



# **Draft Tier 1 Environmental Impact Statement and Preliminary Section 4(f) Evaluation**

**Appendix E2, Transportation Analysis Technical Memorandum**

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## Acronyms

1		
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3	ADOT	Arizona Department of Transportation
4	AMC	Arizona-Mexico Commission
5	EIS	Environmental Impact Statement
6	I	Interstate
7	LAS	Las Vegas International Airport
8	LPOE	Land Port of Entry
9	PHX	Phoenix Sky Harbor International Airport
10	SR	State Route
11	Study Area	I-11 Corridor Study Area
12	TUS	Tucson International Airport
13	UPRR	Union Pacific Railroad
14	US	United States



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1 This appendix provides supplementary information **Chapter 2. Alternatives Considered.**

## 2 **E2.1 FREIGHT**

### 3 **E2.1.1 Freight Corridors**

4 Within the South Section, the Interstate 19 (I-19) and I-10 corridors function as significant  
5 international, national, and regional freight routes. I-19 serves as a major truck route at the  
6 border crossing, bringing manufactured goods and produce north from Mexico. In the Tucson  
7 area, daily truck volumes are about 8 to 14 percent of the total vehicle flow. Arizona Department  
8 of Transportation (ADOT) designated I-19 as a critical link in Arizona's Primary Freight Network  
9 and in the CANAMEX (now, I-11) Trade Corridor. I-19's connection to I-10 also gives those  
10 products access to distribution points throughout the United States (US).

11 Freight rail corridors also play an important freight role in the South Section (and beyond). The  
12 Union Pacific Railroad (UPRR) Nogales Subdivision runs adjacent to I-19, intersecting the  
13 UPRR Sunset Corridor at I-10, which generally runs parallel to I-8, State Route (SR) 238, and  
14 I-10 in the Central and South sections. The 66-mile Nogales Subdivision branch line moves rail  
15 traffic to and from Mexico, connecting the DeConcini Land Port of Entry (LPOE) in Nogales to  
16 Tucson. Approximately six trains per day carry seven million tons annually (ADOT 2011).

17 Within the Central Section, the I-10 and I-8 corridors also function as significant national and  
18 regional freight routes. Daily truck volumes are about 10 percent of the total vehicle flow on I-10  
19 and 16 percent on I-8 in the Central Section. The UPRR Sunset Corridor connects Southern  
20 California to El Paso, Texas, and on through Texas to Florida. The line serves the communities  
21 and economic centers in the southern part of the state, including Yuma, Wellton, Gila Bend,  
22 Maricopa, Casa Grande, Eloy, Marana, Tucson, Benson, and Wilcox (Parsons Brinkerhoff  
23 2013). The UPRR Sunset Route connects with the Phoenix Subdivision near Eloy. The Phoenix  
24 Subdivision is approximately 125 miles of single track serving Phoenix, and points west of  
25 Phoenix, to a point a few miles west of Arlington.

26 The US 93 corridor is the officially designated I-11 Corridor north of Wickenburg. Regionally, the  
27 corridor provides an important link to Las Vegas from the Phoenix metropolitan area and the  
28 broader central Arizona area. The corridor is Arizona's only highway route through the  
29 northwestern portion of the state. Within Wickenburg, truck traffic accounts for 10 percent of the  
30 traffic on US 93 to its junction with US 60 (Wilson & Company 2017).

31 In the North Section, the BNSF Phoenix Subdivision runs out of Phoenix and generally parallels  
32 US 60 to a point northwest of Wickenburg, heads west toward Matthie, and north Congress,  
33 paralleling SR 89. North of Congress, the line continues to Williams, Arizona, where it connects  
34 with the BNSF mainline, which parallels I-40. The Arizona and California Railroad connects with  
35 the BNSF Phoenix Subdivision line northeast of Wickenburg. However, no freight handling  
36 services occur at this junction. Commercial trucks account for the transport of all consumer  
37 goods to markets and stores in the Wickenburg area (Wilson & Company 2017).

38 At this time, adequate capacity is available for current and near-term anticipated demand on the  
39 rail corridors (ADOT 2013; BNSF 2016). Consequently, a need has not been identified for  
40 specific freight rail facilities in the I-11 Corridor Study Area (Study Area). However, north-south  
41 freight movements may grow in the future due to nearshoring or other changes in regional and



1 global trade patterns. The existing north-south freight rail routes through Arizona are not  
2 necessarily direct and would require traversing congested metropolitan areas. However, not all  
3 freight movements are suitable for rail; generally higher volumes and longer distances are more  
4 cost-effective for rail service. If new rail facilities are identified as a need to address future  
5 freight requirements, the privately held railroads would be responsible for the investment. No  
6 private railroad company has proposed facilities within the Study Area, and as such, plans for  
7 freight rail facilities are not being considered in this Draft Tier 1 Environmental Impact Statement  
8 and Preliminary Section 4(f) Evaluation (Draft Tier 1 EIS).

## 9 E2.1.2 Freight Generators and Movements

10 At the international level, most freight movements across the US–Mexico border are carried via  
11 truck (on I-19) and rail (along the UPRR tracks). Air cargo supports approximately 1 percent of  
12 freight movement into and out of Arizona. The Arizona-Mexico Commission (AMC) and US  
13 Department of Transportation, Research and Innovative Technology Administration, indicates  
14 commerce in the form of freight trucks, trains, and containers is increasing. For example, annual  
15 freight truck-container crossings were 763,000 in 2013, representing a notable 10-year growth  
16 from approximately 600,000 in 2003. The AMC also reports nearly \$55 million in bi-national  
17 trade and \$7.3 million in tourism expenditures are conducted daily through the Arizona-Sonora  
18 LPOEs (ADOT 2014).

19 **Table E2-1** (Existing and Proposed Major Freight Generators) presents the major freight  
20 generators in the Study Area. In the South Section, the freight generators are mostly located  
21 along I-19 and I-10, both of which are paralleled by the freight railroad facilities noted earlier. In  
22 the Central Section, the economic activity centers are primarily in two clusters: in Casa Grande  
23 near the I-10/I-8 interchange and along the planned West Pinal corridor route; and near  
24 Buckeye and Goodyear along I-10, SR 303L, and the planned SR 30 route. Because of the  
25 Sonoran Desert National Monument and extensive amounts of Bureau of Land Management  
26 land, limited to no development is expected along the western portion of I-8 and much of SR 85.  
27 There is some expected industrial and freight activity near Mobile and potentially north along the  
28 extended SR 303L route. The North Section is the least developed of the three sections today.  
29 None of the three potential freight generators exists yet; these are planned as part of large  
30 Planned Area Developments or master planned communities; or as standalone industrial  
31 centers (Forepaugh Industrial Rail Park).

32 **Table E2-2** (County-to-County Daily Freight Truck Flows, 2013 and 2040) presents the freight  
33 movements carried by trucks between counties in the Study Area. Freight traffic flows are a  
34 function of shortest and fastest route options and are typically the highest along established  
35 interstate highway corridors. The greatest percentage increase is expected to occur between  
36 Santa Cruz and Pima counties, with a growth of 288 percent in daily freight truck units by 2040.  
37 County-to-county daily freight truck flows also are projected to double between Pinal and  
38 Maricopa counties over that same period. The projected increases in truck-related vehicle miles  
39 traveled throughout the Study Area are consistent with these increases at the county level.



Table E2-1 Existing and Proposed Major Freight Generators

Major Freight Generator	Location	Description
<b>South Section</b>		
Mariposa International Commerce/Industry Park Area	Nogales	Employment center, Industrial parks, and distribution facilities near the Mariposa LPOE, which is the third largest trade corridor crossing of an international border in the US.
Sonoran Corridor	Tucson	Planned 50-square mile import/export logistics hub area that includes aviation and defense-related uses (e.g., Raytheon Missile Systems, Davis-Monthan Air Force Base, Tucson International Airport, University of Arizona Tech Park, etc.).
Port of Tucson	Tucson	An intermodal freight facility fulfilling both domestic and international shipments along I-10 and the UPRR corridor east of Tucson.
Downtown Tucson	Tucson	Primary employment center in the Tucson metropolitan area, located along I-10 north of the I-10/I-19 junction. Includes a mix of employment types, including office, commercial, institutional, and industrial, combined with residential and other mixed uses.
Tangerine Road Corridor	Marana/ Oro Valley	Planned activity center targeted for high-tech business park development, with surrounding residential and commercial mixed-use development.
Transportation Logistics Zone	Marana	Area encompassing the Pinal Airpark, I-10, and planned UPRR rail system improvements.
UPRR Red Rock Classification Yard	North of Tucson	Major rail yard proposed by UPRR to serve its Sunset Limited mainline corridor approximately 35 miles north of Tucson; intended to be one of the largest logistics centers in the western US.
Coolidge Inland Port and Pinal Logistics Park	Pinal County, Northeast of Eloy	Nearly 1,000 acres, this project is in the initial planning stages to deliver marketplace access to international intermodal, domestic intermodal, and carload services.
Phoenix Mart	Casa Grande	Mixed use development and proposed global trade center in Casa Grande that would be an international exposition center like the Merchandise Mart in Chicago, with numerous business and showroom suites, as well as facilities to conduct major events.
Casa Grande Commerce Park	Casa Grande	Employment area, consisting of nearly 600 acres.
Commerce and Business Corridor	Casa Grande	Linear economic growth areas in Casa Grande focused on commerce and business development along I-10 and I-8.



**Table E2-1 Existing and Proposed Major Freight Generators (Continued)**

Major Freight Generator	Location	Description
Manufacturing Cluster	Casa Grande	Planned manufacturing/industrial growth cluster in Casa Grande along the UPRR corridor and near future expressway corridors.
<b>Central Section</b>		
Industrial Cluster	Goodyear	Planned industrial growth cluster in southern Goodyear near the junction of SR 238/UPRR corridor and the Sonoran Valley Parkway corridor.
Phoenix-Goodyear Airport	Goodyear	Existing growth area of warehouse, distribution, and manufacturing development focused around the Phoenix-Goodyear Airport area.
Loop 303/I-10 Job Corridor	Goodyear	Planned growth area of business and commerce-oriented development along the I-10 and SR 303L corridors in Goodyear.
Buckeye Industrial Corridor	Buckeye	Over 16 miles of industrial and business park property supporting both domestic and international business, oriented around the Buckeye Municipal Airport south of I-10 and served by the UPRR Phoenix Subdivision.
Liberty Area	Buckeye	Business park development focus in eastern Buckeye between the UPRR Phoenix Subdivision and planned SR 30 freeway corridor.
<b>North Section</b>		
Belmont	Maricopa County	A 20,800-acre master planned community north of I-10 in Buckeye, with approximately 72,800 planned residential units and 2,100 acres of commercial and employment use.
Douglas Ranch	Buckeye	A 33,800-acre master planned community approximately 40 miles north of I-10 in Buckeye, with over 104,000 planned residential units and 55 million square feet of business and commercial use
Forepaugh Industrial Rail Park	West of Wickenburg	A 76-acre industrial park approximately 10 miles west of Wickenburg that is planned for over 700 acres of light and heavy industrial uses that would serve as a transportation distribution center.

**Table E2-2 County-to-County Daily Freight Truck Flows, 2013 and 2040**

County Pair	Cargo Value (1,000s) <sup>(1)</sup>			Daily Freight Truck Units <sup>(1)</sup>		
	2013	2040	% Change	2013	2040	% Change
Maricopa – Pima	\$13,369	\$30,377	127	943	1,741	85
Maricopa – Pinal	\$7,353	\$13,898	89	3,125	6,614	112
Maricopa – Santa Cruz	\$156	\$405	160	13	28	115
Maricopa – Yavapai	\$1,987	\$5,872	196	364	883	143
Pima – Pinal	\$1,136	\$2,750	142	594	980	65
Pima – Santa Cruz	\$407	\$987	143	83	322	288
Pima – Yavapai	\$718	\$1,115	55	29	43	48
Pinal – Santa Cruz	\$29	\$77	166	9	31	244
Pinal – Yavapai	\$125	\$222	78	12	26	117
Santa Cruz – Yavapai	\$3	\$7	133	1	3	200

(1) Annual flows converted to daily estimates by assuming 300 days per year.  
SOURCE: Transearch 2017.

## 1 E2.2 TRANSIT

### 2 E2.2.1 Regional Transit

3 Greyhound Lines is the dominant provider of scheduled intercity bus service. In the Study Area,  
4 Greyhound operates predominantly along I-10 and I-8, although its buses also use SR 85 (from  
5 I-10 to Gila Bend), serving cities statewide – specifically with Study Area routes connecting  
6 Phoenix, Tucson, Yuma, and Casa Grande. Greyhound offers connections and through ticketing  
7 with Mexican affiliates that serve Nogales and points in the interior of Mexico. White Mountain  
8 Passenger Lines links Phoenix, Payson, Heber, and Show Low (Greyhound 2017).

9 Amtrak provides passenger rail service to Maricopa and Tucson via the Sunset Limited route  
10 operated by the UPRR. ADOT has been working closely with the Federal Railroad  
11 Administration and other agencies to study potential passenger rail service between Tucson and  
12 Phoenix. The *Arizona Passenger Rail Corridor Study* Tier 1 EIS (ADOT 2016a) was prompted  
13 by a growing population and travel forecasts, with limitations to increase capacity on the existing  
14 transportation system between Tucson and Phoenix. A Record of Decision for the *Arizona*  
15 *Passenger Rail Corridor Study* was issued in December 2016 and selects the Yellow Corridor  
16 Alternative (with routing options) for further review in Tier 2 studies (ADOT 2016b). The Yellow  
17 Corridor Alternative (preferred alternative) for passenger rail would serve a slightly different  
18 travel market than I-11, since it is located to the east, serves commuter and intercity travel  
19 within the Phoenix and Tucson metropolitan areas, and would serve the East Valley of Maricopa  
20 County. About 80 percent of the projected 2035 trip demand to be served on proposed  
21 passenger rail service would be commute trips of less than 40 miles (ADOT 2016a).

22 The *Southwest Multi-State Rail Planning Study*, led by the Federal Railroad Administration, was  
23 completed in 2014 and included the states of Arizona, California, and Nevada. This study



1 outlined a preliminary vision for high-speed rail and provided a model framework for other  
2 regions of the US to use for transportation network planning. The study indicated that several  
3 multi-state corridors in the Southwest US could potentially address increasing constraints on the  
4 transportation network. The analysis suggested the connection between southern California and  
5 the Phoenix metropolitan area was a candidate for initial “Core Express” high-speed rail service  
6 characterized by speeds over 125 miles per hour. ADOT will consider these study findings in the  
7 *State Rail Plan Update*, and therefore, this type of high-speed passenger rail service is not  
8 being studied in this Draft Tier 1 EIS.

## 9 **E2.3 LOCAL TRANSIT**

10 Transit service in the South Section is mostly focused within the Tucson metropolitan area.  
11 Co-managed by the City of Tucson and Regional Transportation Authority the Sun Link is a  
12 3.9-mile streetcar system that connects five major districts within the city, from the Mercado  
13 west of I-10 through downtown Tucson and west to the University of Arizona. The Sun Tran  
14 Regional Transportation Authority manages various bus services, including the Sun Tran, Sun  
15 Express, Sun Van, Sun Shuttle, and Sun Shuttle Dial-a-Ride. The current Sun Tran system  
16 provides over 20 million passenger trips annually utilizing a fleet of 253 buses on 27 local routes  
17 and 17 express routes serving most of the City of Tucson as well as South Tucson, Marana,  
18 unincorporated Pima County, and Oro Valley. Sun Tran’s 253-vehicle bus fleet runs 365 days a  
19 year. Dial-a-Ride services extend to Oro Valley and Green Valley/Sahuarita (Sun Tran Regional  
20 Transportation Authority 2017). The Town of Oro Valley funds, manages and operates Sun  
21 Shuttle Dial-a-Ride senior services as well as general-public services in Oro Valley. The City of  
22 Nogales operates “Nogales Rides,” which provides paratransit services to senior citizens,  
23 developmentally disabled, special needs, or physically impaired persons. Although there is  
24 interest in transit services from Nogales along the I-19 corridor to Rio Rico and Tubac, with  
25 connections to Tucson, no public agency has been identified to operate a transit system in the  
26 area. No private service is available in the corridor.

27 Transit service in the Central and North sections are managed separately in Pinal and Maricopa  
28 counties. In Pinal County, the Central Arizona Regional Transit is a regional bus system that  
29 connects Florence, Coolidge, Central Arizona College, and Casa Grande and operates daily.

30 In Maricopa County, Valley Metro manages local and regional transit throughout the broader  
31 Phoenix metropolitan area, including the 26-mile light rail system, 19 neighborhood circulators,  
32 60 local bus routes, 15 limited express/express bus routes, and 6 RAPID bus routes (Valley  
33 Metro Transit 2017). Light rail serves the core of the metropolitan area, connecting Phoenix,  
34 Tempe, and Mesa, including serving Sky Harbor International Airport. Seven light rail extensions  
35 are under study, as well as one streetcar connection, anticipated to expand the system to  
36 66 miles of rail access by 2034. Local, express, and RAPID routes serve the greater Phoenix  
37 area, with one rural route to Gila Bend. Services do not currently extend as far north as  
38 Wickenburg.

### 39 **E2.3.1 Airports**

40 The I-11 Corridor would have a potential impact on air travelers between the Tucson  
41 International Airport (TUS), Phoenix Sky Harbor International Airport (PHX), and Las Vegas  
42 International Airport (LAS). The South Section of the I-11 Corridor is served primarily by TUS  
43 and the Central and North Sections are served by PHX.



1 TUS is a public joint civil-military airport owned by the City of Tucson, 8 miles south of  
2 downtown Tucson, in Pima County. It is the second busiest airport in Arizona, after PHX. Based  
3 on data from the Bureau of Transportation Statistics (2017), there were over 170,000  
4 passengers traveling each direction from PHX to TUS in 2016, with many of these connecting  
5 onto other destinations, and 125,000 passengers traveling each direction from TUS to LAS.  
6 There are eight daily flights between TUS and PHX on American Airlines, and there are three  
7 daily flights between TUS and LAS on Southwest Airlines.

8 PHX is a public airport owned by the City of Phoenix and located Southeast of Downtown  
9 Phoenix off I-10. It is the busiest airport in Arizona serving over 120,000 passengers per day.  
10 There are approximately 600,000 passengers traveling each direction between PHX and LAS.  
11 There are over 30 flights per day between the two destinations.

12 Throughout the Study Area, there are numerous local and regional airports. These airports  
13 typically handle smaller aircraft and may serve as relievers for cargo freight coming into PHX or  
14 TUS. For instance, in the South Section, the Pinal Airpark is located approximately 9 miles  
15 northwest of the City of Marana and is accessible via I-10. The Pinal Airpark is owned and  
16 operated by Pinal County and serves as a reliever airport whose main tenant performs  
17 maintenance service on aircraft, as well as airport storage. Currently, aviation activity at the  
18 airport is dominated by helicopter activity associated with the Arizona Army National Guard and  
19 other tenant organizations of the adjacent Silver Bell Army Heliport (C&S Companies 2015).

## 20 **E2.4 REFERENCES**

21 Arizona Department of Transportation (ADOT). 2016a. *Arizona Passenger Rail Corridor Study,*  
22 *Final Tier 1 Environmental Impact Statement.*

23 Arizona Department of Transportation (ADOT). 2016b. *Arizona Passenger Rail Corridor Study,*  
24 *Record of Decision.*

25 Arizona Department of Transportation (ADOT). 2014. *Arizona's Key Commerce Corridors.*

26 Arizona Department of Transportation (ADOT). 2013. *Arizona-Sonora Border Master Plan.*

27 Arizona Department of Transportation (ADOT). 2011. *What Moves You Arizona Long-Range*  
28 *Transportation Plan 2010-2035.*

29 BNSF. 2016. Personal communication with Jason Sanchez, May 6, 2016.

30 Bureau of Transportation Statistics. 2017. (Internet website:  
31 <https://www.transtats.bts.gov/tables.asp>) accessed July 24, 2017.

32 C&S Companies. 2015. *Pinal Airpark Airport Master Plan.*

33 Greyhound. 2017. (Internet website: <https://www.greyhound.com/en/>) accessed July 24, 2017.

34 Parsons Brinkerhoff. 2013. *Freight Transportation Framework Study. Technical Memorandum*  
35 *I- Freight Shipper and Carrier Profile and Commodity Flow Profile.*

36 Sun Tran Regional Transportation Authority. 2017. (Internet website:  
37 [http://www.suntran.com/index.phpArizona Transit Association\](http://www.suntran.com/index.phpArizona Transit Association/)) accessed July 24, 2017.



- 1 Transearch. 2017. Freight Transportation Statistics. (Internet website:  
2 <http://www.ihsglobalinsight.com/ProductsServices/ProductDetail838.htm>) accessed  
3 November 8, 2017.
- 4 Valley Metro Transit. 2017. (Internet website: <http://www.valleymetro.org>) accessed July 24,  
5 2017.
- 6 Wilson & Company. 2017. *US 93/US 60 Corridor Profile Study, Nevada State Line to SR 303L.*