Arizona State Rail Plan

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Arizona Department of Transportation

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FOREWORD

The Arizona State Rail Plan is one piece of a larger multimodal planning framework for the State of Arizona. This document presents a series of issues and opportunities relative to the future of rail development in Arizona, including a series of implementation directions and a discussion on funding options. The technical work to support this document can be found in the Statewide Rail Framework Study, part of a broader 40-year multimodal transportation vision for Arizona. This planning process has spanned the last three years, included intense interagency and public involvement efforts, and was recently accepted by the State Transportation Board as part of the Statewide Transportation Planning Framework Program. Additional information and technical reports can be found at:
http://www.bqaz.gov

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AA	Alternatives Analysis
AAR	Association of American Railroads
ACC	Arizona Corporation Commission
ADOT	Arizona Department of Transportation
APA	Apache Railway Company
APS	Arizona Public Service
APSX	APS Cholla Power Plant/Palo Verde Nuclear Generating Station Plant Railroad
AZCR	Arizona Central Railroad
ARRA	American Recovery and Reinvestment Act of 2009
ARZC	Arizona & California Railroad
ASARCO	American Smelting and Refining Company
ATSF	Atchison, Topeka, and Santa Fe Railway
AZCR	Arizona Central Railroad
AZER	Arizona Eastern Railway, Inc.
AGFD	Arizona Game and Fish Department
BIA	Bureau of Indian Affairs
BLKM	Black Mesa & Lake Powell Railroad
BNSF	BNSF Railway
BqAZ	Building a Quality Arizona
BRT	Bus Rapid Transit
CAAG	Central Arizona Association of Governments
CBRY	Copper Basin Railway
CMAQ	Congestion Mitigation and Air Quality Management
CTC	Centralized Traffic Control
CWR	Continuous Welded Rail
DOT	Department of Transportation
DSC	Drake Switching Company
DTC	direct traffic control
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FMPO	Flagstaff Metropolitan Planning Organization
FRA	Federal Railroad Administration
FRAC	Freight and Rail Advisory Council
FTA	Federal Transit Administration
FTZ	foreign trade zone
FXE	Ferromex
GCRX	Grand Canyon Railway
GVGN	Gila Valley Globe and Northern Railway
HSR	High-Speed Rail
HUD	Housing and Urban Development
HURF	Highway User Revenue Fund

ICR	intercity rail
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
KCSM	Kansas City Southern de Mexico
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRTP	State Long Range Transportation Plan
MAA	Magma Arizona Railroad
MAG	Maricopa Association of Governments
MP	Milepost
mph	Miles per hour
MPOs	metropolitan planning organizations
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act
PAG	Pima Associations of Governments
PDOX	Phelps Dodge Morenci Mine Industrial Railroad
PFE	Pacific Fruit Express
POLA/POLB	Ports of Los Angeles/Long Beach
PRIIA	Passenger Rail Investment and Improvement Act
PTC	Positive Train Control
RSIA	Rail Safety Improvement Act
RTA	Regional Transportation Authority
SAFETEA-LU	Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users
SMA	San Manuel Arizona Railroad
SP	Southern Pacific
SPSR	San Pedro and Southwestern Railroad
SR	State Route
SRFS	Statewide Rail Framework Study
SRP	Arizona State Rail Plan
STFS	Statewide Transportation Framework Study
TCG	Tucson, Cornelia and Gila Bend Railroad Company
TCIF	Trade Corridor Improvement Fund
TEA-21	Transportation Equity Act for the 21st Century
TEP	Transportation Enhancements Program
TEUs	Twenty Foot Equivalent Units
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery
TWC	Track Warrant Control
UPRR	Union Pacific Railroad
USDOT	United States Department of Transportation
USG/YVR	Yuma Valley Railway
VRE	Virginia Railway Express
WHSRA	Western High Speed Rail Alliance
YMPO	Yuma Metropolitan Planning Organization

GLOSSARY OF TERMS

Alternatives Analysis: Alternatives Analysis focuses on a specific transportation need (or set of needs) in a corridor or subarea, identifies alternative actions to meet these needs, and generates the information necessary to select a preferred project for implementation. These activities are often collectively called "alternatives analysis" and address such issues as potential corridors, corridor characteristics, costs, benefits, environmental and community impacts, and financial feasibility.

Amtrak: Trade name of the National Railroad Passenger Corporation, established in 1971 to take over intercity rail passenger service from private railroads that no longer wished to provide such service.

Branch: A rail track which connects into a railroad trunk line. Rules and instructions pertaining to subdivisions apply on branches.

Class I railroad: As defined by the Association of American Railroads, a railroad with an operating revenue exceeding $319.3 million per year. The U.S. has seven such railroads, including BNSF and Union Pacific.

CANAMEX: The CANAMEX Trade Corridor, as defined by Congress in the 1995 National Highway Systems Designation Act, is a High Priority Corridor connecting Nogales, Arizona, through Las Vegas, Nevada, to Salt Lake City, Utah, to Idaho Falls, Idaho, to Montana, to Canada.

Class II railroad: These railroads are considered by the Association of American Railroads as "Regional Railroads" and are typically at least 350 miles in length with more than $40 million in annual operating revenues.

Class III railroad: These railroads are defined as having annual operating revenues of less than $40 million or are switching/terminal railroads. Class III railroads are typically local short line railroads, serving a very small number of towns or industries. Many Class III railroads were once branch lines of larger railroads that were spun off, or portions of mainlines that had been abandoned.

Classification yard: A railroad yard used to separate railroad cars on to one of several tracks, building new trains in the process. Cars are first taken to a track, called a lead or a drill track, and then sent through a series of switches, called a ladder, to the classification tracks. Larger yards tend to put the lead on an artificial hill, called a hump, so that gravity may propel the cars through the ladder. There are three types of classification yards: flat-shunted yards, hump yards, and gravity yards.

Commuter rail: Passenger rail service that operates within a metropolitan area—also called metropolitan rail, regional rail or suburban rail—or between two nearby metropolitan areas (e.g., San Francisco and San Jose). Commuter Rail most often connects a central city with its suburbs, and typically operates on track that is part of the general railroad system.

Deep-water port: Has more than one definition; perhaps the most pertinent is a port capable of accommodating the largest freight container ships that can pass through the Panama Canal.

Division: A geographical unit used by railroads to divide their operations for administrative purposes.

Environmental Impact Statement (EIS): As required by Section 102 of the National Environmental Policy Act; a detailed statements assessing the environmental impact of, and alternatives to, major federal actions significantly affecting the environment. Such a statement is called an EIS.

Flyover: A grade-separated crossing of two transportation facilities, where one line is physically elevated over the other. Also called an underpass or overpass.

Fracture zone: Areas of reduced permeability between habitat blocks.

Greenfield corridor: A corridor, to be used for development/transportation projects, whose previous use (if any) was vacant undeveloped land or agriculture.

Habitat block: An area of land that consists of important wildlife habitat and can reasonably be expected to remain wild for at least 50 years. Habitat blocks are primarily comprised of lands within National Forests, National Parks, National Wildlife Refuges, large military reservations, tribal lands, and lands managed by Bureau of Land Management (BLM) or Bureau of Land Reclamation (BLR).

High-speed rail: A mode that provides frequent passenger service between major population centers typically 100 to 600 miles apart, routinely achieves operating speeds of 110 mph or more, and may use shared tracks if equipped with positive train control (PTC) technology. According to the FRA, "service… is time-competitive with air and/or automobile travel in a given intercity corridor." Top speeds of 125 mph or more generally require completely grade-separated tracks and dedicated right-of-way. The FRA defines three levels of high-speed rail: express (with top speeds of at least 150 mph), regional (with top speeds of 110 to 150), and emerging (with typical speeds of 90 to 110).

Industrial Lead: A relatively short length of privately operated and maintained rail track, originating from a rail line and serving industrial uses.

Inland port: An inland intermodal terminal directly connected by road or rail to a seaport, and operating as a center for the transshipment of sea cargo to inland destinations. In addition to its role in cargo transshipment, it may contain facilities for storage and consolidation of goods, maintenance for road or rail cargo carriers, customs clearance services. An inland port may also be located in a foreign trade zone (FTZ) that contains adjacent land beyond the inland port, often encompassing manufacturing facilities located in close proximity to the port to take advantage of its intermodal transportation benefits.

Intercity rail: Refers to rail passenger service connecting cities approximately 100 miles or more apart. In the U.S., top speeds may range from 79 mph to approximately 90 mph. It generally operates on track shared with freight trains, commuter rail or both.

Intermodal: Refers to the movement of freight by more than one mode of transportation. The railroad industry applies the term to container and trailer on flat car transportation only.

Linkage zone: A portion or subset of the fracture zone or habitat block identified as an area critical to wildlife movement.

Mainline: A railroad's principal trunk route between two points; it usually has sidings, spurs, and yards at a number of locations to serve customers, and to hold freight cars.

Metropolitan area (formally, Metropolitan Statistical Area or MSA): An area that contains at least one urbanized area of 50,000 or more inhabitants. An MSA "central county" has at least 50 percent of its population residing in urban areas of 10,000 or more population, or contains 5,000 or more people living in a single urban area of at least 10,000. An MSA "outlying county" has at least 25 percent of its employed residents working in the central county or counties of the MSA, or has at least 25 percent of its employment accounted for by workers who reside in the central county or counties.

Panamax: Refers to large ships that currently do not fit through the Panama Canal (carrying over 5,000 twenty thousand-foot equivalent units [TEUs]), until completion of the canal's lock expansion project which will accommodate cargo capacity up to 13,000 TEUs.

Positive Train Control (PTC): Refers to technology that can prevent train-to-train collisions, overspeed derailments, and casualties or injuries to railway workers operating within their limits of authority as a result of unauthorized incursion by a train. PTC can also prevent train movements through a switch left in the wrong position. PTC systems vary widely in complexity and sophistication, based on their level of automation, the system architecture, the wayside system on which they are based (e.g., non-signaled, block signal, cab signal), and the degree of train control they can assume. The federal Rail Safety Improvement Act of 2008 mandates the widespread installation of PTC systems by December 2015.

Quiet zone: A segment of track, typically in an urbanized area, in which an agreement between local government and the railroad removes the requirement of sounding train whistles or horns, at least during specified hours. In return, the local jurisdiction may pay for and install additional safety measures, such as grade-separated road crossings or four-quadrant gates to enhance safety.

Section 130: An FHWA-administered program that provides funding to states for use in highway-rail grade crossing safety improvement projects.

Section 403(b): As part of the National Railroad Passenger Service Act of 1970, federal Amtrak legislation allows under Section 403(b) for a state or states to apply to Amtrak to establish rail service within their state(s) if they agree to pay at least 45 percent of the first year operating costs and 65 percent in the years thereafter.

Short line railroad: As defined by the Association of American Railroads (AAR), short lines consist of (1) line-haul railroads operating less than 350 miles of road and earning less than $40 million of annual operating revenue, and (2) switching and terminal railroads, which are either jointly owned by two railroads for the purpose of transferring cars between railroads, or operate solely within a facility or group of facilities.

Subdivision: A railroad division may be divided into a number of subdivisions for ease of operations.

Switch: As a noun, refers to track equipment that allows cars to move, or cross over, from one track to another. The verb refers to shuffling or moving rail cars, usually within a yard (also called marshaling).

Team Track: A rail siding for general usage by freight shippers, named for the teams of horses that once pulled the wagons to fetch the freight.

Trackage rights: An agreement between two railroads whereby one buys the right to run its trains on the tracks of the other.

Train spot: To switch a freight car to a specific location, usually for loading or unloading.

Transit-oriented development (TOD): A specialized case of mixed-use, moderate-to-high-density development that is located within walking distance of a fixed guideway transit stop. The proximity to fixed guideway transit allows for reduced parking requirements; the mixed-use aspect encourages a reduced demand for trips by bringing housing, jobs, community facilities, and goods and services close together so that the need for travel beyond the immediate vicinity is less than in typical developments. TOD developments typically emphasize walkable streetscapes, moderate to high density housing, office, and supporting retail, focused public spaces, and integrated design that offer the ambience of traditional neighborhoods.

Transloading: The transfer of a shipment from one mode of transportation to another.

Value-added: The enhancement added to a product or service by a company before the product is offered to customers.

Wye: A triangular shaped arrangement of railway tracks with a switch at each corner. In mainline railroads, this is used at a railway junction, where two railways join, or cross over. It can also be used as a stub for turning railway equipment. By performing the railway equivalent of a three-point turn, the direction of a locomotive or railway vehicle can be reversed.

Yard: A system of tracks, other than main tracks and sidings, used for making up trains, storing cars or other purposes.

Yard limits: A portion of main track designated by yard limit signs and by timetable, train order Form T or track bulletin, which trains and engines may use.

1.0 INTRODUCTION

Arizona has experienced several decades of extraordinary growth, and during that time has built modern, vibrant cities and towns. These cities are built on a foundation of well-planned freeway networks integrated into an extensive roadway system generally organized in a grid pattern that has supported a vehicle dominated transportation system throughout the State. The land use patterns which have developed from these decades of growth has tended to be characterized as suburban development with large, single family home subdivisions separated from commercial and employment centers.

The latest economic downturn has vividly demonstrated that unfocused growth is not the path to stable long-term prosperity. Like all Sunbelt states, Arizona is confronting a serious recession and is faced with limited funding for transportation infrastructure. Transportation investments over the next several decades must be strategically utilized to leverage the maximum economic benefits for the State of Arizona. Investment in rail infrastructure has been demonstrated to provide economic stimulation during the implementation phase, and maximizes benefits through direct linkages with private land development along rail corridors once constructed. This can foster urgent job growth needed for the state to navigate a successful recovery from the current economic conditions.

The highly connected grid of highways and local streets which currently exist in the state represent the first half of an efficient multi-modal transportation system which will support the emerging Sun Corridor Megapolitan, and expanding rural areas. The second half of the system is envisioned to be an integrated transit system designed in harmony with the roadway system, and will include intercity passenger rail, commuter rail, high capacity bus rapid transit, light rail, and street car systems. These multi-modal transportation components will expand the new development models emerging within the state. These new approaches integrate horizontal and vertical mixes of land uses with higher density residential sites, including a wide variety of multi-family building types.

In order to economically compete globally the State will need to provide educated workers, sufficient capital to fund research and entrepreneurs, while nurturing promising new homegrown companies. The recession has awakened a sense of urgency to restructure the economy of our State to attract a more sustainable mix of industries and the jobs they offer. A key cornerstone for creating a sustainable economy is an efficient multi-modal transportation system which can support an additional six million people in Arizona within the next 50 years. A multi-modal transportation system which includes a strong rail component can help to promote a compact land use development pattern in the State of Arizona that could have the following benefits;

1. Save over 800 square miles of open desert and agricultural lands from development
2. Eliminate the need for as many as 30 million miles of driving each day, reducing the amount of greenhouse gas emissions and our reliance on foreign energy sources
3. Provide an estimated savings of over $10 B in transportation capital costs, as opposed to an auto-dominated transportation system.

Arizona's economy needs an efficient and competitive rail network. A healthy rail network must provide a reliable, accessible, and cost effective service to shippers and customers across the State. In addition, a fast, frequent and reliable passenger rail service between population centers and tourist destinations that is competitive with automobile and air travel times, is important to the State's economic and environmental well-being.

1.1 Purpose of the Arizona Rail Plan

In the next 20 years, the State of Arizona will face great challenges in managing and developing its transportation system. With a rapidly growing population and expanding business sector, the transportation network will have to accommodate significant increases in passenger and freight movements.

The reality is that much of this demand will stress an already overburdened highway system, and investment in Arizona's rail system may provide some relief to future highway congestion. There is an opportunity to divert passenger and freight demand from highway facilities to the rail network. Through collaborative planning, Arizona can build a rail system that will move people and goods in a safer, sustainable, and in a cost effective way.

The Arizona State Rail Plan (SRP) is the first comprehensive assessment of the State's rail needs and was initiated in response to the increasing involvement by the Arizona Department of Transportation (ADOT) in freight and passenger rail issues. The SRP serves to identify the current rail system, determine infrastructure needs, and to have rail projects included in the State's long-range planning processes to improve regional and statewide safety and mobility. The principle purpose is to convey the magnitude of rail needs in the State and set forth a policy framework through which strategic actions can be taken to realize the full potential of passenger and freight rail transportation.

1.2 History of Railroads in Arizona

Railroads came to Arizona in the late 1800s and had a profound influence on the development of the State. The cornerstones of early Arizona commerce (cattle, citrus, copper, climate and cotton) would not have been possible without the transportation provided by the railroad industry.

Before the railroad reached Yuma, practically all of the supplies for the State were shipped by steamer from San Francisco down the coast, around Lower California and up the Sea of Cortez to Port Isabel, where the cargoes were shifted to light draft stern-wheel boats, and the journey continued up the Colorado River to points in Arizona. Most of this river traffic was carried by the Colorado River Steamer Navigation Company, which was purchased by the Southern Pacific in 1877.

In July 1866, Congress passed a law incorporating the Atlantic and Pacific Railroad, the company was given the mission to build near the 35th parallel from Springfield, Missouri west to the Pacific. In exchange for its completion, the railroad would receive land grants along its route. In 1880, the Atlantic and Pacific Railroad began laying track westward from Albuquerque on its way to California. On August 1, 1882 the railroad reached Flagstaff, and was completed across the State in August 1883. At the time of its completion the Atlantic and Pacific Railroad was a subsidiary of the Atchison, Topeka, and Santa Fe Railway (ATSF). The 209-mile 'Peavine', that connects Williams Junction to Phoenix through Wickenburg, was originally built in 1893-1895 by ATSF, and originally provided service to Prescott. The Peavine has had no passenger trains since 1969, and the Prescott Branch was abandoned in the 1980s. However, the current alignment through Skull Valley is a major freight rail connection between Phoenix and the Transcon Corridor.

The Territorial Act of 1877 called for another main line route to enter into southern Arizona at Yuma, and continue eastward across the southern part of the State into New Mexico at Lordsburg. Southern Pacific (SP) was given the charter for constructing the southern route. By 1879, SP's operations extended from Yuma to Maricopa Wells and later that same year to Tucson. It was another three years before service was opened to Lordsburg. In the early 1900s, the other segments of the historic Southern Pacific system (Phoenix Loop, Nogales, Douglas, Globe, Hayden and Clifton lines) were added. Most of the significant railroading activities occurred at the end of the 19th and the first half of the 20th Century. Few