ARIZONA PASSENGER RAIL CORRIDOR STUDY

Tucson to Phoenix

Final Tier 1 Environmental Impact Statement

Appendices

December 2016

Submitted to:

U.S. Department of Transportation
Federal Railroad Administration

Submitted by:

Arizona Department of Transportation
Multimodal Planning Division

Appendices

Agency Comments on the Draft Tier 1 EIS

Agency Comments on the Draft Tier 1 EIS

10/30/2015 U.S. Environmental Protection Agency Cornell Dunning	
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION IX 75 Hawthorne Street San Francisco, CA 94105 OCT 30 2015 Andréa Martin Federal Railroad Administration 1200 New Jersey Avenue SE, MS-20 2 Washington, D.C. 20590 Carlos Lopez c/o ADOT Passenger Rail Study Team 4 West Camelback Road, Suite 479 Phoenix, AZ 85013 Subject: Arizona Passenger Rail Corridor Study: Tucson to Phoenix Draft Tier 1 Environmental Impact Statement (CEQ# 20150254) Dear Ms. Martin: The Environmental Protection Agency (EPA) has reviewed the Draft Tier 1 Programmatic Environmental Impact Statement (Draft PEIS) for the Arizona Passenger Rail Corridor Study: Tucson to Phoenix. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. EPA accepted the Federal Rail Administration (FRA)'s July 9th, 2012 invitation to participate in the "Tier 1" or programmatic environmental review NEPA process and provided input through interagency meetings as well as written scoping comments on November 9th, 2011. The Tier 1 Draft PEIS process is expected to eliminate broad corridor alternatives from further consideration, and discuss broad landscape-scale impacts. As indicated through the Draft PEIS, future "Tier 2", or project-level analyses, will be implemented as funds become available and will address site-specific environmental impacts of the passenger train project. EPA supports the concept of a rail system in Arizona that can provide an alternative to increasing vehicle miles traveled so long as it is planned well and is implemented with maximum reductions of potential environmental impacts. We have rated the Preferred "Yellow" Alternative as Environmental Concerns – Insufficient Information (EC-2) and provide recommendations for addressing concerns relevant to the decision-making at this programmatic scale of analysis. A "*Summary of EPA Rating Definitions*" is enclosed. *Rail Maintenance Facilities* We recommend analysis and a decision at this Tier 1 phase regarding the impacts and siting of future rail maintenance facilities. Understanding systemwide and general, localized impacts from rail maintenance facilities may provide important information about environmental impacts that could be avoided (noise, air quality, traffic) through a siting decision at this stage in the planning process.	Due to funding constraints, it is unlikely that a complete Tucson-to-Phoenix passenger rail system would be built initially. Therefore, system-wide analyses and comparison of impacts at alternative locations for system facilities, such as Rail Maintenance Yards, cannot be undertaken until a project for an initial operable segment has been defined and conceptualized. A more detailed discussion on this topic appears on Page 4.

Clean Water Act Section 404 While the Draft PEIS defers detailed analysis of aquatic resource impacts, and specific requirements related to Clean Water Act Section 404 permitting, until Tier 2, it is important that FRA choose for future analysis a corridor that includes the option that is most likely to contain the least environmentally damaging practicable alternative, which is the only alternative that can be permitted for CWA Section 404. We recommend that FRA confirm in the combined Final/ROD that the Yellow Corridor is most likely to contain the least environmentally damaging practicable alternative. *Locomotive Technology* Because the proposed technology for the Passenger Rail will be diesel locomotives, EPA recommends that FRA commit now to use of the cleanest engines available and implementation of a robust suite of emission reducing mitigation measures. We also recommend including in the Tier 1 analysis a discussion of what measures might need to be taken now, in advance of future Tier 2 analyses, in order to accommodate a future electrified system (infrastructure needs, siting near electricity sources, preserving footprints for sub-stations, etc.) should that future opportunity be available. The attached detailed comments further describe the above-stated concerns and additional other topics to be addressed within the combined Tier 1 Final PEIS/ROD. In addition, EPA also provides recommendations for consideration during future Tier 2 analysis. We look forward to working with FRA to identify ways to address these issues and the other concerns identified in the enclosed detailed comments. We appreciate the opportunity to review the Draft PEIS and we look forward to continuing our coordination with FRA. If you have any questions, please feel free to contact me at 415-947-4161, or Zac Appleton, the lead reviewer for this project, at 415-972-3321, Appleton.zac@epa.gov. Sincerely, for Connell Dunning, Transportation Team Supervisor Environmental Review Section Enclosures: EPA's Detailed Comments Summary of EPA Rating Definitions cc: Raymond Sukys, FTA Carlos Lopez, ADOT Kathleen Tucker, USACE Alan Hansen, FHWA	With no specific alternative alignments developed in the Tier 1 EIS, subjects such as Clean Water Act Section 404 permitting were discussed only in general terms. Based on the Tier 1 analysis, the Yellow Corridor Alternative would appear to provide a less environmentally damaging alternative alignment than the Orange Corridor Alternative; however, FRA cannot make that determination at this stage. A more detailed discussion on this topic begins on Page 5. For cost estimating purposes, it was assumed that diesel-electric locomotive technology would be used for a theoretical future passenger rail system; this, however, does not preclude ADOT from exploring other means of locomotive power--including electrification. Discussion of and comparison between various types of locomotive technology were not part of the Tier 1 analysis. A more detailed discussion on this topic appears on Page 6.

SUMMARY OF EPA RATING DEFINITIONS* This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS). **ENVIRONMENTAL IMPACT OF THE ACTION** ***"LO" (Lack of Objections)*** The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal. ***"EC" (Environmental Concerns)*** The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts. ***"EO" (Environmental Objections)*** The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts. ***"EU" (Environmentally Unsatisfactory)*** The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ). **ADEQUACY OF THE IMPACT STATEMENT** ***"Category 1" (Adequate)*** EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information. ***"Category 2" (Insufficient Information)*** The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS. ***"Category 3" (Inadequate)*** EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ. *From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.	Detailed responses begin on Page 4.

EPA DETAILED COMMENTS ON THE ARIZONA PASSENGER RAIL CORRIDOR STUDY: TUCSON TO PHOENIX DRAFT TIER 1 ENVIRONMENTAL IMPACT STATEMENT, OCTOBER 30, 2015 The 2014 Council on Environmental Quality (CEQ) guidance for Effective Use of Programmatic NEPA Reviews (p. 10) states that, "using programmatic NEPA reviews allows an agency to…avoid repetitive broad level analyses in subsequent tiered NEPA reviews and provides a more comprehensive picture of the consequences of multiple proposed actions." EPA supports the approach to assess the Passenger Rail Corridor Study at a programmatic scale, especially where such an approach can lead to reducing environmental impacts through systemwide assessment of project impacts. **Rail Maintenance Facilities** The Draft PEIS mentions intended rail maintenance facilities, but does not include an analysis of the impacts that would result from siting a new maintenance facility in the corridor or a comparison of impacts across the entire corridor for purposes of informing a decision for siting. For example, page 5-174 describes a mitigation measure that will be considered for the Tier 2 document, such as secondary containment at rail maintenance yards, but the document does not discuss the impacts of siting maintenance facilities. If left to future Tier 2 analyses, it would be more challenging to compare sites across the entire 120 miles corridor and ultimately choose locations that best minimize impacts to communities. **Recommendation** EPA recommends that FRA consider using the Tier 1 process to disclose to the public and decision makers the various impacts that a new maintenance facility could cause across various possible locations so that a decision regarding where to site a future maintenance facility would be informed by knowledge of impacts and how the impacts differ across sites being considered. We suggest including estimated impacts in a tabular format comparing various sites would be helpful for decision-making. Impacts to consider include estimated localized PM2.5 emissions from diesel exhaust and other health-related air quality impacts, noise and vibration impacts from engine idling and maintenance, visual impacts, and VOCs from solvents and other chemicals common to train maintenance. Alternatively, EPA recommends that FRA commit in the Final PEIS/ROD to assess, at some point in the future, various potential locations for rail maintenance facilities throughout the 120 miles corridor through one analysis with clear comparison of impacts across difference sites. **Aquatic Resources** *CWA Section 404(b)(1) Alternatives Analysis* As stated in the Draft PEIS, prior to project construction, the project proponent may need to obtain a Clean Water Act (CWA) Section 404 permit from the U.S. Army Corps of Engineers (Corps) if jurisdictional waters of the United States will be impacted. The CWA Section 404(b)(1) Guidelines (Guidelines) at 40 CFR Part 230.10(a) state that "… no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." In other words, only the least environmentally damaging practicable alternative (LEDPA) can be permitted under the Guidelines (40 CFR 230.10(a)). 1	**Rail Maintenance Facilities** As funding becomes available, one or more operable corridor segments could be developed as individual projects that make up components of a complete passenger rail system between Tucson and Phoenix. Any such section will be required to have independent utility with or without construction of other sections. No individual segment of a passenger rail system has been identified for implementation, but the following proposed corridor segments could be evaluated as logical, independent sections for commuter service. These corridor segments could also be combined, modified, or revisited in the future based on available funding. •Tucson to Marana •Queen Creek/Santan Valley to Phoenix •Coolidge to Phoenix •Coolidge to Tucson •Tucson to Phoenix FRA will assess, in a Tier 2 study, alternative locations for rail maintenance facilities that serve the initial corridor section, while accommodating the full 120-mile corridor proposed to be built in the future.

EPA appreciates the commitment to address impacts to waters at such time that Tier 2 analyses are initiated. The Draft PEIS identifies that the two potential 1-mile wide, 120-miles long rail corridors, (Yellow Corridor and Orange Corridor) could potentially impact hundreds of acres of wetlands, rivers and streams, along the Gila River, Santa Cruz River, and Salt River. The Tier 2 analyses and design phase will offer an opportunity to avoid and minimize many of these projected impacts to waters within the mile-wide corridor. However, at the Tier 1 phase, it is important for FRA to confirm that the Yellow Corridor is the corridor "most likely to contain" the least environmentally damaging practicable alternative.

When considering the route most likely to contain the LEDPA, the Guidelines call for an analysis that compares the total impact of each alternative, including direct, indirect, and cumulative impacts. The Draft PEIS indicates that estimated impacts to waters are roughly similar between corridors. While it is not feasible to determine the exact quantification of indirect and cumulative impacts at this programmatic scale, EPA recommends that the Final PEIS/ROD provide a more detailed discussion, and broad quantification where possible, of the potential indirect and cumulative effects anticipated from both the Yellow and the Orange Alternative. Specifically, this information should be enough to understand if either route could potentially have significantly more total impacts to waters when considering anticipated indirect or cumulative effects, such that it might affect the determination of the route most likely to be the LEDPA.

Recommendations
EPA recommends that the Tier 1 Final PEIS/ROD confirm that, when also considering indirect and cumulative impacts to waters, the Yellow Alternative is the corridor most likely to contain the LEDPA. Where feasible, include broad quantification of possible indirect and cumulative impacts to support the determination.

Watershed-Scale Analysis and Advance Mitigation
In the subsequent Tier 2 analyses, we understand that FRA will work to determine the least impacting project footprint within the mile-wide corridor. EPA also recommends a watershed-level analysis that can provide landscape-level information about the ecological conditions and functions of the various aquatic resources that will be impacted. This is especially important for water features that will parallel the chosen corridor. For example, a watershed level analysis of possible impacts (and avoidance options) for where the corridor follows the Santa Cruz River would result in information that can guide future decionmaking across the entire watershed, rather than at smaller Tier 2 analyses that might miss opportunities for larger scale avoidance options.

Advanced planning for compensatory mitigation can identify conservation priorities, avoid and minimize impacts, and identify appropriate mitigation measures to fully offset unavoidable impacts. This is especially important if there is potential for fragmentation of an inter-connected network of aquatic ecosystems as a result of the proposed rail corridor. In such a situation, there is a greater likelihood that indirect impacts, along with direct impacts, will need to be fully compensated with "in-kind" mitigation to avoid significant degradation of waters. A cumulative watershed analysis will provide an opportunity to identify cumulative landscape-level impacts, and will subsequently enable FRA to identify effective large-scale mitigation measures. Early planning will also allow FRA to coordinate efforts with other applicable transportation projects in order to achieve a more strategic and effective conservation outcome.

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Aquatic Resources

On a corridor-level scale, the Yellow Corridor Alternative includes four major crossings of waters of the US and 1,030 acres of wetlands of which 550 acres are likely jurisdictional. In comparison, the Orange Corridor Alternative includes three major crossings of water of the US, but also 1,575 acres of wetlands of which 850 acres are likely jurisdictional wetlands. Water crossings may be bridged to potentially avoid direct impacts to water crossings, whereas wetlands may extend over a broader geographic extent and, consequently, be more difficult to avoid. In this regard, the Yellow Corridor Alternative would likely yield the least environmentally damaging practicable alignment alternative.

However, because the actual ROW width would likely be about 200 feet, the number of possible alignment alternatives within a one-mile-wide corridor is great, making avoidance of jurisdictional waters of the US more feasible. Without defining and assessing every practicable alignment, it cannot be confirmed that the Yellow Corridor Alternative would contain the LEDPA.

While the Tier 1 EIS provides a high-level overview of existing environmental conditions within the corridor alternatives, the actual area potentially affected by a passenger rail facility would be much smaller and could potentially avoid impacts to local features identified in the EIS. Watershed-scale impacts within a corridor alternative could be relatively constant regardless of alignment, but at the Tier 1 level of analysis, when no specific project has been designed or funded, it is not possible to estimate a general watershed-scale impact that would not vary based on structural

Recommendations
EPA recommends that prior to initiating individual Tier 2 environmental analyses, FRA complete a systemwide, landscape level watershed analysis that can provide valuable information regarding avoidance opportunities, ecological condition and functional assessments of aquatic features within the systemwide project footprint.

EPA encourages FRA to use the watershed analysis approach to address mitigation needs at a watershed level, rather than at a project-by-project level. We recommend that FRA begin advance planning for compensatory mitigation now in order to identify conservation priorities, avoid and minimize impacts, and secure appropriate mitigation measures to fully offset unavoidable impacts.

Tier-2 Analysis – Aquatic Resources
Please consider the following information at the Tier 2 analysis phase.

Recommendations
EPA recommends that in advance of publishing Tier 2 environmental analyses, FRA receive from the Corps of Engineers an approved Jurisdictional Delineation for the relevant study area.

We recommend Tier 2 analysis include a comprehensive assessment of all direct, indirect, and cumulative impacts of the rail project and its associated structures or fill, such as roads, transfer stations, power stations, maintenance areas, etc. in the selected Corridor.
The analysis should provide the following information:

a. An estimate of the impact area (acreage) of each class of aquatic resources that occur within the footprint of each corridor ROW. Also, provide the amount of linear feet of impact for each class of stream; this should include all permanent direct, indirect and temporary impacts.
b. An estimate of the cumulative linear feet and acreage of upstream reaches that would be affected within a previously agreed-upon project watershed hydrologic unit.
c. A description of the type of drainage network and density associated with the "Class 2" and "Class 3" Ephemeral Streams within the project watershed area.
d. More detailed information about special aquatic sites, such as wetlands, where they are present, their connection to upstream and downstream ecosystems, and their current ecological condition.
e. A description of the current ecological condition of each class of aquatic resource present at the potential impact sites. This can be done using aerial imagery and indicator metrics similar to those used in the California Rapid Assessment Method (CRAM).
f. A description of the large number of wells present within the study corridors and an analysis that would inform the potential impact of new rail infrastructure on surface water flows and the extent of impact into the Santa Cruz and Gila Rivers.

Locomotive Technology
The Draft PEIS is an appropriate forum to determine systemwide decisions regarding locomotive technology so that individual Tier 2 segments will be compatible. Though the Draft PEIS does highlight potential mitigation measures associated with locomotive technology, such as cleaner alternative fuels, idling restrictions (Table ES-6), and "state-of-the-art locomotives to maximize fuel

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requirements of different alignments.

The information gathered for a Tier 1 analysis covers a broad area but is not intended to provide an in-depth analysis. To provide that level of detail in a Tier 1 EIS would result in an encyclopedic volume, with only a fraction of the information gathered being necessary to complete a project-level EIS for implementation of a passenger rail system.

To complete a system-wide, landscape-level watershed analysis and receive an approved Jurisdictional Delineation for the study area would require a level of effort that runs counter to the intent of a tiered NEPA documents. However, opportunities to avoid wetlands, floodplains, and known waters of the US will be taken, to the extent practicable, in the development of alternative alignments for the subsequent project-specific analysis.

The subsequent project-specific analysis is the appropriate time to assess direct, indirect, and cumulative impacts of structural elements, fill, roads, transfer stations, power stations, and maintenance areas.

Locomotive Technology

The Arizona Passenger Rail Corridor Study includes this Tier 1 EIS as well as an Alternatives Analysis (AA) report, which estimated high-level costs for comparison between and among alternatives. The AA study, which was also a high-level analysis, did not estimate costs for electrified locomotion, nor did it compare the cost of an electrified system to the cost of a non-electrified system. In addition to the railroad itself, an electrified locomotive system would entail an additional, parallel

efficiency" (page 5-188) for Tier 2 analysis, EPA recommends that a firm commitment to such measures be specifically mentioned in the Final PEIS/ROD. In addition, EPA recommends a robust discussion about electrification, as well as incorporating into the Final PEIS/ROD any corridor-level considerations necessary to not preclude any future consideration of an electrified system. An electrified system could significantly reduce many of the anticipated diesel-related air quality impacts associated with the proposed passenger rail. **Recommendations** EPA recommends that the Final PEIS/ROD commit to use of Tier IV or the best available nonroad engines for reducing diesel locomotive exhaust emissions at the time future Tier 2 analyses are underway. EPA recommends that the Final PEIS/ROD address if electrification was considered for the passenger rail system and describe the reasons an electrified system was not presented as an option for consideration at this stage of analysis of the passenger rail through the Draft PEIS. EPA recommends that the Final PEIS/ROD identify if there are specific systemwide alignment siting considerations that would be necessary to accommodate future electrification, even if it is not considered for the first phase of the passenger rail system. For example, are there corridor-related considerations that would inform future siting of electricity-providing sub-stations? **Air Quality** The Draft PEIS identifies several Tier 2 considerations (page 5-74) FRA will pursue, including modeling CO and PM emissions to determine potential local air quality effects from the future construction and operation of the passenger rail system, and considering the quantification of Mobile Source Air Toxics (MSATs) emissions. **Recommendations** EPA recommends FRA consult with EPA early in the air quality analysis process for each Tier 2 environmental document. Due to changing ambient air quality conditions and the possible need for project-level transportation conformity hot-spot analyses, early coordination will be critical to insure project delivery and appropriate air quality analysis at the Tier 2 stage. EPA recommends that Tier 2 environmental documents reflect the best available information regarding ambient air quality conditions, the potential impacts from the project, and measures to best reduce those impacts. We recommend that the Tier 1 Final PEIS/ROD include a commitment to quantify MSAT emissions and analyze health impacts in the Tier 2 environmental documents where community impacts are anticipated. A Health Risk Assessment at the Tier 2 stage may be warranted where a future project would introduce additional pollutants into already burdened communities where there are sensitive receptors. *Emissions Mitigation Measures* 4	infrastructure; i.e., the traction power delivery system, resulting in higher construction costs per mile overall and an increased area of ground disturbance. No technology has been proposed or selected in the EIS though relatively conservative assumptions have been made about the performance of a future system to forecast ridership and estimate costs. In a subsequent phase of study, such as a project-specific NEPA document along with supporting analyses, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential. **Air Quality** FRA will consult with EPA early in the air quality analysis during subsequent project-specific studies to be certain that current conditions, methodologies, and standards are used for the analysis. Where community air quality impacts are anticipated, subsequent environmental documentation will quantify MSAT emissions and analyze health impacts.

The Draft PEIS lists (page 5-74) several types of construction emissions mitigation measures the Tier 2 NEPA document will consider for either Build Alternative, but does not state that the measures will be required for construction of each Tier 2 segment. **Recommendation** EPA recommends that the Tier 1 Final PEIS/ROD commit to implementing the construction mitigation measures listed on p. 5-74 for all Tier 2 projects (rather than the current statement that FRA will consider such measures). Further, since the publication of the Draft PEIS, the Pinal County Air Quality Control District has developed dust control rules for construction sites that will need to be included as commitments through the Tier 2 environmental decision-making process (http://apps.azsos.gov/public_services/register/2015/35/28_county_notices.pdf). EPA recommends that the Tier 1 Final PEIS/ROD expand upon the list of mitigation measures identified on page 5-188 that FRA would commit to implementing should the diesel-powered passenger train and maintenance facilities be constructed. For example, the expanded list of mitigation measures could include maintaining efficient signaling to reduce at grade conflicts to limit idling of passenger trains near sensitive receptors. **Tribal Consultation** FRA eliminated several Build Alternatives from further consideration that would have crossed into Gila River Indian Community (GRIC) land, citing concerns over impacts to cultural resources. The Preferred Alternative (Yellow) may cross onto an eastern parcel of GRIC land and the Draft PEIS describes ADOT's commitment to obtain permission from GRIC to further study of any corridor that may cross onto GRIC land. As Tier 2 analyses follow, there will be continued need to consult with GRIC and any other affected tribes who may be impacted by the proposed route. **Recommendations** EPA recommends that the Tier1 Final PEIS/ROD provide a summary of how FRA will continue to consult with GRIC (in addition to ADOT seeking permission for further study) and other tribes regarding tribal concerns with future routes to be analyzed. EPA recommends the Final Tier 1 PEIS/ROD identify the principle cultural resource issues, and Tier 2 measures to address such issues, that are anticipated if a passenger rail is constructed in the preferred corridor. **Contaminated Sites** The Draft PEIS describes (Table 5-17) respectively 1,511 and 1,142 RCRA, CERCLA, UST, LUST, TRI, TSCA, and Brownfields sites in the study areas for the Yellow and Orange Corridor Alternatives. Some of these sites may have complicated chemistry, hydrogeology, and other characteristics that require specific risk prevention measures. **Recommendation** EPA recommends FRA and ADOT consult with EPA and ADEQ early in the Tier 2 development process regarding possible contaminated sites in the selected corridor to ensure the project is designed to accommodate specific management needs associated with these types of facilities or their clean-up activities. 5	**Tribal Consultation** FRA has initiated Section 106 consultation with potentially affected tribes and will continue consultation in subsequent project-specific studies. Future tribal consultations will include requests for permission to further study alternatives that cross into tribal land. The Tier 1 EIS provides lists of previous projects and known archaeological sites within the Yellow and Orange corridor alternatives. During subsequent analyses, when a project is in design, principal cultural resource issues will be identified along with measures to address these issues. **Contaminated Sites** FRA and ADOT will consult with EPA and ADEQ early in the project-specific studies to identify possible contaminated sites to ensure the project is designed to accommodate specific management needs associated with these types of facilities or their clean-up activities.

EPA also recommends that FRA and ADOT consider applying for brownfields related funding assistance in order to promote beneficial re-use in coordination with new development that may accompany the new passenger rail. **Climate Adaptation** EPA supports FRA's efforts to reduce energy consumption and greenhouse gas (GHG) emissions. The Draft PEIS describes (page 5-181) GHG analysis consistent with the Council on Environmental Quality's Revised Draft NEPA Guidance for Federal Departments and Agencies on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Review (CEQ 2014). The emissions analysis in the Draft PEIS describes the net emissions benefits of the proposed passenger rail project, however the document does not discuss general adaptation strategies to promote resiliency in response to climate effects that the Southwest region may expect by the project's horizon year of 2035. As page 22 of CEQ's 2014 draft revised guidance on climate change discusses, "greenhouse gases already in the atmosphere will continue altering the climate system into the future, even with current or future emissions control efforts. Therefore climate change adaptation and resilience – defined as adjustments to natural or human systems in response to actual or expected climate changes - are important considerations for agencies contemplating and planning actions with effects that will occur both at the time of implementation and into the future." Further, the National Climate Assessment (2014) describes climate effects for the Southwest region that may impact infrastructure and ecosystem values related to the proposed passenger rail project (http://nca2014.globalchange.gov/). **Recommendation** EPA recommends the Tier 1 Final PEIS/ROD identify specific commitments to be implemented at the Tier 2 stage to address climate adaptation, including applicable actions noted in the National Climate Assessment for the Southwest Region. EPA recommends that FRA commit to referencing best available science and national guidance on climate adaptation at such time that Tier 2 analyses are undertaken. 6	FRA and ADOT will investigate brownfield funding opportunities if new development associated with a passenger rail alignment crosses or is adjacent to brownfields. **Climate Adaptation** When subsequent project-specific analyses are undertaken, FRA will reference best available science and national guidance on climate adaptation, including applicable actions noted in the National Climate Assessment for the Southwest Region.

10/30/2015	U.S. Department of the Interior	Patricia Sanderson Port	

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

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(ER 14/0507)

Filed Electronically

30 October 2015

Ms.Karla Petty
Arizona Division Administrator
Federal Highway Administration
4000 N. Central Avenue, Suite 1500
Phoenix, Arizona 85012-3500

Subject: Department of Transportation (DOT), Draft Environmental Impact Statement/Section 4(f) Evaluation for the Arizona Passenger Rail Corridor Study Tucson to Phoenix, Maricopa, Pima and Pinal County, Arizona

Dear Ms. Petty:

Thank you for the opportunity to review and comment on the Department of Transportation (DOT), Draft Environmental Impact Statement/Section 4(f) Evaluation for the Arizona Passenger Rail Corridor Study Tucson to Phoenix, Maricopa, Pima and Pinal County, Arizona

SECTION 4(f) EVALUATION COMMENTS

The Department appreciates that you have coordinated with various agencies regarding this project and the development of the Section 4(f) Evaluation. We encourage continued coordination with these agencies and tribes throughout the life of this project.

Currently, there is no preferred alternative identified and the Section 4(f) Evaluation does not contain specific analysis about impacts to Section 4(f) resources. We understand that this Tier 1 Study is the initial stage of a multi-step process, which has resulted in identification of two alternatives (orange and yellow) to be advanced for further study.

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<u>Preferred Alternative</u>

In the Draft Tier 1 EIS, ADOT recommended the Yellow Corridor Alternative as the preferred alternative. FRA identified the Yellow Corridor Alternative as the preferred alternative in the Final Tier 1 EIS.

Further, both alternatives have the potential to affect numerous historic properties, parklands and wildlife refuges, some of which may qualify as Section 4(f) properties needing additional evaluation. Considering that numerous uncertainties remain, including identification of a preferred alternative and an impact analysis for specific Section 4(f) resources, the Department of the Interior is currently unable to provide concurrence that there is a no feasible and prudent alternative and that all measures have been taken to minimize harm. We appreciate and encourage continuedand frequent interagency communication. **Casa Grande Ruins National Monument** The NPS recognizes that this project is within the first tier of the planning process and will be using segments of right-of-way routes between Eloy and Phoenix, Arizona. The proposed route would pass through Coolidge, Arizona, an existing track or right-of-way currently used by Southern Pacific. In Coolidge, this route passes 1,345 feet from the East Boundary of Casa Grande Ruins National Monument (CAGR), and bisects a major archaeological site owned by the Arizona Lands Conservancy (the Grewe Site). Archaelogical sites within the existing CAGR boundary range from 1,345 feet to 6,810 feet from the Area of Potential Impact (APE). In addition, CAGR currently has boundary expansion legislation (H.R. 1077), before the US House of Representatives, Committee on Natural Resources, Subcommittee on Federal Lands. The lands under consideration for inclusion within the Monument include the Grewe Site and Adamsville Site (19,667 feet from APE). Other sites under consideration within the proposed boundary expansion legislation range from 225 feet to 8,701 feet from the APE. There are several archaeological sites which, although not within the existing boundary of CAGR, nor included on any properties under consideration by the proposed boundary expansion legislation, are associated with and contribute to the prehistoric cultural landscape in which CAGR is located. The NPS has concerns regarding potential impacts to CAGR, as well as lands which potentially could be included within CAGR from the proposed boundary expansion.We agree with the Section 5.19.4 recommended mitigation measure that CAGR be avoided. In particular, the NPS is interested in understanding the impacts of alternatives with numerous high-speed trains running fewer than 1,345 feet from CAGR, including the impacts of related noise, vibrations, air and water pollution, and contamination by hazardous materials on the Monument's natural (flora, fauna), cultural resources, and proposed boundary expansion properties. 2	**Casa Grande Ruins National Monument** Because a specific alignment for a passenger rail system has not been selected, no Area of Potential Effects (APE) was delineated during Tier 1 analysis, nor were specific effect findings made.

An analysis which considers maximum pass-by sound levels, speech interference, audibility, and other supplemental metrics may be helpful to fully assess the effects of noise in alternatives where adequate avoidance cannot be achieved. In addition, the NPS would like to see an analysis of how light pollution related to train infrastructure would impact night skies, natural soundscape, and wildlife within the wildlife corridors, including migratory patterns. **National Historic Landmark** Please be aware that the Pueblo Grande Ruin and Irrigation Sites National Historic Landmark (Maricopa County, AZ) and the Desert Laboratory National Historic Landmark (Pima County, AZ) are located within the proposed area of potential effect for the identified orange and yellow line alternatives. In addition, the San Xavier Del Bac Mission and Ventana Cave National Historic Landmarks (Pima County, AZ) are located near the delineated "future extensions" for the proposed project in Tucson, Arizona.Please be advised that the Air Force Facility Missile Site 8, Gatlin Site and Taliesen West National Historic Landmarks are within the scope of the project. To the maximum extent possible, efforts should be made to assess and minimize any potential impacts to these three National Historic Landmarks, in accordance with Section 106 of the National Historic Preservation Act. Results of the assessment should be properly outlined in the Cultural Resources section of the DEIS.	FRA will coordinate with NPS once funding becomes available for project design and construction, to identify the APE in subsequent, project-specific environmental studies and discuss avoidance alternatives and the potential impacts of noise, vibration, and light on the natural and cultural landscape within the APE, including any National Monuments and National Historic Landmarks.
National Historic Trails Given the complexity of managing a National Historic Trail, the EIS should provide more information on how the trail management corridor was established, and how the historic trail corridor, existing and future recreation trail segments, existing auto route, and historic campsites were considered in the development of proposed rail corridor. Without further information included in the EIS document, it is difficult to understand what trail resources were considered when identifying the proposed corridor. The proposed corridors for the Passenger Rail projects coincide with the Juan Bautista de Anza National Historic Trail designated historic corridor, auto tour route, and recreation retracement route; however impacts on the Anza Trail are not discussed in the EIS. The proposed rail corridors overlap the designation in the area between Tucson and Eloy, and possibly in other areas as well. As such it is difficult to determine the exact locations of overlap without mapping the Anza Trail designation and proposed rail projects together and in greater detail. The NPS is prepared to coordinate with the proposed rail project to ensure that impacts to the Anza Trail are identified and disclosed and mitigation is proposed as necessary and appropriate. The National Trails System Act, as amended, defines National Historic Trails as "extended trails which follow as closely as possible and practicable the original trails or routes of travel of 3	**National Historic Trail** The Juan Bautista de Anza National Historic Trail designated historic corridor (Anza Trail Corridor) has been added to the Corridor Aerial Atlas Appendix of the Tier 1 EIS. The 1-mile-wide rail corridor alternatives in the Tier 1 EIS do not define a specific alignment, so a detailed analysis of potential impacts to the trail corridor cannot be undertaken until project development (Tier 2) NEPA documentation.

national historical significance". Such trails have as their purpose "the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment". The National Park Service, with support of community groups along the trail corridor, completed the feasibility study of the Anza Trail in 1986, determining that the Anza Trail met the following criteria of the National Trails System Act:

1. It was established by historic use and is historically significant as a result of that use.
2. It is nationally significant with respect to American history.
3. It has significant potential for historic interest based on historic interpretation and appreciation.

With continued support from the broader public, Congress designated the trail a component of the National Trails System in August 1990.

In 1996, the National Park Service completed the *Comprehensive Management and Use Plan/Final Environmental Impact Statement*(CMP/FEIS) responding to congressional designation of the Juan Bautista de Anza National Historic Trail and the requirements of the National Trail System Act, as amended. The CMP/FEIS defines a vision for the Anza Trail, "a traveler will be able to hike, ride horseback, bicycle, and drive on a marked route … and experiences landscapes similar to those the expedition saw…".

The goal of the recreation route is to provide a multiuse continuous and commemorative trail from Nogales to San Francisco within the historic corridor. The continuous auto route is designated and marked along existing roads within or near the historic corridor; it allows travel and heightens public awareness while simulating use of the recreation trail.

The journals of expedition members Anza and Father Font depict the Expedition's route closely enough to define a historic trail corridor that guides management and administration of the trail. Management objectives for visitor experience identified in the CMP/FEIS emphasize enjoyment of the Anza Trail and outdoor recreation through

1. offering experiences of the colonists in settings similar to those of the 1775-76 either on or parallel to the historic route;
2. providing highly accurate and engaging interpretation at certified locations; and
3. linking historic sites and segments with a recreation trail and an auto route.

The CMP/FEIS includes maps of the historic trail corridor, the auto route, high potential segments, and historic sites. While scholarly research and debate of the exact location still continue, the Anza Trail administrative staff maintains online maps of the historic corridor, planned (from regional and local trail plans) and existing recreation trail segments, and historic campsites at http://www.mapsportal.org/mapcollab_anza/. This information is also available as GIS data layers upon request from Anza Trail staff.

4

Within the proposed rail corridor, the congressionally-designated historic corridor basically follows the Santa Cruz River, passing through Tucson and Marana (along the I-10 between the two cities) before turning north just past Picacho Peak, near Eloy.

The Expedition travelled to Casa Grande National Monument to document the site (present day Coolidge), and travelled for several miles through what is now the Gila River Indian Reservation and the Sonoran Desert National Monument, The route turned to the west, cutting off a bend in the Gila River.

This general description is available as geospatial information by request from the Anza Trail staff and should be shown as a map with the proposed trail corridor to better understand the relationship between the designated historic trail corridor and the proposed rail corridor.

Given the complexity and pieces that make up management of a National Historic Trail, the EIS should provide more information on how the trail management corridor was established, and how the historic trail corridor, existing and future recreation trail segments, existing auto route, and historic campsites were considered in the development of proposed rail corridor. Without further information included in the EIS document, it is difficult to understand what trail resources were considered when identifying the proposed corridor.

BLM Comments

Arizona State Office

Contact: Jacqueline Neckels, Planning and Environmental Specialist
BLM Arizona State Office
One North Central Avenue, Suite 800, Phoenix, AZ 85004
jneckels@blm.gov
(602) 417-9262

The Bureau of Land Management (BLM) was invited to take part in the Tier 1 EIS process as a participating agency. As mentioned in the Executive Summary, federal agencies have expressed interest in becoming a cooperating agency during Tier 2 NEPA studies should a corridor decision be made and this process proceed. Because the proposed corridors contain parcels of BLM-managed land, the BLM Arizona would be interested in participating as a cooperating agency in the Tier 2 NEPA process if the operable segments being analyzed could impact BLM-managed land.

The DEIS indicates a 200-foot-wide corridor was used for impact analysis and this area would allow for passenger stations, parking lots, staging areas for construction etc. Itwas unclear in the project description whether the intercity and commuter trains would operate on the same tracks or if there would be multiple tracks within the 200-foot area (one set of tracks for the commuter trains and one set of tracks for the intercity trains or, one set for trains headed north and one set

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BLM Comments

ADOT and FRA appreciate BLM Arizona's offer to participate as a cooperating agency on this study. While detailed design for a passenger rail facility has not yet taken place, commuter trains and intercity trains would most likely operate on a single set of tracks.

for trains running south). Can this information be provided in general terms at this stage of project development? The document states that compatibility with agency plans depends on the specific alignment of the rail system within the corridor and thus cannot be definitively determined at this time (page 5-15). While the Tier 2 studies and analysis would provide more specifics and detail, can a general determination on plan compatibility be made on a mile-wide corridor (for example: Do agency plans allow or preclude rights-of-way within the corridor, etc.)? Under Section 5.11.5 Tier 2 Considerations for geology, topography, and soil, there is no mention of mineral development that would be needed for the construction of the rail system (concrete, ballast etc.) Mineral materials will be needed for development of the project but there is no indication if material pits exist in close proximity to or within either corridor. The use of this resource should be addressed during future Tier 2 analysis.	Table L-4 in the *Land Use Appendix* indicates general consistency of the Corridor Alternatives with land use goals and circulation/transportation goals of in the general plans of the jurisdictions in the corridor alternatives. Specific plan compatibility and materials sources will be addressed during future Tier 2 analyses when more specific project concepts are investigated.
<u>Phoenix District Office – Lower Sonoran Field Office</u> Contact: Edward Kender, Field Office Manager BLM Lower Sonoran Field Office 21605 North 7th Avenue, Phoenix, AZ 85027-2929 ekender@blm.gov (623) 580-5616 The designated corridor for the Juan Bautista de Anza National Historic Trail coincides with the proposed corridors, but it is not mentioned in the EIS. The proposed rail corridors cross the trail designation at least in the area near Eloy, but possibly other areas as well. Coordination should be conducted with the National Park Service to ensure that impacts are properly identified and disclosed and that appropriate mitigation is proposed if necessary.	The Anza Trail Corridor is mapped on the *Corridor Aerial Atlas* of the Final Tier 1 EIS, as discussed on Page 12.
There is an existing Recreation and Public Purposes lease for Williams Air Force Base that is used as a take-off/landing site on the BLM parcel located along Schnepf Road (Map 9 of 12 in the packet provided to the BLM – T. 2S, R. 8E, Section 15, G&SRM). The lease is in place until 2028, and is eligible for renewal. This would be considered a prior existing right on this parcel, which would require concurrence from the lessee if the operations or other aspects of the authorization were impacted. If concurrence is obtained and an amendment of the lease is necessary, this should be analyzed in the Tier 2 EIS to allow simultaneous approval of the amendment with the ROD if the Orange Corridor Alternative is selected. Additionally, this parcel is potentially part of a World War II auxiliary field, which should be evaluated for eligibility for the National Register of Historic Places.	The BLM parcel along Schnepf Road is within or adjacent to the Orange Corridor Alternative. FRA has selected the Yellow Corridor Alternative as the preferred alternative and implementation of a passenger rail facility within the Yellow Corridor will not affect this parcel.
There are additional rights-of-way located on the BLM parcels (information is available through an online search of the LR2000 system) that will also be considered prior existing rights. Any 6	During project-specific analyses, prior existing rights on BLM land will be investigated and addressed.

impacts to these authorizations should be documented in the Tier 2 EIS, but should at least have a general mention in the Tier 1 EIS. **<u>Gila District Office-Tucson Field Office</u>** Contact Person: Melissa Warren, Field Office Manager BLM Tucson Field Office 3201 E. Universal Way, Tucson, AZ 85756 Mdwarren@blm.gov (520)258-7201 According to the maps provided to BLM by the consultant who prepared the EIS, there are no parcels in which BLM Tucson Field Office (TFO) administers the surface estate within the two study corridors. However, staff checked the Master Title Plats for federal mineral estate status for the study corridors within the TFO and found that BLM does administer the subsurface mineral estate of lands within the study corridors. Split estate lands with federal minerals are subject to federal mining laws. Prospectors may locate mining claims on split estate parcels with federal minerals that are open to mineral entry. While there is a process that needs to be followed in order to locate claims on split estate lands, the right to locate mining claims and to mine valuable minerals from these lands is superior to the rights of surface estate owners to use their lands. The rights of the federal government to determine the use and disposition of the federal mineral estate are superior to the rights of the surface owners to use their lands. Holders of valid, existing mining claims have rights under law. 30 U.S.C. § 612(b) states, in part: […]Any such mining claim shall also be subject, prior to issuance of patent therefor, to the right of the United States, its permittees, and licensees, to use so much of the surface thereof as may be necessary for such purposes or for access to adjacent land: Provided, however, That any use of the surface of any such mining claim by the United States, its permittees or licensees, shall be such as not to endanger or materially interfere with prospecting, mining or processing operations or uses reasonably incident thereto […] For the preliminary corridor study, it is important for decision makers to understand that these split estate lands exist within the study corridors and are open to mineral entry. Should these lands become encumbered by mining claims, the rights of mining claimants would need to be respected in any plans concerning the surface use of these lands.BLM recommends that subsurface mineral estate be considered during any future Tier 2 studies. 7	Because alignments and station locations could hypothetically be located anywhere within the mile-wide corridor alternative, Bureau of Land Management subsurface mineral estate and mining rights were not addressed in this Tier 1 EIS. For the same reason, zoning, which varies widely within the corridor alternatives, and land use impacts were not analyzed for any 200-foot ROW corridor. When developed, project-level NEPA analyses would assess impacts on mineral rights, land use, and zoning.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port

Regional Environmental Officer

cc: OEPC Staff Contact:; Lisa.Treichel@ios.doi.gov

NPS Staff Contact: Alan_Schmierer@nps.gov

BLM Staff Contacts:

jneckels@blm.gov

ekender@blm.gov

APPENDIX A

Federal mineral estate status within the study corridors:

T06S R08E Sec 14 N2; Federal minerals; open to mineral entry

T06S R08E Sec 14 SW; Fissionable minerals reserved to US; open to entry by US and its agents

T06S R09E Sec 6 M&B SWSE; Federal minerals; open to mineral entry

T07S R08E No federal minerals (only TFO lands were checked)

T08S R08E Sec 26 SE; Federal minerals; open to mineral entry

T08S R09E No federal minerals

T09S R09E Sec 04; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 09; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 15; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 23; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R10E Sec 32 E2; Federal minerals; Bureau of Reclamation(BoR) withdrawal

T09S R10E Sec 33 SW; Federal minerals; BoR withdrawal

T10S R10E Sec 04 NENE; Federal minerals; BoR withdrawal

T10S R10E Sec 05 N2N2; Federal minerals; BoR withdrawal

T10S R11E Sec 31; Federal minerals; open to mineral entry

T11S R10E No federal minerals

T11S R11E Sec 08 NE, NESE; Federal minerals; open to mineral entry

T11S R11E Sec 25 W2; Federal minerals; open to mineral entry

T11S R12E Sec 31 portion of NW; - Federal minerals; BoR withdrawal

T11S R12E Sec 31 NESW, NESE, SESE Federal minerals; Udall Closure

T12S R11E Sec 01 PARCEL TA-4-2A; Federal minerals - BoR withdrawal (not shown on ADOT maps)

T12S R12E No federal minerals

T12S R13E No federal minerals

T13S R12E No federal minerals

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T13S R13E No federal minerals

T14S R13E No federal minerals

T14S R14E No federal minerals

APPENDIX B

Federal mineral estate status within the study corridors:

T06S R08E Sec 14 N2; Federal minerals; open to mineral entry

T06S R08E Sec 14 SW; Fissionable minerals reserved to US; open to entry by US and its agents

T06S R09E Sec 6 M&B SWSE; Federal minerals; open to mineral entry

T07S R08E No federal minerals (only TFO lands were checked)

T08S R08E Sec 26 SE; Federal minerals; open to mineral entry

T08S R09E No federal minerals

T09S R09E Sec 04; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 09; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 15; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R09E Sec 23; Federal minerals; Not open to Mineral Entry; Open to Mineral Leasing; R&PP Patent (Picacho Peak State Park)

T09S R10E Sec 32 E2; Federal minerals; Bureau of Reclamation(BoR) withdrawal

T09S R10E Sec 33 SW; Federal minerals; BoR withdrawal

T10S R10E Sec 04 NENE; Federal minerals; BoR withdrawal

T10S R10E Sec 05 N2N2; Federal minerals; BoR withdrawal

T10S R11E Sec 31; Federal minerals; open to mineral entry

T11S R10E No federal minerals

T11S R11E Sec 08 NE, NESE; Federal minerals; open to mineral entry

T11S R11E Sec 25 W2; Federal minerals; open to mineral entry

T11S R12E Sec 31 portion of NW; - Federal minerals; BoR withdrawal

T11S R12E Sec 31 NESW, NESE, SESE Federal minerals; Udall Closure

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T12S R11E Sec 01 PARCEL TA-4-2A; Federal minerals - BoR withdrawal (not shown on ADOT maps)

T12S R12E No federal minerals

T12S R13E No federal minerals

T13S R12E No federal minerals

T13S R13E No federal minerals

T14S R13E No federal minerals

T14S R14E No federal minerals

10/29/2015	Arizona Game and Fish Department	Joyce Francis, PhD.	

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

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TY E. GRAY

October 29, 2015

ADOT Passenger Rail Study Team
c/o Central Creative
24 W. Camelback Rd. #479
Phoenix, AZ 85013

Re: Review of the Arizona Department of Transportation's Passenger Rail Corridor Study Draft Tier 1 Environmental Impact Statement

Dear ADOT Passenger Rail Study Team:

The Arizona Game and Fish Department (Department) appreciates this opportunity to submit comments based on our review of Arizona Department of Transportation's (ADOT's) September 2015 Draft Tier 1 Environmental Impact Statement (Tier 1 DEIS) for the Arizona Passenger Rail Corridor Study: Tucson to Phoenix. The Department appreciates the incorporation of our assessment of potential impacts to wildlife, wildlife habitat, and recreation resources throughout the Tier 1 DEIS; this assessment was submitted to ADOT on June 17, 2014 and used a geospatial data analysis tool that is under development by the Department.

As detailed in the Department's 2014 analysis, and reflected in the Tier 1 DEIS, the Yellow alternative route would result in fewer potential impacts to native vegetation, wildlife habitat and recreation than the Orange alternative. In addition, the Yellow alternative route would result in less fragmentation of intact habitat blocks. Opportunities to minimize and offset potential impacts to wildlife and habitat connectivity (see page-specific comments below) are present along all of the proposed routes, through siting and design that maximizes roadway permeability to wildlife.

The Department offers the following comments:
Pg. 5-128, Figure 5-17:

- In order to present a landscape-scale perspective of connectivity in the region, please include all of the linkages that fall within the map boundaries. The linkages identified to the east should be incorporated into the map to provide a more comprehensive look into the connections between habitat blocks.

Pg. 5- 134:

- Through Arizona's State Wildlife Action Plan (SWAP 2012, https://azgfdportal.az.gov/wildlife/actionplan/), the Department identified Species of Greatest Conservation Need (SGCN), as well as Species of Economic and Recreation Importance

AN EQUAL OPPORTUNITY REASONABLE ACCOMMODATIONS AGENCY

Per AGFD's request, the figure illustrating wildlife linkages (Figure 5-17) has been revised in the Final Tier 1 EIS to show all of the linkages within the map boundaries. A table listing the Species of Greatest Conservation Need (SGCN) and Species of Economic and Recreational Importance (SERI) within the corridor alternatives has been added to the Biological Resources section of the Final Tier 1 EIS.

The statement appearing on Page 5-149 of the Draft Tier 1 EIS was clarified in the Final Tier 1 EIS to read: "a passenger rail system may present opportunities to improve wildlife connectivity by siting the corridors to minimize habitat and connectivity fragmentation, identifying current and potential important wildlife movement areas, and designing facilities to provide maximum permeability for safe wildlife movement."

Potential effects to the western burrowing owl resulting from construction and operation of a passenger rail facility are discussed in the Final Tier 1 EIS. Because the EIS provides a high-level analysis of existing conditions and potential impact, measures to avoid direct and indirect effects to individual species, including the burrowing owl, are not provided in the Final Tier 1 EIS, nor are measures to offset habitat loss discussed. Mitigation measures in the Final Tier 1 EIS were revised as requested.

ADOT Passenger Rail Study Team October 29, 2015 2 (SERI). The Department requests consideration be given to those species that occur along the proposed routes through close coordination with the Department and the development of strategies to minimize and offset potential impacts. Please update this section to address the SGCN and SERI species that could occur along the proposed routes. An updated list of species and their rankings can be obtained on the HDMS Arizona Online Review Tool http://www.azgfd.gov/hgis/. <u>Pg. 5-149:</u> • The Department recommends a clarification of the statement, "a passenger rail system may present opportunities to improve wildlife connectivity" to read as follows: "a passenger rail system may present opportunities to improve wildlife connectivity by siting the corridors to minimize habitat and connectivity fragmentation, identifying current and potential important wildlife movement areas, and designing facilities to provide maximum permeability for safe wildlife movement." <u>Pg. 5-152-153:</u> • The western burrowing owl frequently inhabits agricultural lands such as those that occur along the Yellow and Orange routes; in many instances, they are year-round residents in agricultural areas (Corman and Wise-Gervais 2005). Please discuss potential effects to this species, and identify measures to avoid direct and indirect effects to this species, as well as measures to offset habitat loss. • Please revise the following bullet to read, "Conduct preconstruction surveys for removal and translocation of Sonoran desert tortoise and western burrowing owl." • Please revise the following bullet to read, "Design sufficient wildlife crossing structures to facilitate movement of large and small species of wildlife across the landscape, including appropriate funnel fencing associated with crossing areas, and appropriate right-of-way (ROW) fencing to allow for, or restrict as necessary, wildlife movement". • Under the heading, "Control the Spread of Non-native and Invasive Species", a Habitat Restoration Plan should be developed for all temporary impacts to native vegetation and provided to land management/resource agencies for review prior to project construction. • Edge effects should be addressed and minimized through: the use of existing infrastructure, monitoring of adjacent habitats, and the development of adaptive management strategies for toxins, invasive species and habitat conversion. <u>Pg. 8-3:</u> • Special status species and wildlife movement studies/surveys need to be conducted prior to the Tier 2 NEPA analysis, in order for the data to inform the NEPA process. These studies should be identified with the approximate timelines in relation to the preparation of the Tier 2 NEPA. <u>Pg. 2-13:</u> • In the time since the Department's submittal of our assessment of potential effects to wildlife and wildlife habitat for the Passenger Rail Corridor Study, ADOT has initiated the Tier1 DEIS analysis of the North-South Corridor. The Department is currently working on an	Under "Tier 2 Considerations," in the Biological Resources section of the Final Tier 1 EIS, a sentence has been added stating, "For the detailed analyses provided in a Tier 2 NEPA document, site-specific data on biological resources potentially affected by the project will be required including special status species and wildlife movement studies/surveys to inform the NEPA process." Specific information about which types of studies and their timelines relative to the preparation of project development and Tier 2 NEPA cannot be determined at this time.

ADOT Passenger Rail Study Team
October 29, 2015
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assessment of effects to wildlife and wildlife habitats for the North-South Corridor, and we will include the Passenger Rail Study Team in the distribution of that analysis to aid in the cross-referencing of data, ensuring consistency of data, and informing a cumulative effects analysis. Although much of the proposed North-South Corridor alignment falls within the Orange alternative route for the Passenger Rail Corridor, the Department's analysis of the Yellow alternative route versus the Orange alternative route remains valid. The future potential of co-locating the Passenger Rail and North-South Corridor alignments does not outweigh the benefits of choosing the Yellow Route, which would result in fewer impacts to wildlife and wildlife habitat. However, per NEPA regulations, the cumulative effects on wildlife movement and habitat fragmentation for both the North-South Corridor and the Passenger Rail alignment must be evaluated.

The Department appreciates the continued partnership with ADOT in the development of the Passenger Rail Corridor Study's Tier 1 DEIS and looks forward to continuing to work closely on the Tier 2 analysis. If you have questions or wish to further discuss our comments, please contact Cheri Bouchér, the Department's Project Evaluation Program transportation coordinator, at cboucher@azgfd.gov (623-236-7615).

Sincerely,

Joyce M Francis

Joyce Francis, PhD
Habitat Branch Chief

cc: Michael Kies, ADOT Multi-Modal Planning Division Director
Carlos Lopez, ADOT Rail Planner
Clifton Meek, EPA

M15-09105029

References Cited

Corman, Troy E. and C. Wise-Gervais (Eds.). Arizona Breeding Bird Atlas. University of New Mexico Press. 2005.

10/28/2015 Arizona Corporation Commission Safety Division	Brian H. Lehman	
The Arizona Corporation Commission's ("Commission") Railroad Safety Section, ("Staff'), would like to take this opportunity to comment on ADOT's Draft Tier I Environmental Impact Statement ("EIS") regarding the commuter rail study between Phoenix and Tucson. Staff has a long history cooperating with ADOT regarding the implantation of safety devices and elimination of safety hazards at grade crossings throughout Arizona. However, this is the first instance where Staff has commented on an alignment of a proposed commuter rail line. While the Commission's regulatory oversight is focused on the implementation of warning devices and the approval of modification or alteration to existing or construction of future crossings, whether at-grade or grade separated, Staff does have concerns regarding future rail projects in Arizona. Staff firmly believes that establishing a rail corridor connecting Phoenix and Tucson would be an alternative to expanding traffic lanes for vehicular traffic on Interstate 10 and would relieve highway congestion and reduce vehicle emissions. State and regional planning initiatives have recommended passenger rail alternatives to add travel capacity to what is currently offered by highways. Staff has reviewed the EIS and sees a benefit to Arizona from having an alternative to the automobile to travel between Phoenix and Tucson. While other modes of transportation were taken into consideration, such as express buses, the concept of a commuter train offers significant advantages. The ability to construct additional lanes on Interstate 10 is limited. Air travel was not considered because Staff believes suburban and rural areas between Phoenix and Tucson need to be connected. The EIS was completed by the lead agency, the Federal Railroad Administration ("FRA") along with cooperating federal agencies, the Federal Transit Administration ("FTA") and the Federal Highway Administration ("FHWA"). ADOT is the local sponsoring agency and the designated recipient of study funds. The EIS offers three different alternatives which include "The Orange Alternative", "The Yellow Alternative" and the ‘No Build Alternative". The Orange and the Yellow alternatives offer two different alignments for a rail corridor between Phoenix and Tucson, while the No Build Alternative would do nothing to implement a rail alternative. The estimated cost for the Orange Alternative is $6.8-$8.4 billion in 2013 dollars. The Yellow Alternative would cost between $4.2-$5.1 billion in 2013 dollars. The No Build Alternative would include future planned and proposed highway projects, but would not include any rail planning. The Phoenix to Tucson rail corridor is being studied to address inter-city travel needs where the travel needs are growing but the opportunity to expand highways is limited. Phoenix is the only metropolitan area in the United States with a population over 1 million without a commuter or regional passenger rail system. Safety concerns regarding a potential passenger rail system include a number of issues, including vehicular traffic and pedestrian conflicts at highway-rail grade crossings and the safety of rail passengers on trains and at stations. An understanding of the potential number and type of crossings (at-grade or grade-separated) contributes to an understanding of the degree of risk for collisions within each corridor alternative. For example, urban crossings may include higher volumes of cross traffic and warrant the cost of grade-separated crossings. There is a possibility that nearly 140 public and private at-grade and grade-separated crossings would be affected if the Yellow Alternative was chosen and 100 public and private crossings if the Orange Alternative was selected. Any modification, alteration or newly constructed public crossing would require Commission approval.		Thank you for your comment and participation in this study.

Staff's inspection activity would ensure that any crossing improvement project was installed and maintained in a manner as safe as possible. All aspects of any new or existing rail system would be subject to Staff inspections. In order to accomplish a multidisciplinary evaluation of alternatives, an Alternative Analysis ("AA") was undertaken as part of the Arizona Passenger Rail Corridor Study ("APRCS") that involved conceptual engineering of possible alternative alignments at a level possible for cost estimating, scheduling, operational analyses, and community involvement. Staff believes a passenger rail system within the Yellow Corridor Alignment would be more compatible with existing local plans, property ownership, serve a larger population, and affect slightly fewer natural resources, sensitive noise receptors, and archaeological resources than a rail system within the Orange Corridor Alternative. The potential to affect water resources, wildlife corridors, and potential species habitat would be greater in the Orange Corridor Alternative. Compared to the No Build Alternative, a passenger rail system within either corridor alternative offers increased access to transit for protected populations and economic generators as well as improved air quality and energy consumption. A passenger rail system within the Orange Corridor Alternative would require nearly double the capital cost than the Yellow Corridor Alternative and would be more difficult to implement. The operating and maintenance costs would also be higher. The No Build Alternative would not incur any of these costs, but it would not meet the identified purpose and need for an alternative mode of transportation between Phoenix and Tucson. While the right of way ("ROW") costs would be potentially higher for the Yellow Corridor Alternative, the lower estimated annual operating costs is forecasted to recover the higher ROW costs within the first six years of operation. Considering the overall estimated costs, projected ridership, and potential environmental impacts associated with implementing passenger rail within one of the alternative corridors, Staff finds that a passenger rail system within the Yellow Corridor Alternative is considered more cost efficient and better performing than a rail system within the Orange Corridor Alternative, with similar potential impacts to the environment. Staff recommends further effort toward realizing commuter rail service connecting Phoenix and Tucson. As between the Orange and Yellow route alternatives, Staff believes that the Yellow route appears to present several advantages over the Orange route.			
10/30/2015	Maricopa Association of Governments	Marc Pearsall	
Fantastic work as always. Only a couple of aesthetic comments. These are suggested/recommended edits and changes for the Final Report version: • The image of the red train on the lower right cover of Executive Summary / Final Report / Appendices is actually that of a non-US compliant, electric European unit. Coincidentally, the type of locomotive shown also does not have a front pilot/plow, and this missing equipment on a Rotem Metrolink car in Los Angeles actually contributed to a derailment/fatality earlier this year. Perhaps a simple photo-shopped image of an US domestic diesel or HSR locomotive may be a more suiting representation for the rail vehicle. I believe that WSP-PB and the FRA have some stock images you could use. (Page 1 of the Exec Summary has a good image of the Amtrak Acela.) • Also, perhaps add a small image of Tucson's active Amtrak depot to the Tucson skyline montage? (Two images from MAG's collection are attached.) The following map changes should be included in all future pertinent atlases/map books.			Thank you for your suggestions. The FEIS document covers and map Corridor Aerial Atlas pages have been revised per your suggestions.

(Old GIS map layers and shape files die hard!) ADOT Yellow-Corridor-Aerial-Atlas • On map 32 of 91, the [former railroad] spur into the GRIC should be deleted from the final map. • On map 42 of 91, the [former railroad] spur to Williams AFB should be deleted from the final map. • On map 51 of 91, the old SPRR Creamery Branch has been transformed into the new Metro light rail (since December 2008).			
10/30/2015	Pima County Administration	C.H. Huckelberry, County Administrator	
Congratulations as you approach the completion of the Tier I EIS for the Passenger Rail Corridor Study. Pima County has only one major concern about the results presented in the Draft version of the Study for Phase I. It is not apparent that the planning reflects the extension of the Passenger Rail Corridor to Tucson International Airport (TIA) in the initial implementation phase. On December 18, 2012, the Pima County Board of Supervisors passed and forwarded to ADOT a resolution supporting the designation of TIA as a critical rail station location" and inclusion of the Tucson International Airport rail station in the initial implementation of the Passenger Rail Corridor. " While we understand that the recently published Alternatives Analysis focused on the analysis of two alternative routes between the two major metropolitan areas, Figure 2-5 - Corridor Alternatives Carried Forward for Detailed Study depicts the route from downtown Tucson to TIA as a ''Future Extension." The area surrounding TIA is one of our largest employment centers and is near the new Aerospace Parkway and planned Sonoran Corridor where significant industrial employment growth is anticipated. At the September 16, 2015 public meeting in Tucson, the speakers unanimously called for the initial implementation phase to include TIA. The alternate routes in the Phoenix area are adjacent to Phoenix Sky Harbor and Mesa Gateway Airports. If the initial implementation phase of the Passenger Rail stops in downtown Tucson as presented in the last study, another 10 miles of rail will need to be constructed to get the line close to TIA. Pima County reiterates our support for the initial implementation phase of the Passenger Rail System to be extended to reach TIA and urges that the study results be revised to reflect this plan.			The proposed connections to TUS, Sky Harbor, and Phoenix-Mesa Gateway are an opportunity to link the major airports to provide employment and passenger access to each. Each airport is a current or planned major employment center as well as a travel port. The project plans to eventually link these airport areas together, but all the details have not been covered in this Tier 1 EIS. Based on public and agency input, ADOT and FRA will commit to extending the study area to TUS for future project-specific passenger rail (Tier 2) studies, which would include a TUS station on a passenger rail system from Tucson to Phoenix. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but would be determined as funding is allocated and as part of the subsequent project-specific NEPA process.

10/29/2015	Pima County Department of Transportation	Priscilla S. Cornelio, Transportation Director	
Dear ADOT Passenger Rail Study Team, Pima County appreciates the opportunity to comment on the ADOT Passenger Rail Study. We support the study and the recommendations with one exception. We recommend that the preferred final route extend from downtown Tucson approximately 10 miles south to Tucson International Airport. We recommend that any future evaluation and study include this segment.			Based on public and agency input, ADOT and FRA will commit to extending the study area to TUS in future (Tier 2) studies, which would include a TUS station on a passenger rail system from Tucson to Phoenix. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but would be determined as funding is allocated and as part of the subsequent project-specific NEPA process.

10/27/2015	City of Phoenix Street Transportation Department	Ray Dovalina, Jr., Director	
City of Phoenix STREET TRANSPORTATION DEPARTMENT October 27, 2015 Carlos Lopez, P.E. ADOT Passenger Rail Study Team c/o Central Creative 24 W. Camelback Rd. #479 Phoenix, AZ 85013 RE: ADOT Passenger Rail Corridor Study: Tucson to Phoenix, Draft Tier 1 Environmental Impact Statement Dear Mr. Lopez: The City of Phoenix has reviewed the Draft Tier 1 Environmental Impact Statement (DEIS) for the Arizona Department of Transportation (ADOT) led Passenger Rail Corridor Study: Tucson to Phoenix and has prepared comments and concern that relate to the proposed corridor alignments in the City of Phoenix. In general, the City of Phoenix concurs with the Tier 1 - DEIS, and recognizes that this is one of many phases that need to occur before the passenger rail is actualized. The City of Phoenix concurs with either the yellow or orange corridor alternative, due to the fact that either corridor follows the same alignment when in the City of Phoenix. There are areas that are noted in the Tier 1 - DEIS that need to be further addressed in the Tier 2, and the City of Phoenix is asking for further consideration of factors in the project, as work progresses into the Tier 2 – DEIS. The following comments/concerns from the City of Phoenix regarding the ADOT Passenger Rail Corridor Study: Tucson to Phoenix, Tier 1 (DEIS) include the following: • The City of Phoenix concurs with either the yellow or orange corridor alternatives (as noted in detail in the Corridor Aerial Atlas Appendix), due to the fact that either corridor follows the same alignment and end point when in the City of Phoenix. • As the project moves forward with Tier 2 Environmental Impact Statement process, please consider the letter from City of Phoenix, dated December 18, 2013 (as attached) when addressing the alignment and station location near Phoenix Sky Harbor International Airport. 200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003-1611 • 602-262-6284 • Fax: 602-495-2016 • TTY: 602-256-4286 Recycled Paper			The mile-wide corridor alternatives in the Draft Tier 1 EIS follow the same alignment within the City of Phoenix. Specific alignments were not considered in the Tier 1 EIS. In future project-specific environmental studies, FRA and ADOT will coordinate with the City of Phoenix. Subsequent project-specific studies will comply with Title VI and Environmental Justice regulations and policies as specific alignment considerations are discussed, including areas with protected populations and the area immediately north of Sky Harbor Airport. Coordination among numerous agencies and stakeholder groups will be necessary in developing specific alignment alternatives near Sky Harbor Airport. These include, but are not limited to: • City of Phoenix Aviation Department • City of Phoenix Planning and Development Division • City of Phoenix Street Transportation Department • Federal Aviation Administration • Federal Railroad Administration • Federal Transit Administration • Valley Metro Light Rail

Mr. Carlos Lopez
ADOT Passenger Rail Study Team
Tucson to Phoenix, Draft Tier 1
Page 2

- As noted in Figure 5-5, there is a high minority population that live in both the yellow or orange corridor alternatives in the City of Phoenix. When the project moves into the Tier 2 Environmental Impact Statement process, these residents must continue to be involved in the study and public process to address impacts related to the alignment, rights of way, noise, safety, connections to places of activities including schools, accessibility, visual factors, other design related elements.
- The City of Phoenix urges ADOT to continue to work with Union Pacific Railroad as the project moves forward in the Tier 2 Environmental Impact Statement process, to maximize both passenger and freight rail opportunities in existing corridors, as appropriate, that would both have a positive impact to the economy.
- If the Passenger Rail: Tucson to Phoenix project moves forward with more specific elements such as station locations, new right of way, or other project elements that would affect the existing overall city infrastructure, it is requested that ADOT engage with city staff from multiple departments to ensure that the city's key interests, including connections to the corridors and projects in Transportation 2050, are being included in the development of Tier 2 Environmental Impact Statement process.

Thank you for the continued coordination efforts in the planning phase of his important city-to-city rail project. Should you have any questions, please contact me at (602) 262-6136.

Sincerely,

Ray Dovalina, Jr., PE
Street Transportation Director

cc: Mike Kies, ADOT, Assistant Director – Multimodal Planning Division
Mario Paniagua, City of Phoenix, Deputy City Manager
Paul Blue, City of Phoenix, Deputy City Manager
James Bennett, City of Phoenix, Aviation Director
Maria Hyatt, City of Phoenix, Public Transit Director
Eileen Yazzie, City of Phoenix, Street Transportation Department
Marc Pearsall, Maricopa Association of Governments

Attachment: City of Phoenix, December 18, 2013 letter to Mr. Michael Kies

City of Phoenix
AVIATION DEPARTMENT
PLANNING & ENVIRONMENTAL DIVISION

December 18, 2013

Mr. Michael Kies
Director of Planning and Programming
Arizona Department of Transportation
206 S. 17th Ave., Mail Drop 310B
Phoenix, AZ 85007

Dear Mr. Kies:

The Aviation Department has been coordinating with the Arizona Department of Transportation (ADOT) regarding the proposed passenger rail line that would connect Phoenix and Tucson and has participated in a series of meetings with ADOT staff to discuss alignment considerations in the area immediately north of the Airport. In addition, the Aviation Department has been working the City of Phoenix Planning and Development Department participating in the *Reinvent Phoenix* planning initiative for the Gateway and Eastlake Districts. Our joint efforts allow us to work together to craft a plan that accommodates the rail transportation needs of citizens of the State of Arizona, achieves the redevelopment objectives of the City of Phoenix, and preserves the future of Phoenix Sky Harbor International Airport – a major economic engine for the State.

The Airport is bounded on the south by the Salt River, the east by 44th Street and State Route 143, and to the west by Interstate 10. Consequently, the last remaining space for aviation-related development is in the area north of the Airport, between Runway 8-26 (the north runway) and Washington Street. As a result, the Aviation Department has acquired land north of the Airport and south of Washington Street and it is imperative that future planning for this area consider the potential long-term needs of the Airport.

In response to both the *Reinvent Phoenix* planning initiative and a request from ADOT that the Aviation Department provide input for the planning of a commuter rail alignment in the area north of the Airport, a planning study was undertaken to consider potential long-term uses of land north of the Airport and to establish and provide ADOT with Phoenix Aviation Departments preferred rail corridor alignment. The study was led by the Aviation Department Planning, Environmental and Capital Management Division with input from stakeholders representing a number of other divisions within the Aviation Department. Overall guidance and final direction was provided by the executive team that included the Aviation Director and the Assistant Aviation Directors.

The study area was bounded by Washington Street on the north, Air Lane on the south, Interstate 10 (I-10) on the west, and 44th Street on the east, as depicted on attached **Exhibit 1**. With the stated objectives of developing a conceptual land use plan and establishing a preferred rail alignment, the Aviation Department considered the following constraints:

- Existing and potential future Valley Metro Light Rail stations
- The PHX Sky Train station at 44th Street
- The UPRR underpass at I-10 and the overpass at 44th Street

PHX DVT GYR
© City of Phoenix Aviation Department

3400 East Sky Harbor Boulevard, Suite 3300 • Phoenix, Arizona 85034-4405 • Phone 602-273-3340 • FAX 602-273-3472 • TTY 1-800-781-1010

Recycled Paper

Mr. Michael Kies
Arizona Department of Transportation
Page 2 of 3
December 18, 2013

In developing alternatives for the rail alignment, it was recognized that both ADOT and the City's Planning and Development Department would prefer an alignment of passenger rail closer to Washington Street than the existing UPRR alignment north of the Airport near Air Lane in order to provide potential multi-modal and transit-oriented development opportunities. Recognizing that separate alignments of passenger rail and freight rail north of the Airport would significantly damage the potential for aviation-related development north of the existing airfield and based on input from ADOT, the Aviation Department requests that the proposed passenger rail and existing freight rail be within a common corridor. This would require realignment of the existing freight rail line. The Aviation Department thus developed preferred alternatives for the following:

- The location of the combined alignment of the passenger and freight rail corridor connecting with the existing alignment to the east and west
- The land use area north of the airport, between the two transition points of the combined passenger and freight rail corridor (i.e., its distance from Washington Street)

In developing alternatives for the distance from Washington Street and the east and west transitions, specific technical criteria, such as minimum turn radii, grade separation requirements, maximum grades, and required and preferred separation requirements from rail alignments were considered. These technical criteria were provided by ADOT, UPRR, Valley Metro, and the City of Phoenix. In addition, criteria were established related to maximizing the viability of the land south of the corridor and maximizing the utility of existing facilities.

After initial evaluations of several alternatives, a final recommended alignment of the railroad corridor was developed based upon the following key criteria:

- Maximize the land area available for future aviation-related development
- Maximize the utility of PHX Sky Train and preserve land area in the vicinity of the 44th Street PHX Sky Train station for related land uses
- Facilitate airport-compatible transit oriented development south of Washington Street
- Facilitate a potential passenger rail station and intermodal facility in the vicinity of the 44th Street PHX Sky Train station
- Facilitate high-quality, unimpeded access to the area south of the rail corridor from 24th Street and improve north-south access along 24th Street west of the Airport
- Facilitate high-quality, unimpeded access to the area south of the rail corridor from 40th Street

Recognizing that the area north of the existing airfield at Sky Harbor International Airport is the last remaining land for development of facilities, the final evaluation focused on optimizing the above criteria to maximize the land area available for future aviation-related development while balancing the needs of other potential uses. The resulting preferred alignment for the rail corridor is located approximately 360 feet south of Washington Street, as depicted in attached **Exhibit 2**. The Aviation Department also developed a conceptual land use plan for the area north of the existing airfield and south of the preferred alignment of the rail corridor, as depicted in **Exhibit 3**.

Mr. Michael Kies
Arizona Department of Transportation
Page 3 of 3
December 18, 2013

The Aviation Department appreciates the opportunity to submit this preferred rail corridor alignment and associated conceptual land use plan to ADOT for consideration as part of the passenger rail alignment planning study. Our coordinated planning efforts provide a unique opportunity for us to work together to plan for future transportation infrastructure along the Washington Street corridor in a manner that is compatible with existing and future activity at the Airport, while preserving land for future aviation-related development. We look forward to continued participation in the process and to working together to incorporate compatible development around the Airport into the final plans for passenger rail development.

Sincerely,

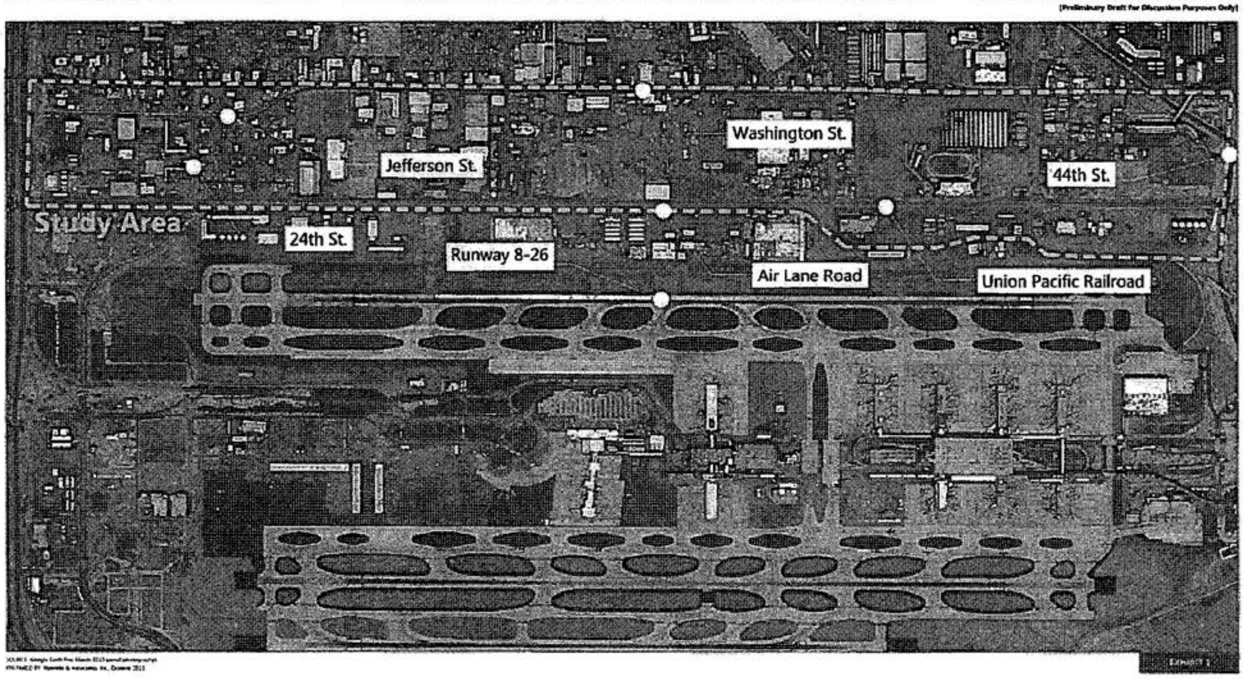
Judy M. Ross
Deputy Aviation Director
City of Phoenix Aviation Department
Planning, Environmental and Capital Management Division

Enclosure: Exhibits (3)

cc: Tamie Fisher, Acting Aviation Director
Sarah Carter, Planning Program Manager
Trina Harrison, Project Manager
Curt Upton, PDD Planner II

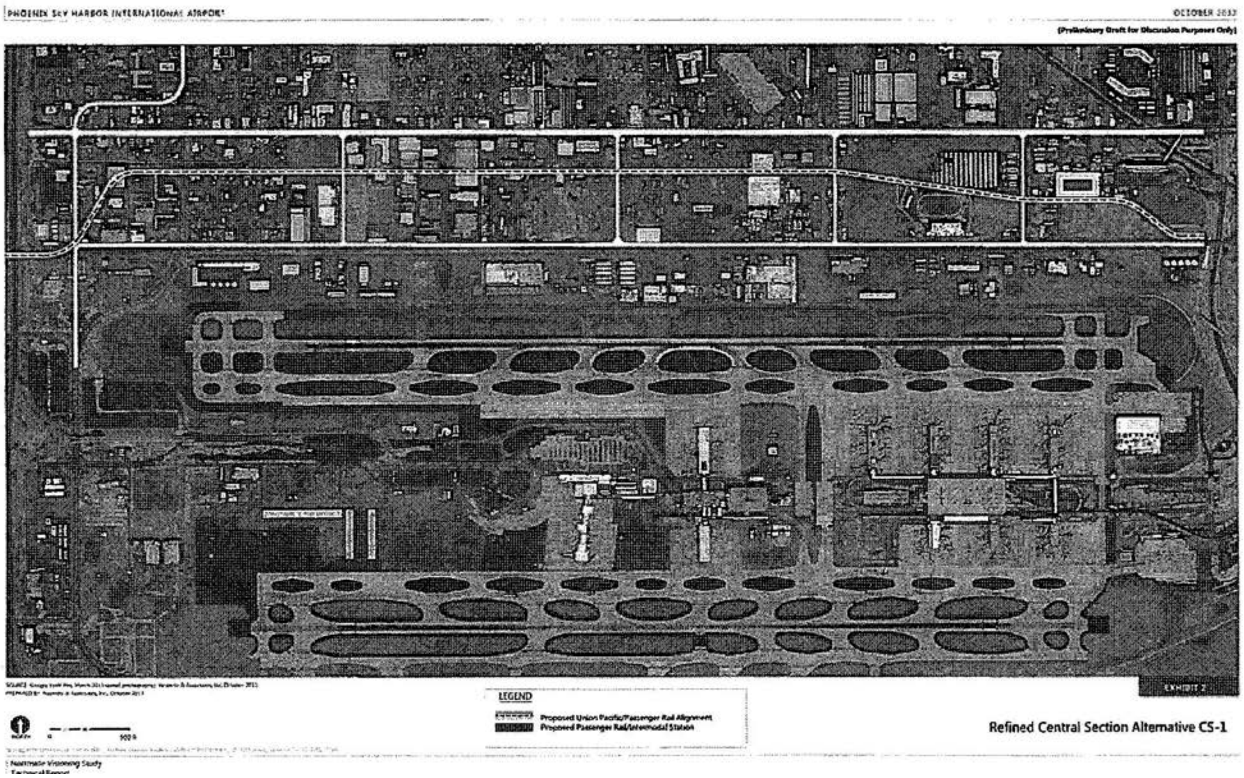
PHOENIX SKY HARBOR INTERNATIONAL AIRPORT

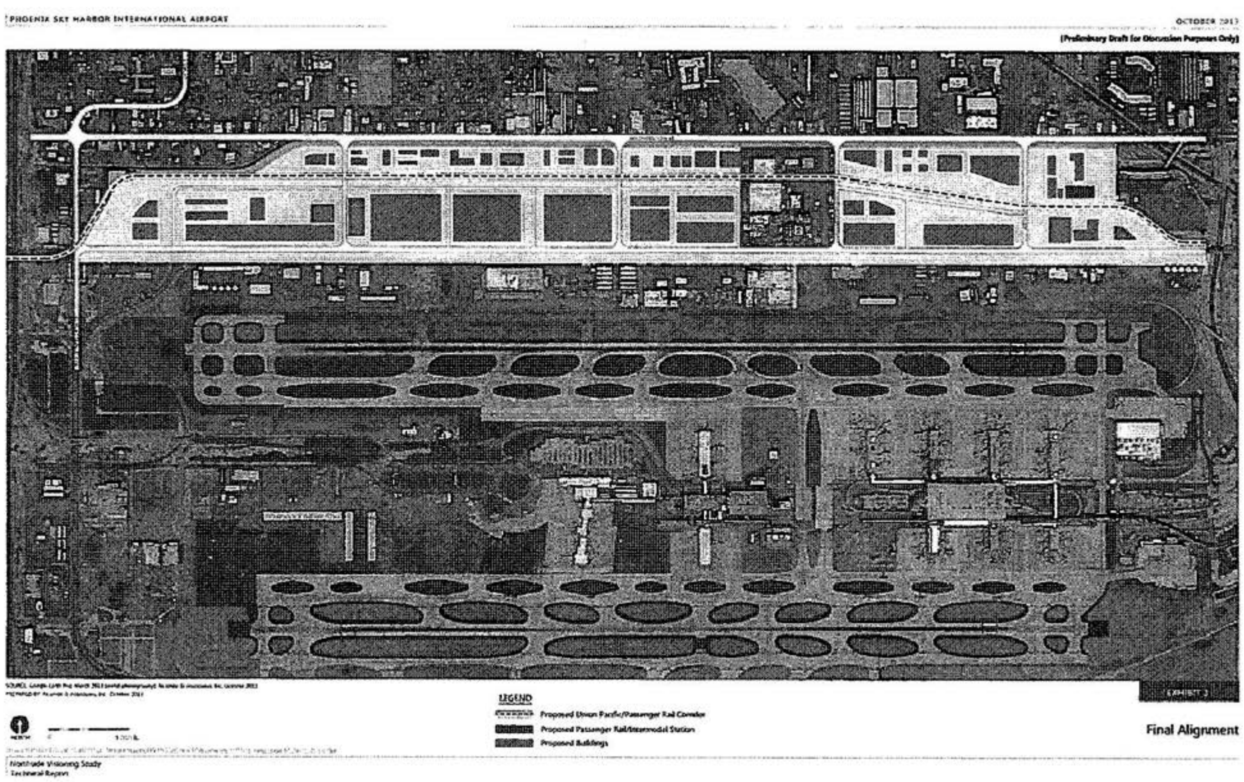
OCTOBER 2013
(Preliminary Draft for Discussion Purposes Only)



Study Area

Northside Visioning Study
Technical Report


PHOENIX SKY HARBOR INTERNATIONAL AIRPORT
OCTOBER 2013
(Preliminary Draft for Discussion Purposes Only)
EXHIBIT 2
LEGEND
Proposed Union Pacific/Passenger Rail Alignment
Proposed Passenger Rail/Intermodal Station
Refined Central Section Alternative CS-1
Northside Visioning Study
Technical Report


PHOENIX SKY HARBOR INTERNATIONAL AIRPORT
OCTOBER 2013
(Preliminary Draft for Discussion Purposes Only)
EXHIBIT 3
LEGEND
Proposed Union Pacific/Passenger Rail Corridor
Proposed Passenger Rail/Intermodal Station
Proposed Buildings
Final Alignment
Northside Visioning Study
Technical Report

10/12/2015	City of Coolidge, City of Eloy, Town of Gilbert, Town of Queen Creek	Mayor Jon Thompson, Mayor Joel G. Belloc, Mayor John W. Lewis, Mayor Gail Barney	

October 12, 2015

ADOT Passenger Rail Study Team
c/o Central Creative
24 W. Camelback Road #479
Phoenix, AZ 85013

RE: Draft Tier 1 Environmental Impact Statement for Arizona Passenger Rail

Dear ADOT Passenger Rail Study Team,

Our cities and towns have actively participated as stakeholders throughout the development of the Passenger Rail Corridor Study, and appreciate the opportunity to provide public comment on the Draft Tier 1 Environmental Impact Statement for Arizona Passenger Rail. This project is highly important to all of our communities as construction of the proposed passenger rail line between Phoenix and Tucson would be a significant economic development tool for Arizona, and would provide residents with an alternative means of transportation to their places of employment, goods and services, and promote tourism opportunities.

Based on input from our residents and citizen committees, many of us have passed resolutions supporting the Yellow Alternative. We have also joined with our neighboring communities over the last four years of the study to advocate for its final selection. On behalf of our cities and towns, we are pleased to see that the Tier 1 Environmental Impact Statement recommended the Yellow Alternative as the preferred route.

The Yellow Alternative will provide the greater number of connections with local communities and destinations, offering service to the fast growing population centers. As stated in the Environmental Impact Statement, the Yellow Alternative also has the highest ridership potential, creating significant economic benefits to the region and the State. Rail stations along this alternative would provide much needed alternative connections between employment centers. This is critically important to our communities because many of our residents commute to places of employment in or located near Phoenix. The Environmental Impact Statement also found that the Yellow Alternative would have a substantially lower cost of construction based on its utilization of the existing rail line right of way, as well as the lowest operating and maintenance costs. Most importantly, the Yellow Alternative received the most public support. All three of these distinctions, in addition to the other findings in the Statement, will be of great assistance in future phases to identify funding for the ultimate implementation of an Arizona Passenger Rail system.

While a construction schedule for the rail system has not yet been identified, our communities believe that planning for rail service is an important next step in our region to provide livable,

The Yellow Corridor Alternative follows the Union Pacific Railroad right-of-way (ROW), but does not necessarily use it. The Tier 1 EIS does not designate a specific alignment, only a corridor that is preferred over others.

The lower estimated cost of the Yellow Corridor Alternative is attributable to differences in overall alignment length, projected construction costs, and required number of rail vehicles. Projected ROW cost within the Yellow Corridor Alternative is actually higher than that for the Orange Corridor Alternative but constitutes only a small percentage of the total estimated cost of a project within either corridor alternative.

economically stable and dynamic communities for our future. On behalf of our cities and towns we urge ADOT and the Federal Railroad Administration to continue to support the Yellow Alternative as the final route for passenger rail.

Sincerely,

Gail Barney, Mayor Town of Queen Creek	John W. Lewis, Mayor Town of Gilbert	Joel G Belloc, Mayor City of Eloy	Jon Thompson, Mayor City of Coolidge

cc: Director Halikowski

9/17/15	Town of Gilbert, Development Services Department	Patrick Banger	
GILBERT ARIZONA September 17, 2015 ADOT Passenger Rail Study Team c/o Central Creative 24 W. Camelback Rd #479 Phoenix, AZ 85013 RE: Support for Yellow Route – Arizona Passenger Rail Draft Environmental Impact Statement Dear ADOT Passenger Rail Study Team: Since the beginning of the Arizona Passenger Rail Study, Gilbert has been a vested participant and has recognized the importance that this endeavor has for the region and the State. For many years, we have maintained our support for the Yellow Alternative, and are pleased that the recommendations from the Draft Tier 1 Environmental Impact Statement established the Yellow Alternative as the preferred route. With our growing communities throughout the Valley and statewide, congestion along our roadways and highways will increase exponentially; costing us valuable resources, economic growth potential, and quality of life for our citizens. Commuter rail service along the yellow route would provide a significant alternative mode of transportation to avoid these negative effects. Gilbert is strong in its support of the yellow alternative based on the noted benefits from the outreach process and the Draft Tier I Environmental Impact Statement: - Economic growth opportunities along the corridor - Higher ridership potential - Lower capital and operating costs - Overwhelming support from the public - Greater number of connections with local communities and destinations As Gilbert's Town Manager, I am committed to assist in making this transit alternative a reality. This project is an important next step in our region to provide livable, economically sustainable, and dynamic communities for our future. I strongly urge you to concur with ADOT's recommendation for the yellow alternative route. Thank you for your time and consideration. If you wish to speak further about the importance of this alternative to the community of Gilbert, please contact me at 480-503-6864. Respectfully, Patrick Banger Town of Gilbert Town of Gilbert | Development Services Department 90 E. Civic Center Drive, Gilbert, AZ 85296 Phone: 480-503-6700 Fax: 480-503-6170 www.gilbertaz.gov			Thank you for your comment and participation in this study.

<table>
<tr><td>9/16/2015</td><td>Town of Queen Creek</td><td>Mayor Gail Barney</td><td></td></tr>
<tr><td colspan="3">

TOWN OF QUEEN CREEK ARIZONA

RECEIVED
SEP 24 2015
AZ Department of Transportation Director's Office

September 16, 2015

John Halikowski
Director, Arizona Department of Transportation
206 S. 17th Avenue
MD 310B
Phoenix, AZ 85007

RE: Town of Queen Creek comments on ADOT Passenger Rail Corridor Study

Dear Director Halikowski,

The Town of Queen Creek has actively participated as a stakeholder throughout the development of the Passenger Rail Corridor Study and appreciates the opportunity to provide public comment.

In November 2012, when ADOT was considering the initial seven conceptual alternatives, Town staff presented these alternatives to the Town's Transportation Advisory Committee and Economic Development Commission. These committees include residents, local business owners, developers, the Queen Creek Chamber of Commerce, as well as representatives from local utilities and the Queen Creek Unified School District. Based upon input from the committees, as well as a Town Council discussion in December of 2012, the Town supported either the yellow or teal alternatives. At that time, the Maricopa Association of Governments (MAG) had also completed a commuter rail study. The first recommended corridor to receive service in this study was the East Valley- Union Pacific Phoenix Subdivision corridor. This included a stop in Queen Creek which showed the second highest boardings of all the stops in the corridor. The yellow alternative very closely matches the corridor identified in the MAG Commuter Rail System Study as that with the highest ridership potential. The Town recognizes that the ADOT Passenger Rail Corridor Study is looking at passenger rail versus commuter rail, but the Town envisions that the route selected for passenger rail will ultimately be the same corridor for commuter rail should funds become available in the future.

In May 2014, when ADOT narrowed the corridors to three alternatives, the Town Council adopted a second resolution to reaffirm their support of the yellow route. Selecting the yellow alternative would provide rail service to a significant portion of the East Valley, this is especially important when considering current and future development at and around Phoenix-Mesa Gateway Airport (PMGA). The yellow alternative offers rail service in very close proximity to PMGA, and has been deemed to be more financially feasible than the orange alternative.

22358 S. Ellsworth Road, Queen Creek, AZ 85142 | 480-358-3000 | Fax: 480-358-3189 | www.queencreek.org

</td><td>Thank you for your comment and participation in this study.</td></tr>
</table>

In addition to the Town's support of the yellow alternative for the reasons highlighted above, the Town has also taken the steps necessary to preserve a transit corridor within the Town Center should there be funds to construct a passenger rail system in the future. The Town's General Plan includes a policy statement relative to the passenger rail corridor study and the Town's preparation and readiness for rail in the future. It reads:

Goal 8: Encourage and Promote Transit Oriented Design and Development

Policy 8b. Development of properties adjacent to the Union Pacific Railroad, west of Ellsworth Road, should incorporate design and land use elements to accommodate the location of a future commuter rail terminal/transit center.

Now, with the Tier 1 Environmental Impact Statement resulting in a recommendation of the yellow corridor, I urge ADOT and the Federal Railroad Administration to continue to support the yellow corridor as the final route for passenger rail. The Town believes this alignment is supported by MAG's Commuter Rail System Study and that it offers service to the fast growing population centers in the East Valley. Rail stations along this alternative would drive further economic development and provide much needed alternative connections between employment centers.

Should you have any questions about the Town's preferred alternative, please contact Tracy Corman, Assistant to the Town Manager, at (480) 358-3740 or tracy.corman@queencreek.org.

Sincerely,

Gail Barney

Gail Barney
Mayor

<table>
<tr><td>10/30/2015</td><td>City of Tucson</td><td>Mayor Jonathan Rothschild</td><td></td></tr>
<tr><td colspan="3">
Oct. 30. 2015 4:15PM No. 0585 P. 1

CITY OF TUCSON
CITY OF TUCSON
OFFICE OF THE MAYOR

JONATHAN ROTHSCHILD
MAYOR

255 WEST ALAMEDA
P.O. BOX 27210
TUCSON, ARIZONA 85726-7210
PHONE: (520) 791-4201
FAX: (520) 791-5348

October 30, 2015

Arizona Department of Transportation
Passenger Rail Study
c/o Central Creative
24 W. Camelback Rd., #479
Phoenix, AZ 85013

Dear Study Team,

Thank you for your work on the Draft Tier 1 Environmental Impact Statement for the Arizona Passenger Rail Corridor Study. As you near completion of this stage, please accept these comments.

I support including a rail station at Tucson International Airport in the initial implementation phase of the Passenger Rail Corridor.

Tucson's proximity to Mexico, Arizona's largest international trading partner and export market, supports a growing logistics and manufacturing base. The development of regional multi-modal transportation operations is critical to this sector, as is connectivity to the Phoenix region.

We expect this sector to expand. The Tucson Airport Authority is developing a master plan for a major aerospace and defense research and business park, and connectivity to the Passenger Rail Corridor will ensure that the entire state benefits as we strengthen Tucson's role as a logistics and manufacturing hub.

The Tucson International Airport is the focal point for transportation for all of southern Arizona, and is at the heart of Tucson's industrial corridor. It should not be left out of the initial implementation of the Passenger Rail Corridor.

Sincerely,

Jonathan Rothschild
Mayor
</td><td>Based on public and agency input, ADOT and FRA will commit to extending the study area to TUS for future passenger rail (Tier 2) studies, which would include a TUS station on a passenger rail system from Tucson to Phoenix. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but will be determined as funding is allocated and as part of the subsequent project-specific NEPA process.</td></tr>
<tr><td>10/27/2015</td><td>City of Mesa</td><td>Mayor John Giles</td><td></td></tr>
<tr><td colspan="3">Congratulations on completing the Draft Tier 1 Environmental Impact Statement (EIS) of the Passenger Rail Corridor Study.

During the Alternatives Analysis, your team did a remarkable job reaching out to the various stakeholders along the different proposed alignments. I know you met with City of Mesa staff on numerous occasions.

The city also appreciates that the locations of the recommended alternative scenarios serve Mesa and the East Valley. However, we feel there is a significant missed opportunity by not directly linking Phoenix-Mesa Gateway Airport as shown in the Yellow Alternative. Currently the airport serves 1.3 million annual passengers with over 2,000 jobs located at the airport. The Gateway Airport Master Plan calls for a long-term annual enplaned passenger total of 2,200,000, or 4,400,000± annual passengers served. The high range forecast identifies that</td><td>Thank you for your comment and participation in this study. Access to the three major airports in the corridor is an important element of the passenger rail service. As noted, airport access would be evaluated in much more detail in the next phase of study. This could be a subsequent project-specific (Tier 2) NEPA document or another study completed prior to the Tier 2 studies moving forward. A commitment has been</td></tr>
</table>

Gateway could handle 5,000,000 annual enplaned passengers, or around 10,000,000 total passengers annually. The EIS states the future rail line serves the airport however, this alternative would require passengers to take a shuttle 3-6 miles from a potential station area in Gilbert to the airport terminal. By not directly connecting the Phoenix-Mesa Gateway Airport with Phoenix Sky Harbor International Airport and Tucson International Airport, the region misses an invaluable opportunity to create synergy in the aviation industry within the State of Arizona. During the study, and in subsequent study presentations, ADOT staff committed to do another study as part of the Tier 2 EIS to look at how to better connect the three airports in the next phase of this project. However, the Draft Tier 1 EIS simply indicated that "these analyses (airport connection) will be undertaken as part of future studies but does indicate when such a study would occur." The City of Mesa respectfully requests that the study team amend the language in the Airport Connection section under Next Steps to more fully commit to doing the airport connection study "as part of one of the independent localized studies in the Tier 2 study." Thank you for the opportunity to provide comments on the Draft Tier 1 Environmental Impact Statement (EIS).		made that airport access would be part of subsequent Tier 2 studies under any circumstances.
9/14/2015 City of Mesa Parks & Recreation	Roxana Rojo Yantos	
What parks/parkland will be affected by the yellow corridor?		The Draft Tier 1 EIS examined mile-wide corridors and not alignments, so all properties and resources in the corridor were identified as being potentially affected. The Corridor Aerial Atlas Appendix in the Tier 1 EIS identifies the parks and parklands that may potentially be affected, but until subsequent project-specific studies examine conceptual alignments, whether these or other parks would be affected by a project cannot be ascertained.

10/30/15	Jess Knudson, Mark Eckhoff, Gilbert Olgin, William Randolph[1]	Town of Florence Officials	
Thanks for this opportunity to comment on this latest stage of the ADOT Passenger Rail Corridor Study. The Town of Florence appreciates the time and effort that has gone into this Study to date and we look forward to working with ADOT and the other members of this extensive project team for many, many years to come. The Town wishes to express its ongoing support for the future Passenger Rail system to be integrated into the planned North-South Freeway Corridor. This is a position that has been officially adopted by our Town Council and integrated into our adopted General Plan Future Land Use Map. This multi-modal approach will be far superior to any other options under study and should provide greater efficiencies in right-of-way acquisition, reduced development costs and fewer environmental impacts. There is also significant stakeholder support for this option from the major property owners owning land impacted by the planned Passenger Rail and Freeway Corridors in the Florence area. Whether ADOT, the FRA and others select the North-South Corridor option or the Union Pacific option through Florence, the Town is adamant about there being a rail stop in the Town of Florence, whether this be a commuter rail stop or an inter-city rail stop or both. Florence is the County Seat and one of the major employment hubs in the County. Furthermore, by the time the rail line is developed, Florence will likely be the largest or one of the largest population centers in Pinal County based on the sheer amount of private and state land available for future development, as well as the current and planned infrastructure and necessary resources to support smart growth. To gain the negative impacts of the rail system without the benefits of one or more stops would cause irreparable harm to the Town of Florence. It would also have significant negative impacts on land and transportation planning and development activities in the region. Thanks again for this opportunity to share our comments on this important study.			Thank you for your comment and for sharing the position taken by the Town. The station locations have not yet been selected. Stations shown on maps were only identified as a basis for projecting ridership and serving the affected areas. The Yellow Corridor Alternative includes an assumption for a station in Coolidge and one in the Santan Valley area. The Orange Corridor Alternative includes an assumption for a station in Florence. When the final concept is developed and an alignment set, the stations would be placed based on where the best service can be offered and the highest ridership achieved. ADOT intends to work with community partners and transit providers to connect communities in the vicinity of a station to the rail service whether directly on the line or not.

[1] Comments submitted individually

10/28/2015 Gila River Indian Community Executive Office	Stephen Roe Lewis	
(letter below)		Responses to individual comments begin on the next page.

GILA RIVER INDIAN COMMUNITY

Executive Office of the Governor & Lieutenant Governor

"Putting Our People First"

Stephen Roe Lewis
Governor

Monica Lynn Antone
Lieutenant Governor

October 28, 2015

ADOT Passenger Rail Study Team
c/o Central Creative
24 W. Camelback Rd., Ste 479
Phoenix, Arizona 85013
Fax: (602) 368-9645

Via e-mail: projects@azdot.gov

Re: Comments of the Gila River Indian Community on the Draft Tier 1 Environmental Impact Statement for ADOT's Passenger Rail Corridor Study.

Dear ADOT Passenger Rail Study Team:

The Gila River Indian Community (the "Community" or "GRIC") is a Federally-recognized Indian Nation located south of Phoenix, Arizona, with reservation lands encompassing approximately 372,000 acres with approximately 21,000 enrolled members. The Community reviewed the Draft Tier 1 Environmental Impact Statement for ADOT's Passenger Rail Corridor Study (the "DEIS") and submits this letter to provide comments on the DEIS[1]. The Community appreciates the opportunity to comment on the Arizona Passenger Rail Corridor Study Draft Tier 1 Environmental Impact Statement and looks forward to working and consulting and collaborating with Arizona Department of Transportation (ADOT) in a meaningful manner during this project.

The Community's specific comments on the DEIS is as follow:

I. **GRIC'S Cultural Resources Management Program**

[1] ADOT submitted the Draft Tier 1 DEIS to the Federal Railroad Administration (FRA) in September 2015. Two of the corridor alternatives ("green" and "yellow") cross the GRIC. In previous meetings, the Community indicated they would not support the "green" route which would parallel I-10 from Tucson to Phoenix. The green route is no longer being considered a viable alternative, but the "yellow" route is being considered along with one other route ("orange"). The yellow route follows the existing UPRR tracks and crosses the SE corner of District 1 of the GRIC; the orange route would be on a currently unbuilt track within the North-South Corridor alignment. Moving forward in the DEIS process, ADOT and FRA are focusing on either the yellow or orange route. One additional consideration is the yellow route could be altered in the area of the GRIC District 1 segment to follow the orange route and thus avoid crossing the Community. That matter has yet to be determined.

525 West Gu u Ki · P.O. Box 97 · Sacaton, Arizona 85147
Telephone: 520-562-9841 · Fax: 520-562-9849 · Email: executivemail@gric.nsn.us

October 28, 2015 ***Re: Comments of the Gila River Indian Community on the Draft Tier 1 Environmental Impact Statement for ADOT's Passenger Rail Corridor Study.*** ***Page 2 of 4*** The Federal Railroad Administration (FRA) and ADOT need to engage the GRIC in timely and meaningful consultation and collaboration with GRIC and GRIC departments/entities. More specifically, the GRIC-Tribal Historic Preservation Office never received a Consultation letter from FRA re: AZ Passenger Rail Study. FRA or ADOT will need to engage the GRIC-THPO and invite them to consult on this project. In regard to cultural resources, the DEIS only includes a "limited Class I records search" and it looks like this was accomplished through AZSITE records search and NRHP record search (page 5-207). GRIC-CRMP was not asked to provide any information for the Class I overview, therefore the overview is incomplete because it lacks GRIC archaeological site and project data. The GRIC archaeological site inventory is proprietary, so ADOT will need to directly request CRMP to provide the relevant archaeological site and project information for the DEIS study area. In reviewing the proposed yellow route section on the GRIC, it would appear that roughly half of the corridor has not been surveyed for cultural resources. If ADOT and FRA proceed with consideration of the yellow route in Tier 2 of the EIS process, they will need to directly request GRIC-CRMP to conduct a Class III archaeological survey of the unsurveyed parts of the route.	FRA sent a letter to Barnaby Lewis, GRIC-THPO, on September 5, 2013 inviting the GRIC to participate in consultation pursuant to Section 106 of the National Historic Preservation Act regarding historic properties, including Traditional Cultural Properties, which might be affected by the proposed project. At the commencement of project-specific (Tier 2) studies, FRA and ADOT will continue Section 106 Consultation with the GRIC-THPO.
The DEIS does not include any information on Traditional Cultural Properties (TCPs) within the study area. ADOT will need to take steps to identify TCP's in accordance with documentation protocols for Section 4(f) properties. In reading the "next steps" sections of the DEIS, it appears that ADOT will initiate a more formal Class I and Class III cultural resources survey during "Tier 2" of the EIS process, as well as a Section 4(f) evaluation, and they will also initiate SHPO and THPO consultation. GRIC-CRMP would like to provide information for the Class I and Class III survey for the on-GRIC part of the "yellow" route and expects that ADOT and FRA will engage GRIC in this endeavor. Furthermore, it is likely that the Passenger Rail Study will require a TCP overview for the Section 4(f) evaluation. GRIC expects that ADOT and FRA will engage GRIC in this endeavor.	As alignment alternatives are developed during subsequent Tier 2 studies, FRA and ADOT will coordinate with the GRIC-CRMP to obtain available Class I, Class III, and TCP data and to discuss requirements for a TCP overview and cultural resource survey of the area of potential effects of proposed alignments that intersect GRIC land.
II. <u>GRIC'S Department of Environmental Quality (DEQ)</u> The following comments are provided in the context of the Yellow Corridor Alternative being selected as the preferred alternative which intersects the Community's boundaries. **Comments in Reference to Section Titled "Existing Conditions and Environmental Consequences"** ADOT's recommendation of the Yellow Corridor Alternative intersects the Community's eastern boundaries, of which are under the jurisdiction of GRIC. The DEIS fails to acknowledge GRIC's jurisdiction, role, and responsibilities regarding environmental regulations. The GRIC DEQ is responsible for compliance and enforcement of all environmental ordinances within the Community boundaries. All ordinances have been enacted in order to promote and protect human health, the environment, natural resources, and wildlife. Therefore, ADOT will be required to comply with all applicable GRIC DEQ environmental ordinances/regulations including any applicable permits/authorizations required for all phases of this project (*e.g.*, Earth Moving Permit, etc.). These can be found at www.GRICDEQ.org.	In subsequent Tier 2 studies, ADOT will comply with GRIC DEQ environmental regulations for the designated study area for portions of proposed alignments located within the Community boundaries.

Comment	Response
October 28, 2015 ***Re: Comments of the Gila River Indian Community on the Draft Tier 1 Environmental Impact Statement for ADOT's Passenger Rail Corridor Study.*** ***Page 3 of 4*** The Yellow Corridor Alternative has impacts on GRIC's environmental quality and natural resources, which may significantly degrade the Community's natural resource base, adversely affect tribal trust resources, and impede the Community's long-term conservation and restoration goals. The construction and operation of the Yellow Corridor rail line and associated infrastructure including rail stations, service roads, power and communications networks, etc. will facilitate urbanization and infill along the multimodal transportation corridor between Florence and Eloy. Increased human activity in this corridor will strain and degrade the natural resource base by fragmenting wildlife habitat; extracting surface and subsurface water from the Middle Gila River Watershed; facilitating soil erosion and the dispersal of exotic and invasive species; and promoting air, water, light, and noise pollution. Urbanization of and increased water extraction in this corridor could also interfere with the Community's plans to restore riparian ecological community once associated with the Gila River and central to the livelihood of Community members. The Community is concerned with potential vibration, noise and light pollution that may affect biological patterns of a variety of nocturnal animals in the vicinity of the Project. In areas along the Project limits, there remain pockets of Sonoran desert habitat that are currently minimally impacted, if at all, by noise and light pollution. These areas provide an "oasis" for many nocturnal species and are becoming an exception in the valley. The Community requests that ADOT implement 8 mitigation measures to reduce noise and light pollution to sensitive wildlife species in the vicinity of the Project.	During subsequent Tier 2 studies, ADOT and FRA will more fully assess the effects of vibration, noise, and light associated with the proposed passenger rail and will identify appropriate mitigation measures to reduce noise and light pollution found to affect sensitive wildlife species in the vicinity of the project, both on and off GRIC land.
Comments in Reference to Section Titled "Next Steps" The Yellow Corridor Alternative will also need to request a GRIC DEQ Land Use Action Assessment to identify if the proposed action may have an impact/effect on waterways, surface water, groundwater, wetlands, culturally significant, and/or protected species or habitat. In addition, the Land Use Action Assessment will identify whether the land has a history involving hazardous waste contamination, solid waste contamination, underground storage tanks, sites listed as Brownfields, and sites listed as Superfund. This can be requested by contacting GRIC DEQ, contact information can be found at www.GRICDEQ.org.	During subsequent Tier 2 studies, ADOT will coordinate with GRIC DEQ to gather data concerning past land uses and the potential for hazardous and solid waste contamination, USTs, and brownfield or Superfund sites.
The Community holds all animals in the highest regard, and recognizes animals as culturally important. While the DEIS focuses primarily on impacts to protected species, ADOT must also address impacts to species of cultural significance to the Community in the Tier 2 Analysis. Notwithstanding that some of these culturally-significant species may not be "protected" under federal or state law, the Community requests that ADOT take every step possible to minimize the risk of adverse effects to animal species generally, and the above species particularly, during the construction and operation of this Project. If, the preferred alternative does not intersect the Community's boundary, GRIC DEQ request continued consultation due to the proximity of the project to Community lands (*i.e.*, directly adjacent), impacts to Community wildlife resources are unavoidable. Because wildlife movement corridors extend well into Community lands, and given the cultural significance of wildlife to the Community, the Community requests that it be included in developing appropriate mitigation measures for impacts to biological resources and in preconstruction (design phase) planning of wildlife-sensitive roadway structures for the Project.	During subsequent Tier 2 studies, ADOT will address impacts to species of cultural significance to the GRIC. In preparing the biological evaluation, ADOT will consult with the GRIC to obtain information on culturally significant species.
III. GRIC'S DEPARTMENT OF TRANSPORTATION GRIC's Department of Transportation (GRICDOT) reviewed the information in the Tier 1 DEIS and has the following comments. The Arizona Passenger Rail Corridor Study (DEIS) states there are two final corridor	ADOT will coordinate with GRIC's Department of Transportation as alignment alternatives are investigated during subsequent Tier 2 analyses.

October 28, 2015
Re: Comments of the Gila River Indian Community on the Draft Tier 1 Environmental Impact Statement for ADOT's Passenger Rail Corridor Study.
Page 4 of 4

alternatives for the rail corridor. A portion of the Yellow Corridor Alternative skims approximately 2 miles of the Community's eastern boundary. Depending on the final alignment, this route could be on or off the Community, but if it is on the Community, a much higher level of community outreach, consultation, coordination and collaboration will be required.

The Yellow Corridor Alternative is located within a half mile of several existing homes on the Community, primarily the homes located near Chin Road. Noise and vibration are of a concern. The Federal Railroad Administration (FRA) and Federal Transit Administration (FTA) have sensitivity standards which will need to be adhered to if the Yellow Corridor is chosen. The Yellow Corridor Alternative is located near the Casa Grande National Monument and will require special analysis to take into account noise and vibration impacts to the Monument. If the Yellow Corridor Alternative is selected, the report recommends working with GRIC on this issue. The report should also state that noise and vibrations impacts to the Monument will require further analysis.

The Yellow Corridor Alternative may impact several acres of possible agricultural land on the Community (depending on the final alignment) and this will need further follow up and analysis.

On Page 59 of the Appendices, under Green Alternative, it states that a presentation was made to the GRIC Community Council about the findings of the Level 3 Evaluation which recommended removing the Green Alternative from the final alternatives. The Community Council suggested that ADOT include further study on providing complimentary transit connections from the Community to future rail stations.

MAP 32 of 91, of the Appendices, shows a spur line heading northwest off the UP Southeast Branch through the GRIC. The easement and the tracks for a significant portion of this spur line (milepost 944.0 to 958.3245) no longer exist. The Partial Termination of Easement was processed and completed through the BIA on April 7, 2015. The map in this document should be corrected to reflect this change.

IV. CONCLUSION

For the reasons noted above the Community urges ADOT to supplement its DEIS to address the Community's comments herein. The Community looks forward to ADOT consulting, collaborating and working with the Community in this endeavor.

Sincerely,

Monica Antone

Stephen R. Lewis, Governor
Gila River Indian Community

Residential areas and sensitive receptors such as the Casa Grande National Monument that would be adversely affected by proposed alternative alignments would require appropriate mitigation measures to adhere to FRA and FTA standards.

Project-specific (Tier 2) studies would analyze socioeconomic impacts, Section 4(f) resources, and farmlands potentially affected by a passenger rail facility.

ADOT will further investigate "Last-mile" connections between community centers and rail stations once station locations have been determined in project-specific studies.

The railroad layer on Map 32 has been revised for the Final Tier 1 EIS and no longer shows the spur line heading northwest through the GRIC.

A supplemental EIS is not warranted; the comments applicable to the Draft Tier 1 EIS have been addressed in the Final Tier 1 EIS.

(no date) Tohono O'odham Nation	Peter L. Steere, Tribal Historic Preservation Officer	
The proposed routes cross the Traditional use Lands of the Tohono O'odham Nation. The Tohono O'odham Nation is concerned about impacts to many cultural and sacred sites. The Tohono O'odham Nation is concerned about the possible disturbance of the burial sites of ancestors. All large Hohokam village sites should be avoided. A complete Class III (100%) survey will need to be completed of both alternative routes before selecting a final route. The route selected should be the one that has the least impact on cultural sites. A Cultural Landscape Study that incorporates both alternative routes needs to completed and used as an evaluative tool before selecting a final route. All reports and studies need to be reviewed by the Tohono O'odham Nation and other Tribes. Presentations on this railroad project need to be made to the Chairman of the Tohono O'odham Nation. Presentations on this proposed railroad project need to be made to the Tohono O'odham Nation Legislative Council Cultural Preservation Committee, and eventually to the full Legislative Council.		Thank you for your comment and participation in this study. ADOT and FRA respect the interests of the Tohono O'odham Nation and other Tribes whose Traditional Lands are crossed by the study corridor alternatives. ADOT and FRA developed a Tier 1 EIS to identify a single corridor for a future passenger rail alignment prior to undertaking detailed data collection and analysis of the areas affected. ADOT recommended, and FRA identified, the Yellow Corridor Alternative as the preferred alternative based on multiple factors, including potential ridership, estimated costs, and public input. Preliminary research undertaken for the Draft Tier 1 EIS indicates that the potential impact on known cultural sites within each of the two corridor alternatives does not differ enough, in the context of other environmental and non-environmental factors, to differentiate one corridor over the other.

10/30/2015	Union Pacific Railroad Company	Melissa B. Hagan, National Environmental Counsel & Senior Counsel–Environmental Law	

UNION PACIFIC RAILROAD COMPANY
13181 Crossroads Parkway North, Ste. 500
City of Industry, CA 91746

Melissa B. Hagan National Environmental Counsel &
Senior Counsel–Environmental Law

October 30, 2015

ADOT Passenger Rail Study Team
c/o Central Creative
24 W. Camelback Rd. #479
Phoenix, AZ 85013
Sent via email to projects@azdot.gov

RE: ADOT Passenger Rail Study Draft Environmental Document

To Whom It May Concern:

Union Pacific is a major stakeholder in the Arizona Department of Transportation's feasibility study on passenger service from Phoenix to Tucson. Many of the route alternatives considered would have a nexus with the railroad, especially in the downtown Tucson and Phoenix areas. Union Pacific is writing to ensure that freight service on the line is not adversely affected. Union Pacific is writing to ensure that freight service on the line is not adversely affected. Therefore, we have been welcomed the ability to engage with the study team to express our company's position.

Union Pacific is a common carrier and has a responsibility to the nation and to its customers to protect the public benefits of freight transportation—energy efficiency, lower emissions, cost-effective cargo transportation for shippers and consumers, and private investment in the nation's infrastructure.

We have shared Union Pacific's Passenger Principals with the study team and were pleased that in section 2.3.1 the Study states "It is anticipated that the Yellow Corridor Alternative would adhere to UP guidelines for coordination of services along active UP freight lines."

As the state moves on to the Tier 2 NEPA study, it will be important to engage Union Pacific in a public project reimbursement agreement so specific technical discussions may take place.

www.up.com

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ADOT has had ongoing discussions with UP related to the preferred Yellow Alternative. Based on information obtained from UP and analysis of the alternative, the implementation of passenger rail within the Yellow Corridor Alternative would not be expected to result in a change in the number of freight trains currently operating in the Tucson to Phoenix corridor.

Some freight train scheduling modifications would be required to prevent conflicts with passenger service. Upgrades to the existing UP track were assumed as part of this alternative, in addition to projects to accommodate passenger rail operations. These upgrade projects would allow continued service to freight customers and mitigate potential restrictions to freight movements.

ADOT Passenger Rail Study
October 30, 2015
Page 2

Union Pacific will consider reasonable proposals for commuter rail service that appear to be viable and adequately funded. Agreements must balance the nation's desire for additional commuter services with Union Pacific's ongoing, critical role in carrying freight that otherwise would likely compete for space on the crowded and underfunded highway network.

Regards,

UNION PACIFIC RAILROAD COMPANY

Melissa Hagan

Melissa B. Hagan

cc: Zoe Richmond

9/16/15	Tucson Electric Power Land Resources	Shannon Breslin, Manager	

TEP
Tucson Electric Power

88 East Broadway Blvd P.O. Box 711
Tucson, Arizona 85702

Shannon Breslin, Manager
Land Resources

Phone (520) 917-8743
Mobile (520)904-4028
Fax: (520) 545-1373
sbreslin@tep.com

May 30, 2014

Arizona Department of Transportation
3217 E. Shea Blvd., Ste. 620
Phoenix, AZ 85028

Re: Passenger Rail Corridor Study: Tucson to Phoenix

On behalf of Tucson Electric Power (TEP), thank you for the opportunity to comment on the proposed passenger rail corridor between Tucson and Phoenix. The study proposes one common corridor through Pima County between Tucson and Picacho Peak area and three alternative routes between Picacho Peak and the Phoenix metropolitan area.

Based on GIS shape files received from ADOT, TEP identified multiple potential impacts to existing transmission and substation facilities along the common corridor route through Tucson. Staff analysis concentrated on the common corridor because the majority of facilities potentially affected are located within that zone. However, please note that two of the corridor alternatives (orange and yellow) will cross the right-of-way for TEP's future 500kV line between Tortolita Substation and Pinal Central Substation, which will be operational in 2016. It is recommended to review planned structure locations, conductor heights, and access routes for this line as soon as possible to reduce potential conflict.

Information provided from ADOT for the common corridor route is considered only as a general location and not to be exact. However, TEP evaluated all electrical facilities in close proximity i.e. 1000 feet, for both the east and west side of the proposed common corridor route. TEP identified 9 substations and 14 transmission lines that could be affected by the location of the proposed railway. Below is a list of these facilities.

Substations	Map ID	Transmission Lines	Map ID
North Loop	1	110-DeMoss Petrie-North Loop, 138 kV	10
Tucson Station	2	111-Irvington-Tucson, 138 kV	11
AZ. Portland Cement	3	112-Tucson-West Ina, 138 kV	12
AZ. P.C. Mill	4	114-North Loop-Rillito, 138 kV	13
West Ina	5	117-Tortolita-North Loop, 138 kV	14
DeMoss Petrie	6	118-Tortolita-North Loop, 138 kV	15
Tucson Newspapers INC.	7	125-Tortolita-North Loop, 138 kV	16
Fair Street	8	127-DeMoss Petrie-North East, 138 kV	17
Thirty Fifth Street	9	129-Drexel-Midvale, 138 kV	18
		131-Irvington-Santa Cruz, 138 kV	19

Thank you for your comment, and the information you provided on Tucson Electric Power's existing and future transmission and substation facilities.

During subsequent project-specific studies, ADOT will coordinate with utility companies, including Tucson Electric Power, during planning and design of the passenger rail system.

132-North Loop-West Ina, 138 kV	20
133-Saguaro-Tortolita, 500 kV	21
139-Santa Cruz-DeMoss Petrie, 138 kV	22
46kV lines	23
Pinal Central – Tortolita 500 kV (proposed)	24

The substations and transmission lines listed above are noted on an attached map for additional information. Of note, not included on the map are multiple historical and cultural sites known to exist along the common corridor route. The expected permitting process involved with relocating the facilities in the vicinity of sensitive cultural and historical sites is anticipated to require numerous environmental permits with considerable costs associated. As alternatives are evaluated, please note that these permits may require substantive timeframes to secure. In addition to environmental permitting requirements, TEP would also advise the potential need for advanced funding for easement replacement and/or new right of way acquisition. Further matters associated with relocating facilities include: expansion capacity, maintenance access, design, project planning and construction sequencing.

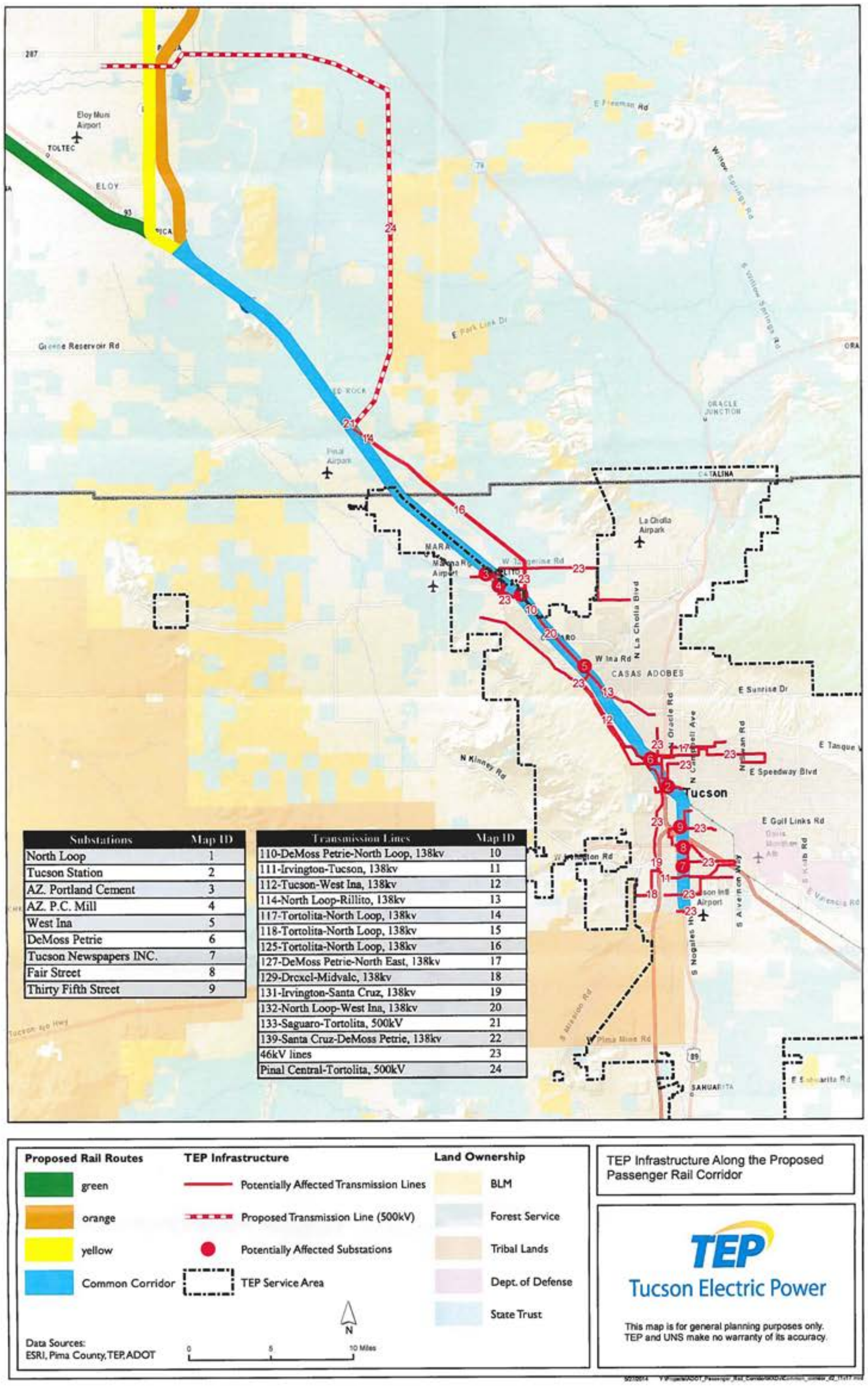
TEP is dedicated to providing safe and reliable service to our customers. The electrical facilities under consideration also provide service for both residential and commercial customers throughout the Tucson metropolitan area. The relocation of these facilities would significantly obstruct that service and require significant planning to avoid a major interruption. TEP is eager to work with ADOT to assist with the alternatives selection, and devise a strategy to minimize outages, costs and interruption for safe and reliable electrical service to the City of Tucson and surrounding Pima County customers.

Thank you for the opportunity to comment on the project. TEP looks forward to future discussions with ADOT and establishing a relationship that will meet the goals and objectives for the proposed passenger railway system.

Please call me with any questions or concerns. I can be reached at (520) 917-8743 or via email at sbreslin@tep.com

Respectfully,

Shannon Breslin, Manager
Land Resources



Substations	Map ID
North Loop	1
Tucson Station	2
AZ. Portland Cement	3
AZ. P.C. Mill	4
West Ina	5
DeMoss Petrie	6
Tucson Newspapers INC.	7
Fair Street	8
Thirty Fifth Street	9

Transmission Lines	Map ID
110-DeMoss Petrie-North Loop, 138kv	10
111-Irvington-Tucson, 138kv	11
112-Tucson-West Ina, 138kv	12
114-North Loop-Rillito, 138kv	13
117-Tortolita-North Loop, 138kv	14
118-Tortolita-North Loop, 138kv	15
125-Tortolita-North Loop, 138kv	16
127-DeMoss Petrie-North East, 138kv	17
129-Drexel-Midvale, 138kv	18
131-Irvington-Santa Cruz, 138kv	19
132-North Loop-West Ina, 138kv	20
133-Saguaro-Tortolita, 500kV	21
139-Santa Cruz-DeMoss Petrie, 138kv	22
46kV lines	23
Pinal Central-Tortolita, 500kV	24

10/29/15	Tucson Airport Authority	Bonnie A. Allin	
Dear Sir or Madame: On behalf of the Tucson Airport Authority (TAA), thank you for the opportunity to review the Draft Tier 1 Environmental Impact Statement (EIS) for the ADOT Passenger Rail Study and provide comments. The TAA is generally supportive of the project and the proposed recommendations contained within the EIS. However, there is one major item that must be addressed to allow for our full support of the project. This item is the location of the southern terminus for the initial phase of the passenger rail. The current EIS shows the initial phase of the rail terminating in downtown Tucson. The TAA strongly requests the terminus be located at TIA. Leaving TIA out of the initial phase of the project will result in numerous unintended and adverse impacts to the Airport and local economy (Note: TIA provides $3.28 economic benefit to the community). These adverse impacts include , and are not limited to , the following : • Enormous competitive disadvantages for TIA; potential loss of customers to other airports • Severe reduction in cargo and commercial air service in the region • Diminished air service development opportunities • Diminished business growth and development opportunities • Potential job loss • Inability to transport the work force to the largest industrial employment area • Failure to connect to the Sonoran Corridor The Pima County Economic Development Plan (2015 - 2017) identifies an area immediately south of TIA for major near-term development. This area, referred to as the Sonoran Corridor and Aerospace and Defense Corridor, is a catalyst for economic growth for the region. The integrated master plan includes connecting Highway 1-19 and Highway 1-10 through the Sonoran Corridor to enhance transportation links across vast geographic areas and national boundaries, and to combine the power of air, rail and surface transportation to create a major Southwest logistics center at TIA. The TAA , Pima County, and City of Tucson have invested millions of dollars to prepare for this critical economic development opportunity , with the goal to promote and support industrial growth to the region and state, attract businesses and increase high-paying job growth, and to protect our existing major employment base. The rail terminus near this area is essential to make both the rail and the land development successful for the region. Between the period of 2011 and 2013, the TAA and members of the community brought these critical points to the attention of ADOT numerous times and were assured TIA would be the southern terminus point in all scenarios. However, the latest report does not reflect or incorporate the TAA and our community's comments, concerns and recommendations. The TAA respectfully asks that the Final Tier 1 EIS include TIA within the initial phase of work. If you have any questions or need additional information, please do not hesitate to contact me at boallin@flytucson.com or Mike Smejkal, Senior Director of Development Services at msmejkal@flytucson.com.			Public input throughout the development of the AA and Draft Tier 1 EIS indicated airport access to be an important consideration as a feature of future passenger rail service. The corridors analyzed for environmental impacts and other factors in the Tier 1 EIS, as established in October 2011 through the NEPA scoping process, terminated in downtown Tucson. While extending passenger rail to TUS was not considered in the Tier 1 environmental analysis, the Alternatives Analysis of the APRCS included coordination with Tucson, South Tucson, PAG and TUS related to airport connectivity, and public and stakeholder input were gathered regarding how best to connect downtown Tucson to TUS. In addition, the conceptual ridership analysis developed for the AA included TUS at the southern end. Comments on the Draft Tier 1 EIS from agencies, jurisdictions, and the public strongly urged that the study corridor terminate at Tucson International Airport rather than downtown Tucson. Based on this input, ADOT and FRA will commit to extending the study area to TUS in future (Tier 2) studies, which would include a TUS station on a passenger rail system from Tucson to Phoenix.

10/29/15	Phoenix-Mesa Gateway Airport Authority	Jane L. Morris	
This letter is in response to ADOT's solicitation of comments regarding the Passenger Rail Corridor Study Draft Tier 1 EIS. Phoenix-Mesa Gateway Airport Authority (PMGAA) has been following ADOT's Passenger Rail Study process with great interest. PMGAA believes that passenger rail connectivity to Gateway Airport would play a significant role in the continued development and success of Phoenix-Mesa Gateway Airport. Currently, Gateway serves 1.3 million annual passengers with over 2,000 jobs now located at the Airport. The current Gateway Airport Master Plan calls for a long-term annual enplaned passenger total of 2,200,000, or 4,400,000± annual passengers served. The high range forecast identifies that Gateway could handle 5,000,000 annual enplaned passengers, or around 10,000,000 total passengers annually. PMGAA encourages airport-rail connectivity that would not require the need for busing between rail stations and the airport. PMGAA also welcomes the stated ADOT commitment to examine how to better connect the three airports (Phoenix-Sky Harbor, Tucson International, and Gateway) as part of the upcoming Tier 2 EIS. This passenger rail study, along with the ADOT North-South Corridor Study, State Route 24 construction, Valley Metro Southeast Valley Transit System Study, and the Transportation Master Plans of Gateway's adjacent municipalities, identify the importance of transportation planning and coordination in the Gateway vicinity. Providing additional modes of transit and connectivity to the Gateway area makes the Airport more attractive for employment and passenger growth, and would further solidify Gateway's role as an economic hub in the region. Thank you for the opportunity to provide comment on this study. PMGAA welcomes the opportunity to further discuss and work with ADOT, and our regional partners, on this topic.			Thank you for your comment and participation in this study. Access to the three major airports in the corridor is an important element of the passenger rail service. As noted, airport access would be evaluated in much more detail in the next phase of study.

Public Comments on the Draft Tier 1 EIS

A. Public Comments on the Draft Tier 1 EIS Submitted Online

Date Submitted	Commenter	Affiliation	Response
9/3/15	Shirley Baumgartner		
I think a light rail system from Tucson to Phoenix should have been built years ago. The VRE light rail in Northern Virginia has been an economic boon for everyone. Tucson has had backward thinkers and planners for so many years I'm surprised they approved a trolley car to run for 4 miles downtown.			Thank you for your comment and participation in this study.
9/3/15	Gary Kordosky, PhD		
How can Casa Grande not be a stopping point of the way between Tucson and Phoenix? The Casa Grande area has the highest population density between Tucson and Phoenix and there is not trains stop there seems really odd. Everyone knows the legislature of the State of Arizona will not want to put a penny into a rail line between Tucson and Phoenix, so where is the money to come from? Even if the feds pay the capital, who is going to cover the operating costs of the passenger rail link between Tucson and Phoenix? This is just another boondoggle that consultants and engineers doing feasibility studies love. Scrap the project now and save a ton of money.			Casa Grande is a major center, but the preferred corridor alternative would serve many more commuter patrons in the East Valley. The corridor that would serve Casa Grande directly has a much lower ridership compared to the other final alternatives. Casa Grande would be linked to the corridor by other means.
9/3/15	Ernesto Villarreal		
Hello, Looking at the Rail Corridor study I would vote for the Yellow path vs. the Orange/Green path. I live in San Tan Valley. Since this is a blended service (express service and local service) there are more communities to stop at on the proposed yellow path. The Orange path would be great if there were more developed cities in its path. I would not vote for the Green path. I hope I live long enough to use it someday ☺ .			Thank you for your comment and participation in this study.
9/3/15	Brent Honn		
I'm a frequent I10 driver to Tucson for biz and as I need my car for appointments when in Tucson would never use the train, I do see benefit of such transit, although I think biggest issue on the I10 is amount of semi trucks. With that said, I think orange route thru east valley that has own right away and avoids dozens and dozens of at grade crossings is only way it can work. Also from Gateway Airport/AZ24 down to I10/Picacho Peak area the tracks need to be built in center of 4/6 lane freeway to add second N/S highway. But before the entire corridor is built, both ends should be started as commuter rail. 2 reasons- to get commuters/travelers used to and accept train travel as a mode, and second the need is greatest for intercity commuter now and will develop intercity in the future - your ridership numbers show much			Thank you for your comment and participation in this study. Future studies will analyze specific rail alignments and impacts to existing and future grade crossings. A final phasing plan has not been developed yet, but will consider funding and logical termini. The plan will consider logical approaches, such as the one you suggest.

Date Submitted	Commenter	Affiliation	Response
greater commuter usage. My vision is ADOT gets Phx downtown to Gateway commuter going and gets Marana to Tucson downtown commuter going at the same time, then while the middle section and eastern n/s freeway gets built, MAG adds NW, chandler, SW, Tempe commuter lines and PAG adds to airport and SE extensions to their commuter rail system. If thru the metro areas they aren't built as express lines with minimal stops the attractiveness and time savings is lost. So while end to end travel needs to be quick; users will still have to drive and park and wait for train at start side and then have travel via cab, rental, or pick up to end location, and those added times at start and finish may be a much time as actual train time.			
9/3/15	Brian Harlow		
This is long overdue. As a person who commutes between North Central Tucson and Chandler for work 4 days a week, I cannot understand why this discussion has not occurred sooner (or perhaps it has and I am not aware). The volume of commuters traveling between the two cities Monday through Friday makes travel on 1-10 a life threatening experience every day. As the growth of each city expands between, it only makes sense to plan and implement the rail corridor before it becomes too late. Don't become hamstrung like Tucson has become as a result of its failure to plan for growth and its inability to now develop the infrastructure to handle the traffic. As for the proposed routes, the yellow route, providing it is feasible, makes more sense. The proposed orange route is too far east in Phoenix to make it practical for most commuters who are traveling to Chandler, Tempe, Downtown and Scottsdale.			Thank you for your comment and participation in this study.
9/4/15	Rory Brennan		
We absolutely need this. I-10 has become unsafe, and these communities will thrive with the improved access and renewed economic growth corridors. Meanwhile, central Phoenix (and surrounding areas) deserve some relief from the ever-increasing automotive traffic from suburban commuters.			Thank you for your comment and participation in this study.
9/4/15	Stephen Matthews		
Howdy, being a guy who works in downtown Tucson and lives in Coolidge you might guess that I have 3 vehicles with over 200000 miles on them and another at 140000. Generally you have to go somewhere else to shop for things that you want, to find a good job or go to a competent doctor. I was looking at this project as a solution to many problems, going to work cheap and easy, creating economic growth in Coolidge and Pinal County and so on. But I see no listings for stops on the maps I downloaded. So basically If there are going to be stops, let			While specific locations for stops have not been identified, a passenger rail system with the Yellow Corridor Alternative would most likely warrant a stop in Coolidge.

Date Submitted	Commenter	Affiliation	Response
it go through Coolidge (Yellow) Otherwise use the other, because the extra volume of train traffic would be worthless noise that further lowers our already depressed real estate values. From a work perspective, YEA Baby! Either one would be excellent. Allowing people to get between the two largest population centers in a reasonable time.			
9/4/15	Melody Moss		
I am a resident of Tempe and I am in favor of the Green Route. It will be the fastest and most direct connection between Phoenix and Tucson. It will probably be the lesser expensive option as well. I like the fact that is option utilizes more existing railroad ROW. I am against the orange route. The attempt to pass every small town in the east valley is not a good use of funds. It is the longest, most expensive, and slowest route. It defeats the purpose of an "express train."			The preferred alternative is the Yellow Corridor Alternative, which generally follows the existing freight rail corridor through East Valley communities. While the Green Alternative between Tucson and Phoenix offered the fastest trip of the top three alternatives originally considered, it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
9/4/15	Elizabeth Leibold P.E. CPM, CFM		
Yellow route is shorter (time travel, construction cost) and appears to have less impacts (less floodplain disturbance) – let's do the yellow route – oh and Wildcats should get a discount on fares. ☺			Thank you for your comment and participation in this study.
9/5/15	Annick Elziere		
What a joy to hear that such project is up in the air. A passenger train between Tucson and Phoenix is the best that can happen, our days. It will help Tucsonans live better and happier. The future of Tucson is in our hands. The transportation system in the U.S. is facing great challenges for years as it reached to a point that leaves no more choice but moving forward and finding quick solutions to help people and businesses grow. The challenges that Tucson and Marana are facing are grand and include increasing highway congestion with trucks and			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
thousands of cars on I-10, cancellations and delays at airports, rising fuel costs and of course, the aging population in Tucson. Driving cars makes traveling costly, adds more pollution to the area and brings much stress to people. I leave home at 5 am to return at 6 pm. I have 50 minutes driving back and forth which stresses me out. At 5 am the highway is already packed and that is not how Tucson should be. Tucson is a beautiful city and should be preserved. We don't need more pollution that needed. We don't need tons of people dying on the road. Why living on the edge when we could all drive to a train station, park the car there for the day and jump into a passenger train to bring us to destination. I live Northwest Avra Valley (Trico Rd.) and can't wait for a passenger train to stop by. The I-10 Marana Rd. Exit (by McDonalds) would be a terrific place for a train station with a lot of parking space to take people straight to the Tucson International Airport. There they can get a taxi and go to work. I know many people who feel like me. I would think that all businesses at the new Twin Peaks Mall would much appreciate a train station at the Marana Exit, too. Many people between Tucson and Phoenix would use it. Maybe people could get yearly passes which would already bring lots of money. Maybe our taxes could be bumped a tiny bit for a beautiful and safe passenger train. It is all worth it. People who cannot find a job in Tucson would have no more excuses... and this would reduce crime in our cities. The Taxi business would bloom. This whole project would bring more jobs on the outskirts of Tucson and Phoenix. It would allow people from Phoenix to come more often and spend their paychecks in Tucson... The Arizona Department of Transportation bringing safety to everyone and raising our quality of life is very important for Pima and Pinal counties. This is a beautiful area of Arizona and great things should happen, not just bad things as too often we hear on the television. If residents and tourists could buy a monthly pass, that would be wonderful. I would think that the train would offer WI-FI on board to encourage all business people to use their laptop while traveling. Companies would support this project, as they should. I encourage the ADOT Passenger Rail Study Team to seriously consider this project for today and not the future. It will pay for itself, quickly.			
9/6/15	Thomas Zane		
Dear Sirs, I have driven the I-10 from Phoenix to Tucson hundreds of times in my career as a Fire Sprinkler Fitter which started in nineteen seventy-seven. In that time I am stunned that			The proposed rail project is in addition to a widened I-10, not instead of it. Even with I-10 widened to four lanes in each

Date Submitted	Commenter	Affiliation	Response
so little has been done to improve the I-10. It is inexcusable that in thirty-eight years time the I-10 is not an eight-lane highway for its entire length. This is a major corridor between two major cities!! The last thing we need in Arizona is another useless rail system. The most intelligent and cost effective improvement is to widen the I-10 to 8 to 10 lanes from Phoenix to Tucson. Thank You			direction, the transportation system may not be able to carry the demand that is projected. The rail option provides an alternative travel mode as well as additional capacity.
9/7/15	Laura Sagerman		
I am in favor of this project. I like the alternative that goes along I-10 the best. It is the shortest and I and in favor of using existing corridors whenever possible to minimize environmental impacts.			Thank you for your comment and participation in this study. The Green Alternative is the shortest alternative between the two hub stations. It received comments of support from many participants in the public outreach process and from some agencies; however, the Green Alternative did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. The preferred alternative, the Yellow Corridor Alternative, would serve the most populous communities and end in Phoenix. Connections to other western cities have been assessed preliminarily by the federal government and shown to provide further benefits to the Phoenix-Tucson route.
9/7/15	Lynne Roper		
I simply want to endorse your work and add the need for the rail and its potential to lessen vehicle traffic which negative impacts the environment more than the rail corridor. It would be extremely useful for increasing business opportunities in Southern Arizona as well as movement of people.			Thank you for your comment and participation in this study.
9/7/15	Karen		
The Statement covered the areas expected to be studied for this project. I am very supportive of this rail corridor, as this would benefit Arizona on many levels. Residents who currently live in one city and work in another would be able to save car wear and tear, as well as, gas money by commuting. This money could then be put into the economy in other ways.			Thank you for your comment and participation in this study.

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Additionally, work could be done on the train thereby increasing productivity. A train would benefit the environment by decreasing the smog we have due to the large amount of auto drivers. Tourists would be better able to travel between Tucson and Phoenix potentially increasing tourism to both cities. There would be a potential expansion in the pool of applicants for jobs when those without an auto have the means to travel from Maricopa to Pinal and Pima county. And lastly, on a personal note, traveling I10 is frightening with all those 18-wheelers. I've seen too many of them weaving lanes and this has limited my travel to Tucson. A train is safer and convenient to travel in between the two cities.			
9/8/15	Marsha Segerberg		
Please go forward as soon as possible with this project. Any negative environmental impact will be offset by the positive impact of dramatically reducing highway traffic along the I-10 corridor as well as in Tucson and Phoenix. Consider adding stops at places in these two major cities that would make it convenient for access to local transportation and for parking at train stops. The drive between Phoenix and Tucson on I-10 is at best stressful and uncomfortable, and at worst hair-raising and dangerous. It is ironic that the rail line runs parallel and unused, except by freight trains, along the way.			Thank you for your comment and participation in this study. Stop locations and other details would be further developed during subsequent project-specific planning and design.
9/8/15	calcote.meg@...		
Highly interested. Regularly travel between Phoenix and Tucson to visit family. Love taking the light rail in Phoenix. Would love not to have to drive the 2 hours to Tucson. I survived a rollover accident many years ago, so driving is always a stressful experience for me. I often feel unsafe driving between Phoenix and Tucson. People drive too fast or too slow, cut one another off, drive with unsafe loads in the backs of their cars, etc. Anything to help relieve congestion on this drive has my full support. The proposed orange and yellow corridors seem like good choices. I lean slightly towards the yellow corridor, but overall either one would help with congestion.			Thank you for your comment and participation in this study.
9/8/15	Danny		
Keep it off of the reservation just like we recommended you should have done 50 years ago with the I-10. But politics were more important then I guess. If you want commerce and development to follow, you'll have to go around (the reservation) and use the undeveloped ARIZONA STATE TRUST LAND which will be much more economical over the long term. You must also consider that the Queen Creek/San Tan Valley corridor should be a priority since they are already starving for some relief from sorely unplanned traffic management. The			Thank you for your comment and participation in this study.

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railroad is already there and there is no question that the opportunities for future economic improvements go through STV than through the reservation. The ONLY way it makes any sense to replicate the I-10 route would be if the reservation were going to pay for it, period!			
9/8/15	Christian Vesper	Tucson Hispanic Chamber of Commerce	
I approve of this project.			Thank you for your comment and participation in this study.
9/8/15	Robert Nemitz		
I think this would be a good thing for the region, under the circumstances that it's high-speed rail that can go 200 Mph plus. It would certainly open up easier access to Jobs and recreational events such as the pro sports teams if one could get from Phoenix to Tucson in less than 45 min.			Thank you for your comment and participation in this study. The technology for this project has not been defined. The assumption used in the analysis was for a maximum speed of 125 mph, but it would be possible to operate at a higher speed under the right conditions.
9/8/15	Stephen Warner		
To whom it may concern, With Tucson and Phoenix continuing to grow as much as they are, this is a much needed investment. I am a student at the University of Arizona and currently live in the Red Rock Village community off of I-10. My fiancé works for the city of Casa Grande which is why we live out here. Having such a train would reduce traffic along I-10 dramatically and make it a safer stretch of highway to travel. Since there are so many people who do commute between Tucson and Phoenix it would greatly reduce the amount of cars on the road, and would reduce the need to expand I-10 any more than it currently is. Also, this is an opportunity for Arizona to make some revenue for our roads and highways. Finally, I just want to add that if a rail line like this existed in Arizona, I would definitely use it to travel between Tucson and Phoenix. Thank you for your time and your efforts on this project, it looks spectacular!			Thank you for your comment and participation in this study.
9/8/15	Nathan Hall		
As someone who travels from Tucson to Phoenix often, the need for passenger rail between the two cities is becoming increasingly needed. Please make this a priority.			Thank you for your comment and participation in this study.
9/8/15	Cindy Lutz		
About time... Can you imagine how much auto traffic will be reduced? Less gas emissions, accidents. Can't wait for this to happen. Hope I can ride it in my lifetime...			Thank you for your comment and participation in this study. The anticipated reduction in vehicle miles traveled resulting

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			from implementing mass transit in the region would be expected to result in a reduction in vehicle emissions.
9/8/15	Lisa & Larry Gould		
We are in favor of this project moving forward. However, confused it would begin in Eloy? Why not Marana? Plenty of Land here! Thank you and looking forward to hearing more.			Thank you for your comment and participation in this study. The project would extend from Tucson to Phoenix. A potential phase of this project is for a local train (commuter service) between Tucson and Marana. Project phasing will depend on funding and logical termini.
9/8/15	Barbara Murphy		
For it to be functional why can't it be like ferry service and take your car too?			The exact form of operation has not yet been decided, though it would be unusual for a commuter and relatively short intercity service to accommodate personal vehicles. The emphasis would more likely be on strengthening the availability of travel options at the destination.
9/8/15	Christina Patriarca		
Yes, Hi, I would like some clarification/explanation of a few things: 1) Why do we need the proposed rail line to go from TIA to Sky Harbor? Do you expect significant amount of travel between the two airports? 2) If there Is room for a light rail line, then why not just add a few more highway lanes so people can use their preferred mode of transportation (car) and designate one lane for semi trucks only? Wouldn't this be a more cost effective solution? Did you study this or compare to existing study? Ask anyone who travels I-10, and they will say just having 3 lanes makes that drive so much better and safer. 3) Will this be built at Pima County construction rate speed or Maricopa construction rate speed? 4.) Most importantly, who pays for this, and how much will taxes need to be increased? This should be the first sentence in your proposal.			1) The proposed connections to TUS and Sky Harbor (and Phoenix-Mesa Gateway) airports are an opportunity to link the major airports to provide employment and passenger access to each. Each airport is a current or planned major employment center as well as a travel port. 2) The proposed type of service is closer to a heavy rail system and would offer an alternative to travel on the freeway. The public and agency response over the course of the project has been favorable to developing another way to get between the two major metropolitan areas. The analysis included consideration of the growth in the study area over the next 30 years and it assumes I-10 would be widened to four lanes in each direction and another North-South Corridor roadway would be built in eastern Pinal County. Even with those improvements, the corridor from Tucson to Phoenix is forecast to not be able to handle the demand for travel, so an alternative system was evaluated. 3) Construction rates are usually defined by the

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			availability of funds for the projects. 4) Funding is a major consideration. The funding program has not been defined for this project, but would most likely entail various forms of funding including federal and local public revenues, private funding from those who would benefit from the new system, or a combination of both private and public funding.
9/8/15	Lisa See		
I would be able to go to Phoenix to see a play or go to a Museum and, also, to be able to fly out of Sky Harbor without having to drive. Driving more than an hour or so is becoming difficult for me and I can't always get a ride.			Thank you for your comment and participation in this study.
9/8/15	Janine Wier		
After reviewing each route, the most logical seems to be the yellow route. It goes through areas that have recently developed but people still need to drive out of the way to get into Phoenix or Tucson, not to mention other towns such as Mesa. This route also seems to run near both the Mesa Gateway airport and Sky Harbor, which can be a huge incentive for revenue since tourist will have an option other than rental cars or taxis. For the working man in the outlying areas, this route is most appealing.			Thank you for your comment and participation in this study. The points you mentioned were some of the criteria applied in identifying the preferred corridor.
9/8/15	Kerry Swindle		
This plan is a great idea and needs to be done. Can't wait to relax on a trip to Phx instead of doing that boring drive.			Thank you for your comment and participation in this study.
9/9/15	Leigh Ayn Scott		
Rail between Tucson & Phoenix makes more sense than adding routes to bus system that is on strike!			Thank you for your comment and participation in this study.
9/9/15	Paula Arnquist		
As a Tucson resident who works for a statewide organization, I would use the passenger rail up to 3 times a month. My use would be for both personal and work purposes. Route preference - my only preference is that I am able to get easily to downtown Phoenix locations as well as easily to Sky Harbor Airport. Fewer transfers are especially important for airport travel because it makes it easier to carry luggage. For the economy and small business owners in Tucson, I would like to see easy access to 4th Ave. and downtown Tucson. Perhaps we			The preferred corridor would serve both Phoenix and Sky Harbor with both local and express trains. The latter would offer fewer stops. Access to 4th Avenue in Tucson would be available from the proposed Historic Depot station downtown by means of the Sun Link streetcar.

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could inspire some of that Phoenix money to travel down here. Thank you. Mostly, let's just build it and then we can expand to more riders after it is built!			
9/9/15	Terrel L. Pochert		
Where is the connection with The City of Maricopa and the Amtrak connection? Leaving the City of Maricopa out of any future plan is a major oversight. Being able to connect Phoenix to the Amtrak in the City of Maricopa should be on top of the list. Now that the City of Maricopa is going to build a new Amtrak station, the ADOT must consider this.			The alternative through the City of Maricopa was eliminated because it traveled over a longer distance than other alternatives, served fewer population centers, and had potential impacts on GRIC lands. Also, the public preference for this alternative was very low. Nothing proposed in this study impacts the construction of a new Amtrak station or the communities served by Amtrak.
9/9/15	Kenneth Dohrman		
Phoenix to Tucson passenger rail is an idea whose time has not yet come, and if we are lucky, will never come. What are passengers supposed to do upon reaching Tucson? Take a bus? Rent a car? Catch a taxi? The fact is there is no "downtown" Tucson other than the University. Any envisioned savings in commute time will prove to be illusionary because of the need to switch transportation modes. With the increasing development of automated highway drivable cars, this will in the future become the preferred method of travel between Phoenix and Tucson. The proposed expenditure of money on a rail system would be better spent on improving Interstate 10 between the two cities with features that will facilitate automated driving.			The rail system is proposed as an alternative to the personal vehicle and the freeway. Passenger rail would offer an alternative to vehicular travel between Tucson and Phoenix. Upon arrival at a destination, train passengers would depend on good local access services (i.e., taxi, bus, light rail, Uber, bike share, etc.) much like what happens when passengers arrive at an airport.
9/9/15	sirfrednes@...		
The nearest Amtrak station is in Maricopa; will there be any considerations to adding a Phoenix to Amtrak segment?			A Maricopa to Phoenix segment was studied in the Red Corridor Alternative; however, it was eliminated because this route from Tucson to Phoenix traveled over a longer distance than other alternatives, served fewer population centers, and had potential impacts on GRIC lands. Also, the public preference for this alternative was very low.
9/9/15	William Cain		
If you're going to invest in infrastructure, go with modern technology. If it's cheaper or more time conservative to drive between the cities, and people have to worry about transportation			The technology for the rail connection between Tucson and Phoenix has not been selected. A 125-mph train was used as a

Date Submitted	Commenter	Affiliation	Response
once they arrive, most people will still opt for their personal vehicles. There is absolutely NO reason to build a train that does the trip in the time a car can do it. It needs to be twice, or three times, as fast to make it appealing. A maglev or other high-speed train is forward looking and will encourage use. Don't invest in out of date methods.			conservative basis for estimating travel times and ridership. Results suggest there is significant demand even with the assumed technology. Trains traveling at 125 mph can make the trip in less time than a car, but as you note, it does require an additional connection at the destination end of the trip.
9/9/15	Alicia Holt		
I think a train from Phoenix to Tucson is a FABULOUS idea. I personally would only use it once a year or less, but I love the idea!			Thank you for your comment and participation in this study.
9/9/15	Tieg Zaharia		
Looking forward to it!			Thank you for your comment and participation in this study.
9/9/15	Mark Bice		
I think the corridor that includes all 3 airports and trying to pick up most (or a better fit through the middle of more of the existing/future population centers) of the population corridors means that the Orange plan has the best hope of serving the most riders in both directions. And I do like the idea of mixed service including express and local service for the pickup/drop-off of smaller or more localized population clusters.			Because it serves the downtown area of most East Valley communities, the Yellow Corridor Alternative is better able to access the main population centers than the Orange Corridor Alternative. Both alternatives propose connections to serve all three airports in the later phases of project development. The blend of local and express service is intended to offer both accessibility to local stations and shorter travel time for those travelling longer distances.
9/9/15	Benjamin F. Nead		
1. BUILD IT! We don't need another silly highway (i.e.: I-11) cutting through virgin or near virgin desert. The United States needs to rebuild modern passenger rail systems that used to serve the country almost a century ago, until we decided not to fund them any longer and let them deteriorate. The idea that we actually fly passenger jet aircraft on 200 and 300 mile hops in this country is completely insane and wasteful. The rest of the civilized world uses high-speed rail for medium-length passenger hauling. We need to rejoin the rest of the civilized world in this regard. The petroleum industry will fight it. They sell lots of automotive gasoline and aviation jet fuel. They won't have a way to make money off of electric high-speed rail. They'll hate it. Don't cave in to this special interest group. 2. Build it next to I-10. Of the three proposed routes shown on this map . . . http://www.azdot.gov/images/default-source/passengerrail/finalalternatives_commoncorridors_2013june27.jpg?sfvrsn=2 . . . the			The Arizona Passenger Rail Corridor Study was designed to identify a viable corridor to implement passenger rail services. The type of service was assumed to operate at up to 125 mph or what is known as "higher speed rail" not true high-speed rail (over 150 mph). The distances between the urbanized development in the Phoenix and Tucson metro areas is only about 75 miles and is not by itself a good candidate for the highest level of performance. Nothing precludes ADOT and FRA from evaluating high-speed rail during subsequent studies if engineering feasibility, costs, public interest, increased ridership, or other factors warrant consideration of a high-

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so-called "Green Alternative" makes the most sense. And it really is the greenest, since it's not cutting through largely undeveloped land. It also is the most direct path between the two major metro areas, getting "from point A to point B" the quickest. If it really is going to be high-speed rail (i.e.: 150mph or greater,) the straight-line approach is best. 3. And yeah . . . HIGH SPEED RAIL! Europe, Japan, China . . . the list goes on. Developed nations everywhere are routinely building trains for human travel that cross the 200 mph mark. Everywhere, of course, but here in "uh-MUR-ik-uh"! Don't build some wimpy-ass 60mph train and force riders into taking oddball detours, which brings me to my next point . . . 4. Let Phoenix build out their own light rail infrastructure to service their east valley and areas to the south and east of central Phoenix. Don't turn a Tucson-to-Phoenix passenger rail system into a "sorta, kinda" project that forces travelers to go all over Phoenix to get to the airport. I don't see maps with squiggly multi-colored lines at the opposite end - in Tucson - going all over that metro area. And, as a Tucson resident, I wouldn't want that either. Keep the path direct: airport to airport. Leave it up to the individual cities to build out their own light metro light rail or buses. Phoenix already has a good head start in that regard . . . lots of light rail already. Tucson lags behind and needs to expand its Modern Streetcar line to head down to the airport and buy a whole bunch of electric buses. But that's another story. 5. Don't share the passenger rail with existing freight lines! I can't emphasize this enough. This is why Amtrak is such an epic failure. If you happen to heading to California by rail and get behind a freight train that's unloading, you might have to wait for an entire day (18 hours or longer . . . and I'm not exaggerating here) to continue on the route. That's insane! No other rail system on the entire planet that calls itself modern works this way. Build the new passenger rail next to the freight lines but DON'T EVER share the tracks between the two entities. . . EVER!!!! (Hint: build the high-speed line with different track format/spacing, so the lines can't ever be shared. Problem solved!) 6. We really need a true high-speed rail system connecting Tucson-to-Phoenix. To summarize: make it fast (150mph or above,) make it direct (airport to airport, along I-10, with no Phoenix sightseeing routes) and make it autonomous (no sharing the rails with freight rail lines.) But, above all, MAKE IT!			speed system. Regarding the selection of a preferred alternative, two main considerations are speed and ridership. The Green Corridor Alternative shortens the travel time between Phoenix and Tucson by a few minutes, but considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
9/10/15	James S. Nabozny		
This is a must do, for our state!!! A rail system of this kind, between our two cities should have been in place already a hundred years ago!!! This is important to both cities. The project has to be undertaken now. Enough time has gone by. Let's get this rail in once and for all!!!!!! The time is now. Do it!!			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
9/10/15	Merrill Darcey		
Please for the sake of ridership, establish the GREEN Study. The green makes a lot more sense. Most riders want a convenience to the airports-- Tucson and Phoenix and the numerous sporting venues. The populations of Casa Grande and Awahtukee would make ridership numbers and support feasibility. Offer a boarding station at Wild Horse Pass and Gila River Community will give you all the right of ways. The populations of Queen Creek and San Tan are too dependent on water, which will impede their growth. The route has to offer convenience to the major population centers. Lodging also matters for tourists, another reason for Wild Horse, and Casa Grande. It's time to step up to the plate with the Indians, they want this as well. I do not support the other chosen routes and will protest them through the multiple channels.			While the Green Alternative between Tucson and Phoenix offered the fastest trip of the top three alternatives originally considered, it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. The Yellow and Orange corridor alternatives have better access to existing population centers in Gilbert, Mesa, Tempe and other East Valley communities.
9/10/15	Wayne Kielsmeier		
Gentlemen & Ladies, This is a long overdue program and I have lived in Tucson since 1970 and certainly endorse this program, as it will open up traveling to Phoenix for hard to get airline connections out of Tucson, and hopefully at some point you could take it and travel with your vehicle like they do in Europe.			Thank you for your comment and participation in this study.
9/10/15	Alexander Benezra		
First and foremost, I cannot wait until this project is completed. It is long overdue and would provide countless benefits to Phoenix, Tucson, and all areas in between. Allowing people to commute to either city from each other or from Pinal County would do wonders for our state and numerous local economies. As a person who commuted from Phoenix to Tucson for 18 months, this rail line would have made my life infinitely easier during that time period; I may still be working in Tucson. Although the green alternative would have been the most beneficial for me personally as an Ahwatukee Foothills resident, the yellow alternative (and to a lesser extent orange) would appear to grant the greatest benefit. Not only would they connect to Gateway airport and allow for connections between it and Sky Harbor, they would allow residents of Coolidge, Florence, and San Tan Valley to commute to either Phoenix or Tucson. As three large population centers of Pinal County, this would make the project reap the fullest benefits of a commuter train line. Although the green line goes through Casa Grande, it seems to be merely an express line between Phoenix and Tucson.			Thank you for your comment and participation in this study. You captured many of the points identified in the analysis that contributed to the selection of a preferred alternative.

Date Submitted	Commenter	Affiliation	Response
9/10/15	Benjamin Shockley		
I am for the Yellow Alternate path of the train.			Thank you for your comment and participation in this study.
9/10/15	Diana Calica		
A high-speed train between Phoenix and Tucson is long overdue. A fast commute between the Phoenix and Tucson areas would be of economic benefit to both cities. It would allow for an increase in tourism in both directions. It would make it easier for Arizonans to commute between both cities for work or pleasure. It would facilitate interactions between businesses, medical and legal entities and universities. A commuter train which includes stops at towns along the way would increase the prosperity of those towns, as well, for the same reasons. A fast speed train would bring our communities together in a positive way not provided by highway travel.			Thank you for your comment and participation in this study.
9/10/15	Arnold Calica		
This train link between Tucson and Phoenix would make both cities more prosperous.			Thank you for your comment and participation in this study.
9/11/15	Tice Suplee	Audubon Arizona	
I support the idea of a passenger rail service between Phoenix and Tucson in concept. I am concerned about the vagueness of the maps, particularly the "Common Corridor" areas depicted to the west of Phoenix. Exactly where are those routes? I would strongly oppose the loop 202 as a common corridor as an example. How does this concept fit with the I-11 inter-modal corridor project? Can the environmental analysis be comprehensive to include both? Some species of conservation concern in the corridor include Burrowing Owl, Kit Fox, Sonoran Desert Tortoise. Include wildlife connectivity corridors in the design. Reference the Pima County Sonoran Desert Conservation Plan.			The Common Corridor areas reaching west of downtown Phoenix represent conceptual future connections out to Buckeye and Surprise. These mile-wide corridors are centered on existing railroad rights-of-way; no specific alignment has been identified. The Common Corridors are shown to demonstrate that in addition to linking major cities in the Tucson to Phoenix corridor, passenger rail service between major cities like Tucson and Phoenix can connect to points beyond the downtown areas via existing infrastructure. However, no environmental analysis was conducted for the Common Corridors (referred to as “Rail Connections” in the FEIS) west of Phoenix and south of Tucson in the Draft Tier 1 EIS; these corridors would be subject to a separate NEPA analysis, including public input on corridor alternatives and specific alignments. The I-11 corridor currently under study was not used in identifying future connections, although it may be considered in future studies. The Purpose and Need for the I-11 study and the Passenger Rail Study are separate

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			and unrelated, and their environmental investigations are being led by separate federal agencies. FRA's preferred and selected alternative for passenger rail, the Yellow Corridor Alternative, was noted in AGFD's comments as the corridor that would have fewer potential adverse impacts to wildlife and wildlife habitat. Specific recommendations for providing structures to facilitate wildlife crossing would be made during subsequent project-specific analysis. The Pima County Sonoran Desert Conservation Plan is referenced on Page 5-120 of the Draft Tier 1 EIS.
9/12/15	Tina Hammerton		
The Orange Alternative would allow park and ride options to work for my husband and I, who commute from Apache Junction to Tempe. We would welcome this opportunity to reduce our impact on the environment. Go Orange!			Thank you for your comment and participation in this study. Based on the analysis completed, the Yellow Corridor Alternative was chosen as the preferred alternative because, considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be a more cost efficient and a better performing passenger rail system compared to the other alternatives.
9/12/15	Julie & Gideon Aboud		
We are writing to express our strong disagreement with the Yellow Alignment. We live at the Reserves at Fulton Ranch – which is off Arizona Avenue/Lake Dr. The train tracks are 4 houses behind our new house. We just moved into this new house a couple months ago after having our house on Redwood Lane torn down by ADOT for the Pecos Freeway. Now we find out ADOT wants to put a bullet train right next to our new house. When we bought this house, we were told by Fulton that those tracks only carried a 4 car local freight train that only went by once a day. I was horrified when I read in the paper the other day that it’s the preferred alignment for the train to Tucson. There are new homes all around us and even more expensive homes on the other side of the tracks. They don’t even have a wall blocking them. This train will significantly affect our property values and cause more crime and pollution in our neighborhood. We most certainly are against this alignment.			The Yellow Corridor Alternative does not pass through Chandler. The tracks you refer to are located within the Purple Alternative, which was eliminated from further study during the Alternatives Analysis process. Heading north from Coolidge, the Yellow Corridor Alternative passes through Queen Creek and turns northwest through Gilbert before heading north again into Mesa.

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9/12/15	Clifford Anderson		
Please consider the use of bicycles in conjunction with railroad ridership as part of this plan, including portage of bicycles on the railway cars and connection to safe bicycle routes at rail stops.			Thank you for the suggestion. Each station location will need to provide appropriate services to allow travelers to complete their trips, and the integration of bicycle portage and bicycle routes may be an elements of those services.
9/14/15	John Murphy		
I do travel this corridor frequently and to be truthful there is no advantage to having a railway corridor for human travel. There are many bus routes already and I would rather see an increase in the number of lanes. I don't think a railway will help at all with congestion. Same for the Phoenix to Flagstaff corridor. I would not foresee with the increase in relocations and visitors that this would help either.			Bus routes were studied as part of the project. Their main drawback is they are subject to the same limitations as cars in congested conditions and cannot travel at as a high a speed as the proposed train. The passenger rail study assumed that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built. Congestion levels are still expected to increase. The train serves as an alternative and a complement to I-10 and would allow riders to make the trip in less time without experiencing congestion.
9/14/15	Miranda Fisher		
I am a Phoenix native and have long wondered why we don't have a major public transit system connecting Tucson and Phoenix. I am in full support of this project and I believe constructing this railway would be an asset to both Phoenix and Tucson as their populations grow in the coming decades. In addition to providing convenience for travelers, this railway would have environmental benefits as fewer drivers would be on the road, resulting in reduced emissions and cleaner air. Cutting oil consumption also has an impact on energy independence for the country as a whole. This railway would put Arizona in a good place to deal with growth in the future. I have 100% support for the project and am willing to pay higher taxes for this project to be successful. Feel free to contact me if necessary. I'm happy to voice my support in whatever forums will be most helpful to push this project forward!!			Thank you for your comment and participation in this study.
9/14/15	Robert Dixon		
Do it!			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
9/14/15	Jonathon McCommack		
The idea of rail is nice but seems to not be that big of a help. I-10 wouldn't be bad if ADOT would finish it to have 6 lanes the entire distance between Chandler and Marana. It really is hard to understand why that's taking so long to happen. We're stuck with unreasonable bottlenecks between. On Sundays the four-lane section between Casa Grande and Chandler is ridiculous and always packed. When is that going to be finished to 6 lanes?			The passenger rail study assumed that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built. Congestion levels are still expected to increase. The train serves as an alternative and a complement to I-10 and would allow riders to make the trip in less time without experiencing congestion. Widening I-10 depends on many factors including funding, mitigating environmental impacts, and negotiating right-of-way with land owners, including the Gila River Indian Community.
9/14/15	Eric Montag		
We fully support the addition of rail transportation from Phoenix to Tucson and as a resident of Gilbert, would like to see the following: -final route choice to come through the southeast valley with train stations in Gilbert -regular rail service into downtown Phoenix from the southeast valley (even though light rail is great, it is a drive to the stations and need a faster alternative) this can also be commuter rail to Tempe/Phoenix employment centers -Need a good alternative to the growing traffic on the freeways -Example to the southwestern states that is this a viable transportation alternative and that people will use it Thank you for the consideration and if you need to implement in phases, would like to see the commuter lines from the southeast valley to Phoenix as the initial one.			Thank you for your comment and participation in this study. The proposed Preferred Alternative is the Yellow Corridor Alternative, which passes through Gilbert and would provide access to Phoenix and Tempe. Preliminary studies evaluating ridership identified that two stations in Gilbert may be warranted, but station locations would be evaluated in more detail in future studies.
9/14/15	Brad Freed		
I saw that you were looking for feedback on the railway between Phoenix and Tucson. What a great idea and way to boost our local economy! It would be great for U of A and Arizona State students as well as commuters for work. Funding should be started by donations. With all of the rich people we have, that would be a no brainer. Start a gofundme or whatever works.			Thank you for your comment and the suggestion.
9/14/15	Zeljko Bozic		
I'm not frequent traveler to Phoenix, but I do travel periodically for non-business reasons. I think fast rail would be beneficial to people like me as well as people traveling more often. Off course this would have to be affordable enough that I would be able to get a cab to make it to my final destination and back and not having to spend more than I would on gas, driving. To drive to PHX and back is about a tank of gas (~$35). If it was a slow train with more than 2			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
stops, I would not even conceder using it.			
9/14/15	shira.liu@...		
This rail line would be wonderful. I hope that Arizona leaders can dig up the political will to see it happen.			Thank you for your comment and participation in this study.
9/14/15	Tara White		
I have been a resident since before Santan Valley existed and the growing pains of this area are predominant when viewing the traffic on a daily commute into Tempe or Phoenix and the fastly growing communities started or planned for future growth. It has especially become apparent within the last two years that this area has no plans and is struggling to upkeep the hefty demands of this growth. I agree with this in theory and as I understand there is no or limited funding to make this a reality. The city of Santan Valley and Queen Creek are in need of this proposed rail line desperately. The orange or yellow routes would suffice for these communities as well as Florence and Tucson. Funding of course is the tricky part as I feel the commuters within these communities are struggling currently and the funding through the cities doesn't provide adequate funding to support the roads they are allocated for as it is. Solar energy, on the other hand, is becoming more popular and is a money making industry at this time. One could ask for funding from such an industry for the savings in marketing costs alone. If you place ads for solar energy in the rail then commuters and residents for several cities would see said ads and save the solar companies a small fortune in marketing if done correctly. If you ask me it is the industry that can economically afford it and had the most to gain by a future collaboration and maybe even run the rail in alternative energy sources. The economic footprint and such care for environmental details may attract other companies within the alternative energy industry for marketing as well. Best of luck and I will watch for great news as I am unable to attend city meetings.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
9/14/15	smp733@...		
So is the green alternative still being considered? If one clicks on the map image it shows the green one. If one clicks on the title of the map it does not show the green one.			The Green Alternative did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. It was shown only as part of the process that led to the final two alternatives addressed in the Tier 1 EIS.
9/14/15	Dan Haney		
We prefer the orange corridor with the rail coinciding with the north-south proposed freeway.			The Yellow Corridor Alternative is the preferred corridor, but there is an option to include the use the Orange Corridor Alternative for segments within Pinal County in future studies, as shown in Figure 7-1 of the Tier 1 EIS.
9/14/15	Maia Ingram		
Rail connection between Tucson and Phoenix would be a huge boost to the local economies of both cities and would clearly be widely utilized. This is a wonderful step to move our region forward.			Thank you for your comment and participation in this study.
9/14/15	Mike		
I am in favor of the yellow alternative and concur with the findings of the Draft EIS.			Thank you for your comment and participation in this study.
9/14/15	barvel4@...		
With the number of people who need transportation to either work or visit the correctional facilities in Eloy and Florence, I think a spur line built at the time of the initial construction would be good. Numerous vehicles carpool up there daily. It is a pain in the ***!			The detailed analysis of specific connections would be undertaken in a later phase of study.
9/14/15	nkrop23@...		
The train to Tucson is dumb! Make a train to Vegas. Don't waste the money for Tucson.			Thank you for your comment and participation in this study.
9/14/15	Barney Brenner		
Please go with the no-build option. It is utter foolishness to spend hundreds of millions of dollars constructing a rail corridor between Tucson and Phoenix when there¹s already an excellent alternative which is used by many tens of thousands of people every day using their own money, not that of beleaguered citizens. On this existing route, known as Interstate 10,			The financing for this project is not yet defined. If there is no funding source, it will not be built. The objective of the project is to begin to identify how travel can occur in the Phoenix-Tucson Corridor when congestion grows on I-10. The

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four people in an average car can make the trip in under two hours for around $2.50 each in gas. Don¹t try to fix a problem that doesn¹t exist. Neither Arizona nor the federal government is rolling in dough. They're both in debt. So why on earth is this colossal waste of resources even being considered? The statistics used to promote rail are always greatly embellished in its favor including stats on ridership, cost to build and cost to operate. The cost benefit is not there. Drive a railroad stake through the heart of this project.			passenger rail study assumed that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built. Congestion levels are still expected to increase. The train serves as an alternative and a complement to I-10 and would allow riders to make the trip in less time without experiencing congestion. More carpooling would contribute to better operation of I-10, but that has not been the historic practice of many who use it.
9/14/15	Patrick Ritchie		
Yes, great idea!			Thank you for your comment and participation in this study.
9/14/15	Mike Shelton	Yuma City Councilmember-Elect	
Hello, I live in Yuma and will be joining the Yuma City Council in January. I'm also a former Phoenix resident. I see no compelling need for rail service between Phoenix and Tucson and wonder where the demand is coming from to justify talking about this project. It's a 90-minute drive for goodness sake. However, I could see reopening the main Phoenix railroad station closed in 1995 based on the principle a major city should have a general passenger railway. Wouldn't hurt either to look at improving the passenger rail in Yuma. Forcing people to stand outside in the elements late at night waiting for a train isn't something I'd recommend. No inside quarters, just a bench outside by the track. Why don't you look at that instead?			The passenger rail study assumed that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built. Congestion levels are still expected to increase. Travel times on I-10 are expected to lengthen considerably in the future to well over three hours. The train serves as an alternative and a complement to I-10 and would allow riders to make the trip in less time without experiencing congestion. Passenger rail service in Yuma is operated by Amtrak; ADOT has no jurisdiction over that service.
9/14/15	Jeremy Sarnataro		
I am against the rail line. There are plenty of easy ways to travel via shuttle or many bus lines for commuters. I-10 is very easy to commute to and from Phoenix and Tucson as well. I also feel that both cities are reliant on having a vehicle for transportation, which makes taking a train impractical.			Bus routes were studied as part of the project. Their main drawback is they are subject to the same limitations as cars in congested conditions and cannot travel at as high a speed as the proposed train. The passenger rail study assumed that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built. Congestion levels are still expected to increase. Travel times on I-10 are expected to lengthen considerably in the future to well over three hours. The train serves as an alternative and a

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			complement to I-10 and would allow riders to make the trip in less time without experiencing congestion.
9/14/15	Susan Weiss		
I am in favor of the passenger rail line connecting Phoenix and Tucson.			Thank you for your comment and participation in this study.
9/14/15	Starr Lucero		
I think instead of expanding to Tucson. You should expand out towards San Tan Valley because there is always heavy traffic to get places and there is no other way to get into town other than drive. We don't have buses and taxis are way too expensive. Most of us drive into Phoenix for work and I think it would cut down a lot on pollution.			San Tan Valley is served directly by the Yellow Corridor Alternative, which is the alternative FRA selected for subsequent studies.
9/14/15	lange9@...		
Talking about BILLIONS to build a new rail which is fine. However we had trains to Tucson and Prescott, Flagstaff etc. which have been decommissioned and the infrastructure is still in place. If that doesn¹t beat all by-passed Phoenix with Amtrak so if you want to go to Chicago you¹re bussed to Flag and if you want to go to Tucson, LA or DC you are bused to Maricopa Yes a train to Tucson would be great, so would some common sense.			Thank you for your comment and participation in this study.
9/14/15	Tim Lank		
1. There is currently no Amtrak connection in Phoenix. The closest station is Maricopa. Under this proposal, the nearest connection to Phoenix for Amtrak would be Eloy. This seems counterproductive, especially after viewing all the Amtrak trains in the video. There needs to be a close and convenient connection to Amtrak if Amtrak will no longer go thru Phoenix. 2. A major deficiency of many train systems in this country is the lack of inexpensive, long-term parking around each station. Most people will need a car to get to the train. A matter of convenience which would increase ridership. 3. Diesel locomotives are not environmentally sound compared to overhead high voltage catenary electrified systems. What is the cost delta? Many old roads in the east are overhead electrified, in addition to the BMLP RR here in AZ.			1. The purpose of the passenger rail system in the Tier 1 EIS is to link Tucson and Phoenix and to provide commuter service within the Phoenix and Tucson metro areas. Amtrak can be accessed in Tucson from the proposed passenger rail service. 2. Though station locations and parking have not been specifically identified in this analysis, a more detailed subsequent environmental study would evaluate proposed parking facilities appropriate for the train service. 3. The technology for this service has not been identified. A diesel-electric train was used as a conservative means for estimating travel times and ridership. In later studies, train technology would be part of the recommendation.

Date Submitted	Commenter	Affiliation	Response
9/14/15	Jamie Lynn McClay		
Hi there. I would like to see all the alternative lines built or utilizing current rail lines as well as add an additional "blue" line to the Westgate area. We currently have two professional sports teams here that I know those that live in the Tucson area as well as the Queen Creek and San Tan areas commute to. AZ is so unfortunately behind the times of other cities that it compares to in the way of rail transportation (regional, light rail and subway). We should be looking to build as current infrastructure is being refurbished or as new additions are being started (202 east/west on the south side for example). We should also look at Yuma as well as Flagstaff (and even north to Page), even west to Lake HC and Parker as well as seeing if we could join in a co-op with Nevada and Utah to share the cost to hit areas right over the border to those states such as Vegas and Lake Powell. This will open tourism to this area, a more viable option as well as promoting people to "get out" more and explore the state. The one thing I miss about living east is the lack of this type of transportation. I don't even take the light rail currently because where I live, I have to drive 20 minutes just to park at BH and 19th Ave. I miss the options of taking a train like I used to from DC to NYC and really wish we had something like this. Hop to it! I'm sure I'll likely be dead before suitable options will likely occur but at least I can have a small smile as I take the sky train every day to and from work from the employee lot.			Thank you for your comment and participation in this study. The Arizona Passenger Rail Corridor Study was identified as an evaluation of corridor level passenger rail opportunities between downtown Phoenix and downtown Tucson. The Notice of Intent submitted in 2011 as provided for in the National Environmental Policy Act (NEPA) defined that corridor as the basis for the Tier 1 Environmental Impact Statement (EIS). While general consideration has been given to other segments beyond the defined study limits, they have not been analyzed to address the requirements of NEPA. At the same time, the concept of extending the line or connecting it to another mode (e.g., light rail) to reach key destinations in the Phoenix metropolitan area is not precluded by the Tier 1 EIS. Regarding destinations outside of the Tucson to Phoenix corridor, the Southwest Multi-State Rail Planning Study completed by the Federal Railroad Administration looked, at a very high level, at the possibilities of a high-speed rail service linking the main Arizona metro areas with destinations in California and Nevada. That report is available on the FRA website at https://www.fra.dot.gov/eLib/Details/L17109.
9/14/15	Wayne Balmer		
Hello and thank you for requesting comments on this project. I will be unable to attend your meetings, and as a result, I am submitting my comments in writing. In my opinion the Yellow Corridor is the most viable option for the following reasons: • It primarily uses existing right of way, although it is possible some additional land may be required when the final alignment is completed. This eliminates the costs, time and the EIS and other paperwork needed to acquire the right of way for the Orange Corridor. Much of the Orange Corridor goes through currently undeveloped and mostly native Sonoran desert areas so the ROW acquisition could be both costly and time consuming, then there would be additional costs to prepare mitigate existing conditions identified in the EIS and prepare the ROW for construction. The railroad may be difficult to negotiate with to obtain use of their property, but it would still be easier			Thank you for your comment and participation in this study. Regarding rights-of-way, the Yellow Corridor Alternative follows the Union Pacific Railroad right-of-way (ROW), but does not necessarily use it. The Tier 1 EIS does not designate a specific alignment, only a corridor that is preferred over others. Even if the alignment ultimately follows the UPRR, the property over which it would run belongs to UP with all the rights and responsibilities that go with that. The Orange Corridor Alternative, also only a corridor at this stage, would more likely be able to benefit from state ROW along freeways

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than having to deal with the paperwork and all the property owners involved to purchase their individual properties • It passes through existing population centers, while the Orange Corridor generally does not. This would be extremely beneficial in that it would allow the system to take advantage of the existing transportation, land use infrastructure and amenities in these communities to facilitate passenger use. It would also place stations at locations that could promote infill type development that would be more “transit friendly” and help make more efficient use of the infrastructure available in these communities. Stations in existing communities would also help promote travel between portions of the line (i.e. Mesa to Queen Creek) which would help increase ridership. It would also give local communities a reason to lend their political support to the project come election time to approve the funding. • Time needed for project completion. The Yellow Corridor could be completed quicker given that there is minimal land acquisition involved and much of the infrastructure required for the Corridor is already in place as a result of the actions in the communities adjacent to the railroad. In addition, many potential problems, such as flooding, have already been addressed. The Orange Corridor ROW is also dependent on the funding and construction of the North/South Freeway. As a result, both projects will need to be funded in order for the Orange Corridor to be constructed - and what are the chances of that happening? I believe there are three additional issues that must be discussed regarding the potential for completion of this project: 1. How would the total cost and cost/benefit for this project compare with the costs and cost/benefits for the construction of additional freeway lanes or new freeways? My guess is that the Yellow Corridor would have a much more positive financial outlook than the Orange Corridor – but how would they compare to the cost and cost/benefit of the South Mountain bypass freeway? 2. Where would this project rank in terms of need, as compared with all the other proposed or planned transportation improvements in the ADOT budget? Would it be number 1 or number 354, given the cost of this project and need for other projects? If it has a low ranking considering both cost and cost/benefit compared with other projects is it likely to ever be funded? 3. Given that ADOT's construction funding budget is limited and the needs are many, it is likely some form of supplemental funding (an Arizona Prop 400) would be needed to complete this and other large-scale transportation projects. How likely is it this project will have sufficient political support to be funded under that type of program when competing with other high profile projects (and likely more politically popular) such as Interstate 11 and the North-South Freeway that could also be proposed for funding? Would Pinal County rather have the Yellow Corridor or the North-South Freeway when push comes to shove? Depending on the answers to those three questions, as well as the result of the upcoming public hearings, if the Yellow			(e.g., a future North-South Corridor) and, therefore, also benefit from reduced ROW costs. The Yellow Corridor Alternative serves more of the existing population centers and, consequently, generates higher levels of ridership. If the Yellow Corridor Alternative follows the UPRR, it would likely be easier to build and less expensive than the Orange Corridor Alternative. The Tier 1 EIS assumes that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor freeway would be built, so passenger rail would be in addition to freeway construction. The passenger rail project would be built in phases according to available funding and the potential for ridership. The entire cost would not likely be borne all at one time. Pinal County has indicated support for the Yellow Corridor Alternative in the letters submitted on the Tier 1 EIS. After consideration of the analysis and the public and agency input, the preferred and selected alternative is the Yellow Corridor Alternative.

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Corridor is not selected I would recommend defaulting to the "No Build" option so that ADOT staff and resources could be re-prioritized to other projects. Should you have any questions, please feel free to contact me.			
9/14/15	Ben Bethel		
I'd like this to be included in public comments please: As a person who's been civically involved for the past 32 years, with a keen focus on local mass transit, commuter rail, and intercity high-speed rail systems, I am strongly against this proposal. The focus should be on the following segment: * Phoenix, Arizona to Yuma, Arizona to Riverside, California - at speeds of 225 mph. At Riverside, this would connect with the California high-speed rail system, which is under construction currently with the first 140 miles opening within the next 2 1/2 years. * Start from Goodyear airport and use abandoned rail bed to Wellton, Arizona just east of Yuma, then run along current freight right of way past the Imperial Valley, Salton Sea, Coachella, Indio, Palm Springs, and then Riverside. * The Riverside station terminus would enable travelers from Phoenix to get to downtown Los Angeles in just over 2 hours, San Diego in just over 2 hours, Anaheim in under 3 hours, San Francisco in under 6 hours, and Sacramento in just over 6 hours. * Later expand to downtown Phoenix, downtown Tempe, and then to Tucson, Nogales, and Rocky Point. * Connecting to major metro areas is key, rather than Phoenix and Tucson - the distance is too short, and the population of Tucson too small for commuter rail to be effective. * High-speed rail is profitable; commuter rail is not and will have low ridership numbers for decades and continue to require subsidies. * This commuter rail, if built, would have to be grade-separated and start with minimum average speeds of 125 mph... Still it's not a smart move. * Currently there are over 385 daily flights between Phoenix, Yuma, Palm Springs, Ontario, Burbank, LAX, Orange County, and Long Beach airports... during peak season we've hit			The Federal Railroad Administration recently completed a high-level evaluation of high-speed rail from Arizona into California. It considered the routing you propose along with other possible alignments. This Tier 1 EIS is being completed as a follow-up to the Arizona State Rail Plan, which recommended as a first priority the connection by passenger rail of the two largest metropolitan areas in Arizona. This project would link to any efforts to connect into California or other western states. Ridership forecasts suggest that commuter rail and intercity rail could be successful in the large urbanized areas of Arizona. The recommended and selected alternative is the Yellow Corridor Alternative; if funded, this corridor would be the basis of further study to refine the details.

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maximum airlift, causing even advance purchase airfares between metro LA and metro Phoenix to reach $600+ round trip... these airfares dissuade business, dissuade travel, and force conventions and events to go to other cities. High-speed rail would eliminate these airfares and replace them with rail tickets that could be as low as $69 round-trip, if you follow the London to Paris Eurostar pricing models and promotional fares. * By reducing strain on Phoenix Sky Harbor International Airport, you will not reach maximum airlift, extending the airport's life beyond the year 2100 and also opening the airport for more profitable, longer distance flights... hopefully international flights. This also helps to bring more people to metro Phoenix, which then helps small local businesses that depend on having as many visitors as possible to be as profitable as possible. In closing, commuter rail between Phoenix and Tucson is a bad idea, and instead we should be focusing our efforts on Phoenix to Yuma to Riverside (just 27 miles longer than using I-10 to Los Angeles), and the abandoned rail bed is there, ready to be used. Let's focus on faster, profitable transportation solutions. This is happening all across the United States right now, and I'm puzzled at why there's no focus on the development of such a segment between Phoenix and Los Angeles at this time.			
9/14/15	Eileen McCarty		
Hello, I am a Sun City, AZ resident that actually works in central Scottsdale. I have a great job with a prestigious company and that is why I choose to work so far from where I live. I am also a 40 year resident, and I lived in central phoenix for most of my 40 years here, so I know the city streets in Phoenix quite well. I am currently challenged by the train as a car commuter going to and from work. The basic challenge is this, that the City of Phoenix has taken away…prime main streets in central phoenix to employ the train. I have to travel Glendale Ave in order to link up to Grand Ave.to get home to Sun City at night. Because of the ongoing construction, it has been extremely frustrating for me to get over in an easy fashion to I-17 on any rush hour time in the afternoon.			Thank you for your comment and participation in this study. The Tier 1 EIS analysis only evaluated potential corridors that essentially align with existing or proposed transportation corridors. If an alignment parallels the existing UP Railroad tracks, vehicular crossings would likely coincide with existing crossings. Any grade crossings associated with passenger rail would be required to meet FRA standards for safety and many freight rail crossings would be upgraded to achieve that. Roadway crossings would be evaluated further in subsequent project-specific studies.

<table>
<tr><th>Date Submitted</th><th>Commenter</th><th>Affiliation</th><th>Response</th></tr>
<tr><td colspan="3">This has been going on for almost 3 years now, since I have been working in Scottsdale.

My question is this, if anyone having to travel the main city streets in central phoenix now…We are being challenged by the train which essentially has taken over

Major arteries and cars are having to compete with the train. You may think this is no big deal, but we are talking about hundreds of cars at the rush hour time.

Many of us will never take the train or bus…because these modes of transportation don't go out to Scottsdale. Believe me, I looked into all of this several years ago.

In my opinion, the train is basically serving the needs of seniors, students, and folks who cannot afford a car, or can no longer drive a car.

To carve out millions of dollars to serve a smaller rational percent, is what I am having a problem with as well.

Why cannot our current bus system, be enhanced to serve these needs?

My main problem is the route that this train is traveling and how it has disrupted rush hour traffic trying to make it across town.

I appreciate you taking the time, and I truly hope that my concerns are weighed as you continue to plan out the city for the future.</td><td></td></tr>
<tr><td>9/15/15</td><td>Susanna Canizo Schippers</td><td></td><td></td></tr>
<tr><td colspan="3">Dear ADOT, My comments pertain to the need for additional mitigation to address impacts on wildlife movement posed by the new passenger rail system. Page 5-143 of the Draft Tier 1 Environmental Impact Statement states that the passenger rail system "would result in a formidable barrier to wildlife movement by both large and small species." On page 5-144, it states that the passenger rail system would "bisect large intact habitat blocks." As described, these impacts clearly reach the level of a "significant impact." However, the recommended mitigation falls short of addressing such a significant impact. Specific recommendations for providing wildlife crossing structures should be made, with a map showing the location of each crossing. Such crossings could be modified as needed in the future, but a specific commitment is needed to ensure that impacts to wildlife will be addressed in the future. Additionally, the discussion of wildlife corridors in the Indirect and Cumulative Effects section (on page 5-235) contradicts the discussion in the Biological Resources section by stating that passenger rail system would "mostly affect individual animals rather than influence the</td><td>While a passenger rail system would impose a barrier to wildlife movement, the mitigation measures listed on Page 5-153 of the Draft EIS identify that additional studies would be conducted, and wildlife crossing structures would be designed to facilitate wildlife movement. Specific recommendations for providing wildlife crossing structures would be made during subsequent project-specific analysis. Within the 1-mile-wide corridor, the locations of future bridges and culverts cannot be determined or mapped. These types of structures, when designed to accommodate wildlife crossing, enhance the porosity of the linear barrier and reduce the impacts. While a long linear feature such a new passenger rail system could contribute to the barriers presented to wildlife movement, the</td></tr>
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diversity or size of populations ..." If the rail system will pose a formidable barrier and disrupt large habitat blocks, the statement in the Cumulative Effects section is incorrect, and larger populations of animals will be adversely affected. This discrepancy should be addressed. Sincerely, Susanna Canizo Schippers			proposed corridors are adjacent to existing or proposed transportation corridors, with the intent that collocating the features would help minimize bisecting large blocks of intact habitat. Furthermore, wildlife in the area where the corridor alternatives parallel the existing UPRR have habituated to trains and may adapt quickly to the passenger rail system. The cumulative effects analysis on Page 5-235 acknowledges that barriers to wildlife movement have fragmented habitat, and that a passenger rail system would contribute, which is an adverse effect. However, with modern design standards that incorporate features to retain wildlife connectivity, the effects would not be expected to influence species diversity or the size of the population when compared with existing conditions. Therefore, with mitigation measures applied, the effects were not determined to be significant. FRA's preferred alternative, the Yellow Corridor Alternative, is identified by AGFD as the alternative that would result in fewer impacts to wildlife and wildlife habitat.
9/15/15	Kevin Morrow		
In addition to supporting the passenger rail corridor from Tucson to Phoenix, I believe that ADOT should also look at what would go beyond this undertaking. ADOT should also look at further destinations for passenger rail, either up I-17 to Flagstaff's Amtrak station or along the 60 corridor through Wickenburg. From there, a rail line could connect Phoenix to Las Vegas with a transit hub in Kingman.			The Phoenix-Tucson corridor was identified as the priority passenger rail corridor in the State Rail Plan. Other destinations would be studied in later analyses.
9/15/15	MaryAnn Seim		
Fantastic idea! More tourism opportunities!			Thank you for your comment and participation in this study.
9/15/15	Seth Chalmers		
I believe the EIS missed alternatives? I believe the High Speed Bus innovative idea that the University of Arizona proposed about two years ago needs to be included. I believe this is a topic of a research project that was proposed? The high-speed bus idea would include consideration of building a dedicated lane (one in each direction) on the current I-10 route that could be used exclusively by a special high-speed bus. Such an idea would be less			The high-speed bus technology has not yet been fully developed and has little comparable research available to provide a basis of comparison. It would appear to require a dedicated lane and specialized controls that are not yet defined. While it may have merit in the long run and could be

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expensive and result in a lot less environmental impact. This special lane idea could also lead to other ideas for uses and funding like making it a HOT lane which could be used for a fee, etc....An additional benefit of the I-10 high-speed bus idea is that it will help refocus attention on I-10 between Phoenix and Tucson as the number 1 surface transportation priority in Arizona.			a component of the corridor travel options, it does not yet have sufficient definition to be a full modal choice.
9/15/15	Crystal Marrs		
Please do this! The drive is so incredibly dangerous! This would allow us to visit up there more often as well as open up new activities to our kids.			Thank you for your comment and participation in this study.
9/15/15	purehype@...		
You need to include a method of transporting personal vehicles along with the passengers.			Thank you for your comment and participation in this study. The concept of carrying vehicles would need to be addressed in later stages of study as appropriate.
9/15/15	Charlotte Mesick		
I would HOPE that due consideration will be given to including some railroad cars for passengers to take their automobiles on the trains, ala the east coast lines to Florida.			Thank you for your comment and participation in this study. The concept of carrying vehicles would need to be addressed in later stages of study as appropriate.
9/15/15	lvtrin27@...		
I would like to first say that a time limit should be set at public hearings. I did not get to speak because three people decided to ramble nonsense for 30 minutes. With that being said, I do support the Yellow alignment. I strongly believe that the service should be all day at a reasonable frequency, (30-60 minutes off peak) for the Phoenix local commuter service. The far SE valley has the least access to freeway of almost any other valley community and a high quality, fast, all day local service would be an invaluable asset for that area to help curb freeway traffic. My in laws live in San Tan Valley and Ironwood or Ellsworth are mostly the only reasonable options to get in or out of Queen Creek and San Tan Valley. Even those roads are often over congested. With a local Phoenix area commuter rail with all day reliable service with stops in Queen Creek and Santan Valley will take reliance off the east valley freeways. I also would like to see some of connector between the rail and Gateway Airport. Thank you.			Thank you for your comment and the suggestion regarding the public hearings. Access to major airports in the corridor is an important element of the passenger rail service and would be evaluated in much more detail in the next phase of study.

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9/15/15	Tony Alldredge		
I oppose the proposed passenger rail service between Phoenix and Tucson for the following reasons: 1. Rail service is MUCH more expensive to construct and maintain than bus service. This has been demonstrated many times. 2. Rail service is MUCH less flexible than bus service. Rail service cannot easily be re-routed or extended, while bus service can be changed quickly and in-expensively. 3. Bus service can be implemented MUCH more quickly with MUCH less disruption than can rail service. I do support enhanced bus service between Tucson and Phoenix, even if substantially subsidized as a service to the two communities.			1. Bus service was considered in the original alternatives but is subject to the same limitations as cars in congested conditions, which is expected to significantly lengthen travel times in the Phoenix-Tucson corridor. Rail is not inexpensive, but it can offer service not available from a bus, such as traveling at higher speeds and being less susceptible to delays during dust storms. 2. Rail is somewhat less flexible than bus service and would rely on other services (e.g., taxi, Uber, light rail transit, bus, etc.) at the destination end of a trip. 3. Bus service is available now between the two major cities, largely by private companies who would normally increase service as demands warrants.
9/15/15	Lhechanova@...		
Unfortunately neither the yellow or red route are the best choice. Both swing too far to the east and the green route was a better choice for a more centralized alignment with I-10 and would provide a more logical park and ride along the current feeder roads to I-10, as well as incorporating Casa Grande ridership.			The Green Alternative is the shortest alternative between the two hub stations, and it received comments of support from many participants in the public outreach process and from some agencies; however, the Green Alternative did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
9/15/15	George Mulloy		
The train rail to connect Phoenix to Tucson is an EXCELLENT idea!! With the tremendous growth in northern Pinal county (San Tan Valley) the residents in this area find it often easier to venture to Coolidge, Florence, Casa Grande, and the surrounding cities near Tucson, including Tucson than it is to travel to Phoenix or Scottsdale. This will be a great sustainable			Thank you for your comment and participation in this study. 1. Specific station locations were not evaluated in detail as part of this Tier 1 EIS. However, high-level assumptions as part of the recommended Yellow Corridor Alternative necessary for

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measure in reducing pollution and reduce our need to use our cars. I imagine the stops would be strategically planned to make traveling to various destinations along the track accessible. For example, the city center of the names cities above as well as destinations close to government offices. Also, in Tucson I imagine several stops along the U of A campus and medical center would be planned. Also, if this track is put into place will there be an increase in public transit such as buses to take commuters to various destinations that may be farther away from the stops? Please consider implementing this proposal as it will be a tremendous move forward in reducing our dependency on oil/gas and becoming a more sustainable metropolitan community!			operational planning did assume a station in San Tan Valley. 2. Passenger Rail system connections to complementary transit services were included in high-level operational assumptions for both the Yellow and Orange corridor alternatives.
9/16/15	Michael Van Os		
I currently live in San Tan Valley. I grew up in Tucson where I have friends and family still. A commuter rail would be a great idea as long as it has convenient stops for the passengers. As of right now it costs me on average $17 in gas to drive to Tucson and back plus any driving I do while there. On average I will spend approximately $25 to $30 in gas for a trip to Tucson and back. The Yellow corridor would be the better option for me but appears to clearly be the best option of the ones identified. Lower cost, lower environmental impact, and more community access. There would need to be some sort of transportation available at the stops in all locations for the passengers. Perhaps Smart / mini cars for rent, bicycles, cabs, smart taxis, any number of these to ease the commute for the passengers that still have some traveling to do. The cost of the tickets as well as these alternative modes of transportation would need to be comparative to the cost of the trip by car.			Thank you for your comment and participation in this study. The fare structure has not been defined yet. The many recommendations in your comment have been considered, but would require a more detailed level of analysis for full implementation.
9/16/15	Henry Harding	Pierson Place Historic District	
On the map there is the Green Alternative and yet there was no mention of it in the video. Is that intended or not? And what would be the purpose of one by the highway? In Germany there is a double decker train that transports cars with owners in the cars to and from one of the northern islands. Would there be a use for something like that? In the video was mentioned that there would be commuter trains that don't stop at each station. Would those trains be the high-speed commuter trains?			The Green Alternative was eliminated from consideration. It did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. The concept of carrying vehicles would need to be addressed in later stages of study as appropriate. The express trains were assumed to be "higher speed" trains travelling up to 125 mph, but no technology has

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			yet been decided upon.
9/16/15	jkotzmanis@...		
Smartest idea ever...been saying since 1992 this should have been done. Will be at meeting tonight.			Thank you for your comment and participation in this study.
9/16/15	ambermarcov@...		
I say do it.			Thank you for your comment and participation in this study.
9/16/15	Brian LoManto		
My name is Brian LoManto. I am a resident of Youngtown, AZ, a suburb of Phoenix. I believe a rail line between Phoenix and Tucson is a fantastic idea. However, I also believe strongly that Phoenix and the metropolitan area need to do some major work on public transportation in our city. A subway or a major extension of the light rail is necessary. Phoenix is growing and in order to match this growth with services, a modern public transportation system capable of expansion and high volume needs to be built. But, with respect to the question at hand, yes, I believe a rail line between Phoenix and Tucson is a great idea and should be built.			Thank you for your comment and participation in this study.
9/16/15	Mike A.		
I would love to have a rail transportation option from Phoenix to Tucson. I live in Phoenix but I have relatives as well as business in Tucson so I make frequent trips. I am curious to know the expected transit time from Phoenix to Tucson. I am hoping this will be higher-speed rail and not just a conventional train.			Thank you for your comment and participation in this study. The intent is that this would be a higher-speed service to effectively attract ridership and provide a viable alternative to the car.
9/16/15	Kyle Robinson		
The best route is the yellow route. It provides a route with the highest existing development and potential customer base that could utilize the service. Thank you!			Thank you for your comment and participation in this study.
9/16/15	Patricia Powers-Zermeno		
Rail is a great idea but concerns remain high that ADOT will destroy more of the Historic District(s) in downtown Phoenix for a rail station in the central city. I-10 Tucson - Phoenix is busy and getting busier - but, let's not trade a train station for large sections of Historic Districts. ADOT already did that once. Do either alternatives include tearing out sections of Historic Districts in downtown Phoenix?			The Tier 1 EIS assumes a northern hub in Downtown Phoenix located adjacent to the existing UPRR right-of-way that runs east-west between Jackson and Buchanan Streets. No National Register-listed historic districts are located within this area. Phoenix Union Station, which is listed on the National Register of Historic Places, could be a candidate station location and

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			could potentially be restored to its former use as a railroad depot. Appendix Table F-4 identifies historic districts within the corridor alternatives; within Phoenix, this includes the Garfield and Phoenix Union High School historic districts. However, because the corridor alternatives are one mile wide, specific alignments identified in a subsequent project-specific analysis may not infringe upon or affect these historic districts. Impacts to historic districts and properties would be analyzed if an alignment cannot avoid them. Federal funding for a passenger rail facility would require compliance with Section 4(f) of the Transportation Act, which protects historic properties as well as recreational facilities and wildlife refuges from use by federally funded transportation projects.
9/16/15	Melissa Hackett		
I'm all for more public transportation. My main concern is that the proposed yellow line literally goes through my backyard. I am concerned with noise/ traffic/ construction/ my property value. What is being done or will be done to minimize disturbances to thru neighborhoods that are on the line. Is it projected values of property will go up or down?			The Yellow Corridor Alternative is a mile-wide corridor. ADOT anticipates that an alignment alternative within this corridor would likely be located within or adjacent to the existing Union Pacific Railroad right-of-way, although other alignments may be considered. During subsequent planning and design stages, public coordination and outreach would continue at a more localized level to discuss potential impacts to neighborhoods and individual properties. A future passenger rail facility's impacts on the value of residential property adjacent to the railroad right-of-way would depend on a number of factors, including proximity to a station, which tends to bolster demand for and value of adjacent housing.
9/16/15	Adam Martinak		
I would like to submit the following comment on this proposal. I believe this project is well worth pursuing but only if it is a high-speed rail project. I commuted from SE Tucson (Golf links/Harrison) for work entering the freeway at Valencia and I-10 and exiting at Baseline road in Tempe (To navigate to the GoDaddy campus). I commuted for about 18 months. Ultimately I had to take work back in Tucson at a reduced pay rate, for a smaller company because of the commute. I will leave the economic implications of the situation to someone more versed			Thank you for your comment and participation in this study. The conservative travel time estimate for the train using a diesel-electric locomotive (technology has not been selected) is about 90 minutes, compared to what will become more than 3 hours with a car.

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than I am. What I want to emphasize is that a citizen of Tucson and Arizona, I would be thrilled to have access to the job market of the Phoenix metro, but I have to be able to get from TIA to Sky Harbor quickly. I would not utilize rail that ran at a comparable time frame to auto. In addition, I would attend all manner of events, including concerts and sports in PHX if I could hop a fast train from TIA to Sky Harbor.			
9/16/15	Jerry Spellman		
I'm writing this as a concerned citizen and long-time advocate for SkyTran in Arizona. It is in response to ADOT's request for comments related to the Tier 1 DEIS on potential high-speed rail corridors to connect Phoenix and Tucson. SkyTran is an innovative and breakthrough automated rail technology with patented and trade secret-protected, unique advanced transit know-how. It has developed its technology over the past decade under a NASA Space Act Agreement at the NASA Ames Research Center. I'm happy to say SkyTran is now ready to be deployed globally. I attended the public comment meeting in Phoenix last evening and came away very disappointed that there was no discussion of next steps to be taken to make a Phoenix to Tucson high-speed rail line a reality. All I heard was there is no money for further study or planning, let alone to build a system, and all I saw were photos of "steel wheel on steel rail" trains. Where is the vision beyond identifying the Yellow Corridor as the preferred choice? Most folks seem to agree, as I do, that that's the way to go. But what about the how to go (mode selection) and the how to pay for it (PPP)? With this in mind, SkyTran is on the verge of taking off globally with a pilot system currently under construction in Tel Aviv, Israel, at Israel Aerospace Industries (IAI), to be completed this year, to be followed by development of a commercial system within Tel Aviv to begin in 2016, and then on to other projects in Israel, India, France and the U.S.A.. Also, SkyTran just this week submitted a RFI proposal to the City of Baltimore, Maryland, to build a pilot system there. As ADOT and the FRA finalize this Tier 1 DEIS by the end of 2015, and SkyTran completes its pilot demo in Tel Aviv around the same time, Arizona needs to seriously consider adopting the SkyTran MagLev PRT alternative if and as it moves into the next phase of its high-speed rail EIS. In brief, here is why: Over the last century, there have been few if any improvements in the way people move			Thank you for your comment and participation in this study. The primary purpose of the Tier 1 EIS is to select the preferred corridor for future passenger rail service. No technology has been proposed or selected in the EIS though relatively conservative assumptions have been made about the performance of a future system to forecast ridership and travel times, and estimate costs. In a subsequent study, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential.

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within cities. In fact, we move slower today in the city -- any city, anywhere -- than we did in the 1940s and 50s. To date and across the world, urban transportation has meant a mix of trains, buses and cars (bikes and walking can suffice only within a very limited range). Admittedly, today's trains, buses and cars are better than those 50 years ago. Yet their core transportation architecture remains the same, requiring the same extensive surface area or exorbitant tunneling costs. As a result, the mobility in cities has failed to advance hand-in-hand with the demands of a growing urban population -- a worldwide phenomenon. Thus, transportation is an unsolved urban-suburban problem that leads to a myriad of other downstream problems: Congestion, stress, health, accidents, pollution, carbon emissions and so on...All in all, the quality of life of citizens has decreased while urban population has increased. And that is because there can be no "smart cities" with stupid transportation.

In short, SkyTran offers freedom from schedules and fixed routes; it offers seated travel; personal space; no jostling with others; and no unnecessary stopping -- all this, in a "green" transportation envelope that is more environmentally compelling than hybrid or electric cars. Moreover, SkyTran travel is five to six times faster than the alternative. And using SkyTran is as easy as using an elevator: the user simply sits in a SkyTran vehicle and clicks on his intended destination on the system display. The vehicle is driven under computer control and is taken to the user's destination non-stop within minutes. SkyTran enhances the appeal of public transport by making it more attractive than cars while helping the economy of the entire area by increasing productivity and saving time for everyone. With high quality public transportation, SkyTran will encourage and entice users out of their cars.

SkyTran is the only high-speed MagLev PRT system: it is optimized, robust, higher capacity, higher speed and lower costs. SkyTran's superiority over earlier PRT systems and surface rail systems is measured in leagues, not increments.

The pending global deployment of SkyTran should be a clarion call to action here in Arizona. Addressing transportation issues in modern cities is not just a matter of more investment or more planning, or more passenger trains on surface tracks; it requires better planning. It requires new technologies, and new ways of thinking about how best to move people and goods. SkyTran's team has done that thinking.

In my estimation, SkyTran would likely be interested in replying to a future RFP from ADOT to design, build, operate and maintain a SkyTran MagLev Personal Rapid Transit (STMLPRT) system to connect and service the Phoenix and Tucson metro areas along the Yellow Corridor, and within the Union Pacific Rail Road (UPRR) ROW. Indeed, SkyTran would likely be willing to

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enter into preliminary discussions with AZDOT as soon as this phase of the EIS is completed to see what Public Private Partnerships (PPP's) might be forged to finance such a major project. SkyTran has a Blue-Chip team comprised of NASA personnel; Israel Aerospace Industry (IAI) personnel; civil engineers from internationally respected Jenkins/Gales & Martinez Engineering; and an extensive list of accompanying talent prepared to enter into such discussions. Profiles of SkyTran's leaders and technology partners are included at the end of the SkyTran overview I'm attaching to this e-mail letter. The detailed overview describes the SkyTran technology and its advantages and should provide ADOT and the FRA with a thorough understanding of why Arizona and this nation need to get on board with SkyTran, and soon. The major differences in the costs of SkyTran (see charts below) as compared to trains for a Yellow Corridor high-speed rail line (approximately half) should be sufficient to interest you in carefully reviewing the entire overview document. Thank you for your consideration. Sincerely, [Tables attached to comment not included in this appendix refer to performance and cost of the described technology compared to a traditional option.]			
9/16/15	Ian and Marie Walker		
Yes, Yes, Yes!!! Brilliant! Please proceed ASAP!			Thank you for your comment and participation in this study.
9/17/15	Sean Schupp		
I am 100% behind the idea of high-speed rail between Tucson and Phoenix. The benefits that both cities would enjoy are boundless. Tucsonans could enjoy more chances for employment in Phoenix as well as more opportunities to enjoy sporting events and other entertainment without having to deal with annoyance of the trek between our two cities. I know that companies from China and Japan are competing for high-speed rail contracts all over the world and China is already in talks to make a track between Los Angeles and Las Vegas. This project would be small potatoes for these companies and competition is good for business making the price tag hopefully something achievable. Also it would be a good start for high-speed rail plans between cities like Phoenix to San Diego and Phoenix and Los Angeles which I believe would be logical next steps. One suggestion that I would have if I may be so bold would to make 2 sets of tracks 1 for one-way trips and 1 for several stops on the way. I think			Thank you for your comment and participation in this study. Financing for this project is not yet defined. This is intended to be a higher speed service, though the exact technology has not been selected. The assumptions used were for a conservative maximum operating speed of 125 mph. Preliminary track configurations have been developed in accordance with the best practices recommended by FRA and the passenger rail industry for the type of service expected to be offered. Upon more detailed analysis, this could change.

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also we should invest in the specialized track and trains that have the capability of going 170 mph or more that China and Japan have all over their country side, at least for the one-way trip suggestion that had. I hope my feedback is appreciated and I look forward to further developments in practical infrastructure projects such as this. Also I would like to reiterate that I very much would like this to happen and would happy to pay the taxes for such a wonderful endeavor.			
9/17/15	Nancy Fahringer		
I would like to add my voice to support a Passenger Rail Service from Tucson to Phoenix. It's a great idea whose time has come.			Thank you for your comment and participation in this study.
9/17/15	Cynthia Yolland		
We need to create a full transportation solution for the whole state. We need to make it easier for businesses to get workers to their locations. We need public transportation solutions.			Thank you for your comment and participation in this study.
9/17/15	Feruza Amanova		
I fully support the construction of the Passenger Rail Corridor between Phoenix and Tucson. As our economy improves and our population grows there will be more people living in both cities and in many cities in between. The construction of the railway would allow for economic growth in smaller communities and most importantly would alleviate the traffic congestion which will absolutely become worse in the next several decades. Additionally, this will allow current commuters to have an alternative mode of transportation and improve air quality. Lastly, Arizona is one of few states with major cities that does not have a well-developed public transportation system (i.e. train system). If possible, I believe that the railway should connect or make it easy for people to connect to the Tucson street car and Phoenix light rail, making an easy commute between UA and ASU. Ideally, I'd like to board a train at UA and arrive at ASU.			Thank you for your comment and participation in this study.
9/17/15	Leo E. Spesard		
The Corridor Aerial Atlas Appendix can't be opened with any program I've tried, either directly from the web or by downloading it.			The Atlas Appendix was divided into two files--Yellow Corridor and Orange Corridor--and re-posted after we were notified of this problem; this may have solved the problem for some users. Downloading the files to the C: drive should make them easier to open.

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9/17/15	Lisa Waite Bunker		
As someone who travels to Phoenix for work, I can't wait for this to be finished! Full speed ahead, please!			Thank you for your comment and participation in this study.
9/17/15	Carolina M. Lopez		
I have been highly in favor of a high-speed rail from Tucson to Phoenix for years. I am very happy to hear that my wish might come to fruition! Please add my name in favor of this project. I would also hope that it would be ADA compliant.			Thank you for your comment and participation in this study. All facilities and trains would be required to be ADA compliant in accordance with federal regulations.
9/17/15	Nancy Jean Sayers		
I am writing in support of the yellow corridor. When it gets to the point of getting the right of ways, etc., I am encouraging you to strongly pursue the purchase/lease and restoration of the historic Union Station in Phoenix as the initial station.			Thank you for your comment and participation in this study. Specific station locations have not been decided as part of this Tier 1 EIS. However, station locations would be evaluated in detail in future phases of the study as part of subsequent project-specific planning and environmental analysis.
9/17/15	Lori Lehman		
I recommend the orange route. It seems like this route would benefit the greatest percentage of population and it looks like it would go around the San Tan Mountains, with less environmental impact. It would also connect to Williams Gateway Airport, an important growing airport.			Your October 5, 2015 comment explains that you mistook the Orange Corridor Alternative for the Yellow Corridor Alternative, which you intended to support. Thank you for your comment and participation in this study.
9/18/15	Nathanael Nerode		
It all looks well analyzed. Please just fund, build and operate the train service already, on either route.			Thank you for your comment and participation in this study.
9/18/15	Mark Andersen		
The idea of a rail line is a good idea. I think it should at minimum connect both airports and ASU to UOFA. At the same time I think it's going the wrong direction. A connection from Phoenix to Vegas through flagstaff would be a potential opportunity for the state to make money after its initial investment. And if we are doing some kind of rail line between major cities a speed rail should be considered.			Thank you for your comment and participation in this study. The purpose of the passenger rail system in the Tier 1 EIS is to link Tucson and Phoenix and to provide commuter service within the Phoenix and Tucson metro areas, but it does not preclude other corridors north of Phoenix from being studied in the future.

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9/18/15	Robert Bowers		
At the hearing on Tucson 9/16, almost every person making comments mentioned the need to have the rail proposal extend to the Tucson airport. It is extremely important that this project would intersect with existing public transportation including airports. Through political and corporate influence and interference, the SunRail project in the Orlando area lacks links to both its airports, Orlando International and the newer alternative of Sanford. At its southern end, the rail line ends about 10 miles from MCO. Someday, Tucson airport may represent a viable alternative for people north of Tucson. It certainly will if convenient transportation exists. I also think it is very important to consider an electrified line. Railroads represent an efficient use of fossil fuels as opposed to vehicles, but we also need to lessen our dependence on fossil fuels as well as the pollution and carbon contribution of fossil fuels.			Public input throughout the development of the Alternative Analysis (AA) and Draft Tier 1 EIS indicated airport access to be an important consideration as a feature of future passenger rail service. Comments on the Draft Tier 1 EIS from agencies, jurisdictions, and the public strongly urged that the study corridor extend to Tucson International Airport (TUS). The corridors analyzed for environmental impacts and other factors in the Tier 1 EIS, as established in October 2011 through the NEPA scoping process, terminate in downtown Tucson. While a connection to TUS was not considered in the Tier 1 environmental analysis, the AA of the APRCS included coordination with Tucson, South Tucson, PAG and TUS related to airport connectivity, and public and stakeholder input were gathered regarding how best to extend passenger rail service from downtown Tucson to TUS. In addition, the conceptual ridership analysis developed for the AA included TUS at the southern end. Based on public and agency input, ADOT and FRA will commit to extending the study area to TUS for subsequent passenger rail studies. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but will be determined as funding is allocated and as part of subsequent NEPA review. Diesel-electric powered locomotion was used for cost estimating purposes as a basis for comparison; an electrified train would cost considerably more than diesel-electric because of the additional infrastructure required. In subsequent planning and design, other locomotive technologies may be investigated.

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9/18/15	Barry Rosen		
Dear Governor Ducey: I attended the rail plan presentation by the staff of the DOT this past Wed, at the Tucson Convention Center, and thought it was done well. Their attempt to solicit input was well received. My concern, and the reason that I am writing to you, is that there is a significant cost to this project that should begin with the primary initiative from our elected State Government Representatives. Only one elected representative was in the audience to offer his support for the project. This project will bring lasting value to the State of Arizona for many reasons. The power within your office is significant enough to begin a real dialogue about the importance of this rail line for the benefit of the public and private sectors of this state. I am 75 years old and would like to be able to ride the first train to Phoenix. However, if I am unable to make it, I would like my 11 year old granddaughter to be able to ride it.			Thank you for your comment and participation in this study.
9/18/15	Dorothy Johnson		
The development of light rail connecting Tucson and Phoenix needs to be pursued aggressively before development interferes with route options. Congratulations on the work to date. Make sure that systems powered by alternative energy sources are explored, so that it would continue to be the preference 10 - 20 years hence. This would be an ideal location for a solar powered train. As a senior I'm progressively less comfortable driving to and from Phoenix. However as a member of the First Things First Pima North Regional Council, I want to continue engagement in related meetings in Phoenix. A train option would remove a major obstacle.			Thank you for your comments and participation. No technology has been selected for the passenger rail service yet. In a next phase of study, such as a subsequent project-specific NEPA study along with the supporting analyses, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential.
9/18/15	Jeffery Sherman		
Please consider the attached link or below text version as my comments on both Arizona Passenger Rail and Phoenix Commuter Rail. https://phxdowntown.wordpress.com/2014/10/28/phoenix-commuter-rail-the-beginning-of-a-plan/ Thank you Jeff Sherman			Thank you for your comment and participation in this study. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for freight movement and would not share line capacity with Union Pacific freight operations. Your

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Why Commuter Rail is important to Downtown Phoenix: Downtown Phoenix gets over 85 thousand daily commuters, plus thousands more for sports, concerts, and entertainment events. These individuals all add vibrancy to the core, but their cars limit us from obtaining a walk-able / bike-able urban environment. Downtown Phoenix will always be a commuter destination, and if it is to continue as the hub of commerce, knowledge, and entertainment then we need to add capacity at the same time we are trying to pedestrianize our streets. Light rail is helping to refocus our growth patterns along its route, and new developments will help create options for people who want to live/work in downtown, but this is not enough. Great cities serve as hubs for transportation networks. Phoenix and Downtown in particular needs to reassert itself as the epicenter of the region's transportation infrastructure network. Phoenix has to do this because the knowledge based economy is dependent upon bringing qualified people together, and for downtown businesses, it is imperative that their employees can get to and from work seamlessly. Therefore, if we are truly looking at ways to reduce our freeway congestion, grow downtown businesses, and create a comfortable safe pedestrian space, than commuter rail is the only high capacity option. A reasonable plan: MAG (Maricopa Association of Governments) has been the forward leader on the topic conducting the 2010 study that helps to form the base for the suggestions below, but MAG has no way to implement projects.1 ADOT however, is studying Phoenix to Tucson intercity rail options, one of which (the Yellow option) corresponds with Phase 1 of my basic proposal. They are also studying high-speed passenger service to California and Nevada as part of the general state rail plan which corresponds with Phase 2 & 3. 2 What is envisioned below is a three layered passenger transportation network, Maricopa Commuter Rail, Inter-city regional rail, and an Inter-Airport transfer service all built upon the current heavy rail freight infrastructure. Because all of these can operate on the same improved track and because the current rail system sits where these connections need to be, the improvement costs are lower and the capacity is higher than many other transportation options. This also creates a shared maintenance and operations burden between multiple stakeholders. How to start: Map Phase 1 MAG's proposed Southeast alignment runs directly from Downtown past Gateway Airport. Currently Transfers between airports requires a private shuttle van service at around $25. Connecting these airports by train allows Gateway airport and its budget regional airlines to effectively link into the national/international hub and spoke system. This allows Sky Harbor to focus more of its facilities on the economically vital national and international carriers while Gateway grows for			suggestions about the phasing of the passenger rail project would apply to the next phase of studies when alignments are developed and financial planning options are evaluated. Some of your concepts extend beyond the specified scope of the Tier 1 EIS (Tucson to Phoenix), but are worthy of further analysis should there be a regional assessment of passenger rail services.

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budget service and East valley commuter flights. Reliable, baggage friendly, scheduled service is key to making transfers between airports work. While Gateway is currently struggling, it is still geographically positioned to serve as Sky Harbor's relief airport over the next 30 years and so it is critical that we plan that infrastructure connection now. While Airport to Airport train service typically only takes place in Tier 1 cities like London and Shanghai, Sky Harbor's proximity to downtown and the strategic placement of Gateway, Goodyear and Tucson airports if joined effectively could create a robust transportation network for the region. Mag-Map MAG's 2010 estimate for the track improvements needed on this Southeast section was $477 Million. This number also includes building 10 stations, which is not necessary because Commuter Rail stations can typically be privately funded or worked into a PPP (Private Public Partnership) thus reducing cost. Nonetheless, globally many large transportation projects actively seek voluntary investments or connection fees from major Airports, Stadium Districts, and Retail complexes, so a capital investment from the airport and other organizations should be expected in any future commuter rail plan, with the goal to provide a sufficient amount to help fund this first section. 3 ADOT's focus then can be on the Gateway to Tucson corridor and maintenance assistance for the commuter section. The key is that Airport transfers and inter-city trips are not expected to be subsidized rates like normal public transport. A $20-25 fee is potentially very close to covering the maintenance and operational needs for Airport transfers on this line and a trip to Tucson would then be a bit higher. A proposal by the Airport and Phoenix to investigate the feasibility of such a project, and the initial prospect of some capital would likely be enough to politically bring Tempe, Mesa, Chandler and Gilbert into a realistic conversation about adding commuter rail along the same route. ADOT would then be able to latch on, selecting to extend this corridor to Tucson. The further hope being that Valley Metro joins as the transportation organizer with a proven commuter rail operator (maybe BNSF) in charge of operations and day to day logistics. Why The South East line First. The passenger estimate for this route from Queen Creek to Downtown is 6450 boardings a day and MAG's operation and maintenance estimate was $9 per boarding. There are many flaws to these boarding numbers given that tourists, special events, and potential transfers between airports, light rail, and other lines will add to the counts. Plus none of this takes into account generational or development shifts all likely to favor more passengers. Taking that the Rapid bus service currently costs $6.50 per round trip a $2-2.50 subsidy is reasonable and the $9 is well below the national commuter rail average of $11. Figuring in the unaccounted boardings I listed above, possible profit sharing with station retail/airport transfers, and the			

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reduced maintenance cost due to private stations, very little Federal or local tax assistance may be necessary for this starter section. For some practical, political, and financial reasons this Southeast commuter line should terminate at the State Capitol with a new private development station. There should be very little added cost for this extra two miles but the increased ridership and political statement is important. Historic Union station can be brought back to serve as both a commuter rail stop for the downtown government district and future regional intercity passenger rail hub incorporating commercial space. Also, a mixed use development/station somewhere between 4th & 7th Streets, possibly incorporated into the ballpark, would serve the sports and business district. PHX-TUC Airport Connector A typical PHX-TUC train would depart from Union station, stop at Sky Harbor to pick up plane transfers and more Tucson passengers. This train would then be a direct to Gateway, making the airport connection and bringing on board more intercity passengers. A stop in Eloy could potentially serve Casa Grande before Downtown Tucson and then Tucson Airport. The 'local' commuter line and freight lines can then run on the improved tracks behind this service. Phase 2 The next phase should be the Yuma line (Airport to Buckeye). Once again there are benefits to the Airport due to a possible connection with Goodyear Airport. While it is not used for passenger service at this time it has the potential as a west valley provider in the next 30 years. However, the major use I see for Goodyear Airport is in freight and cargo. It has one of the longest runways in the southwest, currently sits in the growing west valley warehouse transfer area and is close to the potential I-11 corridor (not that I like it). It is an asset with huge economic and employment potential and connecting it into the transportation network is essential to regional economic growth. The Yuma line also runs less than 2 miles south of the proposed I-10 light rail extension. If a solid alternative was presented there may be political room to stop the I-10 extension boondoggle. I am a huge light rail supporter but building light rail (a system designed for street activation) down the middle of an interstate for commuter traffic is a disastrous mistake for the system. Especially when we have heavy rail tracks so close. If $400 million of the $1.1 billion dollars slated for the I-10 west extension was used to create a commuter rail option; which is MAG's estimate for this section, the other $700 million could go to the South Central light rail extension which is a far more suited light rail line (this also keeps the money in the same district). The Yuma line would also effectively replace the I-10 rapid bus service so while MAG shows this as a low boarding route it is the cheapest to build and has future potential. The East terminus for this line should be Sky Harbor which will also help with boardings and create a future direct			

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airport transfer to Goodyear. This would require sidings and double tracks through downtown (and I hope a 50 year plan to bring the downtown section below grade). This is the only way I can see preventing a terrible mistake with light rail, and building a solid transportation network. The flaw with MAG's projection for this segment is in extending the line past Goodyear airport. The far west valley boardings are not sufficient enough to justify the maintenance and operations costs at this time. It is obvious that the study was trying to include all possible MAG members in the proposal, but any real project would have to be far more reasonable about costs/boardings. Phase 3 One of MAG's suggestions is for BNSF to be the system operator. If this was implemented then Phase 3 should be The Grand Ave commuter rail service. This line has the second greatest passenger potential and the tracks are BNSF owned. Unfortunately it is also the most expensive to implement, but between BNSF, Phoenix, Glendale, Peoria, Surprise, and the possibility of Federal support for a Las Vegas to Phoenix intercity line, adding this portion into an already operating commuter rail system becomes more feasible. Many of these Northwest cities already understand the economic growth potential of commuter rail and have been pushing for leadership and movement on the issue. (see compass study)4 What does it mean for Downtown? MAG estimates 11290 boardings per day for these three lines. While I think this is a low estimate, and not all of these individuals will disembark in downtown this potentially captures 1 in 8 downtown commuters and could change the way we plan our urban environment. This also allows companies to feel comfortable locating offices and developments within our core because the parking and commute time become diminished obstacles and collaborative knowledge clusters become the draw. This will then allow us to look at our downtown streets more holistically. It is hard to have a political fight between the downtown community wanting slower pedestrianized streets, and commuters who have very few options in trying to get to work every day. There has to be a viable high capacity transit option for downtown commuters or unfortunately our city center will likely continue to be automobile dominated because of the political demands of suburbanites. 1. https://www.azmag.gov/Projects/Project.asp?CMSID=1076 2. https://www.azdot.gov/planning/CurrentStudies/PassengerRail 3. For examples see. Peterson George, Unlocking Land Values to Finance Urban Infrastructure (Washington D.C. : The World Bank 2009)			

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4.http://www.azcentral.com/community/peoria/articles/20131226grand-avenue-trains-west-valley-revitalization.html			
9/19/15	Lindzie		
My concern with this rail system is we have lived by other mass transit type rails and most of the stops are riddled with graffiti and crime. The rail lines have been dug down, which is again an added cost. You would also need to consider that through some areas there are still over 2 lane roads that don't have automatic rail gates (mostly through Queen Creek) or have the capacity for mass transit to come through. Where would you put stops? I don't want them by my house, but it's a possibility as we still live by miles of open desert. Since I'm in proximity of the these rails, I'm concerned about the noise, the traffic congestion on these rail crossing, and if it would make the area look not as nice (due to crime and graffiti). I urge you to look closely at other areas in the country that have these types of systems and study the factors above (i.e. the Amtrak on the East coast, and even Front Runner in SLC).			Thank you for your comment and participation in this study. 1) FRA standard "quad-gates" have been assumed for all at-grade crossings associated with the passenger rail as part of this Tier 1 EIS. 2) Decisions regarding specific station locations have not yet been made. However, future phases of the study would take into account surrounding land use, neighborhood character, and proximity to activity centers when considering station locations as part of a subsequent analysis. 3) Other passenger rail systems throughout the country have been referenced continually throughout this Tier 1 EIS process, including Amtrak service and the UTA Frontrunner.
9/19/15	Veera Kasanneni		
Waiting for the implementation of yellow route. Passenger rail between Phoenix and Tucson is very much required as early as possible.			Thank you for your comment and participation in this study.
9/20/15	L. Bredo		
I would like to see transportation rail between Tucson and Phoenix			Thank you for your comment and participation in this study.
9/20/15	Sean D. Sweat	Thunderdome Neighborhood Association for Non-Auto Mobility	
Our organization is unable to find consensus on which route would be best, but we are unanimously and enthusiastically supportive of passenger rail from Phoenix to Tucson. Please build it as soon as possible so people without cars can have the same mobility afforded to those with.			Thank you for your comment and participation in this study.
9/21/15	Troy Kicklighter		
I strongly support the proposed rail line. My family and I visit the Phoenix couple times a year and take Amtrak. It would be so awesome to travel to other areas by using continues rail			Thank you for your comment and participation in this study. System operators, such as Amtrak, would be evaluated in

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service. Please listen to those of us who visit your cities in Arizona to visit our families and to attend football games there.			future phases of the study.
9/22/15	Michael Fenlason		
This is a very exciting opportunity for the State of Arizona and I hardily support this project			Thank you for your comment and participation in this study.
9/22/15	Chase M. Walman		
I am writing the below comments to reflect my support for a passenger rail system between Tucson and Phoenix. A passenger rail system between Phoenix and Tucson should be invested in, and with future growth and predicted congestion in the near future, such a rail is justified. While BRT in theory may seem like an attractive proposition (due to initial cost), it is my belief that BRT would not be the permanent solution necessary in this corridor (due to the carrying capacity, maintenance concerns, problems associated with pulsing, and likely objection of rededicating lanes). The preferred yellow alternative would be the most beneficial in terms of number of people served within the one mile corridor, opportunities for T.O.D., utilization of the already established Union Pacific Railroad R-O-W, and mitigation of environmental impacts. While I feel that this draft EIS has been thorough in dispelling any concerns regarding mitigating impacts, I still wanted to take this opportunity to further comment on the preferred yellow alternative. First, in regards to the Tempe alignment (figure 7.2) still open to comment, I would recommend that the corridor running N-S (West of Mill Ave), turning E-W (North of Broadway Rd) be the preferred Tempe alignment. This is thought because it would be in walking distance to the future Tempe Street Car and in closer proximity to the light rail already in place. Ideally such an alignment would improve upon accessibility both locally and regionally. In addition, noise disturbances are talked about at great length with the assumption that the same quiet zones enforced in parts of Phoenix and Tempe (for freight) would be applicable to this rail. It is my recommendation to further mitigate noise disturbances (especially near residential) that these quiet zones be lobbied for at every single grade crossing (near residential) For future EIS studies, it would also be helpful to receive additional information on how this rail would impact the other prominent inter-city transit: the light rail. Can a reduction in its inter-city ridership (especially Phoenix- Mesa) be anticipated with this competing rail? Thank you for taking the time to read the above, and allowing me the opportunity to give my input.			Thank you for your comment and participation in this study. 1. A bus rapid transit alternative was evaluated in the Alternatives Analysis but eliminated from further consideration as part of this Tier 1 EIS. 2. Specific design and operating decisions, including sound walls and quiet zones, would be evaluated in future phases of the study as part of a subsequent planning and environmental analysis.

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9/23/15	Rhonda Elliott		
I would like a copy mailed to me if possible. I would like as much info as I can get, very excited.			The DEIS is available electronically and can be downloaded as a PDF from the ADOT website. http://www.azdot.gov/planning/CurrentStudies/PassengerRail/deis
9/23/15	Ryan Sweeney		
I fully support any and all mass transit initiatives in Phoenix and the rest of the US! Anything we can do to get people riding mass transit as opposed to driving is always a good thing: for traffic levels, the environment and human health. Build it!			Thank you for your comment and participation in this study.
9/24/15	Jason Kedmenec		
I strongly support and encourage the implementation of passenger rail service between Phoenix and Tucson. It's vital that we build this option of transit to enhance our infrastructure and economy. It will also draw strong ridership once completed especially in the Yellow Preferred Route. I also encourage leaders to explore public, private, or both sources of funding. As a lifelong Arizona native and having commuted between both major cities, I know how congested this corridor has become. Also, this will increase options for all socio-economic backgrounds but also serve for those who do not require a car in their home cities to travel to the other major city for family visits, work, or pleasure. It's also a viable back up corridor linking both cities in case another mode like freeway or air travel were temporarily interrupted. Thank you for taking my comment.			Thank you for your comment and participation in this study. Specific funding options, including public-private-partnerships, would be evaluated in future phases of this study as part of a subsequent planning and environmental analysis.
9/26/15	Monty Morgen		
Yes, it may be many years before this project ever gets completed, but here's one thing to consider. I am physically handicapped and transportation options are much more limited. Especially during the weekends and late nights, i.e. 8 PM or later. I would greatly like to be part of this portion of the project that otherwise may be overlooked.			Thank you for your comment and participation in this study. Specific decisions regarding hours of operations would be determined in future phases of the study as part of a subsequent planning and environmental analysis.
9/27/15	Wendy Greess		
I commute each week from Phoenix to Tucson. I have been doing this for the past 5 years. I leave on Monday morning and have a small apartment in downtown Tucson and return to Phoenix at the end of the work week. I would commute daily on a high-speed train if it had WIFI. As long as the train has WIFI, I would be able to work each way enabling me to			Thank you for your comment and participation in this study. Specific amenities offered on board the train itself would be evaluated during later phases of the study as part of a subsequent planning and environmental analysis.

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complete my work and still live with my family in Phoenix.			
10/1/15	William Pearson		
Hi, thanks for inviting the public to put in their input on the Tucson-Phoenix passenger rail. I for one am for this Tucson Phoenix Rail. For one reason, I LOVE trains, very, very much and have been before I was an adult. And I don't just like watching them, I also like to ride inside them too, preferably at-grade trains though, and I've been riding trains since I was 2 and living in Germany and had my very first Amtrak ride when I was 5, from the town of Benson to Chicago! Train riding is so much fun, to me more fun that riding in cars, buses, and airplanes... to me, I know others prefer these other modes of transportation and to each one his. For another, I think there should be a train running to and from Tucson and Phoenix for safety purposes. Not only will it get you between the two metropolitan cities faster but it's safer than riding between Tucson and Phoenix, especially Tucson and Casa Grande due to those dust storms and it's very sad to see and hear about all these car accidents and deaths occurring on that stretch of Interstate 10, I remember passing through an accident on my way from Casa Grande to Tucson back in January 2012. I mean I am aware that riding passenger trains between Tucson and Phoenix isn't 100% safe and can have its foibles, even in the dust storms, but I feel it's safer than riding on I-10. Though I don't mind riding between Tucson and Phoenix on I-10, it would be really great to ride a train to and from Phoenix, be it the express trains or the local trains, I'll ride either, maybe both just for the experience and sheer joy of it, as long as there are trains running between Tucson and Phoenix, which there should have been a long time ago. And be nice to ride trains other than Amtrak in the U.S. (although I've ridden the Light Rail in Minneapolis and the Tucson Streetcar (I live in but am not from Tucson, I'm from Indiana and the city I was born in has lots of tracks and one passenger rail, NICTD, although Amtrak runs through there too but doesn't stop there.) I mean if we don't get a train between Tucson and Phoenix, that's okay, but I'd really like to see that. What I don't look forward to though, but I won't try to stop it, is the possible elimination of the railroad grade crossings. I'm one of the few people on this earth that actually likes railroad crossings, the pretty flashing red lights, the melody of the bells, and the crossing gates and the little lights on them, those make my day and make my life more interesting. I mean if I have to choose between the crossings and the passenger rail, although I hope at least a few crossings will still exist, and with a 4-Quadrant Gate System, so I'm not selfish, I'll take the passenger rail. Before I finish, let me throw this out to you: How does a train from Tucson to Sierra Vista sound? I know there are no tracks in Sierra Vista and Sierra Vista is a smaller town and out of the way between Tucson and Phoenix but it'd be nice if trains ran there too, and			Thank you for your comments and participation in this study.

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maybe to Bisbee or Douglas. Stops should include Rita Ranch, Vail, Mescal, Benson, St. David, Curtiss, Tombstone or Whetstone, Huachuca City and then Sierra Vista. Then if successful, Hereford, Palominos, Naco, then Bisbee or to Double Adobe, Portlville, and Douglas... and from there freight trains can run into Mexico and not just through Nogales, but limited freight train service (note, this is all just wishful thinking and a mere opinion but an idea I thought I'd throw out. I also used to live in Sierra Vista but moved to Tucson to live in a railroad town, something Sierra Vista used to be.) And how about passenger rail to Nogales and back again (including Sahuarita, Green Valley, Tubac, and Rio Rico?... using the existing Nogales Branch Line) Again, just my opinion, I understand if none of these can happen. But I hope, if nothing else, there's a passenger train between Tucson and Phoenix, and if it ever comes about, I'll totally ride it! And hopefully be able to connect to the Valley Metro Light Rail there (I'm yet to ride that.) That's my input. Thank you all for reading this.			
10/1/15	William Pearson	(Second Comment)	
Dear Reader(s), I am writing in regard to the Tucson-Phoenix Passenger Rail, my support, my questions, and concerns. I am totally into the idea of passenger rail running between Tucson and Phoenix (and I did leave input on that, and thank you again for inviting the public to do so, I learned that from watching KGUN9 News.) I would love to see passenger trains run between Tucson and Phoenix, and of course ride in them as I favor and enjoy passenger rail travel to all other modes of transportation, including air travel. And not just actual trains but I also enjoy riding trolleys (Light Rail and Streetcar, any railway transportation but at-grade preferably) I'm also a train fan (even have toy train and model train sets). And I think this is a safer way to travel than on Interstate 10 due to the dust storms. I am also for this because I miss riding trains on a regular basis like I used to do back when I lived in Germany when I was 2-4 years old back in 1988-1990 and I've love to experience that here in Arizona instead of having to go all the way back to Europe just to do that, or move to other US states and cities like Baltimore, Chicago, and L.A. to name a few, Arizona is my home and though I kind of like Arizona just the way it is, I would like to see passenger rail run in Arizona. And not just between Tucson and Phoenix as well as within Phoenix and within			Thank you for your comments and participation in this study. Passenger rail services are assumed to run on a new, independent track and not share the UP Railroad track to avoid conflicts with freight traffic. It would be built to tighter tolerances to accommodate a much higher level of performance than currently possible with freight trains in the U.S. Most of the line would operate at-grade, but grade crossings would be installed over time. The assumptions for this study are for a few grade separations. Others could be added over time. For at-grade crossings the operating characteristics of the passenger trains would require four-quadrant gates, which prevent drivers from illegally driving around lowered gates, to maximize safety. Some of the crossings in the Tucson area are being redesigned to cross over the freeway. Those are being designed to eventually accommodate a passenger rail line. Others that already go over the cross-street would be expanded to accommodate the new services. There is a strong desire in the Tucson area to extend the passenger rail line to TUS. This makes sense as part of the

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Tucson, but also, but this is just a mere opinion and my personal fantasy, trains between Tucson and Nogales and between Tucson and Sierra Vista (with stops in Rita Ranch, Vail, Mescal, Benson, St. David, Curtiss, Huachuca City, and Sierra Vista, and if you want to go further, Hereford, Palominos, Naco, and Bisbee or more recommended, Douglas (very limited service between Sierra Vista and Douglas though but regular service between Tucson and Sierra Vista, which is admittedly a small town but a growing city and I lived there back in 1990, 1991, and 1999-2002) Anyway, getting serious, some things I am wondering about for the passenger rail, if it ever comes to life, and I do have a few concerns. I am wondering, if this passenger rail does come into existence, if it will run on Union Pacific's tracks, or if new track will be built alongside it (probably the latter.) Now I spoke to Union Pacific about this myself before and was replied to by Zoe Richmond, in case you know her, and she told me Union Pacific isn't doing the Passenger Rail, ADOT is, which is one reason why I'm contacting you. Though I am totally into the idea of passenger trains running between Tucson and Phoenix, my worry and concern was passenger trains running on Union Pacific's tracks and Union Pacific's freight train traffic is supposed to increase if not sky-rocket, which I also look forward to because I'm a rail-fan, or train enthusiast and I like to see trains go by railroad crossings, especially the ones with flashing red lights and gates and sometimes I go to the railroad crossings in Tucson just to see that, and hear the bells. Watching the crossing signal and gate lights flash makes my day. More on the grade crossings later. But with freight train traffic supposing to increase, and running passenger trains on those tracks too, though I wouldn't be as against that idea or as concerned about that idea if freight train traffic wasn't supposed to increase, my concern is the overcrowding and overburdening on Union Pacific's tracks. I mean train traffic is supposed to be (my guess) 80, maybe 90 trains a day. And I know BNSF, which runs through places like Holbrook, Flagstaff, and Williams, runs a so many trains a day on its track, and I would like to see that happen here in Tucson too. But also, passenger trains, namely commuter or regional passenger trains are supposed to be frequent as well and to run passenger trains on a track with 80 to 90 trains a day is a huge concern and cause lots of interference between the freight and passenger trains, which have to stop at stations and it could block the way of freight trains, which don't, or at least shouldn't, have to stop as much. And if I'm not mistaken, freight trains could disrupt and delay passenger trains. Plus, let's not forget the increased wait time and frequent stops at the			larger system, but is not the subject of the present Tier 1 EIS document. It would be evaluated in detail in subsequent environmental document(s). The passenger rail service would offer both commuter and intercity services. The corridor would be organized to permit faster moving trains to pass local trains at stations or at designated double-track locations designed to eliminate conflict points along the route.

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railroad crossings, especially on major roads (e.g. Ruthrauff Road, Ina Road, both of which are supposed to be grade separated anyway) Tangerine Road, and Cortaro Farms Road, and I'll add Main Avenue. I'd at 6th Street and 9th Avenue too since that is a highly used crossing and I go to that crossing more than any other crossing in Arizona, but that's to be grade separated too, at least 6th Street is supposed to be, 9th Avenue is supposed to be turned into a pedestrian and bike at-grade crossing as is 7th Avenue according to Downtown Links when they expand Barrazza-Aviation Parkway from Broadway to I-10, something else I'd like to have happen.) My other concern with this is that passenger trains are supposed to run faster than freight trains (I honestly don't know how much faster, you or someone would have to tell me) and it could cause a rail-traffic jam or worse. What might be done though is the building of new tracks alongside the Union Pacific tracks, which is probably what is planned to do anyway am I right? (And I too am for the yellow alternate rather than the orange, I don't know why for sure I just am, possibly because it's least expensive and runs along the existing UP line, but I'll take either.) It would probably be a better idea to build new track instead of using Union Pacific's tracks, that way the freight train traffic won't be disrupted and the existing U.P tracks wouldn't be disrupted and the passenger trains can stop at stations as the freight trains safely pass by. One question I have is, is this going to be fully double-tracked or single tracked with side tracks? I honestly prefer the full-double track but I'll take the single track with side-tracks, whatever ADOT thinks is best. Another question I have, will this line be generally at-grade (running on the ground) or completely grade-separated like the Bullet Trains in Japan? I would prefer at-grade to tell the truth, but if it is at-grade, I know there are going to be some grade separations, and I did read that at-grade crossings will not be built (I do wish there would be but I understand why not: for safety and convenience). I wonder this, will all the crossings be grade-separated or will there be some at-grade crossings, even on the not-as frequently used roads which do cross at-grade on Union Pacific's crossings? And if there are grade crossings, will they be shared with Union Pacific? (This is what I honestly hope for, but to try to show I don't want to be selfish, there doesn't have to be that many crossings on the passenger rail line, maybe just four or five or ten and grade separations everywhere else. And if grade crossings are in use, I am recommending 4-Quadrant Gate crossings, I highly prefer gated crossings to non-gated crossings, even			

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crossings with just flashing lights and a like gated crossings more than gate-less crossings.

I'll admit to you that although I like grade crossings, the problem with grade crossings is, although the passenger trains would operate on a separate track than the existing UP tracks, the tracks would have to go from 2-tracks (at least between Tucson and Picacho or Eloy) to three, four or even five tracks, making it take a little longer to get off the crossing, and the more tracks on a crossing riskier. And the constant activation of the crossing warning devices, activating like every 10 to 15 minutes (which I have almost no problem with but the masses will,) having to wait for the sky-rocketing amounts of long freight trains going by, and sometimes you get a second train, with either two freight trains passing at the same time (which is entertaining to me) or a second train starting to cross before or after the first one finishes.) And then with the passenger train tracks in place next to the freight-train-heavy tracks, that's more trains to wait for, although these trains are supposed to be shorter and faster.) But it will be a short time between trains for vehicular traffic to cross, plus some thoughtless drivers or impatient drivers try to outrun and beat the trains, even damaging the crossing gates doing so (which I really hate).

But like I said, if there are grade crossings, even if there are just a few, I highly propose strongly-gated crossings, using the 4-Quadrant gate system, or if you want, using B&B AMAR Safety Barrier Gates or Vehicle-Arresting Gates http://www.energyabsorption.com/products/products_stopgate_rail.asp (I prefer the 4-Quadrant system to be honest,) or the Safe Crossings Barrier Gates http://www.safe-crossings.com/ (these are gates that extend as they descend and retract as they ascend)

I don't have much expectation of the passenger rail building new crossings separate from Union Pacific's crossings, I expect crossings outside of Union Pacific's will be strictly grade separated, even if built alongside U.P.'s existing tracks. But I do wonder if the passenger rail shares crossings with UP, will there be some grade crossings and the rest grade separated (which I'm okay with) or will Union Pacific have to sacrifice all its crossings, even the ones not used as much? I admit if U.P decides to grade separate its crossings for the passenger rail, it will be much safer and less costly for everyone, including me.

Now some of UP's crossings are already grade-separated like Prince Road and Twin Peaks Road, or will be (like Ruthrauff Road and Ina Road, I don't know if Cortaro Farms Road and Tangerine Road will be too) so the passenger rail should be able to pass over or under those roads. I am also wondering about the crossings on the roads that terminate at the east-frontage road since they don't see as much vehicular traffic. Those are the ones that should

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have 4-Quad gates if not grade-separated. I'm also wondering how the passenger rail will pass grade separated roads like Grant Road, Miracle Mile, and Speedway Blvd to name a few. Getting away from grade crossings, now will this passenger rail stop in northwest Tucson? Or will this stop at the Amtrak Depot in Downtown Tucson? I also hear it's supposed to stop at Tucson International Airport, is that a good idea? I would like to know what is to take place should this passenger rail actually come into existence and operation, such as sharing track with UP or having separate track alongside UP, if it will be partially or fully grade separated (other than at crossings), will there be at least just a few crossings or absolute grade separation, and if the passenger rail track will run on single track with side tracks or be fully-double tracked. One more thing I'm wondering about is how will local passenger trains, which make frequent stops, run and cooperate with express passenger trains, which have limited stops? Whatever is going to go on or is supposed to go on, please know that I would like to see passenger rail between Tucson and Phoenix with or even without grade crossings. And I would like this as an alternate to travel on I-10 and plus I enjoy train travel over all else and would really love to experience this, and be able to take trains by myself (without the need of a parent or guardian though I'm 30 but admittedly autistic) Thanks for reading this and for your time. I will also send this through info@azdot.gov and hope to hear from you and get answers.			
10/2/15	Ryan Steving		
My family and I have lived in Queen Creek for the last 6 years and in the East Valley for more than 10. We often commute to Tucson to see family and travel everyday to work in Phoenix. The "yellow" route through Queen Creek would be our preferred route, and we think it would benefit our great little town and the state the most.			Thank you for your comment and participation in this study.
10/2/15	Derek Neighbors		
The route going through Queen Creek seems to offer the most economic impact long term.			Thank you for your comment and participation in this study.

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10/2/15	Elaine Block		
Please consider using the yellow line when choosing routes between Phoenix and Tucson. I live in Queen Creek and would use the train frequently if there was a stop here.			Thank you for your comment and participation in this study.
10/2/15	Marvin Block		
The yellow line would be advisable as it cost less and provides more economic benefits to the traveling public. A stop in Queen Creek would provide residents with alternatives for access to the valley and reduce the number of cars on valley roadways.			Thank you for your comment and participation in this study.
10/2/15	Jimmy		
I support the yellow line alternative to the passenger rail system. Queen Creek is becoming a very important area for Arizona. We've got a major airport and many new developments with residents helping Arizona grow. We've got the rail infrastructure already in place and many commuters would benefit from this proposal. Please consider the yellow line alternative and all the benefits it would bring to this growing community.			Thank you for your comment and participation in this study.
10/2/15	sab0623@...		
Hello! Thank you for posting the study and plans for the passenger rail corridor. I just moved to Eastern Queen Creek after living in Southern San Tan Valley for 7 years and I work in Florence. I see daily the need to mitigate the traffic congestion in that general area and beyond. Navigating the roads to just get through that area to a highway is slow and frustrating. With the increasing population there, traffic is heavy and patience is slim. My home is approximately 2 miles from the proposed yellow route existing railway. The location of a station in Queen Creek would be convenient for me, regardless of the exact spot along that line. It does come to mind that this could potentially be a heavily used spot for the commuters of QC and STV, and is there a place that would allow sufficient parking to accommodate the travelers? As for me, I would need to see the proposed times for the trains to evaluate if this would be a benefit. I have neighbors who work in downtown Phoenix, and have considered it myself but for the commute. I do believe that anyone commuting daily to Phoenix or Tucson would embrace this mode of transport, if the commutes are swift and connections are easily made to their ultimate destinations.			Thank you for your comment and participation in this study. Specific station locations were not evaluated in detail as part of this Tier 1 EIS. However, high-level assumptions as part of the recommended Yellow Corridor Alternative necessary for operational planning did assume a station in Queen Creek. Station locations and amenities, such as parking, would be evaluated in future phases of the study as part of a subsequent project-specific environmental analysis.
10/3/15	Douglas Stanfel		
Good Day, The yellow would be the best route to start Arizona's Rail system. The tracks already exist and are on a hardly used route used by UP or BNSF. Also this route services			Thank you for your comment and participation in this study. Although specific design decisions would be evaluated in

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many major cities such as the Fast growing southeast area and could easily be tied in with the new light rail system. In my past job I had a chance to use several rail system in CA, NM, UT and eastern corridor. Having lived in east valley for over 58 years it is a shame how far behind AZ is in rail transit.			future phases of the study as part of a subsequent planning and environmental analysis, connections to Valley Metro light rail and Sun Link street car have been assumed as part of this Tier 1 EIS study.
10/5/15	Lori Lehman		
I accidentally chose the wrong option, orange, in my previous submittal. I meant to choose the YELLOW option, which DOES include a stop in Queen Creek. Thank you, Lori Lehman			Your September 17, 2015 comment was intended to advocate the alternative that includes a stop in Queen Creek, which is the Yellow Corridor Alternative. Thank you for your comment and participation in this study.
10/5/15	Diane Hague		
Looking at the final two options, I believe the yellow route would provide more traffic relief to crowded roads and connect higher density population centers thereby maximizing usage.			Thank you for your comment and participation in this study.
10/6/15	Amy Shipp		
I think letting it go through Queen Creek/San Tan would be the best route for the state. The orange route just goes around everything and doesn't make much sense while the yellow actually goes through cities and would be good for that cities economy.			Thank you for your comment and participation in this study.
10/6/15	Jannine Hedger		
Absolutely! I hate driving all the way to Tempe and would take the train in a heartbeat.			Thank you for your comment and participation in this study.
10/6/15	tjalexander@...		
Do residents really want the Yellow Route that goes through the Town of Gilbert? Does following the US 60 make more sense and least neighborhood impact?			The Yellow Corridor Alternative is the ADOT recommended alternative as part of this Tier 1 EIS, based on a combination of technical analysis, public comments, and agency input gathered during the Tier 1 EIS process. Public comments have favored the Yellow Corridor Alternative over the Orange Corridor Alternative.
10/6/15	Mike Smith		
I vote NO on the rail line stopping in Queen Creek.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/6/15	Shaina Nelson		
No. Not a good idea. Everywhere I've lived where there was public transit it was hardly used by people that actually lived in the rural parts. It was used by criminals and drug users. Became plagues and run down eyesores on nearby communities.			Thank you for your comment and participation in this study.
10/6/15	Elizabeth Corona		
I think it's a great idea! It will bring business actually more business to the queen creek and San tan valley areas. I think the yellow route is prefect! We need something exciting over here!....			Thank you for your comment and participation in this study.
10/6/15	Laury Hart		
I am for the Yellow route. Being out in Queen Creek / San Tan Valley we have no public transportation. This route will offer easy commute both northwest into PHX and well as SE to Tucson. Getting our kids to college & university is huge. Also following the UP PHX sub will be less expensive as the rails are already in place. We have been waiting for a long time. Really looking forward to riding this train.			Thank you for your comment and participation in this study. ADOT has coordinated with the Union Pacific Railroad throughout this Tier 1 EIS. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for freight movement, and would not share line capacity with Union Pacific freight operations.
10/6/15	Diana Martin		
I am a resident of Queen Creek. I just a map of the proposed light rail going to Tucson and I am very concerned. I do not like this idea because this town would definitely lose its small town feel. I realize it may bring in more revenue but I feel it would bring in more transients and questionable individuals that I left California for. Will there be houses lost due to space for construction as well? I feel home values will decrease as well. My vote is NO, respectively. I would like to thank those involved in trying to find alternatives to get down to Tucson. I would never use the light rail anyhow. Thank you for your time in reading this.			Thank you for your comment and participation in this study. 1) This Tier 1 EIS evaluated passenger rail alternatives, an entirely different system than light rail or modern streetcar. Passenger rail is characterized by larger vehicles, faster travel speeds, and greater distance between stations when compared to light-rail. 2) Decisions regarding property acquisition have not yet been made, but would be evaluated in future phases of the study as part of a subsequent environmental analysis. 3) Proximity to rail transit stations has been shown to increase property values in various regions throughout the country.

Date Submitted	Commenter	Affiliation	Response
10/6/15	Brad Schreiber		
Yellow route is my vote....I'm in SE Gilbert and would love the convenience and traffic that the rail would provide.			Thank you for your comment and participation in this study.
10/6/15	David Shutan		
I wholeheartedly support the proposed yellow route. Lack of public transportation in this area (Gilbert and points further east and south) is woefully lacking. This would be a huge step in the right direction.			Thank you for your comment and participation in this study.
10/6/15	Jennifer Snyder		
I would love to have the yellow line. I live in the southeast valley and have several events in downtown Phoenix. It would be so beneficial to have a rail system where I am not bogged down in traffic. Additionally, my husband works in downtown Phoenix and it would be wonderful to be able to commute downtown via rail. The impact it would make for communities like Queen Creek would be incredible as it would be viable for a family to live there and work in either Tucson or Phoenix. I fully support the yellow line.			Thank you for your comment and participation in this study.
10/6/15	Stephanie Zinn		
Please please bring passenger rail to Queen Creek!! With the Gateway airport, ASU Poly and the Apple campus nearby in Mesa, this would help reduce traffic congestion in the future. It would also help home values in an area that still hasn't fully recovered from the housing crash.			Thank you for your comment and participation in this study.
10/6/15	Carmel Robinson		
It would be great to have public transportation from Queen Creek to both Phoenix and Tucson! Many times I have wanted to go to an event in Mesa or Phoenix but don't. My car is getting as old as I am and I don't trust the reliability as much as I used to. The Tucson area has been out of reach to me for ages for the same reason. All things considered this project would have a positive high impact on the ability to get around to a larger geographic area. I would definitely be a customer!			Thank you for your comment and participation in this study.
10/6/15	Richard Harrison		
My first choice would be the yellow route; second choice is the orange route. I know I would use it since both would go by my place of employment and would save me from driving my			Thank you for your comment and participation in this study.

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vehicle 60 miles round trip each day.			
10/6/15	Andres Martinez		
Greetings I am in support of the Yellow Alternative			Thank you for your comment and participation in this study.
10/6/15	Constance Halonen		
I am in support of the yellow line.			Thank you for your comment and participation in this study.
10/6/15	Rachel Pollack		
I vote for the ORANGE route.			Thank you for your comment and participation in this study.
10/6/15	George Easton		
This is wonderful and I look forward to its fruition. I hope it goes through Queen Creek as the Rittenhouse line is a natural route that could link San Tan Valley with the rest of the valley and beyond. Great forward thinking!			Thank you for your comment and participation in this study.
10/6/15	Mary Olson		
Love the "yellow" alternative. Homes are less expensive south of Chandler. Those who live south of Phoenix would have access to better jobs with transportation to those jobs. Good for the whole state.			Thank you for your comment and participation in this study.
10/6/15	Joyce Aurich		
Yellow line please.			Thank you for your comment and participation in this study.
10/6/15	Ladypsylocke@...		
Orange please.			Thank you for your comment and participation in this study.
10/6/15	Luke Simmons		
I hope you will seriously consider the Yellow Alternative. As a resident of Queen Creek and a leader in the community, I believe that the Yellow Alternative would provide a great deal of relief and support to what is already the fastest growing part of Arizona. Many families would experience less commuter stress and more time together if this route were approved. Additionally, the Yellow would be less expensive, given the existing rail infrastructure that exists.			Thank you for your comment and participation in this study. ADOT has coordinated with the Union Pacific Railroad throughout this Tier 1 EIS. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for freight movement, and would not share line capacity with Union Pacific freight operations.

Date Submitted	Commenter	Affiliation	Response
10/6/15	muttsx2@...		
The orange alternative makes the best sense. The route would be best for Coolidge, Florence, San Tan Valley, Gold Canyon and Apache Junction where there are no freeways out that way. It's difficult enough for residents in the far east valley to travel the congested roadways with little options to travel north. At peak travel times, Hunt Highway and Gantzel are heavily traveled. The orange alternative would alleviate the traffic traveling North while providing Queen Creek residents a short distance to travel to pick up the line.			Thank you for your comment and participation in this study.
10/6/15	Timothy Snyder		
I would like the yellow line because it has the smallest amount of environmental impact. I believe a passenger rail would be a great asset to the community.			Thank you for your comment and participation in this study.
10/6/15	Rosa Sumpter		
I am a member of the Queen Creek community and wanted to put my input in regards to the Passenger Rail that you are considering putting through our town! I think it is a GREAT idea and would help bring more people to our town! There is so much to see and history in our town revolved around agriculture that many families as well as schools put on their list for field trips, this would be a great way to get around for community members that have long commutes to and from phoenix area as well. So, I would say YES – let's do it! Look forward to it.			Thank you for your comment and participation in this study.
10/6/15	Rachel Pollack		
I would like to comment on the proposed train route and say that I would NOT like the train to be routed through Queen Creek. There is too much traffic and noise here already, and it will not garner carpooling passengers because of logistics.			Based on forecasts, it is likely that congestion will grow in the area between Tucson and Phoenix, including in Queen Creek. This study considers how to manage such congestion by offering a different choice for travel.
10/6/15	Maureen Schubert		
I would like to express my support for the Yellow Line of the Passenger Rail Corridor Study. I live in Gilbert and believe this proposed route would bring increased economic vitality to the community, as well as make it easier to travel around the state for work and tourism. Thank you for your consideration, and I look forward to hearing about funding proposals very soon.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/7/15	B J		
Please use the yellow line, it will allow more people access to it. The red line seems to skip all the small towns and seems to be where there are less people.			Thank you for your comment and participation in this study.
10/7/15	Josh Spencer		
I simply wanted to voice my support of the Passenger Rail having a stop in Queen Creek. I work in downtown Phoenix and would take the Rail to work and also to the airport.			Specific station locations were not evaluated in detail as part of this Tier 1 EIS. However, high-level assumptions as part of the recommended Yellow Corridor Alternative necessary for operational planning did assume a station in Queen Creek. Actual station locations and amenities would be evaluated in future phases of the study as part of a subsequent planning and environmental analysis.
10/7/15	Camille Kershner		
As was mentioned by nearly every commenter at the Tucson open house in September, the most logical southern terminus for this project is Tucson International Airport. as another commenter also noted, this project absolutely should be powered by renewably sourced electricity- solar panels above and alongside the tracks can easily help offset some of this energy need, setting a great example for the rest of the country by providing a sustainable connection from the southern half of the state to the rest of the world via Sky Harbor and TIA, and to the surrounding metro regions through the MetroRail and SunLink. For example: Please join us at 7pm this Thursday, October 8 UCFW Hall at 877 S. Alvernon Way A Future Without Fossil Fuels. The world is using up its Carbon Budget. A future that solves Climate Change is going to have to stop using fossil fuels. What does a fossil-free electricity grid look like? Come find out at this presentation by Robert Bulechek, clean energy consultant and chair of the Tucson-Pima County Energy Commission. Facebook event: https://www.facebook.com/events/604720469669536/			Thank you for your comment and participation in this study. 1. The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, but actual end-of-line station locations would be evaluated during future phases of the study as part of subsequent planning and environmental analysis. 2. The preliminary analysis conducted for this Tier 1 EIS study assumed the use of diesel multiple unit trains. However, actual decisions regarding preferred technologies, and the consideration of solar power, would be made in future phases of the study as part of subsequent planning and environmental analysis.
10/8/15	Mary Whitted		
I am a resident of San Tan Valley near the Queen Creek Area. I absolutely oppose having the train stop anywhere near our areas. This will bring our area crime from Tucson, Eloy, Coolidge and Florence. Also this rail runs directly along the same areas where prisoners are released compromising safety. This is a bad idea and will only make it easier for prison escapees to get away faster. I am appalled that we are even considering this as a way of increasing money and jobs to our town. It's just going to add to the issue of people sitting in front of the circle K			System security would be evaluated in future phases of the study as part of subsequent planning and environmental analysis, but safety will be of the utmost importance moving forward.ISimilar transit systems implemented throughout the country have not been shown to result in an increase in crime.

Date Submitted	Commenter	Affiliation	Response
waiting to be picked up for work. This will also put unneeded strain on deputies and they will ask for a larger contract when it's time to renew. This is just a really nasty idea and bad for our community.			
10/8/15	dottieday@...		
Having any public transportation available in Queen Creek would open employment and education opportunities up to all the youth in our community. Young people who don't have a job can't afford a car and without a car they can't get to a job. Catch -22. This would help tremendously.			Thank you for your comment and participation in this study.
10/8/15	Kiel Fullmer		
I would love to see the Passenger Rail come into fruition. It's a great idea that is needed to expand the valley and will connect the metro-area as a whole. Living out in Queen Creek, I have a daily commute of close to an hour to get to my job in Phoenix. The Passenger Rail would easily get me to a closer point quicker, and allow me to carpool or use the Metro Public Transport to get to work. I saw the proposed lines on the Queen Creek Town Facebook Page and really like the Yellow Line suggestion as it seems it already follows an established railroad and connects more towns/cities.			Thank you for your comment and participation in this study.
10/8/15	Susan Scott		
The orange line provides better connection for the eastern most cities of Gilbert, Queen Creek San Tan Valley and Apache Junction. Chandler has current access to 101 and 202 freeways. Definitely we need a system.			Thank you for your comment and participation in this study.
10/10/15	Angela Porter		
I would like to know the proposed stop in Queen Creek. How close to a neighborhood?			Specific station locations were not evaluated in detail as part of this Tier 1 EIS. However, high-level assumptions as part of the recommended Yellow Corridor Alternative necessary for operational planning did assume a station in Queen Creek. Actual station locations and considerations, such as proximity to existing residential neighborhoods, would be evaluated in future phases of the study as part of subsequent planning and environmental analysis.

Date Submitted	Commenter	Affiliation	Response
10/10/15	Ralph Smith		
Queen Creek has enough train noise in town. Route the new passenger away from Queen Creek or include noise free zones in your plan.			Thank you for your comment and participation in this study.
10/13/15	Charlotte Appel		
The yellow line will be beneficial to all people of Mesa, Chandler, Gilbert, Queen Creek and San Tan Valley. It will help promote more business and traffic flow to all areas and decrease carbon emissions. I personally work at Banner Ironwood Medical Center at San Tan Valley and I'm also the Travel Reduction Program coordinator for both Banner Ironwood and Banner Goldfield (Apache Junction) and we are looking for ways to cut down on car travel. This will greatly help improve the air quality for the East Valley. We will save on gas, money, and clean the air. Many of our staff travel in from Maricopa County into Pinal County for work. With a passenger railway into the East Valley, I can only see more convenience for travel and lighter traffic on the roads.			Thank you for your comment and participation in this study.
10/13/15	Nancy Anacker		
I was recently in New Mexico and observed the Santa Fe to Albuquerque rail, which I think is a good model. We truly need a rail line between Phoenix and Tucson to alleviate some of the traffic on I-10 and to make commuting easier for many people. I think it needs to be done sooner rather than later, and if New Mexico can do it, we can too. Theirs is fast, very reasonably priced and comfortable.			Thank you for your comment and participation in this study. Other comparable passenger rail systems from around the United States have been referenced and studied as part of the Tier 1 EIS analysis.
10/13/15	Dr. Christopher Bleuenstein		
I am fully supportive of a train route and I do like the yellow alternative route.			Thank you for your comment and participation in this study.
10/17/15	William Ferguson		
Elon Musk hyper-loop in this corridor is well worth considering with its environmental and fiscal impact on many of us living in Arizona.			Thank you for your comment and participation in this study. This Tier 1 EIS assumed the use of diesel multiple unit trains for high-level cost, operations, and environmental impact comparisons. Actual decisions regarding vehicles and technology would be evaluated in detail as part of subsequent planning and environmental analysis.

Date Submitted	Commenter	Affiliation	Response
10/18/15	Tanya Petros		
Yes please bring this into Queen Creek. Only request is that it drops off AT THE PHOENIX SKY HARBOR AIRPORT. Meaning IN THE AIRPORT like the light rail does at the Atlanta airport. No point in having it stop away from the airport and then have to bus in. the light rail in Atlanta for drop off and pick up is actually ATTACHED to the airport.			Thank you for your comment and participation in this study. Specific station locations were not determined as part of this Tier 1 EIS. However, high-level operational assumptions for both corridor alternatives included a future connection to Phoenix Sky Harbor airport. Station locations and the actual design of airport and transit system connections would be evaluated in detail in future phases of the study as part of subsequent planning and environmental documentation.
10/18/15	Connie Finneman		
I support the Yellow line.			Thank you for your comment and participation in this study.
10/18/15	Shana		
Queen Creek is a rapidly growing community that is seriously lacking a transportation system. A passenger rail system would provide invaluable connection to the rest of the valley. It would be greatly welcomed and utilized here.			Thank you for your comment and participation in this study.
10/18/15	Karen Mallo		
Please bring the yellow line to Queen Creek.			Thank you for your comment and participation in this study.
10/18/15	Angela McElyea		
I support mass transit efforts in general and would like more detailed pro/con analysis made available in Queen Creek. People don't seem to understand the benefits...making them jump on "more crime" type of comments, and while they may be acting like sheep and spreading negativism I'd like to hear more about the actual pros and cons that were assessed.			Thank you for your comment and participation in this study. Details of all Tier 1 EIS analyses are available on the ADOT website (https://www.azdot.gov/planning/CurrentStudies/PassengerRail/deis). Chapter 7 of the Tier 1 EIS includes a comparison of the alternatives; a review of the corridor alternatives compared with the No Build Alternative provides the information for you to make your own pro and con assessment. More detailed design-level analysis would be included in future phases of the study as part of a subsequent planning and environmental analysis.

Date Submitted	Commenter	Affiliation	Response
10/18/15	brittneyj21@...		
Yes to the yellow alternative. I would love a faster and more eco friendly way to get to Phoenix from San Tan Valley.			Thank you for your comment and participation in this study.
10/19/15	Julie Hackamack		
I am in support of the Orange Line option. There is an increasing amount of aging population in Queen Creek, and this route provides a viable solution to the area's most common practices and facilities that patients are referred to.			Thank you for your comment and participation in this study. The community of Queen Creek would actually not be directly served by the Orange Corridor Alternative. However, the Yellow Corridor Alternative would serve Queen Creek.
10/20/15	Jessica Smith		
Please bring the Passenger Rail to Queen Creek!			Thank you for your comment and participation in this study.
10/20/15	Jason Zielinski		
I have a question regarding the Yellow Plan railway from Phoenix to Tucson. How wide is Union Pacific's right of way? I'm building a home within a mile of the railway and I am concerned about the potential of my home being a casualty of a new railway.			The Yellow Corridor Alternative is a mile-wide corridor. ADOT anticipates that an alignment alternative within this corridor would likely be located within or adjacent to the existing Union Pacific Railroad right-of-way, although other alignments may be considered. During the subsequent planning and design stage, public coordination and outreach would continue at a more localized level to discuss potential impacts to neighborhoods and individual properties. The Union Pacific rights-of-way vary from 66 feet to 200 feet, depending on the location within the corridor.
10/20/15	Casey Bair		
My name is Casey Bair and I am a property owner and have lived in Queen Creek, AZ for the last 7 years. I am 100% against passenger rail coming through our town. This will be wasted tax dollars on a train that few people will use (despite what studies there have been) go to any big city and the trains are vacant. I do not want the added crime in our town, including the added crime in Gilbert which is one of the safest towns in the country. There is a reason why that is true and you would have to think not have passenger rail systems running through the town helps that statistic of safety. This is one of the worst ideas Arizona has had. Seems like 80%+ are against it in Queen Creek and Gilbert and want to make sure all of those			Thank you for your comment and participation in this study. To clarify, the light rail system in Phoenix carries twice its forecast ridership in the corridor it serves. It has also created an environment favorable for growth in the city. Property values in the vicinity of stations tend to rise over time because of the improved access to the rail mode, and crime actually goes down based on the studies completed on the subject in other communities. Based on the benefits to be derived from the proposed system, the Town of Queen Creek has been in

Date Submitted	Commenter	Affiliation	Response
comments are heard.			favor of the project. In general, the project has had more public support than opposition.
10/24/15	Darryl Mondrow		
We should not be considering diesel engines - electric is the wise alternative because it is much less polluting, both for emissions as well as noise. Electric technology for rail transportation has been embraced in Europe as well as Japan. Look at the scandal that just occurred with VW Corp and their diesel technology pollution issues. Diesel is not the wave of the future - if we truly care about reducing pollution in the Phoenix-Tucson corridor, we must seriously consider the electric alternative Thank you for your efforts.			Thank you for your comment and participation in this study. This Tier 1 EIS assumed the use of diesel multiple unit trains for high-level cost, operations, and environmental impact analyses. More detailed evaluations of vehicles and technology would be evaluated as part of a subsequent planning and environmental analysis.
10/24/15	Brye		
In regards to this project, please reconsider the yellow corridor and instead use one of the other alternatives. I read that the yellow corridor would bring more riders, and I see the positive in that, but it runs right through many small town communities, including my hometown Queen Creek. I have embraced the growth in the Queen Creek area over the last 10 years. It is much bigger than when I first moved out here almost 25 years ago. I am grateful for the town planners for managing the growth out here while still maintaining the small farm town feeling that exists here. I worry that a transportation/rail line being built to go through this town will bring in many problems for our community, including increased crime, transients, more rapid growth that takes away from the farming community feel, traffic, etc. The rail lines mentioned that the yellow corridor would follow also passes by many of our town's schools, including Poston Butte high school, Queen Creek high school, Queen Creek middle school, Benjamin Franklin High School, Heritage Charter school, and more - which could possibly pose a variety of threats to school kids as well. My opinion is narrowed to this area, but the yellow corridor may pose similar issues in other areas that it is proposed to run through, including in San Tan Valley and Gilbert areas. The alternative options may not bring as many riders since they don't run right through the middle of these towns/cities but those who are anticipating help with their commute between The Phoenix area and the Tucson area will likely still use rail system no matter where it is and those commuters/ potential riders are the reason this rail system was proposed in the first place. It is not necessary to us who don't count on or need the rail system to build it in a way that would be at our expense. I am for building a rail system as I can see how that would help out many people, but I really hope that the current leading corridor (the yellow line) is reconsidered. Thank you for your time.			Thank you for your comment and participation in this study. ADOT has recommended the Yellow Corridor Alternative based on a combination of technical analysis (including cost, ridership, and environmental impact considerations), public comments, and input from agencies including the Town of Queen Creek. System security and the avoidance of or mitigation of sensitive noise receptors (including schools) would be addressed in subsequent environmental analyses during later planning and design phases of this study.

Date Submitted	Commenter	Affiliation	Response
10/24/15	Keith Brussman		
Definitely about time.			Thank you for your comment and participation in this study.
10/24/15	Mary G James		
Rail service between Phoenix and Tucson would be valuable for students attending U of A as well as for family members visiting their children/siblings enrolled at the U of A. Many people have friends and family in both towns and would benefit from riding the train rather than driving on an already congested I-10. This interstate is so heavily traveled that an alternative method of transportation would be welcomed. Rental car companies and taxi services would thrive at both terminal points as would possible expanded future metro rail services. Please continue to explore and implement a rail service between Phoenix and Tucson.			Thank you for your comment and participation in this study.
10/24/15	Michael Guilliam		
I think the rail system would be incredibly beneficial to the state. It would allow for stronger business ties between the two cities, and would allow for undergraduate and graduate students more options in terms of their Universities. For both cities, this would mean individuals becoming qualified without leaving their home, thus providing a benefit for their home city, where it would otherwise have been prohibitive to remain.			Thank you for your comment and participation in this study.
10/24/15	D Beeby		
The rail will get good use between Tucson and the Phoenix area. BUILD it. I personally prefer the Green line.			Thank you for your comment and participation in this study. The Green Alternative was removed from further consideration as part of this Tier 1 EIS. It did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts.
10/24/15	gojolly123@...		
We should not be considering diesel engines - electric is the wise alternative because it is much less polluting, both for emissions as well as noise. Electric technology for rail transportation has been embraced in Europe as well as Japan. Look at the scandal that just occurred with VW Corp and their diesel technology pollution issues. Diesel is not the wave of the future - if we truly care about reducing pollution in the Phoenix-Tucson corridor, we must			Thank you for your comment and participation in this study. This Tier 1 EIS assumed the use of diesel multiple unit trains for high level cost, operations, and environmental impact analyses. More detailed evaluations of vehicles and technology would be evaluated as part of a subsequent NEPA

Date Submitted	Commenter	Affiliation	Response
seriously consider the electric alternative Thank you for your efforts.			analysis.
10/25/15	Christopher		
Hello, Thank you for considering rail in AZ. I would love to see the rail built from Phoenix to Tucson. Hopefully funding came come from grants, privately through business ads such as on trains and at stations, as well as possibly taxes. I'd also like to see future rail carried on from Phoenix to Las Vegas on the north route and to California on the western route. I believe this will be another crucial piece of our infrastructure over this next half century.			Thank you for your comment and participation in this study. 1) The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, but this does not preclude future studies to connect Phoenix to other destinations such as Las Vegas or California. 2) Financing to further develop the proposed system is not available at this time, but would be evaluated in future phases of the study as part of a subsequent analysis.
10/24/15	Anna-Lisa Tonge Souers		
The orange route is the preferred route. Apache Junction to Florence would benefit the many the current commute the I-60 to Florence Junction on inadequate roadways and are dangerous are employees at the Federal, State and Immigration facilities. This route would also provide safe alternatives for students and professionals from these areas that desire to Attend ASU or work in downtown Phx with a simple contain on the express bus lines at Superstition Springs. The current ADOT preferred route is not good as the police and EMS services are contracted and disorganized in the event of major event. As well as this area will be serviced by 2 freeway routes. It's time to serve rural Apache Junction and Pinal county which is equally population dense. The population are underserved in AJ and Gold Canyon as they are older, lower social security and would benefit from having transportation to events, shopping, adequate medical care and services Apache Junction is unable to provide or have at a premium due to unrealistic city taxes and lack of mainstream retailers.			Thank you for your comment and participation in this study. The preferred Yellow Corridor Alternative and the Orange Corridor Alternative are both served by the same ambulance services. Police services for both corridor alternatives are identical in the areas where they run in common or are near each other, but where the corridors intersect with different local jurisdictions (such as Coolidge and Florence) police services differ. With nearly the same service providers for emergency services, response times to major emergency events would be expected to be comparable. System security and EMS access would be evaluated in more detail during future stages of the study as part of a subsequent analysis.
10/24/15	Michael Zichichi		
The yellow plan with a stop in Queen Creek is the best long term option for ridership which is the point of a commuter rail line, isn't it? Please select this option with a stop in Queen Creek. As a Queen Creek resident I support this option and would use the service.			Thank you for your comment and participation in this study. Specific station locations were not evaluated in detail as part of this Tier 1 EIS. However, high-level assumptions as part of the recommended Yellow Corridor Alternative necessary for operational planning did assume a station in Queen Creek. Proposed station locations would be evaluated in further detail as part of future phases of the study.

Date Submitted	Commenter	Affiliation	Response
10/24/15	Jim Dickey		
This is an excellent effort and begs the question of organizational structure and funding in order to continue additional planning, design, environmental, engineering, and implementation plans. Because of relationship building with the UP, FRA, FTA, and others, it seems only right to take the next steps. As part of a larger FRA SW regional plan, next steps would keep Arizona on the US transportation map. As to the study, although significant alignment details remain to be determined, this study identifies a clear path to developing an urban transportation solution (commuter rail) and identify for the first time an option to adding more highway lanes to I-10 to connect Arizona's two major urban areas (intercity rail). ADOT should be congratulated for thinking outside that box. This project has demonstrated major support from community and business members in Maricopa, Pinal, and Pima counties. It should not be left out in ADOT's long term planning process.			Thank you for your comment and participation in this study.
10/24/15	Nichole Boyd		
This is a great idea. I love that someone has become innovated in making travel easier. I would also like to see if a light rail would be built to flagstaff. Arizona is growing and ADOT should also be growing. This proposed plan to Tucson could help families who need cost effective travel. Also this would be a great asset to College students so they can travel easier into the valley.			Thank you for your comment and participation in this study. The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, but this does not preclude future studies evaluating connections from Phoenix to other destinations such as Flagstaff.
10/24/15	E W Olson		
My only comment for the rail is to make it high-speed with stops spread out so you can provide a fast service. A train going 60 miles an hour is not an improvement. If you are just using a train or slow form of transportation you might as well widen the freeways for vehicles.			Thank you for your comment and participation in this study. The analysis for this Tier 1 EIS assumed a top speed of 125 mph.
10/24/15	Jennifer Childers		
I would use the passenger rail system from Phoenix to Tucson. I have family in Tucson and it would be easier to visit them with this system.			Thank you for your comment and participation in this study.
10/24/15	Liliana Figueroa		
This is a wonderful idea. I'm a federal employee and several of us have had to frequently commute to Tucson to help our peers at the federal courthouse there and the drive is exhausting! I speak for hundreds of Feds whom go back and forth! Hopefully, this will become			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
a reality soon!			
10/24/15	Jeanmarie Harrington Bisceglia		
I think this will be a great option for professionals like attorneys who have to travel between Phoenix and Tucson. With a passenger rail professionals could use the commute time to work rather than be stuck in traffic driving. I would take advantage of it.			Thank you for your comment and participation in this study.
10/24/15	Dawnn Salyers		
I think it's a wonderful idea to expand the light rail or create a passenger rail to the Tucson area. This opens up opportunity for tourism, my belief is this will great expand simple day trips opportunity for those to travel back and forth for events, leisure etc.			Thank you for your comment and participation in this study.
10/24/15	Jacqueline V		
This is not of much interest to me as I do not travel to any southern parts of Arizona. I would not be for this project.			Thank you for your comment and participation in this study.
10/24/15	Monica Cara		
I vote for the yellow route. Living in a rural area, it would be nice to have alternative ways to travel to the valley.			Thank you for your comment and participation in this study.
10/24/15	Amanda		
A commuter train between Tucson and Flagstaff would be very beneficial...college students could use it; I could have stayed in my house in Tucson and still work in Phoenix. Stops in Casa Grande would allow shopping; seniors can travel safely between cities. There are so many accidents between Tucson and Phoenix, this would be wonderful.			Thank you for your comment and participation in this study. Specific station locations were not determined as part of this Tier 1 EIS. The communities of Flagstaff and Casa Grande would not be directly served by either the Yellow or Orange corridor alternatives, but this does not preclude future studies evaluating connections to other destinations.
10/24/15	Karen Matthews		
I work in Tucson for a company that is headquartered in Tempe. Having a reliable commuter rail system between the two cities would be a tremendous benefit given the number of times employees at both locations need to travel between the two offices for meetings, training and staff development activities.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/24/15	Charles Dine		
I love the idea of a rail system connecting our entire state eventually. As a Marine I have enjoyed Japan's extensive rail amenities. America is already a dinosaur by comparison and must begin planning for mass interconnecting transit now so easements are planned. One thing I didn't see discussed was this particular route's proximity to Gateway. Whichever route is decided upon, proximity to Gateway should be a factor.			Thank you for your comment and participation in this study. Proximity to airports, including Phoenix-Mesa Gateway, was an important consideration during the analysis of corridor alternatives. Although specific station locations, and airport connections, were not analyzed as part of this Tier 1 EIS, these considerations would be evaluated in detail during future planning and design phases of the study.
10/24/15	Sean Paddock		
As long as the final route connects with the current light rail system in the greater Phoenix area I am open to any rail system to connect Phoenix and Tucson. Having to choose one of the three listed, the yellow line is the one that would be most beneficial to me.			Thank you for your comment and participation in this study. Connections to the existing Valley Metro light rail system were included in high-level operational assumptions for both the Yellow and Orange corridor alternatives.
10/24/15	Jeff Porter		
The study so far has shown rail is too expensive compared to adding lanes and wheeled alternatives. Please don't waste any more study money on rail trying to justify a wasteful, ideologically driven transportation alternative. Add lanes, encourage self driving electric cars in this time frame, at much less cost per passenger mile. Trains are great at freight from sea ports to distribution centers; don't put passengers in the way on limited, costly rails.			Thank you for your comment and participation in this study. This study was conducted in order to evaluate alternatives to automobile travel between Phoenix and Tucson, as adding lanes to existing freeways within the study corridor is sometimes not a feasible long-term solution.
10/25/15	Derek O'Toole		
As a resident of the East Valley, I believe the orange route proposal makes the most sense due to the massive influx of population to Queen Creek and San Tan Valley. Currently there is no public transit being offered to these residents who could benefit from a tie-in to Central Phoenix. If the current railroad is used as well throughout the area, a mighty cost savings could be incurred. I know for myself, if a rail was provided I would never have a need to use my vehicle to access Phoenix again.			Thank you for your comment and participation in this study. The Orange Corridor Alternative does not directly serve Queen Creek or San Tan Valley, nor does it follow an existing freight rail corridor through the East Valley. However, the Yellow Corridor Alternative does directly serve these communities, as well as follow an existing freight rail corridor.
10/25/15	Virginia Genovese		
Please move forward with a plan to initiate public rail service between Tucson and Phoenix!			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/25/15	cluciodi@		
In my honest opinion, I don't know anyone who travels frequently enough to Tucson to need a passenger rail. We should work on getting trains from Phoenix to Glendale, Surprise, etc... Not Tucson, most people who travel to Tucson has cars.			Thank you for your comment and participation in this study. 1) Although the analysis of this Tier 1 EIS focused on a passenger rail connection between Phoenix and Tucson, commuter connections into the West Valley were considered as part of high level operational assumptions. 2) Ridership estimates conducted as part of this Tier 1 EIS have indicated the potential for over 2,500 daily riders between Phoenix and Tucson, and over 15,000 shorter trips in the Phoenix and Tucson metropolitan areas.
10/25/15	James Cramer		
I believe AZ must build a rail system between Tucson and Phoenix, I also think that both cities need to clearly address the needs of the passengers once they arrive by train. How will they get around the city, will a park and ride system be in place, can they accomplish their travel goals efficiently? Can riding the train eliminate the need for a private mode of transportation comfortably? Not connecting the train system to Airports, Universities, Major Shopping, Medical, and Sporting and Entertainment venues in some fashion would be a major mistake.			Thank you for your comment and participation in this study. Passenger rail system connections to other transit services, as well as activity centers such as airports, universities, and venues were major considerations in all alternative routing evaluations as part of this Tier 1 EIS. More detailed investigations of specific station locations and amenities, such as parking facilities, would be evaluated in more detail in later planning and design phases of the study.
10/26/15	Terence Johnson		
I just want to say thank you for launching this study, and that I hope the project moves ahead. I would recommend starting small, using existing tracks (the yellow route) and refurbished equipment at first to drive capital costs down, just as a private sector startup would. Trinity Rail Express in Dallas would be a good model to follow. They used rebuilt units at first and then invested in new equipment as demand grew. I believe their original units are now available for another startup service to lease. As a Canadian businessman, I'm much more likely to attend events in the Phoenix -Tucson area if I can get around by public transit and see something outside the conference while I'm in the area. The ease of getting around without hiring a car is currently a major incentive to attend events organised in the SF Bay Area. I tend to see driving time as stressful, unproductive time, and ride public transport as much as possible. If there's coffee and wi-fi, even better. Also, don't forget that evening and weekend services are important both for 24/7 businesses and for families to get around. A			Thank you for your comment and participation in this study. The Yellow Corridor Alternative of this Tier 1 EIS is the ADOT recommended option, which follows existing Union Pacific Railroad freight corridors. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than needed for freight movement and would not share line capacity with Union Pacific freight operations.

Date Submitted	Commenter	Affiliation	Response
service that only operates on weekday rush hours excludes a lot of potential personal travel plans and leaves all its expensive capital equipment idle for much of the time.			
10/26/15	R. L .Stump		
The passenger rail system between Tucson and Phoenix is long overdue. The traffic congestion, road conditions and ongoing major traffic collisions along I-10 is terrible. When a dust storm comes through vehicle traffic is a disaster. The train should tie into the light rail in metro phoenix to make it really efficient. Get with it ADOT the price keeps going up.			Thank you for your comment and participation in this study. The passenger train would link to light rail, street car, and bus services in a number of locations along the corridor.
10/26/15	Jeff		
I feel that the recommended route using the "Yellow Alternative" is the best, safest and cost effective plan ADOT has given. I am for the "Yellow Alternative" Thanks!			Thank you for your comment and participation in this study.
10/26/15	Patrick McCarthy		
Please do not waste our money on a Passenger Rail. You could spend 1/10th of this amount and have Super Luxury, ticket subsidized busses run between Phx and Tucson. See this great article http://www.cato.org/publications/commentary/light-rail-doesnt-work Even with overly luxurious busses (and I mean add all kinds of features, food, keep them super clean) it's still MUCH less expensive AND can adapt to any changes. A rail system cannot adapt - it's a fixed structure. Rail systems in Arizona make zero sense - take a look at the light rail in Phoenix/Tempe - what a joke. some other required reading: http://www.downsizinggovernment.org/transportation/high-speed-rail http://www.downsizinggovernment.org/lone-star-rail-insanity			There are many perspectives that influence our transportation system, both in favor of and opposed to all types of travel modes. Given the expected congestion our highways will experience in the relatively near future as a result of high growth in the corridor between Phoenix and Tucson, the consideration of a passenger rail system is offered as a complement to the highway (I-10, mostly), not a replacement for it. Buses were studied as part of the Alternatives Analysis that preceded the Tier 1 EIS. They are certainly able to provide a high quality service, but they cannot carry the anticipated travel demand of a train and cannot do so at the speeds of a higher speed train. Passenger rail can be a costly project, but it could be implemented in phases and would provide a more comprehensive solution than bus travel can offer.
10/26/15	Steve Whaley		
No Build Alternative.			Thank you for your comment and participation in this study.
10/26/15	dinadoolen@...		
I prefer the orange alternative because it also serves more outlying rural areas. I believe that alternative will be the best start to such service.			Thank you for your comment and participation in this study. The selection of the Yellow Corridor Alternative was based

Date Submitted	Commenter	Affiliation	Response
			largely on the fact that it is able to serve the major population centers in the corridor.
10/26/15	Steve		
Rail? Suggest a high-tech solution using the latest in self-driving automobile technology. Commercial grade vehicles, self guided, that form a "train" when electronically linked. Make them electric (ref: Tesla) and just add "diamond-plus" lanes. Lead the nation in forward thinking green technology and save a few dollars on using the same infrastructure.			This is a possible scenario for the future and could influence how funding for transportation is allocated once it is a viable option. At this stage, the proposed passenger rail system is designed to offer a higher-speed service to shorten the time between the two major metro areas in Arizona. The connected vehicle changes under development would certainly complement the high-speed rail program.
10/26/15	Rich Franz-Under		
I support passenger rail. The no rail alternative is not a forward thinking alternative.			Thank you for your comment and participation in this study.
10/26/15	James Orcutt		
I think this is a great idea. We should also consider rail lines from Phoenix to LA, Phoenix to Las Vegas and Phoenix to Flagstaff. All of these are heavily traveled by Arizona residents. A high-speed rail to LA would be unbelievable popular.			Thank you for your comment and participation in this study. The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, but this does not preclude future studies to connect Phoenix to other destinations.
10/26/15	Tracy Reichle		
We support the yellow line with access to Queen Creek. This would greatly boost the local economy as well as allowing many to search for employment opportunities outside the smaller area currently available to them.			Thank you for your comment and participation in this study.
10/26/15	Former St. Sen. Jack Harper		
No state funds should be spent on the rail to Tucson, unless the Grand Ave Commuter Rail is funded from the same source. Maricopa County should not subsidize other areas of the state, as the Transportation Committee has often required by spending general fund dollars only in non-Maricopa parts of Arizona.			Though it is not a part of this Tier 1 EIS, the Grand Avenue Corridor was considered as a part of the project to establish ridership levels and to recognize the need to reach the westerly areas of Maricopa County for the overall program to succeed. Funding for the passenger rail project has not yet been identified, but it is likely to occur in phases. Maricopa County contributions would presumably cover the segments in Maricopa County, but there could also be a statewide

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			element to the funding program, which could be public or private.
10/26/15	Amanda Harrison		
I fully support the Tucson to Phoenix Rail being built through San Tan Valley & Queen Creek. I believe the Phoenix area has benefitted from this in the past, and being able to expand the Rail through the East Valley and to Tucson will open up new jobs, create new and improved cities. San Tan Valley & Queen Creek has the room to support the rail, and I do believe in the long run our cities could benefit from this rail.			Thank you for your comment and participation in this study.
10/26/15	Lori Campbell		
I fully support the proposed route (yellow) that would route through Queen Creek. This line make the most economical and logistical sense, in that the rail lines are already in place. This would be a huge boost to the commerce in the southeast valley area. I grew up in the Chicago area, so I know how beneficial a commuter rail line can be for both work and pleasure travel.			Thank you for your comment and participation in this study.
10/26/15	Jeff Cooley		
After studying the two remaining alternatives, it appears to me that the yellow alignment would be less expensive and would benefit the most people and would have the most ridership. I therefore, recommend the yellow alignment.			Thank you for your comment and participation in this study.
10/26/15	Sharon Slade		
I agree that the Yellow Corridor option seems to be the best option for rail travel between Tucson and Phoenix. I would use this new rail system frequently since I have family living in Gilbert. The lower cost of this option and the better environmental impact is what makes this corridor ideal. A big "thanks" to all who are working so hard to make Arizona a better place to live!			Thank you for your comment and participation in this study.
10/26/15	Kelley Thomas		
I am in support of the Passenger Rail from Tucson to Phoenix.			Thank you for your comment and participation in this study.
10/26/15	Braden		
I fully support the Yellow Line! It will provide a valuable asset for growth to the ever growing and changing east valley.			Thank you for your comment and participation in this study.

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10/26/15	steve@p…		
This project would be an incredible WASTE of money, and would be of little benefit to the majority of taxpayers. Better to simply increase the number of lanes on I-10 between Phoenix and Tucson. Very few would want to arrive in either city without having a car to use for travel. DON'T BUILD a railway between Phoenix and Tucson.			The rail system is proposed as an alternative to the personal vehicle and the freeway. In the future, even with driverless vehicles, congestion would be a primary determinant of travel decisions. Travel forecasts in 2040 assume I-10 will be widened to at least eight lanes (four in each direction) throughout the Phoenix-Tucson Corridor. Passenger rail would offer an alternative to vehicular travel in the Tucson to Phoenix corridor. Upon arrival at a destination, the train would depend on good local access services (i.e., taxi, bus, light rail, Uber, bike share, etc.) much like what happens when passengers arrive at an airport.
10/26/15	Kevin Myers		
My comments really are more in the form of maybe questions to be answered... 1) How would the Orange route interact with potential light rail plans to utilize the US 60 corridor? 2) The orange route would serve a potentially broader customer base if any stops were added along the US 60 through Mesa / Gilbert 3) The Yellow route would probably best utilize currently under-used existing infrastructure along Rittenhouse Rd in Queen Creek, but may generate more negative feedback from surrounding neighborhood developments 4) The green route wouldn't attract as many users from the East Valley since there wouldn't be any benefit to commuting TO the commuter rail.			1) At this time, there are no specific proposals for light rail in the US 60 Corridor. The configuration of the passenger rail system in the Tier 1 EIS is not yet fully defined. 2) The Yellow Corridor Alternative provides more direct access to Mesa, Gilbert, Tempe, Queen Creek, etc. along the existing freight track than the Orange Corridor Alternative that does not access downtown areas. 3) The proposed passenger rail service would operate on independent track built to higher standards than needed for freight movement and would not share line capacity with Union Pacific freight operations. Potential impacts to adjacent communities are discussed in general terms in this Tier 1 EIS and would be further evaluated in a subsequent environmental analysis. 4) You are correct that the Green Alternative does not attract the same level of ridership as the Yellow and Orange corridor alternatives.
10/26/15	Craig McFarland		
#1 ADOT project should be the widening of I-10 between Chandler and Casa Grande #2 State Rail Plan should use the existing I-10 corridor, stop avoiding the tribal land.			Tribal lands are subject to the decisions of the affected Native American community. Each one is a sovereign nation,

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			with a separate government. The Green Alternative, which followed I-10, was eliminated from further consideration. It did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts.
10/26/15	Danney Cox		
I am all for it as long as the costs are fully covered by ticket prices. I do not want any funds to support this project if they come from taxes: state, county, local or otherwise.			Thank you for your comment and participation in this study. Funding sources are not yet defined and the defrayal of costs through fares is one element of those future discussions. The others could be private or public funds. With the exception of some toll roads, no transportation systems in the U.S. are fully funded by their own revenues, so it is likely that multiple sources and/or subsidies would be required.
10/26/15	Frank M. Pierson		
The proposed rail line between Tucson and Phoenix needs to be built. I am in favor of moving this project forward. The economic benefits as stated in the report are probably not correct; instead I think that the proposed numbers are on the low end.			Thank you for your comment and participation in this study. The economic benefits would be further analyzed and refined in future studies.
10/26/15	Bryce McBride		
I strongly recommend the green alternative route (the one that follows I-10 right alongside Casa Grande) for this project. It would make a lot more sense. Plus, who wants to go thru Eloy and Coolidge?? Bleh!!			The Green Alternative was eliminated from consideration because it did not perform as well as the Yellow and Orange corridor alternatives. It did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. A passenger rail system within the Yellow Corridor Alternative would also cost less to build. Casa Grande would still have access to the rail line, but it would be farther east.
10/26/15	Robin Karlo		
I think the YELLOW line would be a great benefit to the town of Queen Creek. Would love to have the Yellow line get the ok to build. Love the idea of getting to phoenix or Tucson using			Thank you for your comment and participation in this study.

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the train. Also think it would be great alternative to driving and parking at the airport, or for visitors using to get to queen creek. Utilizing a portion of the current track makes sense. The yellow line gets a big YES from me.			
10/26/15	MJ Winst		
No please No. No new passenger railways of any kind. Huge waste of money for something which will be unused. I can't imagine this is still being considered.			The studies indicate the project would be well used given the anticipated congestion that will significantly worsen on I-10 over the next 25 years. It is an alternative that can offer avoidance of typically congested conditions anticipated on I-10 even after it is widened to four lanes in each direction.
10/26/15	Lisa Blackwell		
I do not like the idea of a passenger railway going through Queen Creek. Most people moved there for its small town feel and that would definitely change that. Growth is good, but for some areas it is too much. So I vote NO to a passenger railway in Queen Creek.			ADOT has recommended the Yellow Corridor Alternative, which would pass through Queen Creek, based on a combination of technical analysis (including cost, ridership, and environmental impact considerations), public comments, and input from agencies including the Town of Queen Creek. Impacts to adjacent communities would be considered in greater detail in a subsequent environmental document prior to any construction.
10/26/15	Leslie Ann Wallace		
WE NEED THE YELLOW ROUTE! Queen Creek and San Tan Valley are growing and will continue to grow. The current and proposed growth in population will support the YELLOW ROUTE! This will also increase property values as Queen Creek and San Tan Valley will be more desirable with public transportation needs met.			Thank you for your comment and participation in this study.
10/26/15	Ernest M. Galaz		
This is an idea that should have been implemented years ago. This will also have a positive impact on transportation in other neighboring counties such as Santa Cruz, Cochise and Gila; I strongly support the Yellow Alternative and intend to lobby policymakers and business leaders to move this forward.			Thank you for your comment and participation in this study.
10/26/15	Adriel		
I think this is a great idea!			Thank you for your comment and participation in this study.

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10/26/15	Jeffrey Sharp, M.D.		
I took the train from Phoenix to Tucson as a boy. Where was that route and what happened to it? There is existing track that goes along Rittenhouse. It would make sense to use existing track. The green alternative would not help the east valley residents access Tucson at all. The yellow alternative looks faster than orange and would get some east valley traffic. The orange alternative looks slower but provides access for more east valley residents. I would build the least expensive using existing track where possible.			Thank you for your comment and participation in this study. Amtrak trains from California formerly traveled from Yuma through Phoenix and Tempe, then continued to Tucson on the Phoenix Subdivision of the Union Pacific Railroad. The tracks between Yuma and Phoenix are no longer in service, so those trains now bypass Phoenix and travel through Maricopa on their way to Tucson. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative (which follows the Phoenix Subdivision) is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives in this study. Passenger rail service would most likely require new track, even if adjacent to existing freight track, because it operates at higher speeds than freight trains, and requires much tighter tolerances for safety and performance.
10/26/15	Andrew Ryan		
I am very glad that the Yellow route is currently the recommended route. I would very much like to see Arizona to think towards the future and consider electric locomotives for use for commuter and intercity to be ahead of the power curve on the energy production utilized to power these trains. The use of solar and battery systems could possibly reduce long term costs and increase energy production in this industry for the state by possibly utilizing the existing right of way that this route provides.			No technology has been proposed or selected in the EIS though relatively conservative assumptions have been made about the performance of a future system to forecast ridership and travel times, and estimate costs. The study assumed a train speed of 125 mph, but it would be possible to operate at a higher speed under the right conditions. Higher speeds would also most likely require electrification. In a subsequent NEPA study along with supporting analyses, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential.

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10/26/15	Carl Pavilonis		
I need my tax dollars spent on projects that affect the greatest number of residents. The ridership numbers do not support the cost of this rail system at all. I am not in favor building the system, not matter what the route is.			Thank you for your comment and participation in this study.
10/26/15	Aaron Lenzing		
I would like to see the yellow route built. It takes it through areas where commuters live.			Thank you for your comment and participation in this study.
10/26/15	Roger Gillespie		
This is a plan long overdue and needs to be brought to fruition sooner than later. This will be a difficult sell to those who think, "highways are the only answer" to transportation. They must be made aware that almost every state in the west has some type of commuter rail system. The Rail Runner Express from Albuquerque (32nd largest city in the U.S.) to Santa Fe is only 97 miles - connecting two cities with a combined "city" population of just over 625,000. Phoenix (6th largest city in the U.S.) to Tucson, cities with a combined "city" population of just over 2 million! No commuter rail in the "near" future! Why do people in Arizona always have to fight alternative transportation methods? I.e. Light Rail??? (As a former resident of both the Washington D.C. metro and central Virginia areas - Metro Rail and Virginia Railway Express commuter rail kept me out of my car for both business and personal trips to and around the city) 1. Electric vs. straight diesel power plants needs to highly considered - although a higher cost initially for the former, the environmental impact for an inter-city/high-speed train is lower at greater generated speeds. 2. In addition, although not part of this study, the price of a ticket needs to be reasonable otherwise ridership will be minimal, as the "I told you it wouldn't work..." contingent will continue to over-crowd the highways.			Thank you for your comment and participation in this study. 1) The technology for this project has not been defined. The assumption used was for 125 mph, but it would be possible to operate at a higher speed under the right conditions. Higher speeds would also most likely require electrification, which requires a substantial additional investment. 2) The price of a ticket has not been determined but the goal is to maintain it at an affordable level.
10/26/15	Natalie Bagnall		
It seems to me that the better alternative would be the yellow line. It appears there would be less impact to the environment and be more cost effective for the taxpayers. It only makes sense to build more rail where rail already exists. I did not see any information on what kind of stops there would be in the small towns such as the one I live in, Coolidge. I understand that there would be runs with no stops from Phoenix to Tucson but there should be some stops on the schedule for the smaller towns. While it is wonderful to have three lanes now going to Tucson on I10 starting in Picacho it would be very nice for the rural citizens to have the alternative of the rail. I always feel like I'm stuck behind more semi traffic going from Coolidge to Tucson that I do going from Coolidge to Phoenix. That may not be statistically true but it			Thank you for your comment and participation in this study. The proposed service would combine intercity (express) with commuter (local) operation. The local service would stop at all stations along the way. The intercity would stop at fewer locations. Coolidge is identified as a potential stop for intercity because it is in the middle of the length of the corridor. No specific station locations have yet been identified, but a station would likely be located in each community within the corridor if there is demand for the

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feels that way. I travel to Tucson and to Phoenix both from Coolidge and would consider that an alternative for me rather than driving the I10. I hope it would be an alternative for many.			service.
10/26/15	Mary Parry		
I am FOR the passenger rail between Phoenix and Tucson.			Thank you for your comment and participation in this study.
10/26/15	Janice Stevenson		
I think this is a fantastic plan and the sooner the better - the drive from Phoenix to Tucson is incredibly dangerous and crowded leading to pile ups, long delays and pollution from multitude of vehicles. The idea of having a Tempe stop is wonderful due to the number of students who also can then attend U of A as well as ASU. My son was living in Tempe and completing his Master's in Tucson (U of A) and commuted for two years - scared me to death. Also, I am older and hesitate to drive to Tucson where one of our sons lives, but a train ride down and back would be so easy. I am sure that there are many people who would love to use the train rather than brave the highways as they get older as well. So I strongly support this and hope it comes to fruition quickly.			Thank you for your comment and participation in this study.
10/26/15	George Sealy		
I am a firm believer in the use of trains to move people about in metropolitan areas. At first, people are a little reluctant to use trains as they need to break from their automobile use habit. But then, after a while they realize how much better and easier the experience is. So there will be long term success and real value if the project is completed. I understand that the light rail system in Phoenix has ridership that is exceeding projections. I have lived in the east and trains are everywhere. People use them all the time. This particular corridor makes a lot of sense and it will help out economic development between the two cities. Here are some suggestions: 1.) Tie in the stations with local ground transportation systems. 2.) Have significant park and ride facilities even for bicycles. 3.) Locate stations fairly close to people centers such as airports, universities, sports venues, and corporate centers. 4.) Have monthly and even yearly fare programs.			Thank you for your comments and suggestions. All the bulleted items in your comment are being considered with the passenger rail project and would be developed in more detail in later phases of work.

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5.) Tie in the Phoenix light rail system with a corridor station, so that people can transfer.			
10/26/15	Prof. (Dr.) James Stewart		
I strongly favor the passenger rail project and would be willing to pay an additional sales tax to fund it. I tend to favor the orange route because of its stops in Chandler/Gilbert and Tempe as well as Phoenix. I would use the rail line at least twice a month.			Thank you for your comment and participation in this study. The Orange Corridor Alternative does not directly serve Chandler or Gilbert. However, the Yellow Corridor Alternative would directly serve Gilbert, as well as Tempe and Phoenix.
10/26/15	Jason Algyer		
Please invest in the passenger rail for the community of Queen Creek. I am a American Airlines employee who commutes from San Tan Valley and would enjoy saving wear and tear on a vehicle and racking up the miles. The convenience of not having to drive 40 miles into Sky Harbor			Thank you for your comment and participation in this study. The Yellow Corridor Alternative is the preferred alternative in the Tier1 EIS and it travels through Queen Creek.
10/26/15	Andrea Kaise		
I am a relatively new resident to AZ. Two years. I would love to have a train between the two cities. Hope this works out! Would the travel time be quicker than driving? Maybe not, figuring on the wait time at the stations. And travel time between home and station. Station and destination. It would alleviate road traffic, though! Especially at Thanksgiving, and over the holidays.			Thank you for your comment and participation in this study. Travel times for the train are expected to be substantially shorter than the car as the congestion on I-10 is anticipated to grow to over three hours over the years even after widening of I-10 to 8 lanes (four lanes in each direction). The train is expected to take about 90 minutes.
10/26/15	Lucy Hernandez		
I am in favor of a high-speed rail system that would connect Tucson and Phoenix via rail with stops in connecting cities. Our highway system has reached its capacity and expanding to additional lanes is costly and continues to displace residents and businesses, affecting the latter's financial sustainability. US cities on the East coast are connected by rail and this has proved to be a preferred mode of travel for many who work and do business in major metropolitan areas but prefer to live outside congested cities. Additional modes of travel will also alleviate pollution problem that is created by vehicles on the road.			Thank you for your comment and participation in this study.
10/26/15	Terrel L. Pochert, "Terry		
Why would the ADOT even consider a plan that bypassed the City of Maricopa and the AMTRAK station that exists there? Maricopa is a City of over 51,000 people and exploding.			The Yellow Corridor Alternative serves a much larger population base (including Coolidge, San Tan Valley, Queen

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Florence has a population of around 25,000 with NO AMTRAK station. Did somebody at ADOT forget that the City of Maricopa exists?			Creek, Gilbert, Mesa) much more directly than the Red Alternative (from the Alternatives Analysis) that runs through Maricopa. The Red Alternative was eliminated because it was a circuitous route, carried low ridership, and had potential impacts on Gila River Indian Community lands.
10/26/15	jesjames74@...		
I live in Casa Grande and would definitely use this for shopping, sightseeing, trips w the grandkids. BIGGEST part of the trip is gas and mileage. Sure be a good thing			Thank you for your comment and participation in this study.
10/26/15	Mark and Kathy Guidry		
NO WAY. 100% of taxpaying folks will have to pay for this through taxes. 1/2% of the citizens of Az. will use this rail service. The other 99 1/2 % will never use it but will still have to pay for it. With cars getting better gas mileage, and folks having to get a “ride” to the place to board the train and again needing to have transportation when they arrive at the destination will turn out to be more expensive than driving their own POV all the way. Is this going to be another “BED” tax?			Aside from the fuel efficiency consideration, our highways (I-10 in particular) will experience very high congestion in the relatively near future as a result of high growth in the corridor between Phoenix and Tucson. That assumes I-10 is widened to at least 8 lanes (four in each direction) throughout the corridor. The consideration of a passenger rail system is offered as a complement to the highway (I-10, mostly), not a replacement for it because it provides additional capacity in the corridor and an alternative to driving. Funding sources have not been defined for the project yet. They could private, public, or a combination of both.
10/26/15	stephanieanastasia@...		
I think it’s a plan whose time has come. As it stands now, driving between Tucson and Phoenix is the most feasible method of transportation. The amount of traffic on I-10 between Tucson and Phoenix has just about reached critical mass. I don’t need to go on and on about increased pollution, the number of serious traffic accidents that occur in this corridor, you know all of that. I am totally in favor of this project.			Thank you for your comment and participation in this study.
10/26/15	Todd		
This is a 18th century solution to a 21st century non-problem. Your are wasting valuable time and money on this concept. It's fashionable today to do "Rail.” See link below.			There are many perspectives that influence our transportation system, both in favor and opposed to all types of travel modes. Given the expected congestion our highways

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http://ti.org/antiplanner/?p=10323 You are insulting my intelligence with this idea. Rail anywhere is throwing tax dollars down a rat hole. It is a scheme for income redistribution, from gullible citizens to a government White Elephant and subsidized riders. If you look at major rail systems throughout the US you will find that they are economically unsound and in fact many are dangerous because they don't have funds to do maintenance. Washington DC for example. ADOT has many more important things to fund, for example - maintaining what exists. You can't do that right now and that's why you rely on volunteers to clean the road shoulders.			will experience in the relatively near future as a result of high growth in the corridor between Phoenix and Tucson, the consideration of a passenger rail system is offered as a complement to the highway (I-10, mostly), not a replacement for it. Passenger rail can be a costly project, but it would be implemented in phases and would provide a more comprehensive solution than bus travel can offer.
10/26/15	Steven S. Kuwahara		
It is clear that the yellow corridor makes the most sense. My personal concerns would be to have the train stations in Tucson and Phoenix located to allow easy connections with the local rapid transit systems. The airport to airport connection would be very good, also. Given the amount of sunlight in AZ, would it be possible to use photovoltaic systems to at least provide some of the power for the system. I feel that a major point here is to reduce green house gas emissions, and make it easier for seniors to move between Tucson and Phoenix. My only comment, as a new comer to AZ, is why hasn't this system been built already? It seems like a logical thing to do.			Thank you for your comment and participation in this study.
10/26/15	Stephanie Derivan		
No, no, no!!!!!! Please do not put a passenger rail line in down here. We moved here for the small town feel and do not want mass transit. Just NO!!!!!!!			Thank you for your comment and participation in this study.
10/26/15	Chris Stang		
I frequently drive from Phoenix to Tucson for my healthcare needs at the University of Arizona medical center (now owned by Banner). I would greatly appreciate, and utilize, a passenger rail system between Phoenix and Tucson. I don't have a preference on a recommended route; I just want you to know that there is 1 more potential consumer out there that would take full advantage of this rail offering if it were available.			Thank you for your comment and participation in this study. Ridership estimates conducted as part of this Tier 1 EIS have indicated the potential for over 2,500 daily riders between Phoenix and Tucson, and over 15,000 shorter trips in the Phoenix and Tucson metropolitan areas.
10/26/15	josie_james@...		
How come the passenger rail can't begin in the Buckeye area at the I-10 and run the length of the I-10? The median of the I-10 could contain the rail. The proposed rail beginning in the East Valley does not do service to the rest of the taxpayers.			The Tier 1 EIS covers the connection between the two largest population centers in the state from downtown Tucson to downtown Phoenix. In estimating the potential ridership, however, connections to Buckeye, Surprise and Tucson

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			International Airport were included. These connections would be the subject of more detailed analysis in later phases of work.
10/26/15	John Fusting		
I am responding to the proposed rail corridor between Phoenix and Tucson. I have traveled around many of the world largest cities and between them by rail. The one thing they all have in common is the infrastructure in each of the large connecting cities. They have connecting rail, bus, subway or are walking cities. Phoenix and Tucson do not have good connecting rail, bus or subway and definitely are not walking cities, particularly at 100 degree plus weather. The connecting rail and bus only go to limited locations and passes through very undesirable neighborhoods. Buses are nearly none existent in the far east and west valleys. The existing rail doesn't even connect at the PHX without transferring to another means of transport. I'll never understand why a connecting tram was not utilized? Consequently, nothing is my recommendation unless the existing infrastructure extending out from any station along the stops in the line is put in place long before the trains are put into service.			The local transit systems in both Phoenix and Tucson are expanding rapidly and provide good connections to many important destinations. Sky Harbor now has a connecting SkyTrain system that links the light rail line to the airport. As proposed, the commuter/intercity rail line would access the SkyTrain system in the same location.
10/26/15	James Maloney		
Considering the amount of time this “Rail Project” will take from this date (10/26/2015) to sometime in the NOT foreseeable future I would like to observe that the cost(s) of the project will probably see a permutation in growth (Dollar Costs) of at least 300% to 500% given the cost overrun “incentives” of past Arizona endeavors. Therefore why not, here and now, define this project as an ELECTRIC Rail Corridor? At the VERY BEST it will take until 2045 or 2050 to have your system up and running and by that time solar energy will probably be a mandatory system requirement via the Federal Government and by DOT. The concept and idea for this rail corridor is an excellent one given the facts surrounding Interstate10. I-10 is presently a “Death Trap” (between PHX and TUC) due to the number of semi-trucks on the highway and the congestion such vehicles contribute to!			The cost of the project is presented in 2013 dollars. The costs will rise over time as a result of the time value of money, if not the actual project costs. The technology for this project has not been defined. The assumption used was for 125 mph, but it would be possible to operate at a higher speed under the right conditions. Higher speeds would also most likely require electrification, which requires a substantial additional investment. In a next phase of study, such as a subsequent NEPA study along with the supporting analyses, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential.
10/26/15	Brandt Dary		
I’d like to cast my vote for the Yellow Line, which goes through Queen Creek, since I am a resident.			Thank you for your comment and participation in this study.

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10/26/15	Kevin Jenkins		
Please make this rail happen! I travel all of the time from Phoenix to Tucson and would ride this instead of driving every time. I will do anything and everything to support the rail, especially as the Mesa Gateway Airport continues to develop. Please let me know if you have any questions but please note I will support either route.			Thank you for your comment and participation in this study.
10/26/15	Mike Neel		
Yellow line makes sense to me and as I read the literature and view the YouTube video it seems the delays to move on to phase 2 are mostly administrative. What can be done to move this initiative along more expeditiously? To attract business and support economic growth the under pinning of a reliable and cost effective rail service connecting Phoenix and Tucson seems obvious. Further, connecting the WEST VALLEY is required; perhaps this link should be done first? The intersection of the 303 and I-10 seems a logical edge to the rail serving the entire west valley. Our region seems to be under served.			Thank you for your comment and participation in this study. The Tier 1 EIS covers the connection between the two largest population centers in the state from downtown Tucson to downtown Phoenix. In estimating the potential ridership, however, connections were included that connect to Buckeye, Surprise and Tucson International Airport. These connections would be the subject of more detailed analysis in later phases of work. Funding has not yet been defined and it would take support from multiple sources to generate the needed funds.
10/26/15	Anya Alberts		
In our opinion the passenger railroad should not have been abandoned in the first place, There used to be train service. Yes, for the railroad BUT in your plans you do not mention the west side (valley) A lot of travelers will come from that area too, It is only mentioned that service will be from the East Valley. Don't forget (as was done in the past) that the west valley needs to be included. Where does the money come from? Well, there seems to be enough money available for the Grand Ave/Bell project, That is so ridiculous in pricing, make that project cheaper and easier on the construction by letting the train go over Bell Road, and not the other way around, That way Bell does not have to be closed for 7 months and people can keep their jobs, stores can remain open, Money saved on that could go towards the rail connection.			Thank you for your comment and participation in this study. The Tier 1 EIS covers the connection between the two largest population centers in the state from downtown Tucson to downtown Phoenix. In estimating the potential ridership, however, connections were included that connect to Buckeye, Surprise and Tucson International Airport. These connections would be the subject of more detailed analysis in later phases of work.
10/26/15	Danielle Cummings		
As a professional that works with individuals with visual impairments, this type of public transportation would mean a great deal to our community. Having an alternative to driving or only having the option of the airport shuttle is extremely limiting and would open many doors to many people. Thank you for your consideration of this proposal as it is truly a step forward			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
for Arizona. As an individual living in Prescott, I would utilize this type of public transportation from Phoenix to Tucson as I often make this trip for work purposes. It would allow me to park in Phoenix, conduct my business there, then be able to take the public transport the rest of the way to Tucson, saving my company (the state) gas money and wear and tear on the car. I would be one less car stuck in traffic and I could be more productive on the way being able to get work done. I highly support this proposal.			
10/26/15	phxltc@...		
I think the preferred alternative looks great. I saw that Amtrak was one of the entities involved with the planning. It would be great if as part of this process Amtrak service through Phoenix could be reestablished. If Amtrak could contribute some funds, that would also be beneficial. I would like to see this get constructed as soon as possible.			Thank you for your comment and participation in this study. Funding from all sources would be considered.
10/26/15	Martha Louzy		
This looks great to me. I vote yellow. I am hoping eventually you will expand to Sierra Vista and link it all. Sierra Vista (or Benson) to Tucson To Phoenix (and vice versa).			Thank you for your comment and participation in this study. A possible connection to Sierra Vista would be part of a future study.
10/26/15	Charles Scheps		
As a former New Yorker, my work necessitated frequent travel between New York City and Albany, a distance for me of approximately 180 miles. My viable travel options for these trips were almost entirely between driving or taking Amtrak (the other options being flying or taking a bus). Although taking the train extended the timeframe somewhat (due to being restricted to the train schedule), the trip was without a doubt far more pleasant, whether I used that time for relaxing or getting some work done. Not having to sit behind the wheel as the driver, or be a passenger if I carpooled, made the trip much more pleasant. In spite of the above, however, another significant factor entered into my choice of transportation method - i.e., what would I be doing when I got to Albany. The bottom line is, if I was going to one site, then I could readily take a cab from the train station. However, If I needed to be mobile, then in realistic terms it no longer made sense for me not to have my car. In essence, therefore, what I'm suggesting is the need to factor in the availability to commuters of local transportation options. While they obviously cannot be part of this project per se, they should be made a necessary adjunct, so that additional local travel enhancements make use of the passenger rail a more convenient option as well.			Thank you for your comment and participation in this study. Local services would need to support the passenger rail service at destination locations to provide access where needed. This has been considered in the analysis, but specific details of how those services would be provided would be a local decision (e.g., taxi, bicycle, Uber, bus, light rail, streetcar, etc.)

Date Submitted	Commenter	Affiliation	Response
10/26/15	Joel Hamburg		
I believe the time is now to construct a rail system not only between Phoenix and Tucson but throughout the entire United States. This should be our "Moon Program." As far at the discussion on rail service between Phoenix and Tucson, I agree that the Yellow Alternative is the best place to start. I am pleased to see Arizona moving in this direction. We lag behind so many other countries in the world as far as rail systems go.			Thank you for your comment and participation in this study.
10/26/15	Ann Norbut		
This is just a comment to say that I agree with the choice of the yellow option for the Passenger Rail of the future. One of the main reasons is that it goes through my town of Gilbert, AZ. This town will probably not ever get light rail as Mesa is working on right now. Queen Creek will also be brought into the metro community through the passenger rail system. Many people now living in those two communities take the light rail for Phoenix activities, driving to the eastern end of line in Mesa. With the advent of passenger rail, there would be an easier option to make the trip to downtown Phoenix even for daily work.			Thank you for your comment and participation in this study. The passenger train would complement light rail, street car and bus services in a number of locations along the corridor.
10/26/15	Jessica K. Kamrath		
I support the yellow line and hope there will be a stop in Queen Creek. As a commuter that lives in Queen Creek (I work and go to school in Tempe) I absolutely love an alternative to driving to work. I also like to attend events and visit other communities and this would be a great way to have access to other cities without driving. Please consider making a stop in a growing community - Queen Creek. Yes to the Yellow Line!			Thank you for your comment and participation in this study.
10/26/15	USN779RET@...		
IT SURE SOUNDS LIKE A GREAT IDEA TO ME. COULD / WOULD TAKE SOME OF THE "STRESS & TRAFFIC JAMS AWAY.			Thank you for your comment and participation in this study.
10/26/15	Nathan Tenney		
It might be beneficial to seek out state and local businesses for supplies, construction, and contracting in order to ease the tax burden on the community. I am in favor of the Yellow Line rail option and know that it would benefit me, the town of Gilbert, and the entire East Valley immensely. Thank you for your wise consideration of the Yellow Line rail.			Thank you for your comment and suggestion.

Date Submitted	Commenter	Affiliation	Response
10/26/15	Ronald W Hill		
Seriously? You honestly believe there is a NEED for this? You don't have a clue how many times I have thought to myself ..."I would love to go to Tucson for few hours if there only was a train." Let's see, by the time I drive to a designated parking lot, take a shuttle from that lot to the train then ride for an hour or more only to be dumped off someplace nowhere near to where I want to be and the take a shuttle/bus/taxi to where I actually want to be I would have saved no time and spent more money! Makes all the sense in the world.			The region's highways (I-10 in particular) will experience very high congestion in the relatively near future as a result of high growth in the corridor between Phoenix and Tucson. That assumes I-10 is widened to at least 8 lanes (four in each direction) throughout the corridor. The consideration of a passenger rail system is offered as a complement to the highway (I-10, mostly), not a replacement for it because it provides additional capacity in the corridor and an alternative to driving. Connections would require another mode at the destination, much the way an airport works.
10/26/15	Brian Pickett		
I concur with the recommendation to go with the Yellow Alternative as it would help drive efficiency from a cost and deployment perspective and higher-level usage. I was curious if there was consideration given to an alternative route that would align closer to Route 87 / I10 sooner that Eloy which would allow the ability to have a closer connection to the I10 / I8 split.			Thank you for your comment and participation in this study. The Yellow Corridor Alternative provides for an option that connects to/from I-10 in the vicinity of SR 87. It is coincident with the southern section of the proposed North-South Corridor.
10/26/15	Paul Leitman		
I agree with the Passenger Rail Study's recommendation that the Yellow Corridor be the preferred alternative. I believe that if financed, constructed and operated, it would be a great asset to the future of the Sun Corridor. It holds the greatest potential to encourage dense land use in proximity of the stations, to replace SOV trips in the metropolitan area, and to enhance accessibility of Phoenix, Tucson, and destinations in between.			Thank you for your comment and participation in this study.
10/26/15	Pat Olson		
I'm sad to see that the Orange Corridor has lost out. I do believe the Yellow is definitely viable and it is important to reach the Gateway Airport. I feel there will be more growth in the more "far" east valley, though. Using the Yellow corridor could hinder that to some degree. Since Florence is the county seat for Pinal county I also feel the Yellow corridor should get as close to there a possible. I only hope there is a way to expedite this process. It always seems to take so long to complete this process here in AZ. (Look at the time it took for I-10....it was the last piece finished when the rest of the country was long done)			Thank you for your comment and participation in this study. The ultimate alignment is not yet determined and your comments will be taken into account when alignment alternatives are formulated. The primary determinant of serving population centers is where the activities are today with a secondary consideration of where they could be tomorrow.

Date Submitted	Commenter	Affiliation	Response
10/26/15	Celeste Gornick		
It appears that the yellow route between Phoenix and Tucson would require less impact overall. Using existing rail lines makes sense. Why re-invent the wheel?			Thank you for your comment and participation in this study. The project would, however, require new rail as the operating levels for passenger rail are much higher than the existing allowances on the freight line.
10/26/15	Wayne Richard Mason		
I enthusiastically support proceeding with building a rail connection between Phoenix and Tucson. Not only would it help coordinate the commercial strengths of each city, but it should enhance communication and exchange between the University of Arizona and Arizona State University, but in terms of making it easier for students of one institution to take classes at the other but also for interaction among professors. Of the two choices, the only benefit that I can identify from the Orange configuration is the stop at Gateway Airport in Mesa. If the rail line is going to bypass Gateway as shown in the Yellow configuration, I think the long-term future of Gateway is in doubt unless the Phoenix light rail extends there at some point. It is also imperative that the rail lines link Downtown Phoenix with Las Vegas and Los Angeles. Finally, consideration should be given to extending the line to Puerto Penasco (Rocky Point) in Mexico, particularly in light of the cruise ship terminal that is under construction there. If the rail line connects the major international airports at PHX and TUS, it could result in a significant increase to tourism in both cities when added to a weeklong cruise from Mexico.			Thank you for your comment and participation in this study. The Phoenix-Mesa Gateway Airport would be served from the passenger rail line regardless of which alternative is ultimately built. The other routes you mention are part of ongoing investigations and would be developed more thoroughly over the coming years. Preliminary analyses are that some of those connections are favorable to the Phoenix-Tucson connection.
10/26/15	Heidi Noperi		
I love the idea of a railroad between Tucson and Phoenix. Do you think it would be worthwhile to consider the train going from Phoenix to Benson, and maybe using part of the regular railway. I know many people from Sierra Vista are driving to Tucson daily, and to Phoenix almost quite as often. I am a handicapped person had have to drive to the Phoenix hospital quite often. Eventually it will be too hard for me to drive. I am sure I am not the only one. I am actually quite excited that you are planning this way of transportation. It would help so many people. It could be paid off partially by charging the people a little more for using the train, or increase the state taxes until the train is paid off.			Thank you for your comment and participation in this study. Commuter rail services beyond Tucson have not been studied in this project, but could be added to the Phoenix-Tucson corridor in the future. Funding has not yet been defined and it will take support from multiple sources to generate the needed funds.
10/26/15	April Ritchie		
Positive impact for the state:			Thank you for your comment and participation in this study. Your points are all consistent with the findings and insights

Date Submitted	Commenter	Affiliation	Response
1. decreased traffic on a very dangerous strip of highway 2. reduced accidents on the freeway, which is used by many large trucks. The accidents are usually fatal. 3. provide opportunities for travel for older adults to connect with families in both cities, safely. 4. provide safe travel to both universities, reducing the need for cars for students. 5. increase tourism by providing safe, reasonable transportation to communities along the way. 6. increase business for all the communities and businesses along the route. 7. improve the state image of a progressive state!!!!! I have children, grandchildren in phx and live in Tucson. I also know many people in this same situation. As we age it would be wonderful to be able to still make the trip without the danger of driving. Thank you for all this group has done to advance this concept to this level.			developed in this study.
10/26/15	Steve Skotak		
My only concern is how do you plan to monitor how passengers pay to ride. I believe the city of phoenix has allowed anyone to board the light rail in the city of Phoenix, they only monitor after the fact, and only do they site rarely do they. (there stats are wrong, and inaccurate) The light rail in Phoenix is the new DASH! I believe your new train system and along with an upgrade to the light rail (DASH) in phoenix should also be considered when looking at how will you monitor paying customers when boarding a train. I believe you need to get it right for the start, not like the city of phoenix, allowing anyone to board.			Thank you for your comment and suggestion. Operating practices and fare enforcement have not yet been addressed for this project.
10/26/15	gl.7248@...		
In my opinion this will be a waste of tax payer money. It will undoubtedly go way over budget, underutilized and poorly managed. I oppose this idea and others like it.			Thank you for your comment and participation in this study.
10/26/15	Carole Whipple		
My preference would be to locate the rail service through Coolidge, Az. I attend many cultural events in the Valley and would definitely use the service. I would also use it to attend classes at Mesa Cultural Center. The line would bring new purpose to Coolidge and encourage			Thank you for your comment and participation in this study. The preferred alternative runs through Coolidge.

Date Submitted	Commenter	Affiliation	Response
profitable business. I am a property owner and have lived in Coolidge for 48 years.			
10/26/15	Burt Binenfeld		
It would be a great idea to get this railroad line. It would be better to share the right of way with Union Pacific Railroad. Yellow Route seems to be the best alternative.			Thank you for your comment and participation in this study. ADOT anticipates that an alignment alternative within the Yellow Corridor Alternative would likely be located within or adjacent to the existing Union Pacific Railroad right-of-way, although other alignments may be considered.
10/26/15	Emily Noel		
I am in favor of building the rail, and I think the yellow or green route would make the most sense for me. I commute from Tucson to Scottsdale weekly.			Thank you for your comment and participation in this study.
10/26/15	Betty Cattuse		
Hello!....mi name is Betty Catuse and I usually enjoy ride the bus or train for various reason, I have my own transportation, but I enjoy the freedom of not driving and stressfull traffic. I wonder why the train is not expand to the west valley were is so obvious the majority of working class live in the area and is a millenion season were kids go to college work and shop and go out. I would think it would created more business and created more assest for everyone instead thinking of building a rail system in 2035. What an opportunity wasted			Thank you for your comment and participation in this study.
10/26/15	Mark M Giese		
A rail option between Tucson and Phoenix might reduce air pollutant emissions and enhance highway safety.			Thank you for your comment and participation in this study.
10/26/15	Shirley Ward		
I think that Arizona could be a model for other states, trying to cut down on their carbon footprint and reduce pollution, by building a rail system between these two cities. It would mean fewer cars, more jobs, more possibilities for small businesses at both ends of the rail line and a modern answer to connecting our two largest cities. Either of the proposed lines would be a fantastic idea.			Thank you for your comment and participation in this study.
10/26/15	Sandy Bauer		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit			Thank you for your comment and participation in this study. Although specific design decisions would be evaluated in

Date Submitted	Commenter	Affiliation	Response
services and that passenger rail can be a catalyst for transit-oriented development.			future phases of the study as part of subsequent planning and environmental analysis, connections to Valley Metro light rail and Sun Link streetcar have been assumed as part of this Tier 1 EIS study. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service.
10/27/15	Molly Moore		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. Although specific design decisions would be evaluated in future phases of the study as part of subsequent planning and environmental analysis, connections to Valley Metro light rail and Sun Link streetcar have been assumed as part of this Tier 1 EIS study. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service.
10/27/15	Andrew Ryan		
Please continue to move forward with the Phoenix- Tucson rail plan. I would also suggest to highlight the ability to possibly incorporate the ability to work with energy producers to utilize some of the rural areas for energy production as well to offset costs.			Thank you for your comment and suggestion.
10/27/15	Candace Wilkinson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. Although specific design decisions would be evaluated in future phases of the study as part of subsequent planning and environmental analysis, connections to Valley Metro light rail and Sun Link streetcar have been assumed as part of this Tier 1 EIS study. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that

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			each community is prepared and can take full advantage of the availability of the service.
10/27/15	Michael Sheldon Reed		
Please model any Phoenix-Tucson service after the successful "Piedmont" service in North Carolina. https://en.wikipedia.org/wiki/Piedmont_(train) The service is state-owned but gets a large chunk of Federal funding, especially for service improvements: http://www.ncdot.gov/projects/pip/			Thank you for your comment and suggestion.
10/27/15	Miguel A Velez		
I-10 route appears to make most sense due to existing lines of communication already established. Yellow route appears to provide most access to east valley. The critical issue is to ensure the rail would have comprehensive service to Sky Harbor Airport and TIA. Which makes yellow route even more viable as there could be a stop at Chandler Airport.			Thank you for your comment and participation in this study. The Yellow Corridor Alternative provides access to Sky Harbor and Phoenix-Mesa Gateway Airport as well as the large population base in the East Valley.
10/27/15	Rosalind Ferguson		
We are now stuck in traffic on the grand limited bus. As I gaze to the right I look longingly at the rail tracks and wish for a commuter train. When are we going to catch up to the east coast and Europe?			Thank you for your comment and participation in this study.
10/27/15	Sherry Mullens		
I heartily support the idea of a passenger rail system between Phoenix and Tucson. The benefits of getting more people safely and quickly to both these major cities are obvious to the economic growth of our state. I hope that a continuation of the line from Tucson to Nogales is also being studied. With the emergence of a strong economic presence in our border region with Mexico, this would be a smart investment.			Thank you for your comment and participation in this study.
10/27/15	Rebecca Hall		
I am in support of the Tucson to Phoenix rail system and actually hope for expanded services by rail throughout the Valley and even to other cities such as San Diego, Portland, Seattle, and Denver. I also support any development or expansion of the Light rail system within the Phoenix area. Phoenix is such a huge spread-out metropolitan area, that it can use any assistance with reducing traffic, pollution and giving access to students or seniors who may not have cars or driving ability. Thanks You for moving forward on this			Thank you for your comment and participation in this study. The southwest Multi-State Rail Planning Study completed by the Federal Railroad Administration looked, at a very high level, at the possibilities of a high-speed rail service linking the main Arizona metro areas with destinations in California and Nevada. That report is available on the FRA website at https://www.fra.dot.gov/eLib/Details/L17109.

Date Submitted	Commenter	Affiliation	Response
10/27/15	David Haglan		
I support all rail options. I would prefer the yellow line. I live in the city of Tempe.			Thank you for your comment and participation in this study.
10/27/15	Kirby Maxson		
I am a Gilbert resident who chose to move here because Gilbert has an atmosphere that no other city in the Phoenix metropolitan area can offer. Which is why we see so much growth and new businesses popping up daily. I commend the city of Gilbert for being so choosy with the growth and allowed tenants. This has allowed Gilbert to maintain it charm. But this charm would be destroyed by the proposed passenger corridor linking Phoenix and Tucson. The rail corridor will only increase traffic, as residents on their commutes will be forced to stop and wait for the increased train activity. The corridor would be a huge waste of taxpayer money. Plain and simple, Arizonans do not utilize public transit as other cities do. If people aren't using the light-rail to go to downtown Phoenix, why would one assume that they would use a rail corridor to go to Tucson? There is no demand to link the two cities together. I strongly oppose the rail corridor. I think that such a decision should not be made by officials. The people should have a say. I am a firm believer if this was put up to vote, that that this would not pass. I vote NO for any rail corridor connecting Phoenix and Tucson.			Thank you for your comment and participation in this study.
10/27/15	Hilary Hirsch		
As a native-born Arizonan, I believe that this passenger rail system is long overdue. Commerce between Tucson and Phoenix is growing and the two largest metropolitan cities need a public transportation system to connect the two. This asset will be an investment in Arizona's future public infrastructure and will advance our economy's growth and competitiveness on a global scale.			Thank you for your comment and participation in this study.
10/27/15	Anthony Colbert		
I work in Tempe and live in Casa Grande and think this would be a great idea. I travel 38 miles one way by myself. I have been making this commute for the past 9 years			Thank you for your comment and participation in this study.
10/27/15	Judy Slack		
I prefer the Orange Alternative. I think it will serve the needs of the community more effectively.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/27/15	Rachel Bliss		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Although specific design decisions would be evaluated in future phases of the study as part of a subsequent planning and environmental analysis, connections to Valley Metro light rail and Sun Link streetcar have been assumed as part of this Tier 1 EIS study. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service.
10/27/15	R.J. Lancaster		
I love the idea. How about making 2-3 rail cars for transporting autos and trucks for people to use when they arrive in Tucson or Phoenix? Thank you for the job.			Thank you for your comment and participation in this study. The idea of carrying personal vehicles was not evaluated in this study. While not typical of commuter rail services, this could be considered in later analyses.
10/27/15	Nic Maxson		
I am a Gilbert resident who ultimately would be greatly affected by this proposal. I would like to express a "no build" comment. The cons outweigh any benefits given. The commute between Tucson and Phoenix does not have a daily affect on a majority of our community. The rail systems we have in place in downtown Phoenix lack of use should show you how well this alternative would turn out. Your yellow corridor would result in such negatives for me, my family and my community. 1) local commuters no doubt would have an extended travel time waiting on your trains to pass 2) damaging animal species and habitats 3) bringing down property values and ruining Gilbert's small town charm by increasing train travel 4) increase public safety of potentially having a train that is capable of 120 mph derailing in our community or even having that much more interaction with small traffic like school buses, bike paths etc.) you are considering a project you have no funds for and then doing it in phases so that we run the risk of yet another uncompleted project and many years of construction that still don't benefit a majority of the people. Again, I wish to express a "NO BUILD" option and will also make an effort to spread the word among Gilbert residences to do the same. You say in your video 56% vote for less traffic			Thank you for your comment and participation in this study. The light rail system in Phoenix carries twice its forecast ridership and spurred economic development in the corridor it serves. 1) Local commuters could benefit from the commuter rail service rather than drive to their destination. Most of the line would operate at grade, but grade separations would be installed over time. Wait times for at-grade crossings would be evaluated in the subsequent studies. 2) Protection of wildlife corridors and habitats would be part of the mitigation plan for the project. It would be defined in the subsequent environmental document. 3) Property values in the vicinity of stations tend to rise over time because of the improved access to the rail mode. 4) While derailments happen occasionally, they are very infrequent. Still, you make a good point that the safety of the design of a passenger rail service would need to consider all

Date Submitted	Commenter	Affiliation	Response
as our cities grow which is obvious no one enjoys traffic but this proposal is not a viable option will not be utilized as you project it to be and will ultimately spoil the love I have for my current community.			eventualities. Trains would not operate at 120 mph within the urban areas. 5) Each phase of work would be expected to have "independent utility" so that it could stand on its own even if nothing else were built.
10/27/15	Charles E Downs		
Please do not burden the state payers with another project that cannot produce enough revenue to support itself. We do not need another drain on the state revenues and tax payer pockets.			Funding for the passenger rail project has not yet been identified, but the project is likely to occur in phases and seek funding from multiple sources, both private and public.
10/27/15	Ashba Nesbitt		
I would like to see the Yellow corridor move forward. It serves the most people, is the most cost effective, and has the least environmental impact. As the population continues to grow we to have as many viable options as possible.			Thank you for your comment and participation in this study.
10/27/15	nguyentammar2@...		
I think it's important to have a reliable and usable reliever airport. The route should include access to the AZA airport as it would help alleviate problems associated with traveling to and from that airport. Plus it would be a major benefit in the event something happens at PHX airport. Additionally in Tucson, the route should go all the way to TUS airport as current options are limited. On another note, it's too bad that the route won't be able to connect to an Amtrak station near Phoenix. A current connection in downtown Tucson is already really awesome. One last suggestion, the rail should have its own crossing at all intersections for the safety of everyone. There have been way too many accidents at at-grade crossings due to technical malfunctions and human error.			Thank you for your comment and participation in this study. Both corridor alternatives provide connections to Sky Harbor and Phoenix-Mesa Gateway airports. Based on public and agency input, ADOT and FRA will commit to extending passenger rail service to TUS in subsequent planning and environmental studies. Most of the line would operate at grade, but grade separations would be installed over time. For at-grade crossings the operating characteristics of the passenger trains would require four-quadrant gates, which prevent drivers from illegally driving around lowered gates, to maximize safety.
10/27/15	Nancy Anacker		
Please build this rail line as quickly as possible. I drive to Phoenix from Tucson regularly and would much rather ride the train. It just makes sense.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/27/15	amnguyen1014@...		
Are there any better alternatives than using diesel engines? Are there any faster alternatives that are eco friendly? If trip times between PHX and TUS could be closer to 1 hour that would be great. There shouldn't be any at-grade crossings. Safety is a huge consideration and separate grades would help decrease the number of incidents at intersections. If possible, the routes should also be accessible to education facilities like ASU and U of A, airports (TUS, AZA, PHX), and current or future Amtrak rail stations. It would also be nice if they connected well with current transit centers in all cities involved also. Will these trains be able to run during storms such as heavy monsoon rains or haboobs?			The technology for this project has not been defined. The assumption used was for 125 mph as a basis for estimating travel times and ridership, but it would be possible to operate at a higher speed under the right conditions in some segments of the corridor. Higher speeds would also most likely require electrification, which requires a substantial additional investment. Most of the line would operate at grade, but grade separations would be installed over time. For at-grade crossings the operating characteristics of the passenger trains would require four-quadrant gates, which prevent drivers from illegally driving around lowered gates, to maximize safety. The concept for the corridor is to serve all of the major education institutions and at least the Amtrak station in Tucson. During a major storm, it is likely that train activity would be curtailed not necessarily because of an inability to function, but for the safety of any other people or vehicles in the vicinity.
10/27/15	Francis Schilling		
Clearly, from a SE Pima County resident (Vail), the Yellow Alternative is superior. When you can get me from Tucson to Phoenix in under 1.5 hours my interest is beyond piqued. Higher ROW costs are more than offset by the lower capital costs in my opinion and the increased business from southern Arizonans (like me) who avoid the I-10 suicide mission to Phoenix like the plague would be larger than predicted from speaking to many, many people in this area. If one is to consider ancillary effects like increased sales, venue sell outs, hotel and restaurant revenues and the like then it must be Go On Yellow (as the NHRA likes to say). Thanks you very much for considering my opinion.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
10/27/15	awoodwar@...		
I don't think a rail system would take very much traffic out of the I-10 corridor from Tucson to Phoenix. Adding a bus system would be a lot cheaper and would give an accurate measure of ridership. If a person takes a train/bus to Phx, they still have to get around the city. So they rent a car or take public transportation. When the total cost is added up it may be cost effective to drive the whole trip, and the convenience of having your own vehicle is worth the extra cost.			Buses were studied as part of the Alternatives Analysis that preceded the Tier 1 EIS. They are certainly able to provide a high quality service, but they cannot carry the anticipated travel demand of a train and cannot do so at the speeds of a higher speed train. Congestion levels in the next 20 years are expected to increase substantially leading to travel times between Phoenix and Tucson of over three hours even if I-10 is widened to eight lanes (four lanes in each direction) throughout. A passenger rail option would not be subject to those limitations.
10/27/15	Jill Dusenberry	City of Coolidge, Asst. City Manager	
I support the recommendation utilizing the yellow route.			Thank you for your comment and participation in this study.
10/27/15	Bradley Haase		
I like the yellow route. Just went to Tucson last weekend, the 10 is a nightmare.			Thank you for your comment and participation in this study.
10/28/15	Douglas Lightsey		
The passenger rail should go in the middle of the 10 freeway. Once it goes through phoenix build it up and have it ending at the old Amtrak station in phoenix. This way any future rails can be connected such as to Flagstaff, California, Las Vegas, etc. as far as station, Phoenix, Wildhorse Pass, Casa Grande, Marana and Tucson.			The Green Alternative was eliminated because it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. The preferred alternative, the Yellow Corridor Alternative, would serve the highest population centers. Connections to other western cities have been assessed preliminarily by the federal government and were shown to provide further benefits to the Phoenix-Tucson route.
10/28/15	Amber Trimble		
Please create a public rail system from Tucson to Phoenix! What a wonderful opportunity to show that AZ is considering the environment by offering a good solid public transportation option other than the car. AZ is known for their wonderful freeways and roadways, but we are			Thank you for your comment and participation in this study.

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also known for the "brown cloud" that hangs over Phoenix. If a railway is done correctly, with stops at interim cities, new businesses will be created in those areas. Bravo!			
10/28/15	Connor Descheemaker	Local First Arizona	
Passenger rail is absolutely essential for growing metro areas such as Phoenix and Tucson. Both are absolutely sprawling metropolises, wherein transportation options are few, leaving barriers to travel high. For greater economic investment and prosperity, we must innovate, particularly in transportation, and rail is a prime means of doing so. We must weigh the costs of building rail against the costs of highway construction evenly, along with their potential economic return, and environmental impact. All that being said, I prefer the Yellow Alternative for its greater inclusion of Pinal County, and shared ROW with current Union Pacific tracks. That shared ROW is preferable in my opinion because of linking our transit history, and usage in a more compatible way.			Thank you for your comment and participation in this study. The Yellow Corridor Alternative is a mile-wide corridor that would serve the largest population centers. ADOT anticipates that an alignment alternative within this corridor would likely be located within or adjacent to the existing Union Pacific Railroad right-of-way, although other alignments may be considered.
10/28/15	Craig Krivin		
I think bringing back passenger rail to the Valley and Tucson is a great idea to help reduce traffic, pollution and cost for travel in the region. I am not familiar enough with the two different routes proposed through Metro Phoenix to weigh in on the merits of one vs. the other, but overall I think this is a much needed transportation system.			Thank you for your comment and participation in this study.
10/28/15	Mary Gallas		
I concur with your analysis, favoring the yellow option route as the most beneficial to Phoenix area. Especially the East Valley and Pima county which have expanded significantly, and will continue to do so.			Thank you for your comment and participation in this study.
10/28/15	Kurt Kneip		
Good afternoon and thank you for the opportunity to provide comments. In my opinion, I believe in staying with the status quo and not building the Arizona Passenger Rail Corridor at all. The unknowns with costs far outweigh the benefits and the money can be better spent on a number of other initiatives. Please do not proceed with this project. Thank you.			The rail system is proposed as an alternative to the personal vehicle and the freeway. In the future, even with I-10 widened to eight lanes (four in each direction) throughout the Phoenix-Tucson Corridor, congestion will be a primary determinant of travel decisions. . The status quo is most likely not a viable option given expected changes.

Date Submitted	Commenter	Affiliation	Response
10/28/15	Barbara Foster		
Thanks for doing this. I agree with the Yellow Corridor option. Bring it on and please hurry. Thanks again.			Thank you for your comment and participation in this study.
10/28/15	Peter Mather		
After driving from Phoenix to Tucson and back the last weekend of September 2015, I realized that we need a rail system between the two cities. The traffic was really bad, and that was a weekend not a weekday.			Thank you for your comment and participation in this study.
10/28/15	Kate Randall		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Robert Bowers		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. It is important to connect both the Tucson and Phoenix airports to assure the best options in the future. It is important that these projects begin as soon as practically possible.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort. All three major airports would have a connection

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			to the passenger rail system.
10/28/15	Erin Eccleston		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	David Tang		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. I will personally use it multiple times weekly.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Elna Otter		
I have been hoping for a rail line between Phoenix and Tucson for years now. It finally looks like it might happen in the foreseeable future!! I want this for the personal convenience, but also to lessen the need for cars in our state. We need to cut back on driving, and rail is an ideal answer.			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
I hope that the public transit within Tucson and Phoenix will support it.			
10/28/15	Bob Sommer		
It would be so much safer and easier than driving.			Thank you for your comment and participation in this study.
10/28/15	John Lies		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Carl Perry		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Larry Schnebly		
Having lived in Tucson since 1953, it seems to me that all the talk over so many years, might SOMEDAY bear fruit...that creating a rail transportation option between Tucson and Phoenix			Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Response
may actually become a REALITY! Congratulations!~ Let's keep this ball bouncing! Sooner or later, it will happen! (I H O P E !! !!)			
10/28/15	William T Sellers		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Mary M Cornes		
Thank you for requesting public comments. I strongly recommend building passenger rail service between Tucson and Phoenix. This would aid college students, tourists, and people like me who travel as a disabled person. Lived many years in Northern Virginia, and travelled frequently, over numerous years, from DC to NYC by train. Please build the recommended route!			Thank you for your comment and participation in this study.
10/28/15	Will Stone		
I support the proposed passenger rail yellow corridor. It is the most cost effective and will serve the east valley. I currently live in the Tucson area but I'm originally from the Mesa area so we travel frequently to the Mesa area to visit family. I also think that the passenger rail will make it more appealing to live in Tucson and commute to Phoenix for work or vice versa. It will help spur the growth in Tucson. I would also support private funding for the passenger rail; I believe the use of private funds is inherently more cost efficient. I don't support putting the burden on the taxpayers to fund this. There is enough potential revenue that it should be			Thank you for your comment and participation in this study. Funding for the passenger rail project has not yet been identified, but the project is likely to occur in phases and seek funding from multiple sources, both private and public.

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appealing to private investors. Since this project is in the beginning stages it is difficult to attract private investing because the true costs cannot be ascertained until a corridor is chosen and development costs can be more accurately determined.			
10/28/15	Kim Ortega		
My opinion on which route for the railway to link to Tucson (from someone who lives in San Tan Valley) would be either of the yellow or the orange route options. I would take use of the railway if it was convenient. Located at these two places that would allow me to do that. I have many friends also that live in the Gilbert Chandler area that would find these routes more available to actually use the railway than the green option.			Thank you for your comment and participation in this study.
10/28/15	Ellen Filler		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Bruce Ero		
Great idea putting in a passenger rail system between PHX and TUC. I never go to PHX because of the traffic speed, amount, carelessness, and cost. And it is a dull, droning trip. The system would open Sky Harbor to me; also to take in a hockey or football game. Access to the Heard Museum and MLB Spring Training would be other plusses for me. Hope it gets done.			Thank you for your comment and participation in this study.
10/28/15	Alanna Brook		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local

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			transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Gary LaMaster		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Paul Bakalis		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. Please spend our hard earned money on things like this that encourage us to ride public transit instead of wasting money on highways that cause more consumption of natural resources, increase carbon in the atmosphere, and poison our air. Be the ADOT (transportation), not highways.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.

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10/28/15	Eugene Sougstad		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. Thank you for moving forward with Phoenix-Tucson passenger rail. I encourage you to continue with the necessary next steps.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Beverly Janowitz-Price		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Mills Tandy		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent

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10/28/15	Doris Tillman		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Stephanie Bader		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. Thank you for moving forward with the passenger rail project. I would travel regularly to Phoenix if I didn't have to drive (I promise I will buy season tickets to the Mercury [Theater] as soon as the train option is available). It's better for the environment, reduces carbon footprint, maintenance on road infrastructure, and unhealthy emissions, and ease of transit will be a boost for businesses in both locations. As a Pima County tax payer I am willing to fund our fair share in order to see the passenger rail come to fruition.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Matthew Kaplan		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail

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services and that passenger rail can be a catalyst for transit-oriented development.			service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Denise Hudson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Mel Meter		
I've lived here in Phoenix all my life. The valley and the state are growing and this is needed to allow travelers who cannot or prefer not to drive on I-10 but need a faster form of transportation between the 2 cities. It will be well used and ultimately will remove vehicles off the roads and allow us to breathe easier. I'm all for not driving unless I absolutely have to. Public or private transportation is needed to fill this need. We aren't California or the Northwest where they have AMTRAK or other commuter rail but it sure would be nice to have the option, I'd vote to pay more taxes for this if I didn't have to drive.			Thank you for your comment and participation in this study.

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10/28/15	Kip Goldman		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Rebecca Grubaugh		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Cindy Ballesteros		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent

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10/28/15	Matthew Kaplan		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Nina Ballinger		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Paige Murphy-Young		
Thank you for your efforts and creativity in moving forward concerning a possible passenger train between Phoenix and Tucson. Please continue this work and see this long-awaited and			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail

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desperately needed project through to fruition. Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Paul Maseman		
Thanks for giving me this opportunity to comment. I have recent experience with AMTRAK on the East Coast, the Washington DC Metro system, and also with the Irish rail system. 1. Keep it simple and economical! - Use a direct route from Tucson to Phoenix following existing right-of-way! - Detouring through Chandler and Williams Airport takes considerably more time and only rewards various land speculators at taxpayers' expense. Build a "branch line" to Chandler later if it's economically justified. - It might be more advantageous to model this system on something like the Washington, DC Metro rail system rather that a high-speed interstate system. 2. High-speed is not necessary! - On a 100-mile trip with 3-5 stops, the time difference between a 60 mph and a 100 mph top speed is minimal and not relevant.			Thank you for your comment and participation in this study. Travel times on I-10 are expected to lengthen considerably in the future to well over 3 hours. The train serves as an alternative and a complement to I-10 and would allow riders to make the trip in less time (about 90 minutes vs. 3 hours by auto) without experiencing congestion. Speed is an element of ensuring ridership because people want to travel quickly. That was evident in our surveys over the course of the study. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/28/15	John Maynard		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent

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10/28/15	Bettina Bickel		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. Passenger rail will provide a transportation option that is good for our economy and our environment.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Pat Kryzak		
I like trains have used them on multiple trips. We need to improve rail services. We could use some rail services in the west valley as well.			Thank you for your comment and participation in this study.
10/28/15	Leland Wilson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.

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10/28/15	Kay Accordino		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Eric Ossowski		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. It is a good step forward in the future for Arizona and the environment.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Ben Bethel		
While I'm supportive of Phoenix to Tucson rail, it needs to be high-speed rail at 225mph or greater. And I think our efforts are a bit misguided - we should be focusing on PHX to Yuma to Palm Springs to San Bernardino high-speed rail, as this would then connect with California's high-speed rail system due for completion in 2022...			Thank you for your comment and participation in this study. The technology for this project has not been defined. The assumption used was for 125 mph, but it would be possible to operate at a higher speed under the right conditions. Higher speeds would also most likely require electrification, which requires a substantial additional investment. That evaluation would be addressed before a final subsequent

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			environmental document is completed. Regarding destinations outside of the Tucson to Phoenix corridor, the Southwest Multi-State Rail Planning Study completed by the Federal Railroad Administration looked, at a very high level, at the possibilities of a high-speed rail service linking the main Arizona metro areas with destinations in California and Nevada. That report is available on the FRA website at https://www.fra.dot.gov/eLib/Details/L17109.
10/28/15	Francis Copple		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. In fact I would love to see not only rail service between Phoenix and Tucson but also between Phoenix and Las Vegas as part of a Nationwide high-speed rail system. In 1967 I wrote a paper advocating high-speed rail as a Junior in Engineering at the University of Iowa. My dream then as now is to be able to cross our country on high-speed rail. However, at the twilight of my years I do not think that I will live long enough to see this happen.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. The federal government has evaluated the connections between Phoenix and California and Nevada and found them to be beneficial to travel within Arizona. No specific plans are yet under development.
10/28/15	Barbara Thompson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take

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			full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	John Oehler		
We travel to the Phoenix area at least once a month, frequently more often. Train travel to and from Phoenix would be much safer & more convenient for us than automobile travel. Linking Tucson to Phoenix with passenger rail would be an important step in improving Arizona's transportation system, not only for regular visitors like ourselves, but for tourism & the overall economy as well. Please keep going with this plan.			Thank you for your comment and participation in this study.
10/28/15	Margaret Newman		
Gasoline taxes do not currently pay for all the costs of building and maintaining our roadways. They require additional revenue from other sources, either sales or property taxes. Yes, passenger rail between may require a taxpayer subsidy, but it would be money well spent. By taking traffic off the roads and highways, it would reduce wear and tear and delay the need for repair and expansion. Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. In other words, "Get on board!"			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Funding for the passenger rail project has not yet been identified, but the project is likely to occur in phases and seek funding from multiple sources, both private and public.
10/28/15	Steve Foss		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take

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10/28/15	Michael and Roseanne Haboush		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Bret Fanshaw		
Thanks for moving forward on a passenger rail line between Phoenix and Tucson. This rail system is sorely needed. Traffic on the I-10 between these cities is often congested and dangerous. I spent three weeks on the east coast in September and was able to travel hundreds of miles easily between New York City, Syracuse and Boston by train. I was not alone - thousands of people use similar systems every day to commute and see friends and family. Those trends would be reflected by Arizonans here as well if we were given options like a passenger train. I would also recommend that you explore solarizing the train, so that it takes advantage of our massive solar energy potential and reflects the renewable energy future that I and many others desire in order to protect our environment.			Thank you for your comment and participation in this study. No technology has been proposed or selected in the EIS though relatively conservative assumptions have been made about the performance of a future system to forecast ridership and estimate costs. In a next phase, including a subsequent NEPA study along with the supporting analyses, a technology would be evaluated based on the best fit for the corridor and in consideration of costs and ridership potential.

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10/28/15	David Moore		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Barbara Acker		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Barbara Warren		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent

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10/28/15	Dorothy Motheral		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study.
10/28/15	Serena Unrein		
Thank you for moving forward with Phoenix-Tucson passenger rail. I strongly urge you to continue to move this forward and find the funding to make passenger rail a reality. As someone who frequently travels between Arizona's two largest cities for work and personal reasons, I would welcome and use the passenger rail option. Being able to take a train instead of driving would allow me to increase my productivity during travel and make more trips to Tucson for work. We need to be providing more transportation options like Phoenix-Tucson rail because that's what our economy needs. More and more, people want to live in places that allow them to take modes of transportation other than driving. Tourists want to be able to get around without needing to rent a car. Our health depends on expanded transportation options, too. Reducing the number of cars on the road will improve air quality, and hopefully, allow more Arizonans to live without asthma and lung disease. Finally, please be sure that you connect passenger rail with existing and future transit in both Phoenix and Tucson.			Thank you for your comment and participation in this study.
10/28/15	Jared Vogel		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program

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			for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Alberta Johnson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Jodi Bonney		
Transportation studies in Arizona predict a great increase in population and travel within the state. I believe it is important to create a well functioning Phoenix-Tucson passenger rail service linking the two major Arizona cities, and provide connection with existing and future transit services between the cities and within each city to desired destinations. Having fewer cars on the roads will be safer and more convenient, if the transit services are planned and created well. Please keep on track with Phoenix-Tucson Passenger Rail! Thanks for your consideration.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.

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10/28/15	Kenneth Magel		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Eve Shapiro		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Greg Nemeth		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent

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10/28/15	Tylan Watkins		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Louis Edwards		
Keep moving forward with Phoenix-Tucson passenger rail, and make that rail tap into the Amtrak rail that goes via Benson. Preferably with a spur to Sierra Vista.			Thank you for your comment and participation in this study. A connection to Sierra Vista could be a part of a future study if there is enough support for the service.
10/28/15	Tom Broderick		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important

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			consideration for this effort.
10/28/15	Jeff McMahon		
I'm happy to hear that ADOT is moving forward on passenger rail between Phoenix and Tucson. Trends in Arizona necessitate an increase in public transit. It is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services so that passenger rail can be a catalyst for transit-oriented development. This should be as high a priority, if not higher, than building yet more freeways.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Laurel Watson		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Frank Thody		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program

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			for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Liz Hourican		
Passenger rail travel options between Phoenix -Tucson would decrease dangerous air pollution. Decrease deadly accidents and improve Arizona in a big way for the future generation Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. Safety is a major consideration in the selection of the preferred alternative and would need to be fully developed in later, more detailed levels of analysis. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	LJ Waggoner		
Sure it would be “cool” to have passenger train service between Tucson and Phoenix, however I would question the expenditure when you still have unfinished projects in other areas. For instance, Hwy 260 east of Star Valley. I find it strange you (we) have spent all this money over the past years to divide the hwy from Fountain Hills to Payson, and then most of it from Payson to the top of the rim at Woods Canyon Lake turnoff. But then, why not address the ridiculous fact traffic is still “funneled” thru Payson. While I am on my little 2 cent soap box, I hope we are not paying the same company to fix hwy 260 on a regular basis that was originally done in only the last few years. Bridge approaches, dips in the asphalt, etc. If the rail is funded from a different source rather than what effects other highway projects…….have fun. (Does this mean I-10 from Casa Grande to Firebird will never be widened as well?)			Thank you for your comment and participation in this study. Funding sources have not been defined for the project yet. They could private, public, or a combination of both. A public-private partnership could also be a possible source of financing. Widening I-10 depends on many factors including funding, mitigating environmental impacts, and negotiating right-of-way with landowners, including the Gila River Indian Community.

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10/28/15	Jim Hillyard		
I am a strong supporter of improved public transportation. As the Phoenix light rail shows, these infrastructure investments result in economic growth, more sustainable development, and increased economic mobility for hard-working Arizonans. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Arizona Corporation Commission Safety Division		
The Arizona Corporation Commission's ("Commission") Railroad Safety Section, ("Staff'), would like to take this opportunity to comment on ADOT's Draft Tier I Environmental Impact Statement ("EIS") regarding the commuter rail study between Phoenix and Tucson. Staff has a long history cooperating with ADOT regarding the implantation of safety devices and elimination of safety hazards at grade crossings throughout Arizona. However, this is the first instance where Staff has commented on an alignment of a proposed commuter rail line. While the Commission's regulatory oversight is focused on the implementation of warning devices and the approval of modification or alteration to existing or construction of future crossings, whether at-grade or grade separated, Staff does have concerns regarding future rail projects in Arizona. Staff firmly believes that establishing a rail corridor connecting Phoenix and Tucson would be an alternative to expanding traffic lanes for vehicular traffic on Interstate 10 and would relieve highway congestion and reduce vehicle emissions. State and regional planning initiatives have recommended passenger rail alternatives to add travel capacity to what is currently offered by highways. Staff has reviewed the EIS and sees a benefit to Arizona from having an alternative to the automobile to travel between Phoenix and Tucson. While other modes of transportation were taken into consideration, such as express buses, the concept of a commuter train offers significant advantages. The ability to construct additional lanes on Interstate 10 is limited. Air travel was not considered because Staff believes suburban and			Thank you for your comment and participation in this study.

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rural areas between Phoenix and Tucson need to be connected. The EIS was completed by the lead agency, the Federal Railroad Administration ("FRA") along with cooperating federal agencies, the Federal Transit Administration ("FTA") and the Federal Highway Administration ("FHWA"). ADOT is the local sponsoring agency and the designated recipient of study funds. The EIS offers three different alternatives which include "The Orange Alternative," "The Yellow Alternative" and the 'No Build Alternative." The Orange and the Yellow alternatives offer two different alignments for a rail corridor between Phoenix and Tucson, while the No Build Alternative would do nothing to implement a rail alternative. The estimated cost for the Orange Alternative is $6.8-$8.4 billion in 2013 dollars. The Yellow Alternative would cost between $4.2-$5.1 billion in 2013 dollars. The No Build Alternative would include future planned and proposed highway projects, but would not include any rail planning. The Phoenix to Tucson rail corridor is being studied to address inter-city travel needs where the travel needs are growing but the opportunity to expand highways is limited. Phoenix is the only metropolitan area in the United States with a population over 1 million without a commuter or regional passenger rail system. Safety concerns regarding a potential passenger rail system include a number of issues, including vehicular traffic and pedestrian conflicts at highway-rail grade crossings and the safety of rail passengers on trains and at stations. An understanding of the potential number and type of crossings (at-grade or grade-separated) contributes to an understanding of the degree of risk for collisions within each corridor alternative. For example, urban crossings may include higher volumes of cross traffic and warrant the cost of grade-separated crossings. There is a possibility that nearly 140 public and private at-grade and grade-separated crossings would be affected if the Yellow Alternative was chosen and 100 public and private crossings if the Orange Alternative was selected. Any modification, alteration or newly constructed public crossing would require Commission approval. Staff's inspection activity would ensure that any crossing improvement project was installed and maintained in a manner as safe as possible. All aspects of any new or existing rail system would be subject to Staff inspections. In order to accomplish a multidisciplinary evaluation of alternatives, an Alternative Analysis ("AA") was undertaken as part of the Arizona Passenger Rail Corridor Study ("APRCS") that involved conceptual engineering of possible alternative alignments at a level possible for cost estimating, scheduling, operational analyses, and community involvement. Staff believes a passenger rail system within the Yellow Corridor Alignment would be more			

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compatible with existing local plans, property ownership, serve a larger population, and affect slightly fewer natural resources, sensitive noise receptors, and archaeological resources than a rail system within the Orange Corridor Alternative. The potential to affect water resources, wildlife corridors, and potential species habitat would be greater in the Orange Corridor Alternative. Compared to the No Build Alternative, a passenger rail system within either corridor alternative offers increased access to transit for protected populations and economic generators as well as improved air quality and energy consumption. A passenger rail system within the Orange Corridor Alternative would require nearly double the capital cost than the Yellow Corridor Alternative and would be more difficult to implement. The operating and maintenance costs would also be higher. The No Build Alternative would not incur any of these costs, but it would not meet the identified purpose and need for an alternative mode of transportation between Phoenix and Tucson. While the right of way ("ROW") costs would be potentially higher for the Yellow Corridor Alternative, the lower estimated annual operating costs is forecasted to recover the higher ROW costs within the first six years of operation. Considering the overall estimated costs, projected ridership, and potential environmental impacts associated with implementing passenger rail within one of the alternative corridors, Staff finds that a passenger rail system within the Yellow Corridor Alternative is considered more cost efficient and better performing than a rail system within the Orange Corridor Alternative, with similar potential impacts to the environment. Staff recommends further effort toward realizing commuter rail service connecting Phoenix and Tucson. As between the Orange and Yellow route alternatives, Staff believes that the Yellow route appears to present several advantages over the Orange route. Originator: BHL			
10/28/15	Richard Couture		
It will never, ever pay for itself. We are too attached to our cars.			Thank you for your comment and participation in this study.
10/28/15	William Terrance		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development. Moreover,			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives

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the recently approved US Bicycle Route 90 occupies the same corridor.			Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Eduard Zavurov		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/28/15	Ronald E. Shoopman	Southern Arizona Leadership Council	
To whom it may concern: The purpose of this letter is to provide comment on ADOT's Arizona Passenger Rail Corridor Study Draft Tier 1 EIS. The Southern Arizona Leadership Council and it more than 130 CEO, business and community leaders are extremely concerned with ADOT's current termination point in Tucson of the passenger rail alternatives being considered. While the study identifies the connection from the proposed Tucson hub to the Tucson International Airport (TIA) as a route for future consideration, it does not consider this alternative as part of the Tier 1 study. We believe that the failure to include this link in the initial routing is a fatal error on part of ADOT. The ability for rail passengers to connect between the two major airports in the Sun Corridor is a critical link to ensure the success of a passenger rail system between the two cities. In particular, it is a critical need to support the continued growth and capacity of TIA. If the passenger rail system stops short of TIA, it is a one way supporter of			Based on public and agency input, ADOT and FRA will include a connection to TUS in subsequent studies. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but would be determined as funding is allocated and as part of subsequent NEPA review.

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airline service in the region, delivering Tucson area travelers to Phoenix Sky Harbor. This is not only a death sentence to TIA, it is not a positive economic driver for the Sun Corridor. Lack of inclusion in the initial Tier 1 study, significantly decreases the likelihood of completion of the rail line to TIA. Therefore, SALC strongly recommends ADOT extended the route for all Tier 1 alternatives being considered from the current hub location to the Tucson International Airport.			
10/29/15	Joyce Kotzamanis		
Please provide the. 3 different intended routes. I will provide my information. Great idea...just should have been done years ago.			Thank you for your comment and participation in this study. The two alternatives in the Draft Tier 1 EIS, as well as the entire EIS, are shown on the ADOT website (https://www.azdot.gov/planning/CurrentStudies/PassengerRail/).
10/29/15	Theodore Nathan		
Has anybody looked at paying the existing rail service to run daily passenger service between Phoenix and Tucson? Just a thought.			Currently, no existing passenger rail service runs between Phoenix and Tucson. The light rail service in Phoenix, Tempe and Mesa cannot operate on the same tracks as freight trains by federal safety regulations. Light rail trains also run too slowly to be able to effectively serve the longer distances of the Phoenix Tucson Corridor. The preferred alternative follows existing Union Pacific Railroad freight lines. Although ADOT has coordinated with the Union Pacific Railroad, the proposed passenger rail service that is the subject of this Tier 1 EIS would require track built to higher standards than those for freight movement, and would not share line capacity with Union Pacific freight operations.
10/29/15	Tisha Castillo	SanTanValley.com	
Financially the yellow route is the most economical route. As for a population hub, yellow wins again. Please consider the yellow route which will bring a much needed transportation option to San Tan Valley residents.			Thank you for your comment and participation in this study.

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10/29/15	Carol Braly		
The yellow route appears to be the one I would favor, and I suspect most business owners would choose that one as well.			Thank you for your comment and participation in this study.
10/29/15	wwwonwww@...		
Hello, We really need something like this in the San Tan Valley area. Please choose the YELLOW route... PLEASE!			Thank you for your comment and participation in this study.
10/29/15	Brian		
I prefer the yellow alignment for Mesa Airport and San Tan Valley/Queen Creek!!! PLEASE!!!			Thank you for your comment and participation in this study.
10/29/15	Jarrod Hamm		
I live in Queen Creek and am 100% in favor of the yellow route. Queen Creek hasn't been a small town since the '80's, and the people crying that they want to keep their small town atmosphere are just in denial of living in a large metropolitan area and its requirements.			Thank you for your comment and participation in this study.
10/29/15	Mila Besich-Lira		
The Orange alternative carries fewer passengers and costs more than the Yellow Alternative; though in some areas a combination of the two could be a viable option depending on more detailed study.			The Orange Corridor Alternative carries fewer passengers and would cost more than a passenger rail system within the Yellow Corridor Alternative; though in some areas a combination of the two could be a viable option depending on more detailed study at a later time.
10/29/15	Amanda L		
I think it would be great to have an orange or yellow line. I have family that lives in the east valley and those lines go through there. I have a brother that lives in Chandler and works in Florence and it would be great for him to use as an alternative commuter.			Thank you for your comment and participation in this study.
10/29/15	Steve Procaccini		
This project is long overdue. It really needs to happen, just as it has already happened in so many western U.S. states. AZ is once again behind the times. The funding needs to be found or created somehow to make this happen asap. ADOT should then look at additional routes, ideally Phx to Flagstaff/Williams/Grand Canyon, if possible. It seems that would be very popular and useful versus the I-17 congestion. ADOT should also be working with USDOT/Amtrak to improve the rail lines west of Phoenix and restore Amtrak passenger rail			Thank you for your comment and participation in this study. The funding for the project has not been defined, but would likely come from a variety of sources, both private and public. Other lines and other connections could be the subject of additional studies at a later time.

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into downtown Phoenix, specifically historic Union Station. For this study, I do personally prefer and agree with the Yellow Route. However, I'd also consider an extra spur line to reach downtown Chandler, and another to reach South Tempe and West Chandler, which could help serve the Ahwatukee area. I also think the train speeds should increase so as to shorten the travel times. I look forward to riding this train in the near future.			
10/29/15	Jeremy D. Arp	National Association of Social Workers, Arizona Chapter	
The Arizona Chapter of the National Association of Social Workers (NASWAZ) is writing to support the advancement of the Tucson-to-Phoenix passenger rail. Our organization works to support social workers who provide information and resources to help individuals, families and communities. As you know, transportation comprises a significant portion of most household budgets. Transportation options help individuals and families make choices that best fit their budget and their schedule. Passenger rail in the Sun Corridor can also provide a link to see family and friends that might not otherwise exist for some of our clients – a connection that can be critical for their well-being. We appreciate the work of ADOT in preparing the Draft Tier 1 Environmental Impact Statement for the Tucson-to-Phoenix passenger rail. We encourage you to continue to move forward on this important transportation option while taking into account the impact to the environment and sustainability.			Thank you for your comment and participation in this study.
10/29/15	Barbara Warren	Physicians for Social Responsibility, Arizona Chapter	
For over 50 years, Physicians for Social Responsibility (PSR) has been working to create a healthy, just and peaceful world for both the present and future generations. Among other issues, PSR in Arizona uses our medical and public health expertise to reverse the trajectory towards climate change. As you know, transportation in Arizona is one of the biggest threats to climate change. Vehicles are a significant contributor to that threat. As the Draft Tier I EIS points out, meaningful reductions in pollutants such as NOx, CO, VOC, PM10, CO2, and SO2 can be achieved through establishing passenger rail between Tucson-Phoenix. Therefore, PSR			Thank you for your comment and participation in this study. During subsequent planning and design, alternative technologies may be investigated. The analysis would include effects on air quality, greenhouse gases, and climate change.

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supports and encourages ADOT to continue to move ahead with this rail line. While we appreciate you quantifying pollution reductions, it is important to also incorporate the cleanest fuels available and the least amount of idling possible as part of your calculations to provide a more complete picture of potential public health and air quality benefits. As much of your fuels that you can electrify is the best approach. Thank you for your consideration.			
10/29/15	James Hewitt		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/29/15	Shirley Phan		
The ability to have more transportation in Arizona is a great way to connect to the community. There are people like me that like to travel all over Arizona to get away from the city such as Tucson, Sedona, and Payson. I like enjoying the road trips, but it would be great to have a rail to travel on instead of having to pay so much for a road trip. Being able to relax and not drive would be great, so I can enjoy the view instead of keeping my eyes on the road.			The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, and commuter services in the Phoenix and Tucson metropolitan areas. However, this does not preclude the option to extend the system in the future.
10/29/15	Keith Lipman		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. There is a clear recognition that a successful passenger rail service would depend on the quality of the local transportation system near the stations. The Alternatives

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			Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/29/15	Allen Veaner		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. 1) Passenger Rail system connections to complementary transit services were included in high level operational assumptions for both the Yellow and Orange corridor alternatives. 2) The Arizona Passenger Rail Corridor Study - Alternatives Analysis, an Appendix to this EIS document, developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.
10/29/15	Mary Wellington		
Transportation trends in Arizona point to an increase in public transit. Therefore, it is important to ensure Phoenix-Tucson passenger rail connects with existing and future transit services and that passenger rail can be a catalyst for transit-oriented development.			Thank you for your comment and participation in this study. 1) Passenger Rail system connections to complementary transit services were included in high level operational assumptions for both the Yellow and Orange corridor alternatives. 2) The Arizona Passenger Rail Corridor Study - Alternatives Analysis, an Appendix to this EIS document, developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.

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10/29/15	Bonnie A. Allin	Tucson Airport Authority	
Dear Sir or Madame: On behalf of the Tucson Airport Authority (TAA) , thank you for the opportunity to review the Draft Tier 1 Environmental Impact Statement (EIS) for the ADOT Passenger Rail Study and provide comments. The TAA is generally supportive of the project and the proposed recommendations contained within the EIS. However, there is one major item that must be addressed to allow for our full support of the project. This item is the location of the southern terminus for the initial phase of the passenger rail. The current EIS shows the initial phase of the rail terminating in downtown Tucson. The TAA strongly requests the terminus be located at TIA. Leaving TIA out of the initial phase of the project will result in numerous unintended and adverse impacts to the Airport and local economy (Note: TIA provides $3.28 economic benefit to the community). These adverse impacts include , and are not limited to , the following : • Enormous competitive disadvantages for TIA; potential loss of customers to other airports • Severe reduction in cargo and commercial air service in the region • Diminished air service development opportunities • Diminished business growth and development opportunities • Potential job loss • Inability to transport the work force to the largest industrial employment area • Failure to connect to the Sonoran Corridor The Pima County Economic Development Plan (2015 - 2017) identifies an area immediately south of TIA for major near-term development. This area, referred to as the Sonoran Corridor and Aerospace and Defense Corridor, is a catalyst for economic growth for the region. The integrated master plan includes connecting Highway 1-19 and Highway 1-10 through the Sonoran Corridor to enhance transportation links across vast geographic areas and national boundaries, and to combine the power of air, rail and surface transportation to create a major Southwest logistics center at TIA. The TAA , Pima County, and City of Tucson have invested millions of dollars to prepare for this			Public input throughout the development of the AA and Draft Tier 1 EIS indicated airport access to be an important consideration as a feature of future passenger rail service. The corridors analyzed for environmental impacts and other factors in the Tier 1 EIS, as established in October 2011 through the NEPA scoping process, terminated in downtown Tucson. While extending passenger rail to TUS was not considered in the Tier 1 environmental analysis, the Alternatives Analysis of the APRCS included coordination with Tucson, South Tucson, PAG and TUS related to airport connectivity, and public and stakeholder input were gathered regarding how best to connect downtown Tucson to TUS. In addition, the conceptual ridership analysis developed for the AA included TUS at the southern end. Comments on the Draft Tier 1 EIS from agencies, jurisdictions, and the public strongly urged that the study corridor terminate at Tucson International Airport (TUS) rather than downtown Tucson. Based on this input, ADOT and FRA will commit to extending the study area to TUS in subsequent studies, which would make TUS the southern terminus of a passenger rail system from Tucson to Phoenix.

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critical economic development opportunity , with the goal to promote and support industrial growth to the region and state, attract businesses and increase high-paying job growth, and to protect our existing major employment base. The rail terminus near this area is essential to make both the rail and the land development successful for the region. Between the period of 2011 and 2013, the TAA and members of the community brought these critical points to the attention of ADOT numerous times and were assured TIA would be the southern terminus point in all scenarios. However, the latest report does not reflect or incorporate the TAA and our community's comments, concerns and recommendations. The TAA respectfully asks that the Final Tier 1 EIS include TIA within the initial phase of work. If you have any questions or need additional information, please do not hesitate to contact me at boallin@flytucson.com or Mike Smejkal, Senior Director of Development Services at msmejkal@flytucson.com. Thank you for your attention to our critical concerns. I look forward to working collaboratively with ADOT on this project.			
10/29/15	Jane L. Morris	Phoenix-Mesa Gateway Airport Authority	
This letter is in response to ADOT's solicitation of comments regarding the Passenger Rail Corridor Study Draft Tier 1 EIS. Phoenix-Mesa Gateway Airport Authority (PMGAA) has been following ADOT's Passenger Rail Study process with great interest. PMGAA believes that passenger rail connectivity to Gateway Airport would play a significant role in the continued development and success of Phoenix-Mesa Gateway Airport. Currently, Gateway serves 1.3 million annual passengers with over 2,000 jobs now located at the Airport. The current Gateway Airport Master Plan calls for a long-term annual enplaned passenger total of 2,200,000, or 4,400,000± annual passengers served. The high range forecast identifies that Gateway could handle 5,000,000 annual enplaned passengers, or around 10,000,000 total passengers annually. PMGAA encourages airport-rail connectivity that would not require the need for busing between rail stations and the airport. PMGAA also welcomes the stated ADOT commitment to examine how to better connect the three airports (Phoenix-Sky Harbor, Tucson International, and Gateway) as part of the upcoming Tier 2 EIS. This passenger rail study, along with the ADOT North-South Corridor Study, State Route 24 construction, Valley Metro Southeast Valley Transit System Study, and the Transportation			Thank you for your comment and participation. Access to the three major airports in the corridor is an important element of the passenger rail service. As noted, airport access would be evaluated in much more detail in the next phase of study.

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Master Plans of Gateway's adjacent municipalities, identify the importance of transportation planning and coordination in the Gateway vicinity. Providing additional modes of transit and connectivity to the Gateway area makes the Airport more attractive for employment and passenger growth, and would further solidify Gateway's role as an economic hub in the region. Thank you for the opportunity to provide comment on this study. PMGAA welcomes the opportunity to further discuss and work with ADOT, and our regional partners, on this topic.			
10/29/15	Michal Goforth	Pima Community Access Program	
Dear ADOT Passenger Rail Study Team, Pima Community Access Program, also known as "PCAP,” is a not-for-profit organization that links low-income, uninsured residents of Pima County with an affordable, comprehensive and coordinated network of health care providers. Many of the consumers we speak with have a hard time making ends meet. Since transportation accounts for a large percentage of their expenses, we encourage more public transit options. Through providing more public transit options, consumers can often avoid needing to own a car and the costly monthly payments, operating and maintenance that accompanies owning a vehicle. Public transportation is beneficial to all of us- whether or not we walk, bike, take a bus to work, shop, or visit family and friends. Public transportation helps to grow our economy and create good jobs. Public transportation in Tucson helps those who need it most. Many individuals who use the bus are from working poor families, often without the ability to pay the costs of purchasing, operating and maintaining a car. PCAP helps individuals and families move toward health and wellness by having health care coverage but they must also have transportation to use those services. Thank you for allowing us to provide input.			Thank you for your comment and participation in this study.
10/29/15	Ben Missler	SkyTram International	
SkyTram International, a Portland, Oregon OEM of very high-speed suspended monorail systems strongly supports the building a high-speed rail system between Phoenix and Tucson,			Thank you for your comment and participation in this study. Technology selection was not a part of this Tier 1 EIS and will

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Arizona and believes the project can be completed over a 2 year construction period and at a cost well below $5.5 B versus the $10 B planned for the construction. Unlike many of the high-speed rail systems in use today throughout Europe and Asia, SkyTram is not a traditional high-speed rail system built on a ground-based railroad bed with steel tracks and rail cross ties. It is an innovative and futuristic sky way with an up to 250 MPH tram system suspended on 100 foot high steel towers, with sky cars racing along 50 feet in the air, and utilizing electric powered DC motors supported by green technology solar power and wind turbines. SkyTram International estimates construction and implementation costs at approximately $15 M (+/-10%) per mile over the 113 mile span of Phoenix to Tucson along the divided Interstate Highway 10--with the raised "sky way" built between the North and South heading lanes--and utilizing the right-of-ways and environmental impact statements already in place. Factoring in the total costs, the range would be $1.695 B to $1.495 B. The benefits to Arizonans are immense, including construction and operational cost efficiencies, reduced traffic on freeways, less air pollution, construction job creation, additional tax revenues, greater commuter volume, increased tourism and the public relations value of the first high-speed SkyTram in the world. Once in operation and flying high, SkyTram will travel above the ground on steel towers set 1000 feet apart and anchored atop concrete bases, with minimal impact on the surrounding environment and ground-based transportation. SkyTram will travel at high-speed along its route, with no rail crossings or stoppages impeding the flow of traffic or commerce below. During construction, SkyTram will be built along existing highways and railroad routes to minimize the environmental impact and utilize existing rights-of-way. After construction, railroads, buildings, highways, off ramps and overpasses already in place will not be effected or need to be removed or rerouted. Snow in the high mountains, rivers and flash floods in the desert will have no impact on the raised SkyTram system. Although the environmental impact of the SkyTram along the Phoenix to Tucson route has not been assessed, a route of mostly desert landscape, once in operation, flora and fauna habitats will remain untouched. Animals, from the largest desert coyotes and deer to the smallest animals, such as ground squirrels and turtles will not have to cross over tracks on the ground and face certain death. SkyTram hubs, potentially at Phoenix International Airport in Tempe and downtown Tucson will offer a vast array of retail stores, food services, customer parking, rental cars, and transit bus stations. SkyTram sky cars offer the ultimate in safety, comfort, and high-speed luxury travel with travel times between Phoenix and Tucson slated to be 30 minutes one way. In addition to regular passenger service, SkyTram will offer small package freight service in support of express services such as FEDEX, UPS and the USPS. And, with solar panels and wind turbines on each transit tower, the excess solar and wind energy stored by SkyTram can be sold through grid-			be covered in future analyses of the corridor.

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tie-net metering to local utilities along routes. SkyTram is about the future of travel taking us for an exhilarating ride in the sky that makes us feel more like we are on a speeding airplane than a speeding railroad track. And with the quiet and comfort that comes with flying! CONTACT INFORMATION: Ben Missler, President & CEO skytramamerica@gmail.com 503.539.6116 skytramamerica@gmail.com			
10/30/15	Carl Cerniglia		
Please make this happen soon! We would love to travel more often from Tucson to Phoenix; however we are deterred due to the current congestion on I-10. If a rail option were in place we would be frequent travelers. Honestly a line between these two cities should have been operational years ago. I would prefer the Yellow option as it would also be a boon for the smaller towns along the way.			Thank you for your comment and participation in this study.
10/30/15	Cesare DiRienzi		
Of the two, the yellow alternative seems much more sensible, as long as the existing recreational areas are maintained. Regardless, please do something; we can't move forward environmentally or economically without a useful high-speed rail system.			Thank you for your comment and participation in this study.
10/30/15	Marian Hall		
Yes, This rail system will be a wonderful way to increase the ability for those who live in Tucson, and who work in the Phoenix area. Additionally, it will allow those in Phoenix to enjoy the amenities in Tucson!			Thank you for your comment and participation in this study.
10/30/15	markfox15@...		
A passenger rail will provide another option to commute between the metropolitan areas. Get UP to allow passenger service on their existing track. They worked with UTA in Salt Lake City to build a commuter rail line, it can work here in the Phx area. A passenger rail could improve air quality, produce new economic development along the line and jobs.			Thank you for your comment and participation in this study. Passenger rail services are assumed to run on a new, independent track and not share the UP Railroad track to avoid conflicts with freight traffic. It would be built to tighter tolerances to accommodate a much higher level of performance than currently possible with freight trains in the U.S.
10/30/15	Doug Goodman		
As a long-time resident of Tucson, I frequently travel by car to Phoenix for business meetings and flight connections. Rather than driving, I would much prefer taking a high-speed train from			Thank you for your comment and participation in this study. Both Sky Harbor and Phoenix-Mesa Gateway would be

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Tucson to Phoenix and back. The project will take cars off the road, and offer a tremendous boost to the Tucson area. I support the project 100%!			served by the project regardless of which alternative is selected. TUS would be served by a proposed connection from downtown Tucson.
10/30/15	Laurie Lines		
I think that the light rail going from Phoenix to Tucson would increase our viability as a corporate destination area by adding more public transportation. I can see this as a way to increase tourism and business between Tucson and Phoenix especially for sports venues. Please consider adding this rail route for the Valley.			Thank you for your comment and participation in this study.
10/30/15	Marcia Washburn		
The yellow path makes the most sense.			Thank you for your comment and participation in this study.
10/30/15	Duane C. Olson		
Love the idea of rail service between Tucson, Az. and Phoenix, Az. I'm 73 years old, 11 years in Tucson. My wife and I would use it! I owned several businesses in Fargo, North Dak. I moved to Tucson for baseball spring training, now no more.			Thank you for your comment and participation in this study.
10/30/15	Dan Nelson		
I would like to see this project completed in a proper and non-corrupted time frame before I die.			Thank you for your comment and participation in this study.
10/30/15	Janet McFarland		
After reading the reports and viewing the line for the proposal, the Tucson/Phoenix route that follows existing rail seems the wisest choice. Energy efficiency and emergency routing reports will be interesting to see unless I missed them. This is long overdue...and will be welcomed by many for years ahead.			Thank you for your comment and participation in this study.
10/30/15	Craig		
Bullet train only, 2 stations per local per city with light rail feeds to the stations with both Phoenix and Tucson airport being one of those stations. Expansion plans should be Tucson to San Diego and Phoenix to LA Late Evening cheap fares and freight runs			Thank you for your comment and participation in this study. 1) Although a higher-speed rail connection between Phoenix and Tucson is an important and essential element of this Tier 1 EIS, ridership projections, as well public comment and input from local agencies, has indicated commuter service in the Phoenix and Tucson metropolitan areas to also be a

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			popular and viable project component. 2) The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, and commuter services in the Phoenix and Tucson metropolitan areas. However, this does not preclude the option to connect the system to California in the future.
10/30/15	dougclise@...		
Use the orange route. It is already difficult and time consuming to wait for trains to cross in Queen Creek and San Tan Valley now! Don't bring more!			Thank you for your comment and participation in this study.
10/30/15	Michael Wailes		
As a resident of Tucson, I would aggressively support a rail project between Tucson and Phoenix. I and many others in Tucson would frequently utilize the proposed railway to travel to PHX airport. I would also use it for trips to Phoenix for the arts and entertainment not available in Tucson.			Thank you for your comment and participation in this study.
10/30/15	Julie Rotary		
It would be fantastic to have fast rail service to the airport, the University and downtown Phoenix from Tucson. Given the length of time that all the studies and construction will take, it is best to plan for the least expensive route. It is also best to avoid habitat destruction in the process.			Thank you for your comment and participation in this study. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the Orange Corridor Alternative. Details of both options were evaluated as part of this Tier 1 EIS.
10/30/15	Stuart Katz		
Need this desperately. It needs to run from airport to airport and should extend to Flagstaff as well. There should be no stops between airports. The airports have parking and rental vehicles for those going elsewhere. Bus, taxi and trolley service should be the venues for travelling elsewhere in short distances to and from the airports. There are three large commercial airports, TIA, SKY Harbor and Pulliam. No need to have any other stops anywhere along the way. If you open that Pandora's box, every town, city and community will want to be on the line. It then is no longer the bullet train we need. It becomes the proverbial slow boat to China.			Thank you for your comment and participation in this study. 1) Although a higher-speed rail connection between Phoenix and Tucson airports is an important and essential element of this Tier 1 EIS, ridership projections, as well public comment and input from local agencies, has indicated commuter service in the Phoenix and Tucson metropolitan areas to also be a popular and viable project component. 2) The scope of this Tier 1 EIS was to evaluate passenger rail between

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			Phoenix and Tucson, and commuter services in the Phoenix and Tucson metropolitan areas. However, this does not preclude the option to connect the system to Flagstaff in the future.
10/30/15	Bien Flores		
I feel that a light rail would be beneficial to the economy, environment, and citizens of Tucson. If done correctly, the revenue would not only allow Tucson citizens to travel to Metro Phoenix, but it would also generate from others living outside of Tucson to visit. Environmentally, less cars would be used between Tucson and Phoenix on I-10. Citizens would benefit and appreciate the accessibility the rail brings just by having an easier to access to Phoenix.			Thank you for your comment and participation in this study.
10/30/15	pjazzr@...		
Why in the world has it taken this long to propose a rail system? You should also have a commuter train that goes to Amtrak in Maricopa.			Thank you for your comment and participation in this study. The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, with commuter rail in the Phoenix and Tucson metropolitan areas. A route alternative connecting to Maricopa was originally included as an option, but was eliminated from further consideration based on a combination of technical analysis, public comments, and input from local agencies. However, that does not preclude a connection from Phoenix to Maricopa from being considered in the future.
10/30/15	Thomas Snyder		
considering that the southern pacific was contracted to haul passengers from mesa, etc to phoenix in the 70's when the bridges and crossings were flooded, I think the upsp could be contracted to do the same from phoenix area to Tucson at a lot less expense. The extreme cost of providing this service between the cities compared to the percentage of riders that will actually use it is a cost that is not warranted. The same thing is happening with the light rail. The cost to haul a small percentage of the population is too costly. Higher taxes to support these services for the benefit of a few are hard for most residents to afford, especially now that half the workers are making $30,000/year or less according to the latest studies.			Thank you for your comment and participation in this study. The Yellow Corridor Alternative of this Tier 1 EIS is the ADOT recommended option, which follows the existing Union Pacific Railroad freight corridor. Although ADOT has coordinated with the Union Pacific Railroad, the proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for freight movement and would not share line capacity with Union Pacific freight operations.

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10/30/15	Ann Hilliard		
I strongly disagree with the proposal to build passenger rail service between and Tucson. I think this proposal has totally ignored the geography of these cities. Assuming passengers travel between Phoenix and Tucson, where will they go in the cities when they arrive and how will they get there? The 2008 (pre-recession) I-10 license plate study showing 11,200 repeat trips on the study days appears not to have considered the final destinations of those commuters. Both cities sprawl over hundreds of square miles with little public transportation. No taxpayer-funded transportation project in the last 20 years has come in anywhere near budget. Our state is still reeling from the Great Recession, and there's no way to know how soon the economy and growth might approach the pre-2008 rates. Arizona does not currently have a strong natural resources, industrial, or business base to spur additional growth. I would like to see the assumptions behind the growth estimates, and the error bars! Automobiles are by far the most flexible and cost-effective way to travel for business and leisure in Arizona, and we are long past the time when I-10 needs to be widened. I question whether such widening is "impossible in some areas."			Thank you for your comment and participation in this study. 1) Although the analysis of this Tier 1 EIS focused on a passenger rail connection between Phoenix and Tucson, commuter connections into the West Valley were considered as part of high level operational assumptions. Ridership estimates conducted as part of this Tier 1 EIS have indicated the potential for over 2,500 daily riders between Phoenix and Tucson, and over 15,000 shorter trips in the Phoenix and Tucson metropolitan areas. 2) Passenger rail system connections to other transit services including the Valley Metro Light Rail and Sun Link Streetcar were prioritized as part of all alternative routing decisions 3) The assumptions that led to this rail corridor alternative are that I-10 would be widened to at least 8 lanes (4 in each direction) and another North-South Corridor high-capacity transportation facility would be built. Congestion levels are still expected to increase. The train serves as an alternative and a complement to I-10 and would be able to make the trip in less time without experiencing congestion. Widening I-10 through the Gila River Indian Community would need to address the needs and preferences of the Native American community as well as those of the travelers on I-10. That will determine the timing of the widening.
10/30/15	morris.natalie.r@...		
Please do this! This would be such an increased added value to the Arizona community, but also an improvement to our presence as shown throughout the nation. The increase in efficiency would service the local communities, but also have an effect on environment and economies. A win, win, win for many people. I have lived in communities where trains were an integral part of travel from town to town and, now, I often commute from Tucson to Phoenix and back. I would definitely be a regular of the express train, particularly if features such as a wi-fi and on-site necessities such as a healthy vending amenities were offered. This provides incentives for users to actually take the steps to use the train, and know they can get work			Thank you for your comment and participation in this study. Considerations regarding train amenities, such as Wi-Fi access, were not part of this initial Tier 1 EIS. However, such amenities are becoming commonplace in other comparable systems around the country, and would be evaluated in subsequent planning and environmental reports in future study phases.

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done. Thanks for the opportunity and hope to be able to be using it soon!			
10/30/15	Catherine S. Baird		
I completely support a passenger rail system between Tucson and Phoenix. I frequently have to travel to Tucson and have found there are few alternatives to driving my car. I hope the proposed passenger rail system receives support and funding in the near future. It would be a joy to see construction actually begin.			Thank you for your comment and participation in this study.
10/30/15	John Cook		
Stupid Ideas. Why don't you follow the freeway!			Thank you for your comment and participation in this study. The Green Alternative was removed from further consideration as part of this Tier 1 EIS because it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/30/15	Aaron Jensen		
My opinion is that the orange alternative would be the best route, second would be the green alternative, and last would be the yellow. I understand the yellow would be the least expensive but having a dedicated route through Apache Junction and Mesa would provide a large bonus to this area.			Thank you for your comment and participation in this study. 1) Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts associated with implementing passenger rail within in the corridor alternatives, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives. 2) Both the Yellow and Orange Corridor Alternatives would

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			provide direct passenger rail service to the City of Mesa.
10/30/15	Karen Molique		
Would really like to see railway between Tucson and Phoenix. I think it's a win - win for both cities. We are behind in transportation than most cities!			Thank you for your comment and participation in this study.
10/30/15	Philip Sedgwick		
Absolutely! We need this rail system. It would make access to Sky Harbor infinitely easier and travel from TUS to other locations more inexpensive. Reduction of traffic on I-10, especially in haboob season would be a plus, and I know for a fact I would attend more D'Back games and we would visit our child at ASU more often. We have long talked how essential this system would be. Every way it can be examined, it comes out on the plus side. Yes, yes, YES!			Thank you for your comment and participation in this study.
10/30/15	Leslay Lillywhite		
Yes. I have been hoping for this for years. Finally !!! I hope so.			Thank you for your comment and participation in this study.
10/30/15	Tim Owens		
The Yellow corridor seems like the best choice. I wish you could find an alternative to diesel fuel which creates a lot of pollution.			Thank you for your comment and participation in this study. The technology for this service has not been identified. A diesel-electric train was used as a conservative means for estimating travel times and ridership. In later stages of the study, a specific locomotive technology would be part of the recommendation.
10/30/15	James P Angel		
That the Green Route did not receive the full analysis given to the orange and yellow routes is inexcusable given its position as the most popular route among those who responded to your 2012 solicitation. The justification provided, that the GRIC does not support the route, does not hold water. GRIC must simply be adequately compensated for use of the land. Perhaps offering GRIC a local station and free or heavily subsidized fares would do the trick. Alternatively, you could investigate putting the line on elevated track down the I-10 median. Please reconsider some alternatives. Be creative. For the billions you are proposing to spend you need to make sure this alignment can support true HSR. The yellow route most certainly does not. Two hours for service between Phoenix to Tucson is unacceptably long.			Thank you for your comment and participation in this study. The Green Alternative did include assumptions for a local Gila River Indian Community (GRIC) station, complementary transit services connecting to the rail system, and adequate compensation for use of GRIC easements. However, the Green Alternative was removed from further consideration as part of this Tier 1 EIS because it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource

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			impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/30/15	Carolyn Pager		
I still really feel the Arizona Passenger Rail Corridor should go near Casa Grande, AZ not Coolidge as we need to maintain growth in Casa Grande to help Pinal County all the way around. To me it would be a more central location for Pinal County. Winter Visitors may frequently use to get to locations in Phoenix and Tucson…what a great way to go without driving.			Thank you for your comment and participation in this study. The Green Alternative, which directly served Casa Grande, was removed from further consideration as part of this Tier 1 EIS because it did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/30/15	Mary Brindley		
I think this is a fantastic idea that should be executed. I live in Red Rock and would love if there would be a pick up/ drop off out here. Next should be a east and west bound highway in Tucson.			Thank you for your comment and participation in this study. Specific station locations were not determined as part of this Tier 1 EIS. However, high-level operational assumptions for both corridor alternatives included stations both in Eloy and northern Marana.
10/30/15	tracyland@...		
This project is long overdue. There are not enough good-paying jobs in Tucson to support a working middle class.			Thank you for your comment and participation in this study.

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10/30/15	Loretta Hanson		
Please take a look at the train New Mexico put in that runs between Albuquerque and Santa Fe. It seems to be working well. Perhaps Arizona can find some answers with procedures that have already been tried, both the ones that worked and the ones that didn't.			Thank you for your comment and participation in this study. Comparable systems throughout the United States, including the Rail Runner in New Mexico, were referenced during the Tier 1 EIS process.
10/30/15	Kurt C Denbaars		
I strongly feel that we do need transportation alternatives between Tucson and phoenix, especially Tucson to sky harbor airport. I think that people would ride even if only about as fast as the freeway, all it takes is one accident and they could shut it down for hours. This would put us on par with many other countries that have already done something like this. In favor the yellow route, hopefully funding can be found so we can get moving on this- I don't think that we have any other choice.			Thank you for your comment and participation in this study. Financing to further develop the proposed system is not available at this time, but would be evaluated in future phases of the study.
10/30/15	Mhalltsg@...		
I support the Tucson to Phoenix passenger rail - yellow route is the way to go. Much needed now and more so in the coming years. Kudos to ADOT for this excellent study and presentation.			Thank you for your comment and participation in this study.
10/30/15	Ron Edgell		
Establish toll booths along East and West bound lanes of I-10 and collect an amount from each vehicle to help fund the rail system. Keep Amtrak out of the equation as they are so poorly run.			Thank you for your comment and participation in this study. 1) Financing mechanisms to further develop the proposed system have not yet been considered, but will be evaluated in future phases of the study. However, tolling on public highways is currently not enabled under Arizona law. 2) Passenger rail system operators, such an Amtrak, have also not yet been considered, but would be evaluated as part of a subsequent analysis.
10/30/15	Marty Medvec		
I believe a high-speed train should be considered from Nogales, Az to Flagstaff, Az. I-10 from New Mexico to Tucson and west to California. This would give students and businessman in the state an opportunity to do business in the state and attend major Arizona colleges located in Phoenix, Tucson and Flagstaff. This would also benefit young adults in the different cities to look for work in Phoenix and Tucson, This would also be a boom to major corporations and			The scope of this Tier 1 EIS was to evaluate passenger rail between Phoenix and Tucson, and commuter services in the Phoenix and Tucson metropolitan areas. However, this does not preclude the option to connect the system in the future

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small business to deal with business throughout Arizona and Mexico. The High Speed train could run up I-19 to I-10 to I-17 and have several stops at major hubs along I-10 I-19 and I-17. Parking areas could be made to accommodate parking and bus service from other parts of the state. I would suggest that High Speed trains run east to west on I-40 across northern Arizona and I-10 from Phoenix to California along I-10 and I-8 from Casa Grande, Az to California. It's time Arizona get into the 21 century and be the first state to become the pioneer in HIgh Speed transportation in the United States connecting all parts of Arizona for education, commerce and business. Think of all the jobs this would bring to the citizens of Arizona with employees to run the High Speed train system, maintaining the system, other modes of transportation moving citizens around the state. Tourist can use the High Speed trains to tour Arizona using hotels and rental cars and tour buses. This could can bring revenue and tax money to Arizona. High Speed Trains could also be constructed from Kingman, Az. to Las Vegas, Nv. along route 93, Flagstaff north to Page along route 89, Phoenix to Holbrook along route 60, 61,180. This mode of transportation can be a boom to Arizona.			to Nogales, Flagstaff, or points beyond.
10/30/15	Daniel Snyder		
My wife and I are firmly in SUPPORT of Arizona installing a Tucson to Phoenix Rail Service. With the population growth and the expense of adding more automobile roads, it seems so smart and forward thinking for AZ to move forward with rail. Both my wife and I drive around the state for our work and put too many miles on our vehicles. We would with jump at the chance to use the rail service once it is available. So would many people I am sure as the success of the Phoenix light rail and the Tucson urban streetcar has shown. This would be an extremely smart and highly beneficial move to take for our great state of Arizona.			Thank you for your comment and participation in this study.
10/30/15	Terry Benelli	LISC Phoenix	
LISC Phoenix was formed in 1992 and since its inception, has played an important role in the gradual rebirth of a number of blighted neighborhoods throughout metropolitan Phoenix. Working in collaboration with grassroots organizations, LISC Phoenix and its corporate, foundation and public partners, has created an innovative approach to addressing neighborhood problems in distressed, low-income neighborhoods.			Thank you for your comment and participation in this study. The Arizona Passenger Rail Corridor Study - Alternatives Analysis, an Appendix to this EIS document, developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of

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LISC Phoenix is using transit and Transit Oriented Development as a platform for community development in the valley. The strategic initiative, Our Future is on the Line, launched in 2013 responds to the potential for sustainable and equitable development created by the light rail system in our region. It emphasizes the urgency and need to provide development alternatives that can reduce transportation costs, improve air quality, promote healthy living, increase our economic competitiveness and build livable communities. Our organization is frequently asked about opportunities for TOD in other parts of our state, most notably Tucson. Phoenix to Tucson passenger rail would offer strong potential for TOD to occur along the route and through additional public transportation options developed to connect with this line. We were pleased to see your Draft Tier 1 EIS for this line highlights many positive advantages of passenger rail between Phoenix and Tucson; however, we encourage you to more explicitly include TOD as you continue to document its benefits. Thank you for your efforts on this important opportunity for our state.			the availability of the service. Transit-oriented development was an important consideration for this effort.
10/30/15	Jenise Porter		
Fewer young people are getting drivers' licenses and buying automobiles than have done so in the past. The trend is for more public transit rather than less. We need a Phoenix-Tucson passenger rail. I would use it several times a month.			Thank you for your comment and participation in this study.
10/30/15	Kenyon Newman		
Yes! This is a great idea to increase commerce!			Thank you for your comment and participation in this study.
10/30/15	Shelly A. Tunis		
After reviewing the voluminous data in the “ADOT Passenger Rail Corridor Study – Tucson to Phoenix – Alternatives Analysis,” it seems clear that the best alternative is the Yellow Alternative. Survey Results indicate the public prefers the Yellow Alternative 2 to 1 over the Orange Alternative. It is easy to understand why. The Evaluation establishes that the Yellow Alternative is the best option for: · Community Acceptance and Accessibility · Environmental Impacts · Ease of Implementation			Thank you for your comment and participation in this study. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.

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· Mobility · And importantly, Financial Feasibility Two extremely significant factors rule out the Orange Alternative. It has considerably higher costs and lower anticipated ridership. Those two factors alone could doom the success of this rail project. As a person who utilizes train service when I travel to the East Coast and to European countries, I see the greatest potential for the Yellow Alternative.			
10/30/15	Robert Torres		
I favor the orange or yellow alternate route due to the expectant use of existing rail system, no sense in recreating the wheel. I oppose the green alternate route due to enough congestion in this area and we do not need more in our community [GRIC].			Thank you for your comment and participation in this study. The Yellow Corridor Alternative is the ADOT recommended alternative, which follows existing Union Pacific Railroad freight lines. ADOT has coordinated with the Union Pacific Railroad throughout this Tier 1 EIS. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for freight movement and would not share line capacity with Union Pacific freight operations.
10/30/15	Jayson Matthews	Valley of the Sun United Way	
On behalf of the Valley of the Sun United Way, I am writing to thank you for your efforts to document the benefits of and vast support for Phoenix-Tucson passenger rail, and to ask you to add us to the list of supporters. As you are likely aware, Valley of the Sun United Way has served the needs of individuals and families in Maricopa County since 1925. We are building caring communities where each person has the opportunity to achieve the aspirations we all share: a good education for our kids, a safe place to live, food on the table and the security of financial self-sufficiency. Because of our wide array of partnerships we effectively create change on two levels: 1) drive systemic change that impacts entire communities; and, 2) transform individual lives. We do this by bringing together partners from every sector – public, business, non-profit and faith-based organizations – to get things done. At Valley of the Sun United Way, we have seen how public transportation provides an			Thank you for your comment and participation in this study.

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important element in connecting the individuals and families that live in our neighborhoods and our communities. Through Phoenix-Tucson passenger rail, additional opportunities will exist to connect our state's largest counties and the people that reside and visit them. Thank you for your work on the Draft Tier 1 Environmental Impact Statement. Please proceed with the next steps as soon as possible.			
10/30/15	Bret Fanshaw	Environment Arizona	
On behalf of Environment Arizona, I am writing in support of ADOT moving forward on Tucson to Phoenix passenger rail. As ADOT's Draft Tier 1 EIS documents, there are many environmental advantages for this rail line to exist. Environment Arizona is a citizen-based organization that draws on 30 years of success in tackling our state's and our nation's top environmental problems. Tucson to Phoenix passenger rail would be a tremendous asset to Arizona and our state's environment. In particular, we appreciate that the Draft Tier 1 EIS documents the strong potential to reduce serious pollutants such as CO_2 that contribute to climate change. We also appreciate the referenced reductions in VMT that would be a result of Tucson to Phoenix passenger rail and the related decrease in air quality and public health problems. As you acknowledge in the Draft Tier 1 EIS, additional research and incorporation of the best environmental protections is important. In particular, our organization urges you to minimize threats to water, land and air. We also ask that you include additional measures, such as solar technology and use of the cleanest fuels available, to afford even greater environmental benefits.			Thank you for your comment and participation in this study. A reduction in vehicle miles traveled by introducing mass transit to a region would be expected to result in a reduction in vehicle emissions. During subsequent planning and design, alternative technologies may be investigated. The analysis would include effects on air quality, greenhouse gases, and climate change.
10/30/15	Meghan Hunt		
I personally would like to see a passenger rail stop between the San Tan Valley/Queen Creek area into the Town of Florence. Florence is a major area for employment for residents in the San Tan Valley and Queen Creek areas given that it is the County seat, has multiple state and private prisons, jails, Sheriff's Department, as well as Town employment. For those who live in the surrounding areas, eliminating a daily driven commute would alleviate stress on people, wear and tear on County and State roads from vehicles, vehicle emissions, congestion, vehicle involved accidents, among other related items. A passenger rail would also allow for greater travel within the Florence area and bring additional revenue and commerce to a great Town. As someone who lives in San Tan Valley and commutes to Florence for employment purposes, I would encourage a passenger rail stop to come to the Town of Florence with stops in San Tan			Thank you for your comment and participation in this study. 1) Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives. 2) The Yellow alternative would provide direct service to Queen Creek and San Tan Valley.

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Valley/Queen Creek and other outlying areas of Pinal County. Thank you for your time and good luck on the future endeavors of this project.			
10/30/15	Mary Kitchen		
My suggestion would be the yellow corridor. It doesn't interfere with any wild life.			Thank you for your comment and participation in this study.
10/30/15	Matthew McCormick		
To Whom It May Concern, Thank you for the opportunity to submit comments to the Draft Environmental Impact Statement for the Passenger Rail Corridor Study. Pinal Land Holdings is a major stakeholder in the region between Coolidge and Eloy and would be directly impacted by both the Yellow and Orange Alternatives. That being said, we believe that transportation infrastructure is key to the success of the region and State and support the construction of passenger rail along either alignment. One concern we do have is the location of the midway stop on the Intercity Pattern. We believe that if the Intercity train stops at the Eloy station it will result in more miles being driven by riders to reach that station with either alternative, but especially the Orange Alternative. The midway stop will be primarily attracting riders from communities to the north and west of Eloy (Casa Grande, Coolidge, Florence, Gila River Indian Community & Maricopa), and we believe that the stop would be more efficient in another location. The stop would be better served in a location that is closer to the communities north of the Eloy and at an intersection with an existing or planned East-West connector that would reduce drive distances for riders living in Casa Grande and Maricopa. We look forward to the final EIS and the continued progress on this project. Please feel free to contact us if you would like to discuss our comment further.			Thank you for your comment and participation in this study. Specific station locations have not been decided. The locations shown in maps in the Tier 1 EIS and Alternatives Analysis were shown only to indicate a station area as a general geographical basis for forecasting ridership. The Eloy station, or any other station, would be subject to further study and local outreach and coordination before a final site is decided upon.
10/30/15	Lawrence Ramsey		
I have heard about the proposed rail like between Phoenix and Tucson for decades. Nothing has ever come of it, but now it may have a hope. It would be a great improvement to driving on I-10 for two hours, even after most of it has been widened. I agree that the recommended yellow route is the most feasible. It would also be the quickest and least costly to implement. I am a great fan of rail travel. We normally go on a long rail trip each year that typically lasts 18			Thank you for your comment and participation in this study. ADOT has completed a separate study to reassess the functionality of the Wellton Branch of the Union Pacific Phoenix Subdivision and the cost to reopen passenger services such as Amtrak into Phoenix. Summary statements from that study are included in the Arizona State Rail Plan, available at http://www.azdot.gov/docs/planning/state-rail-

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to 21 days. Some years there are two trips. The next step is to get Amtrak back into the Phoenix area. The UP track from west of Phoenix, through Hyder Valley, to where it rejoins the UP mainline in Yuma County could be rehabbed and put into service cheaper than building another route. I arrived in Tempe in the late 1996 and have lived in the valley since. I remember when I-10 ended where it met I-17. The US60 had not been started. Going west to LA, CA required a trip through Wickenburg. As each of the new routes were constructed, they were overcrowded when they opened. Widen, fly-over lanes, express lanes, stacks, loops, and whatever could be imagined were employed to make it work (better). So get the rail going and the public will use it, requiring you to beef that up also.				plan.pdf
10/30/15	Carolyn Campbell and Jan Holder	Sonoran Desert Protection and Sky Island Alliance		
Thank you for the opportunity to provide comments on the Passenger Rail Corridor Study Draft Tier 1 Environmental Impact Statement. We submit these comments on behalf of the Coalition for Sonoran Desert Protection and Sky Island Alliance. Founded in 1998 and comprised of 35 member groups, the Coalition works to achieve the long-term conservation of biological diversity and ecological function of the Sonoran Desert through comprehensive land-use planning in Pima County. Sky Island Alliance protects and restores the biodiversity and natural heritage of the Sky Islands through science, education, and advocacy. Sky Island Alliance is also a member of the Coalition. Our work is often focused on the preservation of critical wildlife linkages, wildlife movement, and habitat connectivity. We support a passenger rail line from Tucson to Phoenix if the following issues are taken into account. We request that any adverse impact to lands within the Conservation Lands System (CLS) in Pima County are properly mitigated based on CLS guidelines. CLS guidelines can be found at: https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Development%20Services/Land%20Planning%20and%20Regulation/Long%20Range%20Planning/CLS%20Regional%20Plan%20Policy.pdf. The proposed location of the passenger rail in Pima County and into Pinal County is along Interstate 10. We have been working with the Arizona Department of Transportation on planning for the potential widening of Interstate 10 in Pima County and ensuring proper measures are taken to preserve habitat connectivity, such as providing for a vegetated wildlife overpass near the Avra Valley Road interchange. While we support following existing rail lines, the proposed location bisects two critical wildlife linkages: 1) between the				Thank you for your comment and participation in this study. Specific alignments and railroad design were not developed for this Tier 1 analysis. During subsequent studies, ADOT would evaluate impacts to lands within the Conservation Lands System and identify appropriate mitigation measures in coordination with the federal lead and cooperating agencies. At the request of the Arizona Game and Fish Department, the statement appearing on Page 5-149 of the Draft Tier 1 EIS has been clarified in the Final Tier 1 EIS to read: "a passenger rail system may present opportunities to improve wildlife connectivity <u>by siting the corridors to minimize habitat and connectivity fragmentation, identifying current and potential important wildlife movement areas, and designing facilities to provide maximum permeability for safe wildlife movement</u>."

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Tucson and Tortolita Mountains, and 2) between the Picacho Mountains and the Ironwood Forest National Monument. Proper mitigation such as wildlife underpasses or bridges should be incorporated into the final corridor design to alleviate impacts to these critical wildlife linkages. These linkages were identified in the 2006 Arizona Wildlife Linkages Assessment under the direction of the Arizona Department of Transportation, Arizona Game and Fish Department, and a diverse group of NGOs and other stakeholders (including Sky Island Alliance). Detailed linkage designs for both of these wildlife linkages were also completed under the Arizona Missing Linkages project (www.corridordesign.org/linkages/arizona). Moreover, if the passenger rail does not follow existing rail, we request that the rail line be raised to allow for the incorporation of wildlife underpasses within these critical wildlife linkages and thus the promotion of uninterrupted wildlife movement. Again, we can support a passenger rail from Tucson to Phoenix if CLS guidelines are adhered to and if there is proper mitigation for impacts to critical wildlife linkages. Thank you for your consideration of these comments. Please do not hesitate to contact us if you have further questions.			
10/30/15	Gary Hancock		
At this point, given the two alternatives, the Yellow route seems to be preferable. When moving forward, I would hope to see an effort made with UP to partner in the region's transportation, mitigating costs of ROW use and acquisition.			Thank you for your comment and participation in this study. The Yellow Corridor Alternative of this Tier 1 EIS is the ADOT recommended alternative, which follows existing Union Pacific Railroad freight lines. ADOT has coordinated with the Union Pacific Railroad throughout this Tier 1 EIS. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than needed for freight movement and would not share line capacity with Union Pacific freight operations.
10/30/15	Parshelle Brimhall		
I wish to express my ongoing support for the future Passenger Rail system to be integrated into the planned North-South Freeway Corridor. Thank you for all ADOT does for our state.			Thank you for your comment and participation in this study.
10/30/15	Ken Ellsworth		
Hello - I want to express my support for the future Passenger Rail System to be integrated into the planned North-South Freeway Corridor. I believe this will be a vital & extremely beneficial			Thank you for your comment and participation in this study.

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service for the transportation of individuals in and out of this area. Thank you!!			
10/30/15	Diane E. Brown	Arizona Public Interest Research Group (PIRG) Education Fund	
The Arizona PIRG Education Fund appreciates the opportunity to provide comment on the Arizona Passenger Rail Corridor Study - Tucson to Phoenix, Draft Tier 1 Environmental Impact Statement. For over a decade, the Arizona PIRG Education Fund has followed and provided input on policies that would advance Tucson to Phoenix passenger rail. To date, ADOT's Draft Tier 1 EIS provides the most comprehensive, clear and compelling reasons to move forward with Tucson to Phoenix passenger rail. Below please find the Arizona PIRG Education Fund's core principles for Phoenix to Tucson passenger rail as presented to ADOT in October 2012; Arizona PIRG Education Fund top research related to Phoenix to Tucson passenger rail; and specific comments related to ADOT's Draft Tier 1 EIS. Arizona PIRG Education Fund 's Core Principles for Phoenix to Tucson Passenger Rail 1. Choose a track alignment with the greatest ridership potential to maximize the value delivered by the investment. To further improve ridership, the rail service should include features prioritized by the public, such as wireless internet, electrical outlets, and express routes. 2. Select the right places for stations, where passengers have access to local public transit networks to complete their trip and where passenger rail can be a catalyst for transit-oriented development. 3. Price passenger rail fares competitively with other modes of transportation in order to make it a reasonable transportation option. 4. Plan with future transit options in mind. The entire Sun Corridor region – as the collective area between Phoenix and Tucson is known – needs more transportation options. ADOT should ensure that a future passenger rail line connects with existing and future transit services. 5. Eliminate the bus option from consideration. While bus service is often a good transit option, ADOT's own projections estimate that by 2050, it will take more than five hours to			Thank you for your comment and participation in this study. The AA and Tier 1 EIS are high-level planning documents, and some of the requests stated in PIRG's Core Principles cannot be committed to at the conceptual stage. In later phases, when a specific alignment and rail construction project(s) are more developed, items such as amenities, station locations, train operations, and fare structures will be discussed. With regard to PIRG's request for the Tier 1 EIS to include more information on VMT and the cost of congestion for the Tucson to Phoenix corridor, the Purpose and Need chapter of the Tier 1 EIS cites planning studies and demographic forecasts that support the need for additional transportation capacity in the region between Tucson and Phoenix. Numerous additional data regarding existing and projected VMT and the cost of congestion are available both on the Internet and in the sources PIRG references in their comment; however, it was not the intent of the Tier 1 EIS to reference or cite all of those sources. Specific alignment, station locations, and locomotive technology for a passenger rail system have not been determined. Therefore it is not possible until subsequent environmental studies to quantify the effects of passenger rail between Tucson and Phoenix on energy use, air quality, and public health. Likewise, the Tier 1 analysis does not delineate funding sequences. Cost estimates were developed for the AA and reported in the Draft Tier 1 EIS for comparison purposes between alternatives, and used pricing information current at the time the estimates were developed. NEPA does not require cost

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travel between Tucson and Phoenix, even if the I-10 is expanded. We need to look beyond highways for solutions to our traffic congestion and to focus on rail for the study. 6. Design stations with accessibility in mind. Passenger rail should be easy to use for the elderly and people with disabilities. It also should be designed to provide good access for bicyclists and pedestrians. 7. Complete the rail study in a timely manner. Since finalizing the rail study is a key step for the Phoenix to Tucson passenger rail line, ADOT should articulate clear goals for completing the study and the launch of service and regularly measure progress made toward achieving those goals. 8. Encourage cooperation among all levels of government. Since this project will impact a number of jurisdictions, ADOT should bring together local governments in the Sun Corridor and also work collaboratively with the federal government. 9. Invest enough to succeed. Arizona must identify and secure reliable funding in order for passenger rail to be successful. 10. Balance private investment with public safeguards. Harnessing private investment can help provide resources to build passenger rail. The public must retain control over planning and key decisions, and private deals need to operate with their books fully open to the public. Wherever possible, the Phoenix to Tucson passenger rail line should be built on publicly owned right-of- way to allow the line to be built as quickly and inexpensively as possible. Arizona PIRG Education Fund Top Research related to Phoenix to Tucson Passenger Rail Over the last decade, the Arizona PIRG Education Fund has released over two dozen transportation reports (accessible via arizonapirgedfund.org). Below are three reports most relevant to advancing Phoenix to Tucson passenger rail: Arizona's New Frontier (April 2009) makes the case for more and better public transportation in Arizona. The report outlines a vision for the future of public transportation in Arizona, including passenger rail service between Phoenix and Tucson, making travel easier between the cities as they become more and more interdependent. Connecting Phoenix and Tucson (May 2012) highlights that over the past few decades, explosive population growth in Phoenix and Tucson has led the two cities to grow increasingly interconnected, socially and economically. The report states that population growth between Phoenix and Tucson has also resulted in increasing traffic congestion problems, particularly on Interstate 10 and how passenger rail between Phoenix and Tucson can help meet the future			estimates, and the Tier 1 EIS is not sufficiently specific, nor is it intended, to provide precise cost information for a future hypothetical project with such a large number of variables.

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transportation needs of the Sun Corridor. Summer 2015 Update: Bikes, Trains & Less Driving (August 2015) documents how Arizona is experiencing a shift in how people travel. Driving miles per person are down especially sharply among Millennials, America's largest generation that will increasingly dominate transportation trends. Since 2005 Arizonans have been driving fewer miles per person, and they increasingly look to public transportation to get around. Comments on ADOT's Draft Tier 1 EIS As we weigh our principles against ADOT's Draft Tier 1 EIS, we are particularly pleased that ADOT 1) provided strong ridership justification for moving forward with Tucson to Phoenix passenger rail; 2) significantly acknowledged the need to plan with future transit options in mind; and 3) actively encouraged broad governmental, stakeholder and public support. 1. While the Tables typically provide a quick, easy-to-understand snapshot and comparison of the three researched options, the Arizona PIRG Education Fund finds ES-3 and ES-10 contain components most pertinent to the need for moving forward with Tucson to Phoenix passenger rail: daily rail ridership (consumer demand), VMT and VHT reductions and reductions in pollutants such as NOx, CO, VOC, PM10, CO_2, and SO_2 (which can lead to improved air quality and public health). 2. The Arizona PIRG Education Fund often touts the need for providing and connecting transportation options at the local, regional and statewide levels. The ADOT Draft Tier 1 EIS (page ES-3) highlights how ridership on fixed-route transit systems in Tucson and Phoenix has exceeded projected figures. Additionally, it states, "A reliable Tucson-to- Phoenix rail connection could provide the missing backbone, close the gap that currently exists for potential commuters and intercity travelers, and achieve synergies by creating and delivering a robust customer base for a future network of commuter and intercity services." Inclusion of these components point to the success enjoyed thus far and the need to continue to expand transportation options. 3. The Arizona PIRG Education Fund has participated in a number of relevant stakeholder and community meetings ranging from the Corridor Support Team to open houses in libraries. We have demonstrated support of over 100 small businesses and educated members of the general public from Tucson to Phoenix and municipalities in between. We have directly conversed with mayors and other elected officials about their support for Tucson to Phoenix			

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passenger rail. A common thread: as noted in the Draft Tier 1 EIS, ADOT has provided a number of opportunities for citizens to ask questions, receive answers and provide input – whether deep or broad, in person or online, typed or handwritten – and the vast majority of citizens have also favorably responded. While ADOT's Draft Tier 1 EIS references elements for future study such as station locations and accessibility, it would be helpful for ADOT to provide additional data and/or data assumptions including funding sooner rather than later. More specifically: 1. The Draft Tier 1 EIS should include more detail and corresponding citations on VMT and the cost of congestion for the Sun Corridor as well as for individual areas. The Arizona PIRG Education Fund has issued reports documenting transportation trends in our state which since 2005 point to Arizonans driving fewer miles per person while increasingly using public transportation. Too often, we have seen transportation plans fail to recognize these trends. The Draft Tier 1 EIS should include information specific to Arizona passenger travel and energy use (page 5-182 and Table 5-27). The Draft Tier I EIS should document pollution reductions (and air quality and public health benefits) that would be achieved through minimizing idling time and using the cleanest fuels available. 2. While we recognize Tier 2 studies and NEPA documentation will help to refine cost estimates, the Draft Tier 1 EIS could be clearer in delineating the sequence of funding (8.2) to ensure overall success of Tucson to Phoenix passenger rail, increase the potential to connect to local transportation options, as well as to guide the efficient use of limited resources. The Draft Tier 1 EIS (ES-23) should specifically mention the projected cost of inflation for operating, maintenance and capital costs. In addition to cost, we encourage ADOT to more specifically incorporate economic benefits, including Transit Oriented Development. In conclusion, ADOT's Draft Tier 1 EIS contains essential and favorable documentation to move forward with the next steps to making Tucson to Phoenix passenger rail a reality. We urge you to proceed.			
10/30/15	Sandy Bahr / Tiffany Sprague	Sierra Club Grand Canyon Chapter	
Thank you for the opportunity to provide comments on the Draft Tier 1 Environmental Impact Statement (DEIS) for the Arizona Passenger Rail Corridor Study between Tucson and Phoenix. Please accept these comments on behalf of the Sierra Club Grand Canyon Chapter and our			The Green Alternative followed I-10, but it had major challenges beyond being located in the same corridor as I-10. It did not attract ridership comparable to other alternatives,

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more than 35,000 members and supporters in Arizona. Sierra Club's mission is "to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments." Our members have significant interest in this project as many live in the communities that will benefit from the rail or will use this as an alternative mode of transportation. We have long advocated for mass transit options, including a passenger rail between Tucson and Phoenix. The Sierra Club Grand Canyon strongly supports a passenger rail line connecting Tucson to Phoenix with stations at key points in between. A high-capacity passenger rail line is essential for relieving congestion on highways and can have significant environmental benefits, including reduced pollution and energy use. We applaud the Arizona Department of Transportation (ADOT) for moving forward with this proposal. However, in order to minimize environmental impacts while maximizing use, the rail line must be properly sited. We are extremely disappointed that ADOT eliminated the Green Alternative, which followed the I-10 corridor, from further consideration. The DEIS claims that, although this was the shortest route and was well supported during previous comment periods, it has "less potential ridership and serves fewer population centers" (DEIS, p. ES-6). We disagree with this assessment and are interested in an explanation of how this determination was made. This route would provide the most direct link between city centers, where the bulk of the population lives. Building a line far from the city centers discourages ridership from the centers of the cities as the amount of required travel time substantially increases. We would appreciate seeing how the ridership estimates in Table ES-3 compare to those from the Green Alternative. Additionally, one of the primary goals of this rail corridor is to reduce congestion and improve safety on I-10. However, by siting this line far from city centers, ridership is likely to be made up primarily of people who live near that line, who likely would use alternatives to I-10 to travel between the cities. In this case, congestion on I-10 will continue to worsen rather than improve. A key concern with the two alternatives carried forward for analysis is the increased environmental impacts. In our previous comments, we recommended that ADOT only evaluate previously disturbed and already developed areas for the alignment and not consider alignments that would affect currently undisturbed/undeveloped areas. By concentrating in areas that are already disturbed, such as along existing freeways or rail lines, damage to			did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.

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environmental resources could be greatly diminished with the added benefit of less infrastructure needs. Unfortunately, ADOT instead considered areas that may be developed as though they already have been. This will result in the line potentially running through previously undisturbed habitat, causing further fragmentation and habitat loss and negatively impacting resources.

Related to this, the passenger rail should not be used to promote more development in currently undeveloped lands, including the North–South Corridor. Although this area is anticipated to be built up in the next several decades, such development is not certain, nor should ADOT seek to facilitate it with infrastructure development. Building the rail line through this area would not only have irreparable damage to environmental resources but would also spur growth in these important lands. The rail line should instead be sited in an area that has already been developed, such as the I-10 corridor. As we noted in our previous comments, the goal of the passenger rail should be to provide an alternative mode of transportation between Phoenix and Tucson and to reduce the number of vehicles on the road, not an impetus for further sprawl. The route should be as direct as possible within an existing travel corridor, and stops should be limited to existing communities.

The DEIS indicates potentially significant impacts to natural resources from either the Yellow or Orange alternatives. For example, nearly 100 parks, more than 1,000 wetland acres, and 3–4 major waters would be affected (Table ES-5). The DEIS notes that the project will have medium to high impacts on habitat and protected species. Discussion of mitigation options for these effects is very limited, as the DEIS notes that mitigation measures would be determined during a Tier 2 analysis. However, ADOT cannot assume that mitigation options may be available to adequately eliminate or reduce these threats and should provide a more detailed analysis of potential impacts and mitigation options before an alternative is selected.

With the above factors in mind, we are very concerned about the impacts of the proposed alternatives and encourage ADOT to reassess the Green Alternative. The I-10 corridor routes would minimize environmental impacts, limit additional habitat fragmentation, and would likely be the route that would most encourage people to use the rail rather than their cars.

Thank you again for the opportunity to comment on this proposal. We look forward to learning more.

Date Submitted	Commenter	Affiliation	Response
10/30/15	Angela Massey		
I am in support for the future passenger rail system to be integrated into the planned North-South Freeway Corridor.			Thank you for your comment and participation in this study. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/30/15	Stacy Brimhall		
I wish to express my ongoing support for the future Passenger Rail system to be integrated into the planned North-South Freeway Corridor. Thank you for all ADOT does for our state.			Thank you for your comment and participation in this study. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives.
10/30/15	James Pitts		
The concept of commuter line between in Tucson and the Phoenix metro area is one that we have often asked, "why don't they build a rail system between here and there - it would save so much time and effort?" Often I have to drive from Sierra Vista to Casa Grande, Chandler, or Phoenix for a meeting and return the same day. Like it or not, when I was younger, that road trip was not too bad. But the reality is, at 54, it's not that easy now. Also, over the last 15 years, we have seen significant improvements to the I10 corridor; but also a significant increase in traffic, aggressive driving (oh the Texas drivers), many collisions. As a former law enforcement officer and traffic accident re-constructionist, I tend to take note of the collisions, and long traffic delays that they create. But now that I am a business owner, I see these accidents more in the light of an economic issue - injuries and property damage directly effecting our insurance rates and lost revenue and increase operating expenses every-time an employee sits in traffic, just to name two. And then there is the lost productivity of just driving for two plus hours one way. I can get a lot of work done in four hours while "someone else drives." Overall, I think New Mexico made an excellent decision to invest in the New Mexico Rail Runner Express. If New Mexico can do it - so can we!			Thank you for your comment and participation in this study. Comparable systems throughout the United States, including the Rail Runner in New Mexico, were referenced during the Tier 1 EIS process.

Date Submitted	Commenter	Affiliation	Response
10/30/15	Tristan Platt		
I applaud ADOT's effort to continually improve Arizona's transportation infrastructure. Building a rail line between Tucson and Phoenix would provide much needed relief to congested roadway. Railways have had much success in Europe and Eastern US cities. I have used these rail systems before and can attest to their success. Between the Yellow and Orange Alternatives, the Yellow is the better option. The reason for this is the Yellow Alternative's lesser Environmental Impact, Easier projected implementation, Community preference, as well as Cost Efficiency over the Orange rout. Therefore I encourage ADOT to choose the Yellow Alternative. I thank you for your time and the chance to comment on this matter.			Thank you for your comment and participation in this study.
(no date)	John Jones		
The DEIS assumes that for the Yellow Alternative, UPRR will convey an easement on the Phoenix Subdivision to ADOT for the purpose of constructing passenger railroad facilities. This issue had been characterized as a fatal flaw in previous analysis by your consultant. At that time your consultants also stated the Green alternative had a fatal flaw in that it would require GRIC approval. So what changed? Has UPRR agreed to permit passenger train operation within the Phoenix Subdivision ROW? Table 7-1 on page 7-2 and 7-3 compares the community and environmental criteria for the final alternatives. The two route alternatives are equally compatible with local plans. The City of Mesa 2040 Transportation Plan was adopted 11/17/ 2014 and includes both the Yellow and Orange alternatives for passenger rail routes. The Superstition Vistas Plan was adopted on 12/11/2011 as an amendment to the Pinal County Comprehensive Plan and specifically includes a passenger rail corridor for the Orange alignment. The two route alternatives would have a same impact on water resources, wildlife corridors, and species habitat. The summary on page 7-3 states, "The potential to affect water resources, wildlife corridors and potential species habitat would be greater within the Orange Corridor Alternative." That blanket statement bears close examination, as do the numbers cited in the comparison. An examination of the Biological Resources Report completed by Arizona Fish and Game has some misstatements that need to be corrected. Significant impacts were reported in segments 3 and 4 of the Orange Alternative.			Thank you for your comment and participation in this study. 1) During the development of the AA, ongoing discussions with UPRR indicated that use of the Phoenix Subdivision ROW need not be eliminated from consideration. 2) As part of interagency coordination, AGFD undertook an independent study of the Yellow and Orange corridor alternatives. Further analysis of the impacts to water, wildlife corridors, and special status species would be completed for the subsequent project-specific environmental analysis. 3) Use of the I-10 frontage road between Tucson and Marana, which is within ADOT ROW, was assumed for high-level cost estimating purposes. However, no specific alignment was considered for environmental effects in the Tier 1 EIS, which analyzed mile-wide corridor alternatives. Specific environmental impacts, including traffic and transportation, will be examined in detail in subsequent planning and environmental studies.

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Orange segment 3 from AZ 287 to Hunt Hwy has 5 statements. Statement 3 and 5 are incorrect and appear to be the result of hasty cut and paste editing. Statement 1, sentence 2 is partially correct but would not isolate the San Tan Mountains because it is not adjacent to them. This segment is included as an alternative in the recommended Yellow route. Orange segment 4 between Hunt Hwy and Rt 202 at Gateway has 5 statements. The first sentence of Statement 1 is questionable due to the fact that this proposed one mile wide route parallels and includes, an electric transmission line, the Copper Basin RR and the Central Arizona Project Canal. The route appears purposefully chosen to be located adjacent to these industrial structures. It is hard to draw the conclusion that this route is a NEW alignment and there would be higher level of habitat impact and fragmentation than already exists. Sentence 2 of Statement 1 should state the obvious that the CAP canal already bisects habitat and effectively isolates the San Tan Mountains. Sentence 4 of Statement 1 confirms the CAP canal as a barrier to wildlife crossing it and proposes mitigation opportunities to create/ enhance crossings over the CAP canal that connect wildlife with the Valley North and East of the San Tan Mountains habitat block. The DEIS already proposes Orange Segment 3 and Orange Segment 7 are viable alternatives to the recommended Yellow alternative so there is no need to comment further. The two alternative have the same Community and Environmental impacts. There can be no meaningful discussion of Financial Feasibility unless the "Elephant in the Room," UPRR states unequivocally that they will provide ADOT with the necessary legal access to the Phoenix Subdivision to construct and operate a passenger railroad. Page 6-2 states, "Construction would use the existing I-10 westbound frontage road from Grant Rd to Eloy." That statement presupposes that the passenger railroad can only be located to the west of the UPRR track. The DEIS does not address either using State Land on the east side of the UPRR mainline or how the removal of the westbound frontage road would affect the operation the I-10 on and off ramps at Grant, Miracle Mile, Prince Rd etc.			
	Stephen M. Brittle	Don't Waste Arizona, Inc.	
Don't Waste Arizona, Inc. (DWAZ) is a non-profit environmental organization dedicated to the protection and preservation of the environment in Arizona. DWAZ is especially concerned about environmental justice, transportation and hazardous materials issues, and related air			Thank you for your comments. The proposed passenger rail service that is the subject of this Tier 1 EIS would operate on independent track built to higher standards than required for

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pollution issues. DWAZ is headquartered at 2934 West Northview Avenue, Phoenix, AZ 85051, and may be reached at (602) 881-3305. DWAZ has members in the affected area. DWAZ offers the following comments: The DEIS is quite deficient and inadequate; ADOT seems incompetent. It doesn't even examine the alternative of a separate rail line for the passenger train, which also means a high-speed rail line is not examined, despite it being talked about for many years in Arizona, even at the state legislature. This is not looking forward to the future. High-speed rail is available in many foreign countries, but with backwards looking ADOT, this is not even considered. Yet, the high-speed rail for passengers has been a topic of discussion for decades, even at the state legislature. And the restrictions on times that the rail could be used for passenger trains will likely mean it wouldn't be economically feasible. Of course, none of this is adequately analyzed or examined. What is mentioned is just this: "ADOT has had ongoing discussions with UP, the freight operator in the corridor, related to the proposed Yellow Alternative. Based on the information obtained from UP and analysis of the alternative, the implementation of passenger rail within the Yellow Corridor Alternative is not expected to result in a change in the number of freight trains currently operating in the Tucson to Phoenix corridor, although some freight train scheduling modifications would be required to prevent conflicts with passenger service. Upgrades to the existing UP track were assumed as part of this alternative in addition to projects to accommodate passenger rail operations. These potential improvements include: • New at-grade single track • New at-grade siding tracks • New siding turnouts, where needed • New roadway-rail grade crossings • Reconfiguration of UP track where needed • Centralized train control signal systems • Positive train control systems where required by FRA regulations. These projects would allow continued service to freight customers and mitigate potential restrictions to freight movements."			freight movement and would not share line capacity with Union Pacific freight operations. Though all details have not been developed for this early Tier 1 EIS, most if not all of the features you mention are expected to be part of any final plan for the passenger rail service in the Phoenix-Tucson Corridor. Many of the features mentioned in the comment refer to items either not yet defined sufficiently or not applicable to the Tier 1 EIS. Further, because there is no specific alignment identified, many of the impacts discussed cannot yet be fully evaluated. These would be assessed during a subsequent project-specific environmental review, with substantially more detail included. Many of the specific points raised in your comments would be a good basis for the detailed studies in the next phase. This Tier 1 EIS was developed in accordance with the National Environmental Policy Act with guidance from the Council on Environmental Quality.

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There is also this missive: "In the community of Picacho, both sides of the I-10 corridor are predominantly undeveloped, with inclusions of agricultural lands near the I-10 and SR 87 interchange. As the study corridor travels through the narrow Picacho Pass, the west side encroaches on Picacho Peak State Park. Small amounts of open space are also designated west of I-10 just north of the city boundary." There is no mention of the proposed Union Pacific rail yard, much less its effects and potential impacts. The proposed Union Pacific rail yard means much more freight rail traffic, and would significantly affect rail traffic and schedules, availability of the rail for passenger service, have environmental impacts, and possibly rule out passenger rail on that rail line. Yet there is no mention or consideration of this. The cumulative impacts must be disclosed per NEPA regulations. There is also no real consideration of contingencies or worst case scenarios, or the mitigation measures required by NEPA, just this: "With additional trains operating within either corridor alternative, the possibility of train collisions is increased as a result of increased activity between freight and passenger services and a higher number of trains at grade crossings; however, the signaling system, such as positive train control as required by the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), would be designed to mitigate this risk." This is grossly inadequate and gross incompetence. I have an extensive background in emergency planning and response, serving for ten years on the Maricopa County Local Emergency Planning Committee. I have also been involved with significant enforcement of the Emergency Planning and Community Right-to-Know Act (EPCRA). The emergency plan promulgated and updated under the planning requirements of EPCRA also has to consider transportation-related incidents and chemical releases, as well as nuclear waste issues. In the course of that service, I attended many training sessions around the country regarding all aspects of the subject. I also worked as a private contractor as an investigator for chemical disasters, which including the Graniteville, SC chlorine rail disaster and a rail collision disaster in Texarkana. The I-10, adjacent to the only proposed rail route, is a main route of transportation and commerce, and in that subject area, an event forcing closure of the freeway would have an economic impact of enormous proportions, and could have impacts on the rail line used by freight and potentially the passenger line.. Such an incident, if it lasted any appreciable length			

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of time, would cause billions in economic losses and liabilities for lost commerce, and would likely be sufficient to destroy the economy of Arizona. That is a glaring and illegal deficiency. Looking at the maps provided in the recent Pinal County transportation study, it is evident that the transportation corridor being examined has the I-10, which ostensibly will be eventually widened to eight lanes from the current six, a major railroad freight line, which the study purports, would be the likely route of the Phoenix-Tucson rail line, and the CAP canal. The addition of a Union Pacific rail yard complicates matters in this area with increased rail car congestion, but it is not even mentioned or considered in the DEIS. Oddly, ADOT gave Pinal County a grant for a transportation study to examine future transportation developments in the same corridor, and that Pinal study shows the proposed Union Pacific rail yard. The operations of the proposed Union Pacific rail yard would seriously and completely change everything the DEIS purports to study. This is an example of wasting taxpayer dollars through gross incompetence. There are already hazardous materials risks in this area from the existing traffic on the road as well as the freight line. When we examine the circumstances surrounding the Graniteville, SC, chlorine rail disaster, we find that a rail collision cracked open a 90-ton rail car of chlorine. The chlorine rail car released chlorine over a period of days, and parts of the local area were evacuated for about a week. If the tanker has released all of its contents in a catastrophic release, the endpoint of dangerous levels of chlorine would have been at least 12 miles downwind. An incident like this involving chlorine would quickly kill many or all of the people working at the rail yard as well as people in traffic on the highway and the proposed passenger rail line. And having the rail yard in this specific area easily multiplies the probability of such an incident by many, many times. But since the Deficient DEIS never even examines this, there is no study or mitigation that can be examined, a fatal flaw. Again, there needs to be an examination of the proposed effects and impacts of the proposed Union Pacific rail yard and contingency planning to allow the rapid evacuation and protection of people who would be at the rail yard, as well as along the I-10 and on a passenger train. Along the same lines, there is a large amount of LPG and crude oil on the railways now due to increased production in the US. Because of its location nationally between major petrochemical producing and processing areas of the Gulf Coast and major chemical processing and using areas on the West Coast, any new Arizona rail yard might expect to see a good share of petrochemical hazmat cargoes traveling in all directions. Commodities shipped through the proposed UP yard are very likely to include many of the standard and commonly shipped most dangerous rail cargoes such as chlorine, ammonia, LPG, explosives, etc. known			

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to be capable of extensive offsite fire, explosion and toxic gas impacts. The proposed UP rail yard may well be a national magnet for transcontinental hazardous cargoes to be routed through its presumably more efficient switching facilities. The UP railroad is free to make all its regional and national hazmat routing decisions secretly, with no level of government having authority to direct traffic effectively to lower-risk routes. National Transportation Safety Board (NTSB) Rail accident investigation reports include rich evidence of multiple causes of serious rail accidents, such as human factors [fatigue, carelessness, disregard of regulations, etc], equipment failures, gaps in regulations and railroad operating rules, etc. Many hazmat accidents including collisions and derailments have occurred in rail yards or other non-mainline locations. Although most rail yard accidents on average are at slower speeds and result in smaller releases than mainline derailments, some releases are quite significant. In Phoenix, rail cars moving at less than ten mph have tipped over and spilled cargoes. NTSB investigations have often revealed systemic railroad operations problems, often specifically switching-related problems, as contributing probable causes of the significant releases. NTSB makes frequent strong recommendations on needed improvements in safety to government agencies and railroads, which recommendations often lead to significant operating rule or federal regulation changes, but are also often not complied with. Railroads, in litigation of these issues, have asserted that they have to carry the cargoes being shipped and cannot refuse them, even chlorine gas. There are three facilities in Arizona that receive 90-ton rail cars of chlorine; this chlorine rail car rail traffic is a reality. Besides chlorine and other hazardous substances, there is also no reason to not assume that railroads and highways will have high and low-level nuclear waste shipments. Further, despite any assurances from rail corporations, promises to not bring certain cargoes into areas controlled by rail corporations are not locally enforceable due to the Interstate Commerce Clause. For these reasons, these empty assurances are suspect. There is also an issue regarding the transportation of low-level and high-level nuclear waste. The Nevada Department of Transportation has extensive studies detailing the risks and hazards of this, as does the US Department of Energy (DOE). In a serious truck or train wreck or terrorist attack, the casks could be breached, releasing high level radiation into the surrounding area. Estimates vary as to the number of people that would die from radiation exposure in a severe accident. The DOE's worst case scenario predicts 48 radiation-induced deaths in a terrorist incident and 5 radiation-related deaths in a serious truck accident. First			

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responders, local police, fire and hazardous materials response teams could easily be exposed to lethal doses of radiation. Billions of dollars and many years could be required to clean up the area. Transportation routes, including major interstates and train lines could be closed for months, or even years. So there needs to be a contingency plan for that scenario, as there is also no reason to not assume that railroads and highways will have high and low-level nuclear waste shipments. And now there is the issue of terrorism. We must realize that what is proposed creates a very inviting terrorist target. Picacho Peak is a readily accessible location (that cannot be secured) from which to look down and launch an attack. The information about the size, distinct shape, and design of railcars of specific hazardous materials is available; terrorists could monitor rail traffic patterns and pick and choose the most devastating targets, including a passenger train. There is already a history of unexplained train derailments in Arizona that were caused by deliberate human actions. It is ill advised to make this scenario more easy for domestic or foreign-based terrorists. After such a successful terrorist attack, the only interstate highway commerce route is closed, the main rail line used for freight is closed, the Phoenix-Tucson passenger rail line is closed, the drinking and irrigation water (CAP canal) is compromised, potentially forever, as well as Pinal County water recharge projects, a rail yard is contaminated and/or inaccessible, and for a minimal effort and cost on the part of terrorists, billions and billions of dollars of liability are incurred, and the terrorists win. It is appalling that this entire proposal has advanced in this light with no consideration of federal laws, because there are actual laws and directives regarding this. The failure to consider this in transportation planning as proposed is a glaring error, and likely a form of negligence actionable in the federal courts. The U.S. Critical Infrastructure Protection (CIP) is a national program to ensure the security of vulnerable and interconnected infrastructures of the US. In May 1998, President Clinton issued Presidential Directive PDD-63 on the subject of Critical Infrastructure Protection. This recognized certain parts of the national infrastructure as critical to the national and economic security of the United States and the well-being of its citizenry, and required steps to be taken to protect it. This was updated on December 17, 2003, by President Bush through Homeland Security Presidential Directive HSPD-7 for Critical Infrastructure Identification, Prioritization, and Protection The directive describes the United States has having some critical infrastructure			

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that is "so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety. All of the planning that will be conducted as part of this federal transportation planning grant needs to take the Critical Infrastructures Protection Act of 2001 [See 42 U.S. Code § 5195c - Critical infrastructures] into account and fully consider and implement its policies. Until and unless the transportation planning being conducted by ADOT considers all these issues, it is deficient and likely a violation of federal law and its funding grants. Thank you for your consideration of this critical matter. The citizens and taxpayers of Arizona deserve a real environmental impact study, not incompetence.			
	Mike Salisbury	Southwest Energy Efficiency Project	
The Southwest Energy Efficiency Project is a public advocacy organization promoting energy efficiency in the Southwest states of Arizona, Colorado, New Mexico, Nevada, Utah and Wyoming. SWEEP is very supportive of the development of rail service for commuters and intercity travelers between two of Arizona's major metropolitan areas. As noted in the draft EIS, this region is expected to experience substantial growth in future years and the addition of a rail line between Tucson and Phoenix will play an important role in ensuring that the growth in travel demand can be met sustainably. The draft EIS demonstrates that a passenger rail system would provide numerous benefits to the region including but not limited to reduced vehicle travel, criteria pollutants and CO2 emissions. The strong justifications for this rail service detailed in the draft EIS make a compelling case for the importance of transit service in the Sun Corridor. The development of this rail link is especially important at this time as recent travel trends in Arizona show that people are driving less and making greater use of transit. Recent research by SWEEP found that over the last decade the average person in Arizona is driving 1,000 miles less per year and that overall driving has fallen by 2 billion miles since 2006. Over that same time period, transit use in Phoenix and Tucson has increased by 32% and 26% respectively. The addition of a rail link between Tucson and Phoenix will be important in meeting the rising demand for transit in the region and providing residents with alternatives to driving. It will also provide travelers a congestion free mode for travel between Tucson and Phoenix. As driving			Thank you for your comment and participation in this study.

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travel times between Tucson and Phoenix become longer over time, it will be even more critical to offer a reliable and fast option along the corridor. The Preferred Alternative identified in the draft EIS appears to be a good choice among the alternatives presented, offerings access to a greater number of residents and employees at lower cost. One concern is that the identified preferred alternative offers less connectivity to pedestrian, bike and other transit services than the other corridor option. As part of further evaluations we would like to see an examination of how potential station locations along the preferred alternative can maximize connectivity. As part of a Tier 2 process we also look forward to an examination of possible sources of funding for the rail corridor. Thank you for considering our comments.			

B. Public Comments on the Draft Tier 1 EIS Submitted in Writing

Date Submitted	Commenter	Affiliation	Comment	Response
9/16/2015	(Anonymous)			
			The Yellow Corridor Alternative seems to be the most viable option for all of those involved. Better for the communities, environment, and on taxpayers.	Thank you for your comment and participation in this study.
	(Anonymous)			
			I support passenger rail between Phoenix and Tucson and believe that the yellow alternative is best. Let's get it built!	Thank you for your comment and participation in this study.
9/16/15	(Anonymous)			
			This project is of great importance and has a lot of support among the Tucson population (at least anecdotally). I agree with the last speaker, that the train must be electrified with solar being used in every possible place (signs, lights, etc. along tracks). Furthermore, the train must connect the Phoenix and Tucson airports as well as communities along the route. I strongly believe that this train is the best option, as opposed to the proposed I-11, for increasing connectivity and reducing auto travel in southern Arizona.	Thank you for your comment and participation in this study. Electrification (solar or otherwise) would require a substantial additional investment. That evaluation would be addressed before a final project-level environmental document is completed. Access to major airports in the corridor is an important element of the passenger rail service and would be evaluated in much more detail in the next phase of study. The Arizona Passenger Rail Corridor Study is being undertaken

Date Submitted	Commenter	Affiliation	Comment	Response
				independently of the I-11 Tier 1 EIS.
	(Anonymous)			
			The Passenger Rail "Yellow" Corridor would provide the best means of transportation from Tucson to Phoenix. PURPOSE: The idea of the train has seemed to be to provide an alternative means of transportation for business commuters, visitors, students, and retirees from Tucson to Phoenix (and vice versa). Several elements of the train have been addressed such as safety such as licensed train engineers, train stop safety measures as a few examples. Getting more cars off of I-10 might make I-10 safer for drivers not taking the train. SAFETY: For example, during dust storms the fewer drivers on the road might mean less accidents [whereas] the more cars on the road during a dust storm might [mean] more accidents. Therefore, passengers taking the train might be safer on the train during these dust storms. SECURITY: Security on the train is important. I would like to see the same or similar security on the Tucson train as on the Tucson Trolley--not overdone. It should be a relaxed, but secure ride. CONVENIENCE: The train should go from the airports as a start because you can park. The train should connect both airports. It should run from Tucson International Airport to the Phoenix Airport. There should be shuttles to the Phoenix downtown train for downtown workers. That the train goes up past the Phoenix metro area is nice for visitors. This allows commuters to, say, Goodyear to live in Tucson and to work in the Phoenix area. STATIONS: The 12 stations along the way should be equipped with restrooms, phones, lighting, comfortable chairs, shading, snack machines, and water. The double closing gates or barriers solution at train crossings sounds good. Could a bridge be built at these crossings as well, which would allow pedestrians, bicyclists, and drivers to cross safely? The faster train might be better in delivery time. A diesel train might pollute more and is less safe.	Thank you for your comments.
9/16/15	Bob and Brenda Armstrong			
			To ADOT - I was speaking with our mayor, Jon Thompson, regarding passenger rail. I am sending this to you to support the yellow route through Coolidge. It is the shortest and least expensive route from Tucson to Phoenix and we support it.	Thank you for your comment and participation in this study.
	Bob Urdiales			

Date Submitted	Commenter	Affiliation	Comment	Response
[missing page(s)]…The train stopped right at the entrance to Camp Randall Stadium, and Marquette (Milwaukee) students rushed across the street and into the stadium for the annual Wisconsin vs. Marquette football game (65 years ago). BE CERTAIN that you allow for a special train on Saturdays when the [U. of] Arizona vs. ASU football games take place!!!				Thank you for your comment and participation in this study.
9/30/15	Donald and Emilia Falk			
Dear ADOT, We are writing to express our strong support for the proposed passenger rail line between Tucson and Phoenix. This project has been in planning stages for a long time, and now it is time to move forward as quickly as possible and get it built. Many Arizona communities are now leaning toward supporting high-speed rail. As the DEIS notes, there are many reasons why high-speed rail is needed urgently in Arizona. These include traffic congestion on highways, increasing numbers of accidents leading to injuries and fatalities, noise and air pollution, high costs of highway maintenance, and increasing accidents due to driver fatigue or aggressive driving. But the most compelling reason is that we simply must shift away from a petroleum economy as quickly as possible, to avert the worst effects of climate change. Transportation accounts for 31% of all carbon emissions in the United States. This is a disaster in the making, and every measure that can be taken to reduce emissions must be initiated. Instead of building more highways, which promote more automobile use and fuel consumption, we need to find ways to get cars off the road. Rail travel is more relaxing for passengers, allowing free time, rest, and movement that is not possible in an automobile. One of the reasons that high-speed rail is being adopted in every advanced economy in the world is this combination of fuel efficiency, reduced carbon pollution, and quality of travel. The United States, unfortunately, lags far behind other nations in building rail infrastructure, leaving us vulnerable to the economic impacts of increased oil prices and geopolitical instability. It is well established that there are major economic benefits to building a high-speed rail connection between Tucson and Phoenix. Both metropolitan areas, as well as the nearby suburban towns, will benefit from the increased ease of visiting the other city for business, entertainment, travel options, and tourism. The DEIS documents these benefits clearly. We are copying this letter to the Governor and our Congressional delegation. We expect all elected officials to line up to support the Tucson-Phoenix high-speed rail proposal and make it a reality as soon as possible. It's time for action now. Please let us know where you stand.				Thank you for your comment and participation in this study. ADOT and FRA have undertaken this Passenger Rail Corridor Study and Tier 1 EIS as a first step in implementing passenger rail service between Tucson and Phoenix.
	David Bachman-Williams			
YES! Arizona needs high quality mass transportation. We need it in our cities (e.g., Phoenix				Thank you for your comment and participation in this study.

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area light rail) and between cities. Either option works for me, orange or yellow. Please divert the money from more freeways to mass transportation.				While funding has not yet been defined and it will take support from multiple sources to generate the needed funds, ADOT is not able to use highway funds allocated by the Federal Highway Administration for a passenger rail system.
	Dan Miller			
I would like to encourage this project to move forward! We need a better way to travel between major urban centers than interstate highways. Thank you for doing this analysis and I hope that next steps will be taken to fund this project and build it in a well thought out manner.				Thank you for your comment and participation in this study.
	Geza Kmetty			
1). I recommend an independent Value Engineering study at this stage to improve value and public acceptance. 2). The future connectivity of the trains/tracks with the California High Speed Rail System is very important. The future connection to become part of an Interstate High Speed Train system is very likely. 3). Local access, train stations, how people will get to the train stations, and how they proceed to destinations @ 110 degree temperatures? We need an integrated planning of trains, trolleys (light rails), buses, etc. 4). Consider non-polluting (solar, electric) trains.				1. Cost estimates developed for the Arizona Passenger Rail Study were based on relatively conservative assumptions about a future system. The engineering detail necessary to undertake a Value Engineering study would not be available until a subsequent phase of study. 2. In conformance with the State Rail Plan, the Tucson to Phoenix Passenger Rail Corridor Study is being undertaken as a first stage in the State's vision of expanding passenger rail service beyond Arizona's borders. Regarding destinations outside of the Tucson to Phoenix corridor, the Federal Railroad Administration looked, at a very high level, at the possibilities of a high-speed rail service linking the main Arizona metro areas with destinations in California and Nevada in their Southwest Multi-State Rail Planning Study, available at https://www.fra.dot.gov/eLib/Details/L17109. 3. The Alternatives Analysis developed a detailed community readiness program for each potential station location along the route that considered transportation options and land uses. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service. Transit-oriented development was an important consideration for this effort.

Date Submitted	Commenter	Affiliation	Comment	Response
				4) The technology for this service has not been identified. A diesel-electric train was used as a conservative means for estimating travel times and ridership. Electrification (solar or otherwise) would require a substantial additional investment. That evaluation would be addressed before a final, project-level environmental document is completed.
	Jim Trockl			
			Comment in passing. In Arizona, drivers expect that "the other drivers" will use the rail. Then the freeway will be less crowded for them. Good plan=good idea. Good study. It is unfortunate that Amtrak doesn't publically support this as a feeder for their trains.	Thank you for your comment and participation in this study.
9/16/15	Johnna Thompson			
			Population and growth patterns make different transportation options necessary. The yellow route through Coolidge, Arizona is the best and only true option. We need to get ahead of growth and the yellow route is the shortest and least expensive route between Phoenix and Tucson. I would also mention the City of Coolidge along with ADOT has a public transit bus facility which enables Coolidge to service central Pinal County. Coolidge is the center of Pinal County, sits in the growth pattern and has already demonstrated the know-how to run a public transit system. The yellow route is the best route for everyone.	Thank you for your comment and participation in this study.
9/16/15	Jon Thompson			
			Thank you for coming to Central Arizona College on September 17, 2015. It was an informative presentation. As the mayor of Coolidge, AZ I support the "yellow route" which runs through Coolidge. The yellow route is the shortest route between the two large metro areas (Phoenix and Tucson) and is the least expensive route to complete. I would mention Coolidge has a big belief in public transit as our bus service is the only public transit in Pinal County. I would point out when we asked Casa Grande to contribute and support our "bus system" they refused. The current bus service will work in conjunction with Rail in moving people. The yellow route also runs adjacent to the proposed North-South freeway. Passenger rail is important to "All" of AZ. San Tan Valley is still growing and Coolidge has inexpensive land. Coolidge was the last to see growth on the last cycle but will see growth soon when real estate markets surrounding Coolidge prices increase. The public has indicated the yellow route is preferable. I agree and urge you to come work with a community that supports ADOT.	Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Comment	Response
10/30/15 (faxed)	Brent DeRaad, President and CEO	Visit Tucson		
Dear Study Team: Thank you for the outstanding work that has gone into creating a Draft Tier 1 Environmental Impact Statement for ADOT's passenger rail study between Tucson and Phoenix. As the tourism promotion agency for Tucson and Southern Arizona, we at Visit Tucson see tremendous value in creating passenger rail travel between Tucson and Phoenix. Our research shows: • Metro phoenix is Tucson's top year-round feeder market for visitors. • 29% of Tucson visitors fly into Phoenix Sky Harbor International Airport or Phoenix-Mesa Gateway Airport and then drive to Tucson. We believe that incoming visitors to Tucson and Phoenix would use passenger rail to travel between these metro areas. Among visitors who inquired with us at Visit Tucson, 54% took day trips to other Arizona locations with Phoenix being at the top of the list. I offer these statistics to support my request to extend the passenger rail corridor to Tucson International Airport (TIA) in phase one of construction. Connecting TIA to Sky Harbor and Phoenix-Mesa Gateway in phase one would greatly enhance the system's immediate value to residents, along with leisure and business travelers. Benefits include: • Travelers to Tucson could rent cars or secure other local transportation at TIA; • Tucson meetings delegates and leisure/business travelers will have the option of taking passenger rail to Sky Harbor or Phoenix-Mesa Gateway, should they be flying in and out of metro Phoenix; and • TIA will become a more viable option for Arizona travelers due to enhanced connectivity with metro Phoenix and its airports. Thank you for considering extending phase-one construction of passenger rail between Tucson and Phoenix to Tucson International Airport. Please feel free to contact me (520-770-2149, bderaad@visittucson.org) with questions or comments.				Based on public and agency input, ADOT and FRA will include a connection to TUS in future planning and environmental studies for the passenger rail system from Tucson to Phoenix. As noted elsewhere in this EIS, ADOT anticipates that a Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but will be determined as funding is allocated and as part of subsequent NEPA review.
10/30/15	Brent L. Davis, Executive Director	Southern Arizona Lodging & Resort Association		
The Southern Arizona Lodging & Resort Association (SALARA) represents the hotel and lodging industry of Tucson and southern Arizona. SALARA is extremely pleased with the work done by the Arizona Department of Transportation and their consultants in creating a Draft Tier 1 Environmental Impact Statement for their passenger rail study between Phoenix and				Based on public and agency input, ADOT and FRA will include a connection to TUS in future planning and environmental studies for the passenger rail system from Tucson to Phoenix. As noted elsewhere in this EIS, ADOT anticipates that a

Date Submitted	Commenter	Affiliation	Comment	Response
Tucson. SALARA's members recognize the importance of the Phoenix market which provides a large number of tourists that visit Tucson and southern Arizona every year. Passenger rail service between the two cities could enhance the travel experience greatly. As you may or may not know, Phoenix is the number one market for Tucson visitors. Almost 3 in 10 visitors actually fly into Phoenix Sky Harbor International Airport or other regional airports and then drive to Tucson and southern Arizona. Rail passenger service could become an enticing catalyst for many of those visitors to come to Tucson. Conversely, more than half of Tucson's visitors take sight-seeing or other day trips to the Phoenix area while visiting Tucson. The question is whether or not to extend that rail line in Phase I to Tucson International Airport. UL--SALARA strongly believes that this extension is critical to the success of the rail passenger corridor between the two cities and should be included in Phase I.--UL Clearly, travelers to Tucson will have an option to take passenger rail service to metro Phoenix, should they be utilizing Phoenix area airports for the arrival and departure to Arizona. This could enhance the economic activity of those airports affected, particularly Tucson International through increased car rentals, taxi usage, potential light rail usage, or other transportation. This would make Tucson more attractive to travelers with a direct connection to Phoenix and its metro airports. Please consider this letter a strong endorsement from SALARA and the lodging and resort sector of Tucson and southern Arizona for maximizing the potential of a Phoenix-Tucson passenger rail connection and our support for extending Phase I construction to Tucson International Airport. If you have any questions, I can be reached at brent@salara.org or you can call me at 520-207-9931. Thanks for the opportunity to offer input into this process.				Tucson-to-Phoenix passenger rail system would be funded incrementally, and that construction and operations would be implemented in phases. The specific phasing of a future passenger rail system is not known at this time but will be determined as funding is allocated and as part of subsequent NEPA review.

C. Comments on the Draft Tier 1 EIS Taken at Public Hearings

Date Submitted	Commenter	Affiliation	Comment	Response
9/15/15	Armondo Hewitt			
I would like to congratulate you on your study so far. The cost of $5 billion to go 100 miles is so cheap. When you consider that Phoenix spent $21 billion to go 21 miles on the light rail, it's a small per-mile cost. The only thing I hope that you will consider is that because it is Arizona and the heat, that all stops be enclosed and air-conditioned. Together with the help of private enterprise, I think that can be done.				Station locations and amenities, such as parking and station design features (including protection from the elements), will be evaluated in future phases of the study.

Date Submitted	Commenter	Affiliation	Comment	Response
9/15/15	William C. "Blue" Crowley			
			When you said up there, we're going with 120 mile an hour, the bullet trains go a little faster and been proving the thing. California is going to be adopting the bullet train so why wouldn't we be trying to be interstate rather than inter-county and looking at it as the whole picture? You shouldn't stop in Surprise; you should be going to Wickenburg and into California. So when you're asking how we can input and do stuff to this, I go, well, modern technology. You're not considering solar as a part of the way to make the thing go down the road. I don't see where -- you know, Glendale is a part of this, and you don't have their name there. Where are the rail lines that already exist so that when I'm saying, well, this is the alternative I want, it shows the capacity that we have already? To put rail on now, we don't have to build an engine track going through your communities. But what I would like to bring up is the track. Right now, the track is at a level of safety that you can put freight on it; right? And is that level of safety for the track used higher or lower than if you're having passengers on that same rail? Well, freight you got to put on a better track than if you're just running people because if you run people off the tracks, you only kill them. You don't have a hazardous situation.	The technology for this corridor has not been decided. 125 mph was used for purposes of estimating travel times and ridership potential. A locomotive technology decision will be made upon further analysis at a project level. The Tier1 EIS termini were defined in the Notice of Intent as downtown Phoenix to downtown Tucson. Other segments are certainly to be investigated and are recognized in the work done in this study, but are not covered in this document. They will be part of future analysis. The safety requirements for passenger services exceed those for most freight operations because of the potential for injury.
9/15/15	Diane Barker			
			Now, where I'm going with all of this is that I think there is a route that's missing. I know that you're taking care of the East Valley, and there's growth there. There's growth in Buckeye. There's growth all over the Valley, and when we're going to do this system, are we going to make it fast and efficient? Right now, it probably is diesel and electric, but there's other types of things, even magnets, and have it fast, have it an enterprise. You got to find foundations and families that believe in this area that got more money than God, and certainly the government, to do what California is doing now. Obama stopped funding the bullet train and they're having to go out for P3. So I'm saying, go fast. Have it passenger and freight. Have it so that people want to pay. It's an enterprise. It's a better trip than your car or anything, and these stations are tri-level, and they have services, even dry cleaning. We need to think big. It needs to be run tight like a business, and we need to have some money and believe that we will invest in the system. For years ADOT is supposed to be doing transit, and they've always taken a little teeny position behind the city of Phoenix, and what is happening is they should be running the express bus to Tucson and see who will pay for that ride. Who will pay to get down there. Now, I realize they don't have an express lane, which, you know, is the value of the express	The Tier1 EIS was defined in the Notice of Intent as downtown Phoenix to downtown Tucson. Other segments are certainly to be investigated and are recognized in the work done in this study, but are not covered in this document. They will be part of future analysis. The preliminary analysis conducted for this Tier 1 EIS study assumed the use of diesel multiple unit trains. However, actual decisions regarding preferred technologies would be made in future phases of the study as part of a project-level environmental analysis. Specific funding options, including public-private-partnerships, would be evaluated in future phases of this study as part of a subsequent planning and environmental analysis.

Date Submitted	Commenter	Affiliation	Comment	Response
bus on our existing Maricopa roads. So that may be a little problem, but they need to start out to try to prove that people will actually do something. We need to know where we're going to get the money to pay for this. How will we sustain it? Don't build anything that won't be sustained.				
9/15/15	Albert Dare			
So back to the Yellow and the Orange. I was in favor of the rail service from the beginning, very excited about it. I was very concerned about the Orange process because it's tied in with a north-south road. And I don't care how beautiful a wall we want to build, it all comes down to money. Okay. And that's kind of a side thing. We got to have funding once in a while. But anyway, it all comes down to dollars and cents. So I'm very appreciative of keeping the rail projects separate from the North-South Corridor, which is the orange route, for dollars and cents reasons, okay.				Funding for this project has not yet been identified. The project would most likely happen in phases and be funded according to each phase. Coordination with other projects to look for joint funding opportunities is a potential way to identify appropriate funding options (e.g., North-South Corridor), but no decisions have yet been made.
9/15/15	Tom Dauer			
That I'm going to recommend on, on, the Orange Line -- correction. On the Yellow Line, using the Union Pacific tracks, that when they plan the stations for stopping the train, they -- I recommend the intersection of Union Pacific Train Track and the Arizona Farms Road. On the north side of Arizona Farms, that is state land, so it would not be a cost factor for us. And of course, dollars and cents are always important. And one of the other things on the environment is the people who live along the tracks. The current Yellow Line follows in neighborhoods where people are accustomed to trains traveling now. So you will have less resistance to the project.				Impacts to residents along tracks of a future passenger rail service could require mitigation if in more detailed analysis it is found the noise and pollution levels exceed established thresholds.
9/15/15	Jerry Sizouski			
The comments I want to make is, the one thing I didn't see in the environmental study -- and I asked somebody back there, and they said it hasn't extended yet -- is, though they covered Gilbert, and they did cover Queen Creek and stuff, they really didn't cover the towns in between that are going to be impacted because this is going to be a big impact for cities like Eloy or Arizona City, etc., and I'd like to see a little bit of -- if there are going to be stations down there, which there have to be, where are those planned to be, and what are they going to be? And then the gentleman earlier that was talking about likely the train that you're using is a diesel versus the bullet train. This thing isn't going to get built for five, six, seven years. To design a track system or a carrying system now for what we currently have technologically is not necessarily, in my opinion, looking forward. And the gentleman was correct. I foresee				All the communities affected by the two corridor alternatives covered by the Tier 1 EIS were included in the analysis of effects. No specific station locations have been determined, so no specific analyses were identified for any communities. The technology for this corridor has not yet been decided. The 125 mph speed was a conservative estimate for purpose of estimating travel times and ridership potential. A locomotive technology decision will be made upon further analysis at a project level. At an appropriate time, potential connections to other passenger rail services will be addressed, including, as

Date Submitted	Commenter	Affiliation	Comment	Response
that, eventually, this has got to hook up to the California SPUR. I mean, Wickenburg to California is in existence, and Surprise is not that far from Wickenburg. So eventually, my assumption is going to be that this train will extend down to Wickenburg, and once it does that, you know, you got to make sure that you got a situation where you could hook into the rail that exists.				appropriate, the California High Speed Rail project.
9/15/15	Rudlof Kolaja			
There's a lot of talk about cost effectiveness. What I don't hear is cost effectiveness building this high-speed rail. Certainly attractive idea. And I would love it. Question is, can we afford it? I would like to hear how many trains we are going to be using. I'm fascinated. Five, $5 billion. How many people will be traveling these trains in transit? What are the volumes per hour in terms of our direction? We hear probably the (inaudible) not going to be that big, but those issues are key issues and are a lot more important. Only in the environmental statement you talk about endangered species. But we people are the most endangered species in this respect because we build these trains for only customers, just like, for instance, what I fear about is, you know, there was station opened in Mesa. The cost of $200 million. $30,000 spent on one potential person. This is an economic disaster. And I tell you one thing. I'm always using the light rail. I love the light rail. One important point I forgot to talk about. Every transportation study starts with transportation study to find out what is the origin and the destination of those trips. Now, I'm not sure where exactly the origin start and end, but I would like to know where the trips of those people who will be using this train come from and where they go to. How -- for instance, through my personal point of view, going to Tucson, if I'm going to drop -- be dropped off somewhere, and I go to conventions in various places in Tucson, how do I get there? What's the connection? Tucson is most important start point and destination because something that grand being built should be a part of overall, not piecemeal basis.				Funding for this project has not yet been identified. The project would most likely happen in phases and be funded phase by phase. Travel forecasts indicate there will be about 17,000 riders per day on the proposed system assuming four trains per peak hour and fewer during the off-peak, for a daily total of 36 trains. The origin and destination of trips was needed to forecast ridership potential and is based on the existing and anticipated population and employment, among other measures, within the corridor. Travel to Tucson or any other station will rely on the ability of a passenger to connect within the local area by transit, taxi, bike, Uber, or other mode of travel. In Tucson, the Sun Link Streetcar is accessible from the proposed downtown station location and affords access to the Convention Center and the University of Arizona as well as other local facilities.
9/15/15	Ron Barns			
I believe that this is a major thing that's supposed to be going on, right? I mean, like, we're talking about extending something that's, like—it's going to take money. Of course. We know this. It's going to take money. But you got to think about everything else that it's going to generate from this, this, this benefit.				Funding for this project has not yet been identified. The project would most likely happen in phases and be funded phase by phase.

Date Submitted	Commenter	Affiliation	Comment	Response
9/16/15	James Kelley			
It is important—and in every meeting I've had with all the various caucuses within our group, transportation, and particularly public transportation, and the ability to get to Phoenix in ways other than the freeway is very, very important to us. It is imperative that under no circumstances is the airport option allowed to go by the wayside. It is my personal wish that we start the terminus of this railroad at the airport, not somewhere north of downtown, not Marana. It must start at the airport, not be promised as a future build. So that is my one request amongst all of this. The importance of being able to move our people to job centers is ex -- is, is beyond what I can even describe. It just, in all logical manner, the terminus must be on the south side at the Tucson International Airport. I also support the Yellow Line. I do believe that it is the one with the least environmental impact, next to No Build, and No Build is not an option for Legislative District Two.				The Tier1 EIS termini were defined in the Notice of Intent as downtown Tucson and downtown Phoenix. Other segments are certain to be invetigated and are recognized in the work done in this study, but are not covered in this document. They will be part of future analysis. The connection to TUS is an important transportation link within the Tucson area and will be part of the next level of analysis for any passenger rail phase that includes the Tucson metro area.
9/16/15	Jennifer Paige	Southwest Passenger Rail Association		
I am a retired Amtrak director, and I am here representing as the Arizona representative of the Southwest Passenger Rail Association who strongly supports rehabilitation of the Wellton to Phoenix Branch Line of the Union Pacific Transcon main line. This gives the Sunset Limited access again to the Phoenix Market, which has very positive revenue and riding impact for Amtrak, in addition to mitigating highway congestion and reducing greenhouse gases. The California State Transportation Agency has already included Los Angeles to Palm Springs as an approved passenger rail corridor, and the Riverside County Transportation Commission is currently performing feasibility and environmental impact studies for this line. Our inside sources indicate that the California State Transportation Agency would like to see the service extended as one and more than likely two daily trains between Los Angeles and Phoenix, and the economics actually improve even more with the origin and destination. We also believe that restoring the Wellton Branch will allow potential future commuter service west to Phoenix and to Tucson. This is something that is sorely needed, given the highway congestion on I-10, 17, interstate highways.				Thank you for your comment and participation in this study.
9/16/15	John Moffatt	Pima County		
We're very supportive of this. There were a couple of topics that we wanted to raise. In the study, it said that you would be connecting to other studies, and you know, ADOT is starting to kick off the I-11 study. Part of the discussion in the early part of the material I read was the congestion between the two cities and addressing this with rail, I think, is important. But the				While transportation studies such as APRCS and I-11 have independent utility, ADOT considers the potential cumulative implications of implementing various projects within the region. The I-11 Corridor will include a multimodal component

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			I-11 study that you're just getting ready to start, I think, also is a contributor, so I'd like to make sure that those and the considerations and some of the statistics tie to each other. The second thing is it was certainly my understanding that the agencies here and in southern Arizona supported and really were expecting the rail line to go all the way to the airport, and so our—you know, we would certainly ask that that consideration be, be included. The line goes by the two Phoenix airports, and I understand you're not planning terminals there, but it's at least there. It's not north of there by ten miles, so that would—my point would be, your plan ought to include the airport, and certainly, that was—I believe, the county supervisors, the board of supervisors, actually commented on that early, early on, so we'd like to reemphasize that. The third thing is, and we had an alternative plan too, which is, which is very motional at this point in time. And we discussed it, and we were told that it would be put into the future as one of the future considerations to maybe tie the Nogales line to the Sunset line. And I can't find it. It may be in there, but I've gone through, I think, most of the report. So we'd like to at least have that in as, as recognized as a potential, and if that line can be abandoned, it comes down from downtown, we can swing the line over to Old Vail Connection. Tying into the Sonoran Corridor, we can move the traffic over onto the Sunset line. That opens up that rail line down to the airport from downtown.	that could influence some of the thinking about how the passenger rail line is developed. The connection to TUS is an important transportation link within the Tucson area and will be part of the next level of analysis for any passenger rail phase that includes the Tucson metro area. Connections to Nogales and consideration of the Sonoran Corridor are also services that can be built from further analysis of opportunities south of Tucson.
9/16/15	Steve Farley	State Senator		
			I'm grateful that this study is finally coming—nearing conclusion. I want to be focused right now on the future of what happens after this study. We've had too many studies with really good things in this state which end up staying on the shelf and collecting dust. I think that this concept of having a rail corridor alternative to I-10 is too important to just stay on the shelf. We have to get this done. I wish I had the faith that Congress would come through with transportation money for the nation at some point in the future, but despite the good efforts of this Secretary of Transportation and his predecessors, I'm not sure that's going to happen, and so I think we have to come up with a legislated financial alternative that includes doing things locally, and I think a large portion of that is going to be private. So in that regard, I think as a way of ensuring that we have the financial feasibility to build this thing, part of this study should also be looking toward how we can attract private investors and, and enabling them to get a return on their investment through the routing that we decide on. So in that regard, I think while the Yellow certainly looks like the preferred route, I think we should be open to a hybrid route between the Yellow and the Orange, depending on what might be working into the business plan or whatever private party we might be working with, and I think in that regard, I'm certainly hoping that this administration is willing to join me in going	Funding for this project has not yet been identified. The project would most likely happen in phases and be funded phase by phase. The ability to defray some of the costs using non-federal and non-public funding can significantly increase its potential for construction. The Yellow Corridor Alternative does include elements of the Orange Corridor Alternative as "options" should more detailed investigation identify issues in some sections that can be avoided by using the Orange Corridor. The connection to TUS is an important transportation link within the Tucson area and will be part of the next level of analysis for any passenger rail phase that includes the Tucson metro area.

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out and selling this plan to private investment firms, of which there are actually many now, who have many billions of dollars ready to invest in things like infrastructure, and go and find the right partners for this project so that we don't have to pay for all of this ourselves, but we can get it done the way we want it to get done, and I think that is, that is far from the (inaudible). That is something we can actually, actually get done. And I want to echo the voices up here that have already said that we need this to go all the way to Tucson Airport. It can't simply be an afterthought. We need to connect all three airports together, and then we'll have a much longer network of airports along with this alternative to I-10, and Lord knows, I spend a lot of time on I-10 these days. I would love to be able to spend it doing something constructive, instead of, like, listening to the radio and staring at the asphalt.				
9/16/15	Barry Rosen			
I just had to get up because Senator Farley just spoke, and I believe personally that the State of Arizona and the legislature and the governor and all the representatives share a responsibility to all the people, citizens who live here, to also come up with financial input into the process and not to avoid that, not to beat the drum for commercial and all other places that should be gone to, but also to participate because the state government, the representatives, share a responsibility here, and if they're going to have to raise taxes, then this is a good investment. As the good senator said, and I think everybody agrees, it's a good investment that will pay off in grand dividends for the future.				Funding for this project has not yet been identified. The project would most likely happen in phases and be funded phase by phase. Allocating funds to the project will enhance the likelihood of it moving forward.
9/16/15	Mike Smejkal	Tucson Airport Authority		
I'd like to echo previous comments in, generally, we are very supportive of this endeavor and like to see it go forward and don't have a strong preference on the Yellow versus the Orange, but we do have concerns that the way that the Tier 1 analysis was conducted in leaving TIA as a future extension. Our understanding going into this was that it was—TIA was—going to be the southern terminus for the initial project, and to see it not being included in there and call out the future is something very concerning to us, for many of the reasons that's already been reiterated here, so I won't reiterate those, but we ask that as you go to finalize this, that you have to take another look at that and include that in this Tier 1 analysis.				Thank you for your comment and participation in this study. The connection to TUS is an important transportation link within the Tucson area and will be part of the next level of analysis for any passenger rail phase that includes the Tucson metro area.
9/16/15	Wyatt Saul			
The first is the projected attendee rate. We are using DTA, or dynamic traffic assigning software now to try to model the flow of people within cities. It's very important. And with				The tool used to forecast ridership is a model developed by the Federal Transit Administration (FTA) called STOPS

Date Submitted	Commenter	Affiliation	Comment	Response
that being said, how much ridership would be needed to break even on operating cost? I wasn't able to find that on the website. I would love for a study to be done or that information to be available. If you have that now, I'd love to hear it. And how much ridership would be needed to pay back the construction for this project, so we'll be looking forward to seeing that data because us engineers love numbers.				(Simplified Trips-on-Project Software). There are very few transportation systems of any kind (rail, bus highway, airport, etc.) that completely recoup their operational costs, let alone their capital investment, in terms of sheer dollars. The benefits are calculated in more comprehensive ways, depending on the type of project and its contribution to the wellbeing of the users and general public.
9/16/15	Bob Freitas			
I'm a very strong supporter of the passenger rail. I would prefer to see electrification versus diesel for environmental sustainability reasons. I would like to see, at least in the discussion and the planning phases, an extension to Las Vegas as well as to Los Angeles. It could be also coordinated with Amtrak. I reflect the comments of the prior speaker. As well as south to Mexico (inaudible). We need to think regional. This is a great corridor. I think we are underestimating the potential ridership, when people realize the great alternative that they have to driving and being stuck in traffic. This has to connect to major centers. It cannot bypass them. It cannot be dependent upon shuttles and inefficiencies. The Europeans do it very well. And also some other light rail and rail corridors have been demonstrating such, such as San Diego. They have a great system that goes all the way to Oceanside and connects well with Amtrak. I think we have to look at the consumer and the customer interface. We cannot have a clunky interface that isn't friendly to on-boarding and ridership. I think all of you have experienced clunky interfaces, and it discourages ridership. That has to be part of the planning process. Don't try to scrimp and try to achieve savings on that customer interface. It has to be welcoming, accessible, and easy. I would like to make a funding suggestion. On the public/private interface and cooperation, look at the rail as part of the public portion of it. Look at the stations as part of the private side, where the stations have an opportunity, then, to develop around—or there is development around the station, and that would encourage private investment, I think, much more rapidly. So, public on the rail; private on the stations. And then finally, I think we need to see, as another speaker said, some real push from the State and some encouragement from local entities. I'm sorry that there aren't more elected officials here. I'm very pleased that Senator Farley is here, but the elected officials need to get behind this. This city needs to be here. The county needs to be here. And we certainly need it extended, at the minimum, to the Tucson International Airport. That cannot be an option. It has to be part of that Tier 1 planning. I didn't see any options for bypassing the airports in Phoenix. That's considered as a standard.				At an appropriate time, potential connections to other passenger rail services will be addressed. Your point about needing to ensure a good interface at stations to streamline the trip is well taken. Each station will need to provide the appropriate services to support the passenger rail element, but many of these services already exist at the larger station locations. More specific supporting services will be defined in future, more detailed project-level analyses.

Date Submitted	Commenter	Affiliation	Comment	Response
9/16/15	Mike Bording			
What I haven't heard here tonight is anybody's experience in the railroad business. I personally have 42 years in the railroad business. I am extremely disappointed in what I've heard tonight. I've heard we are going to have stations 10 to 12 miles apart. We're supposed to be building high speed rail. I heard that this train is going to be diesel and 125 miles an hour. In this day and age, that is not high speed. I rode the bullet train in Osaka to Tokyo in 1969. It went faster than 125 miles an hour. The routes that you have picked are absurd. The shortest distance between two points is a straight line. You need to get and start thinking out of the box. Get away from the I-10 Corridor. Get away from the UP tracks, and draw a straight line and do high-speed rail, 200 miles an hour, and it should be electrified, and as other speakers have spoken, it should also go from all the airports.				The technology for this corridor has not yet been decided. The 125 mph speed was a conservative estimate for purposes of estimating travel times and ridership potential. A locomotive technology decision will be made upon further analysis at the project level.
9/16/15	Nancy Retson			
I think one of the things that was overlooked in the meeting tonight is everyone keeps talking about going to Phoenix. How about people from Phoenix coming to work in Tucson or coming to work along the, along the I-10 Corridor, so this could provide companies a shuttle. I know in California, for example, Google has shuttles all over the San Francisco area, 10 bringing their, their employees to work. This could be like Rent-A-Car. They could have a special section just for that company. Also the other thing that was overlooked here is for small cargo. Certainly not large cargo because there are cargo trains, but in addition to having private pay from individual riders, there could also be money earned through small cargo. I'm thinking specifically mail, for example, because there's so much mail that goes back and forth.				Details of the passenger rail system's operations have not been addressed in this study, but all the concepts you mention are a possibility once passenger rail service is in place. Some of those amenities could also help offset the cost of operations.
9/16/15	Barry Rosen			
And I think it's in everybody's best interest that everybody get involved, including the government, and I'm sorry that some of the republican representatives were not present today, but money has to be committed from taxes that they have available and move them around so that the money can come up or pull part of it together, but they have to make some kind of commitment. The government has to make a commitment.				Thank you for your comment and participation in this study.
9/17/15	Mike Hurley			
I think it's a great idea, the Yellow Corridor. Let's build it. I'm ready. I'm tired of driving.				Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Comment	Response
9/17/15	Bob Bickel			
			Looking at the presentation here, at one point it was mentioned that it will follow I-60. I'm wondering, how does it follow I-60? Alongside of it? Or would it be taking over some of the car lanes that are already there? How is it going to get implemented? Funded. It was mentioned, public or private. If it's going to be public, does that mean that the communities it's going through would be assessed additional taxes for it? Or is it done by the counties? Or is it done by the state? Who is actually going to be paying for it, and how does that happen if it's public? If it's private, I guess I would just hope that it's done—not done as the many toll roads have been done in the U.S., where it's farmed out to a foreign company to build and operate the toll roads—which could be happening in Arizona, by the way—and the state ends up being on the hook for any shortcomings and—or will assume to that private foreign company. There is an existing track that's not too far from where I live running north and south. Is that track going to be used as part of the track for this route? Or will it be additional track built? How many stops or terminals—I'm not sure what you call them—that you actually can get on and off in between, say, Tempe and Tucson? How many are proposed at this time? I understand there could be some initially and more added later, but what is the overall plan for that? And then I'm curious. What would happen if the train actually would be operating at 125 miles an hour? What happens when there's a residential haboob, which happens in that corridor all the time. So my question is, what's the safety considerations under those circumstances?	For purposes of this analysis, recognizing the points you make, the Orange Corridor Alternative was assumed to travel in an elevated section above the freeways. That is also the reason for its much higher cost to construct. The configuration could be modified and reconsidered in a future study if there is a need to revisit the Orange Corridor Alternative. There are conceptually eight stops planned between Tempe and Tucson on the preferred Yellow Corridor Alternative for local trains. There would be only three for express trains. These details are not fixed, but they provide a sense of what could happen. More detail is available in the Tier 1 EIS and in the supporting Alternatives Analysis. Whether or not train operation in a haboob would even be possible, the trains would be expected to function only under safe conditions.
9/17/15	Rudolf Kojala			
			I have so many comments to make but some technical comments. When you talk about 20 trains a day, 20,000 people, I was informed. I hear that the trains will travel 125 miles an hour. There will be stops maybe 10, 20 miles, but how do you accomplish 125 miles speed if you have these frequent stops? If there is a local express, are you going to build four sets of tracks, just like I take subway in New York City has? Question is, if the system is going to cost $5 billion, a number of questions is built. Can we really afford something like that? I understand the transit system nowhere in the world is totally covered by cash box, but if it's built, it has to be fully used, and otherwise, I don't think there is justification to do it. As I said, I don't have enough information to judge that. Hopefully, it will work. I'm not sure where exactly the origin start and end, but I would like to know where the trips of those people who will be using this train come from and where they go to. If I'm going to be dropped off somewhere, and I go to conventions in various places in Tucson, how do I get	The top speed would only be attained along certain portions of the corridor, and station stops have been considered in the estimation of travel times. There would be both local and express trains, and tracks would be designed to accommodate both types of service, with passing tracks and station tracks to permit safe operation and overtaking when necessary. Passenger Rail system connections to complementary transit services were included in high-level operational assumptions for passenger rail service. The Arizona Passenger Rail Corridor Study - Alternatives Analysis, an Appendix to this EIS document, developed a detailed community readiness program for each potential station location along the route.

Date Submitted	Commenter	Affiliation	Comment	Response
			there? What's the connection?	The intent is to ensure that each community is prepared and can take full advantage of the availability of the service.
9/17/15	Phil Hollins			
			First of all, looking at the hazardous mitigation planning, trying to find out how are they going to deal with certain types of flooding in certain areas because, if you go to Pinal County and you look right down I-10, you're going to notice that there are some areas that are going to flood versus other areas, and how will that impact the overall study? I was wondering if they were going to use some of the existing tracks that were there because there's military rails that are still in existence and—but not knowing whether those were going to be operative or not or may be conducive to what you're trying to do. And one more thing is the cost. Does the cost include security? Because this is going to be an opportunity—be a great opportunity for us, but it's also going to be a great opportunity for drug runners and everyone else to actually start using those routes. So the question is, what type of homeland security, has anybody coordinated with law enforcement, DPS, or anyone else to make sure there's no—you know, that all the bases are covered, and is that part of the $6.8 million to $8 million—$8 billion?	Thank you for your comment and participation in this study. The Green Corridor Alternative (which follows I-10) was not evaluated in the Tier 1 EIS. It did not attract ridership comparable to other alternatives, did not effectively serve as many key population centers within the study corridor, and presented a high degree of potential cultural resource impacts. Considering the overall estimated costs, projected ridership, agency and public input, and potential environmental impacts, a passenger rail system within the Yellow Corridor Alternative is considered to be more cost efficient and a better performing passenger rail system compared to the other alternatives. During subsequent environmental studies, ADOT would evaluate potential flood hazards and identify appropriate mitigation measures in coordination with the federal lead and cooperating agencies. Passenger rail services are not assumed to run on existing railroad tracks. It would be built to tighter tolerances to accommodate a much higher level of performance than currently allowed for freight trains. Cost estimates developed for the AA and shown in the Tier 1 EIS include construction, operation, and maintenance. The estimates do not include the cost of law enforcement or security services.
9/17/15	Victoria Young-Chiverton			
			I drive this highway every day from southeast Tucson to here. I have an hour-and-45-minute commute. I don't mind if my commute isn't any shorter. I'd just like for it to be safer, and I'm really excited about this project. I've been hoping for something like this for years because between Coolidge and Tucson, it's a super dangerous drive, and when those dust storms roll in and you're in a car, there's an accident immediately at Picacho Peak, so I'm just really	Thank you for your comment and participation in this study.

Date Submitted	Commenter	Affiliation	Comment	Response
excited about this and supportive of it, and I'm really looking for a safer commute from Coolidge to Tucson.				
9/17/15	Margarita Sanchez			
My question is -- and I think someone brought this up -- are we going to be using made-in-the-U.S.A. products?				Current policy requires projects receiving federal funding to "buy American," i.e., purchase and utilize materials and equipment manufactured in the US.
9/17/15	Justin Williams			
I support the Orange Alternative. I believe that it should be built alongside the North-South Corridor Freeway Project that they're considering. I believe that there would be a lot of opportunity to grow and improve on the project later on. I mean, the Pinal County growth is supposed to almost double in 10 years in 2025; and by the end of 2050, it's supposed to be at about 900,000 people, and I believe there should be enough room for the rail to expand and be there for people.				The Yellow Corridor Alternative would support much of the same population as the Orange Corridor Alternative with regard to anticipated growth in Pinal County.
9/17/15	William C. "Blue" Crowley			
I'd like to start by saying that with the existing track that there already is, one, why aren't we just getting to that and doing it, and I don't see where the cost of that is. Two, with their statement about going 120 miles an hour, even on all the routes that they were showing the options, where would they be going at? You know, between Tucson and Eloy? Or Tucson and Coolidge? If you'd just give me four more minutes to finish this. So that if we were to just use the existing technology, we could be doing stuff now. I also didn't see anywhere within the plan of using future technology, specifically, magnetic levitation. I also have a problem with the way the thing is being presented. If we did use the existing track—and them saying, well, we got to wait for the public sector or this, that, and the other thing, what it is, if we're using the existing track, we need to deal with Union Pacific to put in a second line, and that's where the costs are going to be because, if we had two lines, we would have one going north, south, east, west; and then the other doing the opposite. With the way that the presentation was, I had a problem with that. One, that we're having the meeting here in Coolidge because, well, that's where the route will go through, but one of the other options, the route went through Maricopa on the map, which I have a lot of problems with. It showed Maricopa, well, not at all. It didn't show the major population center within this county. If we are going to be looking at this realistically, is it a program that we need to be interstate, not just intercounty? And I also don't see the fortitude and foresight what this even—on any of the maps that				The existing UPRR track in the Yellow Corridor Alternative cannot be used because it does not meet the more demanding tolerances required for the much higher speed associated with the passenger rail service. Regarding destinations outside of the Tucson to Phoenix corridor, the Southwest Multi-State Rail Planning Study completed by the Federal Railroad Administration looked, at a very high level, at the possibilities of a high-speed rail service linking the main Arizona metro areas with destinations in California and Nevada. That report is available on the FRA website at https://www.fra.dot.gov/eLib/Details/L17109. Station locations and amenities, such as parking and station design features (including protection from the elements), would be evaluated in future phases of the study. Passenger Rail system connections to complementary transit services were included in high level operational assumptions for passenger rail service. The Arizona Passenger Rail Corridor

Date Submitted	Commenter	Affiliation	Comment	Response
			when it did show the existing rail lines, it didn't take it all the way to Wickenburg to show that there is the Arizona-California Rail. We should be using every single one of the rails that we have now with existing technology planning for the future because, as a part of an intermodal system, that would be the way to go. With Maricopa County and the region of MAG, all I see right now is a joke when it comes to our mass transit system. We don't even cover 10 percent of the area. The infrastructure is so pathetic that it's a hazard to health and the welfare of the citizens that use it. Today was a day that we had a UV Index warning of very high. That meant that if you were of white skin and you were standing in direct sunlight for over 15 minutes, it was injurious to your health. Well, 70 percent of the bus stops don't have shelter. So 70 percent of the bus stops, if your bus wasn't within 15 minutes, we were trying to kill the riders here. When I look at the infrastructure of this, and as I pointed out at the meeting in Phoenix, I find it fascinating that the mayors of Queen Creek and Gilbert were very much for this mass transit and said how much their population would be using it, but as I pointed out to them, they have no mass transit in either one of their communities, so if the people were using the rail, what were they going to use when they got off of it? If they're coming up from Tucson, how were they going to get around your community? When you're bringing it from Gilbert, Queen Creek, and Chandler, where are we going to be taking it? Is it just this circle in Mesa? Is there an existing Mesa facility? I know that there's a Tempe facility. I know that there's a Phoenix facility. And if we had the foresight to show what was going on, we would also know that there's a facility in Glendale—and there's also a facility in Wickenburg.	Study - Alternatives Analysis, an Appendix to this EIS document, developed a detailed community readiness program for each potential station location along the route. The intent is to ensure that each community is prepared and can take full advantage of the availability of the service.
	Dan Millis			
			I would like to encourage this project to move forward! We need a better way to travel between major urban centers than interstate highways. Thanks you for doing this analysis and I hope that the next steps will be taken to fund this project and build it in a well thought out manner.	Thank you for your comment and participation in this study.

Air Quality Appendix

Air Quality Appendix

A.1 Mobile Source Air Toxics

In addition to the NAAQS for criteria air pollutants, EPA also regulates air toxics under section 202 of the CAA. Mobile source air toxics (MSATs) are a subset of the 188 air toxics (pollutants known or suspected to cause cancer) defined by the CAA. MSATs denote compounds emitted from on-road mobile sources (vehicles), non-road mobile sources (such as airplanes and locomotives), and stationary sources (such as factories and refineries). In 2001, EPA issued a Final Rule (66 FR 17230) on controlling emissions of hazardous air pollutants.

EPA is responsible for protecting the public health and welfare from any known or expected effect of an air pollutant. It is the lead authority for administering the CAA and its amendments, and has specific statutory obligations with respect to hazardous air pollutants and MSAT. EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. The agency maintains the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents (FHWA 2012). Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious are the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, and exposure modeling followed by final determination of health impacts. Each step in the process builds on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments because information regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame is not available, forcing the need for unsupportable assumptions.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. EPA (http://www.epa.gov/risk/~basicinformation.htm#g) and HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel particulate matter in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by EPA as provided by the CAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of transit projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits—such as reducing traffic congestion, accident rates, and fatalities, plus improved access for emergency response—that are better suited for quantitative analysis.

Emissions of $PM_{2.5}$ and nitrogen oxides (NO_x) from diesel locomotive engines contribute to the nonattainment of the NAAQS for $PM_{2.5}$ and ozone. EPA has established emission standards for these pollutants for newly manufactured and remanufactured locomotives (see 73 FR 25098, Locomotive and Commercial Marine Rule). EPA is projecting that $PM_{2.5}$ and NO_x emissions will drop as a result of these standards.

For any future alignment selected, the amount of MSATs emitted would be proportional to the resulting VMTs, assuming that other variables, such as fleet mix, are the same for each corridor. It is expected that VMTs for any future alignment selected would be lower than VMTs under the No Build Alternative due to a reduction in vehicles on the road resulting from the implementation of transit service. Traffic congestion would be reduced on the roadways within the study corridors, which would result in a reduction of air pollutants. Further analysis would be conducted during Tier 2 to quantify MSAT emissions.

A.2 Monitoring Station Data

Table A-1 below and Figure A-1 on page 7 of this Air Quality Appendix indicate the locations of air quality monitoring stations in the vicinity of the corridor alternatives. Bold numbers in the table represent an exceedance. In addition, Figure A-1 shows the federal Class I areas in the study area and their proximity to the corridor alternatives.

Table A-1. Monitoring Stations near the Corridor Alternatives

Location	Pollutant	2009	2010	2011	2012
Pima County					
190 West Pennington – Tucson	CO 1-hr	1.5	n/a	n/a	n/a
	CO 8-hr	1.0	n/a	n/a	n/a
1237 South Beverly – Tucson	CO 1-hr	1.8	1.7	2.0	1.8
	CO 8-hr	0.8	0.9	0.9	1.0
22nd & Alvernon – Tucson	CO 1-hr	2.2	2.5	2.5	2.3
	CO 8-hr	1.1	1.1	1.6	1.2
2745 North Cherry – Tucson	CO 1-hr	1.9	2.1	1.7	1.4
	CO 8-hr	1.2	1.3	1.2	1.2
400 West River Road – Tucson	CO 1-hr	1.2	1.1	1.1	1.0
	CO 8-hr	0.9	0.8	0.6	0.6
2601 South Kolb Road – Tucson	CO 1-hr	1.7	2.3	1.6	1.4
	CO 8-hr	1.0	1.2	1.1	0.9
3401 West Orange Grove Road – Tucson	PM_{10} 24-hr	97	57	89	88
8840 West Robinson Street – Rillito	PM_{10} 24-hr	99	43	n/a	n/a

Table A-1. Monitoring Stations near the Corridor Alternatives

Location	Pollutant	2009	2010	2011	2012
1601 South 6th Avenue – South Tucson	PM_{10} 24-hr	127	66	87	89
1016 West Prince Road – Tucson	PM_{10} 24-hr	75	58	55	81
12101 North Camino De Oeste – Marana	PM_{10} 24-hr	41	35	65	41
4625 East Broadway – Tucson	PM_{10} 24-hr	52	33	n/a	n/a
6910 South Santa Clara Avenue – Tucson	PM_{10} 24-hr	48	50	68	75
2498 North Geronimo – Tucson	PM_{10} 24-hr	124	66	85	88
Pinal County					
305 East Superstition Boulevard – Apache Junction	Ozone 8-hr	0.069	0.073	**0.075**	**0.076**
3955 East Superstition Boulevard – Apache Junction	PM_{10} 24-hr	38	43	**255**	73
	$PM_{2.5}$ 24-hr	12	12	42	14
301 East Combs Road – Queen Creek	Ozone 8-hr	0.062	0.062	n/a	n/a
	PM_{10} 24-hr	**180**	110	**280**	**179**
10 South Queen Anne Drive – Queen Valley	Ozone 8-hr	0.070	0.072	**0.078**	**0.078**
212 East Broadway – Coolidge	PM_{10} 24-hr	88	81	72	97
970 North Eleven Mile Corner Road – Casa Grande	PM_{10} 24-hr	**165**	**182**	**1,161**	106
801 North Main Street – Eloy	PM_{10} 24-hr	120	80	127	116
Pinal Air Park Road – Red Rock	Ozone 8-hr	0.065	0.066	0.070	0.072
	PM_{10} 24-hr	49	63	57	122
660 West Aero Drive – Casa Grande	Ozone 8-hr	0.066	0.068	0.070	0.070
401 Marshall Street – Casa Grande	PM_{10} 24-hr	274	127	428	174
	$PM_{2.5}$ 24-hr	19	21	23	19
Maricopa County					
3315 West Indian School Road – Phoenix	CO 1-hr	5.0	3.3	n/a	n/a
	CO 8-hr	3.3	2.3	n/a	n/a
3847 West Earll Drive – Phoenix	Ozone 8-hr	0.068	**0.075**	**0.078**	**0.083**
	CO 1-hr	4.8	4.2	3.9	4.5
	CO 8-hr	3.3	3.2	2.9	2.5
	PM_{10} 24-hr	118	86	**266**	148

Table A-1. Monitoring Stations near the Corridor Alternatives

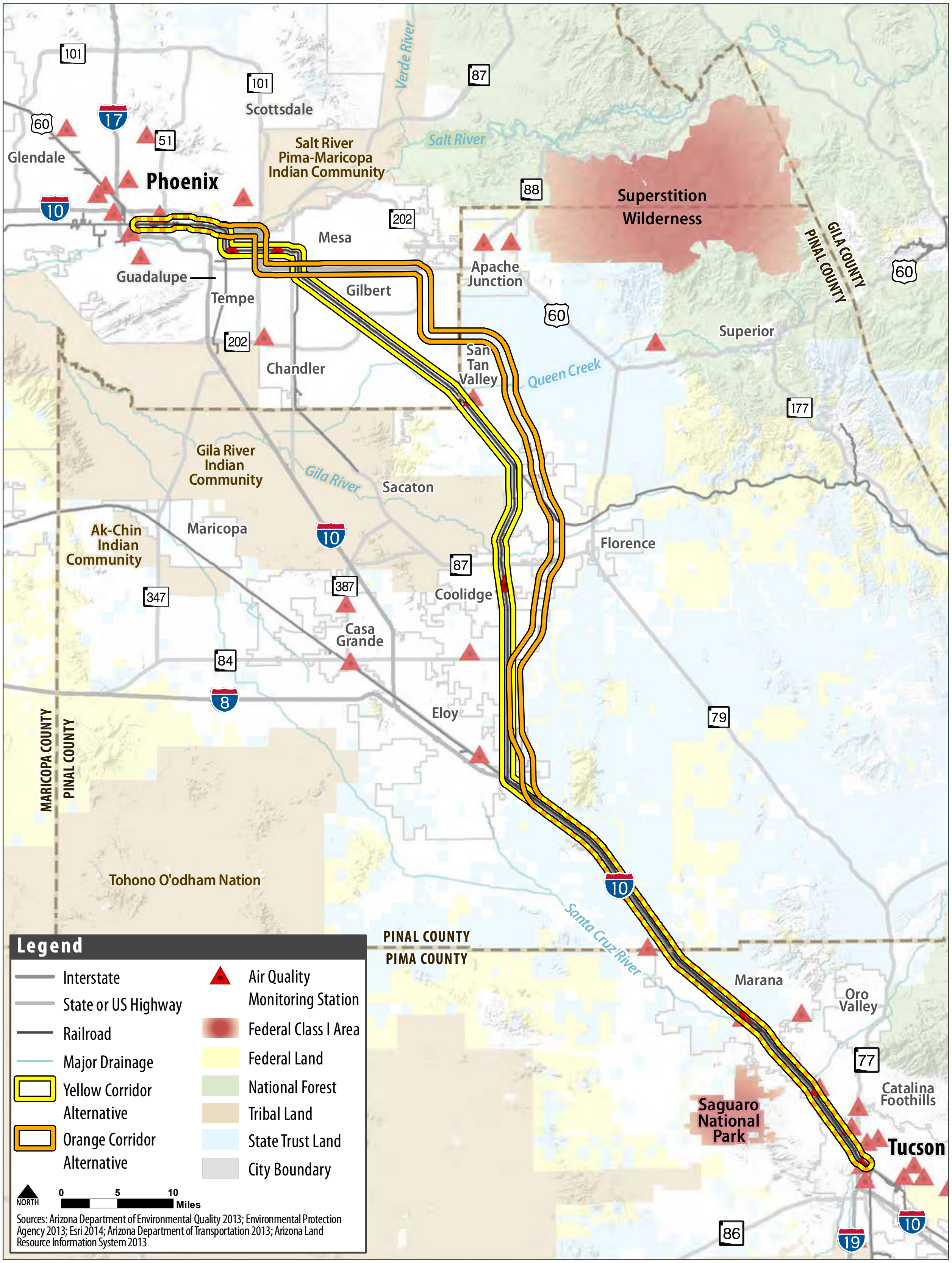
Location	Pollutant	2009	2010	2011	2012
310 S Brooks – Mesa	CO 1-hr	1.9	2.0	1.8	2.1
	CO 8-hr	1.3	1.4	1.3	1.3
	PM_{10} 24-hr	65	39	90	57
601 East Butler Drive & N 6th Street – Phoenix	Ozone 8-hr	0.072	**0.079**	**0.082**	**0.083**
	CO 1-hr	2.1	2.4	2.7	1.8
	CO 8-hr	1.3	1.6	1.5	1.1
	PM_{10} 24-hr	66	39	**184**	140
6000 West Olive Avenue – Glendale	Ozone 8-hr	0.068	0.074	**0.076**	**0.078**
	CO 1-hr	1.9	8.9	1.8	1.8
	CO 8-hr	1.2	1.5	1.2	1.3
	PM_{10} 24-hr	83	62	**240**	136
1645 East Roosevelt Street – Phoenix	Ozone 8-hr	0.069	0.072	0.073	**0.077**
	CO 1-hr	3.0	3.2	3.5	3.3
	CO 8-hr	2.1	2.2	2.1	2.0
	PM_{10} 24-hr	130	63	**307**	137
2857 North Miller Road – Scottsdale	CO 1-hr	1.9	2.0	1.7	1.9
	CO 8-hr	1.4	1.6	1.3	1.3
1128 North 27th Avenue – Phoenix	CO 1-hr	3.2	3.9	3.0	3.5
	CO 8-hr	2.4	2.3	2.5	2.1
	PM_{10} 24-hr	123	135	**254**	**212**
33 West Tamarisk Avenue – Phoenix	Ozone 8-hr	0.067	0.074	**0.076**	**0.078**
	CO 1-hr	3.4	4.3	2.9	3.0
	CO 8-hr	2.2	3.1	2.0	1.6
	PM_{10} 24-hr	**169**	112	**338**	**285**
275 South Ellis – Chandler	CO 1-hr	2.1	2.0	1.7	1.7
	CO 8-hr	1.5	1.6	1.3	1.3
4530 North 17th Avenue – Phoenix	Ozone 8-hr	0.073	**0.076**	**0.078**	**0.076**
	CO 1-hr	2.8	2.7	2.5	2.8
	CO 8-hr	2.3	2.1	2.1	1.6
	PM_{10} 24-hr	106	47	**241**	120
1525 South College Avenue – Tempe	Ozone 8-hr	0.067	0.068	0.070	0.073

Table A-1. Monitoring Stations near the Corridor Alternatives

Location	Pollutant	2009	2010	2011	2012
	CO 1-hr	3.6	2.4	3.4	2.1
	CO 8-hr	2.1	1.6	2.9	1.6
	PM_{10} 24-hr	n/a	n/a	n/a	145
16825 North Dysart – Surprise	Ozone 8-hr	0.069	0.071	0.070	0.073
	CO 1-hr	0.9	1.8	0.9	1.0
	CO 8-hr	0.8	0.6	0.5	0.6
	PM_{10} 24-hr	62	63	**239**	127
26453 West MC85 – Buckeye	Ozone 8-hr	0.062	0.064	0.067	0.068
	CO 1-hr	1.1	1.3	1.2	0.8
	CO 8-hr	0.5	0.6	0.8	0.5
	PM_{10} 24-hr	**400**	107	**296**	**202**
1310 South 15th Avenue – Phoenix	PM_{10} 24-hr	118	66	51	n/a

Source: EPA, PDEQ, PCAQCD, and Maricopa County.
Note: Bold numbers represent an exceedance.

Figure A-1. Air Quality Monitoring Stations and Federal Class I Areas



Alternatives Analysis Report

PASSENGER RAIL CORRIDOR STUDY

— TUCSON TO PHOENIX —

ALTERNATIVES ANALYSIS

Submitted by:

ADOT

Arizona Department of Transportation
Multimodal Planning Division
206 S. 17th Avenue, Mail Drop 310B
Phoenix, AZ 85007

Submitted to:

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Federal Transit Administration
Federal Railroad Administration

Version 1.0 – July 2, 2014 • Version 2.0 – August 29, 2014 • Version 3.0 – October 7, 2014 • Version 4.0 – December 1, 2014

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Acronyms and Abbreviations

AA	alternatives analysis
ADOT	Arizona Department of Transportation
APRCS	Arizona Passenger Rail Corridor Study
ARRF-II	Aggregate Rail Ridership Forecasting Model
AZTDM	Arizona Statewide Travel Demand Model
BNSF Railway	Burlington Northern Santa Fe Railway
bqAZ	Building a Quality Arizona
BRT	bus rapid transit
CBD	central business district
CONNECT	Conceptual Network Connections Tool
CST	Corridor Support Team
CTTP	Census Transportation Planning Package
DCR	Design Concept Report
DMU	diesel multiple unit train
EIS	environmental impact statement
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GIS	geographic information system
GRIC	Gila River Indian Community
HOV	high-occupancy vehicle
HSIPR	high speed and intercity passenger rail
I-10	Interstate 10
LRT	light rail transit
MAG	Maricopa Association of Governments
NEPA	National Environmental Policy Act
PAG	Pima Association of Governments
RTP	regional transportation plan
SDP	service development plan
SHCG	Species and Habitat Conservation Guide
SR	State Route
STOPS	Simplified Trips-on-Project Software
TAZ	traffic analysis zone
TIA	Tucson International Airport
UP	Union Pacific Railroad
VHT	vehicle hours traveled
VMT	vehicle miles traveled

Executive Summary

As part of its mission of providing a safe, efficient, cost-effective transportation system, the Arizona Department of Transportation (ADOT) wishes to serve commuter and intercity travel needs and enhance travel opportunities within Maricopa, Pima, and Pinal Counties. Statewide and regional transportation planning efforts undertaken from 2007 to 2010 ("Building a Quality Arizona" or bqAZ) have recommended implementing passenger rail to add travel capacity to what highways already provide. For this reason, ADOT is studying passenger rail service options between the cities of Tucson and Phoenix to provide more travel choices in this 115-mile-long corridor by introducing passenger rail service. This would provide an alternative travel mode and would reduce travel times. By providing an alternative to private single-passenger vehicle travel within the study corridor, passenger rail would avoid traveler delays caused by highway congestion, enhance highway safety, and reduce pollutant emissions on Interstate 10 (I-10). This project—the Arizona Passenger Rail Corridor Study (APRCS)—focuses on intercity and commuter mobility between the Tucson and Phoenix metropolitan areas, including Pima, Pinal, and Maricopa Counties. The purpose of the project is to examine various means of implementing a high-capacity facility that would serve both intercity and commuter needs together. The project purpose is to:

- Investigate ways to reduce the rate of growth in congestion and divert highway trips within the Tucson-to-Phoenix travel corridor
- Increase access to existing and planned employment and activity centers within the three-county study area
- Provide reliable travel times and safe travel within an increasingly congested region that currently affords few transportation alternatives to the private automobile
- Recommend a route and travel mode to connect the suburban and rural areas between Tucson and Phoenix
- Facilitate continued development of a comprehensive, multimodal, and interconnected regional and multiregional transportation network that provides mobility choices for existing and future needs and allows connectivity to systems beyond the Tucson-to- Phoenix corridor

Between 1990 and 2010, the combined population of Maricopa, Pima, and Pinal Counties increased by over 78 percent, from 2.9 million to nearly 5.2 million, with an over 61 percent increase between 1991 and 2010 in the number of nonfarm jobs. This three-county study area forms part of a clustered network of cities—a "megaregion"—known informally as the "Sun Corridor." A look at travel patterns, available transit services, and trip times shows that the need to move people from one place to another is also growing. Based on population and travel forecasts, and the amount of available open land within the corridor, travel markets are expected to continue to grow in the future; however, opportunities to increase the carrying capacity of the region's roadway network are limited. Given the current travel demand and projected growth, there is a clearly demonstrated need in the corridor for major transportation improvements to address existing and anticipated unpredictability and inefficiency in the transportation system. Transportation improvements are also needed to expand on currently limited transportation options, and increase transportation system capacity needed in the future.

Figure 1—San Diego COASTER Commuter Train

Specifically, as the region evolves there will be explicit and overlapping commuter and intercity needs, as defined below:

- **Commuter need**—Demand for commuter services, where most travelers make same-day round trips, exists within the Phoenix and Tucson metro areas. Demand is expected to grow in the future, as population growth in the service area is projected to remain high over the next few decades. The average journey to work within the study area has grown longer as residential development has spread from the major cities to outlying areas and as population growth has increased traffic congestion. As development in Pinal County proceeds, commuter activity will continue to expand in the areas between Phoenix and Tucson, with major daily commutes taking place between Pinal County and neighboring Maricopa and Pima Counties.

Figure 2—Amtrak Acela Intercity Train

- **Intercity need**—Travel between cities in the Sun Corridor for non-work purposes also accounts for many trips. As population and travel demand grow, intercity travel by auto and air will suffer from increasing congestion and time delays—especially in metropolitan areas, at and around airports, and on weekends and holidays. This decline in transportation service and the quality of the travel experience adversely affects intercity travelers, other users of the system, commercial carriers, and the general public.
- **Commuter and intercity common need**—During the scoping process, respondents expressed a desire for both commuter and intercity service. In both agency and public scoping, many participants independently suggested co-locating intercity and commuter service (express and local) to utilize one corridor with multiple operating plans.

The analysis of opportunities within the Sun Corridor indicates that among the effective choices for improving travel is a higher speed rail service, which can serve both a commuter and intercity need, and would complement and augment the existing highway system. A rail option would likely offer an increase in the level of travel reliability, new travel capacity, and corridor efficiency.

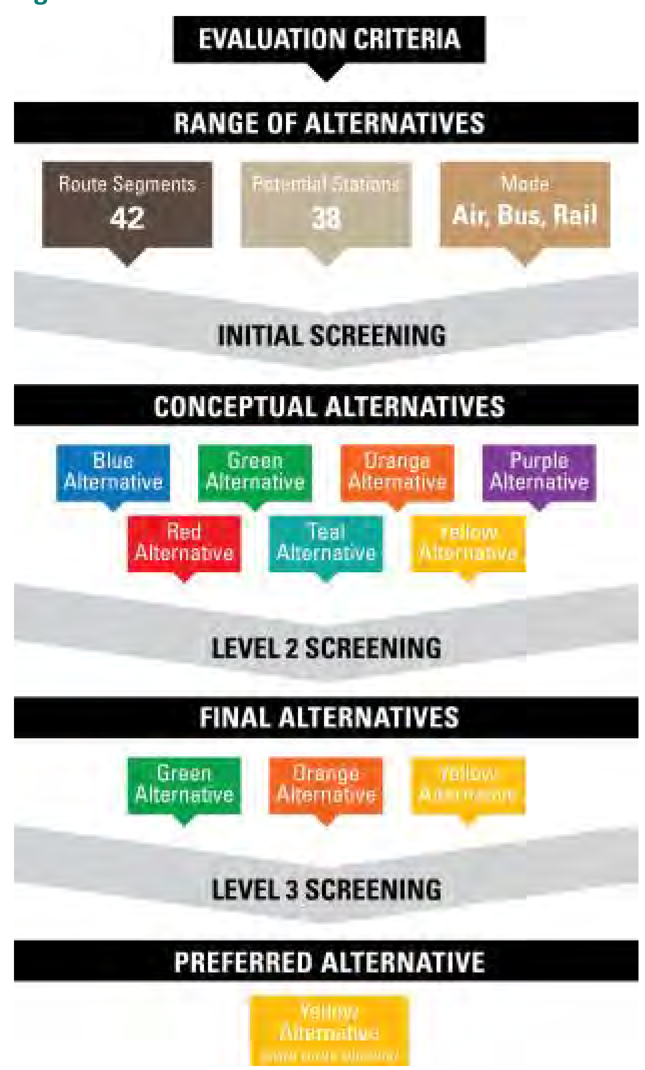
Alternatives Analysis Methodology

The APRCS used a three-level process to formulate, evaluate, and refine the potential mode, routing, system hub, and approximate station areas within the Tucson-to-Phoenix corridor, in addition to input from public and agency stakeholders. Each step in the process was increasingly more comprehensive, refining the evaluation criteria to assess each remaining alternative at a higher level of detail than the previous step. The evaluation methodology and criteria used in the three-level analysis were developed to be compatible with typical Federal Railroad Administration (FRA) and Federal Transit Administration (FTA) evaluation methodology requirements. The process for an FRA Tier 1 environmental impact statement (EIS) includes assessing beneficial and adverse environmental effects associated with a reasonable range of alternatives. The methodology and criteria for the FTA alternatives analysis (AA) process require analyzing reasonable and promising alternatives based on a range of measures designed to understand each alternative's cost-effectiveness, financial feasibility, and potential fatal flaws. The three levels of evaluation and criteria used in the APRCS were designed to compare alternatives using a common measure and advance the most feasible alternatives for further study at the next level, consistent with the objectives of the FRA Tier 1 EIS process and FTA AA process.

Alternatives Development and Evaluation

The three-level progression of analysis identified the Range of Alternatives (Level 1 Evaluation), Conceptual Alternatives (Level 2 Evaluation), Final Alternatives (Level 3 Evaluation), and ultimately the Preferred Alternative including route options (Figure 3).

Figure 3—Evaluation Process



Range of Alternatives

The development of the range of alternatives was the first step in the alternatives development process. It consisted of all reasonable routes, station locations, and modes that were initially evaluated as part of the study. The evaluation of the range of alternatives considered all potential route segments, which were then combined into alternatives consisting of a generalized alignment, stations, and mode. The initial segments used in the range of alternatives analysis were identified based on previous planning initiatives and corridor studies conducted throughout the study area, as well as input from agencies within the study area. There were 42 separate route segments identified based on previous studies, public and agency input, and review of the study corridor. Individual route segments from these previous studies were combined to form 142 potential alternatives connecting the Tucson and Phoenix metropolitan areas. All segments are shown on Figure 4.

There were also potential station locations identified as part of the range of alternatives to inform in decisions on potential routings. Stations were developed based on an assessment of existing and future conditions, previous studies, and stakeholder and agency input workshops. Three different station types with varying levels of service and infrastructure requirements, as described in detail below, were used to shape the alternative routes. Figure 5 shows all potential station locations identified throughout the study area.

- System hub stations serve as the primary core of the passenger rail corridor for both intercity and commuter rail service. Only select locations were identified as potential system hub stations, which are typically located in downtowns near major regional destination, and which can offer connections to other complementary transit services including light rail, streetcar, or bus. Specific system hubs include downtown Phoenix, Tempe/ASU, PHX Sky Harbor airport, downtown Tucson, University of Arizona, and Tucson International Airport.
- Regional stations serve both intercity and commuter rail modes and function as major intermediate stations. Regional stations have multiple access options, have transit-supportive land use policies, and will be transportation gathering centers for the corridor. The location of the regional stations was determined by considering anticipated travel characteristics and agency and public preferences related to how intercity travel is likely to evolve over time. In general, regional stations are located at community centers within the corridor to aid in gathering and distributing trips and at the edge of the urban areas to serve as a collector location for trips traveling to the opposite end of the corridor.
- Local stations will be served by commuter rail service only. The function of local stations is to help move daily trips efficiently throughout the corridor. Agencies and the public identified locations that represent the most likely candidates to carry daily trips throughout the corridor based on where major activities are located within each community and their proximity to the identified segments.

Initial Screening (Level 1 Evaluation)

The Initial Screening process was conducted to evaluate the potential routings, stations, and service types that constituted the range of alternatives. The route screening focused on the potential route locations using parameters including infringement on sensitive environments, length, potential ridership market, institutional considerations, existing transportation uses, and compatibility with local land use plans. The screening of potential station locations was conducted for both commuter and intercity station locations using parameters related to transportation connections and travel markets. The measurement categories used for the route screening were (1) existing or planned transportation use in corridor, (2) infringement upon sensitive environments, (3) compatibility with community land use plans, (4) institutional considerations, and (5) length of possible route. Each potential routing alternative was evaluated at a 4-mile width to allow for flexibility in addressing any issues that could arise during later stages of work. Based on results of Initial Screening, as well as public and agency input, stations and potential routings were combined to create seven alternatives that provide realistic opportunities for competitive high-capacity service. These alternatives connect the Tucson and Phoenix metropolitan areas with key population and employment centers throughout each region. They were advanced to the next stage of evaluation as Conceptual Alternatives for more detailed analysis.

Figure 4—Range of Alternatives Route Segments

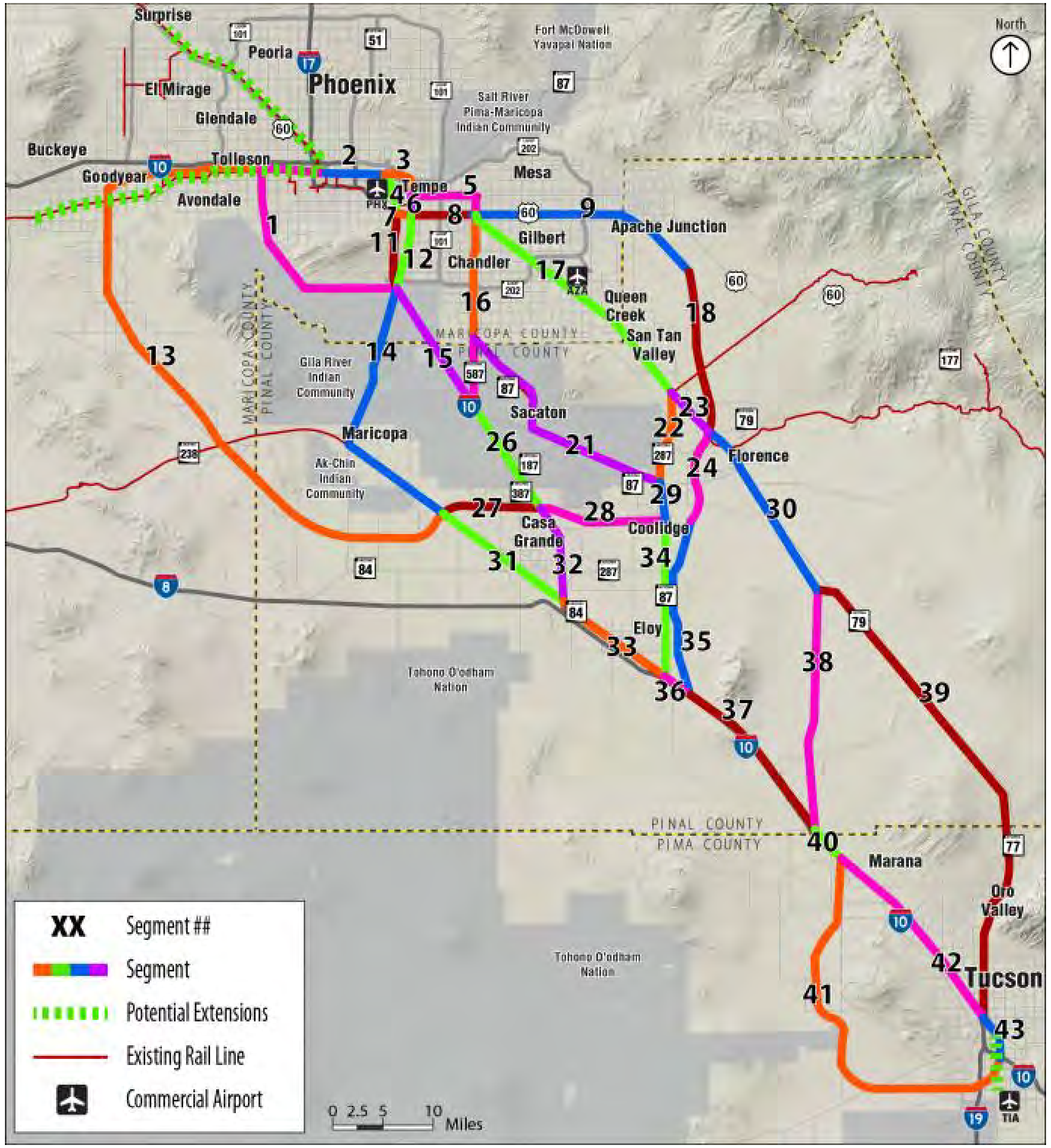
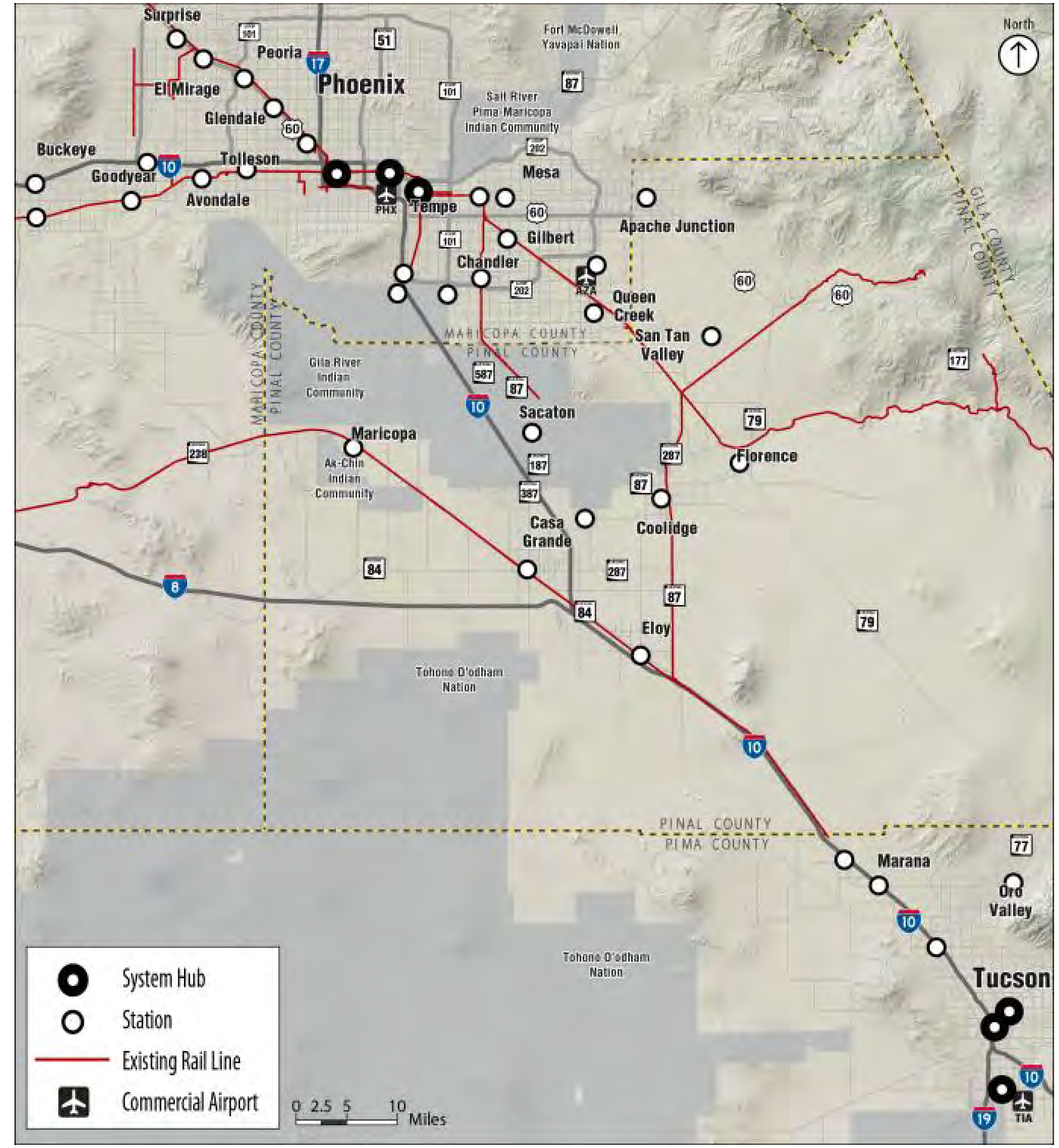


Figure 5—Range of Alternatives Potential Stations



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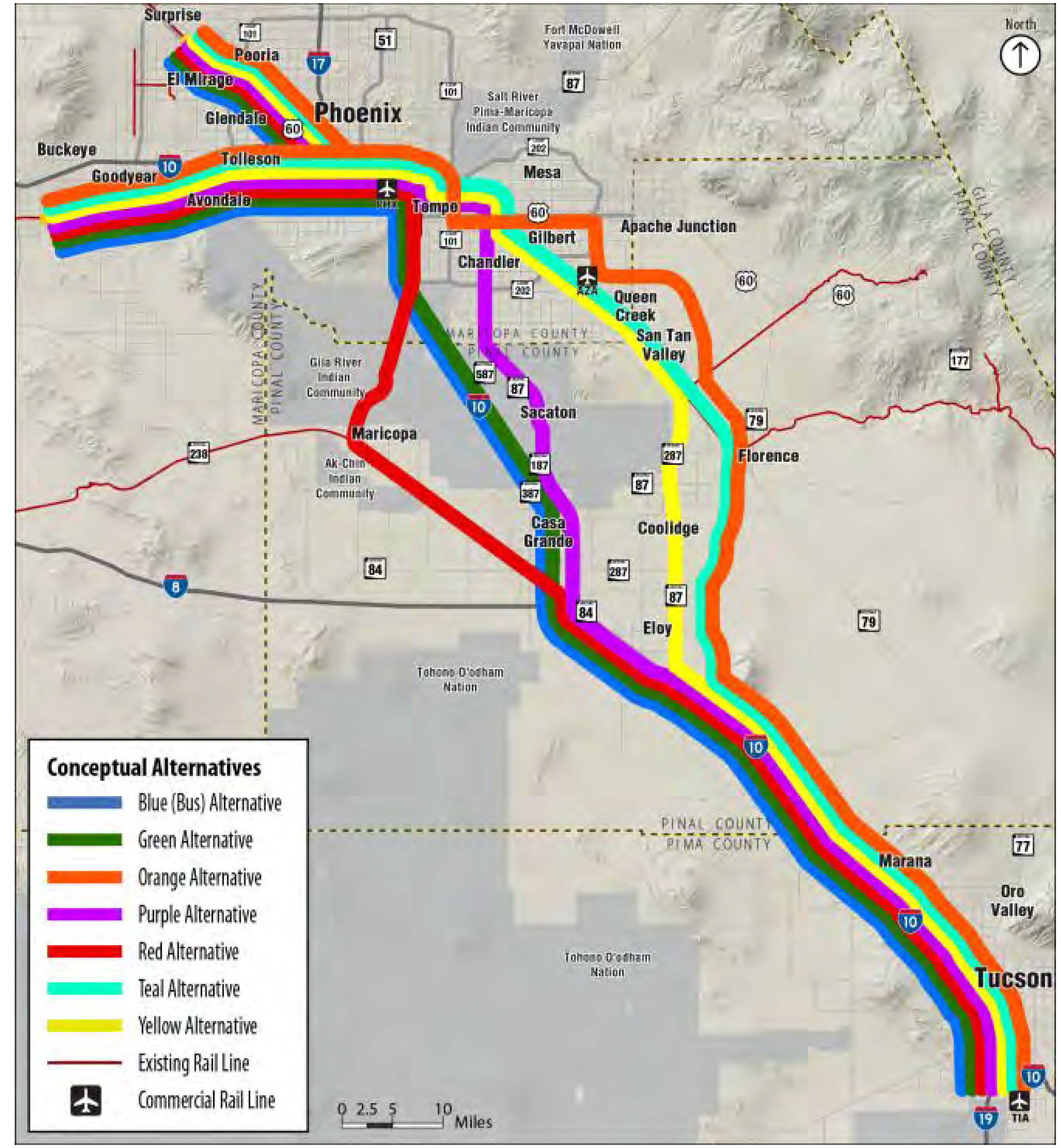
Conceptual Alternatives (Level 2 Evaluation)

The seven Conceptual Alternatives, shown on Figure 6, consist of a unique combination of route, set of stations, and selected operating characteristics. The criteria used in the Level 2 Evaluation included measurements designed to evaluate the route, station locations, and operating characteristics of each alternative, differentiating between the commuter and intercity service features.

- **Blue (Bus) Alternative**—A bus alternative using existing HOV lanes on I-10 within Maricopa County, a new dedicated busway on I-10 from Chandler to Tucson, as well as local arterials within downtown Phoenix and downtown Tucson
- **Green Alternative**—A rail alternative using mostly I-10 rights-of-way to create the most direct route between Phoenix and Tucson
- **Orange Alternative**—A rail alternative using existing and planned freeway rights-of-way to connect Phoenix and Tucson via eastern Maricopa County and central Pinal County
- **Purple Alternative**—A rail alternative utilizing existing freight rail corridors, new greenfield corridors, and I-10 rights-of-way to connect Phoenix and Tucson through Chandler and the Gila River Indian Community (GRIC)
- **Red Alternative**—A rail alternative that connects the cities of Phoenix, Maricopa, and Tucson using existing freight rail and highway corridors
- **Teal Alternative**—A rail alternative that would be built within both existing freight rail and planned freeway corridors to serve Phoenix and Tucson by way of eastern Maricopa County and central Pinal County
- **Yellow Alternative**—A rail alternative using exclusively Union Pacific Railroad Company (UP) rights-of-way or track from downtown Phoenix to downtown Tucson, including the UP Phoenix Subdivision, UP Southeast Branch, and UP Sunset Route from Eloy to Tucson

Figure 6—Conceptual Alternatives



All Conceptual Alternatives include western extensions in the Phoenix metropolitan area (to Surprise along the Burlington Northern Sante Fe (BNSF) Railway on Grand Avenue and to Buckeye along the UP Wellton Branch) and to Tucson International Airport in Tucson. These extensions do not materially influence the routing decision between the Tucson and Phoenix areas but do represent critical linkages for commuter rail to other metropolitan areas, such as Los Angeles and Las Vegas. The extensions are considered important elements of every Conceptual Alternative but do not significantly influence the decision between Phoenix and Tucson.

Level 2 Evaluation Results

The Level 2 Evaluation screened the seven Conceptual Alternatives against various quantitative and qualitative criteria within the six general measurement categories where each complete alternative encompassed several elements, including a unique alignment, potential station areas, and operating assumptions. Table 1 shows the general measurement category scores of each alternative, summarized into an overall assessment of each alternative in terms of *community acceptance and accessibility*, *environmental impacts*, *financial feasibility*, *operating characteristics*, *mobility*, and *safety*. When all general measurement category scores are averaged by alternative and ranked comparatively, the Orange Alternative scores the highest overall, the Green and Teal Alternatives scored higher than average, the Purple Alternative received an average score, the Blue (Bus) and Red Alternatives below average, and the Yellow Alternative scored the lowest overall.

Three inputs were considered in the evaluation of the alternatives—technical, public input, and agency input. Based on the technical evaluation, the Orange Alternative scored the highest overall because the alternative's operations would have no jurisdictional issues with GRIC or UP, would face no interference from automobile or freight rail traffic since the route avoids both I-10 and the UP corridor, and would serve many major population and employment centers. The Green, Teal, Purple, Blue (Bus), and Red Alternatives received average overall assessments due to mixed overall results among the general measurement categories. The Yellow Alternative scored low overall due mainly to potential conflicts with UP operations, which limit mobility, predictability and dependability, and safety particularly in the UP Sunset Route between Eloy and Tucson. However, the public and the agencies expressed support for the Green, Yellow, and Orange Alternatives due to fastest travel time and ability to connect key population centers. As the study progressed ongoing discussions with UP identified a potential reconfiguration of the Yellow Alternative that resolved many of the potential conflicts and significantly enhanced the viability of the route.

Table 1—Overall Level 2 Screening Results

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
Community acceptance and accessibility	3	1	5	3	1	5	3
Environmental impacts	5	3	1	3	3	3	3
Financial feasibility	5	3	1	3	3	3	3
Operating characteristics	1	5	5	3	3	3	1
Mobility	1	3	5	3	3	3	1
Safety	1	5	5	3	3	3	1

The following Conceptual Alternatives are those eliminated from further consideration at the conclusion of the Level 2 evaluation, along with the reasons for their elimination:

- **Blue Alternative**—The Blue (Bus) Alternative demonstrated significantly low commuter demand compared to other alternatives and would be subject to congestion and safety issues similar to those in automobiles, thus not offering a real alternative to existing automobile travel. For these reasons, the Blue (Bus) Alternative does not meet the stated purpose and need of the APRCS study. In addition, the route was the least popular with the public out of all Conceptual Alternatives.

Figure 7—I-10 Congestion

- **Purple Alternative**—This corridor runs through the GRIC's population center in Sacaton on a new Greenfield alignment to join the Chandler Branch of UP into Phoenix. Since a large portion of the corridor passes through GRIC land the ability to implement this alternative would be subject to a great deal of uncertainty due to a lengthy tribal approval process, numerous high value cultural and historic resources on community land, high potential for biological and water quality impacts on the Greenfield segments, and significant challenges associated with displacements and obtaining ROW. The routing through GRIC land would also have much lower ridership potential and lack connectivity to major activity and population centers compared to other viable alternatives.
- **Red Alternative**—The proposed corridor would use existing highway rights-of-way through GRIC land and would also be expected to have low ridership potential due to the comparatively low number of major population centers along the route. These limitations were reflected during the second public outreach phase, when the public ranked the alternative the least favorable overall. In addition, the alternative would likely face increased right-of-way costs, cultural and environmental resource challenges, and a possible violation of highway lease agreement between GRIC and ADOT.

Final Alternatives (Level 3 Evaluation)

The Final Alternatives were identified with consideration of the Level 2 Evaluation results, an analysis of major conflicts or fatal flaws, public outreach, and coordination with partner agencies throughout the study area. The Level 3 Evaluation consisted of a more refined and detailed analysis of the Final Alternatives, culminating in the selection of the preferred alternative.

After considering the results of the Level 2 Evaluation, stakeholder input, and the presence of fatal flaws, the Teal Alternative was initially selected as a Final Alternative. However, further investigations of the alternatives resulted in the determination that the Teal Alternative would not be further evaluated as part of the Level 3 Evaluation.

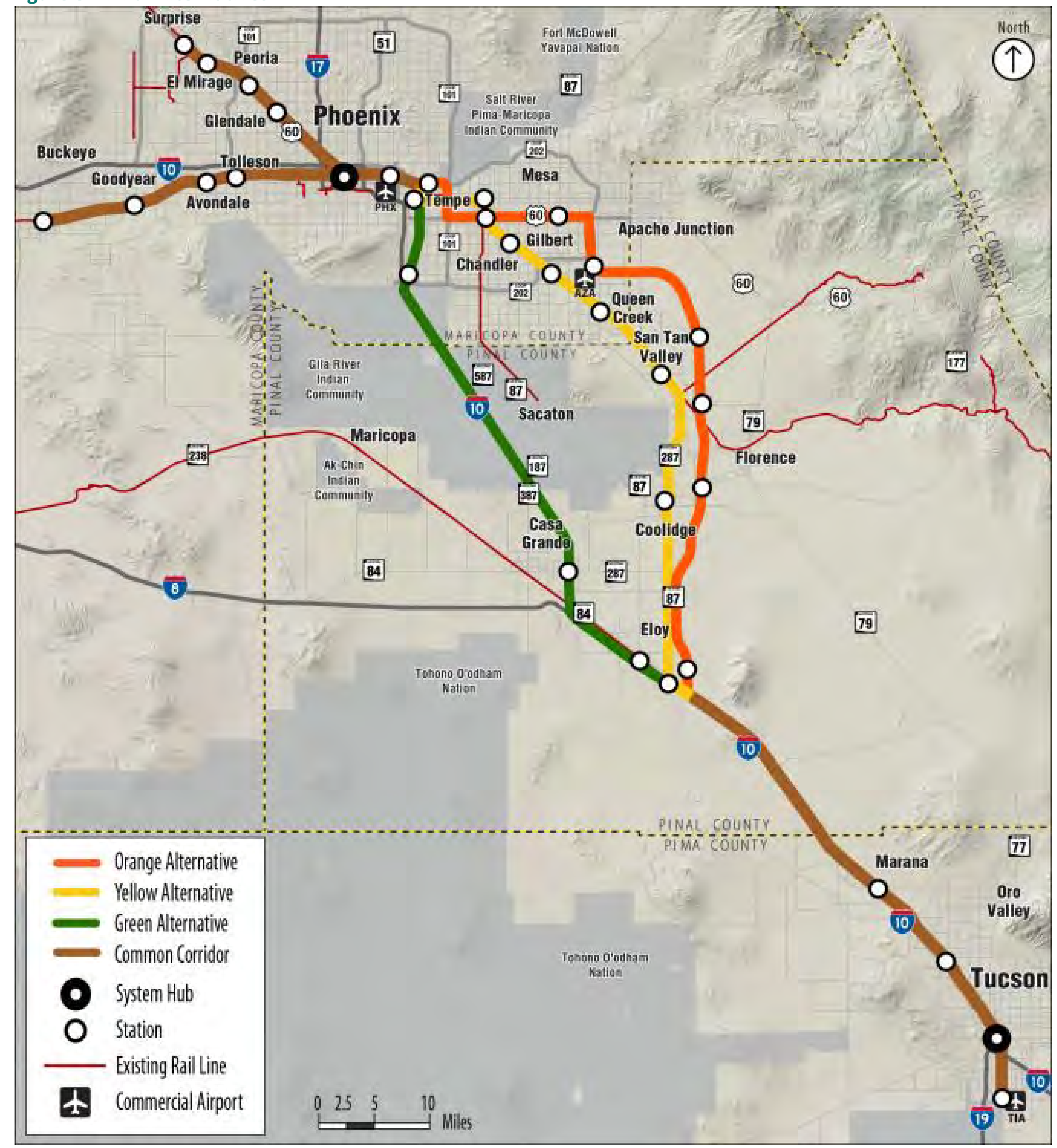
- **Teal Alternative**—With the reconfiguration of the Yellow and Orange Alternatives to include common corridors from downtown Phoenix to Tempe, and Eloy to Tucson, the route assumed by the Teal Alternative would consist almost entirely of portions of the Yellow and Orange alternatives. For this reason, further analysis of Teal as an independent alternative was deemed unnecessary, as the vast majority of the alternative route would be technically evaluated in the Level 3 Evaluation as part of either the Yellow or Orange Alternatives.

The following Conceptual Alternatives were identified as the Final Alternatives for Level 3 Evaluation as they would best meet the purpose of and need for the project and provide the highest potential for successful implementation. However, the routes and station locations of each Final Alternative were refined from earlier alternative definitions as described below.

- **Green Alternative**—The updated Green Alternative still uses mostly I-10 right-of-way. However, the refined route would follow UP right-of-way from Phoenix into downtown Tempe and the UP Tempe Branch right-of-way south from Tempe to meet I-10. Within Tucson, the route would follow UP right-of-way from I-10 to the southern System Hub station.
- **Orange Alternative**—This route would also use UP right-of-way near the Phoenix and Tucson downtown areas as well as the SR 202L Red Mountain Freeway, SR 101 Pima Freeway, US 60 Superstition Freeway, Ellsworth Road, planned North-South multimodal corridor, an exclusive transit corridor planned in the proposed Superstition Vistas development, and I-10 rights-of-way. The northern portion of the route is assumed to be constructed using an elevated guideway between north Tempe and Phoenix Mesa Gateway Airport.
- **Yellow Alternative**—UP expressed major concerns about shared passenger service on the UP Sunset Route in the southern portion of the corridor between Tucson and Eloy, which resulted in the reconfiguration of the corridor. The redefined alternative assumed use of the UP Phoenix subdivision corridor north of Eloy and the I-10 corridor from Eloy to Tucson.

All Final Alternatives share several common corridors, within which both the Green, Yellow, and Orange routes would utilize the same general routes (Figure 8). These sections include the UP Phoenix subdivision right-of-way between downtown Phoenix and Tempe, I-10 right-of-way between Eloy and Tucson, and UP right-of-way in Tucson. In addition, both Final Alternatives include extensions into the West Valley in the Phoenix metropolitan area (to Surprise along the BNSF Railway line on Grand Avenue and to Buckeye along the UP Wellton Branch and to the Tucson International Airport south from downtown Tucson along the UP Nogales Branch).

Figure 8—Final Alternatives



Level 3 Evaluation Results

The Level 3 Evaluation screened the Final Alternatives against various quantitative and qualitative criteria within the general measurement categories. The Green Alternative was initially selected and presented to the public as a Final Alternative. However, ongoing discussions with GRIC staff and officials resulted in the removal of the alternative from further consideration at the onset of the Level 3 technical analysis.

- **Green Alternative**—Once the route was further defined for Level 3 consideration and some of the potential issues were identified, extensive discussions were begun with GRIC to assess the level of concern about possible layouts within the community. A major portion of the alternative assumed the widening of the existing I-10 easement through the jurisdiction of GRIC. More refined analysis of the corridor, and coordination with GRIC cultural resources staff, indicated that the widening of I-10 would require additional Tribal land and have undesirable effects on Tribal cultural and historic resources. The introduction of a new mode, such as rail, in the I-10 corridor would also be incompatible with existing agreements between ADOT and GRIC for transportation in the corridor. The removal of the Green Alternative from the study was accepted by the GRIC Tribal Council, with the understanding that complementary transit connections to GRIC would be included as part of the preferred alternative.

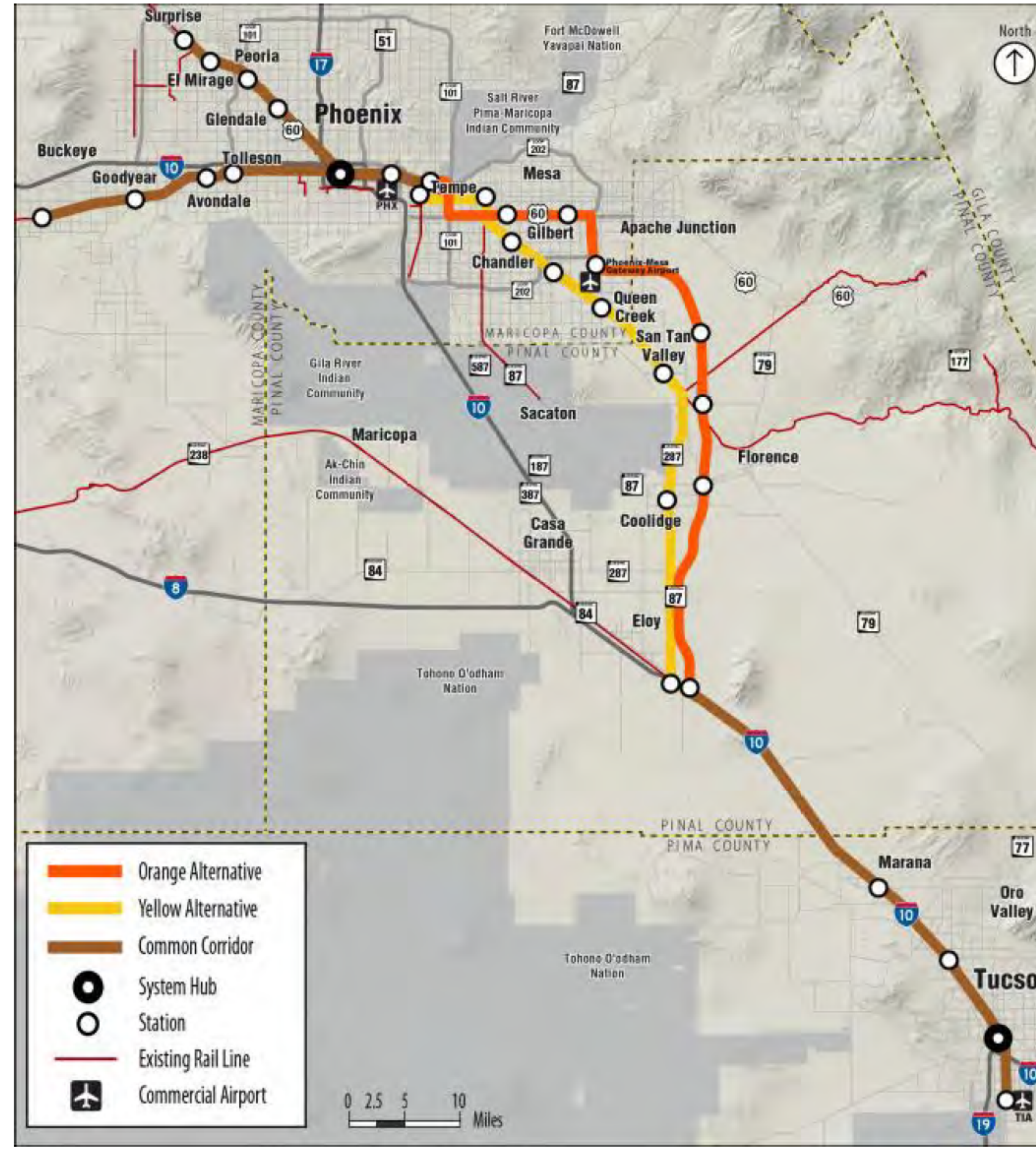
Based on this determination and ruling by the GRIC Tribal Council, only the Final Yellow and Orange Alternatives (Figure 9) were screened as part of the Level 3 Evaluation and analyzed as part of the companion Tier 1 EIS document. Table 2 shows the general measurement category scores of each alternative, summarized into an overall assessment of each alternative in terms of community acceptance and accessibility, environmental impacts, financial feasibility, ease of implementation, operating characteristics, mobility, and safety. When all measurement category scores are evaluated, the Yellow Alternative ranks higher than the Orange Alternative. The Yellow Alternative scored the highest overall because it provides access to existing population and employment centers, has lower capital and operating costs, and has fewer environmental impacts. The Orange Alternative has significantly higher costs and lower anticipated ridership. The Yellow Alternative would require close coordination with UP, but design and operations assumptions at this level would allow enough flexibility for potential conflicts to be mitigated.

Table 2—Overall Level 3 Screening Results

Criteria	Orange	Yellow
Community acceptance and accessibility	1	5
Environmental impacts	1	5
Financial feasibility	1	5
Ease of Implementation	1	5
Operating characteristics	5	1
Mobility	1	5
Safety	5	1

5 = highest ranking
1 = lowest ranking

Figure 9—Final Orange and Yellow Alternatives



Preferred Alternative

A preferred alternative was determined based on the technical analysis presented in the AA, as well as agency and public input. Based on the Level 3 Evaluation, which provided a technical overview of each Final Alternative, the Yellow Alternative was the best performing alternative overall within five of the seven evaluation categories. However, several potential historic and cultural resource issues were identified within route segments of the Yellow Alternative based on analyses performed throughout the AA and major concerns expressed by stakeholders during the agency outreach process. These resources may be subject to protection of Section 4(f)[1] of the U.S. Transportation Act which prevents impacts to these properties unless there is no prudent and feasible alternative. A determination regarding whether properties protected by Section 4(f) will be impacted by the Yellow Alternative would require a much more extensive and detailed analysis than is included in the scope of this study. Although Yellow remains the Preferred Alternative for these unresolved portions of the Corridor; the option of using the Orange Alternative in these segments has been retained as a potential prudent and feasible alternative to impacting properties protected by Section 4(f). It is important to note that the optional segments of the Orange Alternative may also have properties protected by Section 4(f) that may require extensive analysis to make a decision regarding a final alternative. The preferred Yellow Alternative, with routing options, is shown on Figure 10.

Route Options Carried Forward

Optional routings are considered as potential solutions for issues identified along the Yellow Alternative. They could be beneficial in identifying a Preferred Alternative in the Final Tier I EIS if the primary Yellow Alternative route proves to be flawed. These re-routings are presented as options based on a high-level assessment of viability and potential conflicts.

- **Tempe Option**— The locally preferred Yellow Alternative includes an optional routing through Tempe because of the potential impact on historic properties adjacent to UP tracks. The optional routing would use the portion of the Orange Alternative that follows SR 101L Pima and SR 202L Red Mountain freeway rights-of-way. It is shown as an inset on Figure 10.
- **Pinal County Option**— Figure 10 also shows a second optional routing for the Yellow Alternative in Pinal County. Should the use of UP property not be feasible, this option would potentially utilize the portion of the Orange Alternative that extends from Copper Basin Railroad along the planned multimodal North-South Corridor to I-10 as described above in the discussion of the Teal Alternative under Final Alternatives.

In consideration of the technical evaluation results, public opinion gleaned from outreach results, and preferences and concerns shared by agency stakeholders throughout the study area, the Yellow Alternative was ultimately selected as the preferred alternative of the *Arizona Passenger Rail Corridor Study—Tucson to Phoenix Alternatives Analysis*.

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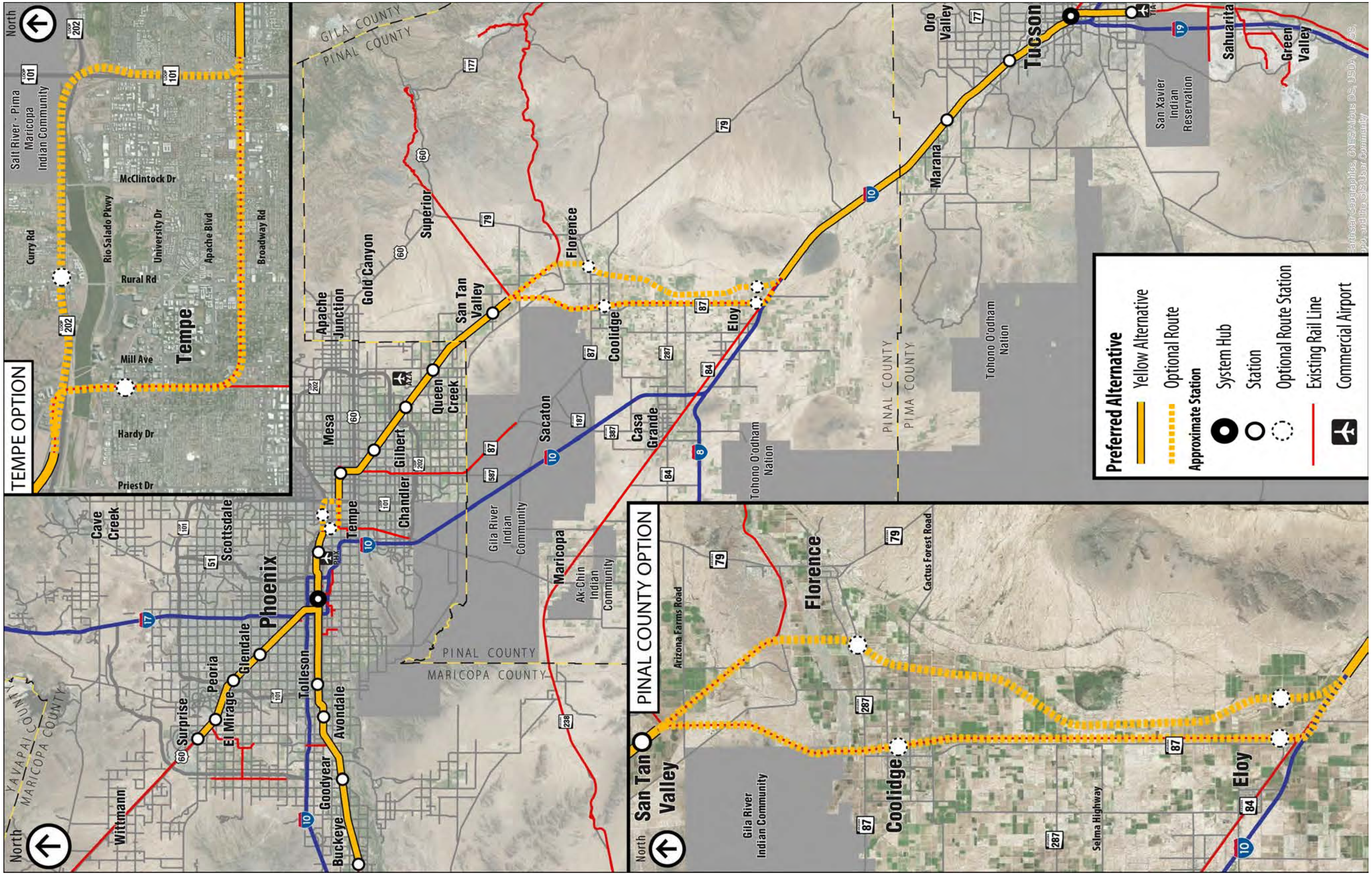
[1] Section 4(f) refers to section of U.S. Department of Transportation Act of 1966 requiring consideration of adverse impacts to park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Section 4(f) properties which could be adversely impacted by a transportation project require supplemental evaluation and must be avoided if prudent and practical alternatives exist.

Figure 10—Preferred Yellow Alternative



1.0 Introduction and Study Purpose

ADOT, in conjunction with FRA and FTA, is evaluating alternatives for high-capacity passenger service connecting the Tucson and Phoenix metropolitan areas to provide for existing and future local and regional travel demands. This AA, part of the Arizona Passenger Rail Corridor Study (APRCS), is complemented by the development of an environmental document in accordance with the National Environmental Policy Act of 1969 (NEPA), FRA procedural requirements, and FTA guidance for environmental review. In addition to this AA, the final study products will include a Tier I EIS and a Service Development Plan (SDP), which will identify the broad range of effects on the environment and a conceptual operations plan. This AA document has been prepared to address FRA, as well as FTA, requirements and will be used as a basis for the Tier I EIS and SDP.

The AA describes the project purpose, the initial range of alternatives proposed for consideration, the methodology used to evaluate the alternatives, and the results of the evaluation leading to the selection of a preferred alternative. A three-step process was used to evaluate alternatives to identify a final alternative, including preliminary service planning elements, which will be considered in the Tier I EIS and be further developed in the SDP.

The Tier I EIS is a separate document being prepared in compliance with NEPA, evaluating potential impacts of the final alternatives that have been carried forward in the screening process for detailed analysis and comparison. Ultimately, ADOT, FRA, and FTA will select one preferred alternative based on the detailed technical analysis included in the Tier I EIS and input from impacted agencies and the public.

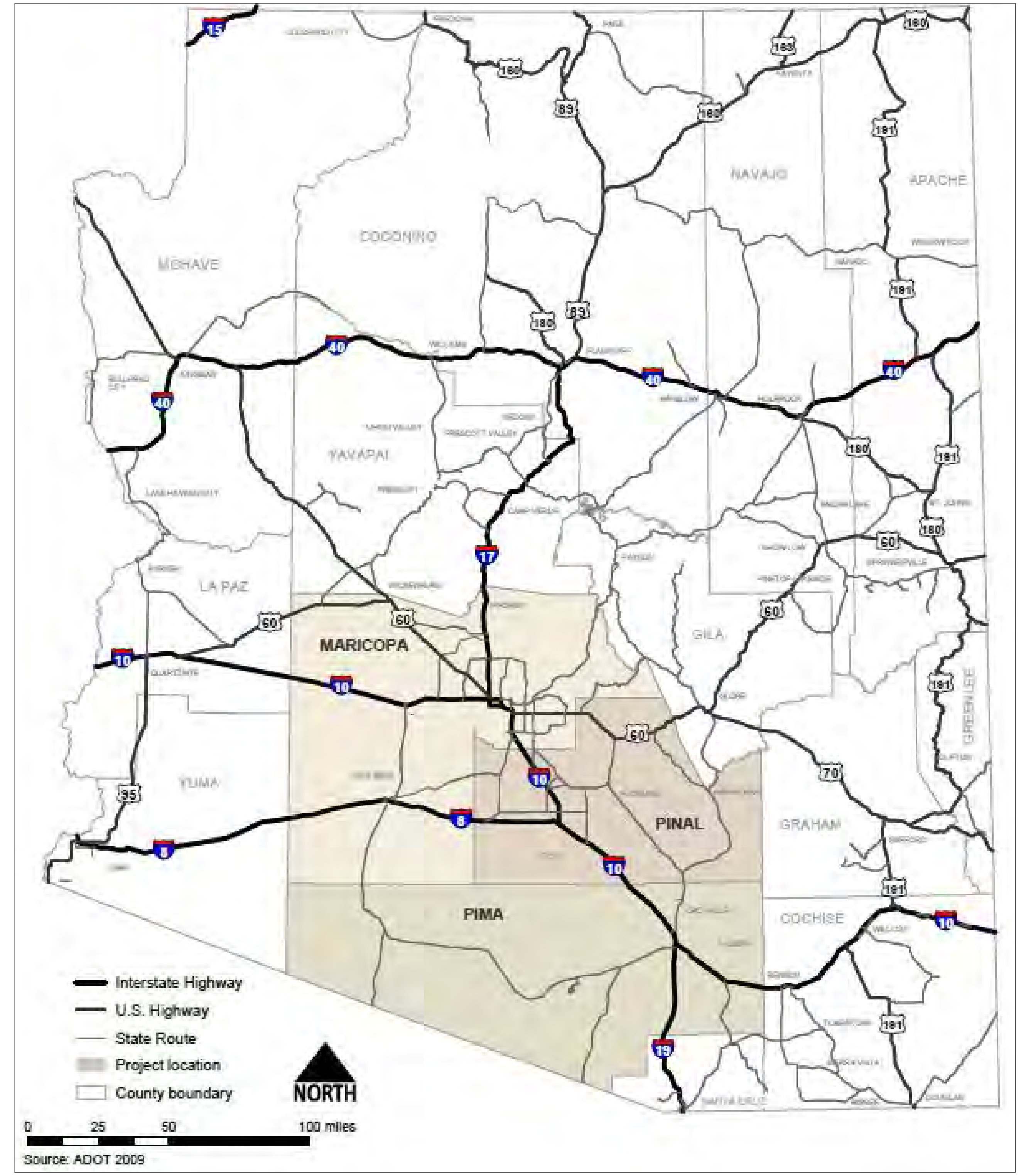
The SDP will provide a conceptual operations plan associated with the preferred alternative. The SDP will include a potential operating plan (trip patterns, schedules, etc.), capital plan (vehicles, guideway, stations, etc.), cost estimates, and ridership projections. In addition, the SDP includes implementation considerations, such as a project management plan, financial plan, maintenance plan, and risk assessment.

The final documentation of the APRCS process is intended to be a combination of reports that include the AA, the Tier I EIS, and the SDP. This approach is designed to avoid duplication of information in multiple documents that have major technical overlap.

1.1 Study Area

The APRCS corridor includes about three-quarters of the state's population, extending from the Tucson to the Phoenix metropolitan areas—the two largest metropolitan areas in Arizona. The two metropolitan areas are separated by a distance of approximately 120 miles across three counties: Pima, Pinal, and Maricopa. The study area, shown on Figure 11, is considered to be the entirety of all three counties though the focus is on the most active portions of the study area—between the two metropolitan areas, also referred to as the Sun Corridor. In the evaluation conducted in this study and documented in this AA, each route alternative evaluated was contained entirely within the study area.

Figure 11—Study Area



1.2 Goals and Objectives

The intent of the APRCS is to provide a new travel option that can provide reliable, safe, and efficient service complementing the highway program while providing access to employment opportunities and activity centers within the study area. The primary APRCS project goals and objectives are:

- **Goal 1**—Manage future congestion
  - **Objective 1.1**—Identify an alternative that will avoid or alleviate highway congestion
  - **Objective 1.2**—Add significant new capacity to the corridor above the currently programmed highway construction program
- **Goal 2**—Provide an alternative mode of travel
  - **Objective 2.1**—Develop transportation system options that offer an alternative to the current single-mode travel option
  - **Objective 2.2**—Reduce the impact of transportation improvements on the built and natural environments
- **Goal 3**—Provide a reliable mode of travel
  - **Objective 3.1**—Identify an option that provides a more reliable alternative to current transportation mode
  - **Objective 3.2**—Identify a travel option that can operate on a published, predictable, and reliable schedule
- **Goal 4**—Provide a safe mode of travel
  - **Objective 4.1**—Reduce overall exposure to highway collisions in the corridor
  - **Objective 4.2**—Minimize the effects of weather, such as dust storms, on travel within the corridor
- **Goal 5**—Provide a fast and efficient mode of travel
  - **Objective 5.1**—Establish a balance between speed and access, but ensure a competitive travel time with the automobile
- **Goal 6**—Provide a mode that will support future travel needs
  - **Objective 6.1**—Provide access and mobility to existing and emerging communities within the corridor
  - **Objective 6.2**—Identify the specific requirements of commuter versus intercity travel and develop plans to meet both
  - **Objective 6.3**—Establish compatibility with future regional plans for travel to neighboring states and metropolitan areas

These goals and objectives served as a basis for developing the Purpose and Need required under NEPA in preparing the environmental documentation for the project. They also influenced the evaluation methodology used in developing the alternatives in this AA.

1.3 Purpose and Need

1.3.1 Study Background

The State of Arizona has completed a number of studies in recent years to better understand and address the demands of its rapidly growing population and the associated demands on the State's transportation system. Statewide efforts, such as bqAZ, the State Rail Plan, and regional efforts such as the *Maricopa Association of Government (MAG) Commuter Rail System Study*, *Pima Association of Governments (PAG) 2040 Regional Transportation Plan* (RTP), and *Pinal County Comprehensive Plan* provide a foundation for a multimodal and sustainable transportation future. The development of these plans, and others, engaged the entire state in identifying transportation needs. They all contribute to identifying solutions for the anticipated demand and the best ways to meet those needs. The APRCS builds on these previous plans and proposes mobility concepts to create and evaluate commuter and intercity opportunities in the Sun Corridor, which is the first step toward the implementation of these plans.

The study corridor has been assessed on a number of occasions. The results are consistently focused on the need for increased capacity and alternative modes to support anticipated changes within the corridor. Previous and concurrent studies, performed by ADOT and other agencies within the study area, identified the planned growth and need for additional transportation facilities and evaluated or recommended specific transportation solutions. The relevant studies are listed with key elements highlighted in Table 3, and represent the basis for the preliminary work performed on the APRCS. The timeline of these studies indicates the long history of growth and transportation facility planning within the area, directly leading to the APRCS study.

Figure 12—Previous Statewide Studies

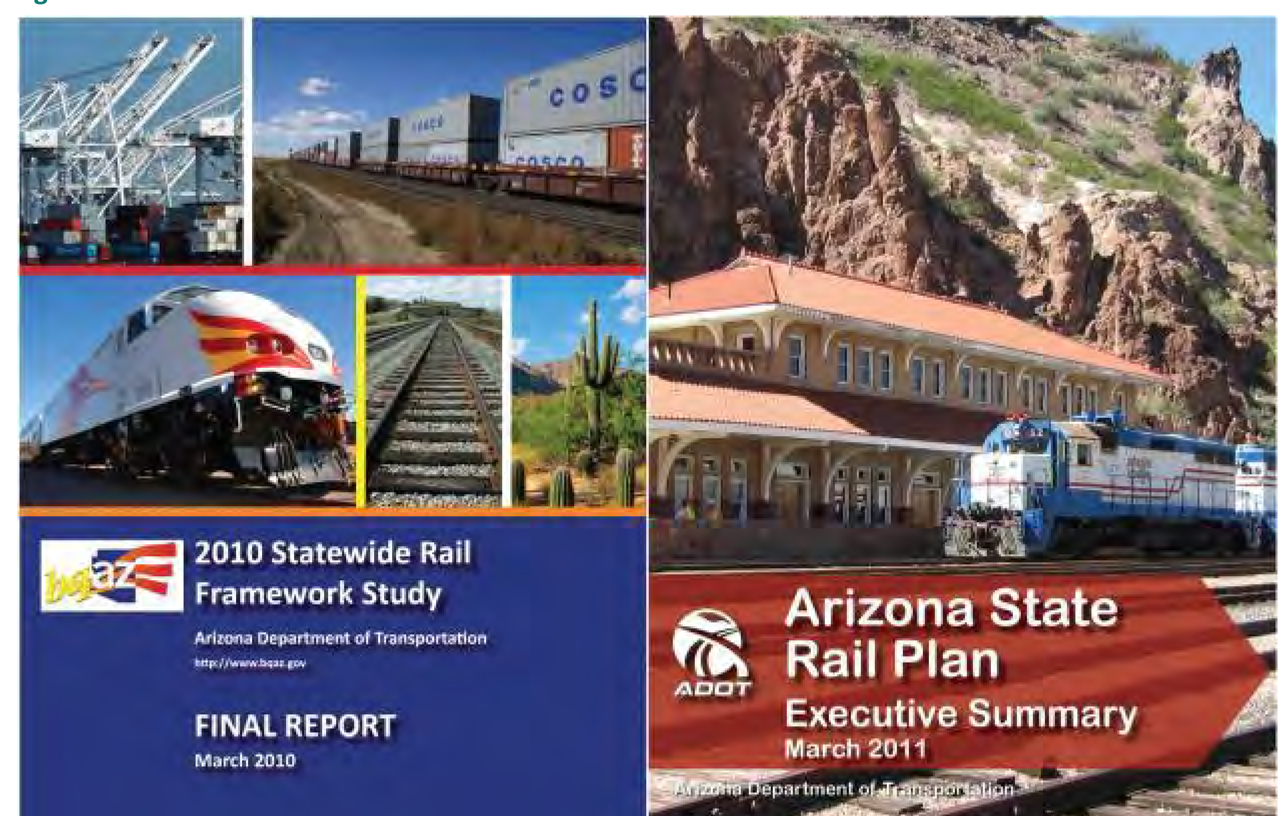
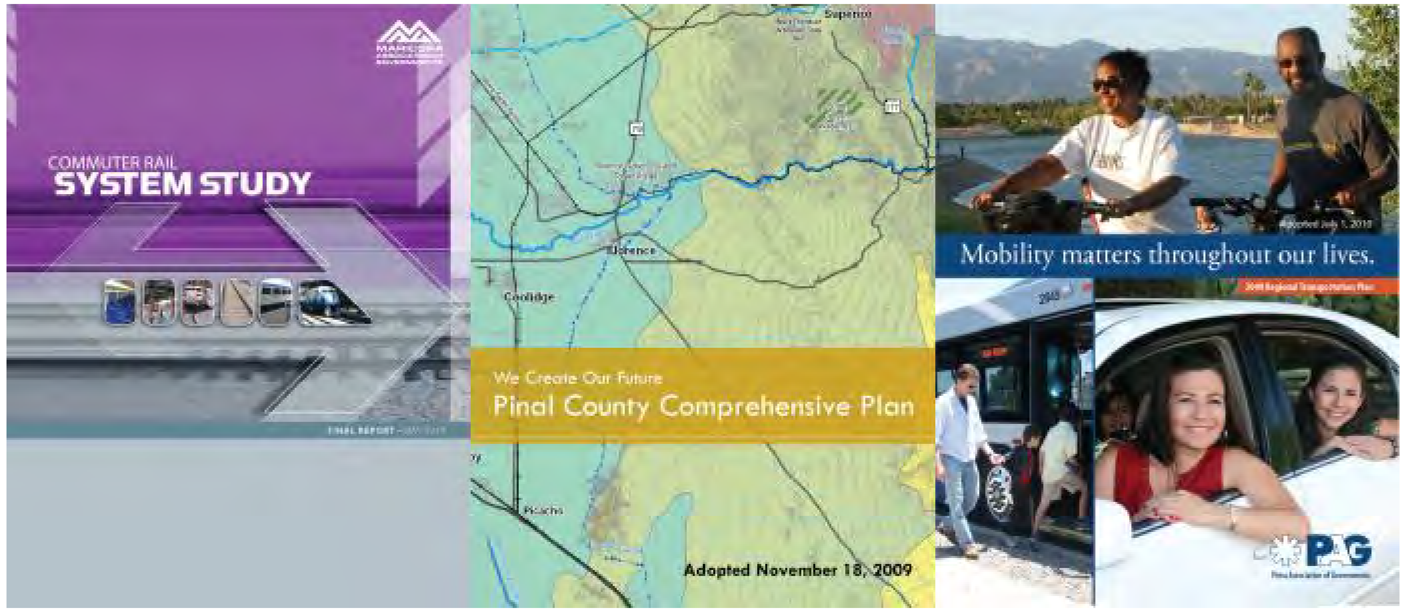


Table 3—Relevant Projects

Year	Project	Relevance
2003	*MAG High Capacity Transit Study*	This study recommended an integrated system of high-capacity transit corridors providing efficient and convenient travel throughout the MAG region. This long-range study considered projected travel demand in the MAG region to 2040, when the population was expected to exceed 7 million residents. The study focused on commuter rail, bus rapid transit (BRT), and light rail transit (LRT), ultimately recommending commuter rail connections from Phoenix to Surprise, Buckeye, and Queen Creek, including a connection to Phoenix-Mesa Gateway Airport and a BRT/LRT alignment in the City of Chandler.
2006	*Pinal County Corridor Definition Study*	This study expanded on recommendations of the Southeast Maricopa/Northern Pinal County Transportation Study. The study had two components—the East Valley Corridor and the Apache Junction/Coolidge Corridor. The East Valley Corridor could parallel or overlap Hunt Highway along the southern boundary of Maricopa County, and extend from I-10 to US 60 in Pinal County. The Apache Junction/Coolidge Corridor begins at I-10 south of Coolidge and could follow SR 87 north to US 60. The study identified a north-south corridor connecting I-10 with US 60, approximately 36 miles in length, which will provide an alternative to I-10 in the future.
	Superstition Vistas Scenarios Report	This was the result of a visioning process for a 275-square-mile tract of State Trust Land in north-central Pinal County. The report outlined three feasible alternative futures for the area, with the end goal of the project to establish a master plan for future development, including the identification of activity centers and future transportation corridors.
2007	*Pinal County Comprehensive Plan Smart Growth Concept and Open Space & Trails Master Plan*	To position Pinal County as a leader in environmental stewardship, the Plan places high emphasis on intergovernmental and interagency collaboration for promoting sustainable practices. Examples include innovative land use planning, sustainable agriculture, open space preservation, water conservation, green building development, and the use of renewable and alternative energy resources. The vision laid out in the plan addresses many important elements that should be applied to the entire Sun Corridor outside Pinal County. For example, the region as a whole would benefit from coordinating with public and private partners to create viable economic development centers, directing development toward communities with existing infrastructure and resources and conserving open space and natural resources on the urban fringe.
2008	*MAG Commuter Rail Strategic Plan*	This plan provides a framework for how commuter rail could be implemented throughout the MAG region and in northern Pinal County. The study area was separated into five "subareas" that are focused on and around existing rail lines. A large amount of the employment growth is occurring or will occur in the central business district (CBD) of Phoenix, resulting in the need for commuters to travel to the CBD from outlying communities, with existing roadway capacity unable to serve future demand without substantial improvements. The Plan examines how commuter rail can serve these growing outlying communities operating on existing freight railroad lines and future extensions. Recommendations from this study were a stepping stone for the *2010 Commuter Rail System Study*.
2009	*MAG Regional Transit Framework*	This study identified regional public transportation needs for Maricopa County through to year 2030. Transit service and capital investment concepts presented in the study were derived from a comprehensive analysis of regional transit needs and deficiencies. The three alternative transit scenarios, which include new or expanded bus service, high-capacity transit all-day (e.g., LRT and BRT) and high-capacity transit peak-period (e.g. commuter rail, dedicated guideway BRT), were developed to meet different transit system objectives and financial constraints.
2010	*MAG Commuter Rail System Study*	This study provided a detailed evaluation of the recommendations from the 2008 *Commuter Rail System Plan* for a system of commuter rail corridors that extend from downtown Phoenix to the northwest, west, and south/southeast within the MAG region and northern Pinal County. This study addresses the increasing future travel demand and provides options for a faster and more reliable travel alternative to downtown Phoenix. The study found that the most viable commuter rail network yielding the highest ridership would be connecting the southeast valley and the northwest valley through downtown Phoenix.
2010	*ADOT Building a Quality Arizona—Statewide Transportation Planning Framework*	This was a long-term, statewide transportation plan to establish a long-range vision considering all surface modes on equal footing; to include city, county, and state systems; and to fully integrate principles of Smart Growth, environmental stewardship, responsible economic growth, and tribal participation. A series of alternative future transportation scenarios was formulated, evaluated, and prioritized to create a statewide comprehensive multimodal recommendation. The recommended framework is a 40-year vision for the future, not only including a series of multimodal transportation improvements, but also policies and programs to support climate change mitigation, responsible urban form, environmental stewardship, economic vitality, and safety and security.
2010	*PAG Regional Transportation Plan*	This plan addresses transportation needs within the PAG planning area, including public transportation, special services, and a potential high-speed rail system through the Sun Corridor. The primary goal of the RTP was to prioritize public transportation investments. Examples of current and future transportation planning efforts intended to maintain and improve the current public transportation system included: ▪ *Regional Comprehensive Transit Operations Analysis Study*—Conduct a comprehensive operations analysis study of the entire regional transit system every five years. ▪ *Sun Trans Bus and Support Vehicle Replacements*—Purchase 15 buses every year and replace support vehicles as needed. ▪ *Transit Center Updates*—Rehabilitate and update existing regional transit centers, including ITS upgrades, building repairs, bus circulation, and access repairs and general cosmetic improvements. ▪ *Paratransit Service Expansion*—Expand paratransit services to serve more clients over a greater geographic area. Rail from Tucson to Phoenix was the most supported project by the public during the development of the RTP.
2011	*ADOT I-10 Corridor Study, Design Concept Report (DCR) and Environmental Assessment (EA)—Junction I-8 to Tangerine Road*	The purpose of this study is to prepare a DCR and long-range implementation plan for I-10 from the junction with I-8 to Tangerine Road to accommodate projected travel demands, provide an acceptable level of service, and address access and geometric deficiencies in the project corridor. The proposed project will increase the roadway capacity and improve operational efficiency of this portion of I-10 by providing a 10-lane divided interstate highway, with continuous parallel one-way frontage roads, and reconstruction or relocation of the existing traffic interchanges. The proposed project also includes the development of a new traffic interchange at Selma Highway and provision for the future development of new traffic interchanges by entities other than ADOT should conditions warrant.
2011	*ADOT Arizona State Rail Plan*	This plan included several statewide goals and objectives for rail, which consist of: ▪ Improving mobility and accessibility ▪ Supporting economic growth ▪ Promoting sustainable transportation and land use coordination ▪ Preserving the environment and natural and cultural resources ▪ Providing safety and security The plan recommends the exploration of four rail corridor strategies, including: ▪ *Arizona Spine*—A north-to-south corridor through the central part of the state which focuses on passenger rail opportunities. ▪ *CANAMEX*—A corridor which spans from Las Vegas to the Mexican border that focuses on establishing a Southwestern High Speed Rail Network. ▪ *Route 66*—An east-to-west corridor that contains the BNSF Transcon Corridor and I-40. This corridor focus is on network enhancement to move people and freight within northern Arizona and across the country. ▪ *Sunset*—An east to west corridor containing the Union Pacific Sunset Corridor, I-8, and I-10. This corridor focus is also on network enhancements to move people and freight within southern Arizona and across the country.
2012	*MAG Sustainable Transportation and Land Use Integration Study*	This study examined transit investment concepts in the MAG region to advance sustainable transportation in ways that reflect market reality, recognize the high cost of high-capacity transit, and are consistent with the values and aspirations of member communities. The study established examples of a range of transit supportive "place types" that could be used as guidance in future planning efforts—compact walkable, transit served, and high-capacity transit oriented. Study recommendations identified strategies to improve transportation mobility through increased transit ridership and to enhance economic opportunities through public and private investments around transit station areas.
Ongoing	*ADOT North-South Corridor Study EIS/DCR*	ADOT and the Federal Highway Administration, as the lead federal agency, have initiated an environmental impact statement (EIS) and DCR to identify a transportation corridor to connect US 60 and I-10. The proposed North-South Corridor Study area begins at US 60, in the vicinity of Apache Junction, and extends south for approximately 45 miles to connect to I-10, in the vicinity of Eloy and Picacho in Pinal County. By January 2011, the study team divided the study area into 16 segments with the intent of developing potential alignments that would support multimodal transportation options. As the alignments are developed, documentation of existing environmental conditions and potential impacts from the introduction of a new transportation facility will be compiled for agency and public comment in the Draft EIS.

Figure 13—Previous Regional Studies



1.3.2 Scoping, Public, and Agency Outreach

For this study, project scoping was conducted early in the analysis to help define project need. The process provided opportunities for all interested parties to share their views and the opportunity for the study team to refine its focus to specifically address the needs and expectations of the Sun Corridor. In addition to the extensive scoping outreach conducted, two phases of public participation, which included extensive communication with stakeholders and the public throughout the corridor, were held during the preparation of the AA and leading to the identification of the alternatives to be analyzed in the Draft Tier I EIS. The outreach programs were held in fall of 2012 and spring of 2014 at public venues in conjunction with scheduled events in communities within the corridor.

Figure 14—Public Outreach

Corridor-wide community status updates were held at public events and with public and environmental resource agency staffs as the alternatives were refined and less effective options were eliminated. Since March 2011, over 10,000 project preference surveys have been completed by members of the public, both in person and through the project website. These have led to a better understanding of what individuals within the corridor communities believe is important and which alternatives best meet those expectations.

The study team received comments from a wide range of interested parties, including public agencies, tribal communities, community leaders, businesses, residents, employees, and students in a dialogue about transportation options that has been unfolding for decades. Building on input received during the development of bqAZ and the *What Moves You Arizona - Long-Range Transportation Plan* (LRTP), ADOT has consistently heard that its customers view public transportation options as a need and priority. Scoping participants expressed a desire for both commuter and intercity service. In both agency and public scoping, many participants independently suggested interlining intercity and commuter service to utilize one corridor with different operating characteristics.

Government agencies that have an interest in the study have been actively engaged. These agencies were sent scoping information and requests to become participating and cooperating agencies during the process. Feedback was solicited from the following through direct contact:

- Elected officials
- Governmental agencies and stakeholders
- Interested organizations
- Community groups

As part of the study process, three Corridor Support Team (CST) meetings were held at key points to gain input from stakeholders and help guide the study. These meetings provided opportunity for participating agencies to provide input into the study process.

1.3.3 Need

Between 1990 and 2010, the combined population of Maricopa, Pima, and Pinal Counties increased by over 78 percent, from 2.9 million to nearly 5.2 million, with an over 61-percent increase between 1991 and 2010 in the number of nonfarm jobs. This three-county study area forms part of a clustered network of cities—a “mega-region”—known informally as the “Sun Corridor.” A look at travel patterns, available transit services, and trip times shows that the need to move people from one place to another is also growing. Based on population and travel forecasts, and the amount of available open land within the corridor, travel markets are expected to continue to grow in the future; however, opportunities to increase the carrying capacity of the region’s roadway network are limited.

Figure 15—Suburban Growth, Phoenix Metropolitan Area

The Phoenix and Tucson metropolitan areas will continue to be major population and employment centers within the region. Most of Arizona’s developable land is situated between these cities, and development of this area is projected to form a continuous urban corridor connecting the metropolitan areas. With Arizona on a steady economic upswing after experiencing a downturn in the second half of the last decade, the increasing development in the corridor will contribute to a need for increased commuter and intercity mobility within the corridor, which will have to be addressed.

Travel between Tucson and Phoenix currently takes place almost entirely on I-10, the only high-capacity freeway between the two cities. Travel along this highway is affected by increasing congestion. Based on forecasts from studies conducted within this corridor, even a planned widening of the existing I-10 freeway to 10 lanes not provide adequate capacity to meet the expected demand. In addition, the construction of a new planned freeway as part of the *ADOT North-South Corridor Study* is also not anticipated to substantially reduce future congestion. As western Pinal County continues to be developed, traffic congestion on area highways will cause an increase in travel times within the study area.

Available transportation choices between Phoenix and Tucson are currently limited to private automobile, common carrier (bus), commercial flights, and ridesharing, with most travelers—commuter, regional, and intercity—using I-10. Despite recent widening of sections of the freeway within the study area, I-10 experiences severe congestion and increasing frequency and duration of traffic jams.

The I-10 corridor between Tucson and Phoenix experiences seasonal dust storms. In recent years, some of these storms have impaired roadway visibility beyond the limits of safe travel, resulting in traffic shutdowns, multivehicle accidents, and fatalities on numerous occasions. The growing demand placed on I-10 as the primary intercity route in the corridor—and the resulting congestion—will increase the likelihood of traffic collisions, which will further reduce the overall effectiveness and reliability of I-10 to serve commuter and intercity travel needs.

Increasing capacity by adding lanes to this highway cannot be done in some sections due to limited rights-of-way, and adding lanes may not be the best solution to address the anticipated demand. An alternative transportation mode, such as passenger rail, could help meet the demand of existing and future travel markets by providing additional transportation capacity that would help serve the increasing travel demand and not be affected by unpredictable highway conditions.

Given the current travel demand and projected growth, there is a clearly demonstrated need in the corridor for major transportation improvements to address existing and anticipated unpredictability and inefficiency in the transportation system as well as limitations in modal choice of travel and future system capacity deficiencies. Specifically, as the region evolves, there will be explicit and overlapping commuter and intercity needs as defined below.

Figure 16—Dust Storm on I-10

Source: Arizona Republic

- **Commuter need**—Demand for commuter services, where most travelers make same-day round trips, exists within the Phoenix and Tucson metro areas. Demand is expected to grow in the future, as population growth in the service area is projected to remain high over the next few decades. The average journey to work within the study area has grown longer as residential development has spread from the major cities to outlying areas and as population growth has increased traffic congestion. As development in Pinal County proceeds, commuter activity will continue to expand in the areas between Phoenix and Tucson, with major daily commutes taking place between Pinal County and neighboring Maricopa and Pima Counties.
- **Intercity need**—Travel between cities in the Sun Corridor for non-work purposes also accounts for many trips. As population and travel demand grow, intercity travel by auto and air will suffer from increasing congestion and time delays—especially in metropolitan areas, at and around airports, and on weekends and holidays. This decline in transportation service and the quality of the travel experience adversely affects intercity travelers, other users of the system, commercial carriers, and the general public.
- **Commuter and intercity common need**—During the scoping process, respondents expressed a desire for both commuter and intercity service. In both agency and public scoping, many participants independently suggested co-locating intercity and commuter service (express and local) to utilize one corridor with multiple operating plans.

1.3.4 Purpose

This project focuses on intercity and commuter mobility between the Tucson and Phoenix metropolitan areas, generally referred to as the Sun Corridor, which includes Pima, Pinal, and Maricopa Counties. The purpose of the project is to examine various means of implementing a high-capacity facility that would serve both intercity and commuter needs together. The project purpose is to:

- Investigate ways to reduce the rate of growth in congestion and divert highway trips within the Tucson-to-Phoenix travel corridor
- Increase access to existing and planned employment and activity centers within the three-county study area
- Provide reliable travel times and safe travel within an increasingly congested region that currently affords few transportation alternatives to the private automobile
- Recommend a viable route and travel mode to connect the suburban and rural areas between Tucson and Phoenix
- Facilitate continued development of a comprehensive, multimodal, and interconnected regional and multiregional transportation network that provides mobility choices for existing and future needs and allows connectivity to systems beyond the Tucson-to- Phoenix corridor

The project purpose was formulated with support from participants in the public and agency scoping meetings, with particular emphasis on improving mobility and regional connectivity throughout Arizona and the Western U.S. There was a demonstrated understanding among the scoping participants that providing transportation options and improving mobility throughout the study area as the area grows will benefit economic development of the region.

1.3.5 Population and Employment Estimate

By 2035, the area between Tucson and Phoenix will be characterized by dense employment and population centers in and around the Tucson and Phoenix metropolitan areas and substantial population and employment centers throughout Pinal County. Forecast population and employment changes in the Sun Corridor are presented in Table 4 and Table 5.

Table 4—Estimated Population Change

County	2010 Population	2035 Population	% Change
Pima	956,000	1,277,000	+ 40%
Pinal	349,700	729,000	+ 108%
Maricopa	3,760,000	5,680,000	+ 51%

Sources: State of Arizona Office of Employment and Population Statistics

Table 5—Estimated Employment Change

County	2010 Employment	2035 Employment	% Change
Pima	337,000	472,600	+ 40%
Pinal	52,000	244,000	+ 371%
Maricopa	1,598,000	2,637,000	+ 65%

Sources: ADOT Risk Analysis Process growth rates, MPO growth forecasts

1.3.6 Current Transportation Modes

The only transportation modes available for travel between Tucson and Phoenix are private auto, common carrier bus, air service, and ridesharing. The majority of commuter, regional, and intercity travel utilizes I-10, the only major roadway connecting the two metropolitan areas. Private auto is the most commonly used mode of travel.

1.3.7 Mobility and Travel Time

Mobility between the Tucson and Phoenix metropolitan areas is negatively impacted by growing congestion within the I-10 corridor. Despite recent widening of sections of I-10 in the study area, increasing durations of severe congestion occur frequently and are expected to worsen as the population and employment in the corridor grow. Future expansion of I-10 and the construction of the potential North-South corridor are expected to be insufficient to accommodate forecasted travel demand in the corridor based on travel projections. The proposed North-South freeway is currently under study by ADOT, and would connect Apache Junction to Eloy in central Pinal County (Figure 17). The duration of a trip from Tucson to Phoenix—which now takes approximately 113 minutes in a private auto under free-flow conditions—would increase to over 142 minutes in 2035 and 180 minutes by 2050.[2] Scoping comments indicated general concern about mobility within the corridor, primarily focusing on reliability, safety, and overall travel time as the travel demand increases.

Figure 17—North-South Corridor Study Area

1.3.8 Intercity and Commuter Demand

With the increase in population and employment throughout the region, the intercity and commuter travel demand between the Tucson and Phoenix metropolitan areas is anticipated to grow significantly. Twenty- two percent of the daily vehicle traffic on I-10 and SR 79 is by travelers who complete a commute-type trip, with the same vehicle coming in at a given location and going out at the same location.[3] From 2006 to 2008, daily inter-county commute trips within the three counties exceeded 75,000, as detailed in Table 6.[4]

Table 6—Estimated Daily Inter- and Intra-county Commute Trips

From	To	# Inter-county Commute Trips	% Inter-county Commute Trips
Pima	Pinal	1,810	2%
Pinal	Pima	3,740	5%
Pima	Maricopa	2,260	3%
Maricopa	Pima	2,980	4%
Pinal	Maricopa	51,625	68%
Maricopa	Pinal	13,265	18%
From	**To**	**# Intra-county Commute Trips**	
NW Maricopa	Phoenix CBD	22,473	
NE Maricopa	Phoenix CBD	64,249	
SE Maricopa	Phoenix CBD	180,242	
SW Maricopa	Phoenix CBD	16,660	
North Pima County	Tucson CBD	31,034	
South Pima County	Tucson CBD	19,467	

Source: Census Transportation Planning Package 2006-2010 (CTPP)

As the Sun Corridor grows and Pinal County reaches its build-out (expected to be around 2050), commuter activity will increase, with significant trip interchanges between Pinal and Maricopa and between Pima and Pinal Counties. Travel markets that will need to be served by commuter services will include:

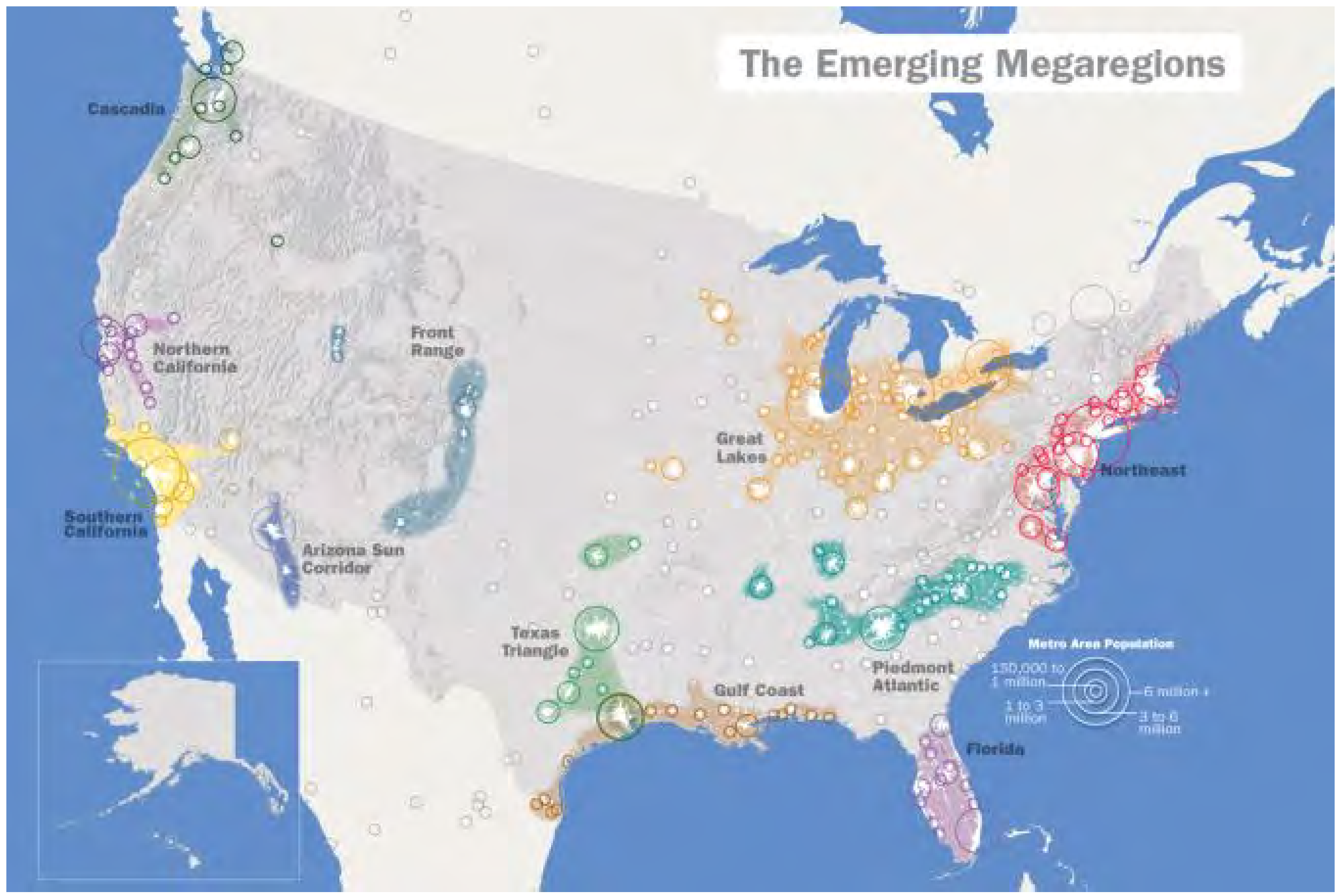
- Phoenix and suburban communities extending into Pinal County
- Tucson and suburban communities extending into Pinal County
- Activity centers in Pinal County and the Phoenix metropolitan area
- Activity centers in Pinal County and the Tucson metropolitan area

2 The future condition assumes I-10 has been fully widened to ten lanes and the North-South Corridor is built linking Apache Junction to I-10 through central Pinal County. Source: Arizona-Travel Demand Model, version 2 (AZTDM2)
3 MAG and PAG photo license plate survey of highway vehicles (automobiles, trucks, etc.), 2008
4 Census Transportation Planning Package 2006-2008 (CTPP)

Travel between cities in the Sun Corridor mega region (Figure 18) accounts for many trips. As population and travel demand grow, intercity travel by auto and air will suffer from increasing congestion and time delays—especially in metropolitan areas, at and around airports, and on weekends and holidays. This decline in transportation service and the quality of the travel experience adversely affects intercity travelers, other users of the system, commercial carriers, and the general public.

Effectively, the entire corridor under study will ultimately need to address both commuter and intercity needs, which will require a hybrid service involving both local and express travel options.

Figure 18—U.S. Emerging Megaregions



2.0 Alternatives Analysis Methodology

The APRCS used a three-level process to formulate, evaluate, and refine the potential mode, routing, and system hub and station locations within the Tucson-to-Phoenix corridor. Each step in the process was more increasingly comprehensive, refining the evaluation criteria to assess each remaining alternative at a higher level of detail than the previous step. This section describes the process used to develop and evaluate alternatives.

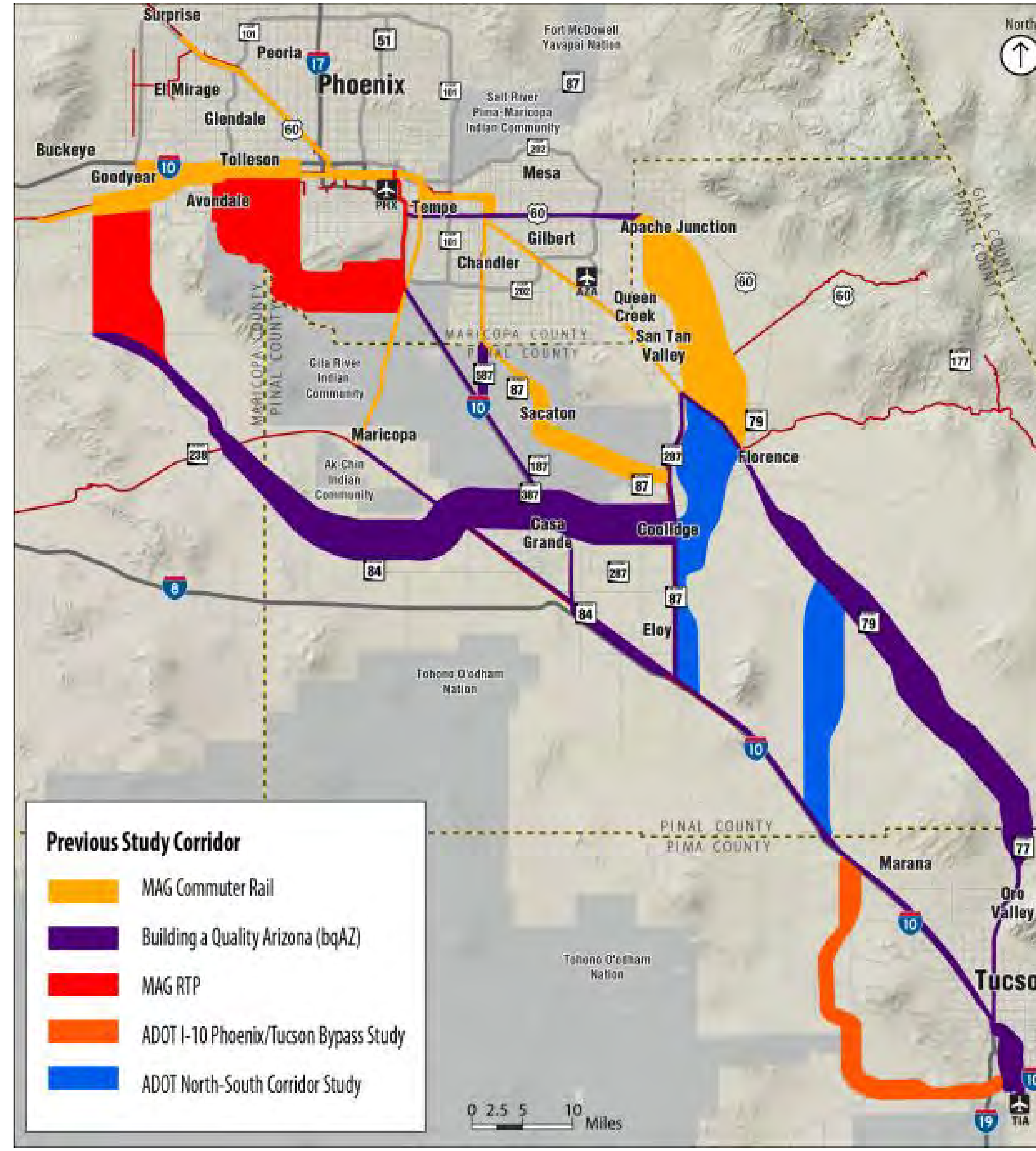
2.1 Evaluation Methodology

The evaluation methodology and criteria used in the three-level analysis were developed to be compatible with typical FRA and FTA evaluation methodology requirements. The process for an FRA Tier 1 EIS includes assessing beneficial and adverse environmental effects associated with a reasonable range of alternatives. The methodology and criteria for the FTA AA process require analyzing reasonable and promising alternatives based on a range of measures designed to understand each alternative's financial feasibility and potential fatal flaws. The three levels of evaluation and criteria used in the APRCS were designed to compare alternatives using a common yardstick and advance the most feasible alternatives for further study at the next level, consistent with the objectives of the FRA Tier 1 EIS and FTA AA processes.

2.1.1 Prior Studies

Routings evaluated in this study were based on efforts of the previous studies, detailed in Section 1.3.1, which include statewide transportation plans by ADOT, major corridor studies, transit studies and regional transportation programs of MAG, PAG, and Pinal County. The potential routes identified in prior studies, shown on Figure 19, included the use of existing and planned transportation corridors.

Figure 19—Corridors Identified in Prior Studies

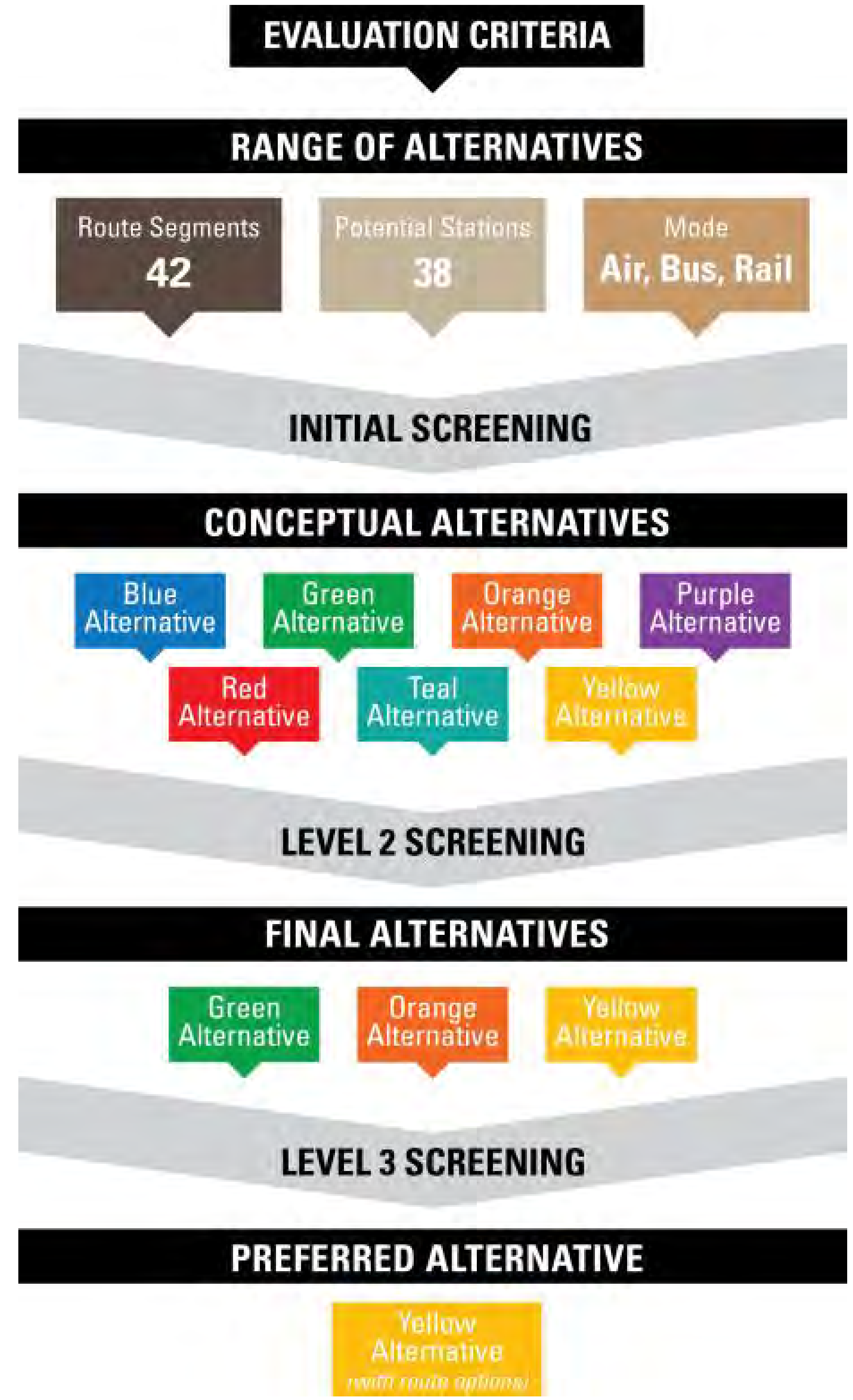


2.1.2 Three-Level Technical Evaluation

The three-level evaluation used to screen the alternatives consisted of an Initial Screening, Level 2 Evaluation, and Level 3 Evaluation, as described in detail below and illustrated on Figure 20.

- **Initial Screening**—The first level of evaluation was designed to identify a viable list of Conceptual Alternatives from the initial range or universe of choices, which are based on the previous study corridors presented on Figure 19. This step was intended to include the broad array of possibilities to connect Tucson and Phoenix. The intent was to address all reasonable alternatives for the preferred alternative. At this level, the analysis included evaluating the individual components that make up the alternatives—corridor/route segments, system hub locations, and modal options. The alternatives were screened based on the presence of fatal flaws, which for the purposes of this study were considered any major conflict to the development of an alternative that would eliminate that alternative as a viable option. In addition, alternatives were also evaluated using high level technical criteria defined in this and past studies, input from scoping, and commonly accepted industry practices for assessing transportation options.
- **Level 2 Evaluation**—The Initial Screening resulted in the selection of seven Conceptual Alternatives. The second level of evaluation consisted of screening each Conceptual Alternative advanced from the Initial Screening based on a prescribed set of evaluation criteria. Each complete Conceptual Alternative consisted of several elements, including a corridor routing, potential station locations, and basic operating assumptions. The alternatives were evaluated based on more refined criteria and applied within a more confined corridor to narrow choices within the context of a potential alignment. This step resulted in a set of Final Alternatives. These are the alternatives reviewed in the Tier I EIS.
- **Level 3 Evaluation**—The Preferred Alternative will be selected from the Final Alternatives identified in the Level 2 Evaluation. The higher level of detail at this level was developed to ensure a more comprehensive identification of impacts, opportunities, costs, travel demand, and preliminary operating characteristics for each alternative so they present an in-depth understanding of the effects of the project under NEPA requirements for the Tier 1 EIS.

Figure 20—Evaluation Process



2.1.3 Analysis Categories

Six evaluation categories, defined below, were identified based on technical assessment requirements and preferences and priorities indicated by the public and agencies during the scoping process. These were used across the three levels of evaluation, within which progressively more detailed criteria were applied over the course of the evaluation process.

- **Community acceptance and accessibility**—Compatibility of an alternative with local development plans and public response, compatibility with underlying property ownership, station area transit-supportive urban design potential, and populations served
- **Environment**—Effect of the project alternative on the environment, including the effect on sensitive species or habitat, cultural resources, and air quality
- **Financial feasibility**—Cost to build and operate the alternative, cost effectiveness, rights-of-way, operating costs, and ease of implementation
- **Operating characteristics**—High-level assessment of the anticipated reliability, predictability, and dependability of a corridor depending on other transportation modes or weather conditions
- **Mobility**—Ridership potential, multimodal connectivity, and overall travel time and travel performance within the corridor.
- **Safety**—A valuation of the anticipated safety of each alternative based on possible automobile conflict points and each alternative's potential ability to decrease automobile related fatalities

Each of these categories was used throughout the AA in evaluating each alternative, with progressively more detailed criteria as the alternatives become more refined. For the third and final Level 3 Evaluation, the "ease of implementation" criterion is considered as a separate measurement category. This determination was made since Level 3 represents the final alternative screening prior to determination of the preferred alternative and the ease of the eventual implementation of the preferred alternative holds greater significance at that stage of evaluation.

2.1.4 Public and Agency Outreach

A robust public and agency outreach program was conducted concurrently to the technical evaluation of corridor alternatives. This effort included extensive project scoping, as well as two additional outreach phases to help develop and refine the range of alternatives and to inform technical analyses and decisions leading to a preferred alternative.

- **Project and agency scoping**—Input during the initial phases of the study was obtained during three CST workshops attended by representatives from agencies within the study area in summer 2011, twelve public scoping events held throughout the study area in fall 2011, and comments submitted through the ADOT project website (www.azdot.gov/passengerrail). Information gathered during the scoping process helped to define the project purpose and need, to supplement and refine possible routes included in the range of alternatives, and to help develop appropriate evaluation measures to be used in project analyses. The process confirmed passenger rail as the preferred travel mode to evaluate as part of the study and also identified significant suggestions and concerns from public comments that would be reflected in technical analyses. Agency partners offered opinions on possible route, station, and service options. Major themes from public comments included the desire for a blended rail system that would offer both commuter and intercity service. Project and agency scoping results are discussed further in Section 3.1.4, and documented in detail as part of the *APRCS Scoping Report (April 2012)*.
- **Level 2 public and agency outreach**—The second phase of project outreach sought input from the public and agency partners on the seven Conceptual Alternatives evaluated during the Level 2 Evaluation. Project team members solicited public feedback and distributed project surveys at an information booth at 16 scheduled events and festivals in fall 2012. In addition, media updates were released, and a two-minute informational video and electronic survey was posted on the project website, resulting in over 3,000 completed surveys during the comment period. Respondents reflected their preference among Conceptual Alternative routes and prioritized the balance between travel time, access to population centers, and financial feasibility. The project team also met individually with each affected agency partner within the study area, who in general voiced support for the project, indicated preferred alternatives, and echoed public sentiments for alternative service to population centers and financial feasibility. The project team consisted of ADOT and consultant project staff. Level 2 public and agency outreach results, including preference among Conceptual Alternatives, are summarized in Sections 3.2.4 and 3.2.5 respectively.

Figure 21—Corridor Support Team Workshop

- **Level 3 public and agency outreach**—The third and final phase of outreach focused on the three Final Alternatives. Engagement methods were similar to those used in Level 2, including team members distributing information at over 15 community events and festivals in spring 2014, and a sophisticated survey tool distributed in paper and online versions that asked the public to prioritize the Final Alternatives based on respondents' typical origins, destinations, and desired service attributes. Over 5,085 surveys were received during the outreach process. Affected agencies were again met with individually during this round of outreach, with the emphasis on specific local needs and opportunities. City staff and several city councils and committees were consulted. In some instances, officials voiced concerns over potential impacts to critical locations within study corridors and proposed alternative routes or deviations that were evaluated as part of the study. Section 3.3.4 and Section 3.3.5 detail public and agency outreach results for Level 3.

2.2 Travel Forecasting Approach

This section presents the approach and methodology used to conduct the travel demand analysis in as part of this study. The initial travel demand analysis approach of this study proposed to use the Arizona Statewide Travel Demand Model (AZTDM) to forecast ridership in the AA. The latest version of AZTDM—AZTDM3, which includes a more sophisticated travel mode choice model—is not anticipated to be available until 2015, so the AA used an adapted approach that relied on other travel models and databases for estimating the market and ridership for the commuter and intercity services in the corridor. In future analyses, AZTDM3 will be the basis of travel demand forecasting.

2.2.1 Level 1 Travel Demand Assessment

The purpose of the Level 1 demand assessment was to identify the comparative magnitude of the travel markets in each alternative corridor. A sketch planning approach was applied to develop travel market projections using concentrations of population and employment in the vicinity of potential station locations throughout the corridor. This served as a reasonable surrogate for trip-making propensity in the initial evaluation of alternatives. This methodology draws upon the outputs produced by the AZTDM2 model (such as person trips and congested highway skims[5]) to identify relative levels of travel activity by market within each potential alternative routing.

2.2.2 Level 2 Travel Demand Assessment

Using the output results from the AZTDM2 model, the Level 2 process provided estimates of comparative ridership by alternative. The focus was on measuring the relative differences in ridership potential among the alternatives, not necessarily an absolute number of riders, but a common basis of comparison. The first step compiled data on mature, functioning rail systems around the country and collecting information on (1) the factors that influence rail ridership and (2) current rail mode splits. Some of this information was compiled from data used to develop FTA's ARRF-II (Aggregate Rail Ridership Forecasting) model and used in this study to estimate the commuter travel demand.

In addition to using FTA's ARRF-II model, FRA's CONceptual NEtwork Connections Tool (CONNECT) was used to estimate intercity travel demand. CONNECT is a high-level sketch planning tool that estimates overall performance of high-speed and intercity passenger rail (HSIPR) corridors and networks. CONNECT is able to assess the regional effect of a proposed HSIPR corridor as part of a larger regional network. The tool is intended for use at the very outset of the planning process as it estimates trip demand between metropolitan statistical areas, such as the Phoenix MSA and Tucson MSA.

2.2.3 Level 3 Travel Demand Assessment

Ridership forecasts for the Final Alternatives were estimated using the FTA forecasting tool called Simplified Trips-on-Project Software (STOPS). It was designed specifically to estimate ridership on fixed guideway systems considering New Starts and Small Starts[6] funding. The FTA-developed STOPS model was used to provide an estimate of ridership for each of the Level 3 or Final Alternatives. The model replaces the standard "trip generation" and "trip distribution" steps with Census Transportation Planning Package tabulations to predict detailed travel patterns, quantify trips-on-project measure for all travelers and for transit dependents, and compute the change in automobile vehicle miles traveled (VMT) based on the change in overall transit ridership between the no-build and build scenarios.[7] Figure 22 illustrates the three progressively refined steps of the travel forecasting approach used in the AA. More detail about the travel forecasting approach is included in Appendix A: Travel Forecasting.

Figure 22—Travel Demand Assessment Process

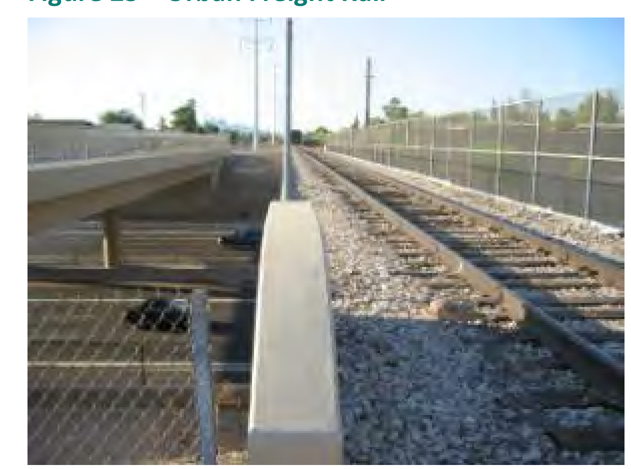
2.3 System Operating Assumptions

Planning level assumptions were used regarding vehicle performance and requirements, alignment layouts, and station features. Each alternative used the same assumptions except for those which differed based on the use of the existing UP corridor or operation of a bus on the I-10 freeway corridor. These elements are detailed below at a planning level and will be further developed in future stages of the study. Although developed at a high level, these assumptions were necessary considerations to inform analyses and decisions on viable route options and service development concepts and also to assist in coordination with partner agencies within the study area.

2.3.1 Rail Alternatives

Rail Speeds

Figure 23—Urban Freight Rail



For all rail alternatives, the maximum design speed was assumed to be 150 mph and maximum operating speed was assumed to be 125 mph, with segments of lower speed where design constraints govern, mostly within the urbanized areas, as well as those which share right-of-way with UP freight operations.

- **Maximum speed assumptions**—A maximum speed assumption was made for each routing segment. The maximum speed assumption was based mainly on the character of development patterns adjacent to the route, as well as the operational rules of shared track or roadway. The maximum speed assumptions are listed below:
  - **Urban area** (generally north of Gilbert and south of Marana)
    - Rail alternative operating at-grade on dedicated track along a route with multiple slow design curves—80 mph
    - Rail alternative operating grade-separated on dedicated track along a route with multiple slow design curves—110 mph

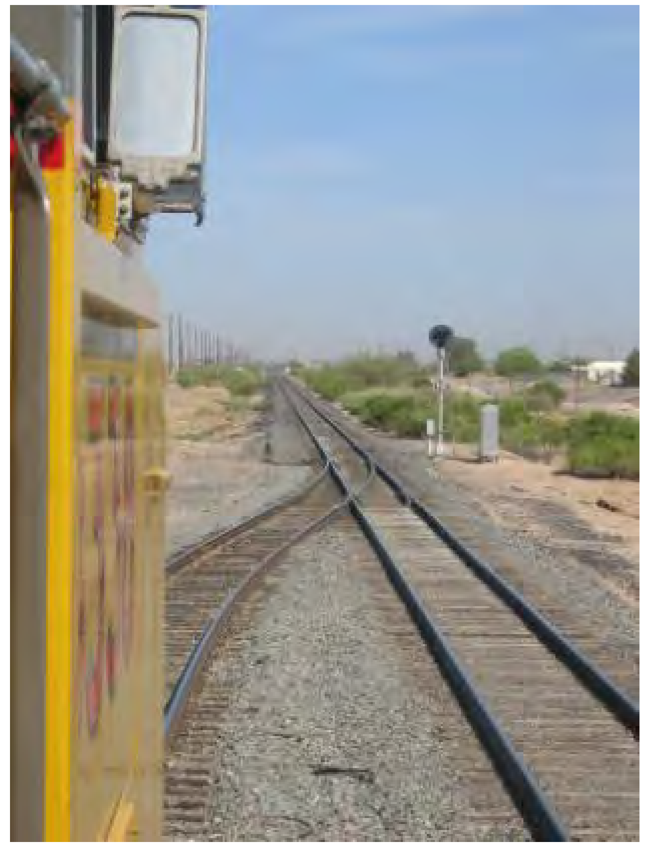
[5] A "highway skim" is a measure of travel impedances between zones in a travel demand model, including congested travel times, distance, and costs.

[6] New Starts and Small Starts are FTA grant programs that provide funding for capital costs associated with new fixed guideway systems, extensions, and bus corridor improvements.

[7] A "no-build" alternative provides the baseline comparison to the rail and bus "build" alternatives defined and evaluated as part of this study and includes all programmed transportation facilities and services likely to exist by the forecasted year of project operation.

- Rail alternative operating at-grade on dedicated track along route with no slow design curves—110 mph
- Rail alternative operating grade-separated in urban area on dedicated track along route with no slow design curves—125 mph
- Rail alternative operating on shared freight track, subject to UP operating rules—79 mph

Figure 24—Rural Freight Rail



– **Rural area** (generally Gilbert to Marana)
- Rail alternative operating at-grade on dedicated track along a route with multiple slow design curves—110 mph
- Rail alternative operating grade-separated on dedicated track along a route with multiple slow design curves—110 mph
- Rail alternative operating at-grade on dedicated track along route with no slow design curves—125 mph
- Rail alternative operating grade-separated on dedicated track along route with no slow design curves—125 mph
- Rail alternative operating on shared freight track, subject to UP operating rules—79 mph
- Bus alternative operating on local roads and I-10—40-75 mph (subject to posted speed limits)

- **Standard station dwell time**—Standard station dwell times represent the time a train would stop at each station along a specified route. A dwell time of 90 seconds was assumed for station stops during commuter service, and a dwell time of 120 seconds was assumed for station stops during intercity service.

Corridor Environment

The elements of routing and corridor environment of the alternatives rely on some basic considerations that help create the context for each route. A generalized geometric character, right-of-way needs, rail system performance and technology options, etc., all contribute to how each alternative is created to ensure a realistic option that complies with the basic expectations of the proposed service.

With that in mind typical sections were developed that show the assumed mainline track profile including ballast and sub-ballast, drainage requirements, and security fence or barrier requirements. A typical section for a single track system within an urban context is shown on Figure 25 as an example, while a complete set of typical sections for all assumed scenarios are included in Appendix B Design Assumptions. The routing assumed at a planning level for each of the alternatives included each of these elements, as described below, to establish a basic level of feasibility for each alternative.

A dual track system was assumed for all rail alternatives that would not be constructed within existing freight rail corridors, where the minimum separation of main line track centerlines is a function of the regulatory environment, the dynamic envelope of the rolling stock, aerodynamic loads on trains due to passage of another train, provision of adequate space for drainage and overhead contact system poles, and other factors. The initial application was assumed as a diesel multiple unit (DMU) system. The dual track typical urban section will be approximately 60-feet wide and in rural areas will be approximately 100-feet wide. The single track typical section for any alternative that would be built within an existing freight rail corridor was assumed to be 60-feet wide in both urban and rural areas.

Alternatives which share existing UP rights-of-way were assumed to utilize a single passenger rail track with sidings and crossings as needed, as shown on Figure 25. The alternatives on UP rights-of-way would follow the UP commuter service design principles, which specify a minimum 50”-foot center-to-center distance between passenger and freight operations as part of its internal UP “Commuter Rail Principles.” The existing freight rail network within the study area is shown on Figure 26. The thick red line in the Figure refers to the UP Sunset Route, a highly utilized mainline east-west route which connects southern California to Texas. The dashed red line shows the lesser used UP Phoenix-Subdivision connecting Eloy to the Phoenix metropolitan area.

Additional design oriented assumptions, including super-elevation, degree of curvature, spiral lengths, grades, vertical curves, and clearances, are described in Appendix B: Design Assumptions. These are illustrative only for purposes of comparing the alternatives.

Figure 25—Urban Typical Track Section

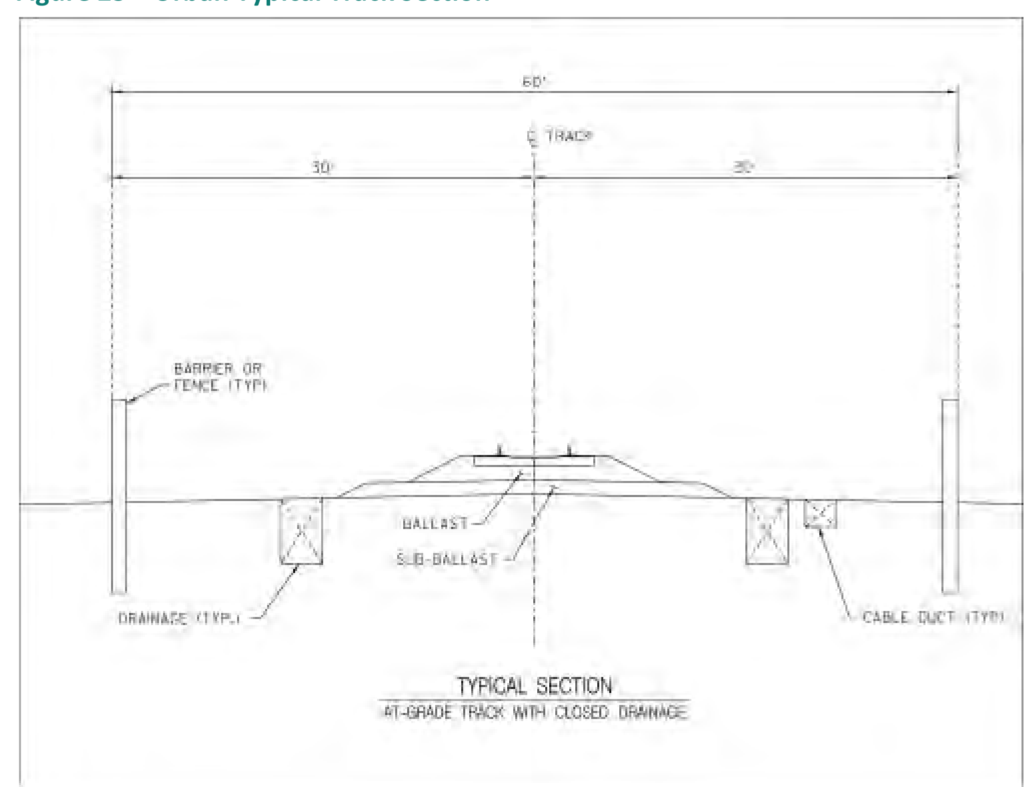
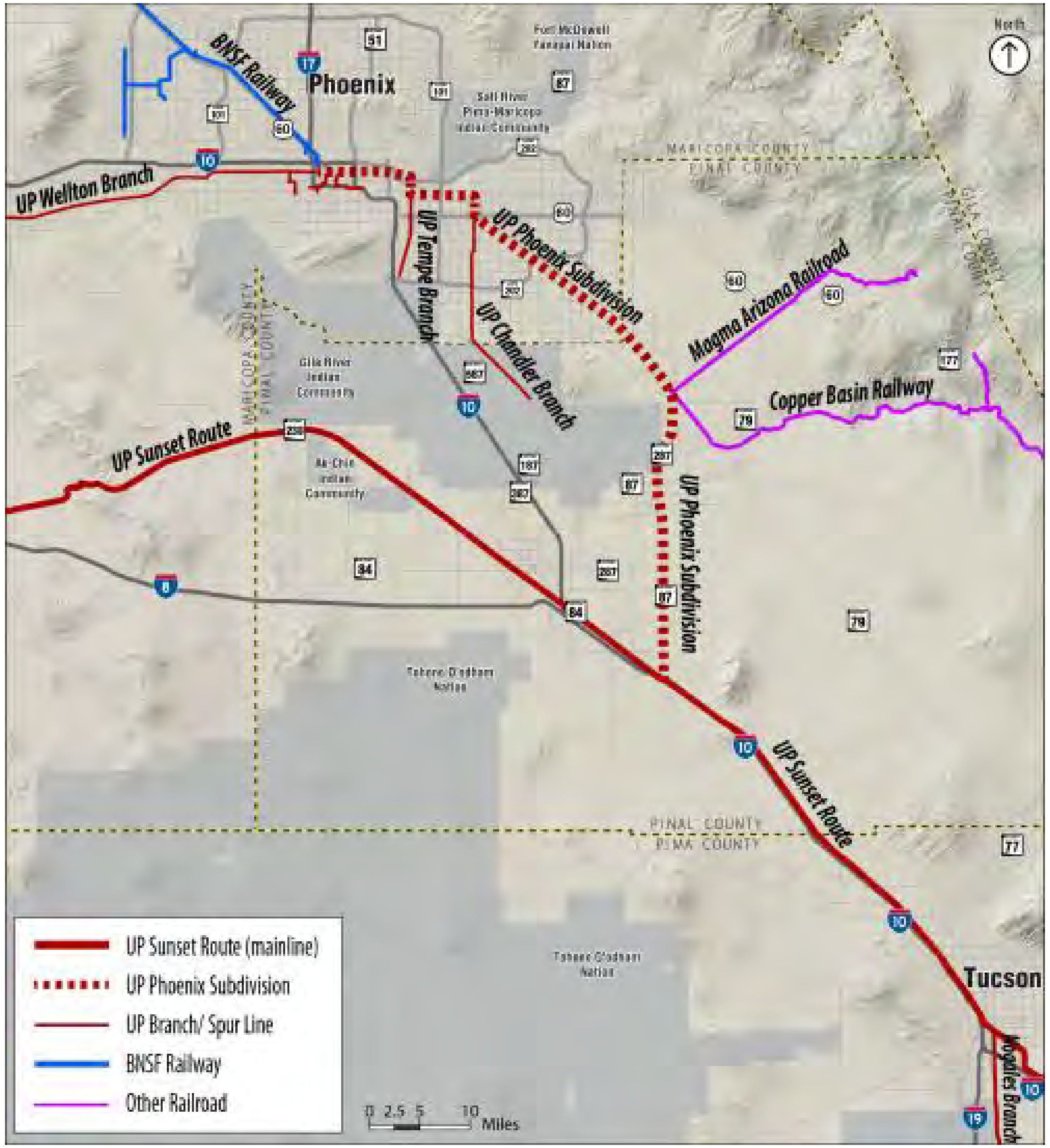


Figure 26—Existing Rail Network



Southwest Regional Context

Each rail alternative was assumed to connect in the future to a larger regional western states rail network connecting California, Arizona, and Nevada, including the California High Speed Rail System. As identified as part of the *FRA Southwest Multi-State Rail Planning Study*, the western network is envisioned to include a high speed rail connection between Phoenix, Las Vegas, and Los Angeles. High level design and system performance assumptions were made to be compatible with the potential future regional network (Figure 27).

Figure 27—Future Western States Rail Network

Service Assumptions

Feedback from the public and agency partners gleaned during the project scoping process emphasized the potential for viable commuter service within the individual Phoenix and Tucson metropolitan areas, in addition to intercity service between the two areas. Basic high level assumptions were made for a blended commuter and intercity system to address these sentiments, which would provide both express intercity service in between Phoenix and Tucson, and local service tailored to commuters within each metropolitan area. The provision of a blended service has been reflected throughout the study process including alternative and station typology development, cost estimates, travel demand modeling, and other aspects of the analysis.

Station Typology

The station typologies developed for each rail alternative include system hub, regional, local, and emerging stations. Each station fills a purpose in the overall blended commuter and intercity system plan allowing a differentiation of the rail service(s) it can support.

- System hub stations (i.e., Phoenix and Tucson) serve as the primary nucleus of the passenger rail corridor for both intercity and commuter service. All trains would stop at the hub stations. The possible system hub of Phoenix Union Station is shown in Figure 28.
- Regional stations function as major intermediate stations (e.g., Tempe, Sky Harbor) and also serve both intercity and commuter service. Most trains would stop at regional stations.
- Local stations are smaller stations that are designed to provide access to population and employment centers (e.g., Gilbert, Queen Creek, Eloy). These stations are served by commuter trains only.
- Emerging stations are locations that, subject to anticipated growth, could become viable station locations. No service would be offered until a reasonable justification can be made for it.

Figure 28—Phoenix Union Station

The station locations vary by alternative but are intended to optimize travel markets and transportation connection opportunities along each alternative route. The stations were located on each alternative to attract and serve the largest possible ridership, where the potential travel markets examined include both existing and future population and employment. The transportation connections examined at each potential station include a range of multimodal pedestrian, bicycle, transit, freeway, and airport opportunities. The overall number of stations for each alternative was intended to optimize the populations served while not significantly impacting overall travel time. Potential station locations of all types were evaluated at high-level using catchment areas meant to represent broad vicinities within a specific neighborhood or district. Decisions and analyses related to the number and placement of potential station locations were necessary to assist in informing decisions on viable route options and service development concepts. Specific site locations for potential stations will be evaluated as part of further studies and could differ from those general locations included in the preferred alternative.

2.3.2 Non Rail Alternatives

Bus speeds

Bus alternatives were assumed to operate at speeds subject to posted speed limits. A maximum speed of 75 mph was assumed on freeways outside the urbanized area, namely I-10. A maximum speed of 55 mph on freeways was assumed within the urbanized area, and speeds of 40 mph on local roadways.

Corridor Environment

Bus alternatives were assumed to operate on the Interstate in a dedicated bus-way or HOV lane, similar to the Metro Silver Line BRT in Los Angeles (Figure 29). Direct access ramps to station areas located within the Interstate right-of-way were also assumed. Within the urbanized area, direct access ramps would be limited and stations may be located outside the Interstate right-of-way.

Figure 29—Los Angeles Metro Silver Line BRT

Service Assumptions and Station Typology

As with rail alternatives, all bus alternatives assumed to operate a blended commuter and intercity system offering local and express service options. Station typologies were also assigned in a similar manner to rail alternatives to develop a high level service concept, with potential stations along each route designated as either system hub, regional, local, or emerging station areas.

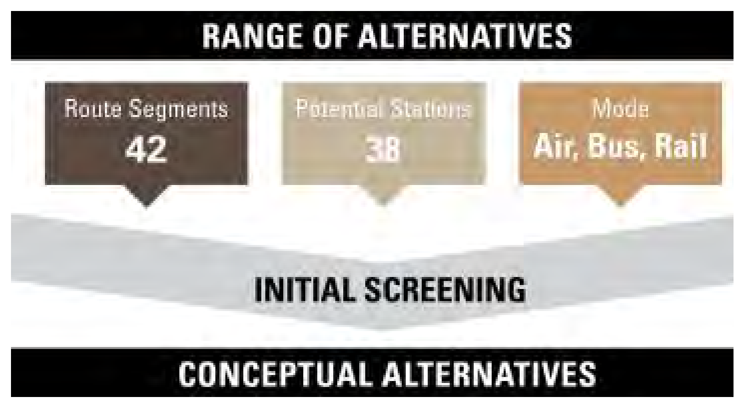
3.0 Alternatives Development and Evaluation

Through the study process, segments, station areas, and complete routings were examined and refined through the three-level progression of analysis identifying the range of alternatives (Initial Screening), Conceptual Alternatives (Level 2), and Final Alternatives (Level 3). This section describes the three-step alternative development process, which built upon previous studies conducted in the region and will lead to the identification of a preferred alternative.

3.1 Range of Alternatives

The range of alternatives was the first step in the alternatives development process. It consisted of all reasonable routes, station locations, and modes that were initially evaluated as part of the study. The evaluation of the range of alternatives considered all potential route segments that were then combined into alternatives consisting of a generalized alignment, stations, and mode. The initial segments, station locations, and possible modes used in the range of alternatives analysis were identified based on previous planning initiatives and corridor studies conducted throughout the study area, as well as input from partner agencies and the greater public gleaned during the project scoping process. The Initial Screening of the range of alternatives resulted in the Conceptual Alternatives as illustrated in Figure 30.

Figure 30—Range of Alternatives Evaluation



- **Technical input**—Initial route segments, stations, and mode options included in the range of alternatives were initially identified by the project team from the alignments of prior corridor studies explained in Section 2.1.1, existing transportation corridors, and other greenfield corridors developed based of project team experience and local knowledge.
- **Public input**—The elements of the range of alternatives also reflect input received from the public during the project scoping process. In particular, comments expressed rail as the preferred mode and emphasized the importance of travel time, speed, limiting environmental impacts, and commuter service. These sentiments assisted the project team in prioritizing the inclusion of some routings, stations, and modes into the range of alternatives over others.

  Agency input—Opinions on possible routes, station locations, and service options were offered by agency partners as part of three CST workshops held throughout the study area in summer 2011. Through an interactive exercise, workshop attendees identified their preferred route, station locations, and service type within the study area. Alternative elements identified in the workshops helped to supplement and refine those included as part of the range of alternatives.

3.1.1 Description of Range of Alternatives

The preliminary range of alternatives was initially identified to consist of routes, modes, and potential station areas.

Modes

Three transportation modes were examined to connect Tucson and Phoenix metropolitan areas—bus, rail, and air. Personal auto was not considered as a mode in this analysis because it has been and is being addressed as part of other studies within the region. The characteristics and feasibility of each mode are detailed in Table 7.

Table 7—Mode Options

	Bus	Rail (DMU)	Air	Personal Automobile (not included)
Average Cost per Mile	$0.92	$0.63	$16.13	$0.55
CO_2 Emissions	56 grams/passenger mile	160 grams/passenger mile	243 grams/passenger mile	371 grams/passenger mile
Energy Use	749 Btu/passenger mile	1,850 Btu/passenger mile	3,260 Btu/passenger mile	3,861 Btu/passenger mile
Implementation Status	No current plans for exclusive right-of-way for buses between Tucson and Phoenix. There is existing bus service on I-10.	Rail connection between Tucson and Phoenix identified in State Rail Plan.	No current plans for expansion of air service between Tucson and Phoenix.	A number of plans are in place to add capacity for cars and trucks over the coming years.
Potential Service Characteristics	Opportunity for stations in many intermediate communities between Tucson and Phoenix, offering a range of connection options.	Opportunity for stations in a limited number of communities between Tucson and Phoenix.	Limited to stations in Mesa, Phoenix, and Tucson.	No substantive change from present roadway practices, including predominant use of I-10 for travel between Tucson and Phoenix.

Source: Bureau of Transportation Statistics, 2011
DMU = diesel multiple unit train
CO2 = carbon dioxide
Btu = British thermal unit

Despite the potential highway improvements planned within the study corridor in coming years, the ADOT AZTDM-2 travel model indicates that additional capacity could be needed to accommodate the anticipated future population growth within the corridor. These further improvements would be in addition to the potential widening of I-10 to ten lanes between Phoenix and Tucson, the construction of the planned North-South Freeway between Apache Junction and Eloy, and the expansion of SR-79 between Florence and Tucson. For this reason, personal automobile use was not considered a viable mode as part of this study effort, as the purpose of this study intended to evaluate alternatives to the currently prevalent use of personal automobiles.

The consideration of air travel was also dismissed as a viable alternative prior to the initial screening. Existing air flights are limited, relatively costly compared to other modes, and expansion of services within the study would be limited to Phoenix, Mesa, and Tucson. In addition, the air mode is not equipped to meet the expectations of desired commuter services.

Route Segments

There were 42 separate route segments identified based on previous studies, public outreach, discussions about best routes with public agencies, and a review of the study corridor. Individual route segments from these previous studies were combined to form 142 potential routings connecting the Tucson and Phoenix metropolitan areas. The segments fall within various county and local government jurisdictions, as well as different types of land ownership classifications, including Tribal land, State Trust land, and property controlled by the Bureau of Reclamation and the Bureau of Land Management. The segments vary in length from 1.5 miles to 69.1 miles, and were evaluated as either 4-mile-wide corridors or centerlines of those corridors as appropriate. Where possible, segments follow an existing or planned transportation corridor, such as I-10, UP, or alignment options for the concurrent North-South Corridor Study. All segment centerlines are shown on Figure 31 and described in detail in Appendix C: Range of Alternatives.

Stations

Potential station locations were identified along potential route segments for the purpose of helping to inform decisions and analyses on viable routes. For instance, viable station areas located along a route could indicate that route as having greater potential to serve population concentrations or access major activity centers. In some instances, the screening could indicate some potential station locations as important regional activity centers that would be prudent to include as part of an alternative in latter stages of the study. As described in Section 2.3.1. Three different station types with varying levels of service and infrastructure requirements were used to create the alternatives. Figure 32 shows all potential station locations identified throughout the study area. Additional data and analysis on each potential station location is provided in Appendix C: Range of Alternatives, including prototypical station area development concepts, station area plans, and station footprints developed for each station type (Figure 33 through Figure 35).

- **System hub stations** serve as the primary core of the passenger rail corridor for both intercity and commuter rail service. Only select locations were identified as potential system hub stations, which are located in downtowns near regional destinations, and which can offer connections to other complementary transit including light rail, streetcar, or bus. Specific system hubs include downtown Phoenix, Tempe/ASU, PHX Sky Harbor airport, downtown Tucson, University of Arizona, and Tucson International Airport.
- **Regional stations** serve both intercity and commuter rail modes and function as major intermediate stations. Regional stations have multiple access options, transit-supportive land use policies, and will be gathering centers for the corridor. Regional station locations were determined by considering travel characteristics and public preferences on how intercity travel is likely to evolve over time. In general, regional stations are located at community centers to aid in gathering and distributing trips and at the edge of the urban areas to serve as a collector location for trips traveling to the opposite end of the corridor.
- **Local stations** will be served by commuter rail service only. The function of local stations is to help move daily trips efficiently throughout the corridor. Agencies and the public identified locations that represent the most likely candidates to carry daily trips throughout the corridor based on where major activities are located within each community and their proximity to the identified segments.

Figure 31—Route Segments

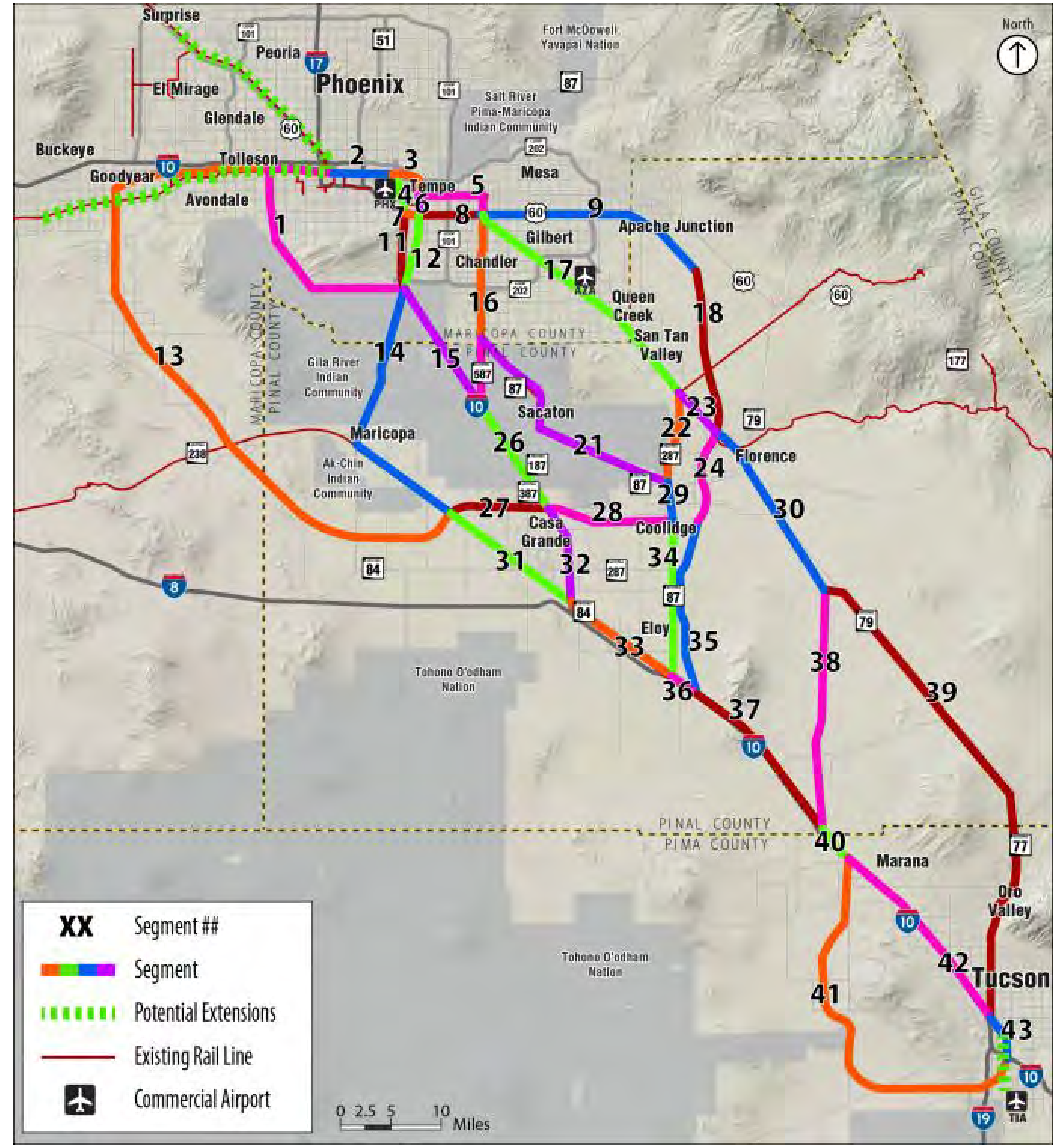


Figure 32—Potential Stations

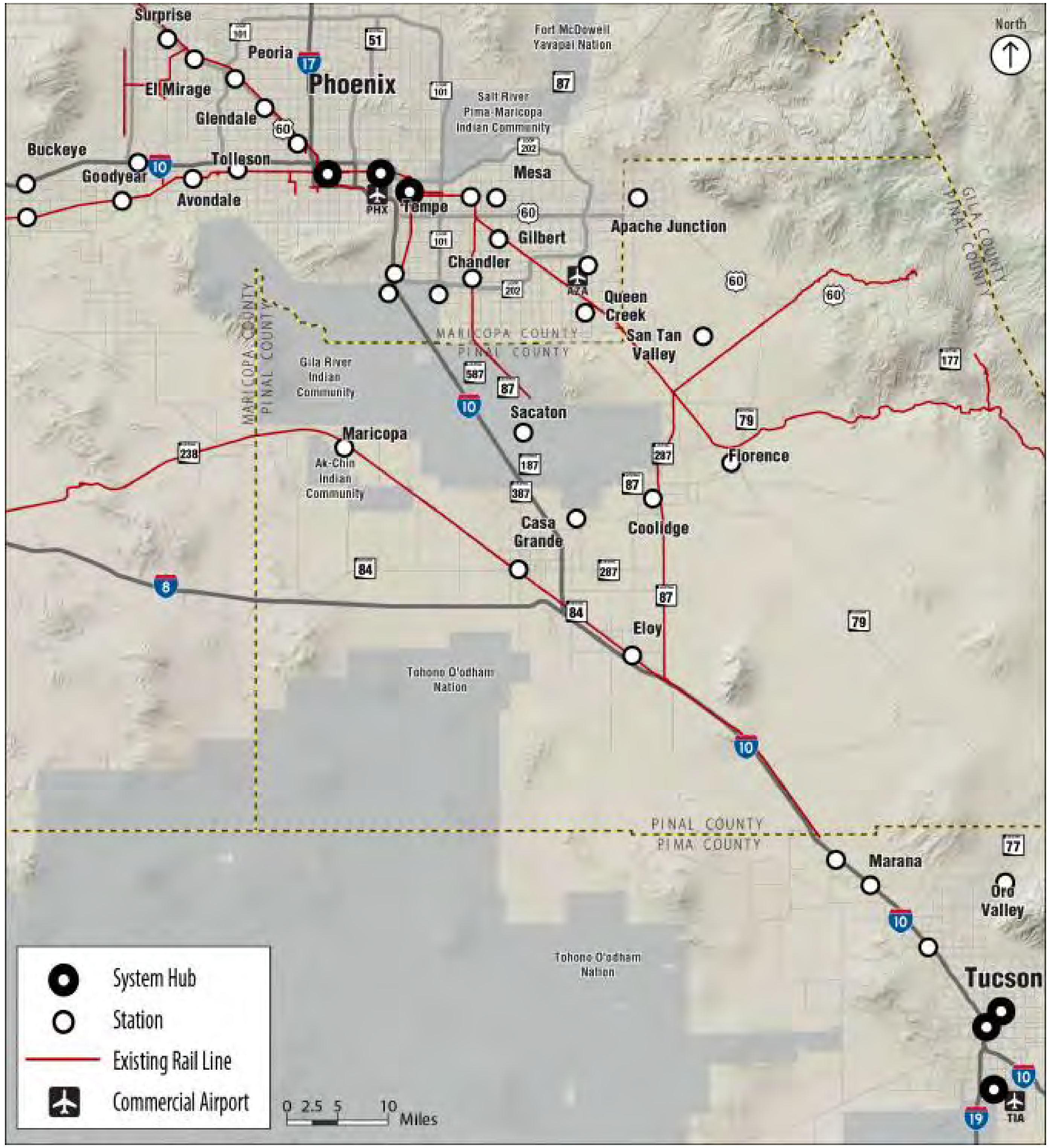


Figure 33—Prototypical System Hub Station Area Development

Figure 34—Prototypical Regional Station Area Plan

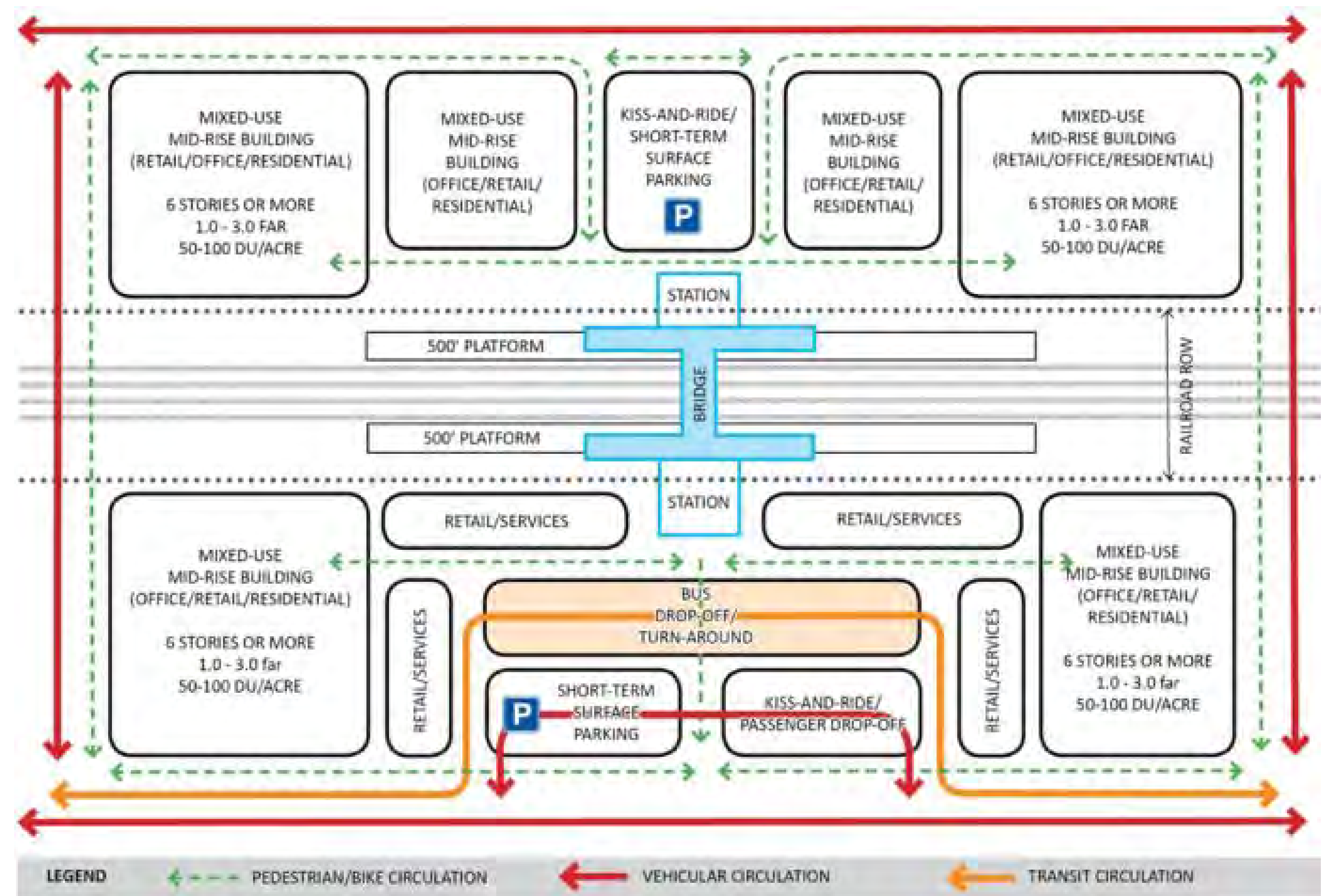
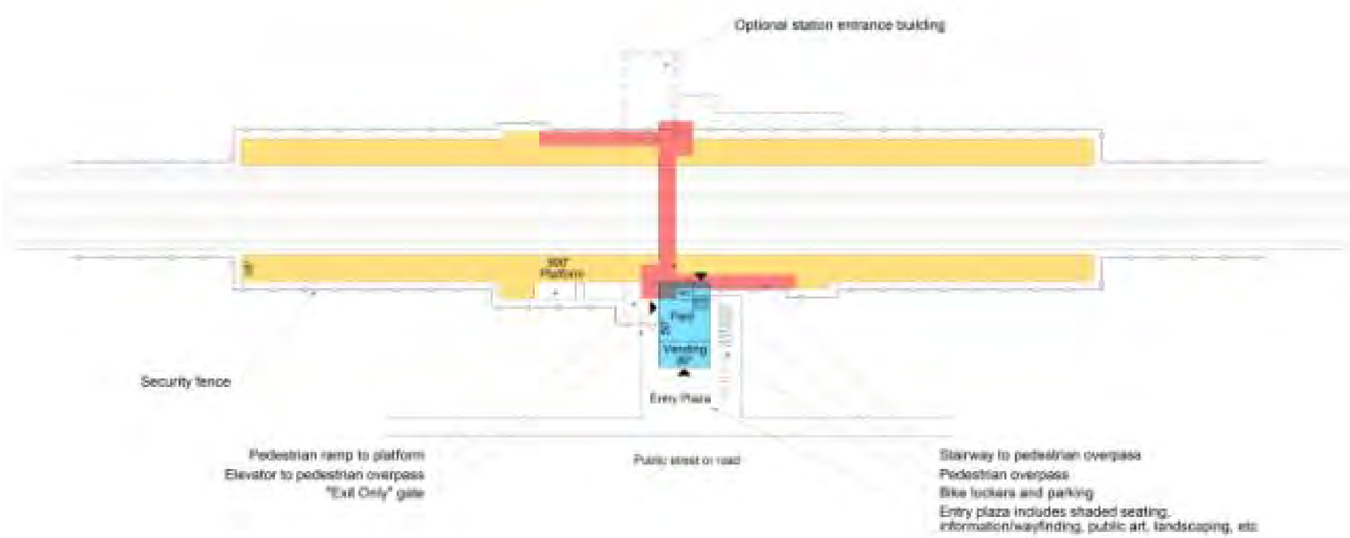


Figure 35—Prototypical Local Station Footprint



3.1.2 Initial Screening

The Initial Screening process was conducted to evaluate the potential route segments and service types as presented as part of the range of alternatives in Section 3.1.1 and represents the first of three levels of analysis as illustrated in Figure 36. Route segments were evaluated both individually and also, where appropriate, as combinations of segments forming unique routings between Tucson and Phoenix (

Figure 36—Initial Screening

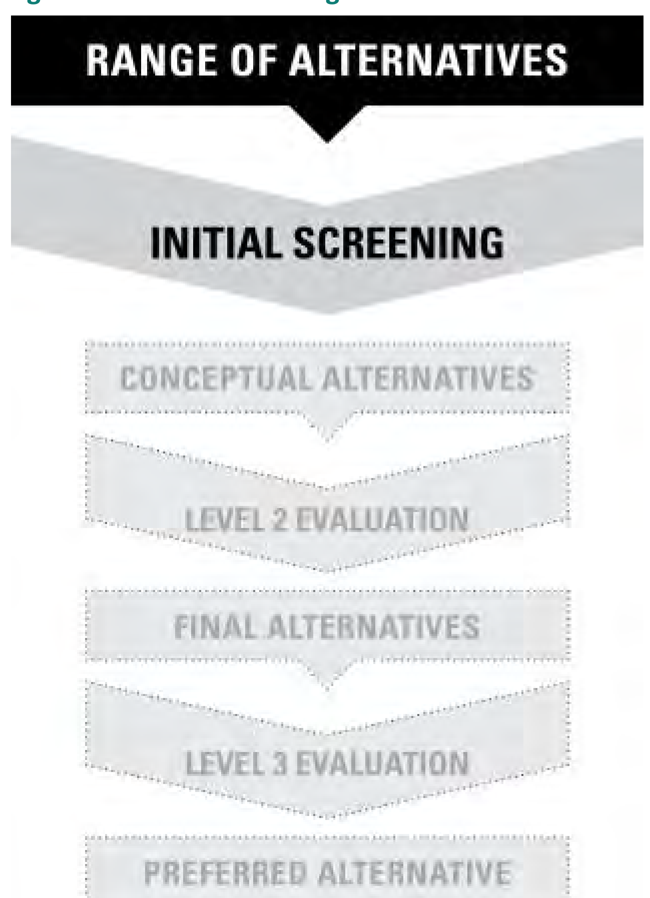


Figure 37). The route screening focused on the potential route locations using parameters including infringement on sensitive environments, length, potential ridership market, institutional considerations, existing transportation uses, and compatibility with local land use plans. Potential station locations were also considered to assist in the screening of routing alternatives using parameters related to transportation connections and travel markets. An overview of evaluation criteria and applied screening measures are summarized in Table 8 and detailed throughout this section.

Figure 37—Example Route Composed of Multiple Route Segments

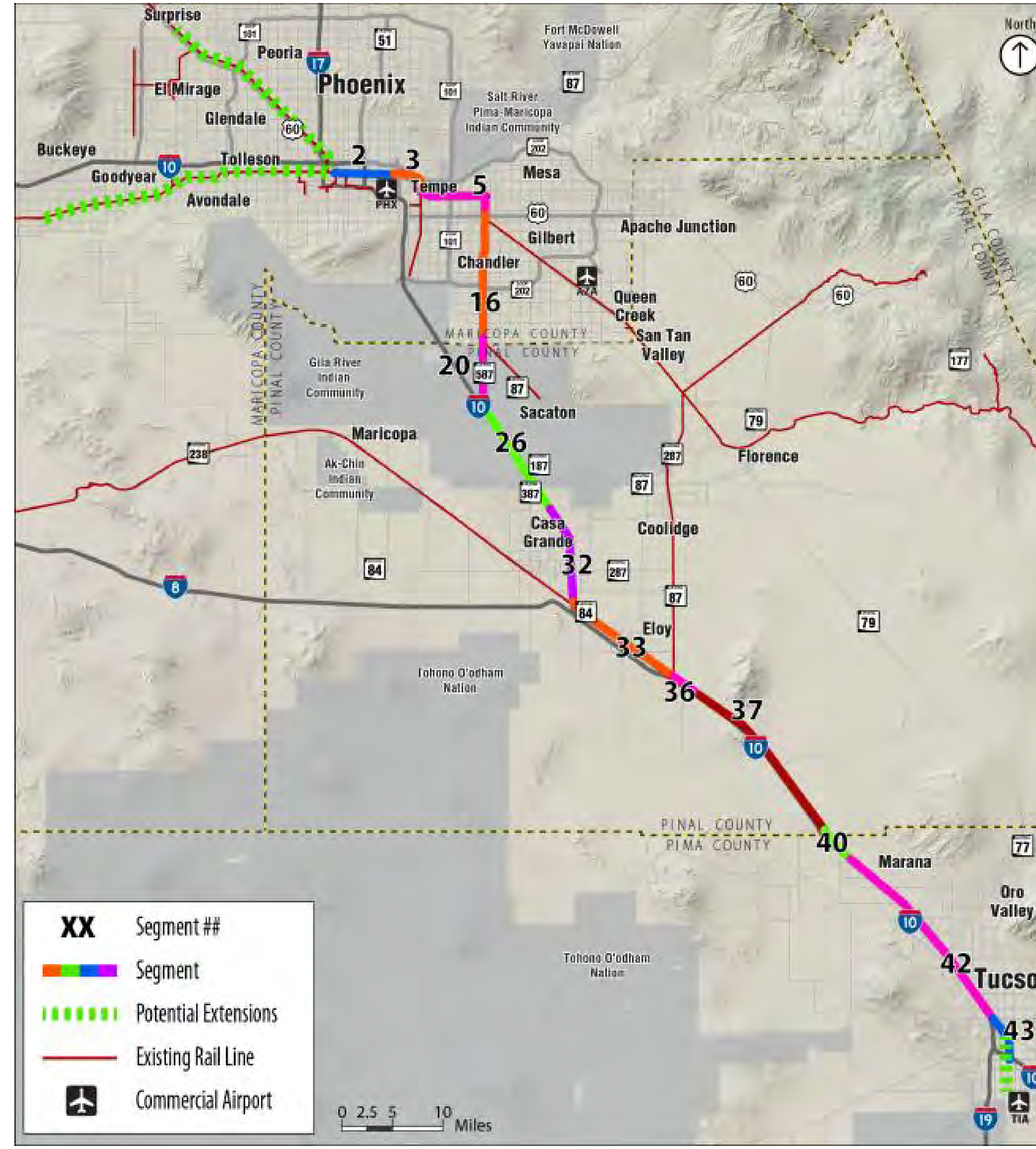


Table 8—Evaluation Criteria Overview—Initial Screening

Evaluation Criteria		Description	Evaluation Measure
Existing or planned transportation use		Ease of implementation given existing transportation within corridor	4-mile-wide route segment
Infringement on sensitive environments	Biological resources	Quantified biological resources within corridor using the Arizona Game and Fish Department *Species and Habitat Conservation Guide* tool	4-mile-wide route segment
	Historic, cultural, and archeological places	Number of nationally registered historic places within corridor	4-mile-wide route segment
Compatibility with community land use plans		Compatibility of underlying planned land use within corridor	4-mile-wide route segment
Institutional considerations		Compatibility of underlying land ownership within corridor	4-mile-wide route segment
Length of routing alternatives		Total length of combined route segments between Tucson and Phoenix, as proxy for cost, constructability, and ridership	Length of combined route segment centerlines
Travel markets		Existing and future population and employment within potential station area catchment	1-mile- and 5-mile-radius catchment areas
Connections from station	Local transportation connections	Pedestrian and bicycle facilities and local street intersection density within potential station area catchment	1-mile-radius catchment area
	Fixed guideway transit connections	Existing or planned fixed guideway transit routes within potential station area catchment	1-mile-radius catchment area
	Other transit connections	Bus service connections within potential station area catchment	1-mile-radius catchment area
	Freeway connections	Freeway access points within potential station area catchment	1-mile-radius catchment area
	Airport connections	Distance from potential station area catchment to nearest commercial passenger airport	Distance from catchment area

Route Screening

The measurement categories used for the Initial Screening of route segments were:

- Existing or planned transportation use
- Infringement on sensitive environments
- Compatibility with community land use plans
- Institutional considerations
- Length of routing alternatives

Each potential routing alternative was evaluated, where possible, as a 4-mile swath to allow for flexibility in addressing any issues that could arise during later stages of work. The process is summarized in this section while the detailed data and analysis are included in Appendix D: Initial Screening.

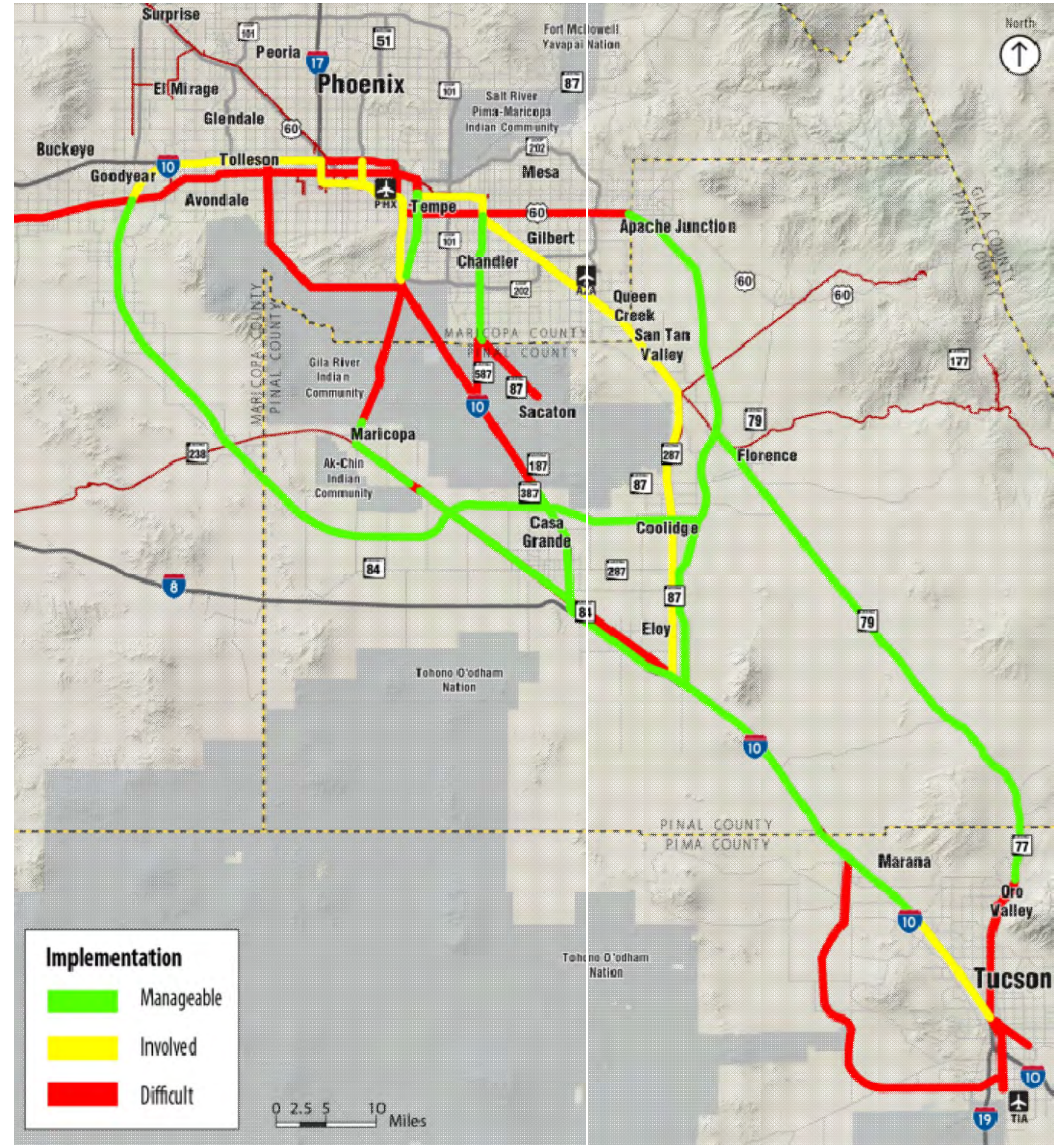
Existing or Planned Transportation Use

Within each route segment identified for evaluation there are existing roadways, existing railroads, planned future roadways, or a combination of existing and future roadways and rail within a single corridor. The existing or planned transportation use in a corridor may enable, support, or conflict with a proposed transportation use identified in this study. In order to assess the existing or planned transportation use in the corridor, the compatibility of the corridor of each of the 42 route segments was identified as *manageable, involved,* or *difficult,* as defined below.

- **Manageable**—Current or future roadway or rail in the corridor enables the implementation of a new transportation use
- **Involved**—Current or future roadway or rail in the corridor supports the implementation of a new transportation use subject to overcoming identified limitations
- **Difficult**—Current or future roadway or rail in the corridor creates conflict for the implementation of a new transportation use

The summary of existing transportation operations by segment is shown graphically on Figure 38. The corridor between Eloy and Tucson along I-10 encompasses the two major transportation operations of the I-10 freeway and UP Sunset Route mainline. The section is shown as either manageable or involved since, at this high level, a route that follows the corridor was determined to be able to utilize I-10 right-of-way without contending with UP operations. The same is true between Maricopa and Casa Grande, where a route would be able to use either UP or Maricopa-Casa Grande Highway rights-of-way.

Figure 38—Existing or Planned Transportation Use



Infringement on Sensitive Environments

At the Initial Evaluation level, the impact of each route segment on sensitive environments was assessed based on two readily available data sets—biological resources and historic places.

Biological Resources

The biological resources assessment was based upon the Species and Habitat Conservation Guide (SHCG) tool published in 2011 by the Arizona Game and Fish Department. This SHCG tool provided a broad regional assessment of conservation potential in the study area.

Using the SHCG tool, conservation potential was measured in six levels, as shown on Figure 40 where 1 depicts the lowest conservation potential (lightest blue color) and 6 depicts the highest conservation potential (darkest blue). To assess the biological resources impact by segment, the levels were combined and analyzed as follows:

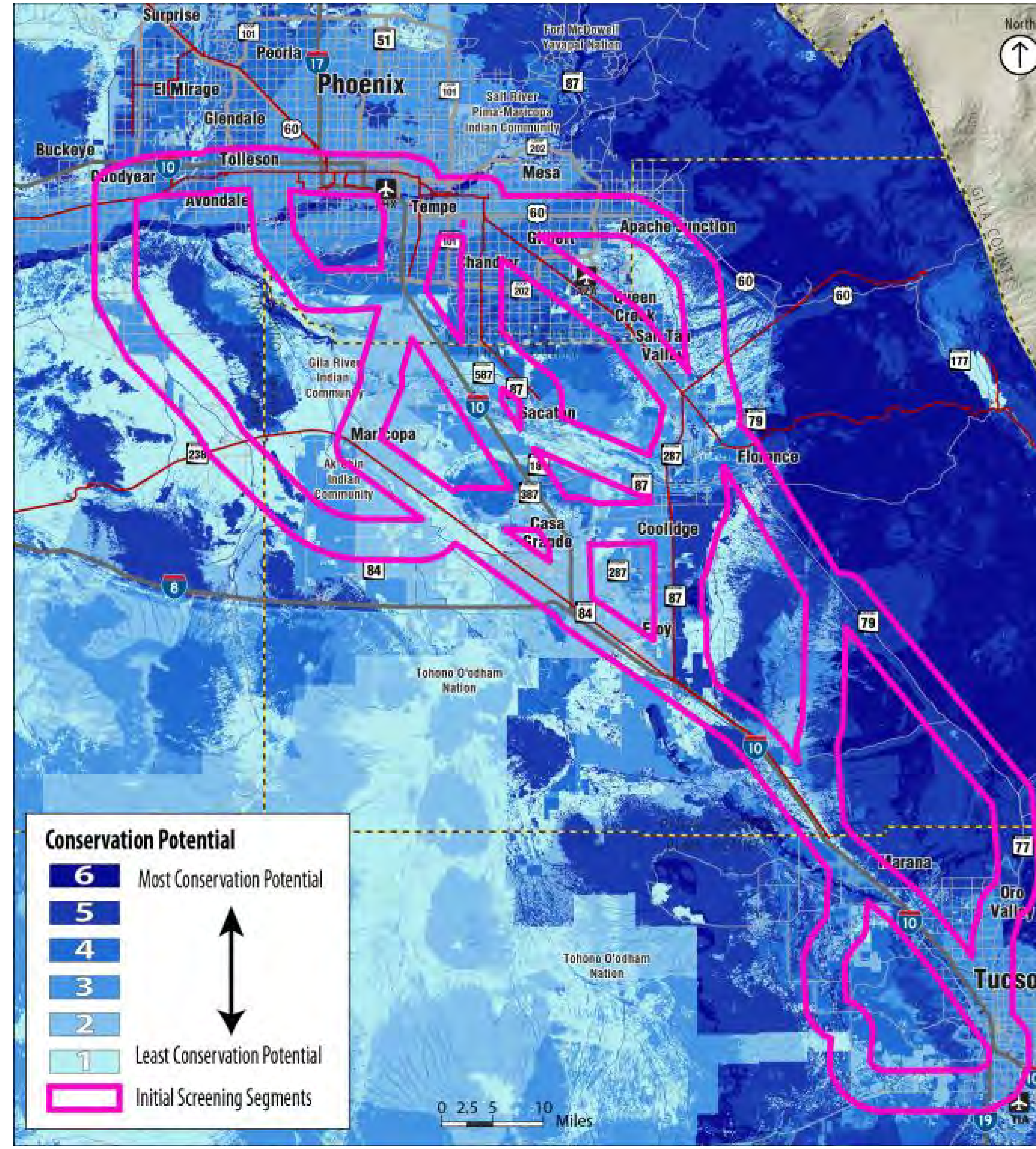
- **Low conservation potential**—Levels 1 and 2
- **Medium conservation potential**—Levels 3 and 4
- **High conservation potential**—Levels 5 and 6

The *low, medium,* and *high conservation potential* was quantified in square miles by segment and summarized by routing alternative.

Figure 39—Pinal County Desert

Source: USA Today

Figure 40—Infringement on Biological Resources



Source: Arizona Game and Fish Department, 2011

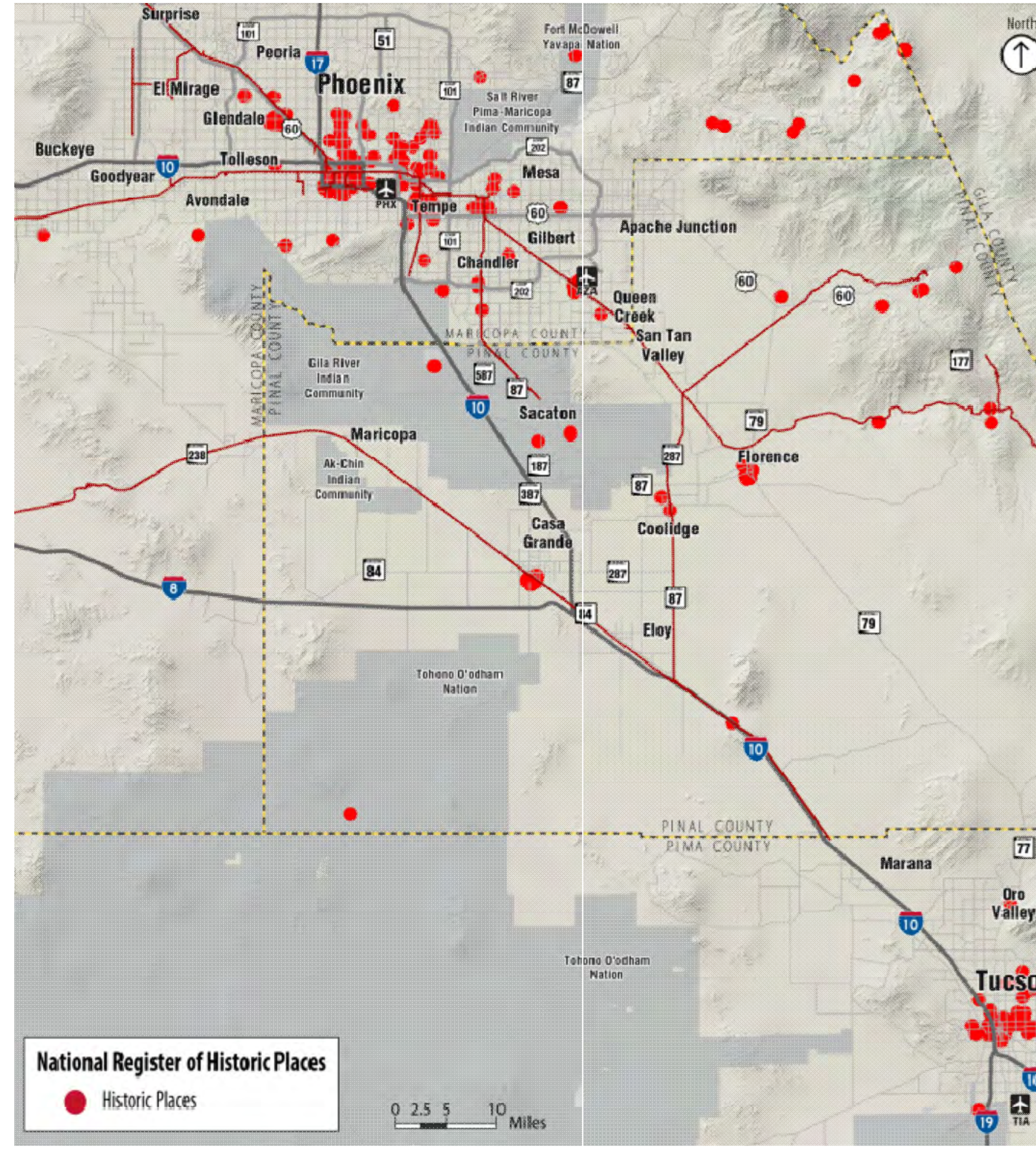
Historic Places

The second component used for gauging the Infringement on Sensitive Environments was the total number of historic places located within each segment. At this initial evaluation level, the total number of registered buildings, districts, sites, structures, and objects within 4 miles of each segment were quantified and summarized with other segments to compare the total number of historic places between. The greater the number of known historical, cultural, and archeological places, as documented in the National Register of Historic Places, the greater the environmental impact of an alternative route was deemed to have. As shown on Figure 42, the greatest concentrations of places exist within currently developed areas. Calculation methods and results by segment are documented in Appendix D: Initial Screening.

This assessment was considered along with Biological Resources to gauge each routing alternative's overall infringement on sensitive environments. Several other environmental concerns were addressed in other measurement categories, including land use, land ownership, and length of full alignment.

Figure 41—Casa Grande National Monument

Figure 42—Historic/Cultural/Archeological Places



Source: National Register of Historic Places, 2011

Compatibility with Community Land Use Plans

Existing land use data and future land use plans of communities within the study area were reviewed to assess the compatibility of a transportation corridor with community land use plans. Both existing and future resident and employment land uses were identified.

For this measure, the land use compatibility within the routing was classified as *high compatibility, medium compatibility,* or *low compatibility* as described below:

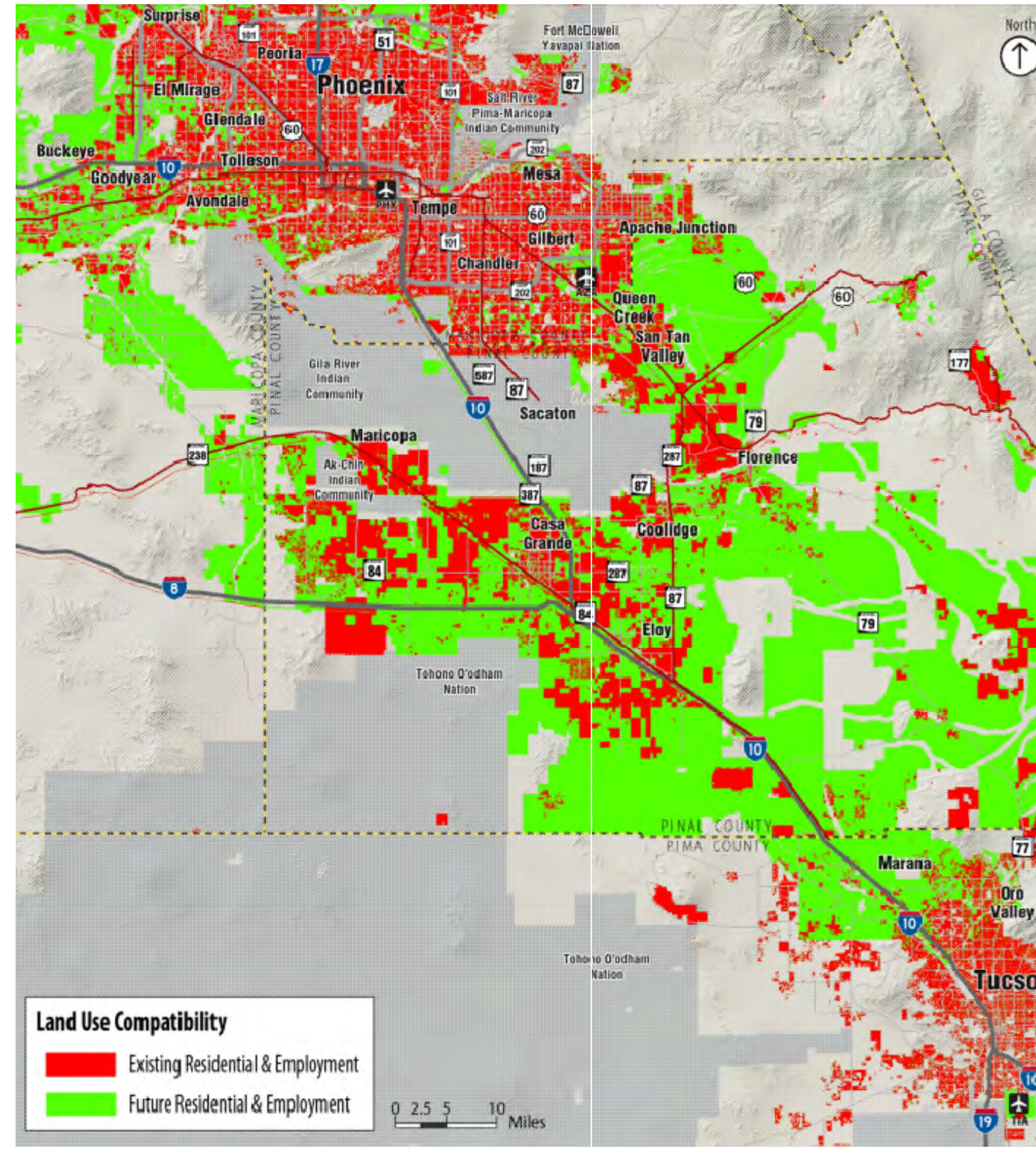
- **High compatibility**—Most of the land is currently undeveloped and could accommodate a future transportation corridor
- **Medium compatibility**—Some of the land is currently undeveloped and could accommodate a future transportation corridor
- **Low compatibility**—A significant portion of the land is currently developed and it would be difficult to accommodate a future transportation corridor

Because this analysis is for the overall impacts of the alternative routings, the alternatives that would impact *future* residential or employment lands were preferred over alternatives that would impact *existing development and entitled* lands. ("Entitled" lands are properties that have approvals for construction but are not yet built upon.) Disrupting existing land uses may require extensive mitigation or acquisition to build, whereas future land uses can be developed to accommodate the transportation corridor, minimizing infringement upon the environment and seamlessly integrating into the community. The summary of the land use compatibility is represented graphically on Figure 44.

Figure 43—Sun Corridor New Housing Construction

Source: Jim Poulin/ The Business Journal

Figure 44—Land Use Compatibility



Institutional Considerations

Each route segment was evaluated for potential institutional considerations that could represent various levels of conflict for a transportation corridor by measuring the percentage of each that would be subject to the following institutional controls (Figure 46):

- National monuments, national parks, or military areas
- Tribal lands
- Existing or future parks/preserves, wilderness areas, Areas of Critical Environmental Concern (as designated by the Bureau of Land Management), or State of Arizona Department of Game and Fish Lands
- Federal lands (e.g., Bureau of Land Management or Bureau of Reclamation)
- State trust, county, or city lands

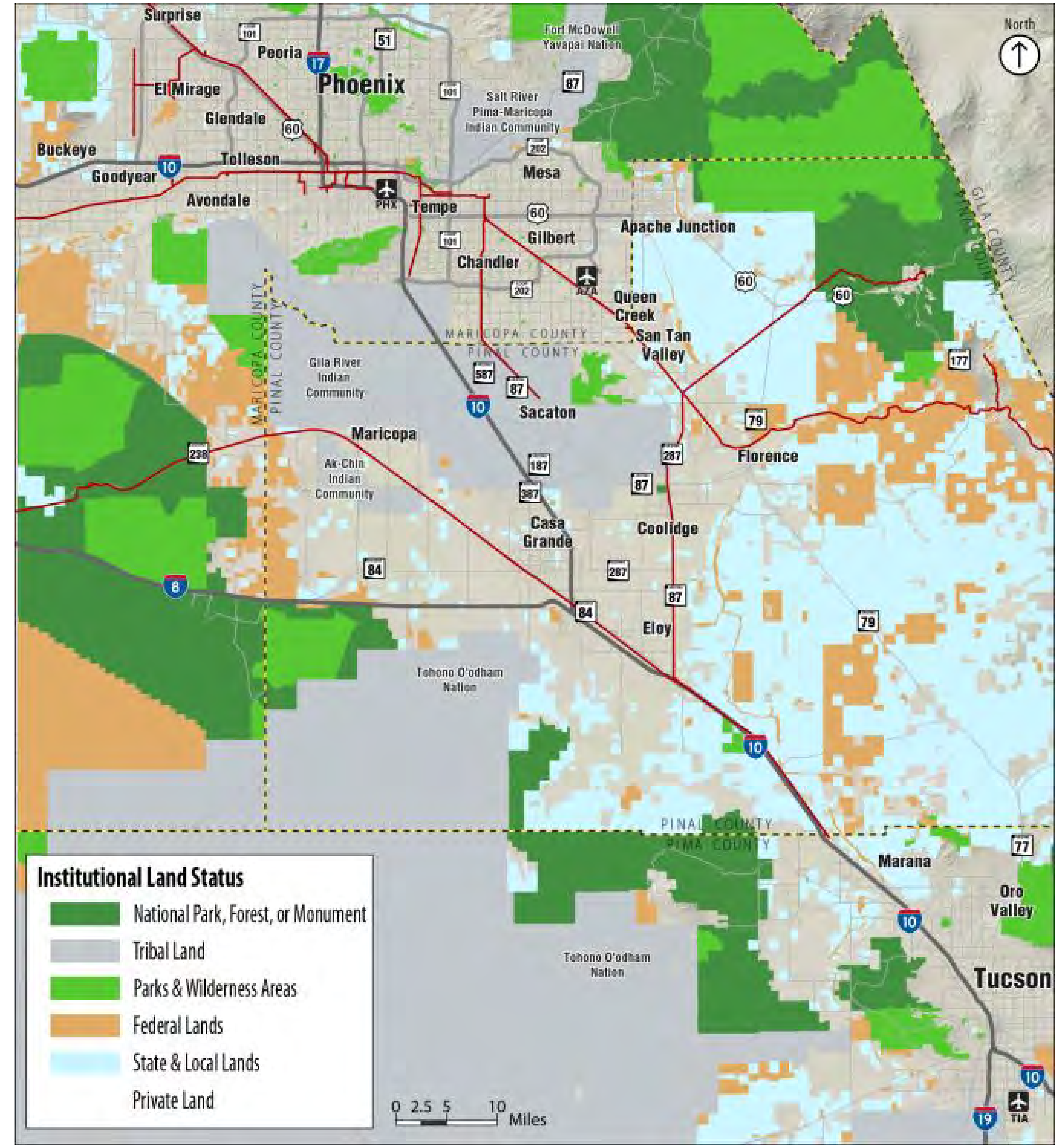
Figure 45—Study Area Institutions

GILA RIVER INDIAN COMMUNITY 1939 ARIZONA

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Arizona State Land Department

Figure 46—Institutional Character of the Corridor



**Parks & Wilderness Areas include Areas of Critical Environmental Concern, Federal Lands include Military Areas.*

Length of Routing Alternatives

The total length of each routing alternative was used for the Initial Screening to represent a range of potential impacts, including:

- **Financial**—In general, the longer an alternative, the higher the anticipated cost
- **Constructability**—The longer an alternative, generally the more likely to encounter difficult construction issues
- **Environmental**—The longer an alternative, the more opportunity to infringe upon sensitive environments
- **Safety**—The longer an alternative, the more likely the exposure to conflicts
- **Ridership**—The longer an alternative, the longer the travel time

Because of the relatively flat topography in this region, no alternatives were considered that would incur significant, costly design solutions (e.g., tunneling through a mountain) as a trade-off to length.

Alternative routes ranged from a minimum of 117.2 miles to a maximum of 185.7 miles, where the average alternative route length was 140.7 miles. The alternatives were evaluated based on the overall length, where the longer alternatives were considered less desirable due to considerations such as higher cost, increased travel time, and higher likelihood of environmental impacts.

Corridor Routing Screening Results

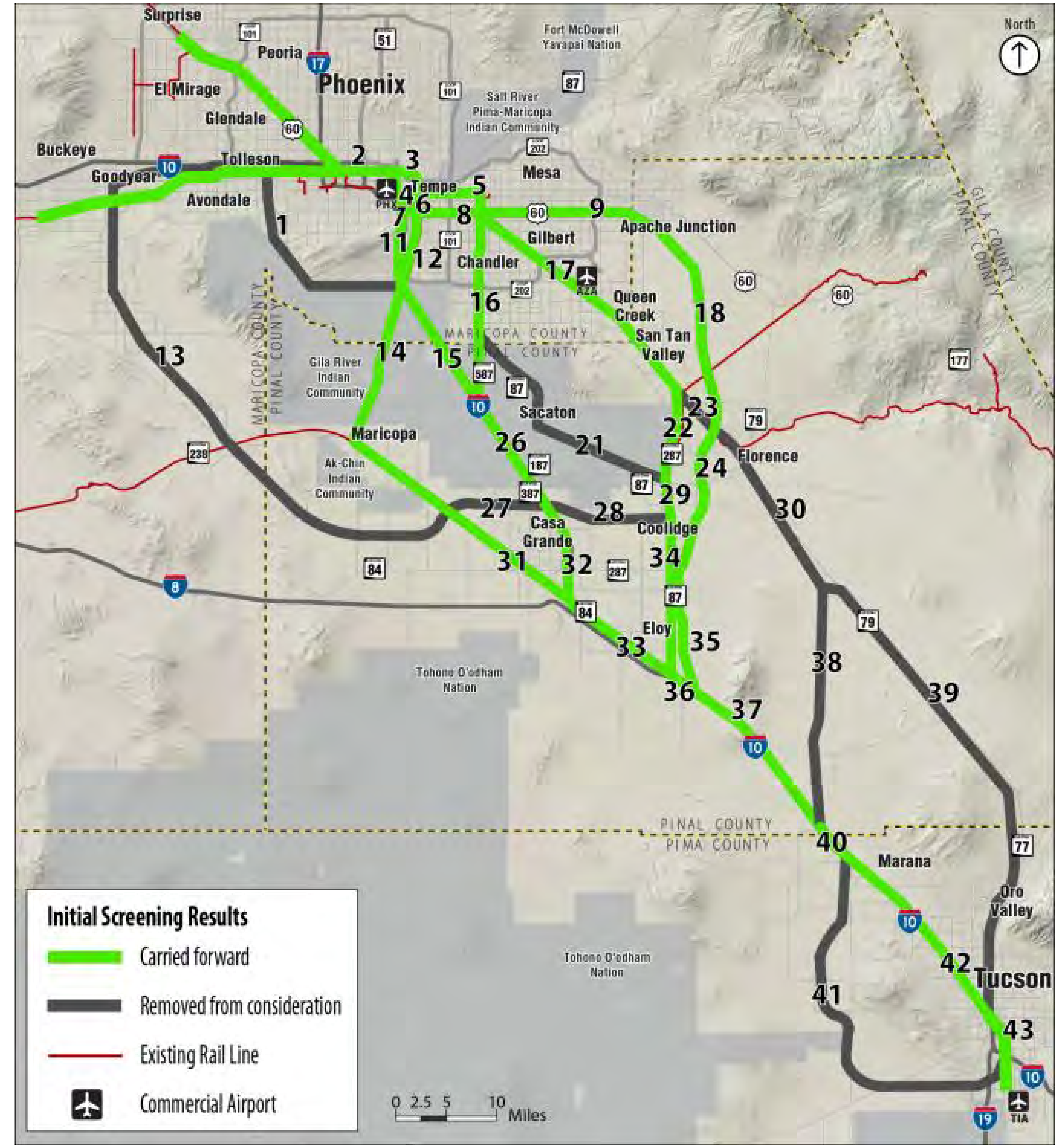
Using the data, analysis, and ranking process described in the previous section and in Appendix D: Initial Screening, the individual segments and overall alternative routings were evaluated and ranked. Based on this evaluation, several segments were removed from further consideration as parts of viable routings. The segments removed are depicted graphically in black on Figure 47. The green segments are those advanced for consideration as Conceptual Alternatives. The dashed green lines represent potential extensions to the initial alternative connection between Tucson and Phoenix. At the conclusion of Initial Screening, it was decided that these potential extensions would be carried forward as a part of any viable alternative.

Some criteria used in the Initial Screening were weighted more heavily than others (Table 9). Weightings for the various evaluation criteria were based in a large part on input gleaned during the public outreach process. Travel time, speed, and mobility were strongly emphasized in public sentiments. Therefore, the total length of routing alternatives was considered the most influential to a route's performance, due to the likely impact route length could affect financial, ridership, and service performance aspects of the route. Infringement on sensitive environments was considered the second most influential, followed by compatibility with community land use plans and existing or planned transportation use. Institutional considerations were considered the least influential during this initial high-level evaluation.

Table 9—Initial Screening Criteria Weighting

Evaluation criteria	Share of Total Score (%)
Existing or planned transportation use	14%
Infringement on sensitive environments	16%
Compatibility with community land use plans	14%
Institutional considerations	13%
Length of routing alternative	43%

Figure 47—Segments Used in Alternatives for Further Study



*Segments carried forward are intended to represent general corridors and do not assume the use of a particular underlying transportation facility, such as I-10 or the UP Sunset Route

Potential Station Location Screening

As depicted graphically on Figure 32, potential station locations were considered as part of the Initial Screening only to the extent that they could inform decisions on routing alternatives. For example, consideration of potential station locations assisted in determining which routing alternatives serve major population concentrations, important regional activity centers, and provides connections to airports, freeways, or other transit systems. However, no stations were removed from consideration as a result of the high-level screening at this initial stage. The general location used for consideration at this stage does not indicate a precise location, but a broad area or district within a community. Considerations of potential station areas included travel markets and connections.

Travel Markets

The travel market evaluation is a multi-part measure using data for population and employment within a wide catchment area of a potential station to gauge a route's ridership demand. Existing and future (2035) timeframes were used to assess potential ridership, with preference given to existing conditions over the future anticipated conditions.

Figure 48—Commuter Rail Bicycle Connection

Connections from Station

A second consideration for each potential station location was access to other transportation connections within close proximity to a general catchment area:

- **Transportation connections**—Pedestrian, bicycle, and local street connections were measured by an intersection count within a catchment area as a surrogate for urban density.
- **Fixed guideway transit connections**—Fixed guideway transit connections (existing, planned, and programmed) within a catchment area were identified for each potential station location.
- **Other transit connections**—The number of non-fixed-guideway transit connections was identified within each catchment area.
- **Freeway connections**—Freeway connections were identified within each catchment area, by measuring the distance from a potential station location to the nearest freeway.
- **Airport connections**—A straight-line distance from a station location to the nearest commercial aviation passenger terminal was measured for each potential station area.

The potential station locations considered at this initial stage and included as Conceptual Alternatives were only those located along high-performing routing alternatives. Although this high-level consideration of potential station locations was necessary to inform decisions on the route screening process, it in no way precluded the inclusion of lower performing stations in later levels of analysis. In addition, other potential station locations not considered at this stage were identified along routing alternatives in latter stages of the study. The calculation process used to measure travel markets and connections from station is described in detail in Appendix D: Initial Screening.

3.1.3 Initial Screening Technical Results

The Initial Screening technically evaluated route segments and unique alternative routings from Tucson to Phoenix using the evaluation categories and measures described throughout Section 0. At the conclusion of this evaluation phase, technically high-performing potential routings were combined with potential station locations to create seven viable Conceptual Alternatives that could provide realistic opportunities for competitive high-capacity service. The Conceptual Alternatives were conceived during a project team "bundling" exercise, which pieced together each alternative using the technical corridor route screening results and potential station locations described previously, as well as input from the public and affected agencies. Each Conceptual Alternative would provide a viable connection between the Tucson and Phoenix metropolitan areas, as well as key population and employment centers throughout each region. These Conceptual Alternatives were identified for further analysis and are described in Section 3.2.1.

3.1.4 Initial Screening Public and Agency Outreach Considerations

Conceptual Alternative routing and station area decisions were made with consideration of public and agency input. Public comments received during the public scoping process in fall 2011 were used during the bundling exercise. Those initial comments made clear the desire for the project to improve travel time and overall mobility to an extent competitive with the automobile, to limit impacts to sensitive environments by using existing transportation corridors, to offer connections to regional airports, to offer commuter and intercity service, and to improve safety. Common themes identified from public scoping comments are shown by category in Table 10. These major themes and desired attributes gleaned from the public were reflected in the definition of the Conceptual Alternative routes and stations.

Figure 49—Public Scoping

Table 10—Public Scoping Common Themes

Comment Category	Number of Comments	Share of Comments (%)
Financial feasibility	1,199	8%
Operational characteristics	1,841	13%
Safety and security	1,720	12%
Mobility	6,858	48%
Environment	1,858	13%
Economy	742	5%

The project team also used input from agency partners throughout the study area for the formation of the Conceptual Alternatives, based on the opinions on their preferred routes, station locations, and service options for the project obtained during the CST workshops in summer 2011. As with the public, agencies expressed a preference for an alternative that would utilize existing or planned transportation corridors, offer commuter and intercity service, and provide airport connections. In particular, agency input on major activity centers and desired local station locations, as well as insight into potential local conflicts were important considerations in the bundling of potential station areas to potential routes to form each Conceptual Alternative.

3.2 Conceptual Alternatives (Level 2 Evaluation)

This section outlines the Level 2 Evaluation process, which provides a detailed analysis of the seven Conceptual Alternatives to arrive at the Final Alternatives as shown in Figure 50. These alternatives are described in Section 3.2.1, shown on Figure 51 through Figure 58. Each consists of a unique route, set of potential stations, and selected operating characteristics. The criteria used in the Level 2 Evaluation included measurements designed to evaluate the route, station locations, and operating characteristics of each alternative, differentiating between the commuter and intercity service features. Decisions regarding the definition of each Conceptual Alternative were made with the consideration of technical evaluation and public outreach results.

Figure 50—Conceptual Alternative Evaluation

- **Technical input**—The Conceptual Alternatives were principally based on the Initial Screening of corridor route segments and potential station areas. High-performing route segments described in "Route Segments" (under Section 3.1.1), were combined with potential station areas to form each unique alternative. The majority of station locations carried forward were those that were located along high-performing route segments. Other stations included major activity centers that were evaluated highly and would be more desirable to bundle with routings to create a complete alternative between Tucson and Phoenix.
- **Public input**—The routes, station locations, and service options included in the Conceptual Alternatives reflect input received from the public during project scoping. Major comment themes stressed the importance of travel time, commuter and airport service, and the utilization of existing transportation corridors.
- **Agency input**—The Conceptual Alternatives also reflect the opinions of affected agencies within the study area who expressed thoughts on preferred routes, station locations, and potential challenges within their local jurisdictions.

3.2.1 Description of Conceptual Alternatives

The seven Conceptual Alternatives evaluated in the Level 2 Evaluation are described below and shown on Figure 51 through Figure 58. The potential station areas included in each alternative are identified as general catchment areas providing access to activity and population centers along each route but are not meant to represent specific sites. Although defined and evaluated as 1-mile-wide corridors, high-level cost estimates calculated at this stage required some general assumptions about the infrastructure that would be necessary to construct each alternative route. These illustrative infrastructure assumptions were included in alternative definitions for cost purposes only and in no way prevented changes to these assumptions in later stages of evaluation.

- **Blue (Bus) Alternative**—A bus alternative that would use existing HOV lanes on I-10 within Maricopa County, a new dedicated busway on I-10 from Chandler to Tucson, as well as local arterials within downtown Phoenix and downtown Tucson. System Hub stations would include Central Station in Downtown Phoenix and the Rondstadt Transit Center in downtown Tucson. Other stations would be placed along I-10, within or adjacent to the freeway (Figure 52).
- **Green Alternative**—A rail alternative that would use mostly I-10 right-of-way to create the most direct route between Phoenix and Tucson. The route would begin in downtown Phoenix on an elevated viaduct, following Washington Street and SR 143 rights-of-way, before returning to grade within the I-10 corridor and following I-10 into Tucson. Stations along I-10 would be placed within or adjacent to the freeway. Within Tucson, the route would follow the abandoned El Paso-Southwestern rail corridor from I-10 right-of-way to the southern System Hub in downtown Tucson (Figure 53).
- **Orange Alternative**—A rail alternative that would use existing and planned freeway rights-of-way to connect Phoenix and Tucson via eastern Maricopa County and central Pinal County. The route would begin elevated in downtown Phoenix on Washington Street and remain in an elevated structure, following SR 202L, SR 101L, US 60, and Ellsworth Road rights-of-way before returning to at-grade construction near the Phoenix-Mesa Gateway Airport. The route then would proceed south following an exclusive transit corridor planned in the proposed Superstition Vistas community and planned North-South Freeway corridor into Eloy. The route would utilize I-10 and El Paso-Southwestern rail rights-of-way to connect Eloy to the Tucson System Hub station (Figure 54).
- **Purple Alternative**—A rail alternative that would use existing freight rail corridors, new greenfield corridors, and I-10 rights-of-way to connect Phoenix and Tucson through Chandler and GRIC. The route would connect downtown Phoenix to north Tempe by means of Washington Street in an elevated structure, returning to at-grade construction and following the existing UP Phoenix Subdivision and UP Chandler Branch rail corridors through Tempe, Mesa, and Chandler into GRIC jurisdiction. The route then would use a new greenfield corridor through Sacaton until meeting I-10 and use freeway and El Paso-Southwestern rail rights-of-way south into downtown Tucson (Figure 55).
- **Red Alternative**—A rail alternative that would connect Phoenix, Maricopa, and Tucson using existing freight rail and highway corridors. The route would begin in downtown Phoenix on an elevated viaduct, follow Washington Street east, and return to at-grade construction within UP Phoenix Subdivision rights-of-way. The route then would follow UP Tempe Branch and SR 347 rights-of-way into Maricopa and use the Maricopa-Casa Grande Highway, I-10, and El Paso-Southwestern rail rights-of-way into downtown Tucson (Figure 56).
- **Teal Alternative**—A rail alternative that would be built within both existing freight rail and planned freeway corridors to serve Phoenix and Tucson by way of eastern Maricopa County and central Pinal County. The route would use Washington Street right-of-way between downtown Phoenix and north Tempe on an elevated structure and return to at-grade construction within UP Phoenix Subdivision right-of-way north of Tempe Town Lake. The route then would follow UP Southeast Branch and Copper Basin Railway corridors through the East Valley into Pinal County, meeting the planned North-South Freeway corridor. The alternative then would use the planned North-South Freeway, I-10, and El Paso-Southwestern rail rights-of-way to Tucson (Figure 57).
- **Yellow Alternative**—A rail alternative that would use, exclusively, UP rights-of-way or track from downtown Phoenix to downtown Tucson, including the UP Phoenix Subdivision, UP Southeast Branch, and Sunset Route from Eloy to Tucson. System Hub stations would be located at, or in close vicinity of Union Station in downtown Phoenix and the historic Tucson Rail Depot, which currently serves as the Tucson Amtrak Station. At this stage of analysis, the Yellow Alternative was assumed to use only existing freight rail corridors and no freeway corridors (Figure 58).

Figure 51—Conceptual Alternatives

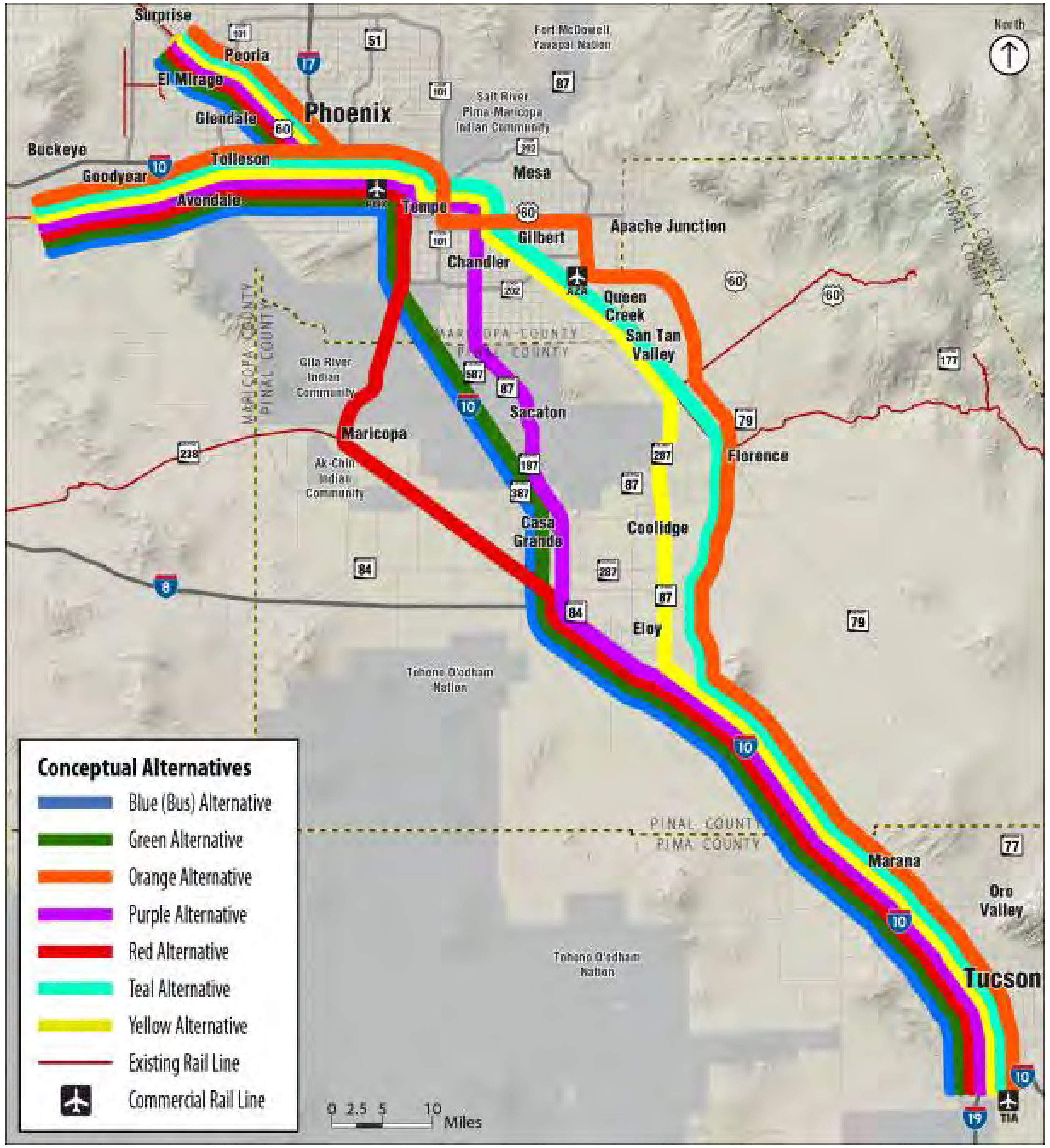


Figure 52—Conceptual Blue (Bus) Alternative

Figure 53—Conceptual Green Alternative

Figure 54—Conceptual Orange Alternative

Figure 55—Conceptual Purple Alternative

Figure 56—Conceptual Red Alternative

Figure 57—Conceptual Teal Alternative

Figure 58—Conceptual Yellow Alternative

All Conceptual Alternatives include extensions into the West Valley in the Phoenix metropolitan area (to Surprise along the BNSF Railway line along Grand Avenue and to Buckeye along the UP Wellton Branch and, at the southerly end, to Tucson International Airport on the UP Nogales Branch. Though these extensions do not materially influence the routing decision between the Tucson and Phoenix metropolitan areas, they represent critical linkages within the two major metropolitan areas for commuter rail services and for linkages to other metropolitan areas, such as Los Angeles and Las Vegas.

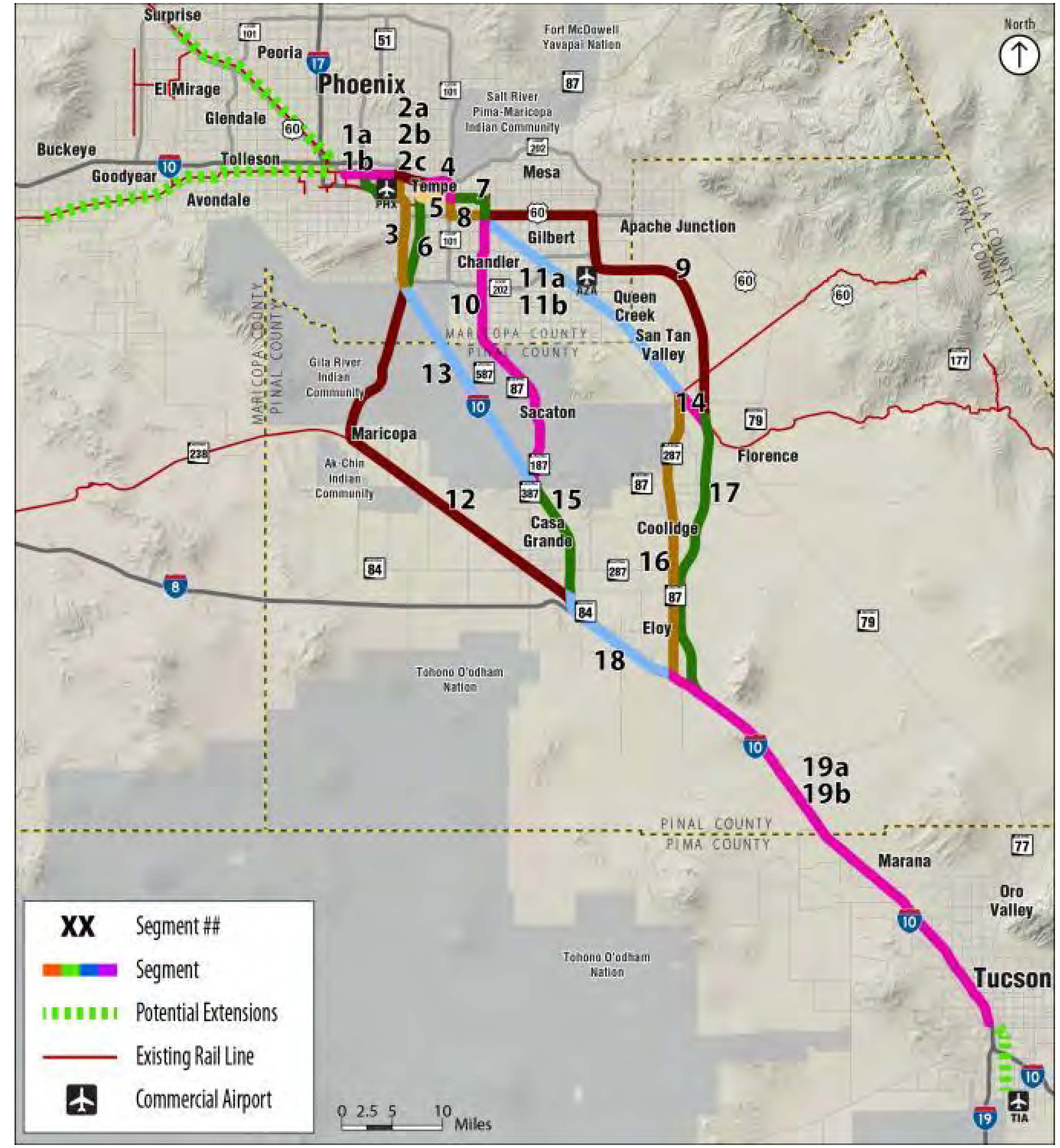
Route Segments

The route of each Conceptual Alternative was developed based on the alignments that remained after the Initial Screening analysis of proposed segments, public and agency input, and a project team "bundling" workshop that combined the remaining route options with potential station locations to identify viable alternatives for more detailed analysis. For evaluation purposes, the alternative routes were separated into a total of 25 unique alignment segments, many of which would be used by multiple alternatives (Figure 59). The routes were separated into segments at locations where alignments intersected one another or where the assumed travel mode or underlying property ownership differed between alternative alignments. For example, the complete Green Alternative route is made up of segments 1a, 3, 13, 15, 18, and 19a. Segments with "b," such as "1b," indicate the use of UP right-of-way or track. Segments were evaluated at this stage as 1-mile-wide corridors where possible, a significant refinement on the 4-mile-wide corridors evaluated as part of the Initial Screening

Evaluating routes by this means allowed flexibility by making clear problematic sections of Conceptual Alternative routes that could be changed in later stages of the analysis. For example, every Conceptual Alternative followed a very similar corridor between Eloy and Tucson (shown as segments 19a and 19b on Figure 59). Segment 19a assumed the use of I-10 rights-of-ways while 19b assumed the use of the UP Sunset Route. If either segment was found to have a major conflict or fatal flaw that prevented the eventual development of a route, an alternative could be redefined in later stages of the study to include a different segment without drastically changing the context of an alternative.

The western extensions from downtown Phoenix to Surprise and Buckeye and the southern extension from downtown Tucson to Tucson International Airport are absent from the route segments evaluated as part of the Level 2 Evaluation. Although these potential extensions are included in the definition of every Conceptual Alternative, they do not materially influence the routing decision between the Tucson and Phoenix metropolitan areas and were assumed to be carried forward for further analysis.

Figure 59—Route Segments—Level 2 Evaluation



Potential Stations

The stations of each Conceptual Alternative were identified following the Initial Screening process and project team bundling workshop, based on the route segments that were advanced, planned activity and population centers, as well as public and agency input. As with the Initial Screening, potential station locations were considered to assist in the assessment of route segments and to help inform decisions about alternative routings. For Level 2 Evaluation purposes, the station areas of the seven Conceptual Alternatives were separated into a total of 34 unique station areas (Figure 60). The general locations of the station areas for the Level 2 Evaluation were determined by their placement within the alternative corridors.

As detailed station areas are not defined as part of this study, each station area was considered as a 1/2-mile-radius catchment area. The smaller catchment size was determined based on the need for more advanced analysis of local station context at this stage but is intended to allow for flexibility in later stages of analysis.

Table 11 lists the preliminary name, general location, community, and station type of every station area used for the Level 2 Evaluation. Although described by general location, potential station locations were defined as 1/2-mile-radius catchment areas and were not intended to represent specific sites or exact locations. In addition, potential station locations were only evaluated as a means to gauge the performance of an alternative route and inform routing decisions during later stages of the study. The evaluation does not preclude any station area located on a studied route from being carried forward for further analysis in later stages of the project.

Station types were assigned on a preliminary basis in order to determine operational characteristics for evaluation purposes, such as speed and travel time, for local and express service of each alternative. The three station types are described below.

- **System hub**—A downtown station in Phoenix or Tucson that serves as a key origin and destination point for both commuter and intercity trips within the corridor
- **Regional station**—A station located in an urban community or outlying regional destination area that would be served by both local commuter service and express intercity trips
- **Local station**—A station located in a local community that would be served by local or commuter trips only

Figure 60—Potential Station Areas—Level 2 Evaluation

Table 11—Potential Station Areas—Level 2 Evaluation

Station ID	Station Name	General Location *(Not Exact)*	Community	Station Type
1	Phoenix Central Station	Van Buren St & Central Ave	Phoenix	System Hub
2	Downtown Phoenix	Washington St & First Ave	Phoenix	System Hub
3	Union Station	Central Ave & UP PHX Subdivision	Phoenix	System Hub
4	Sky Harbor (West)	Buckeye Rd & 24th St	Phoenix	Local
5	PHX Sky Train	Washington St & 38th St	Phoenix	Regional
6	PHX Sky Train (UP)	38th St & UP PHX Subdivision	Phoenix	Regional
7	North Tempe	Center Pkwy & UP PHX Subdivision	Tempe	Local
8	Downtown Tempe	5th St & UP PHX Subdivision	Tempe	Local or Regional
9	Chandler Blvd	I-10 & Chandler Blvd	Chandler	Local
10	Chandler Blvd (UP)	Chandler Blvd & UP Tempe Branch	Chandler	Local
11	Downtown Mesa	Country Club Dr & UP Chandler Branch	Mesa	Local
12	Downtown Chandler	Chandler Blvd & UP Chandler Branch	Chandler	Regional
13	Gilbert Rd	Gilbert Rd & US 60	Mesa	Local
14	Downtown Gilbert	Gilbert Rd & UP Southeast Branch	Gilbert	Local
15	Power Rd	Power Rd & US 60	Mesa	Local
16	Cooley Station	Williams Field Rd & UP Southeast Branch	Gilbert	Regional
17	Gateway Airport	Ellsworth Rd & Ray Rd	Mesa	Regional
18	Downtown Queen Creek	Ocotillo Rd & UP Southeast Branch	Queen Creek	Regional
19	Maricopa	Hathaway Ave & UP Mainline	Maricopa	Local
20	Sacaton	Sacaton Rd & Casa Blanca Rd	Sacaton	Local
21	San Tan Valley	Bella Vista Rd & UP Southeast Branch	San Tan Valley	Local
22	Superstition Vistas	Planned Activity Center	Superstition Vistas	Local
23	Downtown Casa Grande	Florence St & UP Mainline	Casa Grande	Regional
24	Florence Blvd	Florence Blvd & I-10	Casa Grande	Regional
25	Downtown Coolidge	Northern Ave & UP Southeast Branch	Coolidge	Regional
26	Coolidge-Florence	Vah Ki Inn Rd & Clemans Rd	Florence	Regional
27	Alsdorf Rd	Alsdorf Rd & I-10	Eloy	Local
28	Eloy (UP)	UP Mainline & UP Southeast Branch	Eloy	Local
29	Eloy (North-South)	UP Mainline & North-South Freeway	Eloy	Local
30	Tangerine Rd	Tangerine Rd & I-10	Marana	Regional
31	Ina Rd	Ina Rd & I-10	Marana	Local
32	Downtown Tucson	Central Ave & Congress St	Tucson	System Hub
33	Ronstadt Transit Center	6th Ave & Congress St	Tucson	System Hub
34	Amtrak Tucson Station	4th Ave & UP Mainline	Tucson	System Hub

*The general locations of stations are provided for basic orientation and to distinguish stations in close proximity, and are not meant to represent exact positions or specific sites

*Assigned station types are preliminary at this stage for basic service assumptions

Operating Assumptions

Basic operating assumptions, such as average speed and travel time between Tucson and Phoenix, were developed for the Level 2 Evaluation based on the specific routes and station areas included in each Conceptual Alternative. The calculation to determine average speed and travel time for each alternative was a factor of the length and route of the alignment; the location, number, and distance between potential station areas; and specific speed limitations, acceleration and deceleration rates, and total dwell times specified for each alternative.

Speed and travel time assumptions for local commuter and express intercity service were differentiated based on the station areas included in the calculation. Trains operating for local commuter service were assumed to stop at every station along the route, whereas express intercity trains were assumed to only stop at regional stations.

Only route segments and station areas which could be used to connect downtown Tucson to downtown Phoenix were used in the Level 2 Evaluation.

3.2.2 Level 2 Evaluation

The Level 2 Evaluation consisted of screening each Conceptual Alternative based on a set of individual technical evaluation criteria within six measurement categories. The Level 2 Evaluation was the second of three alternative evaluations as represented in Figure 61. Evaluation criteria used in this stage of the analysis fall into the general measurement categories of community acceptance and accessibility, environmental impacts, financial feasibility, operating characteristics, mobility, and safety.

The general measurement categories used for the Level 2 Evaluation, as well as the criteria included in each category, are summarized in Table 12 and presented further throughout this section. Individual Screening methods and results are summarized, as well as an explanation of how overall Level 2 Evaluation results were determined for each Conceptual Alternative. The results of the analysis of each category are discussed in the following sections. More details of the evaluation process can be found in Appendix E: Level 2 Evaluation.

Figure 61—Level 2 Evaluation

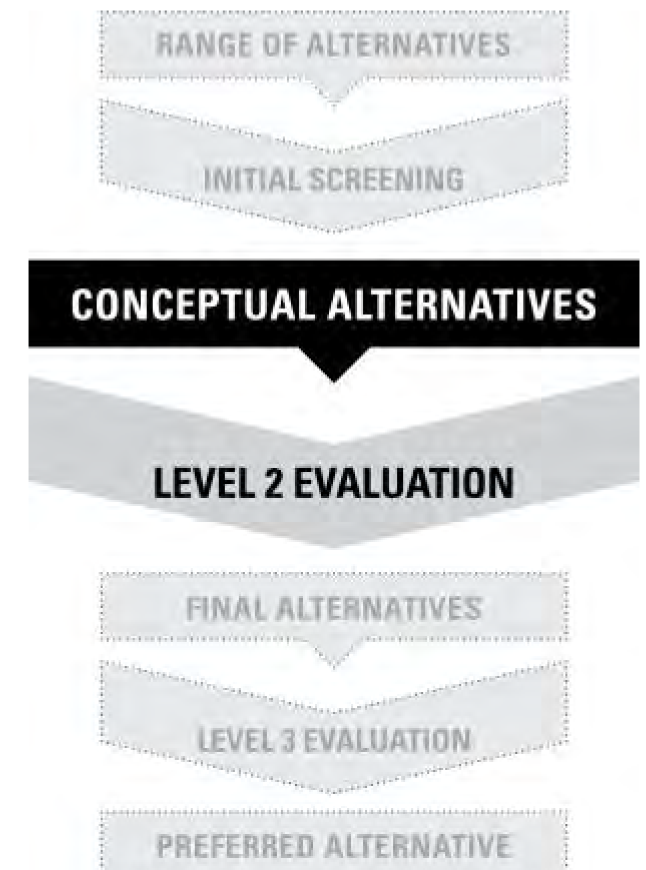


Table 12—Evaluation Criteria Overview—Level 2 Evaluation

Evaluation Criteria	Description	Evaluation Measure
Community Acceptance and Accessibility		
Compatibility with local plans	Effect of the alternatives on existing or proposed plans within the corridor	1-mile-wide route segment
Compatibility with underlying property ownership	Level of alternative negotiation required with independent agencies/nations/companies.	1-mile-wide route segment
Compatibility of station areas	Compatibility of local community station area development/plans with transit supportive urban design principles	1/2-mile station catchment
Existing population	Existing population within station area	1/2-mile station catchment
Existing employment	Existing employment within station area	1/2-mile station catchment
Future population	Future population within station area	1/2-mile station catchment
Future employment	Future employment within station area	1/2-mile station catchment
Environmental Impacts		
Noise receptors	Sensitive noise receptors which may be impacted within corridor	1-mile-wide route segment
Historic/cultural/archeological resources	Number of historic/cultural/archeological resources registered with the State Historic Preservation Office within corridor	1-mile-wide route segment
Water resources	Wetlands, flood plains, rivers, washes and arroyos which may be impacted within corridor	1-mile-wide route segment
Wildlife corridors	Number of wildlife corridors crossed as identified in the Arizona Missing Linkages report prepared by Arizona Fish and Game Department	1-mile-wide route segment
Biological resources	Quantified biological resources within corridor using the Arizona Game and Fish Department "SHCG" tool	1-mile-wide route segment
Financial Feasibility		
Operating cost (commuter)	Operating cost/year for commuter rail portion of service	Complete alternative route
Operating cost (intercity)	Operating cost/year for intercity rail portion of service	Complete alternative route
Capital cost (commuter)	Commuter rail capital costs including track, stations, rolling stock, maintenance yard, etc.	General alignment within route segment
Capital cost (intercity)	Intercity rail capital costs including track, stations, rolling stock, maintenance yard, etc.	General alignment within route segment
Ease of implementation	Relative costs of building route including potential property acquisition, construction challenges, public support, and negotiations	1-mile-wide route segment
Operating Characteristics		
Predictability and dependability	Anticipated reliability of route compared to baseline condition	Complete alternative route
Mobility		
Commuter demand	Estimate of commuter demand using FTA ARRF-II modeling tool	Complete alternative route
Intercity demand	Estimate of intercity demand using FRA CONNECT modeling tool	Complete alternative route
Commuter travel time (minutes)	Commuter travel time in minutes based on average travel speeds	Complete alternative route
Intercity travel time (minutes)	Intercity travel time in minutes based on average travel speeds	Complete alternative route
Safety		
Major conflicts	Estimate of at-grade railroad crossings needed for rail alternatives	General alignment within route segment

Community Acceptance and Accessibility

The individual criteria used to evaluate community acceptance and accessibility include compatibility with local plans, compatibility with underlying property ownership, compatibility of station areas, and populations served.

Compatibility with Local Plans

Compatibility with local plans is a general assessment of how well each route conforms to local transportation plans within the study area. The more compatible an alternative, the more likely the potential development of the alternative would meet local transportation goals and receive support from local communities along the route.

Each Conceptual Alternative was evaluated for compatibility with local plans by performing a qualitative assessment based on existing or proposed transportation plans within a corridor as well as impacts on built conditions. The compatibility with local plans for each complete alternative route was classified as either *compatible*, *compatible with difficulties*, or *incompatible*.

Figure 62—Superstition Vistas Transportation Plan

- **Compatible (C)**—An alternative route was considered to be compatible if it was identified in local plans consistent with the intent of the project or if the route was located in an existing or planned major transportation corridor. Examples of compatible portions of a route include I-10, US 60, and the planned North-South Freeway Corridor. A second consideration was whether an alternative violated the intended use of a transportation corridor. For example, the portion of I-10 within the GRIC exists subject to a lease agreement for highway uses only. The Green Alternative would potentially violate this agreement while the Blue (Bus) Alternative would not.
- **Compatible with difficulties (D)**—An alternative route was considered to be compatible with difficulties if it was not entirely reflected in local plans, would not create significant complications, or if some portions of the route would not be located in an existing or planned major transportation route while some of the route would require substantial negotiation. The southern portion of the Yellow Alternative that assumes use of the UP Sunset Route is an example of this, where the route is located within an existing major transportation corridor (UP-owned rights-of-way) but would require extensive negotiation with UP in order to share the Sunset Route transportation corridor.
- **Incompatible (I)**—An alternative route was considered to be incompatible if it would impact an already built condition, if it is not reflected in local plans, and if major portions of the route would not be located within existing or planned major transportation corridors. The Purple and Red Alternatives would be examples of

where major portions of the route would be built on undeveloped land or within the right-of-way of minor roads. An alternative was also deemed incompatible if it violates the intended use of the corridor, such as the Green Alternative which violates ADOT's I-10 lease agreement with GRIC.

Table 13 summarizes the compatibility score for each alternative. The Blue, Teal, and Orange Alternatives were considered compatible as they are all reflected as transportation corridors in adopted plans, while the Green, Purple, and Red Alternatives were deemed incompatible, as previously described. The Yellow Alternative is considered compatible with difficulties. The Yellow is located within an existing major transportation corridor, but would require substantial negotiation with UP in order to utilize the Sunset Route corridor. Level 2 Evaluation differs from the Initial Screening in that the corridor is more defined and the effects more localized.

Table 13—Compatibility with Local Plans

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Compatibility with local plans	C	I	C	I	I	C	D

C = compatible D = compatible with difficulties I = incompatible

Compatibility with Underlying Property Ownership

Compatibility with underlying property ownership is an indication of how difficult the development of a Conceptual Alternative would be in terms of acquiring or gaining access to the land required for construction or operation. The more compatible an alternative, the more easily needed rights-of-way could be obtained or used without substantial negotiation or cost.

Figure 63—UP Sunset Route

Each Conceptual Alternative route was evaluated for compatibility with underlying property ownership by making a qualitative assessment of the level of negotiation that would be required with independent agencies, nations, or companies in order to further pursue the development of the alternative. The compatibility with underlying property ownership was classified as either *compatible*, *compatible with difficulties*, or *incompatible*.

- **Compatible (C)**—An alternative route was considered to be compatible with existing property ownership if its development would require little to no negotiation with independent agencies, nations, or companies. For example, the Orange Alternative would be located completely within existing or planned public rights-of-way. A major portion of the Blue (Bus) Alternative would be located within GRIC-owned property. However, as a highway use, a bus alternative might not require significant additional negotiation.
- **Compatible with difficulties (D)**—An alternative route was considered to be compatible with difficulties if a portion of the route would be incompatible with underlying property ownership while the remainder would be at least partially compatible, requiring at least a moderate level of negotiation with independent agencies, nations, or companies. For example, the Teal Alternative is primarily located in public owned rights-of-way with a portion located within UP-owned rights-of-way.
- **Incompatible (I)**—An alternative route was considered to be incompatible if major portions of the route were considered incompatible with underlying property ownership, requiring a substantial level of negotiation with independent agencies, nations, or companies. For example, major portions of the Green, Purple, and Red Alternatives would be located within the GRIC. The development of the Yellow Alternative would also require substantial negotiation, as the entire alignment would fall within UP-owned rights-of-way.

Table 14 summarizes the compatibility score for each alternative. The Blue and Orange Alternatives were considered compatible, as they would be located either in public-owned rights-of-way or would not require any significant negotiation. The Yellow, Green, Purple, and Red Alternatives were deemed incompatible, since they would all require substantial negotiations with either GRIC or UP. The Teal Alternative was the only alternative that was considered compatible with difficulties, since it is located mainly in public rights-of-way but would necessitate some negotiation with UP.

Table 14—Compatibility with Underlying Property Ownership

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Compatibility with underlying property ownership	C	I	C	I	I	D	I

C = compatible D = compatible with difficulties I = incompatible

Compatibility of Station Areas

The compatibility of cities to host station locations and pursue compatible urban development around these stations, within an alternative, was assessed using a three-step process to inform communities about elements that foster successful station area planning and then evaluate the individual communities based on improvements/ projects that have been implemented or are planned for implementation.

The first step of this process was the Station Area Planning Exercise at the CST meetings held in July and August 2012. The exercise served to:

- Gain an understanding of land use, urban form, and transit connectivity elements that contribute to a rail transit-ready environment
- Illustrate public policy and private actions required to proactively prepare for rail transit
- Understand regulatory and policy changes needed
- Understand land use thresholds required by FRA and FTA to obtain federal funding

The second step was to complete the "Community Readiness Assessment for Rail Transit" form, a self-assessment that was mailed to all communities in the study area that could host a passenger rail station in the future. This assessment served to review each community's plans and policies for land use, mobility, connectivity, building design, housing affordability, and parking that are required to support and enable successful station area development. Cities and towns were encouraged to involve representatives from the Planning/Community Development, Economic Development, Housing, Transportation, Public Works, and Real Estate departments in the self-assessment.

The third step of this process included individual meetings with candidate station location cities and towns along the rail corridor alternatives, where the project team discussed the output of the "Community Readiness Assessment for Rail Transit" form submitted by the community, updated the community on the alternatives evaluation, and elaborated on the implications of a possible station site selection in that municipality. Information received through the self-assessment and during the individual community meetings was used to evaluate each municipality based on its readiness to host a future passenger rail station. Weighted scores were used to evaluate the communities on the following criteria:

- Land use
- Mobility and connectivity
- Activity center building design
- Housing affordability
- Parking

In addition to the above criteria, the communities were scored on their potential ability to facilitate nearby development conducive to a successful station, through formal general plans, zoning ordinances, or other planning documents. Based on the cumulative evaluation scores, communities were then classified into the following four categories related to their ability to host station development:

- Ready
- Nearly ready
- Developing
- In transition

Table 15 summarizes the total quantitative compatibility score of all station areas included in each Conceptual Alternative, as determined by the assessment and detailed in Appendix E: Level Evaluation. The quantitative scores for each alternative were then aggregated as either *compatible*, *compatible with difficulties*, or *incompatible*, based on the relative score among all seven alternatives. In general, the Yellow, Orange, Purple, and Teal Alternatives were deemed compatible as most stations included in the alternatives would be located in denser downtown areas more amenable to a rail station. Many of the stations included in the Blue and Green Alternatives would be located within vicinity of I-10 at locations with less supportive land policies and density.

Figure 64—Tucson Amtrak Station

Figure 65—Tempe Historic Rail Depot

Table 15—Compatibility of Station Areas

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Quantitative score	326	326	467	425	415	462	462
Compatibility of station areas	I	I	C	C	D	C	C

C = compatible D = compatible with difficulties I = incompatible

Populations Served

Populations served is an indication of the number of people who would be able to access the rail route and stations. The higher the number, the more opportunity the service has to attract ridership and result in benefits to the surrounding communities.

An evaluation of the potential populations served was a quantitative process that used existing and future population and employment information. The analysis was conducted utilizing a 1/2-mile-radius catchment area for each station location and demographic data from the AZTDM2. The 1/2-mile-radius catchment area differs in size from station catchments in other levels of analysis but was deemed appropriate for Level 2 Evaluation to avoid overlap between many station areas in close vicinity. For the purpose of the Level 2 Evaluation, AZTDM2 outputs were produced for 2008 for existing population and employment and 2035 for future population and employment. Table 16 summarizes the quantitative score of station area existing population for each alternative. The higher the number, the more the alternative is likely to generate ridership for the proposed system.

Table 16—Station Area Populations Served

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Existing population	9,700	10,400	15,500	23,000	17,400	24,800	28,400
Existing employment	96,600	90,600	94,300	107,500	99,300	108,200	89,500
Future population	11,900	12,800	20,000	30,000	20,400	35,200	39,700
Future employment	155,900	151,000	159,800	177,700	166,100	179,500	149,400

Environmental Impacts

The individual criteria measures used to determine the general category score for Environmental Impacts are potential noise receptors; historic, cultural, and archeological resources; water resources; wildlife corridors; and biological resources. A more complete environmental review for the Final Alternatives can be found in the companion Tier I EIS for this project.

Potential Noise Receptors

Noise receptors gauge the potential disruption an alternative's operation could cause to adjacent residences and parks along the route. The higher the number of receptors, the more likely the service will have adverse noise effects on adjacent communities and face potential challenges to implementation.

Potential noise receptors were evaluated by determining the number of sensitive noise receptors located within 1/2 mile of each alignment segment's centerline. Table 17 summarizes the total number of noise receptors in each alternative. The Green and Blue Alternatives have the same score, as each alternative shares essentially the same route, and do not differ enough in the Tucson and Phoenix downtown areas to capture a different total of noise receptors.

Table 17—Potential Noise Receptors

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Noise receptors	30,123	30,123	51,041	55,404	36,428	56,372	57,154

Historic, Cultural, and Archeological Resources

The numbers of officially registered national historic sites or archaeological sites registered with the State Historic Preservation Office that are located within close proximity to an alternative's route were recorded. The greater the number of sites near a route, the more challenges the alternative could face to development. For this portion of the measure, the total numbers of historic, cultural, and archeological resources within 1/2 mile of a route were summed by alternative. Table 18 summarizes the quantitative score of historic, cultural, and archeological sites.

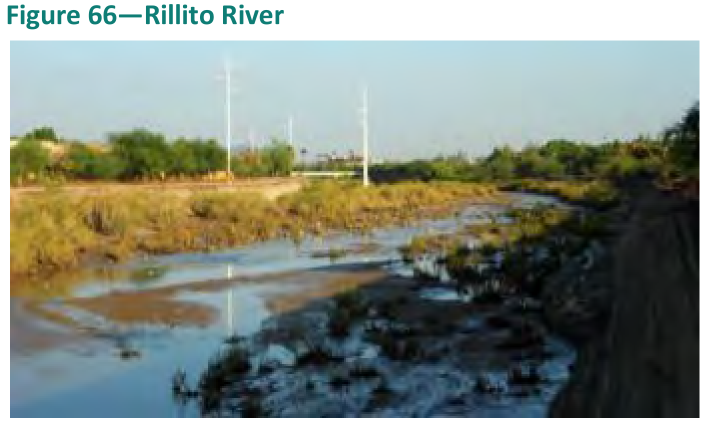
Table 18—Historic, Cultural, and Archeological

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Historic/cultural/archeological resources	531	531	604	610	643	666	657

Water Resources

The water resources of wetlands, floodplains, rivers, washes, and arroyos were measured to gauge the potential impact of each alternative on environmentally sensitive aquatic areas. The higher the number of water resources impacted, the higher the likelihood of harmful environmental effects.

Figure 66—Rillito River



The surface water resources of wetlands, floodplains, rivers, washes, and arroyos were evaluated by quantifying either acreage or linear feet of water resources within each 1/2-mile route segment. Wetlands and floodplains were measured in acres, while linear feet was used to quantify rivers, washes, or arroyos, using the most accurate GIS data at the time from the U.S. Fish and Wildlife Service. Information for wetlands, floodplains, and linear water features (rivers, washes, and arroyos) were each compiled and evaluated separately. Table 19 summarizes the quantitative score of water resources examined associated with each alternative. The total wetlands are the same for all but the Yellow Alternative, since the only wetlands impacted are located within a shared route segment north of Tucson.

Table 19—Water Resources

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Wetlands (acres)	65.8	65.8	65.8	65.8	65.8	65.8	50.5
Floodplains (acres)	16,500	16,500	12,200	17,700	19,100	12,200	12,000
Rivers, washes, and arroyos (linear feet)	700,000	700,000	900,000	798,000	745,000	611,000	581,000

Wildlife Corridors

Wildlife corridors indicate the potential impact of each alternative on sensitive wildlife areas. The greater the number of wildlife corridors that intersect an alternative, the greater potential for adverse effects on wildlife. Wildlife corridors within an alternative corridor were assessed based on information provided by the Arizona Wildlife Missing Linkages report prepared by the Arizona Game and Fish Department. The Linkages report identifies areas of "potential linkage zones" throughout the state that are deemed to be particularly sensitive to wildlife populations. For the purpose of the Level 2 Evaluation, the total number of potential linkage zones that fall within or intersect each alternative was used to determine the value of this criterion for each alternative. Table 20 summarizes the quantitative score of wildlife corridors associated with each alternative.

Table 20—Wildlife Corridors

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Wildlife corridors	5	5	10	7	5	7	7

Biological Resources

The biological resources assessment was based upon the SHCG tool published in 2011 by the Arizona Game and Fish Department. This SHCG tool provided a broad regional assessment of conservation potential in the study area. In the SHCG, conservation potential is measured in six levels, as shown previously in Section 3.1.2. Table 21 summarizes the quantitative score of biological resources associated with each alternative and the aggregated classification of *high, medium,* or *low* based on relative scores among alternatives. In general, alternative routes which travel through central Pinal County were shown to have greater conservation potential due to the low amounts of existing development. Calculation methods are documented in Appendix E: Level 2 Evaluation.

Table 21—Biological Resources

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Biological resources	170	170	200	177	159	206	203
	M	M	L	M	H	L	L

H = high M = medium L = low

Financial Considerations

This section describes the screening methods used to evaluate alignments in terms of financial feasibility. The individual criterion measures include annual operating costs, capital costs, and ease of implementation.

Annual Operating Costs

Annual operating cost assesses the cost of operating commuter and intercity services of each alternative for one year. The higher the annual operating costs associated with an alternative, the more difficult it would be to fund the alternative's continued operating and maintenance costs as well as life-cycle costs.

The evaluation of annual operating cost was conducted by estimating the total cost of operating and maintaining the services specified by each Conceptual Alternative for one year. The annual operating cost calculation for each alternative was based on standard train-hour and car-mile cost information from the 2010 National Transit Database (+3 percent per year inflation), the route characteristics of each Conceptual Alternative, as well as the operating assumptions discussed below:

- **Technology**—The use of 125-mph-capable diesel multiple unit (DMU) trains with the potential for future electric multiple unit train technology for all rail alternatives and 75 mph for express buses for the Blue (Bus) Alternative
- **Operating hours**—All train or express bus service would operate for a total of 14 hours each weekday, covering AM peak, midday, and PM peak periods
- **Vehicles per day**—The Yellow (UP exclusive) Alternative would operate 10 commuter trains and 8 intercity trains per day (18 total), due to shared freight track limitations; all other rail alternatives would operate 26 commuter trains and 8 intercity trains per day (34 total); the Blue (Bus) Alternative would operate 40 buses per day
- **Fleet size**—Total vehicle fleet size for each alternative was determined from route miles, peak and off-peak service hours, travel time for commuter and intercity service, and a 20-percent assumption for spare equipment

The route characteristics of each alternative and the operating assumptions discussed above were used to estimate fleet size, annual vehicle hours, and annual train or bus miles for each alternative to arrive at the annual operating cost estimate. The estimated fleet size, annual vehicle hours, annual vehicle miles, and total annual operating cost of each alternative is shown in Table 22. More detail on operating costs is included in Appendix F: Cost Assumptions.

Table 22—Total Annual Operating Cost

Annual Total	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Fleet size (DMU or express bus)	48	52	64	64	64	68	52
Train or bus hours	96,645	20,655	24,990	24,480	23,460	25,500	15,045
Train or bus miles	3,943,065	4,917,420	5,795,640	5,092,860	5,157,936	5,167,320	3,155,880
Operating cost	$107 M	$86 M	$102 M	$91 M	$92 M	$93 M	$56 M

M = millions

Table 23 provides a breakdown of the cost ratio for commuter and intercity services provided by each alternative, proportional to the service hours for commuter and intercity, respectively.

Table 23—Annual Operating Cost—Commuter and Intercity Share

Annual Total	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/ E. Valley	Yellow UP Tracks
Commuter share	—	$55 M	$65 M	$58 M	$59 M	$59 M	$23 M
Percent of total	—	64%	63%	64%	64%	64%	41%
Intercity share	$107 M	$31 M	$37 M	$33 M	$33 M	$34 M	$33 M
Percent of total	100%	36%	37%	36%	36%	36%	59%

M = millions

Capital Costs

Capital cost was evaluated by estimating the total cost of construction and equipment necessary to complete each Conceptual Alternative in 2012 dollars. Estimates included track, stations, rolling stock, maintenance yards, power systems, etc. The capital cost calculation for each Conceptual Alternative was based on the route characteristics of each alternative, unit costs from recent projects, industry data, and several cost assumptions discussed below:

- **Busway or track**—Double track was an underlying assumption for each rail alternative. In the portions of rail alternative routes that fall within existing rail corridors, track additions and improvements were assumed in order to ensure dual track along the entire length of the alignment. In the portions of rail alternative routes outside existing rail corridors, the construction of a new double track was assumed. The Blue (Bus) Alternative assumed the use of existing or planned HOV lanes where possible and the construction of two new dedicated bus lanes in sections of the alignment without existing or planned HOV lanes.
- **Equipment**—The use of electric multiple unit train sets was assumed for each rail alternative, specifically four vehicle trains for commuter service and eight vehicle trains for intercity service. The Blue (Bus) Alternative assumed the use of 48 electrified express buses for intercity service.
- **Crossovers**—The construction of universal crossovers was assumed at 5- to 10-mile spacing along each rail alternative route in order to allow trains to switch tracks when necessary during operations.

- **Right-of-way**—The purchase of right-of-way for the routes, stations, and maintenance facilities associated with each alternative was not considered within Level 2 Evaluation capital cost estimates. Although it is acknowledged that right-of-way cost could be significant, the alignments at this stage of analysis are not clearly defined enough to provide a complete picture of necessary right-of-way. Right-of-way will be an important factor in later stages of analysis.
- **Contingency**—A contingency of 40 percent was added to the total capital cost estimate of each alternative to cover such things as materials cost changes over the course of the project, significant design adjustments, inflation, interest rate changes, and unforeseen environmental mitigation.

Figure 67—Commuter Rail Construction

Source: Denver Regional Transportation District

The characteristics of each alternative, unit costs from recent projects, industry data, and the cost assumptions discussed above were used to calculate a high-level capital cost estimate for each alternative. Table 24 shows the total capital cost estimate for each Conceptual Alternative as well as a breakdown of the general cost categories used to calculate the total cost. The value of the 40-percent contingency was distributed throughout the various cost categories for the purpose of the estimate, with the remaining unallocated contingency indicated in the table. It is important to acknowledge that all capital cost estimates were calculated at a high level using comparable unit costs and factors for the purpose of distinguishing between Conceptual Alternatives. A more refined estimate of costs will be available once final alternatives are more clearly defined. More detailed calculations of the capital cost estimate is included in Appendix F: Cost Assumptions.

Table 24—Total Capital Costs

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Total Capital Cost	**$2.2 B**	**$7.8 B**	**$10 B**	**$7.5 B**	**$7.7 B**	**$7.6 B**	**$ 5.1 B**
Busway or track elements	$721 M	$2.7 B	$3.8 B	$2.3 B	$2.4 B	$2.4 B	$1.0 B
Stations and terminals	$42 M	$75 M	$115 M	$90 M	$80 M	$100 M	$75 M
Support facilities	$7.2 M	$100 M	$125 M	$125 M	$125 M	$135 M	$105 M
Sitework and special conditions	$133 M	$580 M	$670 M	$640 M	$660 M	$540 M	$420 M
Signal and power systems	$263 M	$1.7 B	$2.0 B	$1.8 B	$1.8 B	$1.8 B	$1.8 B
Vehicles	$72 M	$250 M	$310 M	$310 M	$310 M	$325 M	$250 M
Professional services	$308 M	$1.2 B	$1.6 B	$1.2 B	$1.2 B	$1.2 B	$0.8 B
Unallocated contingency	$295 M	$1.1 B	$1.4 B	$1.1 B	$1.1 B	$1.1 B	$0.7 B
Finance	$8 M	$8 M	$8 M	$8 M	$8 M	$8 M	$8 M

B = billions M = millions

Table 25 provides a breakdown of the total capital cost for commuter and intercity services based on the ratio of service hours for each type of service, as determined by operating cost estimates.

Table 25—Total Capital Cost—Commuter and Intercity Share

Annual Total	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Commuter share	—	$5.0 B	$6.4 B	$4.8 B	$4.9 B	$4.8 B	$2.1 B
Percent of total	—	64%	63%	64%	64%	64%	41%
Intercity share	$2.2 B	$2.8 B	$3.7 B	$2.7 B	$2.8 B	$2.7 B	$3.1 B
Percent of total	100%	36%	37%	36%	36%	36%	59%

B = billions

Ease of Implementation

Ease of implementation indicates the potential added costs associated with major construction, property acquisition, and jurisdictional issues. The higher the determined ease of implementation, the less likely an alternative will face costly and unanticipated challenges to implementation.

Each complete alternative was evaluated for ease of implementation by making a high level qualitative assessment of the relative costs of developing and constructing the complete alternative. Specifically, the measure was intended to gauge added costs due to factors such as property acquisition, construction challenges, public support, and negotiations with independent entities. For this measure, ease of implementation for each complete alternative alignment was classified as either *high, medium,* or *low*.

- **High (H)**—An alternative alignment was considered to have a high ease of implementation if its anticipated property acquisition costs would be minimal, have limited construction challenges, have acceptable overall public support, and have no substantial negotiation required to make the alignment available to the proposed service. The Blue (Bus) Alternative, for example, would most likely have minimal property acquisition costs (though it would require approval of the GRIC), few significant design challenges, and limited impacts compared to other alternatives.
- **Medium (M)**—An alternative alignment was considered to have a medium ease of implementation if its anticipated property acquisition costs would be moderate, have some construction or public acceptance challenges, or require some limited negotiation to acquire needed rights-of-way or operating licenses. For example, the Orange and Teal Alternatives may encounter higher right-of-way costs compared to other alternatives but would most likely be generally accepted by the public and would require only traditional negotiation to acquire rights-of-way or operating licenses.
- **Low (L)**—An alternative was considered to have a low ease of implementation if there would be significant anticipated property acquisition costs, significant construction challenges, challenges to public acceptance, and complex negotiation to acquire needed rights-of-way or operating permission. For example, the Green, Purple, Red, and Yellow Alternatives would have higher costs and would require substantial negotiations with either GRIC or UP.

As shown in Table 26, the Yellow, Green, Purple, and Red Alternatives were deemed to have a low ease of implementation since they would require substantial negotiation with either GRIC or UP. The Orange and Teal Alternatives were considered moderately implementable based on their general public acceptance and moderate costs related to construction. Only the Blue (Bus) Alternative was thought to have a high ease of implementation since the proposed express bus service along I-10 would be generally accepted by the public with minimal construction costs.

Table 26—Ease of Implementation

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Ease of implementation	H	L	M	L	M	M	L

H = high M = medium L = low

Operating Characteristics

This section describes the screening methods used to evaluate alternatives in terms of operating characteristics, which is based on the single criterion of predictability and dependability.

Predictability and Dependability

Predictability and dependability assesses the reliability of each alternative based on the effects of other transportation modes and weather conditions. The higher the reliability associated with an alternative, the less the chance for the operations of the alternative to be interrupted by conditions that can affect optimal performance.

Each complete alternative alignment was evaluated for predictability and dependability by making a qualitative assessment of anticipated reliability of the route in terms of impacts from other transportation modes and interference from adverse weather conditions. An example is the potential for operational conflicts between freight movements on the line and passenger service. For this measure, predictability and dependability for each complete alternative was classified as either *high, medium,* or *low*. Table 27 summarizes the evaluation of predictability and dependability for each alternative.

- **High (H)**—An alternative alignment was considered to have high predictability and dependability if there would be little to no anticipated impacts from other transportation modes or adverse weather conditions. For example, both the Green and Orange Alternatives would operate with zero interference from highway automobile or freight rail traffic, and the rail operation would be essentially unaffected by normal corridor adverse weather events.
- **Medium (M)**—An alternative alignment was considered to have a medium level of predictability and dependability if there would be moderate anticipated impacts from other transportation modes or adverse weather conditions. Major portions of the Purple, Red, and Teal Alternatives would have potential conflicts with freight rail traffic on UP-owned track.
- **Low (L)**—An alternative alignment was considered to have a low level of predictability and dependability if there would be significant anticipated impacts from other transportation modes or adverse weather conditions. The entire Yellow Alternative alignment would have potentially significant conflicts with freight rail traffic on UP-owned track whereas the Blue (Bus) Alternative would be impacted by both I-10 automobile congestion and potential dust and wind storms.

The Blue and Yellow Alternatives were considered to have a low level of predictability and dependability, based on interference from either automobile traffic on I-10 or freight operations within the UP corridor. The Green and Orange Alternatives had a high level of predictability since their operations would have no interference from other travel modes, while the Purple, Teal, and Red Alternatives were determined to have moderate predictability and dependability because of the portions of their alignments within UP-owned corridors.

Table 27—Predictability and Dependability

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Predictability and dependability	L	H	H	M	M	M	L

H = high M = medium L = low

Mobility

The individual criteria used to evaluate mobility include potential ridership and travel time.

Potential Ridership

Potential ridership is an indication of the potential demand for the assumed commuter and intercity services of each alternative. Potential ridership was evaluated in a two-pronged process using sketch planning tools to estimate ridership demand for both commuter and intercity services. The ARRF-II was used to estimate commuter travel demand, while intercity travel demand was estimated using FRA's CONNECT. Both sketch modeling approaches and screening results are discussed below and in more detail in Appendix E: Level 2 Evaluation.

Figure 68—Metrolink Commuter Train

Source: METROLINK

Commuter Demand

For purposes of the Level 2 Evaluation, the default mode of access and catchment assumptions along with potential station areas, alignment length, and assumed local operating speed were used as inputs into the ARRF-II model to produce an estimate for weekday commuter demand for each alternative. Table 28 summarizes the commuter demand associated with each alternative.

Table 28—Commuter Demand

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Commuter demand	1,250	4,200	5,900	5,550	5,200	6,250	5,600

Intercity Demand

Demand for intercity rail services was evaluated through ridership estimates produced by FRA's CONNECT. The tool is intended to be used during early stages of the planning process, before alignment and operational plans are fully developed. A complete breakdown of all CONNECT system assumptions used for each alternative is documented in Appendix E: Level 2 Evaluation. Table 29 details the CONNECT-generated order of magnitude daily demand estimates for each alternative.

Table 29—Intercity Demand

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Intercity demand	—	2,710	2,640	2,730	2,710	2,720	2,710

Travel Time

Travel time is an estimate of the duration of a trip between Tucson and Phoenix. Travel times were estimated from downtown Tucson to downtown Phoenix given the route and station areas specified for each alternative. The total travel time calculation for each alternative was based on the factors discussed below and based on the technology characteristics previously presented in Section 2.3.

- **Potential station areas**—The number of station areas included in each alternative and the distance by specified route between the stations served as the basis for the travel time calculation.
- **Maximum speed assumptions**—A maximum speed assumption was made for each alignment segment. The maximum speed assumption was based mainly on the character of development patterns adjacent to the alignment as well as the operational rules of shared track or roadway. The maximum speed assumptions are listed in detail in Section 2.3.
- **Standard acceleration and deceleration rates**—Acceleration and deceleration rates for rail alternatives were based on British Rail IC 125 Lightweight Diesel trains, which accelerate at an average of 0.58 mph/second and decelerate at an average of 1.75 mph/second. Average acceleration and deceleration rates for a 12.5 meter bus was used for the Blue (Bus) Alternative, which specify an average acceleration of 1.92 mph/second and an average deceleration of 5.76 mph/second.
- **Standard station dwell time**—Standard station dwell times represent the amount of time a train would stop at a station throughout a specified route. A dwell time of 90 seconds was assumed for station stops during commuter service, and a dwell time of 120 seconds was assumed for station stops during intercity service.

Commuter travel time was calculated based on the route, station areas, maximum speed assumptions, and standard acceleration and deceleration rates of each alternative. For commuter service, it was assumed that the train would stop for a standard dwell time of 90 seconds at every station area specified along the route from Tucson to Phoenix. Intercity travel time was calculated based on the route, station areas, maximum speed assumptions, and standard acceleration and deceleration rates of each alternative. For intercity service, it was assumed that the train would stop for a standard dwell time of 120 seconds at station areas specified as "regional stations." Table 30 summarizes the commuter travel time associated with each alternative.

Table 30—Travel Time

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Commuter travel time (minutes)	111	83	107	105	100	111	126
Intercity travel time (minutes)	111	73	88	90	85	91	110

Safety

This section describes the screening method used to compare alternatives in terms of safety, which is based on the single criterion of major conflicts.

Major Conflicts

Major conflicts gauge the potential of trains or buses associated with each alternative to collide with other vehicles at conflict points. The lower the number of conflict points along an alternative's route, the safer the alternative's operations. Each alignment was evaluated in terms of the number of identifiable conflict points along the route segment. Conflict points for rail alternatives were determined by the number of existing or anticipated at-grade road crossings along each route, where the moving train could potentially collide with crossing vehicles. It is important to note that construction assumptions, such as the installation of elevated railway structure, bridges, and grade separations within each rail alignment segment, were considered for the purposes of evaluation. For example, a route segment located within an existing rail corridor may be considered to have fewer at-grade road crossings than the existing track operating environment after incorporating needed improvements to the track, such as improved gates. The bus alternative was assumed to have potential for automobile collisions throughout the entire route, since it would operate within traffic on local roads and I-10. Table 31 summarizes the major conflicts associated with each rail alternative.

Figure 69—Tempe At-grade Rail Crossing

Table 31—Major Conflicts

Criteria	Blue	Green	Orange	Purple	Red	Teal	Yellow
	I-10 Busway	I-10 Rail	Central Pinal/ E. Valley	I-10/UP Chandler Branch	Western Pinal/UP Tempe Branch	North-South Corridor/ E. Valley	UP Tracks
Major conflicts	0	0	0	31	38	26	74

3.2.3 Level 2 Evaluation Technical Results

The Level 2 Evaluation screened seven Conceptual Alternatives against various quantitative and qualitative criteria within six general measurement categories. Each complete alternative encompassed several elements, including a route, potential station areas, and operating assumptions. The individual criteria included in the Level 2 Evaluation assessed individual elements within each alternative or the alternative as a whole.

Table 32 shows the general measurement category scores of each alternative, summarized into an overall assessment of each alternative in terms of the six evaluation categories. The relative score for each general measurement category were summarized on a scale of 1 to 3 (3 being desirable and 1 being less desirable), and shown graphically using "Harvey Ball" symbols as 5 = 3, 3 = 2, and 1 = 1. When all general measurement category scores are averaged by alternative and ranked comparatively, the Orange Alternative performed the best overall. The Green and Teal Alternatives also scored highly, while the Blue (Bus), Red, and Yellow Alternatives scored below average.

The Orange Alternative scored the highest overall because the alternative's operations would have no jurisdictional issues with GRIC or UP, would face no interference from automobile or freight rail traffic since the route avoids both I-10 and the UP corridor, and would serve many major population and employment centers. The Green, Teal, Purple, Blue (Bus), and Red Alternatives received average overall assessments due to mixed overall results among the general measurement categories. The Yellow Alternative scored low overall due mainly to potential conflicts with UP operations along the UP Sunset Route, which limit mobility, predictability and dependability, and safety.

Figure 70—UP Sunset Route

The technical results at this stage reflect the performance of each Conceptual Alternative, as defined at the onset of the Level 2 Evaluation. As described in Section 3.2.1, each alternative was evaluated as a set of route segments which would enable an alternative route to be redefined at the conclusion of the Level 2 Evaluation if the analysis indicated a major conflict or fatal flaw within the route segment. For example, analysis indicated that the poor performance of the Yellow Alternative was due to the assumption that the route would use UP Sunset Route right-of-way between Eloy and Tucson (southern section) and that the northern section could remain as part of a viable alternative route if combined with other viable route segments (Figure 70). The technical results were an essential element considered during the selection of the Final Alternatives for further analysis. However, decisions of Final Alternatives also took into account input from the public and affected agencies.

Table 32—Level 2 Evaluation Results

Criteria	Blue I-10 Busway	Green I-10 Rail	Orange Central Pinal/ E. Valley	Purple I-10/UP Chandler Branch	Red Western Pinal/UP Tempe Branch	Teal North-South Corridor/E. Valley	Yellow UP Tracks
Community Acceptance and Accessibility	3	1	5	3	1	5	3
Compatibility with local plans	C	I	C	I	I	C	D
Compatibility with underlying property ownership	C	I	C	I	I	D	I
Compatibility of station areas	326	326	467	425	415	462	462
Existing population	9,700	10,400	15,500	23,000	17,400	24,800	28,400
Existing employment	96,600	90,600	94,300	107,500	99,300	108,200	89,500
Future population	11,900	12,800	20,000	30,000	20,400	35,200	39,700
Future employment	155,900	151,000	159,800	177,700	166,100	179,500	149,400
Environmental	5	3	1	3	3	3	3
Noise receptors	30,123	30,123	51,041	55,404	36,428	56,372	57,154
Historic/cultural/archeological resources	531	531	604	610	643	666	657
Wetlands	65.8	65.8	65.8	65.8	65.8	65.8	50.5
Floodplains	16,500	16,500	12,200	17,700	19,100	12,200	12,000
Rivers, washes, and arroyos	700,000	700,000	900,000	798,000	745,000	611,000	581,000
Wildlife corridors	2	5	10	7	5	7	7
Biological resources	170	170	200	177	159	206	203
Financial Feasibility	5	3	1	3	3	3	3
Operating Cost (Commuter)	—	$55 M	$65 M	$58 M	$59 M	$59 M	$23 M
Operating Cost (Intercity)	$107 M	$31 M	$37 M	$33 M	$33 M	$34 M	$33 M
Capital Cost (Commuter)	—	$5.0 B	$6.4 B	$4.8 B	$4.9 B	$4.8 B	$2.1 B
Capital Cost (Intercity)	$2.2 B	$2.8 B	$3.7 B	$2.7 B	$2.8 B	$2.7 B	$3.1 B
Ease of Implementation	H	L	M	L	M	M	L
Operating Characteristics	1	5	5	3	3	3	1
Predictability and Dependability	L	H	H	M	M	M	L
Mobility	1	3	5	3	3	3	1
Commuter Demand	1,250	4,200	5,900	5,550	5,200	6,250	5,600
Intercity demand	—	2,710	2,640	2,730	2,710	2,720	2,710
Commuter travel time (minutes)	111	83	107	105	100	111	126
Intercity travel time (minutes)	111	73	88	90	85	91	110
Safety	1	5	5	3	3	3	1
Major conflicts	0	0	0	31	38	26	74

C = compatible D = compatible with difficulties I = incompatible H = high M = medium L = low
5 = highest ranking 1 = lowest ranking

3.2.4 Level 2 Public Outreach Results

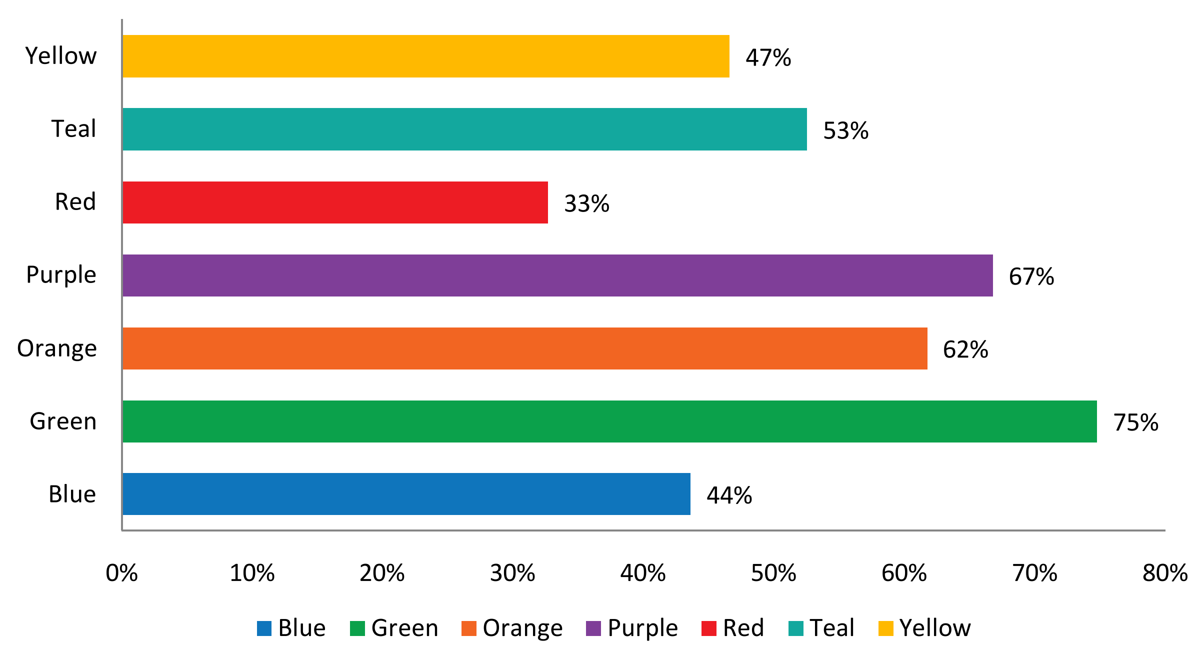
In addition to the technical analysis, a critical assessment of the Conceptual Alternatives is the response from communities to the prospects of a new passenger rail service within the corridor. For the Level 2 Evaluation, study team members staffed an information booth at 16 scheduled events and festivals between October 6, 2012, and December 9, 2012, in Pima, Pinal, and Maricopa Counties (Figure 72). The booth was designed to display and solicit feedback on the seven Conceptual Alternatives. Nearly 2,000 project-specific information booklets and comment forms were distributed during the events. The deadline to provide comments was December 31, 2012. The details of the individual events are included in Appendix G: Level 2 Public Outreach.

Figure 71—Information Booth

To maximize participation in the program, ADOT made participation as convenient as possible. To that end, one key element of participation at the events was the distribution of a 16-page booklet with an eight-question survey and self-addressed postage paid envelope. A 2-minute 50-second video was also available online at www.azdot.gov/passengerrail along with an electronic version of the survey. Over 3,000 completed surveys were received during the comment period.

Results of the survey and comments received during the outreach period reflected strong support for rail between Tucson and Phoenix. Many respondents felt that rail is the future and are happy to see that alternative options for I-10 are being studied. It was clear that a balance between travel time and serving population centers was important, along with financial feasibility. The public's preference for the alternatives is indicated on Figure 72. Respondents were allowed to select multiple alternatives, which is why total percentages are greater than 100 percent.

Figure 72—Level 2 Public Preference



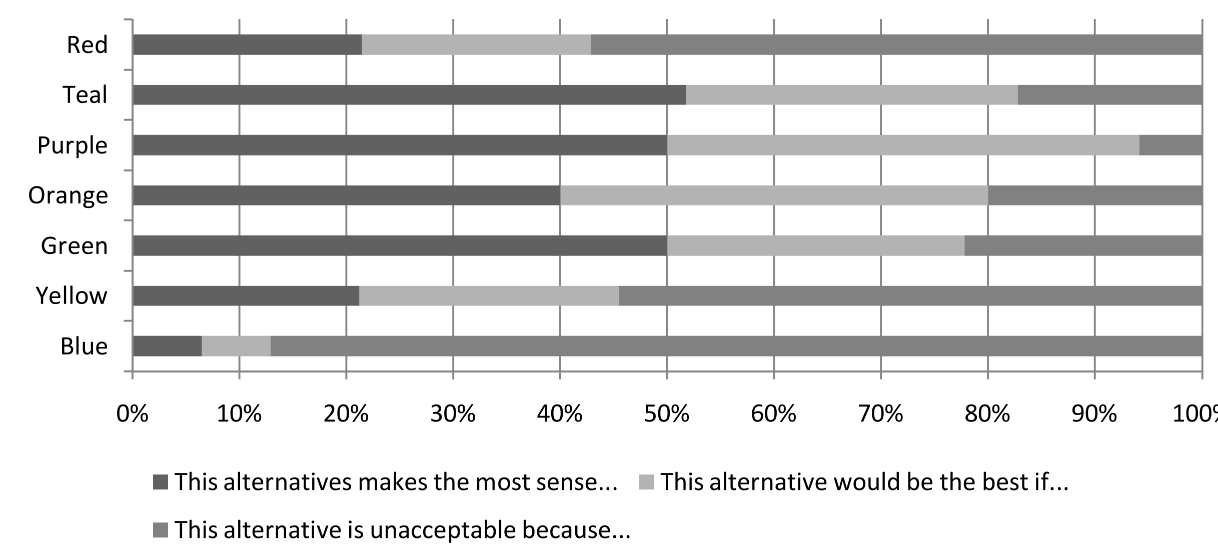
While the Green Alternative is favored because of the shorter travel time, further inquiries and results from the surveys suggest respondents also prefer service to the places they are likely to travel to. The Purple, Orange, Teal, and Yellow Alternatives provide access to activity centers more effectively than the Green Alternative though they have longer travel times. The Red and Blue Alternatives were consistently less favored due to slower travel time, reduced reliability, and less access to activity centers, which is also consistent with the technical analysis.

Figure 73—CST Meeting

3.2.5 Level 2 Agency Outreach

In parallel with the public outreach, ADOT and the project team organized CST meetings and one-on-one meetings with each affected agency within the study corridor. There was also general support for the project at the agency level and the results of the discussions resulted in similar findings compared to the public. Figure 74 shows the indication of preference from the affected agencies based on their CST participation. In addition, ongoing meetings were held with GRIC staff and officials as well as UP officials to coordinate on decisions regarding alternatives that would utilize UP property.

Figure 74—Level 2 Agency Preference



The Purple Alternative was viewed as a kind of hybrid between the fast travel time on the Green Alternative and the better ability of the Yellow and Orange Alternatives to serve the communities in the East Valley of the Phoenix metropolitan area. The Teal and Orange Alternatives fared well because they offer access and the Blue and Red Alternatives were undesirable for the opposite reason. The Yellow Alternative, as defined at this level, was not favored largely because of the longer travel time associated with assumptions about the operation of a shared freight and passenger corridor, which could especially cause disruptions along the UP Sunset Route between Eloy and Tucson.

3.2.6 Conceptual Alternatives Removed from Consideration

This section describes the Conceptual Alternatives eliminated from further consideration at the conclusion of the Level 2 evaluation, along with the reasons for their elimination. Further refinements to alternatives leading to the selection of the Final Alternatives prior to the Level 3 Evaluation are described in Section 3.3.

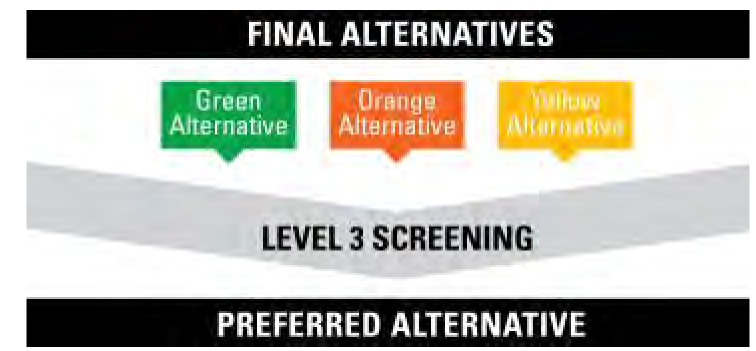
- **Blue Alternative**–The Blue (Bus) Alternative would be subject to unpredictable highway conditions on I-10, including increased congestion, traffic accidents, and inclement weather events that would make bus operation, even in a dedicated lane, unsafe or unreliable. As part of the Level 2 Evaluation, the FTA ARRF-II modeling tool was used to estimate levels of commuter demand for each Conceptual Alternative. Through this analysis, the Blue (Bus) Alternative demonstrated significantly low commuter demand compared to other alternatives, indicating that the Blue (Bus) Alternative would not provide an effective solution to increasing capacity constraints on the regional highway system. Furthermore, it was determined that the bus service offered by the Blue (Bus) Alternative would be limited to travel under the same operating conditions as adjacent automobile traffic and would be subject to congestion and safety issues similar to those in the automobile at locations where the systems interact, thus not offering a real alternative to existing automobile travel. This determination was made despite the assumption of the use of existing and new HOV lanes on I-10. For these reasons, the Blue (Bus) Alternative does not meet the stated purpose and need of the APRCS study. In addition, the Blue Alternative was the second least popular among the public-based survey results and received the highest amount of negative submitted comments. High-level operating cost estimates also indicated that long-term operation and maintenance costs for bus service would be much greater than a rail alternative and would have substantially lower passenger capacity.
- **Purple Alternative**—This corridor uses I-10 from Tucson north and runs through the center of the GRIC's population center in Sacaton on a new Greenfield alignment to join the Chandler Branch of UP into Phoenix. The portion of the corridor through the GRIC would be subject to significant tribal land right-of-way and cultural and historic resource challenges. The cost of the needed tribal right-of-way would be expected to be exceedingly high and the legal process for allotted land acquisition could prove overly cumbersome and uncertain, as evidenced by recent examples of tribal land purchases for transportation corridors throughout the region. In addition, GRIC representatives suggested the study focus on routings within existing transportation corridors, noting their concern over resource challenges related to greenfield alignments through Sacaton. The routing through GRIC land would also have much lower ridership potential and lack connectivity to major activity and population centers compared to other viable alternatives.
- **Red Alternative**—The proposed corridor would use existing highway ROW through GRIC land from metropolitan Phoenix to the City of Maricopa, before proceeding within ADOT ROW from Maricopa, through Casa Grande and Eloy, to Tucson along I-10. The alternative would travel a longer distance than other alternatives, following an indirect route between Phoenix and Tucson, resulting in a slower total travel time than most other alternatives. The alternative would also be expected to have low ridership potential due to the comparatively low number of major population centers along the route. These limitations were reflected during the second public outreach phase, when the public ranked the alternative the least favorable overall, and agency partners affected by the alternative stated a preference for other alternative routes. In addition, the alternative would require the use of additional GRIC tribal land, which would likely face highly increased right-of-way costs, cultural and environmental resource challenges, cumbersome and uncertain legal acquisition processes, and a possible violation of highway lease agreement between GRIC and ADOT.

3.3 Final Alternatives

This section describes the Final Alternatives and the Level 3 Evaluation process. The Final Alternatives were identified with consideration of the Level 2 Evaluation results, an analysis of major conflicts or fatal flaws, public outreach, and coordination with partner agencies throughout the study area. The Level 3 Evaluation consisted of a more refined and detailed analysis of the Final Alternatives, culminating in the selection of the preferred alternative (Figure 75). Considerations used to inform the selection of the Final Alternatives are summarized below:

- **Technical evaluation input**—The Level 2 Evaluation indicated that the Orange Alternative was the most feasible given a multitude of evaluation criteria documented in Section 3.2.2 of this report. The Green and Teal Alternatives also scored higher than average, while the Yellow and Red Alternatives were considered the least feasible. However, analysis indicated that the poor performance of the Yellow Alternative was due to the assumption that the route would use UP Sunset Route right-of-way between Eloy and Tucson (southern section). These technical results were essential elements, but one of multiple considerations in the selection of the Final Alternatives.

Figure 75—Final Alternative Evaluation



- **Major conflict or fatal flaws**—A separate analysis of major conflicts conducted concurrently with the Level 2 Evaluation determined several Conceptual Alternatives or route segments to be either fatally flawed or have other characteristics that rendered them non-competitive. These determinations were made in part through coordination with GRIC and UP.
- **Public input**—Comments received from the public on the Conceptual Alternatives favored routes that would offer the fastest travel time but also those that serve population centers and activity centers. Among the public, the Green Alternative was favored the most and the Red and Blue (Bus) Alternatives were favored the least due to travel time. The Purple, Orange, Teal, and Yellow Alternatives were also favored relatively high based on the access they would provide to activity centers.
- **Agency input**—Opinions gleaned from affected agencies during one-on-one meetings and CST meeting participation echoed similar themes to the public, including an emphasis on travel time and access to population and activity centers. Meetings with GRIC staff and officials brought to light their concerns about alternative routes that would follow greenfield corridors through GRIC land and likely face cultural and historic resource challenges. Initial discussions with UP expressed major concerns about any alternative that would have shared passenger and freight service on the Sunset Route. However, further coordination opened potentially valuable possibilities for the Phoenix Subdivision of the UP system (north of I-10 from Eloy to Phoenix).

3.3.1 Description of Final Alternatives

Final Alternative Selection

After considering the results of the Level 2 Evaluation, stakeholder input, and the presence of fatal flaws, the Teal Alternative was initially selected as a Final Alternative. However, further investigations of the alternatives resulted in the determination that the Teal Alternative would not be further evaluated as part of the Level 3 Evaluation as described below:

- **Teal Alternative**—With the reconfiguration of the Yellow and Orange Alternatives to include common corridors from downtown Phoenix to Tempe and Eloy to Tucson, the route assumed by the Teal Alternative would consist almost entirely of portions of the Yellow and Orange alternatives. For this reason, further analysis of Teal as an independent alternative was deemed unnecessary, as the vast majority of the alternative route would be technically evaluated in the Level 3 Evaluation as part of either the Yellow or Orange Alternatives. The only portion of the original Teal Alternative route not covered by either the Yellow or Orange routes is a 5-mile section following the Copper Basin Railroad corridor, between the vicinity of San Tan Valley and the planned North-South Study Corridor. Use of the Copper Basin segment in addition to the North-South Study corridor could serve as an optional routing of the final Yellow Alternative should challenges arise along its preferred route within Pinal County. The Teal Alternative and its relation to the Yellow and Orange Alternatives is shown on Figure 76.

Based on the results of the Level 2 Evaluation, major conflicts, and public and agency coordination, the Green, Orange, and Yellow Alternatives were identified as the Final Alternatives for the Level 3 Evaluation, as they would best meet the purpose of and need for the project and provide the highest potential for successful implementation. Each alternative consists of a unique routing, set of stations, and operating characteristics. However, the routes and station locations of each Final Alternative were refined from earlier alternative definitions, based on major conflicts indicated by technical analyses and input from public and agency stakeholders. The updated Green, Orange, and Yellow Alternatives, as well as their shared common corridors, are described below and shown on Figure 77.

- **Green Alternative**—The updated Green Alternative still would use mostly I-10 right-of-way to create the most direct route between Phoenix and Tucson. However, the refined route would follow UP right-of-way from Phoenix into downtown Tempe, as opposed to an elevated route following Washington Street. The route would then use UP Tempe Branch right-of-way south from Tempe to meet I-10 south of SR 202L and use I-10 right-of-way from Chandler to Tucson. Within downtown Tucson, the route would follow UP right-of-way from I-10 to the southern System Hub at the historic Tucson Rail Depot.

Figure 76—Teal Alternative

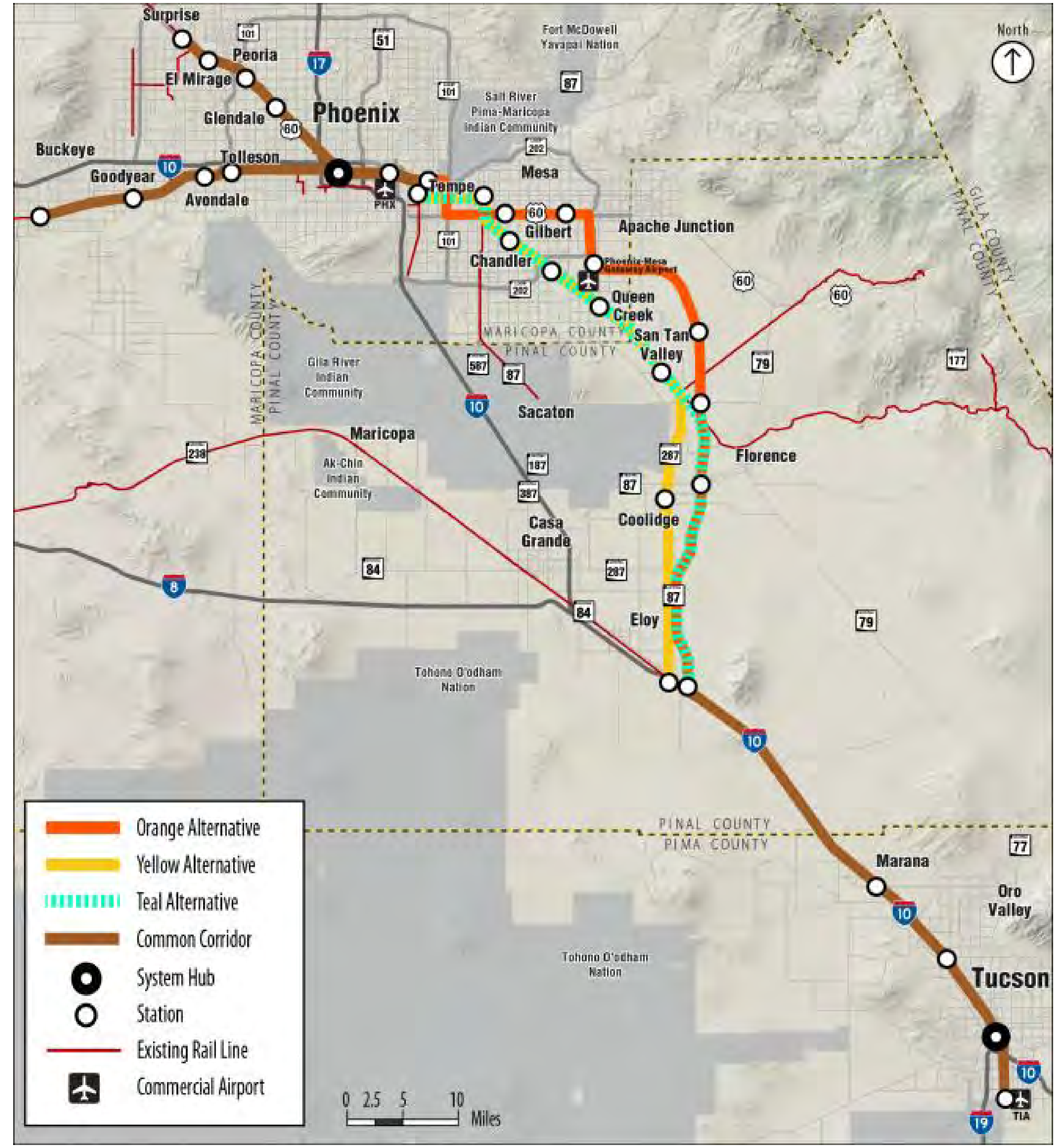
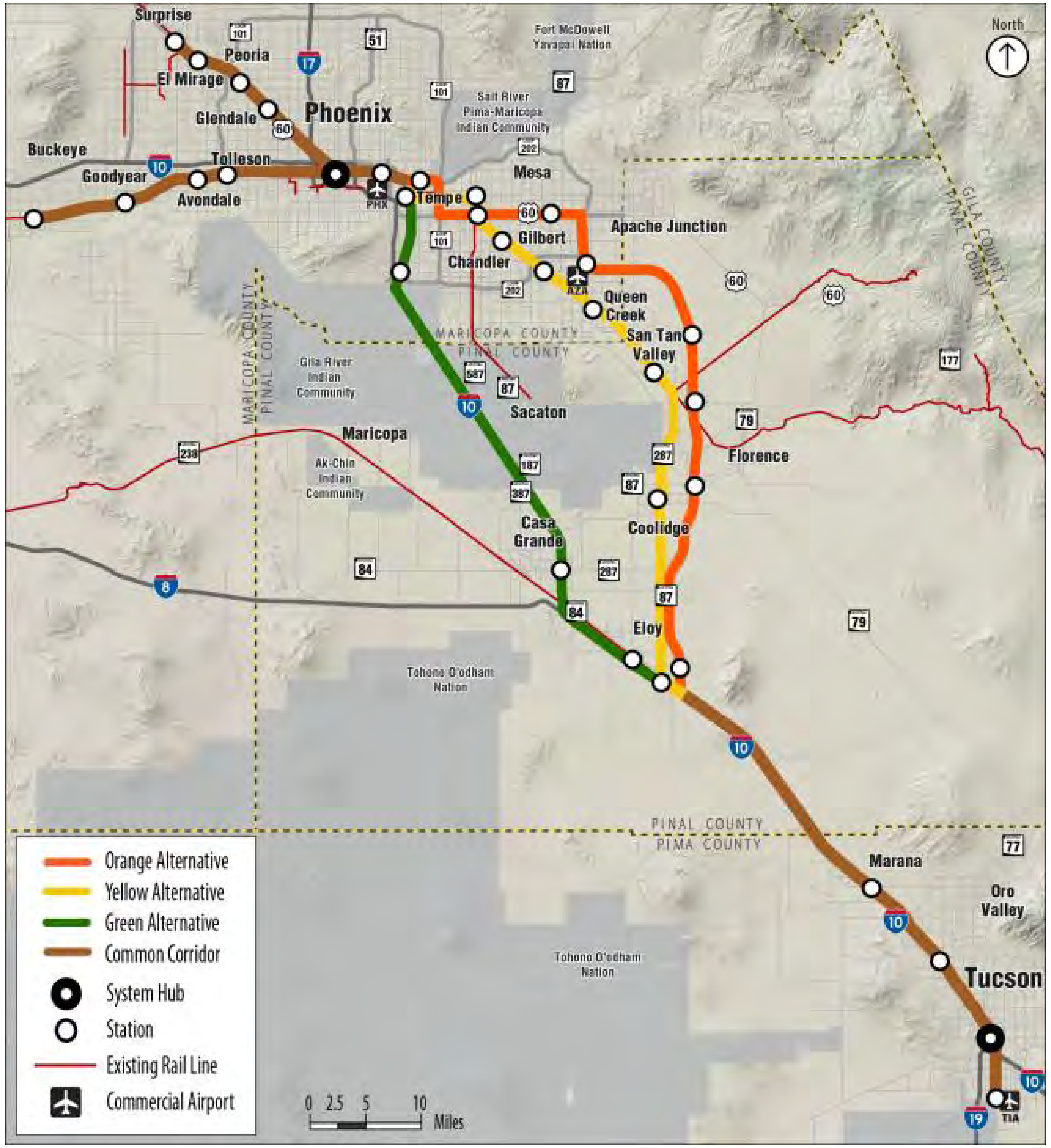


Figure 77—Final Alternatives



- **Orange Alternative**—This rail alternative also would use UP right-of-way near the Phoenix and Tucson downtown areas. In addition, the route would still utilize the SR 202 Red Mountain Freeway, SR 101 Pima Freeway, US 60 Superstition Freeway, Ellsworth Road, and I-10 rights-of-way. The alternative also assumes the use of the planned North-South multimodal corridor, as well as an exclusive transit corridor planned in the proposed Superstition Vistas development, which is located on land held in trust by the Arizona State Land Department. The northern and most urban portion of the alternative route is assumed to be constructed using an elevated guideway between north Tempe and Phoenix Mesa Gateway Airport.
- **Yellow Alternative**—UP expressed major concerns about shared passenger service on the UP Sunset Route in the southern portion of the corridor between Tucson and Eloy. The Sunset Route serves as one of UP's busiest and most vital freight routes, which would likely prevent effective shared use as a joint passenger and freight corridor. The shared southern section of the alternative was eliminated due to this conflict, as other viable routes existed within the same corridor. However, the UP Phoenix Subdivision remained a viable connection between Eloy and Phoenix, which resulted in a reconfiguration of the Yellow Alternative. The redefined alternative assumed use of the UP Phoenix Subdivision corridor north of Eloy and the I-10 corridor from Eloy to Tucson. This revised rail alternative would be built entirely at-grade on or adjacent to UP right-of-way from Phoenix to Eloy within the Southeast Branch of the UP Phoenix Subdivision, as well as I-10 right-of-way between Eloy and Tucson. In the Tucson downtown area, the alternative again would follow UP right-of-way to the historic Tucson Rail Depot. The alternative would use UP right-of-way but would not use UP freight track.

The Final Alternatives share several common corridors, within which the Green, Orange, and Yellow routes would utilize the same general routes. These sections include the UP Phoenix subdivision right-of-way between downtown Phoenix and Tempe, the I-10 right-of-way between Eloy and Tucson, and the UP Sunset Route in downtown Tucson. In addition, the Final Alternatives include extensions into the West Valley in the Phoenix metropolitan area (to Surprise along the BNSF Railway line on Grand Avenue and to Buckeye along the UP Wellton Branch and to Tucson International Airport south from downtown Tucson along the UP Nogales Branch. As with the Conceptual Alternatives, the extensions do not materially influence the alignment decision between the Tucson and Phoenix metropolitan areas, but do represent critical corridors within the two major metropolitan areas for commuter rail services and for regional linkages to other metropolitan areas.

Route Segments

The routes of each Final Alternative were subdivided into segments for the purpose of continued evaluation, in the same way that the Conceptual Alternatives were segmented for the Level 2 Evaluation. As shown on Figure 78, segments were created based on potential transition points between the remaining alternatives, in order to ensure flexibility in defining the preferred alternative route. As an example, the Yellow Alternative route is comprised of route segments 1, 2, 4, 6, 8, and 10. This segmented evaluation also creates the possibility of route options to the Preferred Alternative, which could prove necessary if detailed future analysis brings to light a major conflict that prevents the preferred route from being viable.

Each route segment was defined as the corridor centerline of a 1-mile-wide corridor and is detailed in Appendix H: Level 3 Evaluation. As part of the Level 3 Evaluation, segments were screened using the more detailed route centerline where possible and the wider 1-mile corridor for more high-level evaluation criteria. Route segments are part of the Green, Orange, and Yellow Alternatives. The previously defined western extensions from downtown Phoenix to Surprise and Buckeye, and the extension from downtown Tucson to Tucson International Airport, are also included as part of the Final Alternatives. Other than as part of the travel forecasting effort, the extensions were not considered in the Level 3 Evaluation.

Potential Stations

The potential station areas of each Final Alternative were identified initially using those of the Green, Orange, and Yellow Conceptual Alternative segments. However, several of those stations were moved or refined in shaping the Final Alternatives, based on the reconfiguration of Conceptual Alternative routings and input from affected agencies. All Final Alternatives assume the same stations along shared route segments in Phoenix and south of Eloy. The station locations were defined mainly as general vicinities, such as the intersection of a roadway and alternative route segment. Some stations, however, such as downtown Phoenix and downtown Tucson system hubs, were identified more narrowly. All Final Alternative station areas are shown on Figure 79.

Table 33 describes the potential stations of each Final Alternative. Although described by general location, the Level 3 Evaluation screened each station as either a 3-mile-radius catchment area or more specific location depending on the evaluation criterion. The 3-mile-radius catchment area differs from the catchment size used for both the Initial Screening and Level 2 Evaluation but was necessary for the more advanced ridership modeling that took place at this stage for both commuter and intercity travelers.

As with earlier levels of analysis, potential station locations were only evaluated as a means to gauge the performance of an alternative route and to inform routing decisions on the preferred alternative. The evaluation in no way prevents a technically lower scoring station from being carried forward as part of the preferred alternative route. Station types were also assigned in order to determine operational characteristics for evaluation purposes, such as speed and travel time, for local and express service of each alternative. Express services would serve only regional and system hub stations, while local services would serve all station areas.

Figure 78—Route Segments—Level 3 Evaluation

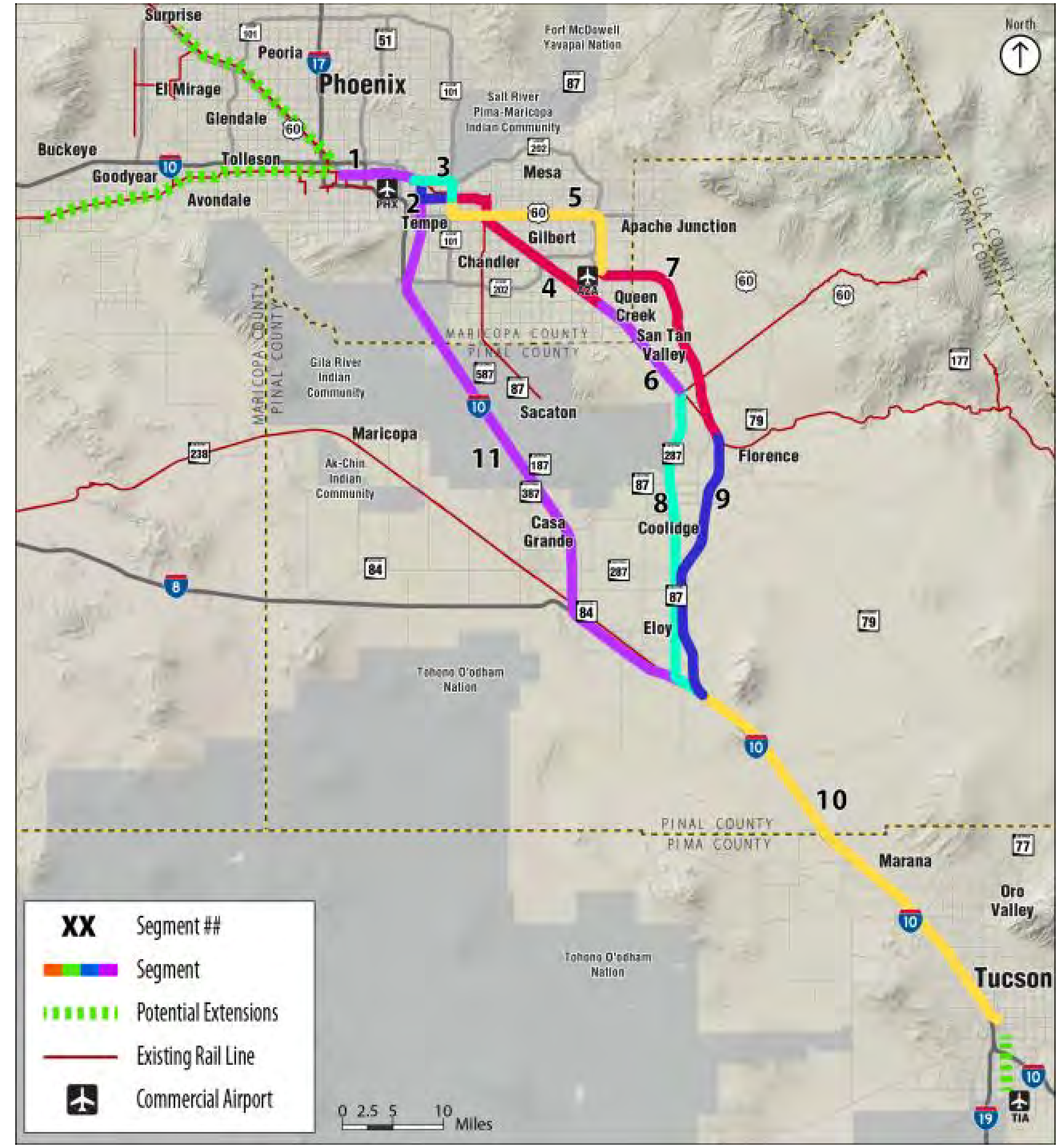


Figure 79—Potential Stations—Level 3 Evaluation

Table 33—Potential Station Areas—Level 3 Evaluation

Station ID	Station Name	General Location *(Not Exact)*	Community	Station Type
1	Phoenix Union Station	Union Station—3rd Ave & UP PHX Subdivision	Phoenix	System Hub
2	PHX Sky Train (UP)	44th St & UP PHX Subdivision	Phoenix	Regional
3	North Tempe	Rural Rd & SR 202L	Tempe	Local
4	Downtown Tempe	5th St & UP PHX Subdivision	Tempe	Local
5	Downtown Mesa	Country Club Dr & UP PHX Subdivision	Mesa	Local
6	West Chandler	Chandler Blvd & UP Tempe Branch	Chandler	Regional
7	Mesa—Country Club	Gilbert Rd & US 60	Mesa	Local
8	Gilbert North	Gilbert Rd & UP Southeast Branch	Gilbert	Local
9	Mesa—Power Rd	Power Rd & US 60	Mesa	Local
10	Gilbert South	Williams Field Rd & UP Southeast Branch	Gilbert	Local
11	PHX-Mesa Gateway Airport	Ellsworth Rd & Pecos Rd	Mesa	Regional
12	Queen Creek	Ocotillo Rd & UP Southeast Branch	Queen Creek	Regional
13	San Tan Valley	Bella Vista Rd & UP Southeast Branch	San Tan Valley	Local
14	Superstition Vistas	Planned Activity Center	Superstition Vistas	Local
15	Casa Grande	Florence Blvd & I-10	Casa Grande	Regional
16	Coolidge	Northern Ave & UP Southeast Branch	Coolidge	Regional
17	Coolidge-Florence	SR 287 & Adamsville Rd	Florence	Local
18	Eloy (I-10)	Alsdorf Rd & I-10	Eloy	Local
19	Eloy (UP)	Milligan Rd & UP Southeast Branch	Eloy	Local
20	Eloy (North-South)	Milligan Rd & North-South Freeway	Eloy	Local
21	Tangerine Rd	Tangerine Rd & I-10	Marana	Regional
22	Orange Grove Rd	Orange Grove Rd & I-10	Marana	Local
23	Tucson	Tucson Amtrak—4th Ave & UP Sunset Route	Tucson	System Hub

*The general locations of stations are provided for basic orientation and to distinguish between stations in close proximity, and are not meant to represent exact positions or specific sites
*Assigned station types are preliminary at this stage for basic service assumptions

Operating Assumptions

Operating parameters, such as speed and station-to-station travel times, were determined for the local commuter and express intercity services of each Final Alternative, for both preliminary service and system planning and the Level 3 Evaluation. Estimates for travel time were based on the specific routings and station locations of each Final Alternative. Specifically, calculations were a factor of route length, curvature, and contextual speed limitations, as well as the number and distance between stations, acceleration and decelerations rates, and station dwell times. In addition, the speed and travel times for commuter and local services at this level were determined by a high-level “string-line” operations analysis that gauged the effect of potential service conflicts along the Final Alternative routes.

Figure 80—French TGV

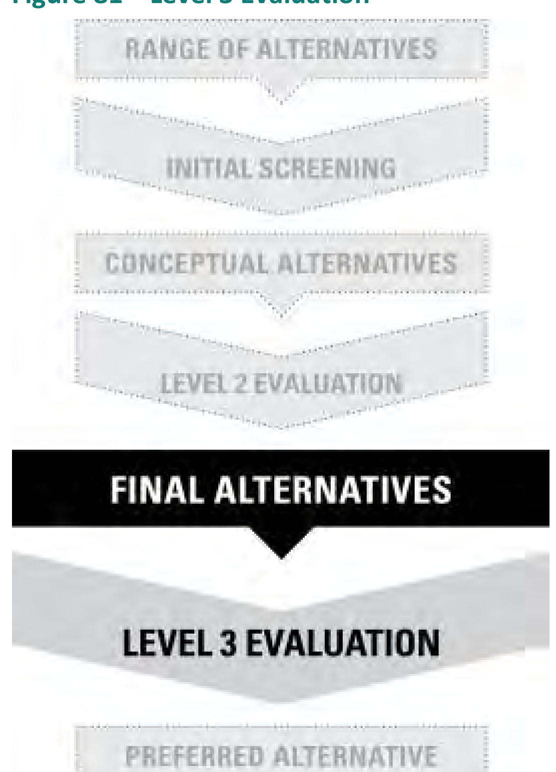
Similar to the Level 2 Evaluation, operating assumptions for local commuter or intercity express trains differed depending on the number of stations included for each service. Local commuter trains were assumed to serve every station along the route, and express intercity trains were assumed to stop only at locations designated as regional stations. Operating assumptions are detailed in Appendix H: Level 3 Evaluation.

3.3.2 Level 3 Evaluation

As described previously, the Green Alternative was initially selected and presented to the public as a Final Alternative. However, ongoing discussions with GRIC staff and officials resulted in the removal of the alternative from further consideration at the onset of the Level 3 technical analysis.

- **Green Alternative**—The Green Alternative was originally included among the Final Alternatives because it carried some support from agencies and the public. In addition, much of the technical analysis in the AA considered the Green Alternative along with the Yellow and Orange. Once the route was further defined for Level 3 consideration and some of the potential issues were identified, extensive discussions were begun with the GRIC to assess the level of concern about possible layouts within the community. A major portion of the alternative assumed the widening of the existing I-10 easement through the jurisdiction of the GRIC. More refined analysis of the corridor and coordination with GRIC cultural resources staff indicated that the widening of I-10 would require additional Tribal land and have significant impacts on sensitive Tribal traditional cultural and historic properties. The introduction of a new mode, such as rail, in the I-10 corridor would also be incompatible with existing agreements between ADOT and GRIC for transportation in the corridor. In addition, the I-10 through GRIC is planned for future highway expansion, which would prohibit construction of a passenger rail system within the highway median due to safety and access concerns. The removal of the Green Alternative from the study was accepted by the GRIC Tribal Council, with the understanding that complementary transit connections to GRIC would be included as part of the preferred alternative.

Figure 81—Level 3 Evaluation



The Level 3 Evaluation analyzed the remaining two Final Alternatives using individual evaluation criteria within seven general measurement categories. The general measurement categories used for the Level 3 analysis include community acceptance and accessibility, environmental impacts, financial feasibility, ease of implementation, operating characteristics, mobility, and safety. An overview of criteria and measures are included in Table 34. Unlike preceding levels of analysis, the "ease of implementation" criterion is considered as a separate measurement category for the Level 3 Evaluation. This determination was made since Level 3 represents the final alternative screening prior to determination of the preferred alternative (Figure 81) and the ease of the eventual implementation of the preferred alternative holds greater significance at this stage of evaluation.

Table 34—Criteria Overview—Level 3 Evaluation

Evaluation Criteria	Description	Evaluation Measure
Community Acceptance and Accessibility		
Compatibility with local plans	Effect of the alternatives on existing or proposed plans within the corridor	1-mile-wide route segment
Compatibility with underlying property ownership	Level of alternative negotiation required with independent agencies/ nations/companies	1-mile-wide route segment
Compatibility of station areas	Compatibility of local community station area development/plans with transit-supportive urban design principles	General station vicinity
Existing population	Existing population within station area	3-mile station catchment
Populations served	Existing employment within station area	3-mile station catchment
	Future population within station area	3-mile station catchment
	Future employment within station area	3-mile station catchment
	Existing minority population within station area	3-mile station catchment
	Existing low-income population within station area	3-mile station catchment
	Existing elderly population within station area	3-mile station catchment
Environmental Impacts		
Noise receptors	Sensitive noise receptors which may be impacted within corridor	1-mile-wide route segment
Historic/cultural/archeological resources	Sites registered with the State Historic Preservation Office within corridor	1-mile-wide route segment
	Sites registered with the Arizona State Museum within corridor	1-mile-wide route segment
Water resources	Wetlands, flood plains, rivers, washes, and arroyos which may be impacted within corridor	1-mile-wide route segment
Wildlife corridors	Number of wildlife corridors crossed as identified in the Arizona Missing Linkages report and stakeholder workshops and assessments	1-mile-wide route segment
Biological resources	Quantified biological resources within corridor using the Arizona Game and Fish Department SHCG tool	1-mile-wide route segment
Automobile reduction	Reduction in vehicle miles traveled and greenhouse gas emissions as result of alternative operations	Complete alternative route
Financial Feasibility		
Operating cost (commuter)	Operating cost/year for commuter rail portion of service	Complete alternative route
Operating cost (intercity)	Operating cost/year for intercity rail portion of service	Complete alternative route
Capital cost	Capital costs, including track, stations, rolling stock, maintenance yard, etc.	General alignment
Ease of Implementation		
Ease of implementation	Relative costs of building route, including potential property acquisition, construction challenges, public support, and negotiations	General alignment
Operating Characteristics		
Predictability and dependability	Anticipated reliability of route compared to baseline condition	General alignment
Mobility		
Ridership potential	Total alternative ridership based on FTA STOPS model	Complete alternative route
Transit/pedestrian connectivity	Quality of connections to local transit, pedestrian, and bicycle facilities	General station vicinity
Commuter travel time	Commuter travel time based on stringline analysis	Complete alternative route
Intercity travel time	Intercity travel time based on stringline analysis	Complete alternative route
Safety		
Major conflicts	Estimate of at-grade railroad crossings needed for rail alternatives	General alignment
Injury and fatality reduction	Reduction in automobile fatalities and injuries based on FTA STOPS model	Complete alternative route

The Level 3 Evaluation is described at a summary level throughout this section. The general measurement categories, individual evaluation criteria, screening methodology, and explanation of results for each Final Alternative are included. The evaluation criterion scores for each Final Alternative are documented in tables. Scores highlighted in green are meant to indicate a higher or more positive measure compared to scores highlighted in red. For example, a green evaluation criterion score assigned to the Yellow Alternative and a red score assigned to the Orange Alternative indicates that the Yellow Alternative performed "better" than the Orange Alternative for that individual evaluation criterion.

In general, the Level 3 Evaluation analysis was conducted at more detail than previous levels, as more detailed investigations were carried out of the routes and station locations for each Final Alternative. This is especially true in terms of environmental impacts, potential ridership, and financial feasibility. Other higher level evaluation criteria were measured at a similar scale to the Level 2 Evaluation. However, these broader assessments were adequate in distinguishing between the Final Yellow and Orange Alternatives. Details of the Level 3 Evaluation are described in Appendix H: Level 3 Evaluation.

Level 3 Evaluation Alternatives

Based on input received by GRIC staff and officials and a ruling by the GRIC Tribal Council and subsequent determination by the project team, only the Orange and Yellow Alternatives (Figure 82) were screened as part of the Level 3 Evaluation and analyzed as part of the companion Tier 1 EIS document.

Figure 82—Final Orange and Yellow Alternatives

Community Acceptance and Accessibility

Screening methods used to evaluate alignment segments and station locations within the community acceptance and accessibility measurement category are described in this section. The individual criteria used to determine the category score are detailed in this section and include compatibility with local plans, compatibility with underlying property ownership, compatibility of station areas, and populations served.

Compatibility with Local Plans

Compatibility with local plans is a general assessment of how well each route conforms to local transportation plans within the study area. The more compatible an alternative, the more likely the potential development of the alternative would meet local transportation goals and receive support from local communities along the route. Classifications of compatibility level and alternative scores are summarized below and listed by alternative in Table 35. The compatibility with local plans for each complete alternative route was classified as either *compatible, compatible with difficulties,* or *incompatible.*

- **Compatible (C)**—An alternative alignment was considered to be compatible if it was identified in local plans consistent with the intent of the project or if the route was located in an existing or planned major transportation corridor. Examples of compatible portions of a route include I-10, US 60, and the planned North-South Freeway Corridor.
- **Compatible with difficulties (D)**—An alternative alignment was considered to be compatible with difficulties if it was not entirely reflected in local plans, would not create significant complications, or if some portions of the route would not be located in an existing or planned major transportation route while some of the route would require substantial negotiation.
- **Incompatible (I)**—An alternative alignment was considered to be incompatible if it would impact an already built condition, if it is not reflected in local plans, and if major portions of the route would not be located within existing or planned major transportation corridors.

The Yellow and Orange Alternatives were both considered compatible as they are either reflected as transportation corridors in adopted plans or are entirely located within existing major transportation corridors. This Yellow Alternative compatibility score differs from the Level 2 Evaluation, as the Yellow Alternative route assumed the use of the UP Sunset Route mainline during the Level 2 Evaluation. Since the southern portion of the Yellow Alternative between Eloy and Tucson was reconfigured to follow I-10 right-of-way, the level of negotiation required with UP was considered much less substantial.

Table 35—Compatibility with Local Plans

Criteria	Description	Orange	Yellow
Compatibility with local plans	Effect of the alternatives on existing or proposed plans within the corridor	C	C

C = Compatible

Compatibility with Underlying Property Ownership

Compatibility with underlying property ownership is meant to gauge, in qualitative terms, how difficult the development of a Final Alternative would be in terms of the property owner that currently owns the necessary right-of-way for construction. Considerations include the actual cost of acquiring the land required, as well as the level of alternative negotiation necessary with the property owner. The more compatible an alternative, the more easily needed rights-of-way could be obtained or used without substantial negotiation or cost. Classifications of compatibility level and alternative scores are summarized below and listed by alternative in Table 36.

- **Compatible (C)**—An alternative alignment was considered to be compatible with existing property ownership if its development would require little to no negotiation with independent agencies, nations, or companies. For example, the Orange Alternative would be located completely within existing or planned public rights-of-way.
- **Compatible with difficulties (D)**—An alternative alignment was considered to be compatible with difficulties if a portion of the route would be incompatible with underlying property ownership while the remainder would be at least partially compatible, requiring at least a moderate level of negotiation with independent agencies, nations, or companies. For example, the redefined Yellow Alternative is primarily located in public-owned rights-of-way in its southern portion between Eloy and Tucson but would require negotiation with UP to utilize rights-of-way within the UP Phoenix Subdivision.
- **Incompatible (I)**—An alternative alignment was considered to be incompatible if major portions of the route were considered incompatible with underlying property ownership, requiring a substantial level of negotiation with independent agencies, nations, or companies.

Table 36 summarizes the compatibility score for each alternative. The Orange Alternative was considered compatible as it would be located entirely within public-owned rights-of-way and would not require any significant negotiation. The Yellow Alternative was considered compatible with difficulties since it would utilize public rights-of-way between Eloy and Tucson but would necessitate some negotiation with UP for its northern portion. This Yellow Alternative score differs from the Level 2 assessment, which assumed the use of UP rights-of-way for the entire alternative route.

Table 36—Compatibility with Underlying Property Ownership

Criteria	Description	Orange	Yellow
Compatibility with underlying property ownership	Level of alternative negotiation required with independent agencies/ nations/companies.	C	D

C = compatible D = compatible with difficulties

Compatibility of Station Areas

Compatibility of Station Areas is a valuation of the local jurisdiction's ability to properly accommodate a future station area through local development plans, zoning ordinances, and commitment to transit-supportive urban design. The more compatible a planned station area is within a community, the more likely the station will be successful at producing ridership and benefiting the local community. A quantitative score for each station area along a Final Alternative's route was determined though a "Community Readiness Assessment for Rail Transit," which is described further in Section 3.2.2 and detailed in Appendix H: Level 3 Evaluation. Although a similar process to the compatibility of station area measure used in the Level 2 Evaluation, this level differs as assessment methods were more technical, station areas have been refined, and the evaluation sought to distinguish between two alternatives as opposed to seven.

The community readiness assessment used meetings with local development staff, a self-assessment by local development staff on their community's policies, and a review of local plans and ordinances to develop a weighted numerical score for each station location. Scores were determined using the criteria of land use, mobility and connectivity, activity center building design, housing affordability, parking, and the ability of a community to accommodate a station area through general plans, zoning codes, and other official documents. For the purpose of the Level 3 Evaluation, the score of each station area along a route was averaged to determine a quantitative score for each Final Alternative. The numbered scores were then aggregated and classified into a six point scale represented by letter grades, with "A" being the most transit receptive and "F" the least transit receptive. Table 37 shows the average score and letter grade for all the station areas located along the Orange and Yellow Alternatives.

The stations located along the Yellow Alternative were considered more compatible, since the majority of stations included in the alternative would be located in denser downtown areas more amenable to a rail station. The Orange Alternative received a slightly lower score, since most of the stations unique to the Orange Alternative are located either adjacent to major freeways or in greenfield areas on undeveloped land.

Table 37—Compatibility of Station Areas

Criteria	Description	Orange	Yellow
Compatibility of station areas	Compatibility of local community station area development/plans with transit supportive urban design principles	D	C
		31	34

Populations Served

Populations served is a measure of the number and composition of people that would have access to each Final Alternative through the station locations located along each route. The higher the number of people in each category, the more opportunity the service has to attract ridership from that demographic group.

Table 38 shows the breakdown of populations served, including existing and future population and employment, as well as the existing minority, low-income, and elderly populations. Quantitative measures were determined using a 3-mile-radius station district to represent a catchment for both local commuter and intercity services, as well as demographic data by traffic analysis zones (TAZ) from the FTA STOPS model for existing and future population and employment (2008 and 2035). Census 2010 data was used for environmental justice populations. The 3-mile-radius catchment size differs from the 1/2-mile catchment used for the Level 2 Evaluation, since the 3-mile catchment is more appropriate for estimating commuter and intercity demand with the more sophisticated FTA STOPS modeling tool used at this level, and overlap between catchments was less of a concern with only two alternatives.

Table 38—Populations Served

Criteria	Description	Orange	Yellow
Populations served	Existing population within station area district	717,329	851,713
	Existing employment within station area district	726,212	796,426
	Future population within station area district	1,027,518	1,188,103
	Future employment within station area district	939,520	1,036,490
	Existing minority population within station area district	404,114	481,916
	Existing low-income population within station area district	265,145	296,018
	Existing elderly population within station area district	85,161	73,592

Environmental Impacts

This section describes the screening methods used to evaluate alignment segments and station locations in terms of environmental impacts. (A more complete environmental review for the Final Alternatives can be found in the companion Tier I EIS for this project.) The individual measures used to determine the general category score are organized into two general groups discussed in this section—those that measure the impact on specific resources and those related to automobile emissions reduction:

- Resources impacted
  - Potential noise receptors
  - Historic, cultural, and archeological resources
  - Wetlands, floodplains, rivers, washes, and arroyos
  - Wildlife corridors
  - Biological resources
- Automobile emissions reduction
  - Reduction in nitrogen oxide (NO_x) emissions
  - Reduction in carbon monoxide (CO) emissions
  - Reduction in volatile organic compound (VOC) emissions
  - Reduction in particulate matter (PM) emissions

Figure 83—Burrowing Owl

Potential Noise Receptors

Potential noise receptors provide an indication of the level of potential disruption the sound of an alternative's operation could cause to residences, parks, and other public gathering places along a route. Increases to adverse noise effects on adjacent neighborhoods and challenges to the implementation of an alternative from the public would be expected to increase along with an increased number of noise receptors impacted.

The Final Alternatives were evaluated in this category by totaling the number of first and second level sensitive noise receptors, as defined by the EPA, within 1/2 mile of each route segment's centerline. Table 39 summarizes the total number of noise receptors impacted within the route segments of each Final Alternative. These totals differ from the Level 2 Evaluation, as the routes of both the Orange and Yellow Alternatives were modified prior to Level 3 Evaluation.

Table 39—Potential Noise Receptors

Criteria	Description	Orange	Yellow
Potential noise receptors	Number of first and second level sensitive noise receptors within 1/2 mile of route	54,215	52,827

Historic, Cultural, and Archeological Resources

Assessing the number of historic, cultural, and archeological resources located in close proximity to an alternative's route is one method to gauge the number of potential challenges the development of that alternative could face. For the purpose of this evaluation, the numbers of registered historic, cultural, and archeological resources within 1/2 mile of each route segment were recorded, using information from both the Arizona State Historic Preservation Office and the Arizona State Museum. Table 40 summarizes the total number of resources impacted within the route segments of each Final Alternative according to both information sources. Values again differ from the Level 2 Evaluation, since the Orange and Yellow Alternative routes were both refined prior to Level 3 Evaluation and additional information was made available through the Arizona State Museum.

Figure 84—Potential Cultural Sites

Table 40—Historic, Cultural, and Archeological Resources

Criteria	Description	Orange	Yellow
Historic, cultural, and archeological resources	Number of resources registered with the State Historic Preservation Office within 1/2 mile of route	111	144
	Number of sites registered with the Arizona State Museum within 1/2 mile of route	562	551

Water Resources

The potential of each Final Alternative to harmfully impact environmentally sensitive aquatic areas was assessed by quantifying the effects of each route on wetlands, floodplains, rivers, washes, and arroyos. The acreage or linear feet of each surface water type that exists within 1/2 mile of each route segment's centerline was calculated. The total impacted acres of wetlands and floodplains and total feet of linear water features (rivers, washes, arroyos) were compiled separately using readily available geographic information system (GIS) data from Federal Emergency Management Agency, counties within the study area, and the U.S. Fish and Wildlife Service. The total water resources impacted within each Final Alternative corridor are shown in Table 41. Affected wetland acres are substantially different from those shown in the Level 2 Evaluation because U.S. Fish and Wildlife Service sources were updated prior to the Level 3 Evaluation.

Table 41—Water Resources

Criteria	Description	Orange	Yellow
Water resources	Wetlands (in acres) within 1/2 mile of route centerline	1,538	1,105
	Floodplains (in acres) within 1/2 mile of route centerline	9,944	9,485
	Rivers, washes, or arroyos (in linear feet) within 1/2 mile of route centerline	1,910,872	1,480,187

Wildlife Corridors

The number of wildlife corridors within 1/2 mile of each route segment centerline was measured using information from the Arizona Wildlife Missing Linkages report prepared by Arizona Game and Fish Department. Areas of "potential linkage zones" throughout the state that are deemed to be particularly sensitive to wildlife populations are identified in the report. Table 42 shows the number of linkage zones or corridors that fall within or intersect each Final Alternative.

Table 42—Wildlife Corridors

Criteria	Description	Orange	Yellow
Wildlife corridors	Number of wildlife corridors crossed as identified in the Arizona Missing Linkages report prepared by Arizona Fish and Game Department	6	5

Biological Resources

The impact of each route segment on biological resources and conservation potential within the study area was measured using the Arizona Game and Fish Department's 2011 SHCG tool. The SHCG gauges conservation potential on six levels, as described previously in Section 0. A GIS-based method was used to quantify the overall conservation potential within 1/2 mile of each route segment centerline. Table 43 summarizes the quantitative score of biological resources associated with the route segments of each Final Alternative. Details of scoring and calculation methods for biological resources are documented in Appendix H: Level 3 Evaluation.

Table 43—Biological Resources

Criteria	Description	Orange	Yellow
Biological resources	Quantity of biological resources within 1/2 mile of centerline based on six-point scale using the Arizona Game and Fish Department *Species and Habitat Conservation Guide*	207	202

Automobile Emissions Reduction

The development of a commuter and intercity rail service in a predominantly automobile-based region would be expected to divert a percentage automobile trips to commuter or intercity train trips, which in turn would reduce total automobile VMT and corresponding automobile based emissions.

Figure 85—Train Bypassing Roadway Congestion

Ridership forecasts for the corridor were estimated using the FTA STOPS tool. The STOPS model outputs include the estimated reduction in daily VMT that would be expected as a result of rail service operations. Standard greenhouse gas emissions factors were applied to the daily VMT reduction created by each Final Alternative to gauge the potential environmental benefit each service would produce as a result of reducing automobile use. The daily reductions of nitrous oxide (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM) created by the Orange and Yellow Alternatives are shown in Table 44. Complete results of the STOPS forecasts are discussed further later in this Section and detailed in Appendix H: Level 3 Evaluation.

Table 44—Automobile Emissions Reduction

Criteria	Description	Orange	Yellow
Automobile emissions reduction	Daily reduction of NO_x emissions as result of rail alternative based on FTA STOPS model	519 kg	516 kg
	Daily reduction of CO emissions as result of rail alternative based on FTA STOPS model	9,563 kg	9,507 kg
	Daily reduction of VOC emissions as result of rail alternative based on FTA STOPS model	342 kg	340 kg
	Daily reduction of PM emissions as result of rail alternative based on FTA STOPS model	6 kg	6 kg
	Daily reduction of CO_2 emissions as result of rail alternative based on FTA STOPS model	243,504 kg	242,072 kg
	Daily reduction of SO_2 emissions as result of rail alternative based on FTA STOPS model	2.4 kg	2.39 kg

Financial Considerations

This section describes the screening methods used to evaluate alignment segments in terms of financial feasibility. The individual measures used to determine the general category score are discussed in this section and include annual operating costs, capital costs, cost effectiveness, and right-of-way costs.

Costs at this stage are estimated at a high level but built upon the specific corridor context using the most appropriate information available. The following assumptions were made for the development of the capital and operating cost estimates:

- Average speed provided for local and express service planning will be used for each service level to calculate fleet size. A total of 40 minutes (20 minutes at each terminal) for trains is allocated for terminal turn-back time. One spare commuter train and one spare intercity train are assumed.
- Double track costs are estimated for all elevated segments and on at-grade segments identified by stringline conflict locations. Rights-of-way for double track are assumed along the entire corridor to allow future growth to occur to minimize future construction impacts.
- Train sets will consist of DMUs with four vehicles for commuter train sets and eight vehicles for intercity train sets.
- Bridges, such as those across canals, streets, and some washes, are assumed to be 200 feet or less in length. Some bridges across freeways, washes, and wide roadways are assumed to be between 200 feet and 300 feet in length. Major bridges are estimated on a cost-per-linear-foot basis.
- Universal crossovers consist of four turnouts arranged in sets of two to form single crossovers in opposite directions. Crossovers allow trains to cross from one track to another and are located at terminal stations, connections to servicing and maintenance facilities, and at intermediate locations in order to allow trains to operate over only one track due to maintenance or a problem on the other track. It is assumed that crossovers will be spaced 5 to 10 miles apart.
- At-grade highway/railroad crossings would be rebuilt for higher train speeds and multiple tracks in accordance with federal and state regulations. Each at-grade crossing would be equipped with medians and quadrant gates (to prevent motorists from driving around the gates), constant warning predictors, concrete panel crossing surfaces, and all required signage and graphics.
- All alternatives assume the use of the existing westbound frontage road to the north and east of I-10 from Picacho to Grant Road in Tucson. Property acquisition or additional access will be required for properties impacted by loss of the frontage road. Reconstruction of Red Rock traffic interchange and Missile Base Road were included in cost estimates as well as new roadways providing access for Park Link Drive (proposed in the I-8—Tangerine design concept report) and APS Power Plant Access Road. Ina Road and Ruthrauff Road, currently under design, will accommodate the passenger rail alignment.
- Positive and centralized train control costs are included and consist of cab signaling and automatic train protection and supervision.
- Passenger stations will consist of system hub stations located at terminals, regional stations at key junction points, and local stations located along the system. Local stations located in freeway rights-of-way will include pedestrian crossings and stairs/elevators for passenger access.
- Unit costs are based upon experience, industry articles, and costs which have been rounded up after allowing for inflation.
- Contingency of 40 percent has been added to the construction cost to reflect the planning level of the cost estimates.
- Right-of-way costs are included in these estimates and reflect anticipated acquisition for each alternative based on the best understanding of underlying property impacts and ownership (e.g., UP internal policy of 50-foot separation between passenger and freight tracks).

Annual Operating Costs

Annual operating costs is an estimate of the costs associated with running the proposed services based upon the service characteristics previously detailed. The estimated costs are approximated for the commuter and intercity portion of the service assuming eight intercity cars and four commuter cars. The number of needed cars has been updated from earlier operating cost estimates based on more precise service analysis conducted at this stage. Estimated service assumptions used to calculate operating costs are shown in Table 45 and Table 46, and a breakdown of operating costs for the Orange and Yellow Alternatives are shown in Table 47 and Table 48.

Table 45—Estimated Weekday Revenue Service Assumptions—Orange Alternative

Train Type	Trip Length	Weekday 1-way Trips per Day	Weekday Mileage	Annual Revenue Miles
Intercity	128.5	16	2056	534,560
Commuter	128.5	56	7196	1,870,960

Table 46—Estimated Weekday Revenue Service Assumptions—Yellow Alternative

Train Type	Trip Length	Weekday 1-way Trips per Day	Weekday Mileage	Annual Revenue Miles
Intercity	119.8	16	1916.8	498,368
Commuter	119.8	56	6708.8	1,744,288

Table 47—Estimated Operating Costs—Orange Alternative

Vehicle Type	Unit	Unit Cost	Quantity	Estimated O&M Cost
Intercity	Cost/ vehicle mile	$35.75	534,560	$19,108,000
Commuter	Cost/ vehicle mile	$35.75	1,870,960	$66,877,000
				$85,985,000

Table 48—Estimated Operating Costs—Yellow Alternative

Vehicle Type	Unit	Unit Cost	Quantity	Estimated O&M Cost
Intercity	Cost/ vehicle mile	$29.79	498,368	$14,845,000
Commuter	Cost/ vehicle mile	$29.79	1,744,288	$51,958,000
				$66,803,000

Annual operating and maintenance cost estimates are based upon the 2010 National Transit Database vehicle mile and train/bus hour costs, inflated by 3 percent per year to 2013. Station operating costs reflect a percentage of the associated capital cost. The unit cost for the Orange Alternative has been inflated by 50% to take into account higher operating speed and structures assumed for this rail system.

Table 49 summarizes the overall operating cost for intercity and commuter service by alternative, where the Yellow Alternative is shown to have a lower overall operating cost. The primary reason for the lower operating cost is the shorter length of the Yellow Alternative. Detailed Operating and Maintenance Cost calculations are included in Appendix H: Level 3 Evaluation.

Table 49—Annual Operating Costs

Criteria	Description	Orange	Yellow
Annual operating costs	Operating cost per year for commuter rail portion of service (2014 dollars)	$66,877,000	$51,958,000
	Operating cost per year for intercity rail portion of service (2014 dollars)	$19,108,000	$14,845,000

Capital Costs

Capital cost estimates for rail improvements were prepared consistent with the level of detail available for each proposed alternative. Considerations included infrastructure improvements and annual operating and maintenance costs based upon an assumed intercity and commuter rail operating plan. The capital cost estimates are presented in current year U.S. dollars and were developed for initial base year operations (2020). The estimates were prepared using standardized unit prices based on current railroad industry unit prices. The estimated cost for intercity and commuter rail stations, train equipment, and yard and maintenance facilities are also included in the capital cost estimate at a parametric level. The estimated capital costs for the Orange and Yellow Alternatives are shown in Table 50 and Table 51, respectively.

Figure 86—Tucson Streetcar Groundbreaking

Table 50—Estimated Capital Costs (in FTA Standard Cost Category Format) — Orange Alternative

FTA Major Standard Cost Categories (SCC)	Base Year Cost without Contingency (x000)	Base Year Allocated Contingency (x000)	Base Year Dollars Total (x000)
10 Guideway & Track Elements	$3,291,156	$297,301	$3,588,456
20 Stations, Stops, Terminals, Intermodal	$70,833	$135,137	$205,970
30 Support Facilities: Yards, Shops, Admin. Bldgs	$160,000	$108,109	$268,109
40 Sitework & Special Conditions	$614,884	$162,164	$777,048
50 Systems	$362,710	$135,137	$497,847
Construction Subtotal (10—50)	*$4,499,583*	*$837,847*	*$5,337,430*
60 ROW, Land, Existing Improvements	$51,620	$108,109	$159,729
70 Vehicles	$400,000	$135,137	$535,137
80 Professional Services	$454,262		$454,262
Subtotal (10—80)	*$5,405,466*	*$1,081,093*	*$6,486,559*
90 Unallocated Contingency			$1,081,093
Total (10—90)			**$7,567,652**

Table 51—Estimated Capital Costs (in FTA Standard Cost Category Format) — Yellow Alternative

FTA Major Standard Cost Categories (SCC)	Base Year Cost without Contingency (x000)	Base Year Allocated Contingency (x000)	Base Year Dollars Total (x000)
10 Guideway & Track Elements	$1,466,063	$111,935	$1,577,997
20 Stations, Stops, Terminals, Intermodal	$38,333	$63,963	$102,296
30 Support Facilities: Yards, Shops, Admin. Bldgs	$148,000	$63,963	$211,963
40 Sitework & Special Conditions	$449,471	$95,944	$545,415
50 Systems	$356,060	$79,953	$436,013
Construction Subtotal (10—50)	*$2,457,927*	*$415,758*	*$2,873,685*
60 ROW, Land, Existing Improvements	$120,760	$127,926	$248,686
70 Vehicles	$368,000	$95,944	$463,944
80 Professional Services	$251,450		$251,450
Subtotal (10—80)	*$3,198,138*	*$639,628*	*$3,837,765*
90 Unallocated Contingency			$639,628
Total (10—90)			**$4,477,393**

The capital cost estimates in 2013 dollars, excluding any finance charges, are $7.6 billion for the Orange Alternative and $4.5 billion for the Yellow Alternative. Table 52 summarizes this measure, where the Yellow Alternative is the less costly alternative. Complete calculations and breakdowns for capital cost are included in Appendix H: Level 3 Evaluation.

Table 52—Capital Costs

Criteria	Description	Orange	Yellow
Capital costs	Capital costs, including track, stations, rolling stock, maintenance yard (2014 dollars)	$7,568,000,000	$4,477,000,000

Cost Effectiveness

The cost effectiveness measure is a calculation based on the estimated operating cost and the anticipated ridership, where the cost per person can be estimated. This analysis utilizes operating costs and does not account for offsetting fare box revenues. Because this measure is a ratio of cost to riders, the most financially effective operating route is able to be identified. Table 53 details the breakdown of cost effectiveness, where the Yellow Alternative is more cost effective.

Table 53—Cost Effectiveness

Criteria	Description	Orange	Yellow
Cost effectiveness	Annual operating cost per annual commuter rail passenger (2014 dollars)	**$15.99**	**$10.37**
	Annual operating cost per annual intercity rail passenger (2014 dollars)	**$15.38**	**$14.73**

Right-of-Way Costs

As described in Section 3.3.2., the routes of the Orange and Yellow Alternatives were analyzed in greater detail during this level of evaluation. As a result of the more defined routes, an estimated cost for right-of-way acquisition based on the potential impacts from each alternative was calculated. The estimate used unit costs for the following categories of property impacts:

- Residential
- Commercial
- Industrial
- Institutional
- Farm/vacant

The Orange Alternative was assumed to be located within the proposed North-South Freeway corridor for the portion of its route through central Pinal County (Figure 17), therefore no right-of-way costs were assumed for that shared portion of the alignment. Table 54 summarizes the overall right-of-way costs, where the Orange Alternative has a lower cost than the Yellow Alternative, primarily due to the shared North-South Corridor portion. Details of the right-of-way assumptions by category are provided in Appendix H: Level 3 Evaluation.

Table 54—Right-of-Way Cost

Criteria	Description	Orange	Yellow
Right-of-way cost	Cost of property acquisition necessary for development of rail alternative (2014 dollars)	**$62,135,000**	**$144,897,000**

Ease of Implementation

Ease of implementation is a high-level qualitative assessment of the relative costs and potential challenges associated with the construction and development of a complete rail service along an alternative route. Specific considerations include added costs due to unanticipated property acquisition, jurisdictional issues, major construction challenges, lack of public support, and negotiations and disagreements with independent agencies and organizations. Classifications of ease of implementation and criterion scores for each Final Alternative are summarized below and in Table 55.

- **High (H)**—Minimal costs related to property acquisition and construction with general public acceptance/support
- **Moderate (M)**—Moderate costs related to property acquisition and construction with some challenges related to public acceptance/support
- **Low (L)**—Significant costs related to property acquisition and construction with some challenges related to general public acceptance/support

The Orange Alternative received a lower score than the Yellow Alternative, since much of Orange Alternative route would require elevated structure within the Phoenix metropolitan area, which substantially increases cost and would likely face challenges to public acceptance and support. Although some property acquisition would be probable for implementation of the Yellow Alternative, relative costs and public challenges would be expected to be lower.

Table 55—Ease of Implementation

Criteria	Description	Orange	Yellow
Ease of implementation	Qualitative evaluation of the relative costs of building route, including property acquisition, construction challenges, public support, and negotiations	L	M

M = moderate L = low

This criterion is considered as its own general measurement category for the Level 3 Evaluation, as noted previously and unlike preceding levels of analysis. Since Level 3 represents the last screening prior to the selection of the preferred alternative, the ease of the eventual implementation of the preferred alternative holds greater significance at this stage of evaluation and more information has been made apparent through investigations conducted since the conclusion of the Level 2 Evaluation to make a more accurate qualitative assessment possible.

Operating Characteristics

This section describes the evaluation of Final Alternatives in terms of operating characteristics, which is based on the single criterion of predictability and dependability.

Predictability and Dependability

Each Final Alternative was evaluated in terms of potential predictability and dependability by making a high-level qualitative assessment of the reliability of passenger rail services along a route considering potential disruptions from other transportation modes, such as automobiles or freight rail. The level of potential disruption to commuter and intercity trains is directly correlated with the chance that passenger services along an alternative route could be interrupted affecting optimal performance. For this measure, predictability and dependability is classified into one of three categories as described in Table 56.

- **High (H)**—High level of reliability on corridor, including limited impacts from other transportation modes
- **Moderate (M)**—Moderate level of reliability on corridor, including potential impacts from other transportation modes
- **Low (L)**—Low level of reliability on corridor, including the potential for significant impacts from other transportation modes

The Yellow Alternative received a moderate score, since potential disruptions to rail service could exist due to freight operations operating in the same corridor and the higher number of at-grade road crossings along the alignment. The Orange Alternative would have fewer at-grade road crossings and fewer freight operations occurring within its corridor

Table 56—Predictability and Dependability

Criteria	Description	Orange	Yellow
Predictability and dependability	Anticipated reliability of route compared to baseline condition in regards to impacts from other transportation modes such as automobile and freight rail	H	M

H = high M = moderate

Mobility

This section describes the screening methods used to evaluate alignment segments in terms of mobility. The individual criteria used to determine the general category score are discussed in this section and include potential ridership, reduction in automobile use, transit and pedestrian connectivity, and travel time.

Potential Ridership

Potential ridership is an estimation of the number of passengers that can be expected to use the local commuter and express intercity services offered through the development of a rail alternative. A rail alternative with a higher number of estimated passengers would be considered to have greater potential for success in terms of regional mobility and financial performance than a rail alternative with a lower number of estimated passengers. For the purposes of this study, potential ridership was forecasted using the FTA STOPS tool. The tool was designed specifically to estimate ridership on fixed guideway systems. The development of STOPS evolved directly from the federal requirement established in the Final Rule on major capital investments in MAP-21[8], which is to provide a simplified method that project sponsors can use to quantify the measures of "trips-on-project" and changes in VMT that are required as part of AA and EIS documents. Ridership forecasts were produced for each Final Alternative using the FTA STOPS tool and socio-economic TAZ data produced by the Arizona statewide AZTDM-2 model. Assumptions included standard mode of access and catchment areas for station areas, as well as maximum speed calculations based on DMU vehicle technology, route curvature, speed limitations, and segment length between stations. In addition, forecasts used revised Arizona State Demographer socio-economic forecasts for the three-county study area.

[8] MAP-21 (Moving Ahead for Progress in the 21st Century Act) was enacted in 2012 to provide funding for surface transportation programs. MAP-21 emphasizes system performance based analysis as part of project planning and funding decisions, including the requirement to determine potential ridership and changes in VMT related to proposed transit projects.

FTA STOPS model outputs for each Final Alternative include year 2010 and 2035 estimates for average daily total ridership, local commuter and intercity ridership, ridership breakdown by trip purpose, reduction in automobile VMT and vehicle hours traveled (VHT), greenhouse gas emissions reductions, and safety information, including fatality and injury reduction factors. Appendix H includes a detailed explanation of the modeled transportation effects of the Orange and Yellow Alternatives, including FTA STOPS documentation, calculation methods, and additional ridership characteristics.

Estimates for year 2035 were used for the purpose of the Level 3 Evaluation. For purposes of this analysis, trips of less than 50 miles were defined as commuter trips, whereas trips greater than that length were considered intercity trips. Daily estimated ridership characteristics of each Final Alternative are summarized by route and in Table 57 through Table 59. As indicated, the Yellow Alternative has greater passenger potential for all ridership categories, except for intercity trips of over 50 miles and terminal-to-terminal trips between the Phoenix and Tucson system hub stations.

Table 57—Potential Ridership—Route Level—Trip Type

Criteria	Description	Orange	Yellow
Daily route level ridership (FTA STOPS)	Total ridership of alternative route (2035)	18,080	20,060
	Home-based-work ridership (2035)	14,610	15,540
	Home-based-other ridership (2035)	3,000	3,050
	Non-home-based ridership (2035)	470	470

Table 58—Potential Ridership—Route Level—Trip Distance

Criteria	Description	Orange	Yellow
Daily route level ridership (FTA STOPS)	Commuter ridership (-40 mile trips) (2035)	13,940	16,700
	Intercity ridership (+40 mile trips) (2035)	4,140	3,360
	Ridership between Phoenix—Tucson (2035)	930	720

Table 59—Potential Ridership—Route Level—Transit Dependents

Criteria	Description	Orange	Yellow
Daily route level ridership (FTA STOPS)	Transit dependent ridership (2035)	3,240	3,790

Daily station boardings and passenger volumes by route location for the Orange and Yellow Alternatives are shown on Figure 87 and Figure 88. Table 60 and Table 61 show the station-to-station travel times generated by the FTA STOPS model based on the input travel times from the AZTDM2 model.

Figure 87—Station Boardings and Link Volumes—Orange Alternative

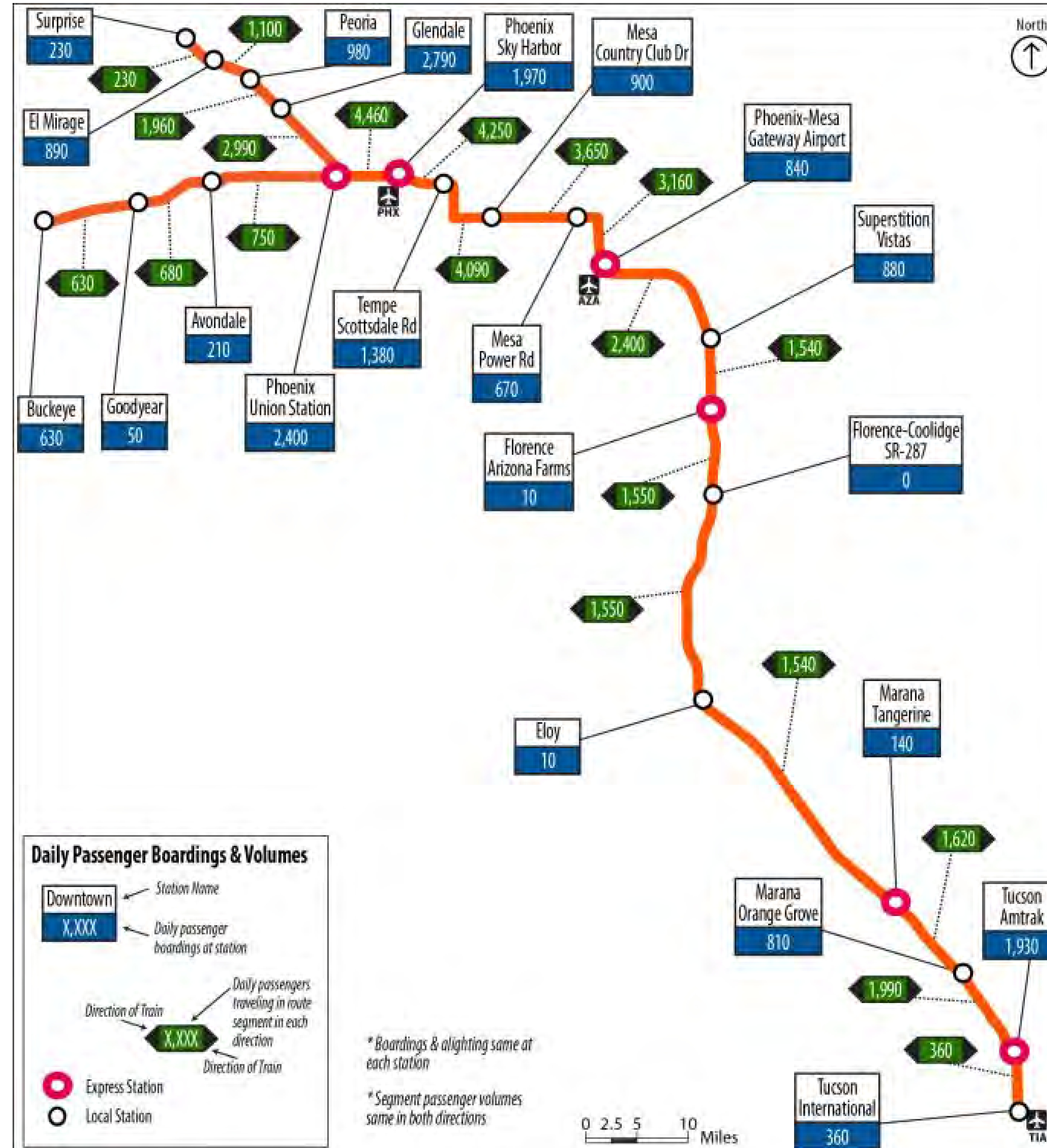


Figure 88—Station Boardings and Link Volumes—Yellow Alternative

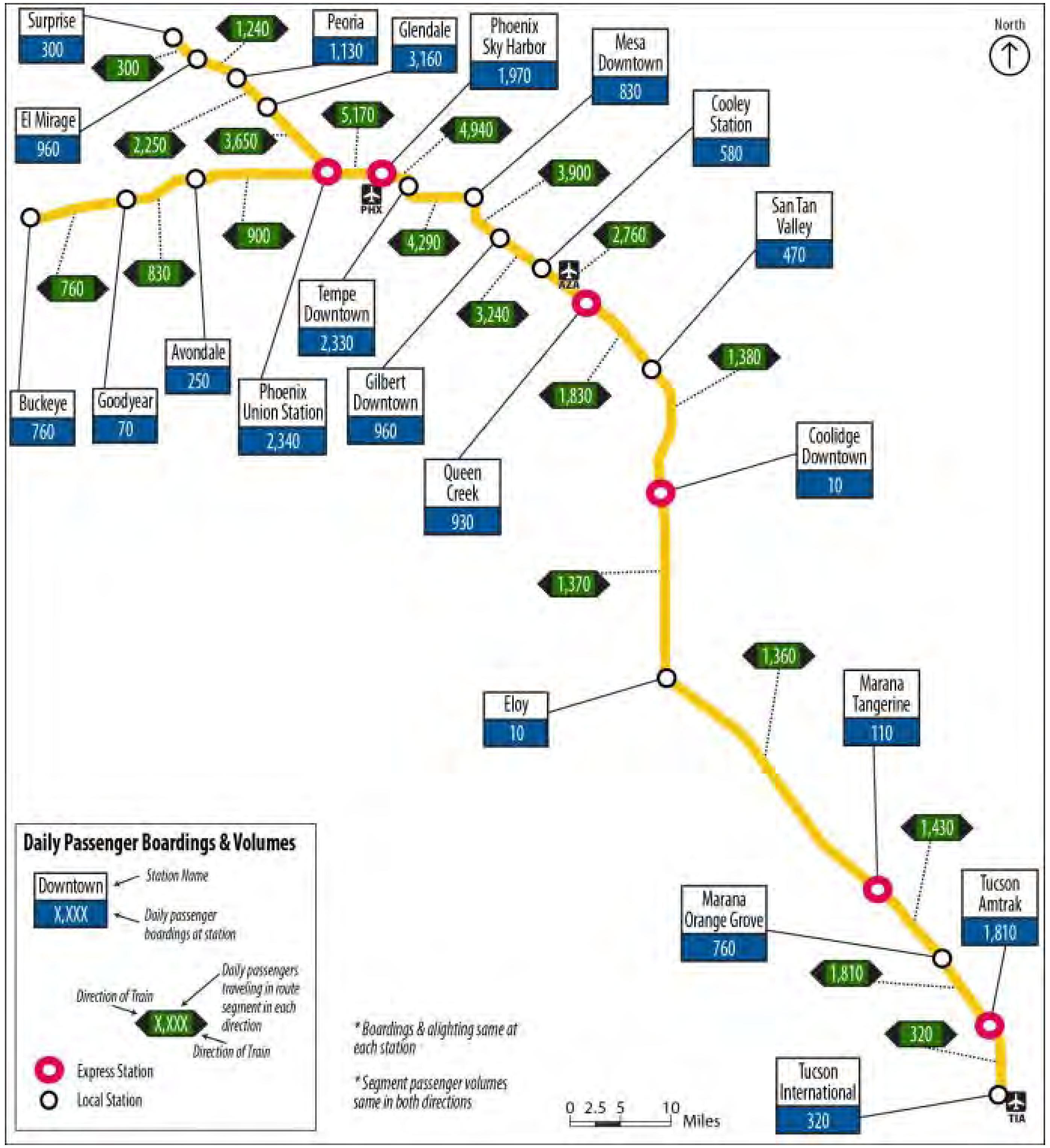


Table 60— FTA STOPS Stations and Travel Times—Orange Alternative

Local Service			Express Service		
From	**To**	**Travel Time (min)**	**From**	**To**	**Travel Time (min)**
Buckeye Extension			Phoenix Union Station	Phoenix Sky Harbor	6.5
Buckeye	Goodyear	10.4	Phoenix Sky Harbor	Phoenix-Mesa Gateway	26
Goodyear	Avondale	8.7	Phoenix-Mesa Gateway	Florence Arizona Farms	13.5
Avondale	Phoenix Union Station	16.1	Florence Arizona Farms	Marana Tangerine	23
Surprise Extension			Marana Tangerine	Tucson Amtrak	15.5
Surprise	El Mirage	5.2			
El Mirage	Peoria	6.7			
Peoria	Glendale	6.1			
Glendale	Phoenix Union Station	10.3			
Mainline					
Phoenix Union Station	Phoenix Sky Harbor	6.5			
Phoenix Sky Harbor	Tempe Scottsdale Rd	6			
Tempe Scottsdale Rd	Mesa Country Club Dr	8			
Mesa Country Club Dr	Mesa Power Rd	6.5			
Mesa Power Rd	Phoenix-Mesa Gateway	7			
Phoenix-Mesa Gateway	Superstition Vistas	9			
Superstition Vistas	Florence Arizona Farms	5.5			
Florence Arizona Farms	Florence-Coolidge	6			
Florence-Coolidge	Eloy	12			
Marana Tangerine	Marana Orange Grove	6.5			
Marana Orange Grove	Tucson Amtrak	7			
TIA Extension					
Tucson Amtrak	Tucson International	5.9			

Table 61— FTA STOPS Stations and Travel Times—Yellow Alternative

Local Service			Express Service		
From	To	Travel Time (min)	From	To	Travel Time (min)
Buckeye Extension			Phoenix Union Station	Phoenix Sky Harbor	7
Buckeye	Goodyear	10.4	Phoenix Sky Harbor	Queen Creek	28
Goodyear	Avondale	8.7	Queen Creek	Downtown Coolidge	17
Avondale	Phoenix Union Station	16.1	Downtown Coolidge	Marana Tangerine	28
Surprise Extension			Marana Tangerine	Tucson Amtrak	13
Surprise	El Mirage	5.2			
El Mirage	Peoria	6.7			
Peoria	Glendale	6.1			
Glendale	Phoenix Union Station	10.3			
Mainline					
Phoenix Union Station	Phoenix Sky Harbor	7			
Phoenix Sky Harbor	Tempe	6			
Downtown Tempe	Downtown Mesa	7			
Downtown Mesa	Downtown Gilbert	6			
Downtown Gilbert	Cooley Station	5.5			
Cooley Station	Queen Creek	5.5			
Queen Creek	San Tan Valley	7			
San Tan Valley	Downtown Coolidge	11			
Downtown Coolidge	Eloy	11			
Eloy	Marana Tangerine	17.5			
Marana Tangerine	Marana Orange Grove	7.5			
Marana Orange Grove	Tucson Amtrak	6			
TIA Extension					
Tucson Amtrak	Tucson International	5.3			

Reduction in Automobile Use

As discussed earlier in this Section , the implementation of a rail alternative offering commuter and intercity service would be expected to shift a segment of travelers from automobile trips to commuter or intercity train trips, thus reducing overall automobile use in the area served by the alternative route. The FTA STOPS model estimated a reduction in daily automobile use that would be anticipated as a result of the development of each Final Alternative. Table 62 shows the daily reduction in VMT and VHT resulting from the Orange and Yellow Alternatives.

Table 62—Reduction in Automobile Use

Criteria	Description	Orange	Yellow
Reduction in automobile use	Daily reduction in automobile vehicle miles traveled (VMT) as result of rail alternative (FTA STOPS)	570,268	566,914
	Daily reduction in automobile vehicle hours traveled (VHT) as result of rail alternative (FTA STOPS)	17,655	17,522

Transit and Pedestrian Connectivity

Figure 89—Denver Transit Center

Transit and Pedestrian Connectivity is a valuation of each potential station area's quality of connection to local transit, pedestrian, and bicycle facilities. A station location that offers adjacent transit and non-motorized facilities would provide greater ease of access to a potential passenger, without the need to rely on automobile travel. A quantitative ranking of all potential station areas along the routes of the Orange and Yellow Alternatives was determined through a "last-mile" connections assessment, which considered the number and quality of adjacent light rail, streetcar, and local bus services, as well as bicycle lanes and pedestrian sidewalk facilities. Letter grades were assigned to individual stations based on their overall ranking—with "A" offering the greatest number of transit and pedestrian connections and "F" the lowest number of connections. The complete station ranking and calculation methodology of the assessment is detailed in Appendix H: Level 3 Evaluation. The average letter grades of the potential station locations included in each Final Alternative are shown in Table 63.

Table 63—Transit and Pedestrian Connectivity

Criteria	Description	Orange	Yellow
Transit and pedestrian connectivity	Assessment of the quality of local transit, pedestrian, and bicycle connections to the potential station areas of each alternative	A	B

Travel Time

As part of the SDP efforts, preliminary stringline diagrams were developed depicting assumed commuter and intercity rail operations for each Final Alternative. These stringline diagrams are used to determine potential conflict points where a passing track would be needed in a single track configuration or where the train schedule would need to be adjusted to maximize efficiencies and reduce the potential for operational delays. The stringline diagrams were used to estimate terminal-to-terminal travel times for commuter and intercity trains traveling between the Tucson and Phoenix system hub stations, given the operational constraints assumed in the service development analysis. A summary of commuter and intercity travel times is summarized in Table 64. The stringline development process and actual diagrams are detailed in Appendix H: Level 3 Evaluation.

Table 64—Travel Time

Criteria	Description	Orange	Yellow
Travel time	Estimated commuter travel time from Tucson to Phoenix based on alternative "stringline" analysis	1:45	1:35
	Estimated intercity travel time from Tucson to Phoenix based on alternative "stringline" analysis	1:30	1:23

Safety

This section describes the screening methods used to evaluate alignment segments in terms of safety. The individual criteria used to determine the general category score are discussed in this section and include potential rail and automobile conflicts and fatality and injury reduction.

Rail and Automobile Conflicts

A passenger rail system would be faced with automobile conflict points along its route in those sections where the route is constructed at-grade and the passenger rail track crosses a roadway. Despite safety measures for automobiles and pedestrians, such as railroad crossing gates, warning lights and signs, etc., a rail alternative with a high number of at-grade roadway crossings would be considered to have higher exposure, relative to a rail alternative with fewer at-grade crossings. For the purposes of the Level 3 Evaluation, the total number of at-grade crossings that would exist along each route segment was calculated. Table 65 summarizes the total number of at-grade crossings included in the route segments of each Final Alternative. As indicated, the completed Yellow Alternative would have a much greater number of potential conflict points due to its at-grade construction along the entire route. However, rail and automobile conflict mitigation plans would be addressed as part of future studies.

Table 65—Potential Rail and Automobile Conflicts

Criteria	Description	Orange	Yellow
Rail and automobile conflicts	Number of at-grade crossings that would exist within alternative segment as rail conflict points	20	76

Fatality and Injury Reduction

Overall passenger safety in the corridor will improve if passenger rail service diverts automobile traffic to rail. With the proper infrastructure in place to support it, rail is inherently more reliable than other land and air-based modes. A highway accident rate is more than twice that of rail, where the fixed operational environment means there are fewer variables and less chance of collisions between vehicles. Based on these conditions, a decrease in VMT as a result of rail operations would be expected to reduce the likelihood of automobile crash related injuries and fatalities. The factor by which the operations of each Final Alternative would decrease automobile injuries and fatalities was determined for the Level 3 Evaluation. The factors were calculated by applying commonly accepted industry fatality and injury reduction factors (per 1 million VMT) to the daily reduction in automobile VMT produced by each alternative. The reduction in fatalities and injuries are shown in Table 66. Calculation methods and assumptions are detailed in Appendix H: Level 3 Evaluation.

Table 66—Fatality and Injury Reduction

Criteria	Description	Orange	Yellow
Fatality and injury reduction	Automobile fatality reduction as result of rail alternative, per 1 million VMT (FTA STOPS)	0.00741	0.00737
	Automobile injury reduction as result of rail alternative, per 1 million VMT (FTA STOPS)	0.1112	0.1105

3.3.3 Level 3 Evaluation Technical Results

The Level 3 Evaluation screened the Orange and Yellow Alternatives against various quantitative and qualitative criteria within seven general measurement categories. The individual criteria included in the Level 3 Evaluation examined each alternative as a whole. The specific screening methods and results of each criterion and general measurement category are detailed in the previous sections of this report.

Table 67 shows the general measurement category scores of each alternative, summarized into an overall assessment of each alternative in terms of community acceptance and accessibility, environmental impacts, financial feasibility, ease of implementation, operating characteristics, mobility, and safety. The relative scores for each criterion were summarized on a scale of 1 to 2 (2 being desirable and 1 being less desirable), and shown graphically using "Harvey Ball" symbols as 5 = 2 and 1 = 1. The category of ease of implementation was added at the Level 3 Evaluation to more comprehensively evaluate the alternatives. When all measurement category scores are evaluated, the Yellow Alternative ranks higher than the Orange Alternative.

The Yellow Alternative scored the highest overall because it provides access to existing population and employment centers, has lower capital and operating costs, shorter travel time, and fewer environmental impacts. The Orange Alternative has significantly higher costs and lower anticipated ridership. The Yellow Alternative would require close coordination with UP, but assumptions at this level were designed to minimize these potential conflicts.

Table 67—Overall Level 3 Evaluation Results

Criteria	Orange	Yellow
Community Acceptance and Accessibility	1	5
Compatibility with Local Plans	C	C
Compatibility with Underlying Property Ownership	C	D
Compatibility of Station Areas	D	C
Existing population within station area district	717,329	851,713
Existing employment within station area district	726,212	796,426
Future population within station area district	1,027,518	1,188,103
Future employment within station area district	939,520	1,036,490
Existing minority population within station area district	404,114	481,916
Existing low-income population within station area district	265,145	296,018
Existing elderly population within station area district	85,161	73,592
Environmental Impacts	1	5
Potential noise receptors within corridor	54,215	52,827
Resources registered with the State Historic Preservation Office within corridor	111	144
Resources registered with Arizona State Museum within corridor	562	551
Wetlands (in acres) within corridor	1,538	1,105
Floodplains (in acres) within corridor	9,944	9,485
Rivers, washes, or arroyos (in linear feet) within corridor	1,910,872	1,480,187
Wildlife corridors crossed as identified in Arizona Missing Linkages report	6	5
Species and Habitat Conservation Guide resources within corridor	207	202
Reduction in Nox emissions (FTA STOPS Model)	519 kg	516 kg
Reduction in CO emissions (FTA STOPS Model)	9,563 kg	9,507 kg
Reduction in VOC emissions (FTA STOPS Model)	342 kg	340 kg
Reduction in PM emissions (FTA STOPS Model)	6 kg	6 kg
Financial Feasibility	1	5
Annual operating cost for commuter rail portion of service (2014 dollars)	$66,877,000	$51,958,000
Annual operating cost for intercity rail portion of service (2014 dollars)	$19,108,000	$14,845,000
Capital cost (2014 dollars)	$7,568,000,000	$4,477,000,000
Annual operating cost per annual commuter rail passenger (2014 dollars)	$15.99	$10.37
Annual operating cost per annual intercity rail passenger (2014 dollars)	$15.38	$14.73
Right-of-way cost (2014 dollars)	$62,135,000	$144,897,000
Ease of Implementation	1	5
Ease of implementation	L	M
Operating Characteristics	5	1
Predictability and dependability	H	M
Mobility	1	5
Total daily ridership	18,080	20,060
Daily ridership between Phoenix-Tucson	*930*	*720*
Reduction in automobile vehicle miles traveled (FTA STOPS Model)	570,268	566,914
Transit and pedestrian connectivity	A	B
Tucson to Phoenix commuter travel time	1:45	1:35
Tucson to Phoenix intercity travel time	1:30	1:23
Safety	5	1
At-grade crossings	20	76
Daily reduction in fatalities (FTA STOPS)	0.00741	0.00737
Daily reduction in injuries (FTA STOPS)	0.1112	0.1105

5 = highest ranking 1 = lowest ranking

3.3.4 Level 3 Public Outreach Results

As during the Level 2 Evaluation, an outreach effort was carried out to gauge public opinion on the Final Alternatives. Engagement methods were similar to those used previously, including informational booths at community events, media releases, and a study survey that asked members of the public their opinion among the Final Alternatives as well as desired attributes of a rail system. Study team members staffed an information booth at over 15 community events and festivals throughout the study area between March 8 and May 15, 2014. At the conclusion of the outreach survey period on June 30, 2014, 5,085 completed surveys had been received either via mail-in, forms completed at community events, or online submissions on the ADOT project website

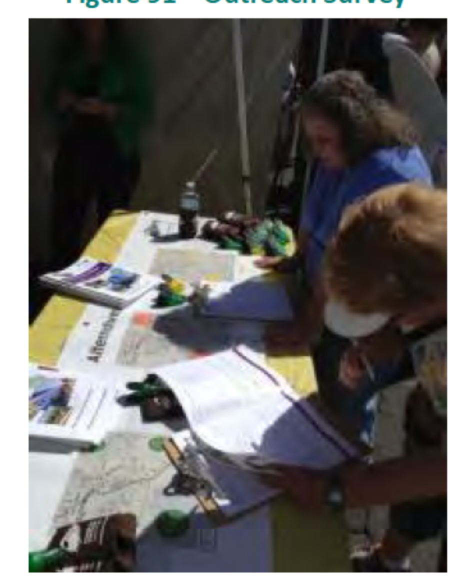
As part of the survey, the public was asked their preference among the Final Alternatives as well as to comparatively rank desired system attributes. These survey results are shown below. The Green Alternative is included in the public preference results, as the determination to remove the Green Alternative from further consideration was made after the launch of the public outreach and survey period.

Figure 90—Information Booth

- Final alternatives—public preference
  - Yellow Alternative—46 percent
  - Green Alternative—32 percent
  - Orange Alternative—22 percent
- Final alternative attributes—public preference
  - Travel time
  - Service reliability
  - Travel cost
  - Construction cost
  - Property impact
  - Environmental impact

As indicated during earlier public engagement phases, surveys and comments received during the outreach period suggest strong support for a rail system between Tucson and Phoenix. Survey results show the Yellow Alternative to be the most popular with the public by a fairly large margin. Service reliability and travel time were also specified by the public as the most important desired attributes of a rail service. Individual community event details and complete survey results are included in Appendix H: Level 3 Evaluation.

Figure 91—Outreach Survey



Paired Attribute Comparison

For the Level 3 outreach, an additional technique was used to collect more focused information about project priorities from the survey participants. In cooperation with the University of Arizona, the survey instrument used in the Level 3 Evaluation was modified to include a paired comparison of some of the proposed rail alternatives' attributes to assess preferences in more depth than a simple question about preferred alternatives. The surveys distributed included random questions about the critical features or characteristics of the project compared to each other to test the strength of the preferences when asked in different contexts. For example, a comparison of travel speed to the cost of the trip might assign a higher priority to trip cost, but a comparison of travel speed to reliability of service might suggest travel speed is more important. By comparing the results among select pairings, the priorities for various features among the participants can be expected to emerge. While the survey was not designed to be statistically valid, the large number of responses adds a level of confidence to the results and provides valuable insight into how people see the project.

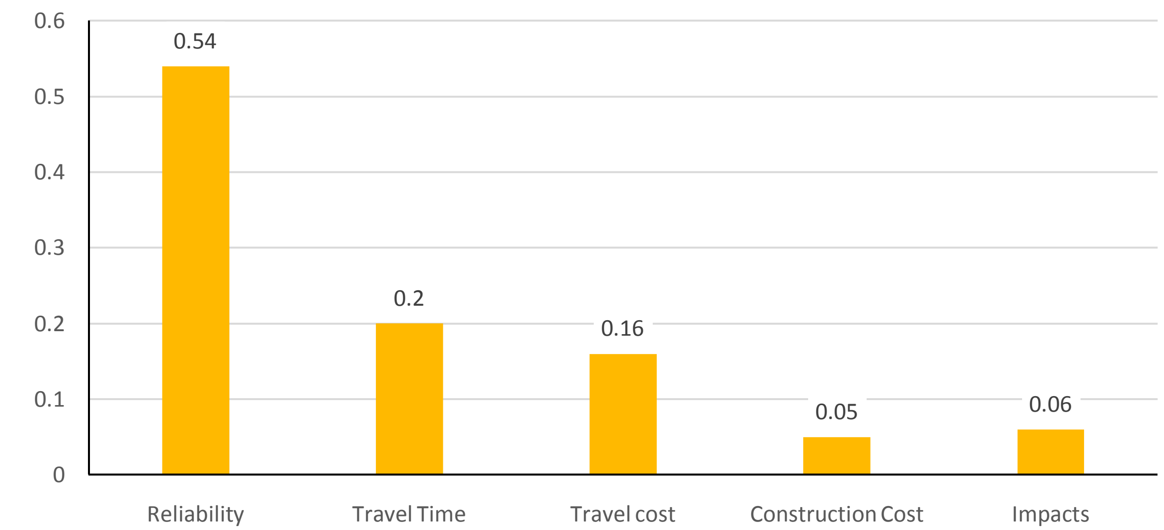
On a straight preference basis, among the three Final Alternatives, the Yellow Alternative is supported by 46 percent of the nearly 4,000 participants who responded to that question. The Green was preferred by 32 percent and the Orange by 22 percent. In addition to the overall preference, reviewing the attribute comparisons produced the results shown in Table 68.

Table 68—Paired Comparisons of Select Features

Policy Attribute Questions and Possible Answers	Responses by Survey Answer	Percentage of Responses by Question
Policy Q1—Travel Time vs. Cost of Construction		
Provide fastest overall travel time	1203	79.20%
Limit cost of construction	316	20.80%
Policy Q2—Reliability vs. Impacts to Private Property		
Limits service disruptions and maintains schedule reliability	1208	79.63%
Limits impacts to private property	309	20.37%
Policy Q3—Cost of Trip vs. Cost of Construction		
Limiting the cost of the trip	1301	78.71%
Limiting the cost of construction	352	21.29%
Policy Q4—Reliability vs. Cost of Trip		
Limits service disruptions and maintains schedule reliability	1352	81.59%
Limits the cost of a trip	305	18.41%
Policy Q5—Cost of Construction vs. Impacts to Private Property		
Limiting cost of construction	545	54.12%
Limiting impacts to private property	462	45.88%
Policy Q6—Cost of Trip vs. Travel Time		
Limits cost of trip	425	42.00%
Provides fastest overall travel time	587	58.00%

The results in Figure 92 show the significance of the variables among the respondents. Reliability is the clear priority for those responding to the survey, while construction cost and impacts to private property are less important. More detail about this process can be found in Appendix H: Level 3 Evaluation.

Figure 92—Passenger Rail Public Priorities



3.3.5 Level 3 Agency Outreach Results

As during the Level 2 Evaluation, the agencies within the corridor that are affected by the Final Alternatives were contacted to discuss the details of the analysis and obtain input from the local perspective. The project continued to retain a highly favorable rating, but the emphasis now has become more specific to local needs and opportunities. Presentations have been made not only to staffs at cities and towns, but in a number of cases to city councils that have broader interests in the benefits or challenges presented by a proposed new passenger service. This input proved invaluable in understanding how the project is being perceived by the affected agencies and what their primary interests are. Major outcomes of agency coordination are summarized below.

- Officials from several communities located along the Yellow Alternative route expressed their support for the Yellow Alternative over the Orange Alternative.
- Several affected agencies voiced their preferences for variations to Final Alternative routings within their jurisdictions that serve or avoid critical locations, which could result in optional routings as part of the preferred alternative.
- Multiple stakeholders stressed the critical importance of airport connections to every regional airport within the study corridor, emphasizing the need for either direct or complementary high-capacity transit connections.
- As noted previously, coordination with GRIC resulted in the determination to remove the Green Alternative from further analysis based on likely right-of-way challenges, cultural and historical impacts, and low ridership potential.
- Ongoing coordination with UP encouraged the possibility that a rail alternative which utilizes UP Phoenix Subdivision right-of-way could prove viable, if the system and service design of the preferred alternative avoids disruptions to existing freight operations.

3.4 Preferred Alternative

3.4.1 General

This section outlines the selection of the preferred alternative, which consists of a unique route, set of stations, and selected operating characteristics. Decisions regarding the definition of the preferred alternative were made with the consideration of technical evaluation, public outreach results, and agency coordination.

- **Technical input**—The Yellow Alternative performed best in the Level 3 technical screening, as detailed in Section 3.3.2. The Yellow Alternative would provide access to existing population and employment centers and has lower capital and operating costs, shorter travel time, and fewer environmental impacts compared to the Orange Alternative. The Orange Alternative has significantly higher costs and lower anticipated ridership. The Yellow Alternative would require close coordination with UP, but assumptions at this level were designed to minimize these potential conflicts to existing freight operations.
- **Public input**—The 5,085 survey responses on the Final Alternatives, obtained during spring 2014 public outreach, expressed a preference for the Yellow Alternative, followed by the Green and then Orange Alternatives. The Green Alternative is included in the public preference results, as the determination to remove the Green Alternative from further consideration was made after the launch of the public outreach and survey period. In addition, responses on desired service attributes emphasized travel time and service reliability, while minimizing concerns over construction cost and impacts to property and the environment.
- **Agency input**—Agency opinions on Final Alternatives were an essential consideration in the selection of the Preferred Alternative route. Officials from several communities expressed support for the Yellow Alternative, and multiple affected agencies voiced preferences for variations to routings within their jurisdictions that serve or avoid critical locations. In addition, stakeholders stressed the importance of airport connections, coordination with GRIC resulted in the removal the Green Alternative in addition to right-of-way, ridership, and cultural property limitations, and discussions with UP encouraged the possibility of a rail alternative using UP Phoenix Subdivision right-of-way if disruptions to existing freight operations are avoided.

3.4.2 Preferred Alternative

A preferred alternative was determined based on the technical analysis presented in the AA, as well as agency and public input. Based on the Level 3 Evaluation, which provided a technical overview of each Final Alternative, the Yellow Alternative was the best performing alternative overall within five of the seven evaluation categories. However, several potential historic and cultural resource issues were identified within route segments of the Yellow Alternative based on analyses performed throughout the AA and major concerns expressed by stakeholders during the agency outreach process. These resources may be subject to protection of Section 4(f)[9] of the U.S. Transportation Act which prevents impacts to these properties unless there is no prudent and feasible alternative. A determination regarding whether properties protected by Section 4(f) will be impacted by the Yellow Alternative would require a much more extensive and detailed analysis than is included in the scope of this study. Although Yellow remains the Preferred Alternative for these unresolved portions of the Corridor; the option of using the Orange Alternative in these segments has been retained as a potential prudent and feasible alternative to impacting properties protected by Section 4(f). It is important to note that the optional segments of the Orange Alternative may also have properties protected by Section 4(f) that may require extensive analysis to make a decision regarding a final alternative. The preferred Yellow Alternative is shown in Figure 93. The routing options are also detailed in Figure 93 as insets.

Route Options Carried Forward

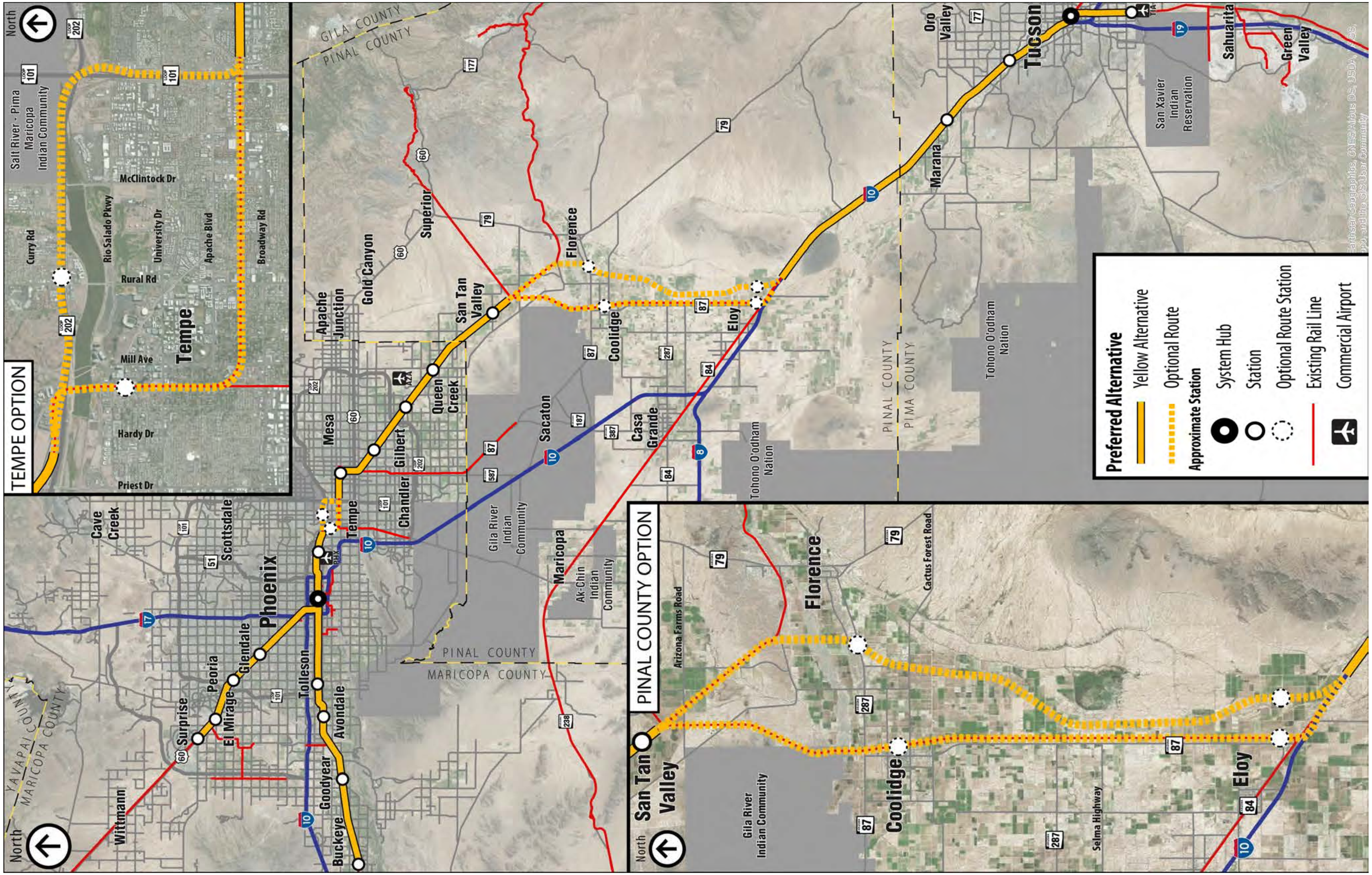
Optional routings are considered as potential solutions for issues identified along the Yellow Alternative. They could be beneficial in identifying a Preferred Alternative in the Final Tier I EIS if the primary Yellow Alternative route proves to be flawed. These re-routings are presented as options based on a high-level assessment of viability and potential conflicts.

- **Tempe Option**—The locally preferred Yellow Alternative includes an optional routing through Tempe because of the potential impact on historic properties adjacent to UP tracks. The optional routing would use the portion of the Orange Alternative that follows SR 101L Pima and SR 202L Red Mountain freeway rights-of-way. It is shown as an inset in Figure 93.
- **Pinal County Option**— Figure 93 also shows a second optional routing for the Yellow Alternative in Pinal County. Should the use of UP property not be feasible, this option would potentially utilize the portion of the Orange Alternative that extends from Copper Basin Railroad along the planned multimodal North-South Corridor to I-10 as described above in the discussion of the Teal Alternative under Final Alternatives.

In consideration of the technical evaluation results, public opinion gleaned from outreach results, and preferences and concerns shared by agency stakeholders throughout the study area, the Yellow Alternative was ultimately selected as the preferred alternative of the *Arizona Passenger Rail Corridor Study—Tucson to Phoenix Alternatives Analysis*.

[9] Section 4(f) refers to section of U.S. Department of Transportation Act of 1966 requiring consideration of adverse impacts to park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Section 4(f) properties which could be adversely impacted by a transportation project require supplemental evaluation and must be avoided if prudent and practical alternatives exist.

Figure 93—Preferred Yellow Alternative



4.0 Next Steps

4.1 Environmental Impact Statement

A Tier 1 EIS provides a NEPA-compliant document that includes the appropriate level of information to determine corridor-level decisions and address related issues of concern. The Tier 1 EIS will document and confirm the purpose and need, identify a range of alternatives to be analyzed (including alignments, technology, and service operations), identify and develop evaluation criteria, document environmental impacts, identify a preferred alternative for the corridor/study area alignment, and address component projects for a Tier 2 assessment to increase capacity for travel along the selected corridor.

4.2 Service Development Plan

A service development plan provides a conceptual operations plan associated with a preferred alternative. The SDP provides an operating plan (trip patterns, schedules, etc.), capital plan (vehicles, guideway, stations, etc.), cost estimates, and ridership projections. In addition, the SDP includes implementation considerations such as a project management plan, financial plan, maintenance plan, risk assessment, and stakeholder agreements.

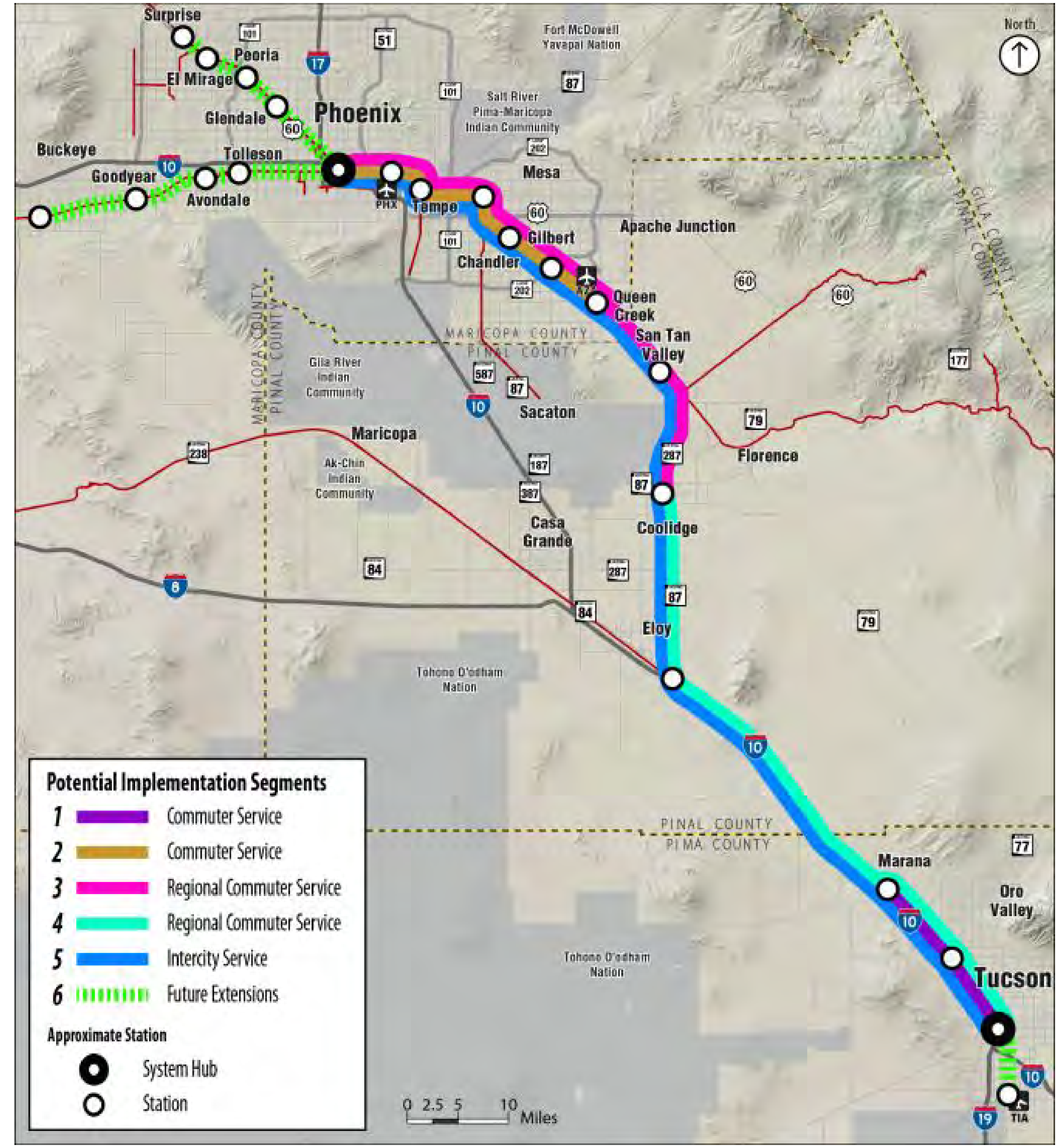
4.2.1 Potential Implementation Segments

A typical service development plan also includes a concept for potential project construction phasing and implementation. It is likely that the development of the Preferred Alternative in this Tucson to Phoenix corridor would occur in individual segments following a standard practice of phased implementation. The likely phased approach is due to many factors including the estimated capital costs associated with the development of the Preferred Alternative, challenging infrastructure funding realities, and more immediate travel demand potential in the Tucson and Phoenix metropolitan areas. Figure 94 displays the following possible segment implementation concept:

- **Tucson Commuter Service**— Initial service between downtown Tucson and Marana
- **Phoenix Commuter Service**— Initial service between downtown Phoenix and Queen Creek
- **Regional Phoenix Commuter Service**— Regional service between downtown Phoenix and Coolidge
- **Regional Tucson Commuter Service**— Regional service between downtown Tucson and Coolidge
- **Intercity Service**— Intercity service between Tucson and Phoenix
- **Future Extensions**— Extensions from downtown Phoenix to Surprise and Buckeye, and from downtown Tucson to Tucson International Airport

The potential implementation segments and phasing shown in Figure 94 are intended to represent one possible approach at a high level. The Service Development Plan document will include a more detailed implementation concept.

Figure 94—Potential Implementation Segments



PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

STATION AREA PLANNING GUIDANCE FOR COMMUNITIES

ADOT PASSENGER RAIL CORRIDOR STUDY
TUCSON TO PHOENIX

November 26, 2013

Prepared by:
AECOM

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Tucson to Phoenix

LIST OF ABBREVIATIONS

ADOT	Arizona Department of Transportation
APRCS	Arizona Passenger Rail Corridor Study
BRT	Bus Rapid Transit
bqAZ	Building a Quality Arizona
CDBG	Community Development Block Grant
CFD	Community Facilities District
DU	Dwelling Unit
EDA	Economic Development Administration
EIS	Environmental Impact Statement
FAR	Floor Area Ratio
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GPLET	Government Property Lease Excise Tax
LRT	Light Rail Transit
MAG	Maricopa Association of Governments
MARTA	Metropolitan Atlanta Rapid Transit Authority
PARA	Planning Assistance for Rural Areas
SCC	Sustainable Communities Collaborative
STLUIS	MAG Sustainable Transportation and Land Use Integration Study
TIF	Tax Increment Financing
TOD	Transit-Oriented Development
UP/UPRR	Union Pacific Railroad
USDOT	United States Department of Transportation

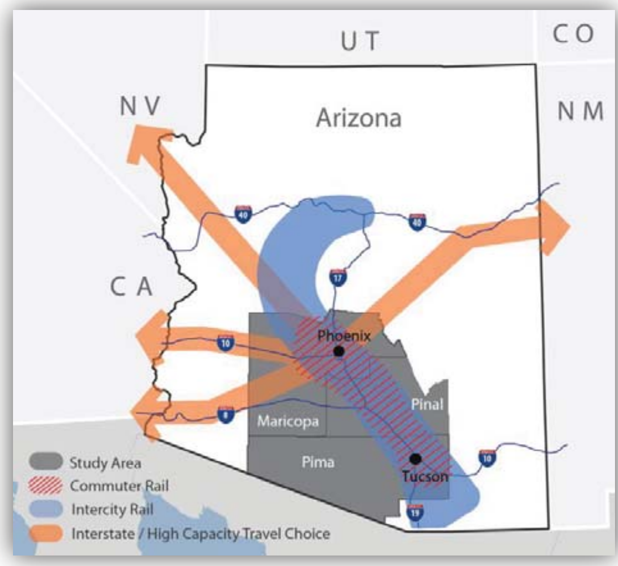
Chapter 1. Introduction to the Corridor

1.1 Project Location and Background

The Arizona Department of Transportation (ADOT) Arizona Passenger Rail Corridor Study (APRCS) consists of an Alternatives Analysis/Tier 1 Environmental Impact Statement (EIS) and Service Development Plan to evaluate potential high-capacity transit improvements between the Tucson and Phoenix metropolitan areas, separated by approximately 120 miles (Figure 1). The proposed Tucson to Phoenix Passenger Rail Corridor (Corridor) comprises three counties: Maricopa, Pima, and Pinal, and is part of the larger Sun Corridor Megapolitan, one of the fastest growing locations in the United States identified by the Brookings Institution and Regional Plan Association in 2005

Tucson and Phoenix are the two largest metropolitan areas in Arizona, representing about three-quarters of the state's population. In addition, approximately 9 out of 10 jobs in the state are found in these two metropolitan areas. With recent population growth in the study area, several statewide and regional planning processes have identified a need for increased transportation capacity between the Phoenix and Tucson metropolitan areas.

Figure 1: bqAZ Recommendations for Passenger Rail



In March 2010, ADOT completed the *Building a Quality Arizona (bqAZ) Statewide Transportation Planning Framework Program,* which concluded that Arizona cannot address future congestion by continuing to rely exclusively on roadways to move people and goods. Rail offers a highly sustainable form of transportation that is more environmentally-friendly and a resource-sensitive method of moving goods and people. The concept of an intercity rail corridor between Tucson and Phoenix was further studied and recommended in the 2011 *Arizona State Rail Plan*. This study, the *Arizona Passenger Rail Corridor Study*, intends to investigate the benefit of this alternative mode of travel through the heart of the Sun Corridor and recommend a program for implementation.

Transit Technologies

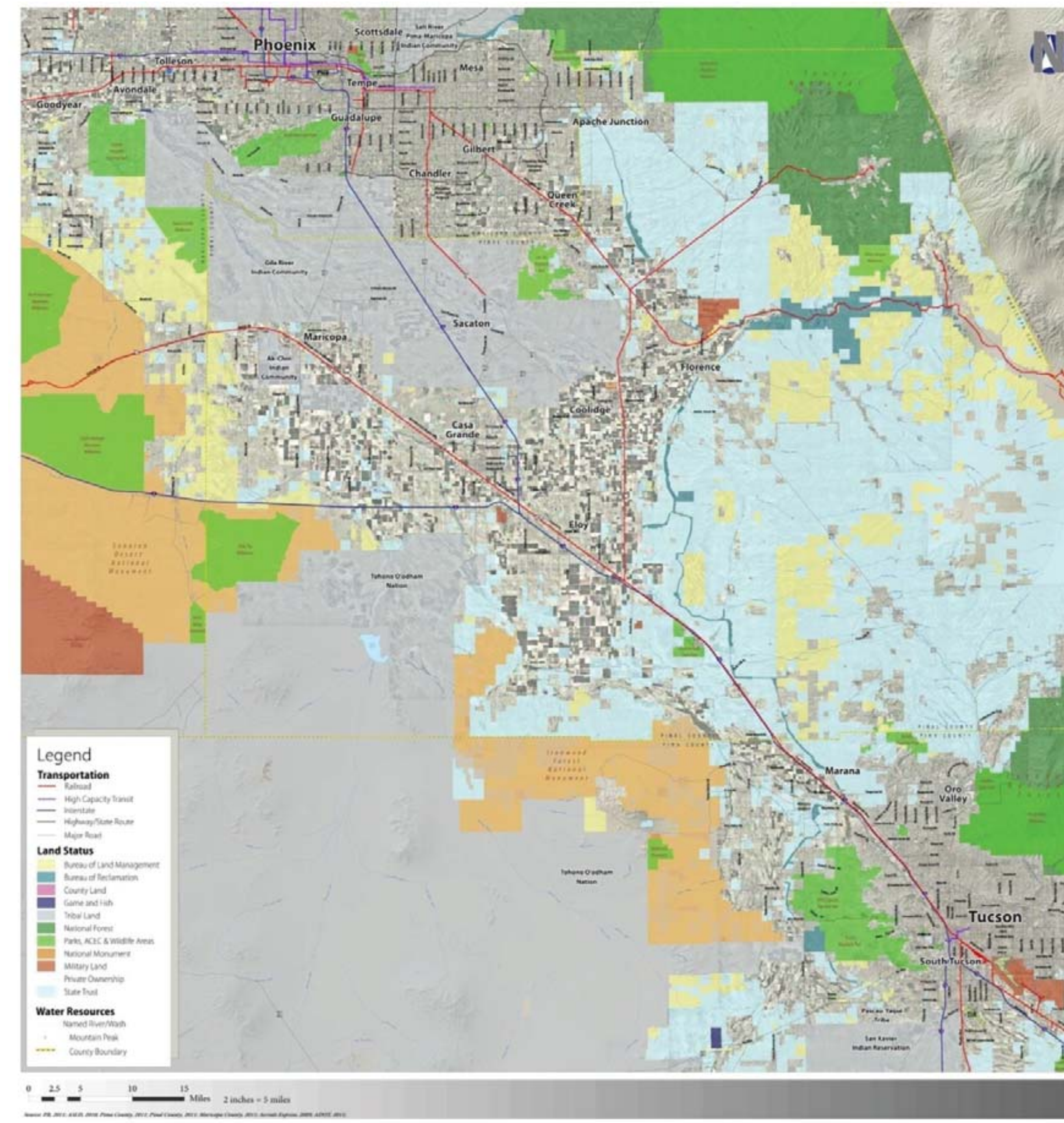
To date, this study has gone through an extensive alternatives development and evaluation process where both regional bus and passenger rail (intercity and commuter rail) alternatives were analyzed between the Tucson and Phoenix metropolitan areas in the overall Alternatives Analysis/Tier 1 EIS document. The recommendation from that process is to implement regional passenger rail service

between Tucson and Phoenix, building first on initial commuter rail service to be implemented initially from the Phoenix Metropolitan Area southward into Pinal County.

Station Typologies

Four types of stations (system hub, regional, local, transit emergent) were identified for the corridor based on the unique southwestern context, existing and potential future growth patterns (including land uses and densities), and community needs and demands. These station types will be further discussed in more detail in later parts of this report.

Figure 2: Study Area



Station Locations

Figure 3 illustrates the universe of station locations considered. The range of preliminary station locations were initially identified through agency and public scoping meetings, and individual community meetings. These were evaluated in Tier 1 based on factors such as adequate population to support the station, travel demand, compatible adjacent land uses and densities, and existing transit connections.

The Tier 2 evaluation of station locations included a three step process. The first step of this process included the "Station Area Planning Exercise" at the Corridor Support Team Meetings held in July and August 2012. The exercise served the purpose of:

- Gaining an understanding of urban form, land use, and transit connectivity elements that contribute to a rail transit-ready environment
- Illustrating public policy and private actions required to proactively prepare for rail transit
- Understanding regulatory and policy changes needed
- Understanding land use thresholds required by the Federal Transit Administration (FTA) to obtain federal funding

The second step included completing the "*Community Readiness Assessment for Rail Transit*", a self-assessment tool that was distributed to all communities in the study area that could potentially host a future passenger rail station (Figure 3). This assessment served to review each community's plans and policies for land use, mobility, connectivity, building design, housing affordability and parking that are required to support and enable successful station area development. Cities and towns were encouraged to involve representatives from their Planning/Community Development, Economic Development, Housing, Transportation, Public Works, and Real Estate departments in the self-assessment.

The third step of this process included individual meetings with candidate station location communities along the rail corridor alternatives where the Project Team discussed the output of the "*Community Readiness Assessment for Rail Transit*" prepared and submitted by the community, updated the community on the alternatives evaluation progress, and elaborated on the implications of a possible station location selection in that municipality.

1.2 Project Goals and Objectives

The *bqAZ Statewide Transportation Planning Framework Program* 2050 travel demand projections indicate that traffic congestion in this corridor could increase the travel time between Tucson and Phoenix to five hours (more than double the average travel time today) by 2050 if significant improvements are not implemented, including some combination of roadway and alternative modes. This includes construction of the ultimate build-out of the Interstate 10 (I-10) corridor to ten lanes (5-lanes in each direction) between the Tucson and Phoenix metropolitan areas and construction of the proposed North-South corridor from I-10 in Eloy to the East Valley of the Phoenix metropolitan area. It is important, therefore, to begin conceptualizing alternative routes and modes to alleviate the congestion along this important artery. The ADOT *Arizona Passenger Rail Corridor Study* intends to develop passenger rail (both intercity and commuter rail) as a viable transportation option that fulfills the state's

long range vision of providing safe, efficient, and sustainable transportation options that serve the needs and aspirations of its communities.

Figure 3: Universe of Station Locations Considered

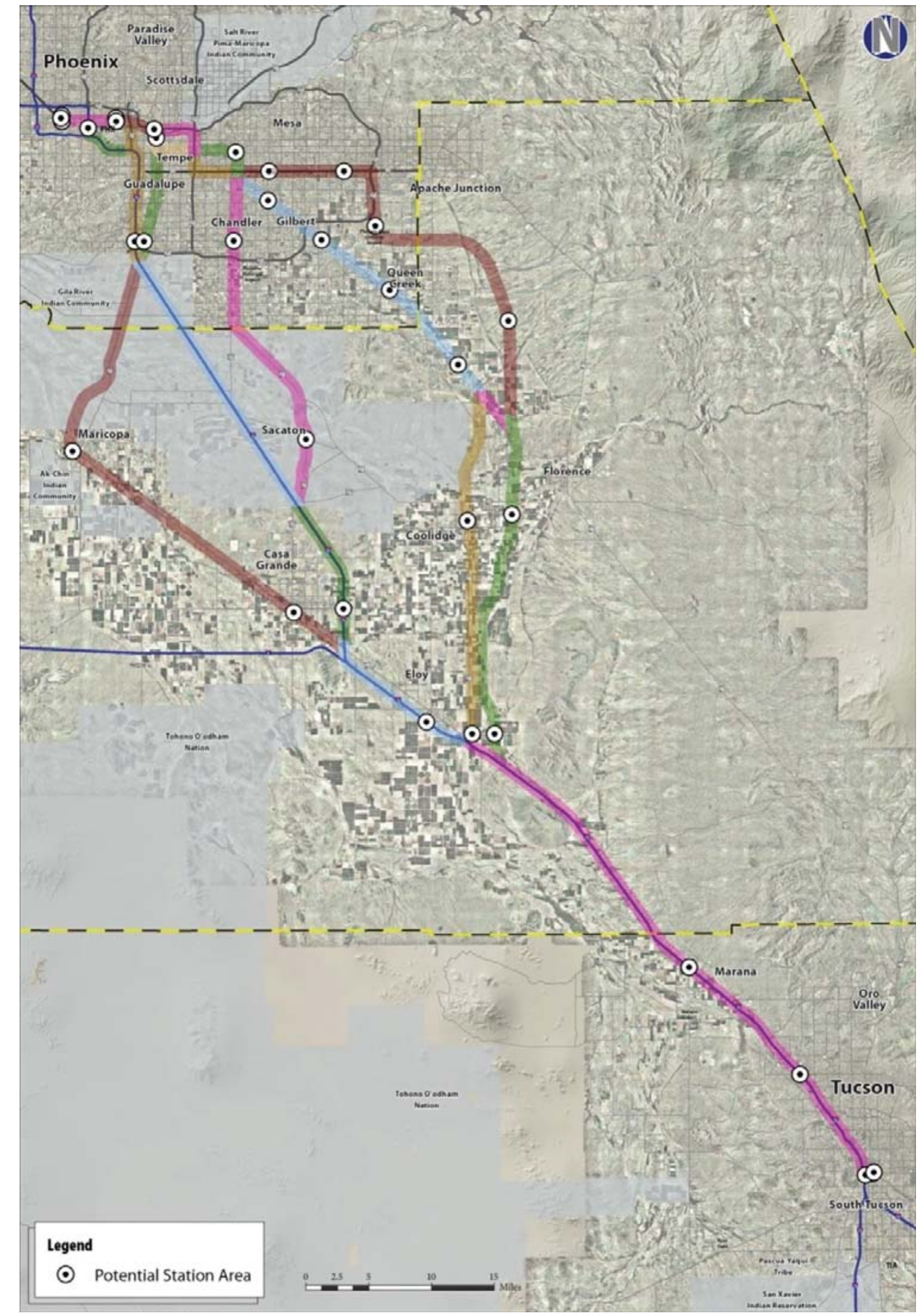


Figure 4: Community Readiness Assessment for Rail Transit

COMMUNITY READINESS ASSESSMENT FOR RAIL TRANSIT

PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

Community: ______________________________

Identified Activity Center Location*: ______________________________

*with the potential to host a passenger rail station (1/4 mile radius Transit Core evaluation only)

	Community Assessment Questions	Yes/No	Comment
Land Use			
1	When was your community's General Plan adopted or last updated (if it was approved by the voters, use that date)? Date:______________ Next expected update year:________________________		
2	Does your General Plan identify activity centers in the Land Use Element and/or Growth Area Elements? a. Do you have specific policies and/or plans that promote transit use at your activity centers? b. Do your activity centers allow for a variety of land uses to create a 16-hour/day activity (i.e. office, lofts/condominiums, apartments/ townhomes, entertainment venues, commercial services, retail)?		
3	Does your community's Zoning Ordinance encourage (check those that apply): a. Mixed Use Development b. Higher Density Activity Centers c. Transit / Pedestrian Friendly Streetscapes d. Parking Maximums e. Provisions that are Form Based or Hybrid f. Transit Oriented Development Overlay		
4	Does your community have incentives to encourage land use, economic development, and redevelopment strategies? If yes, check those that apply: a. Density bonuses b. Streamlined development processes and permitting c. Public financing for pedestrian and streetscape amenities d. Use of Assessment or Community Facilities Districts		
Mobility and Connectivity			
1	Is the identified activity center currently served (or planned to be served) by any of the following types of transit? (check all that may apply): a. Light rail b. Modern street car c. Express bus/BRT d. Higher frequency local bus e. Local bus f. Circulator bus g. None of the above		

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Figure 4 Continued.

COMMUNITY READINESS ASSESSMENT FOR RAIL TRANSIT

PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

	Community Assessment Questions	Yes/No	Comment
2	Do streets within the identified activity center vicinity provide access for transit vehicles and their operational needs (i.e. bus pull-outs, adequate turning radius, etc.)?		
3	Do streets within the identified activity center vicinity promote pedestrian activity through any of the following (check all that may apply): a. Small Block Size (between 200 – 400 ft./side) b. Shaded sidewalks c. Street furniture d. Pedestrian scale lighting e. Landscape buffer (between curb and sidewalk) f. On-street parking (parallel or angular configuration) g. Pedestrian signage and crosswalks h. Low to moderate traffic speeds i. None of the above		
Activity Center Building Design			
1	Do you have design guidelines for the identified activity center? If yes, do the guidelines address (check those that apply): a. Buildings oriented towards the street b. Narrow or no building setbacks c. Avoidance of blank walls along sidewalks or streets d. Pedestrian friendly uses along pedestrian pathways (i.e. small professional and services offices or retail facilities, such as dry cleaners, newsstands, coffee shops, restaurants, etc.)		
2	Does the identified activity center have continuous development with absence of large tracts of vacant land and surface parking lots? a. If not, are redevelopment plans or policies in place to encourage redevelopment of these under-utilized sites?		
Housing Affordability			
1	Is affordable housing available within or adjacent (within 10-minute walk) to the identified activity center?		
2	Are there plans or policies to preserve, rehabilitate or encourage new affordable housing development in the activity center?		
Parking			
1	Does the identified activity center allow on-street parking (parallel or angular configuration) that acts as a buffer for pedestrians from street traffic and creates a reserve of short-term parking?		
2	Does the activity center offer multi-storey parking structure(s) and/or shared surface parking lots convenient to a likely rail station/transit center site?		
3	Are priority parking spaces available for multiple occupant and/or alternative fuel vehicles in the identified activity center?		

The following goals and objectives have been developed to guide the station area planning process for potential station locations along the passenger rail corridor in the Sun Corridor:

- Provide a secure and safe station area vicinity for the users during the day and night
- Provide a safe and user-friendly station facility that incorporates supportive facilities such as concession areas, waiting rooms, restrooms, and ticket booths
- Provide aesthetically-pleasing and visually engaging surroundings that people will enjoy before/after their train ride
- Provide station facilities that are accessible and are ADA compliant
- Accommodate for safe and practical circulation methods between the various station components, parking, pick-up/drop-off areas
- Incorporate the use of sustainable planning, building, and implementation practices to ensure long-term use and cost-effectiveness, while also encouraging an environmentally-sensitive approach

1.3 Purpose of Land Use/Urban Form Guidance

The purpose of this Land Use/Urban Form Guidance Document is to provide a framework for station area planning that can be used by host communities (those with a station site selection) to develop plans for their specific station areas. This document is a tool that simplifies the approach to station planning and outlines the recommended criteria for the building of efficient, functional, and coordinated station areas along the passenger rail corridor. The guidance highlights the need for regional coordination and cooperation, and uses an integrated approach to transportation and land use.

This document lays emphasis on the planning aspects of station area development for the four station types identified for the Sun Corridor. The guidelines will help to determine the station type appropriate for a host community based on several factors, including the maturity of a municipality's community development pattern, the level of sophistication in its overall planning framework, the existing and planned local transit system, and other features that promote sustainability and an approach to smarter growth. As communities continue to grow in size and enhance the quality of activity within the station area, they may work with the operating/management agency of the system to "upgrade" to a higher level of station type, based on the recommendations made in this document.

This document includes the following chapters:

1. Introduction to the Corridor
2. Station Typologies Overview
3. System Hub Station
4. Regional Station
5. Local Station
6. Transit Emergent Station Location
7. Station Area Planning Principles
8. Implementation Program Requirements
9. Other Resources

As noted, the Land Use/Urban Form Guidance document begins with a brief description of the project location and background and discusses the history of the regional transportation facilities in the corridor. Chapter 2 provides an overview of the station typologies and station influence area components, and explains the hierarchy of the four station types.

Chapters 3 through 6 discuss the station types in more detail and provide target station area characteristics, such as the mix of land use and development densities, building heights, recommended transit connections, pedestrian and bicycle accessibility, and provision of affordable housing. A prototypical station area plan has been developed for each of the station types to demonstrate the desired interrelationships between the passenger rail station and its surrounding urban context.

Chapter 7 outlines the key station area planning principles that have been identified as the building blocks of a successful passenger rail station, and are recommended as a guide for communities in updating their general plans and in developing detailed specific area plans.

Chapter 8 provides an implementation program with a step-by-step station area planning process, a phased approach for necessary public and private actions, and the agencies that should participate in the planning process. Potential incentives for encouraging infill, new development, and redevelopment in the station area core are also discussed in this chapter.

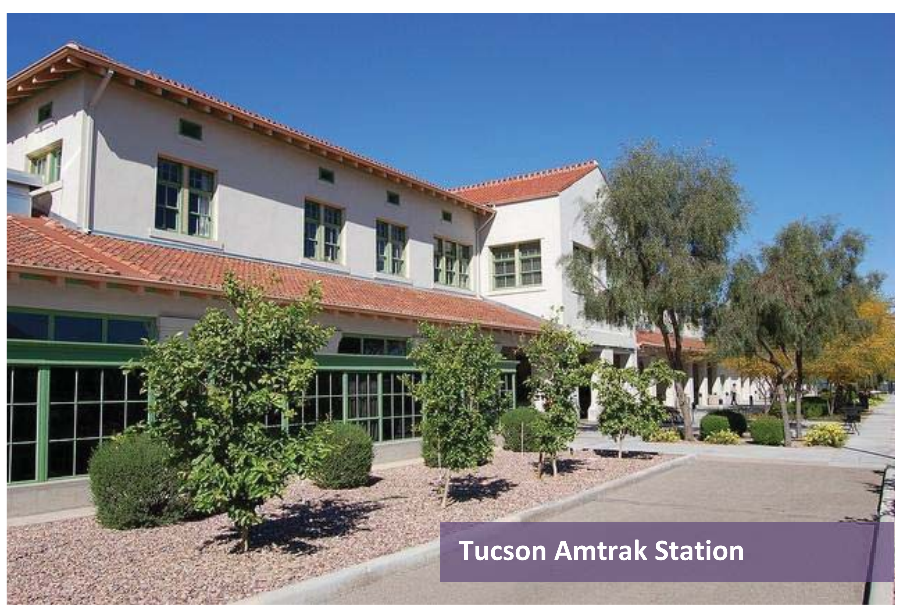
Chapter 9 provides brief introduction to other similar resources that may serve as reference materials for communities preparing to plan for station areas within their jurisdiction.

1.4 History of Regional Transportation Facilities within the Corridor

The Tucson-Phoenix corridor is part of the Sun Corridor Megapolitan, and connects the two largest metropolitan cities in the state. The population in the three-county study area (Maricopa, Pima and Pinal counties) is expected to grow from approximately 5.2 million in 2010 to about 11.7 million in 2050, with the majority of the population growth expected to be centered on the I-10 corridor or the central "spine" though the Sun Corridor. The I-10 corridor is the main transportation corridor connecting Tucson and Phoenix, with planned widening up to 10 lanes (5 lanes in each direction). The Union Pacific (UP) Sunset Route mainline corridor generally follows the I-10 alignment from Tucson to Eloy, veering to the west through Pinal County and eventually paralleling the I-8 corridor toward Yuma. The UP Phoenix Subdivision connects the Sunset Route with the Phoenix metropolitan area, connecting to Wellton and Eloy on the western and eastern ends, respectively.


Phoenix Union Station

The historic Phoenix Union Station is located in downtown Phoenix just south of West Jackson Street between 3rd and 5th Avenues, and was previously used to serve intercity rail passengers for both the Southern Pacific Railroad and later Amtrak, but no passenger service is currently provided to Phoenix or nearby areas. The Union Station building is currently owned and occupied by a telecommunications company for stationing their wireless communications equipment.


Tucson Amtrak Station

One of the historic rail depots in Tucson is located along Toole Avenue between Congress Street and Pennington Street in downtown, and was previously owned by the Southern Pacific Railroad. The City of Tucson purchased the depot in 1998 and restored the main depot building and the three adjacent buildings to their 1941 architectural style,

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completed in 2004. The depot currently serves as a passenger rail station for Amtrak's Sunset Limited Route (connecting Florida to California). The Southern Arizona Transportation Museum is located on the west side of the rail depot.

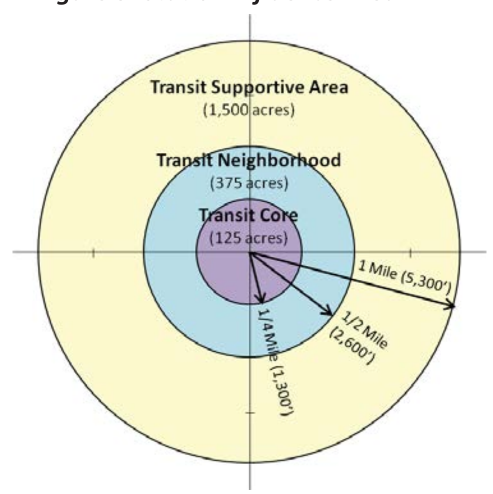
The other historic rail depot in Tucson, formerly of the El Paso and Southwestern Railroad, is located just south of Congress Street and east of I-10. The Phelps Dodge Mining Company extended its El Paso and Southwestern Railroad from El Paso to Tucson in 1912, and the depot was built in 1913. By 1924, the railroad was taken over by Southern Pacific, which did not need two Tucson depots, so this depot was closed after just 11 years of service. More recently, the old depot has been restored and is serving as a restaurant and office building.


El Paso & Southwestern Railroad Depot

Chapter 2. Station Typology Overview

2.1 Station Influence Area Components

Figure 5: Station Influence Area



Station area planning involves designating the area within a five- to twenty-minute walk, or one-mile, of a transit station as a distinct type of place. The area within this one mile threshold is known as the "station influence area." Actual boundaries will vary based upon the unique physical characteristics of each station area. Stations will be generally located at the centers of significant higher-density economic and cultural activity. In addition, each station area should have a well established network of pedestrian pathways connecting the station to nearby high-density residential and employment areas. Such pedestrian pathways should include supportive infrastructure, such as sheltered waiting areas, street furniture, low-scale lighting, shade, bike racks, and retail/service uses tailored towards pedestrian traffic. It is understood that for this corridor, the highest density station areas will primarily occur in the core of the Tucson and Phoenix metropolitan areas, however the intent is to stimulate mixed-use, medium- to high-density development within station areas along the entire corridor, including suburban and rural areas.

The station area consists of (approximately) the 500 acres within the one-half mile surrounding a transit station, composed of the transit core and transit neighborhood. These areas are further surrounded by the transit-supportive area (not part of the station area). Transit geography is illustrated in Figure 4 and further defined below:

- ***Transit Core:*** First one-quarter mile, or approximately 125 acres, of the station area centered at the transit station; generally a five-minute walk from the station.
- ***Transit Neighborhood:*** Second one-quarter mile, or approximately 375 acres, of the station area surrounding the transit core; generally a 10-minute walk from the station.
- ***Transit Supportive Area:*** Next one-half mile radius around transit station (generally a 20-minute+ walk), beyond the transit core and transit neighborhood, comprising an additional 1,500 acres; often experiencing modest increases in density due to station proximity.

2.2 Station Typology and Hierarchy

The following four station types have been developed for intercity and commuter rail service between Tucson and Phoenix. The station types have been defined by considering the unique southwestern context of the study area, the current and planned characteristics of Arizona communities (both urban and rural), combined with requirements based on service and access needs. The four identified station types include:

1. System Hub Station
2. Regional Station
3. Local Station
4. Transit Emergent Station Location

Figure 6 illustrates the four station types and the corresponding passenger rail service associated with them. Intercity rail service is proposed to stop at the system's hub and regional stations; commuter rail service can stop at all four station types. Characteristics of specific station types will be discussed in more detail in the following sections, including the provision of key information, such as the typical urban setting, employment/ commercial/residential land use types, typical transit patronage area, and typical transportation modes and parking types associated with each station type. An overview of these characteristics is presented in Table 1.

Figure 6: Rail Services at Various Station Types

		Station Types			
		System Hub	Regional Station	Local Station	Transit Emergent Station
Rail Service	Intercity Rail	●	●		
	Commuter Rail	●	●	●	●

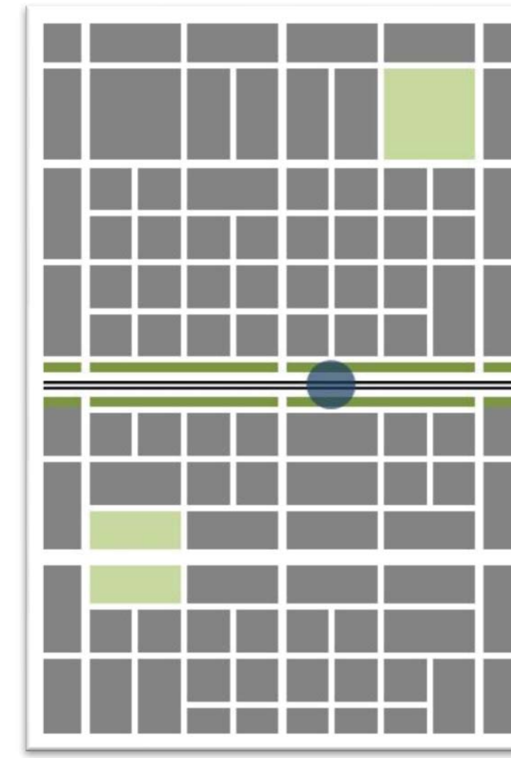
Each of the four station types will have different transit connectivity characteristics, based on the urban context in which they are located, and the passenger patronage area associated with them. An overview of the general patronage area for each station type by location (urban or rural), generally available transit connections (light rail transit [LRT], modern streetcar, bus rapid transit [BRT], local and circulator bus system), bicycle and pedestrian infrastructure, and parking facilities have also been provided for each station type. Typical block sizes and development densities that support walkability within the station area, and enhance the attractiveness of the development are also discussed.

Prototypical station area plans are provided for system hub, regional and local station types. These plans are not site-specific, and depict typical conditions present in the corridor. Each station type is composed of various land uses, facility types, amenities, and their relationships for access and circulation which remain constant; however, these components can be modified to fit site-specific conditions since each station area will present a different set of opportunities and constraints. The prototypical station area plans should only be used as a guidance tool to develop individual station area plans based on site-specific conditions of host communities.

Table 1: Station Area Typology Overview

Station Type	Typical Urban Setting	Employment/ Commercial Land Use Types	Residential Land Use Types	Transit Patronage Area	Typical Transportation Modes and Parking Types
System Hub	Downtown/center of metropolitan area	Primary office, government, and cultural/sports/ entertainment center with supportive retail and services	High-density, multi-family housing	15 to 25 miles	Intermodal facility/transit hub; major regional destination with high- quality feeder transit (light rail, streetcar, bus, circulator); potential park-and-ride location with structured parking integrated into mixed-use development
Regional Station	Sub-regional downtown or major employment center	Regional employment hub and major activity center (retail, services, education, medical, entertainment)	Mid- to high-density residential, often as part of mixed-use developments	10 to 15 miles	May be a sub-regional destination on fixed-guideway transit corridor or sub-regional transit center with high quality feeder bus service, including local activity center circulator; potential park-and-ride location with structured parking
Local Station	Suburban town center, master planned community mixed-use core, or historic downtown of rural community	Office/service/retail economic activity center, potential regional government service center	Mid-density multi-family, and higher-density single family (e.g., townhouses, row houses)	5 to 20 miles (suburban) 20 to 40 miles (rural)	Local activity center linked with high quality feeder bus services (e.g., express bus, regional fixed-route bus routes); potential park-and-ride location with surface parking lots or decked parking
Transit Emergent Station Location	Center of a small town outside a major metropolitan area, or master planned community with mixed-use core, with significant surrounding growth potential	Office/service/retail center, potential civic service center; often a historic "Main Street" activity node	Medium-density multi-family, possibly single family (e.g., row houses, patio homes)	20 to 40 miles	Transit station with future connections to local feeder bus service, and regional bus transit with service to adjacent towns/cities; potential park-and-ride location with surface parking lots

Chapter 3. System Hub Station



A system hub station would generally be located at the heart of a major metropolitan area, typically a downtown, characterized by a high-density mix of housing and employment types, including:

- Corporate offices
- Government offices
- High-rise apartments and condominiums
- Regional civic uses
- Major mixed-use development
- Cultural and entertainment facilities
- Supportive retail and services

Densities may be higher within a quarter-mile radius of stations than elsewhere. System hub stations would be served by both regional and commuter rail services, and would accommodate substantial intermodal connections to the local transportation network including fixed-guideway transit (light rail, streetcar), buses, shuttles, taxis, cars, bicycles, and pedestrians. System hub stations typically attract ridership from within a 15- to 25-mile radius around the station.

The general planning considerations for hub stations and the typical characteristics of the various modes of access are discussed below. System hub parameters are summarized in Table 2, presented at the end of the chapter.

3.1 Station Characteristics

Mix of Land Uses and Development Densities

Within the first quarter-mile (Transit Core), typical land uses may include:

- Corporate offices
- Government offices
- Regional sports/entertainment
- Convention/conference facilities
- High-rise residential towers

Within the next quarter-mile (Transit Neighborhood), typical land uses may include:

- Mid-high rise office towers

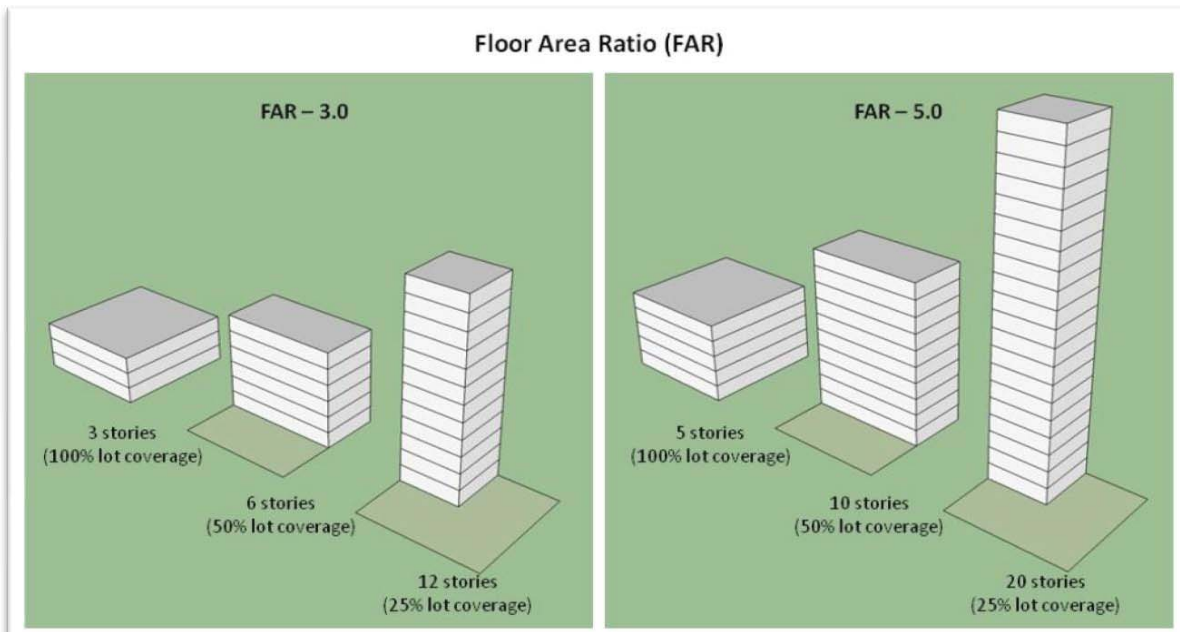
- Mid-high rise residential towers
- Government/educational/employment/research campuses

In the outer half-mile (Transit Supportive Area), typical land uses may include:

- Mid-rise residential towers
- Lofts/condominiums
- Apartments/townhomes
- Office/research park
- Medical facilities
- Lifestyle retail centers
- Other mixed-use developments

Target Floor Area Ratio (FAR)/Building Heights

- 3.0 – 5.0 FAR
- 10 stories or more



Station Footprint and Site Acreage

- Station Footprint – 1.4 to 1.7 acres
- Station Site Acreage – 6 to 8 acres

Parking Requirements

- Multi-story parking structure or parking deck

3.2 Modes of Access

A system hub station will serve corporate and government offices, sports and entertainment venues of regional significance, convention/conference facilities, mid-high rise residential towers, mid-high rise office towers, and educational/research campuses. Areas surrounding a hub station should be walkable and should provide access through a variety of transit and personal transportation modes, to encourage interaction and develop synergies between the different uses. Greatest priority should be given to pedestrian and bicycle connectivity, followed by transit connections. Use of private vehicles to access passenger rail facilities should be discouraged through measures such as provision of limited on-site parking; provision of kiss-and-ride facilities at rail stations in place of park-and ride facilities; and higher parking charges, among others.

General Planning and Design Considerations

- Typical block size: 200’ to 400’ with pedestrian penetration every 200’
- Maximum block perimeter: 1,200’
- Study area reference: existing block sizes
  - Downtown Phoenix: 340’ x 340’
  - Downtown Tucson: 360’ x 300’

Pedestrian and Bicycle Accommodations

- Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping
- Mid-block plazas with pedestrian linkage to streets
- Pedestrian access to transit hubs from within a short (0-1 mile) distance
- Bike lanes and/or paths throughout the station area
- Bicycle access to transit hubs from within a moderate (1-5 mile) distance, which may be on-street, off-street or a combination

Transit Connections

- LRT
  - LRT is a fixed-guideway rail transit that often operates in exclusive right-of-way with stops averaging every one mile, and more frequently, in higher-density activity centers
  - Multiple routes serving regionally-significant activity and employment centers, high-density residential nodes
- Modern Streetcar
  - Modern streetcar is a “lighter LRT” that often operates in mixed traffic in traditional traffic lanes, with stations averaging every half-mile, and more frequently in higher-density activity centers
  - May provide local circulation, as well as commuting functions
- BRT/Express Bus

- Long distance fixed routes operating in major transportation corridors with stops averaging one to three miles
- May operate in semi-exclusive right-of-way or mixed traffic
- Typically operates during peak periods only, or with less frequent mid-day service

- Local Bus
  - All-day, fixed-route local arterial bus service with stops averaging every quarter-mile to half-mile
  - May offer higher frequency during peak periods
  - Accessible buses; articulated where necessary
- Circulator Bus
  - Circulates within activity center and to adjacent neighborhoods
  - Frequent stops (averaging every quarter-mile or less)
  - Provides feeder or distribution service to and from transit centers, activity centers, or rail stations
  - May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district

Vehicular Parking Facilities

- Multi-story parking structures/decks integrated into mixed-use developments
- Incorporate rental car agencies and carshare programs

3.3 Prototypical Station Footprint and Station Area Plan

A prototypical station area footprint has been developed for the system hub station, and is presented in Figure 7. The station footprint illustrates the passenger amenities and supporting activity spaces for the system hub station. Figure 7 (as well as subsequent prototypical station area footprints for the other station types) illustrates four rail tracks through the station, which is intended to show the need for both northbound and southbound sidings adjacent to platforms to allow freight trains, as well as passenger trains in skip stop operations to pass as passenger boarding/alighting occurs at stations.

Table 2 provides a summary of the development characteristics for the areas surrounding a system hub station, including land use and activity types, FAR, building heights, development densities, and parking. It is recommended that communities refer to these development characteristics while formulating station area plans for their community. A prototypical station area plan for the system hub station is presented in Figure 8, which illustrates such development characteristics.

Figure 9 illustrates a three-dimensional rendering of the system hub station and the surrounding development using the recommended build-out land uses and densities and includes key considerations, such as:

1. Station is focus of mixed-use activity center
2. Ability to phase-in higher density surrounding development
3. All structured parking, with exception of small short-term surface lot
4. Regional transit hub

PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

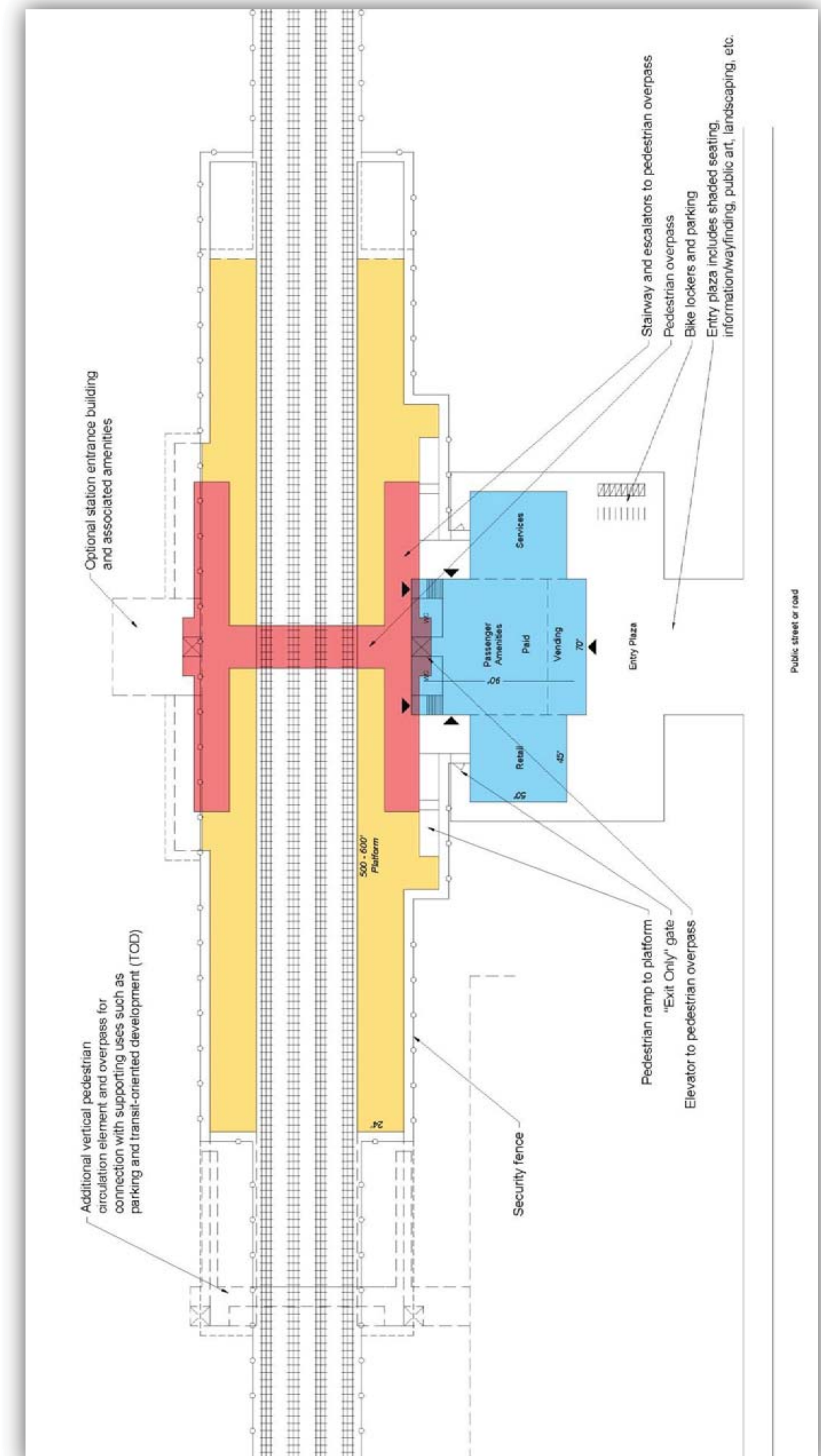
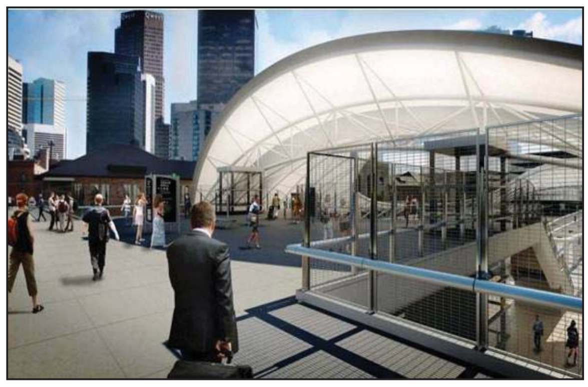


Figure 7: System Hub Station Footprint

Table 2: System Hub Characteristics



Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Development Density	Average Residential Density	Parking Types
Transit Core ▪ **1/4 mile radius from station** ▪ **5-minute walk**	125 acres	▪ Up to 75% employment ▪ Up to 35% residential ▪ Up to 10% other	▪ Corporate offices ▪ Government offices ▪ Regional sports/ entertainment ▪ Convention/conference facilities ▪ High-rise residential towers	10 stories or more	3.0 – 5.0 FAR	100+ dwelling units (DU)/acre	▪ Multi-story structure
Transit Neighborhood ▪ **1/2 mile radius from station** ▪ **10-minute walk**	375 acres	▪ Up to 60% employment ▪ Up to 50% residential ▪ Up to 15% other	▪ Mid-high rise office towers ▪ Mid-high rise residential towers ▪ Government/educational/ employment/research campuses	6 stories or more	1.5 – 3.0 FAR	50 - 100 DU/acre	▪ Multi-story structure
Transit Supportive Area ▪ **1 mile radius from station** ▪ **20-minute walk** ▪ **5-minute drive**	1,500 acres	▪ Up to 40% employment ▪ 60% or more residential ▪ 15% or more other	▪ Mid-rise residential towers ▪ Lofts/condominiums ▪ Apartments/townhomes ▪ Office/research park ▪ Medical facilities ▪ Lifestyle retail centers ▪ Other mixed-use developments	4 stories or more	0.5 – 1.5 FAR	25 - 50 DU/acre	▪ Short-term: surface lot ▪ Long-term: parking deck

Figure 8: Prototypical Station Area Plan – System Hub Station

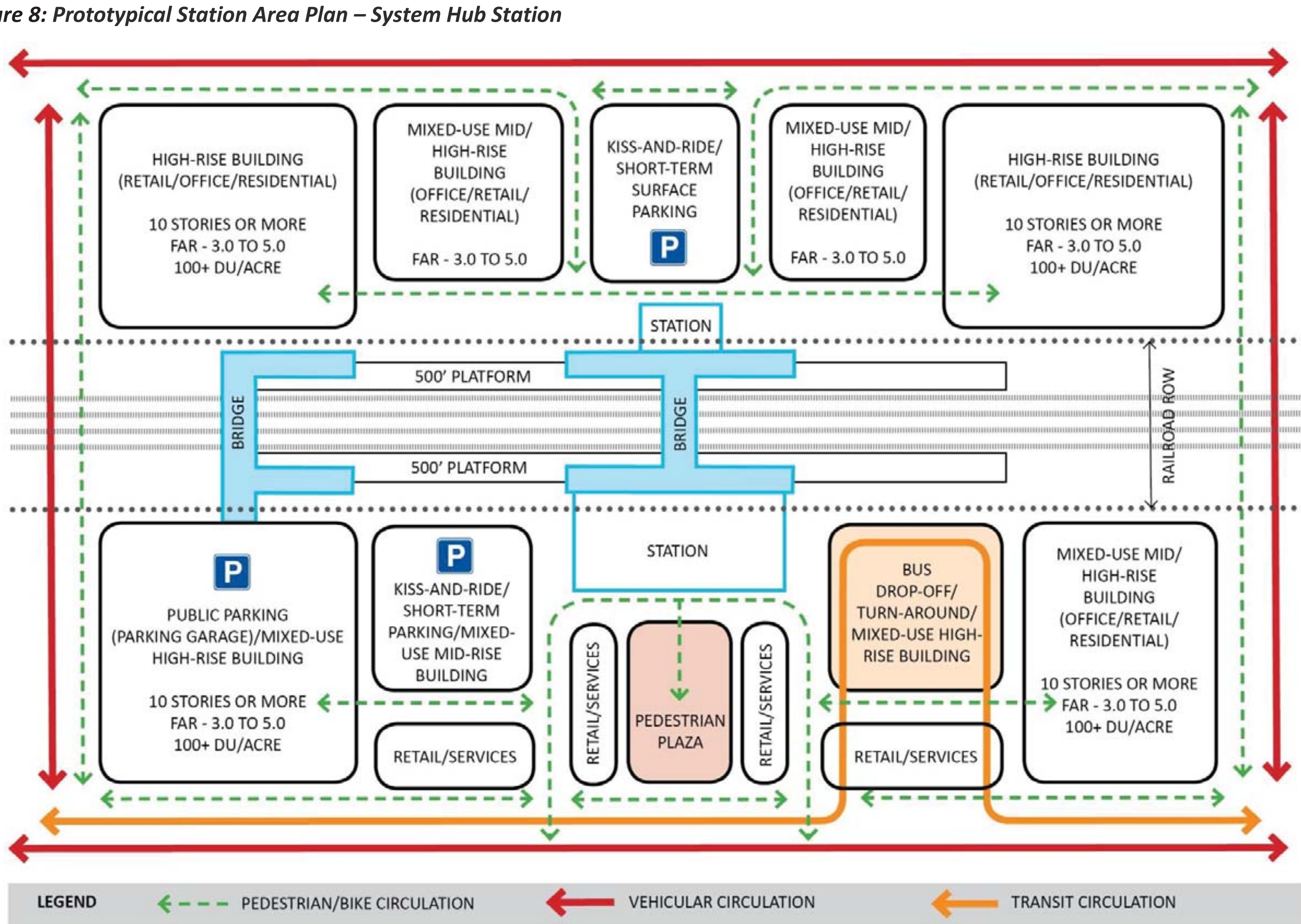


Figure 9: Station Area Development Phasing Perspective – System Hub Station

Initial Development Phase **HUB STATION**

Development Phase 1 (Initial)

Development Phase 2

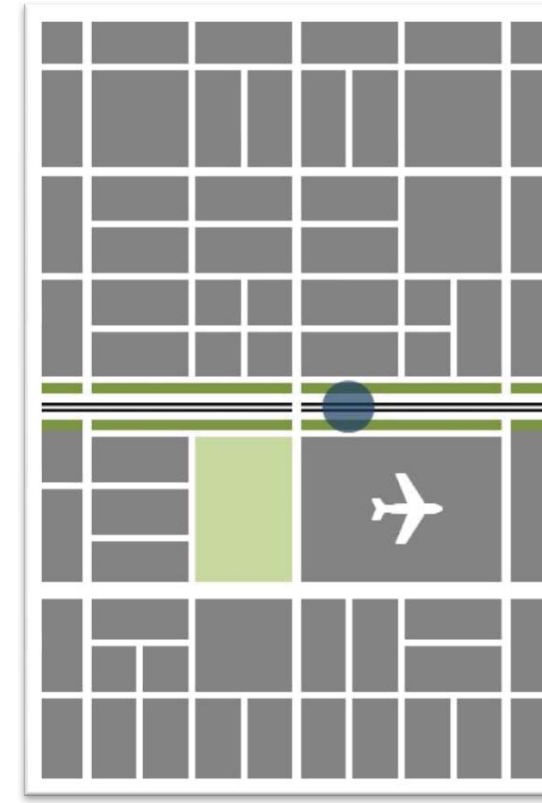
Development Phase 3

Development Phase 4 (Buildout)

HUB STATION

Buildout Development

Chapter 4. Regional Station



A regional station would generally be located at a sub-regional downtown, a town center or a major employment center, characterized by a mix of the following uses, generally at somewhat lower densities and intensities than in system hub locations:

- Medium- to high-density residential and employment
- Mid-rise office and residential towers
- Office/medical/ educational/research campus
- Cultural and entertainment uses
- Supportive retail and services.

Regional stations may be served by both the intercity and commuter rail service. They would serve as commuter hubs for the sub-regions of a metropolitan area, and may be served by multiple transit options, often including fixed-guideway regional transit (LRT, streetcar), high-frequency regional express bus or BRT, as well as local fixed-route bus service. Regional stations may also be served by park-and-ride facilities, usually taking the form of structured parking. In general, they may be less dependent on transit access and more dependent on parking than a system hub. Regional stations typically attract ridership from within a 10- to 15-mile radius around the station.

The general planning considerations for regional stations and the typical characteristics of the various modes of access are discussed below. Regional station parameters are summarized in Table 3, presented at the end of the chapter.

4.1 Station Type Characteristics

Mix of Land Uses and Development Densities

Within the first quarter-mile (Transit Core), typical land uses may include:

- Mid-high rise office towers
- Mid-high rise residential towers
- Government/educational/employment/research/campuses

Within the next quarter-mile (Transit Neighborhood), typical land uses may include:

- Mid-rise residential towers
- Lofts/condominiums
- Apartments/townhomes
- Office/research park
- Medical facilities
- Lifestyle retail centers
- Mixed-use developments

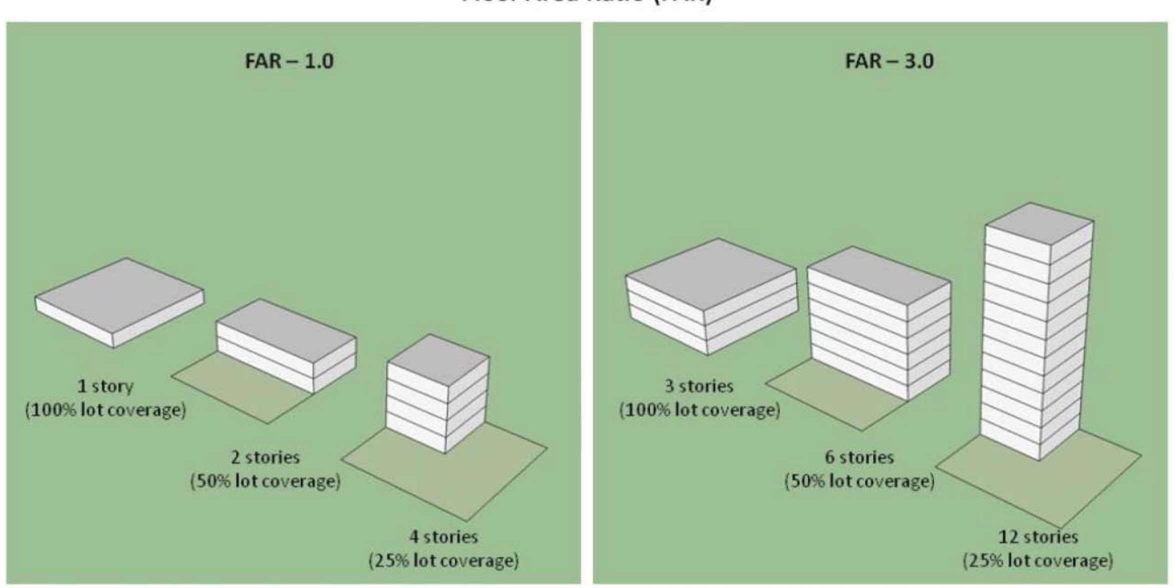
In the outer half-mile Transit Supportive Area, typical land uses may include:

- Apartments/townhomes
- Row houses
- Office/research park
- Garden/office buildings
- Multi-use developments

Target FAR/Building Heights

- 1.0 – 3.0 FAR
- 6 stories or more

Floor Area Ratio (FAR)



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Tucson to Phoenix

Station Footprint, and Site Acreage

- Station Footprint – 0.9 to 1.15 acres
- Station Site Acreage – 5 to 6 acres

Parking Requirements

- Multi-story parking structure or parking deck

4.2 Modes of Access

A regional station will serve mid- to high-rise office towers, mid- to high-rise residential towers, government/educational/research campuses, apartments/townhomes, medical facilities, retail centers, and mixed-use developments. Areas surrounding a regional station should be walkable and should provide access through a variety of transit and personal transportation modes, to encourage interaction and develop synergies between the different uses. Greatest priority should be given to pedestrian and bicycle connectivity, followed by transit connections. Use of private vehicles to access passenger rail facilities should be discouraged through measures such as provision of limited on-site parking, provision of kiss-and-ride facilities at rail stations in place of park-and ride facilities, and higher parking charges, among others.

The general planning and design considerations for regional stations, and the typical characteristics of the various modes of access are discussed below.

General Planning and Design Considerations

- Typical block size: 200' – 400' with pedestrian penetration every 200'
- Maximum block perimeter: 1,200'
- Study area reference (existing block sizes): Downtown Tempe – 340' X 370'

Pedestrian and Bicycle Accommodations

- Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping
- Mid-block plazas with pedestrian linkage to streets
- Pedestrian access to transit hubs from within a short (0-1 mile) distance
- Bike lanes and/or paths throughout the station area
- Bicycle access to transit hubs from within a moderate (1-5 mile) distance, which may be on-street, off-street or a combination

Transit Connections

- LRT
  - LRT is a fixed-guideway rail transit that operates in exclusive right-of-way with stops averaging every one mile, and more frequently, in higher-density activity centers
  - Multiple routes serving regionally-significant activity and employment centers, high-density residential nodes

- Modern Streetcar
  - Modern streetcar is a "lighter LRT" that often operates in mixed traffic in traditional traffic lanes, with stations averaging every half-mile, and more frequently in higher-density activity centers
  - May provide local circulation, as well as commuting functions

- BRT/Express Bus
  - Long distance fixed routes operating in major transportation corridors with stops averaging one to three miles
  - May operate in semi-exclusive right-of-way or mixed traffic
  - Typically operates during peak periods only, or with less frequent mid-day service

- Local Bus
  - All-day, fixed-route local arterial bus service with stops averaging every quarter-mile to half-mile
  - May offer higher frequency during peak periods
  - Accessible buses; articulated where necessary

- Circulator Bus
  - Circulates within activity center and to adjacent neighborhoods
  - Frequent stops (averaging every quarter-mile or less)
  - Provides feeder or distribution service to and from transit centers, activity centers, or rail stations
  - May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district

Vehicular Parking Facilities

- Multi-story parking structures/decks integrated into mixed-use developments
- Incorporate rental car agencies and carshare programs

4.3 Prototypical Station Footprint and Station Area Plan

A prototypical station area footprint for the regional station type is presented in Figure 10. The station footprint illustrates the passenger amenities and supporting activity spaces for the regional station.

Table 3 provides a summary of the development characteristics for the areas surrounding a regional station, including land use and activity types, FAR, building heights, development densities, and parking. It is recommended that communities refer to these development characteristics while formulating station area plans for their community. A prototypical station area plan for the regional station is presented in Figure 11, which illustrates such development characteristics.

Figure 12 illustrates a three-dimensional rendering of the regional station and the surrounding development using the recommended build-out land uses and densities and includes key considerations, such as:

1. Station is focus of mixed-use activity center
2. Ability to phase-in mid- to high-density surrounding development
3. Most parking structured in garages or two level decks, with small short-term surface lot
4. Regional transit hub

Figure 10: Regional Station Footprint

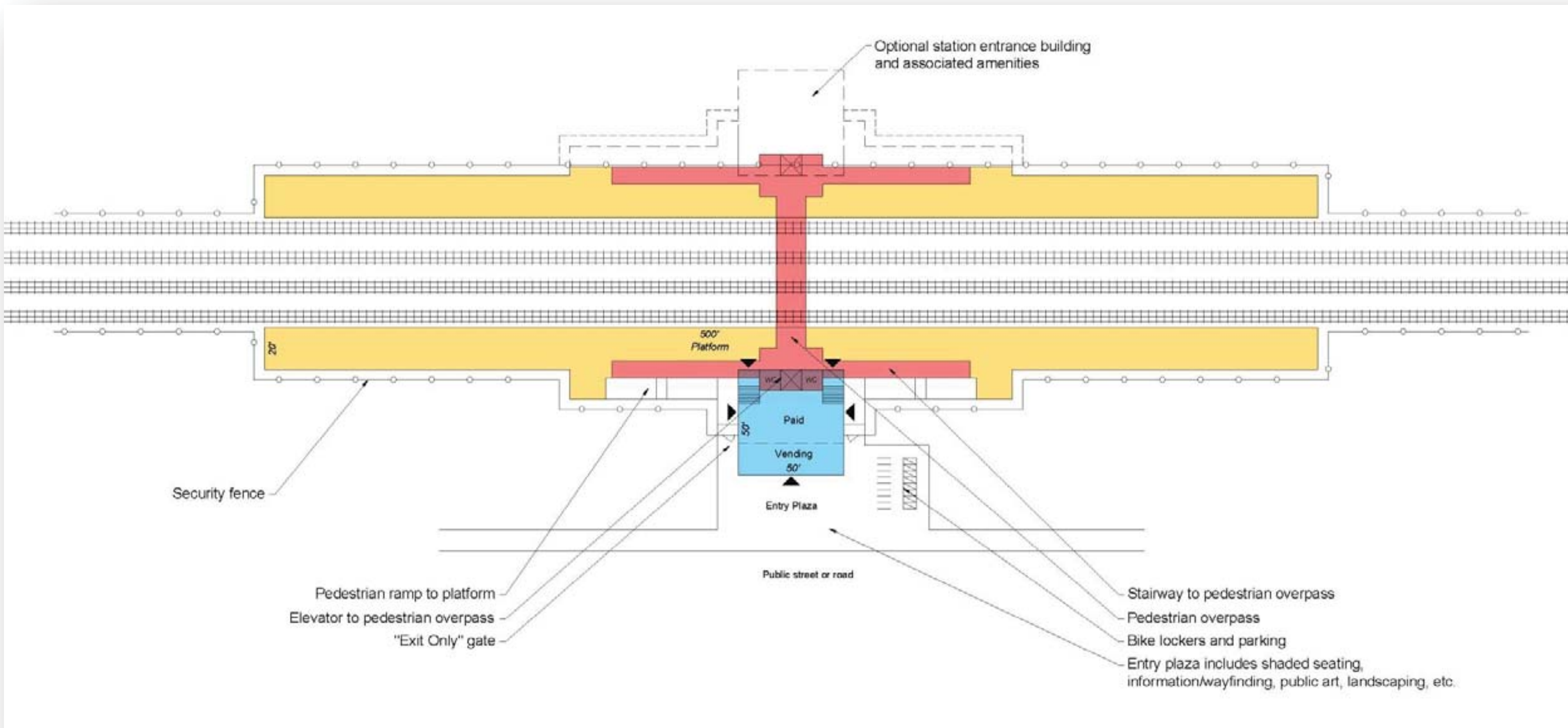


Table 3: Regional Station Characteristics



Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Development Density	Average Residential Density	Parking Types
Transit Core ▪ **1/4 mile radius from station** ▪ **5-minute walk**	125 acres	▪ Up to 70% employment ▪ Up to 50% residential ▪ Up to 15% other	▪ Mid-high rise office towers ▪ Mid-high rise residential towers ▪ Government/educational/ employment/research campuses	6 stories or more	1.0 – 3.0 FAR	50 - 100 DU/acre	▪ Multi-story structure
Transit Neighborhood ▪ **1/2 mile radius from station** ▪ **10-minute walk**	375 acres	▪ Up to 60% employment ▪ 50% or more residential ▪ 15% or more other	▪ Mid-rise residential towers ▪ Lofts/condominiums ▪ Apartments/townhomes ▪ Office/research park ▪ Medical facilities ▪ Lifestyle retail centers ▪ Mixed-use developments	4 stories or more	0.5 – 1.0 FAR	25 - 50 DU/acre	▪ Multi-story structure or parking deck
Transit Supportive Area ▪ **1 mile radius from station** ▪ **20-minute walk** ▪ **5-minute drive**	1,500 acres	▪ Up to 40% employment ▪ 60% or more residential ▪ 15% or more other	▪ Apartments/townhomes ▪ Row houses ▪ Office/research park ▪ Garden office buildings ▪ Multi-use developments	2 stories or more	0.35 – 0.5 FAR	18 - 25 DU/acre	▪ Long-term: parking deck ▪ Short-term: surface lot

Figure 11: Prototypical Station Area Plan – Regional Station

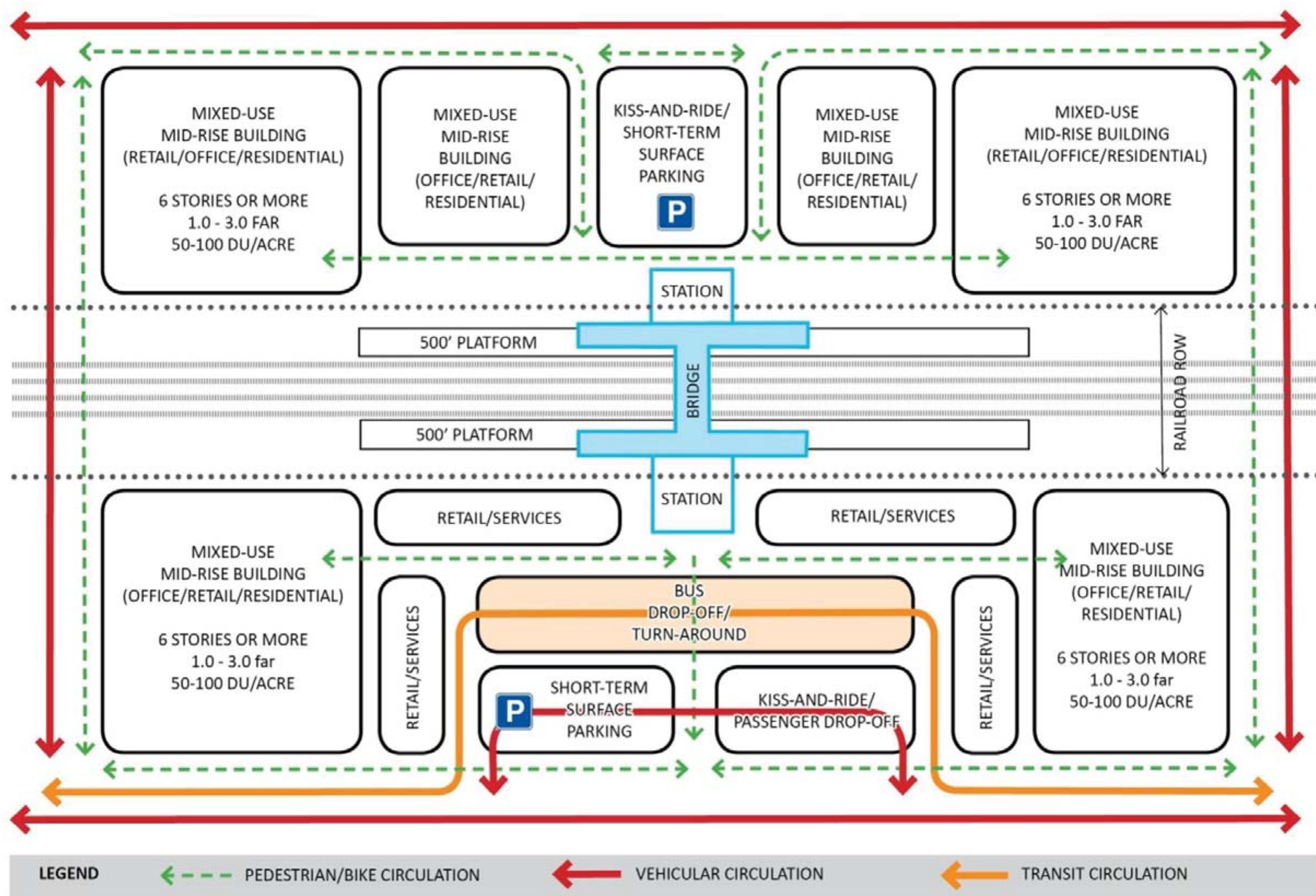
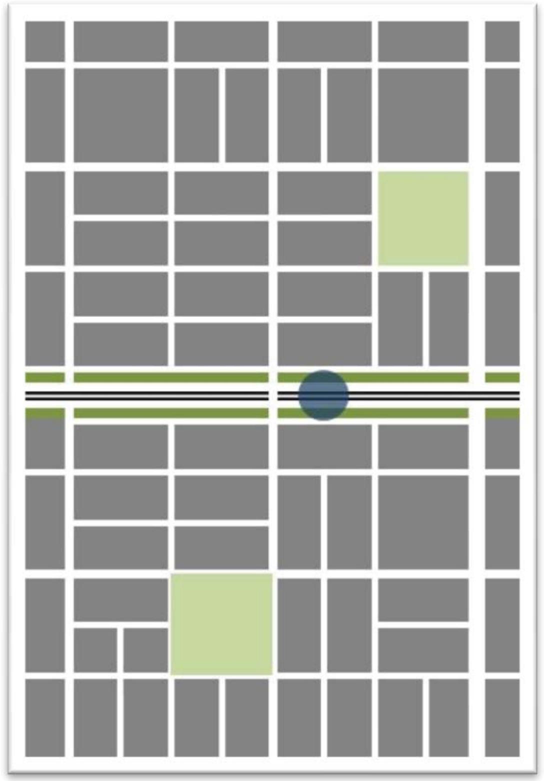


Figure 12: Station Area Perspective – Regional Station

Buildout Development REGIONAL STATION

Chapter 5. Local Station



A local station would generally be located in a suburban town center, the central activity center of a master planned community or the historic downtown of a rural freestanding community, characterized by a mix of residential, civic, employment, and retail uses (e.g., "Main Street" commercial, garden office buildings), at lower intensities than those around regional stations. They serve as trip generators for commuters; some may serve as attractions as well. Local stations capture inbound and outbound commuters via commuter rail.

Intercity passenger rail typically does not stop at local stations, but may stop at a local station that is strategically located to capture riders from smaller communities between larger metropolitan areas within the Sun Corridor. These stations may, however, be connected to a sub-regional transit network, including downtown circulator routes, fixed-route bus service, and potentially express bus. Local stations are generally supported by park-and-ride facilities. In a suburban setting, local stations typically attract ridership from within a 5- to 20-mile radius around the station. In a rural setting, local stations often attract ridership from within a 20- to 40-mile radius.

The general planning considerations for local stations and the typical characteristics of the various modes of access are discussed below. Local station parameters are summarized in Table 4, presented at the end of the chapter.

5.1 Station Type Characteristics

Mix of Land Uses and Development Densities

Within the first quarter-mile (Transit Core), typical land uses may include:

- Mid-rise residential towers
- Lofts/condominiums

- Apartments/townhouse complexes
- "Main Street" commercial/mixed-use development
- Government service center
- Office/research park

Within the next quarter-mile (Transit Neighborhood), typical land uses may include:

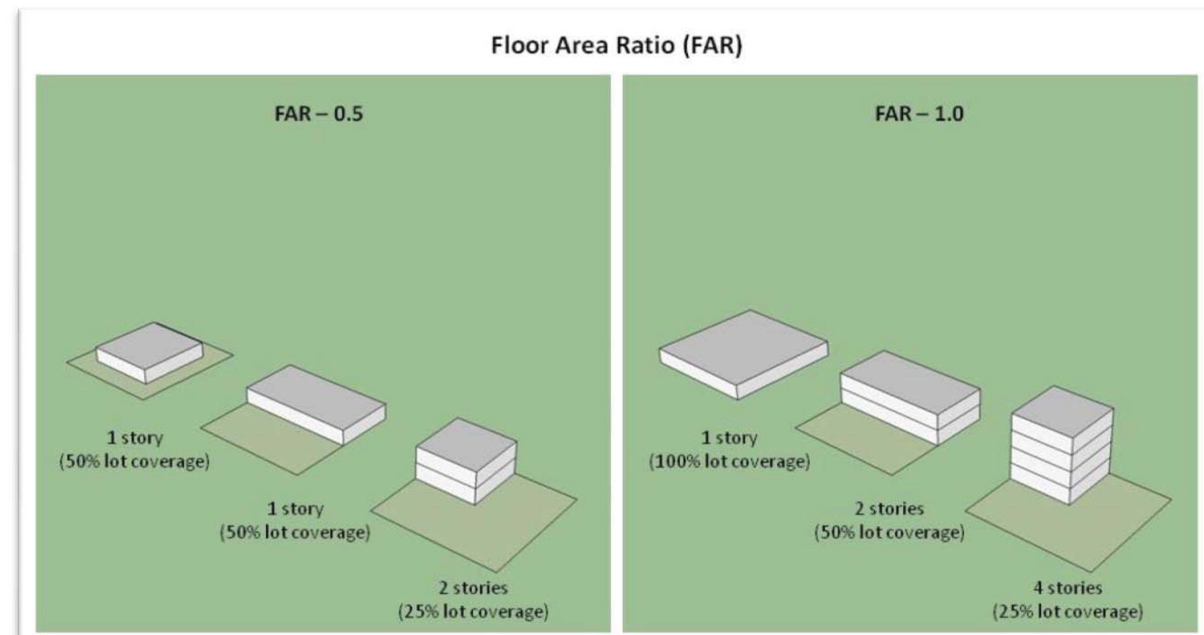
- Apartments/townhomes
- Row houses
- Garden/office buildings
- Multi-use developments

In the outer half-mile (Transit Supportive Area), typical land uses may include:

- Apartments/townhomes
- Patio home/zero lot line residential
- Garden/office buildings
- Multi-use developments

Target FAR/Building Heights

- 0.5 – 1.0 FAR
- 4 stories or more



Station Footprint, and Site Acreage

- Station Footprint – 0.8 to 1.0 acres
- Station Site Acreage – 4 to 5 acres

Parking Requirements

- Surface parking lot, with potential for future structured parking deck, if necessary

5.2 Modes of Access

Unlike a system hub or a regional station, a local station will primarily serve "main street" commercial and mixed-use developments, government service centers, office/research parks, and residential uses such as higher-density apartments, condominiums, townhomes, and row houses. Areas surrounding a local station will, therefore, require shorter distances of connectivity, and put more emphasis on localized transit. Greatest priority should be given to pedestrian and bicycle connectivity and bus transit options that include both locally-oriented service to surrounding neighborhoods and commercial districts such as circulators, as well as limited stop regional transit service to surrounding municipalities. Park-and-ride facilities should be provided to accommodate users who choose to access the passenger rail service through personal vehicles.

The general planning and design considerations for local stations, and the typical characteristics of the various modes of access are discussed below.

General Planning and Design Considerations

- 200' – 400' with pedestrian penetration every 200'
- Maximum block perimeter: 1,200'
- Study area reference (existing block sizes): Downtown Casa Grande – 300' x 300'

Pedestrian and Bicycle Accommodations

- Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping
- Mid-block pedestrian linkage
- Pedestrian access to transit hubs from within a short (0-1 mile) distance
- Bike lanes and/or paths throughout the station area
- Bicycle access to transit hubs from within a moderate (1-5 mile) distance, which may be on-street, off-street or a combination

Transit Connections

- BRT/Express Bus
  - Fixed route bus service operating along major highways between communities
  - Limited stop express service between communities
  - Schedule coordination with commuter rail service

- Local Bus
  - All-day, fixed-route bus service along main roads with stops averaging every quarter- to half-mile

  - May offer higher frequency bus service during peak periods

- Circulator Bus
  - Circulates within activity center and adjacent neighborhoods
  - Frequent stops averaging every quarter-mile or less (including flag-down service, to allow stops at undefined locations)
  - Provides feeder or distribution service to and from transit center/rail station

Vehicular Parking Facilities

- Surface parking lot, with potential for future structured parking deck, if necessary
- Incorporate car share programs (particularly in communities with significant regional attractions)

5.3 Prototypical Station Footprint and Station Area Plan

A prototypical station area footprint for the local station type is presented in Figure 13. The station footprint illustrates the passenger amenities and supporting activity spaces for the local station.

Table 4 provides a summary of the development characteristics for the areas surrounding a local station, including land use and activity types, FAR, building heights, development densities, and parking. It is recommended that communities refer to these development characteristics while formulating station area plans for their community. A prototypical station area plan for the local station is presented in Figure 14, which illustrates such development characteristics.

Figure 15 illustrates a three-dimensional rendering of the local station and the surrounding development using the recommended build-out land uses and densities and includes key considerations, such as:

1. Station becomes anchor and focal point in mixed-use downtown environment
2. Ability to phase-in modest density immediately surrounding station, including potential structured deck parking
3. Regional transit hub
4. Most parking in surface lots with multi-use potential with adjacent commercial services

Figure 13: Local Station Footprint

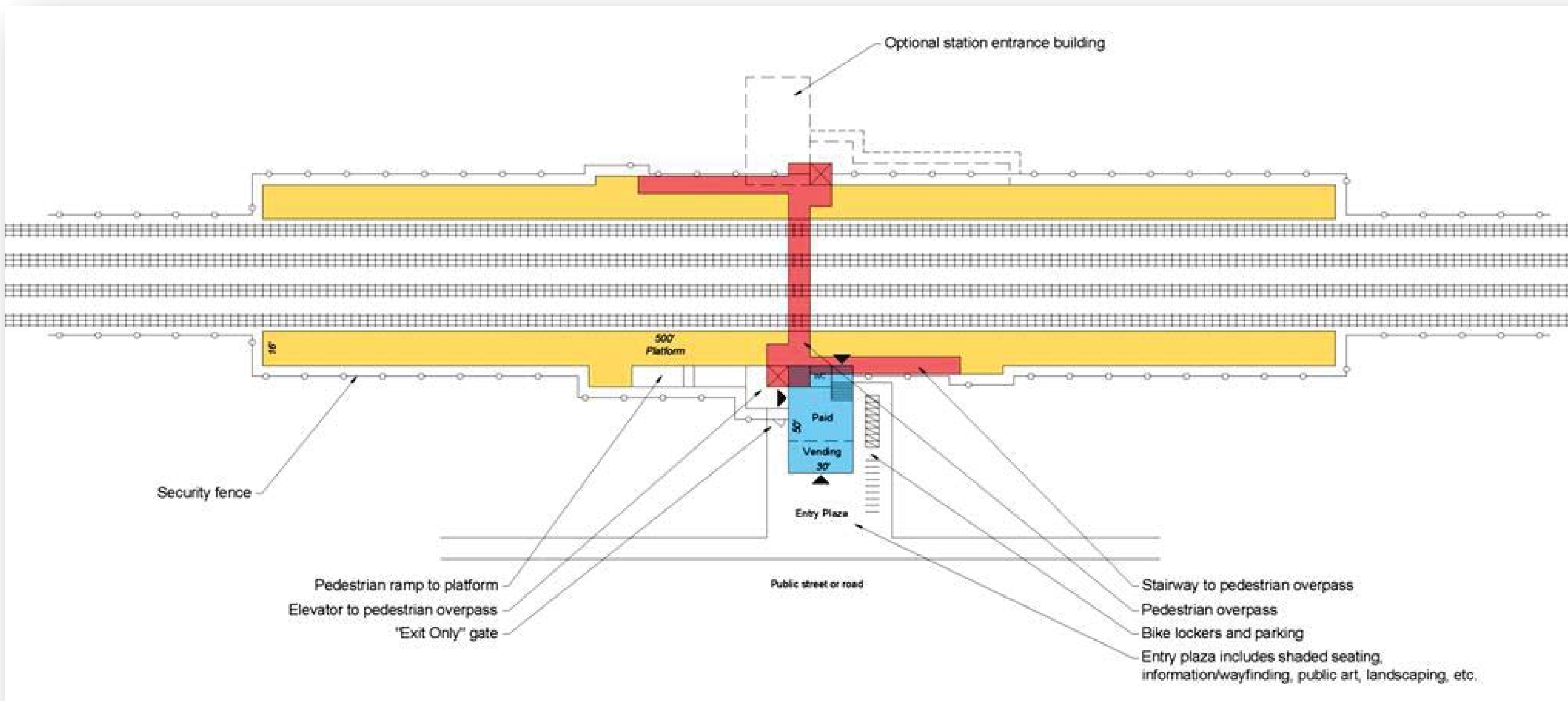
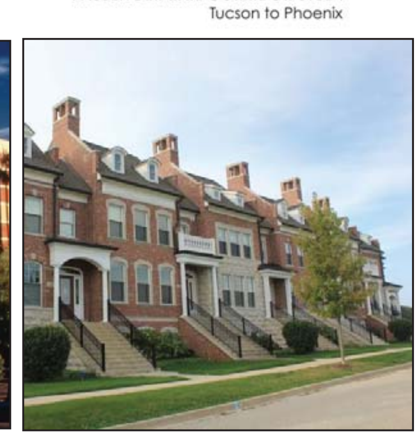


Table 4: Local Station Characteristics



Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Development Density	Average Residential Density	Parking Types
Transit Core ▪ **1/4 mile radius from station** ▪ **5-minute walk**	125 acres	▪ Up to 60% employment ▪ Up to 50% residential ▪ 15% or more other	▪ Lofts/condominiums ▪ Mid-rise residential towers ▪ Apartment/townhouse complexes ▪ "Main Street" commercial/ mixed-use development ▪ Government service center ▪ Office/research park	4 stories or more	0.5 – 1.0 FAR	25 - 50 DU/acre	▪ Surface lot, with potential to accommodate future structured parking deck
Transit Neighborhood ▪ **1/2 mile radius from station** ▪ **10-minute walk**	375 acres	▪ Up to 30% employment ▪ 50% or more residential ▪ Up to 15% other	▪ Apartments/townhomes ▪ Row houses ▪ Garden office buildings ▪ Multi-use developments	3 stories or more	0.35 – 0.5 FAR	18 - 25 DU/acre	▪ Surface lot
Transit Supportive Area ▪ **1 mile radius from station** ▪ **20-minute walk** ▪ **5-minute drive**	1,500 acres	▪ Up to 30% employment ▪ 80% or more residential ▪ 10% or more other	▪ Apartments/townhomes ▪ Patio home/zero lot line residential ▪ Garden office buildings ▪ Multi-use developments	2 stories or more	0.25 – 0.35 FAR	8 - 18 DU/acre	▪ Surface lot

Figure 14: Prototypical Station Area Plan – Local Station

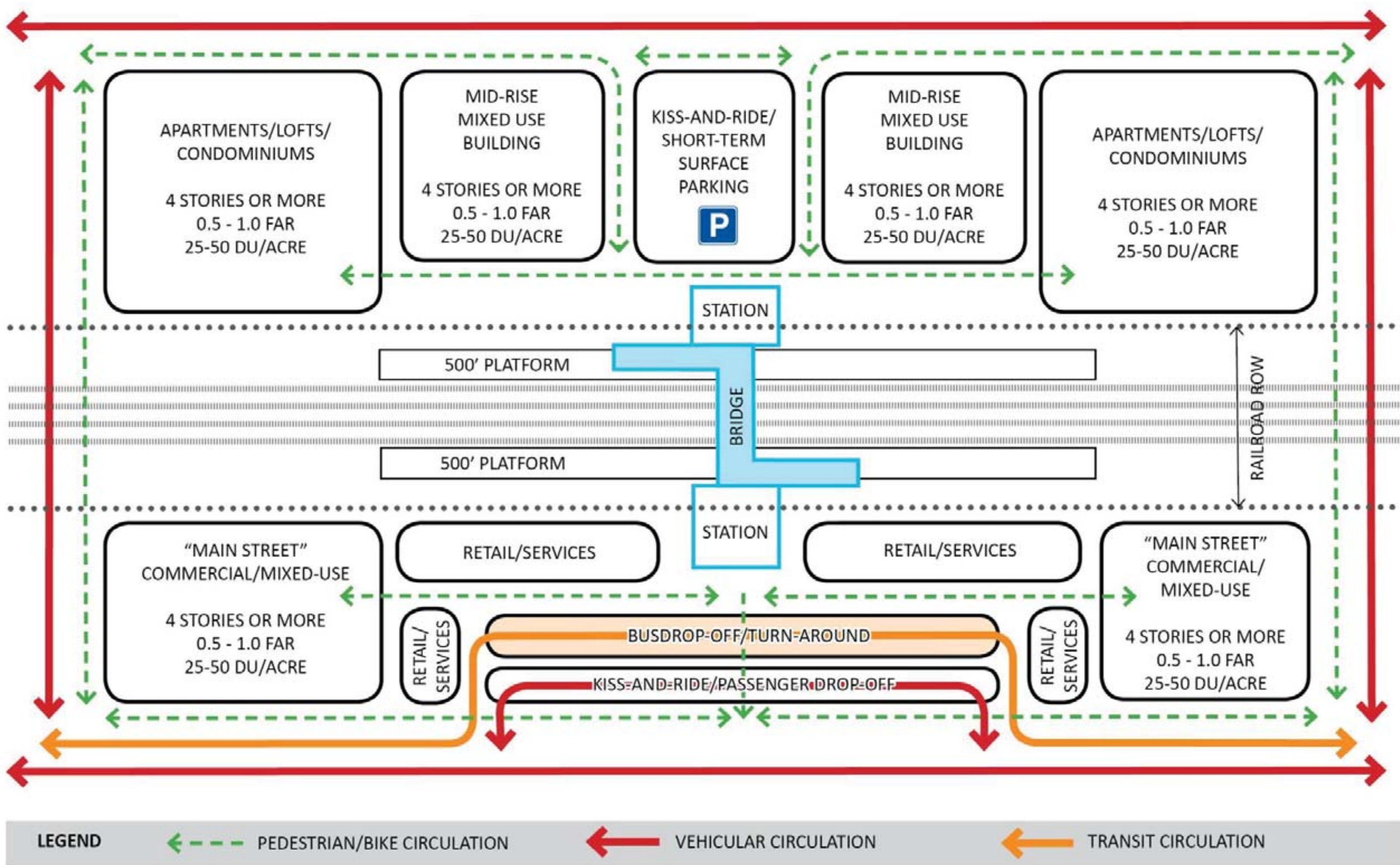


Figure 15: Station Area Perspective – Local Station

Buildout Development

LOCAL STATION

Chapter 6. Transit Emergent Station Location

A transit emergent station would generally be located in the core of a smaller town outside a major metropolitan area, or serve as the mixed-use core activity center of a freestanding master planned community, which is part of a larger regional economy and expects considerable growth to occur in the next 15- to 20-years. The station area would have a mix of retail and service uses, including such residential and civic uses:

- "Main Street" commercial
- Garden office buildings
- Apartments/townhomes
- Row houses

These uses would occur at intensities approaching those around local stations, however, passenger rail service would not yet stop at these stations. "Transit emergent" means that there may currently be little or no local transit service to the activity center, but such service is expected to emerge (e.g., regional transit connections between communities) as local community development activity matures and intensifies, justifying the need for a future local station with commuter rail service.

The general planning considerations for transit emergent station locations and the typical characteristics of the various modes of access are discussed below.

6.1 Station Type Characteristics

Mix of Land Uses and Development Densities

Within the first quarter-mile (Transit Core), typical land uses may include:

- "Main Street" commercial/mixed-use development
- Apartments/townhomes
- Row houses
- Government service center
- Garden/office buildings

Within the next quarter-mile (Transit Neighborhood), typical land uses may include:

- Apartments/townhomes
- Row houses
- Garden/office buildings
- Multi-use developments

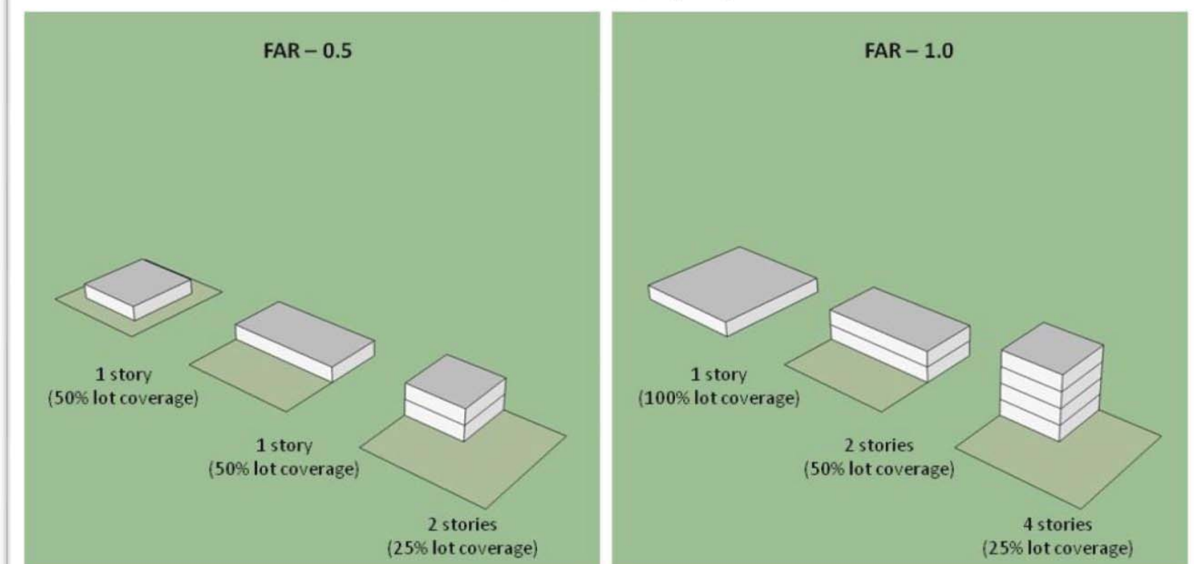
In the outer half-mile (Transit Supportive Area), typical land uses may include:

- Patio home/zero lot line residential
- Row houses
- Garden/office buildings
- Multi-use developments
- Single-family neighborhoods of New Urbanist character

Target FAR/Building Heights

- 0.5 – 1.0 FAR
- 2 stories or more

Floor Area Ratio (FAR)



Parking Requirements

- Surface lot, with potential for future structured parking deck, if necessary

6.2 Modes of Access

Unlike a system hub or a regional station, a transit emergent station location will primarily serve "Main Street" commercial and mixed-use developments, government service centers, office/research parks, and residential uses such as condominiums, apartments, townhomes, and row houses. Areas surrounding a transit emergent station location will, therefore, require shorter distances of connectivity, and should put more emphasis on localized transit. Greatest priority should be given to pedestrian and bicycle connectivity and circulator bus transit options. Park-and-ride facilities should be provided to accommodate users who choose to access the future passenger rail service through personal vehicles.

The general planning and design considerations for transit emergent station locations, and the typical characteristics of the various modes of access are discussed as follows.

General Planning and Design Considerations

- 200' – 400' with pedestrian penetration every 200'
- Maximum block perimeter: 1,200'
- Study area reference (existing block sizes): Downtown Coolidge – 600' x 300'

Pedestrian and Bicycle Connectivity

- Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping
- Mid-block pedestrian linkage
- Pedestrian access to transit hubs from within a short (0-1 mile) distance
- Bike lanes and/or paths throughout the station district
- Bicycle access to transit hubs from within a moderate (1-5 mile) distance, which may be on-street, off-street or a combination

Transit Connections

- Express Bus
  - Fixed route bus service operating along major highways between communities
  - Limited stop express service between communities
  - Schedule coordination with commuter rail service

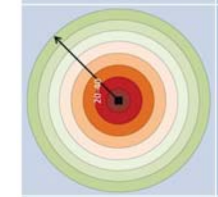
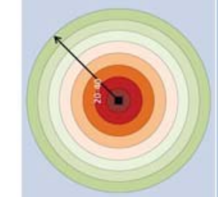
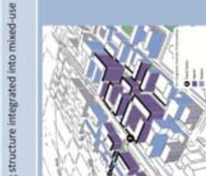
- Local Bus
  - All-day, fixed-route bus service along main roads with stops averaging every quarter- to half-mile
  - May offer higher frequency bus service during peak periods

- Circulator Bus
  - Circulates within activity center and adjacent neighborhoods
  - Frequent stops averaging every quarter-mile or less (including flag-down service, to allow stops at undefined locations)
  - Provides feeder or distribution service to and from transit center/rail station

Vehicular Parking Facilities

- Surface parking lot

Table 5: Supportive Transportation Infrastructure

Passenger Patronage Area			 	
	15-25 miles	10-15 miles	5-20 miles (Suburban) / 20-40 miles (Rural)	20-40 miles
Transit Modes	System Hub Station	Regional Station	Local Station	Transit Emergent Station
LRT	• Fixed-guideway rail transit in exclusive right-of-way with stops averaging every 1 mile • Multiple routes serving regionally-significant activity and employment centers, high-density residential nodes	• Fixed-guideway rail transit in exclusive right-of-way with stops averaging every 1 mile • Located along a route serving regionally-significant activity and employment centers, high-density residential nodes		
Modern Streetcar/Hybrid	• "Lighter LRT" operating in mixed traffic with stops averaging 1/2 to 1 mile • May provide local circulation as well as commuting	• "Lighter LRT" operating in mixed traffic with stops averaging 1/2 to 1 mile • May provide local circulation as well as commuting		
BRT/Express Bus	• Fixed routes operating in major transportation corridors with stops averaging 1 to 3 miles • May operate in semi-exclusive right-of-way or mixed traffic • Typically operates during peak periods only	• Fixed routes operating in major transportation corridors with stops averaging 1 to 3 miles • May operate in semi-exclusive right-of-way or mixed traffic • Typically operates during peak periods only	• Fixed route operating along major highways • Limited stop express service between communities • Schedule coordination with intercity and commuter rail	• Fixed route operating along major highways • Limited stop express service between communities • Schedule coordination with commuter rail
Local Bus	• All-day, fixed-route bus service along main roads with stops averaging every 1/4 to 1/2 mile • May offer higher frequency during peak periods • Accessible buses; articulated where necessary	• All-day, fixed-route bus service along main roads with stops averaging every 1/4 to 1/2 mile • May offer higher frequency during peak periods • Accessible buses; articulated where necessary	• All-day, fixed-route bus service along main roads with stops averaging every 1/4 to 1/2 mile • May offer higher frequency during peak periods • Accessible buses	• All-day, fixed-route bus service along main roads with stops averaging every 1/4 to 1/2 mile • May offer higher frequency during peak periods • Accessible buses
Shuttle/ Circulator Bus	• Circulates within activity center and to adjacent neighborhoods • Frequent stops (averaging ¼ mile) • Provides feeder or distribution service to and from transit centers, activity centers, or rail stations • May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district	• Circulates within activity center and to adjacent neighborhoods and communities • Frequent stops (averaging ¼ mile) • Provides feeder or distribution service to and from transit centers, activity centers, or rail stations • May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district	• Circulates within activity center and to adjacent neighborhoods • Frequent stops averaging ¼ mile or less (or flag-down service) • Provides feeder or distribution service to and from transit center/rail station	• Circulates within activity center and to adjacent neighborhoods • Frequent stops averaging 1/4 mile or less (or flag-down service) • Provides feeder or distribution service to and from transit center/rail station
Bikeways	• Bike lanes and/or paths throughout the station district • Provide access to transit hubs from within a moderate (1-5 mile) distance • May be on-street, off-street or a combination	• Bike lanes and/or paths throughout the station district • Provide access to transit hubs from within a moderate (1-5 mile) distance • May be on-street, off-street or a combination	• Bike lanes and/or paths throughout the station district • Provide access to transit hubs from within a moderate (1-5 mile) distance • May be on-street, off-street or a combination	• Bike lanes and/or paths throughout the station district • Provide access to transit hubs from within a moderate (1-5 mile) distance • May be on-street, off-street or a combination
Pedestrian Pathways	• Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping • Mid-block plazas with pedestrian linkage to streets • Provide access to transit hubs from within a short (0-1 mile) distance	• Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping • Mid-block plazas with pedestrian linkage to streets • Provide access to transit hubs from within a short (0-1 mile) distance	• Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping • Provide mid-block pedestrian linkage • Provide access to transit hubs from within a short (0-1 mile) distance	• Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping • Provide mid-block pedestrian linkage • Provide access to transit hubs from within a short (0-1 mile) distance
Vehicular Parking Facilities	• Multi-story parking structure integrated into mixed-use developments	• Multi-story parking structures	• Structured parking/surface parking lot	• Surface parking lot
Typical Station Area Surrounding Density				
Typical Block Size	200' – 400' with pedestrian penetration every 200' Maximum block perimeter: 1,200' Study area reference: Downtown Phoenix – 340' x 340'	200' – 400' with pedestrian penetration every 200' Maximum block perimeter: 1,200' Study area reference: Downtown Tempe – 340' x 370'	200' – 400' with pedestrian penetration every 200' Maximum block perimeter: 1,200' Study area reference: Downtown Casa Grande – 300' x 300'	200' – 400' with pedestrian penetration every 200' Maximum block perimeter: 1,200' Study area reference: Downtown Coolidge – 600' x 300'

Chapter 7. Station Area Planning Principles

7.1 Land Use

The surrounding mix of land uses plays an important role in making a rail stop a successful station location. Station area plans help communities identify the appropriate scale and type of development that can support both local visions and the regional transit network. Standards for new development or redevelopment should recognize the travel behavior of residents, employees, and others close to transit and appropriately plan for reduced parking demand, local-serving retail/service demand, and the need for pedestrian and bicycle infrastructure.

The following land use planning principles are presented to serve as a basis for communities to develop specific station area plans.

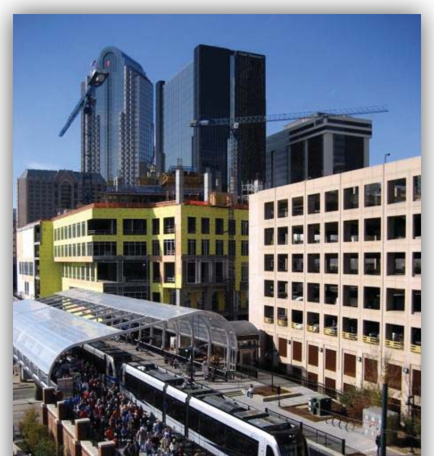
A. **Plan for the highest density development to be clustered around the station location or within the immediately adjacent activity center.**


Highest Density Development in Downtown Phoenix

The concentration of medium- to high-density developments (ideally within mixed-use development projects) around station locations fosters transit-oriented development (TOD) and promotes transit ridership and sustainability of the area. These higher density areas should be planned with small block sizes and pedestrian amenities to foster a highly walkable environment. Ideally, uses clustered around the station location should contribute to at least a 16-hour a day activity center (mix of business, commercial, and retail/services open for at least 16 consecutive hours to allow for street activity) (as further elaborated in principle C).

B. **Buildings in mixed-use development projects or within a quarter-mile radius of the station location should typically be 6 stories or higher (1.0 to 3.0 FAR; 50-100 DU/acre) for the system hub and regional station type, and 4 stories or higher (0.5 to 1.0 FAR; 25-50 DU/acre) for the local station type.**

While land use plans, redevelopment strategies, and zoning codes often specify a range of densities or a maximum density for development, setting minimum densities can help define the character of TOD and help provide flexibility to accommodate changing market demands.


High-Rise Development Adjacent to Passenger Rail

C. **The activity center where the rail station is located should offer a variety of land uses that create 16-hour/day activity (e.g., offices, lofts/condominiums, apartments/townhomes, medical facilities, retail/service centers, etc.).**

Incorporating a variety of uses in an activity center/core ensures that it remains active for a majority of the 24-hour day and attracts people with diverse interests to conduct business in proximity to transit infrastructure. In addition to creating an active business and social environment, all-day activity increases safety with more "eyes on the street" and enhances the character of the activity center.

Key social services like childcare centers, health clinics and other important destinations should be located close to heavily-used transit stations and hubs to accommodate transit-dependent populations.


Retail Below, Residential Above

D. **Employment uses should constitute a descending proportion of the land use within a quarter-mile radius of a rail station as we transition from a hub to a regional to a local station type.**

Setting maximum prescribed percentages for land use compositions ensures a balanced activity center with the correct mix of land uses.


Employment Emphasis at Sunnyvale Regional CALTRAIN Station

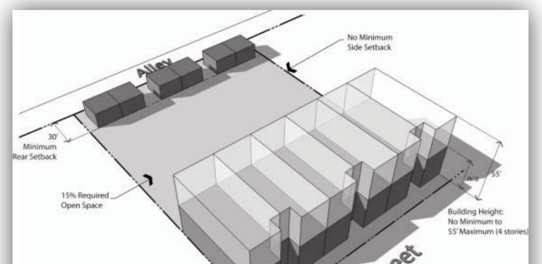
E. **Residential uses should constitute an ascending proportion of the land use within a quarter-mile radius of a rail station as we transition from a hub to a regional to a local station type.**

Setting maximum prescribed percentages for land use compositions ensures a balanced activity center with the correct mix of land uses.


Residential Emphasis at Local at San Antonio CALTRAIN Station

F. Local municipalities should consider implementing a performance-based tool (e.g., form based development code, regulatory Specific Area Plan, other) to direct and regulate medium- and high-density mixed-use development within the station vicinity.

A regulatory framework that allows for and encourages medium- and high-density mixed-use development is essential for promoting the types of quality development that support a passenger rail station and foster a safe and healthy urban environment.



Performance-Based Tools can help in Directing and Regulating Development

7.2 Mobility and Connectivity

Successful station areas require access to multiple modes of travel, including walking, biking, transit, and vehicular travel. Streets within the station areas should plan for safe mobility for all users, and provide a walkable environment that encourages rail and transit patrons to use pedestrian facilities. This approach to mobility and connectivity may result in trade-offs due to space constraints in close proximity to transit; priority should be given to non-automobile modes whenever possible.

A. The station location for the system hub and regional station types should be served by high-capacity transit (LRT/modern streetcar, express bus/BRT) and higher-frequency local bus, circulator bus systems, and/or a combination thereof. Local station types should be served by local bus and circulator bus systems.

A passenger rail station should be accessible through a range of transit options to make it attractive and convenient for the largest number of potential riders. Availability of convenient intersecting transit connections expands the overall population served by rail, and attracts more rail riders due to the convenience of accessing activity center destinations beyond a reasonable walking distance from the rail station.

Feeder Buses Connect Employment Centers with Commuter Rail Stations in San Francisco

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B. Streets, within the station vicinity should provide access for transit vehicles and their operational needs, if applicable (e.g., bus pull-outs, adequate turning radii, pedestrian crosswalks with warning signals).

Streets within station areas should be planned with the ultimate aim of providing easy access to transit services. Narrow travel lanes and slow design speeds, combined with bus pull outs and geometric considerations for easy movement of large transit vehicles such as buses, are desired. Street design should be considered early in the planning process and the advantages weighed against potential impacts such as lower bus operating speeds and higher operating expenses.

Transit Center near Denver Union Station

C. Block sizes within the station vicinity should facilitate a dense street grid pattern such that they support walkability and street side retail/service and business activities (200'- 400' with pedestrian penetration every 200'; maximum block perimeter – 1,200').

Smaller block sizes are often perceived as more easily walkable and accessible to pedestrians. Station areas should be planned with a denser grid street pattern that reduces walking distances and provides easy access to sidewalk retail/services, where applicable.

Smaller Block Sizes Support Walkability and Street-side Business Activities

To be walkable, neighborhoods need destinations (schools, grocery stores, jobs) within walking distance. They need a certain density of activity to be functional and active throughout a good portion of the day. They also need to be safe, with good sidewalks, lighting, and buffers for protection from traffic.

D. The inclusion of public spaces is essential to vibrant station activity and should be located appropriate to adjacent uses (e.g., parks and playgrounds in residential areas, public plazas in employment, commercial and campus areas).


Public Plaza in Downtown Phoenix

The provision of open space such as plazas or parks should be an integral consideration in land use planning and urban design scenarios for the station districts. Four key factors for successful public spaces include: they are accessible; people are engaged in activities there; the space is comfortable and has a good image; and it is a sociable place: one where people meet each other and take people when they come to visit. Public art that involves local artists and reflects local history, culture, and aesthetics should be incorporated in public spaces. Open spaces offer the flexibility for accommodating special community events, such as a farmer's market.

E. The station district should incorporate pedestrian-oriented streets with shaded sidewalks and other amenities (e.g., street furniture, pedestrian scale lighting), and should be buffered from vehicular traffic by landscaping.

Shaded Sidewalks and Street Furniture

The sidewalk network within the station area should be buffered from street traffic by landscaping or on-street parking, and should provide pedestrian amenities that are integral to a quality walkable environment, such as shade, lighting, landscaping, benches, etc. Sidewalks should not be placed next to empty building faces. Doors and windows should open onto sidewalks.

7.3 Building Design

Building design (or overall mixed-use project character development) plays an important role in defining the quality and attractiveness of an area and in making it desirable to businesses that depend on pedestrian traffic. Several building design principles can be used for this purpose, with minimal cost implications for property owners or developers. The following key principles have been identified to guide the design of buildings or mixed-use development projects within station areas.

A. Buildings or mixed-use development projects within the station district should be designed to avoid placing blank walls along pedestrian walkways.


Avoid Blank Walls along Sidewalks

Long stretches of blank walls along sidewalks and pedestrian walkways are known to discourage pedestrian activity. Blank walls provide no destinations of activity and minimal lighting. Therefore, they can often be perceived by pedestrians to be unsafe corridors. Buildings within the station district should be designed to avoid placing blank walls along pedestrian facilities and incorporate spaces such as retail and service uses for pedestrians and utilize engaging facades.

B. Off-street parking should be provided behind or adjacent to buildings with well-marked access, or in parking structures lined with other pedestrian-oriented uses, such as retail, services, or residential.

Parking Behind or Adjacent to Buildings

Large surface parking lots in front of buildings (between the building and the street) act as barriers for pedestrian activity. Parking, if required, should be provided behind buildings (with doors and windows opening to the sidewalk, not the parking facility) to make it more attractive for pedestrian access, as well as to create a more engaging sidewalk environment. Parking does not always need to be directly adjacent to the station. Often, local retail can be strengthened if transit riders have to walk along a shopping street to get to and from the station.

C. Local municipalities should require new and rehabilitated buildings to have pedestrian-friendly uses located along pedestrian pathways.

Retail and other pedestrian-friendly uses located along pedestrian pathways contribute to a high-quality walking environment and are generally attractive to transit users. Such pedestrian-oriented uses allow for more "eyes on the street", increasing safety, community awareness, and community cohesion. In addition, key social services such as childcare centers, health clinics, and service agencies generally provide an economic benefit when located close to heavily-used transit stations and hubs to accommodate transit-dependent populations.


Locate Pedestrian Friendly Uses along Sidewalks

D. Local municipalities should encourage the use of environmentally-sustainable design, creation of public green spaces, and the accommodation of multiple modes of travel within building or mixed-use project developments.

Local municipalities can put into place incentives that encourage the use sustainable design and construction materials, creation of functional public spaces, incorporation of green technologies, and the accommodation of multiple modes of travel through density bonuses, expedited building reviews, and financial assistance. These characteristics generally improve the character of the area.


Encourage Environmentally Sustainable Design

7.4 Housing Affordability

A transit system can only be successful if it is accessible to people from all social and economic backgrounds. The success of a transit-oriented development is, in part, dependant on the availability of housing that is affordable within walking distance of the transit station. The following principles have been identified to incorporate affordable housing in a station area plan.

A. Local municipalities, in partnership with for- and non-profit developers, should ensure that affordable housing is available within walking distance (10-minute walk) from the transit station.

Local municipalities should have policies to encourage affordable housing within the station district. More affordable housing will promote both transit ridership and social equity by lowering the combined cost of housing and transportation is to expand housing opportunities adjacent to transit.


Affordable Housing within Walking Distance

B. It is important to preserve, rehabilitate or replace existing affordable housing over time as new development or redevelopment occurs within station areas.


Rehabilitate Existing/Develop New Affordable Housing

As station area development or redevelopment occurs, local municipalities should put in place policies for preserving existing affordable housing in the station district, as well as proactively implement policies to encourage development of additional affordable housing opportunities, often as part of other development projects. Maintaining a healthy mix of housing options near transit stations allows communities to produce better economic, social and environmental outcomes for all residents. Mixed-income housing – whether provided within a single project or a neighborhood – enhances community stability and sustainability, and ensures that low-income households are not isolated in concentrations of poverty. Just as important, mixing and mingling of people from diverse backgrounds and experiences promotes innovation by increasing the opportunities for people to share and combine ideas from different perspectives and traditions.

C. Local municipalities should provide incentives to encourage the developers of market-rate residential projects to incorporate a proportion of affordable housing within their projects.

Station area plans should set goals for encouraging attainable housing as part of market-rate housing development projects, and proactively implement policies such as inclusionary zoning, density bonuses, expedited review processes, etc. to achieve them. Providing a mix of market-rate and affordable housing units broadens the transit ridership base.

Local Incentives help in Encouraging Affordable Housing as a part of Market-Rate Housing

D. Local municipalities should offer incentives to provide affordable housing as a part of mixed- or multi-use developments.

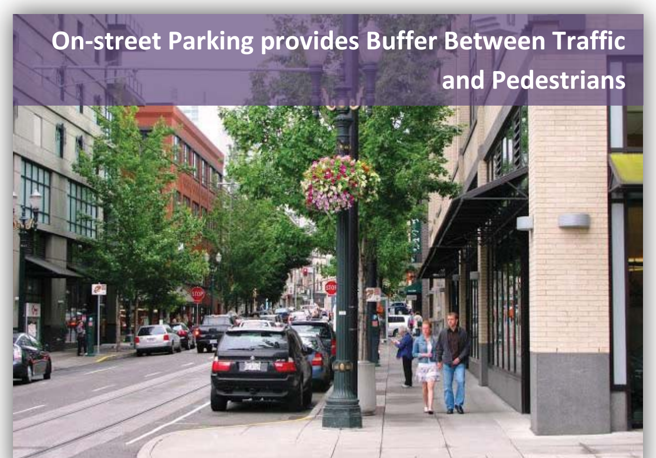
Local municipalities can use similar incentives to those identified above to encourage the development of affordable housing within mixed- or multi-use developments.

7.5 Parking

Parking facilities within the station area should be planned to complement development projects and support use of rail transit without compromising walkability.

A. On-street parking can serve as a buffer between pedestrians and street traffic and creates a reserve of short-term parking.

Local municipalities should formulate parking policies for the station district that promote short-term on-street parking. On-street parking serves as a buffer between street traffic and pedestrians, and provides easy short-term access to retail/service uses and restaurants.



On-street Parking provides Buffer Between Traffic and Pedestrians

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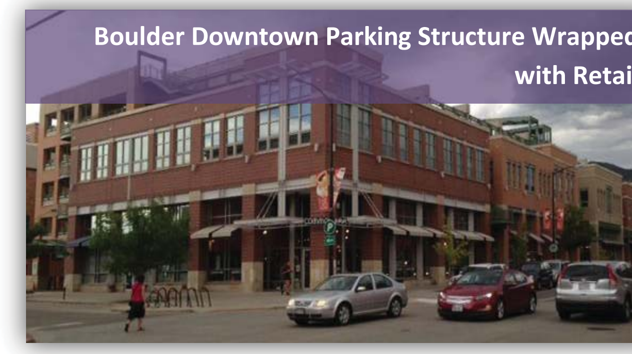
B. Station locations for the system hub and regional station types should incorporate multi-story parking structure(s) with retail/service uses on the ground floor along pedestrian corridors.

The station district should offer structured parking that is easily accessible, but does not always need to be adjacent to the station. Often, local retail and services can be strengthened if transit riders have to walk a short distance along a shopping street to get to and from the station.



Boulder Downtown Parking Structure Wrapped with Retail

C. Parking should be priced to encourage transit use over driving.

Parking within the station district should be provided only as supporting infrastructure, and should be priced to encourage transit use over driving. Innovative parking management strategies such as reduced parking or maximum parking requirements, shared parking, car-sharing, parking assessment and revenue districts should also be considered in station area planning.

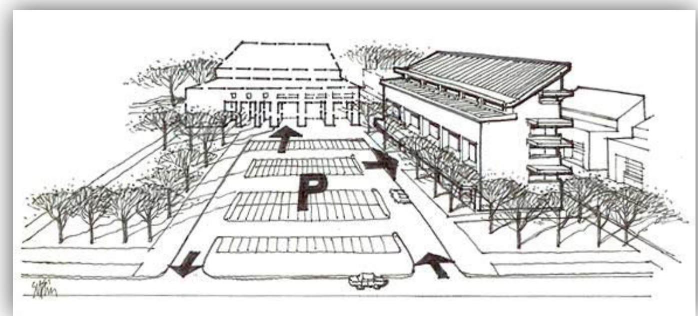
Car-Share Programs Help in Encouraging Transit Use

D. Priority parking spaces should be made available within station districts for multiple occupant and alternative fuel vehicles.

Municipal parking policies should incentivize carpooling and use of alternative fuel vehicles by providing priority parking spaces for residents, employees, and guests within station districts. Such parking spaces could include plug-ins for electric vehicles.

Provide Priority Parking Spaces for Alternative Fuel Vehicles

E. Municipalities should encourage adjacent uses with different peak hours of parking demand to share parking or provide reduced parking to encourage transit use.



Municipal parking policies should incorporate provisions that enable the sharing of parking spaces by adjacent business to maximize the utility of available parking spaces and not to develop unused parking for large portions of the day. An example might be the sharing of parking between an office building (generally occupied most during working hours) and a movie theater complex (generally most occupied during evening hours and on weekends). Additionally, park-and-ride facilities in suburban or rural locations could share parking with nearby commercial properties or public facilities such as libraries or post offices.

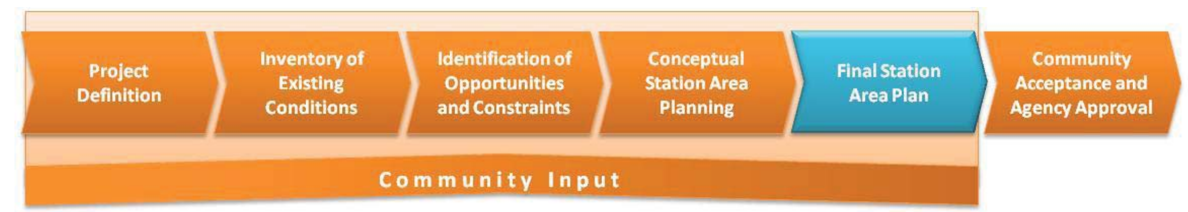
Chapter 8. Implementation Program Requirements

8.1 Planning Process for Communities

Planning for intercity and commuter rail stations is new to Arizona communities, with most of the communities having little or no rail transit station planning experience. The planning process must comply with Arizona state statutes and satisfy the requirements of the Growing Smarter framework (created by the Growing smarter Act of 1998) for increased level of public participation, incorporation of new growth-related plan elements, and provision of public hearings for future rezoning actions.

As a guidance tool, a recommended planning process has been outlined that can be used for developing individual station area plans.

Planning Process for Communities



Step 1 – Project Definition

The first step in the station area planning process involves defining the project goals, objectives, and location-specific characteristics. At the beginning of the Tier II analysis of alternatives for the APRCS study, four station types were defined to address the local needs and future vision for the Sun Corridor. A universe of alternative station locations were identified through discussions with partner agencies, stakeholders, counties, and cities/towns. Identified station locations were analyzed for proximity to existing activity centers, surrounding land uses and densities, access to existing or programmed transit services, and ridership potential for commuter and intercity rail services, among other measures. In addition, a “Community Readiness Assessment” was conducted, which served to review each community’s plans and policies for transit supportive land uses, mobility, connectivity, building design, housing affordability and parking that are required to support and enable successful station area development. A final set of individual meetings with communities, combined with the other tools mentioned above, helped determine a potential list of station locations. Stakeholder outreach and community involvement should be ongoing, incorporated into each step of the planning process.

With defined station location sites, the project definition stage for cities and towns begins here. This step should have strong emphasis on community and stakeholder involvement. As the ultimate users of the station area, the city/town should lead the planning process for the station area and all key stakeholders should be engaged early on in defining the needs and aspirations of the community as a whole. Additionally, it is important for the municipal government and planning departments to be involved from the beginning since they provide the regulatory background necessary for the success of a station area planning process.

Step 2 – Inventory of Existing Conditions

Step 2 of the planning process involves creating a complete inventory of existing conditions around an identified station location. Mapping of adjacent elements ensures that station designs integrate within the local context and provide continuity in transportation connections.

Elements that should be inventoried as part of this step include:

- Adjacent land uses, zoning, and development densities
- Land use and zoning policies
- Availability of vacant/developable land parcels
- Proximity to community facilities
- Existing roadways (size, elements within the right-of-way) and traffic control devices
- Streetscape policies and aesthetic elements
- Location of parallel and intersecting transit routes (including stops, schedules, and accommodations within street right-of-way)
- Pedestrian and bicycle connections, sidewalks and trails
- Existing bike facilities such as bike lanes, bike racks, etc.
- Existing parking types (e.g., off-street lots, on-street parking stalls, structured parking) and parking capacity

Step 3 –Identification of Opportunities and Constraints and Analysis of Development Potential

Step 3 of the planning process involves investigation and identification of potential opportunities and constraints specific to the station site and vicinity. Analysis of opportunities establishes future development potential for the area, while the constraints help in addressing potential challenges during the station development process.

In addition to ascertaining the future development potential, this stage involves the assessment of future development and capacity needs, such as required parking spaces, public open spaces, etc. An assessment of market and economic conditions is also critical to establish target markets for new and revitalized development activity, and to understand station area elements necessary to attract those markets. Additionally, a market analysis can provide an understanding of reasonable amounts of different land uses to plan for (e.g., what is the saturation of retail uses the station area can withstand?). A study of similar comparable projects or "best practices" in other parts of the country could provide insight into sizing needs, mix of land uses, costs, and other innovative design and implementation techniques used.

Step 4 – Conceptual Station Area Planning

Step 4 of the planning process involves the use of the previous assessment of existing conditions, issues and opportunities, development potential, and market studies to begin defining potential development and revitalization alternatives. This includes concepts for the use of vacant/developable land parcels, ideas for redevelopment of properties, or reuse of underutilized parcels with the ultimate objective of maximizing the utility of the spaces around the station site. This is the stage where agencies and stakeholders should review conceptual designs and provide input regarding consistency with local

planning legislation and guidelines.

Preliminary phasing and conceptual cost estimates are also part of this stage. Since all development around a station site is not expected to occur at the same time, it is important to incorporate the idea of phased development from the conceptual planning stage. Public capital investments may be needed in the initial phases to develop basic infrastructure (e.g., transportation, potable water, sanitary sewer, storm drainage, etc.) and amenities that will in turn attract new development to the area.

Step 5 – Final Station Area Plan

This stage involves refinements to the station area plan concepts leading to the formulation of development alternatives and ultimately the selection and refinement of a final station area plan. The ongoing refinements to conceptual plans typically include identification of site specific program elements, defined spaces, mix of uses, mobility elements, building footprints, etc. The final station area plan includes policies and strategies to encourage identified development types and styles, attract target businesses, and create spaces that encourage transit ridership. The plan also outlines detailed project costs, identifies the funding sources, and lays out development phasing for final implementation.

Step 6 – Community Acceptance and Agency Approvals

Upon completion of a final draft of the station area plan, the station area plan should go through a final vetting and review process prescribed by the city/town, and involve the community, partnering agencies, and all key stakeholders. Any final adjustments to plan details may be made at this stage to ensure that the plan complies with local regulations and meets the desires and needs of the community and stakeholders.

8.2 Public Policy Actions

The following identifies a menu of public policy actions that could be pursued by a city/town to prepare and implement station area plans to guide urban development or redevelopment within station districts around intercity or commuter rail stations. This list is representative and is not meant to be prescriptive, but is intended to provide a "checklist" as to the actions a municipality may want to consider.

1. **Development Policy Considerations**

   A. *General Plan Amendment* – An amendment to the General Plan may be required to:
      - Establish a station district
      - Provide property tax incentives to develop mixed uses
      - Broaden uses permitted under the mixed-use zoning category
      - Facilitate regional revenue sharing to fund pre-development and infrastructure incentives
      - Include an open space strategy for the station area/activity center
      - Promote smaller block sizes; prevent large blocks with similar uses
      - Ensure historic preservation
      - Establish a redevelopment district
      - Encourage more vertical development

- Revise parking standards within station district

B. *Changes to the zoning code* – Communities may require changes to their zoning code to allow mixed-uses; consider Form Based Code (flexible zoning, zero lot lines) within the station district.

C. *TOD Overlay District* – Designation of a TOD overlay district for station area; develop a TOD plan for the station area

D. *Design/Development Guidelines* – Establish design guidelines that encourage mixed uses, include integrated energy practices, promote more vertical development by increasing building heights and allowable densities, and provide development incentives.

E. *Station Area Plan* – Develop a station area plan that locates key public uses in the activity center core, accommodates highest density development in station area core with step-down density moving away from the center, incorporates open space as a key component, and interfaces all modes of transportation with the rail station in a functional and efficient manner. The station area plan will treat the station area and activity center core as one integrated planning area. The plan will also provide appropriate transition between employment and residential uses.

F. *Joint Public Facility Plan* – The community may develop a joint public facility plan in association with the transit authority/agency to guide long-term public investment in the station district.

2. Transportation Policy Considerations

A. *Multimodal Transportation Plan* – A transport agency may be established to facilitate coordinated development of an integrated transportation system. The community will need to develop an integrated multimodal transportation master plan that address pedestrian and bike facilities, rail, public transit, and vehicular traffic needs. The plan may include:
   - Multi-use paths
   - Open space/trails plan
   - Well-designed bike connectivity
   - Car share and bike share facilities
   - Bike lockers/showers at stations

B. *Transit Connectivity* – The station district should feature an expanded transit system with a variety of public transit options, including high-capacity transit (LRT/modern streetcar) in large communities, and express and local bus systems. Connections between the activity center core, rail station, and adjoining mixed-use, employment and residential uses should be provided through a circulator bus system. A rail station with an integrated transit station is preferred. Bus pull-outs and shelters should be provided. Minimize transit transfers as much as possible; transit connections should go directly to rail station.

C. *Parking Facilities* – Parking facilities should be strategically located and distributed, to avoid under-utilized asphalt islands. Within the station district, parking standards will need to be revised to promote joint/shared parking facilities, reduced parking minimums, promote

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vertical parking facilities (multi-story parking decks and garages), and provide on-street parking. Park-and ride facilities may be required. A parking policy may be essential to establish varying rates for short-term and long-term parking. Parking garages could be provided on the edge of mixed-use areas or integrated into those areas to serve multiple purposes.

D. *Rental Cars/Car Sharing Programs* – Rental car agencies and carshare programs should be incorporated into the design of station areas. Explore the feasibility of starting a carshare program, and identify the most desirable location for locating such a service in relationship to the station. Car rental agencies should be located to provide easy access for passengers arriving/departing by rail, while ensuring that the most attractive land around the station is available for active-use developments.

E. *Pedestrian/Street Network* – Revise street standards to provide complete streets (include pedestrian infrastructure, traffic calming measures, bicycle lanes, and bus lanes/pull-outs) throughout the station area, and along major arterial streets. Road diets (lane reduction or road re-channelization to achieve systemic improvements) could be used to accommodate a finer grid pattern (smaller block sizes) and to preserve right-of-way for future development. The station area should feature walkable streets with wider sidewalks, shade and lighting along sidewalks, pedestrian-scale development, and pedestrian connectivity between the station and the activity center core. In addition, the "main street" area should feature enhanced pedestrian streetscape with limited access to vehicular traffic.

F. *Grade Crossings* – Ideally, the local street pattern is aligned parallel to rail corridors to minimize at-grade crossings, however different historical development patterns may exist. Grade separated crossings should be provided to minimize rail/vehicular traffic conflicts, as necessary.

G. *Other Transportation Considerations* – may include:
   - Employee or other special group subsidies for public transportation
   - Establish no whistle zones for trains in the community in coordination with other safety measures

3. Other Considerations

Other considerations for station area development include:

- Promote sustainable practices in all new and rehabilitated construction – solar energy, gray water, green roofs
- Plan for flexibility
- Provide easy connectivity through layering of transportation linkages
- Provide direct highway linkage to station
- Provide affordable housing nearby or integrated into mixed-use developments
- Provide multi-use/greenway trails near major employment areas, and parks near residential areas
- Advance right-of-way preservation to minimize costs and provide development surety
- Implement measures to allow new and rehabilitated development to pay for amenities

in the station area

- Gather political support, and develop "local champions" to provide community leadership in station area planning and development

8.3 Phasing of Public and Private Actions

Formulation of a Station Area Plan is the first of many coordinated steps, both public and private, towards development of a vibrant and attractive transportation node around a passenger rail station. Successful implementation of the plan will require a strong partnership between ADOT, the City, other affected government agencies, property owners, developers, private agencies, community groups, and private citizens. These coordinated efforts will need to be made over several years.

Various public and private actions have been identified, which may be part of an overall development project. However, it should be noted that every development project is different and rarely follows a strictly linear process. The graphic presented with this discussion serves only as a point of reference.

Public Actions

In order to begin the process of implementation of the Station Area Plan, the public agencies will need to work together to develop a regulatory environment suitable for new higher intensity development to occur. This will require working with private property owners and developers to gauge the market demand for various types of development potential within the station area both now and in the future, but will primarily involve decisions and steps to be taken by the public agencies, as illustrated in **Figure 16** on Page 67.

1. ***Prepare a Station Area Plan***
   The City will, in coordination with ADOT, other stakeholder agencies, and community groups, formulate a Station Area Plan that is consistent with the overall goals and objectives of the passenger rail system.
2. ***Incorporate Station Area Plan and Policies into General Plan document***
   The City would need to initiate an update to the existing General Plan to include policies and elements that are fundamental to the implementation of the station area plan. A General Plan update is typically a lengthy process, and hence the City should initiate this effort early on.
3. ***Potentially Designate a Redevelopment District around station***
   The City could identify and designate a redevelopment district around the passenger rail station where it intends to encourage new higher density mixed-use development in the future. In order to designate a redevelopment area, the City must satisfy the following Arizona statutes requirements:
   - One or more slum or blighted areas exist in the station area vicinity
   - The redevelopment of that area or areas is necessary in the interest of the public health, safety, morals or welfare of the residents of the municipality

   The City must ensure that property owners and developers refrain from speculation by delaying redevelopment of their properties.

4. ***Acquire Land for Redevelopment***
   The City could work with property owners to acquire properties within the station district which are candidates for redevelopment and are critical for development of higher intensity uses. ADOT could also potentially acquire land for the rail corridor. The City could work with ADOT to use the remnant parcels from ADOT for future development.
5. ***Incentivize Redevelopment Projects***
   The City could identify policies and incentives to attract developers, encourage property owners to redevelop their properties, and major employers to the area.
6. ***Engage Corporate Attention***
   Corporations can play an influential role in stimulating development around transit. Corporations are increasingly viewing good transit access as a valuable tool for recruiting scarce talent. Engaging corporations in the implementation process can encourage them to locate their offices within the station district, stimulating development of complementary uses around them. An example of corporate engagement is the Transit-Oriented Development associated with Bell South in Downtown Atlanta, where Bell South decided to consolidate 10,500 employees in three centers adjacent or very near to MARTA rapid rail stations, within the City of Atlanta. By design Bell South provided parking only for about half the workforce, with the remaining half expected to use MARTA other transit options. This led to a string of positive spin-off effects with a number of other employers renewing or expanding their commitment to locating jobs at transit-accessible locations.

Private Actions

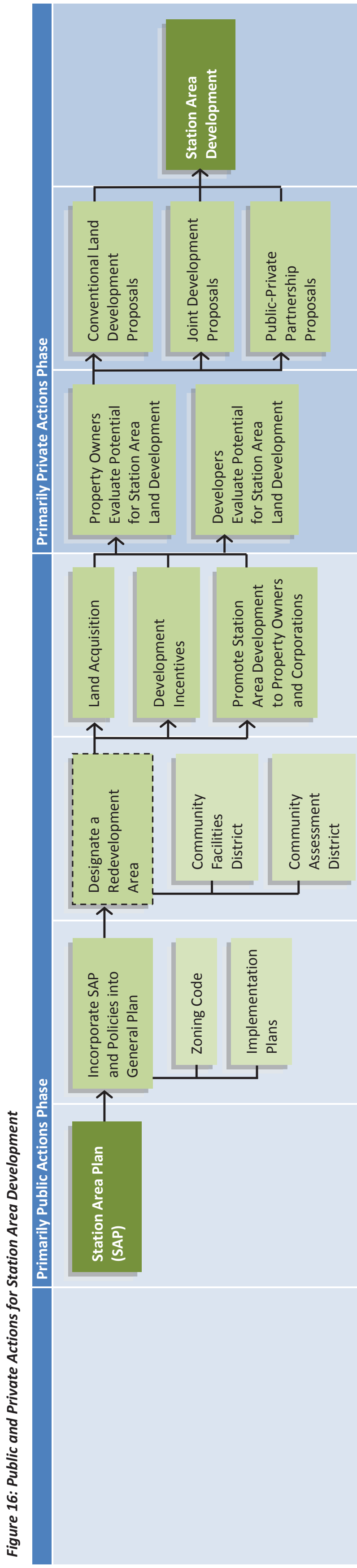
Private property owners, developers, and organizations have a substantial interest at stake in the overall development of a station area. Such stakeholders would typically want to get involved in the planning process from the very beginning to ensure that their interests and concerns are addressed in the plan. During the implementation process, private entities can play an important role in actually bringing new development to the area. In most instances, public efforts for the implementation of the station area plan would be unsuccessful in the absence of interest from private entities.

1. ***Private institutions could promote station area development***
   Private entities, such as the Urban Land Institute, Valley Forward, or Imagine Greater Tucson, may promote station area development through their planning efforts. Such entities may utilize national level resources from organizations, such as the Center for Transit Oriented Development, and Institute for Transportation & Development Policy.
2. ***Property owners seek redevelopment of their property***
   In anticipation of increased activity surrounding the passenger rail station, private property owners may plan development in coordination with the City consistent with the station area plan. This may include market studies, and conceptual site planning for their properties.
3. ***Developers draw plans for new development projects***
   Developers may plan development in coordination with the City consistent with the station area plan. This may include market studies, and conceptual site planning for their properties. The City

may offer incentives to developers for such projects. Municipal incentives for new developments can help in offsetting costs that act as deterrents for developers.

4. ***Approach the City with proposals for Joint Development***
   Joint development is the primary value capture mechanism transit agencies/rail authorities commonly use. It is generally a real estate development project that involves coordination among multiple public and private parties to develop sites near rail transit, usually on publicly-owned land. Typically the transit agency/rail authority and the private developer will agree to share costs of and revenue from the project.
5. ***Use Public-Private Partnerships to plan and construct major development projects and associated key public infrastructure***
   Developers or investors may approach the City with proposals for developing large mixed-use, residential or employment projects through a public-private partnership arrangement. In such situations, the private entity often provides a portion of the capital to finance the project and collects an agreed upon portion of the revenue generated by the project, and the public agency may provide free or low-cost land, access to infrastructure or other incentives for project development. The public sector may also share in the revenue generated by the project.

Figure 16: Public and Private Actions for Station Area Development



Public Entities							
Arizona Department of Transportation	Participate in Planning	Supportive Role	Supportive Role	Lead land acquisition for Rail Transit ROW	Supportive/Advisory Role	Supportive/Advisory Role (Potential Participation)	Supportive/Advisory Role
Host Municipalities	Lead preparation of Station Area Plan	Lead General Plan amendment process	Lead designation of Redevelopment Area or other funding districts	Lead land acquisition for TOD	Supportive/Advisory Role	Sponsoring/Permitting Agency	Sponsoring Agency/ Permitting Agency
Other Affected Agencies[1]	Participate in Planning	Technical Support	Technical Support	Advisory role	Supportive/Advisory Role	Supportive/Advisory Role (Potential Participation)	Supportive/Advisory Role
Private Entities							
Property Owners	Participate in Planning	Stakeholder	Provide feedback, issues/priorities concerning property	Stakeholder	Lead Evaluation of Land Development Potential	Lead preparation of Land Development Proposals	Land Development, Partner with others (as appropriate)
Developers	Participate in Planning	Stakeholder	Provide feedback, issues/priorities concerning property	Stakeholder	Lead Evaluation of Land Development Potential	Lead preparation of Land Development Proposals	Land Development, Partner with others (as appropriate)
Community Betterment Organizations[2]	Participate in Planning	Stakeholder	Provide feedback, issues/priorities concerning property	Stakeholder	Marketing/Promotion, Economic Development	Supportive/Advisory Role	Marketing/Promotion, Economic Development
Community Groups[3]	Participate in Planning	Stakeholder	Provide feedback, issues/priorities concerning property	Stakeholder	Stakeholder	Stakeholder	Stakeholder
Public-at-Large	Participate in Planning	Stakeholder	Provide feedback, issues/priorities concerning property	Stakeholder	Stakeholder	Stakeholder	Stakeholder

[1] Includes state and local agencies, such as the Department of Housing, Commerce Authority, MAG, PAG, CAG, Counties, etc.
[2] Includes Urban Land Institute, Valley Forward, Imagine Greater Tucson, etc.
[3] Includes Neighborhood Organizations, RWAs, etc.

8.4 Roles and Responsibilities

A collaborative approach should be adopted throughout the station area planning and development process, involving the key agencies and stakeholders, to ensure that the development around the station area meets the community's vision and aspirations for the future. At a minimum, the planning process should involve the following key partner agencies:

Table 6: Partnering Agencies and Their Roles

	Partnering Agency/Stakeholder	Role
Federal Agencies		
1.	Federal Railroad Administration (FRA)	Oversight and Funding/Advisory
2.	Federal Transit Administration (FTA)	Oversight and Funding/Advisory
3.	Federal Highway Administration (FHWA)	Advisory/Right-of-Way
State, Regional and Private Entities		
1.	Arizona Department of Transportation (1)	State Transportation Regulatory Authority
2.	Arizona Department of Housing	Advisory/Affordable Housing Incentives
3.	Arizona Department of Environmental Quality	Advisory/Regulatory Authority
4.	Arizona Game and Fish Department	Advisory
5.	Arizona State Land Department	Advisory/Land Resource Incentives
6.	Arizona Commerce Authority	Advisory/ Economic Incentives
7.	Maricopa Association of Governments (1)	Planning/Jurisdictional Support
8.	Pima Association of Governments (1)	Planning/Jurisdictional Support
9.	Central Arizona Governments	Planning/Jurisdictional Support
10.	Sun Corridor Metropolitan Planning Org. (1)	Planning/Jurisdictional Support
11.	Maricopa County	Planning/Jurisdictional Support
12.	Pinal County	Planning/Jurisdictional Support
13.	Pima County	Planning/Jurisdictional Support
14.	Union Pacific Railroad (1)	Private Entity/Transportation Stakeholder
15.	BNSF Railway (1)	Private Entity/ Transportation Stakeholder
Municipal Departments		
1.	Planning and Community Development	Planning, Permitting and Implementation
2.	Transportation/Transit Planning	Roadway and Transit Facilities Planning and Implementation
3.	Economic Development	Economic Incentives
4.	Public Works Department	Public Facilities Construction Programming and Implementation

(1) At this time, no particular entity has been identified to prepare final design, construct and implement commuter or intercity rail within the Sun Corridor. Such activities could be undertaken in the future by some combination of state and regional agencies, potentially in partnership with the private sector.

8.5 Potential Incentives for Infill, Revitalization, and Redevelopment

Through the "Community Readiness Assessments", communities throughout the Tucson to Phoenix corridor have demonstrated that there are opportunities for infill development; revitalization of activity centers, historic downtowns and town centers; and redevelopment of properties within otherwise vibrant activity nodes. Various incentives are available which can be used to incentivize the location of new development or redevelopment in these areas. A few such potential incentives have been discussed in this chapter.

8.5.1 Public Financing for Site Acquisition and Consolidation, Infrastructure, Parking and Pedestrian/Streetscape Amenities

Most public agencies are experiencing severe fiscal constraints at this time. In a time like this, communities are looking for ways to make the best use of local government revenue, such a property and sales taxes, and generate new revenue to fund TOD infrastructure. A key step in creating a TOD infrastructure financing strategy is to evaluate which tool will work best for a particular project or in a particular development context.

8.5.2 Historically-Used Funding Tools

Density Bonus

A density bonus is an incentive-based tool that permits developers to increase the maximum allowable development on a property in exchange for helping the community achieve public policy goals. Increasing development density may allow for increases in developed square footage or increases in the number of developed residential units. This tool works best in areas where growth pressures are strong and land availability limited or when incentives for attaining the goals outweigh alternative development options.

Density bonuses can help encourage lower cost market-rate housing in areas with high land costs. Density bonus programs encourage developers to create affordable dwelling units in areas where the local government has identified a shortage of housing affordable to low- and moderate-income households. Density bonuses can also be used to entice development to specific neighborhoods or zones, such as transit-oriented development in station areas or housing in urban centers, or provide amenities, including open space or transit and non motorized transportation features.

Applicability: Affordable housing, housing for people with special needs, childcare facilities, structured/underground parking, open spaces and public plazas, landscaping, preservation of historic structures, guide development to preferred location

Streamlined Development Process and Permitting

Delays during any stage in the development process add to the final costs of new development. Reducing the costs incurred by developers during the development review process makes locating in a community more attractive to developers. Expedited permitting is a cost-efficient and very effective way of reducing developer costs. Fast-tracking review and permitting of development projects reduces developer costs at no-cost to local jurisdictions.

Applicability: Affordable housing development, preservation of historic structures, guide development to preferred location

Community Development Block Grant (CDBG) Program

The CDBG Program, administered by the U.S. Department of Housing and Urban Development (HUD), is intended to ensure decent affordable housing, community services to vulnerable neighborhoods, and job creation and retention of businesses. CDBG provides annual formula grants to local government agencies and states in several program areas. This tool is not focused on TOD infrastructure but could be used in combination with other funding and financing tools for a larger TOD project that meets CDBG criteria.

Applicability: Affordable housing development, neighborhood revitalization and housing rehabilitation and infrastructure development, streetscape projects

Economic Development Administration (EDA) Grants

The EDA, an agency in the U.S. Department of Commerce, provides grants to economically distressed communities to generate new employment, help retain existing jobs, and stimulate industrial and commercial growth. Some EDA funding is reserved for public works projects, which can include a wide range of infrastructure types provided the project has an economic development purpose. Local governments apply directly to the EDA when grants are available.

Applicability: Small business loans and grants, site acquisition and preparation for economic development, infrastructure to support economic development

Assessment District/Business Improvement District

An Assessment District (sometimes known as a Business Improvement District) is a tool through which municipal governments exact revenues from property owners based on the market value of the properties within an established district. The assessment is made up of two components – the improvement or building value, and the land or site value. Assessment districts can be formed in undeveloped areas to build roads and install water and sewer infrastructure, or they might be formed in

established commercial districts (Business Improvement District) to finance new public improvements.

Applicability: Special district infrastructure, streetscape or joint use parking projects, district maintenance, marketing/promotions, security, site acquisition and consolidation

Community Facilities District (CFD)

A Community Facilities District is an area specially designated by a municipality to issue general obligation bonds, special assessment bonds and revenue bonds or any combination thereof, that are repaid with a mechanism that taxes (or assesses) only the lands directly benefitted by the new infrastructure. CFDs are formed to finance the construction or acquisition of certain designated capital facilities (infrastructure) and/or to finance public services by levying special taxes included in the CFD. This allows much needed community development which would otherwise be unfeasible due to the prohibitive costs imposed by extensive infrastructure burdens. CFD taxes are collected as direct levies on property tax bills of included parcels.

Applicability: Water and sewer projects, police and fire facilities (and sites), public buildings (and sites), flood control and drainage projects, street facilities/roadways, public parking structures, landscaping, lighting and traffic control, parks and recreational facilities, schools and school sites, pedestrian malls, enhanced public services

Designation of a Redevelopment Area under Arizona Statute

Arizona redevelopment law is bound in Arizona Revised Statutes (ARS) 36-1471, “Slum Clearance and Redevelopment.” State statutes recognize the need for redevelopment of blighted areas and allows for the development of a “slum clearance and redevelopment commission”, or form of redevelopment committee. Redevelopment initiatives require the preparation of a redevelopment plan – its contents prescribed in the statute – and its adoption into the municipal general plan. Then, a municipality may begin to acquire property for redevelopment purposes and fund redevelopment initiatives.

“Slum and blight” is define by an area in which there is significant evidence of buildings or other improvements (e.g., streets, sidewalks, lighting) which, because of age or other reasons, have deteriorated, are inadequate, unsafe, impair sound growth, and retard economic development. Examples of “blight” include inadequate street layout, substandard lotting, and the existence of many owners, making parcel assembly difficult for development. Examples of “slum” include unsafe structural conditions (fire hazard), crime, unsanitary sewer conditions, and the existence of water, soils, and noise pollution.

While many options exist to finance redevelopment projects, public projects must be consistent with other public facility project funding, which requires the approval of the voters through the electoral process.

Applicability: May be used for encouraging and promoting new development or redevelopment within the station district, central business district, or activity center if it qualifies as a redevelopment area

Developer Fees and Exactions

(Impact fees, system development charges, facility fees, infrastructure reimbursement agreements, developer exactions)

Development impact fees and exactions are charges assessed on new development to defray the cost to the jurisdiction of expanding and extending public services to the development. The fees are generally collected once and are used on a pay-as-you-go basis to offset the cost of providing public infrastructure and facilities such as new streets, utilities and other public facilities. Because they are one time fees, they cannot be used for ongoing facility operations and maintenance.

Applicability: Public infrastructure and facilities development (e.g., streets, potable water, sanitary sewer, storm drainage, libraries, parks, and police and fire stations)

Joint Development

Joint development is the primary value capture mechanism transit agencies commonly use. It is generally applied to a real estate development project that involves coordination among multiple parties to develop sites near transit, usually on publicly-owned land, and can take many forms, ranging from an agreement to develop land owned by the transit agency to joint financing and development of a project that incorporates both public facilities (e.g., parking garages) and private development. Typically the transit agency and the private developer will agree to share costs of and revenue from the project.

Applicability: Real estate projects, affordable housing development, parking, public amenities as part of development projects

Public-Private Partnership

Public-private partnerships are contractual agreements between a public agency and a private-sector entity whereby “the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public.” In addition to the sharing of resources, each party shares in the risks and rewards in the delivery of the service and/or facility. In a typical public-private partnership, the private entity provides the capital cost to finance a public project, such as a parking facility, toll road, or airport, then collects some portion of the revenue generated by the project. In most public-private partnerships, the public sector partner guarantees payment to the private sector partner even if the project does not deliver the expected level of revenue or if the expected revenue does not cover the entire cost of debt repayment.

Applicability: Large roadway projects, mixed-use development, high-rise residential towers with affordable housing component.

8.5.3 Emerging Community Development and Infrastructure Financing Tools

Structured Funds

Structured funds are investment funds that are configured with an intentional mixture of both fixed-income securities as well as equity products. The general idea behind this type of fund configuration is to provide the investor with the security that is provided by the fixed-income assets, since those assets can help offset potential losses sustained with the up and down movement of the equity securities. At the same time, the inclusion of the equity securities allows the investor to generate significant returns when and as those equities appreciate. Structured funds pool money from different investors with varying risks and return profiles. Communities have been increasingly interested in using structured funds as a property acquisition tool to support affordable housing, particularly near transit.

Applicability: Specific real estate development projects (e.g., affordable housing, mixed-use development) near transit stations

Land Banks

Land assembly and acquisition can be a challenge for TOD because land near transit is often scarce and generally of high costs. Although not a financing tool, communities’ interest in the applicability of land banks to TOD has been growing in an effort to find additional property acquisition tools. While land banks have not typically been used for TOD infrastructure, assembling developable land in station areas could make TOD and the associated infrastructure projects more feasible.

Applicability: Neighborhood stabilization and revitalization, affordable housing development

Redfields to Greenfields

Redfields to Greenfields is a concept of converting underused or distressed properties into an asset. A local municipality acquires underused properties (redfields) and converts them to new parks (greenfields). Redfields to Greenfields is not tied to any particular funding or financing source; in fact, the municipality would have to identify a funding source to pay for property acquisition and to convert the property into a park, which could include parks that are a part of a mixed-use TOD project. The new park could boost property values of surrounding properties, increasing property tax revenue.

Applicability: Public space development used to incentivize adjacent real estate development.

Government Property Lease Excise Tax

The Government Property Lease Excise Tax (GPLET) is an excise tax based on the square footage of the building, rather than on value. It is to be collected by the city where the property is located. GPLET applies to properties when:

- The building (or parking structure) is owned of record by a city, town, or county.
- The building or other structure is leased in whole or part by a private party.

- The leased space is occupied and used for commercial or industrial purposes, including but not limited to, office, retail, restaurant, service business, hotel, entertainment, recreational or parking uses.

The structure of a GPLET involves deeding property to a local government. This results in the property being removed from the property tax rolls. The property is then leased back to the private owner with a lease that confers all incidents of ownership. The government merely holds title, but has no financial responsibility for the property. Such properties enjoy a cheaper property tax rate than privately-owned properties.

The favored use of GPLET is for major downtown or commercial redevelopment projects. Such projects, if located in a redevelopment area of the municipality, are exempt from the GPLET tax for a period of eight years from receiving a certificate of occupancy. This exemption essentially confers an eight year tax abatement on such development as an explicit, legislatively-conferred, redevelopment incentive.

Planning Assistance for Rural Areas (PARA)

The Planning Assistance for Rural Areas (PARA program is sponsored by the Arizona Department of Transportation Multimodal Planning Division (MPD) and provides federal funds to assist tribal governments and counties, cities and towns located outside Transportation Management Area (TMA) planning boundaries with multimodal transportation planning needs.

PARA funds are limited to planning applications and may not be used for the design or construction of transportation facilities. PARA funds may be applied to address a broad range of planning issues related to roadway and non-motorized transportation modes. Funds may also be applied to studies dedicated solely to the planning of public transportation services. PARA funds can be used for station area planning studies where the total project cost is $50,000 or less.

8.5.4 Infrastructure Financing Tools Used in Other States

Tax increment financing (TIF)

TIF captures the increase in property tax revenue (and, in some states, sales tax revenue) that occurs in a designated area after a set year. Tax Increment Financing dedicates tax increments within a certain defined district to finance the debt that is issued to pay for the project. TIF was designed to channel funding toward improvements in distressed, underdeveloped, or underutilized parts of a jurisdiction where development might otherwise not occur. TIF creates funding for public or private projects by borrowing against the future increase in these property-tax revenues. The tax increment is collected for an established period (usually between 15 and 30 years) and the tax increment can be used to secure bonds, allowing the issuer to collect the money up front, or it can be used on a pay-as-you-go basis over time. TIF is most commonly used for local infrastructure, environmental cleanup, and land assembly.

Applicability: Public amenities, streetscape and landscaping, parking, affordable housing development

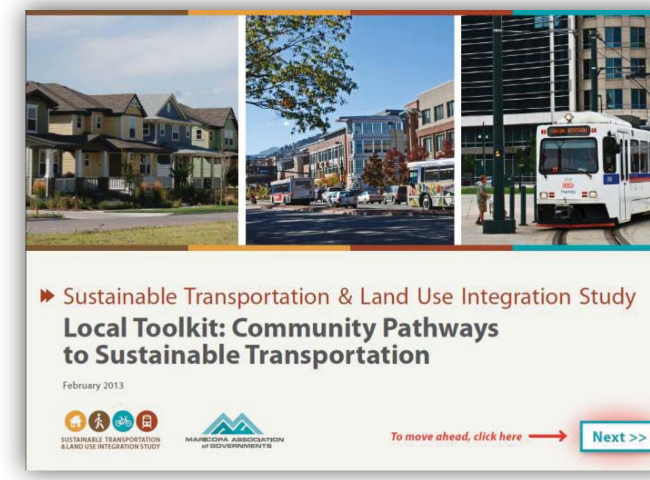
PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

Chapter 9. Other Resources

Transportation agencies in other states have developed similar guidance for station area planning in their local communities with standards specific to their regional/local context. Similarly other agencies within Arizona have prepared important reference documents that can be very helpful to communities in Arizona that are planning for rail stations and supporting transit/transportation infrastructure. This section provides information about some such resources that may serve as additional reference.

Sustainable Transportation & Land Use Integration Study (STLUIS), Maricopa Association of Governments, AZ

The MAG Sustainable Transportation and Land Use Integration Study is a recently completed project that answers questions such as: How can transit investments increase the MAG region's economic competitiveness? What is sustainable transportation and how does it fit into the region's future? Which development policies can encourage transit-supportive places? And what kinds of transportation investments can support sustainable neighborhoods and business districts "without" high-cost transit investment?



The study builds on previous MAG studies that identified the need to better coordinate regional transportation planning with land use decisions, growing interest in sustainability by MAG member agencies, and greater emphasis on sustainability in transportation funding criteria. The study focuses on high-capacity transit within the Phoenix metropolitan area.

A very relevant product of this study is the "Community Pathways to Sustainable Transportation" tool, which is an interactive tool designed to help users understand what actions need to be put in place to develop transit-supportive land uses by assessing their community's current status and future vision for land use, urban design and transportation using a variety of planning data, focusing on community sub-areas such as a station area, employment center, downtown, or neighborhood. This tool is complemented by the Prototypes Catalogue, which includes illustrations of model and actual development projects that support sustainable transportation.

Web URL: http://www.bqaz.org/pdf/sustainable/BQAZ-STLU_2013-03-29_Key-Findings-and-Recommendations.pdf

Pinal County Activity Center Guidelines and Draft Zoning Ordinance, Pinal County, AZ

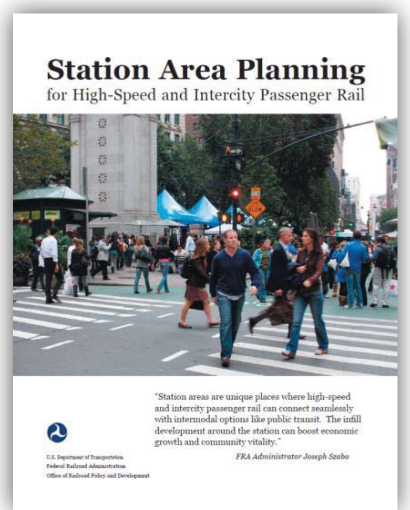
In 2009, the Pinal County Board of Supervisors adopted a revised Comprehensive Plan. This plan involved a tremendous amount of public input, resulting in a comprehensive vision for future development of the county. A core element of the land use plan was the organization of the county into various activity centers – mixed-use developments that incorporate residential, commercial/service, and employment uses, as well as cultural amenities. These clusters were organized at different scales and could have different foci, depending on their location (e.g., more industrial/logistics-oriented, commerce centers, tourism, etc.).

The "Pinal County Activity Center Development Guidelines" seek to provide development parameters for the different scales and types of proposed activity centers. These guidelines were codified in an updated Pinal County Zoning Ordinance, which has a specific chapter dedicated to three intensities of activity center zoning districts.

The Activity Center Development Guidelines and Zoning Ordinance provide a foundation for urban form guidance relative to station area site selection in Pinal County, although an additional level of refinement and new policy recommendations will be required for sufficient transit readiness. Once accepted in Pinal County, it would be the intent for local jurisdictions to equally adopt the revised zoning language to provide a consistent manner of activity center development region-wide.

Web URL: http://pinalcountyaz.gov/Departments/PlanningDevelopment/Documents/Activity%20Center%20Development%20Guideline%20Manual.FINAL.pdf

Station Area Planning for High-Speed and Intercity Passenger Rail, USDOT Federal Railroad Administration (FRA)



This station area planning document is a reference tool for state transportation departments and local and regional jurisdictions working in partnership with transportation agencies implementing high-speed and intercity passenger rail (HSIPR) projects. The document includes topics, concepts and ideas to assist local jurisdictions and others accomplish successful station area planning and achieve an optimal integration of the station in its context; to ensure ridership growth; and to capture livability, sustainability, and economic benefits. This document also provides three common principles and recommended strategies for the creation of places that invite people to stay and enjoy, and that enhance the economy and sustainability of the region.

Web URL: http://www.fra.dot.gov/eLib/details/L03759

Station Area Planning Manual, Center for Transit-Oriented Development

This manual is intended to serve as a companion to the Metropolitan Transportation Commission's TOD Policy for Priority Development Areas under the *Focusing Our Vision* program, to assist jurisdictions in the San Francisco Bay area with decision-making as they complete planning efforts around transit hubs and corridors. The Station Area Planning Manual provides a good description of various place types/station typology (particularly the range of place types, from regional center to transit town center), with suggested target densities for housing and commercial developments.

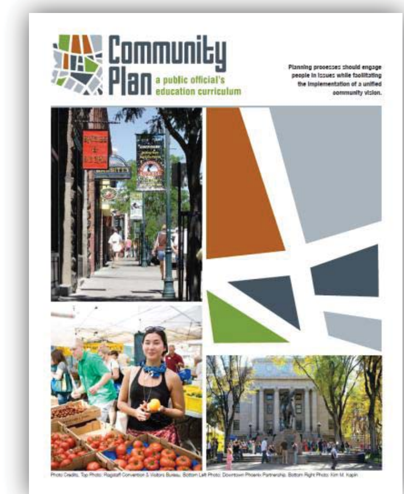
Web URL: http://www.bayareavision.org/pdaapplication/Station_Area_Planning_Manual_Nov07.pdf

Urban Design Guidelines, California High-Speed Train (CAHST) Project

These urban design guidelines are intended to assist local jurisdictions and to integrate the CAHST project into their communities. The guidelines are based upon international examples where cities and transit agencies have incorporated sound urban design principles as integral elements of large-scale transportation systems. The document provides urban design techniques that will promote successful high-speed rail. The urban design techniques include guidance to create context sensitive solutions (CSS) that are specific to and reflect the characteristics of each geographic zone, emphasize development of a pedestrian influence area within one-quarter to one-half mile of the station, and focus on preservation of specific areas as well as infill and redevelopment.

Web URL: http://www.cahighspeedrail.ca.gov/assets/0/152/269/a89ed24f-b312-4cf4-b7d1-059541bb57f1.pdf

Community Plan, Urban Land Institute, Arizona



Community Plan is a resource for communities and regions to learn the foundational aspects and finer nuances of issues affecting land use, planning, and development. Community Plan is intended to build leadership capacity for informed local decision-making to enhance sustainable communities. Community Plan is a partnership of eight statewide organizations who have come together to lead this educational curriculum for public officials. Partners include the Urban Land Institute-Arizona District Council, the Arizona Chapter of the American Planning Association, the Arizona Departments of Housing, Transportation, and Health Services, the Arizona Association for Economic Development, the League of Arizona Cities and Towns, and the County Supervisors Association of Arizona.

Community Plan is a 2- to 4-hour interactive workshop for public officials that provides effective tools for addressing important community and regional issues. The workshops are intended to develop a better understanding of land use planning and zoning, housing, multimodal transportation and mobility, real estate development, economic development, and, finance and infrastructure; outline the connectivity between community building blocks (high capacity transit, land use, pedestrian-friendly streetscape), their importance within the community or region, and the necessity for using a holistic approach to achieve long-term goals; create a toolbox of information, case studies, and online resources that can enhance community decision-making; and, develop an action plan to apply what was learned.

Web URL: http://arizona.uli.org/community/communityplan/

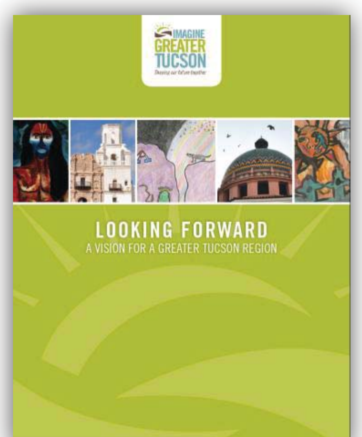
Reinvent PHX, City of Phoenix

Reinvent PHX is a collaborative partnership between the City of Phoenix, the U.S. Department of Housing and Urban Development (HUD), Arizona State University (ASU), St. Luke's Health Initiatives and local organizations committed to growing a sustainable city. The Reinvent Phoenix program aims to eliminate physical and institutional barriers to TOD and catalyze livable, sustainable development through planning, regulatory reform, innovative infrastructure designs, economic development incentives, capacity building, and affordable housing implementation activities; demonstrate regional benefits of transit oriented development through the design and implementation of pilot projects for economic development, housing and infrastructure; and involve residents in identifying strategic improvements that will enhance safe, convenient access to quality, affordable housing; well-paying jobs; education and training programs; fresh food and healthcare services.

Web URL: http://phoenix.gov/pdd/reinventphx.html

Imagine Greater Tucson, Tucson, Arizona

Imagine Greater Tucson is a collaborative, community-driven effort that fosters collaboration towards a regional vision and aligns the region's future with the shared regional values. In 2008, a group of community members, business and civic leaders, jurisdictional representatives, local organizations, and others came together to discuss the critical needs for the region's future. Imagine Greater Tucson (IGT) was launched to listen to the community and create this shared Vision based on the values and goals of the residents. Imagine Greater Tucson has three main phases. TALK. THINK. ACT. The IGT process began in October 2010 by listening to residents through group conversations and surveys to learn what they value as a region. Next, IGT asked people to think about and express how future growth can be accommodated in the region in accordance with the shared values.



Web URL: http://www.imaginegreatertucson.org/

Sustainable Communities Collaborative, Arizona

The Sustainable Communities Collaborative (SCC) is a non-profit partnership powered by a privately-financed fund. SCC is creating an economic catalyst for three Valley cities (Phoenix, Mesa and Tempe) connected to the Valley METRO light rail. The SCC has taken a lead in promoting Transit-Oriented Development (TOD) along the Light Rail Transit (LRT) alignment. The SCC has attracted a combined $20 million of private investment from two key partners: Local Initiatives Support Corporation (LISC) and Raza Development Fund (RDF). In June 2011, SCC joined the Mayors from Phoenix, Tempe, and Mesa and the President/CEOs of LISC and RDF to launch the $20 million Sustainable Communities Fund. The SCC's policy focus is on stimulating affordable housing, promoting public health, encouraging sustainable community development, providing financial tools for TOD, and realizing a complete multimodal transportation network within its program area.

Web Link: http://www.sustainablecommunitiescollaborative.com/

Biological Resources Appendix

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

June 17, 2014

Mr. Carlos Lopez
Arizona Department of Transportation
206 South 17th Avenue
MD 310B
Phoenix, AZ 85007

Re: Evaluation for the Arizona Department of Transportation's Passenger Rail Corridor Study Level I Analysis

Dear Mr. Lopez:

The Arizona Game and Fish Department (Department) appreciates this opportunity to submit the preliminary results of our Level 1 evaluation of the potential impacts to wildlife and wildlife habitat along the Passenger Rail Corridor Study area. In addition to identifying potential impacts to sensitive resources along the three corridor alternatives, this evaluation has also allowed us to identify data needs and mitigation opportunities along these alternative routes.

METHODOLOGY

The Department recognizes that use of Geographic Information Systems (GIS) and geospatial data can be powerful tools for wildlife conservation and planning. The Department's online HabiMap™ Arizona (www.habimap.org) is a web-based viewer designed to make more than 300 layers of data and conservation information from the State Wildlife Action Plan (SWAP) (AGFD 2012) available and accessible. The GIS-based models and query tools within HabiMap™ allow planners and developers to access these data for all of Arizona. The data is meant to inform at a coarse scale, so it may be necessary to incorporate and/or substitute additional information and data when analyzing at a site-specific scale.

The Department has been developing a repeatable and standardized approach that facilitates the incorporation of relevant fish and wildlife resources and wildlife habitat geospatial datasets in order to identify potential impacts of projects on wildlife resources and wildlife related recreation. The Department first utilized this approach during the Level 2 evaluation of the Interstate 11 (I-11) corridor analysis pilot project, using Arizona Department of Transportation's (ADOT) pre-established evaluation criteria. In applying the same general methodology for an additional project review such as the ADOT Passenger Rail Corridor Study (Level 1); our goal is provide a general assessment of the potential impacts of the various alternatives identified by ADOT. We will enhance these initial project impacts as additional data and information become available throughout the project planning timeline. To begin, we modified the criteria used for the I-11 analysis to include the following questions for this level 1 evaluation:

Landscape connectivity/fragmentation:
1.) What is the level of anticipated habitat fragmentation impact?
2.) What data exist in the area related to wildlife connectivity?

Wildlife and wildlife habitat sensitivity:
1.) How many HDMS species occur in the area?
2.) What ESA species occur in the area?
3.) What is the SGCN/SERI score in the area?
4.) What is the majority vegetation in the area?
5.) How much riparian/wetland habitat is in the area?

Conservation land management sensitivity:
1.) What protected lands occur in the area?

Waterways sensitivity:
1.) How much perennial and intermittent waterway occurs in the area?
2.) How much perennial waterway occurs in the area?

Recreation effects:
1.) How does this alternative affect outdoor recreation opportunities, including access?

To adequately answer these questions, this project review process uses a lattice of 1 square mile hexagons as shown in Figure 1.

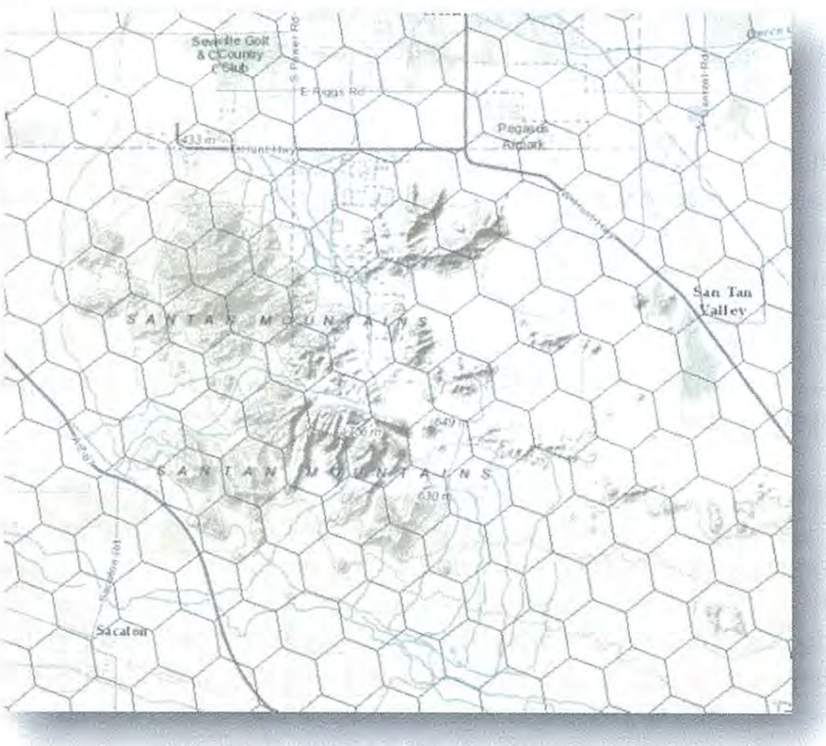
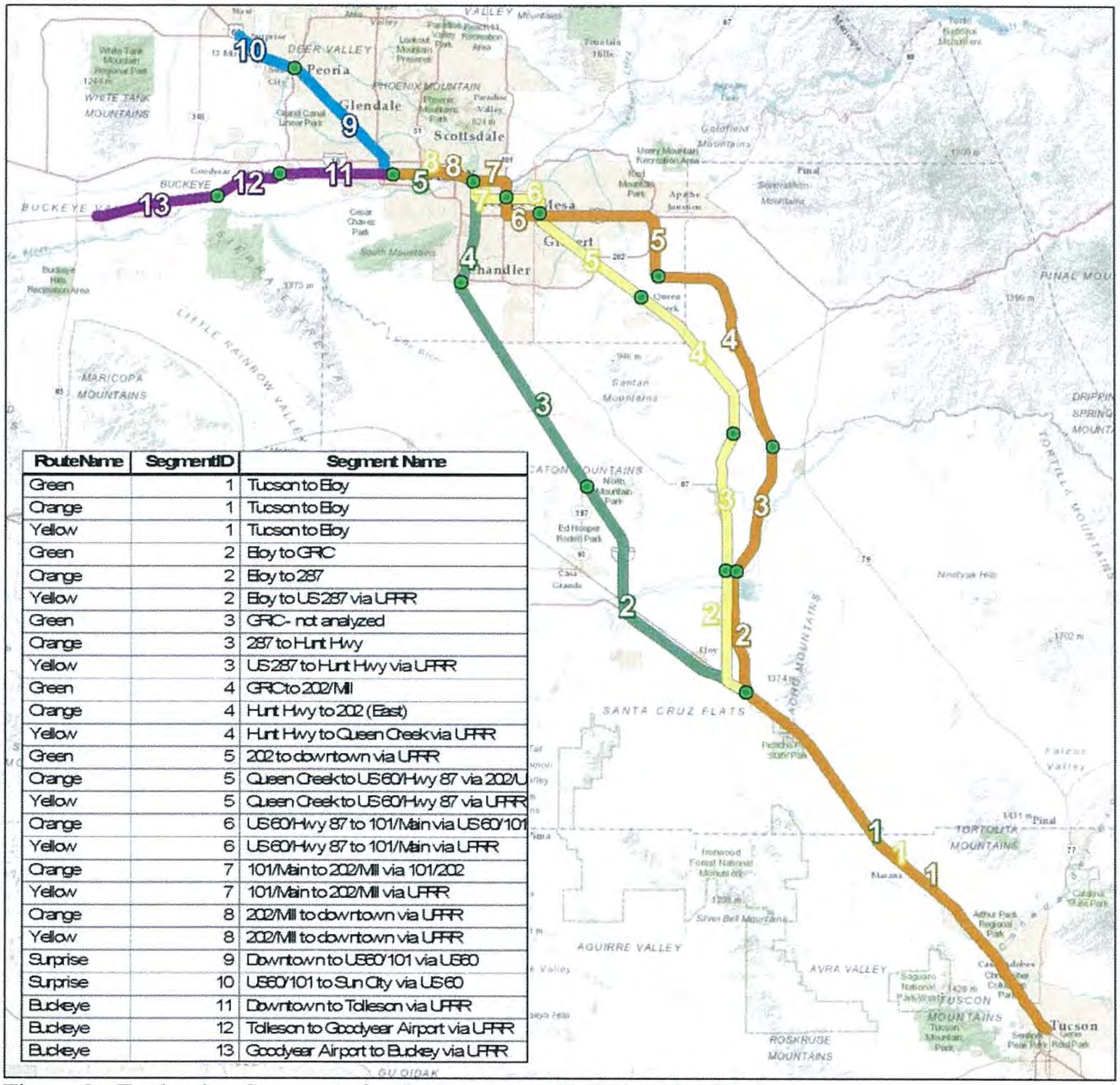


Figure 1: Map depicting hexagons in the San Tan Mountains/San Tan Valley area.

The method to populate the hexagons depends on the type and spatial resolution of the input data. For example, hexagons were usually assigned the maximum value among all the 30 meter pixel raster data values from the HabiMap layers. For other datasets, a length, area, or occurrence of overlapping features was attributed to the hexagons.

Once hexagons were attributed with the input data, results were summarized by segment. These segments were delineated by Department staff and are shown in Figure 2 below; the segments allowed the Department to group hexagons together for ease of analysis.



RouteName	SegmentID	Segment Name
Green	1	Tucson to Eloy
Orange	1	Tucson to Eloy
Yellow	1	Tucson to Eloy
Green	2	Eloy to GRIC
Orange	2	Eloy to 287
Yellow	2	Eloy to US287 via UPRR
Green	3	GRIC- not analyzed
Orange	3	287 to Hunt Hwy
Yellow	3	US287 to Hunt Hwy via UPRR
Green	4	GRIC to 202/Mill
Orange	4	Hunt Hwy to 202 (East)
Yellow	4	Hunt Hwy to Queen Creek via UPRR
Green	5	202 to downtown via UPRR
Orange	5	Queen Creek to US60/Hwy 87 via 202/U
Yellow	5	Queen Creek to US60/Hwy 87 via UPRR
Orange	6	US60/Hwy 87 to 101/Main via US60/101
Yellow	6	US60/Hwy 87 to 101/Main via UPRR
Orange	7	101/Main to 202/Mill via 101/202
Yellow	7	101/Main to 202/Mill via UPRR
Orange	8	202/Mill to downtown via UPRR
Yellow	8	202/Mill to downtown via UPRR
Surprise	9	Downtown to US60/101 via US60
Surprise	10	US60/101 to Sun City via US60
Buckeye	11	Downtown to Tolleson via UPRR
Buckeye	12	Tolleson to Goodyear Airport via UPRR
Buckeye	13	Goodyear Airport to Buckey via UPRR

Figure 2: Evaluation Segments for the Passenger Rail Corridor Study

The hexagons overlapping the different passenger rail alternatives were included in the analysis, meaning that the area they represent is considered to be directly affected by the rail corridor. Although this is a coarser scale than may be considered ideal, it is the best fit for this phase of project review. As the rail corridor alternatives are refined into actual alignments, the Department could continue refining the data to evaluate impacts at a finer scale.

The Department staff reviewing this project evaluated the data for each segment and categorized the potential impacts per segment as low, medium, or high. We relied on expert opinion of Department staff for the ranking, based on the quantitative values in relation to other segments, (i.e. if the number of ESA species ranged between 0 and 5 among the segments, segments with 0 or 1 ESA species were ranked low, segments with 2-3 ESA species were ranked medium, and segments with 3-5 ESA species were ranked high). While it is understood a passenger rail line would require a new facility/ground disturbance at any given location, the expected level of impact to sensitive resources would differ depending on its placement within the landscape (i.e. within dense urban development, adjacent to an existing rail line or roadway, within an agricultural area, or within native habitat currently un-bisected by a roadway or rail line). "New" rail lines would result in the highest amount of actual disturbance and fragmentation to habitat, while "expansion" segments, which fall adjacent to existing road or rail lines, would result in less habitat fragmentation). Evaluation criteria values were weighted according to the potential degree of impact given current land use.

Due to the scale and location of the analysis, and the earlier stage of ADOT planning the Passenger Rail Corridor Study is currently in, this analysis differs from the previous I-11 analysis in a number of ways:

- No designated critical habitat for federally listed (or proposed listed) species was present within the study area, so this data did not factor into the ranking of Wildlife and Wildlife Habitat Sensitivity.
- In addition to identified wildlife movement corridors, the I-11 analysis looked at un-fragmented habitat blocks, and identified where these blocks would be fragmented, and the size of the blocks that would be fragmented. Within the Passenger Rail Corridor Study area, the alternative routes were primarily situated between habitat blocks; while the routes sometimes isolated the separate blocks or skirted the edges (Figure 3), none of the routes were found to bisect existing large intact habitat blocks, therefore, the quantitative analysis of the these blocks was not performed. Instead, the qualitative nature of the isolation was addressed within the comments of Table 1 below.
- The Species of Economic and Recreation Importance (SERI) and Species of Greatest Conservation Need (SGCN) rankings were determined by taking the maximum value of the statewide model ranking that occurred within each segment. More information on these models can be found at www.habimap.org.
- As a Level 1 analysis, the Department addressed vegetation communities within each segment by providing the first and second most dominant vegetation communities within each segment. This approach provided efficiency in analysis while capturing the overall presence and type of dominant habitat within each segment. Consequently, smaller portions of riparian habitat are not captured in this majority approach. In order to capture the presence and documented quantity of riparian/wetland vegetation, a critical resource

for wildlife and habitat in Arizona, we included acreage of wetland/riparian habitat delineated in National Wetland Inventory data for each segment within the analysis.

- The I-11 corridor analysis utilized Federal Emergency Management Agency (FEMA) 100-year floodplain delineations as one of the data sets to analyze impacts to waterways. A large portion of this Passenger Rail Corridor Study area falls within Pinal County, for which no FEMA floodplain data are yet available. Due to the absence of such data for so much of the study area, the 100-year floodplain data were not used; instead, the analysis for impacts to waterways relied solely upon the National Hydrography Dataset (NHD), produced by the U.S. Geologic Survey (USGS).

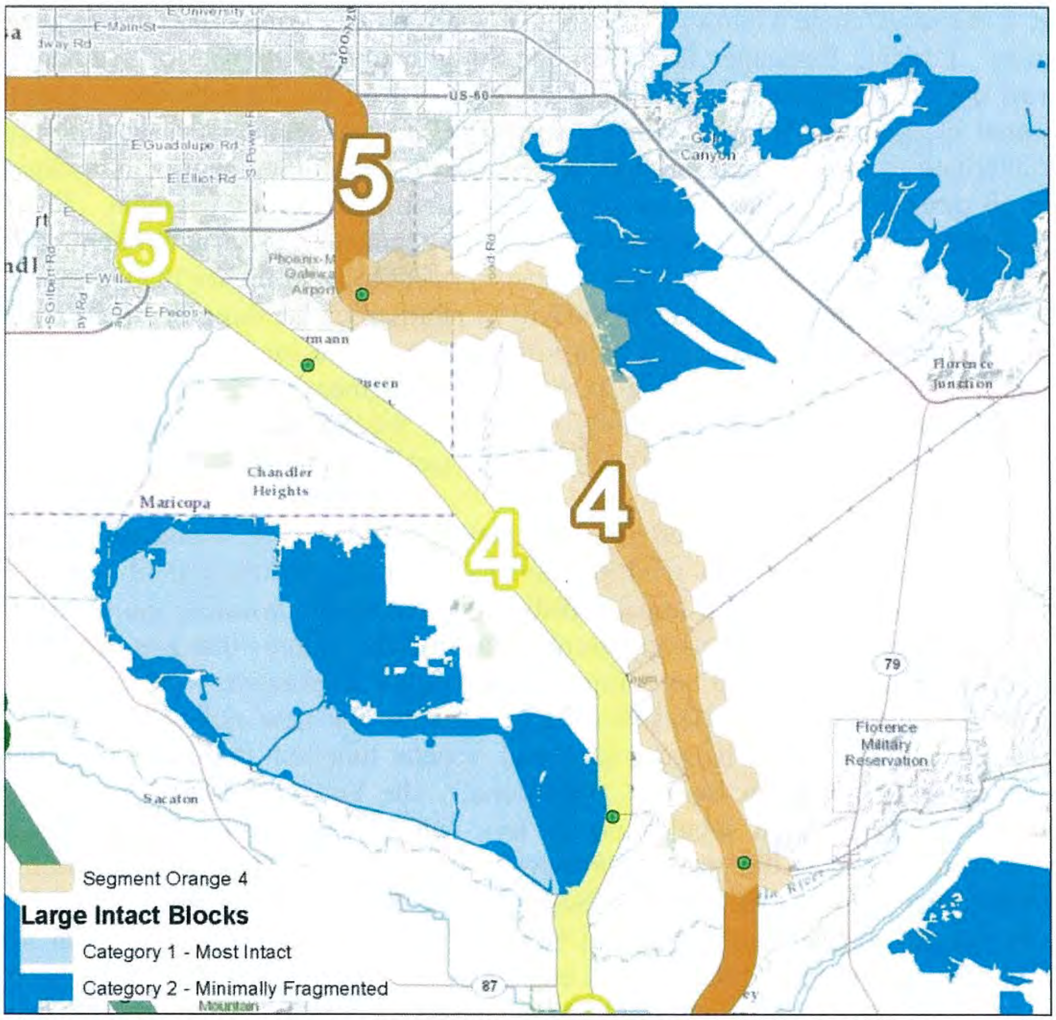


Figure 3: Orange and Yellow corridors in relation to large habitat blocks.

ANALYSIS RESULTS

The overall results, including a segment by segment summary with Department evaluation comments are listed in Table 1. Each segment was given an overall rating of high, medium or low; a high rating indicates potential significant impacts to resources; a medium rating indicates moderate to significant impacts to resources, with the potential to minimize or mitigate impacts; and a low rating indicates limited impacts to resources if appropriate mitigation measures are implemented. The evaluation criteria results are detailed in Table 2, with information on the metrics associated with each dataset(s) used for each evaluation criteria. Data sets, types, and sources used in analysis, and the analytical methods used, are described in Attachment A.

Segment 1 (Green/Orange/Yellow) was especially difficult to categorize and requires further explanation. For this Passenger Rail Corridor Study analysis, the size of segments, and the location of the breaks between segments, was developed by the Department; segments breaks were located in areas that allow flexibility for ADOT to use segments from different colored corridor alternatives to form future routes, if necessary. Due to Segment 1 following the same route for all three corridor alternatives, it was identified as one long segment. The length of Segment 1, which is much longer than any of the other segments, led to an unintentional skewing of data that resulted in evaluation criteria data to be quantitatively higher than within any of the other segments. In future analysis, this issue will be rectified by breaking Segment 1 into smaller segments. For this analysis, although many of the criteria are ranked in the "High" category based on quantitative values (see Table 2), the overall Segment is classified as "Moderate", to reflect the potential for impacts, especially impacts to wildlife movement, to be mitigated by development of crossing(s) across the 1-10/passenger rail corridor.

Overall, the Green Alternative, which uses the existing I-10 corridor, would result in the lowest level of impacts to wildlife and wildlife habitats. While construction of a passenger rail alongside the interstate would still impact wildlife and habitat for wildlife, the habitat is already significantly fragmented; providing opportunities to include features that may mitigate some of the existing fragmentation would be optimal. The Yellow Alternative would result in the next higher level of impacts to wildlife and wildlife habitats; the new rail line would follow the existing Union Pacific rail line between Eloy and Apache Junction; thereby, expanding existing barriers instead of creating new barriers. Additionally, the Yellow Alternative is situated closer to existing development and would impact less native habitat for wildlife. The Orange Alternative would result in the greatest impacts to fish and wildlife resources, wildlife habitat, and wildlife related recreation. Orange Segment 4 would create an entirely new barrier to wildlife movement, further limiting access between the San Tan and Superstition Mountains. Orange Segment 7, although following the existing Loop 202 freeway, would likely require an elevated track that could conflict with flight behavior of avian species, including species protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGA). Arizona Game and Fish Commission policy A2.16 directs the Department to seek compensation at the 100% level for habitat loss. Selection of a corridor with substantial acreage of wildlife habitat could result in considerable compensation costs.

DATA NEEDS

Tucson shovel-nosed snake and Sonoran Desert tortoise have been recorded adjacent to Orange and Yellow Segments 1 through 3, and Orange Segment 4. In order to fully evaluate project effects to the local populations of these species, as well as movement issues and needs, more information is needed about their current distribution and movement patterns across the proposed corridors. These data are critical to establishing meaningful and effective mitigation and minimization approaches and designs for Tucson shovel-nosed snake and Sonoran Desert tortoise along the chosen corridor.

A greater understanding is needed of the current movement of larger mammals, such as mule deer and desert bighorn sheep, across Segment 1, especially in the Picacho Peak area. This area has been identified, in a number of movement corridor studies, as an area critical to wildlife movement across Interstate 10 (I-10); however, more detailed information about movement patterns and species' use, is necessary to identify appropriate mitigation for the additional barrier effects that the Passenger Rail would cause in the region.

While there is some literature that includes a cursory depiction of railway effects on wildlife connectivity (Van Riper et al. 2001), there is a critical need for empirical data on the extent of rail effects relative to most taxa. The Department recommends collection of movement data for target species prior to, during, and for at least four years following construction, and considers this an essential component of any mitigation strategy regardless of which corridor is selected. An evaluation with accompanying pre- and post-construction data is also imperative for the application of any and all mitigation components.

MITIGATION OPPORTUNITIES

Railroad infrastructure compromises the natural movement of mammals and small reptiles due to the inability to cross the concrete and steel barriers of the infrastructure. The barrier effect on wildlife results from a combination of disturbance and avoidance effects, physical hindrances, and traffic mortality that all reduce the number of movements across the barrier. Railroads are a part of a larger transportation network contributing to overall statewide fragmentation, degradation, isolation, mortality and barrier effects of wildlife and habitats. Therefore, single infrastructure also needs to be evaluated at a more landscape scale, considering its contribution to the larger infrastructure network.

Opportunities to improve wildlife movement and habitat connectivity are present within Green Segments 1 and 2, Yellow Segments 1 through 5, Orange Segments 1 through 5, and Buckeye Segment 12. Corridors of the most critical concern to the Department include the Picacho Peak area of Segment 1, connectivity along the Gila River in Orange and Yellow Segment 3, and improving connectivity between the San Tan and Superstition Mountains along Orange and Yellow Segments 4 and 5.

Within Orange Segments 3 through 5, there are opportunities to improve connectivity over the CAP canal, which presents an existing barrier to wildlife movement. Mitigation for Yellow Segments 3 and 4 could also include improved CAP canal connectivity.

Orange and Yellow Segments 2 and 3 present opportunities to improve and maintain connectivity between the Picacho Mountains and San Tan Mountains. The Gila River is a prime corridor in this area, but other connectivity opportunities, such as along washes, ridges, and other landscape features, may be present.

Within Segment 1, I-10 acts as a significant barrier to wildlife movement and habitat connectivity between the Picacho Mountains and Ironwood Forest National Monument. The addition of a passenger rail line adjacent to 1-10 would further intensify the barrier effect. Underpasses or crossing structures along this segment could greatly improve landscape connectivity, allowing for movement of wildlife populations east and west of I-10.

In addition to the typical effects to wildlife movement discussed above, pollution by toxins, nutrients, and noise from the rail lines can create edge effects on adjacent hydrology and microclimate, reducing the suitability of the remaining habitats. These indirect effects spread into the surrounding landscape and may contribute far more to the overall loss and degradation of natural habitat than the road body itself. The indirect effects are influenced by road and traffic characteristics, landscape topography and hydrology, wind, and vegetation. In addition, the consequent impacts on wildlife and ecosystems also depend on the sensitivity of the species in the vicinity.

Opportunities to minimize new edge effects include: construct the rail alongside existing infrastructure, such as the segments in the "Expanded" categories, instead of creating new infrastructure corridors; develop and implement adequate weed abatement and habitat restoration programs that monitor adjacent habitats and adaptively address effects such as toxins, invasive species, and habitat conversion.

The Department hopes this preliminary Level 1 evaluation of the Passenger Rail Corridor Study will aid ADOT in upcoming alternative selection and evaluation, and provide information on future data needs and mitigation opportunities as the study progresses. We continue to look forward to partnering with ADOT on this important transportation project. If you have further questions or wish to further discuss our evaluation, please contact Cheri Bouchér, the Department's Project Evaluation Program transportation coordinator, at cboucher@azgfd.gov (623-236-7615).

Sincerely,

Joyce Francis

Joyce Francis
Habitat Branch Chief

cc: Jim DeVos, Assistant Director WMD
Jim Hinkle, Assistant Director Field Ops
Raul Vega, Regional Supervisor Region V
Rod Lucas, Regional Supervisor Region VI

John Windes, Habitat Program Manager, Region V
Kelly Wolff-Krauter, Habitat Program Manager, Region VI
Thor Anderson, ADOT
Anthony Scolaro, Jacobs

REFERENCES CITED

Van Riper III C, Hart JV, Bright JL (2002) Effect of fenced transportation corridors on pronghorn antelope movement in Petrified Forest National Park, Arizona. Pp. 71-77, In: *Crossing boundaries in park management, Proceedings of the 11th Conference on Research and Resource Management in Parks and Public Lands* (ed Harmon D), pp 71-77. The George Wright Society, Hancock, MI.

Table 1: Summary of Level 1 Hexagon Analysis for the Passenger Rail Corridor Study

Segment	Proposed Change in Infrastructure (New/Expanded)	Sensitivity Score (Low/Moderate/High)					OVERALL ASSESSMENT			Comments
		Landscape Connectivity	Wildlife and Wildlife Habitat	Conservation Land Management	Impacted Waterways	Effects to Recreation	Significant Impacts to Sensitive Areas	Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts	Limited Impacts to Wildlife and Opportunities to Offset and Enhance	
		1	2	3	4	5				
Green01/ Orange01/ Yellow01	Expansion	High	High	Moderate	High	Moderate				1: Rail would be adjacent to existing roadway. Three wildlife movement corridors span the road in the Picacho Peak, Red Rocks, and Marana areas, which present opportunities to mitigate by improving crossings/permeability within these linkages; 2: This area is high for species diversity, with large expanses of open native habitat, including a large amount of riparian/wetland vegetation. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise. Examine opportunities to re-connect mule deer and bighorn sheep populations; 3: Goes through the Picacho Peak State Park; 4: High amount of linear waterways, but no perennial waters; 5: Could limit access to Picacho Peak and Red Rock areas.
Green02	Expansion	Low	Moderate	Low	Low	Low				1: Rail would be adjacent to existing roadway. No wildlife movement corridors have been identified within this segment; 2: This area is moderate to high for species diversity, dominated by agricultural land and open native habitat, including a large amount of riparian/wetland vegetation; 3: No known land use conservation conflicts; 4: Very few linear waterways, and no perennial waters; 5: Likely limited effects to recreation.
Green03	**Did not evaluate due to Gila River Indian Community lands**									
Green04	Expansion	Low	Moderate	Moderate	Low	Low				1: Rail would be adjacent to existing roadway in largely urbanized area. No wildlife movement corridors have been identified within this segment, but the Salt River offers movement opportunities; 2: This area is moderate for species diversity due to the Salt River, dominated by developed land; 3: North end of Segment overlaps Papago Park; 4: Very few linear waterways, and no known perennial waters; 5: Access to Papago Park not likely affected due to current offset access.
Green05/ Orange08/ Yellow08	Expansion	Moderate	Moderate	Moderate	Low	Moderate				1: Rail would be adjacent to existing roadway in largely urbanized area. The Salt River acts as a wildlife movement corridor within this segment; 2: This area is moderate for species diversity due to the Salt River, dominated by developed land; 3: East end of Segment overlaps Papago Park; 4: Moderate linear waterways, and no perennial waters; 5: Access to Papago Park not likely affected due to current offset access.

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 1: Summary of Level 1 Hexagon Analysis for the Passenger Rail Corridor Study

Segment	Proposed Change in Infrastructure (New/Expanded)	Sensitivity Score (Low/Moderate/High) Landscape Connectivity	Wildlife and Wildlife Habitat	Conservation Land Management	Impacted Waterways	Effects to Recreation	OVERALL ASSESSMENT Significant Impacts to Sensitive Areas	Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts	Limited Impacts to Wildlife and Opportunities to Offset and Enhance	Comments
		1	2	3	4	5				
Orange02	New	Low	High	Low	Moderate	Low				1: Rail would be along a new alignment, resulting a higher level of habitat impact and fragmentation; 2: This area is high for species diversity, dominated by agricultural land and open native habitat, including a large amount of riparian/wetland vegetation. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment is adjacent to the Picacho Reservoir, which provides habitat for waterfowl; 4: Moderate amount of linear waterways, but no known perennial waters; 5: Likely limited effects to recreation.
Orange03	New	Moderate	High	Moderate	High	Moderate				1: Rail would be along a new alignment, resulting in a higher level of habitat impact and fragmentation. Route would bisect large blocks of undeveloped habitat, effectively isolating the San Tan Mountains. Gila River acts as a Wildlife Corridor in this segment; 2: This area is high for species diversity, dominated by agricultural land, including a large amount of riparian/wetland vegetation, and crosses Gila River. Potential habitat restoration opportunities within Gila River. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment fall within Superstition Vistas Planning Area; 4: Moderate amount of linear waterways, and <1 acre of perennial waters; 5: Potential recreation impacts to Superstition Vistas Planning Area
Orange04	New	High	High	Moderate	High	Moderate				1: Rail would be along a new alignment, resulting in a higher level of habitat impact and fragmentation. Route would bisect large blocks of undeveloped habitat, effectively isolating the San Tan Mountains. Queen Creek and the CAP canal act as Wildlife Corridors in this segment. Mitigation opportunities to create/enhance crossings over the CAP canal, that connect wildlife with the Valley North and East of the San Tan Mountains habitat block ; 2: This area is moderate to high for species diversity, dominated by Sonoran Desert scrub vegetation, including a large amount of riparian/wetland vegetation. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment falls within Superstition Vistas Planning Area; 4: High amount of linear waterways, but no known perennial waters; 5: Potential recreational impacts to Superstition Vistas Planning Area

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 1: Summary of Level 1 Hexagon Analysis for the Passenger Rail Corridor Study

Segment	Proposed Change in Infrastructure (New/Expanded)	Sensitivity Score (Low/Moderate/High): Landscape Connectivity	Wildlife and Wildlife Habitat	Conservation Land Management	Impacted Waterways	Effects to Recreation	OVERALL ASSESSMENT: Significant Impacts to Sensitive Areas	Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts	Limited Impacts to Wildlife and Opportunities to Offset and Enhance	Comments
		1	2	3	4	5				
Orange05	Expansion	Low	Moderate	Low	High	Moderate				1: Much of this segment would be situated in largely urbanized area. The East Maricopa Floodway offers limited wildlife movement opportunities; 2: This area is moderate for species diversity due to some Sonoran Desert scrub at the eastern portion of the segment, and includes a large amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: High amount of linear waterways, but no known perennial waters; 5: Potential recreational impacts to Superstition Vistas Planning Area
Orange06	Expansion	Low	Low	Low	Low	Low				1: Entire segment would be situated in largely urbanized area. No wildlife movement corridors have been identified within this segment, with limited wildlife movement opportunities; 2: This area is low for species diversity due to developed landscape, but crosses over a large amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: Very few linear waterways miles, and no known perennial waters; 5: Not expected to impact recreation opportunities
Orange07	Expansion	High	Moderate	Moderate	Low	Low				1: Rail would be adjacent to existing roadway in largely urbanized area. Potentially significant MBTA and Eagle conflicts. This segment overlaps the confluence of Indian Bend Wash (a Wildlife Corridor) with the Salt River (a Wildlife Corridor), and follows the Salt River (a Wildlife Corridor) instead of just crossing over it. The Phoenix Mountains- Salt River habitat blocks also intersect the Salt River within this segment. Very high amount of Riparian/Wetland habitat in this segment; 2: This area is moderate for species diversity due to the Salt River, dominated by developed land; 3: West end of Segment overlaps Papago Park; 4: Very few linear waterways, and no known perennial waters; 5: Access to Papago Park not likely affected due to current offset access.
Yellow02	Expansion	Low	High	Low	Moderate	Low				1: Rail would be adjacent to the existing Union Pacific rail, somewhat limiting habitat impact and fragmentation; 2: This area is high for species diversity, dominated by agricultural land and open native habitat, including a moderate amount of riparian/wetland vegetation. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment is near to the Picacho Reservoir, which provides habitat for waterfowl; 4: Very few linear waterways, and no known perennial waters; 5: Likely limited effects to recreation.

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 1: Summary of Level 1 Hexagon Analysis for the Passenger Rail Corridor Study

		Sensitivity Score (Low/Moderate/High)					OVERALL ASSESSMENT			
Segment	**Proposed Change in Infrastructure (New/Expanded)**	**Landscape Connectivity**	**Wildlife and Wildlife Habitat**	**Conservation Land Management**	**Impacted Waterways**	**Effects to Recreation**	**Significant Impacts to Sensitive Areas**	**Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts**	**Limited Impacts to Wildlife and Opportunities to Offset and Enhance**	**Comments**
		1	2	3	4	5				
Yellow03	Expansion	Moderate	High	High	Moderate	Low				1: Rail would be adjacent to the existing Union Pacific rail, somewhat limiting habitat impact and fragmentation. Route bisects large blocks of undeveloped habitat, effectively isolating the San Tan Mountains. Gila River acts as a Wildlife Corridor; 2: This area is high for species diversity, dominated by agricultural land and open native habitat, including a moderate amount of riparian/wetland vegetation, and crosses Gila River. Potential habitat restoration opportunities within Gila River. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment overlaps east side of the Casa Grande Ruins National Monument, and Superstition Vistas Planning Area; 4: Moderate amount of linear waterways, and no known perennial waters; 5: Access to the Casa Grande Ruins not likely affected, but potential recreational impacts to Superstition Vistas Planning Area.
Yellow04	Expansion	Moderate	Moderate	Moderate	High	Moderate				1: Rail would be adjacent to the existing Union Pacific rail, somewhat limiting habitat impact and fragmentation. Route bisects large blocks of undeveloped habitat, effectively isolating the San Tan Mountains. Queen Creek acts as a Wildlife Corridor; 2: This area is moderate for species diversity, dominated by agricultural land and open native habitat, including a high amount of riparian/wetland vegetation. Data needs include population and movement data for Tucson shovel-nosed snake and Sonoran Desert tortoise; 3: Segment falls within Superstition Vistas Planning Area; 4: Moderate amount of linear waterways, and 3.2 acres of perennial waters; 5: Potential recreational impacts to Superstition Vistas Planning Area.
Yellow05	Expansion	Low	Moderate	Low	Low	Low				1: Much of this segment would be situated in largely urbanized area. The East Maricopa Floodway offers limited wildlife movement opportunities; 2: This area is moderate for species diversity due to some Sonoran Desert scrub at the eastern portion of the segment, and includes a large amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: High amount of linear waterways, but no known perennial waters; 5: Potential recreational impacts to Superstition Vistas Planning Area
Yellow06	Expansion	Low	Low	Low	Low	Low				1: Much of this segment would be situated in largely urbanized area. No wildlife movement corridors have been identified within this segment, with limited wildlife movement opportunities present; 2: This area is low for species diversity, and includes a small amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: Very few linear waterways miles, and no known perennial waters; 5: Not expected to impact recreation opportunities.

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

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		Landscape Connectivity	Wildlife and Wildlife Habitat	Conservation Land Management	Impacted Waterways	Effects to Recreation	Significant Impacts to Sensitive Areas	Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts	Limited Impacts to Wildlife and Opportunities to Offset and Enhance	
		1	2	3	4	5				
Yellow07	Expansion	Moderate	Moderate	Moderate	Low	Low				1: Rail would be adjacent to existing roadway in largely urbanized area. This segment crosses over the Salt River (Wildlife Corridor) instead of following it. The Phoenix Mountains- Salt River habitat blocks also intersect the Salt River within this segment. ; 2: This area is moderate for species diversity due to the Salt River, but is dominated by developed land. A high amount of Riparian/Wetland habitat in this segment. Potentially significant MBTA and Eagle conflicts. ; 3: North end of Segment overlaps Papago Park; 4: Very few linear waterways, and no known perennial waters; 5: Access to Papago Park not likely affected due to current offset access.
Buckeye11	Expansion	Low	Low	Low	Low	Low				1: Rail would be adjacent to existing roadway in patchwork of developed and agricultural lands; 2: This area is low for species diversity, and is dominated by developed land. Burrowing owls and migratory birds are likely to be present within the agricultural fields. A low amount of Riparian/Wetland habitat in this segment; 3: Segment does not fall within any known areas of conservation; 4: Very few linear waterways, and no known perennial waters; 5: Access to the Gila River not likely affected due to distance from River.
Buckeye12	Expansion	Moderate	High	Low	Moderate	Moderate				1: Rail would be adjacent to existing roadway in patchwork of developed and agricultural lands. The Lower Agua Fria River acts as a Wildlife Corridor; 2: This area is high for species diversity due its adjacency to the Gila River, but is dominated by agricultural and developed land. Burrowing owls and migratory birds are likely to be present within the agricultural fields. A high amount of Riparian/Wetland habitat in this segment, as it crosses over the Agua Fria River; 3: Segment does not fall within any designated areas of conservation; 4: A moderate number of linear waterways within the segment, and no known perennial waters; 5: Could restrict access to the Gila River and Estrella Mountain Park.
Buckeye13	Expansion	Low	High	Low	Low	Moderate				1: Rail would be adjacent to existing roadway in patchwork of developed and agricultural lands; 2: This area is high for species diversity due its adjacency to the Gila River, but is dominated by agricultural and developed land. Burrowing owls and migratory birds are likely to be present within the agricultural fields. A high amount of Riparian/Wetland habitat present in this segment; 3: Segment does not fall within any known areas of conservation; 4: A low number of linear waterways within the segment, and no known perennial waters; 5: Could restrict access to the Gila River and Estrella Mountain Park.

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 1: Summary of Level 1 Hexagon Analysis for the Passenger Rail Corridor Study

Segment	Proposed Change in Infrastructure (New/Expanded)	Sensitivity Score (Low/Moderate/High) Landscape Connectivity	Wildlife and Wildlife Habitat	Conservation Land Management	Impacted Waterways	Effects to Recreation	OVERALL ASSESSMENT Significant Impacts to Sensitive Areas	Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts	Limited Impacts to Wildlife and Opportunities to Offset and Enhance	Comments
		1	2	3	4	5				
Surprise09	Expansion	Low	Moderate	Low	Low	Moderate				1: This segment would be situated in largely urbanized area. No wildlife movement corridors are identified within this segment, with limited wildlife movement opportunities; 2: This area is moderate for species diversity due to its proximity to the New River, and includes a small amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: Very few linear waterways, and no known perennial waters; 5: Potential limited impacts to adjacent urban parks.
Surprise10	Expansion	Moderate	Moderate	Low	Moderate	Low				1: This segment would be situated in largely urbanized area. The New River and Agua Fria Rivers act as Wildlife Corridors in this segment; 2: This area is moderate for species diversity due to its proximity to the New River and Agua Fria Rivers, and includes a high amount of wetland/riparian vegetation; 3: Segment does not fall within any known areas of conservation; 4: A moderate amount of linear waterways, and no known perennial waters; 5: Unlikely limited impacts to adjacent urban parks.

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 2: Evaluation Criteria Results

		LANDSCAPE CONNECTIVITY		*WILDLIFE AND WILDLIFE HABITAT SENSITIVITY*						*CONSERVATION LAND MANAGEMENT SENSITIVTY*	*IMPACTED WATERWAYS*		*EFFECTS TO RECREATION*
Segment	**Proposed Change in Infra-structure**	**Level of data supported wildlife connectivity concerns**	**Level of anticipated landscape integrity impacts**	**SERI Ranking (1-10)**	**SGCN Ranking (1-10)**	**HDMS Species Diversity within 3-Miles of the Segment**	**ESA Species Recorded within a 3-mile Buffer of the Segment**	**Majority/ Secondary Veg Type**	**Riparian/ Wetland (acres)**	**Areas acquired or managed with conservation or wildlife considerations overlapping segment**	**Linear Waterways (km)**	**Perennial Streams (km)**	**How does this alternative affect outdoor recreational opportunities, including access?**
Green01/ Orange01/ Yellow01	Expansion	Ironwood-Picacho Linkage, Coyote-Ironwood-Tucson Linkage, and Tucson-Tortolita-Santa Catalina Mountain Linkage	Increases the barrier to wildlife movements between important habitat features.	10	10	21	Lesser Long-nosed Bat (LE), Northern Mexican Gartersnake (PT), Sonoran Desert Tortoise (C), Tucson Shovel-nosed Snake (C), Yellow-billed cuckoo (PT)	Sonoran Desert scrub/ Developed	477.2	Picacho Peak State Park	241.4	0.0	Limit access to Picacho Peak and Red Rock Areas
Green02	Expansion	-		9	10	4	Tucson Shovel-nosed Snake (C), Sonoran Desert Tortoise (C)	Agriculture/ Sonoran Desert scrub	61.1		4.7	0.0	
Green03		**Did not evaluate due to Gila River Indian Community lands**											
Green04	Expansion	-		7	10	6	-	Developed	147.1	Papago Park	6.5	0.0	
Green05/ Orange08/ Yellow 08	Expansion	Salt River		7	10	5	-	Developed	172.1	Papago Park	11.8	0.0	
Orange02	New	-		9	10	7	Tucson Shovel-nosed Snake (C), Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture/ Sonoran Desert scrub	52.8	Adjacent to Picacho Reservoir	14.5	0.0	
Orange03	New	Gila River	Increases isolation of un-fragmented habitat	9	10	10	Sonoran Desert Tortoise (C), Tucson Shovel-nosed Snake (C), Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture	68.9		38.0	0.8	Superstition Vistas
Orange04	New	Queen Creek, Valley North and East of the San Tan Mountains	Increases isolation of un-fragmented habitat	7	10	5	Tucson Shovel-nosed Snake (C), Sonoran Desert Tortoise (C)	Sonoran Desert scrub/ Agriculture	154.4	Superstition Vistas	99.5	0.0	Superstition Vistas

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Table 2: Evaluation Criteria Results

		LANDSCAPE CONNECTIVITY		*WILDLIFE AND WILDLIFE HABITAT SENSITIVITY*						*CONSERVATION LAND MANAGEMENT SENSITIVTY*	*IMPACTED WATERWAYS*		*EFFECTS TO RECREATION*
Segment	**Proposed Change in Infra-structure**	**Level of data supported wildlife connectivity concerns**	**Level of anticipated landscape integrity impacts**	**SERI Ranking (1-10)**	**SGCN Ranking (1-10)**	**HDMS Species Diversity within 3-Miles of the Segment**	**ESA Species Recorded within a 3-mile Buffer of the Segment**	**Majority/ Secondary Veg Type**	**Riparian/ Wetland (acres)**	**Areas acquired or managed with conservation or wildlife considerations overlapping segment**	**Linear Waterways (km)**	**Perennial Streams (km)**	**How does this alternative affect outdoor recreational opportunities, including access?**
Orange05	Expansion	East Maricopa Floodway		7	10	2	-	Developed/ Sonoran Desert scrub	102.2	Superstition Vistas	65.0		Superstition Vistas
Orange06	Expansion	-		7	5	6	-	Developed	60.7		3.7	0.0	
Orange07	Expansion	Indian Bend Wash, Salt River, Phoenix Mountains - Salt River		7	10	5	-	Developed	338.5	Papago Park	9.0	0.0	
Yellow02	Expansion	-		9	10	7	Tucson Shovel-nosed Snake (C), Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture/ Sonoran Desert scrub	45.8		6.6	0.0	
Yellow03	Expansion	Gila River	Increases isolation of un-fragmented habitat	9	10	5	Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture/ Sonoran Desert scrub	34.2	Casa Grande Ruins, and Superstition Vistas	36.9	0.0	Superstition Vistas
Yellow04	Expansion	Queen Creek	Increases isolation of un-fragmented habitat	7	10	3	Tucson Shovel-nosed Snake (C)	Agriculture/ Sonoran Desert scrub	76.1	Superstition Vistas	28.5	3.2	Superstition Vistas
Yellow05	Expansion	East Maricopa Floodway		7	10	3	-	Developed/ Agriculture	93.2		8.1	0.0	
Yellow06	Expansion	-		7	4	6	-	Developed	9.1		0.4	0.0	
Yellow07	Expansion	Salt River, Phoenix Mountains - Salt River		7	10	5	-	Developed	80.4	Papago Park	6.5	0.0	
Buckeye11	Expansion	-		7	8	4	-	Developed/ Agriculture	18.3		1.4	0.0	

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Table 2: Evaluation Criteria Results

Segment	Proposed Change in Infra-structure	LANDSCAPE CONNECTIVITY: Level of data supported wildlife connectivity concerns	LANDSCAPE CONNECTIVITY: Level of anticipated landscape integrity impacts	WILDLIFE AND WILDLIFE HABITAT SENSITIVITY: SERI Ranking (1-10)	SGCN Ranking (1-10)	HDMS Species Diversity within 3-Miles of the Segment	ESA Species Recorded within a 3-mile Buffer of the Segment	Majority/ Secondary Veg Type	Riparian/ Wetland (acres)	CONSERVATION LAND MANAGEMENT SENSITIVTY: Areas acquired or managed with conservation or wildlife considerations overlapping segment	IMPACTED WATERWAYS: Linear Waterways (km)	IMPACTED WATERWAYS: Perennial Streams (km)	EFFECTS TO RECREATION: How does this alternative affect outdoor recreational opportunities, including access?
Buckeye12	Expansion	Lower Agua Fria River		7	10	10	Southwestern willow flycatcher (LE), Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture/ Developed	115.2		10.7	0.0	
Buckeye13	Expansion	-		7	8	9	Southwestern willow flycatcher (LE), Yellow-billed cuckoo (PT), Yuma clapper rail (LE)	Agriculture/ Developed	74.6		0.2	0.0	
Surprise09	Expansion	-		7	8	5	Chiricahua Leopard Frog (LT)	Developed	9.9		0.0	0.0	
Surprise10	Expansion	New River - Ganial Peak Wash, Lower Agua Fria River		7	9	2	-	Developed	105.8		13.9	0.0	

= **Significant Potential Impacts to Sensitive Areas**

= **Impacts to Wildlife are Likely, but Potential Strategies to Offset Impacts**

= **Limited Impacts to Wildlife and Opportunities to Offset and Enhance**

Note: This is a preliminary Level 1 evaluation based on broad alternatives. As ADOT's planning progresses, and/or as additional relevant data along the corridor alternatives is made available, the Department will adjust its evaluation to incorporate new information and/or more specific route locations.

Attachment A. Data Sources

Data Sets, Types, and Sources Used in Analysis

Data Set*	Data Type	Source**	Analytical Method
Corridors	Polygons	AGFD County Linkages/NAU-AGFD Missing Linkages	Identify overlap within segment
Unfragmented	30 m pixel; Polygons	AGFD model as depicted in HabiMap (for scored value); AGFD Large Intact Blocks for qualitative review	ArcGIS Identity to determine maximum HabiMap value within segment; visual review of proximity to large intact blocks
Species of Greatest Conservation Need (SGCN)	30 m pixel	AGFD model as depicted in HabiMap and described in the Arizona SWAP	Maximum score of the SGCN model; metadata available for model within HabiMap
Species of Economic and Recreational Importance (SERI)	30 m pixel	AGFD model as depicted in HabiMap and described in the Arizona SWAP	Maximum score of the SERI model; metadata available for model within HabiMap
Special Status Species	Polygons	Heritage Data Management System (HDMS)	Count of species within 3 mile buffer of each segment
Habitat Type	30 m pixel	AGFD modified version of Southwest ReGap	Primary and secondary habitat type within each segment
Conservation Areas	Polygons	Protected Areas Database (PAD-US)	Identification of any protected areas contained within each segment
Linear Waterways	Polylines	National Hydrography Database	Miles of rivers and streams intersecting the hexagon buffer for each segment
Perennial Streams	Polylines	National Hydrography Database	Miles of Perennial Streams intersecting the hexagon buffer for each segment

Additional Information

Arizona State Wildlife Action Plan (SWAP)	http://www.azgfd.gov/w_c/swap.shtml
HabiMap Arizona	http://habimap.org/
Wildlife Linkages/Connectivity	http://www.azgfd.gov/w_c/conn_whatGFDoing.shtml
HDMS/Environmental Online Tool	http://www.azgfd.gov/hgis/
Southwest ReGap	http://swregap.nmsu.edu/default.htm
US Fish and Wildlife Service Critical Habitat	http://crithab.fws.gov/crithab/
Protected Areas Database (PAD-US)	http://gapanalysis.usgs.gov/padus/

* SGCN = Species of Greatest Conservation Need From Statewide Action Plan
SERI = Species of Economic and Recreational Importance
Cons. Areas = Areas with Conservation Investment/Dedicated to Conservation
** HDMS = Heritage Data Management System
USFWS = US Fish and Wildlife Service
NCED = National Conservation Easement Database
ADEQ = Arizona Department of Environmental Quality
PAD-US Protected Areas Database-US

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
1	Tucson to Eloy	Green/ Orange/ Yellow	Abutilon parishii	Pima Indian Mallow	SC	S	S	SR
1	Tucson to Eloy	Green/ Orange/ Yellow	Aquila chrysaetos	Golden Eagle			S	
1	Tucson to Eloy	Green/ Orange/ Yellow	Aspidoscelis stictogramma	Giant Spotted Whiptail	SC	S		
1	Tucson to Eloy	Green/ Orange/ Yellow	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
1	Tucson to Eloy	Green/ Orange/ Yellow	Bat Colony					
1	Tucson to Eloy	Green/ Orange/ Yellow	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
1	Tucson to Eloy	Green/ Orange/ Yellow	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Dendrocygna bicolor	Fulvous Whistling-Duck	SC			
1	Tucson to Eloy	Green/ Orange/ Yellow	Ferocactus cylindraceus	Desert Barrel Cactus				SR
1	Tucson to Eloy	Green/ Orange/ Yellow	Gastrophryne olivacea	Western Narrow-mouthed Toad			S	WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S	S	WSC

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
1	Tucson to Eloy	Green/ Orange/ Yellow	Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE			WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Mammillaria thornberi	Thornber Fishhook Cactus				SR
1	Tucson to Eloy	Green/ Orange/ Yellow	Myotis velifer	Cave Myotis	SC		S	
1	Tucson to Eloy	Green/ Orange/ Yellow	Opuntia versicolor	Stag-horn Cholla				SR
1	Tucson to Eloy	Green/ Orange/ Yellow	Thamnophis eques megalops	Northern Mexican Gartersnake	PT	S		WSC
1	Tucson to Eloy	Green/ Orange/ Yellow	Tumamoca macdougalii	Tumamoc Globeberry		S	S	SR
1	Tucson to Eloy	Green/ Orange/ Yellow	Tyrannus melancholicus	Tropical Kingbird				WSC
2	Eloy to GRIC	Green	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
2	Eloy to GRIC	Green	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
2	Eloy to GRIC	Green	Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
2	Eloy to GRIC	Green	Lasiurus xanthinus	Western Yellow Bat		S		WSC
2	Eloy to 287	Orange	Abutilon parishii	Pima Indian Mallow	SC	S	S	SR
2	Eloy to 287	Orange	Ardea alba	Great Egret				WSC
2	Eloy to 287	Orange	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
2	Eloy to 287	Orange	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
2	Eloy to 287	Orange	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
2	Eloy to 287	Orange	Ixobrychus exilis	Least Bittern				WSC
2	Eloy to 287	Orange	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
2	Eloy to US 287 via UPRR	Yellow	Ardea alba	Great Egret				WSC
2	Eloy to US 287 via UPRR	Yellow	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
2	Eloy to US 287 via UPRR	Yellow	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
2	Eloy to US 287 via UPRR	Yellow	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
2	Eloy to US 287 via UPRR	Yellow	Ixobrychus exilis	Least Bittern				WSC
2	Eloy to US 287 via UPRR	Yellow	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
3	287 to Hunt Hwy	Orange	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S	
3	287 to Hunt Hwy	Orange	Ardea alba	Great Egret				WSC
3	287 to Hunt Hwy	Orange	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
3	287 to Hunt Hwy	Orange	Catostomus clarkii	Desert Sucker	SC	S	S	
3	287 to Hunt Hwy	Orange	Catostomus insignis	Sonora Sucker	SC	S	S	
3	287 to Hunt Hwy	Orange	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
3	287 to Hunt Hwy	Orange	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
3	287 to Hunt Hwy	Orange	Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC
3	287 to Hunt Hwy	Orange	Ixobrychus exilis	Least Bittern				WSC
3	287 to Hunt Hwy	Orange	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
3	US 287 to Hunt Hwy via UPRR	Yellow	Ardea alba	Great Egret				WSC
3	US 287 to Hunt Hwy via UPRR	Yellow	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
3	US 287 to Hunt Hwy via UPRR	Yellow	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
3	US 287 to Hunt Hwy via UPRR	Yellow	Gila River Indian Reservation	Gila River Indian Reservation				
3	US 287 to Hunt Hwy via UPRR	Yellow	Ixobrychus exilis	Least Bittern				WSC
3	US 287 to Hunt Hwy via UPRR	Yellow	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
4	GRIC to 202/Mill	Green	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
4	GRIC to 202/Mill	Green	Bat Colony					
4	GRIC to 202/Mill	Green	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
4	GRIC to 202/Mill	Green	Lasiurus blossevillii	Western Red Bat		S		WSC
4	GRIC to 202/Mill	Green	Lasiurus xanthinus	Western Yellow Bat		S		WSC
4	GRIC to 202/Mill	Green	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
4	GRIC to 202/Mill	Green	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
4	Hunt Hwy to 202 (East)	Orange	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
4	Hunt Hwy to 202 (East)	Orange	Catostomus insignis	Sonora Sucker	SC	S	S	
4	Hunt Hwy to 202 (East)	Orange	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
4	Hunt Hwy to 202 (East)	Orange	Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC
4	Hunt Hwy to 202 (East)	Orange	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
4	Hunt Hwy to 202 (East)	Orange	Gila River Indian Reservation	Gila River Indian Reservation				
4	Hunt Hwy to Queen Creek via UPRR	Yellow	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
4	Hunt Hwy to Queen Creek via UPRR	Yellow	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*			
4	Hunt Hwy to Queen Creek via UPRR	Yellow	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
5	202 to downtown via UPRR	Green	Bat Colony					
5	202 to downtown via UPRR	Green	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
5	202 to downtown via UPRR	Green	Lasiurus xanthinus	Western Yellow Bat		S		WSC
5	202 to downtown via UPRR	Green	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
5	202 to downtown via UPRR	Green	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
5	Queen Creek to US 60/Hwy 87 via 202/US 60	Orange	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
5	Queen Creek to US 60/Hwy 87 via 202/US 60	Orange	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
5	Queen Creek to US 60/Hwy 87 via UPRR	Yellow	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
5	Queen Creek to US 60/Hwy 87 via UPRR	Yellow	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
5	Queen Creek to US 60/Hwy 87 via UPRR	Yellow	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Bat Colony					
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Lasiurus xanthinus	Western Yellow Bat		S		WSC
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
6	US 60/Hwy 87 to 101/Main via US 60/101	Orange	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Bat Colony					
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Lasiurus xanthinus	Western Yellow Bat		S		WSC
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
6	US 60/Hwy 87 to 101/Main via UPRR	Yellow	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
7	101/Main to 202/Mill via 101/202	Orange	Bat Colony					
7	101/Main to 202/Mill via 101/202	Orange	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
7	101/Main to 202/Mill via 101/202	Orange	Lasiurus xanthinus	Western Yellow Bat		S		WSC
7	101/Main to 202/Mill via 101/202	Orange	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
7	101/Main to 202/Mill via 101/202	Orange	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
7	101/Main to 202/Mill via UPRR	Yellow	Bat Colony					
7	101/Main to 202/Mill via UPRR	Yellow	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
7	101/Main to 202/Mill via UPRR	Yellow	Lasiurus xanthinus	Western Yellow Bat		S		WSC
7	101/Main to 202/Mill via UPRR	Yellow	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
7	101/Main to 202/Mill via UPRR	Yellow	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
8	202/Mill to downtown via UPRR	Orange	Bat Colony					
8	202/Mill to downtown via UPRR	Orange	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
8	202/Mill to downtown via UPRR	Orange	Lasiurus xanthinus	Western Yellow Bat		S		WSC
8	202/Mill to downtown via UPRR	Orange	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC
8	202/Mill to downtown via UPRR	Orange	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
8	202/Mill to downtown via UPRR	Yellow	Bat Colony					
8	202/Mill to downtown via UPRR	Yellow	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
8	202/Mill to downtown via UPRR	Yellow	Lasiurus xanthinus	Western Yellow Bat		S		WSC
8	202/Mill to downtown via UPRR	Yellow	Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
8	202/Mill to downtown via UPRR	Yellow	Sauromalus ater (Arizona Population)	Arizona Chuckwalla	SC			
9	Downtown to US60/101 via US60	Surprise	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
9	Downtown to US60/101 via US60	Surprise	Bat Colony					
9	Downtown to US60/101 via US60	Surprise	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
9	Downtown to US60/101 via US60	Surprise	Lasiurus xanthinus	Western Yellow Bat		S		WSC
9	Downtown to US60/101 via US60	Surprise	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT			WSC
10	US60/101 to Sun City via US 60	Surprise	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
10	US60/101 to Sun City via US 60	Surprise	Eumops perotis californicus	Greater Western Bonneted Bat	SC		S	
11	Downtown to Tolleson via UPRR	Buckeye	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
11	Downtown to Tolleson via UPRR	Buckeye	Bat Colony					
11	Downtown to Tolleson via UPRR	Buckeye	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
11	Downtown to Tolleson via UPRR	Buckeye	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Bat Colony					

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Dendrocygna autumnalis	Black-bellied Whistling-Duck				WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE			WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Ixobrychus exilis	Least Bittern				WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC
12	Tolleson to Goodyear Airport via UPRR	Buckeye	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S	
13	Goodyear Airport to Buckey via UPRR	Buckeye	Bat Colony					
13	Goodyear Airport to Buckey via UPRR	Buckeye	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PT	S		WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE			WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S	S	WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S	S	WSC

HDMS Data from May 28, 2014.

Attachment B. HDMS Species Recorded within 3 Miles of Each Segment

Seg. ID	Segment Name	Route Name	Scientific Name	Common Name	FWS	USFS	BLM	STATE
13	Goodyear Airport to Buckey via UPRR	Buckeye	Ixobrychus exilis	Least Bittern				WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC
13	Goodyear Airport to Buckey via UPRR	Buckeye	Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC

FWS = United States Fish and Wildlife Service
BGA = Bald and Golden Eagle Protection Act
C* = Candidate for federal listing
LE = Federally listed Endangered
LT = Federally listed Threatened
PT = Proposed for listing as Threatened
SC = Species of Concern

State = State of Arizona
HS = Highly Safeguarded
SR = Salvage Restricted
WSC = Wildlife of Special Concern in Arizona

USFS= United States Forest Service
S = Sensitive

BLM= Bureau of Land Management
S = Sensitive

HDMS Data from May 28, 2014.

Cultural Resources Appendix

Cultural Resources Appendix

This appendix provides information about the cultural resource studies and cultural sites recorded within the passenger rail corridor alternatives. Table C-1 lists the prior cultural resource studies that are known to intersect the Yellow or Orange corridor alternatives. Table C-2 lists the recorded sites. The tables are followed by a bibliography of sources from which they were developed.

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
12-145.BLM	Unknown	Unknown	AZSITE
12-150.BLM	Unknown	Unknown	AZSITE
12-163.BLM	Unknown	Unknown	AZSITE
12-169.BLM	Unknown	Unknown	AZSITE
12-190.BLM	Unknown	Unknown	AZSITE
12-19-8.BLM	Unknown	Unknown	AZSITE
12-19-9.BLM	Unknown	Unknown	AZSITE
12-56.BLM	Unknown	Unknown	AZSITE
1955-3.ASM	Southern Pacific Pipeline Survey	2 – AZ AA:6:47 (ASM); AZ AA:7:5 (ASM)	Komerska and Breternitz 1955
1973-13.ASM	Salt-Gila Survey	0	Grady 1973
1974-16.ASM	Cholla-Saguaro Transmission Line	0	Teague and Mayro 1974
1975-6.ASM	Bechtel Inc.-Ina Road Water Pollution Control Facility Survey	0	AZSITE PRF – no reference listed
1976-1.ASM	Cañada del Oro Sewer	0	Brew and Rogge 1976
1979-38.ASM	Santa Cruz River Park Survey	10 – AZ AA:12:85 (ASM); AZ AA:12:91 (ASM); AZ AA:12:99 (ASM); AZ AA:12:103 (ASM); AZ AA:12:104 (ASM); AZ BB:13:85 (ASM); AZ BB:13:86 (ASM); AZ BB:13:87 (ASM); AZ BB:13:88 (ASM); AZ BB:13:110 (ASM)	Betancourt 1978
1979-39.ASM	TG+E Northern Tucson Transmission Line Survey	0	Rozen 1979
1980-11.ASM	Horizon Hills, Phase II	0	Urban 1980

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1980-89.ASM	State Land Survey - ADOT	1 – AZ AA:7:24 (ASM)	AZSITE PRF – no reference listed
1980-143.ASM	Oshrin Intercept Survey	0	Huckell and Brew 1980
1980-152.ASM	Denny Dunn Neighborhood Park Survey	0	Brew 1980
1980-155.ASM	Santa Cruz/SW Interceptor Project	0	Adams et al. 1980
1980-163.ASM	TRICO Surveys	0	Czaplicki 1980
1980-242.ASM	TEP Tortolita-South Utility Corridor and Alt. Routes	0	Wilson 1980
1980-249.ASM	Tucson Aqueduct Phase A - CAP	3 – AZ AA:7:6 (ASM); AZ AA:7:32 (ASM); AZ AA:7:33 (ASM)	McCarthy 1982
1981-154.ASM	TEP Tortolita-South Realignment Survey	0	Wilson 1981
1981-174.ASM	The Northern Tucson Basin Survey: Phase I	1 – AZ AA:12:876 (ASM)	Fish et al. 1992; Madsen et al. 1993
1982-6.ASM	El Oasis Apartments	0	Urban 1982a
1982-34.ASM	CAP Tucson Aqueduct Phase A Class III Survey	0	Czaplicki 1983
1982-108.ASM	Marana Canning Co., Inc.	1 – AZ AA:12:369 (ASM)	Urban 1982b
1982-156.ASM	Adonis Mobile Home Sub-Division	1 – AZ AA:12:382 (ASM)	Urban 1982c
1982-160.ASM	Tucson Aqueduct Phase A Class III Survey, Reach 3	0	Czaplicki et al. 1982
1982-207.ASM	Tucson-Apache 115 kV Transmission Line	0	Hammack 1983
1983-45.ASM	Southern Pacific Pipe Line Inc.	0	Madsen 1983
1983-78.ASM	Tucson Low Income Housing	0	Urban 1983
1983-95.ASM	Proposed I-10 – SR 210 Interchange Area, West of Granada Avenue: the Aviation Corridor Project	3 – AZ BB:13:157 (ASM); AZ BB:13:158 (ASM); AZ BB:13:159 (ASM)	Dart 1983
1983-198.ASM	Northern Tucson Basin Survey Marana, Phase II	1 – AZ AA:12:876 (ASM)	Fish et al. 1992; Madsen et al. 1993
1984-31.ASM	Trico-Marana Survey	0	Castalia 1984
1984-85.ASM	Naviska Rest Area Test Wells	1 – AZ AA:11:30 (ASM)	Rosenberg 1984
1984-97.ASM	New Right-of-Way, I-10 at Rillito Creek	0	Sires 1984
1984-183.ASM	Tucson Aqueduct	0	Lincoln 1984

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1985-91.ASM	Bowie-Marana Surveys	0	Sires 1985
1985-150.ASM	El Rio Survey	2 – AZ BB:13:319 (ASM); AZ BB:13:320 (ASM)	Dart 1985
1985-160.ASM	Tucson Aqueduct	0	Lincoln 1985
1985-167.ASM	Western Area Power Administration's Saguaro to Tucson Reconductoring	0	Effland and Green 1985
1985-188.ASM	Orange Grove Road	1 – AZ AA:12:20 (ASM)	Swidler 1985
1986-41.ASM	CAP Distribution Systems Central Arizona Central Main Canal	0	Quillian 1988
1986-109.ASM	Tucson Aqueduct Project - Phase B	0	AZSITE
1986-167.ASM	Halbert Industrial Park Survey	1 – AZ AA:12:503 (ASM)	Gregonis 1986
1987-205.ASM	Orange Grove/ I-10/ SPRR Flood Control	0	Mayro 1987a
1987-214.ASM	Santa Cruz River Improvement District	0	Mayro 1987b
1987-216.ASM	Santa Cruz River Survey, St. Mary's to Fort Lowell	0	Mayro 1987c
1987-221.ASM	SCR Improvement D.3MLT	0	Mayro 1987d
1987-222.ASM	U.S. Telecom Buried Fiber Optic Cable	0	O'Brien et al. 1987
1987-237.ASM	Tangerine Road	0	Stone and Bontrager 1987
1988-24.ASM	Ina Road - I-10	1 – AZ AA:12:688 (ASM)	Bontrager 1988a
1988-87.ASM	Tangerine Road Survey	0	Maldonado 1988
1988-158.ASM	Picacho Peak 12kV Distribution	0	Macnider 1988
1988-167.ASM	Tangerine Road West	0	Bontrager 1988b
1988-189.ASM	Tucson-Grant Road	0	Curtis 1988
1988-247.ASM; 1989-217.ASM	Central Arizona Irrigation and Drainage District, South Main Canal Alignment	0	Van Nimwegen and Henderson 1991a
1989-2.ASM	Rillito Testing Project	6 – AZ AA:12:10 (ASM); AZ AA:12:21 (ASM); AZ AA:12:689 (ASM); AZ AA:12:690 (ASM); AZ AA:12:691 (ASM); AZ AA:12:692 (ASM)	Ciolek-Torrello and Homburg 1989

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1989-168.ASM	Tangerine Road Survey	0	Heuett 1989
1989-190.ASM	West Speedway Survey and Testing	0	Huckell 1989
1990-40.ASM	Orange Grove Road Survey	0	Troncone 1990
1990-77.ASM	Community Center Reclaimed Water Main	0	Mabry 1990
1990-173.ASM	ADOT I-10 Corridor Survey	3 – AZ AA:12:11 (ASM); AZ AA:12:13 (ASM); AZ AA:12:736 (ASM)	Bernard-Shaw 1990
1991-40.ASM	Orange Grove Extension Survey	0	Grenda 1991
1991-42.ASM	Ted Walker Regional Park and Proposed Equestrian Staging Area	1 – AZ AA:12:739 (ASM)	Albright 1991
1991-88.ASM	Glenn-Fairview Main Replacement	0	Eppley 1991a
1991-91.ASM	Archaeological Survey of Fairview Avenue - Grant Road to 15th Avenue Widening	0	Eppley 1991b
1991-109.ASM	CAP Pressure Regulating Valve Stations Survey	0	Slawson 1991
1991-111.ASM	Lower Santa Cruz Levee Survey	0	Harry 1991
1991-165.ASM	Orange Grove/Thornydale Arch. Assessment	0	Doelle 1991
1991-185.ASM	Recharge Monitor Wells Survey	0	Mabry 1991
1991-234.ASM	TRICO Survey	0	Doak 1991
1992-62.ASM	Rillito Loop	0	Adams and Macnider 1992
1992-179.ASM	Archaeological Survey For Proposed Boundary Fence at Picacho Peak State Park	0	Montero 1992
1992-239.ASM	Tucson-Phoenix III	2 – AZ AA:7:464 (ASM); AZ AA:7:465 (ASM)	Crary 1992
1992-270.ASM	State Route 84/Casa Grande – Eloy	2 – AZ Z:2:40 (ASM); AZ AA:2:118 (ASM)	Wright 1992
1992-289.ASM	Red Rock Loop	2 – AZ AA:7:462 (ASM); AZ AA:7:463 (ASM)	Crary and Macnider 1992
1993-38.ASM	Cowtown Survey	0	Slawson 1993

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1993-88.ASM	Plane Avenue Survey	0	Eppley 1993
1993-89.ASM	Archaeological Surveys at Four 1993 Flood Repair Locations	0	Goetze 1993
1993-205.ASM	ADOT I-10/Rillito Creek	0	Duff 1993
1993-236.ASM	Ronstadt/Splinter Brothers' Warehouse Survey	0	Thiel 1993
1994-113.ASM	Ina Road Survey	1 – AZ AA:12:798 (ASM)	Slawson 1994
1994-129.ASM	MSP Survey	0	Roth 1994
1994-136.ASM	I-10 – Ina Road to Hartman Lane Survey	0	Swartz 1994a
1994-137.ASM	I-10 – Canada del Oro Survey	0	Swartz 1994b
1994-245.ASM	I-10 Canada del Oro Survey	0	Freeman 1994a
1994-248.ASM	Golf Academy Survey	0	Freeman 1994b
1994-279.ASM	Oracle-Tucson 115-kV Transmission	1 – AZ BB:5:123 (ASM)	Brown and Rohman 1994
1994-318.ASM	Santa Cruz Bikepath Survey	0	Freeman 1994c
1994-415.ASM	Environmental Restoration Survey	1 – AZ AA:6:51 (ASM)	Roberts 1994
1994-424.ASM	Cortaro Farms Road	0	Myers and Slaughter 1994
1994-472.ASM	Avra Valley Survey	0	Slaughter and Bierer 1994
1995-214.ASM	Cortaro Road	0	Stone 1995
1995-330.ASM	Juhan Park Survey	0	Swartz 1995
1995-340.ASM	Tangerine Road/Marana	0	Tweedy and Woodall 1995
1995-390.ASM	Cortaro Road Survey	0	Noll and Myers 1995
1995-392.ASM	Speedway/Ajo Pipeline Survey	0	Swartz 1996
1995-394.ASM	Granite Testing	1 – AZ AA:12:788 (ASM)	Wallace 1995
1995-395.ASM	Santa Cruz Levee	0	Rieder 1995
1995-465.ASM	Court Avenue Monitoring	0	Tompkins 1995
1995-470.ASM	Maricopa-Saguaro 115-kV Transmission Line	1 – AZ AA:1:95 (ASM)	Moreno et al. 1996
1996-13.ASM	Silverbell and Ina Testing and Monitoring	0	Lindeman et al. 1996
1996-14.ASM	Sun Tran Survey	1 – AZ AA:12:801 (ASM)	Wallace 1996a
1996-44.ASM	Cortaro-Ina Sewerline Survey	0 AZ AA:12:100 (ASM)	Wallace 1996b
1996-91.ASM	Miracle Mile-Oracle Road	0	Woodall 1996
1996-145.ASM	Thornydale Road Survey	0	Rieder and Myers 1996

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1996-219.ASM	Southern Pacific Railroad Survey	0	Rosenzwieg 1996
1996-283.ASM	Ft. Lowell/Santa Cruz Survey	0	Freeman 1996
1996-366.ASM	River and Thornydale Survey	0	Terzis 1996
1996-399.ASM	Tangerine Road R.O.W. Sec 6 & 31 Project	0	Stephen 1996a
1996-476.ASM	Red Roof Inn at Ina	0	Stephen 1996b
1996-477.ASM	Ina/Trico	0	Stephen 1996c
1996-480.ASM	Miscellaneous Monitoring for Southwest Gas	0	Lindeman 1996
1997-75.ASM	Interstate-8/Picacho-Red Rock	0	Lite and Cadiente 1997
1997-161.ASM	Red Rock Drill Holes Survey (SVS#6)	0	Jones 1997
1997-184.ASM	Saguaro-Oracle-Coolidge Survey	1 – AZ AA:8:366 (ASM)	Lindeman 1997
1997-475.ASM	AAtlas Storage	1 – AZ AA:12:820 (ASM)	Stephen 1997
1997-523.ASM	Red Rock Survey	3 – AZ AA:7:492 (ASM); AZ AA:7:494 (ASM); AZ AA:10:19 (ASM)	Mason-Kohlmeyer 1998
1998-38.ASM	Broadway Boulevard/6th Avenue Water Main Survey	0	Vint 1998
1998-86.ASM	MTSO Cellular One	0	Aguila 1998
1998-143.ASM	818 N. 11th Ave. Survey	0	Sliva 1998
1998-147.ASM	Sun Tran Access Survey	0	Wallace 1998
1998-244.ASM	ADOT – Tucson I	1 – AZ AA:12:830 (ASM)	Larkin et al. 1998
1998-267.ASM	Miracle Manor Survey	0	Diehl 1998a
1998-271.ASM	Rio Nuevo Center Survey	0	Diehl 1998b
1998-272.ASM	Treasure Chest Survey	0	Diehl 1998c
1998-439.ASM	I-10 (Milepost 175.8-226)	0	Barz 1998
1998-556.ASM	Gary Brown Survey	1 – AZ AA:12:836 (ASM)	Fratt 1998
1998-559.ASM	Cochise and Pinal Counties Survey	0	Fratt and Rude 1999
1999-45.ASM	Parsons Fenceline, Corral	0	Rozen 1999
1999-55.ASM	Prince Road – I-10 to 1st Avenue Survey	0	Diehl 1999a
1999-92.ASM	Back to Basics - Barrio Anita Survey	0	Diehl 1999b
1999-99.ASM	University Blvd./6th Ave. Main Survey	0	Diehl 1999c
1999-145.ASM	Sun Tran Access Survey	0	Wallace 1999

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
1999-158.ASM	Walmart Survey	0	Duff 1999
1999-182.ASM	Cortaro Rd Design Concept	0	Archer and Wellman 1999
1999-326.ASM	Jusnic Estates 13.97 Acre Survey (99SVS26)	0	Jones 1999
1999-340.ASM	Barrio Anita Monitoring	0	Hall 1999
1999-343.ASM	Court and Meyer at 6th Street Survey	0	Diehl 1999d
1999-357.ASM	Gravel Pits Survey	0	Vint 1999a and 1999b
1999-362.ASM	Phase I of the Tucson Freeway Management System	1 – AZ BB:13:425 (ASM)	Hill and Garcia 1999
1999-389.ASM	Lon Adams Road Dental Office	0	Stephen 1999
1999-515.ASM	Costco Survey	0	Fratt and Hayes 2000
1999-587.ASM	PBNS Level 3 Fiber Optic Line	5 – AZ AA:6:69 (ASM); AZ AA:7:536 (ASM); AZ AA:12:857 (ASM); AZ AA:12:858 (ASM); AZ AA:12:859 (ASM)	Doak 1999
2000-16.ASM	Marana/Honea Heights Colonia WWM Sewerline-Cultural Resources Assessment	0	Jones 2000a
2000-140.ASM	KMEP Arizona Anomaly Repair Project	0	Self 2000 and 2001
2000-154.ASM	Blue Moon Park Survey	0	Wocherl 2000
2000-166.ASM	Pipeline Anomaly Digs Project	0	Bauer and Rogge 2000
2000-253.ASM	Saguaro Power Plant Facilities	0	Punzmann 2000
2000-284.ASM	Moratorium Streets Survey	0	Diehl 2000
2000-319.ASM	Ina and Camino del Oeste Survey	0	Thurtle 2000
2000-565.ASM	Marana/Honea Heights Colonia WWM Sewerline	0	Jones 2001a
2000-589.ASM	Kinder Morgan Anomaly Digs #4	0	Ramos et al. 2001a
2000-590.ASM	Kinder Morgan Anomaly Digs #3	0	Ramos et al. 2001b
2000-592.ASM	Dove Mtn. Offsite Sewer (ASLD # 18-105008)	0	Stephen 2000a

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2000-621.ASM	Marana Circ. 15 & 16 Rebuild and Avra Valley Tie Line Project	0	Hesse and Archer 2000
2000-630.ASM	Demoss Petrie Substation Testing at 2501 N. Flowing Wells Road (DPT)	0	Jones 2000b
2000-723.ASM	AT&T NexGen/Core Project Link 3 Class 3 Survey	2 – AZ AA:12:51 (ASM); AZ AA:12:252 (ASM)	Kearns et al. 2001
2000-784.ASM	La Cholla @ Santa Cruz River	0	Stephen 2000b
2000-822.ASM	Tucson Maintenance – I-10	1 – AZ AA:12:870 (ASM)	Barnes and Wright 2001
2001-6.ASM	AZ-Cortaro – I-10 Communications Tower Survey (ERMS#2)	0	Jones 2001b
2001-42.ASM	Cortaro Farms Survey	0	Brack 2001a
2001-128.ASM	TRICO ARCO Farms Overhead Power Line Conversion	0	Neves 2001
2001-154.ASM	Orange Grove Road from Thornydale Road to Corona Road Survey	0	Kaldahl and Dart 2001
2001-157.ASM	Apex Plant	0	Wright 2001
2001-244.ASM	Fire Station 4 Survey (West Grant Road)	0	Diehl 2001
2001-245.ASM	Silverbell Landfill Monitor Well Survey	0	Hall 2001
2001-270.ASM	KB 15-Acre Survey	0	Hayes and Olsson 2001
2001-366.ASM	Owl Head Survey	0	Slawson 2001a
2001-404.ASM	DPS	0	Brack 2001b
2001-406.ASM	Surveys of Six Proposed Reroutes for a Proposed Fiber Optic Cable ROW	4 – AZ AA:7:503 (ASM); AZ AA:7:506 (ASM); AZ AA:12:741 (ASM); AZ AA:12:875 (ASM)	Baker and Webb 2001
2001-499.ASM	Debbie Cell Tower Survey	0	Slawson 2001b
2001-553.ASM	Commerce Ave.	0	Stephen 2001a
2001-580.ASM	TEP Pole Replacement	0	Fuller 2001
2001-628.ASM	Northwest Quadrant Main Survey	0	Cook 2001
2001-654.ASM	Section 5	0	Stephen 2001b
2001-662.ASM	Church Development Plan	0	Stephen 2001c
2001-713.ASM	Jct. SR 84 – Coolidge SR 287	1 – AZ AA:6:91 (ASM)	Touchin 2001

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2001-716.ASM	Survey of Three Op Amp Facilities	0	Baker and Kearns 2001
2001-783.ASM	Tangerine Road ROW Archaeological Survey	1 – AZ AA:12:686 (ASM)	Hesse 2001
2002-18.ASM	Grant West of I-10 Monitoring	1 – AZ BB:13:23 (ASM)	Diehl 2002b
2002-98.ASM	Main and 6th Monitoring	0	Diehl 2002c
2002-124.ASM	Town of Marana Santa Cruz River Trail Phase II paved path cultural resources survey (02SVS#11)	0	McKee and Dart 2002a
2002-128.ASM	Town of Marana Santa Cruz River Trail Phase I and II Dirt Path Cultural Resources Survey	1 – AZ AA:12:912 (ASM)	McKee and Dart 2002b
2002-363.ASM	Red Rock Assessment supplemental ca. 282-acre Cultural Resources Survey in Sections 4, 5, 8, & 9	0	Jones and Dart 2002
2003-36.ASM	Main Street Monitoring	0	Diehl 2002a
2003-232.ASM	I-10, Miracle Mile - Oracle Highway	0	Touchin and Brodbeck 2003
2003-316.ASM	AT&T NexGen/Core Project Link 3 Second Rillito River Reroute	0	Smith and Wheeler 2003a
2003-366.ASM	2425 W. Wave Hill Court, 1.89-Acre Cultural Resources Survey	1 – AZ AA:12:18 (ASM)	Jones and Dart 2003b
2003-367.ASM	Arizona Portland Cement 105-Acre Expansion Survey	0	Lyon and Lascaux 2002
2003-397.ASM	Thornydale Widening Survey	0	Diehl 2003c
2003-453.ASM	Pegler Wash Park Extension	0	Knoblock and Fahrni 2003
2003-474.ASM	EPNG Line 1007 Survey	0	Hesse and Chenault 2003
2003-506.ASM	Stone Ave - 6th to 1st Assessment	0	Diehl 2003d
2003-517.ASM	Sagebrush Survey	0	Moses 2003b
2003-896.ASM	Old Pascua Neighborhood Survey	0	Diehl 2003b

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2003-910.ASM	Cultural Resources Survey of the 360 Networks Fiber Optics Lines	11 – AZ AA:7:523 (ASM); AZ AA:12:92 (ASM); AZ AA:12:111 (ASM); AZ AA:12:256 (ASM); AZ AA:12:258 (ASM); AZ AA:12:370 (ASM); AZ AA:12:486 (ASM); AZ AA:12:683 (ASM); AZ AA:12:742 (ASM); AZ AA:12:871 (ASM); AZ AA:12:872 (ASM)	Railey and Yost 2001
2003-948.ASM	TRICO Marana Estates Rebuild Project	1 – AZ AA:12:685 (ASM)	Twilling and Hesse 2003
2003-1070.ASM	EPNG Tucson Class III Survey	7 – AZ AA:7:30 (ASM); AZ AA:7:510 (ASM); AZ AA:7:511 (ASM); AZ AA:7:512 (ASM); AZ AA:7:513 (ASM); AZ AA:7:514 (ASM); AZ AA:7:515 (ASM)	Hesse and Gutierrez 2004
2003-1073.ASM	Tangerine Road Extension Survey	0	Hesse 2003
2003-1137.ASM	Sandario Road Survey	0	Klucas 2002
2003-1257.ASM	Joplin Road	0	Moses 2003a
2003-1262.ASM	KMEP Phase II Pipeline Replacement Project and KMEP Line Section 53/54 Anomaly 1 Repair	1 – AZ AA:12:16 (ASM)	Estes et al. 2004b
2003-1264.ASM	I-10 Geotech Monitoring	0	Terhune and Garcia 2007
2003-1281.ASM	Grant/Ft. Lowell Survey	1 – AZ AA:12:862 (ASM)	Sterner 2001
2003-1287.ASM	AT&T NexGen/Core Project Link 3 Rillito Reroute Survey	0	Smith and Wheeler 2003b
2003-1361.ASM	Access Road for the Desert Energy Project	0	Bassett 2002a
2003-1479.ASM	629 W. Mabel Survey	0	Diehl 2003a
2003-1548.ASM	KMEP 12 Anomaly Digs, LS 53/54	2 – AZ AA:7:520 (ASM); AZ AA:12:953 (ASM)	Estes et al. 2004a
2003-1571.ASM	Shoppes at Orange Grove & River	0	Jones and Dart 2003a

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2003-1590.ASM	Desert Energy Power Plant Project	1 – AZ AA:7:527 (ASM)	Bassett 2002b
2004-7.ASM	TJ Bednar	0	DeJongh and Thurtle 2003
2004-133.ASM	Lattamore Well Lot Survey	0	Petersen 2004
2004-314.ASM	The Pines Sec 27	Unknown	Doak 2004
2004-324.ASM	Corrosion Prevention Project Assessment and Survey	0	Diehl 2003e
2004-526.ASM	Rillito Apex Plant	Unknown	AZSITE; no PRF available
2004-535.ASM	Cortaro Farms Widening Survey	0	Brack 2004
2004-627.ASM	Add. D: El Paso to Los Angeles Fiber Optic Cable Project: GRIC Alt B Reroute	0	Newsome and Berg 2001
2004-666.ASM	East Marana Properties Environmental Services	2 – AZ AA:7:522 (ASM); AZ AA:12:964 (ASM)	Barr 2004
2004-724.ASM	Riggs Road – Picacho Peak Road	0	Brodbeck and Touchin 2004
2004-810.ASM	101 W. 6th Street Monitoring	0	Diehl 2004a
2004-1726.ASM	Marana Town Center survey	0	Craig 2004a
2004-1747.ASM	Marana Gin property at NW corner of Sandario & Trico-Marana roads, 39.09-acre cultural resources survey	2 – AZ AA:12:970 (ASM); AZ AA:12:971 (ASM)	McKee and Dart 2004
2004-1851.ASM	Pascua Neighborhood Improvements Survey	0	Diehl 2004b
2004-1864.ASM	Alameda Street Survey	0	Fahrni and Twilling 2004
2004-1900.ASM	El Paso CPS 1990	0	Wilcox 2004
2005-49.ASM	CSD 4-Home Survey	0	Diehl 2004c
2005-58.ASM	I-10 Prince-Ruthrauff – Prince Road Bridge Survey	0	Garcia 2005
2005-159.ASM	U of A Marana Farm	0	DeJongh and Dart 2005a
2005-344.ASM	Picacho Yard	0	Bild 2005
2005-358.ASM	Riverview Park Survey	0	Diehl 2004d
2005-446.ASM	Tucson-Apache 115-kV Transmission Line Project	0	Goldstein 2008
2005-490.ASM	Trico Cascada Project	0	Barr 2005

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2005-578.ASM	Cultural Resources Survey and Monitoring for the KMEP Line Section 6/7 and 7 Anomaly Repair Project	0	Allan 2005
2005-584.ASM	Marana 100 Survey	0	Craig 2004b
2005-617.ASM	Monitoring at St Marys and Granada	0	Harris Environmental Group, Inc. 2005
2005-721.ASM	Flowing Wells Lighting Survey	0	Diehl 2005a
2005-790.ASM	Riverview Park Monitoring	0	Diehl 2005b
2005-829.ASM	El Rio Acres B2B Survey	0	Diehl 2005c
2005-848.ASM	Fairview Industrial Park Parcel	0	Jerla and Dart 2005
2005-877.ASM	MUSD Transportation Facility	0	DeJongh and Dart 2005b
2005-1056.ASM	Tortolita Mountain Ranch Enviro Services	0	Barr 2006
2005-1061.ASM	Anasazi Stone EA	0	Klimas 2005
2006-132.ASM	PSI Picacho	0	Rogers 2006
2006-292.ASM	Kinder Morgan Energy Partners Anomaly Dig Sites F/6 and 29, Pima and Pinal Counties, AZ	0	Epperson 2006
2006-308.ASM	Cambio Grande Survey	0	Diehl 2006
2006-507.ASM	Camino del Cerro ROW Landscaping Survey	0	Cook 2006
2006-631.ASM	12" East Line Washout (aka. 12" Tucson-Phoenix Washout)	0	Epperson and Self 2006
2006-781.ASM	West Ina Road Parcel 101-05-010C, 1.99-acre Cultural Resources Survey	0	DeJongh and Dart 2006
2006-782.ASM	Red Rock TI	0	Baker and Heilman 2007
2006-928.ASM	AT&T NexGen/Core Project	4 – AZ AA:12:901 (ASM); AZ AA:12:903 (ASM); AZ AA:12:904 (ASM); AZ AA:12:907 (ASM)	Freuden 2006
2006-938.ASM	Yaqui Survey	0	Doak 2006a
2006-939.ASM	Mars Survey	0	Doak 2006b
2006-999.ASM	I-10, La Cholla Blvd. and W. Fort Lowell Road	2 – AZ AA:12:735 (ASM); AZ AA:12:745 (ASM)	Fenicle 2007
2007-45.ASM	City of Tucson 06 58	0	Tucker 2006

Table C-1. Previous Cultural Resources Studies within the Corridor Alternatives

Project Number	Project Name	Number of Sites Recorded - Site Number(s)	Reference
2007-504.ASM	Peppertree Ranch Lot 42	0	Stephen 2006
2007-547.ASM	Old Pasqua Neighborhood Survey	0	Howell 2007
2007-594.ASM	COT 07-33 Miracle Mile Property	0	Tucker 2007
2007-679.ASM	COT 07-27 Speedway/Main Intersection	Unknown	Hesse 2007
2007-823.ASM	EPNG Line 2113 PIP	0	Hesse and Levstik 2008
2008-573.ASM	Miracle Mile Parcel Survey	0	Howell 2008
2008-579.ASM	08-32 COT – El Camino del Cerro Rd Widening	0	Griset 2008
2009-787.ASM	San Lucas Floodwall ASLD	0	Jones 2009
2010-375.ASM	Yaqui 2 Lots Survey – Calle Sur	0	Howell 2010a
2010-376.ASM	Yaqui 2 Lots Survey – Calle Adelanto	0	Howell 2010b
SHPO-2003-0588	Cultural Resource Survey of Ina Road and the Santa Cruz River in Marana, Arizona	Unknown	AZSITE
SHPO-2003-0848	Orange Grove Road Expansion - Pima County Department of Transportation proposed 2.25 mile expansion	Unknown	AZSITE
SHPO-2004-0008	CSI - Communication Service, Inc. T-Mobile Proposed site PH35202A "TEP Lattice Tower" Proposed	Unknown	AZSITE

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ T:10:84 (ASM)/ Southern Pacific Railroad: Wellton-Phoenix-Eloy Spur; Sunset Route	Historic railroad	Determined Eligible (A)	Kearns et al. 2001
AZ Z:2:40 (ASM)/ Southern Pacific Railroad Mainline - Southern Route; Sunset Route; Southern Pacific Mainline	Historic railroad	Determined Eligible (A)	Wright 1992; Barz 1998; Smith and Wheeler 2003a and 2003b; Terhune and Garcia 2007
AZ AA:1:95 (ASM)	Historic transmission line	Not considered eligible	Moreno et al. 1996
AZ AA:2:118 (ASM)/ State Route 84; Casa Grande Highway	Historic roadway	Determined Eligible (A and D)	Wright 1992; Baker and Webb 2001; Barnes and Wright 2001; Newsome and Berg 2001; Smith and Wheeler 2003a and 2003b; Brodbeck and Touchin 2004; Garcia 2005; Barr 2006; Baker and Heilman 2007; Terhune and Garcia 2007
AZ AA:6:47 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Komerska and Breternitz 1955; Crary 1992
AZ AA:6:51 (ASM)	Prehistoric Hohokam habitation	Considered eligible	Roberts 1994
AZ AA:6:69 (ASM)	Historic habitation	Considered eligible	Doak 1999
AZ AA:6:91 (ASM)	Historic artifact scatter	Not considered eligible	Touchin 2001
AZ AA:7:5 (ASM)	Multicomponent – Historic artifact scatter and prehistoric sherd scatter	Not evaluated	Komerska and Breternitz 1955
AZ AA:7:6 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter; bone on surface	Considered eligible	McCarthy 1982; Doak 1999; Baker and Webb 2001; Kearns et al. 2001; Railey and Yost 2001
AZ AA:7:17 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:7:24 (ASM)	Prehistoric Hohokam sherd scatter	Not evaluated	AZSITE

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:7:30 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:32 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	McCarthy 1982
AZ AA:7:33 (ASM)	Historic artifact scatter	Not evaluated	McCarthy 1982; Hesse and Gutierrez 2004
AZ AA:7:34 (ASM)	Historic artifact scatter	Not evaluated	AZSITE
AZ AA:7:71 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:7:88 (ASM)/ Highway Hearth Site	Hearth and flakes of unknown age	Not evaluated	AZSITE
AZ AA:7:454 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:7:455 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter	Not evaluated	AZSITE
AZ AA:7:462 (ASM)/ Red Rock Station	Historic railroad complex	Considered eligible	Crary and Macnider 1992; Kearns et al. 2001; Railey and Yost 2001; Estes et al. 2004a
AZ AA:7:463 (ASM)	Railroad tie structure of unknown function and age	Considered eligible	Crary and Macnider 1992; Roth 1994
AZ AA:7:464 (ASM)	Protohistoric/Historic artifact scatter	National Register Listed (D)	Crary 1992; Newsome and Berg 2001
AZ AA:7:465 (ASM)	Historic railroad complex	Not evaluated	Crary 1992
AZ AA:7:492 (ASM)	Prehistoric Hohokam artifact scatter	Not considered eligible	Mason-Kohlmeyer 1998
AZ AA:7:494 (ASM)	Historic artifact scatter	Not considered eligible	Mason-Kohlmeyer 1998
AZ AA:7:502 (ASM)	Historic wagon road with associated artifacts	Considered eligible	AZSITE
AZ AA:7:503 (ASM)	Historic roadway	Not considered eligible	Baker and Webb 2001; Terhune and Garcia 2007
AZ AA:7:504 (ASM)	Historic structural remains, part of a maintenance yard	Considered eligible	AZSITE
AZ AA:7:506 (ASM)/ El Paso Natural Gas Pipeline No. 2023	Historic gas pipeline	Not considered eligible	Baker and Webb 2001; Hesse and Chenault 2003

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:7:510 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:511 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter with features	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:512 (ASM)	Prehistoric Hohokam artifact scatter with features	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:513 (ASM)	Prehistoric Hohokam artifact scatter with one rock feature	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:514 (ASM)	Historic artifact scatter with features	Not considered eligible	Hesse and Gutierrez 2004
AZ AA:7:515 (ASM)	Prehistoric Archaic lithic scatter with features	Considered eligible	Hesse and Gutierrez 2004
AZ AA:7:520 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Estes et al. 2004a
AZ AA:7:522 (ASM)	Historic artifact scatter	Not considered eligible	Barr 2004
AZ AA:7:523 (ASM); AZ AA:12:874 (ASM)	Historic artifact scatter	Not considered eligible	Railey and Yost 2001
AZ AA:7:527 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Bassett 2002b
AZ AA:7:536 (ASM)	Prehistoric Hohokam artifact scatter with one feature	Considered eligible	Doak 1999
AZ AA:8:366 (ASM)	Historic transmission line	Not considered eligible	Lindeman 1997
AZ AA:10:19 (ASM); AZ AA:7:495 (ASM); AZ AA:7:521 (ASM)/ Arizona Southern Railroad Company Railroad Grade; Industry Railroad Grade; Sasco Road	Historic railroad – portions of grade used as road	Considered eligible	Mason-Kohlmeyer 1998; Wilcox 2004
AZ AA:11:30 (ASM)	Historic artifact scatter	Not considered eligible	Rosenberg 1984; Barr 2004

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:11:139 (ASM)	Multicomponent – Historic artifact scatter and Prehistoric Hohokam artifact scatter	Not considered eligible	Barr 2004
AZ AA:12:1 (ASM)	Prehistoric artifact scatter	Not evaluated	AZSITE
AZ AA:12:5 (ASM)	Prehistoric Hohokam sherd scatter	Not evaluated	AZSITE
AZ AA:12:9 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:10 (ASM)/ Sunset Mesa Ruin; Basillio Cuevas Homestead	Prehistoric Hohokam habitation and Historic Mexican-American homestead	Considered eligible	Ciolek-Torrello and Homburg 1989; Wallace 1995
AZ AA:12:11 (ASM)	Prehistoric Hohokam artifact scatter	Determined eligible (D)	Bernard-Shaw 1990; Adams and Macnider 1992; Railey and Yost 2001
AZ AA:12:13 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Bernard-Shaw 1990; Adams and Macnider 1992; Railey and Yost 2001
AZ AA:12:14 (ASM)/ Jaynes Station	Multicomponent – Prehistoric Hohokam artifact scatter and historic settlement	Not evaluated	AZSITE
AZ AA:12:15 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter, agricultural terraces, and canal and historic artifact scatter	Not evaluated	AZSITE
AZ AA:12:16 (ASM)	Prehistoric Hohokam artifact scatter	Determined eligible (D)	Estes et al. 2004b; Garcia 2005
AZ AA:12:17 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:18 (ASM)/ Hodges Ruin; Grand Pit; Gravel Pit Site	Prehistoric Hohokam habitation	Considered eligible	Jones and Dart 2003b
AZ AA:12:19 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Adams and Macnider 1992

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:20 (ASM); AZ AA:12:41 (ASM); AZ AA:12:351 (ASM); AZ AA:12:352 (ASM)	Multicomponent – Prehistoric Hohokam habitation and historic artifact scatter and race track	Determined eligible	Swidler 1985; Smith and Wheeler 2003a and 2003b
AZ AA:12:21 (ASM)	Prehistoric Hohokam habitation	Considered eligible	Ciolek-Torrello and Homburg 1989; Terzis 1996; Smith and Wheeler 2003b
AZ AA:12:34 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:37 (ASM); AZ AA:12:823 (ASM)	Prehistoric habitation; burial	Not evaluated	AZSITE
AZ AA:12:38 (ASM); AZ AA:12:41 (ASM)	Prehistoric Hohokam habitation	Not evaluated	AZSITE
AZ AA:12:44 (ASM); AZ AA:12:488 (ASM)/ GRIP Site (Grant Road Industrial Park)	Prehistoric Hohokam artifact scatter and roasting pits	Not considered eligible	AZSITE
AZ AA:12:51 (ASM)/ Stewart Brickyard Site	Prehistoric Hohokam artifact scatter	Determined eligible (D)	Kearns et al. 2001; Railey and Yost 2001; Freuden 2006; Terhune and Garcia 2007
AZ AA:12:52 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:54 (ASM)/ Point of Mountain	Historic stage and freighting station	Determined eligible	Terhune and Garcia 2007
AZ AA:12:61 (ASM)	Prehistoric Hohokam sherd scatter	Determined eligible	Terhune and Garcia 2007
AZ AA:12:85 (ASM)	Multicomponent – Prehistoric Archaic and Hohokam village	Determined eligible (D)	Betancourt 1978
AZ AA:12:88 (ASM)	Prehistoric Hohokam cremations	Not evaluated	AZSITE
AZ AA:12:90 (ASM)/ Wetlands Site	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:91 (ASM); AZ AA:12:41 (ASM)/ Los Pozos	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter	Determined eligible	Betancourt 1978; Hill and Garcia 1999

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:92 (ASM)	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter and canal	Determined eligible (D)	Railey and Yost 2001
AZ AA:12:95 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and Historic artifact scatter and building remnants	Determined eligible (D)	AZSITE
AZ AA:12:99 (ASM)	Prehistoric Hohokam habitation	Not evaluated	Betancourt 1978; Estes et al. 2004b
AZ AA:12:100 (ASM)/ Bechtel 2	Prehistoric artifact scatter and roasting pits	Not evaluated	Wallace 1996b
AZ AA:12:103 (ASM)	Prehistoric Hohokam habitation	Determined eligible	Betancourt 1978
AZ AA:12:104 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Betancourt 1978
AZ AA:12:111 (ASM)/ Las Capas	Multicomponent – Prehistoric Archaic and Hohokam habitation	Determined eligible	Brew and Rogge 1976; Railey and Yost 2001
AZ AA:12:113 (ASM)	Prehistoric Hohokam habitation	Not evaluated	AZSITE
AZ AA:12:130 (ASM)	Multicomponent – Prehistoric Archaic and Hohokam roasting pits and hearths	Not evaluated	AZSITE
AZ AA:12:141 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:142 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:143 (ASM)/ Los Morteros Locus 1	Multicomponent – Prehistoric Archaic and Hohokam habitation	Not evaluated	AZSITE
AZ AA:12:226 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible (D)	Craig 2004b; Terhune and Garcia 2007
AZ AA:12:227 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:228 (ASM)	Multicomponent – Historic artifact scatter and foundation and prehistoric artifact scatter	Not evaluated	AZSITE

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:232 (ASM)/ Cortaro Site	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter and pit features	Determined eligible (D)	Terhune and Garcia 2007
AZ AA:12:252 (ASM)/ Rillito Loop Site	Multicomponent – prehistoric Hohokam artifact scatter and historic cemetary	Determined eligible (D)	Kearns et al. 2001; Railey and Yost 2001; Freuden 2006; Terhune and Garcia 2007
AZ AA:12:256 (ASM)	Prehistoric Hohokam artifact scatter	Determined eligible (D)	Railey and Yost 2001; Terhune and Garcia 2007
AZ AA:12:257 (ASM)	Historic building remnants	Not evaluated	AZSITE
AZ AA:12:258 (ASM)/ Rillito Townsite	Historic Rillito Train State and ticketing depot	Considered eligible (A and D)	Kearns et al. 2001; Railey and Yost 2001; Terhune and Garcia 2007
AZ AA:12:262 (ASM)	Prehistoric Hohokam artifact scatter and hearth	Not evaluated	AZSITE
AZ AA:12:285 (ASM); AZ AA:12:774 (ASM)/ Dairy Site	Multicomponent – Prehistoric Archaic and Hohokam habitation and historic artifact scatter	Determined eligible (D)	Madsen et al. 1993; Moses 2003a; Brack 2004
AZ AA:12:325 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:326 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:350 (ASM)	Historic habitation	Not evaluated	AZSITE
AZ AA:12:369 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Urban 1982b
AZ AA:12:370 (ASM)/ Antonio Alvarez Homestead	Historic structures	Determined eligible	Kearns et al. 2001; Railey and Yost 2001; Freuden 2006; Terhune and Garcia 2007
AZ AA:12:372 (ASM)	Historic structure and depression	Not evaluated	AZSITE
AZ AA:12:373 (ASM)	Historic structures	Not evaluated	AZSITE
AZ AA:12:374 (ASM)	Historic structures	Not evaluated	AZSITE
AZ AA:12:375 (ASM)	Historic cemetery	Not evaluated	AZSITE
AZ AA:12:382 (ASM)/ Adonis site	Prehistoric Hohokam artifact scatter	Determined eligible	Urban 1982c; Kearns et al. 2001; Railey and Yost 2001; Freuden 2006; Terhune and Garcia 2007

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:455 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:459 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:486 (ASM)/ Cortaro Fan Site	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter and features	Determined eligible (D)	Railey and Yost 2001; Terhune and Garcia 2007
AZ AA:12:487 (ASM)	Prehistoric ash stain	Not considered eligible	AZSITE
AZ AA:12:503 (ASM)/ Costello-King Site	Multicomponent – Prehistoric Archaic and Hohokam habitation	Determined eligible	Gregonis 1986; Railey and Yost 2001; Smith and Wheeler 2003b
AZ AA:12:649 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:672 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:682 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:683 (ASM); AZ AA:12:873 (ASM); AZ AA:12:896 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Railey and Yost 2001; Terhune and Garcia 2007
AZ AA:12:685 (ASM)	Prehistoric Hohokam sherd scatter	Not considered eligible	Twilling and Hesse 2003; Terhune and Garcia 2007
AZ AA:12:686 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Hesse 2001
AZ AA:12:687 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ AA:12:688 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Bontrager 1988a
AZ AA:12:689 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Ciolek-Torrello and Homburg 1989
AZ AA:12:690 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Ciolek-Torrello and Homburg 1989; Terzis 1996
AZ AA:12:691 (ASM)	Prehistoric Hohokam artifact scatter	Not considered eligible	Ciolek-Torrello and Homburg 1989; Jones 1999
AZ AA:12:692 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Ciolek-Torrello and Homburg 1989
AZ AA:12:735 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Fenicle 2007

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:736 (ASM)/ Valley Farms Site	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter and historic artifact scatter	Determined eligible	Bernard-Shaw 1990; Kearns et al. 2001; Railey and Yost 2001; DeJongh and Thurtle 2003; Terhune and Garcia 2007
AZ AA:12:739 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Albright 1991
AZ AA:12:741 (ASM)	Prehistoric Hohokam artifact scatter and roasting pit	Determined eligible (D)	Baker and Webb 2001; Kearns et al. 2001; Railey and Yost 2001; Terhune and Garcia 2007
AZ AA:12:742 (ASM)/ Marana Siding	Historic railroad siding	Not considered eligible	Kearns et al. 2001; Railey and Yost 2001; Freuden 2006; Terhune and Garcia 2007
AZ AA:12:745 (ASM)/ Square Hearth Site	Prehistoric Archaic habitation	Determined eligible (D)	Fenicle 2007
AZ AA:12:746 (ASM)/ Santa Cruz Bend; Vacas Muertas	Prehistoric Archaic habitation	Determined eligible (D)	Hill and Garcia 1999
AZ AA:12:788 (ASM)/ Rillito Fan Site	Multicomponent – Prehistoric Archaic and Hohokam habitation	Determined eligible (D)	Wallace 1995
AZ AA:12:789 (ASM)	Prehistoric Hohokam canal	Determined eligible (D)	AZSITE
AZ AA:12:790 (ASM)	Prehistoric Hohokam canal	Considered eligible	AZSITE
AZ AA:12:798 (ASM)/ Slip-up Site	Prehistoric Hohokam artifact scatter	Considered eligible	Slawson 1994
AZ AA:12:801 (ASM)	Prehistoric artifact scatter	Not evaluated	Wallace 1996a
AZ AA:12:820 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter	Not considered eligible	Stephen 1997
AZ AA:12:830 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Larkin et al. 1998
AZ AA:12:836 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and prehistoric/historic cairns	Considered eligible	Fratt 1998

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:857 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter	Considered eligible	Doak 1999
AZ AA:12:858 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter	Considered eligible	Doak 1999; Kearns et al. 2001; Railey and Yost 2001; Freuden 2006
AZ AA:12:859 (ASM)	Prehistoric Hohokam artifact scatter	Considered eligible	Doak 1999; Kearns et al. 2001; Railey and Yost 2001; Smith and Wheeler 2003b
AZ AA:12:862 (ASM)	Historic artifact scatter	Not considered eligible	Sterner 2001
AZ AA:12:870 (ASM); AZ AA:12:895 (ASM)/ Cortaro Farms Canal	Historic canal	Determined eligible (A)	Baker and Webb 2001; Barnes and Wright 2001
AZ AA:12:871 (ASM)	Historic railroad spur	Considered eligible	Railey and Yost 2001
AZ AA:12:872 (ASM)	Prehistoric Hohokam sherd scatter	Considered eligible	Railey and Yost 2001
AZ AA:12:875 (ASM); AZ AA:7:505 (ASM)/ El Paso Natural Gas Pipeline No. 1007	Historic natural gas pipeline (El Paso No. 1007)	Determined eligible (C and D)	Baker and Webb 2001; Hesse and Chenault 2003; Allan 2005; Barr 2006
AZ AA:12:876 (ASM)/ Producers Cotton Oil Company Marana Gin Office and Warehouse	Historic buildings	Considered eligible	Fish et al. 1992; Madsen et al. 1993; Jones 2001a
AZ AA:12:877 (ASM)	Prehistoric habitation	Considered eligible (D)	Terhune and Garcia 2007
AZ AA:12:897 (ASM)	Historic canals and road bed	Determined eligible (A and C)	Terhune and Garcia 2007
AZ AA:12:898 (ASM)	Prehistoric Hohokam artifact scatter	Determined eligible (D)	Terhune and Garcia 2007
AZ AA:12:900 (ASM)/ Cortaro	Historic Southern Pacific railroad station	Not evaluated	AZSITE
AZ AA:12:901 (ASM)	Historic canal	Considered eligible	Freuden 2006
AZ AA:12:902 (ASM)	Historic canal	Considered eligible	AZSITE

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ AA:12:903 (ASM)/ El Camino de Manana	Historic roadway	Considered eligible	Freuden 2006
AZ AA:12:904 (ASM)	Historic roadway	Not considered eligible	Freuden 2006
AZ AA:12:905 (ASM)/ Massingale Road	Historic roadway	Considered eligible	AZSITE
AZ AA:12:907 (ASM)/ Pima Farms Road	Historic roadway	Considered eligible	Freuden 2006
AZ AA:12:911 (ASM)	Prehistoric canal	Considered eligible	AZSITE
AZ AA:12:912 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic Apache/O'odham artifact scatter	Considered eligible	McKee and Dart 2002b
AZ AA:12:953 (ASM)	Multicomponent – Prehistoric artifact scatter and historic artifact scatter	Considered eligible	Estes 2004a
AZ AA:12:964 (ASM)	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter	Not considered eligible	Barr 2004
AZ AA:12:970 (ASM)/ Anderson Clayton Marana Gin	Historic cotton gin	Considered eligible	McKee and Dart 2004
AZ AA:12:971 (ASM)	Historic habitation	Not considered eligible	McKee and Dart 2004
AZ BB:5:123 (ASM)/ Oracle-Tucson Transmission Line	Historic transmission line remnants	Not considered eligible	Brown and Rohman 1994; Kearns et al. 2001; Smith and Wheeler 2003b
AZ BB:9:78 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ BB:9:222 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	AZSITE
AZ BB:13:23 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Diehl 2002b
AZ BB:13:85 (ASM)	Prehistoric Hohokam habitation	Not evaluated	Betancourt 1978
AZ BB:13:86 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Betancourt 1978; Diehl 2004d
AZ BB:13:87 (ASM)	Prehistoric Hohokam hearth	Not evaluated	Betancourt 1978

Table C-2. Cultural Resource Sites Recorded within the Corridor Alternatives

Site Number/ Name	Description	NRHP Eligibility	Reference
AZ BB:13:88 (ASM)	Multicomponent – Prehistoric Hohokam and historic O'odham artifact scatter	Not evaluated	Betancourt 1978
AZ BB:13:110 (ASM)/ St. Mary's Dump	Historic artifact scatter	Determined eligible	Betancourt 1978; Dart 1983
AZ BB:13:156 (ASM)/ Court Street Burials; Court Street Cemetery; Tucson Miscellaneous Sites #10	Historic cemetery	Not evaluated	AZSITE
AZ BB:13:157 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic artifact scatter	Determined eligible	Dart 1983
AZ BB:13:158 (ASM)	Multicomponent – Prehistoric Archaic and Hohokam artifact scatter and historic artifact scatter	Determined eligible	Dart 1983
AZ BB:13:159 (ASM)	Multicomponent – Prehistoric Hohokam artifact scatter and historic O'odham artifact scatter	Determined eligible	Dart 1983
AZ BB:13:319 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Dart 1985
AZ BB:13:320 (ASM)	Prehistoric Hohokam artifact scatter	Not evaluated	Dart 1985
AZ BB:13:425 (ASM)/ Stone Pipe Site	Multicomponent – Prehistoric Archaic and Hohokam habitation	Determined eligible	Hill and Garcia 1999
AZ BB:13:468 (ASM)/ Canal Site	Multicomponent – Prehistoric Hohokam canals and features and a historic canal and features	Determined eligible	AZSITE
AZ BB:13:514 (ASM)	Historic trash dump	Not evaluated	AZSITE
AZ BB:13:623 (ASM)/ Historic Block 54	Historic habitation area/neighborhood block	Not evaluated	AZSITE
AZ BB:13:640 (ASM)	Prehistoric Hohokam canal	Considered eligible	AZSITE
AZ BB:13:668 (ASM)	Multicomponent – Prehistoric habitation and historic habitation	Not evaluated	AZSITE

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Initial Screening Report and Appendix

PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

Passenger Rail Corridor Study
Tucson to Phoenix

INITIAL SCREENING REPORT
LEVEL ONE RESULTS

Submitted by:

ADOT

Arizona Department of Transportation
Multimodal Planning Division
206 S. 17th Avenue, Mail Drop 310B
Phoenix, AZ 85007

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1.0 Introduction

This document outlines the initial screening of the range, or "universe," of alternatives that was conducted for the Arizona Passenger Rail Corridor Study (APRCS) by applying the process established in the *Evaluation Methodology Report*. Each project element - alignment, station, and service type - was evaluated independently according to the methods documented in this report. The intent of this initial screening was to use the project elements to form full corridor alignments, including stations and modal choice. The detailed evaluation of the full alignments is included in this document as part of the Appendix. The alternatives which were advanced to the second level of evaluation in this study are described in the companion document *Range of Alternatives Technical Memorandum*.

In general, the project elements were evaluated as follows:

- **Alignments**: Measurements were made on each unique corridor segment and combined into alignments connecting the two ends of the corridor. The alignments were compared using a variety of factors outlined in Section 2.0. Figure 1 shows each corridor segment and its associated reference number.
- **Stations**: Potential station locations (shown in Figure 2) were evaluated based on defined catchment areas differentiating between commuter and intercity travel markets. The process utilized existing and projected population and employment data to assess the travel market potential, as well as measures of overall mobility and accessibility, and is described in Section 3.0.
- **Service Type**: The evaluation of service type, or mode, compared the feasibility of bus, rail, highway and air modes to serve the Tucson to Phoenix corridor. The service type analysis is at an overview level and is focused on the fact that there is substantial other work already underway on highway projects in the corridor and that air service compared to other surface alternatives does not provide a realistic option.

Figure 1—Individual Corridor Segments

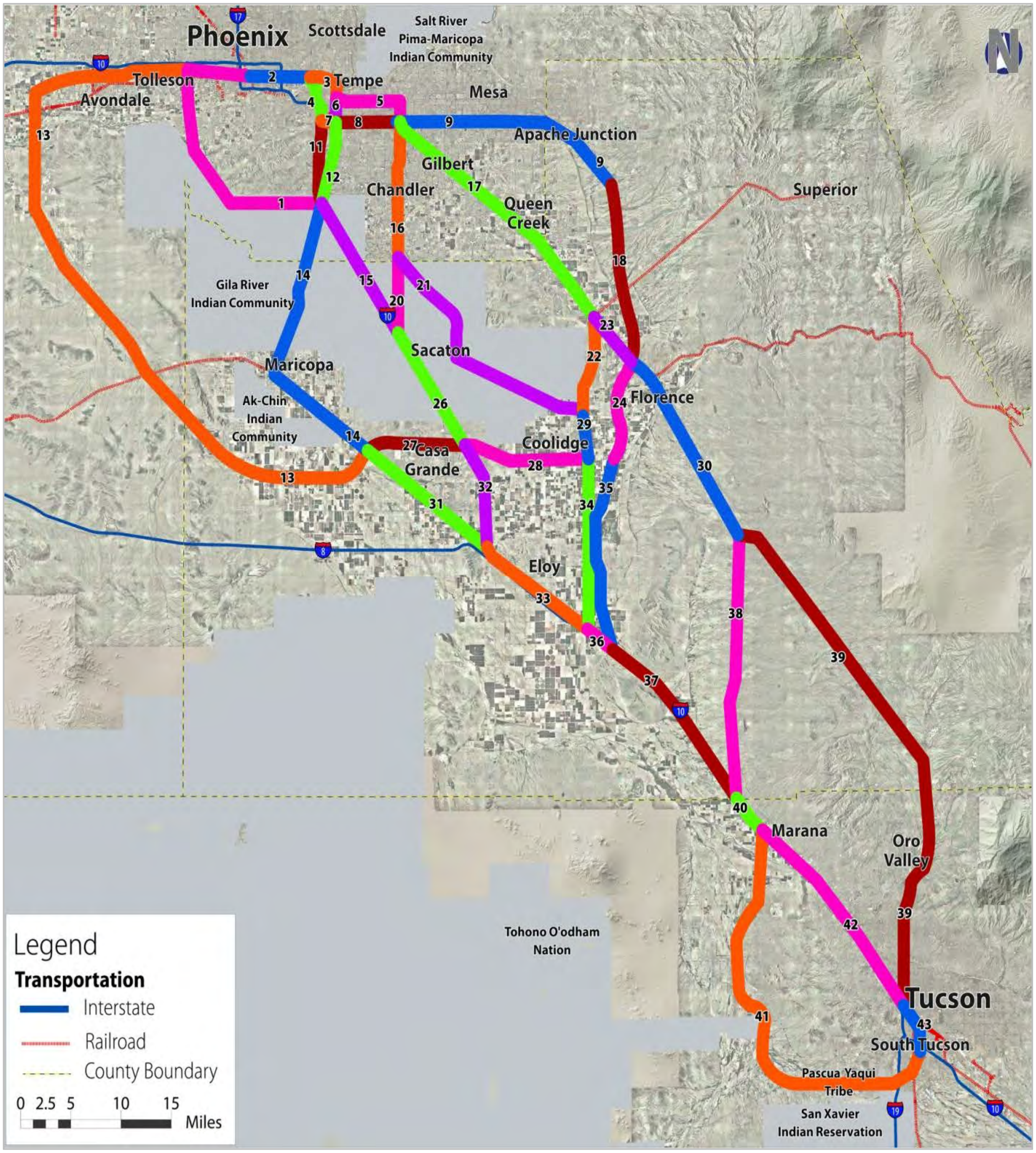
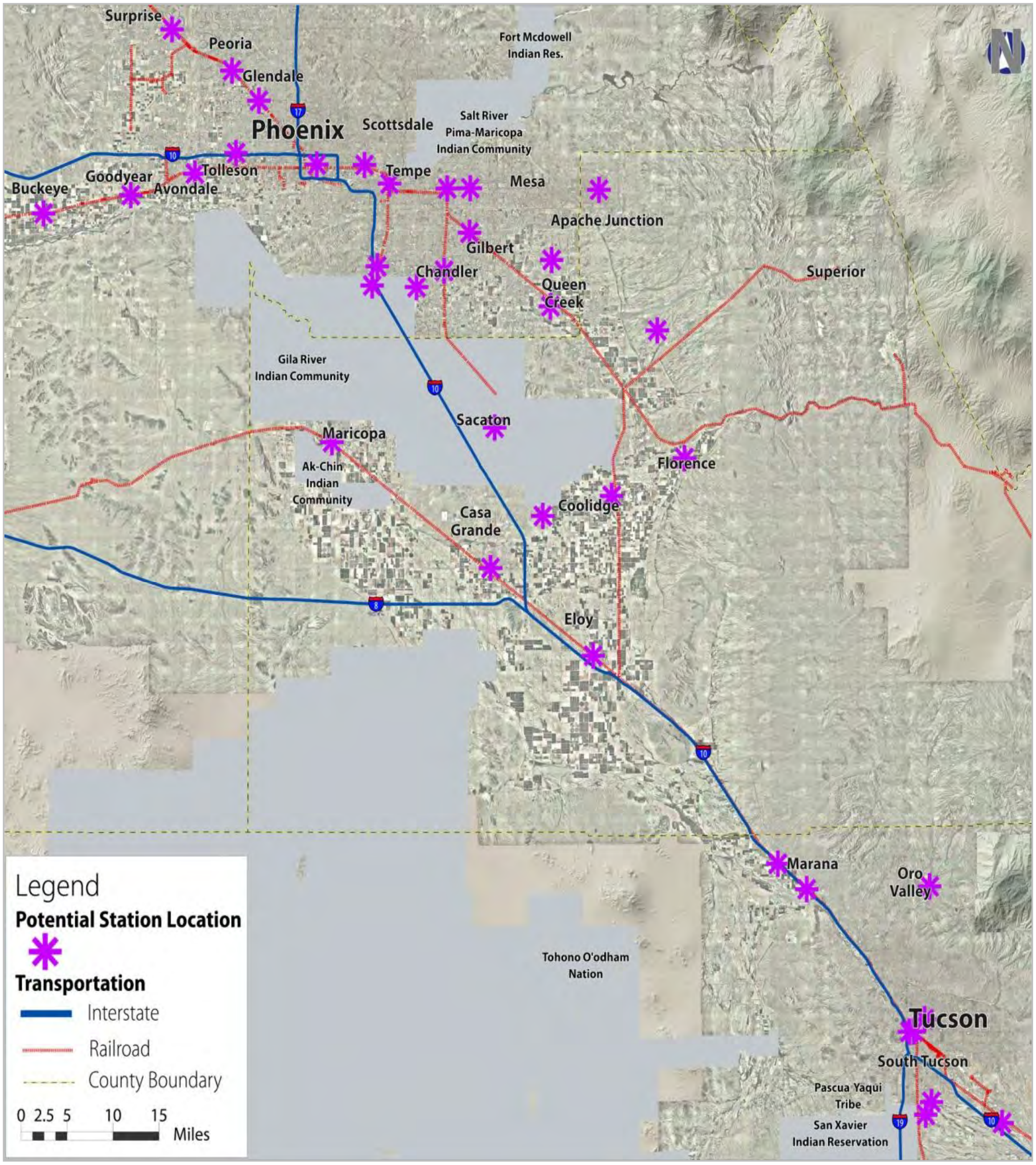


Figure 2—Potential Station Locations



2.0 Alignment Screening

For evaluation purposes, the 40 individual corridor segments shown in Figure 1 were combined to create unique full corridor-long alignment alternatives. Every reasonable combination of segments (e.g., shortest path, no significant out of direction travel, logical geographic placement within the corridor) that could be used to connect Tucson to Phoenix was identified at this step, which yielded a total of 142 alignment alternatives. For purposes of this screening it was not practical to fully evaluate the 142 alignment alternatives. Instead, the screening was conducted on the 40 unique segments. At a later stage in the study, a more detailed evaluation will be conducted on a reduced number of alternatives to determine the most feasible alternative.

An example of how the individual corridor segments were combined into alignment alternatives, in this case Alignment N-6, is shown in Figure 3. A description of how the segments were combined to create the 142 alignments is included in the Appendix.

The measurement categories utilized for this stage of analysis were:

1. Existing or Planned Transportation Use in Corridor,
2. Infringement upon Sensitive Environments,
3. Compatibility with Community Land Use Plans,
4. Institutional Considerations, and
5. Length of Alignment.

For the alignment screening, measurements were made in categories 1 through 4 for each of the 40 segments, with measurements for category 5 being applied to the entire length of the alignment. The outcomes of each measurement criterion were scored on a scale of 1-3, with 3 being the most desirable and 1 being the least desirable, shown graphically as:

- 6 –3
- 3 –2
- 1 –1

The detail of how individual corridor segments were combined to create the alignment alternatives is included in Table 1 of the Appendix. As the detailed alignments have not yet been refined at the initial screening stage, a four-mile buffer along each potential alignment alternative was utilized to assess conditions surrounding each alignment to allow for flexibility in addressing any issues that may arise during later stages of work. The primary approach for each of the measures was to identify the percentage of the length or surface area for each project feature within the four mile width, although a few of the categories allowed for a simple counting of the number of features within the four-mile width. The detail of each of these measurements is included in the next section.

To complete the alignment screening, the results of the individual measurements were combined, weighted and summarized for each alignment alternative to evaluate its overall performance.

Figure 3—Example Alignment Composed of Multiple Individual Corridor Segments

This is an example of how segments were combined into an alternative. Here, segments identified by numbers 43, 42, 40, 37, 35, 24, 18, 9, 5, 3, 2 (sequenced from south to north) were combined to create alternative N-6.

2.1 Existing or Planned Transportation Use

Within the 40 segments identified for evaluation there are existing roadways, existing railroads, planned future roadways, or a combination of existing and future roadway and rail within a single corridor. The existing or planned transportation use in a corridor may enable, support, or conflict with a proposed transportation use identified in this study. In order to assess the existing or planned transportation use in the corridor, the compatibility of the 40 segments was identified as "*manageable,*" "*involved*" or "*difficult*," as defined below.

- Manageable: Current or future roadway and/or rail in corridor enables new transportation use
- Involved: Current or future roadway and/or rail in corridor supports new transportation use
- Difficult: Current or future roadway and/or rail in corridor creates conflict for new transportation use

Each alignment alternative was then evaluated based on the summary of the existing or planned transportation use within each segment. The overall compatibility of an alignment with existing and/or planned transportation use was calculated by proportionally weighting the percent manageable, involved or difficult within each alignment alternative and normalized by subtracting from the highest possible value of 300, which is the total maximum value if the entire corridor was considered manageable, as shown below.

Normalized Threshold Value = 300 - (% Difficult x 100) + (% Involved x 200) + (% Manageable x 300)

Table 1 details the thresholds and corresponding evaluation value assigned for existing transportation use evaluation. The summary of existing transportation operations by segment is shown graphically Figure 4 and detailed in Table 2; segment numbers correspond to those shown in Figure 1. The summary of existing transportation operations by alternative alignment is shown in Table 2 of the Appendix.

Table 1—Existing Transportation Use Measurement (Threshold by Alternative Alignment)

Compatibility with Existing/ Planned Transportation Use	Normalized Threshold Value	Evaluation Value
High	< 74	●
Medium	75–99	◑
Low	> 100	○

Figure 4—Existing or Planned Transportation Use

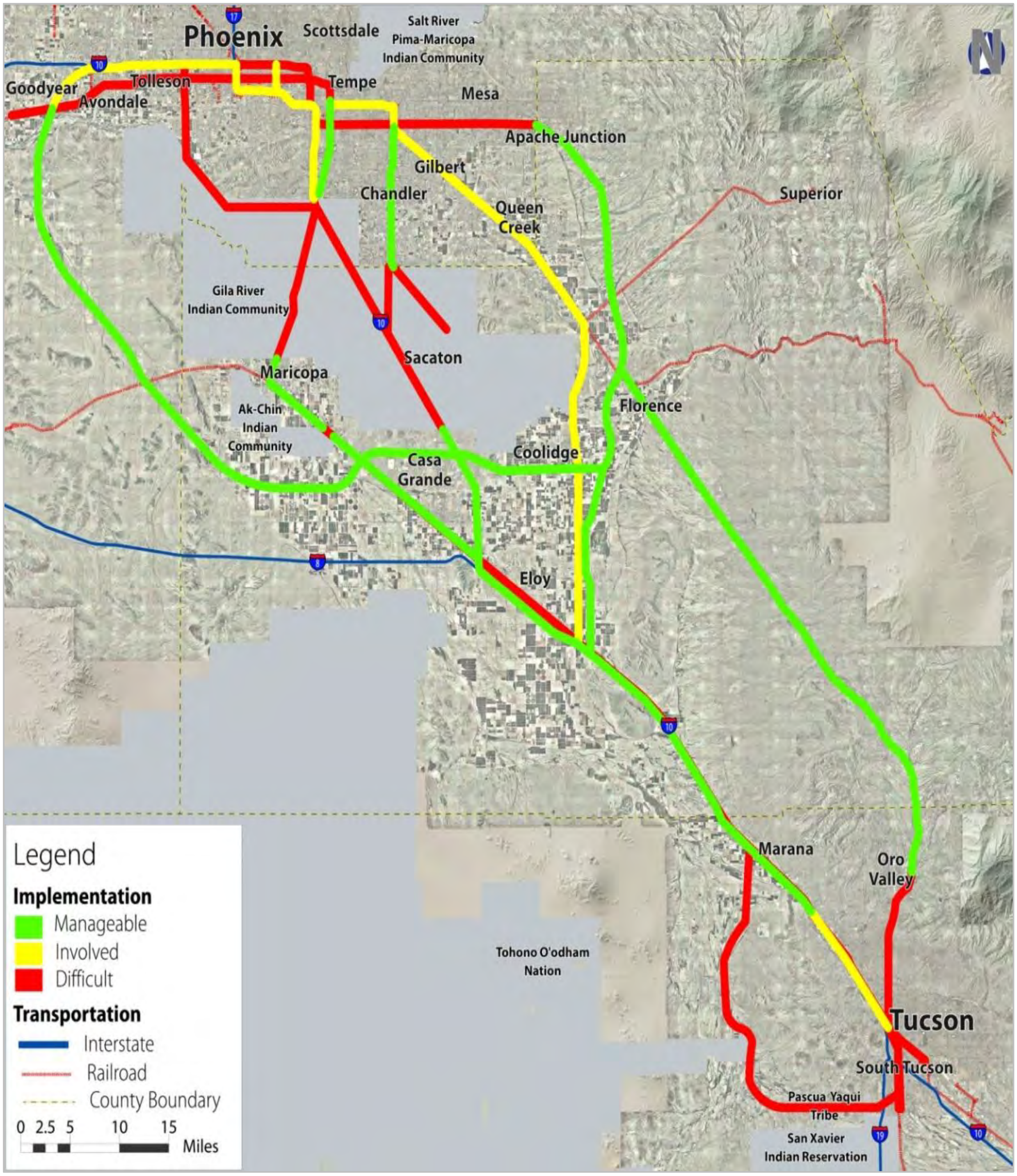


Table 2—Existing Transportation Operations Evaluation by Segment

Segment Number	% Length Difficult	% Length Involved	% Length Manageable	Total Length (Miles)
1	100%	-	-	28.7
2	100%	-	-	5.9
3	100%	-	-	4.0
4	55%	45%	-	4.4
5	-	100%	-	8.3
6	-	-	100%	2.2
7	100%	-	-	1.5
8	100%	-	-	6.1
9	61%	-	39%	23.6
11	-	84%	15%	7.5
12	18%	-	84%	7.4
13	28%	-	72%	77.4
14	55%	-	45%	27.8
15	100%	-	-	13.9
16	-	-	100%	12.2
17	-	100%	-	26.4
18	-	-	100%	16.1
20	100%	-	-	6.8
21	100%	-	-	25.1
22	-	100%	-	9.1
23	-	-	100%	5.4
24	-	-	100%	9.3
26	79%	-	21%	12.1
27	-	-	100%	9.8
28	-	-	100%	12.6
29	-	100%	-	3.9
30	-	-	100%	31.0
31	-	-	100%	14.7
32	-	-	100%	9.8
33	-	-	100%	12.5
34	-	100%	-	15.4
35	-	-	100%	17.8
36	-	-	100%	3.1
37	-	-	100%	18.3
38	-	-	100%	23.8
39	-	-	100%	50.6
40	-	-	100%	3.9
41	100%	-	-	40.5
42		60%	40%	21.2
43	100%	-	-	4.6

Example: Using alignment alternative E-7[1] as an example, Table 3 and Table 4 summarize the process used to calculate the Transportation Operations Measurement using the information in Table 1, Table 2 and Appendix Table 2.

Table 3—Part 1 Transportation Operations Measurement Example Calculation for Alternative E-7

Segment Number	Difficult		Involved		Manageable		Length (miles)
	Miles	%	Miles	%	Miles	%	
2	5.9	100%					5.9
4	2.4	54%	2.0	46%			4.4
7	1.5	100%					1.5
12	1.3	17%			6.2	83%	7.4
14	15.3	55%			12.4	45%	27.8
31					14.7	100%	14.7
33					12.5	100%	12.5
36					3.1	100%	3.1
37					18.3	100%	18.3
40					3.9	100%	3.9
41	40.5	100%					40.5
43	4.6	99%			0.0	1%	4.6
TOTAL	**71.4**		**2.0**		**71.2**		**144.6**

Table 4—Part 2 Transportation Operations Measurement Example Calculation for Alternative E-7

Summary	Total Miles	%	Weight Value	Weighted Threshold Value (rounded)	Normalized Threshold Value
Difficult	71.4	49.4%	100	49	300 – 200 = 100
Involved	2.0	1.4%	200	3	
Manageable	71.2	49.2%	300	148	
TOTAL	144.6	**100%**		**200**	

Using Table 1, the value of 100 is considered to have low compatibility with existing/planned transportation operations and, therefore, receives a ranking of ○.

2.2 Infringement upon Sensitive Environments

At the initial screening level, the impact of each of the 40 segments on sensitive environments was assessed based on two readily available data sets: biological resources and historic places. The biological resources assessment was based upon the Species and Habitat Conservation Guide (SHCG) tool published in 2011 by the Arizona Game and Fish Department. This SHCG tool provided a broad regional assessment of conservation potential in the study area. Historic places were assessed based on those listed on the National Register of Historic Places, which documents historic buildings, districts, sites, structures and objects. Several other environmental concerns were addressed in other measurement categories, including land use, land ownership and length of alignment.

[1] Outlined in the introduction of Section 2.0 and detailed in the Appendix.

In the SHCG, conservation potential is measured in six levels, as shown in Figure 5, where 1 is the lowest conservation potential (lightest blue color) and 6 is the highest conservation potential (darkest blue). To assess the biological resources impact by segment the levels were combined and analyzed as follows:

- Low Conservation Potential: Levels 1-2
- Medium Conservation Potential: Levels 3-4
- High Conservation Potential: Levels 5-6

The Low, Medium and High Conservation Potential was quantified in square miles by segment and summarized by alignment alternative. The infringement of an alignment upon biological resources was calculated by proportionally weighting the percentage of conservation potential in each alignment alternative with higher benefit accruing to the high conservation areas, as shown below.

Normalized Threshold Value = *(% Low Conservation Potential x 100) +*
(% Medium Conservation Potential x 200) +
(% High Conservation Potential x 300)

This normalized threshold value was then assigned a quantitative value reflecting the overall conservation potential for an alignment. Table 5 details the thresholds associated with each level of conservation potential as well as the evaluation value assigned for each alternative alignment. The summary of the infringement on biological resources by segment is detailed in Table 6, and the summary of infringement on sensitive environments by alternative alignment is in Table 3 of the Appendix.

Table 5—Infringement upon Biological Resources Measurement Threshold by Alternative Alignment

Conservation Potential	Normalized Threshold Value	Evaluation Value
Low	> 200	●
Medium	200–180	◑
High	< 180	○

Figure 5—Infringement on Biological Resources

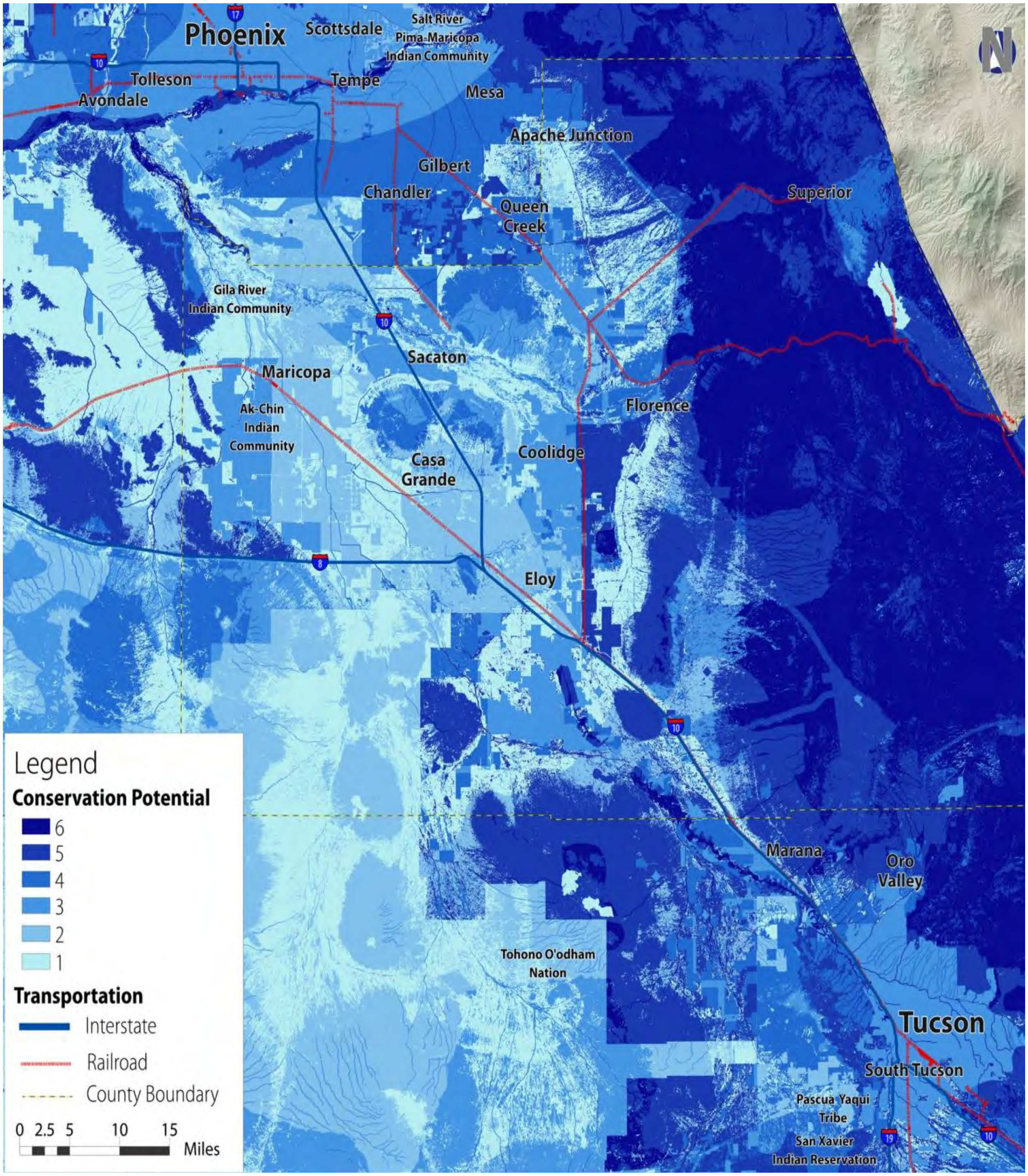


Table 6—Infringement upon Biological Resources by Segment

Segment Number	Low Potential		Medium Potential		High Potential		Total Area (acres)
	acres	%	acres	%	acres	%	
1	23.56	21.1%	82.20	73.7%	5.77	5.2%	111.53
2	0.01	0.0%	21.19	91.0%	2.08	8.9%	23.28
3	0.03	0.2%	12.49	77.8%	3.54	22.1%	16.05
4	0.00	0.0%	14.83	86.4%	2.32	13.5%	17.16
5	0.14	0.4%	31.14	96.2%	1.08	3.3%	32.36
6	-	-	8.91	100.0%	0.00	-	8.91
7	0.06	1.4%	3.82	86.0%	0.55	12.4%	4.44
8	-	-	24.93	99.0%	0.26	1.0%	25.19
9	19.43	21.1%	59.96	65.1%	12.68	13.8%	92.06
11	1.12	3.8%	27.08	90.9%	1.58	5.3%	29.78
12	1.04	3.5%	28.32	95.4%	0.30	1.0%	29.67
13	142.38	46.2%	146.83	47.7%	18.90	6.1%	308.11
14	92.75	83.9%	17.43	15.8%	0.31	0.3%	110.49
15	32.29	60.8%	20.17	38.0%	0.66	1.2%	53.13
16	0.30	0.6%	41.95	90.4%	4.16	9.0%	46.41
17	10.21	9.7%	85.08	81.2%	9.53	9.1%	104.81
18	30.55	47.6%	22.69	35.4%	10.88	17.0%	64.12
20	12.34	42.7%	15.81	54.7%	0.74	2.6%	28.89
21	41.64	40.3%	59.85	57.9%	1.95	1.9%	103.45
22	11.23	31.3%	21.80	60.7%	2.87	8.0%	35.90
23	7.06	32.7%	13.64	63.2%	0.87	4.0%	21.57
24	6.70	18.0%	15.05	40.4%	15.52	41.6%	37.27
26	18.58	38.5%	29.25	60.7%	0.39	0.8%	48.22
27	25.47	65.8%	12.78	33.0%	0.45	1.2%	38.70
28	18.53	38.1%	25.37	52.1%	4.78	9.8%	48.67
29	0.19	1.2%	5.63	36.6%	9.58	62.2%	15.40
30	14.70	19.4%	17.50	23.1%	43.69	57.6%	75.89
31	52.56	91.3%	4.27	7.4%	0.72	1.3%	57.55
32	33.64	88.9%	3.96	10.5%	0.25	0.7%	37.84
33	32.98	63.7%	16.18	31.3%	2.61	5.0%	51.76
34	13.97	22.7%	24.47	39.8%	23.06	37.5%	61.50
35	19.48	27.4%	12.98	18.2%	38.71	54.4%	71.17
36	5.09	42.4%	1.85	15.4%	5.06	42.1%	12.01
37	31.95	43.6%	14.72	20.1%	26.53	36.2%	73.20
38	23.19	24.4%	21.90	23.0%	50.05	52.6%	95.13
39	4.15	2.0%	50.93	25.1%	147.68	72.8%	202.76
40	2.83	18.2%	7.58	48.8%	5.10	32.9%	15.52
41	44.61	27.6%	85.44	52.9%	31.58	19.5%	161.64
42	7.23	8.4%	53.11	62.1%	25.25	29.5%	85.59
43	0.22	1.2%	16.51	92.6%	1.08	6.1%	17.82

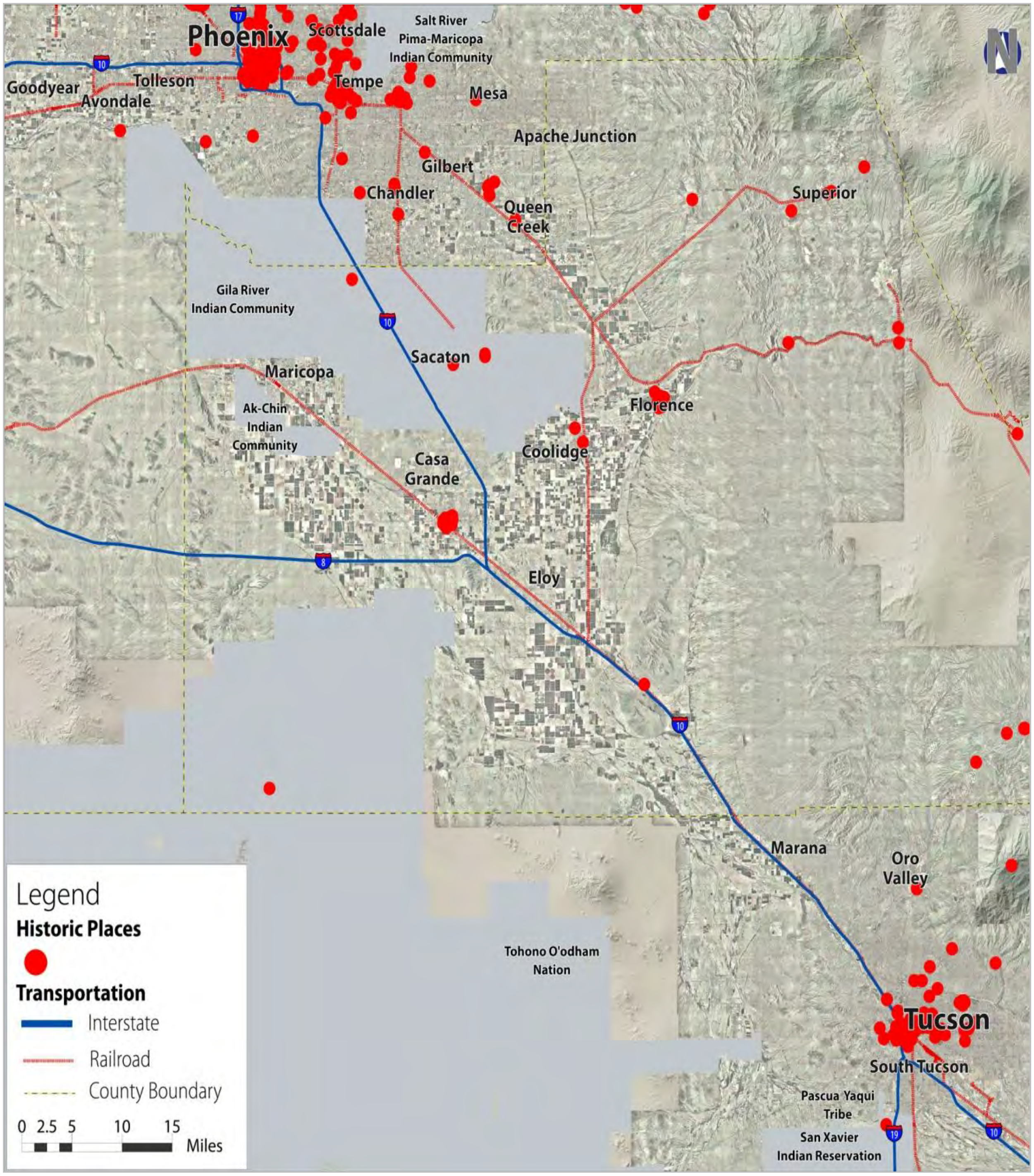
Known historical, cultural and archeological places, as documented in the National Register of Historic Places, are shown graphically in Figure 6. To assess the potential effects on these resources, the total number of resources was identified for each segment and summarized by alternative alignment. The potential impacts to resources were assigned a value based on the number of sites within the 4-mile wide evaluation area, consisent with the thresholds defined in Table 7.

Table 7—National Register of Historical Places Measurement Threshold by Alternative Alignment

Potential Impacts	Normalized Threshold Value	Evaluation Value
Low	< 175	●
Medium	175–225	◑
High	>225	○

The summary of the potential impacts on biological resources and historic/cultural/archeological places is shown by segment in Table 8. The evaluation by alignment alternative is included in the summary of infringement upon sensitive environments shown in Table 3 of the Appendix.

Figure 6—Historic/Cultural/Archeological Places



Source: National Register of Historic Places

Table 8—Infringement upon Known Historic Places by Segment

Segment Number	National Register of Historic Places (Total)
1	38
2	268
3	76
4	35
5	53
6	18
7	5
8	5
9	-
11	-
12	2
13	36
14	-
15	3
16	12
17	18
18	-
20	-
21	6
22	-
23	-
24	-
26	-
27	-
28	-
29	5
30	47
31	105
32	-
33	-
34	-
35	-
36	-
37	3
38	-
39	40
40	-
41	3
42	33
43	110

2.3 Compatibility with Community Land Use Plans

Existing land use data and future land use plans of communities within the study area were reviewed to assess the compatibility of a transportation corridor with community land use plans. Both existing and future resident and employment land uses were identified.

As the study corridor covers many jurisdictions, there was a range of land use terminology utilized in adopted plans. The most common discrepancy across the corridor was the land use classification of "entitled residential and employment," used in Pinal County and the Cities of Marana and Oro Valley, defined as lands that possess all requisite approvals to begin construction, a term not used at all in the other jurisdictions. Therefore for evaluation purposes, "entitled residential and employment" was categorized as "existing," to be consistent with naming conventions in Maricopa County and elsewhere in Pima County.

For this measure, the land use compatibility within the 4 mile alignment was classified as *"high compatibility," "medium compatibility,"* or *"low compatibility,"* as described below:

- **High Compatibility**: Most of the land is currently undeveloped and could accommodate a future transportation corridor
- **Medium Compatibility**: Some of the land is currently undeveloped and could accommodate a future transportation corridor
- **Low Compatibility**: A significant portion of the land is currently developed and it would be difficult to accommodate a future transportation corridor

Because this analysis is for the overall impacts of the alternative alignment, the alternatives that would impact *future* residential or employment lands were preferred over alternatives that would impact *existing and entitled* lands. The rationale for this treatment was that disrupting existing land uses may require extensive mitigation or acquisition to build whereas future land uses can be developed to accommodate the transportation corridor, minimizing infringement upon the environment and seamlessly integrating into the community. The station evaluation, addressed in Section 3.0, addresses the advantage for existing residential and employment near specific station areas.

The weighting and ranking threshold values used to assess compatibility with local plans, as well as the thresholds for levels of compatibility and evaluation value are summarized in Table 9.

Table 9—Compatibility with Community Land Use Plans

Level of Compatibility with Local Plans	Percent of Total Length Thresholds	Evaluation Value
High	> 90%	●
Medium	90–75%	◑
Low	<75%	○

The summary of the land use compatibility is shown by segment in Tables 10 and 11, and represented graphically in Figure 7. The evaluation by alignment alternative is shown in Table 4 of the Appendix.

Figure 7—Land Use Compatibility

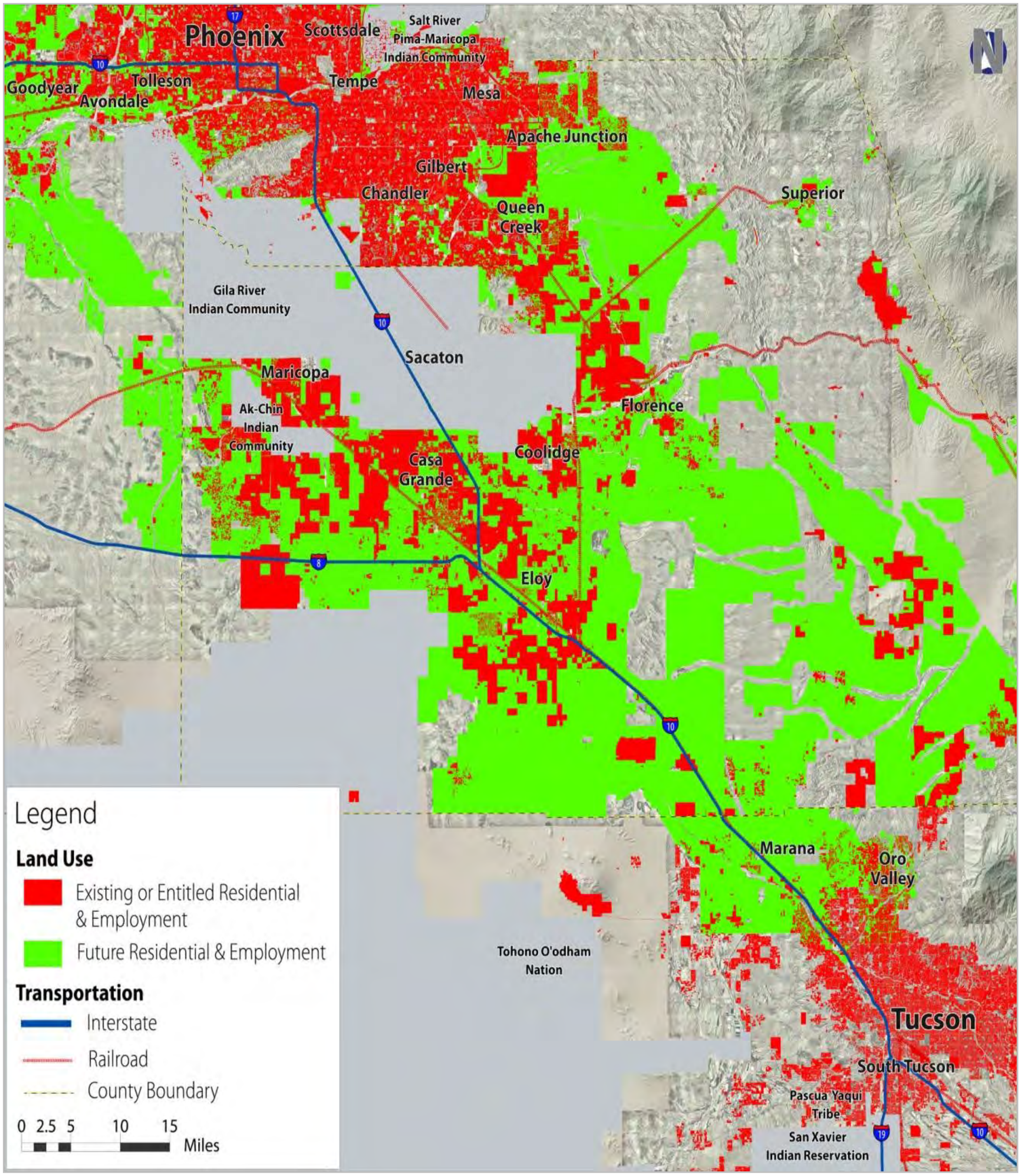


Table 10—Existing Land Use Compatibility Evaluation by Segment

Segment Number	Segment Area (sq miles)	Existing or entitled residential and employment land uses					Existing Employment (%)
		Existing Residential (sq mi)	Existing Residential (%)	Residential Entitlements (sq mi)	Residential Entitlements (%)	Existing Employment (sq mi)	
1	111.5	23.10	21.0%	-	-	22	20.0%
2	23.3	6.6	28.3%	-	-	11	47.2%
3	16.1	2.5	15.5%	-	-	7.6	47.2%
4	17.2	3.7	21.5%	-	-	9.5	55.2%
5	32.4	16.2	50.0%	-	-	11.7	36.1%
6	8.9	4.5	50.6%	-	-	3.5	39.3%
7	4.4	2.5	56.8%	-	-	0.7	15.9%
8	25.2	14.2	56.3%	-	-	7.7	30.6%
9	92.1	37.4	40.6%	0.3	0.3%	12.8	13.9%
11	29.8	11.7	39.3%	-	-	8.9	29.9%
12	29.7	13.6	45.8%	-	-	9.9	33.3%
13	308.1	41.6	13.5%	28.9	9.4%	31.9	10.4%
14	110.5	4.8	4.3%	27.1	24.5%	2.4	2.2%
15	53.1	1	1.9%	-	-	2.6	4.9%
16	46.4	26	56.0%	-	-	11.6	25.0%
17	104.8	39.5	37.7%	12.7	12.1%	15.1	14.4%
18	64.1	1.5	2.3%	15.4	24.0%	-	-
20	28.9	2.5	8.7%	-	-	0.1	0.3%
21	103.4	3.1	3.0%	2.5	2.4%	1.1	1.1%
22	35.9	0.9	2.5%	12.2	34.0%	2.1	5.8%
23	21.6	0.8	3.7%	13.8	63.9%	0.8	3.7%
24	37.3	1.3	3.5%	12.1	32.4%	1.5	4.0%
26	48.2	1.7	3.5%	2.8	5.8%	0.1	0.2%
27	38.7	2.7	7.0%	20.6	53.2%	3	7.8%
28	48.7	3.6	7.4%	15.8	32.4%	1.3	2.7%
29	15.4	1.6	10.4%	4.2	27.3%	0.8	5.2%
30	75.9	4.4	5.8%	11.7	15.4%	1.7	2.2%
31	57.6	3.8	6.6%	18.5	32.1%	5.5	9.5%
32	37.8	3.8	10.1%	18.5	48.9%	1.3	3.4%
33	51.8	2.3	4.4%	15.3	29.5%	2.3	4.4%
34	61.5	1.4	2.3%	16	26.0%	1.5	2.4%
35	71.2	1.6	2.2%	10.5	14.7%	1.4	2.0%
36	12	0.5	4.2%	2	16.7%	0.1	0.8%
37	73.2	0.6	0.8%	3.1	4.2%	0.9	1.2%
38	95.1	1.5	1.6%	0.3	0.3%	0.5	0.5%
39	202.8	30.4	15.0%	1.5	0.7%	9.5	4.7%
40	15.5	0.2	1.3%	0.4	2.6%	-	-
41	161.6	27.5	17.0%	-	-	10.5	6.5%
42	85.6	23.3	27.2%	-	-	10	11.7%
43	17.8	4.4	24.7%	-	-	5.3	29.8%

Table 11—Future Land Use Compatibility Evaluation by Segment

Segment Number	Segment Area (sq mi)	Future residential or employment land uses			
		Future Residential (sq mi)	Future Residential (%)	Future Employment (sq mi)	Future Employment (%)
1	111.5	35	31.4%	29.2	26.2%
2	23.3	7	30.0%	11.9	51.1%
3	16.1	2.8	17.4%	6.5	40.4%
4	17.2	3.9	22.7%	10	58.1%
5	32.4	16.5	50.9%	10.9	33.6%
6	8.9	4.5	50.6%	3.3	37.1%
7	4.4	2.6	59.1%	0.7	15.9%
8	25.2	14.4	57.1%	7	27.8%
9	92.1	68.3	74.2%	17.9	19.4%
11	29.8	12.2	40.9%	10.7	35.9%
12	29.7	14	47.1%	11.1	37.4%
13	308.1	179.2	58.2%	66.3	21.5%
14	110.5	32.9	29.8%	11.1	10.0%
15	53.1	3.4	6.4%	5.1	9.6%
16	46.4	27.2	58.6%	12.1	26.1%
17	104.8	68	64.9%	28.7	27.4%
18	64.1	53	82.7%	5.5	8.6%
20	28.9	2.6	9.0%	0.9	3.1%
21	103.4	11.7	11.3%	1.2	1.2%
22	35.9	20.4	56.8%	2.7	7.5%
23	21.6	16.2	75.0%	1.8	8.3%
24	37.3	25.8	69.2%	8.2	22.0%
26	48.2	9.6	19.9%	2.2	4.6%
27	38.7	30.8	79.6%	6.7	17.3%
28	48.7	35.8	73.5%	6.9	14.2%
29	15.4	12.1	78.6%	3	19.5%
30	75.9	57.6	75.9%	12.1	15.9%
31	57.6	41.2	71.5%	13.7	23.8%
32	37.8	30.4	80.4%	4.6	12.2%
33	51.8	31.7	61.2%	16.6	32.0%
34	61.5	33.6	54.6%	25.9	42.1%
35	71.2	36.3	51.0%	35	49.2%
36	12	8.1	67.5%	3.9	32.5%
37	73.2	44.3	60.5%	21.3	29.1%
38	95.1	56.9	59.8%	8.7	9.1%
39	202.8	115.9	57.1%	6.1	3.0%
40	15.5	12.6	81.3%	2.7	17.4%
41	161.6	14.8	9.2%	14.3	8.8%
42	85.6	28.1	32.8%	15.4	18.0%
43	17.8	-	-	-	-

2.4 Institutional Considerations

Each alignment alternative was evaluated for potential institutional considerations by measuring the percentage of each alignment alternative subject to the range of institutional controls identified as the following (and depicted in Figure 8):

- National Monuments, National Parks, or Military Areas,
- Tribal Lands,
- Existing or future parks/ preserves, wilderness areas, Areas of Critical Environmental Concern (as designated by the Bureau of Land Management (BLM)) or Game and Fish Lands,
- Federal Lands (e.g., BLM or Bureau of Reclamation (BOR)), or
- State Trust Land, county, or city lands.

The management and control of land varies by institution. The following approvals are required to convert land for use as a transportation corridor:

- National Monuments, National Parks, or Military Areas require Congressional approval and have potential Section 4(f) implications,
- Tribal Lands require Tribal approval and Bureau of Indian Affairs (BIA) concurrence,
- Existing or future parks/ preserves, wilderness areas, areas of critical environmental concern, or Game and Fish lands have potential Section 4(f) implications,
- Federal Lands require Federal agency approval, and
- State Trust Land, county, or city lands require approval by the applicable jurisdiction(s).

For this measure, the land use compatibility within the 4-mile wide alignment was classified as *"high compatibility," "medium compatibility,"* or *"low compatibility,"* as described below, with thresholds summarized by institution type in Table 12.

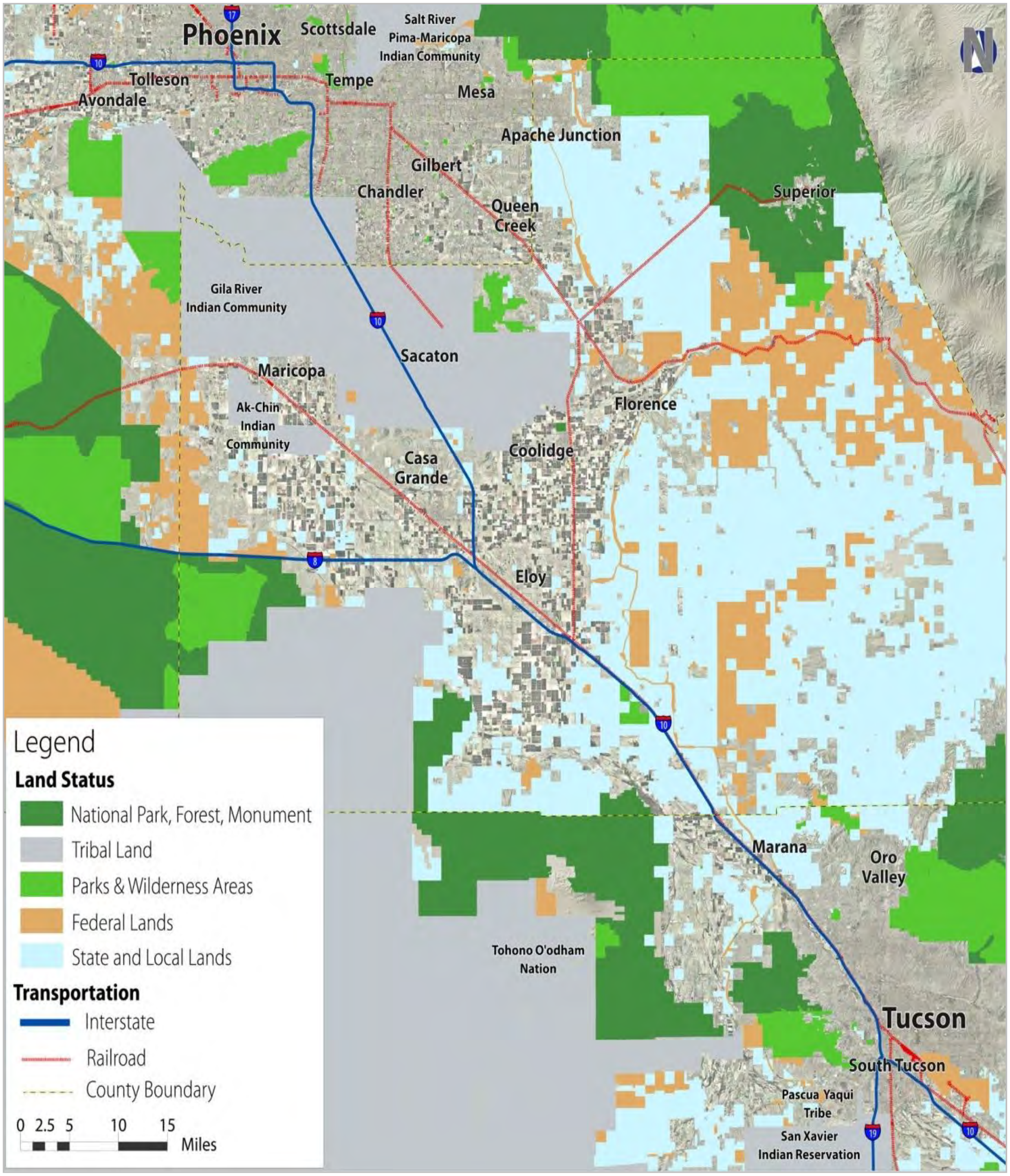
- High Compatibility: Minimal impacts to national protected, tribal, park, or Federal lands, *or* significant use of State Trust lands
- Medium Compatibility: Some impacts to national protected, tribal, park, Federal lands, or State Trust lands
- Low Compatibility: Significant impacts to national protected, tribal, park, or Federal lands, *or* minimal use of State Trust lands

The summary of the land use compatibility factors is shown by segment in Table 13. The evaluation of institutional considerations by alignment alternative is shown in Table 5 of the Appendix.

Table 12—Institutional Considerations

Level of Compatibility with Institutional Considerations	Percent of Total Alignment Thresholds	Evaluation Value
National Monuments, National Forests, National Parks, Wilderness Areas, Areas of Critical Environmental Concern		
High	< 1%	●
Medium	1–5%	◑
Low	> 5%	○
Tribal Lands		
High	< 5%	●
Medium	5–15%	◑
Low	> 15%	○
Parks (State, Regional, or Local) or Game and Fish Areas		
High	< 3%	●
Medium	3–5%	◑
Low	> 5%	○
Federal Lands and Military Areas		
High	< 2%	●
Medium	2–5%	◑
Low	> 5%	○
State Trust Lands		
High	< 20%	●
Medium	20–15%	◑
Low	> 15%	○

Figure 8—Institutional Character of the Corridor



**Parks & Wilderness Areas include Areas of Critical Environmental Concern, Federal Lands includes Military Areas.*

Table 13—Institutional Considerations Evaluation by Segment

Segment Number	Segment Area (sq mi)	National Protected Lands		Tribal Lands		Parks		Federal Lands		State Trust Lands	
		(sq mi)	(%)	(sq mi)	(%)	(sq mi)	(%)	(sq mi)	(%)	(sq mi)	(%)
1	111.5	-	0.0%	38	34.1%	5.3	4.8%	0.3	0.3%	0.9	0.8%
2	23.3	0.1	0.4%	-	-	0.6	2.6%	-	-	0.3	1.3%
3	16.1	0.6	3.7%	-	-	2.8	17.4%	0.1	0.6%	-	-
4	17.2	-	-	-	-	0.4	2.3%	-	-	-	-
5	32.4	-	-	0.9	2.8%	0.5	1.5%	0.1	0.3%	0.1	0.3%
6	8.9	-	-	-	-	0.1	1.1%	-	-	-	-
7	4.4	-	-	-	-	0.8	18.2%	-	-	-	-
8	25.2	-	-	-	-	0.5	2.0%	-	-	0.1	0.4%
9	92.1	-	-	-	-	0.7	0.8%	1.1	1.2%	28.3	30.7%
11	29.8	-	-	3	10.1%	3	10.1%	-	-	0.1	0.3%
12	29.7	-	-	2.9	9.8%	0.8	2.7%	-	-	0.1	0.3%
13	308.1	6.8	2.2%	-	-	10.7	3.5%	47.3	15.4%	22.1	7.2%
14	110.5	-	-	64.6	58.5%	-	-	0.3	0.3%	4.3	3.9%
15	53.1	-	-	51.8	97.6%	-	-	-	-	-	-
16	46.4	-	-	-	-	0.6	1.3%	-	-	0.1	0.2%
17	104.8	-	-	0.1	0.1%	0.7	0.7%	-	-	11.6	11.1%
18	64.1	-	-	-	-	-	-	2.3	3.6%	37.5	58.5%
20	28.9	-	-	25.5	88.2%	-	-	-	-	-	-
21	103.4	0.1	0.1%	89.2	86.3%	-	-	-	-	0.3	0.3%
22	35.9	0.1	0.3%	10.1	28.1%	-	-	1.5	4.2%	5.6	15.6%
23	21.6	-	-	0.4	1.9%	-	-	2.1	9.7%	3.5	16.2%
24	37.3	-	-	-	0.0%	-	-	0.4	1.1%	2.7	7.2%
26	48.2	-	-	37.9	78.6%	-	-	0.3	0.6%	3.5	7.3%
27	38.7	-	-	0.1	0.3%	-	-	0.6	1.6%	4.4	11.4%
28	48.7	-	-	2.9	6.0%	-	-	0.1	0.2%	3.1	6.4%
29	15.4	0.6	3.9%	-	-	-	-	0.1	0.6%	-	-
30	75.9	0.3	0.4%	-	-	-	-	1.4	1.8%	35	46.1%
31	57.6	0.3	0.5%	-	-	-	-	-	-	1.9	3.3%
32	37.8	-	-	0.1	0.3%	-	-	-	-	3.2	8.5%
33	51.8	0.5	1.0%	-	-	-	-	-	-	0.7	1.4%
34	61.5	-	-	-	-	-	-	0.3	0.5%	8.1	13.2%
35	71.2	-	-	-	-	0.6	0.8%	1.2	1.7%	18.5	26.0%
36	12	-	-	-	-	0.2	1.7%	-	-	4.9	40.8%
37	73.2	-	-	-	-	14	19.1%	2.5	3.4%	55.8	76.2%
38	95.1	-	-	-	-	23.2	24.4%	24	25.2%	62.4	65.6%
39	202.8	11.6	5.7%	-	-	13.3	6.6%	5.9	2.9%	110.5	54.5%
40	15.5	-	-	-	-	-	-	1	6.5%	3.8	24.5%
41	161.6	5.6	3.5%	12.2	7.5%	-	-	12.3	7.6%	29.2	18.1%
42	85.6	0.2	0.2%	-	-	0.3	0.4%	1	1.2%	10.1	11.8%
43	17.8	-	-	-	-	0.3	1.7%	-	-	-	-

2.5 Length of Alignment Alternatives

The length of each alignment alternative was utilized for the initial screening to represent a range of potential impacts, including:

- **Financial**: in general, the longer an alternative, the higher the anticipated cost
- **Constructability**: the longer an alternative, the more likely to encounter difficult construction issues
- **Environmental**: the longer an alternative, the more opportunity to infringe upon sensitive environments
- **Safety**: the longer an alternative, the more likely the exposure to conflicts
- **Ridership**: the longer an alternative, the longer the travel time

Because of the relatively flat topography in this region, no alternatives were considered which would incur significant, costly design solutions (e.g. tunneling through a mountain) as a trade-off to length.

For this measure, the alternative lengths were compared and classified for evaluation purposes as *"below average," "average,"* and *"above average,"* as described in Table 14.

Table 14—Length of Alignment Alternatives Evaluation

Length of Alignment	Length Thresholds	Evaluation Value
Below Average	< 125	●
Average	125–150	◑
Above Average	> 150	○

The length of each alternative alignment is shown in Table 6 of the Appendix. Alternative alignments ranged from a minimum of 117.2 miles to a maximum of 185.7 miles, where the average alternative alignment length was 140.7 miles. The alternatives were evaluated based on the overall length of each alternative and assigned an evaluation value based on the thresholds shown in Table 14. The longer alternatives were considered less desirable due to considerations such as higher cost, increased travel time and higher likelihood of environmental impacts.

2.6 Alignment Corridor Weighting

Each of the alignments was evaluated based on the combined measurements presented in Sections 2.1 through 2.5. The evaluation value assigned to each alternative for each measurement category and subcategory was weighted based on the significance and impact of each as well as input from the scoping process, as documented in the *Scoping Report* prepared April 2012. Given that there were five overall measurement categories, several with subcategories, a total value of seven was allotted, allowing each of the measurement categories and subcategories to be weighted according to importance. These weights are detailed in Table 15. At this early stage of the Alternatives Analysis, because of the importance and multiple influences of the length measurement, this was weighted as the most significant measurement category.

Table 15—Alignment Corridor Weighting

Measurement Category	Weight	% Subcategory	% Measurement Category
Measurement Category 1: Overall Existing Transportation Operations	1.0	14.3%	14.3%
Measurement Category 2: Overall Environmental	1.1	-	15.7%
Subcategory 2.1 Infringement upon biological resources	0.8	11.4%	
Subcategory 2.2 National Register of Historic Places	0.3	4.3%	
Measurement Category 3: Overall compatibility with adopted land use and transportation plans	1.0	-	14.3%
Subcategory 3.1 Existing/Entitled Residential and Employment	0.3	4.3%	
Subcategory 3.2 Future Residential and Employment	0.7	10.0%	
Measurement Category 4: Institutional Considerations	0.9	-	12.9%
Subcategory 4.1 National Protected Lands	0.1	1.4%	
Subcategory 4.2 Tribal Lands	0.5	7.1%	
Subcategory 4.3 Parks	0.1	1.4%	
Subcategory 4.4 Federal Lands	0.1	1.4%	
Subcategory 4.5 State Trust Lands	0.1	1.4%	
Measurement Category 5: Length	3	42.9%	42.9%
TOTAL	**7**	**100.0%**	**100.0%**

2.7 Alignment Corridor Screening Results

Using the weighting and ranking process described in the previous sections, the individual segments and overall alternative alignments were evaluated and ranked. Segments which were evaluated to have the lowest ranking, ○, in all measures were eliminated from further evaluation. For the length measure, which was evaluated by overall alignment, the segments which were only included in alignments ranking were removed from further evaluation.

Based on this evaluation, 10 segments were removed from further consideration. The 10 segments removed are depicted graphically in gray in Figure 9. The green segments are those advanced for further study. The segments advanced for further study and removed from further consideration are summarized in Table 16. The gray routes or portions thereof may be reintroduced if needed based on stakeholder input and further evaluation.

Figure 9—Segments Used in Alternatives for Further Study

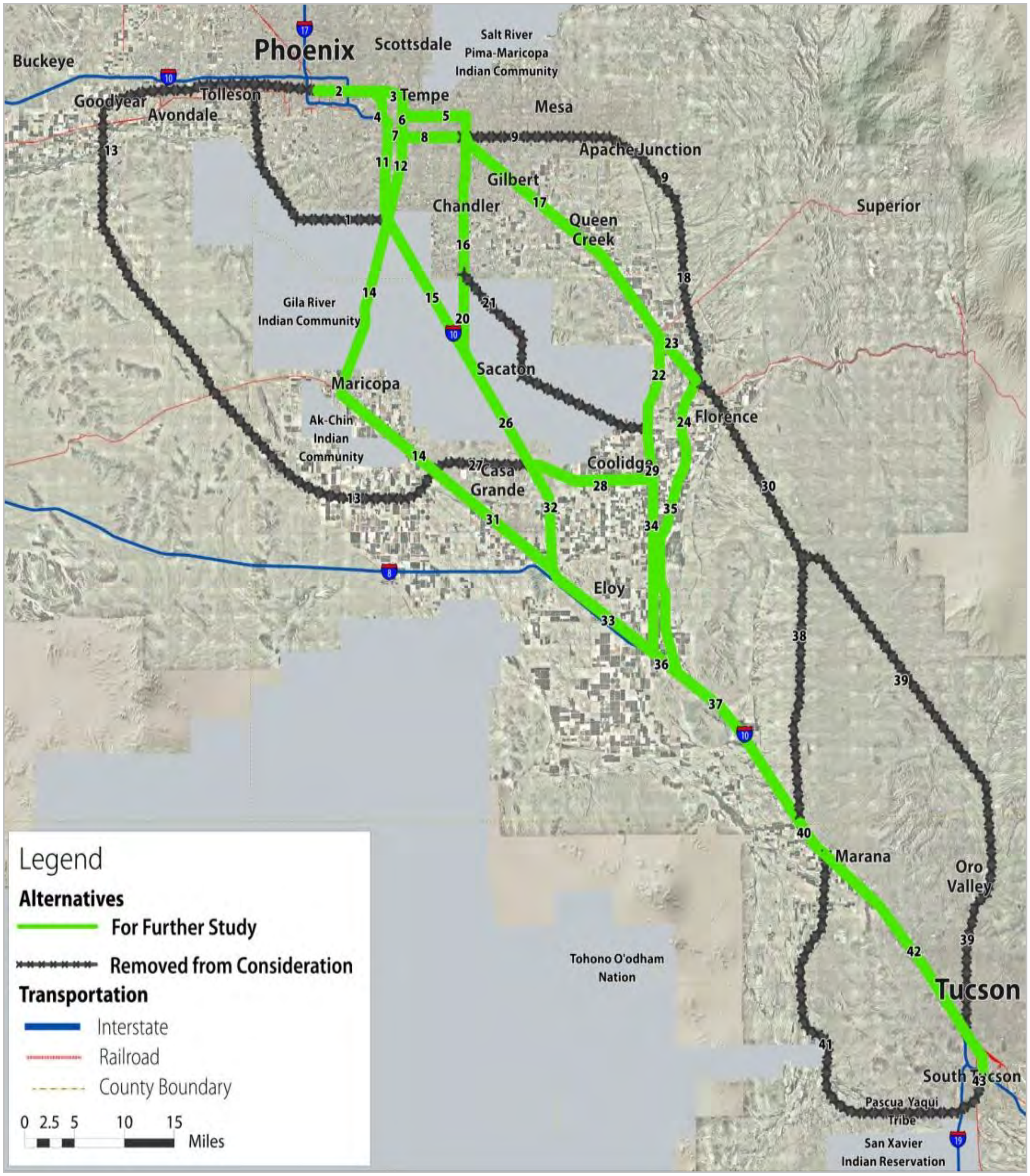


Table 16—Segments Advanced and Removed for Study

Segment Number	Advanced	Removed
1		X
2	X	
3	X	
4	X	
5	X	
6	X	
7	X	
8	X	
9		X
11	X	
12	X	
13		X
14	X	
15	X	
16	X	
17	X	
18		X
20	X	
21		X
22	X	
23	X	
24	X	
26	X	
27		X
28	X	
29	X	
30		X
31	X	
32	X	
33	X	
34	X	
35	X	
36	X	
37	X	
38		X
39		X
40	X	
41		X
42	X	
43	X	

3.0 Potential Station Location Screening

This section describes screening methods used to evaluate potential station locations, including the inputs and parameters used, and summarizes the results of the application of each measure.

As depicted graphically in Figure 2, 38 potential station locations were identified and evaluated as part of the initial screening process. As part of the screening, each station was broadly assessed based on the proximity to potential travel markets and access to transportation connections with the intention of quantitatively defining the potential ridership market of a given location. The broad assessment differentiated between commuter rail and intercity rail services, generally focusing on a one mile catchment area for commuter rail and a five mile catchment area for intercity rail, as described in detail in Section 3.1. The purpose of the screening at this level was to:

- Serve as a guide for development of alternatives
- Enable an understanding of how well-prepared communities are for high capacity transit
- Provide input for station typology suggestions

This section describes measurement inputs and parameters used to evaluate the potential stations. Broadly, the criteria can be categorized into two groupings: 1) travel markets, which encompass proximity to existing and future population and employment centers, and 2) transportation connections which assess first and last mile connections available from the station.

It should be noted that for purposes of the initial screening, a preliminary location within each community was selected to permit evaluation. This location was used for evaluation purposes only and does not necessarily indicate a precise location of the potential station, which has yet to be determined and will be assessed in later stages of this study. At this level, stations were evaluated and compared using travel markets and connections. No stations were removed from evaluation at this stage.

3.1 Travel Markets

The travel market evaluation is a multi-part measure that is evaluated and ranked using existing and future population and employment information within specified radii of the selected location as quantitative measures to determine commuter and intercity stations with greatest ridership potential. Emphasis is placed on stations with existing proximity to areas of greatest ridership potential. The variables utilized to examine the station area travel markets were distance from station (both for existing and future years) and demographics, where each of these variables was assessed for both commuter and intercity travel markets.

Distance was a variable used in assessing potential demand in station areas, with an emphasis on the one mile catchment area for potential commuter travel demand and an emphasis on the five mile catchment area for potential intercity travel demand.

Existing and future (2035) timeframes were utilized to assess potential ridership in proximity to station areas, with preference given to existing conditions over the future planned conditions (known versus anticipated conditions) for both commuter and intercity travel demand. The demographic analysis utilized population and employment figures, with an emphasis on employment for both commuter and intercity.

Using the weightings described above and defined in Table 17, all 38 stations were evaluated for each of the market types (commuter or intercity), demographic variables (population or employment) and catchment areas (one mile or five mile) and subsequently ranked. The rankings of stations by commuter, intercity, one mile and five mile assessment is shown in Table 18 through Table 21. Using these station rankings, quantitative values were then assigned for each of the demographic characteristics commensurate with the ranking, which is described in Table 22, where 1 is the highest (best) ranking. These quantitative values were then converted to a five-point scale for the overall station evaluation, which is described in Section 3.3.

Table 17—Station Area Demographic Weighting

Variable	Commuter	Intercity
Distance Variable	**Weight**	**Weight**
One-mile catchment	65%	20%
Five-mile catchment	35%	80%
Time Period	**Weight**	**Weight**
Existing	60%	60%
Future (2035)	40%	40%
Metric	**Weight**	**Weight**
Population	35%	35%
Employment	65%	65%

Table 18—Commuter Station Rankings, One Mile Catchment Area

	Existing		Future	
Name	Population	Employment	Population	Employment
Avondale (Avondale Blvd / Buckeye Rd)	9	3	8	2
Buckeye (Miller Rd / Baseline Rd)	7	8	4	5
Downtown Chandler	13	17	9	11
S. Price Corridor—Hi Tech Center	6	15	3	9
W. Chandler Blvd. CDB	6	21	4	14
Wild Horse Pass	1	12	1	8
Downtown Gilbert	11	20	8	13
Glendale (Grand Ave / 59th Ave)	13	19	8	13
Goodyear (Cotton Lane / MC85)	4	2	3	1
Downtown Mesa	13	23	9	15
LRT End Station (Mesa)	14	14	9	8
Phoenix Mesa Gateway Airport	0	1	0	1
Peoria (Grand Ave / 83rd Ave)	12	14	8	10
Downtown Phoenix	12	25	6	17
PHX Sky Harbor	3	21	5	14
South Mountain Freeway	8	16	7	11
Downtown Queen Creek	6	7	5	7
Surprise (Grand Ave / Bell Rd)	8	13	6	9
Downtown Tempe / ASU	11	23	7	16
Marana (Ina Rd / I-10)	5	11	0	0
Marana (Marana Rd / Sandario Rd)	4	10	2	7
Marana (Tangerine Rd / I-10)	1	3	1	2
Oro Valley	4	5	2	4
Amtrak Tucson Station	10	25	6	16
Raytheon	1	6	1	4
Tucson Historic Depot	10	24	6	15
Tucson International Airport	2	18	1	12
University of Arizona	11	22	7	15
University of Arizona Research Center	3	18	3	12
Downtown Apache Junction	8	10	5	6
Downtown Casa Grande	9	16	5	10
Central Arizona College	3	4	2	3
Downtown Coolidge	7	9	4	5
Downtown Eloy	7	5	4	3
Downtown Florence	5	12	3	8
Downtown Maricopa	10	8	7	6
Downtown Sacaton	2	1	2	0
Superstition Vistas (Future Activity Center)	0	0	0	0

Table 19—Commuter Station Rankings, Five Mile Catchment Area

Name	Existing		Future	
	Population	Employment	Population	Employment
Avondale (Avondale Blvd / Buckeye Rd)	4	7	3	5
Buckeye (Miller Rd / Baseline Rd)	2	4	1	2
Downtown Chandler	5	10	4	6
S. Price Corridor—Hi Tech Center	5	9	3	6
W. Chandler Blvd. CDB	4	10	3	7
Wild Horse Pass	4	8	2	5
Downtown Gilbert	7	11	5	7
Glendale (Grand Ave / 59th Ave)	7	11	5	7
Goodyear (Cotton Lane / MC85)	3	5	2	3
Downtown Mesa	7	11	5	8
LRT End Station (Mesa)	7	10	4	7
Phoenix Mesa Gateway Airport	3	5	2	3
Peoria (Grand Ave / 83rd Ave)	6	9	4	6
Downtown Phoenix	7	14	4	9
PHX Sky Harbor	6	13	4	9
South Mountain Freeway	6	8	4	6
Downtown Queen Creek	3	4	2	3
Surprise (Grand Ave / Bell Rd)	5	7	3	4
Downtown Tempe / ASU	6	13	4	9
Marana (Ina Rd / I-10)	0	2	0	0
Marana (Marana Rd / Sandario Rd)	1	3	0	2
Marana (Tangerine Rd / I-10)	2	3	1	2
Oro Valley	2	4	1	3
Amtrak Tucson Station	6	12	4	8
Raytheon	4	7	2	5
Tucson Historic Depot	5	12	3	8
Tucson International Airport	4	8	3	5
University of Arizona	5	13	3	8
University of Arizona Research Center	2	6	1	4
Downtown Apache Junction	3	6	2	4
Downtown Casa Grande	3	6	2	4
Central Arizona College	1	1	1	1
Downtown Coolidge	1	1	1	1
Downtown Eloy	1	1	1	1
Downtown Florence	1	3	0	2
Downtown Maricopa	2	2	1	1
Downtown Sacaton	0	0	0	0
Superstition Vistas (Future Activity Center)	0	0	0	0

Table 20—Intercity Station Rankings, One Mile Catchment Area

Name	Existing		Future	
	Population	Employment	Population	Employment
Avondale (Avondale Blvd / Buckeye Rd)	3	1	2	1
Buckeye (Miller Rd / Baseline Rd)	2	2	1	2
Downtown Chandler	4	5	3	3
S. Price Corridor—Hi Tech Center	2	5	1	3
W. Chandler Blvd. CDB	2	6	1	4
Wild Horse Pass	0	4	0	2
Downtown Gilbert	4	6	2	4
Glendale (Grand Ave / 59th Ave)	4	6	3	4
Goodyear (Cotton Lane / MC85)	1	1	1	0
Downtown Mesa	4	7	3	5
LRT End Station (Mesa)	4	4	3	3
Phoenix Mesa Gateway Airport	0	0	0	0
Peoria (Grand Ave / 83rd Ave)	4	4	2	3
Downtown Phoenix	4	8	2	5
PHX Sky Harbor	1	7	1	4
South Mountain Freeway	2	5	2	3
Downtown Queen Creek	2	2	1	2
Surprise (Grand Ave / Bell Rd)	2	4	2	3
Downtown Tempe / ASU	3	7	2	5
Marana (Ina Rd / I-10)	1	3	0	0
Marana (Marana Rd / Sandario Rd)	1	3	1	2
Marana (Tangerine Rd / I-10)	0	1	0	1
Oro Valley	1	2	1	1
Amtrak Tucson Station	3	8	2	5
Raytheon	0	2	0	1
Tucson Historic Depot	3	7	2	5
Tucson International Airport	1	6	0	4
University of Arizona	3	7	2	4
University of Arizona Research Center	1	5	1	4
Downtown Apache Junction	3	3	2	2
Downtown Casa Grande	3	5	2	3
Central Arizona College	1	1	1	1
Downtown Coolidge	2	3	1	1
Downtown Eloy	2	1	1	1
Downtown Florence	2	4	1	2
Downtown Maricopa	3	3	2	2
Downtown Sacaton	1	0	0	0
Superstition Vistas (Future Activity Center)	0	0	0	0

Table 21—Intercity Station Rankings, Five Mile Catchment Area

Name	Existing		Future	
	Population	Employment	Population	Employment
Avondale (Avondale Blvd / Buckeye Rd)	10	17	6	11
Buckeye (Miller Rd / Baseline Rd)	5	8	3	5
Downtown Chandler	11	22	8	14
S. Price Corridor—Hi Tech Center	11	20	7	14
W. Chandler Blvd. CDB	10	23	7	15
Wild Horse Pass	9	19	5	12
Downtown Gilbert	16	24	11	16
Glendale (Grand Ave / 59th Ave)	17	25	11	17
Goodyear (Cotton Lane / MC85)	6	11	4	6
Downtown Mesa	15	26	11	17
LRT End Station (Mesa)	15	24	10	16
Phoenix Mesa Gateway Airport	7	12	6	8
Peoria (Grand Ave / 83rd Ave)	13	21	9	13
Downtown Phoenix	16	31	10	20
PHX Sky Harbor	14	30	9	21
South Mountain Freeway	15	19	10	13
Downtown Queen Creek	7	9	4	7
Surprise (Grand Ave / Bell Rd)	10	15	7	10
Downtown Tempe / ASU	14	29	9	20
Marana (Ina Rd / I-10)	0	5	0	0
Marana (Marana Rd / Sandario Rd)	2	6	1	3
Marana (Tangerine Rd / I-10)	4	8	2	5
Oro Valley	5	10	3	6
Amtrak Tucson Station	13	28	8	18
Raytheon	8	16	5	10
Tucson Historic Depot	12	27	7	18
Tucson International Airport	9	18	6	12
University of Arizona	12	29	8	19
University of Arizona Research Center	4	14	2	9
Downtown Apache Junction	8	13	5	9
Downtown Casa Grande	6	13	4	8
Central Arizona College	2	2	2	2
Downtown Coolidge	3	3	2	2
Downtown Eloy	3	3	1	1
Downtown Florence	1	7	0	4
Downtown Maricopa	5	4	3	3
Downtown Sacaton	0	1	0	1
Superstition Vistas (Future Activity Center)	1	0	1	0

Table 22—Station Area Demographic Ranking

Commuter		Intercity	
Total Population within Catchment Area (Rank)	Value	Total Population within Catchment Area (Rank)	Value
Total Population within One Mile			
< 7	3	< 7	3
7–10	2	7–10	2
> 10	1	> 10	1
Total Employment within One Mile			
< 15	3	< 3	3
15–22	2	3–8	2
> 22	1	> 8	1
Total Population within Five Miles			
< 5	3	< 8	3
5–8	2	8–14	2
> 8	1	> 14	1
Total Employment within Five Miles			
< 8	3	< 10	3
8–15	2	10–25	2
> 15	1	> 25	1

3.2 Connections from the Station

Each potential station location was evaluated for transportation connections from the station area using the five categories below to evaluate the range of transportation modes available:

- **Transportation Connections**: pedestrian, bicycle, and local street connections were measured by an intersection count within a one-mile catchment area as a surrogate for urban density.
- **Fixed Guideway Transit Connections**: fixed guideway transit connections (existing, planned and programmed) within the one-mile catchment area were identified for each potential station location.
- **Other Transit Connections**: the number of non-fixed-guideway transit connections was identified within the catchment areas.
- **Freeway Connections:** freeway connections were identified within the catchment areas for commuter rail and the distance from the centroid of the potential station location to the nearest freeway was measured for intercity rail.
- **Airport Connections**: a straight-line distance from the centroid of the station location to the nearest commercial aviation passenger terminal was measured.

The evaluation of the commuter station area emphasized the transit and transportation connections while the intercity station area evaluation emphasized the freeway and airport connections. Using the measurement variables and weightings described above and defined in Table 23, all 38 stations were evaluated and ranked. Quantitative values were then assigned for each of the measurement variables commensurate with the weighting, as described in Table 24. These quantitative values were then converted to a five-point scale for the overall station evaluation, which is described in Section 3.3.

Table 23—Station Area Transportation Connections Weighting

Distance Variable	Commuter		Intercity	
	Weight Percentage	Weight	Weight Percentage	Weight
Freeway Connections	13%	1.0	33%	4.0
Airport Connections	13%	1.0	33%	4.0
Fixed Transit Connections	25%	2.0	17%	2.0
Other Transit Connections	25%	2.0	17%	2.0
Pedestrian, Bicycle and Local Street Connections	25%	2.0	0%	0.0

Table 24—Station Area Connections Ranking

Commuter		Intercity	
Total Connections within One-Mile (Count)	Value	Total Connections within One-Mile (Rank)	Value
Freeway Connections			
> 1	3	< 3	3
		3–10	2
< 1	1	> 10	1
Airport Connections			
< 8	3	< 1	3
8–24	2	1–5	2
>	1	> 5	1
Fixed-Guideway Transit Connections			
> 1	3	> 1	3
< 1	1	< 1	1
Other Transit Connections			
> 10	3	> 6	3
10–6	2	6–3	2
< 6	1	< 3	1
Pedestrian, Bicycle and Local Street Connections			
> 327	3	> 150	3
327–216	2	150–100	2
< 216	1	< 100	1

3.3 Station Location Weighting

Each measurement category and subcategory was assigned a weight consistent with the significance of the measurements based on input from scoping. These weights were applied to the measurements presented in Sections 3.1 and 3.2 and are summarized in Table 25.

Table 25—Station Area Weighting

Measurement Category	Weight	%
Demographic	4.0	44.4%
Connections	5.0	55.6%
TOTAL	**9**	**100.0%**

3.4 Station Location Screening Results

Table 26 and Table 27 provide a summary of the 38 potential stations that were evaluated for commuter and intercity service based on the measurement criteria described in the previous sections. In these tables, the potential stations are ranked in descending order beginning with the highest ranking stations. The rating for the travel markets and connections criteria are included, each rated on a five-point scale based on the weightings described in Sections 3.1 and 3.2. The rating, on a ten-point scale, is the basis for the overall ranking. The highest ranked stations are those that would be more desirable to bundle with alignments to create a complete alignment.

Figure 1 through Figure 38 of the Appendix detail the complete description of the station locations.

Table 26—Commuter Potential Station Location Ranking

County	Name	Travel Markets	Connections	Overall	Rank
Maricopa	Downtown Phoenix	5.0	5.0	10.0	**1**
Pima	Tucson Historic Depot	5.0	5.0	10.0	**1**
Pima	Tucson Convention Center	5.0	5.0	10.0	**1**
Maricopa	Downtown Tempe / ASU	5.0	4.4	9.4	**4**
Pima	University of Arizona	5.0	4.1	9.1	**5**
Maricopa	LRT End Station West (West Valley)	4.4	4.1	8.5	**6**
Maricopa	Downtown Mesa	5.0	3.4	8.4	**7**
Maricopa	LRT End Station East (Mesa)	5.0	3.4	8.4	**7**
Maricopa	Glendale (Grand Ave / 59th Ave)	5.0	2.8	7.8	**9**
Maricopa	Phoenix Sky Harbor	4.4	3.1	7.5	**10**
Maricopa	Downtown Chandler	5.0	2.2	7.2	**11**
Maricopa	Peoria (Grand Ave / 83rd Ave)	5.0	2.2	7.2	**11**
Maricopa	Downtown Gilbert	5.0	0.9	5.9	**13**
Maricopa	W. Chandler Blvd. CDB	4.4	0.9	5.3	**14**
Maricopa	Surprise (Grand Ave / Bell Rd)	3.8	1.3	5.1	**15**
Pinal	Downtown Casa Grande	3.1	1.3	4.4	**16**
Maricopa	Avondale (Avondale Blvd / Buckeye Rd)	2.5	1.6	4.1	**17**
Maricopa	S. Price Corridor—Hi Tech Center	3.1	0.9	4.0	**18**
Pima	Tucson International Airport	2.5	1.3	3.8	**19**
Pinal	Downtown Apache Junction	3.1	0.3	3.4	**20**
Pinal	Downtown Coolidge	1.3	1.6	2.9	**21**
Maricopa	Wild Horse Pass	1.9	0.9	2.8	**22**
Pima	University of Arizona Research Center	1.9	0.9	2.8	**22**
Maricopa	Buckeye (Miller Rd / Baseline Rd)	1.3	0.6	1.9	**24**
Maricopa	Phoenix Mesa Gateway Airport	1.3	0.6	1.9	**24**
Maricopa	Downtown Queen Creek	1.3	0.6	1.9	**24**
Pima	Raytheon	1.3	0.6	1.9	**24**
Pinal	Downtown Eloy	1.3	0.6	1.9	**24**
Pinal	Downtown Florence	1.3	0.6	1.9	**24**
Pinal	Downtown Maricopa	1.3	0.6	1.9	**24**
Pima	Marana (Ina Rd / I-10)	0.0	1.6	1.6	**31**
Pima	Marana (Marana Rd / Sandario Rd)	0.6	0.6	1.2	**32**
Pima	Marana (Tangerine Rd / I-10)	0.0	0.6	0.6	**33**
Pima	Oro Valley	0.0	0.3	0.3	**34**
Pinal	Downtown Sacaton	0.0	0.3	0.3	**34**
Pinal	Superstition Vistas (Future Activity Center)	0.0	0.3	0.3	**34**
Maricopa	Goodyear (Cotton Lane / MC 85)	0.0	0.0	0.0	**37**
Pinal	Central Arizona College	0.0	0.0	0.0	**37**

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Table 27—Intercity Potential Station Location Ranking

County	Name	Travel Markets	Connections	Overall	Rank
Maricopa	PHX Sky Harbor	3.8	2.1	10.0	**1**
Maricopa	Downtown Phoenix	2.5	1.3	9.2	**2**
Maricopa	Downtown Tempe / ASU	5.0	2.5	9.2	**2**
Maricopa	Downtown Mesa	4.4	1.7	8.3	**4**
Maricopa	LRT End Station West (West Valley)	5.0	2.1	8.3	**4**
Pima	Amtrak Tucson Station	2.5	1.7	8.3	**4**
Pima	Tucson Historic Depot	5.0	2.1	8.3	**4**
Pima	University of Arizona	5.0	1.7	8.3	**4**
Pima	Tucson International Airport	2.5	0.8	8.0	**9**
Maricopa	LRT End Station East (Mesa)	5.0	3.3	7.7	**10**
Maricopa	Downtown Chandler	4.4	3.3	7.5	**11**
Maricopa	W. Chandler Blvd. CDB	1.3	3.3	7.1	**12**
Maricopa	Downtown Gilbert	4.4	2.1	7.1	**12**
Maricopa	Glendale (Grand Ave / 59th Ave)	5.0	4.2	6.7	**14**
Maricopa	Peoria (Grand Ave / 83rd Ave)	5.0	5.0	6.5	**15**
Pima	Raytheon	5.0	3.3	6.3	**16**
Maricopa	S. Price Corridor—Hi Tech Center	3.1	1.7	6.1	**17**
Maricopa	Avondale (Avondale Blvd / Buckeye Rd)	3.8	0.8	5.9	**18**
Maricopa	Downtown Queen Creek	5.0	4.2	4.8	**19**
Pinal	Downtown Apache Junction	1.3	2.5	4.8	**19**
Maricopa	Phoenix Mesa Gateway Airport	1.9	1.7	4.6	**21**
Maricopa	Surprise (Grand Ave / Bell Rd)	0.6	1.7	4.6	**21**
Pinal	Downtown Casa Grande	1.9	1.3	4.6	**21**
Maricopa	Wild Horse Pass	5.0	3.3	4.2	**24**
Pima	University of Arizona Research Center	2.5	3.8	4.2	**24**
Maricopa	Buckeye (Miller Rd / Baseline Rd)	5.0	3.3	3.8	**26**
Pima	Marana (Ina Rd / I-10)	3.8	4.2	3.8	**26**
Pima	Marana (Marana Rd / Sandario Rd)	5.0	3.3	3.6	**28**
Maricopa	Goodyear (Cotton Lane / MC 85)	2.5	1.7	3.3	**29**
Pima	Oro Valley	3.1	1.7	3.2	**30**
Pinal	Downtown Eloy	3.8	0.8	3.0	**31**
Pinal	Downtown Coolidge	0.6	1.7	2.7	**32**
Pinal	Downtown Florence	1.9	0.8	2.5	**33**
Pinal	Downtown Maricopa	1.3	1.7	2.5	**33**
Pima	Marana (Tangerine Rd / I-10)	2.5	0.0	2.3	**35**
Pinal	Central Arizona College	2.5	0.0	2.3	**35**
Pinal	Downtown Sacaton	0.6	0.8	1.4	**37**
Pinal	Superstition Vistas (Future Activity Center)	0.0	0.0	0.0	**38**

4.0 Modes

Four transportation modes were examined to connect the Tucson and Phoenix metropolitan areas: bus, rail, highway (auto) and air. Personal auto was not carried forward as a mode in this analysis because it has been and is being addressed as part of a number of other studies within the region. The characteristics and feasibility of bus, rail and air modes are described below.

4.1 Bus

- **Average Cost per Mile**[2]: $0.92
- **CO2 Emissions**: 56 g/pass-mile
- **Energy Use** : 749 BTU/pass-mile
- **Implementation Status**: No current plans for exclusive right-of-way for buses between Tucson and Phoenix. There is existing bus service on I-10.
- **Potential Service Characteristics**: Opportunity for stations in many intermediate communities between Tucson and Phoenix, offering a range of connection options.

4.2 Rail

- **Average Cost per Mile**: $0.63
- **CO2 Emissions**: 160 g/pass-mile
- **Energy Use**: 1850 BTU/pass-mile
- **Implementation Status**: Rail connection between Tucson and Phoenix identified in State Rail Plan.
- **Potential Service Characteristics**: Opportunity for stations in a limited number of communities between Tucson and Phoenix.

4.3 Air

- **Average Cost per Mile**: $16.13
- **CO2 Emissions**: 243 g/pass-mile
- **Energy Use**: 3260 BTU/pass-mile
- **Implementation Status:** No current plans for expansion of air service between Tucson and Phoenix.
- **Potential Service Characteristics:** Limited to stations in Tucson and Phoenix.

Due to the cost and limited service characteristics of air, only the bus and rail modes were advanced for further consideration.

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[2] Bureau of Transportation Statistics, 2011

5.0 Summary

The range of alternatives (ROA) process introduced all reasonable route alignments and system hub station locations that have been evaluated as part of the APRCS study process. The information from the ROA process is utilized in the initial screening of alignments and provided a fatal flaw and/or risk assessment to help select choices that best meet the project Purpose and Need.

Throughout the initial screening process, the evaluation methodology established an appropriate level of analysis to identify a set of complete corridor alternatives. The screening criteria relied as much as possible upon quantitative measures, with minimal use of qualitative assessments. Qualitative assessments were made to establish a tiered ranking of the measurements and included the input of the public, agencies and professionals with pertinent expertise.

A complete corridor alternative comprises three elements that were assessed independently in the initial screening:

1. Alignment
2. Stations Locations (including Terminal Stations, Regional Stations, and Local Stations)
3. Service Type (mode, connections)

The initial screening is reflected in subsequent sections of the *Range of Alternatives Technical Memorandum* which details complete corridor alternatives.

PASSENGER RAIL CORRIDOR STUDY
Tucson to Phoenix

Passenger Rail Corridor Study
Tucson to Phoenix

INITIAL SCREENING REPORT
LEVEL ONE RESULTS

APPENDIX

Submitted by:

Arizona Department of Transportation
Multimodal Planning Division
206 S. 17th Avenue, Mail Drop 310B
Phoenix, AZ 85007

Submitted to:

Federal Transit Administration
Federal Rail Administration

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Version 1.0 | June 28, 2012

Tables

Figures

Table 1A—Segments included per Alignment Corridor Alternative by Identification Number

			Alignment ID							
Segment Number	Seg Area	Length (miles)	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8
1	111.5	28.7								
2	23.3	5.9								
3	16.1	4.0								
4	17.2	4.4								
5	32.4	8.3								
6	8.9	2.2								
7	4.4	1.5								
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4	x	x	x	x	x	x	x	x
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8			x	x	x	x	x	x
28	48.7	12.6					x	x	x	x
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7	x	x						
32	37.8	9.8			x	x				
33	51.8	12.5	x	x	x	x				
34	61.5	15.4					x	x		
35	71.2	17.8							x	x
36	12.0	3.1	x	x	x	x	x	x		
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		175.0	155.7	179.9	160.6	185.7	166.4	184.9	165.6
	Total Area		697.6	621.5	716.6	640.5	737.2	661.1	734.8	658.8

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Table 1B—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8
1	111.5	28.7	x	x	x	x	x	x	x	x
2	23.3	5.9								
3	16.1	4.0								
4	17.2	4.4								
5	32.4	8.3								
6	8.9	2.2								
7	4.4	1.5								
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8	x	x	x	x	x	x	x	x
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8			x	x	x	x	x	x
28	48.7	12.6					x	x	x	x
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7	x	x						
32	37.8	9.8			x	x				
33	51.8	12.5	x	x	x	x				
34	61.5	15.4					x	x		
35	71.2	17.8							x	x
36	12.0	3.1	x	x	x	x	x	x		
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		154.1	134.8	159.0	139.7	164.8	145.4	164.0	144.7
	Total Area		611.5	535.5	630.5	554.4	651.1	575.0	648.7	572.7

Continues next page

Table 1C—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8
1	111.5	28.7	x	x	x	x	x	x		
2	23.3	5.9							x	x
3	16.1	4.0								
4	17.2	4.4							x	x
5	32.4	8.3								
6	8.9	2.2								
7	4.4	1.5								
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5							x	x
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8							x	x
15	53.1	13.9	x	x	x	x	x	x		
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x	x	x	x	x		
27	38.7	9.8								
28	48.7	12.6			x	x	x	x		
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7							x	x
32	37.8	9.8	x	x						
33	51.8	12.5	x	x					x	x
34	61.5	15.4			x	x				
35	71.2	17.8					x	x		
36	12.0	3.1	x	x	x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		147.4	128.1	153.2	133.9	152.4	133.1	143.2	123.9
	Total Area		582.7	506.6	603.2	527.2	600.9	524.8	570.2	494.2

Continues next page

Table 1D—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0							x	x
4	17.2	4.4	x	x	x	x	x	x		
5	32.4	8.3								
6	8.9	2.2							x	x
7	4.4	1.5								
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5	x	x	x	x	x	x		
12	29.7	7.4							x	x
13	308.1	77.4								
14	110.5	27.8	x	x	x	x	x	x	x	x
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8	x	x	x	x	x	x		
28	48.7	12.6			x	x	x	x		
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7							x	x
32	37.8	9.8	x	x						
33	51.8	12.5	x	x					x	x
34	61.5	15.4			x	x				
35	71.2	17.8					x	x		
36	12.0	3.1	x	x	x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		148.1	128.8	153.8	134.5	153.1	133.8	145.0	125.7
	Total Area		589.2	513.1	609.8	533.7	607.4	531.4	577.9	501.8

Continues next page

Table 1E—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x	x	x	x	x		
4	17.2	4.4							x	x
5	32.4	8.3								
6	8.9	2.2	x	x	x	x	x	x		
7	4.4	1.5							x	x
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4	x	x	x	x	x	x	x	x
13	308.1	77.4								
14	110.5	27.8	x	x	x	x	x	x	x	x
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8	x	x	x	x	x	x		
28	48.7	12.6			x	x	x	x		
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7							x	x
32	37.8	9.8	x	x						
33	51.8	12.5	x	x					x	x
34	61.5	15.4			x	x				
35	71.2	17.8					x	x		
36	12.0	3.1	x	x	x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		149.9	130.6	155.6	136.3	154.9	135.6	144.6	125.3
	Total Area		596.9	520.8	617.4	541.4	615.1	539.1	574.5	498.5

Continues next page

Table 1F—Segments included per Alignment Corridor Alternative by Identification Number (continued)

Segment Number	Seg Area	Length (miles)	Alignment ID F-1	F-2	F-3	F-4	F-5	F-6	F-7	F-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0								
4	17.2	4.4	x	x	x	x	x	x	x	x
5	32.4	8.3								
6	8.9	2.2								
7	4.4	1.5	x	x	x	x	x	x		
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5							x	x
12	29.7	7.4	x	x	x	x	x	x		
13	308.1	77.4								
14	110.5	27.8	x	x	x	x	x	x		
15	53.1	13.9							x	x
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1							x	x
27	38.7	9.8	x	x	x	x	x	x		
28	48.7	12.6			x	x	x	x		
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8	x	x					x	x
33	51.8	12.5	x	x					x	x
34	61.5	15.4			x	x				
35	71.2	17.8					x	x		
36	12.0	3.1	x	x	x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		149.5	130.2	155.3	135.9	154.5	135.2	136.5	117.2
	Total Area		593.5	517.5	614.1	538.0	611.7	535.7	541.3	465.3

Continues next page

Table 1G—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0					x	x	x	x
4	17.2	4.4	x	x	x	x				
5	32.4	8.3								
6	8.9	2.2					x	x	x	x
7	4.4	1.5								
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5	x	x	x	x				
12	29.7	7.4					x	x	x	x
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9	x	x	x	x	x	x	x	x
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x	x	x	x	x	x	x
27	38.7	9.8								
28	48.7	12.6	x	x	x	x			x	x
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8					x	x		
33	51.8	12.5					x	x		
34	61.5	15.4	x	x					x	x
35	71.2	17.8			x	x				
36	12.0	3.1	x	x			x	x	x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		142.3	122.9	141.5	122.2	138.3	119.0	144.1	124.8
	Total Area		561.9	485.9	559.6	483.5	549.0	473.0	569.6	493.6

Continues next page

Table 1H—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x						
4	17.2	4.4			x	x	x	x	x	x
5	32.4	8.3								
6	8.9	2.2	x	x						
7	4.4	1.5			x	x	x	x	x	x
8	25.2	6.1								
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4	x	x	x	x	x	x	x	x
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9	x	x	x	x	x	x	x	x
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x	x	x	x	x	x	x
27	38.7	9.8								
28	48.7	12.6	x	x			x	x	x	x
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8			x	x				
33	51.8	12.5			x	x				
34	61.5	15.4					x	x		
35	71.2	17.8	x	x					x	x
36	12.0	3.1			x	x	x	x		
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		143.3	124.0	137.9	118.6	143.7	124.4	142.9	123.6
	Total Area		567.3	491.2	545.7	469.6	566.2	490.2	563.9	487.9

Continues next page

Table 1I—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x	x	x	x	x	x	x
4	17.2	4.4								
5	32.4	8.3	x	x	x	x	x	x		
6	8.9	2.2							x	x
7	4.4	1.5								
8	25.2	6.1							x	x
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2	x	x	x	x	x	x	x	x
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8	x	x	x	x	x	x	x	x
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x	x	x	x	x	x	x
27	38.7	9.8								
28	48.7	12.6			x	x	x	x		
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8	x	x					x	x
33	51.8	12.5	x	x					x	x
34	61.5	15.4			x	x				
35	71.2	17.8					x	x		
36	12.0	3.1	x	x	x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		142.1	122.7	147.8	128.5	147.1	127.8	142.0	122.7
	Total Area		565.0	488.9	585.6	509.5	583.2	507.2	566.7	490.7

Continues next page

Table 1J—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	J-1	J-2	J-3	J-4	J-5	J-6	J-7	J-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x	x	x				
4	17.2	4.4					x	x	x	x
5	32.4	8.3								
6	8.9	2.2	x	x	x	x				
7	4.4	1.5					x	x	x	x
8	25.2	6.1	x	x	x	x	x	x	x	x
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2	x	x	x	x	x	x	x	x
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8	x	x	x	x	x	x	x	x
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x	x	x	x	x	x	x
27	38.7	9.8								
28	48.7	12.6	x	x	x	x			x	x
29	15.4	3.9								
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8					x	x		
33	51.8	12.5					x	x		
34	61.5	15.4	x	x					x	x
35	71.2	17.8			x	x				
36	12.0	3.1	x	x			x	x	x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		147.8	128.5	147.1	127.7	141.7	122.3	147.4	128.1
	Total Area		587.3	511.2	585.0	508.9	563.4	487.3	583.9	507.9

Continues next page

Table 1K—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0			x	x	x	x	x	x
4	17.2	4.4	x	x						
5	32.4	8.3			x	x	x	x		
6	8.9	2.2							x	x
7	4.4	1.5	x	x						
8	25.2	6.1	x	x					x	x
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2	x	x	x	x	x	x	x	x
17	104.8	26.4								
18	64.1	16.1								
20	28.9	6.8	x	x						
21	103.4	25.1			x	x	x	x	x	x
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1	x	x						
27	38.7	9.8								
28	48.7	12.6	x	x						
29	15.4	3.9			x	x	x	x	x	x
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4			x	x			x	x
35	71.2	17.8	x	x			x	x		
36	12.0	3.1			x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		146.7	127.4	145.3	126.0	144.6	125.3	145.3	126.0
	Total Area		581.6	505.5	578.6	502.6	576.3	500.2	580.4	504.3

Continues next page

Table 1L—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	L-1	L-2	L-3	L-4	L-5	L-6	L-7	L-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x					x	x
4	17.2	4.4			x	x	x	x		
5	32.4	8.3							x	x
6	8.9	2.2	x	x						
7	4.4	1.5			x	x	x	x		
8	25.2	6.1	x	x	x	x	x	x		
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2	x	x	x	x	x	x		
17	104.8	26.4							x	x
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1	x	x	x	x	x	x		
22	35.9	9.1							x	x
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8								
28	48.7	12.6								
29	15.4	3.9	x	x	x	x	x	x	x	x
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4			x	x			x	x
35	71.2	17.8	x	x			x	x		
36	12.0	3.1			x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		144.6	125.3	144.9	125.6	144.2	124.9	143.5	124.1
	Total Area		578.0	502.0	577.0	501.0	574.7	498.6	569.5	493.4

Continues next page

Table 1M—Segments included per Alignment Corridor Alternative by Identification Number (continued)

Segment Number	Seg Area	Length (miles)	Alignment ID M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x	x	x	x	x		
4	17.2	4.4							x	x
5	32.4	8.3	x	x						
6	8.9	2.2			x	x	x	x		
7	4.4	1.5							x	x
8	25.2	6.1			x	x	x	x	x	x
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4	x	x	x	x	x	x	x	x
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1	x	x	x	x	x	x	x	x
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8								
28	48.7	12.6								
29	15.4	3.9	x	x	x	x	x	x	x	x
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4			x	x			x	x
35	71.2	17.8	x	x			x	x		
36	12.0	3.1			x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		142.7	123.4	143.4	124.1	142.7	123.4	143.1	123.7
	Total Area		567.1	491.1	571.2	495.2	568.9	492.8	567.9	491.8

Continues next page

Table 1N—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	N-1	N-2	N-3	N-4	N-5	N-6	N-7	N-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0			x	x	x	x	x	x
4	17.2	4.4	x	x						
5	32.4	8.3			x	x	x	x		
6	8.9	2.2							x	x
7	4.4	1.5	x	x						
8	25.2	6.1	x	x					x	x
9	92.1	23.6			x	x	x	x	x	x
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4	x	x						
18	64.1	16.1			x	x	x	x	x	x
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1	x	x						
23	21.6	5.4								
24	37.3	9.3			x	x	x	x	x	x
26	48.2	12.1								
27	38.7	9.8								
28	48.7	12.6								
29	15.4	3.9	x	x						
30	75.9	31.0								
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4			x	x			x	x
35	71.2	17.8	x	x			x	x		
36	12.0	3.1			x	x			x	x
37	73.2	18.3	x	x	x	x	x	x	x	x
38	95.1	23.8								
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x	
42	85.6	21.2		x		x		x		x
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		142.3	123.0	153.1	133.8	152.4	133.1	153.1	133.8
	Total Area		565.5	489.5	606.8	530.8	604.5	528.4	608.6	532.5

Continues next page

Table 1O—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID						
Segment Number	Seg Area	Length (miles)	P-1	P-2	P-3	P-4	P-5	P-6	P-7
1	111.5	28.7							
2	23.3	5.9	x	x	x	x	x	x	x
3	16.1	4.0	x	x					x
4	17.2	4.4			x	x	x	x	
5	32.4	8.3							x
6	8.9	2.2	x	x					
7	4.4	1.5			x	x	x	x	
8	25.2	6.1	x	x	x	x	x	x	
9	92.1	23.6	x	x	x	x	x	x	x
11	29.8	7.5							
12	29.7	7.4							
13	308.1	77.4							
14	110.5	27.8							
15	53.1	13.9							
16	46.4	12.2							
17	104.8	26.4							
18	64.1	16.1	x	x	x	x	x	x	x
20	28.9	6.8							
21	103.4	25.1							
22	35.9	9.1							
23	21.6	5.4							
24	37.3	9.3	x	x	x	x	x	x	
26	48.2	12.1							
27	38.7	9.8							
28	48.7	12.6							
29	15.4	3.9							
30	75.9	31.0							x
31	57.6	14.7							
32	37.8	9.8							
33	51.8	12.5							
34	61.5	15.4			x	x			
35	71.2	17.8	x	x			x	x	
36	12.0	3.1			x	x			
37	73.2	18.3	x	x	x	x	x	x	
38	95.1	23.8							x
39	202.8	50.6							
40	15.5	3.9	x	x	x	x	x	x	x
41	161.6	40.5	x		x		x		x
42	85.6	21.2		x		x		x	
43	17.8	4.6	x	x	x	x	x	x	x
	Total Distance		152.4	133.1	152.7	133.4	152.0	132.7	161.7
	Total Area		606.2	530.2	605.2	529.1	602.9	526.8	593.9

Continues next page

Table 1P—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	Q-1	Q-3	Q-6	Q-7	R-2	R-4	R-5	R-7
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x	x	x	x			
4	17.2	4.4						x	x	x
5	32.4	8.3	x	x						
6	8.9	2.2			x	x	x			
7	4.4	1.5						x	x	x
8	25.2	6.1			x	x	x	x	x	x
9	92.1	23.6	x	x	x	x	x	x	x	x
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4								
18	64.1	16.1	x	x	x	x	x	x	x	x
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4								
24	37.3	9.3								
26	48.2	12.1								
27	38.7	9.8								
28	48.7	12.6								
29	15.4	3.9								
30	75.9	31.0	x	x	x	x	x	x	x	x
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4								
35	71.2	17.8								
36	12.0	3.1								
37	73.2	18.3								
38	95.1	23.8	x		x	x		x	x	
39	202.8	50.6		x			x			x
40	15.5	3.9	x		x	x		x	x	
41	161.6	40.5			x			x		
42	85.6	21.2	x			x			x	
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		142.4	144.1	161.7	142.4	144.1	161.3	142.0	143.7
	Total Area		517.8	524.3	595.6	519.5	526.1	592.2	516.2	522.7

Continues next page

Table 1Q—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID							
Segment Number	Seg Area	Length (miles)	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	111.5	28.7								
2	23.3	5.9	x	x	x	x	x	x	x	x
3	16.1	4.0	x	x		x	x		x	x
4	17.2	4.4			x			x		
5	32.4	8.3	x			x			x	
6	8.9	2.2		x			x			x
7	4.4	1.5			x			x		
8	25.2	6.1		x	x		x	x		x
9	92.1	23.6								
11	29.8	7.5								
12	29.7	7.4								
13	308.1	77.4								
14	110.5	27.8								
15	53.1	13.9								
16	46.4	12.2								
17	104.8	26.4	x	x	x	x	x	x	x	x
18	64.1	16.1								
20	28.9	6.8								
21	103.4	25.1								
22	35.9	9.1								
23	21.6	5.4	x	x	x	x	x	x	x	x
24	37.3	9.3	x	x	x	x	x	x		
26	48.2	12.1								
27	38.7	9.8								
28	48.7	12.6								
29	15.4	3.9								
30	75.9	31.0							x	x
31	57.6	14.7								
32	37.8	9.8								
33	51.8	12.5								
34	61.5	15.4								
35	71.2	17.8	x	x	x	x	x	x		
36	12.0	3.1								
37	73.2	18.3	x	x	x	x	x	x		
38	95.1	23.8							x	x
39	202.8	50.6								
40	15.5	3.9	x	x	x	x	x	x	x	x
41	161.6	40.5	x	x	x				x	x
42	85.6	21.2				x	x	x		
43	17.8	4.6	x	x	x	x	x	x	x	x
	Total Distance		144.5	144.5	144.1	125.2	125.2	124.8	153.8	153.8
	Total Area		574.7	576.4	573.0	498.6	500.4	497.0	564.1	565.8

Continues next page

Table 1R—Segments included per Alignment Corridor Alternative by Identification Number (continued)

			Alignment ID						
Segment Number	Seg Area	Length (miles)	T-1	T-2	T-3	T-4	T-5	T-6	T-7
1	111.5	28.7							
2	23.3	5.9	x	x	x	x	x	x	x
3	16.1	4.0		x	x		x	x	
4	17.2	4.4	x			x			x
5	32.4	8.3		x			x		
6	8.9	2.2			x			x	
7	4.4	1.5	x			x			x
8	25.2	6.1	x		x	x		x	x
9	92.1	23.6							
11	29.8	7.5							
12	29.7	7.4							
13	308.1	77.4							
14	110.5	27.8							
15	53.1	13.9							
16	46.4	12.2							
17	104.8	26.4	x	x	x	x	x	x	x
18	64.1	16.1							
20	28.9	6.8							
21	103.4	25.1							
22	35.9	9.1							
23	21.6	5.4	x	x	x	x	x	x	x
24	37.3	9.3							
26	48.2	12.1							
27	38.7	9.8							
28	48.7	12.6							
29	15.4	3.9							
30	75.9	31.0	x	x	x	x	x	x	x
31	57.6	14.7							
32	37.8	9.8							
33	51.8	12.5							
34	61.5	15.4							
35	71.2	17.8							
36	12.0	3.1							
37	73.2	18.3							
38	95.1	23.8	x	x	x	x			
39	202.8	50.6					x	x	x
40	15.5	3.9	x	x	x	x			
41	161.6	40.5	x						
42	85.6	21.2		x	x	x			
43	17.8	4.6	x	x	x	x	x	x	x
	Total Distance		153.4	134.5	134.5	134.1	136.2	136.2	135.8
	Total Area		562.4	488.0	489.7	486.4	494.5	496.3	492.9

Table 2A—Existing Transportation Operations Evaluation by Alignment Alternative

Overall Existing Transportation Operations				
Alignment ID	Percent Difficult	Percent Involved	Percent Manageable	Overall
A-1	38%	0%	62%	◑
A-2	17%	8%	75%	●
A-3	37%	0%	63%	●
A-4	16%	8%	76%	●
A-5	36%	8%	56%	◑
A-6	16%	17%	67%	●
A-7	36%	0%	64%	●
A-8	16%	8%	76%	●
B-1	58%	0%	42%	○
B-2	36%	9%	54%	◑
B-3	56%	0%	44%	○
B-4	35%	9%	56%	◑
B-5	54%	9%	37%	○
B-6	33%	19%	47%	◑
B-7	54%	0%	46%	○
B-8	34%	9%	58%	◑
C-1	66%	0%	34%	○
C-2	44%	10%	46%	◑
C-3	63%	10%	27%	○
C-4	42%	21%	37%	○
C-5	64%	0%	36%	○
C-6	43%	10%	48%	◑
C-7	48%	6%	46%	○
C-8	23%	17%	60%	●
D-1	46%	6%	48%	◑
D-2	22%	16%	62%	●
D-3	45%	15%	40%	○
D-4	21%	27%	52%	●
D-5	45%	5%	50%	◑
D-6	21%	16%	63%	●
D-7	49%	0%	51%	◑
D-8	25%	10%	65%	●
E-1	48%	0%	52%	◑
E-2	24%	10%	66%	●
E-3	46%	10%	44%	○
E-4	23%	21%	57%	●
E-5	46%	0%	54%	◑
E-6	23%	9%	68%	●
E-7	49%	1%	49%	○
E-8	25%	12%	64%	●

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Table 2B—Existing Transportation Operations Evaluation by Alignment Alternative (Continued)

Overall Existing Transportation Operations				
Alignment ID	Percent Difficult	Percent Involved	Percent Manageable	Overall
F-1	48%	1%	51%	◑
F-2	24%	11%	65%	●
F-3	46%	11%	43%	○
F-4	23%	22%	55%	●
F-5	46%	1%	52%	◑
F-6	23%	11%	66%	●
F-7	56%	6%	38%	○
F-8	31%	18%	51%	◑
G-1	54%	17%	29%	○
G-2	29%	30%	41%	◑
G-3	54%	6%	40%	○
G-4	30%	17%	53%	◑
G-5	58%	0%	42%	○
G-6	33%	11%	56%	◑
G-7	55%	11%	34%	○
G-8	31%	23%	46%	◑
H-1	56%	0%	44%	○
H-2	32%	10%	58%	●
H-3	58%	1%	41%	○
H-4	33%	12%	55%	◑
H-5	55%	12%	33%	○
H-6	31%	24%	44%	◑
H-7	56%	1%	43%	○
H-8	32%	12%	57%	◑
I-1	50%	6%	44%	○
I-2	25%	17%	58%	●
I-3	48%	16%	36%	○
I-4	24%	28%	48%	◑
I-5	48%	6%	46%	○
I-6	24%	17%	59%	●
I-7	54%	0%	46%	○
I-8	30%	10%	60%	●
J-1	52%	10%	37%	○
J-2	29%	22%	49%	◑
J-3	53%	0%	47%	○
J-4	29%	10%	61%	●
J-5	55%	1%	44%	○
J-6	30%	12%	58%	●
J-7	52%	12%	36%	○
J-8	29%	24%	48%	◑

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Table 2C—Existing Transportation Operations Evaluation by Alignment Alternative (Continued)

Overall Existing Transportation Operations				
Alignment ID	Percent Difficult	Percent Involved	Percent Manageable	Overall
K-1	53%	1%	46%	○
K-2	29%	12%	60%	●
K-3	55%	19%	26%	○
K-4	31%	32%	37%	◑
K-5	55%	8%	36%	○
K-6	32%	20%	48%	◑
K-7	59%	13%	27%	○
K-8	36%	25%	38%	◑
L-1	60%	3%	38%	○
L-2	36%	13%	50%	◑
L-3	59%	15%	26%	○
L-4	36%	27%	37%	◑
L-5	60%	4%	36%	○
L-6	36%	15%	49%	◑
L-7	38%	44%	18%	○
L-8	12%	61%	27%	◑
M-1	39%	33%	28%	○
M-2	12%	49%	39%	●
M-3	43%	38%	19%	○
M-4	17%	54%	29%	◑
M-5	43%	28%	30%	○
M-6	17%	42%	41%	◑
M-7	43%	40%	18%	○
M-8	17%	56%	27%	◑
N-1	43%	29%	28%	○
N-2	17%	44%	39%	◑
N-3	45%	15%	39%	○
N-4	22%	27%	51%	●
N-5	46%	5%	49%	◑
N-6	22%	16%	62%	●
N-7	49%	10%	41%	○
N-8	26%	21%	53%	●
P-1	50%	0%	50%	◑
P-2	26%	10%	64%	●
P-3	49%	11%	39%	○
P-4	26%	23%	51%	●
P-5	50%	1%	49%	○
P-6	26%	11%	63%	●
P-7	43%	5%	52%	◑

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Table 2D—Existing Transportation Operations Evaluation by Alignment Alternative (Continued)

Overall Existing Transportation Operations				
Alignment ID	Percent Difficult	Percent Involved	Percent Manageable	Overall
Q-1	20%	15%	65%	●
Q-3	20%	6%	74%	●
Q-6	47%	0%	53%	◑
Q-7	25%	9%	66%	●
R-2	24%	0%	76%	●
R-4	47%	1%	52%	◑
R-5	25%	10%	65%	●
R-7	24%	1%	74%	●
S-1	38%	24%	38%	○
S-2	42%	18%	39%	○
S-3	42%	20%	38%	○
S-4	12%	38%	50%	●
S-5	16%	31%	52%	●
S-6	16%	33%	51%	●
S-7	36%	23%	42%	◑
S-8	40%	17%	43%	◑
T-1	40%	19%	42%	◑
T-2	11%	35%	54%	●
T-3	15%	29%	56%	●
T-4	15%	31%	54%	●
T-5	11%	25%	64%	●
T-6	15%	19%	65%	●
T-7	15%	21%	64%	●

Table 3A—Infringements Upon Sensitive Environments Evaluation by Alignment Alternative

Infringement Upon Sensitive Environments						
Alignment ID	Infringement upon biological resources (Percentage of Area)			National Register of Historic Places	Infringement Rank	Historic Places Rank
	Low Potential	Medium Potential	High Potential			
A-1	45%	42%	13%	50	●	●
A-2	44%	42%	14%	90	●	●
A-3	45%	43%	13%	55	●	●
A-4	44%	43%	13%	95	●	●
A-5	39%	46%	16%	108	●	●
A-6	37%	46%	17%	148	●	●
A-7	39%	44%	17%	3	●	●
A-8	38%	44%	18%	43	◑	●
B-1	47%	40%	13%	50	●	●
B-2	47%	40%	14%	90	●	●
B-3	46%	41%	12%	55	●	●
B-4	46%	41%	13%	95	●	●
B-5	40%	44%	16%	108	●	●
B-6	39%	45%	17%	148	●	●
B-7	40%	42%	18%	3	●	●
B-8	39%	42%	19%	43	◑	●
C-1	39%	48%	14%	57	●	●
C-2	37%	48%	14%	97	●	●
C-3	32%	51%	17%	110	◑	●
C-4	29%	52%	19%	150	◑	●
C-5	32%	49%	19%	5	◑	●
C-6	29%	50%	21%	45	◑	●
C-7	46%	40%	14%	93	●	●
C-8	46%	39%	15%	133	●	●
D-1	46%	41%	13%	98	●	●
D-2	45%	40%	14%	138	●	●
D-3	39%	44%	17%	151	●	●
D-4	37%	44%	18%	191	◑	◑
D-5	39%	42%	19%	46	●	●
D-6	38%	42%	20%	86	◑	●
D-7	46%	41%	14%	131	●	●
D-8	45%	40%	14%	171	●	●
E-1	45%	41%	13%	136	●	●
E-2	45%	41%	14%	176	●	◑
E-3	38%	45%	17%	189	●	◑
E-4	37%	45%	18%	229	◑	○
E-5	39%	43%	19%	84	◑	●
E-6	37%	43%	20%	124	◑	●
E-7	46%	40%	14%	128	●	●
E-8	45%	40%	14%	168	●	●

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Table 3B—Infringements Upon Sensitive Environments Evaluation by Alignment Alternative (Continued)

Infringement Upon Sensitive Environments						
Alignment ID	Infringement upon biological resources (Percentage of Area)			National Register of Historic Places	Infringement Rank	Historic Places
	Low Potential	Medium Potential	High Potential			
F-1	46%	41%	13%	133	●	●
F-2	45%	41%	14%	173	●	●
F-3	39%	45%	17%	186	●	◑
F-4	37%	45%	18%	226	◑	○
F-5	39%	43%	19%	81	●	●
F-6	37%	43%	20%	121	◑	●
F-7	38%	48%	15%	100	●	●
F-8	36%	49%	16%	140	◑	●
G-1	30%	51%	19%	153	◑	●
G-2	27%	53%	20%	193	◑	◑
G-3	30%	49%	21%	48	◑	●
G-4	27%	50%	22%	88	◑	●
G-5	37%	49%	14%	138	●	●
G-6	35%	50%	15%	178	◑	◑
G-7	30%	52%	18%	191	◑	◑
G-8	27%	53%	20%	231	◑	○
H-1	30%	50%	20%	86	◑	●
H-2	27%	51%	22%	126	◑	●
H-3	37%	48%	14%	135	●	●
H-4	35%	49%	15%	175	◑	●
H-5	30%	52%	18%	188	◑	◑
H-6	27%	53%	20%	228	◑	○
H-7	30%	50%	20%	83	◑	●
H-8	27%	51%	22%	123	◑	●
I-1	32%	53%	15%	371	◑	○
I-2	30%	54%	16%	411	◑	○
I-3	25%	56%	19%	424	◑	○
I-4	22%	58%	20%	464	◑	○
I-5	26%	54%	21%	319	◑	○
I-6	22%	56%	22%	359	○	○
I-7	32%	53%	15%	232	◑	○
I-8	30%	55%	16%	272	◑	○
J-1	25%	56%	18%	285	◑	○
J-2	22%	58%	20%	325	◑	○
J-3	25%	54%	20%	180	◑	◑
J-4	22%	56%	22%	220	○	◑
J-5	32%	53%	15%	229	◑	○
J-6	30%	55%	16%	269	◑	○
J-7	25%	56%	18%	282	◑	○
J-8	22%	58%	20%	322	◑	○

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Table 3C—Infringements Upon Sensitive Environments Evaluation by Alignment Alternative (Continued)

Infringement Upon Sensitive Environments						
Alignment ID	Infringement upon biological resources (Percentage of Area)			National Register of Historic Places	Infringement Rank	Historic Places
	Low Potential	Medium Potential	High Potential			
K-1	26%	54%	20%	177	◑	◑
K-2	22%	56%	22%	217	○	◑
K-3	24%	56%	20%	430	◑	○
K-4	21%	58%	22%	470	○	○
K-5	25%	54%	22%	325	◑	○
K-6	21%	55%	24%	365	○	○
K-7	24%	56%	20%	291	◑	○
K-8	21%	58%	21%	331	○	○
L-1	24%	54%	22%	186	◑	◑
L-2	21%	56%	24%	226	○	○
L-3	24%	56%	20%	288	◑	○
L-4	21%	58%	21%	328	○	○
L-5	25%	54%	22%	183	◑	◑
L-6	21%	56%	24%	223	○	◑
L-7	21%	58%	21%	376	○	○
L-8	17%	60%	23%	416	○	○
M-1	21%	55%	23%	271	○	○
M-2	17%	57%	26%	311	○	○
M-3	21%	58%	21%	237	◑	○
M-4	17%	60%	23%	277	○	○
M-5	21%	56%	23%	132	○	●
M-6	17%	58%	25%	172	○	●
M-7	21%	58%	21%	234	◑	○
M-8	17%	60%	23%	274	○	○
N-1	21%	56%	23%	129	○	●
N-2	17%	58%	25%	169	○	●
N-3	26%	52%	23%	403	◑	○
N-4	22%	53%	25%	443	○	○
N-5	26%	50%	25%	298	◑	○
N-6	22%	51%	27%	338	○	○
N-7	26%	52%	23%	264	◑	○
N-8	22%	53%	25%	304	○	○
P-1	26%	50%	24%	159	◑	●
P-2	22%	51%	27%	199	○	◑
P-3	26%	52%	23%	261	◑	○
P-4	22%	53%	25%	301	○	○
P-5	26%	50%	24%	156	◑	●
P-6	22%	51%	27%	196	○	◑
P-7	23%	50%	27%	292	○	○

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Table 3D—Infringements Upon Sensitive Environments Evaluation by Alignment Alternative (Continued)

Infringement Upon Sensitive Environments						
Alignment ID	Infringement upon biological resources (Percentage of Area)			National Register of Historic Places	Infringement Rank	Historic Places
	Low Potential	Medium Potential	High Potential			
Q-1	19%	51%	30%	332	○	○
Q-3	13%	44%	42%	289	○	○
Q-6	23%	50%	27%	153	○	●
Q-7	19%	51%	30%	193	○	◑
R-2	13%	45%	42%	150	○	●
R-4	23%	50%	27%	150	○	●
R-5	19%	51%	30%	190	○	◑
R-7	13%	44%	42%	147	○	●
S-1	21%	55%	24%	277	○	○
S-2	21%	55%	23%	138	○	●
S-3	21%	55%	23%	135	○	●
S-4	17%	57%	26%	317	○	○
S-5	17%	57%	26%	178	○	◑
S-6	17%	57%	26%	175	○	●
S-7	18%	55%	26%	271	○	○
S-8	18%	56%	26%	132	○	●
T-1	18%	56%	26%	129	○	●
T-2	13%	57%	29%	311	○	○
T-3	13%	58%	29%	172	○	●
T-4	13%	58%	29%	169	○	●
T-5	7%	50%	42%	268	○	○
T-6	7%	51%	42%	129	○	●
T-7	7%	50%	42%	126	○	●

Table 4A—Land Use Compatibility Evaluation by Alignment Alternative

Alignment ID	Existing or entitled residential and employment land uses			Future residential or employment land uses		Existing land use rank	Future land use rank	Overall land use rank
	Existing Residential (sq miles)	Residential Entitlements (sq miles)	Existing Employment (sq miles)	Future Residential (sq miles)	Future Employment (sq miles)			
A-1	12%	10%	8%	48%	20%	●	◑	●
A-2	12%	11%	9%	56%	23%	●	●	●
A-3	12%	12%	8%	49%	19%	●	◑	●
A-4	12%	14%	9%	57%	21%	●	●	●
A-5	11%	12%	7%	49%	20%	●	●	●
A-6	12%	13%	8%	56%	23%	●	●	●
A-7	11%	11%	7%	48%	21%	●	●	●
A-8	12%	12%	8%	56%	23%	●	●	●
B-1	11%	11%	8%	36%	18%	●	○	◑
B-2	12%	12%	9%	44%	21%	●	◑	●
B-3	11%	14%	8%	38%	18%	●	○	◑
B-4	12%	16%	9%	46%	20%	◑	●	●
B-5	11%	13%	7%	38%	19%	●	○	◑
B-6	11%	15%	8%	45%	21%	●	●	●
B-7	11%	12%	7%	37%	20%	●	○	◑
B-8	11%	14%	8%	45%	22%	●	◑	●
C-1	11%	7%	8%	33%	17%	●	○	◑
C-2	12%	8%	9%	40%	20%	●	○	◑
C-3	11%	7%	7%	33%	18%	●	○	◑
C-4	11%	8%	8%	40%	21%	●	◑	●
C-5	11%	5%	7%	32%	19%	●	○	◑
C-6	11%	6%	8%	39%	22%	●	◑	●
C-7	12%	12%	10%	37%	20%	●	◑	●
C-8	13%	13%	11%	45%	24%	◑	◑	◑
D-1	12%	15%	9%	39%	19%	●	○	◑
D-2	13%	17%	11%	47%	22%	◑	●	●
D-3	11%	14%	9%	39%	21%	●	◑	●
D-4	12%	16%	10%	47%	24%	◑	●	●
D-5	11%	13%	9%	38%	22%	●	◑	●
D-6	12%	15%	10%	46%	25%	◑	●	●
D-7	12%	11%	10%	37%	20%	◑	◑	◑
D-8	13%	13%	12%	45%	23%	◑	●	●
E-1	12%	15%	10%	39%	19%	●	○	◑
E-2	13%	17%	11%	47%	22%	◑	●	●
E-3	12%	14%	9%	39%	20%	●	◑	●
E-4	13%	16%	10%	47%	23%	◑	●	●
E-5	12%	13%	9%	38%	21%	●	◑	●
E-6	13%	14%	10%	46%	24%	◑	●	●
E-7	12%	12%	10%	37%	20%	◑	◑	◑
E-8	13%	13%	12%	45%	24%	◑	●	●

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Table 4B—Land Use Compatibility Evaluation by Alignment Alternative (Continued)

Alignment ID	Existing or entitled residential and employment land uses			Future residential or employment land uses		Existing land use rank	Future land use rank	Overall land use rank
	Existing Residential (sq miles)	Residential Entitlements (sq miles)	Existing Employment (sq miles)	Future Residential (sq miles)	Future Employment (sq miles)			
F-1	12%	15%	10%	39%	19%	●	○	◑
F-2	13%	17%	11%	48%	22%	◑	●	●
F-3	12%	14%	9%	39%	21%	●	◑	●
F-4	13%	16%	10%	47%	24%	◑	●	●
F-5	12%	13%	9%	38%	22%	●	◑	●
F-6	13%	14%	10%	46%	25%	◑	●	●
F-7	12%	8%	10%	33%	19%	●	○	◑
F-8	13%	9%	11%	41%	22%	●	◑	●
G-1	11%	7%	9%	33%	20%	●	◑	●
G-2	12%	8%	11%	41%	24%	●	◑	●
G-3	11%	6%	9%	32%	21%	●	◑	●
G-4	12%	7%	11%	40%	25%	●	●	●
G-5	13%	8%	10%	33%	19%	●	○	◑
G-6	14%	9%	12%	42%	22%	●	◑	●
G-7	12%	7%	10%	33%	20%	●	◑	●
G-8	13%	8%	11%	41%	24%	●	◑	●
H-1	12%	6%	10%	33%	21%	●	◑	●
H-2	13%	7%	11%	40%	25%	●	◑	●
H-3	13%	8%	10%	33%	19%	●	○	◑
H-4	14%	9%	11%	42%	22%	●	◑	●
H-5	12%	7%	9%	33%	21%	●	◑	●
H-6	13%	8%	11%	41%	24%	●	◑	●
H-7	12%	6%	9%	33%	22%	●	◑	●
H-8	13%	7%	11%	40%	25%	●	●	●
I-1	17%	7%	11%	37%	19%	◑	○	○
I-2	19%	9%	13%	45%	22%	◑	●	●
I-3	16%	7%	11%	37%	20%	◑	◑	◑
I-4	18%	8%	12%	45%	24%	◑	◑	◑
I-5	16%	6%	11%	36%	21%	◑	◑	◑
I-6	18%	6%	12%	44%	25%	◑	◑	◑
I-7	17%	7%	11%	37%	19%	◑	○	○
I-8	19%	9%	13%	45%	22%	◑	●	●
J-1	16%	7%	10%	37%	20%	◑	◑	◑
J-2	18%	8%	12%	45%	23%	◑	●	●
J-3	16%	6%	10%	36%	21%	◑	◑	◑
J-4	18%	6%	12%	44%	25%	◑	◑	◑
J-5	17%	7%	11%	37%	19%	◑	○	○
J-6	19%	9%	12%	46%	22%	◑	●	●
J-7	16%	7%	10%	37%	21%	◑	◑	◑
J-8	18%	8%	12%	45%	24%	◑	●	●

Continues next page

Table 4C—Land Use Compatibility Evaluation by Alignment Alternative (Continued)

Alignment ID	Existing or entitled residential and employment land uses			Future residential or employment land uses		Existing land use rank	Future land use rank	Overall land use rank
	Existing Residential (sq miles)	Residential Entitlements (sq miles)	Existing Employment (sq miles)	Future Residential (sq miles)	Future Employment (sq miles)			
K-1	16%	6%	10%	36%	22%	◑	◑	◑
K-2	18%	6%	12%	44%	25%	◑	◑	◑
K-3	16%	5%	11%	33%	20%	◑	○	○
K-4	17%	6%	12%	41%	23%	◑	◑	◑
K-5	16%	4%	11%	32%	21%	◑	◑	◑
K-6	17%	4%	12%	40%	24%	◑	◑	◑
K-7	16%	5%	11%	33%	19%	◑	○	○
K-8	18%	6%	12%	41%	23%	◑	◑	◑
L-1	16%	4%	11%	32%	20%	◑	◑	◑
L-2	18%	4%	12%	40%	24%	◑	◑	◑
L-3	16%	5%	11%	33%	20%	◑	○	○
L-4	18%	6%	12%	41%	23%	◑	◑	◑
L-5	16%	4%	11%	33%	21%	◑	◑	◑
L-6	18%	4%	12%	40%	24%	◑	◑	◑
L-7	18%	9%	12%	42%	23%	◑	◑	◑
L-8	20%	10%	13%	51%	27%	◑	●	●
M-1	18%	8%	12%	41%	24%	◑	◑	◑
M-2	20%	9%	13%	51%	28%	◑	●	●
M-3	18%	9%	12%	42%	23%	◑	◑	◑
M-4	20%	10%	13%	52%	27%	◑	●	●
M-5	18%	8%	12%	42%	24%	◑	◑	◑
M-6	20%	9%	13%	51%	28%	◑	●	●
M-7	18%	9%	11%	43%	23%	◑	◑	◑
M-8	20%	10%	13%	52%	27%	◑	●	●
N-1	18%	8%	12%	42%	24%	◑	◑	◑
N-2	20%	9%	13%	51%	28%	◑	●	●
N-3	16%	8%	10%	47%	21%	◑	●	●
N-4	18%	9%	12%	57%	25%	◑	●	●
N-5	17%	7%	10%	47%	22%	◑	●	●
N-6	18%	8%	12%	56%	26%	◑	●	●
N-7	17%	8%	10%	47%	21%	◑	●	●
N-8	18%	9%	12%	57%	24%	◑	●	●
P-1	17%	7%	10%	47%	22%	◑	●	●
P-2	19%	8%	12%	56%	25%	◑	●	●
P-3	17%	8%	10%	48%	21%	◑	●	●
P-4	18%	9%	12%	57%	25%	◑	●	●
P-5	17%	7%	10%	47%	22%	◑	●	●
P-6	18%	8%	12%	56%	26%	◑	●	●
P-7	17%	5%	10%	49%	15%	◑	◑	◑

Continues next page

Table 4D—Land Use Compatibility Evaluation by Alignment Alternative (Continued)

Alignment ID	Existing or entitled residential and employment land uses			Future residential or employment land uses		Existing land use rank	Future land use rank	Overall land use rank
	Existing Residential (sq miles)	Residential Entitlements (sq miles)	Existing Employment (sq miles)	Future Residential (sq miles)	Future Employment (sq miles)			
Q-1	19%	5%	12%	58%	18%	◑	◑	◑
Q-3	20%	6%	11%	61%	14%	◑	◑	◑
Q-6	18%	5%	10%	49%	15%	◑	◑	◑
Q-7	19%	5%	12%	59%	17%	◑	◑	◑
R-2	20%	5%	11%	62%	13%	◑	◑	◑
R-4	18%	5%	10%	49%	15%	◑	◑	◑
R-5	19%	5%	11%	59%	18%	◑	◑	◑
R-7	20%	6%	11%	62%	14%	◑	◑	◑
S-1	18%	9%	11%	42%	25%	◑	◑	◑
S-2	18%	9%	11%	43%	24%	◑	◑	◑
S-3	18%	9%	11%	43%	25%	◑	◑	◑
S-4	19%	11%	13%	52%	29%	◑	●	●
S-5	20%	11%	13%	52%	28%	◑	●	●
S-6	20%	11%	13%	52%	29%	◑	●	●
S-7	18%	7%	11%	45%	17%	◑	○	○
S-8	19%	7%	11%	45%	17%	◑	◑	◑
T-1	19%	7%	11%	45%	17%	◑	◑	◑
T-2	20%	8%	13%	54%	20%	◑	●	●
T-3	21%	8%	13%	55%	20%	◑	●	●
T-4	21%	8%	13%	55%	20%	◑	●	●
T-5	21%	8%	13%	57%	16%	◑	◑	◑
T-6	22%	8%	13%	58%	16%	◑	◑	◑
T-7	22%	8%	12%	58%	16%	◑	◑	◑

Table 5A—Institutional Considerations Evaluation by Alignment Alternative

Institutional Considerations						
Alignment ID	Area in or near National Protected Lands	Area in or near Tribal Lands	Area in or near Parks	Area in or near Federal Lands	Area in or near State Trust Lands	Institutional Rank
A-1	2%	2%	4%	9%	17%	◑
A-2	1%	0%	4%	8%	16%	◑
A-3	2%	2%	4%	9%	17%	◑
A-4	1%	0%	4%	8%	16%	◑
A-5	2%	2%	3%	9%	18%	◑
A-6	1%	0%	4%	8%	17%	◑
A-7	2%	2%	3%	9%	19%	◑
A-8	1%	0%	4%	8%	18%	◑
B-1	1%	19%	3%	3%	17%	◑
B-2	0%	19%	4%	1%	15%	◑
B-3	1%	18%	3%	3%	17%	◑
B-4	0%	19%	4%	1%	16%	◑
B-5	1%	18%	3%	3%	18%	◑
B-6	0%	18%	3%	1%	17%	◑
B-7	1%	18%	3%	3%	18%	◑
B-8	0%	18%	4%	1%	18%	◑
C-1	1%	24%	3%	3%	17%	◑
C-2	0%	25%	4%	1%	16%	◑
C-3	1%	24%	3%	3%	18%	◑
C-4	0%	25%	4%	1%	17%	◑
C-5	1%	24%	3%	3%	19%	◑
C-6	0%	25%	4%	1%	18%	◑
C-7	1%	14%	3%	3%	18%	◑
C-8	0%	14%	4%	1%	17%	◑
D-1	1%	14%	3%	3%	18%	◑
D-2	0%	13%	4%	1%	17%	◑
D-3	1%	14%	3%	3%	19%	◑
D-4	0%	13%	4%	1%	18%	◑
D-5	1%	14%	3%	3%	20%	◑
D-6	0%	13%	4%	1%	19%	◑
D-7	1%	14%	3%	3%	17%	◑
D-8	0%	13%	4%	1%	16%	◑
E-1	1%	13%	3%	3%	18%	◑
E-2	0%	13%	4%	1%	17%	◑
E-3	1%	13%	3%	3%	18%	◑
E-4	0%	13%	4%	1%	18%	◑
E-5	1%	13%	3%	3%	19%	◑
E-6	0%	13%	4%	1%	19%	◑
E-7	1%	14%	3%	3%	18%	◑
E-8	0%	14%	3%	1%	16%	◑

Continues next page

Table 5B—Institutional Considerations Evaluation by Alignment Alternative (Continued)

Alignment ID	Area in or near National Protected Lands	Area in or near Tribal Lands	Area in or near Parks	Area in or near Federal Lands	Area in or near State Trust Lands	Institutional Rank
F-1	1%	13%	3%	3%	18%	◑
F-2	0%	13%	3%	1%	17%	◑
F-3	1%	13%	3%	3%	19%	◑
F-4	0%	13%	3%	1%	18%	◑
F-5	1%	14%	3%	3%	20%	◑
F-6	0%	13%	3%	1%	19%	◑
F-7	1%	19%	3%	3%	19%	◑
F-8	0%	20%	4%	1%	18%	◑
G-1	1%	19%	3%	3%	19%	◑
G-2	0%	20%	4%	1%	18%	◑
G-3	1%	19%	3%	3%	20%	◑
G-4	0%	20%	4%	1%	20%	◑
G-5	1%	19%	3%	3%	18%	◑
G-6	0%	20%	4%	1%	17%	◑
G-7	1%	19%	3%	3%	19%	◑
G-8	0%	19%	4%	1%	18%	◑
H-1	1%	19%	3%	3%	20%	◑
H-2	0%	19%	4%	1%	19%	◑
H-3	1%	19%	3%	3%	19%	◑
H-4	0%	20%	4%	1%	18%	◑
H-5	1%	19%	3%	3%	19%	◑
H-6	0%	19%	4%	1%	18%	◑
H-7	1%	19%	3%	3%	20%	◑
H-8	0%	20%	4%	1%	19%	◑
I-1	1%	14%	3%	3%	18%	◑
I-2	0%	13%	4%	1%	17%	◑
I-3	1%	14%	3%	3%	19%	◑
I-4	0%	13%	4%	1%	18%	◑
I-5	1%	14%	3%	3%	20%	◑
I-6	0%	13%	4%	1%	19%	◑
I-7	1%	13%	3%	3%	18%	◑
I-8	0%	13%	4%	1%	17%	◑
J-1	1%	13%	3%	3%	19%	◑
J-2	0%	13%	4%	1%	18%	◑
J-3	1%	13%	3%	3%	20%	◑
J-4	0%	13%	4%	1%	19%	◑
J-5	1%	13%	3%	3%	18%	◑
J-6	0%	13%	4%	1%	17%	◑
J-7	1%	13%	3%	3%	19%	◑
J-8	0%	13%	3%	1%	18%	◑

Continues next page

Table 5C—Institutional Considerations Evaluation by Alignment Alternative (Continued)

Alignment ID	Area in or near National Protected Lands	Area in or near Tribal Lands	Area in or near Parks	Area in or near Federal Lands	Area in or near State Trust Lands	Institutional Rank
K-1	1%	14%	3%	3%	20%	◑
K-2	0%	13%	4%	1%	19%	◑
K-3	1%	18%	3%	3%	18%	◑
K-4	0%	18%	4%	1%	17%	◑
K-5	1%	18%	3%	3%	19%	◑
K-6	0%	18%	4%	1%	18%	◑
K-7	1%	17%	3%	3%	18%	◑
K-8	0%	18%	4%	1%	17%	◑
L-1	1%	18%	3%	3%	19%	◑
L-2	0%	18%	4%	1%	18%	◑
L-3	1%	18%	3%	3%	18%	◑
L-4	0%	18%	4%	1%	17%	◑
L-5	1%	18%	3%	3%	19%	◑
L-6	0%	18%	4%	1%	18%	◑
L-7	1%	4%	3%	3%	21%	◑
L-8	0%	2%	4%	1%	20%	●
M-1	1%	4%	3%	3%	22%	◑
M-2	0%	2%	4%	2%	22%	●
M-3	1%	4%	3%	3%	21%	◑
M-4	0%	2%	4%	1%	20%	●
M-5	1%	4%	3%	3%	22%	◑
M-6	0%	2%	4%	1%	21%	●
M-7	1%	4%	3%	3%	21%	◑
M-8	0%	2%	4%	1%	20%	●
N-1	1%	4%	3%	3%	22%	◑
N-2	0%	2%	4%	1%	22%	●
N-3	1%	2%	3%	3%	28%	◑
N-4	0%	0%	4%	2%	29%	●
N-5	1%	2%	3%	3%	29%	◑
N-6	0%	0%	4%	2%	30%	●
N-7	1%	2%	3%	3%	28%	◑
N-8	0%	0%	4%	2%	28%	●
P-1	1%	2%	3%	3%	29%	◑
P-2	0%	0%	4%	2%	30%	●
P-3	1%	2%	3%	3%	28%	●
P-4	0%	0%	3%	2%	29%	●
P-5	1%	2%	3%	3%	29%	●
P-6	0%	0%	3%	2%	30%	●
P-7	1%	2%	5%	7%	33%	◑

Continues next page

Table 5D—Institutional Considerations Evaluation by Alignment Alternative (Continued)

Alignment ID	Area in or near National Protected Lands	Area in or near Tribal Lands	Area in or near Parks	Area in or near Federal Lands	Area in or near State Trust Lands	Institutional Rank
Q-1	0%	0%	5%	6%	34%	◑
Q-3	2%	0%	3%	2%	40%	◑
Q-6	1%	2%	5%	7%	33%	◑
Q-7	0%	0%	5%	6%	34%	◑
R-2	2%	0%	3%	2%	40%	◑
R-4	1%	2%	4%	7%	33%	◑
R-5	0%	0%	5%	6%	34%	◑
R-7	2%	0%	3%	2%	40%	◑
S-1	1%	2%	3%	3%	22%	◑
S-2	1%	2%	3%	3%	22%	◑
S-3	1%	2%	3%	3%	22%	●
S-4	0%	0%	4%	2%	21%	●
S-5	0%	0%	4%	2%	21%	●
S-6	0%	0%	4%	2%	21%	●
S-7	1%	2%	5%	7%	26%	○
S-8	1%	2%	5%	7%	26%	◑
T-1	1%	2%	5%	7%	26%	◑
T-2	0%	0%	6%	6%	26%	◑
T-3	0%	0%	6%	6%	26%	◑
T-4	0%	0%	5%	6%	26%	◑
T-5	3%	0%	4%	2%	33%	●
T-6	3%	0%	4%	2%	32%	●
T-7	2%	0%	3%	2%	33%	●

Table 6A—Length by Alignment Alternative

Length			
Alignment ID	Total Distance	Distance Rank	
A-1	175.0	139	○
A-2	155.7	129	○
A-3	179.9	140	○
A-4	160.6	131	○
A-5	185.7	142	○
A-6	166.4	138	○
A-7	184.9	141	○
A-8	165.6	137	○
B-1	154.1	124	○
B-2	134.8	54	◑
B-3	159.0	130	○
B-4	139.7	65	◑
B-5	164.8	136	○
B-6	145.4	100	◑
B-7	164.0	135	○
B-8	144.7	95	◑
C-1	147.4	105	◑
C-2	128.1	35	◑
C-3	153.2	119	○
C-4	133.9	49	◑
C-5	152.4	114	○
C-6	133.1	44	◑
C-7	143.2	79	◑
C-8	123.9	14	●
D-1	148.1	108	◑
D-2	128.8	38	◑
D-3	153.8	123	○
D-4	134.5	53	◑
D-5	153.1	116	○
D-6	133.8	46	◑
D-7	145.0	97	◑
D-8	125.7	28	◑
E-1	149.9	110	◑
E-2	130.6	40	◑
E-3	155.6	128	○
E-4	136.3	61	◑
E-5	154.9	126	○
E-6	135.6	56	◑
E-7	144.6	94	◑
E-8	125.3	26	◑

Continues next page

Table 6B—Length by Alignment Alternative (Continued)

Length			
Alignment ID	Total Distance	Distance Rank	
F-1	149.5	109	◑
F-2	130.2	39	◑
F-3	155.3	127	○
F-4	135.9	58	◑
F-5	154.5	125	○
F-6	135.2	55	◑
F-7	136.5	62	◑
F-8	117.2	1	●
G-1	142.3	71	◑
G-2	122.9	8	●
G-3	141.5	66	◑
G-4	122.2	4	●
G-5	138.3	64	◑
G-6	119.0	3	●
G-7	144.1	85	◑
G-8	124.8	19	●
H-1	143.3	80	◑
H-2	124.0	15	●
H-3	137.9	63	◑
H-4	118.6	2	●
H-5	143.7	83	◑
H-6	124.4	18	●
H-7	142.9	77	◑
H-8	123.6	12	●
I-1	142.1	70	◑
I-2	122.7	7	●
I-3	147.8	107	◑
I-4	128.5	37	◑
I-5	147.1	103	◑
I-6	127.8	33	◑
I-7	142.0	69	◑
I-8	122.7	6	●
J-1	147.8	106	◑
J-2	128.5	36	◑
J-3	147.1	102	◑
J-4	127.7	32	◑
J-5	141.7	67	◑
J-6	122.3	5	●
J-7	147.4	104	◑
J-8	128.1	34	◑

Continues next page

Table 6C—Length by Alignment Alternative (Continued)

	Length		
Alignment ID	Total Distance	Distance Rank	
K-1	146.7	101	◑
K-2	127.4	31	◑
K-3	145.3	99	◑
K-4	126.0	30	◑
K-5	144.6	93	◑
K-6	125.3	25	◑
K-7	145.3	98	◑
K-8	126.0	29	◑
L-1	144.6	92	◑
L-2	125.3	24	◑
L-3	144.9	96	◑
L-4	125.6	27	◑
L-5	144.2	89	◑
L-6	124.9	21	●
L-7	143.5	82	◑
L-8	124.1	17	●
M-1	142.7	76	◑
M-2	123.4	11	●
M-3	143.4	81	◑
M-4	124.1	16	●
M-5	142.7	75	◑
M-6	123.4	10	●
M-7	143.1	78	◑
M-8	123.7	13	●
N-1	142.3	72	◑
N-2	123.0	9	●
N-3	153.1	118	○
N-4	133.8	48	◑
N-5	152.4	113	○
N-6	133.1	43	◑
N-7	153.1	117	○
N-8	133.8	47	◑
P-1	152.4	112	○
P-2	133.1	42	◑
P-3	152.7	115	○
P-4	133.4	45	◑
P-5	152.0	111	○
P-6	132.7	41	◑
P-7	161.7	134	○
Q-1	142.4	74	◑

Continues next page

Table 6D—Length by Alignment Alternative (Continued)

Length			
Alignment ID	Total Distance	Distance Rank	
Q-3	144.1	87	◑
Q-6	161.7	133	○
Q-7	142.4	73	◑
R-2	144.1	86	◑
R-4	161.3	132	○
R-5	142.0	68	◑
R-7	143.7	84	◑
S-1	144.5	91	◑
S-2	144.5	90	◑
S-3	144.1	88	◑
S-4	125.2	23	◑
S-5	125.2	22	◑
S-6	124.8	20	●
S-7	153.8	122	○
S-8	153.8	121	○
T-1	153.4	120	○
T-2	134.5	52	◑
T-3	134.5	51	◑
T-4	134.1	50	◑
T-5	136.2	60	◑
T-6	136.2	59	◑
T-7	135.8	57	◑

It should be noted that for purposes of the Level 1 screening, an optimal location within each community was selected for evaluation purposes. This location was for evaluation purposes only and does not serve as the precise location of the potential station, which has yet to be determined and will be assessed in later stages of this study.

Pima County Stations

Figure 1—Marana (Ina Rd) Station Location

Figure 2—Marana (Marana Rd) Station Location

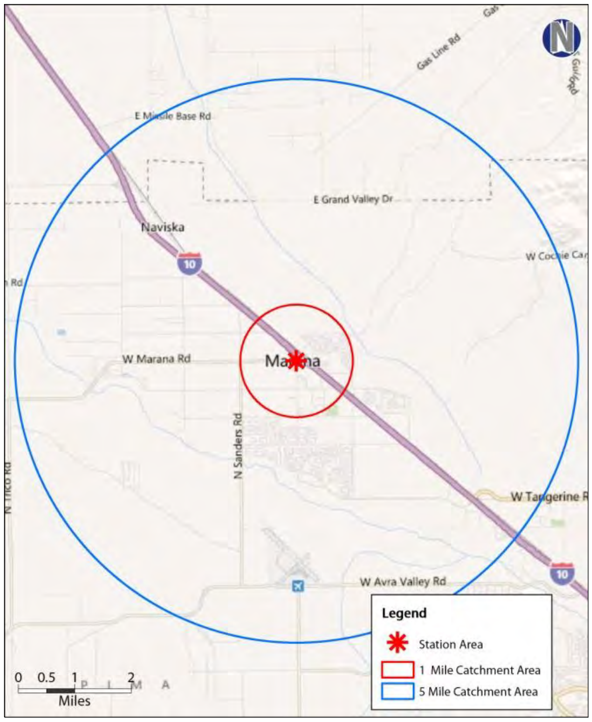


Figure 3—Marana (Tangerine Road) Station Location

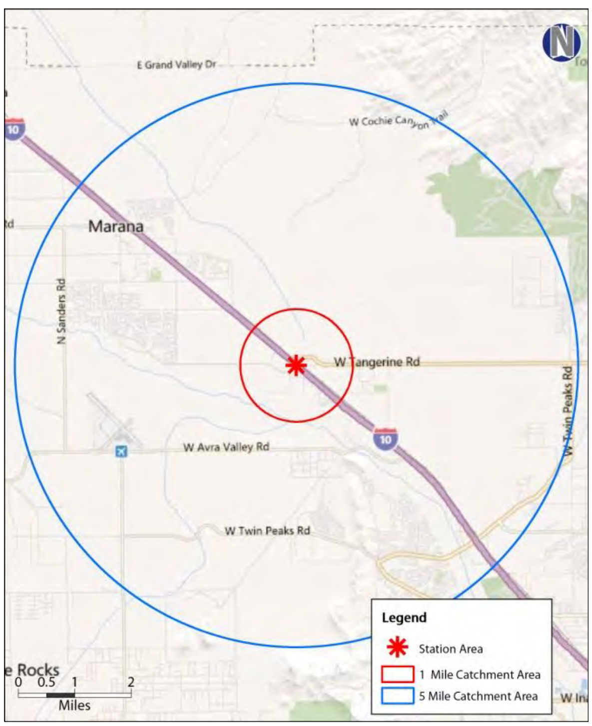


Figure 4—Oro Valley Station Location

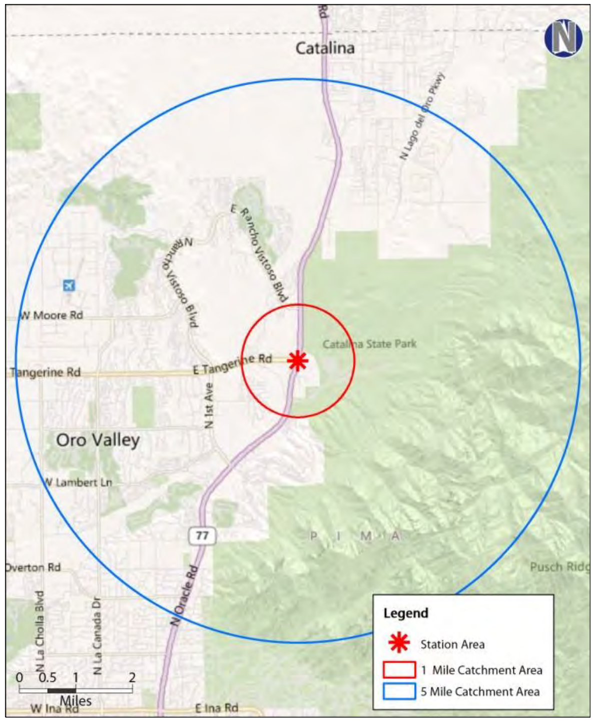


Figure 5—Raytheon Station Location

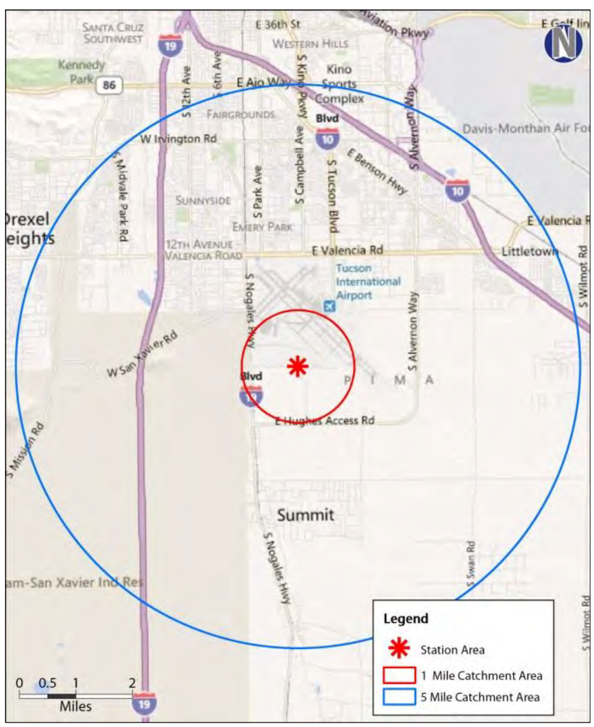


Figure 6—Tucson Convention Center Station Location

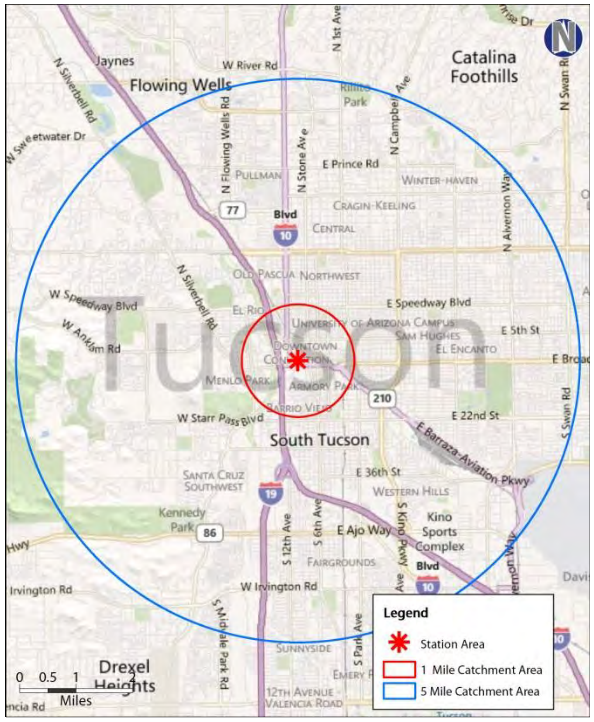


Figure 7—Tucson Historic Depot Station Location

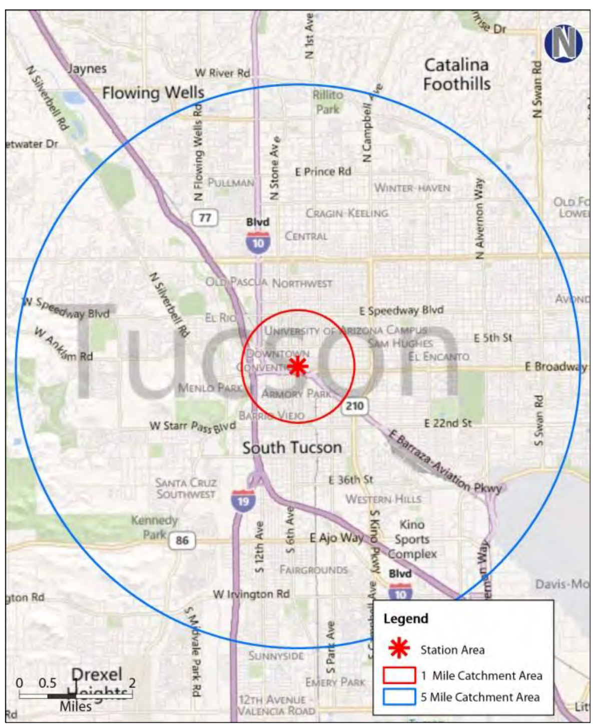


Figure 8—Tucson International Airport Station Location

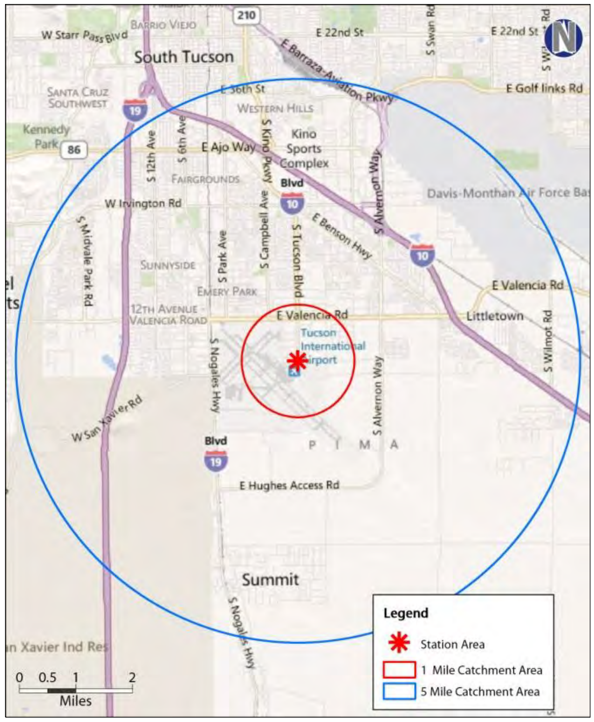


Figure 9—University of Arizona Station Location

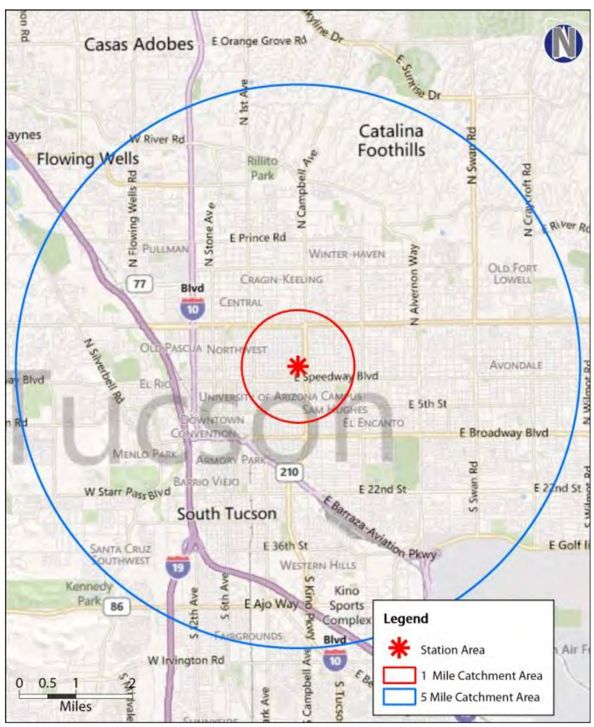
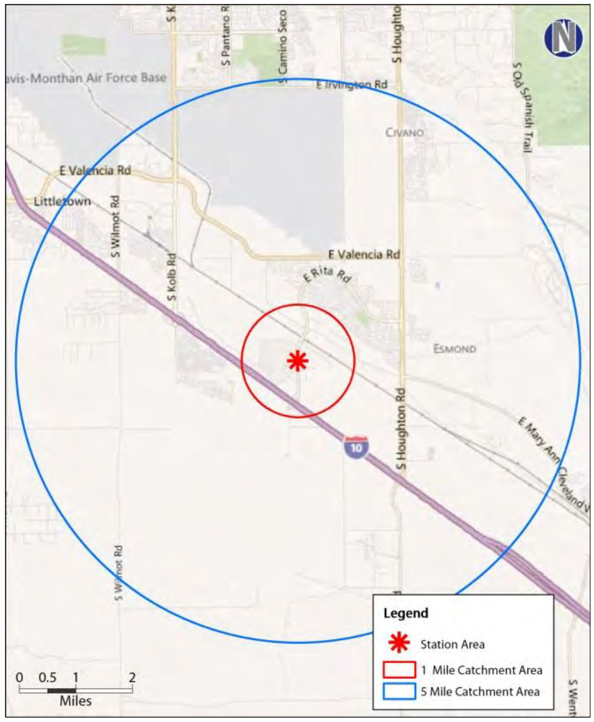


Figure 10—U of A Research Park Station Location



Pinal County Stations

Figure 11—Apache Junction Station Location

Figure 12—Casa Grande Station Location

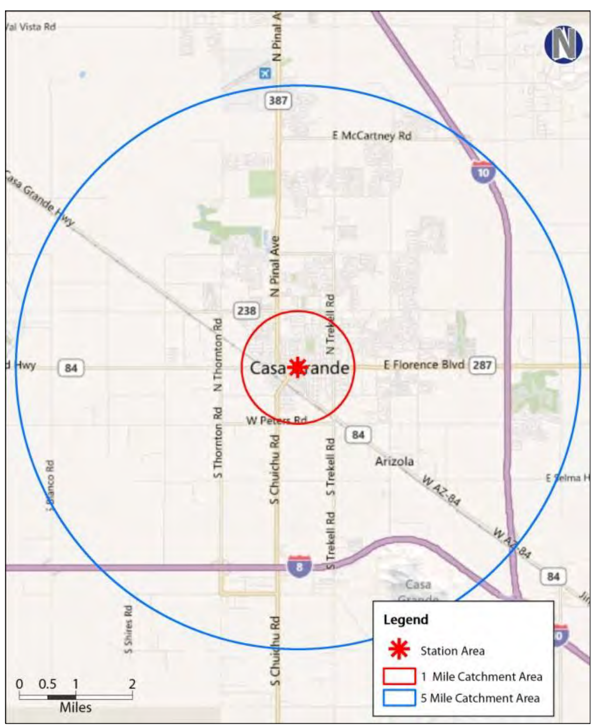


Figure 13—Central Arizona College Station Location

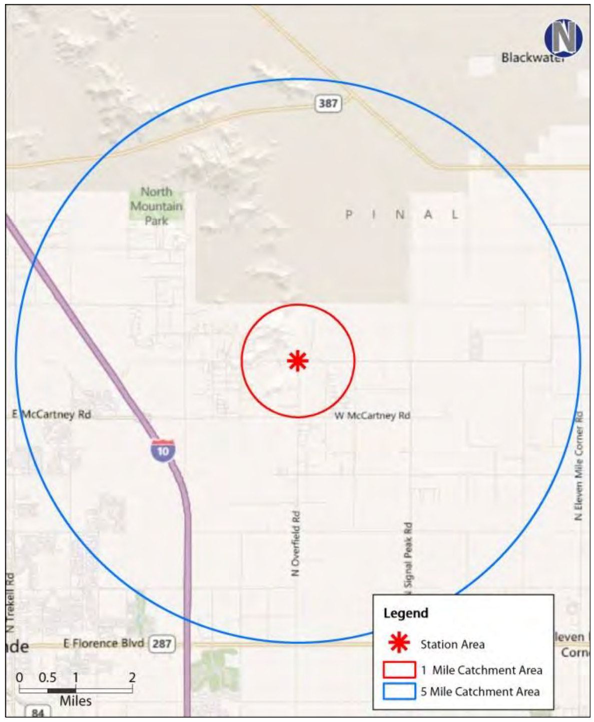


Figure 14—Coolidge Station Location

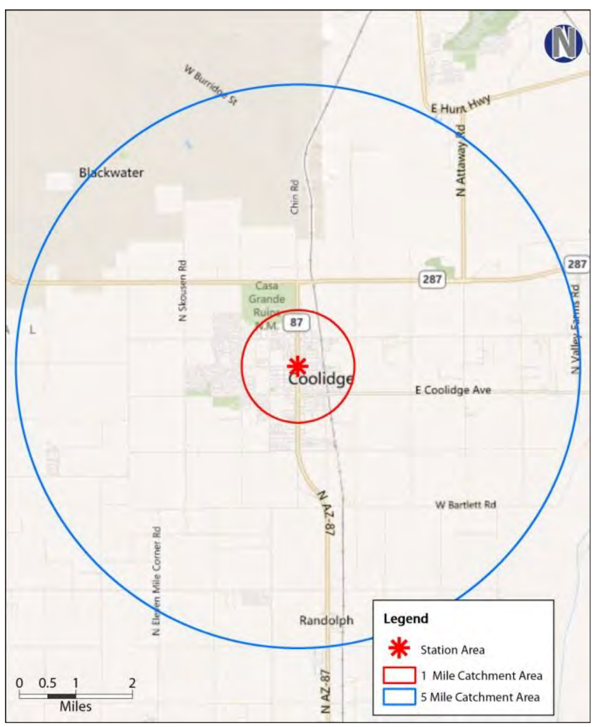


Figure 15—Eloy Station Location

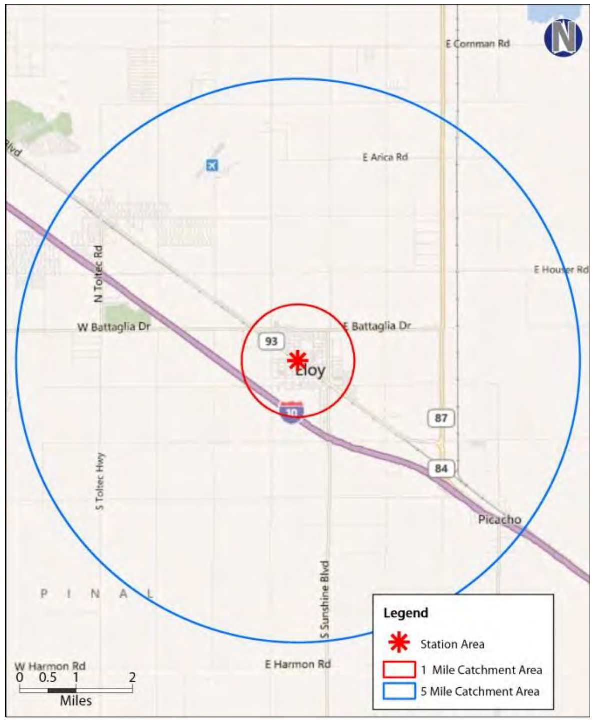


Figure 16—Florence Station Location

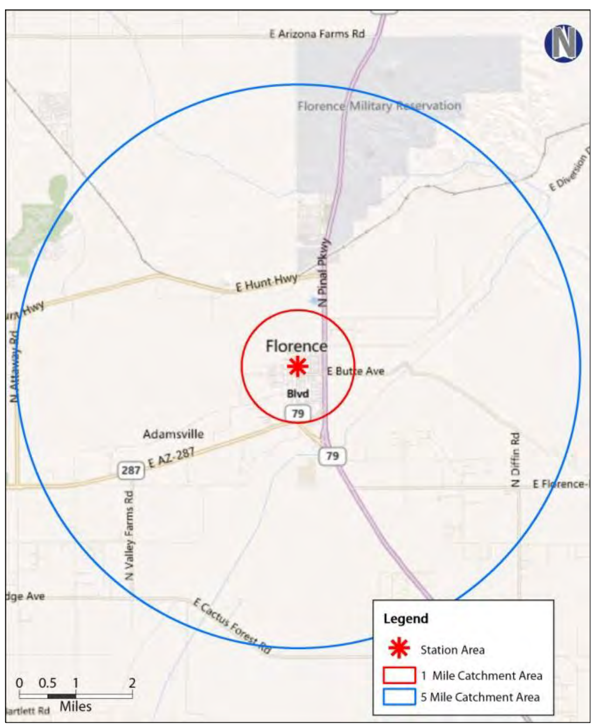


Figure 17—Maricopa Station Location

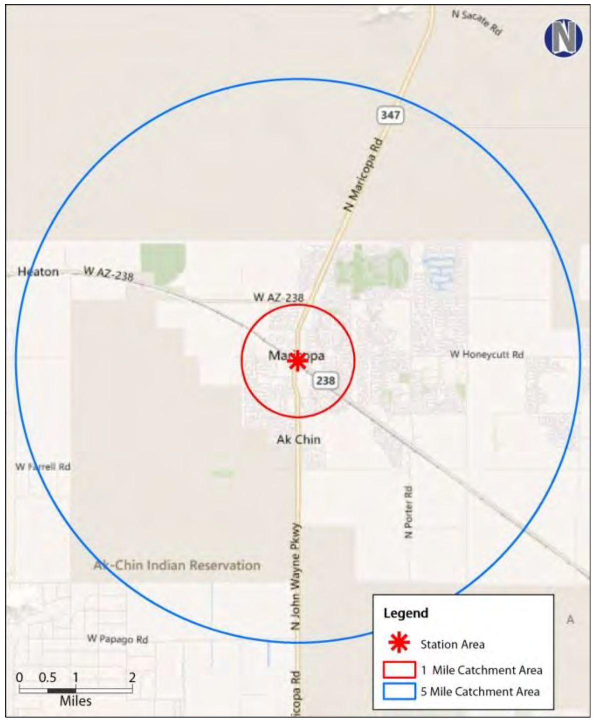


Figure 18—Sacaton Station Location

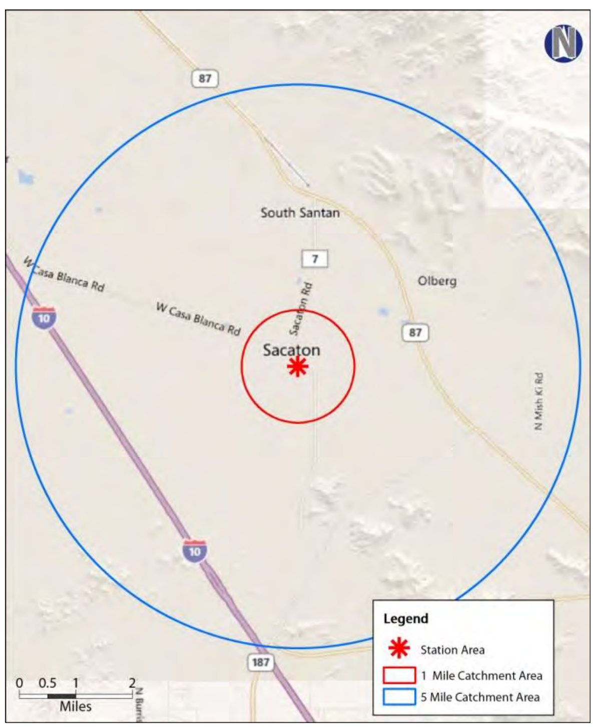
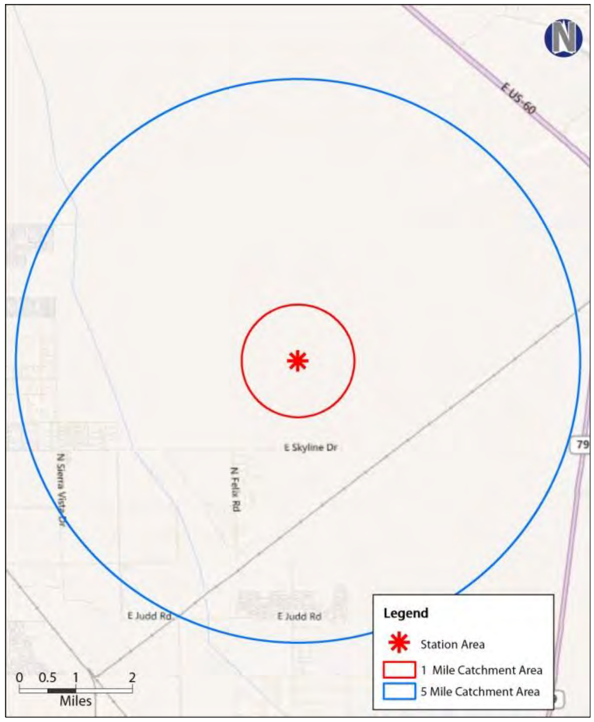


Figure 19—Superstition Vistas Station Location



Maricopa County Stations

Figure 20—Avondale Station Location

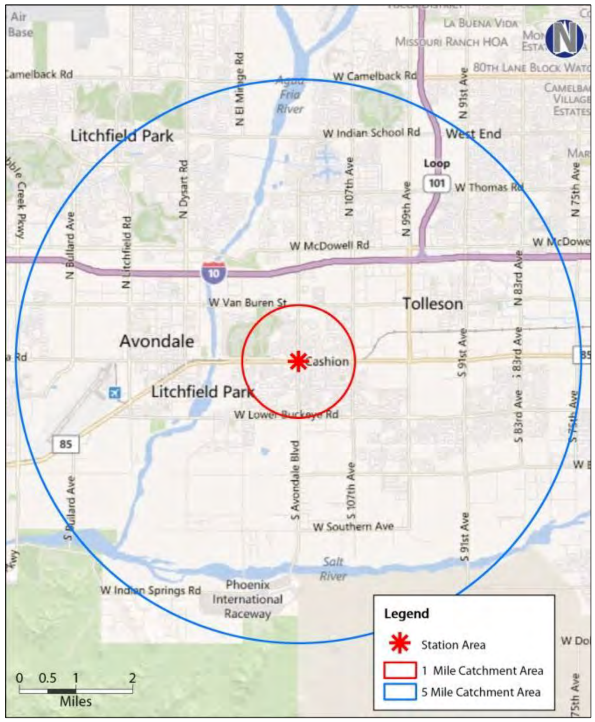


Figure 21—Buckeye Station Location

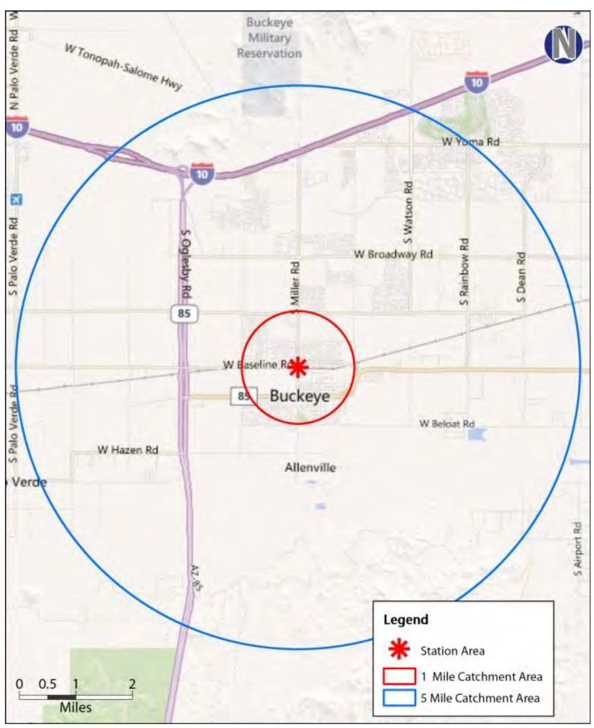


Figure 22—Downtown Chandler Station Location

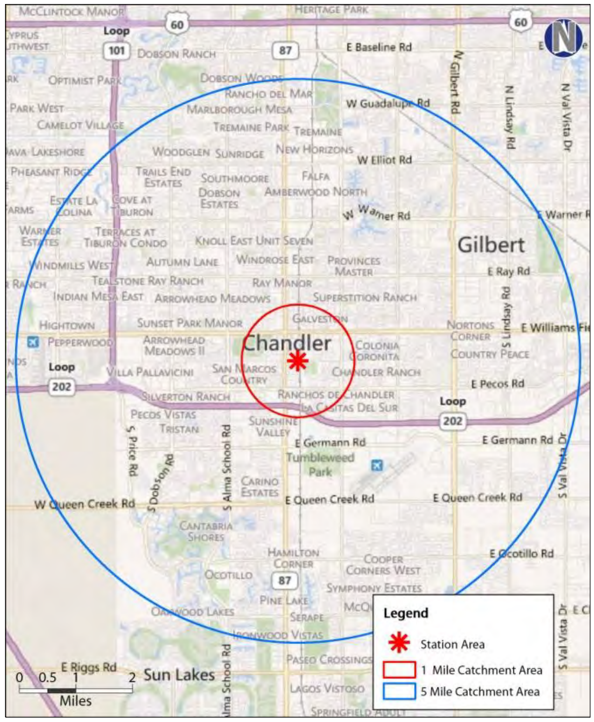


Figure 23—S. Price Hi-Tech Corridor Station Location

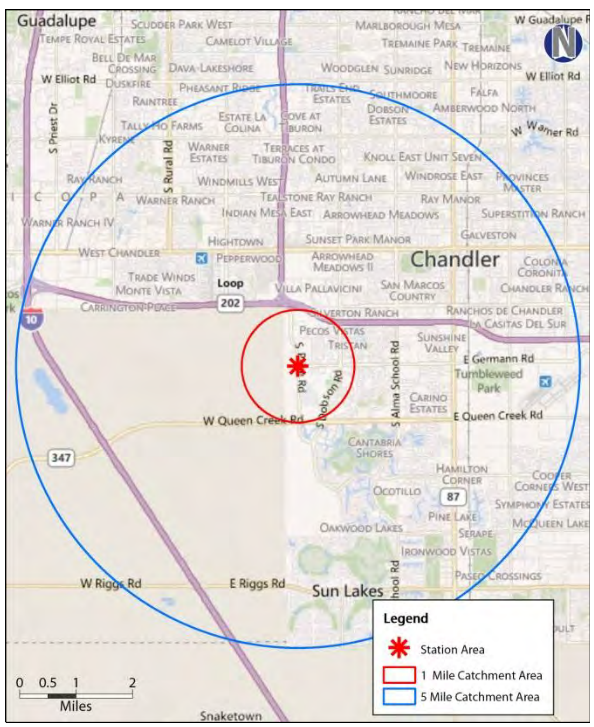


Figure 24—W. Chandler Blvd Station Location

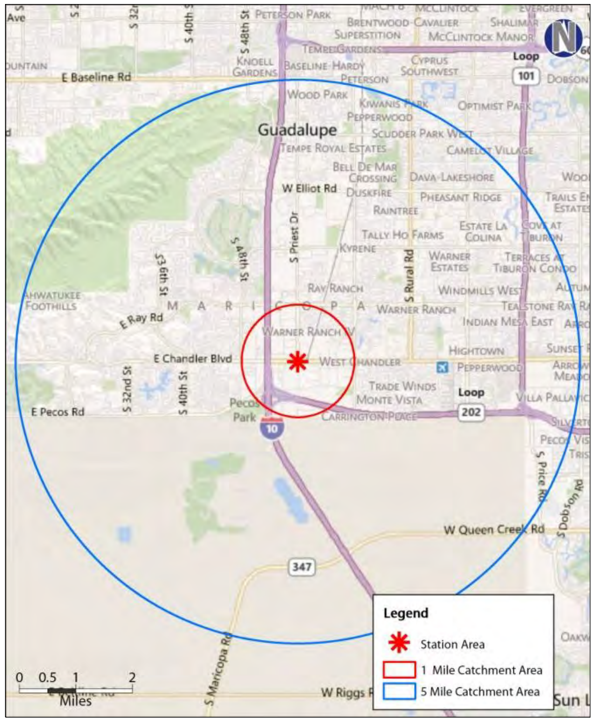


Figure 25—Wild Horse Pass Station Location

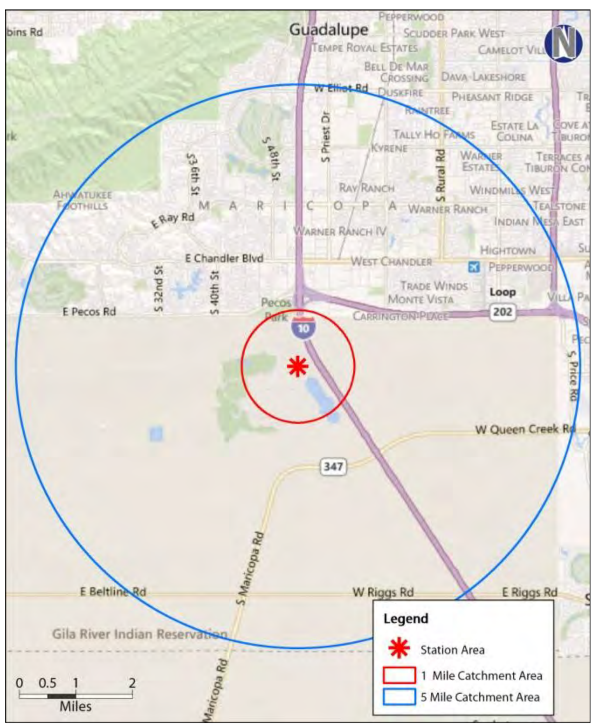


Figure 26—Downtown Gilbert Station Location

Figure 27—Glendale Station Location

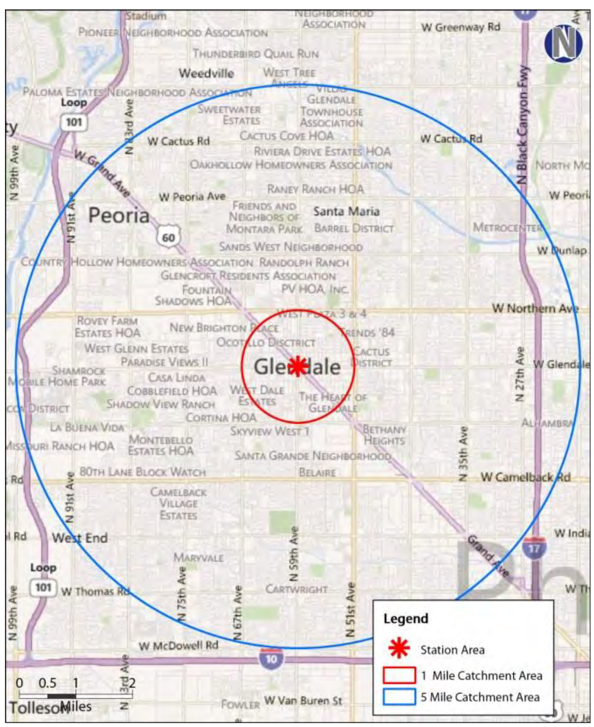


Figure 28—Goodyear Station Location

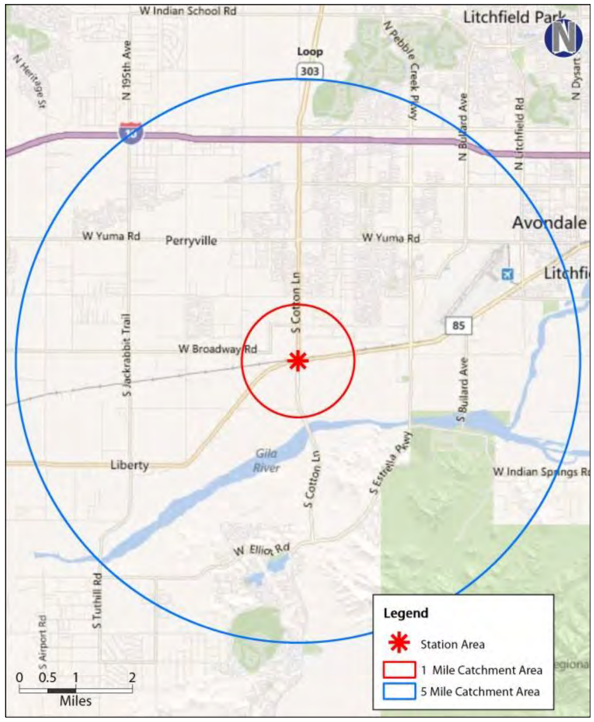


Figure 29—Mesa Station Location

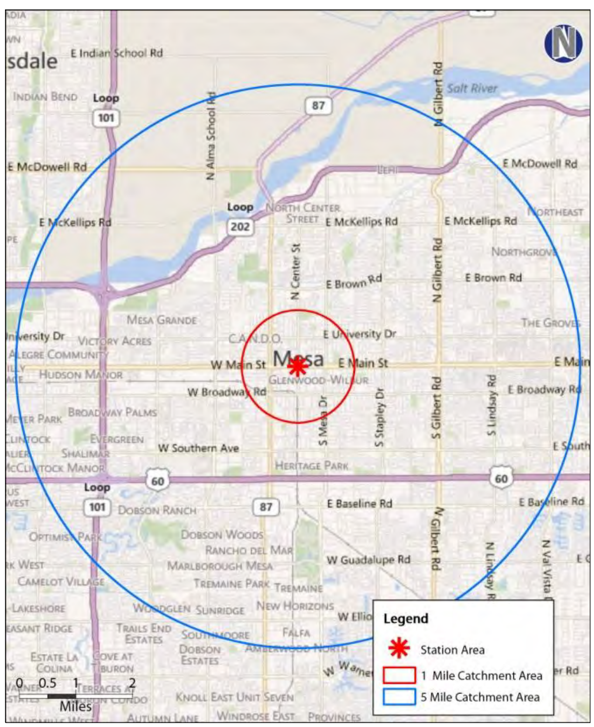


Figure 30—LRT End Station East Station Location

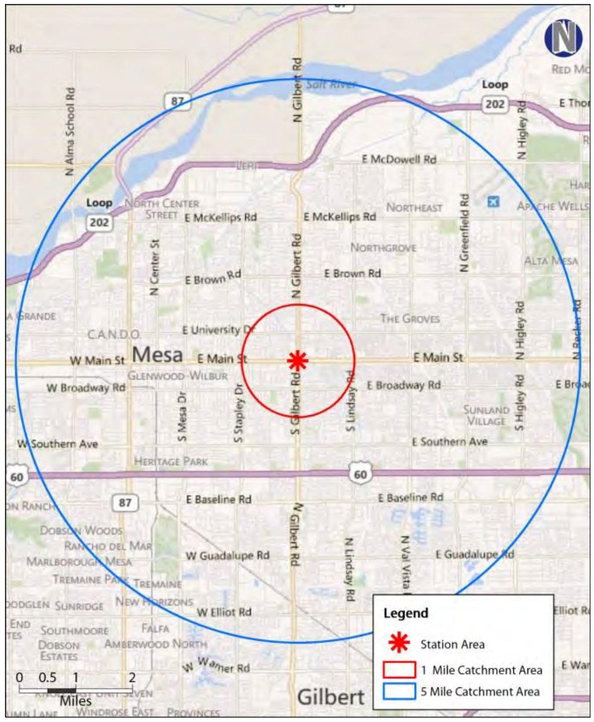


Figure 31—Phoenix Mesa Gateway Station Location

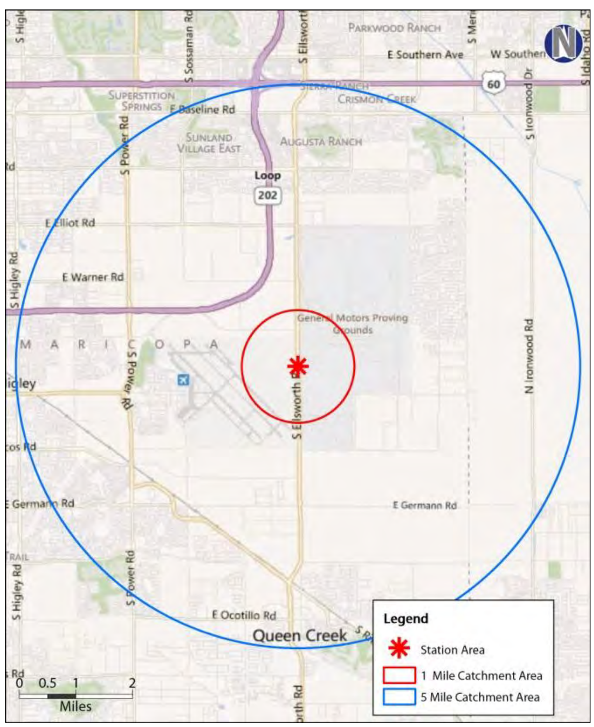


Figure 32—Peoria Station Location

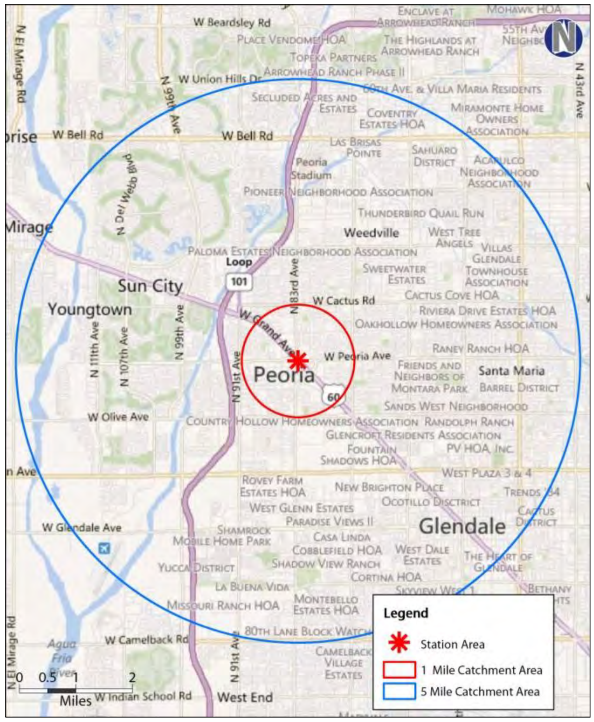


Figure 33—Downtown Phoenix Station Location

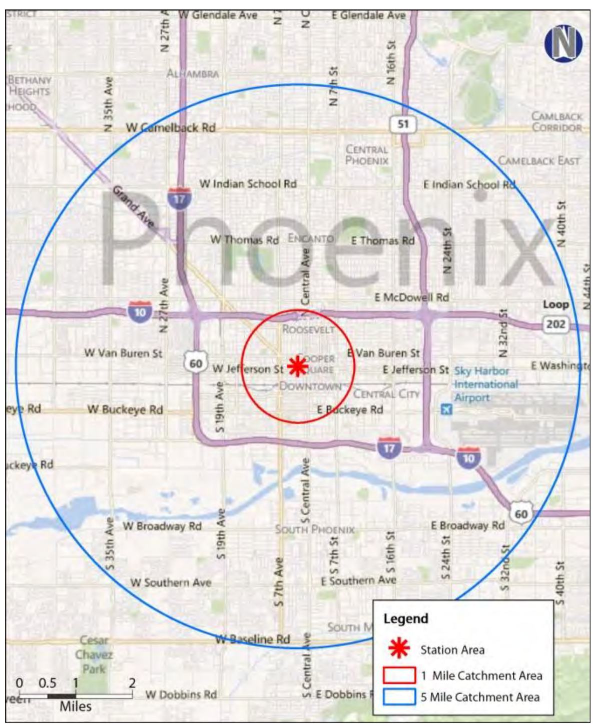


Figure 34—Phoenix Sky Harbor Station Location

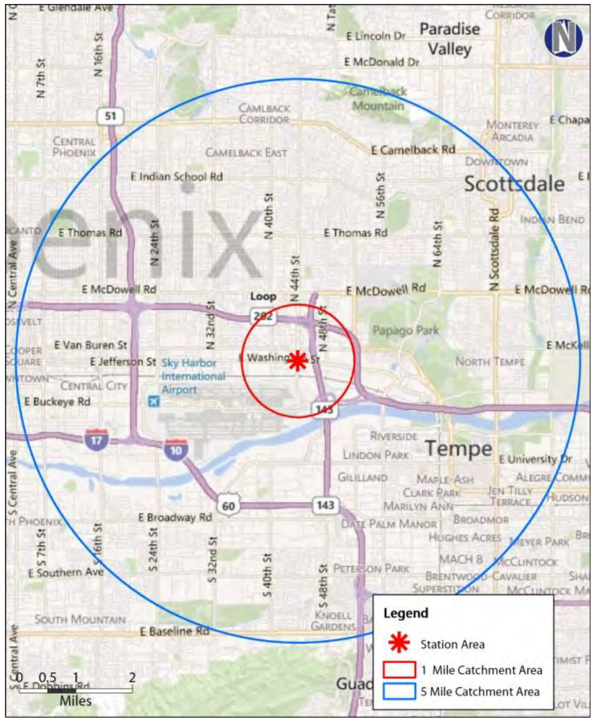


Figure 35—LRT End Station West Station Location

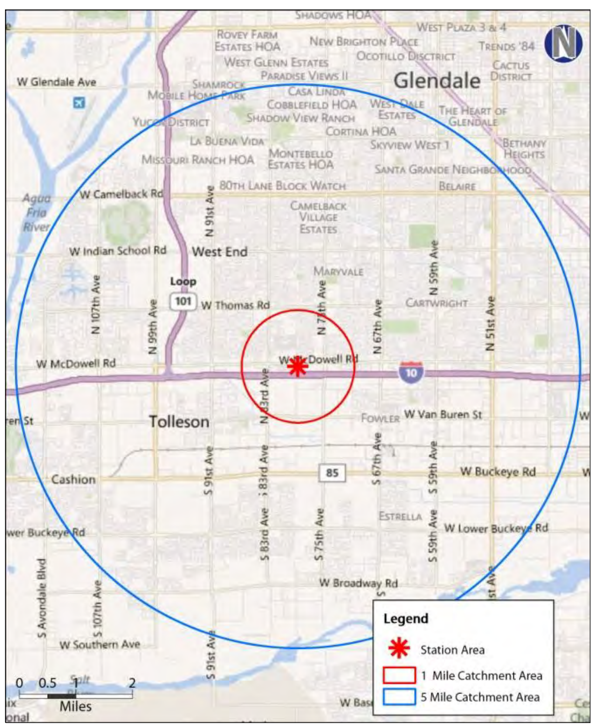


Figure 36—Queen Creek Station Location

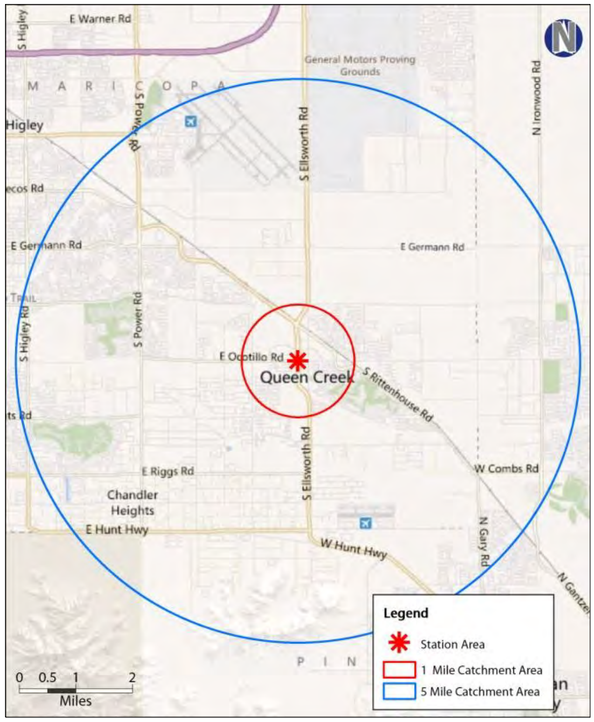


Figure 37—Surprise Station Location

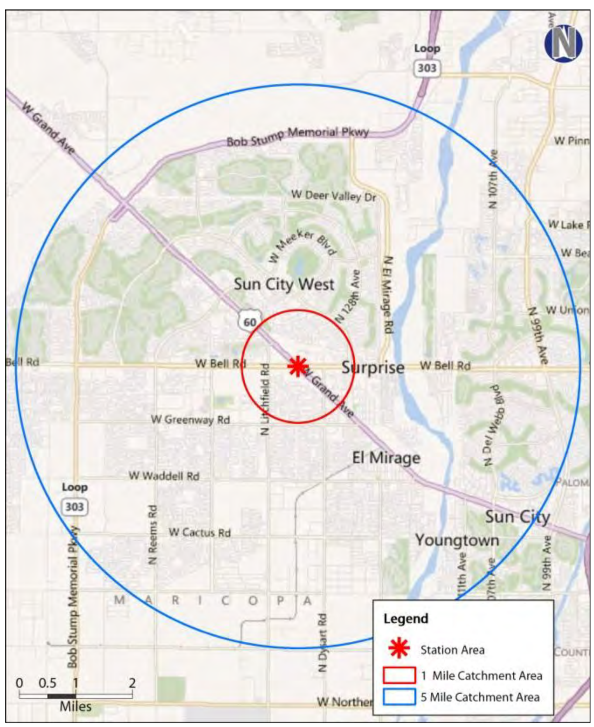


Figure 38—Tempe ASU Station Location