
# South Orient Railroad (SORR) Rehabilitation & Presidio-Ojinaga International Bridge Reconstruction Project

Presidio County, Texas

TIGER FY16 Grant Application

April 2016

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## Appendices

# i. PROJECT DESCRIPTION

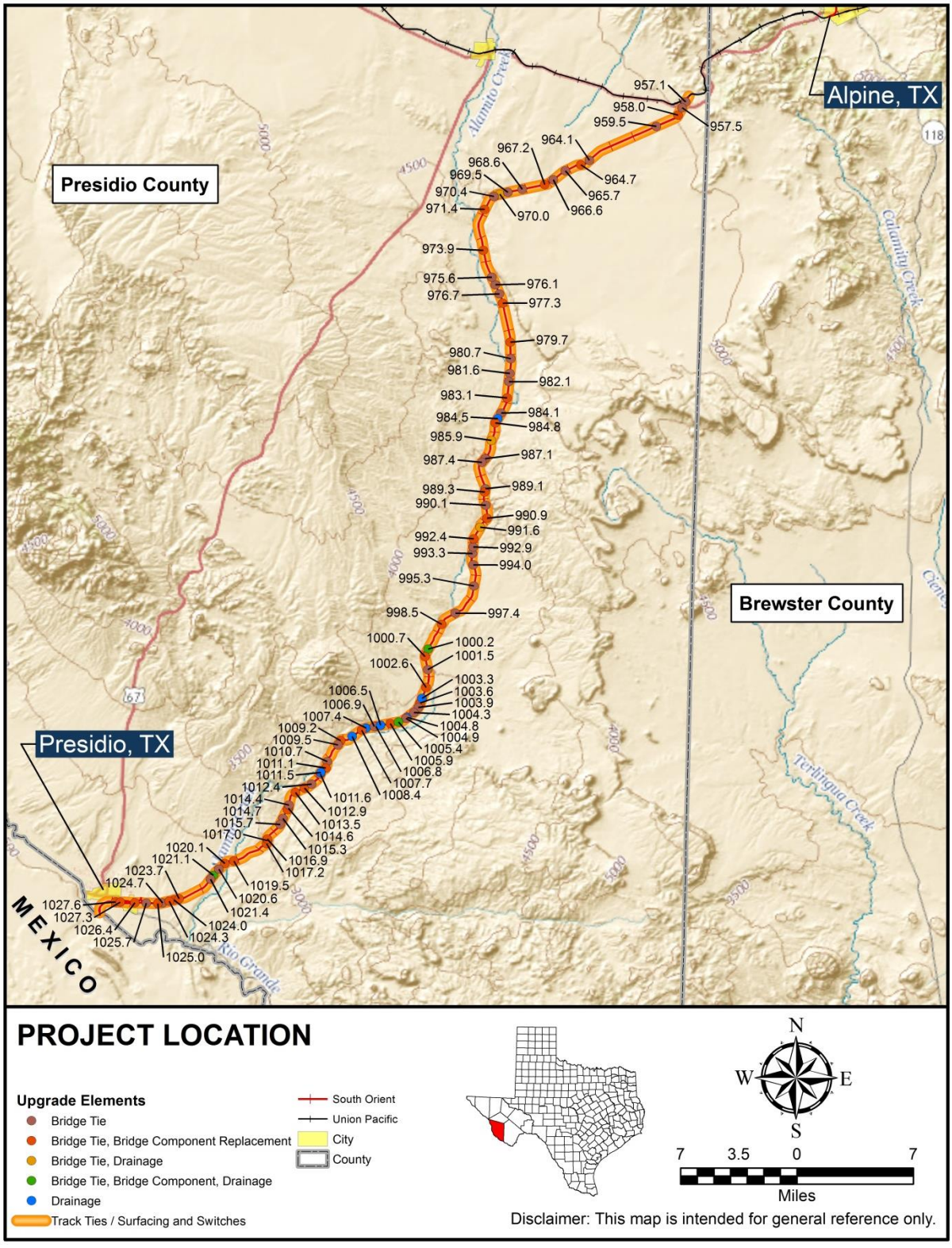
## a. ELIGIBILITY

The Texas Department of Transportation (TxDOT) South Orient Railroad (SORR) Bridge project includes the construction and reestablishment of a border crossing from Ojinaga, Mexico to Presidio, Texas. The project would also include track tie and surfacing, switch replacement, timber bridge component replacements, and drainage improvements along the existing line from the new international rail bridge north to the Union Pacific Railroad (UPRR) crossing near Paisano Junction, Texas for approximately 72 miles in total, as shown in Figure 1.

The total estimated project cost is $16.2 million. The State of Texas partnered with the Texas Pacifico Transportation Company (TXPF), Ltd. who currently leases the rail line from TxDOT. TXPF has agreed to provide 57 percent of the necessary funding ($9.2 million) for the United States (U.S.) portion of the SORR Bridge reconstruction over the Rio Grande River. TxDOT is requesting the remainder of the costs, $7 million, for railroad improvements and upgrades from the Transportation Investment Generating Economic Recovery (TIGER) Discretionary grant funds.

The project will foster the creation of high-paying jobs in a region with relatively high unemployment rates and will improve safety and environmental impact by removing truck traffic from local rural roads.

**Figure 1: Project Location Map**



## b. DETAILED PROJECT DESCRIPTION

In 1991, prior to the signing of the North American Free Trade Agreement (NAFTA), the Atchison, Topeka and Santa Fe Railway (ATSF) filed to abandon the South Orient rail line. The abandonment was proposed because there was very little local or international rail freight pre-NAFTA, and the South Orient rail line was in poor condition due to deferred maintenance. Attempts to foster international traffic over the line were largely unsuccessful due to the condition of the line and the reduced operating speed limit (10 miles per hour), rendering the rail line to be non-competitive with trucks. The State of Texas partnered with private investors to acquire the line from ATSF and prevented its abandonment. The investors formed the South Orient Railroad Company (SORC) to operate the line, but SORC was also unable to realize an operational profit and subsequently sold its interest in the SORR to the state in 2001. TxDOT then leased operations on the line to a subsidiary of Grupo Mexico, Texas Pacifico Transportation, Ltd, a short line railroad which was formed to operate the SORR. Grupo Mexico is also the majority owner of Ferromex, the largest railroad in Mexico which also connects to the SORR at the border.

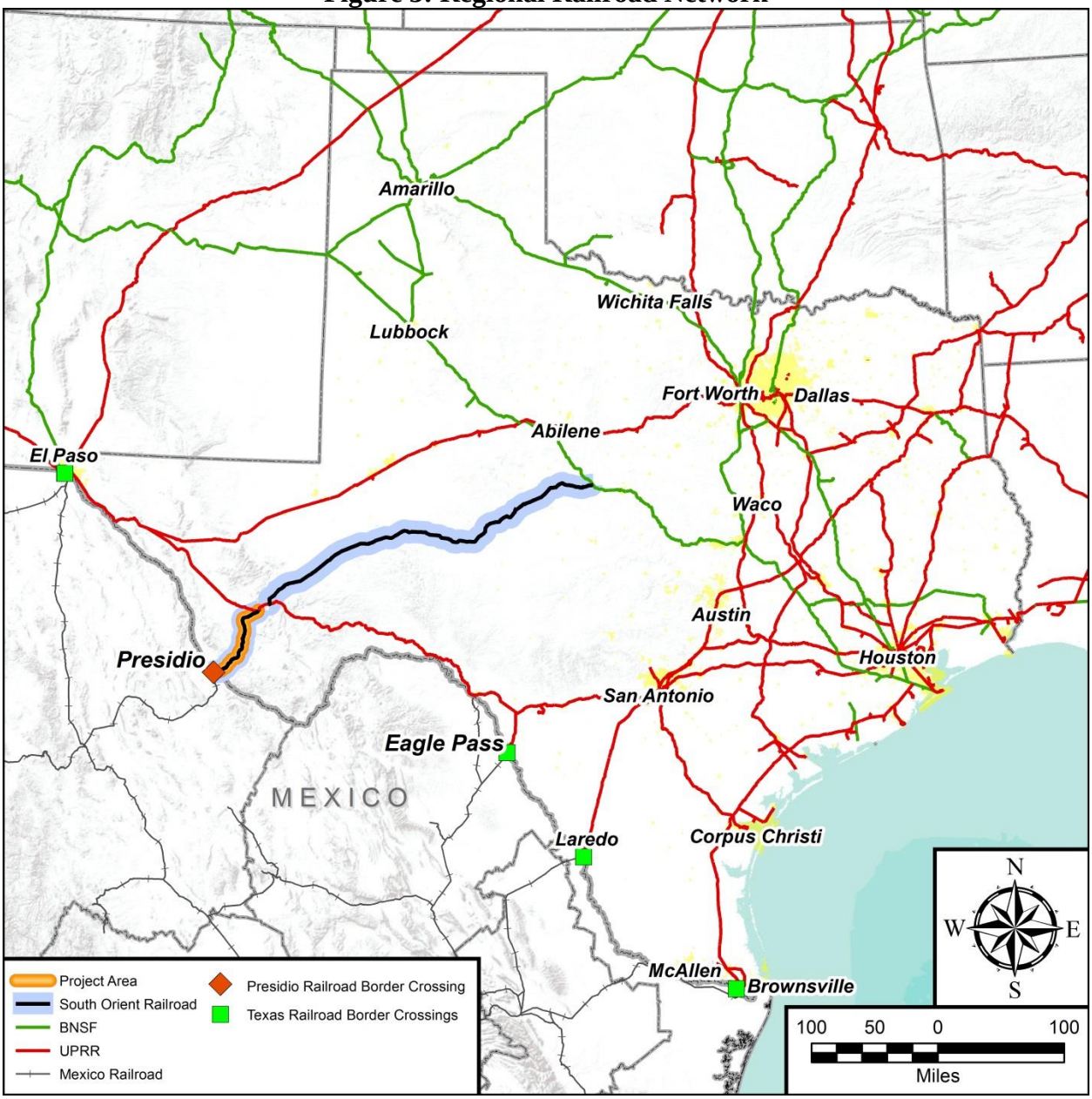
**Figure 2: Existing SORR Bridge**

In February 2008, the SORR International Rail Bridge burned to the ground south of a levee on the U.S. side. This event severed one of eight rail crossings between the U.S. and Mexico and one of five rail crossings in the state of Texas. The remnants of the bridge are pictured in Figure 2. Since then, TxDOT has been working with TXPF to rehabilitate the line, starting at the eastern end where industries currently supporting the railroad are located. TxDOT has invested over $34 million in rehabilitation projects from San Angelo Junction to Mertzon, Texas, a total distance of over 100 miles. TXPF has invested approximately $35.8 million in rehabilitation and capacity expansion between 2002 and 2015.[1]

In total, the SORR extends approximately 391 miles in length from San Angelo Junction to Presidio at the U.S./Mexico border as shown in Figure 3. Rehabilitation of the eastern end of the line has resulted in improved operations and safety along with an increase in freight traffic; with annual carloads interchanged rising from an average of approximately 2,000 pre-rehabilitation to over 25,000 in 2015.

[1] The Feasibility of Selling the South Orient Railroad, TxDOT, February 2009; Texas Pacifico Rail Line investments, July 2015.

**Figure 3: Regional Railroad Network**




The proposed project includes the reconstruction of the Presidio-Ojinaga International Rail Bridge and the rehabilitation of approximately 72 miles of railroad from the U.S./Mexico border (Railroad Mile Post 1029) to Alpine, Texas (Railroad Mile Post 956.7). Rehabilitation will include track, bridge and drainage improvements from the new international rail bridge north to the UPRR main line at the Paisano Junction (located 11 miles west of Alpine, Texas). There are multiple track, bridge, and drainage issues that need addressed in this segment of track, such as the failed timber box culvert that has eroded on the outlet shown in Figure 4.

Proposed funding for the project has been identified through a public-private sector partnership between the State of Texas, which is seeking federal TIGER Discretionary grant funds, and TXPF. With federal funding support, the SORR will continue to serve the strategically located

Port of Entry (POE) in Presidio, Texas that has local, national, and international significance and makes broad economic contributions to the region.

**Figure 4: Existing SORR Culvert**

Proposed improvements to the SORR will have a significant impact at a regional level in terms of reducing energy producer input prices in the Permian Basin and potentially increasing shipments of grain, automobile parts and other commodities.[2] At a national level, this project will support energy independence as well as enable the future potential to export goods between the U.S. and Mexico. Additionally, the potential for commencing Mexican oil/gas exploration activities could result in an increase in the U.S. export of drilling materials and frac sand to Mexico. This heavy freight would be ideal for transport by rail.

The project will also foster the creation of additional high-paying jobs in the region in the industries of oil and gas extraction, engineering, and construction positions, creating ladders of opportunity and financial security for many who would otherwise be under- or un-employed. The project will provide the following benefits:

- increased allowable train speeds from 10 mph to 25 mph;
- better use of multimodal connections;
- avoidance of heavy trucks using the highway system;
- reduction in transportation costs; and
- job creation.

The SORR rehabilitation and international bridge reconstruction project is strongly supported by Texas' Congressmen and State Legislators from the region as well as TxDOT, TXPF, Fort Stockton Economic Development Corporation, and other state, and local stakeholders.

The benefits of rehabilitating the SORR between Presidio and Paisano Junction and reconstruction the Presidio-Ojinaga International Bridge exceed $140 million over 20 years, with a benefit–cost ratio (BCR) of 9.38 to 1.[3] The project will create 21 job years during the 10-month construction phase. Safety benefits are also anticipated with the project as the proposed improvements would allow freight from road to divert to rail; resulting in fewer trucks on the highway network which results in an increase in safety.[4] The avoided truck use in favor of rail results in accident cost savings of over $34 million through the study period (2016$, 7% discount rate). In addition to the freight by road diversion, rail is the safest way to transport hazardous materials, with 99.99 percent of shipments arriving at their destination safely.

[2] Potential Economic Impacts of an Improved South Orient Railroad. TxDOT. December 30, 2007.
[3] The listed benefit number and BC ratio is discounted to 7% and is in 2016$.
[4] Fatality and injury rates per mile of freight carried by truck are greater than the fatality and injury rates for an equal volume of cargo when shipped by rail.

The Categorical Exclusion (CE) for the proposed reconstruction of the U.S. portion of the Presidio International Rail Bridge is anticipated within six months. Because the project crosses the Rio Grande, identified as a navigable water, a U.S. Coast Guard (USCG) Section 9 permit and a U.S. Army Corps of Engineers (USACE) Section 10 permit will be required. TxDOT has begun the application process for both permits, and they are anticipated to be approved in January 2017. The track, bridge, and drainage improvements along the existing rail line from the new bridge north to the UPRR crossing near Alpine would not result in any significant environmental impacts and would take place fully within the existing freight SORR rail right of way (ROW).

Once the environmental clearance and final design are complete, the project will be procured and awarded. This will be a five-month process with the project's anticipated letting date in August 2017.Construction is anticipated to begin one month later. This date is two years prior to the required obligation date of September 2019. Construction is expected to last 10 months and will be complete in May 2018.

### c. USE OF TIGER FUNDS

The requested $7 million of TIGER Discretionary funding is needed to enable completion of the full scope of this project. Currently, the approximately 72-mile section of the SORR between the U.S./Mexico border and the Paisano Junction is classified as FRA Excepted Track[5] and limited to operating speeds of 10 mph. If rehabilitation funding is not provided, this section of the line is expected to become inoperable within 5 to 10 years, threatening future transportation network efficiency, freight mobility, energy development, and economic growth. The TIGER Discretionary funds will be used to upgrade the 72-mile section to Class 2 standards, which would allow operating speeds to increase to 25 mph. These rail improvements would increase the capacity of the SORR and allow for continued transport of goods on rail rather than increasing freight truck movements in the region. In addition, the rail improvements to Class 2 standards would promote growth of rail freight transport in southwestern Texas, between the U.S. and Mexico, and nationally through the SORR's connectivity to BNSF and UPRR.

### d. EXPECTED PROJECT USERS

Once completed, the SORR bridge and rail line improvement project will be utilized by:

- TXPF and its existing freight rail customers,
- future customers attracted by the capital improvements to the line and resource development in the area, and
- the traveling public using the roadway-rail crossings.

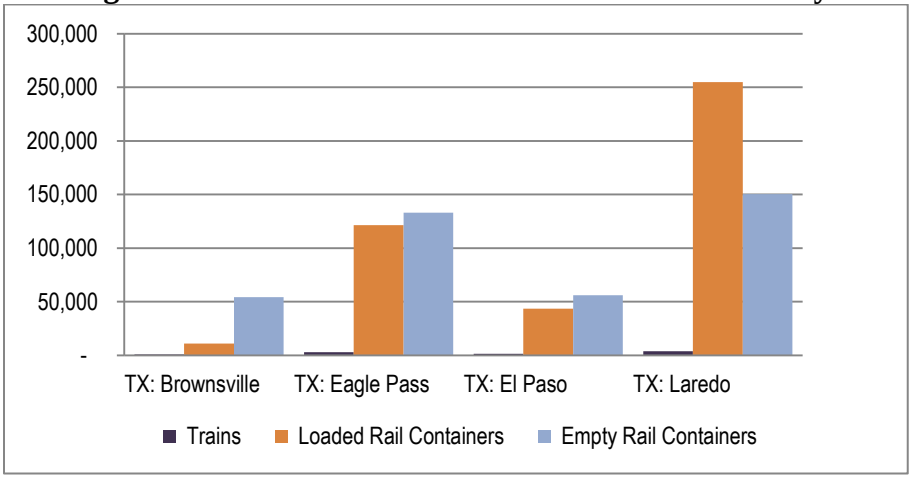
This project will have a significant impact at a regional level in terms of reduced transportation prices in the Permian Basin and potential for providing increased shipments of grain, automobile parts and other commodities.[6]

Figure 5 illustrates the 2014 annual number of trains and empty/loaded rail containers moving through the Texas POEs with rail access. The proposed SORR improvements would provide an

[5] Federal Railroad Administration (FRA) Excepted Track status regulations limit this segment of the line to 10 mph, restrict hazardous materials to 5 cars per train, and prohibit the movement of occupied passenger cars.
[6] Potential Economic Impacts of an Improved South Orient Railroad. TxDOT. December 30, 2007.

additional U.S./Mexico rail crossing in Texas between El Paso and Eagle Pass. This section of the SORR would have direct connectivity to BNSF and Union Pacific rail lines in the U.S., and Ferromex in Mexico, as shown in Figure 3. Figure 3 also illustrates the potential connectivity in this region of Texas, with the closest connection at Paisano Junction and the central Texas connection at San Angelo Junction.

**Figure 5: 2014 Rail Movements in Texas Ports of Entry**[7]



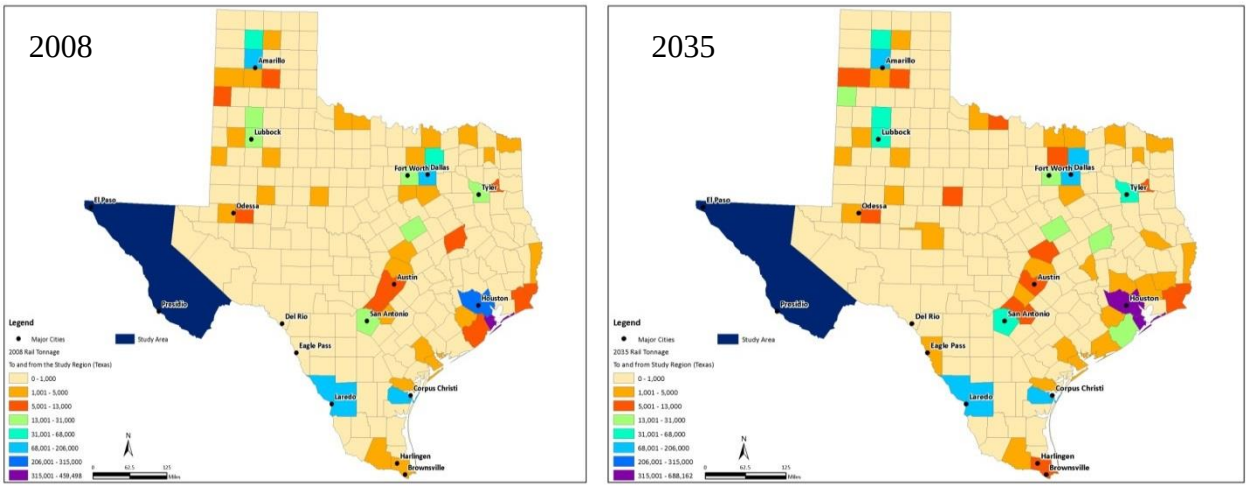

### e. TRANSPORTATION CHALLENGES

The Texas border between Eagle Pass and El Paso is lacking an international rail border crossing and functional railroad, resulting in increased freight truck volumes. Without needed improvements, the SORR between the U.S./Mexico border and the Paisano Junction is expected to become inoperable within 5 to 10 years. Decreased ability to ship by rail will result in further increases in freight truck movements, leading to the need for increased road maintenance, decreased safety and the potential for environmental externalities. This region supports transport of materials needed to develop the Permian Basin and crude oil outputs and also could support new exports including wheat and frac sand to Mexico.

As shown in Figure 6, the project area supports rail movements across the state of Texas and is anticipated to grow by 2035. The project provides international rail connectivity to significant areas of growth that are centered near major metropolitan regions including Dallas, Fort Worth, and Houston.

[7] U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S.

**Figure 6: 2008 and 2035 Rail Movements within Texas To and From the Study Region**




As noted in the Texas A&M Transportation Institute's (TTI) *Potential Impacts of Mexico's Energy Reform on the Texas Transportation System,* three key vulnerabilities of the Texas transportation network were identified, and all three were related to the State's rail network:

- The shortage of refineries and absence of pipelines in the Burgos Basin will lead to an increase in use of railways for the transportation of crude oil from Mexico to refineries on the U.S. Gulf Coast.
- Rail border crossings will also be affected, as currently there are capacity constraints at the few existing rail crossings in the region.
- The frac sand coming from the Midwest by rail to areas like the Eagle Ford and Permian Basin, as well as to Texas' ports, is likely to be extended toward the Mexican side of these shale reserves. Rail volumes through Texas could potentially increase.[8]

**Frac Sand**

A key input to well production using hydraulic fracturing is 'frac sand'. Each new well development requires the equivalent of 15-30 train car loads of frac sand, the equivalent of 60 – 120 truckloads. It is estimated that in the U.S., energy companies are expected to use more than 56 billion pounds of sand this year. Efficient and cost effective access to frac sand supplies is critical to the success of crude production activities. The frac sand originates from sites that are long distances away and therefore is most efficiently transported by rail.

### f. LADDERS OF OPPORTUNITY

The SORR International Rail Bridge and proposed rail improvements will create economic ladders of opportunity by bringing additional jobs and businesses to the area as a result of the improved connectivity of the regional freight rail transportation system serving the energy

[8] *Potential Impacts of Mexico's Energy Reform on the Texas Transportation System,* TTI. http://tti.tamu.edu/policy/wp-content/uploads/2014/12/Mexico-Energy-Policy-Brief-final.pdf

industry and support services. This project will promote the creation of additional high-paying oil and gas extraction jobs in the region. The national average oil and gas extraction job pays a salary of $89,060 compared with the national mean wage for all occupations of $48,320[9]. The median household income in Presidio County is $30,983[10], while the unemployment rate is at 10 percent. This economically disadvantaged area would benefit from these high-paying jobs which would provide financial security for many who would otherwise be working in lower paying jobs or unemployed.

In addition to the high-paying oil and gas extraction jobs, this project will create 21construction jobs in the short-term during the design and construction period. Short-term jobs for many may be considered a ladder of opportunity to gain working experience allowing for further long-term job prospects. It is estimated that the construction of the Presidio-Ojinaga International Bridge and the rehabilitation of the SORR between Presidio and Alpine will provide opportunity for 21 short-term jobs during the 10 month construction period.

## ii. PROJECT LOCATION

Located in central and west Texas, the SORR extends approximately 391 miles from San Angelo Junction near Coleman, Texas through the San Angelo and Fort Stockton, as well as several smaller cities, to Presidio, Texas located along the U.S./Mexico border. The SORR interchanges with BNSF and Fort Worth and Western Railway at San Angelo Junction, UPRR southwest of Alpine, and, until 2008/2009 when two separate fires burned the Presidio-Ojinaga International Bridge, with Ferrocarril Mexicano (Ferromex) at the border in Presidio. The Presidio border crossing is one of five rail crossings in Texas and one of only eight along the entire U.S./Mexico border. According to a recent Government Accountability Office report[11], rail border crossings currently fall short of maximum efficiency due to crew change points, inspections, conflicting freight rail movements, highway-rail grade crossing conflicts, and community impacts. There would be no conflicting freight rail movements at this location and the additional border crossing capacity could provide some relief for other rail border crossing locations.

Though the portion of the line from San Angelo Junction to Alpine is currently active track, the bulk of the activity is between San Angelo Junction to Fort Stockton. This section of line crosses the southern portion of the Permian Basin which according to the Energy Information Agency "is the nation's most prolific oil producing area". This region produced 1,350,000 barrels per day in 2013, accounting for 18 percent of the nation's total production for the year.[12] This route plays an important role for the southern Permian Basin by transporting frac sand and equipment into the region and hauling crude oil out of the region, thus removing a portion of the commercial truck traffic from an already overwhelmed rural highway network.

Extending through one of the least inhabited areas of the state, the 72-mile project area includes the section of the SORR from west of Alpine to Presidio, including the rail border crossing bridge. Upon completion of the project, the SORR will once again connect with Mexico and

[9] U.S. Bureau of Labor Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates
[10] U.S. Census Bureau, 2014 American Community Survey 5-Year Estimates
[11] U.S Border Communities: Ongoing DOT Efforts Could Help Address Impacts of International Freight Rail, Government Accounting Office, January 2016.
[12] https://www.eia.gov/todayinenergy/detail.cfm?id=17031

provide an additional international crossing to facilitate international trade and alleviate some congestion at other crossings.

## iii. PROJECT PARTIES

The SORR is owned by TxDOT on behalf of the State of Texas. TxDOT has a workforce of more than 12,000 employees and is headquartered in Austin, Texas. TxDOT has vast experience managing federal and state infrastructure projects including successfully completing many rail rehabilitation and construction projects. TxDOT is a cooperating agency with the Federal Railroad Administration (FRA) and is currently managing significant federally-funded rail projects, such as Dallas to Houston High Speed Rail Preliminary Engineering & Environmental project, the Texas to Oklahoma Passenger Rail Study, and provided oversight of the recently completed, highly successful Tower 55 Multimodal Improvement Project. TxDOT is also working with FRA to take a more active role in administering the Railroad Relocation & Improvement Funding program and will be a cooperating lead agency in those efforts. TxDOT's experienced Rail Division staff will provide effective and efficient oversight and management of this grant.

TxDOT has leased operations on the SORR line to TXPF and, under the terms of the agreement, TxDOT became the permanent owner of the ROW and infrastructure. TXPF obtained a 40-year operating lease with renewal options. TxDOT has invested approximately $34 million in rehabilitation projects and TXPF has invested approximately $35.8 million in rehabilitation and capacity projects to keep the line operable and functional at 25 mph. TxDOT completed the rehabilitation of the line from San Angelo east toward Coleman through several rehabilitation projects including:

- 84,197 cross ties replaced
- 965 switch ties replaced
- 52,751 feet of rail replaced
- 69,290 tons of ballast installed
- 119 grade crossings reconstructed
- 3 bridge replacements
- Repairs to 29 additional bridges
- 8 grade crossing signals upgraded
- Repairs to 35 switches
- Additional interchange track at San Angelo Junction

These projects were completed using a combination of federal American Recovery and Reinvestment Act of 2009 (ARRA) funds, FRA grants, and State, TXPF, and City of San Angelo contributions. These projects have enabled 25 mph speeds from San Angelo Junction (near Coleman) to Sulphur Junction (11 miles east of Fort Stockton).

TxDOT's ownership of the line, the lease to TXPF, and their joint efforts to rehabilitate the line make this project a true public-private partnership. The requested TIGER Discretionary grant funds will enable a key segment of the SORR to reach operating parameters necessary to enable large volume increases,- to access the UPRR in Alpine, and allow trade with Mexico on the railroad to resume. This volume (and associated earnings) will further enable the partners to invest in future improvements eventually reaching a full rehabilitation of the SORR.

## iv. Grant Funds and Sources/ Uses of Project Funds

TxDOT is prohibited by state statute from using fuel-tax revenues for non-highway projects, severely restricting the funds available for rail projects. TxDOT and TXPF have used all resources allocated to-date to complete the rehabilitation of the line from San Angelo Junction to Sulphur Junction and do not have adequate rehabilitation funds remaining for the proposed project. The TIGER grant matching funds will be provided by TXPF for the reconstruction of the SORR international rail bridge over the Rio Grande, which reestablishes connectivity between the U.S. and Mexico in this region of Texas.

TxDOT and TXPF have funded the cost of developing plans, specifications, estimates, and environmental clearances for the project. The construction and project management costs would be funded by the $7 million TIGER Discretionary grant funds with a 56.9 percent match ($9,244,572) from TXPF for the construction of the international rail bridge over the Rio Grande River. Any cost overruns would be paid by TXPF. The funding sources are shown in Table 1, and the uses and sources of the funds are shown in Table 2.

**Table 1: Project Funding Sources, 2016$ Millions**

| Funding Sources | Participation | Total |
|---|---|---|
| TXPF | 56.9% | $9.2 |
| TIGER | 43.1% | $7.0 |
| Total | 100% | $16.2 |

**Table 2: Project Funding and Component Splits**

| Project Component | Component Cost | Component % | Funding Source | |
|---|---|---|---|---|
| | | | TIGER | TXPF (match) |
| International Bridge Replacement | $7,703,810 | 48% | $0 | $7,703,810 |
| Track Tie, Surfacing, and Switches | $4,030,710 | 25% | $4,030,710 | $0 |
| Bridge Component Replacements | $380,520 | 2% | $380,520 | $0 |
| Bridge Tie Replacements | $536,450 | 3% | $536,450 | $0 |
| Drainage Improvements | $1,503,850 | 9% | $1,503,850 | $0 |
| Contingency | $2,089,232 | 13% | $548,470 | $1,570,762 |
| TOTAL | $16,244,572 | 100% | $7,000,000 | $9,244,572 |
| Percentage of Project | | 100% | 43.1% | 56.9% |

### a. PREVIOUS FEDERAL FUNDING REQUESTS

Previous TIGER Requests

TxDOT has applied for previous TIGER funding in past years for other SORR, as listed below. This project has not been submitted before. No federal funds have been awarded to the other projects to date.

- TIGER FY 2012
- TIGER FY 2013
- TIGER FY 2014

Other Previous Federal Funding Requests

In the spring of 2005, TxDOT received $5.5 million in federal funds to assist with the on-going rehabilitation of the rail line. TxDOT contracted to install a total of 37,125 new crossties in the line, 93 percent of which were installed from near Alpine to Presidio. Other rehabilitation improvements and enhancements were made to the railroad in Fort Stockton to allow for the city's economic development.

In the spring of 2009, the Texas Transportation Commission approved $14.01 million in ARRA funding for the rehabilitation of the line. These funds were used to complete the rehabilitation of the line from San Angelo Junction to Sulphur Junction (Mile Post 869.3).[13]

The 2010 Federal Omnibus Act included $1 million for the rehabilitation of grade crossings in San Angelo and $1 million for the rehabilitation of the line from San Angelo west toward Fort Stockton.

### b. PROJECT COMPLIANCE FUNDING COMMITMENTS

TXPF issued a letter of commitment to provide the $9 million in matching TIGER Discretionary grant funds to be used for the reconstruction of the Presidio-Ojinaga International Bridge and Alpine to Presidio track rehabilitation project. The letter is in included in Appendix A: Letters of Support.

## v. SELECTION CRITERIA

### a. PRIMARY SELECTION CRITERIA

#### State of Good Repair

The rehabilitation of the line using TIGER Discretionary grant funds will improve the condition of an existing rail transportation system from the Presidio-Ojinaga International Bridge north to the UPRR crossing near Paisano Junction, The project will minimize life-cycle costs by bringing the SORR into a state of good repair and maintaining it in that condition beyond the expected lifespan of the materials used in the rehabilitation project. The line will remain in the rehabilitated condition because TXPF is contractually obligated to maintain any segment of the SORR that is rehabilitated by TxDOT in the same or better condition as when the project is completed. TXPF's contractual obligations have eliminated any future maintenance or

[13] http://ftp.dot.state.tx.us/pub/txdot-info/rail/south_orient/facts.pdf

rehabilitation requirements by the state for track infrastructure or the local communities for grade crossing surface conditions.

According to the Association of American Railroads (AAR), the average train speed of the Class 1 railroad is between 23 and 25 mph. The rehabilitation elements proposed as part of this project are appropriate for improving track speed within the project limits to 25 mph. This will result in an efficient, effective, and safe rail service in the region and provide for an ongoing state of good repair. This level of investment is adequate for existing and projected needs without "over investment" in unnecessary higher speeds.

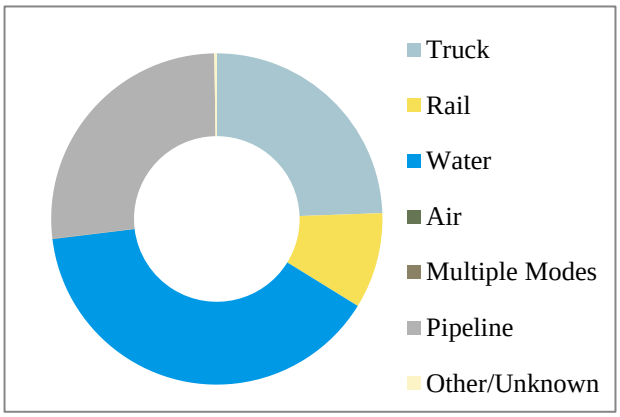
If the international rail bridge and the segment of the SORR between the border and Paisano Junction are not reinstated or rehabilitated, this line will continue to be inoperable, providing no opportunity for rail growth the future exporting of frac sand and other critical exports. Large trucks will continue to dominate the export markets, as shown in Figure 7, as the existing shippers will continue to be forced to divert their rail freight to roadways.

The project is projected to divert approximately 204 million truck miles to train miles over the next 20 year period. This diversion of heavy trucks on the highway system reduces highway maintenance costs and in particular pavement re-surfacing and maintenance costs. Over the study period, over $17 million in highway maintenance costs are avoided (2016$, 7% discount rate).

### Economic Competiveness

The expenditure of $7 million for freight rail infrastructure rehabilitation and an additional $9.2 million for the reconstruction of the Presidio-Ojinaga International Bridge will result in shipping cost savings of over $86 million (2016$, 7%). In the short-term, the project will provide for 21 jobs during the construction period.

**Figure 7: 2015 Texas Exports to Mexico by Mode**




Source: Center for Transportation Analysis, http://faf.ornl.gov/fafweb/Extraction4.aspx

### Texas Trade and National Economic Competiveness


Texas is the U.S. state that trades most with its southern neighbor. It is uniquely positioned to take advantage of trade with Mexico because the two share a 1,200-mile border. As a result, Texas and Mexico are able to exchange a significant portion of their goods via relatively inexpensive surface modes such as truck and rail.

Of the $236 billion of goods that the U.S. exported to Mexico in 2015, nearly $94.5 billion were produced in Texas (according to the U.S. Census Bureau), which accounted for approximately 38% of the state's total exports. In fact, the state's growing exports to both Mexico and Canada have greatly contributed to making it the largest exporting state in the U.S., with $251 billion (approximately 16.7% of total U.S. exports) in 2015. According to the U.S. Department of Commerce, Texas has had 93% export growth to NAFTA Partners since 2005. An improved SORR would be very well positioned to facilitate such cross-border trade.

The project will improve the long-term efficiency, reliability, and cost-competitiveness of freight movements to and from this region by providing a safe, efficient, and truck-competitive rail line with national linkages. The rehabilitated SORR will increase the efficiency and effectiveness of the existing multi-modal transportation system as a whole by reestablishing the ability for freight rail to travel between the U.S. and Mexico at this location. With the rail line improvements, freight rail will have connectivity to national rail lines such as BNSF and UPRR and also connectivity to the Fort Stockton region where it can be trans-loaded to trucks for delivery to local destinations. At the U.S./Mexico border, with the reinstatement of the railroad bridge, the SORR would directly connect to the Ferromex railroad.

Additionally, at Paisano Junction, the roadway network includes U.S. Highway (US) 90 and US 67 along with other regional and local roads such as Farm-to-Market (FM) 118 and FM 17. In Fort Stockton, via US 67, the roadway network includes Interstate 10 (I-10), US 285, US 385, State Highway (SH) 18, and other regional and local roads such as FM 1053 and FM 1776. These roadways provide an extensive distribution system for rail freight that is being shipped to the region and trans-loaded at Fort Stockton.

The demand for frac sand in Mexico is growing with fracking expected to increase in Mexico[14] and a bulk of Mexico's shale prospects located in the northeastern sections of the country where infrastructure is largely undeveloped[15]. Due to the expected increase in investments for exploration and production of Mexico's shale reserves that are located south of the Rio Grande River (Figure 8), the hydraulic fracturing boom along the Eagle Ford in Texas will likely expand south. The potential influx of investment from foreign companies in the Sabinas and Burgos Basins can have strong implications on Texas' transportation system.

**Figure 8: Mexican Oil Reserves**


During the oil/gas well development stage, it is expected that the number of oversize/overweight loads using the Texas transportation system and crossing the Texas/Mexico border will increase in the short term. Steel pipes may be shipped via rail or truck across the border from manufacturing facilities.

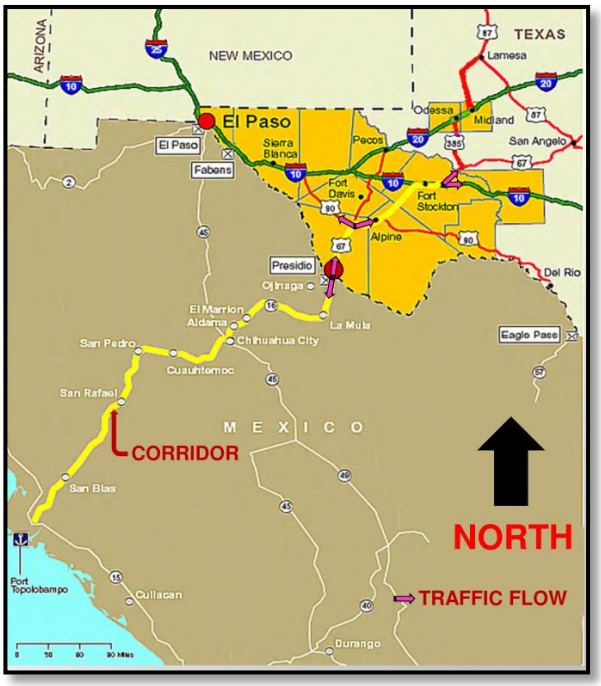
The frac sand needed for hydraulic fracturing originates from the Midwestern U.S., parts of Canada, and Brazil. As Mexico has no local sources for frac sand, it is anticipated frac sand would be exported to Mexico from Texas' deep water ports and transported to this Mexican region by rail or truck, resulting in impacts to Texas ports, highway, and rail networks.

[14] http://www.forbes.com/sites/greatspeculations/2014/08/26/union-pacific-may-benefit-from-mexico-energy-reform/#d4817296253a

[15] http://www.aiche.org/chenected/2016/01/mexicos-huge-untouched-shale-oil-fields-lure-wildcatters-and-criminals

Given the shortage of Mexican refineries and pipelines in the area, it is likely that most of the extracted oil will be shipped to refineries in Texas and Louisiana. Oil will be hauled from drill sites by truck to gathering hubs and terminals for shipment by rail to the nearest refineries. There is a potential that the U.S. railroads serving the Gulf Coast could eventually handle crude-by-rail from Mexico. This could become a concern in Texas as Mexico's energy sector increases. International rail crossing capacity might be an additional concern with increased demand.[16]

**Figure 9: Mexican Roadway Network**




Cost savings from avoiding heavy truck travel in favor of rail are efficiencies expected to result from the reinstatement of the international railroad bridge in Presidio and rail line improvements from Presidio to Paisano Junction. TxDOT is conducting an environmental evaluation for improvements to the Presidio-Ojinaga International roadway Port of Entry (POE). The study is evaluating alternatives to improve mobility at the Presidio-Ojinaga International POE due to the lack of reliability and public safety for crossing movements, increased congestion, wait times for crossing traffic, and the need to enhance free flow of commodities between the U.S. and Mexico. The study noted that in late 2003, the state of Chihuahua finished the initial phase of a new location highway between Chihuahua City and Ojinaga, see Figure 9. The new highway reduces driving time by half from the previous existing condition, while providing an excellent roadway for transporting delicate freight materials. Since completion of the road, commercial border crossings have increased over 300 percent at the Presidio-Ojinaga POE.[17] The project to widen the Presidio-Ojinaga International Bridge is anticipated to let in August 2017.[18]

While improvements to the border crossing are being advanced for passenger and commercial vehicles, improving the SORR and reinstating the international rail bridge will provide additional efficiencies for freight rail travel. In particular, transportation shipping cost savings from avoiding heavy truck travel in favor of rail amount to roughly $86.7 million over the study period (2016$, 7% discount rate). The rehabilitation of the line will allow these movements to continue by rail while effectively reducing the time spent operating trains in this area by more than half.[19]

[16] *Potential Impacts of Mexico's Energy Reform on the Texas Transportation System*, TTI. http://tti.tamu.edu/policy/wp-content/uploads/2014/12/Mexico-Energy-Policy-Brief-final.pdf

[17] Presidio-Ojinaga International Port of Entry Project, Open House Public Meeting Materials, August 28, 2013. http://ftp.dot.state.tx.us/pub/txdot-info/elp/notices/082813-presentation.pdf

[18] http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/let/2017/letelp.htm

[19] Increasing train speeds from 10 mph to 25 mph reduces the operating times by more than half.

The AAR has determined that a freight train on average can carry one ton of cargo a distance of 479 miles on a single gallon of fuel, some four times more fuel efficient than trucks per ton-mile.[20] This high level of efficiency reduces the nation's dependence on foreign oil and helps shrink its carbon footprint through lower greenhouse gas emissions while also reducing highway gridlock.

**Quality of Life**

The rehabilitation of the SORR will benefit the livability of the region and have a positive impact on community life by reducing truck traffic on the region's roadways, thereby improving vehicular mobility and roadway safety.

The project will enhance points of modal connectivity by rehabilitating a deteriorating transportation asset and increasing the amount and types of freight that can move over this section of the SORR, which connects to an extensive rail and highway system.

The project will also enhance energy-related and support services, provide ladders of opportunity through economic development efforts, and bring additional jobs and businesses to the area as a result of an improved regional freight rail transportation system with a connection to the UPRR (Class 1 railroad) in Alpine.

The SORR operates through 11 counties in West Texas, including: Brewster, Coleman, Crane, Crockett, Irion, Pecos, Presidio, Reagan, Runnels, Tom Green, and Upton. Aside from Tom Green County, all of these counties have small populations with fewer than 20,000 residents. Coleman, Crockett, Irion, Pecos, Runnels, and Upton counties have experienced population decline since 2000, ranging from -1.9 to -9.2 percent. Brewster, Presidio, Reagan, and Tom Green counties all experienced moderate population growth between 2000 and 2014, ranging from 2.4 to 9.1 percent. Tom Green County was the only county along the SORR with a population growth rate greater than 10 percent; however, the 15.2 percent population increase in Tom Green County between 2000 and 2014 was still considerably lower than the Texas statewide population growth rate of over 25 percent during the same time period. In 2014, 10 of the 11 counties along the SORR had median household incomes lower than that of the state of Texas.[21]

For the purposes of this application, the funding will be used for infrastructure rehabilitation in Presidio County. Presidio County, which is located within the project area, is within the Borderplex (Upper Rio Grande) Workforce Development Areas (WDA) established by the Texas Workforce Commission. Between 2000 and 2014, the population of Presidio County increased by only 2.4 percent compared to a 25.1 percent population increase for the state of Texas during the same period. The population of Presidio County is largely minority (84.3 percent) and earns less than the Texas population on average. The 2014 median household income in Presidio County was $30,983 compared with $52,576 for the state of Texas.[22] In 2015, the

[20] Environmental Benefits of Moving Freight by Rail, Association of American Railroads, August 2015. https://www.aar.org/BackgroundPapers/Environmental%20Benefits%20of%20Moving%20Freight%20by%20Rail.pdf

[21] U.S. Census Bureau, 2014 American Community Survey 5-Year Estimates

[22] Ibid.

unemployment rate of Presidio County was 10.8 percent, more than double that of the Texas unemployment rate of 4.5 percent.[23]

Approximately 21 short-term jobs are estimated to be created over the 10-month construction period. The rehabilitation of SORR and reconstruction of the Presidio-Ojinaga International Bridge will enhance the livability of the region and nation by the continued and increased diversion of freight from the roadways to rail, reducing pavement maintenance costs, improving safety, and reducing emissions related to truck travel. The project is part of a regionally focused effort to improve rail service on the SORR. It has broad, regional and international support. The project includes a potential NAFTA trade corridor via connections with Ferromex at Presidio.

**Environmental Sustainability**

The SORR project will result in lower shipping costs, reduced emissions, improved safety, and reduced pavement maintenance costs by allowing some freight associated with truck traffic to divert to rail. The proposed bridge at Presidio will reopen an international rail crossing, thus allowing the railroad to become more cost competitive and opening another point of entry into Mexico.

The project will also support the on-going development of new energy industries in west Texas and new markets in Mexico. It will have multiple benefits for many generations from air quality improvements, sustainability, economic growth, and reductions in the use of greenhouse gas hydrocarbons. Emissions impacts were determined in accordance with the TIGER Benefit-Cost Analysis Resource Guide. The methodology was used to determine the emissions impacts from the diversion of existing and projected freight from rail to trucks. The analysis determined that the 7 percent discounted cost savings of avoided emissions (NOx, CO2, VOC and PM) was $3.6 million over a 20-year period. The rehabilitation of the SORR from Presidio to the Paisano Junction and the reconstruction of the international rail bridge would prevent the diversion of this freight from rail to roadway, therefore providing a benefit due to avoided emissions.

This cost savings shows that there are substantial transportation costs related to energy consumption and emissions. If the SORR is not rehabilitated, those costs and emissions would increase dramatically as a result of the diversion of freight from rail to roads and would cause adverse effects to the environment.

**Safety**

The rehabilitation of the SORR and the reinstating of the international rail bridge will provide safety improvements for the traveling public as well as the operating railroad by diverting freight from trucks on the roadways to rail. Improving the railroad to Class 2 operating standards will also reduce the likelihood of derailments from improved track conditions.

Diverting freight from road to rail will result in fewer trucks on the highway network which results in an increase in safety.[24] This is due to both lower traffic volumes resulting in fewer collisions and fewer trucks resulting in less serious collisions. The avoided truck use in favor of

[23] U.S. Bureau of Labor Statistics, Labor Force Data by County, 2015 Annual Averages

[24] Fatality and injury rates per mile of freight carried by truck are greater than the fatality and injury rates for an equal volume of cargo when shipped by rail

rail results in accident cost savings of over $34 million through the study period (2016$, 7% discount rate).

Rail is the safest way to transport hazardous materials, with 99.99 percent of shipments arriving at their destination safely. It is essential that the SORR rehabilitation be completed from the U.S./Mexico border to Paisano Junction in order to support new distribution facilities and other heavy industrial developments and to prevent this freight from being shipped by trucks. The rehabilitation of the SORR would allow the transportation of these materials by the safest method available.

Because of the distance between potential Mexican wells to refineries and the existing, robust pipeline network in Texas, crude-by-rail transportation is not expected to increase in Texas.[25]

### b. SECONDARY SELECTION CRITERIA

### Innovation

The lease agreement between TxDOT and TXPF was amended and requires TXPF to maintain each segment of the line in the same or better condition as it is in when a TxDOT project is complete. This contractual requirement ensures that the funds invested by TxDOT provide a long-term benefit by maintaining the line on an on-going basis.

### Partnership

Jurisdictional and Stakeholder Collaboration

TxDOT's ownership of SORR and the lease agreement with TXPF constitute a true public-private partnership to provide essential transportation services to a large region in west Texas. TxDOT has invested over $34 million in addressing critical deficiencies to keep the line operational and increase speeds in those sections to 25 mph as part of the overall plan of rehabilitating the entire line from east to west. It is estimated that rehabilitating the project area to 25 mph speeds will require a $5,100 per mile annual maintenance program to keep the line in good condition. TXPF will be wholly responsible for that maintenance program.

The SORR rehabilitation and international bridge reconstruction project is strongly supported by Texas' Congressmen and State Legislators from the region as well as TxDOT, TXPF, Fort Stockton Economic Development Corporation, and other state, and local stakeholders. The letters of support are provided in Appendix A.

Disciplinary Integration

All aspects of this project have been fully discussed between TxDOT, as the SORR owner, and TXPF, as the SORR operator/funding partner, as well as consultant teams providing environmental and engineering services. All engineering disciplines involved in the design and cost estimation of the project have fully integrated their work to ensure that the project will advance smoothly and seamlessly.

[25] *Potential Impacts of Mexico's Energy Reform on the Texas Transportation System*, TTI. http://tti.tamu.edu/policy/wp-content/uploads/2014/12/Mexico-Energy-Policy-Brief-final.pdf

## vi. RESULTS OF BENEFIT-COST ANALYSIS

A Benefit-Cost Analysis (BCA) was conducted in conformance with United States Department of Transportation (USDOT) guidance to assess the impact of the TxDOT proposed SORR project. TxDOT proposes construction of these cost-effective project components:

- Rehabilitation of track, bridge, and drainage systems along the 72-mile segment from the US/Mexico border along the existing South Orient Railroad (SORR) from Presidio, Texas north to the UPRR crossing at Paisano Junction. This segment is located 11 miles west of Alpine, Texas. Proposed track improvements to Class 2 rail would result in speed increases from 10 miles per hour to 25 miles per hour.
- Construction of a new international bridge railroad crossing between Presidio, Texas and Ojinaga, Mexico.

The BCA was prepared based on an estimate of potential truck-to-rail mode shift benefits. With federal assistance, rail track improvements along the project corridor and construction of the international bridge at Presidio could result in existing truck freight loads shifting to the SORR. This modal shift would reduce the trip length to one of the other international points of entry at Del Rio, El Paso, Eagle Pass, or Laredo.

A summary of the BCA results is provided in this section and more detail regarding the inputs, sources, analysis, and results is provided in Appendix B: Benefit-Cost Analysis Details. All monetary values were adjusted to 2016 dollars based on the Gross Domestic Product Price Index, unless otherwise stated. A 7 percent discount rate was used to compute net present values of benefits and costs.

### a. BENEFIT COST ANALYSIS

A spreadsheet model was developed in accordance with USDOT guidance to compute the benefit/cost ratio based on project-specific inputs and industry-standard or USDOT-defined values for modal shipping costs, safety, emissions, and pavement maintenance savings. Table provides a summary of the BCA results for the SORR project.

**Table 3: Benefit Cost Summary**

| | |
|---|---|
| Life-Cycle Benefits (in millions) | $142.3 |
| Life-Cycle Costs (in millions) | $16.2 |
| Benefit / Cost Ratio | **9.38** |

Note: Costs provided are in 2016 dollars, present value over 20-year life cycle at 7% discount rate

Figure 10 and Figure 11 graphically depict the share by category of total project life-cycle benefits and total project life-cycle costs associated with the SORR project, as discussed in more detail in the following sub-sections.

**Figure 10: SORR Itemized Benefits, Present Value**

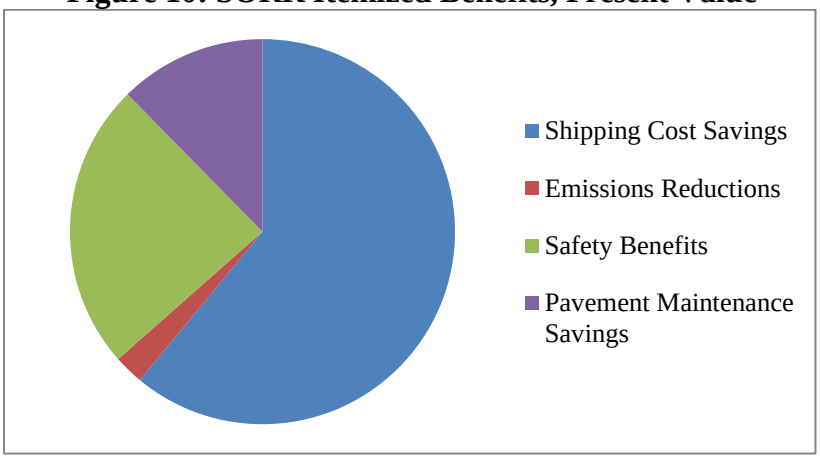



**Figure 11: SORR Project Costs, Present Value**

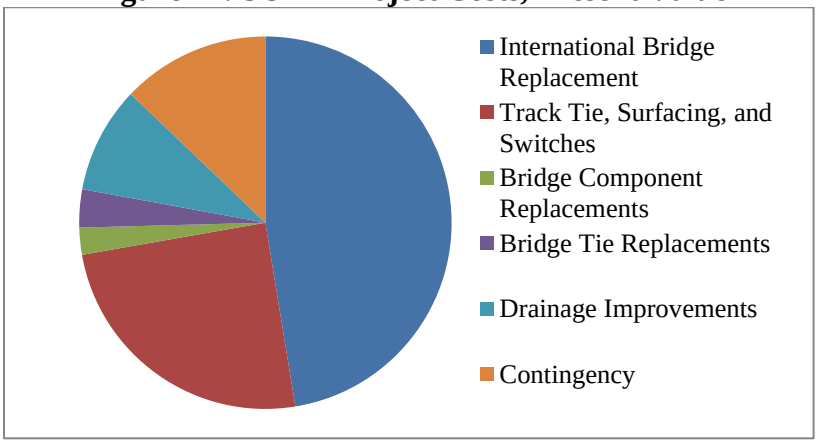



Table 4 provides a general overview of the SORR project parameters, as described elsewhere in this application in more detail.

**Table 4: SORR Project Matrix**

| | |
|---|---|
| Current Status / Baseline & Problem to be Addressed | Track conditions restrict overall train speeds. Drainage conditions lead to track washouts. Lack of international crossing limits market for freight movement. |
| Change to Baseline / Alternatives | Proposed Class 2 rail track improvements will increase operating speeds to 25 mph. The proposed bridge at Presidio will reopen an international rail crossing, thus allowing the railroad to become more cost competitive while opening another point of entry into Mexico. |
| Type of Impacts | The SORR project will result in lower shipping costs, reduced emissions, improved safety, and reduced pavement maintenance costs by allowing some freight |

| | |
|---|---|
| | associated with truck traffic to divert to rail. |
| Affected Population | Freight rail shippers would experience lower shipping costs and the general public would benefit from improved air quality, fewer crashes, and lower pavement maintenance costs. |
| Economic Benefit | The BCA model indicates that the project will result in benefits associated with shipping cost savings, emission reductions, safety, and reduced pavement maintenance cost. |
| Summary of Results | The BCA model indicates that the SORR project will provide a Benefit/Cost Ratio of 9.38. |

### b. PROJECT COSTS

Project costs incurred each year of the construction period were entered into the BCA model. The project costs are discounted at seven percent to reflect their present value (2016$). The initial design and construction costs for the SORR project are approximately **$16.2 million** as described in more detail in the Project Description section of this application. All improvements are assumed to be constructed in a single year. No marginal railroad maintenance of way costs or cyclic capital replacement costs are anticipated or included in the BCA. Project costs are represented by the following capital cost categories

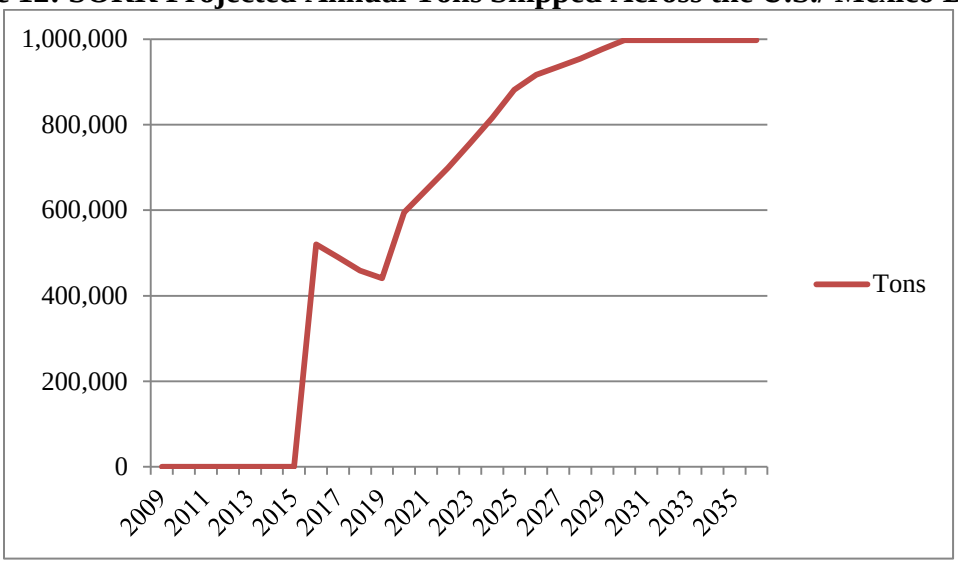
- International Bridge Replacement
- Track Tie, Surfacing, and Switches
- Bridge Component Replacement
- Bridge Tie Replacement
- Drainage Improvements
  Contingency

### c. MONETIZED BENEFITS

The BCA assumes that trucks carry the existing and projected market demand for freight within the region and cross the border through the points of entry at Del Rio, Eagle Pass, El Paso or Laredo. With the proposed track improvements along the 72-mile project corridor and the reopening of the rail point of entry at Presidio, the BCA assumes that one-half of projected rail carload market demand will be diverted from truck to rail.

Figure 12 shows the growth in annual tons shipped associated with the SORR project. Table 5 provides a summary of the monetized benefits for shipping cost savings, reduced net emissions, improved net safety, and reduced pavement maintenance costs associated with truck to rail diversions over the 20-year life cycle of the project. More information regarding the input assumptions and data sources underlying these annual benefit totals is provided in Appendix B: Benefit-Cost Analysis Details.

**Figure 12: SORR Projected Annual Tons Shipped Across the U.S./ Mexico Border**




Source: Texas Department of Transportation, South Orient Rail Line Benefit Cost Analysis, January 2015.

### Shipping Cost Savings

The net shipping costs associated with truck to rail diversions were computed using industry data. Truck shipping costs per truck-mile were derived from annual data provided by the American Transportation Research Institute.[26] Rail shipping costs were derived from TXPF and by a previous benefit-cost analysis completed for the SORR in 2015.[27] Because the truck costs reflect truck operating costs and the rail costs reflect railroad revenue, the analysis is considered to be conservative.

### Emission Reductions

The net emissions associated with truck to rail diversions were computed using industry data. Carbon dioxide ($CO_2$), volatile organic compounds (VOCs), nitrogen oxides ($NO_X$), and particulate matter (PM) emissions rates for rail and truck were derived from Environmental Protection Agency data.[28,29] The social cost of carbon and values of other emissions were based on current USDOT guidance.

### Safety Benefits

Crash rates for fatality, injury, and property damage only accidents were obtained from recent annual data provided by the Bureau of Transportation Statistics.[30] Unit values of avoided crashes were based on current USDOT guidance.

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[26] Average Carrier Costs per Mile, 2008-2014, from American Transportation Research Institute, An Analysis of the Operational Costs of Trucking: 2015 Update, September 2015. Available at http://atri-online.org/wp-content/uploads/2015/09/ATRI-Operational-Costs-of-Trucking-2015-FINAL-09-2015.pdf

[27] TxDOT. Benefit-Cost Analysis for the South Orient Railroad. January, 2015.

[28] Office of Transportation and Air Quality. Environmental Protection Agency. Average In-Use Emissions from Heavy-Duty Trucks, 2008. https://www3.epa.gov/otaq/consumer/420f08027.pdf

[29] Office of Transportation and Air Quality. Environmental Protection Agency. Emissions Factors for Locomotives, 2009. https://www3.epa.gov/nonroad/locomotv/420f09025.pdf

[30] BTS National Transportation Statistics Table 2-43
http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_02_43.html

**Pavement Maintenance Cost Savings**

Diversion of truck traffic to rail reduces costs associated with highway maintenance. The marginal cost of highway pavement deterioration was derived from information provided by the Federal Highway Administration and updated to 2016 dollars.[31]

[31] Federal Highway Administration. Addendum to the 1997 Federal Highway Cost Allocation Study Final Report, 2000. Table 13, for 80 kip 5-axle rural. Available at https://www.fhwa.dot.gov/policy/hcas/addendum.cfm.

## Table 5: SORR Benefits and Costs by year (2016$)

| A | B | *Ben1a* | *Ben2a* | *Ben2b* | *Ben2c* | C | C7 | C3 | *Cost1a* | D | D7 | D3 | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Calendar Year | Net O&M Cost for Expanded Demand (truck to rail diversion) | Reduced Net Emissions | Improved Net Safety | Reduced Pavement Maintenance Costs | Non-$CO_2$ Benefits (2016$) | 7% NPV Non-$CO_2$ Benefits [C/(1.07^A)] | 3% NPV Non-$CO_2$ Benefits [C/(1.03^A)] | Capital Costs | Non-$CO_2$ Costs (2016$) | 7% NPV Non-$CO_2$ Costs [D/(1.07^A)] | 3% NPV Non-$CO_2$ Costs [D/(1.03^A)] | Net Non-$CO_2$ Benefits [C+D] | 7% NPV Non-$CO_2$ Net Benefits [E/(1.07^A)] | 3% NPV Non-$CO_2$ Net Benefits [E/(1.03^A)] | $CO_2$ Reduced (Metric Tons) | 3% SCC (2016$) | Undiscounted $CO_2$ Benefits @ 3% Avg SCC [H*I] | NPV $CO_2$ Benefits @ 3% Avg SCC [J/(1.03^A)] | 7% NPV Total Net Benefits [F+K] | 3% NPV Total Net Benefits [G+K] |
| 0 | 2016 | $4,964,214 | $217,578 | $2,103,737 | $1,077,077 | $8,362,606 | $8,362,606 | $8,362,606 | -$14,000,000 | -$14,000,000 | -$14,000,000 | -$14,000,000 | -$5,637,394 | -$5,637,394 | -$5,637,394 | 7,692 | $44.86 | $345,055 | $345,055 | -$5,292,339 | -$5,292,339 |
| 1 | 2017 | $4,793,079 | $205,142 | $1,983,497 | $1,015,517 | $7,997,234 | $7,474,050 | $7,764,305 | $0 | $0 | $0 | $0 | $7,997,234 | $7,474,050 | $7,764,305 | 7,252 | $45.90 | $332,899 | $323,203 | $7,797,253 | $8,087,508 |
| 2 | 2018 | $4,589,485 | $191,710 | $1,853,622 | $949,023 | $7,583,840 | $6,624,019 | $7,148,496 | $0 | $0 | $0 | $0 | $7,583,840 | $6,624,019 | $7,148,496 | 6,778 | $46.94 | $318,172 | $299,908 | $6,923,927 | $7,448,404 |
| 3 | 2019 | $4,528,968 | $184,438 | $1,783,313 | $913,026 | $7,409,746 | $6,048,560 | $6,780,967 | $0 | $0 | $0 | $0 | $7,409,746 | $6,048,560 | $6,780,967 | 6,521 | $47.99 | $312,906 | $286,353 | $6,334,913 | $7,067,320 |
| 4 | 2020 | $6,102,168 | $248,690 | $2,404,554 | $1,231,091 | $9,986,503 | $7,618,655 | $8,872,878 | $0 | $0 | $0 | $0 | $9,986,503 | $7,618,655 | $8,872,878 | 8,792 | $49.03 | $431,083 | $383,012 | $8,001,667 | $9,255,890 |
| 5 | 2021 | $6,643,323 | $270,768 | $2,618,030 | $1,340,387 | $10,872,507 | $7,751,947 | $9,378,720 | $0 | $0 | $0 | $0 | $10,872,507 | $7,751,947 | $9,378,720 | 9,573 | $49.03 | $469,354 | $404,869 | $8,156,817 | $9,783,590 |
| 6 | 2022 | $7,172,545 | $292,356 | $2,826,764 | $1,447,255 | $11,738,921 | $7,822,139 | $9,831,161 | $0 | $0 | $0 | $0 | $11,738,921 | $7,822,139 | $9,831,161 | 10,336 | $50.07 | $517,558 | $433,447 | $8,255,586 | $10,264,608 |
| 7 | 2023 | $7,761,924 | $316,402 | $3,059,262 | $1,566,290 | $12,703,878 | $7,911,337 | $10,329,415 | $0 | $0 | $0 | $0 | $12,703,878 | $7,911,337 | $10,329,415 | 11,186 | $52.16 | $583,465 | $474,411 | $8,385,748 | $10,803,826 |
| 8 | 2024 | $8,368,078 | $341,131 | $3,298,364 | $1,688,706 | $13,696,279 | $7,971,359 | $10,811,970 | $0 | $0 | $0 | $0 | $13,696,279 | $7,971,359 | $10,811,970 | 12,060 | $53.20 | $641,649 | $506,523 | $8,477,883 | $11,318,493 |
| 9 | 2025 | $9,041,328 | $368,602 | $3,563,971 | $1,824,693 | $14,798,592 | $8,049,454 | $11,341,889 | $0 | $0 | $0 | $0 | $14,798,592 | $8,049,454 | $11,341,889 | 13,031 | $54.25 | $706,913 | $541,790 | $8,591,244 | $11,883,679 |
| 10 | 2026 | $9,404,932 | $383,451 | $3,707,547 | $1,898,201 | $15,394,131 | $7,825,596 | $11,454,679 | $0 | $0 | $0 | $0 | $15,394,131 | $7,825,596 | $11,454,679 | 13,556 | $55.29 | $749,533 | $557,723 | $8,383,319 | $12,012,402 |
| 11 | 2027 | $9,590,396 | $391,040 | $3,780,924 | $1,935,769 | $15,698,129 | $7,458,068 | $11,340,662 | $0 | $0 | $0 | $0 | $15,698,129 | $7,458,068 | $11,340,662 | 13,825 | $56.33 | $778,790 | $562,614 | $8,020,682 | $11,903,277 |
| 12 | 2028 | $9,783,759 | $398,953 | $3,857,434 | $1,974,941 | $16,015,087 | $7,110,890 | $11,232,660 | $0 | $0 | $0 | $0 | $16,015,087 | $7,110,890 | $11,232,660 | 14,104 | $57.38 | $809,263 | $567,601 | $7,678,491 | $11,800,261 |
| 13 | 2029 | $10,012,131 | $408,300 | $3,947,808 | $2,021,211 | $16,389,450 | $6,801,039 | $11,160,418 | $0 | $0 | $0 | $0 | $16,389,450 | $6,801,039 | $11,160,418 | 14,435 | $57.38 | $828,223 | $563,980 | $7,365,019 | $11,724,397 |
| 14 | 2030 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $6,493,673 | $11,069,861 | $0 | $0 | $0 | $0 | $16,744,158 | $6,493,673 | $11,069,861 | 14,748 | $58.42 | $861,574 | $569,602 | $7,063,275 | $11,639,463 |
| 15 | 2031 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $6,068,853 | $10,747,438 | $0 | $0 | $0 | $0 | $16,744,158 | $6,068,853 | $10,747,438 | 14,748 | $60.51 | $892,345 | $572,762 | $6,641,615 | $11,320,200 |
| 16 | 2032 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $5,671,825 | $10,434,405 | $0 | $0 | $0 | $0 | $16,744,158 | $5,671,825 | $10,434,405 | 14,748 | $61.55 | $907,730 | $565,667 | $6,237,493 | $11,000,073 |
| 17 | 2033 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $5,300,771 | $10,130,491 | $0 | $0 | $0 | $0 | $16,744,158 | $5,300,771 | $10,130,491 | 14,748 | $62.59 | $923,115 | $558,500 | $5,859,271 | $10,688,990 |
| 18 | 2034 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $4,953,992 | $9,835,428 | $0 | $0 | $0 | $0 | $16,744,158 | $4,953,992 | $9,835,428 | 14,748 | $63.64 | $938,500 | $551,270 | $5,505,262 | $10,386,698 |
| 19 | 2035 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $4,629,899 | $9,548,959 | $0 | $0 | $0 | $0 | $16,744,158 | $4,629,899 | $9,548,959 | 14,748 | $64.68 | $953,886 | $543,988 | $5,173,887 | $10,092,947 |
| 20 | 2036 | $10,228,502 | $417,157 | $4,033,444 | $2,065,055 | $16,744,158 | $4,327,008 | $9,270,834 | $0 | $0 | $0 | $0 | $16,744,158 | $4,327,008 | $9,270,834 | 14,748 | $65.72 | $969,271 | $536,662 | $4,863,670 | $9,807,496 |
| **Total** | | **$174,355,841** | **$7,138,656** | **$69,022,936** | **$35,338,571** | **$285,856,005** | **$142,275,741** | **$206,848,241** | **-$14,000,000** | **-$14,000,000** | **-$14,000,000** | **-$14,000,000** | **$271,856,005** | **$128,275,741** | **$192,848,241** | **252,377** | | **$14,271,285** | **$10,148,940** | **$138,424,681** | **$202,997,181** |

| Benefit Cost Ratio | | |
|---|---|---|
| 7% Discount Rate | 10.89 | [(C7+K)/D7] |
| 3% Discount Rate | 15.50 | [(C3+K)/D3] |

## vii. PROJECT READINESS

TxDOT and TXPF have been preparing for reinitiating international rail service along SORR since its international rail bridge burned down in February 2008. Currently, a set of plans, specifications, and estimate (PS&E) is being finalized for bridge reconstruction at the U.S/Mexico border. Further, a track assessment conducted by TxDOT in December 2014 (*Texas Pacifico Transportation-South Orient Rail-line Infrastructure Assessment* (Appendix C)) identified locations of needed track improvements along the South Orient Railroad line to upgrade the railroad from Excepted Track status of 10 mph to Class 2 allowable freight speeds of up to 25 mph. This assessment is the foundation for track improvements detailed in this project application and is included in Appendix C: Texas Pacifico Transportation-South Orient Rail line Infrastructure Assessment.

### a. TECHNICAL FEASIBILITY

Design and implementation of the project components will follow the latest versions of the American Railway Engineering and Maintenance-of-Way Association (AREMA) guidelines and TxDOT *Bridge Design Manual*, as applicable. Development of construction cost estimates included detailed quantities from either design plans or infrastructure field assessments with unit costs identified from similar previous projects.

The project's statement of work includes:

- Reconstruction of the international rail bridge: The contractor will remove the existing remaining bridge components and reconstruct the U.S./Mexico international rail bridge per the design plans. The deck girder open deck bridge will be raised an additional eight feet from the previous top-of-rail elevation to accommodate a higher water surface elevation. There will also be additional track work in the vicinity of the bridge approaches to adjust the track for the change in top-of-rail elevation. Substructure installation shall include three pipe piles (14-inch diameter) with precast concrete caps.
- Rehabilitation of the track between the U.S./Mexico Border at Presidio and Alpine to a Class 2 rail line: The contractor will provide track rehabilitation for components of the existing rail infrastructure, including the following project components and locations:
    - Replacement of bridge ties and timber bridge components including caps, sills, stringers, posts/columns, backwalls, and parapet walls from Mile Post 957.1 to Mile Post 1027.6;
    - Drainage improvements from Mile Post 970.0 to Mile Post 1021.1, including ditch profiling, stabilization of embankment and streambed areas, and replacement of timber box culverts;
    - Track tie replacements (including ties, plates, and fasteners) and surfacing from Mile Post 955 to Mile Post 1029, including an area of extensive rehabilitation from Mile Post 956 to Mile Post 968; and
    - Four switch/switch tie replacements.

### b. FINANCIAL FEASIBILITY

The overall project costs have been developed from final design construction estimate costs and estimated track component replacement costs and locations based on the recommendations

within Appendix C: *Texas Pacifico Transportation-South Orient Rail-line Infrastructure Assessment.* A contingency of 20 percent was applied to the international bridge costs with a contingency of eight percent throughout the remaining project components, which is an acceptable level of contingency relative to similar construction activities. The detailed budget breakdowns for the bridge construction and track rehabilitation are discussed further in the Appendix D: Detailed Cost Estimates.

Table 6 identifies the project components, each component's cost and the anticipated funding source for each component's cost. As noted in the table, the percentages of requested TIGER Discretionary funding and matching funds are 43.1 percent ($7 million) and 56.9 percent ($9.2 million), respectively, of the overall project value.

**Table 6: Funding and Component Splits**

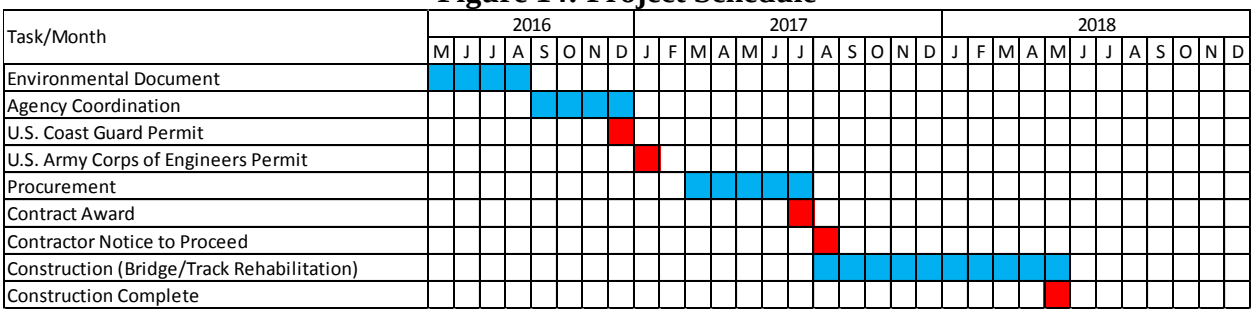
| Project Component | Component Cost | Component % | Funding Source | |
|---|---|---|---|---|
| | | | TIGER | TXPF (match) |
| International Bridge Replacement | $7,703,810 | 48% | $0 | $7,703,810 |
| Track Tie, Surfacing, and Switches | $4,030,710 | 25% | $4,030,710 | $0 |
| Bridge Component Replacements | $380,520 | 2% | $380,520 | $0 |
| Bridge Tie Replacements | $536,450 | 3% | $536,450 | $0 |
| Drainage Improvements | $1,503,850 | 9% | $1,503,850 | $0 |
| Contingency | $2,089,232 | 13% | $548,470 | $1,570,762 |
| **TOTAL** | **$16,244,572** | **100%** | **$7,000,000** | **$9,244,572** |
| Percentage of Project | | 100% | 43.1% | 56.9% |

The project's matching funding source in anticipation of TIGER Discretionary grant obligation is being provided through in kind services by the reconstruction of the international rail bridge by TXPF. TXPF is owned by Grupo Mexico and operates over SORR through a lease and operating agreement with TxDOT. Grupo Mexico is the largest mining company in Mexico and operates multiple rail lines within Mexico, including a majority of Ferromex, which moves over 40 percent of rail cargo in the country.

## c. PROJECT SCHEDULE

The project's anticipated schedule, Figure 14, below identifies environmental, procurement, and construction activities that comply with the requirements for obligation of funds.

**Figure 14: Project Schedule**




Pre-construction activities include environmental clearance and permit items. Environmental clearance has already begun on the project, and it is estimated that environmental clearance and permitting will be completed by January 2017. This includes required USCG and USACE permits.

Once the environmental clearance and final permits are received, the project will be procured and awarded. This will be a five-month process with the project's anticipated letting date in August 2017; construction is anticipated to begin one month later. This date is two years prior to the required obligation date of September 2019. Construction is expected to last 10 months and complete in May 2018.

Since the project includes the reconstruction and rehabilitation of existing facilities within existing ROW, the project does not require additional ROW to complete the project and is not a schedule constraint.

## d. ENVIRONMENTAL REVIEWS AND REQUIRED APPROVALS

### NEPA

National Environmental Policy Act (NEPA) requirements and the current environmental status of the SORR project are described below.

<u>New Bridge at the International Border Crossing</u>

TxDOT is preparing an FRA CE for the reconstruction of the U.S. portion of the Presidio-Ojinaga International Rail Bridge. Environmental clearance is anticipated within three to six months. Because the project includes crossing the Rio Grande, a navigable waterway, a USCG Section 9 permit and a USACE Section 10 permit are required. TxDOT is coordinating with both USCG and USACE and anticipates the required permits to be approved in fall 2016.

<u>Track Tie and Surfacing, Switch Replacement, Timber Bridge Component Replacements, and Drainage Improvements along Existing SORR</u>

The track, bridge, and drainage improvements along the existing rail line from the new bridge north to the UPRR crossing near Alpine would not result in any significant environmental impacts and would take place fully within the existing ROW. The ROW has been previously disturbed by operations and maintenance activities on the existing freight rail line.

Consequently, this project would qualify for a CE for NEPA compliance under FRA regulations. The proposed action would be classified as a (c)-list CE under FTA NEPA regulations at 23 CFR 771.118(c)(8), reserved for actions such as:

"Maintenance, rehabilitation, and reconstruction of facilities that occupy substantially the same geographic footprint and do not result in a change in functional use, such as: improvements to bridges, tunnels, storage yards, buildings, stations, and terminals; construction of platform extensions, passing track, and retaining walls; and improvements to tracks and railbeds."

### Legislative Approvals

TxDOT leased operations on the SORR line to TXPF, and under the terms of the agreement, TxDOT became the permanent owner of the ROW and infrastructure. TXPF obtained a 40-year operating lease with renewal options.

### State and Local Planning Approvals

The project is in the El Paso/Santa Teresa-Chihuahua Border Master Plan, TxDOT April 2013, which is included in Appendix E: Pages from the El Paso/Santa Teresa-Chihuahua Border Master Plan.

## e. Assessment of Project Risks

A key factor in the success of this proposed project is the identification, assessment, mitigation, and subsequent management of risks. The project partners recognize the need to take a proactive approach in the management of project risks and will develop a Risk Management Plan that follows a continuous risk management process. The risk management process consists of five phases which are to Identify, Analyze, Respond, Track, and Control project risks. The process allows the project partners to assess the identified risks, determine the probability and impacts of identified risks, develop mitigating strategies, develop contingency plans, implement strategies and plans, and monitor risk status. A risk list will be used for tracking risks throughout the project.

Risk-mitigation measures have been or are currently being undertaken to limit risk to scope, schedule, and budget on the project. These are:

- Scope: The project is well-defined for the infrastructure needs to reinitiate international rail service (reconstruction of U.S.-Mexico bridge) and requirements to bring the existing track from the U.S.-Mexico border to Alpine up to FRA Class 2 track based on current bridge PS&E design and assessment of track needs.
- Schedule: There is low risk in the schedule items since the project is near the end of the project design. An obligation date for construction funds of September 2017 for the reconstruction and rehabilitation efforts exceeds the required obligation by two years.
- Budget: Project cost estimates are based on detailed plans for the bridge and estimated costs of the assessment need for track rehabilitation and utilize unit costs from previous projects. The estimates also contain an 8 percent contingency.

## viii. FEDERAL WAGE CERTIFICATION

TxDOT follows federal wage rate requirements and the federal wage rate certification is provided in Appendix F: Federal Wage Certification.