

ARIZONA STATE RAIL PLAN

Role of Rail: Technical Memo No. 1



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Arizona State Rail Plan
Technical Memorandum #1
Role of Rail – Plan Chapter 1
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Contents

1	The Role of Rail in Statewide Transportation (Overview)	1-1
1.1	PURPOSE AND CONTENT	1-1
1.2	MULTIMODAL TRANSPORTATION SYSTEM GOALS	1-2
1.3	ROLE OF RAIL IN THE ARIZONA TRANSPORTATION NETWORK	1-3
1.3.1	<i>Rail's Past in Arizona</i>	1-3
1.3.2	<i>Rail's Role in Arizona's Freight Network</i>	1-7
1.4	FREIGHT RAIL SERVICES, INITIATIVES, AND PLANS	1-8
1.4.1	<i>Southern Transcon</i>	1-8
1.4.2	<i>Sunset Route</i>	1-9
1.4.3	<i>Rail Corridor Development</i>	1-10
1.4.4	<i>Trade with Mexico</i>	1-11
1.4.5	<i>Rail and Economic Development</i>	1-11
1.5	ROLE OF PASSENGER RAIL IN ARIZONA TRANSPORTATION NETWORK	1-11
1.6	PASSENGER RAIL INITIATIVES AND PLANS	1-14
1.6.1	<i>Intercity Passenger Rail Initiatives and Plans</i>	1-14
1.6.2	<i>Commuter Rail Initiatives and Plans</i>	1-14
1.7	INSTITUTIONAL GOVERNANCE STRUCTURE OF RAIL IN ARIZONA	1-15
1.7.1	<i>ADOT's Legislative Rail Authority and Organization</i>	1-15
1.8	PUBLIC FUNDING AND FINANCING OF RAIL PROJECTS	1-20
1.8.1	<i>State and Local Funding of Rail Projects in Arizona</i>	1-20
1.8.2	<i>Federal Funding Sources</i>	1-20
1.8.3	<i>Federal Financing Programs</i>	1-25

Tables

Table 1-1.	Content of the 2017 Arizona State Rail Plan	1-2
Table 1-2.	Rail's Percent Modal Share of Freight Originating and Terminating in Arizona by Commodity and Mileage Range (2017)	1-7
Table 1-3.	Summary of Amtrak Routes in Arizona	1-12
Table 1-4.	Arizona Population Served by Intercity Passenger Rail	1-13

Figures

Figure 1-1.	BNSF Railway System Map	1-5
Figure 1-2.	Union Pacific Railroad System Map	1-6
Figure 1-3.	BNSF Southern Transcon Corridor	1-8
Figure 1-4.	UPRR Sunset Corridor	1-9
Figure 1-5.	Canamex Corridor	1-11
Figure 1-6.	Amtrak Routes and Stations Serving Arizona	1-13
Figure 1-7.	ADOT Organization Chart	1-16
Figure 1-8.	ADOT COGs and MPOs	1-18
Figure 1-9.	Arizona Rail Network and Tribal Lands	1-19

1 The Role of Rail in Statewide Transportation (Overview)

1.1 PURPOSE AND CONTENT

The purpose of the Arizona State Rail Plan (SRP) is to guide the advancement of the rail system used by the state's freight shippers and rail passengers. The State Rail Plan provides an updated assessment of the rail system along with recommendations for policies, programs, processes, and projects to improve rail-related safety and service, and serves as a practical roadmap for future rail investment and policies in Arizona. The document will be used to provide an understanding of existing and future issues and trends influencing the state's rail system from the present year to the year 2040. It will further serve to provide guidance and recommendations to enhance Arizona's rail system and service.

The SRP has been prepared by the Arizona Department of Transportation (ADOT) to meet the requirements of the federal Passenger Rail Investment and Improvement Act (PRIIA) of 2008, as well as the subsequent State Rail Plan Guidance issued by the Federal Railroad Administration (FRA) in 2013. While the primary purpose of PRIIA was to provide for improved passenger rail service in the United States, the Act requires each state to have an approved rail plan as a condition for receiving future rail funding for either passenger or freight improvements.

The prior SRP was completed in 2011 and was prepared in support of the transportation framework studies prepared for Building a Quality Arizona (BqAZ), an association bringing together municipalities, MPOs, ADOT, the State Legislature, the Governor's Office, and business leaders to discuss state infrastructure needs. The current plan is one of several modal plans prepared by ADOT which complements the vision and goals of the State Long-Range Transportation Plan (LRTP) and the State Freight Plan.

The State Rail Plan reflects the input of a large number of stakeholders including the railroads, key freight shippers, government officials, regional planning entities, rail interest groups, economic development officials, border organizations, tribal governments and rail-served counties. Table 1-1 summarizes the content of the Arizona SRP by chapter.

Table 1-1. Content of the 2017 Arizona State Rail Plan

Chapter/Title	Description of Content
Executive Summary	
1. The Role of Rail in Statewide Transportation	Describes the role of rail within the State's transportation system and how Arizona state and local government entities are organized to support rail development.
2. The State's Existing Rail System	Describes the Arizona rail system, its current condition, and environmental and economic impacts on the State. Identifies past and future trends that have impacted or will impact the Arizona rail system.
3. Proposed Passenger Rail Improvements and Investments	Identifies passenger rail service needs and opportunities. Describes improvements and investments that have been put forward to address passenger rail service needs and opportunities.
4. Proposed Freight Rail Improvements and Investments	Identifies freight rail service needs and opportunities. Describes improvements and investments that have been put forward to address freight rail service needs and opportunities.
5. The State's Rail Service and Investment Program	Presents ADOT's vision for railroad transportation, projects and strategies to meet that vision, summary of impacts that would result from the projects and strategies, and a discussion of probable financing scenarios.
6. Coordination and Review	Descriptions of outreach and coordination efforts in developing the SRP.
Technical Appendices	

1.2 MULTIMODAL TRANSPORTATION SYSTEM GOALS

The SRP is part of Arizona's multimodal "family of plans." In that context, the SRP is an outgrowth of Arizona's Long-Range Transportation Plan (LRTP), based on similar goals and objectives. Arizona's new LRTP, entitled What Moves You Arizona 2040 (WMYA 2040), is expected to be published in late 2017, but ADOT has released a preliminary version of WMYA 2040 goals and objectives. A version modified to include only rail-relevant objectives is below.

1. Improve Mobility, Reliability, and Accessibility – Implement critical, cost-effective investments to improve access to multimodal transportation and optimize mobility and reliability for passengers and freight
 - Address freight bottlenecks identified by the Statewide Freight Study
 - Support and facilitate better accessibility to the statewide multimodal transportation system and connectivity between modes
 - Emphasize the deployment of technology to optimize existing system capacity and performance
2. Preserve and Maintain the System – Maintain, preserve, and extend the service life of existing and future State Transportation System infrastructure
3. Enhance Safety – Continue to improve and advocate for transportation system safety for all modes
 - Reduce the number and rate of serious injuries
 - Reduce the number of non-motorized fatalities and serious injuries

4. Strengthen Partnerships – Develop and nurture partnerships that support coordination, integration, and preservation of ADOT’s investment
 - Strengthen the effectiveness of ADOT’s project and program coordination with MPOs, COGs, local agencies, and tribes
 - Improve coordination with state and federal agencies and NGOs
 - Explore the use of public-private partnerships to accelerate or improve program and project delivery
 - Reduce institutional and administrative hurdles to public-private partnerships
5. Improve Program Delivery and Foster Environmental Stewardship – Continually enhance the ability of ADOT to efficiently, effectively, and transparently deliver programs and projects, and do so in a way that preserves and protects the natural environment
 - Increase the percent of projects delivered on time and on budget
 - Communicate investment needs and articulate the benefit of improvements
 - Make more effective use of data to improve analysis and inform decisions
 - Minimize and mitigate the environmental impact of transportation projects and system operations
6. Make Cost-Effective Investment Decisions and Support Economic Vitality – Better link planning and programming through performance-based decision-making that integrates the project evaluation criteria and weighting established by the LRTP. Ensure responsible management of public resources, and implement funding strategies to ensure long-term balanced investment in the State Transportation System.
 - Seek to optimize the return on investment (ROI) on all projects and programs
 - Implement the most cost effective transportation solutions
 - Act as stewards for the state’s natural, cultural, and environmental resource
 - Maximize the leveraging of ADOT funds

These multimodal goals and objectives will be considered in developing the rail vision, goals, and objectives that will appear later in this document.

1.3 ROLE OF RAIL IN THE ARIZONA TRANSPORTATION NETWORK

1.3.1 Rail’s Past in Arizona

The origins of rail in Arizona began in May 1877 in Yuma, when a Southern Pacific Railroad engine crossed the Colorado River from California into Arizona. By 1879, Southern Pacific’s operations extended from Yuma to Maricopa Wells, and soon after that, reached Tucson. Within another three years, the line

fully extended through southern Arizona to the New Mexico border. The Atlantic and Pacific Railroad, completed between 1880 and 1883, crossed northern Arizona, linking Albuquerque to California.

The late 1800s and early 1900s was the Golden Age of railroads. After the two cross-state lines were built, a number of auxiliary routes were constructed. Atchison, Topeka, and Santa Fe Railway (ATSF), of which Atlantic and Pacific Railroad was a subsidiary, built the 209-mile “Peavine” route in 1893-1895, connecting Williams Junction to Phoenix. Southern Pacific added segments to Nogales, Douglas, Globe, Hayden, and other areas in southern Arizona.

The construction of Arizona’s rail network had a major impact on the state’s growth and development, allowing key commodities in Arizona – including cattle, coal, copper, and cotton – to be shipped to markets outside the state. The advent of railroads also allowed Arizona to receive supplies more quickly and at a lower cost. Before the railroads were in operation, goods were shipped by steamer from San Francisco around Baja California and up the Sea of Cortez before being moved to light draft stern-wheel boats, which would carry goods up the Colorado River into Arizona.

Little rail development occurred until late 20th century due to the increasing competitiveness of automobile travel. The construction of the interstate highway system, greater regulation of railroads, and lower vehicle prices made the automobile the preferred mode for personal travel and boosted the trucking industry’s share of freight movement.

Following a wave of bankruptcies and mergers reducing the number of major railroads in the country from over 125 in the mid-1950s to 35 in 1980, Congress passed the Staggers Rail Act of 1980, which largely deregulated the railroad industry and improved railroad companies’ finances.

As a result of rationalization permitted by the Staggers Act, today, two large railroads operate in Arizona—BNSF Railway Company (BNSF) and Union Pacific Railroad (UPRR)—the products of numerous mergers, the last of which were mid-1990s mergers between the Burlington Northern Railroad and Atchison, Topeka & Santa Fe Railway (commonly known as the Santa Fe), and between Southern Pacific (SP) and the UPRR. BNSF operates 33,500 route miles in 28 U.S. states and 2 Canadian provinces, while UPRR operates 36,000 miles in 23 states. Through connections with eastern railroads, these railroads facilitate coast-to-coast movement of various commodities, and provide a key link between California and Midwestern industrial and distribution areas.

A number of smaller railroads also operate in Arizona, which mostly serve the mining and natural resource industries.

Responsibility for passenger rail operations shifted to Amtrak in the early 1970s following a decades-long decline in ridership on services previously operated by combined freight and passenger railroads. Congress created Amtrak in 1970 to relieve the freight railroads of the financial burden of operating passenger trains, while still preserving passenger rail service. Services provided in Arizona are part of Amtrak’s long-distance, cross-country operations, operating over the BNSF line in northern Arizona and the UPRR line in southern Arizona.

Figure 1-1. BNSF Railway System Map



Source: <https://www.sec.gov/Archives/edgar/data/15511/000001551113000005/bnsfcopcommform10kmapsmalls.jpg>

Figure 1-2. Union Pacific Railroad System Map

Source: https://www.up.com/aboutup/reference/maps/system_map/index.htm

1.3.2 Rail's Role in Arizona's Freight Network

Overall, the railroads carry around 10 percent of freight tonnage to and from Arizona, but modal share varies greatly by commodity type and distance. Table 1-2 displays rail's modal share for freight that originates or terminates in Arizona. The table lists commodities in descending order of the tonnage shipped by rail with coal accounting for the highest originating or terminating tonnage. In most states rail is used for shipping low value, dense commodities long distances. Rail shipments to/from Arizona generally follow this trend, so that rail has the highest volumes and modal share for shipments of coal, metallic ores, and fertilizers, all of which are bulky, low value commodities. Typically, rail transportation is not used for shipments within a state as trucking has a cost advantage over short distances. However, within Arizona, some transportation markets are specialized with rail used heavily between certain locations. For example, coal and metallic ores are shipped in large quantities between a handful of mining, processing, and consumption locations thus showing relatively larger market share over distances of less than 100 miles.

Table 1-2. Rail's Percent Modal Share of Freight Originating and Terminating in Arizona by Commodity and Mileage Range (2017)

Commodity	Rail Tonnage	Rail Modal Share by Mileage Range					Total
		Less than 100	100 - 249 Miles	250 - 499 Miles	500 - 999 Miles	1,000 + Miles	
Coal	8,974,000	100%	0%	0%	0%	100%	97%
Metallic ores	5,895,000	28%	65%	36%	14%	3%	50%
Fertilizers	1,506,000	1%	18%	45%	24%	82%	59%
Nonmetal min. prods.	1,357,000	0%	7%	0%	45%	33%	7%
Basic chemicals	1,347,000	7%	49%	19%	25%	58%	31%
Cereal grains	1,142,000	0%	0%	17%	52%	91%	43%
Animal feed	678,000	1%	14%	0%	1%	42%	13%
Coal-n.e.c.	659,000	0%	0%	0%	1%	75%	1%
Other foodstuffs	646,000	0%	0%	0%	0%	25%	4%
Wood prods.	627,000	0%	0%	0%	12%	46%	13%
Motorized vehicles	549,000	0%	0%	0%	1%	44%	21%
Base metals	534,000	0%	21%	1%	32%	22%	13%
Plastics/rubber	406,000	4%	0%	0%	1%	35%	15%
Other	2,167,000	0%	0%	0%	4%	17%	2%
Total	26,486,000	6%	19%	3%	5%	43%	11%

Source: Freight Analysis Framework - 4

1.4 FREIGHT RAIL SERVICES, INITIATIVES, AND PLANS

1.4.1 Southern Transcon

BNSF's Southern Transcon rail line (Figure 1-3), connecting Southern California with Kansas City and Chicago runs through northern Arizona to the north of the UPRR Sunset route along I-40 corridor. The Sunset Route and the Southern Transcon serve roles that are in some ways similar, to connect the West Coast to interior parts of the United States. Both railroads have invested heavily in their respective routes over the years.

Figure 1-3. BNSF Southern Transcon Corridor



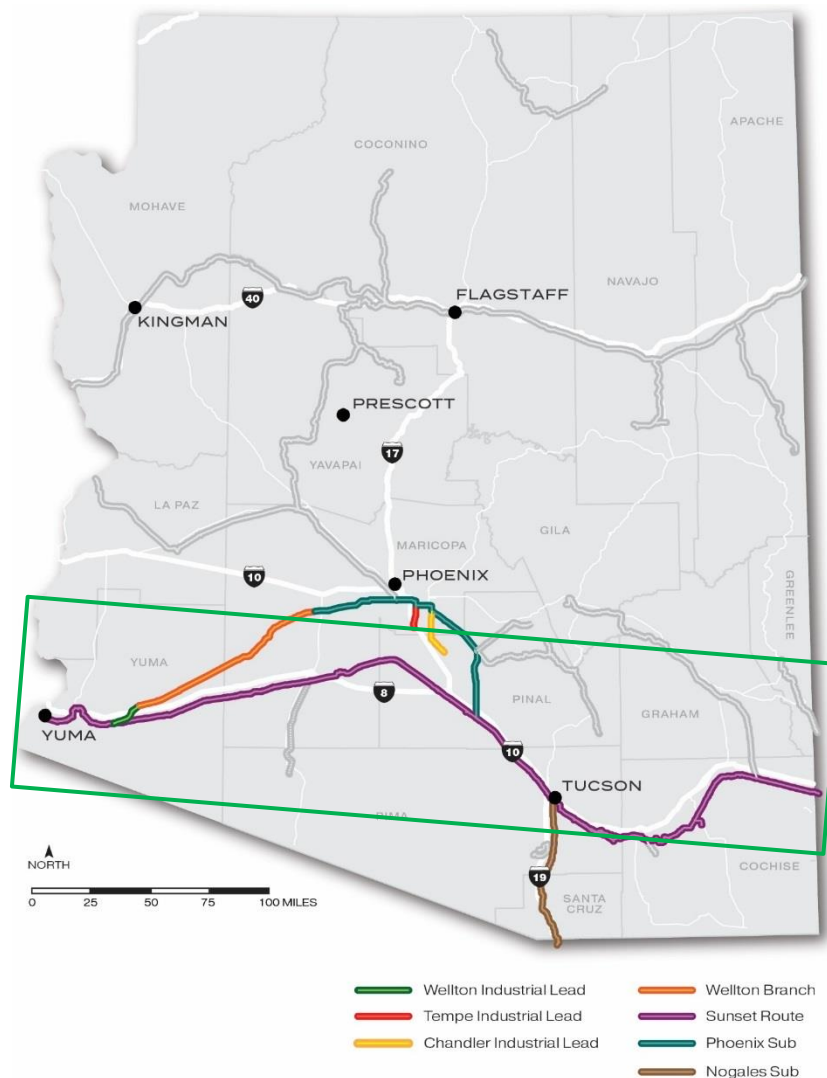
Source: WSP

Although Phoenix is connected to BNSF and UPRR by branch lines, neither of the two major rail corridors directly accesses Phoenix. UPRR at one time had a parallel line to its Sunset Corridor with a connection at Wellton to the west and Picacho, near Eloy, to the east. Today a major segment between Wellton and Phoenix is out of service, while the Phoenix-Picacho segment remains operational. BNSF has line into Phoenix connecting with the Transcon at Williams Junction.

1.4.2 Sunset Route

The Sunset Route, shown in Figure 1-4, is the corridor that is owned and operated by the UPRR between Los Angeles, CA and El Paso, TX crossing the southern part of Arizona passing through Yuma and Tucson. It serves as a key linkage between the West Coast and interior portions of the U.S. According to UPRR, the Sunset Route handles approximately 20 percent of the railroad's traffic.¹ When the UPRR acquired the Sunset Route in purchasing the Southern Pacific, most of the rail line was a single track. Since that time, UPRR has been constructing a second parallel track to accommodate growth in freight traffic. In 2014, UPRR announced the double tracking to be 80 percent completed.

Figure 1-4. UPRR Sunset Corridor



Source: WSP

¹ Union Pacific in Arizona, 2016 Fast Facts, https://www.up.com/cs/groups/public/@uprr/@corprel/documents/up_pdf_natedocs/pdf_arizona_usguide.pdf.

Not only has the line been upgraded, but terminals and facilities to serve the line have also been improved. The Port of Tucson received a \$5 million federal grant under the USDOT's TIGER discretionary grant program² in 2014 as part of a \$13 million project to install powered high speed switches to allow UPRR trains to enter and exit the facility without reducing speed, thus lessening blockages at highway crossings and obstructions of the UPRR mainline. The project reduces congestion experienced by motorists and other trains in the area. The project has also reduced the time required to load and unload trains, which allowed the Port of Tucson to initiate service between Tucson and the Ports of Los Angeles/Long Beach.

UPRR has also looking to expand yard facilities to support the Sunset Route. In 2006, UPRR proposed a plan to construct a new classification yard near Picacho Peak in Pinal County. In order to construct the yard, UPRR would need to obtain land from the State of Arizona. As of 2017, UPRR and the State Land Department are studying proposed changes to the project.³

1.4.3 Rail Corridor Development

Several rail lines within Arizona access coal, copper, and other mines. Due to fluctuating commodity prices, parent company strategies, low mine outputs, and other considerations, the level of activity at these mines differs, as does the level of traffic on rail lines leading to the mines. The Arizona Eastern Railway invested heavily between 2012 and 2017 to upgrade its lines due to growth in traffic associated with Freeport-McMoRan copper mining and processing operations on its lines. By contrast, the Magma Arizona Railroad is inactive due to lack of mining activity on the line. However, plans are in place to reactivate mining operations along the line and the line could be placed back into service. As of mid-2017, Resolution Copper Mining, the owner, is exploring potential uses of the rail line.

The Black Mesa and Lake Powell Railroad transports coal from the Peabody Energy Kayenta Mine near Kayenta to the Navajo Generating Station at Page. The Navajo Generating Station is expected to close in 2019, thus removing shipping activity on the rail line. Proposals have been put forward to connect the rail line to the wider rail network with a new rail line built to the BNSF Transcon. A new connection is thought to open opportunities to the Kayenta mine and other potential shippers on the line.

The Arizona & California Railroad provides a third corridor for Arizona shippers to the West Coast, although as a short line it is less efficient route than either the Southern Transcon or the Sunset Corridor. The short line serves as a "bridge" connecting with BNSF at Matthie and Cadiz, CA.

² The Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant program was originally part of the 2009 Recovery Act. Since that time, this competitive intermodal grant program has been funded each federal fiscal year, funding collectively \$5.1 billion in road, rail, transit and port projects.

³ Phil Riske, "A decade later, no 'pressing need' for Red Rock rail facility railroad says," *Casa Grande Dispatch*, September 10, 2017.

1.4.4 Trade with Mexico

A number of parties are examining using rail transportation to facilitate trade with Mexico. The CANAMEX Corridor Coalition, comprising Arizona, Nevada, Utah, Idaho and Montana, along with the Canadian province of Alberta and the Mexican state of Sonora, was formed as part of the North American Free Trade Agreement (NAFTA) in 1995. The CANAMEX Corridor (Figure 1-5), now designated as future Interstate 11 in Arizona, passes through Arizona from Nogales to Las Vegas and has been considered a high priority corridor by the U.S. DOT. Rail transportation would be a component of the CANAMEX corridor and any subsequent trade initiatives.

Other specific concepts and needs for cross-border commerce have been considered. The possibility of shipping Mexican produce into the U.S. has been explored. The Yuma Metropolitan Planning Organization conducted a feasibility study in 2013 to evaluate the potential for building a rail connection between the UPRR Sunset Route and the Ferromex Calexico Subdivision south of the border. Needs and improvements for the crossing at Nogales have been put forward.

Figure 1-5. Canamex Corridor



1.4.5 Rail and Economic Development

Shippers, railroad representatives and economic development officials continue to investigate ways that rail can support economic development and job creation in Arizona.

1.5 ROLE OF PASSENGER RAIL IN ARIZONA TRANSPORTATION NETWORK

Table 1-3 summarizes the Amtrak *Southwest Chief* and *Sunset Limited* routes that provide service to stations in Arizona. Both are long-distance trains, defined by their routes being over 750 miles, and the costs of operating the services not covered by ticket revenues being supported by the federal government. The state of Arizona does not pay for these services.

Rail transportation represents a small share of Arizona passenger travel. Data from the Arizona statewide travel demand model suggests that the average number of daily long-distance auto trips, defined as over 50 miles, was 46 million in 2010 the most recent year data are available. By comparison, 98,000 people got on or off trains in Arizona the same year, 0.2 percent of the auto users.

Table 1-3. Summary of Amtrak Routes in Arizona

Route	Southwest Chief	Sunset Limited
Arizona Stations	Winslow; Flagstaff; Williams Jct; Kingman	Benson; Tucson; Maricopa; Yuma
End Points	Chicago and Los Angeles	New Orleans and Los Angeles
Frequency (each direction)	Daily	Tri-weekly
Arrival Time at First and Last Stations in Arizona – Westbound	7:50 PM, 11:46 PM	5:18 PM, 11:49 PM
Arrival Time at First and Last Stations in Arizona – Eastbound	1:28 AM, 5:35 AM	2:47 AM, 9:15 AM

Source: Amtrak

A more recent comparison can be made between rail and air travel in Arizona. In 2016, Sky Harbor Airport had 43 million enplanements/deplanements while Tucson International Airport had 3.3 million. Amtrak had 107 thousand boardings or alightments, for a share similar to automobile travel.

Ridership is adversely affected by schedules. Amtrak routes serving Arizona are timed to facilitate connections in Los Angeles, CA. As shown in Table 1-3, westbound trains serve Arizona stations late in the day, leaving the western-most station in Arizona shortly before midnight. Eastbound trains serve Arizona stations late at night or early in the morning. Particularly for eastbound trains, the scheduling reduces the convenience of the service. In addition, the Sunset Limited only operates three times a week. Despite these limitations and relatively small modal share, Amtrak service significantly benefits Arizona's tourist industry. For example, the Southwest Chief provides access to Flagstaff and the Grand Canyon Railway at Williams Junction.

Arizona residents are served by stations within Arizona as listed in Table 1-3, as well as Needles, CA, just over Arizona's western border, Gallup and Lordsburg, NM, which are just over Arizona's eastern border. Per the U.S. Census Bureau's 2010 Census, 996,133 Arizona residents live in a census block within a 10-mile radius of an Amtrak station, constituting 15.6 percent of the statewide population. This includes Arizona residents who are within 10 miles of an Amtrak station that is located outside the Arizona state border.

Also, as reported in the U.S. Census, 3,190,510 residents, or 49.9 percent of the statewide population resides within 30 miles of an Amtrak station. This includes Arizona residents who are within 30 miles of an Amtrak station that is located outside the Arizona state border. A total of 4.6 million of Arizona's total population of 6.8 million live in the Phoenix metropolitan area, or about two-thirds of the state's population. The closest Amtrak station to Phoenix is in Maricopa, which is over 10 miles away. The 10-mile radius reflected in Table 1-4 misses the Phoenix metropolitan area, but the 30-mile radius includes much of Phoenix. The difference of in coverage of Phoenix largely accounts for the significant differences in the percentage of state population served by the 10 and 30-mile radius.

Table 1-4. Arizona Population Served by Intercity Passenger Rail

Radius of Station	Population	Percentage of State
10 miles	996,133	15.6%
30 miles	3,190,510	49.9%

Source: 2010 U.S. Census

Figure 1-6. Amtrak Routes and Stations Serving Arizona



Source: National Transportation Atlas Database, WSP Analysis

1.6 PASSENGER RAIL INITIATIVES AND PLANS

1.6.1 Intercity Passenger Rail Initiatives and Plans

The Passenger Rail Corridor Study began in 2011 and assessed the feasibility of a passenger rail service operating between Tucson and Phoenix. A Tier 1 Draft Environmental Impact Statement (DEIS) was published in September 2015, which documented the environmental considerations related to two “build” alternatives and a “no-build” alternative. The decision to pursue the alternatives in the DEIS resulted less from technical analyses and more from public and agency input, including surveys received from over 10,000 people across Arizona. ADOT, in coordination with the FRA, has completed a Tier 1 Final Environmental Impact Statement, and the FRA has signed a Record of Decision. One of the alternatives has been selected and routing options will be further reviewed during a Tier 2 environmental review. As of 2017, no funding or construction schedule has been established for the project, and funding will need to be identified for the project to move forward.

ADOT participated in the Southwest Multi-State Rail Planning Study (SW Study), which included California, Nevada, and Arizona. This study was the first of a series of regional studies to be conducted by the FRA and represents one part of FRA’s action plan to complete requirements associated with PRIIA. In this study, FRA sought to test a series of tools that FRA hopes will aid with regional rail planning nationwide. The SW Study team,

- Inventoried long-distance travel studies in the area;
- Identified potential future travel and economic activity;
- Applied a network tool to provide sketch-plan evaluation of a range of intercity travel options;
- Facilitated workshops and working sessions with a stakeholder group.

The SW Study developed a vision for a future intercity passenger rail network in the Southwest.

1.6.2 Commuter Rail Initiatives and Plans

In 2004, voters in Maricopa County approved Proposition 400, which among other provisions included funding for a study to assess the feasibility of establishing commuter rail service in the region. The Commuter Rail Strategic Plan was published in 2009, and based upon this plan the Maricopa Association of Governments (MAG) commissioned three additional planning studies: The Systems Study, Grand Avenue Corridor Study, and the Yuma West Corridor Study. These were completed in the Spring of 2010. In 2017 MAG is managing the Regional Commuter Rail System Study Update, the purpose of which is to revise data from the original Commuter Rail System Study, and to investigate governance and indemnity/liability issues related to passenger rail implementation.

1.7 INSTITUTIONAL GOVERNANCE STRUCTURE OF RAIL IN ARIZONA

1.7.1 ADOT's Legislative Rail Authority and Organization

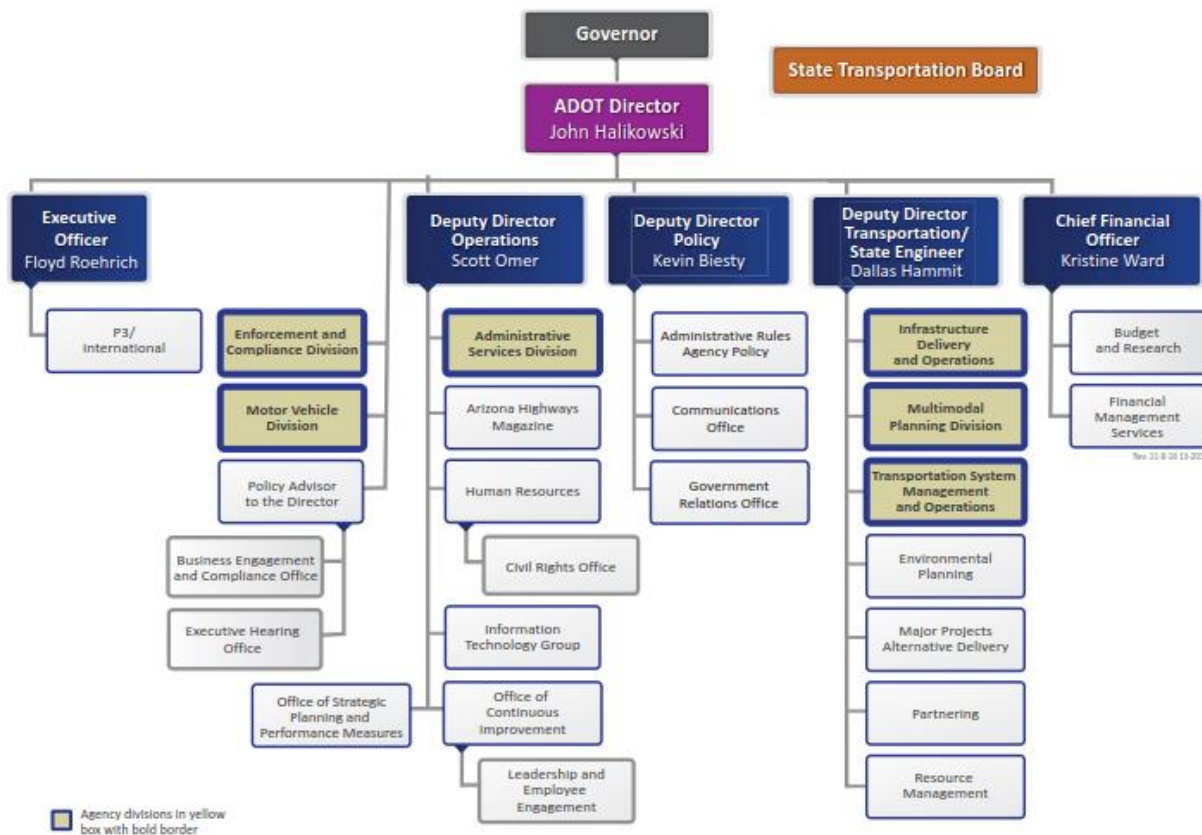
The Arizona Revised Statutes list, among ADOT's many duties, "Do multimodal state transportation planning, cooperate and coordinate transportation planning with local governments."⁴ These duties include rail planning. ADOT serves as the State Rail Transportation Authority responsible for preparing, maintaining, coordinating, and administering the SRP as well as the State Rail Plan Approval Authority, which will be responsible for reviewing and approving the SRP.

Figure 1-7 provides a general overview of ADOT's organization. Organizations that support rail include:

- **Multimodal Planning Division** is responsible for a variety of planning functions including the preparation of this SRP. Within the Multimodal Planning Division, Planning and Programming develops the Statewide Transportation Improvement Plan (STIP), the Multimodal Long-Range Plan, performs freight planning, coordinates bicycle and pedestrian programs, works with tribes and local planning agencies. With the exception of the STIP, components of each of these activities are relevant to rail. The Major Projects Group coordinates planning associated with specific projects, including rail projects.
- **P3/International** has dual responsibilities. The office coordinates public-private partnership (P3) initiatives, where the private sector assumes some or all of a project's risks and responsibilities that would traditionally be borne by ADOT. If a passenger rail service were to be initiated in Arizona in the future, these P3 functions could be relevant to rail. A private company could assume construction, operation, and financing activities to support passenger rail that would traditionally be the responsibility of the public sector. The office also represents ADOT as a party to international initiatives. ADOT investigates ways that transportation infrastructure, including rail, can support cross-border commerce and economic development. ADOT is a lead agency in the Transportation and Trade Corridor Alliance (TTCA) which serves as the state's freight advisory committee as federally mandated under the FAST Act. Through the TTCA, ADOT is tasked by the Governor of Arizona, to work collaboratively with the Arizona-Mexico Commission (AMC), Arizona Commerce Authority (ACA) and Arizona Office of Tourism and other stakeholders to assess the viability of opportunities in trade, transportation, logistics, and supply chain management.
- **Utility and Railroad Engineering Section** within the Infrastructure Delivery and Operations Division coordinates ADOT activities with railroads. The Utility and Railroad Engineering section develops agreements with railroads if ADOT projects impact or require access to railroad property. This group is also responsible for maintaining the Statewide Railroad Crossing Inventory and administering the Federal Highway-Railroad Grade Crossing Safety Program (Section 130).

⁴ Arizona Revised Statutes, §28-332.

Figure 1-7. ADOT Organization Chart



OTHER STATE AGENCIES

ARIZONA CORPORATION COMMISSION

The mission of the Arizona Corporation Commission's (ACC) Railroad Safety Section is to ensure that citizens of Arizona as well as railroad employees throughout the state have a railroad system that is operated and maintained in as safe a manner as possible. The Section is responsible for enforcing both state and federal laws as they pertain to rail. A majority of staff have been certified by the FRA to enforce federal laws working with and on behalf of the FRA. The Section's activities fall into two areas:

- **Highway-Rail Grade Crossings.** Any changes made to highway-rail grade crossings in Arizona must be approved by the ACC. If municipalities would like to upgrade or close crossings, they must apply to the ACC. A docket is established, and a hearing held. The ACC also works with ADOT each year to establish a panel of crossing improvement projects that could be funded through the Federal Highway-Railroad Grade Crossing Safety Program (Section 130), and the panel must be approved by the ACC before these improvements can be funded. The ACC hears complaints about crossings and investigates crashes at crossings. The agency maintains an emergency phone line that railroads and others should contact in case there is an accident. Beyond responding to complaints, the ACC also conducts routine inspections of crossings, crossing warning signals, train control signals and devices to ensure that they meet federal and state requirements.

- **Other Railroad Infrastructure and Practices.** The ACC investigates accidents, receives complaints, and conducts inspections beyond highway-rail grade crossings. ACC staff inspect track, locomotives, shipments of hazardous materials, and railroad operating practices to ensure compliance with applicable federal and state laws.

ARIZONA COMMERCE AUTHORITY

The Arizona Commerce Authority (ACA) is the state's lead agency to promote economic development in Arizona. The ACA takes part in corridor and multinational studies that analyze how infrastructure could be leveraged to drive economic development, including rail infrastructure. It also seeks to inform potential companies moving to Arizona of rail assets.

INTERNATIONAL ORGANIZATIONS

ADOT, the ACA and other organizations support rail transportation through membership in cross-border organizations.

- **Arizona-Mexico Commission's** mission is to improve the economic prosperity and quality life for Arizonans through collaborations in advocacy, trade, networking, and information. The ADOT Director is a co-chair of the Transportation, Infrastructure & Ports Committee. The Arizona committee is partnered with a counterpart committee in Mexico, through the Arizona-Mexico Commission's partner organization, the Comisión Sonora-Arizona. The Transportation, Infrastructure & Ports committee has developed action items, plans and sponsored summits to explore improvements to support cross-border commerce.
- **U.S.-Mexico Joint Working Committee on Transportation Planning** is a binational group whose primary focus is to cooperate on land transportation planning and the facilitation of efficient, safe, and economical cross-border transportation movements. It is headed by the U.S. Federal Highway Administration and the Mexican Secretaría de Comunicaciones y Transportes, but also includes the U.S. Department of State, its counterpart in Mexico, and departments of transportation from bordering states in the U.S. and Mexico, including Arizona. The group seeks to establish methods and procedures to analyze infrastructure needs, evaluate transportation demand and resulting transportation impacts. While the committee's focus is primarily on roadway transportation, activities could also be relevant to rail.

LOCAL AND REGIONAL AGENCIES

A range of local and regional government entities can support rail in Arizona through planning and other activities. As an example, Pima County partnered with the Port of Tucson to support a successful TIGER grant application to improve intermodal service into and out of the Port of Tucson.

COUNCILS OF GOVERNMENT

Within Arizona are six Councils of Governments (COGs). COGs are associations of municipal and county governments that provide communication, policymaking, coordination, advocacy and technical assistance across jurisdictions. In rural areas of Arizona, the COGs perform planning services and direct service functions such as operating the Area Agency on Aging, the Head Start programs and employment

programs. The boundaries of Arizona's COGs were established by the Arizona governor in 1970. Planning activities can pertain to rail, and COGs can apply for federal funding relevant to rail. The COGs, shown in Figure 1-8 are:

- Central Arizona Governments (CAG)
- Maricopa Association of Governments (MAG)
- Northern Arizona Council of Governments (NACOG)
- Pima Association of Governments (PAG)
- Southeastern Arizona Governments Organization (SEAGO)
- Western Arizona Council of Governments (WACOG)

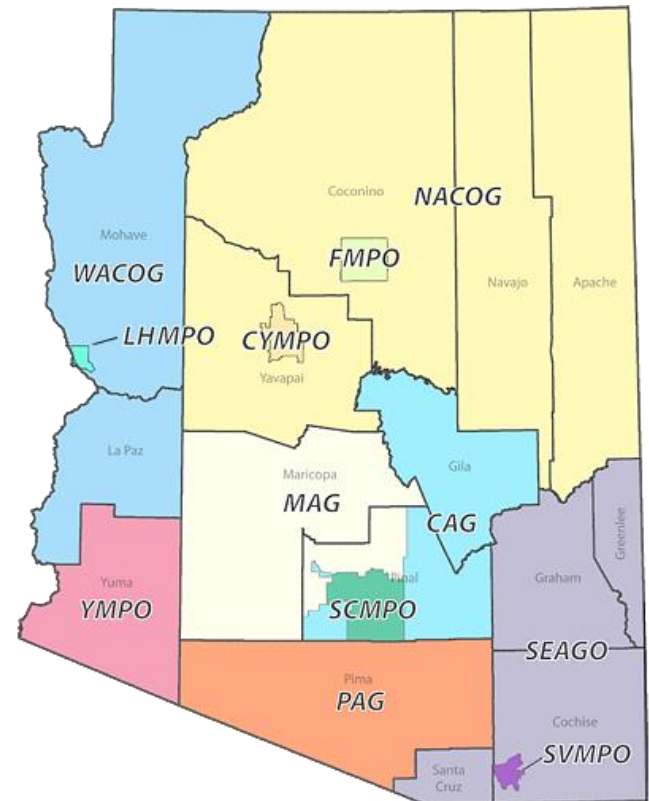
METROPOLITAN PLANNING ORGANIZATIONS

Eight Metropolitan Planning Organizations (MPOs) are located in Arizona. MPOs are required by federal law for urbanized areas with 50,000 or more population. MPOs are required to evaluate transportation alternatives, develop a Metropolitan Transportation Plan and a Transportation Improvement Plan, and involve the stakeholders and the public in the planning process. In the case of MAG and PAG, the COG and the MPO are the same organization. Similar to COGs, MPOs can include rail within their planning activities and can sponsor funding applications for rail projects. The MPOs are:

- Maricopa Association of Governments (MAG)
- Pima Association of Governments (PAG)
- Yuma Metropolitan Planning Organization (YMPO)
- Flagstaff Metropolitan Planning Organization (FMPO)
- Central Yavapai Metropolitan Planning Organization (CYMPO)
- Lake Havasu Metropolitan Planning Organization (LHMPO)
- Sun Corridor Metropolitan Planning Organization (SCMPO)
- Sierra Vista Metropolitan Planning Organization (SVMPO)

Arizona's COGs and MPOs are shown in **Error! Reference source not found..**

Figure 1-8. ADOT COGs and MPOs

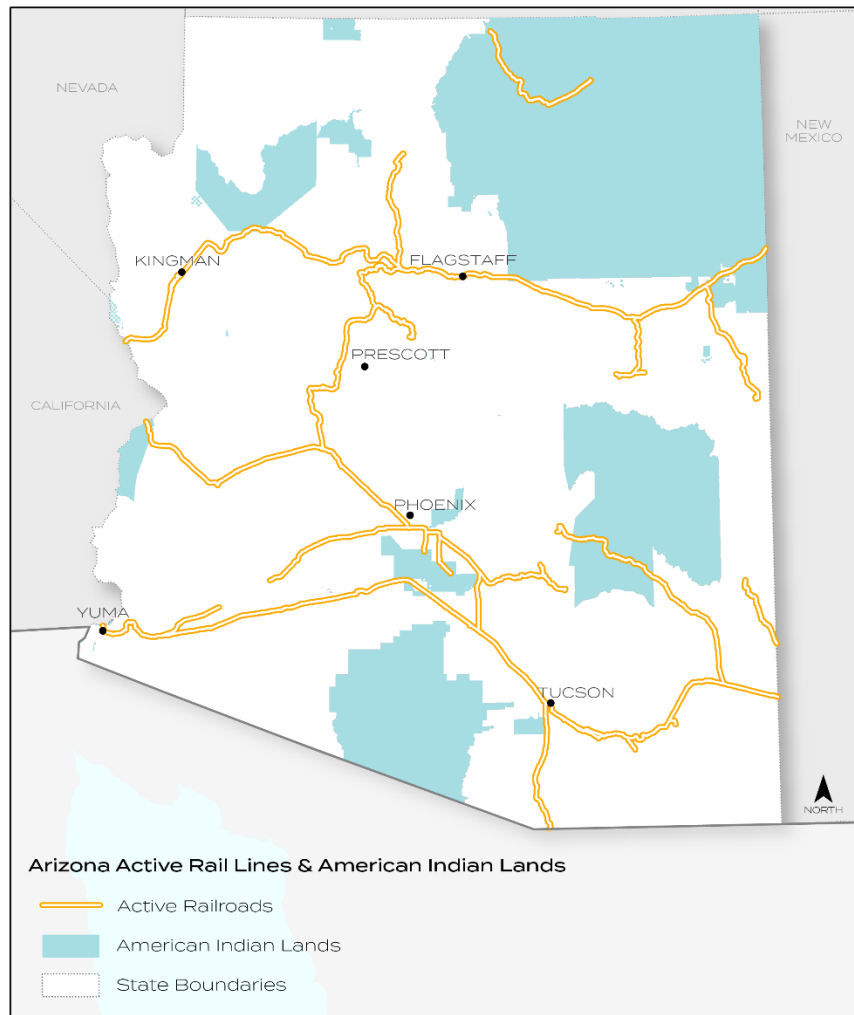


Source: MAG

TRIBAL NATIONS

Arizona is also home to twenty-two sovereign American Indian communities. Total reservation land covers over a quarter of the state. Most of this land is owned by the U.S. government and held in trust for usage by the tribes. Native American communities have an interest in the rail lines that cross through tribal lands in terms of potential economic development, safety, and other issues.

Figure 1-9. Arizona Rail Network and Tribal Lands



Source: WSP

OTHER

Other organizations support rail transportation as well. One example is the Kingman Airport Authority, which owns a rail-served industrial park outside of Kingman, Arizona. Over 1,500 carloads originate or terminate in the park per year. Kingman Airport Authority, Inc. is a not-for-profit corporation that leases the airport and industrial park from the City of Kingman for management purposes. The Kingman Airport Authority was originally created by Mojave County but now operates independently, leasing property from the City of Kingman. The Authority's Board of Directors is made up of local business leaders. Rail improvements at the industrial park have been funded by selling land parcels in the park. The Airport

Authority facilitates the sale of the property for the City of Kingman by completing all paper work for public auctions that the City Council conducts. Patriot Rail Company's subsidiary, Kingman Terminal Railroad, provides rail switching service in the park.

1.8 PUBLIC FUNDING AND FINANCING OF RAIL PROJECTS

1.8.1 State and Local Funding of Rail Projects in Arizona

Arizona does not fund rail services. No commuter rail services operate in the state, and existing intercity passenger rail services in Arizona are funded by ticket revenues and federal subsidies. The Arizona constitution states that:

Neither the state, nor any county, city, town, municipality, or other subdivision of the state shall ever give or loan its credit in the aid of, or make any donation or grant, by subsidy or otherwise, to any individual, association, or corporation.

Because freight railroads are private companies, the "gifting clause" of the Arizona state constitution severely limits the state's ability to fund freight rail projects. The practical implication of Arizona's gifting clause is that government payments to private companies can only be considered constitutional if the resulting value to the state can be proven to exceed the amount that was paid to the private entity. Projects will also be more likely to violate the gifting clause if they benefit a specific company, rather than members of the general public that happened to take advantage of the project. In general, ADOT would not invest in infrastructure projects unless the benefits outweigh the costs, but for freight rail projects, the nature of the benefits (economic competitiveness, safety, environmental savings, reduced need for highway capacity and damage) make it difficult to prove and guarantee value to the state. Often the benefits that accrue to freight rail projects are not direct financial benefits to state and local governments (e.g. increased tax revenues), but a more generalized set of benefits associated with reduced truck traffic and improvements to freight capacity and fluidity, improved economic competitiveness. In recent years, a number of economic development initiatives have been challenged for their adherence to the gifting clause, including a loan to maintain operations on a short line railroad.⁵

1.8.2 Federal Funding Sources

HIGHWAY-RAIL CROSSINGS PROGRAM (SECTION 130)

ADOT's Utility and Railroad Section administers the federal aid Highway Rail Crossing Program which is authorized by United States Code Title 23, Section 130. The goal of this fund, commonly referred to as Section 130, is to reduce the crash risk at public rail-highway grade crossings. Nationwide, safety at rail-

⁵ Nick Worth, *The Tribune-News Silver Creek Herald*, "Goldwater Institute Takes Aim at Loan for Apache Railway," April 2, 2014.

highway grade crossings has been improved by projects funded with Section 130 assistance. The number of crashes at public crossings is less than half what it was in 1980.⁶

Typical highway rail crossing upgrades using Section 130 funds fall into two categories:

- At crossings with passive protection (such as crossbucks and/or stop signs), projects to install train-activated warning devices. Usually, warning bells, flashing lights, overhead cantilevers with flashing lights, and gates are installed.
- At crossings with existing train-activated protection (such as flashing lights and/or gates), projects to upgrade the existing protections or add a median barrier (to prevent motorists from driving around lowered gates) or other enhancements to reduce crash risk.

Section 130 improvements require 10 percent matching funds by local government authorities. Arizona receives on average \$2.3 million in Section 130 funds per year.

TIGER GRANT PROGRAM

Beyond highway-rail safety improvement funds, over the past seven years, the most frequently used source of federal funding source for rail projects has been the TIGER (Transportation Investment Generating Economic Recovery) program.

TIGER is a highly-competitive grant program that provides funding for road, rail, transit, bike/pedestrian, and port projects that support economic development, state of good repair, quality of life, sustainability, and safety. The fiscal year 2017 TIGER solicitation is funded at \$500 million. Since the program started, approximately 21 percent of TIGER funding has gone to freight rail projects, and approximately 28 percent of TIGER funding has gone to transit projects.

Past projects have ranged in size and scope from under \$10 million for rural freight rail rehabilitation projects to up to a \$98 million grant to create double-stack capacity along the MD-WV-PA-OH National Gateway rail corridor, and \$100 million to address freight rail congestion in the Chicago area. In Arizona, two rail-related projects have been funded by a TIGER grant since the program began in 2009:

- \$5 million awarded to Pima County in 2013 to extend the Wilmot siding and install high-powered switches to eliminate the need to slow and stop arriving trains at the Port of Tucson Container Export Rail Facility.
- \$15 million awarded to ADOT in 2015 for a grade-separation project of the four-lane SR347 over a double track rail line. This project also relocated an existing Amtrak station.

Demand for TIGER funding exceeds available funds, with only seven percent of applications being awarded each year.

⁶ Source: Bureau of Transportation Statistics, https://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/national_transportation_statistics/html/table_02_03.html

FAST Act

The most recent transportation authorization bill, the 2015 Fixing America's Surface Transportation Act (FAST Act), included several new rail programs.

NATIONAL HIGHWAY FREIGHT PROGRAM (FAST ACT SECTION 1116; 23 USC 167)

Funded at \$1.1 to \$1.5 billion annually for federal FY2016 through FY2020, the new National Highway Freight Program (NHFP) is intended to improve the efficient movement of freight on the National Highway Freight Network (NHFN), and support investment in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, and improve safety.⁷ While the program is focused on highway projects, up to 10 percent of a state's apportionment can be spent on rail, port, and intermodal projects.

Eligible projects include a wide range of activities, including but not limited to: planning, environmental review, environmental mitigation, acquisition of real property, acquisition of equipment, implementation of intelligent transportation systems, border security technology, resiliency projects, and construction of highway, rail, port, and intermodal projects, including highway-rail grade separations.

INFRA GRANT PROGRAM

Infrastructure for Rebuilding America (INFRA) is a grant program established by the FAST Act to provide funding for the Nationally Significant Freight and Highway Projects (NSFHP). INFRA is a competitive grant program similar to TIGER, but is focused specifically on freight: highway, rail and intermodal projects of regional or national significance. Its four goals are:

- Support economic vitality on a national or regional level (including improving safety, mobility, and state-of-good repair on transportation facilities)
- Innovation in project design or delivery
- Utilization of non-federal funds for infrastructure
- Promoting accountability for performance outcomes for federal grant recipients

Funding has been authorized under the FAST Act through FY2020. Funding for the current combined FY2017-18 round (applications due November 2, 2017) is \$1.56 billion. A minimum 40 percent match is required, some of which may be met with other federal funds (up to a maximum of 80 percent federal funds).

⁷ The FAST Act requires the establishment of a National Highway Freight Network, which will consist of the following components:

- The Primary Highway Freight System (PHFS)
- Critical Rural Freight Corridors
- Critical Urban Freight Corridors
- Those portions of the Interstate System that are not part of the PHFS

The FAST Act designates the PHFS and requires FHWA to redesignate it every five years. It also provides for designation of Critical Rural Freight Corridors and Critical Urban Freight Corridors. [23 USC 167(d)-(f)]

As with TIGER, INFRA (formerly FASTLANE) is oversubscribed, with 212 applications requesting a total of \$9.8 billion in the first year of the program (FY2016), during which 18 grantees received \$768 million in awards.⁸ About \$306 million were for rail-related projects. Arizona won one of the 18 awards, \$54 million for a highway project improving sections of I-10.

FAST ACT FRA PROGRAMS

The FAST Act authorized \$2.2 billion over five years (FY2016-FY2020) for three new FRA competitive grant programs.

- *Consolidated Rail Infrastructure and Safety Improvements (CRISI) (Sec. 11301)*: Goals are to improve the safety, efficiency, and reliability of passenger and freight rail systems. Eligible activities include a wide range of capital, regional, and corridor planning, environmental analyses, research, workforce development, and training projects. Over \$1.1 billion was authorized over FY2016-FY2020. Sixty-eight million was appropriated to the program in FY2017.
- *Federal-State Partnership for State of Good Repair (Sec. 11302)*: Intended to reduce the state of good repair backlog on publicly-owned or Amtrak-owned infrastructure, equipment, and facilities. Eligible activities include capital projects to (1) replace existing assets in-kind or with assets that increase capacity or service levels, (2) ensure that service can be maintained while existing assets are brought into a state of good repair, and (3) bring existing assets to a state of good repair. Approximately \$1.0 billion authorized over FY2016-FY2020. Twenty-five million was appropriated to the program in FY2017.
- *Restoration and Enhancement Grants (Sec. 11303)*: Created to provide operating assistance to initiate, restore or enhance intercity passenger rail transportation. Grants are limited to three years of operating assistance per route and may not be renewed. Authorized at \$20 million annually through FY2020. Five million was appropriated to the program in FY2017.

POSITIVE TRAIN CONTROL IMPLEMENTATION GRANT PROGRAM

Section 3028 of the FAST Act authorized funding for implementation of Positive Train Control (PTC). Selection criteria for this competitive grant program include safety as well as promoting economic competitiveness and enhancing quality of life and economic opportunity. A 20 percent local match is required. In August 2016, FRA awarded \$25 million in competitive grants for the program in FY2016. For FY2017, \$197 million in grants were given to 17 projects in 13 states. None were in Arizona.

RAILROAD SAFETY INFRASTRUCTURE IMPROVEMENT GRANT

In Federal FY2016 Congress appropriated \$25 million for the Rail Safety Infrastructure Improvements Grant program to improve the safety of rail infrastructure. A total of 23 projects in 14 states and the District of Columbia received awards. None were in Arizona.

⁸ This is based on the "Proposed FY2016 FASTLANE Project Awards" (http://transportation.house.gov/uploadedfiles/fastlane_project_awards_7.1.pdf) and is subject to revision.

EDA GRANTS

The U.S. Economic Development Administration (EDA) offers a number of grant and loan assistance programs to support local organizations with economic development.⁹ EDA assistance is targeted to distressed communities. Two EDA grant programs are the Public Works program and the Economic Adjustment Assistance (EAA) Program.

- The Public Works program seeks to help distressed communities revitalize, expand, and upgrade their physical infrastructure to attract new industry or diversify the economy. It can also be used to purchase land to support establishment or expansion of industrial or commercial enterprises.
- The EAA program provides a wide range of technical, planning, and infrastructure assistance to regions experiencing adverse economic changes resulting from a steep decline in manufacturing employment, changes in trade patterns, major natural disasters, military base closures, or environmental changes and regulations.

Both programs fund rail projects.

CMAQ

The Federal Highway Administration's Congestion Mitigation and Air Quality (CMAQ) program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide or particulate matter (nonattainment areas), and for former nonattainment areas that are now in compliance (so-called "maintenance" areas).

Eight Arizona counties¹⁰ are in non-compliance or maintenance for ozone and/or particulate matter, and are thus eligible to receive CMAQ funding for projects that reduce vehicular emissions.

The FAST Act apportioned \$2.3–\$2.5 billion per year for this program from FY2016 through FY2020. Funds may be used for both passenger and freight rail capital expenditures as long as the projects have an air quality benefit. Examples of CMAQ-funded freight rail projects include intermodal facilities, diesel engine retrofits, idle-reduction projects in rail yards, and rail track rehabilitation.

FTA FUNDING

Arizona's transit programs receive federal funding from the Federal Transit Administration (FTA) through the Section 5307 (urbanized area) formula grants, Section 5337 (State of Good Repair) and Section 5309 (fixed guideway modernization) federal programs. The scope of this Rail Plan covers commuter rail, but not light rail/streetcars, such as are in place in Tucson and Phoenix. Currently, a commuter rail plan is in the planning stage for Phoenix. If the system progresses, it will likely seek funding to establish the service through the FTA 5309 Fixed Guideway Capital Investment Grants program. Once the service is

⁹ For additional detail, see the EDA website: <https://www.eda.gov/programs/eda-programs/>

¹⁰ Table of counties and pollutants: https://www3.epa.gov/airquality/greenbook/anayo_az.html

established, ongoing federal subsidies would be provided by the Section 5307 and Section 5337 formula grant programs.

1.8.3 Federal Financing Programs

In addition to grant funding, credit assistance can help bridge the gap between project costs and project-related revenues for freight rail improvement projects. Credit assistance can be in the form of loan guarantees, or could be direct loans with favorable terms, including low-interest rates, long payback periods, and/or payment schedules that do not begin until after construction is completed. These financing alt

RAILROAD REHABILITATION AND IMPROVEMENT FINANCING

The FRA's Railroad Rehabilitation and Improvement Financing (RRIF) program provides direct loans and loan guarantees to finance development of railroad infrastructure. The program is funded up to \$35.0 billion, with \$7.0 billion reserved for projects benefiting non-Class I railroads. Currently this program is undersubscribed, with only \$2.7 billion in outstanding loans, most to Class II and III railroads. Most sources indicate that an excessively long approval period (averaging 13 months¹¹) is a reason for the program's underutilization.

RRIF was re-authorized under the FAST Act in December 2015, which expanded RRIF to allow financing of transit oriented development (TOD) elements of passenger rail projects, and to shorten review times and provide more transparency in the process. The FAST Act also included provisions to speed up environmental reviews, which may also help increase the program's utilization.

While new program guidance is being developed, RRIF is proceeding under the existing guidance.

RRIF can be used for projects that:

- Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards buildings and shops
- Refinance outstanding debt incurred for the purposes listed above
- Develop or establish new intermodal or railroad facilities

Direct loans may be used to fund up to 100 percent of a railroad project with repayment periods of up to 35 years, and at favorable interest rates (possibly as low as the U.S. Treasury rate). Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers who intend to construct a new rail connection.

¹¹ Two examples: <https://www.narprail.org/news/blog/section-by-section-analysis-of-fast-act/>
<http://usa.streetsblog.org/2011/02/18/in-age-of-s%C2%ADpending-cuts-why-are-billions-of-federal-rail-dollars-going-unused/>
<http://cs.trains.com/trn/b/observation-tower/archive/2015/07/28/to-extend-or-not-to-extend-the-ptc-deadline-the-question-dividing-the-industry.aspx>

The FRA will give priority to projects that provide public benefits, including benefits to public safety, the environment and economic development. Additional criteria for approving the loans include the creditworthiness of the applicant and project service/capacity impacts.

TIFIA

The federal Transportation Infrastructure Finance and Innovation Act (TIFIA) is a broad-based credit program, providing federal credit assistance to a wide range of surface transportation projects, including highway, transit, intercity passenger rail, some types of freight rail, intermodal freight transfer facilities, and port terminals. The FAST Act also added TOD to the list of eligible projects under TIFIA.

TIFIA leverages federal dollars by facilitating private participation in transportation projects and encouraging innovative financing mechanisms that help advance projects more quickly. The FAST Act continues this program, with funding of \$275 to \$300 million per year through 2020. While the FAST Act decreases annual funding to the TIFIA program, it also reduces the minimum project size for TIFIA, expands eligibility to include infrastructure for TOD development near transit stations, provides funding to cover the loan evaluation costs typically borne by the borrower, and provides flexibility to States to use Federal formula dollars to cover credit subsidy costs. Eligible recipients include states, municipalities, public authorities, and private entities undertaking projects sponsored by public authorities.

TIFIA provides three types of financial assistance:

- Secured loans offering flexible repayment terms (e.g., loan payments delayed for a set number of months or years during the construction phase)
- Loan guarantees, which lend the full-faith-and-credit of the U.S. Government to loans provided by institutional investors such as pension funds.
- Lines of credit, which are contingent sources of funding in the form of Federal loans that may be drawn upon to supplement project revenues, if needed, during the first ten years of project operations.

TIFIA cannot provide lines of credit or loans of more than 33 percent and 49 percent of a project, respectively. In addition, projects must be no more than 80 percent federally funded overall.