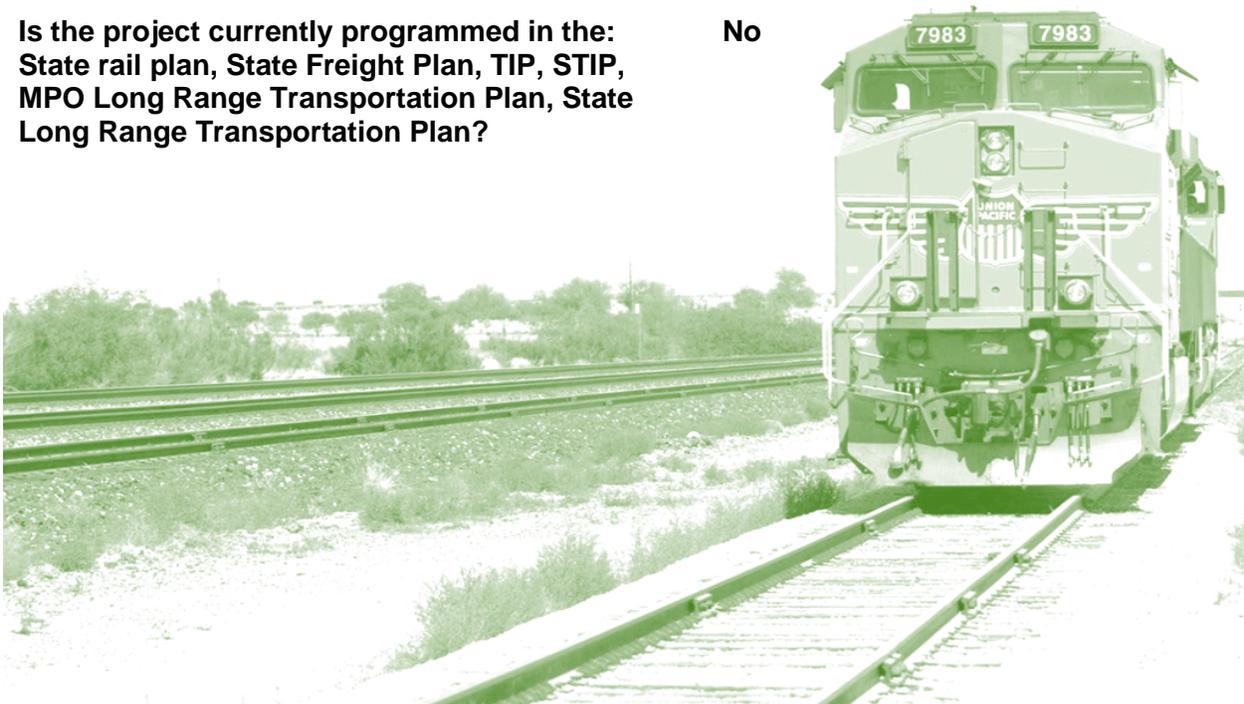


Project Title:	ARC Rail Expansion and Bypass
Lead Applicant:	Pima County
Co-Applicants:	None
Project Track:	1 - Planning
Will this project contribute to the Restoration or Initiation of Intercity Passenger Rail Service?	No
Was a Federal grant application previously submitted for this project?	No
If applicable, what stage of NEPA is the project in (e.g., EA, Tier 1 NEPA, Tier 2 NEPA, or CE)?	N/A
Is this a Rural Project? What percentage of the project cost is based in a Rural Area?	Yes; 91%
City(ies), State(s) where the project is located:	Tucson (Pima County), Arizona
Urbanized Area where the project is located:	Tucson (Pima County), Arizona
Population of Urbanized Area:	City of Tucson: 530,706 Pima County: 1,016, 2060
Is the project currently programmed in the: State rail plan, State Freight Plan, TIP, STIP, MPO Long Range Transportation Plan, State Long Range Transportation Plan?	No



II. Project Summary

Pima County intends to engage in the planning process to support the potential realignment of the Union Pacific Railroad (UP), Nogales Subdivision out of the City of Tucson’s urban center and into industrial areas planned for rail served economic development. The potential realignment would reduce the number of trains currently utilizing 20 at-grade crossings where approximately 300,000 cars cross daily, contributing to significant traffic congestion, auto related idle pollution, and safety concerns. The realignment will ensure that all future crossings will be configured to minimize future car and train interaction with separated crossings giving priority to train traffic. The potential realignment will open up thousands of acres of vacant land for rail served development opportunities, expanding the region’s international freight logistics opportunities.

III. Project Funding

Task No.	Task name/project component	Cost	Percentage of Total Cost
1	Development of Detailed Project Work Plan, Budget and Schedule →Consultant	\$25,000	2%
2	Planning Activities →Consultant <ul style="list-style-type: none"> • Identification of Purpose and Need Statement and Analysis of Alternatives • Environmental Fatal Flaws Analysis 	\$290,000	22%
3	Freight Forecasting, Market Analysis, and Industrial Development Potential Sites Analysis →Consultant	\$95,000	7%
4	Conceptual Engineering, Estimating, and Operations Analysis →Consultant <ul style="list-style-type: none"> • Conceptual Engineering (5% Design) and Capital Planning • Conceptual Engineering Drawings • Rail Network Planning, Operations Analysis, and Operations Simulation 	\$420,000	31%
5	Economic Analysis →Consultant	\$85,000	6%
6	Funding Availability Assessment →Consultant	\$15,000	1%
7	Union Pacific Analysis →Union Pacific <ul style="list-style-type: none"> • Provide engineering, operating, and industrial development analysis services 	\$80,000	6%
8	Stakeholder Outreach and Coordination →Consultant	\$70,000	5%
9	Final Performance Report →Consultant <ul style="list-style-type: none"> • Final Report • Final Performance Report 	\$20,000	1%

10	<p>Program Management Oversight →Nancy Cole (Manager), Pima County Project Management Office</p> <ul style="list-style-type: none"> • Provide Project Management oversight for adherence to Pima County Project Development Manual and Gate Process. • Develop and monitor Project Management Plan to ensure adherence to project Scope, Schedule and Budget 	\$29,873	2%
11	<p>Program Management →Greg Hitt (Project Planner), Pima County Project Management Office</p> <ul style="list-style-type: none"> • Manage consultant tasks for conceptual engineering, estimating, and market forecasting • Supervise development of Final Reports, including environmental and industrial development analysis • Ensure compliance with grant management performance metrics • Assist with stakeholder outreach and coordination during planning stage of project • Assist with rail network planning, operations analysis and operations simulation 	\$41,049	3%
12	<p>Program Management →Sandi Garrick (Utility and Railroad Liaison), Pima County Public Works</p> <ul style="list-style-type: none"> • Manage consultant tasks for freight forecasting, operations and maintenance analysis • Coordinate with Union Pacific Railroad for development of rail network planning and operations simulations • Facilitate and oversee stakeholder outreach through lifecycle of project • Assist with development of Final Reports, including economic analysis and identification of potential public-private funding partnerships • Assist with monitoring of Project Management Plan and adherence to performance metrics 	\$104,587	8%
13	<p>Grant Compliance and Performance Oversight →Molly Hilber (Grant Writer), Pima County Grants Management & Innovation (GMI) Department</p> <ul style="list-style-type: none"> • Ensure programming compliance with federal regulations articulated with federal grant agreement as well as 2 CFR 200 • Assist County program management with creation and monitoring of implementation plans, benchmarks, and grant evaluation and reporting • Monitor and troubleshoot spend-down ratio of grant on monthly basis with Program Management and GMI/Finance Bureau. 	\$5,743	.4%
14	<p>Administrative Assistance →Sandra Rosewell (Special Staff Assistant Senior), Pima County Administration</p>	\$21,911	2%

	<ul style="list-style-type: none"> • Assist with preparation of progress reports • Facilitate meeting organization • Assist Program Management with report preparation and data collection 		
15	Fiscal Management Oversight →Principal Accountant, Pima County Grants Management & Innovation Department <ul style="list-style-type: none"> • Reconcile and analyze expenses and other documentation • Prepare Quarterly Reports • Prepare Drawdown Reports 	\$17,190	2%
16	Fiscal Oversight →Principal Analyst, Pima County Grants Management & Innovation Department <ul style="list-style-type: none"> • Ensure compliance with federal regulations articulated with federal grant agreement as well as 2 CFR 200 • Monitor administrative and fiscal activities and prepare related reports, ensuring compliance with all related requirements 	\$8,246	1%
17	Fiscal Oversight →Principal Analyst, Pima County Grants Management & Innovation Department <ul style="list-style-type: none"> • Ensure compliance with federal regulations articulated with federal grant agreement as well as 2 CFR 200 • Monitor administrative and fiscal activities and prepare related reports, ensuring compliance with all related requirements 	\$8,000	.6%
	Total Project Cost	\$1,336,599	100%
	Federal Funds Received from Previous Grant	\$0	0%
	CRISI Federal Funding Request	\$880,000	66%
	Non-Federal Funding/Match	\$456,599	34%
	Portion of Non-Federal Funding from the Private Sector	\$0	0%
	Portion of Total Project Costs Spent in a Rural Area	\$1,216,305	91%
	Pending Federal Funding Requests	\$0	0%

Non-Federal Funding Arrangements

Matching funds include \$50,000 regional funds from Pima Association of Governments, \$170,000 from Pima County Public Works Administration, and \$236,599 in-kind services.

IV. Applicant Eligibility

The project is located fully within the boundaries of Pima County as per Arizona Revised Statutes Title 11. Counties § 11-112. As such, **Pima County is an eligible applicant under Section C(1)e** – A political subdivision of the State of Arizona.

Pima County pursues the CRISI grant as a sole applicant with the support of various local, regional, and state agencies, and the Union Pacific Railroad, as attested to with Letters of Support

from, the City of Tucson, Pima Association of Governments, the City of South Tucson, and Sun Corridor (Regional Economic Development Agency), Arizona’s Congressional Delegation, and Union Pacific Railroad. The letters are available on the project website at <https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>.

V. Project Eligibility

Pima County, in partnership with other government and private partners in the region and state, recognizes the need to support and promote vital economic growth in southern Arizona through the improvement of transit corridors. Expansion and enhancement of railroad infrastructure is a critical component of this vision.

This project is the planning effort to develop a Rail Plan along with the corresponding technical and environmental analyses, and **is therefore eligible under Subsection C(3) vi. - Rail Line and Relocation Improvement Project under Track 1 – Planning efforts.**

The 2011 Arizona State Rail Plan identified four “Corridors of Opportunity” (Figure 1) to establish a set of rail priorities for the State to pursue. This project is located within three of those strategic Corridors, the Arizona Spine, the Sunset, and the CANAMEX Corridors. The Arizona Spine is a north to south corridor through central Arizona, the Sunset line traverses the southern portion of the state in an east-west direction, and the CANAMEX Corridor spans from Las Vegas, Nevada, south to the international border with Mexico. The State Rail Plan predicted that nearly 75 percent of Arizona employment growth will occur in the Sun Corridor, a designated megapolitan area, with a focus on emerging industries that include a manufacturing component, which will expand the amount of goods exported from the state.

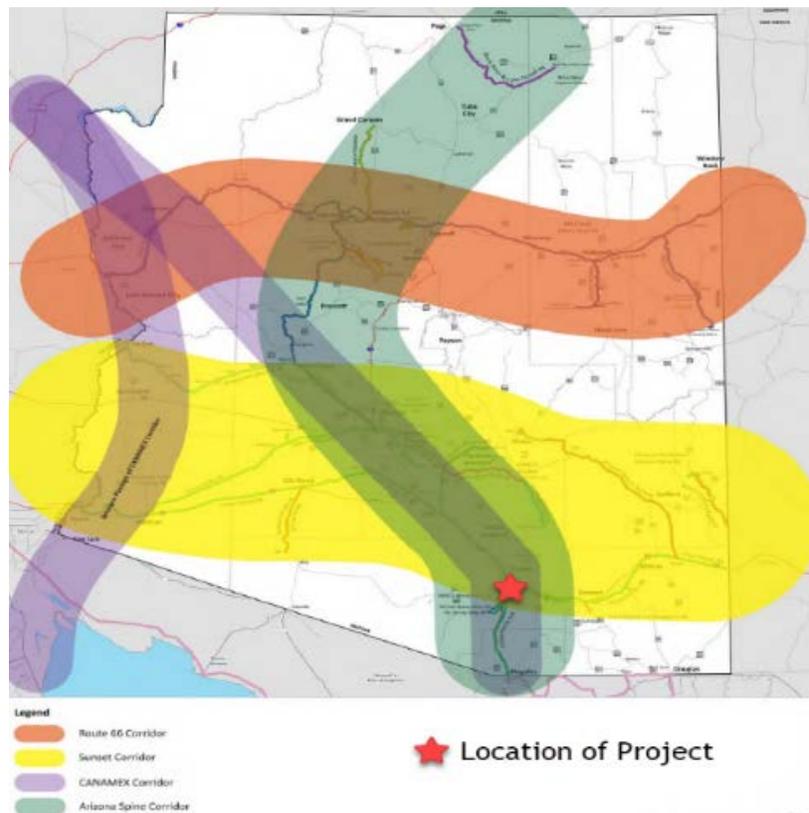


Figure 1-Arizona State Rail Plan Corridors of Opportunity

(<https://www.azdot.gov/docs/planning/state-rail-plan.pdf> [pgs 63-64])

VI. Detailed Project Description

Background

Pima County and supporting jurisdictions within the Tucson metropolitan area have long discussed ways of alleviating train conflicts with other forms of transportation within the region. Union Pacific Railroad (UP) operates two major rail lines in southern Arizona - the historic Sunset Line, which crosses several Southwestern states and connects with major rail facilities in the Midwest and beyond; and the Nogales Line, originating in Tucson, Arizona and extending deep into Mexico, serving the Mexican Ports of Guaymas, Tempico, and Lazaro Cardenas, and City of Hermosillo and Mexico City, among others. Opening in 1882, the Nogales Port is the oldest rail crossing of any border port of entry along the U.S.-Mexico border. Statistics compiled by the University of Arizona's Eller College of Management indicate that in the months of January, February, and March 2018, north-bound train crossings at the Nogales Port increased 32.61%, 16.67%, and 8.33%, respectively (<https://azmex.eller.arizona.edu/border-crossings/border-crossings-nogales-district-az-bpoe-total>). Approximately 130 million tons of commodities are currently transported via rail in Arizona, with total freight rail tonnage projected to triple in volume by 2050 (State Rail Plan).

The Nogales Line, with trains an average of 7,000 foot in length, runs on a line that cuts through six existing City of Tucson neighborhoods, three city wards and seven zip codes, serving not only as a visual barrier, but also a physical barrier to residents and local businesses. The 20 at-grade crossings on the line create barriers to the efficient flow of pedestrian, bicycle, and vehicular traffic. In addition, the Nogales Line runs adjacent to Borton Magnet Elementary, Van Buskirk Elementary, and Drexel Elementary schools.

Pima County, Arizona, anticipates total project costs will approximate \$1,336,599.00 and is applying for \$880,000 (with a 25% cash match and a 25% in-kind match) in Consolidated Rail Infrastructure and Safety Improvements (CRISI) Track 1 – Planning Grant funding to aid in the development of a study that will include technical and environmental analyses to support potential construction of a new railway bypass at Tucson, Arizona, inclusive of the existing Union Pacific Railroad (UP) Nogales Subdivision.

The potential scope of the study was broadly developed by Pima County through consultation with UP and in consideration of federal guidance promulgated in the Federal Railroad Administration's Notice of Funding Opportunity for Consolidated Rail Infrastructure and Safety Improvements (contained in Federal Register, Vol. 83, No. 35; February 21, 2018). It would enable Pima County, railroad stakeholder UP, and state and local stakeholders to determine:

- the conceptual feasibility for construction of the bypass,
- related environmental, economic, public, and railway operations and industrial development impacts,
- conceptual capital and operations and maintenance costs,
- potential public (federal, state, local) and private funding sources to construct the bypass in the future

The Nogales Line (Line) would be relocated to a U.S. Census Bureau designated Rural Area, south of the Tucson metropolitan area, along Old Vail Connection Road, within both unincorporated Pima County, and partially within the incorporated limits of the City of Tucson. Nearly the entire 11 mile bypass route is undeveloped and surrounded by industrially zoned land that is planned for regional economic development.

Notable project benefits include:

- lower fuel consumption from local automotive traffic and trains,
- lower regional air pollution from idling traffic,
- reduced surface street congestion,
- increased economic development activity,
- increased safety through the elimination of at-grade crossings,
- potential to redevelop the old rail corridor using other forms of mass transit, connecting large employers, the airport and other uses into the Downtown area and the City of Tucson's streetcar.

Users and Beneficiaries

The proposed realignment benefits many users, including:

- *Union Pacific Rail Road* stands to benefit significantly from the bypass route, providing increased efficiencies throughout their national rail network. In addition to the safety enhancements, UP will be afforded operational flexibility by being able to conduct crew changes outside of UP's Tucson Yard (Yard), providing nearly direct rail access to UP's operations in El Paso, Texas and Santa Teresa, New Mexico, for inbound trains from Mexico. This direct link allows UP to bypass the speed restricted tracks through central Tucson, and the Yard.
- *Pima County* has started acquiring industrially zoned land to provide a buffer against planned residential development as well as providing opportunities for economic growth. With several 100 acre or larger parcels available for development along the proposed bypass route, it stands to become one of the County's primary locations for job growth and new business attraction. The proposed rail bypass will bring an active rail line to serve this job center, a critical component to ensuring its successful development.
- *Port of Tucson*, the only inland multimodal rail port located in Arizona, will be provided with direct rail access, allowing unit trains from Mexico to directly enter the Port. In addition, rail supported customers can take advantage of shovel-ready locations set aside for development within a Foreign Trade and State of Arizona Enterprise Zone.
- *City of Tucson Residents* will benefit through increased safety for pedestrians, bicyclists, and drivers, as the proposed bypass will eliminate 20 at-grade crossings. In addition, rerouting the route will eliminate trains that often carry hazardous materials through residential areas and reduce pollution caused by vehicles idling as they wait at the crossings. It will also increase safety around two Tucson schools.
- *Rural Arizona communities* have the potential to benefit by increasing rail efficiencies along with more direct access to the Port of Tucson, providing construction jobs and long-term employment for transloading operators and other logistics jobs.

Components and Elements of the Project

This project aims to increase rail system efficiency and safety by reducing freight transportation cost and travel time, minimizing vehicular traffic congestion, and supporting quality economic growth. Included in this planning effort is:

- the identification and evaluation of alternatives,
- market analysis,
- railroad system design (including horizontal and vertical alignment),
- environmental evaluations and recommendations,
- existing railroad operations analysis,
- conceptual railroad operations modeling,
- revenue forecasting,
- preliminary engineering conceptualization,
- data analysis of existing and projected economic conditions,
- identification and confirmation of stakeholders and entities responsible for rail plan elements, and
- preparation of a conceptual estimate of capital cost.

Proposed Performance Measures

In 2015, there were approximately 2,100 railroad crossing incidents with 230 fatalities. To improve safety, the FRA has developed the *Railroad Crossing Safety & Trespass Prevention Initiative* with a 3 E framework of **E**ducation, **E**ngineering and **E**nforcement. The potential elimination of 20 existing at-grade crossings in an urban area, supports the FRA's mission through **E**ngineering to reduce grade crossing intersections. This project is the crucial first step of Planning to determine the most beneficial rail alignment to improve safety and efficiency for rail, vehicle, freight, and pedestrian users while supporting critical economic development. (<https://www.fra.dot.gov/Page/P08455>)

(A) Grade crossing information:

Table 1: Grade Crossings on Current Alignment

Infrastructure Owner	Primary Railroad Operator	DOT Crossing Inventory Number	Roadway	Crossing Position
Union Pacific	Union Pacific	741-135B	Park Avenue	RR Over
Union Pacific	Union Pacific	742-045F	Toole Ave	At Grade
Union Pacific	Union Pacific	742-047U	17th St	At Grade
Union Pacific	Union Pacific	742-049H	18th St	At Grade
Union Pacific	Union Pacific	742-100D	19th St	At Grade
Union Pacific	Union Pacific	742-103Y	20th St	At Grade
Union Pacific	Union Pacific	742-104F	22nd St	At Grade
Union Pacific	Union Pacific	742-106U	29th St	At Grade
Union Pacific	Union Pacific	742-107B	36th Ave	At Grade
Union Pacific	Union Pacific	742-108H	I-10 Overpass	RR Under
Union Pacific	Union Pacific	742-109P	Ajo Way	At Grade
Union Pacific	Union Pacific	742-110J	Fair St / Michigan Ave	At Grade

Union Pacific	Union Pacific	742-112X	Irvington Rd	At Grade
Union Pacific	Union Pacific	742-113E	Fletcher Rd	At Grade
Union Pacific	Union Pacific	742-114L	Drexel Rd	At Grade
Union Pacific	Union Pacific	742-115T	Bilby Rd	At Grade
Union Pacific	Union Pacific	742-116A	Valencia Rd	At Grade
Union Pacific	Union Pacific	742-117G	Teton Rd	At Grade
Union Pacific	Union Pacific	748-710G	Vamori Rd / Aero Park Blvd	At Grade
Union Pacific	Union Pacific	742-119V	Herman Rd	At Grade
Union Pacific	Union Pacific	742-120P	Hughes Access Rd / Aerospace Pkwy	At Grade
Private	Union Pacific	742-121W	Guillermo Herron	At Grade

Table 2: Proposed Realignment Grade Crossings

Infrastructure Owner	Primary Railroad Operator	DOT Crossing Inventory Number	Roadway	Crossing Position
Union Pacific	Union Pacific		Country Club Rd	RR Over
Union Pacific	Union Pacific		Swan Rd	RR Over
Union Pacific	Union Pacific		Wilmot Rd	RR Over
Union Pacific	Union Pacific		Rita Road	RR Over
Union Pacific	Union Pacific		I-10	RR Over

(B) Heavily traveled rail corridor information, if applicable. N/A

(C) PTC information, if applicable. N/A

VII. Project Location

The planned relocation is south of the Tucson Metropolitan area, along the Old Vail Connection Road. It bisects Arizona's 2nd and 3rd Congressional Districts and is in the Sonoran Corridor Study Area (Figures 2 and 3). All but one mile is in a U.S. Census Bureau designed Rural Area.

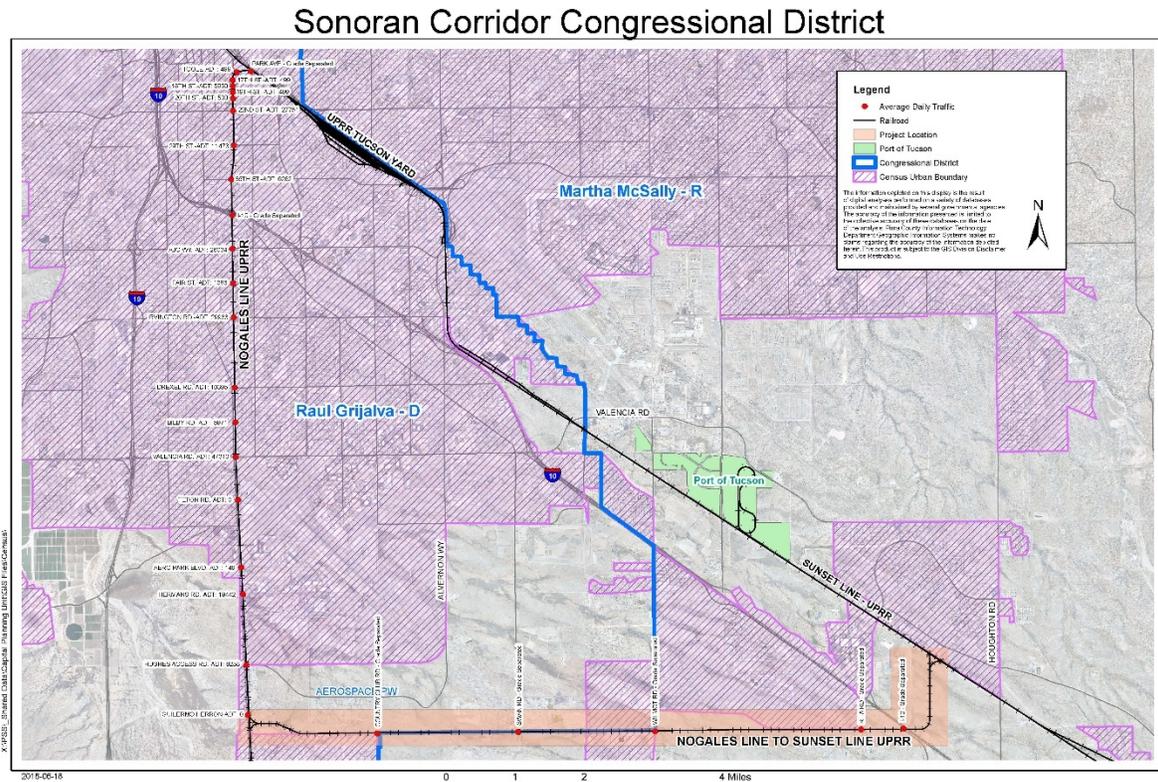


Figure 2- Sonoran Corridor Congressional Districts

The project is located near vital community and economic drivers including the Tucson International Airport, the Port of Tucson, Aerospace Research Campus, Raytheon Missile Systems, World View Enterprises, and Interstates 10 and 19. As such, providing rail service along



Figure 3-Aerial View of the Sonoran Corridor

the area of the proposed auxiliary interstate connection of the Sonoran Corridor will enable dynamic economic growth and new business development in the region.

VIII. Evaluation and Selection Criteria

Evaluation Criteria

Project Benefits: It is not often that communities have the opportunity to reduce the number of trains using 20 at-grade railroad crossings, thereby improving safety and quality of life, while simultaneously expanding a large area for critical economic development and significantly improving rail operations and efficiencies.

A. Effects on system and service performance:

Increased Speed

Union Pacific (UP) operates an average of eight trains a day along the Line. Trains from Mexico typically transport automobiles and other manufactured goods, while trains returning to Mexico often carry scrap metals and hazardous chemicals used in mining operations. Navigating the city center, the trains are limited to speeds of 10-20 miles per hour. A bypass route would reduce the number of trains through these neighborhoods and allow UP to operate the trains at speeds as high as 50 miles per hour along the bypass.

Increased Switching Volumes

UP's Tucson Yard was established at the turn of the century and, while it is the largest classification yard in Arizona, it is limited in its ability to expand due to its central Tucson location. The 2011 Arizona State Rail Plan identified the Yard as having "reached its capacity, and as demand for deliveries in Phoenix and Tucson increase, additional yard capacity is needed for these freight movements to be completed by rail." While the efforts considered as part of this grant application will not include a new classification yard, it demonstrates the need to expand the operations of the existing Tucson classification yard and region. The proposed realignment will likely include the ability to refuel and conduct crew changes along the new route, which will allow trains to continue to the Santa Teresa, New Mexico, or El Paso, Texas, yards without having to go through the Yard, thus freeing up added capacity at the Yard. Or, as trains move west, they can continue through the Tucson yard with minimal switching required to pass through. This will allow for increased switching volumes, thereby enhancing the overall efficiency and capacity for economic growth.

(<https://www.azdot.gov/docs/planning/state-rail-plan.pdf> [pg 41])

Increased Efficiencies

UP stands to benefit significantly from the bypass route as it would provide increased efficiencies throughout their national rail network. UP would be afforded operational flexibility by being able to conduct crew changes outside of UP's Tucson Yard, providing nearly direct rail access to UP's operations in El Paso, Texas and Santa Teresa, New Mexico, for inbound trains from Mexico. This direct link allows UP to bypass the speed restricted tracks through central Tucson, and the Yard.

Reduced Maintenance Cost of At-Grade Crossings

Annual savings of maintenance cost for the 20 UP at-grade crossings to be potentially reduced by this project are estimated to be \$70,000 for railroad track surface and \$188,500 for railroad signal equipment. A list of UP Crossings with summary of equipment and estimated maintenance cost is available on the project website

(<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

B. Effects on safety, competitiveness, reliability, trip or transit time, and resilience:

Bicycle and Pedestrian Traffic

UP's eight trains per day, with average of 7,000 foot in length, run on a line that cuts through existing City of Tucson neighborhoods, serving not only as a visual barrier, but also a physical barrier to residents and local businesses. This creates a significant impact to bike and pedestrian traffic, as what should be a simple trip often ends up a circuitous route in order to find safe crossings. Pedestrian traffic in this case also includes school children walking to and from public elementary schools.

Barriers to pedestrian traffic presented by the Line often impact impoverished areas of the city the greatest, as these areas usually have higher concentrations of people who depend on walking or biking to travel. The current route often forces residents to choose between crossing legally, or shortening their route by illegally crossing the railroad tracks. Tucson summer heat is intense. Typical temperatures rest firmly in the 90s between the months of June and September, with more than 40 days exceeding 100 degrees annually. These extreme summer temperatures tend to exacerbate people's desire to seek out a shorter route across the tracks, increasing the chances an incident occurs and demonstrating the opportunity to improve public health through the bypass.

Automobile and Bus Traffic

Analyzing the potential to relocate portions of the Line out of the central city area will reduce rail traffic at 20 existing at-grade crossings and their resulting impact on local traffic. Approximately 300,000 automobiles cross the existing crossings on a daily basis, causing significant traffic delays. Several of these streets are major east-west thoroughfares, including 22nd Street and Valencia Road, which serves as the western entry point into Tucson International Airport. While Interstates 10 and 19 cross the region, in the absence of a regional freeway network, the Tucson area relies heavily on the local road network to move traffic across town.

Suntran, Tucson's public transit authority, has six major bus routes that cross railroad tracks at multiple points. These bus routes serve the Tucson International Airport, and large regional employers such as Bombardier and Raytheon, in addition to local route service. Ridership data is available on the project website:

(<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

C. Efficiencies from improved integration with other modes:

Tucson International Airport

Rerouting the Line would open up undeveloped land for new rail-served uses. The bypass would route the trains 11 miles through largely undeveloped, industrially zoned land. The route would bring rail close to Tucson International Airport’s existing air freight operations, and Interstates 10 and 19, solidifying the area as an international advanced logistics hub.

Port of Tucson

The Port of Tucson (Port), the only inland multimodal rail port located in Arizona, is a federally designated Foreign Trade Zone and a State of Arizona Enterprise Zone, providing duty and tax benefits to users of the Port (Figure 4). The Port is located on over 700 acres of land in southeast Tucson and currently has over 1.7 million square feet of manufacturing, warehousing, and distribution space, and over 50,000 feet of working rail track. The bypass will provide direct access to the Port, where rail supported customers can take advantage of several ready locations set aside for future development and receive the tax benefits of locating in a Foreign Trade and Enterprise Zone. In addition, it would allow unit trains from Mexico to directly enter the Port, avoiding the Yard, increasing the speed and efficiency of the local rail operations. Information on the Port of Tucson is available on the project website (<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

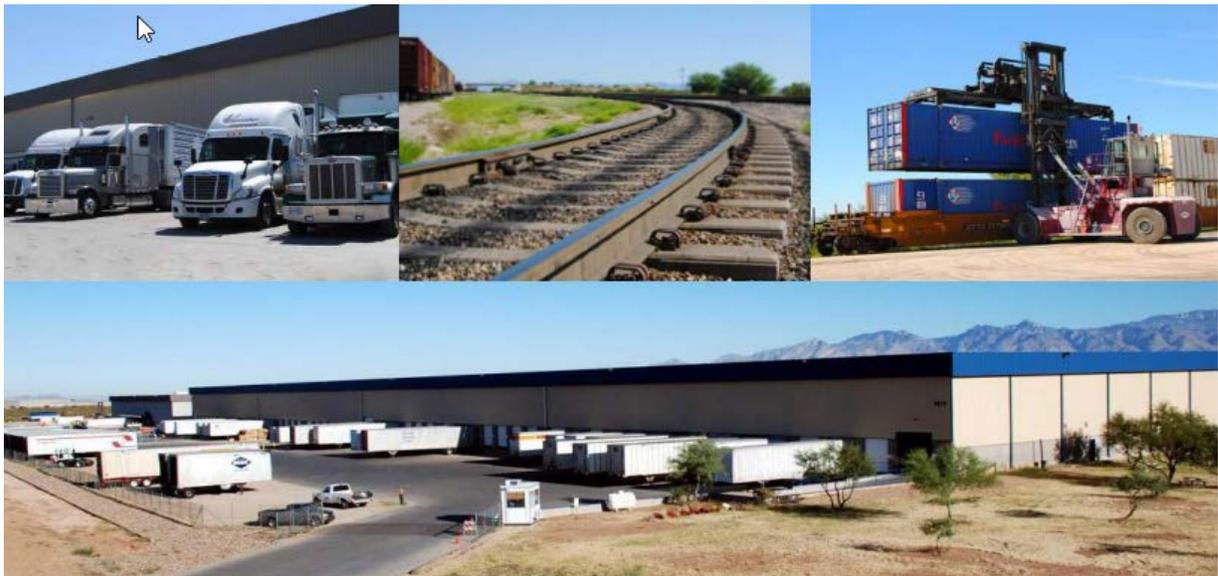


Figure 4-Port of Tucson Facilities

D. Ability to meet existing or anticipated demand:

According to the Arizona Commerce Authority’s report on *Arizona’s Aerospace and Defense Industry*, “Arizona manufactures more guided missiles and space vehicles than any other state”, with Arizona’s workforce being “employed in this industry at a rate more than 11 times that of the national average”

(https://d35uq38u77mscr.cloudfront.net/media/1065189/ACA_AD_IndustryOverview2015.pdf?pdf=Aerospace-Defense-Industry-Overview [pg 8]).

As identified in the September 2014 Southwest Multistate Rail Planning Study, the Arizona Sun Corridor contains some of the “highest growth areas in the U.S., as Nevada and Arizona were the two fastest-growing states in the country between 2000 and 2010, with population growth rates of 35 to 25 percent, respectively” (<https://www.fra.dot.gov/eLib/Details/L16012> [pg 5]).

The Arizona State Rail Plan (<https://www.azdot.gov/planning/transportation-programs/state-rail-plan>) identified the area where this project is located to be a state corridor specifically targeting “improved freight service to the Phoenix metropolitan area, and improved north-south freight movements within the State” and connecting with global trade with Mexico. With inbound, outbound, and through rail freight tonnage expected to triple in volume by 2050, eliminating urban at-grade crossings will support this increased demand for freight rail traffic (Figure 5).

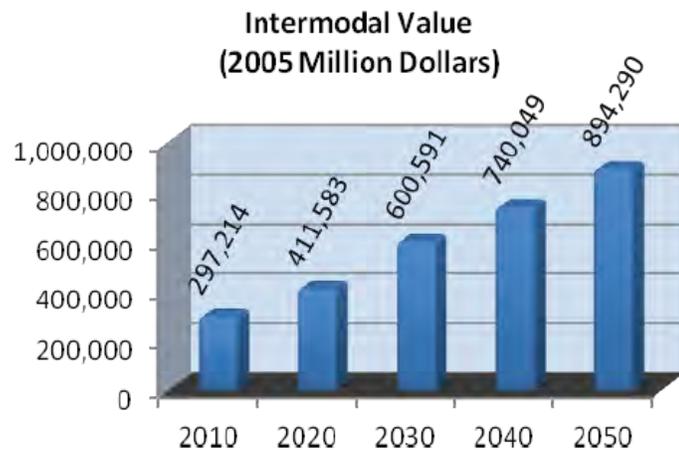


Figure 5-Economic Analysis of Rail Demand Forecasts (2011 State Rail Plan)

E. *Aerospace Research Campus (ARC)*

The region’s largest private employer, Raytheon Missile Systems, employs 12,000 people and is headquartered in Tucson, located adjacent to the Nogales line and the Tucson International Airport. Beginning in 2008, Pima County started acquiring industrially zoned land to provide a buffer against planned residential development south of Raytheon’s Plant site. Since 2008, the County has acquired nearly 600 acres of vacant industrial land in this area and, working with Raytheon, has established the Aerospace Research Campus (ARC) (Figure 6). ARC, located along the western end of the proposed bypass route, has attracted the interest of several aerospace related companies, including World View Enterprises, and Vector Space Systems. Within the ARC, Pima County has set aside nearly 60 acres for rail related uses, including a wye off the Nogales line, track sidings, and spurs. These planned rail improvements have attracted significant interest from existing businesses, allowing them to expand into new sites that better suit their needs. For example, Vector Space Systems chose to locate within the ARC, which gave them direct rail access enabling them to ship their containerized, low orbit rocket systems to their launch sites around the world. Information on the ARC is available on the project website (<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

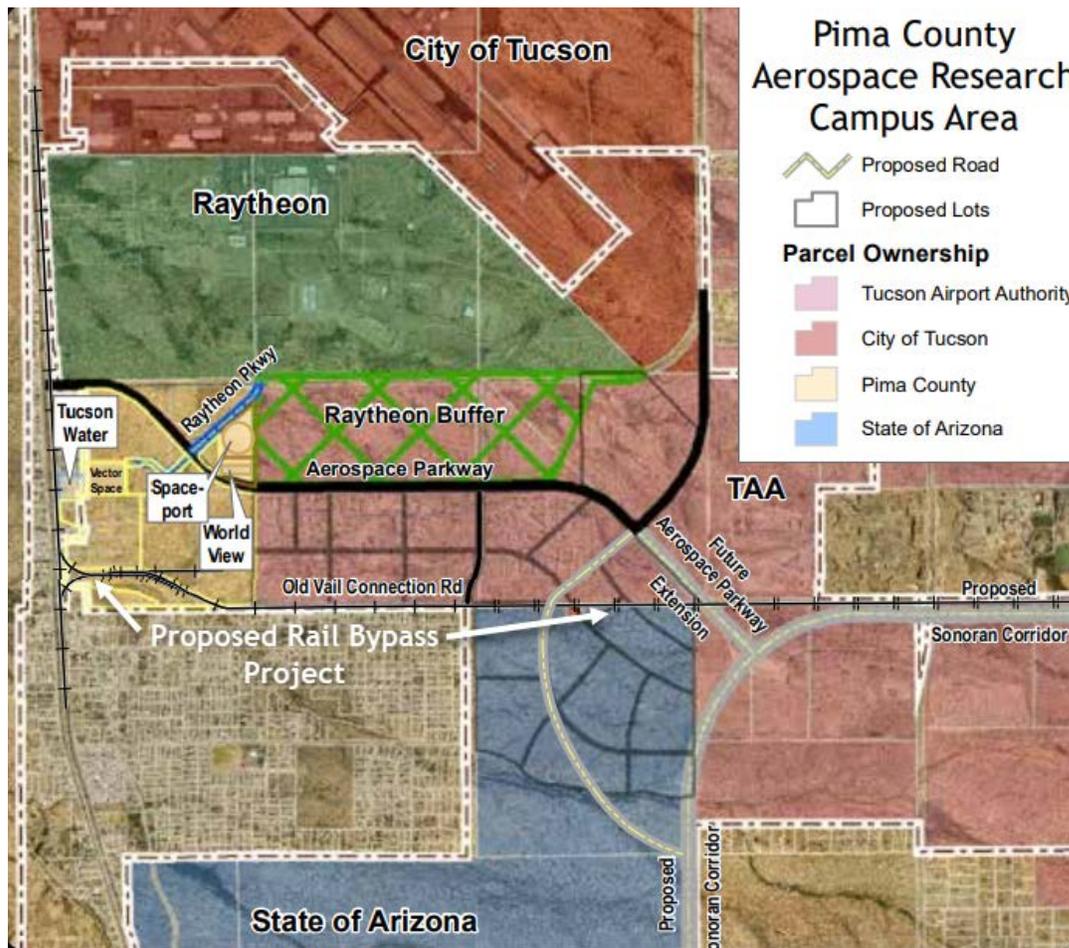


Figure 6-Aerospace Research Campus with Project Location

Pima County’s focus on the aerospace industry, as shown by its investment in the Aerospace Research Campus, is aligned with Arizona’s state-wide economic strategic visioning project known as ASPED (Arizona Strategic Partnership for Economic Development). This strategic plan identified “aerospace (together with microelectronics) as one of Arizona’s eleven key industry clusters” in which Arizona had “either a concentration of a growth rate higher than the national average” (*Arizona and Mexico: The Aerospace Manufacturing Connection*, <https://azmex.eller.arizona.edu/news-article/20feb2018/arizona-and-mexico-aerospace-manufacturing-connection>).

Tucson International Airport Master Plan

As identified in the 2014 Tucson International Airport Master Plan, the Tucson Airport Authority’s (TAA) reserve land area comprises approximately 5,700 acres of the total 14,000 acres available for future development south of the City of Tucson (Figure 7). This area is largely undeveloped, which creates the potential for development at a significant scale. Industrial/logistics and large-scale industrial development are recognized to be a primary focus for future land use, including the “continuing development of Tucson’s aerospace and

defense manufacturing, research and development, technology and biosciences employment cluster” (<https://www.flytucson.com/about-tus/master-plans/> [pg 7]).

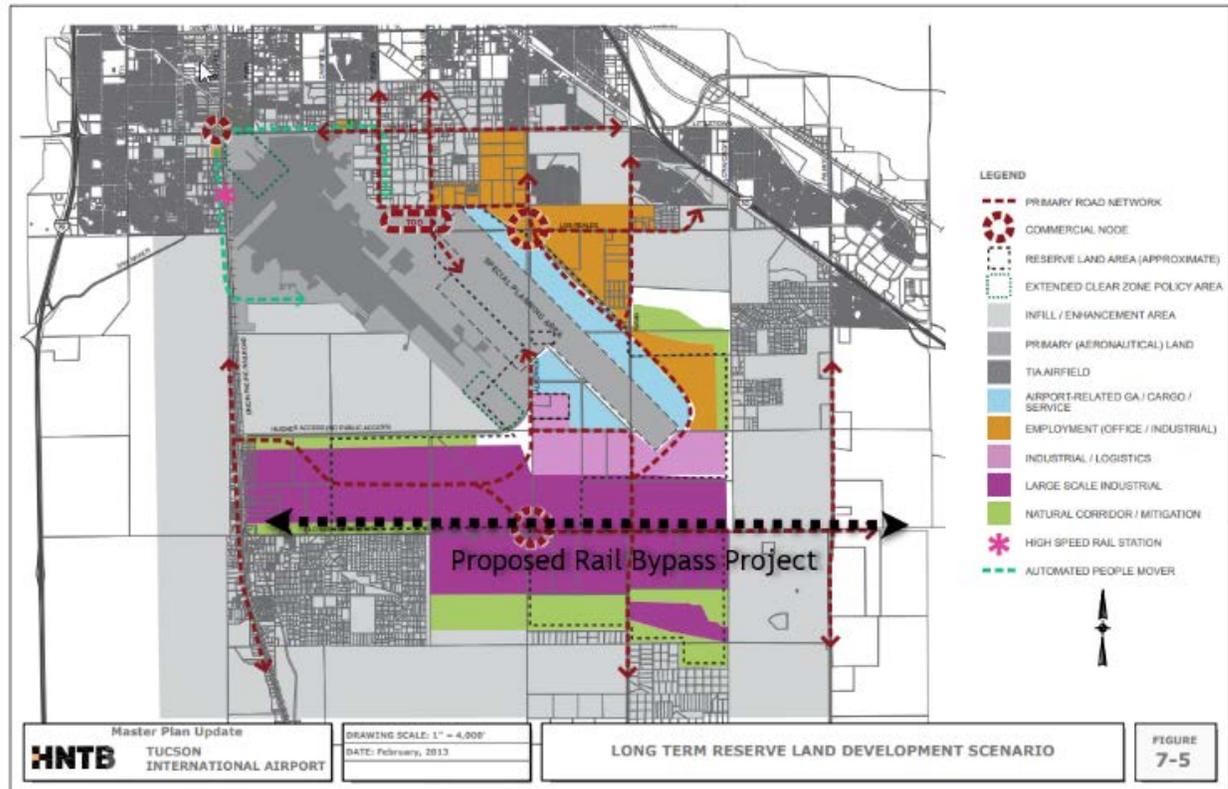


Figure 7-Long term Tucson International Airport Land Development with Project Location

Southwest Employment and Logistics Center (SELC)

Many of the existing rail-served properties in the Tucson area are comprised of small sites, located within City limits and lacking suitable building square-footage or the road networks necessary to accommodate expanding high-tech aerospace, rail-served businesses. Meanwhile, much of the 11 mile bypass route is undeveloped and surrounded by industrially zoned land, planned for regional economic development. In 2017, Pima County took steps to rezone over 1,800 acres of Pima County owned land for industrial uses along the eastern limits of the bypass route. The County hired a land use consulting firm to develop a master plan for the area, called the Southwest Employment and Logistics Center (SELC), which would provide large scale sites for a manufacturing job center. With several 100 acre or larger parcels available for development in this area, it stands to become one of the County’s primary locations for job growth and new business attraction. The proposed rail bypass will bring an active rail line to the serve this job center, a critical component to ensuring its successful development. Additional information about the SELC is available on the project website (<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

Arizona Sun Corridor

The proposed rail network is located within the Arizona Sun Corridor Megapolitan region, one of only 20 U.S. Megapolitans. The Sun Corridor is equivalent to both the size and population of the state of Indiana, with a projected growth of 118 percent by the year 2050, and generating 2 percent of the US Gross Domestic Product.

(http://www.america2050.org/arizona_sun_corridor.html).

As identified in the September 2014 Southwest Multi-State Rail Planning Study Summary Report, the Arizona Sun Corridor (Figure 8) contains some of the “highest growth areas in the U.S., as Nevada and Arizona were the two fastest-growing states in the country between 2000 and 2010, with population growth rates of 35 and 25 percent, respectively” (<https://www.fra.dot.gov/eLib/Details/L16012> [pg 5]).

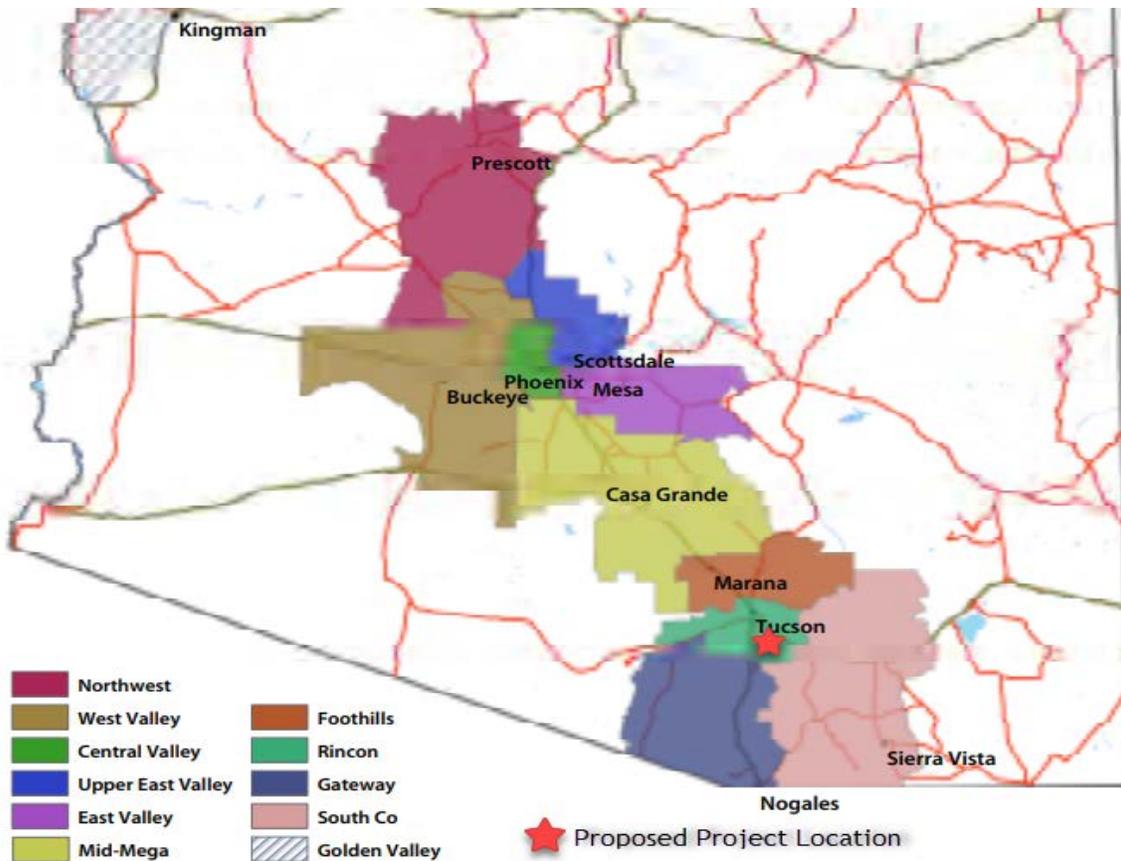


Figure 8-Location of Project within Arizona Sun Corridor

Sonoran Corridor

In 2017, the Arizona Department of Transportation (ADOT) kicked off a three-year study of potential routes for the Sonoran Corridor, a federally designated highway that would connect Interstate-10 with Interstate-19 in the area near this proposed new rail corridor (Figure 9). The Sonoran Corridor has been identified as a critical transportation piece that will support the

economic development initiatives of not only Pima County, but of southern Arizona as a whole. The Fixing America's Surface Transportation Act (FAST Act) designated the Corridor as a high-priority corridor, that could potentially alleviate traffic congestion at the Interstate-10 and Interstate-19 interchange, and improve the flow of interstate commerce originating out of Mexico. The Sonoran Corridor Study is posited to “establish a multimodal corridor, with the potential to enhance the movement of people and freight, support economic development and be a corridor for trade, communications, and technology”. A synopsis of the study is available on the project website

(<https://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=427311>).

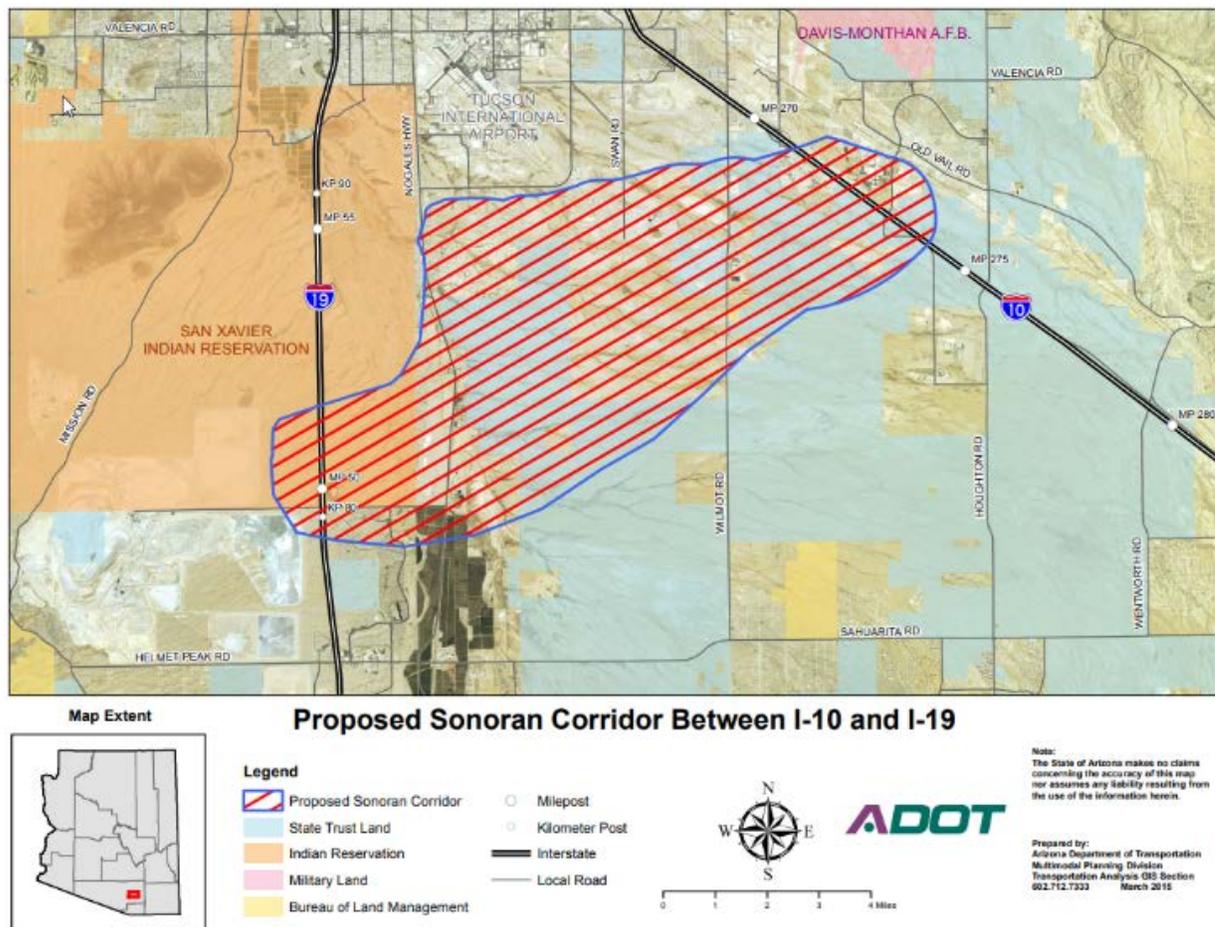


Figure 9-Proposed Sonoran Corridor within Pima County

Productive negotiations continue with the Tohono O’odham Nation (Nation) regarding the inclusion of tribal lands in the planning area and location of future improvements on tribal lands. The Nation is working with their allottees in the proposed improvement area to advance potential land acquisition discussions. The Nation has voiced their support of the Sonoran Corridor and its reach into their southern boundary, and have planned additional investment in the area to support their own economic development initiatives.

Figure 10 shows the location of the proposed bypass within the Sonoran Corridor.



Figure 10-Proposed Rail Bypass Line Primarily within Sonoran Corridor Limits

Amazon Fulfillment Center

Amazon recently announced plans to construct an 850,000 square foot fulfillment center on 94 acres with direct access to the privately operated track within the Port of Tucson (<http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=2349454>). The new fulfillment center will employ approximately 1,500 people, and provide Amazon with their largest regional fulfillment center in the southwest, serving Southern Arizona, New Mexico, and Texas with same day and next day delivery services. The site will accommodate over 400 semi-trucks and intermodal containers, with room to expand capacity as the facility grows.

Technical Merit:

A. Scope of Work is Appropriate to Achieve Outcome:

The desired project outcome is to research, analyze and develop a viable rail plan that would reduce use of, or eliminate, 20 at-grade crossings in urban areas, while simultaneously expanding new rail service into developing rural areas to support critical development in key economic sectors. The scope of this ARC Rail Expansion planning study would include assessment of:

- Conceptual engineering feasibility
- Economic impact at local, regional and state levels
- Environmental compliance (aligned with State NEPA efforts for Sonoran Corridor)
- Railroad network planning, operations analysis and simulations
- Industrial development opportunities along new rail line
- Identification of potential private-public funding partnerships

- Freight forecasting and market analysis
- Operating and maintenance cost forecasts

These tasks are the essential planning steps to ultimately constructing a railway bypass that will serve the needs of increasing national and international freight along critical trade corridors, provide new rail service for expanding aerospace and heavy-industry job markets, reduce congestion and improve safety for 20 at-grade railroad crossings, and improve rail efficiencies and operations.

B. Project Readiness for Designated Project Track:

This project concept has been evaluated for several years with various public and private entities, including the Union Pacific Railroad, Pima Association of Governments, Port of Tucson, City of Tucson, Arizona Department of Transportation and the Sun Corridor Economic Development Organization. Pima County is fully committed to starting comprehensive planning efforts and analyses as soon as grant negotiations are completed. The County's goal is to proceed into design efforts as soon as possible, according to the findings and recommendation of the planning efforts this CRISI grant would fund.

C. Technical Qualifications and Experience:

Pima County regularly implements Federal grants, and has administered over \$40,956,040 in Federal dollars during Fiscal Year 2017 alone, with \$3,325,621 of those dollars awarded by the Department of Transportation. An additional \$6,197,137 (includes state, local, tribal, and foundation grants) were successfully administered. In 2014, Pima County implemented the federally-funded TIGER 2013 Discretionary Grant for the Port of Tucson Export Rail Facility. The County received numerous accolades for its on-time/on-budget performance, demonstrating above-average ability to effectively execute an award granted by the Federal Railroad Administration.

D. Consideration of Potential Private Sector Participation:

Pima County will follow best-practice methods during the planning stage to discern viable opportunities for public-private funding partnerships. The National Cooperative Rail Research Program (NCRRP) Report 1: *Alternative Funding and Finance Mechanisms for Passenger and Freight Rail Projects* identified three general types of funding mechanisms that will be considered: Service or Asset-Related Revenue, Public Revenue, and Financing Mechanisms (Transportation Research Board, 2015).

Collaborating partners in developing this project will continue to be the Union Pacific railroad, Pima Association of Governments, Arizona Department of Transportation, City of Tucson, and other agencies and businesses as identified through stakeholder outreach.

E. Legal, Financial and Technical Capacity:

Fiscal management of this Federally-funded project will fall under the purview of the Grants Management division of Pima County's finance department. Using the centralized management system, Advantage Management Solutions (AMS), actual costs are regularly compared to budgeted values to ensure benchmarks are being met timely. All departments

are subject to internal audits conducted by the Finance and Risk Management department per Pima County Board of Supervisors Policy C2.6.

Invoices and Delivery Orders are tracked with the centralized AMS system as well, allowing copies of these documents to be made available to the public at request. The Grants Management division works closely with the program manager to ensure costs are aligned with program implementation, and maintains records for state, federal, and internal audits.

All contracts and grant-in-aid agreements are required per Pima County Administrative Procedure 3-5 to undergo review by the Pima County Attorney's Office to ensure compliance with local and Federal law before undergoing formal acceptance by the Board of Supervisors per Administrative Procedure 22-4. The Administration Division of the Pima County Attorney's Office provides continuing support for all other divisions within the County Attorney's Office. Under the direction of the County Attorney, it develops and implements operating policies and procedures and is primarily responsible for budget and finance, personnel, purchasing, and facilities management.

F. Project Consistency with Planning Guidance

The goals and objectives of this project are consistent with recommendations of the 2011 Arizona State Rail Plan, 2014 Southwest Multi-State Rail Planning Study, and other Reports as referenced. The scope of work and performance metrics are established and will be monitored in compliance with DOT and FRA requirements.

I. Selection Criteria

A. Proposed Cost Share:

The total match provided by both Pima County Public Works Administration (PWA) and Pima County Grants Management & Innovation (GMI) Department is \$406,599.00. Of the PWA match, \$170,000.00 is a cash match contribution. Along with the cash match commitment of \$50,000.00 by the Pima Association of Governments/Regional Transportation Authority (PAG/RTA), the total cash match of the Pima County CRISI Grant Proposal (i.e., the ARC Rail Expansion and Bypass proposal) is \$220,000.00 (\$50,000.00 + \$170,000.00). Please see the Letters of Commitment from PWA, GMI, and PAG/RTA on the webpage for detailed explanations of the cash and in-kind match commitments.

B. Net benefits of the grant funds will be maximized considering the Benefit-Cost Analysis, including anticipated private and public benefits relative to the costs of the proposed project, and factoring in the other considerations in [49 U.S.C. 24407\(e\)](#):

Full range of benefits, both public and private, will be identified as part of the Scope of this planning project. Anticipated benefits are summarized as below and will be expanded and quantified for detailed description in the final planning study report.

Table 3: Expected Effects on Benefit Categories

Impact Categories	Description	Monetized	Qualitative
Reduced Travel Time Costs	Reduced travel time costs from vehicle idling and delay at 19 at-grade crossings.	Yes	-
Improved Safety and Avoided Accident Costs	Improved safety and avoided accident costs from bypassing the Nogales Line and the 19 road grade crossings.	Yes	-
Avoided Emissions Costs	Avoided emission costs from vehicle idling and delay along the existing Nogales Line	Yes	-
Reduced Vehicle Operating Costs	Reduced vehicle operating costs from vehicle idling and delay along the existing Nogales Line.	Yes	-
O&M Cost Savings	Bypassing the grade crossing would reduce the amount spent maintaining the 19 at-grade crossings.	Yes	-
Improved Travel Time Reliability	Bypassing the road grade crossings will improve travel time reliability as there will be significantly lower probability for drivers to be delayed.	-	Yes
Improved Access to Future Development Potential	The new rail alignment will open up thousands of acres of vacant land currently zoned for industrial use serviceable by freight rail.	-	Yes
Efficient Rail Operations	Reducing rail congestion by allowing higher speeds along new alignment will increase switching volumes and improve the current operational efficiency and capacity for economic growth.	-	Yes
Improved Emergency Vehicle Access	Fewer rail crossing blockages will improve travel time and reliability for emergency responders that may otherwise be delayed or be forced to take a longer route.	-	Yes
Eliminate Transportation of Hazardous Materials through Residential Neighborhoods	Reducing the number of trains travelling through Tucson limits potential hazardous cargo from passing through various neighborhoods, including two adjacent elementary schools.	-	Yes

Key Departmental Objectives

A. Supporting economic vitality at the national and regional level:

The ARC Rail Expansion is aligned with Arizona State and Southwest Regional efforts to support increasing freight and rail transport needs, especially as the project is located within the CANAMEX, Arizona Spine, and Sunset Corridors. The proximity to the U.S.-Mexico border and direct access to the state's only multimodal rail port will serve to facilitate increased cross-border collaboration and trade, further supporting Arizona's mission to act as a gateway for international trade and investment (<http://www.azcommerce.com/media/1541864/aca-business-plan.pdf> [pg 17]). With existing freight tonnage expected to triple in volume by the year 2050, it is imperative to plan strategically so that these vital rail corridors are equipped to meet those increasing needs. (<https://www.azdot.gov/planning/transportation-programs/state-rail-plan> [pg 96]). With a combined gross domestic product of \$2.3 trillion, the

combined economies of Arizona, California, and Nevada represent approximately 15 percent of the total U.S. economy (<https://www.fra.dot.gov/eLib/Details/L16012> [pg 5]). With Arizona having some of the highest growth areas in the country, the ARC Rail Expansion study is vital to ensuring that these international trade corridors operate at potential, that targeted industry sectors are able to expand along the rail line, and that local communities are afforded the opportunity to benefit from higher-wage job markets and improved multi-modal transportation infrastructure.

Public and private commitments are in place to expand land development adjacent to the proposed rail line, with an emphasis on aerospace and heavy-industrial market sectors. The aerospace industry has been identified as a key sector opportunity for State and Regional economic growth by numerous regional and state entities including the Arizona Commerce Pima County, along with other partners including the Union Pacific Railroad, Pima Association of Governments, City of Tucson, Authority (<https://www.azcommerce.com/about-us/business-plan> [pg 26]), Arizona Strategic Partnership for Economic Development (<https://azmex.eller.arizona.edu/news-article/20feb2018/arizona-and-mexico-aerospace-manufacturing-connection>), and the Arizona State University Morrison Institute for Public Policy (<https://morrisoninstitute.asu.edu/sites/default/files/content/projects/EDP%20Executive%20Summary.pdf> [pg 4]). Port of Tucson, Arizona Department of Transportation, Tucson International Airport, and private businesses remain committed to the expanding development of this region as a hub for aerospace and other heavy-industrial sectors. A comprehensive analysis and forecast for rail and multi-modal transit, of which the ARC Rail Expansion Study is an integral planning component, will facilitate this development.

B. Leveraging Federal funding to attract other, non-Federal sources of infrastructure investment, as well as accounting for the life-cycle costs of the project:

In support of this project, the County is receiving \$50,000 from the City of Tucson/Pima Association of Governments, \$170,000 from the Pima County general fund, with an additional \$236,599 contributed as in-kind match.

C. Using innovative approaches to improve safety and expedite project delivery:

Pima County routinely awards contracts using alternative project delivery methods including: Job Order Contracting, Construction Manager At-Risk, and Design/Build. In addition, project planning and design has been streamlined to allow the majority of projects to utilize the same format as private sector developers when submitting plans for review and approval. These plans are routed through the Pima County Development Services Department (DSD), and are typically returned reviewed by DSD within 1.5 days. In addition, projects are required to follow the Project Management Process which includes the gate process. The gate process involves an interdisciplinary team of reviewers that attend meetings at key project intervals. During these meetings, the project is then reviewed for adherence to scope, schedule and budget. This approach has allowed Pima County to improve project delivery metrics by 30-50% over projects done prior to implementing this approach. Pima County's Project Delivery manual and gate process have been lauded, and ultimately applied, by jurisdictions throughout the State. The process has been studied and taught at Arizona State University's Alliance for

Construction Excellence. These processes are applied throughout the entire project from planning through construction.

Improved safety is a primary concern throughout Pima County. All meetings, even those that are not construction specific, begin with a safety share—an exercise in which safety tips are discussed as a group. These tips vary from specific industry guidelines such as OSHA, to simple “common sense” tips specific to the region, such as wearing sunscreen and hydrating throughout the workday to keep everyone safe in the hot, desert climate.

D. Holding grant recipients accountable for their performance and achieving specific, measurable outcomes identified by grant applicants:

Pima County requires strict adherence to the County-approved Project Development Manual. All projects receive continuous oversight and regular senior-level reviews (GATE Process). This has resulted in significant improvement to project outcomes: scope, schedule, and budget. Information on Pima County’s Project Management and Gate Process is available on Pima County’s Project Management Office website (http://webcms.pima.gov/government/project_management_office_pmo/).

IX. Project Implementation and Management:

Describe proposed project implementation and project management arrangements.

Arrangements for Project Contracting

Development of the contract for this work is in conformance with Pima County Procurement Code and Arizona State Revised Statutes. This same approach was used when delivering the Port of Tucson Grant from TIGER V. The Port of Tucson Container Rail Facility met all FRA requirements and was completed in line with the Project Management Plan developed for that project. The Port of Tucson Container Rail Facility received significant agency praise for the team’s effectively meeting the grant’s requirements.

Project Management Plan

The Grantee shall develop a Project Management Plan (PMP) for the scope of services awarded by the Consolidated Rail Infrastructure and Safety Improvement (CRISI) Grant. A PMP is the Grantee’s overarching project implementation plan that spans the entire period of the Project. It should describe a Grantee’s approved policies, practices, and procedures related to the management, planning and preliminary design for the CRISI Grant scope of work. As the Project progresses, an initial PMP should be updated as needed to include any new or improved procedures. A PMP shall include the following sections:

- A description of the scope of work for the Project;
- Adequate staff organization with well-defined reporting relationships, statements of functional responsibilities, job descriptions, and job qualifications;
- Organizational structures, management skills, and staffing levels required for the Project;
- A document control procedure and recordkeeping system;

- Project Contracting will follow state statutes and Pima County Procurement Code D29.4 for uniform and efficient contracting;
- Procedures for monitoring and controlling Project costs, schedule, and scope to ensure they don't exceed or deviate from the requirements;
- Risk Management Plan identifying potential risks and methods to manage those risks as well as describing procedures for monitoring, identifying and managing future risks as they arise;
- A Change Order Procedure that includes a documented, systematic approach to handling Project scope, budget and scheduling changes;
- Quality control and quality assurance functions, programs and responsibilities;
- A documented system health and safety plan for the entire Project lifecycle;
- If applicable, description of required safety certifications and processes;
- Identification of required stakeholder agreements, right of way agreements, and other critical third party agreements and the process for obtaining those agreements;
- Required government actions or approvals;
- Material testing policies and procedures, if applicable to the Project; and,
- Internal plan implementation, communications and reporting requirements.

The Pima County Project Management Office and the Pima County Grants Management Innovation Office will provide all project management and oversight of the grant. All projects of this nature are managed according to the Pima County Project Management Manual which includes the Gate Process. The gate process are mandated milestone reviews to determine if a project has met all the required milestones and remains on target (scope, schedule and budget). The manual and workflow schematic are available on Pima County's Project Management and Gate Process website: http://webcms.pima.gov/government/project_management_office_pmo/.

The manual addresses procurement of professional services, change-order management, risk management and provides an escalation ladder to direct issues needing resolution in a timely matter to the appropriate parties. The key purpose of the manual is to provide structure to keep projects on schedule, on budget, and within scope.

X. Planning Readiness for Tracks 2 and 3

N/A

XI. Environmental Readiness for Track 3 FD/Construction Projects

N/A

Appendices

Appendix A Statement of Work

Appendix B Benefit Cost Analysis