

Arizona State Freight Plan To

EXECUTIVE SYNTHESIS

Over one thousand pages of Working Papers, detailing the 11 phases used to study freight movement in Arizona, were produced during the development of the Final Freight Plan. This document serves as an Executive Summary of process, findings, and recommendations, enabling key stakeholders to identify and implement the policies and projects that will improve the movement of freight in Arizona.

Ê

THE ARIZONA STATE FREIGHT PLAN

The Arizona State Freight Plan (Freight Plan) defines immediate and longrange investment priorities and policies that will generate the greatest return for Arizona's economy.

The Freight Plan also fulfills federal requirements introduced in the Fixing America's Surface Transportation (FAST) Act. The FAST Act requires states to develop a state freight plan in order to receive National Highway Freight Program (NHFP) funding for freight projects. In November 2017, the Federal Highway Administration approved the Arizona State Freight Plan, enabling ADOT to use up to \$95.7 million in NHFP funding for freight projects.

While ADOT can use NHFP funds for a variety of projects, there are limits on the types of roadways eligible for NHFP funded projects. The FAST Act requires NHFP funding to be used on the National Highway Freight Network (NHFN). The NHFN consists of the following four subsystems:



The PHFS and Interstates not on the PHFS are designated by USDOT/FHWA, CRFCs are designated by the state, and the state and Metropolitan Planning Organizations (MPO) designate CUFCs. Arizona has 1,025.62 miles of PHFS, 102.56 miles of CUFCs, and 205.12 miles of CRFCs. ADOT worked with its MPO partners and Freight Advisory Committee (FAC) to identify the state's CRFCs and CUFCs. In coordination with ADOT, MAG designated 60 miles and PAG designated 30 miles of Arizona's 102.56 miles of CUFCs, leaving ADOT responsible (in coordination with the MPOs) to designate 12.56 miles. ADOT received concurrence from Central Yavapai Metropolitan Planning Organization for the 12.56 miles of CUFCs in their MPO jurisdiction in June 2017.

FREIGHT PLAN VISION, GOALS, AND OBJECTIVES

The Freight Plan articulates a vision, supported by goals and objectives, which guided decision-making in order to ensure consistency throughout the development of the Freight Plan. The Freight Plan's vision, three foundational goals, and supporting objectives are shown below.

THE VISION

Arizona's freight transportation system enhances economic competitiveness and quality growth through effective system performance and management.

THE OBJECTIVES

ECONOMIC COMPETITIVENESS
INCREASE ECONOMIC ACTIVITY, INVESTMENT AND HIGH PAYING JOBS
INCREASE TRADE
INCREASE SYSTEM PERFORMANCE
IMPROVE MOBILITY AND MULTIMODAL ACCESSIBILITY
INCREASE SYSTEM EFFICIENCY AND RELIABILITY
INCREASE SAFETY AND SECURITY
MINIMIZE NEGATIVE SOCIAL AND ENVIRONMENTAL IMPACTS
IMPROVE SYSTEM MANAGEMENT
IMPROVE SYSTEM MANAGEMENT ENSURE SYSTEM PRESERVATION AND MAINTENANCE
 IMPROVE SYSTEM MANAGEMENT ENSURE SYSTEM PRESERVATION AND MAINTENANCE WORK IN PARTNERSHIP
IMPROVE SYSTEM MANAGEMENT ENSURE SYSTEM PRESERVATION AND MAINTENANCE WORK IN PARTNERSHIP ENSURE GOOD FISCAL STEWARDSHIP
IMPROVE SYSTEM MANAGEMENT ENSURE SYSTEM PRESERVATION AND MAINTENANCE WORK IN PARTNERSHIP ENSURE GOOD FISCAL STEWARDSHIP INCREASE EFFECTIVE PERFORMANCE MONITORING
IMPROVE SYSTEM MANAGEMENTENSURE SYSTEM PRESERVATION AND MAINTENANCEWORK IN PARTNERSHIPENSURE GOOD FISCAL STEWARDSHIPINCREASE EFFECTIVE PERFORMANCE MONITORINGLINK TRANSPORTATION AND LAND-USE
IMPROVE SYSTEM MANAGEMENTENSURE SYSTEM PRESERVATION AND MAINTENANCEWORK IN PARTNERSHIPENSURE GOOD FISCAL STEWARDSHIPINCREASE EFFECTIVE PERFORMANCE MONITORINGLINK TRANSPORTATION AND LAND-USEINCREASE SMART NETWORK EXPANSION

would and the sound and the

The foundational goals and supporting objectives are closely aligned with the national freight goals identified in the FAST Act, the guiding principles of Building a Quality Arizona (bqAZ), and the related goals of Arizona's Long-Range Transportation Plan (LRTP). To translate the vision, goals, and objectives into action, the Freight Plan establishes a single, simple policy which will better reflect the role of freight in enhancing the competitiveness and growth of Arizona's economy:

THE POLICY

To increase the prominence of freight in ADOT planning and programming.

Six strategies are identified to achieve the goals and objectives of the Freight Plan. The Freight Plan's strategies are in line with federal, state, and regional goals and objectives, reflect the roles and interest of freight transportation system stakeholders, and borrow from freight planning best practices in the U.S. and internationally.

THE STRATEGIES

Merit-Based Priorization Freight transportation system improvements to be prioritized on the basis of merit, in line with the goals and objectives of the Arizona State Freight Plan. 2 Preservation, Modernization and Expansion Freight transportation system investments to prioritize asset preservation first, modernization to optimize the existing system second, and network expansion third. Key Commerce Corridors 3 Freight transportation system improvements to bolster the performance of Key Commerce Corridors. Improve Freight Information 4 Freight transportation system management to be informed on the basis of solid research, data and system performance monitoring. Coordination, Partnerships and Communication 5 System planning and improvements to be coordinated witth all stakeholders that have a role in enabling the goals and objectives of the Arizona State Freight Plan. Sustainable Freight Funding 6 Priority freight projects to have access to a dedicated and sustainable source of funding and seek to leverage partner funding and private capital, where appropriate.

FREIGHT AND THE ARIZONA ECONOMY

The role of the Freight Plan is to identify issues and propose solutions that improve transportation mobility for Arizona's freight-dependent industries; ultimately resulting in long-term economic competitiveness and quality growth.

The expected outcomes of the Freight Plan include increasing Gross Domestic Product (GDP) growth, attracting greater private investment, and growing trade and exports—all resulting in more, higher paying, high-quality jobs in Arizona. To enhance Arizona's economic competitiveness and quality growth, the Arizona State Freight Plan focuses on addressing the transportation performance needs of sectors that drive Arizona's economic activity and growth.

ARIZONA'S FREIGHT DEPENDENT SECTORS AND GROUPS

Freight Plan identified Arizona's top ten freight-dependent industries by measuring the volume and value of freight flows, contribution to Arizona's GDP, exports, and employment. The Freight Plan is informed in large part by ten individual freight dependent industry working papers. Based on research and consultations with industry stakeholders, Arizona's top ten freight dependent sectors were then grouped based on their transportation needs. The result is the following freight sector groups:

SECTOR GROUPS	TOP TEN SECTOR	FREIGHT INFLOWS	FREIGHT OUTFLOWS	FREIGHT FLOWS WITHIN ARIZONA	ROLE OF TRANSPORTATION
CONSUMER GOODS	 Wholesalers and Retailers Food & Beverage 	\$40.3 bn.	\$17.7 bn.	\$51.2 bn.	Predominately uses trucking with freight moving primarily into and within Arizona
MANUFACTURING	 High-Tech General Transportation Equipment 	\$26.1 bn.	\$15.2 bn.	\$7.1 bn.	Large inbound and outbound freight flows, primarily using trucking and some rail
NATURAL RESOURCES	MiningAgricultureForestryEnergy	\$3.2 bn.	\$3.3 bn.	\$6.3 bn.	Bulk commodities using both trucking and rail depending on rail access, product, and cost
TRANSPORTATION & LOGISTICS	 Transportation & Logistics 	\$8.9 bn.	\$1.5 bn.	\$6.8 bn.	Almost exclusively trucking moving freight primarily into and within Arizona



Arizona's freight dependent sectors make a significant contribution to Arizona's economy, totaling:

5

ARIZONA'S FREIGHT TRANSPORTATION SYSTEM

Arizona's roadways, railways, air cargo airports, pipelines, and border crossings facilitated the movement of over \$914 billion of freight. Over 74 percent of which moved through the state, primarily due to international trade traveling to and from the Ports of Los Angeles and Long Beach. Of the freight traveling to, from, or within Arizona, over 83 percent travels via truck, with rail handling the largest share of the balance. The remainder of this section highlights the components of Arizona's freight transportation system and their role in the Arizona economy.

ROADWAYS

The condition and performance of Arizona's roadways are critical to the \$488 billion (53 percent) of freight that is moved by truck. Freight movements on the Arizona highway system are characterized by their high share of through traffic – that is, neither originating or destined to Arizona.

\$308 billion of the freight moved by truck is through traffic

Analyzing freight traveling to, from, and within Arizona shows all of Arizona's freight dependent sectors use roadways to move freight. I-10 and to a lesser degree on I-17, I-40, and I-19 emerge as critical infrastructure to the movement of freight. Trucking is particularly important for transportation and logistics, consumer goods, and manufacturing. The natural resources sector uses trucking for short moves and when rail is not available, due to the bulk products typically transported.

FREIGHT SECTOR FLOWS TRAVELING TO, FROM, AND WITHIN ARIZONA





RAIL

The Arizona freight rail system consists of more than 2,000 track miles. Over three-quarters of Arizona's rail tonnage is moving through the state—mostly between the Ports of Los Angeles and Long Beach and major rail hubs in Chicago and Dallas. Short line carriers provide local service to rail-dependent industries like mining and provide connections to the Class I network. The natural resources sector is the heaviest user of rail, primarily the mining industry and to a lesser extent forestry.

AIR CARGO

While Arizona has multiple airports that handle freight, 90 percent of all air cargo originating or terminating in Arizona moves through Phoenix Sky Harbor International Airport (PHX). Tucson International Airport handles nearly all of the remaining 10 percent of the state's air cargo. Due to the high cost, commodities that are high value and low weight and/or time sensitive move via air cargo. For Arizona, air cargo is important for manufacturers, specifically high-tech and transportation manufacturing.

FREIGHT CLUSTERS

Arizona's freight clusters, areas with concentrated freight activity, are generally well connected to the multimodal transportation system. The greatest concentration of freight clusters are located along the I-10 corridor in Phoenix and Tucson, including freight activity clusters located at Tolleson, Phoenix Sky Harbor International Airport, Chandler, and the Port of Tucson. Outside the two largest metropolitan areas, Phoenix and Tucson, clusters are notably located in Casa Grande, Yuma, Prescott Valley, Flagstaff, Lake Havasu City, Bullhead City, Sierra Vista, and the border city of Nogales.

PORTS OF ENTRY

Arizona has nine Land Ports of Entry (LPOE) on the U.S.-Mexico border, seven of which handle freight. The Mariposa LPOE in Nogales has the highest volume of freight crossings.





TRENDS AND FUTURE FREIGHT FLOWS

TRENDS AND FUTURE FREIGHT FLOWS

The Freight Plan identified several trends that are likely to affect Arizona's freight transportation system, with implications for planning and preparedness:

- Predicted population growth concentrated in the Phoenix and to a lesser extent, Tucson metro areas, has the dual impact of generating more truck trips to serve local demand while also increasing pressure from passenger vehicles on area roads.
- Arizona's economic recovery and subsequent growth following the Great Recession will lead to more truck trips in major urban centers and trade will place pressure on some Key Commerce Corridors (KCC).
- Limited funding for freight projects will continue to be a challenge, even with dedicated NHFP funding from the FAST Act.

• Though more difficult to predict, Arizona is experiencing a greater number of extreme weather events, which may disrupt supply chains.

In addition to the trends identified above, ADOT considered social, technological, economic, environmental, and political (STEEP) drivers of future change. The STEEP drivers, summarized below, formed the basis for developing three future freight scenarios. The freight trends and scenarios inform the identification of strengths, weaknesses, needs, projects, and the development of a prioritization approach to focus future planning and implementation efforts.



STRENGTHS, WEAKNESSES, NEEDS, AND ISSUES

For the most part, Arizona's freight transportation system has adequate capacity and performs well. Arizona's network of freight transportation facilities is extensive, robust, and reliable—traits that are essential to maintaining Arizona's economic competitiveness. Yet, the system has a number of needs and issues for consideration in the Freight Plan. Consultations with freight stakeholders from all of Arizona's freight dependent sectors resulted in the identification of both general and sector specific transportation needs and issues. The following presents a synthesized list of issues identified in the Freight Plan:

SYSTEM CONDITION, PERFORMANCE, AND CAPACITY

- Recurring congestion and bottlenecks in and around urban centers: Virtually all freight sectors identified peak congestion and bottlenecks as barriers to transportation system performance and sector competitiveness. Transportation and logistics sector stakeholders, for instance, noted peak-hour bottlenecks on urban interstates and near major warehousing and terminal clusters as the most acute problem affecting their operations. The manufacturing sector, noted congestion around the outskirts of Phoenix, particularly around Sky Harbor International Airport, as well as I-10 between Phoenix and Tucson as most problematic.
- Non-recurring congestion and bottlenecks: Although less frequently cited than recurring urban congestion, stakeholders across most sector groups noted nonrecurring congestion and road closures as hindering the reliability of their transportation operations. Cited causes include road construction-related lane closures, crashes, and weather events.
- Inadequate truck parking facilities: The transportation and logistics sector, specifically truck drivers, identified a lack of safe truck parking across Arizona, especially on the I-17 corridor between Phoenix and Flagstaff and on I-10 between Tucson and Blythe, California.

- Need for additional passing and climbing lanes on KCCs: The Freight Plan's analysis of Arizona's roadways revealed poor mobility and reliability in areas with limited directional capacity and inadequate passing/climbing lanes.
- Poor reliability of the crossing times at the U.S.-Mexico LPOEs: Limited LPOE highway and rail capacity and limited roadway connections result in poor reliability at the Mexican border (unpredictability of crossing times). For example, traffic stoppages at milepost 25 of I-19 due to border inspection activity, contributing to delay and reduced corridor reliability.
- Limited air cargo connections: Arizona's busiest air cargo airport, Phoenix Sky Harbor International, has limited international connections and customs services on the weekend and during off-hours. Additionally, air cargo arriving in Phoenix is limited to one truck route, resulting in concentrated truck activity and roadway congestion in the surrounding area.

TRANSPORTATION POLICY

- Limited consideration of freight in project planning: Arizona's Planning-to-Program (P2P) process—which guides statewide project prioritization for all modes uses simple freight flow evaluation criteria that need to be strengthened.
- Shortage of truck drivers: The national truck driver shortage affects all freight dependent sectors, but is notably acute in seasonal sectors, including agriculture and forestry, where demand is highly peaked for several months per year and an adequate labor pool of drivers is not available.
- Municipal noise ordinances as a barrier to off-peak deliveries: The retail sector identified city ordinances related to noise in areas of Tucson and Phoenix as an issue that limits the ability of trucks to serve stores outside of congested hours.
- Axle-load restrictions: Several shippers noted that axle load restrictions in Arizona are low relative to other states that allow gross vehicles weights in excess of 80,000 pounds. Axle load restrictions are a top issue for natural resources sector stakeholders, particularly for mining and forestry sectors. Higher axle-loads would allow from greater economies of scale in moving product, which would drive down per ton cost, thereby increasing competitiveness.

- Location-specific truck maneuverability issues: Some companies – largely serving the retail sector – noted challenges in maneuvering large trucks to and from delivery docks at shopping centers, leading to increased transit time and lower equipment/labor utilization.
- Road/rail grade separation: Existing at-grade crossings negatively affect the performance of both road and rail networks. The need for road/rail separation may become more acute in and around major centers, notably Phoenix, as population and the economy grow.

The Freight Plan identified issues on the transportation system in order to identify immediate and long-range investment priorities and policies that will generate the greatest return for Arizona's economy. ADOT can address transportation issues through several different means, including planning, investments, operations and technology improvements, and regulations.



PRIORITIZATION OF NEEDS AND PROJECT IDENTIFICATION

The Freight Plan identified over 100 freight transportation issues using stakeholder outreach, performance measures, and an analysis of Arizona's top freight sectors. Freight transportation issues ranged from recurring urban congestion to a need for passing/climbing lanes. The Freight Plan developed and applied a two-step prioritization framework to identify the most strategic projects for ADOT to implement.

STEP 1: APPLY QUALITATIVE SCREEN TO THE "LONG LIST" OF ISSUES

The "Long List" of 100 issues was screened to 30 strategic issues using criteria aligned with Freight Plan Goal 1: Increase Economic Competitiveness and Goal 2: Increase System Performance, along with their related objectives. The long list of issues was assessed qualitatively with a "yes/no" answer against a set of merit-based considerations to develop a Short List of the 30 most strategic freight issues.

STEP 2: APPLY QUANTITATIVE WEIGHTED PRIORITIZATION TO THE SHORT LIST OF ISSUES

The short list of strategic issues identified in Step 1 was subsequently ranked using a quantitative weighted prioritization process that assessed the likelihood an issue would increase economic competitiveness and increase system performance. Projects were then identified to address each of the strategic issues and assessed against Goal 3: Improve System Management. The Arizona FAC reviewed the prioritization approach and helped establish the weight of each criterion.



A final selection screen was applied using an analysis of the benefits of projects to freight relative to passenger vehicles, ADOT planning/funding cycles, emerging issues, and the readiness of the project to be advanced. The resulting prioritization is shown below:

RANK	ROUTE (AREA)	PROJECT OPTION(S)	PLANNING LEVEL PROJECT COST (MILLIONS)	SHARE OF FREIGHT BENEFITS
1	I-40	I-40/US93 System Interchange Improvements	\$86.50	55.0%
2	I-10	I-10/US 191 System Interchange Improvements (interim)	\$1.50	54.0%
3	I-10	Reconstruct the US 191/Cochise RR Overpass to accommodate oversize freight	\$16.50	52.2%
4	I-40	I-40/I-17 System Interchange Improvements	\$82	34.9%
5	I-10	I-10 Picacho Area Roadway Widening*	\$85	29.5%
6	I-10	I-10 West of Phoenix General Purpose Lane	\$61.30	28.2%
7	I-10	Tucson Area I-10 Widening Project	\$1,860	22.4%
8	I-10	I-10 Gila River Indian Community Area Widening	\$189	21.6%
9	I-10	Earley Road to I-8 Widening and TI Improvements on I-10*	\$40	21.3%
10	I-10	I-10/I-19 System Interchange Improvements	\$83	20.4%
11	US 60	US 60 Passing Lane	\$5.10	19.9%
12	US 60	US 60 Access Controlled Freeway Extension	\$245	18.0%
13	SR 260	SR 260 Show Low Area Intersection Improvements	\$8	17.2%
14	I-17	I-17 Stoneman Lake Area Climbing Lane and ITS	\$23.10	17.1%
15	US 60	Globe Area Freight Improvements	\$6.80	16.0%
16	US 89	SR 89/I-40 System Interchange Improvements	\$29	15.6%
17	SR 189	SR 189 Traffic Flow Improvements (interim)	\$70	14.9%
18	I-10	I-10 Phoenix Urban Area Improvements	\$775	14.8%
19	SR 189	SR 189 Traffic Flow Improvements (ultimate)	\$161	14.7%
20	US-60	US 60 Phoenix Urban Area Improvements	\$425	13.2%
21	SR 69	SR 69 East of Prescott ITS Improvements	\$3.30	13.1%
22	I-17	I-17 Phoenix Urban Area Improvements	\$600	11.4%
23	I-10	I-10 Phoenix Urban Area Improvements	\$300	10.2%
24	I-10	I-10 Phoenix Urban Area Improvements	\$200	10.1%
25	I-19	I-19 Tucson Area Widening and TI Improvements	\$625	8.8%

ARIZONA FREIGHT SYSTEM IMPROVEMENT STRATEGY

Implementing the Freight Plan means that, at a minimum, Arizona is in compliance with federal requirements in the FAST Act. Surpassing minimum compliance and positioning ADOT to achieve the Freight Plan's Vision, will require a combination of funding and strategic actions that:

- 1 Advance top priority freight improvements to development and completion
- 2 Increase prominence of freight in ADOT planning and programming
- **3** Coordinate freight improvement issues and projects falling within Metropolitan Planning Organizations (MPO) jurisdictions
- Continuing the Involvement of the Freight Advisory Committee



1. ADVANCE TOP PRIORITY FREIGHT IMPROVEMENTS TO DEVELOPMENT AND COMPLETION

Arizona's apportionment of dedicated FAST Act freight funds under the National Highway Freight Program (\$95.7 million over five years) can be best used to advance the following six freight improvement projects:

- I-40/US 93 System Interchange Improvements \$15 million
- I-10/US 191 System Interchange Improvements (interim)- \$6.2 million
- US 191 Cochise Railroad Overpass \$16.5 million
- I-10 West of Phoenix General Purpose Lane \$33 million
- SR 189 Traffic Flow Improvements (interim) Mariposa LPOE to I-19 \$15 million
- Statewide Truck Parking and Freight Operations \$10 million

The Freight Plan's project list only includes NHFP funds spent on these projects and does not include state, local, or other federal funds used to pay for projects. The Freight Plan covers NHFP funding from 2016-2020 because it is not clear whether the NHFP or another freight specific funding source will continue beyond 2020.

The projects identified in the Freight Plan's fiscally constrained project list will be added to Arizona's Five-Year Transportation Facilities Construction Program, subject to recommendation and approval by the State Transportation Board.



2. INCREASE THE PROMINENCE OF FREIGHT IN ADOT PLANNING AND PROGRAMMING

ADOT should leverage the research, analysis, working papers, and reports of the Arizona State Freight Plan with the aim of disseminating and promoting the findings to others within Department and more broadly in the transportation planning community in Arizona. The 2017 update of the Arizona LRTP provides a practical opportunity to increase the prominence of freight in planning and programming as this guiding document will inform Arizona's planning and programming for the next five years.

ADOT should strengthen the freight criteria within ADOT's project planning and prioritization process.

ADOT should also ensure the addition of freight projects for statewide consideration in the P2P process. This will help ensure ADOT is well positioned to use future freight funds as they are made available.

3. COORDINATE FREIGHT IMPROVEMENT ISSUES AND PROJECTS FALLING WITHIN MPO JURISDICTION

ADOT should continue to coordinate with the State's regional transportation planning agencies, such as MPOs and Council of Governments (COGs) to advance projects for programming into the STIP.

Coordination between ADOT and the MPOs and COGs on freight planning initiatives, such as the State Freight Plan, MPO freight plans, and regional efforts, such as the 'SPINE' study addressing freight in the Phoenix metropolitan area, can help define freight priorities and implement freight improvement projects.

4. CONTINUE INVOLVEMENT OF A FREIGHT ADVISORY COMMITTEE

Throughout the development of the Arizona State Freight Plan, ADOT has benefitted from advice offered by the Arizona FAC. The FAC fulfills the state's statutory "freight advisory council" purpose, including a strong role in advising the development of the Arizona State Freight Plan.

There is no requirement that the Arizona FAC adhere to a certain organizational structure or adopt bylaws or a charter. Creating a FAC charter and drafting more formal meeting minutes would help to increase the transparency of Freight Plan implementation. A formal record of the FAC's membership, structure, meetings, and advice could address potential comments received during future public review periods. ADOT is grateful to all FAC participants for their hard work and helpful advice.



