingen	Boca Chica Blvd/ SH 48	Brownsville	33,000	$11,800,000	$8,126,000
KCS Laredo	Corpus Christi Street	Laredo	10,200	$4,000,000	$7,254,000
Brownsville	Williams Road	San Benito	13,400	$8,160,000	$7,015,000
KCS Laredo	Smith Street	Hebbronville	9,200	$8,460,000	$5,649,000
Harlingen	15th Street/ US 77	Harlingen	25,000	$12,310,000	$5,629,000
Brownsville	Wilson Road	Harlingen	8,100	$8,610,000	$5,010,000
KCS Laredo	Market Street (east crossing) & Bartlett Avenue	Laredo	11,170	$19,450,000	$7,952,000
KCS Laredo	San Diego/ SH 44/ Gravis St	San Diego	7,400	$12,270,000	$4,455,000
UP Laredo	Jefferson Street	Laredo	7,460	$9,220,000	$4,418,000
UP Laredo	Calton Road	Laredo	7,790	$18,290,000	$4,322,000

Table 7-1: Summary of Potential Grade Separations

A breakdown of the order of magnitude cost estimates and the estimated associated public benefits are included in Appendix E and Appendix F, respectively. The improvements are described individually in further detail in Section 8.

Each crossing closure consists of removing a roadway/rail at-grade crossing so that vehicles are prevented from crossing the railroad at a particular location, thus requiring an alternate route for vehicular through-traffic. Crossing closures minimize the safety hazards associated with the vehicle/train interface; however, only crossing closures that would redirect traffic to either an existing grade separated structure or a potential grade separation were identified in this study. A list of crossings identified for potential closure is provided in Table 7-2 with estimated costs and public benefits. Potential crossing closures are classified as either near term or mid-range roadways improvements, depending on whether traffic would be rerouted to an existing or proposed grade separation, and are listed in descending order of the ratio of estimated public benefit to the estimated cost of implementation.

Subdivision	Grade Crossing Street Name	City	ADT	Estimated Cost	Estimated Public Benefit	Estimated Timeframe
UP Laredo	Sanchez Street	Laredo	276	$100,000	$1,075,000	Mid-Range
KCS Laredo	Buena Vista Street	Laredo	1,690	$100,000	$1,031,000	Near-Term
KCS Laredo	Washington Street	Laredo	1,300	$100,000	$838,000	Mid-Range
KCS Laredo	W Galbraith Street	Hebbronville	1,200	$100,000	$731,000	Mid-Range
UP Laredo	Baltimore Street	Laredo	276	$100,000	$636,000	Near-Term
UP Laredo	Zaragoza Street	Laredo	276	$100,000	$554,000	Near-Term
KCS Laredo	Zaragoza Street	Laredo	276	$100,000	$364,000	Near-Term
UP Laredo	Gonzalez Street	Laredo	276	$100,000	$362,000	Mid-Range
KCS Laredo	Seymour Street	Laredo	276	$100,000	$309,000	Near-Term
KCS Laredo	Stone Avenue	Laredo	276	$100,000	$293,000	Near-Term
KCS Laredo	Sanders Avenue	Laredo	276	$100,000	$213,000	Mid-Range
KCS Laredo	Marcella Avenue	Laredo	276	$100,000	$205,000	Mid-Range
UP Laredo	Scott Street	Laredo	276	$100,000	$196,000	Near-Term
KCS Laredo	Malinche Avenue	Laredo	276	$100,000	$153,000	Mid-Range
KCS Laredo	Rigma Street	Hebbronville	85	$100,000	$97,000	Mid-Range

Table 7-2: Potential Crossing Closures

Crossing closure costs typically do not exceed $100,000, when including the removal of pavement across the crossing, traffic signs, traffic barricades, minor roadway improvements such as paving and sidewalk improvements, and minor city traffic signal work associated with closing a crossing. The railroads typically pay for the costs associated with removing the crossing panels within their right of way, and at times have been known to provide a minimal financial contribution to the overall crossing closure cost. The estimated associated public benefits are included in Appendix F and the improvements are described individually in further detail in Section 8.

The identified potential grade separations and crossing closures create the potential for implementing quiet zones in several areas within the study region. A quiet zone is a segment of a rail line, within which is situated one or a number of consecutive public roadway-rail crossings, at which locomotive horns are not routinely sounded. In locations where quiet zones are established, locomotives cannot sound horns except for emergency situations, such as a trespasser on the track. Through 49 CFR Parts 222 and 229, the FRA requires the sounding of locomotive horns at all roadway-rail at-grade crossings except for designated track lengths set up as quiet zones.

To be eligible for implementation of a quiet zone, the Quiet Zone Risk Index (QZRI) must be below the Nationwide Significant Risk Threshold (NSRT) for a segment of track. The QZRI is defined as the measure of risk to the motoring public after adjustments for increased risk due to lack of locomotive horn use and decreased risk due to implemented safety measures, while the NSRT reflects the average level of risk to the motoring public at roadway-rail crossings equipped with flashing lights and gates and where train horns are sounded. Safety measures include supplemental safety measures (SSMs) and Alternative Safety Measures (ASMs) as well as the

elimination of at-grade crossings through grade separations. SSMs include measures such as medians or channelization devices of a certain length, crossing closures, four-quadrant gate systems, and one-way streets. ASMs are measures submitted to the FRA that are most likely similar to SSMs and are deemed an effective substitute to a SSM. The potential grade separations and crossing closures would potentially lower the QZRI below the NSRT.

There are multiple opportunities for implementation of quiet zones in municipalities throughout the Lower Rio Grande Valley and Laredo District. Currently, the FRA does not show any established quiet zones within the study area. However, the city of Laredo has proposed a railroad noise abatement program to look into implementing quiet zones at targeted locations within the city limits.

Potential quiet zone segments that may be implemented in conjunction with the improvements identified in this study are listed as follows:

- Proposed West Rail Bypass (UP Brownsville Subdivision) – The West Rail Bypass is currently under construction and will bypass to the north and west of the city of Brownsville and will only include one at-grade crossing. A new at-grade crossing will be required at New Carmen Road, which is adjacent to a noise-sensitive area at the World Birding Center. As part of the project, Cameron County is installing channelization devices to create a quiet zone at this location to decrease noise from the addition of the new crossing. Additionally, the West Rail Bypass will eliminate 13 at-grade crossings on the existing UP Brownsville Subdivision in the downtown Brownsville area.
- UP Laredo Subdivision from the Rio Grande to MP 408.00 (north of Industrial Boulevard) for a total length of approximately 4.5 miles located within the city of Laredo – Potential grade separations outlined in this report include Jefferson Street and Calton Road; potential crossing closures include Zaragosa Street, Sanchez Street, Scott Street, and Baltimore Street. All remaining at-grade crossings would, at a minimum, require bells, flashers, and gates as well as constant warning time devices. SSMs may be required for at least one or more of the crossings to bring the QZRI below the NSRT.
- KCS Laredo Subdivision from MP 2.00 (2 miles east of the Rio Grande) to MP 5.60 (east of Loop 20) for a total length of approximately 3.6 miles within the city of Laredo – Potential grade separations outlined in this report include Corpus Christi Street, Guadalupe Avenue, Chihuahua Avenue, W Market Street, E Market Street, and Arkansas Avenue; potential crossing closures include Monterrey Avenue, Sanders Avenue, Marcella Avenue, Stone Avenue, Seymour Avenue, Buena Vista Avenue, and Malinche Avenue. All remaining at-grade crossings would, at a minimum, require bells, flashers, and gates as well as constant warning time devices. SSMs may be required for at least one or more of the crossings to bring the QZRI below the NSRT. This quiet zone would not be needed in the event that a KCS bypass around Laredo is constructed.

Railroad Improvements

Rail improvements foster the economic growth of the region by improving the efficiency of freight rail operations as well as minimizing disturbance to residents of the region. Providing additional rail capacity relieves congestion along the rail corridors and allows trains to pass through the region more quickly. Examples of rail capacity enhancements are listed as follows:

- Adding a mainline track
- Signal improvements and upgrades
- Adding switches and passing sidings at strategic locations to allow trains to pass one another or to idle without causing delays
- Expanding rail yard capacity
- Constructing connections between rail lines to improve rail traffic mobility
- Relocating rail yard and/or intermodal facilities
- Relocating through-freight rail traffic onto new alignments (bypass routes)

Potential improvements to the existing rail network are listed in Table 7-3 along with implementation timeframes, estimated order-of-magnitude costs, estimated public and private benefits and associated planning cases. The improvements are described individually in further detail in Section 8.

Several of the listed improvements are located outside of the limits of this study, in particular near the San Antonio and Corpus Christi areas, but have an impact on the regional rail network. The improvements in Table 7-3 are not based on evaluations of engineering feasibility but rather upgrades intended to improve train operations as suggested by the simulation exercises. Alternative capacity increases in the same general areas may provide the same level of improvement to train operations. The locations of the identified rail improvements are shown in Figures 7-1 and 7-2, while conceptual drawings are included in Appendix D.

The identified rail improvements do not constitute an all-inclusive list of potential improvements for the region. Some improvements were not included in the list because the projects are too conceptual at this time to determine costs, benefits and operational impacts for this study. In particular, the potential for a rail bypass around Laredo is dependent on the construction of a new international rail crossing as discussed in the review of Presidential permit applications in Section 1 of this report. The location of the international crossing as well as the associated bypass route around Laredo has not been determined due to the 3 conflicting Presidential permit applications (UP in 1995, Webb County in 2007, and KCS in 2008). In addition, since the Class 1 railroads did not actively participate in this study, the level of detail needed to accurately model operations for a new bypass route was not available.

The potential route of the proposed KCS Laredo bypass, as discussed in Section 1, is not defined to the extent where a quantitative analysis of the public benefit could be calculated. The public benefits identified in Tables 7-1 and 7-2 for grade separations and crossing closures on the KCS Laredo Subdivision in Laredo may be

realized with the incorporation of the KCS bypass. The extent of grade crossings that may be eliminated, thereby creating a reduction in public burden, however, is not fully known.

Subdivision	Rail Improvement	Estimated Cost	Planning Case	Total Cost	Estimated Public Benefits	Estimated Private Benefits	Estimated Timeframe
Brownsville	CTC from Inari south to Sinton and from Odem south to Robstown	$82,900,000	PC 1 (10%, 5 to 10 year growth)	$107,500,000	n/a	$28,500,000	Near-Term
Brownsville	Sidings extensions at Woodsboro, Sarita, and Norias	$2,400,000					Near-Term
Brownsville	New siding at Kingsville	$5,000,000					Near-Term
Brownsville	Upgraded switches at sidings between Robstown and Harlingen	$5,300,000					Near-Term
KCS Laredo	Upgraded switches at sidings between Robstown and Laredo	$6,400,000					Near-Term
UP Laredo	New Sidings at Artesia Wells	$5,500,000					Near-Term
Brownsville	Sidings extensions at Sinton	$6,700,000	PC 2 (18%, 10 to 20 year growth)	$17,500,000	n/a	$37,200,000	Mid-Range
UP Laredo	New Sidings at Armour and Dilley	$10,800,000					Mid-Range
Brownsville	Bloomington to Placedo siding track extension	$10,150,000	PC 4 (25%, 20 to 30 year growth)	$47,785,000	n/a	$41,300,000	Long-Term
Brownsville	Sinton to Odem siding track extension	$13,550,000					Long-Term
Brownsville	New sidings at Bishop and Ricardo	$11,010,000					Long-Term
UP Laredo	New siding at Natalia	$7,495,000					Long-Term
UP Laredo	Siding extensions at Finley, Callaghan	$1,970,000					Long-Term
UP Laredo	Yard lead extension at Laredo	$3,610,000					Long-Term
Brownsville	Relocate Harlingen Yard	$25,000,000	PC 5	$30,500,000	$2,270,000	-$3,100,000	Mid-Range
Brownsville	Commerce Street Connection in Harlingen	$5,500,000					Mid-Range
Brownsville	RVSC Mission Subdivision Bypass Route	$66,800,000	n/a	n/a	n/a	n/a	Long-Term
Brownsville/ Harlingen	North Rail Relocation (Harlingen Bypass)	$100,000,000	n/a	n/a	n/a	n/a	Long-Term
Brownsville	Upgrade Bridges to Load Capability of 286k pounds	$35,700,000	n/a	n/a	n/a	n/a	Long-Term

Table 7-3: Railroad Improvements

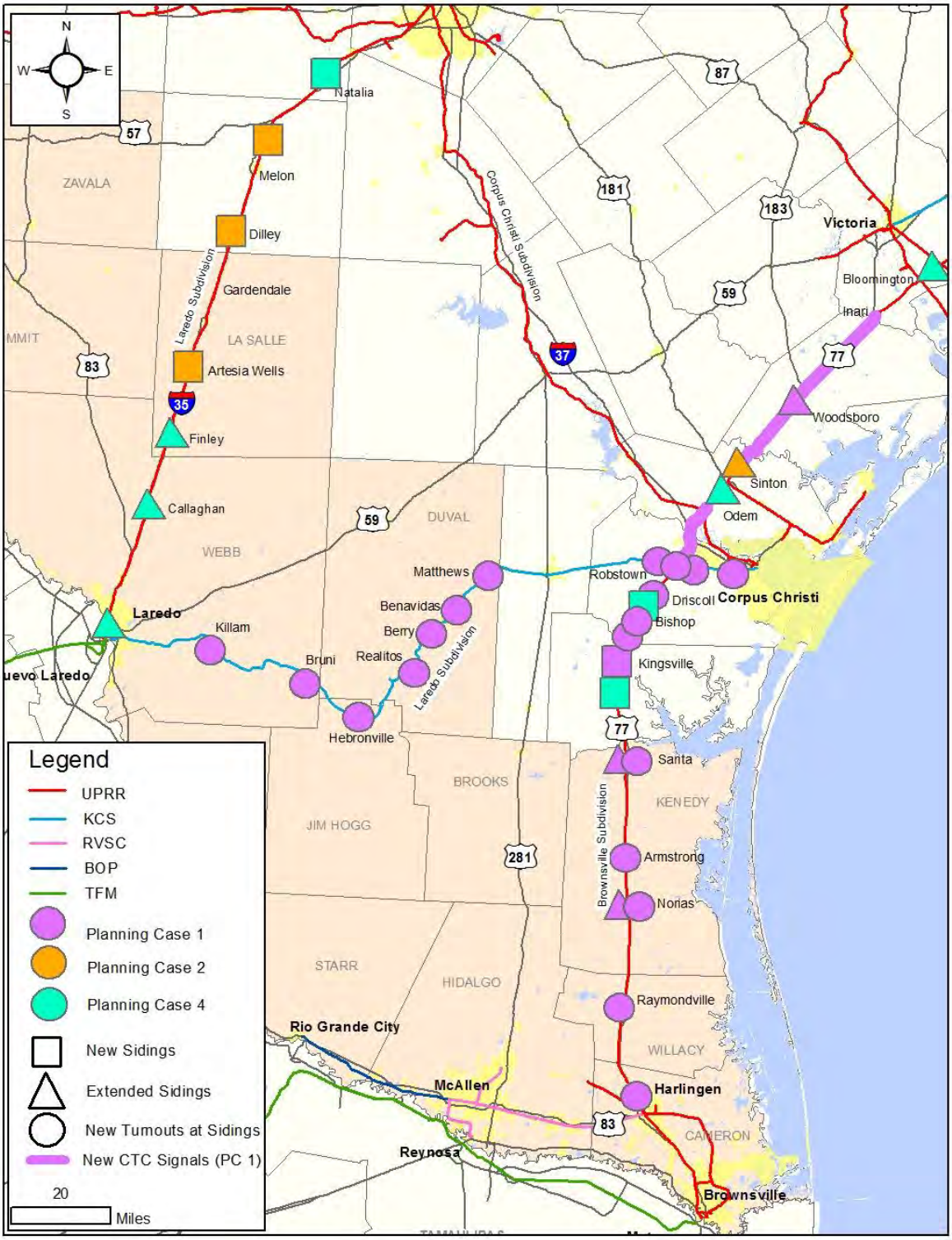


Figure 7-1: Railroad Improvements – Potential Signal and Siding Improvements

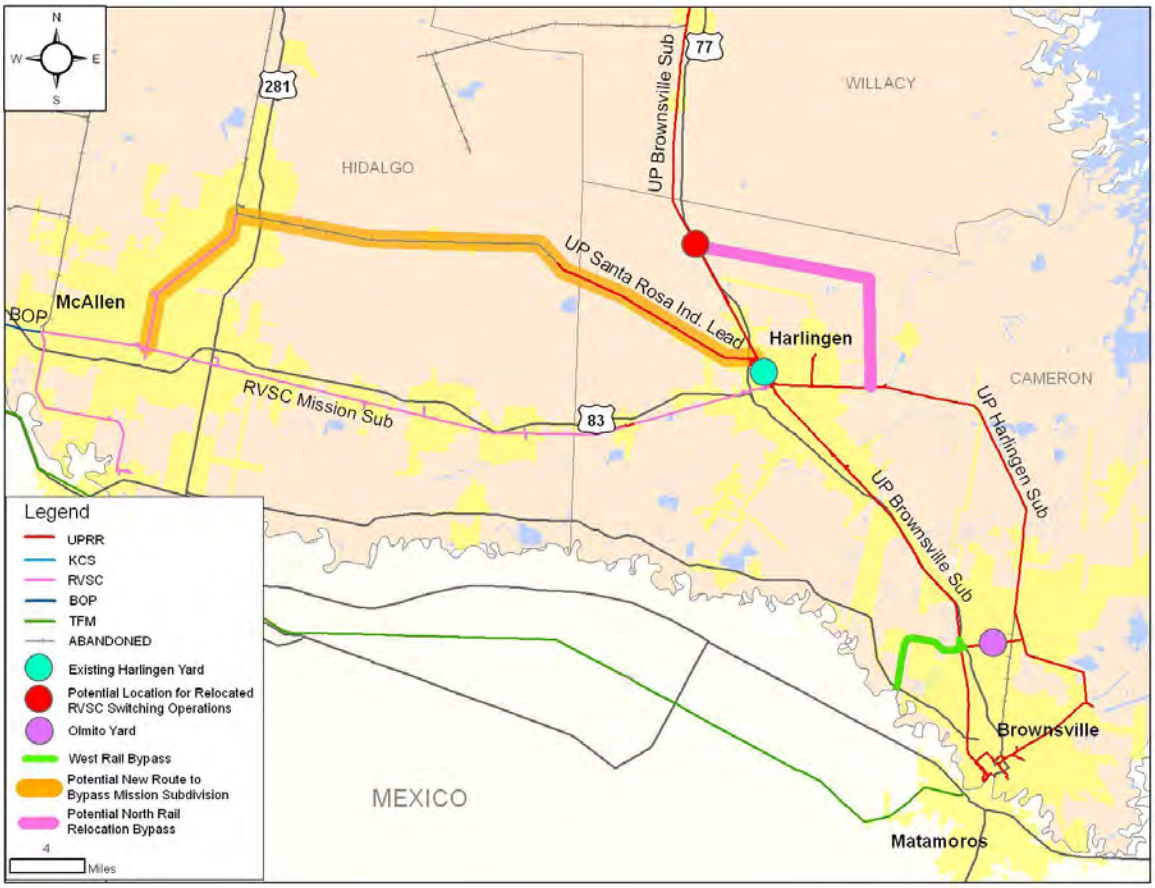


Figure 7-2: Railroad Improvements – Possible Bypass Routes and Yard Relocations

Rail Infrastructure Improvement Planning Cases

Planning cases, representing improvements and/or relocations, were investigated with the ultimate goal of either accommodating project growth or improving train mobility and efficiency within the network.

Expectations for growth in train traffic on the Valley rail network were integrated into the RTC model in order to measure the effects that increases in train activity may have on railroad operating performance, and to determine the amount and types of infrastructure improvements that may be necessary to restore performance to that of existing (Base Case) conditions. The modeling results including performance measurements for run time, delay, and average speeds, for the each of the modeled cases are discussed in further detail in section 5 of this report.

Modeled Cases

The Planning Cases test identified improvements intended to improve railroad operating efficiency and performance or add capacity in the region. The planning cases are listed as follows:

- Base Case – Existing conditions
- Planning Case 1 (PC 1) – 10 year growth scenario
- Planning Case 2 (PC 2) – 15 to 20 year growth scenario
- Planning Case 3 (PC 3) – Updated Base Case to include recent improvements
- Planning Case 4 (PC 4) – 20 to 30 year growth scenario
- Planning Case 5 (PC 5) – Tested Harlingen Yard relocation and Commerce Street connection in Harlingen to improve vehicular mobility in Harlingen

The Mission Subdivision Bypass was not included in the planning cases since it was determined to have potential benefits, such as the potential for future passenger rail service along the existing Mission Subdivision that would not be reflected in the model. Similarly, the benefits of upgrading bridges along the Brownsville Subdivision to increase load bearing capacity would have operational benefits that could not be reflected in the performance measurements based on time and delay used in RTC. The North Rail Relocation that would bypass the city of Harlingen was also not modeled in the Planning Cases since the project is still conceptual and does not yet have an identified alignment or route, which would impact the rail operations as well as the level of public and private benefit. These potential improvements should be analyzed in independent cost-benefit analyses that are not included in this study if determined to be desired by the region.

Base Case

Existing railroad infrastructure and operations were analyzed to develop an RTC Base Case model for comparison to potential alternatives and improvements. The basis for measurement of the impact or benefit of proposed improvements is the performance of the current network in the Base Case simulation. Simulation results for the Base Case as well as all subsequent planning cases are tabulated and discussed in further detail in section 5 of this report.

Planning Case 1

The first planning case assumes that train counts increase by about 10% on each of the three main routes in the study (the UP Brownsville Subdivision between Bloomington and Brownsville, the UP Laredo Subdivision between San Antonio and Laredo, and the KCS Laredo Subdivision between Corpus Christi/Robstown and Laredo), which is assumed to represent growth within 10 years from the time this study was completed. The trains were added to the RTC model in proportions relative to the train types and routes that exist within the Base Case.

Planning Case 1 included the following infrastructure improvements, as determined necessary based on the RTC modeling to accommodate the modeled growth without negatively impacting operating performance:

- UP Brownsville Subdivision
    - CTC extended from Inari south to Sinton, and from Odem south to Robstown

    - Sidings lengthened at Woodsboro, Sarita, and Norias to between 7700 and 8000 feet each
    - New siding at Kingsville
    - Crew-activated remote control turnouts placed on siding switches between Robstown (south of end of extended CTC) and Harlingen
- KCS Laredo Subdivision
    - Crew-activated remote control turnouts placed on siding switches between Robstown and Serrano Yard at Laredo
- UP Laredo Subdivision
    - Second running track added within control system between Tower 105 and Willhem Junction, south of SoSan Yard (approximately 5.9 miles in length)
    - New controlled 9,000 foot siding at Artesia Wells, MP 353.54 – MP 355.28

Planning Case 2

The second planning case assumes that train counts on the three principal subdivisions increase by a further 8% on top of the Planning Case 1 modeled growth, which is assumed to represent growth approximately 10 to 20 years from the time this study was completed.

Planning Case 2 included the following infrastructure improvements in addition to the improvements modeled in Planning Case 1, as determined necessary based on the RTC modeling to accommodate the modeled growth without negatively impacting operating performance:

- UP Brownsville Subdivision
    - The existing short, non-controlled siding at Sinton, located north of the former SP crossing, extended north, lengthened to 9500 feet, and placed within the CTC system
- UP Laredo Subdivision
    - New controlled 9,000 foot siding at Armour, MP 306.26 – MP 308.28, between Yarbrough and Melon
    - New controlled 9,000 foot siding at Dilley, MP 328.04 – MP 329.86, between Melon and Gardendale

Planning Case 3

Planning Case 3 consists of improvements made to update the Base Case to include the West Rail Bypass and the Olmito Yard expansion projects that are currently under construction and expected to be completed and fully operational within 2012.

West Rail Relocation – The West Rail Relocation consists of a new rail bypass to replace the existing Brownsville Subdivision in downtown Brownsville. The Brownsville Subdivision will be abandoned and removed from just south of Olmito to the border crossing and replaced with a new nearly 6 mile long mainline is currently

being constructed for a bypass to the west of Brownsville and Matamoros, Mexico and includes a new international railroad border crossing. This project removes multiple at-grade roadway-rail crossings within the Brownsville area, as listed below, with the removal of the track.

- Palm Boulevard
- W. 5th Street
- W. 8th /Riverside Street
- W. 13th Street
- Elizabeth Street
- Washington Street
- US Hwy 281
- Old Military Road
- Los Ebanos Street
- FM 802
- FM 3248
- Tandy Road
- Fish Hatchery Road

Olmito Yard expansion – The existing UP yard at Olmito has been expanded to accommodate additional UP freight operations that were relocated from Harlingen Yard. UP switching operations previously occurred in Harlingen and caused delays to motorists and trains in Harlingen due to the location of the yard in the center of town. The construction at Olmito includes a repair-in-place facility and additional capacity improvements to accommodate the switching and RVSC interchange operations that had previously taken place in Harlingen. The project, in concert with other potential projects such as a rail connection near Commerce Street and a new RVSC yard outside of Harlingen as discussed in Planning Case 5, will improve mobility within the Harlingen area.

The improvements modeled in Planning Case 3 only impacted the Brownsville Subdivision, while performance measurements on all other subdivisions did not change from the original modeled Base Case. The West Rail Bypass and Olmito Yard projects modeled in Planning Case 3 resulted in a 20% improvement in performance from the Base Case, as measured by the change in delay minutes per 100 train-miles.

Planning Case 4

Planning Case 4 modeled a 25 percent increase in train volumes as compared to the revised Base Case modeled in Planning Case 3 on the UP Laredo and Brownsville Subdivisions and the KCS Laredo Subdivision, which is assumed to represent growth approximately 20 to 30 years from the time this study was completed.

Planning Case 4 included the following infrastructure improvements in addition to the improvements modeled in Planning Case 2, as determined necessary based on the

RTC modeling to accommodate the modeled growth without negatively impacting operating performance:

- UP Brownsville Subdivision
  - Extension of Bloomington yard track north to Placedo and made into a controlled siding
  - Extension of South Sinton siding to North Odem
  - New siding equipped with crew-operated power switches at Bishop, MP 124
  - New siding equipped with crew-operated power switches at Ricardo, MP 108

- UP Laredo Subdivision
  - New siding at Natalia, MP 287
  - Extension of Finley siding to the south; to 9560 feet
  - Extension of Callaghan siding to the north; to 9400 feet
  - Extension of Laredo Yard lead north to MP 156.5 to connect with RG Runaround

Planning Case 5

Planning Case 5 included the West Rail and Olmito projects as modeled in the revised Base Case (Planning Case 3) and added a new connection between the Brownsville and Harlingen subdivisions at Brownsville Subdivision MP 25.1 (Commerce Street Connection) and a new yard to replace the existing Harlingen Yard.

The Commerce Street connection consists of a new connection between the Brownsville Subdivision and the Harlingen Subdivision that would allow for the removal of the existing connection track as shown in Figure 7-3. The relocation of this connection would eliminate five at-grade crossings in Harlingen: Adams, Washington, Lela, Ona, and Orange Heights.

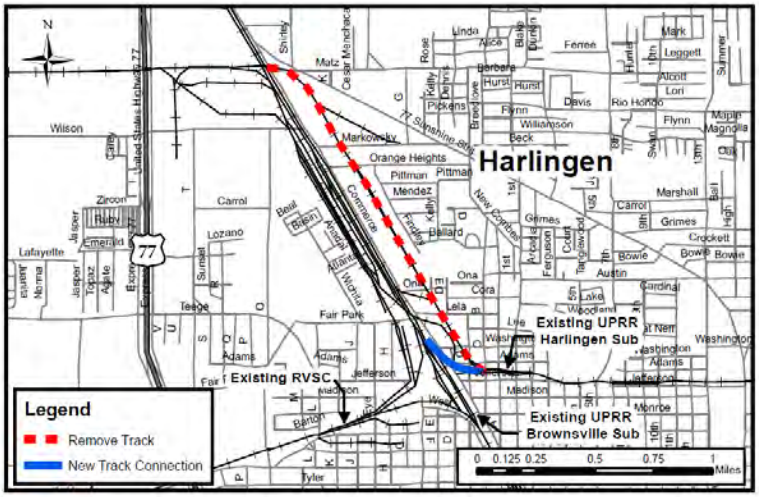


Figure 7-3: Commerce Street Connection

The relocation of RVSC operations from Harlingen to a new yard location in conjunction with the relocation of the UP switching operations from Harlingen to Olmito would allow the existing Harlingen Yard to be abandoned. A potential new switching yard was analyzed nearly 8 miles north of Harlingen immediately west of the UP Brownsville Subdivision and US 77 near Orphanage Road.

Cumulatively, the relocation of the UP switching operations to Olmito, the relocation of the Commerce Street crossing, and the relocation of the RVSC operations to a new yard outside of Harlingen would provide the following benefits:

- Remove over six miles of track in Harlingen
- Eliminate five road crossings
- Allow for a 30 mph turnout to the Harlingen Subdivision
- Allow for a 49 mph travel speed on the Brownsville Subdivision
- Reduce motor vehicle delays at several downtown Harlingen street crossings
- Make available for development approximately 20 acres of land at the existing Harlingen Yard
- Support the development of the North Rail Relocation to bypass the City of Harlingen to the northeast

Analysis of Public and Private Benefits

The public benefits of rail improvements may be estimated as the value associated with reduced vehicular delay at roadway-rail grade crossings resulting from reduced train volumes, increased train speeds, or the elimination of at-grade crossings. Planning Cases 1, 2, and 4 consisted of train growth scenarios and did not have such public benefits since they include increased train volumes at roadway-rail grade crossings. However, the increase in train volumes would increase the public benefit of the potential grade separations and crossing closures identified in this study.

The public benefit of Planning Case 5 consist of the eliminated vehicular delay, emissions, and safety issues associated with 5 at-grade crossings in Harlingen that would be removed as part of the Commerce Street Connection modeled in the planning case.

Potential benefits that may be realized by the railroads as a result of the modeled improvements vary by the type of improvements, but may include:

- Improved train operating performance (reduced delays, improved run-times, increased average speeds)
- Increased capacity
- Reduced exposure to roadway-rail crossings

The train operating performance measures have been translated to an economic value using the following unit costs:

- Train mileage = $83.50/mile
- Delay time = $658.31/hour

The train mileage cost of $83.50/mile is a representative industry cost that reflects rail operating expense per train mile. The value is based on total U.S. capital expenditures for track and equipment as well as total miles of track operated reported in the Association of American Railroads (AAR) Analysis of Class I Railroads Report for 2009. The values vary by operating railroad and were weighted according to the percentage of trains operated by each railroad (UP – 72%, KCS – 23%, BNSF – 6%) as modeled in RTC for this Study Region.

The average delay time cost of $658.31 per hour assumes a 30:70 ratio of yard-to-line haul operating times within study region, where expected yard operating expenses are $338 per hour and line haul operating expenses are $795 per hour. Operating expenses per hour were determined by analyzing each railroad's reported system wide hours, miles, and operating expenses for yard and switching operations as well as road train operations. Since each railroad had different calculated train delay hour costs, the average cost was derived based on the relative percentage of trains operated by each railroad in the modeled network.

The difference in train miles and delay hours between the planning case and the base case were than translated into an annual benefit (or cost) using the unit costs discussed above and projected with an annual 3 percent inflation rate over a 10 year analysis period to determine the net present value.

However, private benefits for the growth scenarios modeled in Planning Cases 1, 2, and 4 could not be estimated by simply comparing performance measures between the respective planning case and the Base Case, since the planning cases included increased volumes of trains as discussed previously and summarized below.

<u>Planning Case 1 (PC 1)</u>

- 10 percent growth in train volumes beyond the Base Case
- Assumed to be reached within 10 years, assumed to be approximately 5 years for the purpose of estimating benefits

<u>Planning Case 2 (PC 2)</u>

- 18 percent growth in train volumes beyond the Base Case
- Assumed to be reached in 10 to 20 years, assumed to be approximately 15 years for the purpose of estimating benefits

Planning Case 4 (PC 4)

- 25 percent growth in train volumes beyond the Base Case
- Assumed to be reached in 20 to 30 years, assumed to be approximately 25 years for the purpose of estimating benefits

RTC simulation of each scenario listed above provided a forecast of the rail network operating conditions before and after implementation of the planning case improvements. Subsequent to these simulations, "Train Delay per 100 Train Miles" was used as the operating performance measure upon which the economic benefit of each planning case was based.

RTC simulation provided information on forecasted Train Delay per 100 Train Miles under the planning case conditions of 10, 18, and 25 percent growth in Base Case train volumes, which are assumed to occur at 5, 15, and 25 years into the future, respectively. While each of the projects for a planning case may not in reality be implemented within a single year, this assumption is necessary since it would be impractical to model the response of each separate, small change to the rail network in RTC simulation. The reality, however, is that it is the cumulative effort of the projects that provide the greater benefit.

As illustrated in Figure 7-4, an increase in train volumes beyond that of the Base Case condition has shown in the RTC simulation to cause rail network performance to diminish if rail infrastructure is not added to the network. RTC simulation provided the means of quantifying the differences in rail network performance (i.e., differences in train delay per 100 train-miles) by modeling the network prior to and after the addition of infrastructure.

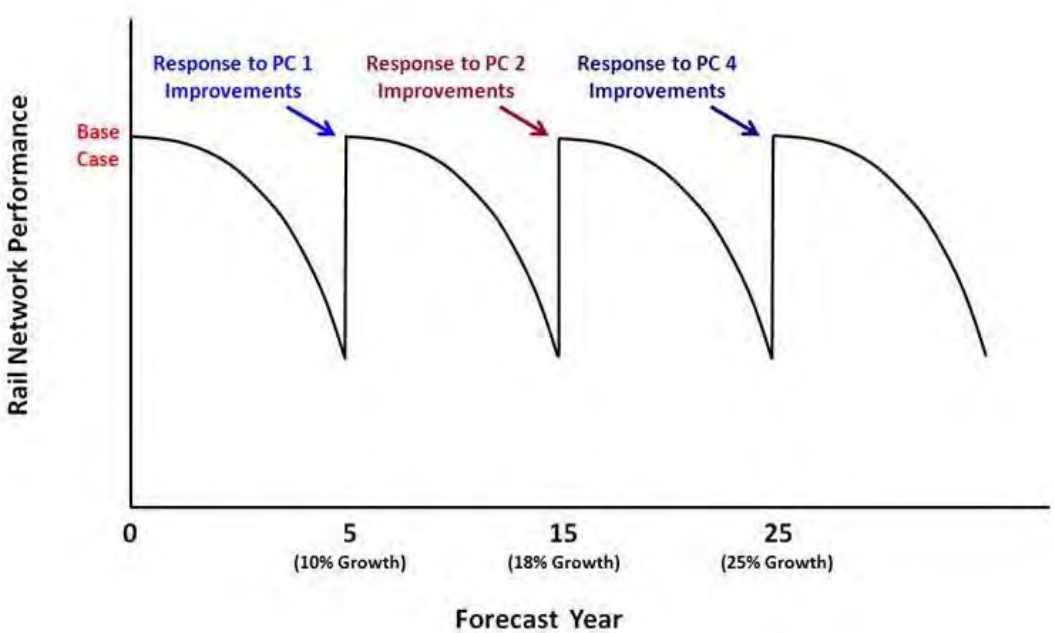


Figure 7-4: General Response of Rail Network Performance to Train Volume Growth and Rail Infrastructure Improvements

Since it was only practical to collect RTC output information for the Base Case and each forecast year (Years 5, 15, and 25), intermediate years, represented in Figure 7-4 as periods of curvilinear decline in network performance, were approximated using a straight line decline trend to estimate the diminishing benefits of investment in each prior planning case caused by the growth in train volumes. Figure 7-5 plots the economic benefits associated with each planning case (PC 1, PC 2, and PC 4) for the year in which they are implemented, as well as the declining benefit of these investments during intermediate years of the forecast period.

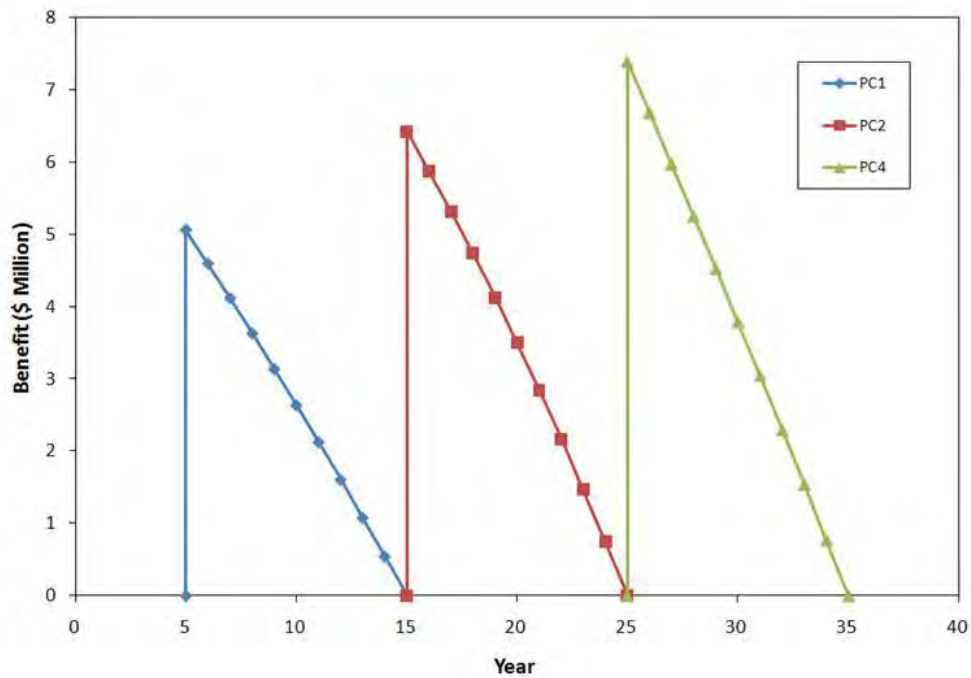


Figure 7-5: Benefit of Reductions in Train Delay from Infrastructure Investment

For example, at a cost of train delay to the railroads of an assumed $658 per hour, benefits from reduced train delay in the first year of implementing PC 1 (i.e., five years into the future) equals $5.0 million. The annual benefit of this investment declines over the next 10 years as train volumes continue to grow, ultimately requiring new investments to be made, as modeled in PC 2, if Base Case operating conditions are to again be restored. The estimated benefits over a 10 year analysis period associated with each of the growth scenario planning cases in the form of reduced train delay are listed as follows in terms of today's dollars:

- PC 1 = $28.5 million
- PC 2 = $37.2 million
- PC 4 = $41.3 million

Although the benefits listed above have not been discounted by railroad costs of capital, decisions to implement each planning case are likely to be made close to the

time of need for these projects, in which case their values will be close to the benefits itemized above.

The private benefits for Planning Case 5 were estimated by calculating the net present value of the annual benefit of reduced train delay hours in comparison to the Base Case over a 10 year analysis period. Since Planning Case 5 did not include any growth of train volumes in comparison to the Base Case, no annual degradation in value of the improvements was estimated. However, the modeling results for Planning Case 5 showed that the Harlingen Yard Relocation would increase train miles and run times due to the increased travel distance required to the new yard, resulting in an increase (rather than a savings) to private operating costs. Although, as discussed in Section 5, an alternative that would mitigate the added operating costs and distance is to revert switching operations to current-day operations, in which switching and classification for RVSC trains would be conducted at the new relocated Harlingen Yard. The Harlingen Yard relocation would also support the potential North Rail Relocation to bypass the city of Harlingen.

The estimated costs and benefits associated with each Planning Case are shown in Table 7-4. The benefits for Planning Case 3 are not shown, since it was used as a revised base case for comparison against Planning Case 5.

Planning Case	Total Cost	Estimated Public Benefits	Estimated Private Benefits
PC 1 (10% growth, estimated 5 years)	$107,500,000	n/a	$28,500,000
PC 2 (18% growth, estimated 15 years)	$17,500,000	n/a	$37,200,000
PC 4 (25% growth, estimated 25 years)	$47,785,000	n/a	$41,300,000
PC 5 (Harlingen Yard Relocation and Commerce Street Connection)	$30,500,000	$2,270,000	-$3,100,000

Table 7-4: Estimated Costs and Benefits of Rail Improvement Planning Cases

SECTION 8: IMPROVEMENT DESCRIPTIONS

The following section lists the roadway crossing and rail infrastructure improvements identified in this study. The potential improvements are organized by subdivision with descriptions, estimated costs, and estimated benefits. Average daily traffic volumes used for analysis and in this report are based on the Texas Railroad At-Grade Crossing Inventory. Preliminary layouts with adjacent land uses of the identified grade separation alternatives as well as alternate routes and associated distances for potential crossing closures are included in the figures in Appendix D. Estimated costs for each grade crossing and rail improvement are detailed in Appendix E.

UP Brownsville Subdivision

Grade Separations

Williams Road

Williams Road is currently a four-lane roadway that crosses the railroad at-grade in Cameron County in San Benito. An average daily traffic volume of 13,400 vehicles crosses the UP railroad at this location. The identified four-lane roadway overpass would separate vehicular traffic from the UP Brownsville Subdivision.

Access roadways could be provided alongside the grade separation to provide access to Williams Road for driveways and cross streets such as Woolam Road and Surise Boulevard. Additionally, a private access roadway would need to be provided for properties in the southeast quadrant of the crossing to provide a connection from the properties to Gil Drive. The access roadways could potentially prevent the need to acquire entire properties and instead only acquire easements from each property adjacent to the grade separation.

The grade separation of Williams Road is estimated to cost $7.5 million with an estimated public benefit of $7 million over a twenty-year period.

Wilson Road

Wilson Road is currently a two-lane roadway that crosses the railroad at-grade in Cameron County in Harlingen. An average daily traffic volume of 8,100 vehicles crosses the UP railroad at this location. The identified two-lane roadway overpass would separate vehicular traffic from the UP Brownsville Subdivision.

The grade separation of Wilson Road would require that an overpass be constructed for Commerce Street in order to maintain connectivity between the two roadways. An access driveway would be required for the property south of Wilson Road to provide access to Wilson Road just west of the grade separation. The grade separation would require the acquisition of multiple properties east of Commerce Street, since the grade separation would remove roadway access to those properties. The grade separation would also require the closure of Murkowsky Avenue at Commerce Street, removing connectivity between those two roadways.

Traffic from Murkowsky Avenue would be rerouted to Orange Heights Drive or U.S. 77 to access Commerce Street.

The grade separation of Wilson Road is estimated to cost $7.9 million with an estimated public benefit of $5 million over a twenty-year period.

Quiet Zones

The West Rail Bypass is currently under construction and will bypass the city of Brownsville to the north and west. A new at-grade crossing will be required at New Carmen Road, which is adjacent to a noise-sensitive area at the World Birding Center. As part of the project, Cameron County is installing channelization devices to create a quiet zone at this location to decrease noise from the addition of the new crossing.

Rail Improvements

Extension of CTC

The extension of the existing CTC system from Inari south to Sinton and from Odem south to Robstown adds capacity needed to accommodate projected 10-year growth based on RTC modeling along the higher volume segments of the Brownsville Subdivision. This section of the Brownsville Subdivision is used by UP trains as well as KCS and BNSF trains operating across the UP line under trackage rights agreements. Traffic volumes south of Robstown were determined to not be high enough to require further extension of CTC signals. The identified signal improvements are located north of Corpus Christi outside of the study area; however, they have significant impact on the capacity of the Brownsville Subdivision and operations within the study area. The estimated cost of the signal improvements is approximately $82.9 million.

New Sidings and Siding Extensions

Rail operations modeling results show that the existing sidings at Woodsboro, Sarita, and Norias would need to be lengthened to nearly 8,000 feet each to accommodate 10-year growth projections. Additionally, the siding at Sinton would need to be lengthened to 9,500 feet to accommodate 20-year growth projections based on RTC modeling results. The RTC modeling results also showed that the Sinton siding would need to be extended further to North Odem to accommodate the 30-year growth projection modeled in Planning Case 4.

The sidings at Woodsboro and Sinton are located north of Corpus Christi outside of the study area; however, they have significant impact on the capacity of the Brownsville Subdivision and operations within the study area.

A new siding at Kingsville, located south of Corpus Christi, would be required in addition to the siding extensions discussed above to accommodate 10-year growth projections on the Brownsville Subdivision based on the RTC modeling results. Additional new sidings would be required at Bishop and Ricardo to accommodate the 20 to 30 year growth projects modeled in RTC.

The costs of each potential siding extension and new siding are shown in Table 1, with a total combined cost of approximately $48.8 million.

Subdivision	Rail Improvement	Estimated Cost	Estimated Timeframe
Brownsville	Siding extensions at Woodsboro, Sarita, and Norias	$2,400,000	Near-Term
Brownsville	Siding extension at Sinton	$6,700,000	Mid-Range
Brownsville	Bloomington to Placedo siding track extension	$10,150,000	Long-Term
Brownsville	Sinton to Odem siding track extension	$13,550,000	Long-Term
Brownsville	New siding at Kingsville	$5,000,000	Near-Term
Brownsville	New sidings at Bishop and Ricardo	$11,010,000	Long-Term

Table 1: Potential Siding Extension Improvements on Brownsville Subdivision

Signal Improvements at Existing Sidings

Crew-activated remote control turnouts on siding switches between Robstown (south of end of extended CTC) and Harlingen would expedite train meets along the subdivision. The switches would allow trains to enter and leave the siding more efficiently while another train passes on the mainline track. The estimated cost of the upgraded switches at sidings is approximately $5.3 million.

Harlingen Yard Relocation

The switching operations in the Harlingen Yard area frequently block streets crossing the railroad, resulting in vehicular safety concerns and congestion in Harlingen. In cooperation with Cameron County, UP has completed the expansion of Olmito Yard to accommodate the relocation of their current operations at Harlingen Yard to Olmito. Relocating the remaining RVSC switching operations at Harlingen Yard to a new RVSC yard location outside of Harlingen would further reduce vehicular impedance and safety concerns associated with train operations in Harlingen. Additionally, the land currently used for Harlingen Yard may be used by Cameron County or the City of Harlingen. Potential yard relocation sites have not been fully investigated, but may include a site near the intersection of US 77 and Orphanage Road to the north of the existing yard. The relocation of Harlingen Yard would require the construction of the Commerce Street connection in order to remove the old Harlingen Yard tracks. The estimated cost of the Harlingen Yard relocation is approximately $25 million.

Commerce Street Connection

The UP has completed preliminary design for a new rail connection that would eliminate the old SP Harlingen yard tracks and relocate traffic from the Harlingen Subdivision onto the Brownsville Subdivision south of the existing connection. The Commerce Street connection would require the relocation of RVSC switching operations to a new yard location in order to remove the old Harlingen Yard tracks. The estimated cost of the Harlingen Yard relocation is approximately $5.5 million.

Mission Subdivision Bypass Route
A potential new route following the UP Santa Rosa Industrial Lead from the Brownsville Subdivision to Santa Rosa and then along an abandoned corridor to Edinburg, then down to McAllen on the RVSC Edinburg Branch, would potentially eliminate freight traffic on the RVSC Mission Subdivision from McAllen to Harlingen. The possible bypass route would provide for the potential use of the Mission Subdivision for passenger rail as well as development along Business US 83. Conceptual drawings of the possible bypass route are included in Appendix D. The estimated cost of the Mission Subdivision Bypass is approximately $66.8 million.

Upgrades to Existing Structures
Upgrades to all of the structures on the Brownsville and Angleton Subdivisions, currently rated for 268,000 pound loads, to be capable of supporting 286,000 pound loads would provide significant operational benefit to the railroads operating over those lines. Upgrading the structures to 286,000 load capability would likely require replacing the existing timber bridges with concrete or steel structures. The estimated cost to replace more than 4,000 linear feet of bridges is approximately $35.7 million.

UP Harlingen Subdivision

Grade Separations

Boca Chica Boulevard/ SH 48
Boca Chica Boulevard is currently a six-lane roadway that crosses the railroad at-grade in Cameron County in Brownsville. An average daily traffic volume of 33,000 vehicles crosses the UP railroad at this location. The identified four-lane roadway overpass would separate vehicular traffic from the UP Harlingen Subdivision.

Access roadways could be provided alongside the grade separation to provide access for driveways to existing properties along Boca Chica Boulevard. The access roadways could potentially prevent the need to acquire entire properties and instead only acquire easements from each property adjacent to the grade separation. The bridge across the irrigation canal west of the at-grade crossing may need to be widened for the potential access roads adjacent to the grade separation.

The grade separation of Boca Chica Boulevard is estimated to cost $10.4 million with an estimated public benefit of $8.1 million over a twenty-year period.

15th Street/ U.S. 77
U.S. 77 is currently a six-lane roadway that crosses the railroad at-grade in Cameron County in Harlingen. An average daily traffic volume of 25,000 vehicles crosses the UP railroad at this location. The identified six-lane roadway underpass would separate vehicular traffic from the UP Harlingen Subdivision.

U.S. 77 splits north of the railroad crossing, with U.S. 77 continuing west and Morgan Boulevard continuing east. The potential grade separation would require a

reconfiguration of U.S. 77, Morgan Boulevard, and the intersection with Washington Avenue in order to maintain connectivity between the roadways. Additionally, an access road on the south side of the railroad would be required to provide access to properties adjacent to U.S. 77 on the east side of the roadway.

The grade separation of U.S. 77 is estimated to cost $10.9 million with an estimated public benefit of $5.6 million over a twenty-year period.

Rail Improvements

North Rail Relocation

The rail lines that currently run through the city of Harlingen consist of the UP Harlingen and Brownsville Subdivisions and Santa Rosa Industrial Lead as well as the RVSC. The presence of freight rail activity cause vehicular delays at the numerous at-grade crossings in the area. As a result, the City of Harlingen and Cameron County have conducted studies to analyze alternatives for a rail bypass around Harlingen. The Harlingen North Rail Relocation Study completed in 2006 identified several alternative alignments for a rail bypass to the northeast of the city. The conceptual level costs estimated for the alternatives reported in the study ranged from $70 million to $100 million. The North Rail Relocation was not modeled in the Planning Cases in this study because the project is still conceptual in nature and does not yet have a determined route, which would impact rail operations and associated public and private benefits. The bypass route would provide the potential to either eliminate or reduce vehicular impedance at several at-grade crossings in the Harlingen area. The general location of a potential bypass is shown in Appendix D.

KCS Laredo Subdivision

Grade Separations

Arkansas Avenue

Arkansas Avenue is currently a two-lane roadway that crosses the railroad at-grade in Webb County in Laredo. An average daily traffic volume of 18,600 vehicles crosses the railroad at this location. The identified two-lane roadway underpass would separate vehicular traffic from the KCS Laredo Subdivision.

The potential underpass ramps would require the closure of Rosario, Chihuahua, Guadalupe, and Laredo Streets at the intersections with Arkansas Avenue, which should cause minimal impact since each of those streets currently terminate at the railroad very shortly beyond Arkansas Avenue. Properties along Arkansas Avenue that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separation of Arkansas Avenue is estimated to cost $6.7 million with an estimated public benefit of $17.4 million over a twenty-year period.

Bartlett Avenue and Market Street (East Crossing)
Bartlett Avenue and Market Street cross the railroad at-grade in Webb County in Laredo. An average daily traffic volume of 4,000 vehicles crosses the railroad at Bartlett Avenue and 7,200 vehicles cross daily at Market Street. Market Street and Bartlett Avenue intersect immediately north of the railroad line. A grade separation of either roadway alone would require the closure of the other roadway. As a result, the identified two-lane roadway underpasses would separate vehicular traffic from the KCS Laredo Subdivision along both roadways while maintain connectivity between the two roadways.

The potential underpass ramps would require the closure of Malinche Avenue and Martin Avenue at the intersections with Market Street. Cortez Street and Rosario Street would also be closed at their intersections with Bartlett Avenue.
If grade separations are constructed at both Bartlett Avenue and Market Street, all properties adjacent to the grade separation structures would have to be purchased, since those properties would lose roadway access due to the underpass ramps.

The grade separations of Bartlett Avenue and Market Street are estimated to cost $15.2 million, with an estimated public benefit of nearly $8 million over a twenty-year period.

Corpus Christi Street
Corpus Christi Street is currently a two-lane roadway that crosses the railroad at-grade in Webb County in Laredo. An average daily traffic volume of 10,200 vehicles crosses the railroad at this location. The identified two-lane roadway overpass would separate vehicular traffic from the KCS Laredo Subdivision.

The potential overpass ramps would require the closure of Monterrey Avenue and Springfield Avenue at the intersections with Corpus Christi Street. Marcella Avenue and Sanders Avenue would continue as through streets underneath the potential overpass bridge, although they would not have any connectivity with Corpus Christi Street. Properties along Corpus Christi Street that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separation of Corpus Christi Street is estimated to cost $3.5 million with an estimated public benefit of $7.3 million over a twenty-year period.

Chihuahua and Guadalupe Streets
Chihuahua and Guadalupe Streets are one-way pairs that cross the railroad at-grade in Webb County in Laredo. A combined average daily traffic volume of 31,000 vehicles crosses the railroad at this location. The identified two-lane roadway overpasses would separate vehicular traffic from the KCS Laredo Subdivision.

The potential overpass ramps would require the closure of Maryland Avenue and Sanders Avenue at the intersections with Chihuahua Street. Marcella Avenue and Springfield Avenue would continue as through streets underneath the potential

overpass bridge, although they would not have any connectivity with Chihuahua or Guadalupe Streets.

If grade separations are constructed at both Guadalupe and Chihuahua Streets, all properties between Guadalupe Street and Chihuahua Street along Sanders Avenue and Maryland Avenue would either have to be purchased or provided with an access roadway. Additionally, properties along Chihuahua and Guadalupe Streets that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separations of Chihuahua and Guadalupe Streets are estimated to cost $10 million, including the access roads for properties between Chihuahua and Guadalupe Streets, with an estimated public benefit of $54 million over a twenty-year period.

Market Street (West Crossing)

Market Street is currently a two-lane roadway that crosses the railroad at-grade in Webb County in Laredo. An average daily traffic volume of 13,800 vehicles crosses the railroad at this location. The identified two-lane roadway underpass would separate vehicular traffic from the KCS Laredo Subdivision mainline and the adjacent spur track that leads to a rail yard.

The potential underpass ramps would require the closure of Marcella Avenue and Maryland Avenue at the intersections with Market Street. Properties along Market Street that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separation of Market Street is estimated to cost $6 million with an estimated public benefit of $10.8 over a twenty-year period.

San Diego/ Gravis Avenue/ SH 44

Gravis Avenue is currently a two-lane roadway that crosses the railroad at-grade in Duval County in the city of San Diego. An average daily traffic volume of 7,400 vehicles crosses the railroad at this location. The identified two-lane roadway underpass would separate vehicular traffic from the KCS Laredo Subdivision mainline and the adjacent spur track that leads to a rail yard.

The potential underpass ramps would require the closure of Julian, Flores, Trevino, and Tovar Streets at their intersections with Gravis Avenue. Properties along Gravis Avenue that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separation of Gravis Avenue is estimated to cost $8.5 million with an estimated public benefit of $4.5 million over a twenty-year period.

Smith Street/ SH 16

Smith Street is currently a four-lane roadway that crosses the railroad at-grade in Jim Hogg County in the city of Hebbronville. An average daily traffic volume of 9,200 vehicles crosses the railroad at this location. The identified four-lane roadway overpass would separate vehicular traffic from the KCS Laredo Subdivision.

The potential overpass ramps would require the closure of Oak Avenue at the intersection with Galbraith Street and the closure of Galbraith Street west of Smith Street. Galbraith Street east of Smith Street could be reconstructed with a ramp to intersect with the potential Smith Street intersection to maintain connectivity between the two roadways. Properties along Smith Street that would no longer have roadway access due to the potential grade separation would need to be purchased.

The grade separation of Smith Street is estimated to cost $5.1 million with an estimated public benefit of $5.6 million over a twenty-year period.

Crossing Closures

Buena Vista Street

Buena Vista Street is currently a two-lane roadway with an average daily traffic volume of 1,700 vehicles where it crosses the railroad in Laredo. Buena Vista Street provides access to and from primarily residential areas.

The vehicular traffic along Buena Vista Street could be rerouted to cross the KCS railroad tracks on the existing Meadow Avenue overpass, located west of the Buena Vista Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Buena Vista by less than one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $1 million.

Galbraith and Rigma Streets

Galbraith and Rigma Streets are two-lane residential streets with average daily traffic volumes of approximately 1,200 and less than 100 vehicles, respectively, where they cross the railroad in Hebbronville in Jim Hogg County.

The vehicular traffic along both roadways could be rerouted to cross the KCS railroad tracks on the potential Smith Street overpass identified in his study, located east of the Galbraith Street crossing. Closing the crossings would increase the travel distance to cross the railroad from each roadway by approximately 1 mile.

The crossing closures are each estimated to cost $100,000 with an estimated public benefit of $731,000 at Galbraith Street and $97,000 at Rigma Street.

Malinche Avenue

Malinche Avenue is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the railroad in Laredo. Malinche Avenue provides access to and from primarily residential areas.

The vehicular traffic along Malinche Avenue could be rerouted to cross the KCS railroad tracks on the potential Bartlett Avenue and Market Street underpasses identified in his study, located east of the Malinche Avenue crossing. Closing the crossing would increase the travel distance to cross the railroad from Malinche Avenue by less than one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $153,000.

Marcella Avenue

Marcella Avenue is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the railroad in Laredo. Marcella Avenue provides access to and from residential and commercial areas.

The vehicular traffic along Marcella Avenue could be rerouted to cross the KCS railroad tracks on the potential Guadalupe Street and Chihuahua Street overpasses identified in his study, located south of the Marcella Avenue crossing. Closing the crossing would increase the travel distance to cross the railroad from Marcella Avenue by less than one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $205,000.

Sanders Avenue

Sanders Avenue is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the railroad in Laredo. Sanders Avenue provides access to and from residential and commercial areas.

The vehicular traffic along Sanders Avenue could be rerouted to cross the KCS railroad tracks on the potential Corpus Christi, Guadalupe or Chihuahua Street overpasses identified in his study, located south of the Sanders Avenue crossing. Closing the crossing would increase the travel distance to cross the railroad from Sanders Avenue by less than one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $213,000.

Seymour Avenue and Stone Avenue

Seymour and Stone Avenues are two-lane residential streets with average daily traffic volumes of approximately 300 vehicles each where they cross the railroad in Laredo.

The vehicular traffic along both roadways could be rerouted to cross the KCS railroad tracks on the existing Meadow Avenue overpass, located east of the Seymour Avenue crossing. Closing the crossings would increase the travel distance to cross the railroad from each roadway by approximately 1 mile.

The crossing closures are each estimated to cost $100,000 with an estimated public benefit of $309,000 at Seymour Avenue and $293,000 at Stone Avenue.

Zaragoza Street

Zaragoza Street is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the UP Laredo and KCS Laredo Subdivisions in Laredo. Zaragoza Street provides access to and from residential and commercial areas.

The vehicular traffic along Zaragoza Street could be rerouted to cross the KCS and UP railroad tracks on the existing Eagle Pass Avenue overpass located south of the Zaragoza Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Zaragoza Street by less than one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $919,000.

Quiet Zones

A potential quiet zone may be implemented on the KCS Laredo Subdivision from MP 2.00 (Monterrey Avenue) to MP 5.60 (east of Loop 20) in conjunction with the potential grade separations outlined in this report including Corpus Christi Street, Guadalupe Avenue, Chihuahua Avenue, W Market Street, E Market Street, and Arkansas Avenue and the potential crossing closures including Monterrey Avenue, Sanders Avenue, Marcella Avenue, Stone Avenue, Seymour Avenue, Buena Vista Avenue, and Malinche Avenue. All remaining at-grade crossings within the limits of the quiet zone would, at a minimum, require bells, flashers, and gates as well as constant warning time devices. Additionally, supplemental safety measures may be required for at least one or more of the crossings.

Rail Improvements

Signal Improvements at Existing Sidings

Crew-activated remote control turnouts on siding switches between Robstown and Serrano Yard in Laredo would expedite train meets along the subdivision. The switches would allow trains to enter and leave the sidings more efficiently while another train passes on the mainline track. The estimated cost of the upgraded switches at the 13 sidings on the KCS Laredo Subdivision is approximately $6.4 million.

UP Laredo Subdivision

Grade Separations

Jefferson Street

Jefferson Street is currently a two-lane roadway that crosses the UP Laredo Subdivision and the City of Laredo owned Rio Grande line at-grade in a primarily industrial area of Laredo. An average daily traffic volume of 7,500 vehicles crosses the railroad at this location. The identified two-lane roadway underpass would separate vehicular traffic from the UP Laredo Subdivision. The Rio Grande Line crossing would remain at-grade due to significant additional impacts and costs that would be associated with grade separating both of the crossings. The two crossings are located too close together for two separate grade separations and a continuous overpass or underpass structure between both crossings would eliminate access to many properties. Additionally, the rail traffic volume is lower on the Rio Grande Line than the UP Laredo Subdivision and therefore would have lower public benefit associated with a grade separation.

The potential underpass would require the closure of Santa Isabel Avenue and San Ignacio Avenue at the intersections with Jefferson Street. Properties along Jefferson Street that would no longer have roadway access due to the potential grade separation would need to be purchased, since there is not right-of-way available to construct at-grade access roads alongside the grade separation. An access driveway from Santa Isabel Avenue to Jefferson Avenue would provide roadway access to properties north of Jefferson Street on the east side of the crossing.

The grade separation of Jefferson Street is estimated to cost $6.5 million with an estimated public benefit of $4.4 million over a twenty-year period.

Calton Road

Calton Road is currently a two-lane roadway that crosses the UP Laredo Subdivision and the City of Laredo owned Rio Grande line at-grade in a primarily industrial and commercial area of Laredo. An average daily traffic volume of 7,800 vehicles crosses the railroad at this location. The identified two-lane roadway underpass would separate vehicular traffic from the UP Laredo Subdivision and the Rio Grande Line. The grade separation of Calton Road includes underpass ramps on Santa Maria Avenue in order to maintain connectivity between the two roadways.

The potential underpass would require the closure of Modern Lane at the intersection with Calton Road. Properties along Calton Road that would no longer have roadway access due to the potential grade separation would need to be purchased, since there is not right-of-way available to construct at-grade access roads alongside the grade separation. An access driveway could provide roadway access to properties north of Calton Road on the east side of the crossing.

The grade separation of Calton Road is estimated to cost $15.2 million with an estimated public benefit of $7.7 million over a twenty-year period.

Crossing Closures

Sanchez Street

Sanchez Street is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the UP Laredo Subdivision and the City of Laredo owned Rio Grande line in Laredo. Sanchez Street provides access to and from primarily residential areas as well as commercial properties along the rail lines. The potential crossing closure identified in this study would close Sanchez Street at the crossing with the UP Laredo Subdivision, although the crossing with the Rio Grande line would remain open to maintain access for properties located between the two rail lines. Closing the crossing at the UP Laredo Subdivision would eliminate use of Sanchez Street as a through street and would reduce the daily vehicular traffic using the street significantly.

The vehicular traffic along Sanchez Street could be rerouted to cross the UP railroad tracks on the potential Jefferson Street underpass identified in this study, located north of the Sanchez Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Sanchez Street by approximately 1.7 miles.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $1.1 million.

Baltimore Street

Baltimore Street is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the UP Laredo Subdivision and the City of Laredo owned Rio Grande line in Laredo. Baltimore Street provides access to and from primarily residential areas. The potential crossing closure identified in this study would close Baltimore Street at the crossing with the UP Laredo Subdivision, although the crossing with the Rio Grande line would remain open to maintain access for properties located between the two rail lines. Closing the crossing at the UP Laredo Subdivision would eliminate use of Baltimore Street as a through street and would reduce the daily vehicular traffic using the street significantly.

The vehicular traffic along Baltimore Street could be rerouted to cross the UP railroad tracks on the existing Lafayette Street grade separation, located south of the Baltimore Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Baltimore Street by approximately one mile.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $636,000.

Zaragoza Street

The potential Zaragoza Street crossing closure is discussed in the improvements for the KCS Laredo Subdivsion, since the crossing closure includes both the KCS Laredo and the UP Laredo Subdivisions.

Gonzalez Street

Gonzalez Street is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the UP Laredo Subdivision and the City of Laredo owned Rio Grande line in Laredo. Gonzalez Street provides access to and from industrial properties in between the two rail lines as well as residential areas east of the rail lines. The potential crossing closure identified in this study would close Gonzalez Street at the crossing with the UP Laredo Subdivision, although the crossing with the Rio Grande line would remain open to maintain access for properties located between the two rail lines. Closing the crossing at the UP Laredo Subdivision would eliminate use of Gonzalez Street as a through street and would significantly reduce the daily vehicular traffic using the street.

The vehicular traffic along Gonzalez Street could be rerouted to cross the UP railroad tracks on the potential Jefferson Street underpass identified in this study, located north of the Gonzalez Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Gonzalez Street by approximately 1.3 miles.

The crossing closure is estimated to cost $100,000 with an estimated public benefit of $362,000.

Scott Street

Scott Street is currently a two-lane roadway with an average daily traffic volume of approximately 300 vehicles where it crosses the UP Laredo Subdivision in Laredo. Scott Street provides access to and from primarily industrial properties on each side of the railroad.

The vehicular traffic along Scott Street could be rerouted to cross the railroad tracks on the existing Washington Street grade separation, located south of the Scott Street crossing. Closing the crossing would increase the travel distance to cross the railroad from Baltimore Street by approximately one mile. The crossing closure is estimated to cost $100,000 with an estimated public benefit of $196,000.

Quiet Zones

A potential quiet zone may be implemented on the UP Laredo Subdivision from the Rio Grande to MP 408.00 (north of Industrial Boulevard) in conjunction with the potential grade separations outlined in this report including Jefferson Street and Calton Road and the potential crossing closures including Zaragosa Street, Sanchez Street, Scott Street, and Baltimore Street. All remaining at-grade crossings would, at a minimum, require bells, flashers, and gates as well as constant warning time devices. Additionally, supplemental safety measures may be required for at least one or more of the crossings.

Rail Improvements

Siding Extensions and New Sidings

Rail operations modeling results show that a new 9,000-foot siding at Artesia Wells would be needed to accommodate 10 year growth projections. Additionally, new 9,000-foot sidings at Armour, located between Yarbrough and Melon, and at Dilley, located between Melon and Gardendale, would be needed to accommodate 20 year growth projections. The sidings at Armour and Dilley are outside of the study area; however, they significantly impact capacity on the UP Laredo Subdivision and therefore the study area. Additional siding extensions at Finley and Callaghan, a yard lead extension at Laredo, and a new siding at Natalia would be needed to accommodate 20 to 30 year growth projections based on the RTC modeling results.

The costs of each potential siding extension and new siding are shown in Table 2, with a total combined cost of approximately $29.4 million.

Subdivision	Rail Improvement	Estimated Cost	Estimated Timeframe
UP Laredo	New Sidings at Armour and Dilley	$10,800,000	Near-Term
UP Laredo	New Sidings at Artesia Wells	$5,500,000	Mid-Range
UP Laredo	Siding extensions at Finley, Callaghan	$1,970,000	Long-Term
UP Laredo	Yard lead extension at Laredo	$3,610,000	Long-Term
UP Laredo	New siding at Natalia	$7,495,000	Long-Term

Table 2: Potential Siding Extension Improvements on Laredo Subdivision