



# Alternatives Selection Report

December 2017



Federal Aid No. 999-M(161)S  
ADOT Project No. 999 SW 0 M5180 01P



## SUMMARY

The Federal Highway Administration (FHWA) and Arizona Department of Transportation (ADOT) have prepared this *Alternatives Selection Report* (ASR) to document the development, evaluation, and screening of corridor options for the I-11 Corridor from Nogales to Wickenburg during the ASR phase. A set of corridor options were defined and evaluated as part of this phase. Ultimately, these corridor options will be assembled into end-to-end alternatives from Nogales to Wickenburg. The approach to developing shorter options during the ASR phase allows for a more focused approach to identifying and assessing specific corridor issues, and will provide flexibility in combining the options to respond to the needs of the I-11 Corridor.

Corridor options were developed and screened based on the ASR methodology and criteria, including consistency with Purpose and Need. The ASR screening enabled the FHWA and ADOT to identify and refine an initial range of corridor options that meet the Purpose and Need, and assessed these alternatives through a screening process that considered agency, tribal, and public input as well as transportation performance, environmental, community and economic development, and other planning information to identify opportunities and constraints. The number of corridor options will be reduced to a reasonable range to be carried forward into the Tier 1 Environmental Impact Statement (EIS) for further study. The Tier 1 EIS will assess a set of Build Corridor Alternatives (i.e., alternative corridors from Nogales to Wickenburg) and its component corridor options, along with the No Build Alternative (i.e., do-nothing option).



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## Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
ALRIS	Arizona Land Resource Information System
Arizona Model	Arizona Statewide Travel Demand Model
ASLD	Arizona State Land Department
ASP	Arizona State Parks
ASR	Alternatives Selection Report
BLM	Bureau of Land Management
bqAZ	Building a Quality Arizona
CAVSARP	Central Avra Valley Storage and Recovery Project
COG	Council of Government
EIS	Environmental Impact Statement
ESRI	Environmental Systems Research Institute
Exst R/W	existing right-of-way
FAST	Fixing America's Surface Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
HSM	Highway Safety Manual
I	Interstate
ISTEA	Intermodal Surface Transportation Efficiency Act
IWCS	I-11 and Intermountain West Corridor Study
LOS	Level of Service
LPOE	land port of entry
LRTP	Long Range Transportation Plan
MAG	Maricopa Association of Governments
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPH	miles per hour
MPO	Metropolitan Planning Organization
NAFTA	North American Free Trade Agreement
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act



NHD	National Hydrography Dataset
NHS	National Highway System
NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
Reclamation	Bureau of Reclamation
ROD	Record of Decision
RTC	Regional Transportation Commission of Southern Nevada
SAVSARP	Southern Avra Valley Storage and Recovery Project
SR	State Route
STIP	Statewide Transportation Improvement Program
STRAHNET	Strategic Highway Network
Section 4(f)	Refers to the original section within the U.S. Department of Transportation Act of 1966 which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development.
TAZ	traffic analysis zone
TTI	Travel Time Index
UPRR	Union Pacific Railroad
US	United States
USFWS	US Fish and Wildlife Service
USFS	US Forest Service
V/C	volume-to-capacity

# 1 INTRODUCTION

## 1.1 Overview

The Federal Highway Administration (FHWA) and Arizona Department of Transportation (ADOT) are conducting the environmental review process for the Interstate 11 (I-11) Corridor from Nogales to Wickenburg, Arizona. A Tier 1 Environmental Impact Statement (EIS) will be prepared as part of this process in accordance with the National Environmental Policy Act (NEPA) and other regulatory requirements. The FHWA is the Federal Lead Agency and ADOT is the Local Project Sponsor under NEPA.

The environmental review process builds upon the prior *I-11 and Intermountain West Corridor Study* (IWCS) completed in 2014, which was a multimodal planning effort that involved ADOT, the Nevada Department of Transportation (NDOT), FHWA, Federal Railroad Administration (FRA), Maricopa Association of Governments (MAG), Regional Transportation Commission of Southern Nevada (RTC), and other key stakeholders. The IWCS identified the I-11 Corridor as a critical piece of multimodal infrastructure that would diversify, support, and connect the economies of Arizona and Nevada. The study also concluded that it could be part of a larger north-south transportation corridor, linking Mexico and Canada.

In December 2015, the United States (US) Congress approved the Fixing America's Surface Transportation (FAST) Act, which is a 5-year legislation to improve the Nation's surface transportation infrastructure. The FAST Act formally designates I-11 throughout Arizona, reinforcing ADOT's overall concept for the I-11 Corridor that emerged from the IWCS study.

The FHWA and ADOT are continuing to study the I-11 Corridor in Arizona for the approximate 280-mile section between Nogales and Wickenburg, as shown on **Figure 1-1** (I-11 Corridor Study Area [Nogales to Wickenburg]). The *Alternatives Selection Report* (ASR) describes the assessment of an initial range of corridor options through a robust evaluation process that uses public and agency input as well as transportation performance, environmental, community and economic development, and other planning information to identify opportunities and constraints. The number of corridor options will be reduced to a reasonable range to be carried forward into the Tier 1 EIS for further study. The Tier 1 EIS will assess a set of Build Corridor Alternatives (i.e., alternative corridors from Nogales to Wickenburg) and its component corridor options, along with the No Build Alternative (i.e., do-nothing option).

## 1.2 Purpose of Report

The FHWA and ADOT have prepared this *Alternatives Selection Report* to document the development and screening of corridor options for the I-11 Corridor during the ASR phase. Ultimately, the Tier 1 EIS will assess the corridor options that emerged from the screening and assemble them into a series of Build Corridor Alternatives, or end-to-end alternatives, from Nogales to Wickenburg.

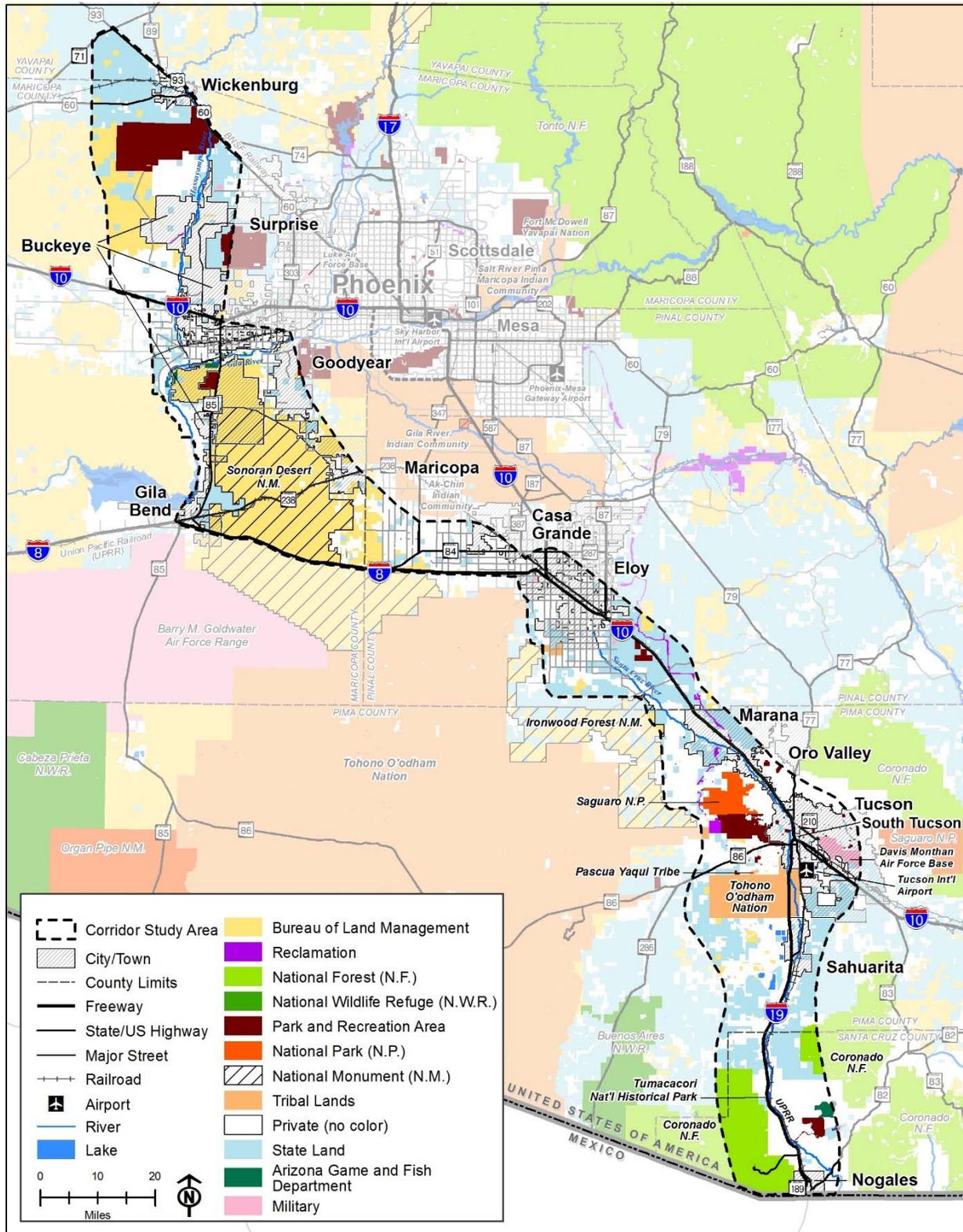


Figure 1-1 I-11 Corridor Study Area (Nogales to Wickenburg)

## 2 BACKGROUND

The concept of a high-capacity, north-south interstate freeway facility connecting Canada and Mexico through the western US has been considered for more than 20 years. It was initially identified as the CANAMEX trade corridor outlined in the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), established under the North American Free Trade Agreement (NAFTA) in 1993, and defined by Congress in the 1995 National Highway Systems Designation Act (Public Law 104-59). CANAMEX was designated as High Priority Corridor #26 in the National Highway System (NHS), recognizing the importance of the corridor to the nation's economy, defense, and mobility.

In 2014, the NDOT and ADOT jointly completed the IWCS that encompassed a broad study area for the Intermountain West region from Mexico to Canada. The purpose of the IWCS was to determine whether sufficient justification exists for a new high-capacity transportation corridor, and if so, to establish the likely potential routes. The study established the corridor vision, developed justification, and defined an implementation plan to move forward. It was intended to provide a high-level overview of the corridor opportunities and foundation for subsequent detailed corridor alternative and environmental studies, such as this Tier 1 EIS. In December 2015, the US Congress approved the FAST Act, which formally designates I-11 throughout Arizona, reinforcing ADOT's overall concept for the I-11 Corridor.

### 2.1 Study Area

**Figure 1-1** depicts the study limits, existing transportation network, municipalities, and major public and private land ownership within the I-11 Corridor Study Area (Study Area). As shown, the Study Area extends approximately 280 miles from Nogales to Wickenburg, traversing five counties, 14 municipalities, and two tribal communities.

On the southern end, the I-11 Corridor Study Area does not extend all the way to the Arizona-Sonoran border; it stops at the I-19/State Route (SR)189 interchange. The small segment from I-19/SR 189 to the international border is under evaluation as part of a separate feasibility study and environmental assessment. The proposed concept for the ultimate configuration of the I-19/SR 189 interchange would include free-flow ramp movements, a grade separation from local arterials, and corridor management improvements. These proposed improvements would address the transportation needs in this immediate area to Mexico, and as such, the I-11 Corridor Study Area for the ASR and Tier 1 EIS was truncated in Nogales, with the logical terminus at the I-19/SR 189 interchange location.

Existing interstate freeways within the Study Area include I-19 from Nogales to Tucson, I-10 from Tucson to Casa Grande, I-8 from Casa Grande to Gila Bend, and I-10 from Buckeye to Tonopah. The state highway network also contains SR 189 and SR 82 in Nogales; SR 86, SR 210, and SR 77 near Tucson; SR 87, SR 287, SR 347, and SR 84 near Eloy and Casa Grande; SR 238 in Gila Bend; SR 85 between Gila Bend and Buckeye; and SR 89 and SR 71 near Wickenburg. US 60 and US 93 border the northern end of the Study Area.

The Union Pacific Railroad (UPRR) runs adjacent to I-19 (Nogales Subdivision) and I-10 (Sunset Corridor) in the southern end of the Study Area, before turning west toward Gila Bend along SR 238. The BNSF Railway parallels US 60 in the northern portion of the Study Area to Wickenburg (Phoenix Subdivision, also referred to as the "Peavine Corridor").

Land throughout the corridor includes a mix of private and public properties within cities, towns, and counties; military areas; tribal lands; and lands owned or managed by the Arizona State Land Department (ASLD), Arizona State Parks (ASP), Bureau of Land Management (BLM), Bureau of Reclamation (Reclamation), National Park Service (NPS), and US Forest Service (USFS). Major rivers flowing through Study Area include the Santa Cruz River from Nogales to Casa Grande, Gila River from Gila Bend to Goodyear, and Hassayampa River from Buckeye to Wickenburg.

## 2.2 Purpose and Need for the Project

An early step in preparing an EIS is to determine if a transportation problem(s) or other need(s) exist in a defined study area. If the analysis demonstrates a Purpose and Need for a proposed action, the EIS process continues with evaluation of a reasonable range of alternatives for a transportation solution that would meet the Purpose and Need. The Purpose and Need provides the basis for identifying, evaluating, and screening corridor options. A reasonable range of alternatives are carried forward into the EIS analysis, which will provide the basis for the selection of a Preferred Alternative.

FHWA and ADOT have prepared a statement of the Purpose and Need for I-11, which is based on key transportation-related issues identified in previous studies, and refined through agency coordination and public involvement during the scoping process (May-July 2016) and continuing coordination with agencies and tribes. The purpose of the proposed action and need for an I-11 Corridor are briefly summarized below. Detailed information regarding the Purpose and Need is provided in a memorandum that may be found on the study website:  
<http://i11study.com/Arizona/Documents.asp>

### 2.2.1 Purpose of Proposed Action

The overall purpose of the I-11 Corridor is to:

- Provide a high priority, high capacity, access-controlled, transportation corridor;
- Support improved regional mobility for people, goods, and homeland security;
- Connect major metropolitan areas and markets in the Intermountain West with Mexico and Canada; and
- Enhance access to the high capacity transportation network to support economic vitality.

While not part of the fundamental purpose for the proposed I-11 Corridor, there are several other desirable outcomes for consideration:

- Provide the opportunity for multimodal use should needs arise in the future;
- Support the protection of sensitive tourist attractions in accordance with applicable plans and policies;
- Support the protection of the environment and cultural resources in accordance with applicable plans and policies; and
- Support coordination with other federal and state agencies to maintain the integrity of wildlife movement.

### 2.2.2 Need for Proposed Interstate Freeway Facility

The problems, issues, and opportunities that support the need for a proposed transportation facility in the I-11 Corridor Study Area are:

- Address population and employment growth;
- Mitigate congestion and improve travel time reliability;
- Improve system linkages and regional and interstate mobility;
- Improve access to economic activity centers; and
- Improve homeland security and national defense.

In a 2016 progress update of ADOT's Long Range Transportation Plan (LRTP), the economic outlook of Arizona was shown to outpace the US in terms of jobs, population, and real income growth. This economic growth would result in impacts related to change in demand on the multimodal transportation system. Rail facilities and services already exist within the I-11 Corridor Study Area, and/or are proposed as part of the *Arizona Passenger Rail Corridor Study*, *State Rail Plan Update*, and *State Freight Plan*. These independent study efforts have examined future needs with regard to rail service within or near the I-11 Corridor Study Area and will be considered as part of the Tier 1 EIS. FHWA and ADOT will continue to coordinate with rail stakeholders, and utility and energy stakeholders, to ensure that relevant multimodal and associated projects (i.e., rail and utility) are integrated or considered within the Tier 1 EIS for the I-11 Corridor as appropriate.

## 2.3 Agency and Public Scoping

Scoping is an early, important step in the environmental review process. During scoping, agencies, tribal governments, and the public have an opportunity to share their ideas and concerns, which help determine the "scope" or range of issues to be addressed in the Tier 1 EIS.

Agency, tribal, and public input was received throughout an approximately 45-day scoping period at the onset of the I-11 Corridor environmental review process, beginning on May 23, 2016 and ending on July 8, 2016. During this time period, FHWA and ADOT held six public scoping meetings at locations throughout the Study Area, including Casa Grande, Buckeye, Nogales, Tucson, Marana, and Wickenburg. A total of 540 people participated in the meetings. Attendees were encouraged to share verbal and written comments, as well as mark suggestions on maps of the 280-mile-long corridor Study Area. In addition to the scoping meetings, the public had an opportunity to submit comments through an online survey and by e-mail, mail or voicemail. In total, 834 public comments were received through these outreach methods. Three agency scoping meetings were also held to obtain input from federal, state, regional, county, local and tribal governments. The meetings were held in Phoenix, Casa Grande and Tucson, with 23 agencies in attendance.

Input varied widely from the various stakeholders. Common themes voiced include:

- Environmental impact concerns, such as avoiding neighborhoods, parks, and recreation areas; minimizing impact to wildlife movement and habitat; concerns regarding air and water quality

- Potential corridor alternative preferences, such as utilizing existing corridors (assumed to minimize additional impacts and costs) versus building new corridors (to address congestion and develop a more direct route)
- Multimodal considerations, such as how to incorporate freight and passenger rail
- Growth and economic development considerations, such as addressing the potential to improve economic opportunities as well as concerns about promoting development in new or sensitive areas

A full description of the scoping process, including all agency, tribal, and public comments can be found in the *Scoping Summary Report*, located on the study website:  
<http://i11study.com/Arizona/Documents.asp>.

## 2.4 Tribal Coordination

Tribal coordination continues to be an integral part of this study. While invited to attend agency and stakeholder meetings throughout the process (2016 Scoping; 2017 Agency and Public Information Meetings), a series of smaller meetings have also occurred with the Four Southern Tribes (Ak-Chin Indian Community, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Tohono O’odham Nation), and any other tribal government requesting individual meetings. Input received during these meetings has led to new data sources, refined corridor options, and general consensus with the direction of the study’s findings to date. Typically, information is exchanged in person at the meetings, but several formal resolutions have been submitted for the study record.

Tribal coordination meetings generally include a mix of participants, including cultural resource specialists participating in the Section 106 consultation process, as well as other interested departments such as transportation, community development, and/or economic development.

**Table 2-1** (Tribal Engagement) lists the major points of tribal coordination that have occurred during the ASR phase of study.

**Table 2-1 Tribal Engagement**

Date	Engagement Activity	Outcome/Activity
21 Mar 2016	Letter to tribes invited to participate in early Section 106 consultation (16 tribes)	Letter initiating early Section 106 consultation process. <sup>(1)</sup>
9 Apr 2016	Pre-scoping presentation to San Xavier District-Tohono O’odham Nation; presentation at District offices in Tucson, AZ at a Saturday Tribal Community (public) meeting	General overview of the I-11 project.
22 Apr 2016	Meeting with Four Southern Tribes Cultural Resource Working Group <sup>(2)</sup>	General overview of the I-11 project.
10 May 2016	Pre-scoping meeting with Ak-Chin leadership; meeting at Ak-Chin offices in Maricopa, AZ	General overview of the I-11 project.
11 May 2016	Telephone conversation with Pascua Yaqui Tribe	General overview of the I-11 project.



Date	Engagement Activity	Outcome/Activity
26 Jun 2016	Garcia Strip Community of the Schuk Toak District of the Tohono O'odham Nation Resolution GS-06-26-16 #1	Resolution opposing the I-11 Tier 1 EIS Corridor Study within the Garcia Strip Community of the Schuk Toak District.
27 Jun 2016	General overview meeting with Tohono O'odham Nation tribal chairman and leadership in Sells, AZ (during official scoping period)	General overview of the I-11 project.
27 Jun 2016	General overview meeting with Tohono O'odham Nation Agriculture and Natural Resources Committee in Sells, AZ (during official scoping period)	General overview of the I-11 project.
14 Jul 2016	General overview meeting with Pascua Yaqui leadership at Pascua Yaqui offices in Tucson, AZ	General overview of the I-11 project.
1 Sep 2016	Update meeting with San Xavier District-Tohono O'odham Nation leadership at District offices in Tucson, AZ	General overview of the I-11 project.
12 Sept 2016	Four Southern Tribes cultural resources meeting in Sacaton, AZ at (Gila River Indian Community Tribal Historic Preservation Officer) (GRIC-THPO) offices	General overview of the I-11 project.
8 Nov 2016	Meeting with Tohono O'odham Tribe at San Xavier District offices in Tucson, AZ	Presented Section 106 methodology and archaeological site density maps and requested information about areas that should be avoided.
9 Nov 2016	Meeting with Ak-Chin and Salt River Pima-Maricopa Indian Communities at ADOT offices in Phoenix, AZ	Presented archaeological site density maps and requested information about areas that should be avoided.
17 Nov 2016	Sif Oidak District Council Resolution SODC 16-145	Resolution supporting the I-11 Tier 1 EIS Corridor Study within the Sif Oidak District.
28 Nov 2016	Meeting with Gila River Indian Community at GRIC-THPO offices in Sacaton, AZ	Meeting conducted to follow-up on agency scoping meeting. Provided overview of Section 106 process to date and distributed archaeological site density maps.
27 Dec 2016	Four Southern Tribes Cultural Resources Working Group meeting in Casa Grande, Arizona public library	Provided general overview of the I-11 project.
11 Jan 2017	January 11, 2017 letter of opposition to the I-11 Corridor in or near the San Xavier District of the Tohono O'odham Nation	San Xavier District Chairman signed letter of opposition (letter erroneously dated 2016) to the I-11 Corridor.
11 Feb 2017	Schuk Toak District of the Tohono O'odham Nation Resolution ST-02-11-17-019	Resolution opposing the I-11 Tier 1 EIS Corridor Study in or near the Garcia Strip Community of the Schuk Toak District.
14 Feb 2017	General update meeting with San Xavier District-Tohono O'odham Nation leadership at District offices in Tucson, AZ	Provided description of study process, scoping activities, and issues and concerns; discussed future meeting opportunities and communications.



Date	Engagement Activity	Outcome/Activity
15 Feb 2017	General update meeting with Fort Yuma-Quechan leadership at tribal offices in Winterhaven, CA	Provided an update of the I-11 project.
06 Mar 2017	ADOT March 6, 2017 response letter to San Xavier District of the Tohono O’odham Nation	Provided responses to San Xavier District’s January 11, 2017 I-11 letter of opposition (letter erroneously dated 2016)
20 Apr 2017	I-Meeting with Four Southern Tribes at Casa Grande Public Library in Casa Grande, AZ	Provided an update of the I-11 project, including a preview of information to be presented at the May public meetings.
27 Apr 2017	Letter sent to Section 106 consulting parties	Letter inviting participating agencies to attend public meetings scheduled May 2 through May 16, 2017.
8 May 2017	Meeting with Fort Yuma Quechan Tribe tribal council in Winterhaven, CA	Provided Fort Yuma Quechan Tribe with a project status update for new Tribal Council members and Tribal Cultural Resources Committee.
20 May 2017	General update meeting with Schuk Toak District of the Tohono O’odham Nation at the Schuk Toak District offices in Haivana Nakya, AZ	Provided an update of the I-11 project.
23 May 2017	General update meeting with Sif Oidak District of the Tohono O’odham Nation at Sif Oidak District offices in North Komelik, AZ	Presented overview of I-11 study as third agenda item at Sif Oidak District Council meeting.
13 Jun 2017	Meeting with Ak-Chin tribal Council and leadership at Ak-Chin offices in Maricopa, AZ	Provided general I-11 update meeting for Ak-Chin tribal council members and planning and environmental leadership staff
27 Jun 2017	I-11 project meeting with Four Southern Tribes at Casa Grande Public Library in Casa Grande, AZ	Provided an update of the I-11 project.

- (1) Section 106 consulting party letters sent to the following tribes: Yavapai-Prescott, Yavapai-Apache Nation, White Mountain Apache Tribe, San Xavier District-Tohono O’odham Nation, Tonto Apache Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Pascua Yaqui Tribe, Hopi Tribe, Gila River Indian Community, Fort Yuma-Quechan Tribe, Fort McDowell Yavapai Nation, Fort Mojave Indian Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, and Ak-Chin Indian Community. The *I-11 Public Outreach and Agency Coordination Plan* has a complete listing of those tribes that accepted the invitation to be a Section 106 consulting party, available online: <http://i11study.com/Arizona/Documents.asp>.
- (2) The Four Southern Tribes include: Ak-Chin Indian Community, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and Tohono O’odham Nation.

### 3 CORRIDOR ALTERNATIVES DEVELOPMENT

For purposes of the ASR, the Study Area is divided into three sections – South, Central and North (**Figure 3-1**, I-11 Corridor Study Area Sections). A broad range of corridor options were developed within these three sections, with the ability to be pieced together into a set of end-to-end alternatives from Nogales to Wickenburg during the Tier 1 EIS.

It is important to note that although the corridor options were initially structured by section, these are not necessarily local transportation solutions. The goal of the I-11 Corridor is to serve long-distance travel across Arizona and the Western US, including efficient and reliable access between Nogales and Wickenburg, Arizona.

This chapter describes the basis for the development of the corridor options that were subject to evaluation and screening during the ASR phase. As described in Chapter 4, the evaluation of these corridor options utilized quantitative and qualitative criteria, to identify a reasonable range of options that will undergo a programmatic-level environmental review in the Tier 1 EIS phase, along with a No Build Alternative. For more information on the ASR methodology, please refer to the *I-11 ASR Evaluation Methodology and Criteria Report*, located on the study website: <http://i11study.com/Arizona/Documents.asp>.

#### 3.1 Definition of Corridor Options

An initial range of corridor options were developed based on four primary sources:

- **Prior I-11 Study:** The 2014 IWCS encompassed a broad study area for the Intermountain West region from Mexico to Canada. The purpose of the IWCS was to determine whether sufficient justification exists for a new high-priority, high-capacity, transportation corridor, and if so, to establish the likely potential routes, focusing on connections within Arizona and Nevada. The study established the corridor vision, developed justification, and defined an implementation plan to move forward. It was intended to provide a high-level overview of the transportation corridor opportunities and foundation for subsequent corridor alternative and environmental studies. The IWCS provided the initial basis for the I-11 Corridor Study Area that advanced into this environmental review process, incorporating potential corridor alternatives from Nogales to Wickenburg.
- **Agency Scoping Input:** During the 2016 scoping period, agencies and tribal communities provided feedback on potential corridor preferences, considerations, and constraint areas, including potential locations for a transportation facility or areas to avoid. Common feedback themes included:
  - Split preference for corridor options on existing freeways (I-19, I-10, I-8, SR 85) versus new/proposed corridors (Pima County west Tucson route, Eloy/Pinal County route west of I-10, West Pinal route north of I-8, Hassayampa Freeway route, SR 303L south extension, west of Vulture Mountains route)
  - Develop a reasonable range of alternatives and consider a multimodal corridor
  - Ensure consistency with existing and proposed local and regional plans, environmental documents, and master planned community plans
  - Study opportunities to foster economic development
  - Protect environmentally-sensitive resources

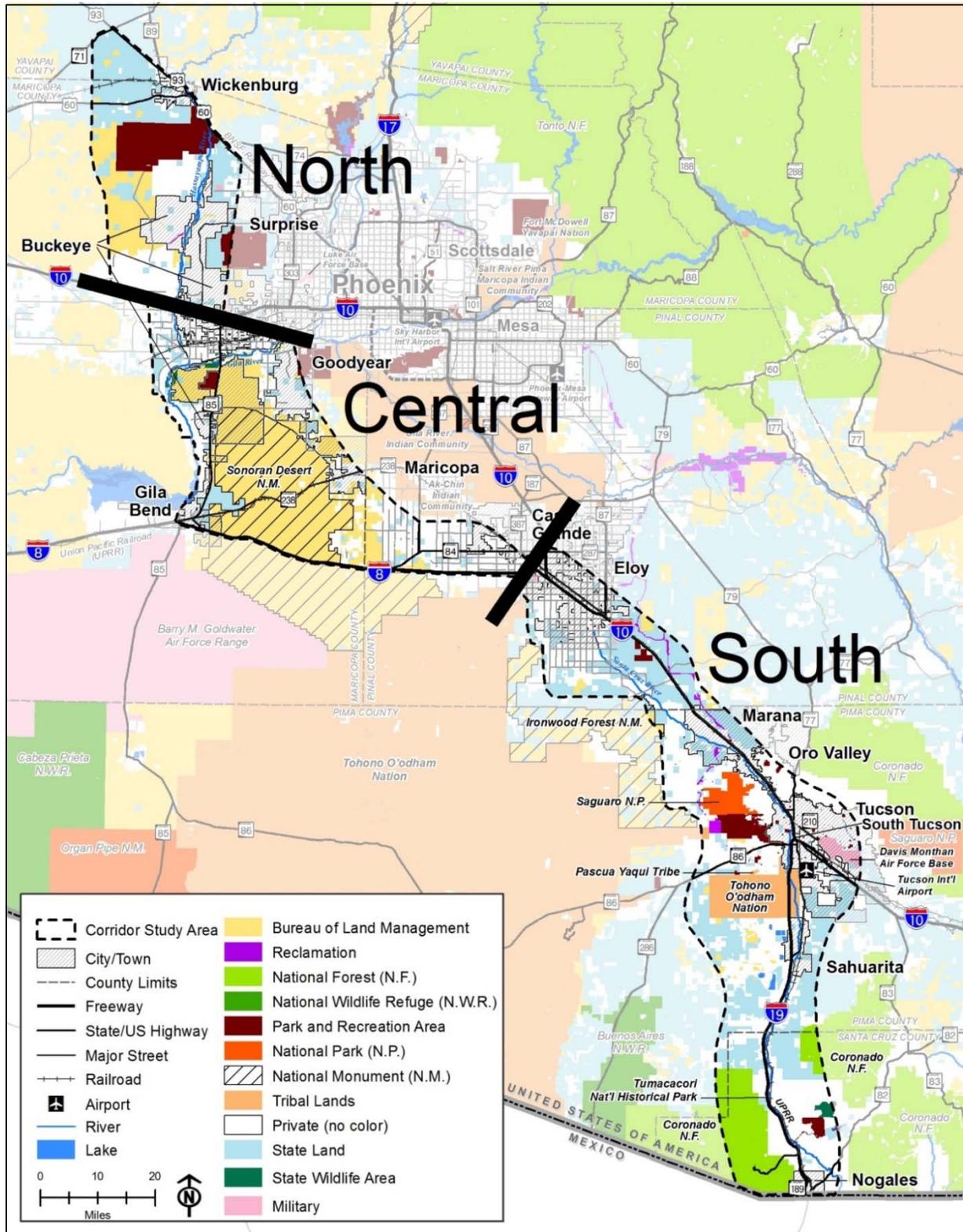
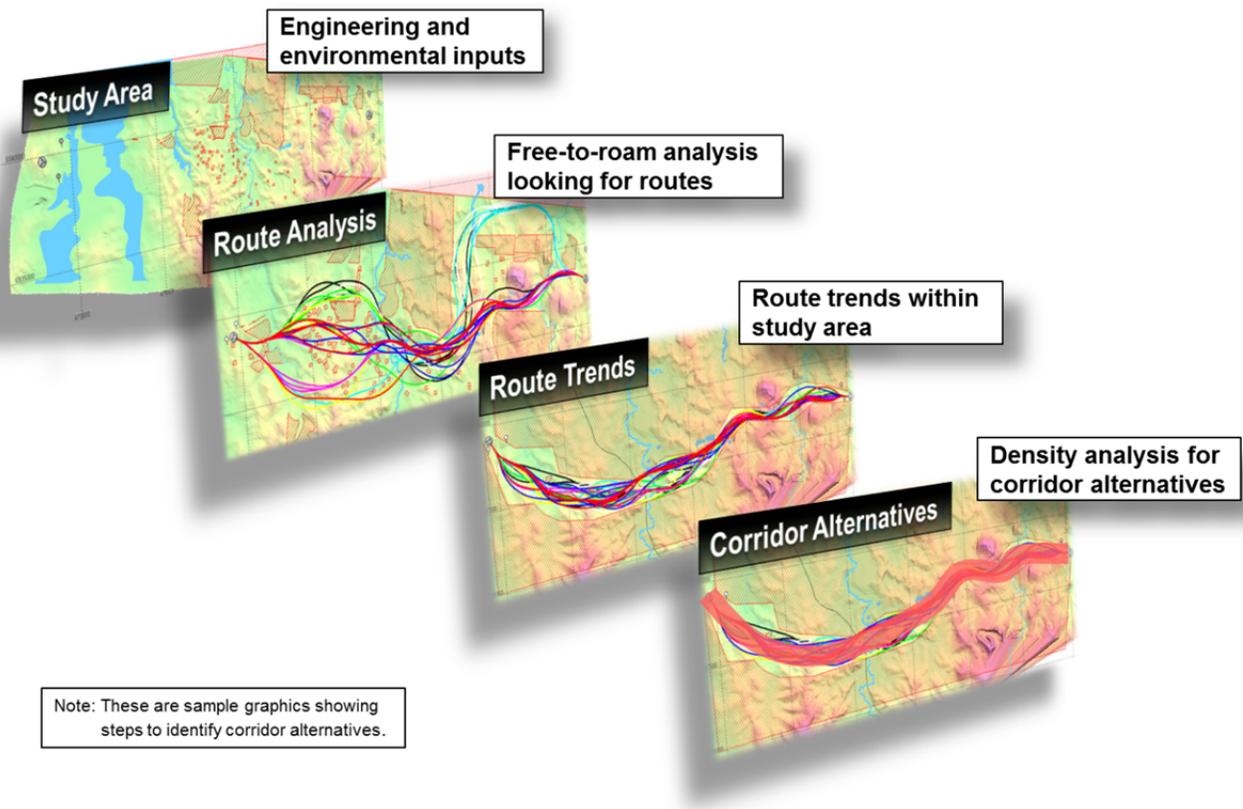


Figure 3-1 I-11 Corridor Study Area Sections

- Consider cumulative impacts and growth-related indirect impacts
- Assess impacts to environmental justice communities
- Maintain connectivity between regional trails and parks
- **Public Scoping Input:** During the 2016 scoping period, the general public also provided feedback on potential corridor option preferences, considerations, and/or constraint areas, including potential locations for a transportation facility or areas to avoid. Common feedback themes included:
  - Preferences for both improving existing freeways and interstates and constructing I-11 as a separate/new facility
  - Support for accommodating multimodal transportation options
  - Concern regarding impacts to the Sonoran Desert environment
  - Desire to minimize disturbances to undeveloped lands
  - Avoid parks and conservation management areas (e.g., Coronado National Forest, Saguaro National Park West, Vulture Mountain Recreation Area, national monument areas, major rivers, etc.)
  - Many concerns regarding environmental preservation and community impacts in Avra Valley
  - Preserve opportunities for recreational visitor use (e.g., hiking, hunting, camping)
  - Consider emergency access, such as the effect of dust storms on interstate mobility
  - Use I-11 to bring economic benefits to surrounding communities
  - Concern regarding property values and increased heavy truck traffic
- **Technical Analysis:** The technical analysis involved the use of a software modeling tool (Quantm) that considered both engineering and environmental factors. It mapped potential routes for a proposed transportation facility based on engineering design criteria, and at the same time, avoided sensitive environmental resources and topographical constraints, for the purpose of identifying any reasonable corridor options not already studied or recommended, as well as to validate or optimize previously suggested routes. The major steps followed include: (1) collect and enter engineering and environmental inputs into model, (2) run model for a free-to-roam analysis looking for potential routes within the Study Area, (3) evaluate model outputs to identify route trends within the Study Area, and (4) conduct a density analysis of route trends to identify potential corridor options.

The definition of corridor options was an iterative exercise, which culminated in a set of options (from all four primary sources) and defining the initial range of alternatives to carry forward into the ASR screening process.

**Figure 3-2** illustrates the steps involved in the technical analysis. For more information on the specific methodology and inputs to the technical analysis, please see the *I-11 ASR Evaluation Methodology and Criteria Report*, located on the study website at: <http://i11study.com/Arizona/Documents.asp>.



**Figure 3-2 Steps Involved in the Technical Analysis**

### 3.2 Corridor Options (by Section)

To promote comprehensive coverage of the Study Area, defining the initial range of corridor options included comparing the four sources – prior I-11 study, agency scoping input, public scoping input, and technical analysis – to capture all points of input and develop a range of options to be evaluated during the ASR phase.

**Figure 3-3** (I-11 Corridor Options) illustrates the initial range of corridor options, which is meant to encompass themes from all corridor suggestions and points of view (e.g., use existing corridors, develop new corridor options that bypass certain areas or constraints, such as areas of congestion, parks, natural resource areas, etc.). The corridor options are organized within section divisions (South, Central, North) and are labeled with an alphanumeric label to differentiate each option under consideration.

As discussed further in the next section of this report, the corridor options within each section were compared to each other to understand the opportunities and constraints of each option, as well as understand how well each option contributes to meeting the I-11 Corridor's Purpose and Need. Following an evaluation based on the screening criteria, corridor options that are recommended for further study will be advanced into the Tier 1 EIS and will be assembled into a set of long-distance, end-to-end corridor alternatives from Nogales to Wickenburg.

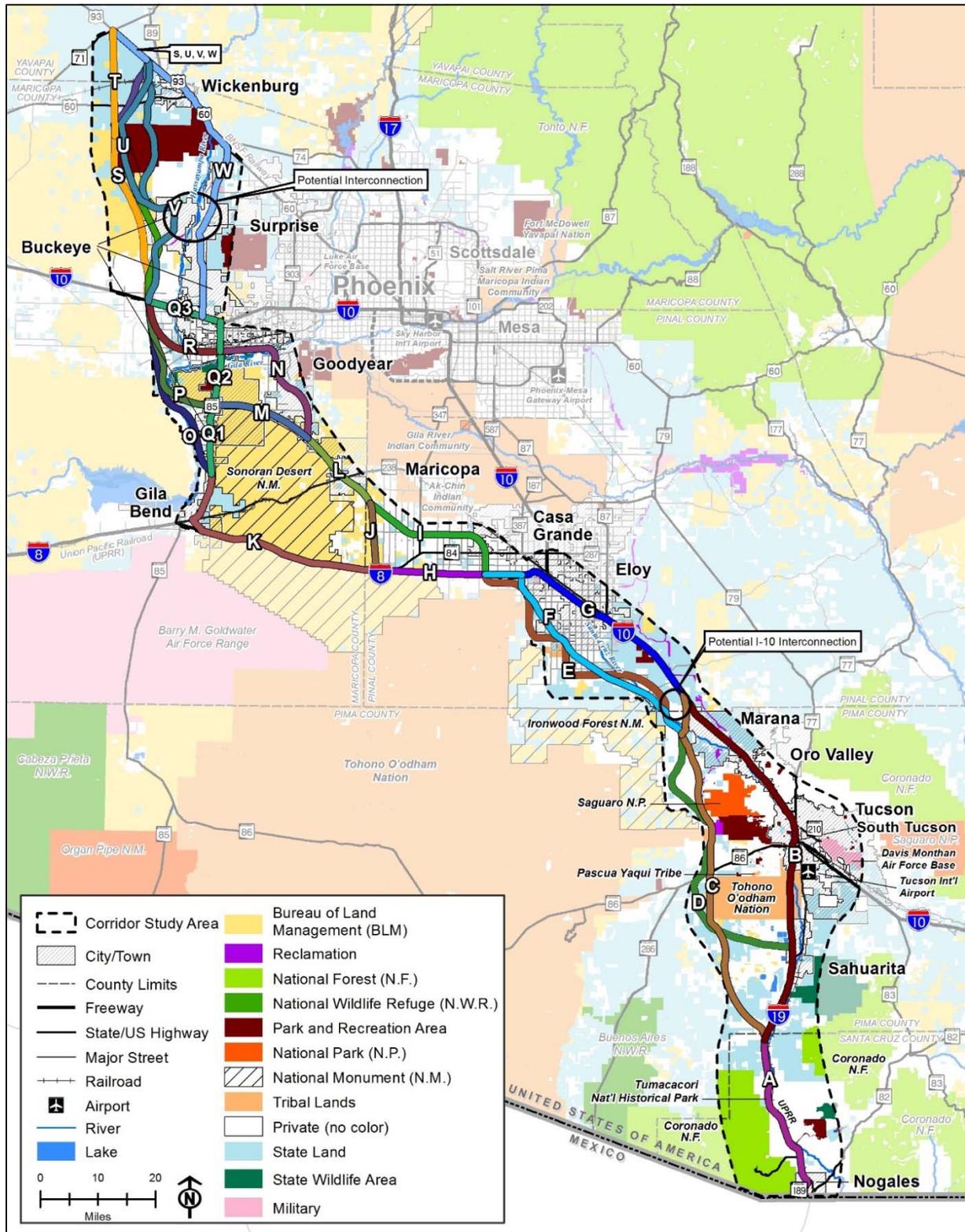


Figure 3-3 I-11 Corridor Options

## 4 ALTERNATIVES SCREENING PROCESS

### 4.1 Screening Methodology and Criteria

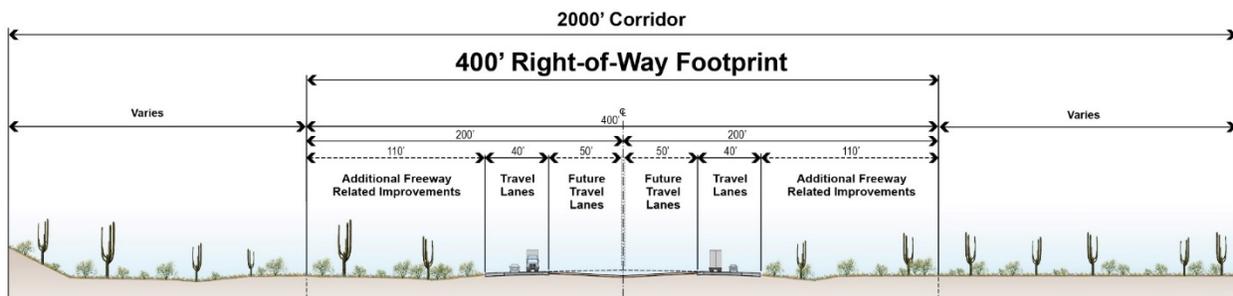
The alternatives screening process was implemented to assess the initial range of corridor options for the Study Area using an established set of criteria. The criteria includes multiple quantitative and qualitative measures that correspond with the Purpose and Need; public, agency, and tribal input; as well as additional planning-related factors, such as potential impacts to sensitive environmental resources. The screening criteria and specific measures are listed in **Table 4-1** (Screening Criteria and Measures).

This screening process constitutes a high-level evaluation of the corridor options, with the intent that options advanced into the Tier 1 EIS meet the Purpose and Need and avoid major environmental and engineering constraints to the extent possible at this stage. More detailed impacts analysis will occur on as part of the Tier 1 EIS, including detailed resource area topics such as land use, biological resources, water resources, Section 4(f) properties, etc.

#### 4.1.1 Screening Process

For the screening analysis, a standard 400-foot typical section was used to compare each corridor option to each other (**Figure 4-1**, Typical Section for Proposed Interstate Freeway Facility). The typical cross section defined for the I-11 Corridor was developed to provide a high-level comparison of transportation and environmental factors and to provide flexibility with the ultimate placement of the future alignment anywhere within the 2,000-foot corridor.

Engineering inputs for grade during the technical analysis included assumptions that would allow integration of parallel freight rail or passenger rail in the future. A 400-foot corridor footprint is considered to be conservative and would allow flexibility in the use of the right-of-way in the future.



Note: 400' right-of-way footprint for the I-11 Corridor may not be centered in the overall 2000' study corridor, but could be located anywhere within the 2000' alternative. Widths on either side of freeway corridor may vary.

**Figure 4-1 Typical Section for Proposed Interstate Freeway Facility (not to scale)**

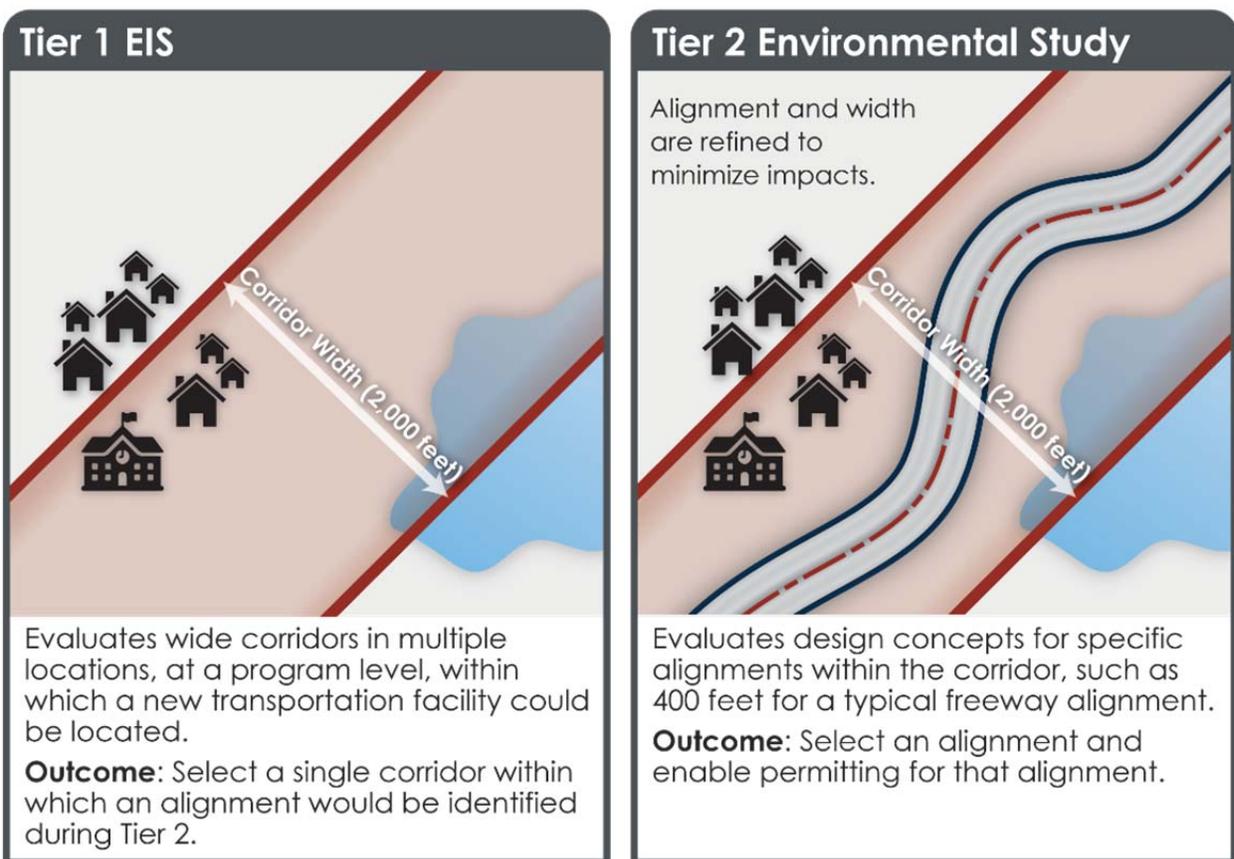
In response to information learned during the alternatives screening process, cross sections will be evaluated for the Tier 1 EIS to reflect conditions along the corridor options and existing roadways to better inform the assumptions regarding a right-of-way footprint.

The screening process was conducted on all corridor options. The purpose of this approach is to better understand the factors contributing to the comparison among the alternatives that might be less obvious when end-to-end corridor data is aggregated.

In addition to the criteria outlined in **Table 4-1**, public, tribal, and agency input was considered to determine the set of alternatives to carry forward into the Tier 1 EIS. Input received was diverse and so it is difficult to quantify and rank the input received. Therefore, an assessment of the adequacy of the range of corridor options in reflecting the comments and input received from the public, tribal, and agency stakeholders during the scoping process (June 2016) and public information meetings (May 2017) was made. Additional information on the input received and how it informed the evaluation of alternatives is provided in Chapter 5.

#### 4.1.2 Contextual Level of Detail

An important consideration to note is the level of analysis detail that will be considered in this ASR, versus the Tier 1 EIS and subsequent Tier 2 environmental studies (**Figure 4-2**, Tier 1 vs Tier 2 Level of Detail).



**Figure 4-2 Tier 1 vs Tier 2 Level of Detail**



The ASR presents a high-level, comparative evaluation of corridor options to gain an understanding of which options best meet the screening criteria and should be advanced into the Tier 1 EIS for further evaluation. The screening criteria are aligned with the Purpose and Need, which sets forth the broad context for the I-11 Corridor. Therefore, detailed elements of an analysis, such as the presence of specific neighborhood features (parks, schools, water facilities, etc.) were not necessarily a basis for evaluating which corridor options advance into the EIS for further study. These features will, however, be considered in the Tier 1 EIS. Thus, the Tier 1 EIS will be conducted to understand the potential impacts associated with each Build Corridor Alternative (e.g., end-to-end alternative) and its component corridor options. The potential for impacts will be assessed within a 2,000-foot wide corridor, although the actual I-11 facility would have a much narrower footprint (typically about 400 feet). The outcome of the Tier 1 EIS will be the selection of a Selected Corridor Alternative or the No Build Alternative. If a Build Corridor Alternative is selected, the future Tier 2 environmental study would be required to identify the precise alignment and footprint within the future I-11 Corridor.

**Table 4-1 Screening Criteria and Measures <sup>(1)</sup>**

Criteria	Description	Evaluation Measure	Scale	Source
<b>Address Population and Employment Growth</b>				
Population Growth	Ability to connect the projected population increase (2015-2035) to the high-capacity, access-controlled transportation network.	Population growth (2015 to 2035) in traffic analysis zones (TAZs) that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li>○ Low new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li>● Moderate new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li>● High new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	ADOT Statewide Travel Demand Model (based on growth projections established by the state Metropolitan Planning Organizations [MPOs] and Arizona State Demographer's office).
Employment Growth	Ability to connect the projected increase in jobs (2015-2035) to the high-capacity, access-controlled transportation network.	Employment growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li>○ Low new employment growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li>● Moderate new employment growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li>● High new employment growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	ADOT Statewide Travel Demand Model (based on growth projections established by the state MPOs and Arizona State Demographer's office).
<b>Mitigate Congestion and Improve Travel Times</b>				
Traffic Volumes	Projected traffic to be carried on each corridor alternative, as well as diversions that may alleviate congestion throughout the existing network in 2035.	<p>Average weekday traffic volumes on each corridor option, 2035</p> <p>Average weekday traffic volumes on other major corridors in the network (I-10, SR 85, I-8, I-17 etc.), 2035</p> <p>Predicted traffic diversions from the existing transportation network</p>	<ul style="list-style-type: none"> <li>○ Lower traffic volumes including traffic diverted from more congested routes</li> <li>● Moderate traffic volumes including traffic diverted from more congested routes</li> <li>● Higher traffic volumes including traffic diverted from more congested routes</li> </ul>	ADOT Statewide Travel Demand Model
Level of Service	Level of Service (LOS) is a quantitative measurement of the operational characteristics of traffic and the perception of traffic conditions by both motorists and passengers. LOS measures impacts to traffic operations and access due to new connections with existing or planned regional facilities (freeway and state routes).	<p>LOS on each corridor option (traffic flow from A to F), 2035</p> <p>LOS on other major corridors in the network (I-10, SR 85, I-8, I-17 etc.) (traffic flow from A to F), 2035</p>	<ul style="list-style-type: none"> <li>○ LOS E or worse</li> <li>● LOS D</li> <li>● LOS C or better</li> </ul>	ADOT Statewide Travel Demand Model
Travel Times	Compares average travel times on corridor options; a lower average travel time indicates improved travel time relative to the other corridor options.	Average travel time (minutes) during peak (3 PM and 6 PM), 2035	<ul style="list-style-type: none"> <li>○ Slowest travel time</li> <li>● Average travel time</li> <li>● Fastest travel time</li> </ul>	ADOT Statewide Travel Demand Model
Average Speeds	Compares average travel speeds on corridor options; a higher average travel speed indicates improved travel speeds relative to the other corridor options.	Average travel speed (miles per hour [mph] during peak (3 PM and 6 PM), 2035	<ul style="list-style-type: none"> <li>○ &lt; 55 mph</li> <li>● 55 to 65 mph</li> <li>● &gt; 65 mph</li> </ul>	ADOT Statewide Travel Demand Model

Criteria	Description	Evaluation Measure	Scale	Source
Safety	Estimated 2035 Study Area crashes based on a Highway Safety Manual (HSM) crash prediction model.	Comparison of corridor option crashes on high capacity roadways, 2035	<input type="radio"/> Most crashes <input type="radio"/> Some crashes <input checked="" type="radio"/> Fewest crashes	ADOT Arizona Annual System Performance Measures <sup>(2)</sup>
<b>Improve System Linkages and Interstate Mobility</b>				
Modal Interrelationships	Ability to connect existing and planned freight activity hubs to the planned high-capacity, access-controlled transportation network.	Number of freight activity hubs within 2 miles either side of corridor options	<input type="radio"/> Low number of freight activity hubs within 2 miles either side of the alternative <input type="radio"/> Moderate number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> High number of freight activity hubs within 2 miles either side of the alternative	MAG Freight Transportation Framework Study, 2013
Freight Truck Flows	Freight trucks utilizing corridor on a daily basis (24-hour period).	Estimated daily freight truck units, 2035	<input type="radio"/> Relatively low daily truck units <input type="radio"/> Moderate daily truck units <input checked="" type="radio"/> Relatively high daily truck units	Transearch and ADOT Statewide Travel Demand Model
<b>Improve Access to Economic Activity Centers</b>				
Economic Activity Centers	Ability to improve access and connectivity to major employment and economic development projects in the Study Area.	Number of existing and emerging economic activity centers within 5 miles either side of corridor options	<input type="radio"/> Low number of economic activity centers within 5 miles either side of the alternative <input type="radio"/> Moderate number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> High number of economic activity centers within 5 miles either side of the alternative	Regional comprehensive and municipal plans
		Additional population (compared to the No Build), within a 45-minute drive time of Study Area existing and emerging economic activity centers	<input type="radio"/> Relatively low level of additional population served <input type="radio"/> Moderate level of additional population served <input checked="" type="radio"/> Relatively high level of additional population served	ADOT Statewide Travel Demand Model
<b>Support Homeland Security and National Defense</b>				
Incident Management <sup>(3)</sup>	Ability to provide alternate routes for weather, crash, emergency, and defense needs.	Provides alternate interstate freeway route (yes or no)	<input type="radio"/> No (existing route) <input checked="" type="radio"/> Yes (new route option)	
<b>Minimize Direct Impacts on Sensitive Environmental Resources <sup>(4)</sup></b>				
Critical Habitat	Minimize the potential for loss of designated habitat.	Acres within corridor that could impact designated critical habitat for special status species	<input type="radio"/> High risk of critical habitat loss <input type="radio"/> Moderate risk of critical habitat loss <input checked="" type="radio"/> Low risk of critical habitat loss	US Fish and Wildlife Service (USFWS), 2015; Arizona Game and Fish Department (AGFD), 2015
Special Designated Lands	Minimize the potential for loss of special designated lands.	Acres within corridor that could impact BLM wildernesses, national monuments, and areas of critical environmental concern (ACEC); USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties	<input type="radio"/> High risk of loss of specially designated lands <input type="radio"/> Moderate risk of loss of specially designated lands <input checked="" type="radio"/> Low risk of loss of specially designated lands	BLM, 2016; USFS, 2016; NPS, 2016; AGFD, 2015

Criteria	Description	Evaluation Measure	Scale	Source
Wetlands and Lakes	Minimize the potential for impacts on wetlands and lakes.	Acres within corridor that could impact wetlands and lakes	<input type="radio"/> High risk of loss of water resources <input type="radio"/> Moderate risk of loss of water resources <input type="radio"/> Low risk of loss of water resources	National Hydrography Dataset (NHD), 2014; USFWS National Wetlands Inventory (NWI), 2015
100-Year Floodplains	Minimize potential for construction within 100-year floodplains and floodways.	Acres within corridor that could impact 100-year floodplains	<input type="radio"/> High risk of encroachment <input type="radio"/> Moderate risk of encroachment <input type="radio"/> Low risk of encroachment	Federal Emergency Management Agency (FEMA), 2011 to 2014; Yavapai County Flood Control, 2016
		Acres within corridor that could impact floodways		
Cultural Resources	Minimize potential for impacts on cultural resources.	Likelihood of impact on historic properties listed in the National Register of Historic Places (NRHP)	<input type="radio"/> Very likely to impact cultural resources <input type="radio"/> Moderate likelihood to impact cultural resources <input type="radio"/> Not likely to impact cultural resources	National Register of Historic Places (NRHP), 2016; AZSITE; ADOT Historic Preservation Team Portal; other record searches; and input from Tribal coordination
Section 4(f) Resources	Minimize potential for impacts on Section 4(f) resources.	Likelihood of impacts to publicly-owned parks, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)	<input type="radio"/> Very likely to impact Section 4(f) resources <input type="radio"/> Moderate likelihood to impact Section 4(f) resources <input type="radio"/> Not likely to impact Section 4(f) resources	Environmental Systems Research Institute (ESRI), 2013; Arizona Land Resource Information System (ALRIS), 2014; BLM, 2016; NPS, 2016; NRHP, 2016; Reclamation, 2016

- (1) **Appendix A** contains more detail on the methodology and evaluation measures for each of the screening criteria.
- (2) Crashes for new corridors were estimated using observed crash histories as part of the ADOT Arizona Annual System Performance Measures.
- (3) The incident management criterion is presented in this table under "Support Homeland Security and National Defense" to align with the structure of the Purpose and Need, but will be documented in the evaluation as a sub-measure of the "Mitigate Congestion and Improve Travel Times" category.
- (4) Acres of environmental resources within the corridor options were quantified using available GIS data; the future siting of the actual I-11 alignment within the broader 2,000-foot study corridor could minimize or avoid some or all impacts. Therefore, any quantities represented in the analysis reflect the possibility or risk of encountering impacts, rather than precise impacts.

## 5 CORRIDOR OPTIONS SCREENING AND EVALUATION RESULTS

The screening was conducted on a set of corridor options in each of the three sections: South, Central, and North, as illustrated in **Figure 3-3**. The goal of the screening effort was to narrow the range of corridor options to those best meeting the screening criteria. Those options best meeting the high-level screening criteria and reflecting the range of issues raised by agency, tribal, and public stakeholders will be advanced to the Tier 1 EIS, and will be subject to a more comprehensive evaluation of potential impacts. Initial screening results and recommendations were presented to agency, tribal, and public stakeholders for review and input in May 2017. Ultimately, the Tier 1 EIS will assess the corridor options that emerged from the screening and assemble them into a series of Build Corridor Alternatives, or end-to-end alternatives from Nogales to Wickenburg.

The following section summarizes the results of the alternatives screening analysis, including agency, tribal, and public input received during the June 2016 scoping process and the May 2017 Agency and Public Information Meetings. A more in-depth analysis of each criterion is provided in **Appendix A**, followed by detailed tables presenting the quantitative screening results for all corridor options, by section, in **Appendix B**. **Appendix C** provides a more detailed overview of the May 2017 Agency and Public Information Meetings. The full inventory of comments received will be compiled into a separate report and posted on the project website.

### 5.1 Summary Comparison of Corridor Options

The initial range of corridor options was evaluated using the criteria in **Table 4-1**. The intent was not to define one recommended option, but rather identify a reasonable range of corridor options to be evaluated in more detail in the Tier 1 EIS.

The screening results are comparative to each other – ranging from those that best meet the screening criteria, to those least meeting the criteria. Because the analysis was comparative, the ratings of ‘best meets criteria’ or ‘least meets criteria’ are not indicators of meeting certain thresholds for each criterion or the severity of potential impacts. The ratings represent how well an option performs relative to the other options under consideration.

**Figure 5-1** (Preliminary Results of Alternatives Screening) illustrates the recommendations that were presented during the Agency and Public Information Meetings in May 2017. **Figures 5-2, 5-3, and 5-4** presents the same information by section, including a tabular summary of the preliminary screening results. The maps presented to the public in May color-coded the preliminary recommendations in three categories:

- Corridor options recommended to be advanced into the Tier 1 EIS (dark blue)
- Corridor options recommended for elimination (gray)
- Corridor options requiring further analysis either to advance or eliminate (green)

As follow-up to the agency, tribal, and public input period, the “corridor options requiring further analysis” were further analyzed based on input and data received. The following subsections describe the preliminary screening results, and public and agency input through the end of June 2017. Additional discussion of the continuing analysis and final recommendations is provided in Chapter 6.

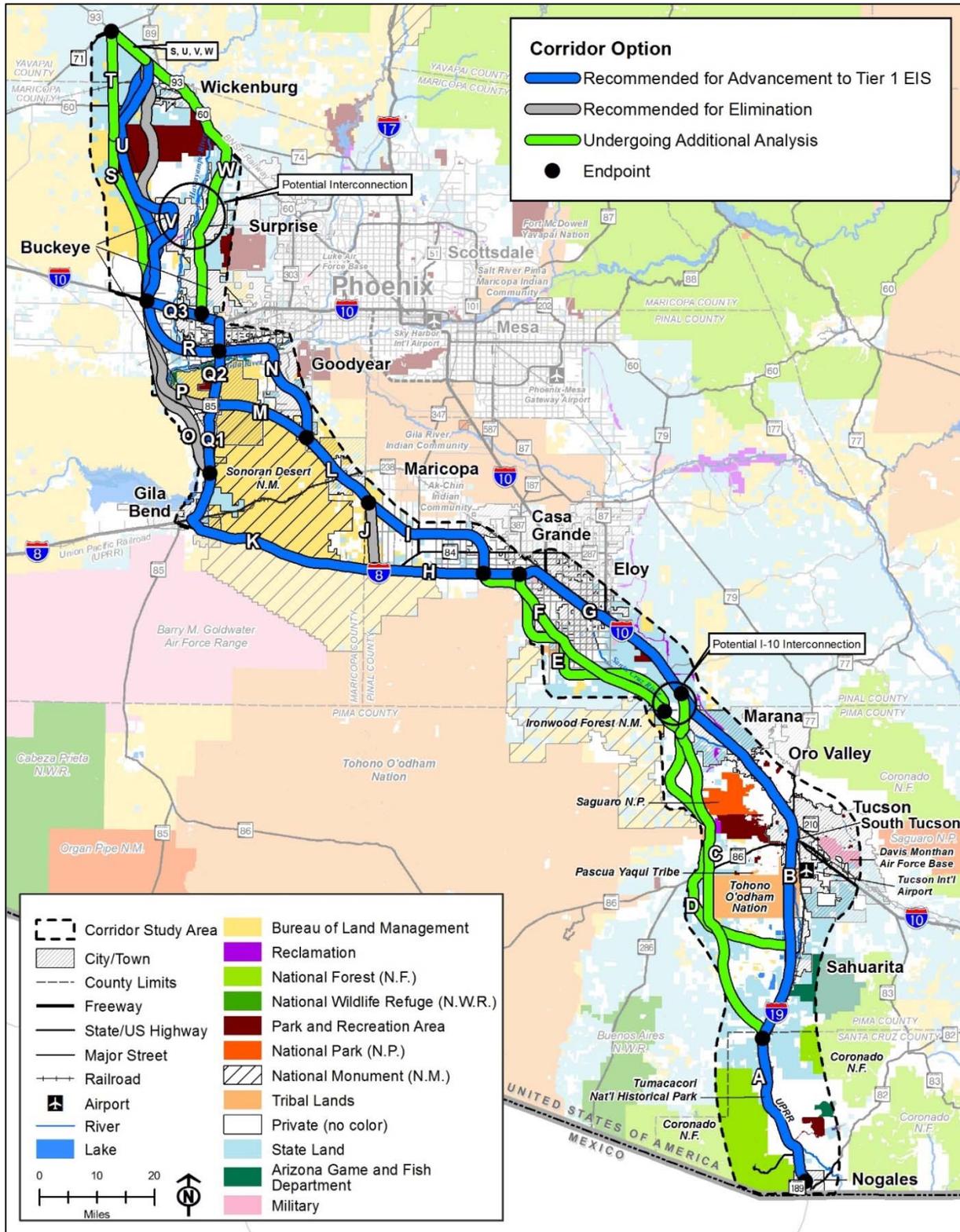
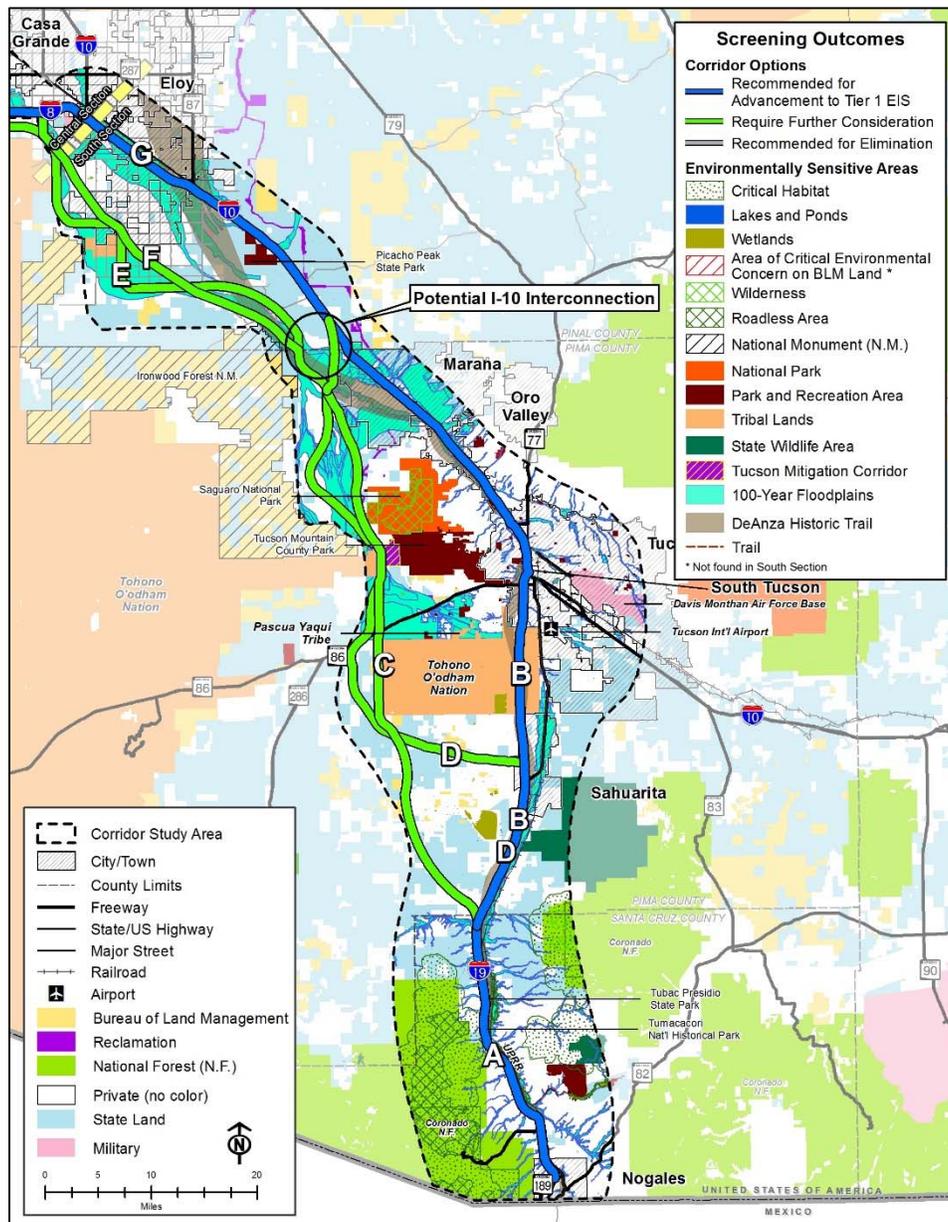


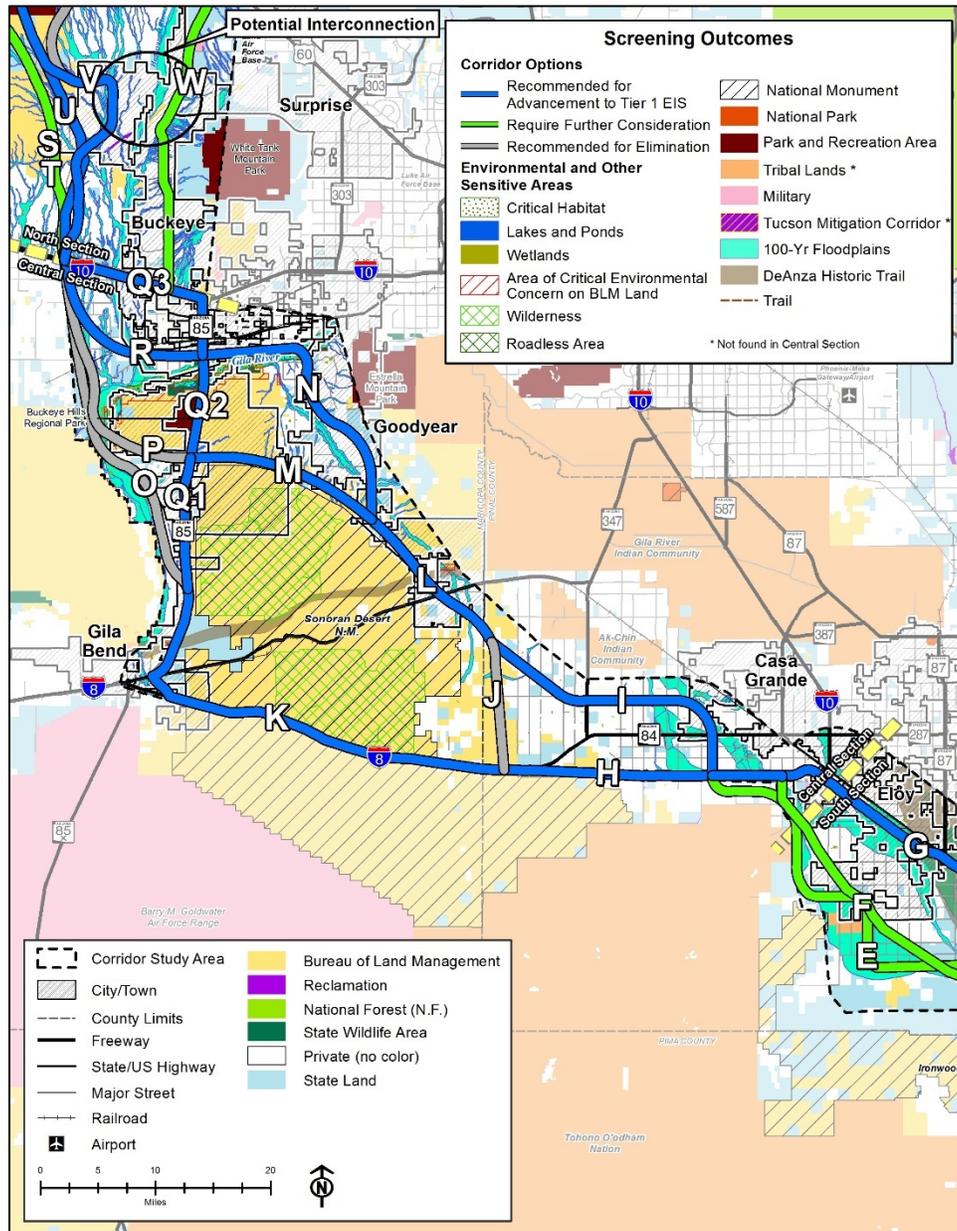
Figure 5-1 Preliminary Results of Alternatives Screening



Criteria	Corridor Options						
	Note: These ratings represent a relative comparison to each other.						
	A	B	C	D	E	F	G
Population and Employment Growth	○	●	○	○	○	○	●
Congestion and Travel Time	○	○	●	●	●	●	○
System Linkages and Interstate Mobility	○	○	●	○	○	○	○
Economic Activity Centers	○	●	○	○	○	○	●
Sensitive Environmental Resources	●	●	○	○	●	●	●

● Best meets criteria      ○ Reasonably meets criteria      ○ Least meets criteria

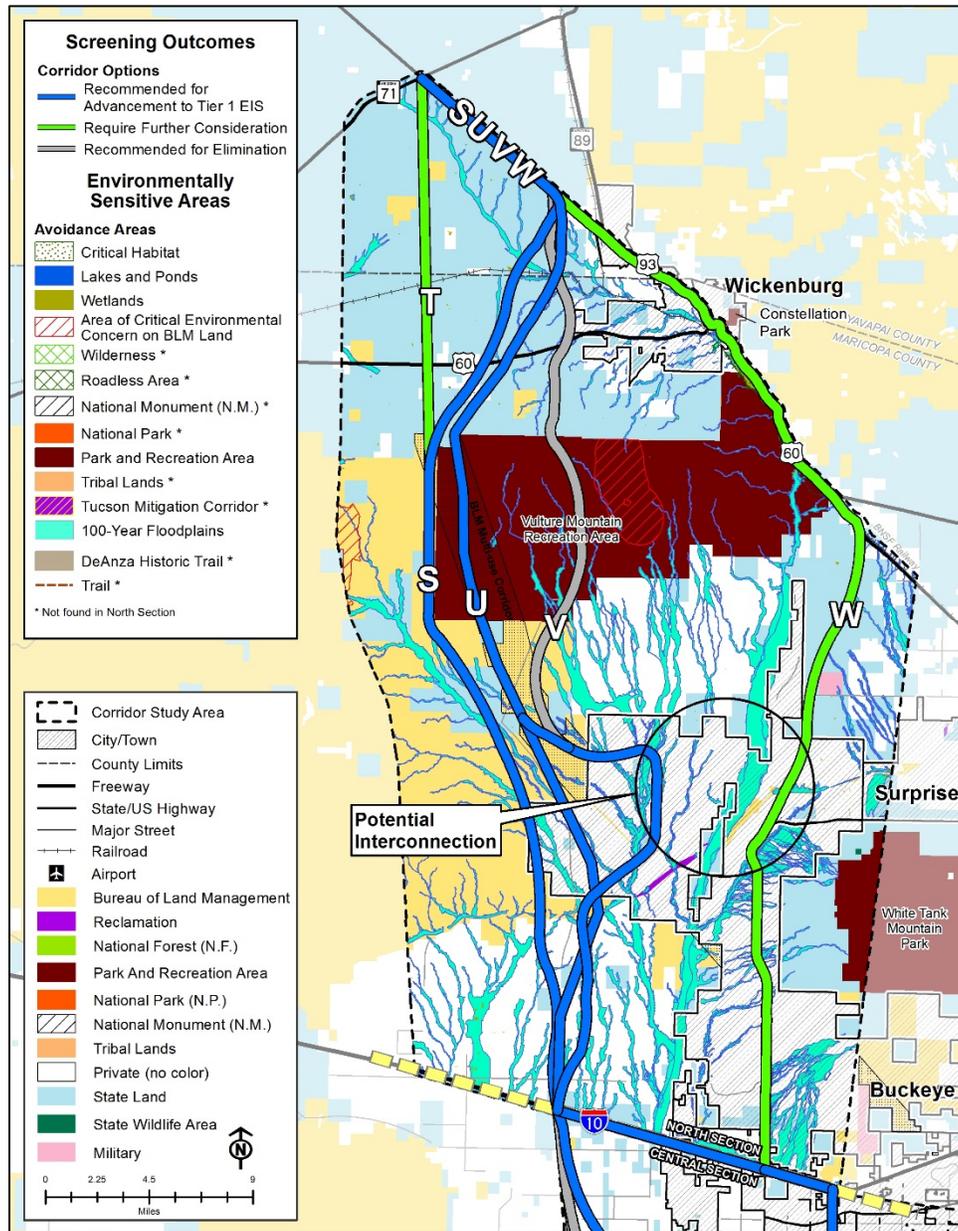
**Figure 5-2 South Section Summary Screening Results**



Criteria	Corridor Options											
	Note: These ratings represent a relative comparison to each other.											
	H	I	J	K	L	M	N	O	P	Q	R	
Population and Employment Growth	○	○	○	○	○	○	●	○	○	○	○	
Congestion and Travel Time	○	◐	◐	○	◐	◐	●	◐	◐	○	●	
System Linkages and Interstate Mobility	○	●	○	○	◐	◐	◐	○	◐	◐	◐	
Economic Activity Centers	◐	◐	○	○	◐	◐	●	○	◐	◐	●	
Sensitive Environmental Resources	●	●	●	●	●	●	○	○	○	●	●	

● Best meets criteria    ◐ Reasonably meets criteria    ○ Least meets criteria

**Figure 5-3 Central Section Summary Screening Results**



Criteria	Corridor Options				
	S	T	U	V	W
Population and Employment Growth	○	○	◐	◐	●
Congestion and Travel Time	●	●	●	○	○
System Linkages and Interstate Mobility	●	●	●	●	●
Economic Activity Centers	●	●	●	◐	●
Sensitive Environmental Resources	●	●	◐	◐	○

● Best meets criteria      ◐ Reasonably meets criteria      ○ Least meets criteria

Figure 5-4 North Section Summary Screening Results

### 5.1.1 South Section

The South Section includes corridor options A through G, stretching from Nogales to Casa Grande (**Figure 5-2**). This section is comprised of corridors along existing interstate highways (A, B, G) and a series of new routes (C, D, E, and F).

Only one corridor option exists in the southernmost portion of this section – I-19 from SR 189 to approximately the Pima/Santa Cruz County line. After the technical analysis was conducted to support the development of alternatives, it was determined that a second option was not needed for various reasons. Travel demand and available expansion capacity within the existing right-of-way suggests that a secondary facility is not warranted. In addition, major environmental constraints exist in this area, including the presence of Tumacácori National Historical Park, Coronado National Forest lands and related “roadless areas.” Finally, public and agency feedback received during the 2016 scoping period was of strong consensus to utilize and improve I-19, with no interest in developing a parallel facility.

#### 5.1.1.1 Preliminary Screening Results

Following the preliminary evaluation, it was determined that corridor options A, B, and G should be advanced into the Tier 1 EIS to reflect the interest in building upon existing linear facilities to achieve the Purpose and Need. Further review and input from stakeholders was pursued for corridor options C, D, E, and F to determine if some or all options should be advanced into the Tier 1 EIS for further evaluation.

Among the new corridor options (C/D and E/F), input was solicited as technical analyses indicated generally similar mobility performance but varied potential environmental impacts. A detailed discussion is provided in **Appendix A**. Key observations included:

- Generally, future population and employment are projected to grow along existing corridors in the ADOT Arizona Statewide Travel Demand Model (Arizona Model). This suggests increased travel demands that may exacerbate congested conditions in some areas, such as the Tucson central business district. When new transportation corridors are added to the model, C performs well as a way to improve mobility throughout the network. D also provides mobility benefits, but its less direct path adds travel time. Mobility improvements along existing corridors would require capacity improvements in some parts of the I-10 corridor.
- There is potential for impacts on sensitive environmental resources along both C and D. Between C and D, C better meets most evaluation criteria, especially the ability to mitigate congestion, however D provides a greater buffer between an I-11 Corridor and park and tribal lands in some locations.
- Between E and F, E reflects proposals in adopted transportation plans in Eloy and Pinal County, whereas F better avoids impacts to floodplains and tribal land.

Based on the screening conducted, no corridor option in the South Section was recommended to be eliminated prior to the 2017 public meetings, although input was sought on the range of options.

### 5.1.1.2 Agency and Public Input

Agency, tribal, and public feedback received in May 2017 was extensive regarding options C and D. Input emphasized a high level of sensitivity in the area, and concern for a range of potential environmental and social impacts. It was determined both corridor options would be carried into the Tier 1 EIS for further analysis to maintain a range of alternatives and provide additional information on those impacts; consider improvement, avoidance, or mitigation strategies; and document the comparison between corridor options B, C, and D.

Following the public input period and subsequent stakeholder meetings with Pinal County jurisdictions, it was determined that F would be carried forward to the Tier 1 EIS. Although F is very similar to E in terms of mobility, F would reduce the potential for impacts on floodplains and other sensitive water resources. Local planning staff suggested that the alignment of E was placed in planning documents in concept only – to plan ahead for new access and avoidance of natural resource constraints. It was noted that the exact routing was open to modification, and concurrence from Cooperating and Participating Agencies validated the move forward with F as the corridor option for continued study.

Additional data were received from agencies, tribes, and the public to identify areas of concern in the South Section, and this information was reviewed and corridor options were refined as appropriate to avoid, minimize, or mitigate as many issues as possible. Chapter 6 further discusses the corridor option refinement process.

### 5.1.2 Central Section

The Central Section includes corridor options H through R, stretching from Casa Grande to Buckeye, in the vicinity of I-10 (**Figure 5-3**).

This section includes the existing corridors of I-8 and SR 85, along with several new corridors that traverse the area north and west of the Sonoran Desert National Monument. Many of these new corridor options are derived from previous studies and agency recommendations, such as the I-11 and IWCS, Pinal Transportation Plan, MAG Hassayampa and Hidden Valley Transportation Framework Studies, and ADOT's planning for SR 303L.

#### 5.1.2.1 Preliminary Screening Results

Following the preliminary evaluation, it was determined that all corridor options except three would be advanced into the Tier 1 EIS. The three new corridor options recommended for elimination include:

- J, which forms a connection between I-8 and new corridors to the north, but provides little mobility benefit. Because of the minimal benefit provided across the screening criteria, it was more logical to maintain the options of either (1) staying on existing corridors or (2) developing a new corridor throughout the section. Additionally, J traverses the planned Pinal County Palo Verde Regional Park.
- O and P, which provide alternative options west of SR 85, but both raise greater environmental concerns (critical habitat, habitat fragmentation, Important Bird Area, floodplain issues, cultural resource impacts), and there are other reasonable alternatives that address the mobility needs.

The remaining corridor options provide a range of (1) co-locating with existing transportation facilities (H, K, Q), and (2) new roadways that might provide faster travel times but could

represent new impacts to the environment (I, L, M, N, R). Corridor options L and M are mostly within a designated BLM multi-use utility corridor paralleling the north side of the Sonoran Desert National Monument.

**Appendix A** includes more a more detailed discussion of the outcomes of each screening criteria.

### 5.1.2.2 Agency and Public Input

Agency, tribal, and public feedback received in May 2017 supported the recommendations presented at the meetings. Overall, there was strong interest in utilizing the existing I-8 and SR 85 corridors (options H, K, Q). However, there was equal interest in corridor options I, L, and N to operate as an efficient alternative to I-10 in the Phoenix metropolitan area. Regardless of corridor preference, all those providing feedback emphasized minimizing or enhancing natural, economic, and social environmental concerns. Additionally, there was substantial support for eliminating the corridor options proposed to be removed from further consideration (J, O, P).

### 5.1.3 North Section

The North Section includes corridor options S through W, stretching from Buckeye to Wickenburg (**Figure 5-4**). This section does not include an existing high capacity north-south transportation corridor that traverses the entire section. Most corridor options in the North Section are new corridors, with the exception of the portions of corridor options paralleling US 60/US 93, an urban arterial roadway, which crosses the northeast portion of the section.

#### 5.1.3.1 Preliminary Screening Results

Following the preliminary evaluation, it was determined that corridor options S, U, and the south portion of V should be advanced into the Tier 1 EIS. Further review and input from stakeholders was pursued for corridor options T and W to determine if either or both should be advanced into the Tier 1 EIS for further evaluation. Considerations on these corridor options include:

- Option T serves the same purpose as options S and U, but does not meet the criteria as well as other corridor options, due to its greater distance from the Town of Wickenburg and its planned population and employment growth.
- Although option W utilizes a portion of existing roadway (US 60/US 93), it performs poorly against the screening criteria, and would require expanding and completely re-building the existing roadway. The entire option infringes on environmentally-sensitive areas, such as the Hassayampa River and related floodplains and drainage features, Hassayampa River Preserve, Vulture Mountain Recreation Area, White Tank Mountain Regional Park, and wildlife movement corridors. Additionally, it encroaches upon existing development. Both the Sun Valley Parkway and US 60 would need to be removed as an arterial roadway connection and re-built as a freeway – potentially eliminating local access opportunities.

It was determined that the northern portion of V be eliminated from further consideration. This segment passes through the BLM Vulture Mountain Recreation Area along Vulture Mine Road, infringes upon environmentally-sensitive areas, and conflicts with existing and planned Maricopa County recreation areas. BLM, which manages the land in this area, would prefer alternatives that are outside of Vulture Mountains Recreation Area or within the designated BLM multi-use utility corridor.

A more detailed discussion of the screening results provided in **Appendix A**.

### 5.1.3.2 Agency and Public Input

Agency and public feedback received in May 2017 was diverse, including the following general observations:

- Option S was well-received by the public and agencies as it minimally impacts existing development and routes around the edge of the Vulture Mountain Recreation Area. At the far north end where it meets US 93, the corridor option would encroach upon clusters of residential development and residents would prefer that the corridor be further offset from their community.
- Option T was highly supported because it was seen as an alternative to option S that does not encroach upon the existing Vista Royale subdivision. However, public opinion mostly saw options S and T as interchangeable, with the priority on option T given to its avoidance of existing community development.
- Option U is very similar to options S and T on the south end, and better avoids residential areas to the north, so it was generally well received. It does traverse the Vulture Mountain Recreation Area through a BLM multi-use utility corridor. Several residents suggested refining this corridor to follow an existing power line corridor that uses a similar route.
- Agencies and members of the public were supportive of eliminating the north portion of alternative option V where it traverses the Vulture Mountain Recreation Area.
- Overall agency and public opposition to option W because of environmental impacts south of US 60 (community impacts, proximity to Hassayampa River and White Tank Mountains, wildlife connectivity concerns, etc.), and community impacts on the Town of Wickenburg (adverse impact to existing business and residential properties).

The Town of Wickenburg commissioned the *Preserving Wickenburg's Heritage in the Face of the Nation's New International Infrastructure Corridor: A Context Sensitive Design Report* which included community workshops led by the Sonoran Institute, a non-profit organization with a mission of fostering resilient communities, to understand what the Town would like to see with implementation of an I-11 Corridor. The Town formally accepted this report and passed a resolution (No. 2043 on May 1, 2017) stating that only corridor options crossing US 60 and US 93 at mileposts 101 and 189, respectively, be considered. Public input received indicated strong support for the proposed corridor option recommended in the report and the Wickenburg resolution, which is a variation on options S, T, and U that avoids existing developments, but is close enough to the Town of Wickenburg to support economic development objectives.

## 6 RECOMMENDED REASONABLE RANGE OF CORRIDOR OPTIONS FOR TIER 1 EIS

This chapter describes the refinements made to the corridor options in response to additional analysis following the agency, tribal, and public meetings in May 2017, and confirms the corridor options that will advance into the Tier 1 EIS for further study. Any rankings developed as part of the screening process would not be carried through to the Tier 1 EIS; all alternatives would be considered equally. The corridor options that emerged from the screening will be assembled into a series of Build Corridor Alternatives, or end-to-end alternatives, from Nogales to Wickenburg. The Tier 1 EIS will assess a set of Build Corridor Alternatives (i.e., alternative corridors from Nogales to Wickenburg) and its component corridor options, along with the No Build Alternative (i.e., do-nothing option).

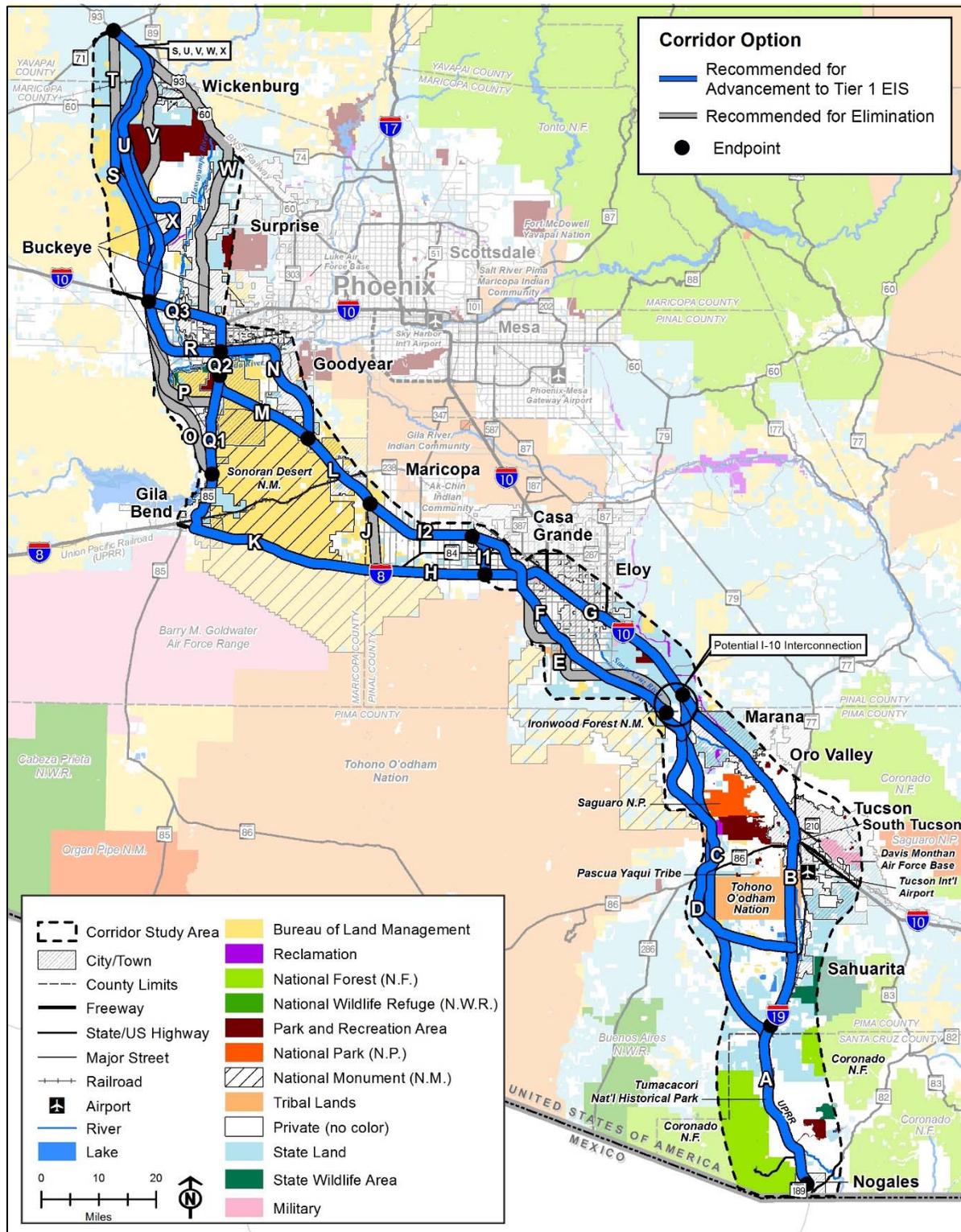
### 6.1 Refinements to Corridor Options

After the screening and public review were completed, the input and additional data that was received from agencies were considered as part of a more detailed review of the corridor options recommended for advancement. A series of refinements to the corridor options were conducted, to ensure the most viable corridor options are advanced into the Tier 1 EIS for detailed evaluation. Refinements to the corridor options were considered based on the following factors:

- To address engineering considerations; including sharp curves or skewed intersection angles, maintaining consistency with previously-completed planning studies, and topographical features with clear avoidance opportunities.
- Additional efforts to avoid or reduce impacts on properties that are potentially afforded protections under Section 4(f), a component of the U.S. Department of Transportation Act of 1966 which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development.
- To address situations where a potential adverse impact could be avoided with a minor modification to the corridor that does not appear to cause any other potential adverse impacts.

Where these factors were identified, the study team evaluated whether constraints or sensitive resources were avoidable by a 400-foot alignment within the 2,000-foot corridor. Isolated resources or land uses (such as community buildings, residences, infrastructure) present within the 2,000-foot corridor were considered avoidable. Where avoidance within the 2,000-foot corridor was possible, no refinements were explored. If the resource or land use impacts were unavoidable, avoidance opportunities in the area immediately surrounding the corridor were explored. Adjustments to the corridor were only made if the adjustment resolved the issue and did not cause new or different impacts within the adjusted corridor.

**Figure 6-1** (Corridor Option Recommendations) illustrates the corridor options recommended to be advanced into the Tier 1 EIS as part of the components of the Build Corridor Alternatives, along with those recommended for elimination, per the results of the screening analysis and agency, tribal, and public input.



Notes: (1) With the extension of option F north I-8, connecting with a portion of option I, option I is now labeled as I1 and I2 to differentiate this intersection point. (2) With the elimination of the northern portion of corridor option V, the refined option V has been relabeled as corridor option X.

**Figure 6-1 Corridor Option Recommendations**

Refinements were made on some of the corridor options and in most cases, they were minor shifts to better avoid a sensitive environmental resource or land use impact. A summary of these refinements and their primary reason for change are listed in **Table 6-1** (Corridor Refinements).

**Table 6-1 Corridor Refinements**

Corridor Option	Refinement
C	Refinements at I-19 due to unavoidable residential land uses; refinements through Avra Valley to reduce potential impacts special designated and sensitive land uses
D	Refinements south of Avra Valley to avoid an archaeological district
F	New extension of F north of I-8 along Chuichu Road added to provide corridor option that is not co-located with I-8
K	Refined to follow the planned connection alignment of I-8 and SR 85 as shown in a previously-completed study (ADOT, <i>Final Design Concept Report SR 85 at Gila Bend, 2009</i> )
M	Connection at SR 85 refined because of unavoidable sanitary landfill/power substation location
R	Minor alignment refinements due to unavoidable agricultural development/operations
S	Refinement made to avoid mountainous terrain
U	Refinement made due to align with Town of Wickenburg’s preferred corridor, as detailed in Resolution No. 2043
X (V)*	Refinement made to place corridor option within the multi-use corridor of the Vulture Mountain Recreation Area and follow existing transmission line; northern section aligned with Town of Wickenburg’s preferred corridor, as detailed in Resolution No. 2043

\* With the elimination of the northern portion of V, the southern portion of V was retained and the entire corridor option relabeled as corridor option X.

In some cases, refinements involved the introduction of new corridor options (or segments thereof) to respond to transportation factors or agency and public input. Following the elimination of corridor option E, a new connection was made between I-8 and corridor option I at Barnes Road (crossing I-8 at approximately Chuichu Road), allowing an extension of option F that would not require a parallel route to I-8 (as shown in **Figure 6-1**). This decision was made in coordination with input received from the City of Casa Grande and Pinal County, to promote a functional and efficient transportation network in a relatively densely settled area of the county.

With the elimination of the northern portion of V, the southern portion of V was retained and relabeled as corridor option X. Option X would follow the existing transmission line through the designated BLM multi-use corridor, as suggested in agency, tribal, and public input. Option U would also occur within the multi-use corridor, but follows the path identified through the technical analysis.

## 6.2 Recommendations

The following discussion expands upon the corridor options depicted in **Figure 6-1**, which illustrates the recommendations of the ASR phase of study – a culmination of the screening, outreach, and refinement processes.

### 6.2.1 South Section

The range of corridor options carried forward in the South Section (A, B, C, D, F, G), provide a range of alternatives where co-location with existing facilities would minimize new environmental impacts, while new routes may provide greater mobility benefits, including an additional or alternative route in the event of safety and security issues or weather incidents.

Based on the screening conducted, corridor option E is recommended for elimination. Option E serves the same purpose as option F – providing an alternate route for I-11 between Marana and Casa Grande – however E has higher potential impacts, based on proximity to the Santa Cruz River floodplain and parcels of tribal land near the Ironwood Forest National Monument. Although proposed in transportation plans in Eloy and Pinal County, it has been determined that corridor option F serves the same mobility and economic opportunity needs as E. Input during the public review period indicated that there was flexibility in the location of E so long as the basic function and intent remained intact. Therefore, option E will be eliminated and F moved forward into the Tier 1 EIS.

Areas labeled as a potential location for interconnections with I-10 are areas where the Tier 1 EIS may identify and evaluate short connector pieces to enable a variety of combinations for corridor options to be pieced together into end-to-end alternatives.

### 6.2.2 Central Section

Like the South Section, the collection of corridor options carried forward in the Central Section (H, I, K, L, M, N, Q, R) provide a range of alternatives where co-location with existing facilities would minimize new environmental impacts, while new routes may provide greater mobility benefits, including an additional or alternative route in the event of safety and security issues or weather incidents.

Three corridor options are recommended for elimination and include:

- J, which forms a connection between I-8 and new corridors to the north, but provides little mobility benefit.
- O and P, which provide alternative options west of SR 85, but both cause higher environmental concerns (critical habitat, habitat fragmentation, Important Bird Area, floodplain issues, cultural resource impacts, etc.) and there are reasonable alternatives to meet the mobility needs.

In addition, a new corridor segment was added as an extension of option F, north of I-8 along Chuichu Road to join with option I2 at Barnes Road. This new connection allows a more seamless connection between F and I without having to co-locate with or parallel I-8 (see **Figure 6-1**).

### 6.2.3 North Section

After incorporating the feedback received, the range of corridor options carried forward in the North Section includes variations on corridor options S, U, and V. Option U was refined to reflect local input, as described below. Option V was refined into a new corridor option X by removing the segment along Vulture Mine Road through the Vulture Mountain Recreation Area and instead, following the existing power line corridor through the designated BLM multi-use corridor. Options T and W were eliminated.

Eliminated options include:

- Option T: This option serves the same purpose as options S/U, but does not meet the criteria as well as other corridor options. Public feedback regarding a preference for an option with fewer impacts on Vista Royale development were addressed through refined options U and X to correspond with the Town of Wickenburg resolution.
- Option W: This option performs poorly against the screening criteria, and is not preferred by stakeholders due to potential community and environmental impacts. Additional reasons for elimination include:
  - Sun Valley Parkway (which W is co-located with directly north of I-10) and US 60 are non-access controlled arterials (approximately 120 feet in right-of-way width) surrounded by built, under construction, and entitled properties. It would be challenging to overlay an access-controlled freeway over a functioning arterial with limited future expansion opportunities without major disruption to adjacent urban development. This option would require construction of additional local access routes in addition to the high-capacity facility.
  - Option W would require the construction of a second system interchange on I-10 to transition from SR 85 to Sun Valley Parkway. The spacing of these interchanges is not ideal and would add a great cost to the project.
  - Various environmental concerns have been voiced by stakeholders, including critical habitat issues identified along the Hassayampa River, major wash and alluvial floodplain issues between the river and White Tank Mountains, difficulty crossing a large linear dam located just north of I-10 managed by the Flood Control District of Maricopa County, impacts to the Town of Wickenburg, and impacts to the Hassayampa River Preserve.

Modifications to recommended corridor options include:

- The northern portions of option U and X (north of the Vulture Mountain Recreation Area) have been shifted to follow the preferred routing defined in the Town of Wickenburg's Resolution No. 2043.
- The northern portion of option X through the Vulture Mountain Recreation Area will parallel the existing transmission line within the designated multi-use corridor. North of the recreation area, it will be the same as amended option U, which utilizes the Town of Wickenburg's Resolution No. 2043 routing. Note that option U, which also crosses Vulture Mountains Recreation Area, is within the designated multi-use corridor as well but its corridor location was determined through the technical analysis described in Section 3.1.

### 6.3 Tier 1 EIS Build Corridor Alternatives

The screening process; agency, tribal, and public input; and the alternatives refinement exercise yielded a set of corridor options recommended for further study. As part of the Tier 1 EIS analysis, this range of corridor options will be combined into Build Corridor Alternatives, which are end-to-end alternatives running from Nogales to Wickenburg. The Tier 1 EIS will analyze the Build Corridor Alternatives and the corridor options that comprise them, in addition to a No Build Alternative.

The Build Corridor Alternatives will represent the most effective combinations from a mobility perspective and reflect the range of viewpoints voiced during the study to date. The range of input includes maximizing co-location with existing corridors, and consideration of new corridor

options to alleviate existing, congested corridors and support economic development objectives related to connectivity.

The EIS analysis will assess the Build Corridor Alternatives both from a long-distance perspective (end-to-end), as well as broken down by its component options, allowing a detailed assessment of each option within the Build Corridor Alternative. Ultimately, the Draft Tier 1 EIS analysis will include a recommendation for a Build Corridor Alternative or the No Build Alternative. These recommendations may consider a combination of pieces from various Build Corridor Alternatives, if supported by the analysis, to best meet the Purpose and Need while minimizing adverse impacts.

## 6.4 Description of No Build Alternative

A No Build Alternative (i.e., do-nothing option) will serve as a baseline for comparison to the Build Corridor Alternatives, and will be evaluated as a full alternative in the Tier 1 EIS. The No Build Alternative represents the existing transportation system, along with committed improvement projects that are programmed for funding. These improvements are represented in the federally-approved 2017-2021 State Transportation Improvement Program (STIP). Projects in the STIP are consistent with the statewide long-range transportation plan and metropolitan transportation improvement programs.

Under the No Build scenario, travel between Nogales and Wickenburg would utilize the existing corridors of I-19 and I-10 within the Study Area, along with a connection to Wickenburg via the Phoenix metropolitan area, which could take many routes, depending on traveler preference (e.g., SR 101L, SR 202L, SR 303L, I-17, SR 74, US 60, etc.). **Table 6-2** (Evening Travel Statistics from Nogales to Wickenburg, 2016 and 2035) provides the various routing options, distance, travel times, and average speeds. This information was generated based on the Arizona Model maintained by ADOT.

As noted in **Appendix A**, the Arizona Model was developed by ADOT as a trip-based model to estimate the interaction between travel movements (passenger cars and trucks) and transportation network. The Arizona Model is applied using a traditional four-step forecasting approach with trip generation, trip distribution, mode choice, and trip assignment.

The Arizona Model 2015 and 2035 transportation networks were applied in conjunction with socioeconomic forecasts and four-step modeling process to generate performance measures for the Study Area and broader state of Arizona No Build conditions. The 2035 transportation network includes capacity improvements identified in ADOT's and regional MPOs regional long-range transportation plans.

**Table 6-2 Evening Travel Statistics from Nogales to Wickenburg, 2016 and 2035**

Trips Between Nogales and Wickenburg <sup>(1)</sup>	Northbound			Southbound		
	Distance (miles)	Travel Time <sup>(1)</sup> (minutes)	Average Speed (mph)	Distance (miles)	Travel Time <sup>(1)</sup> (minutes)	Average Speed (mph)
<b>2016</b>						
I-19/I-10/I-17/SR 74/US 60/US 93	244	235	62	244	240	61
I-19/I-10/US 60/US 93	232	240	58	232	260	54
I-19/I-10/I-8/SR 85/I-10/SR 303/US 60/US 93	275	250	66	275	250	66
I-19/I-10/L101/US 60/US 93	238	235	61	238	250	57
I-19/I-10/L303/US 60/US 93	243	230	63	243	240	61
<b>2035</b>						
I-19/I-10/I-17/SR 74/US 60/US 93	244	319	46	244	330	44
I-19/I-10/US 60/US 93	232	329	43	232	340	41
I-19/I-10/I-8/SR 85/I-10/SR 303/US 60/US 93	275	317	52	275	326	51
I-19/I-10/L202/I-10/L101/US 60/US 93 <sup>(2)</sup>	238	294	49	238	323	45
I-19/I-10/L202/I-10/L303/US 60/US 93 <sup>(2)</sup>	243	288	51	243	316	47
I-19/I-10/L101/US 60/US 93	238	326	44	238	338	42
I-19/I-10/L303/US 60/US 93	243	320	46	243	330	44

NOTES:

(1) 2016 travel times based on Google estimates for a 4 p.m. departure on March 15, 2016. 2035 travel times derived from the Arizona Statewide Travel Demand Model.

(2) Reflects 2035 travel times for a route that includes the South Mountain Freeway (L202), not built in 2016.

SOURCE: Google Maps, 2016. Arizona Statewide Travel Demand Model, 2015.

The 2018-2022 Five-Year Transportation Facilities Construction Program identified several capacity improvements programmed and funded for construction on the interstate and state highway system within the I-11 Study Area by 2022:

- I-10: Ina Road to Ruthrauff Road (Pima County)
- I-10: SR 87 to Picacho (Pinal County)
- I-10: Earley Road to I-8 (Pinal County)
- US 93: Tegner Drive to SR 89

The No Build Alternative will include added new capacity to I-10 between Tucson and Casa Grande, and conversion of US 93 to a four-lane divided highway for a short three-mile segment through Wickenburg.

## **6.5 Considerations for Tier 1 EIS**

### **6.5.1 Continuing Technical Analysis**

Upon completion of the alternatives analysis process in the ASR, several ongoing issues are noted for further investigation or consideration during the more detailed Tier 1 EIS analysis, described as follows and organized around the ASR screening criteria.

#### **6.5.1.1 Population and Employment Growth**

The Tier 1 EIS will provide a more detailed assessment of existing and planned land uses, and the compatibility of the alternatives under consideration with local and regional planning. The Arizona Model utilized for the traffic analysis reflects current demographic and land use projections, and the introduction of a new access-controlled facility may affect those assumptions. The Tier 1 EIS will investigate the possible impacts associated with induced growth, and related indirect or cumulative impacts that could result from the proposed project.

#### **6.5.1.2 Congestion and Travel Times**

Transportation performance conditions of a specific corridor depend both on the location of the corridor, as well as the relationship to the broader transportation system. Evaluating short corridor options does not provide a good indication of true conditions of a long-distance corridor from Nogales to Wickenburg, although it does begin to indicate hot spots where congestion is likely and further evaluation may be necessary. The Tier 1 EIS will better encompass all the individual sub-criteria studied in this evaluation by assessing the end-to-end Build Corridor Alternatives that meet the purpose of this travel corridor.

#### **6.5.1.3 System Linkages and Interstate Mobility**

As the transportation system evolves, freight flows will also evolve with the change in employment levels, emerging industrial markets, travel times along key transportation corridors, and changes in congestion levels. Routes that currently do not show significant freight truck flows, may become more attractive and draw greater traffic volumes.

Introduction of new routes will also likely change the travel patterns of freight traffic. I-11 may provide an alternative route for freight traffic, help mitigate congestion along existing key transportation corridors, and spur economic growth that can lead to the location of potential freight hubs along the new interstate facility. Currently, freight traffic is attracted to existing routes because no other option exists. The Tier 1 EIS will evaluate the end-to-end Build Corridor Alternatives from Nogales to Wickenburg. These long-distance alternatives that reduce travel distances, travel times, and increases reliability, may result in changing freight patterns and logistics.

#### **6.5.1.4 Access to Economic Activity Centers**

In this global economy, prospects for new employment centers continue to evolve. It is likely that additional emerging economic activity centers, in addition to those already identified, will be acknowledged throughout the EIS process. To maintain a consistent foundation, only those



documented in approved plans should be considered as potentially impactful to the I-11 Corridor.

#### **6.5.1.5 Direct Impacts on Sensitive Environmental Resources**

The environmental component of the alternatives analysis was focused on the potential for direct impacts (i.e., through anticipated right-of-way requirements) on geographic-specific sensitive resources. The Tier 1 EIS will further examine potential environmental impacts that could result from the construction and operation of the proposed project. The EIS will address a broader range of natural and human resources, as well as the potential for indirect and cumulative impacts.

#### **6.5.2 Consideration of Emerging Technologies**

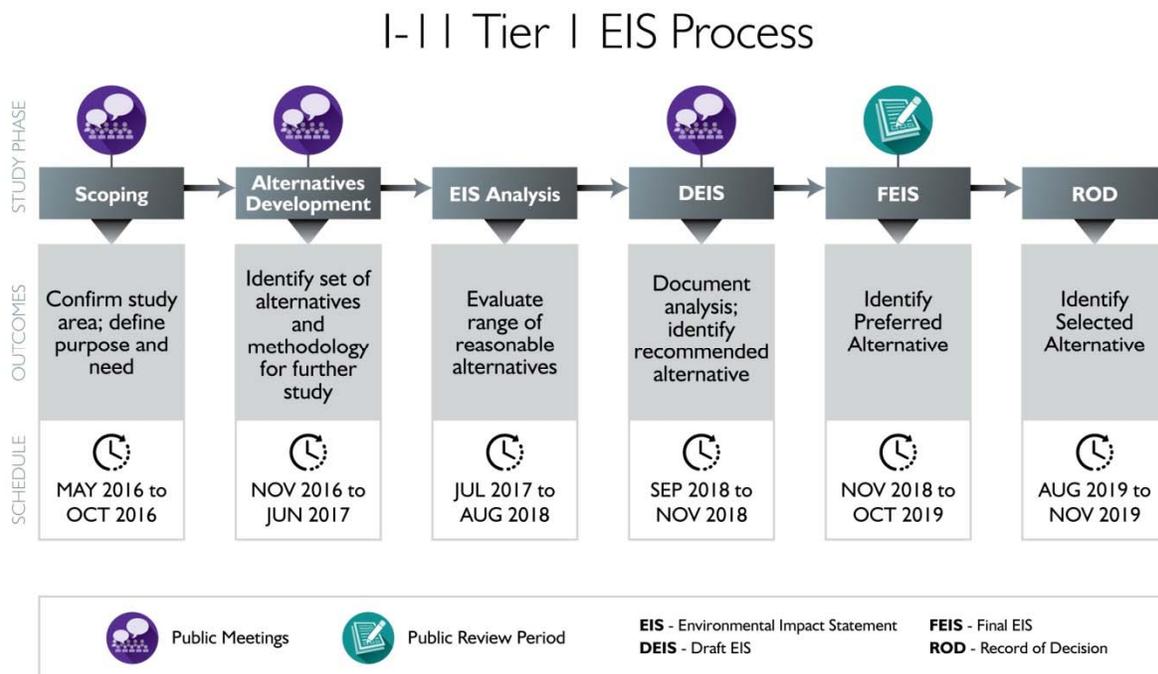
As indicated in prior studies, the intent of the I-11 Corridor has always been to be adaptive. Although it is unknown when the corridor would be constructed, or the technological trends occurring at that time, contingencies and adaptiveness for inevitable travel changes should be considered as possible.

Emerging technology trends, such as autonomous/connected vehicles and truck platooning might impact traffic volumes, travel times, average speeds, and safety – which could impact the corridor footprint or defer more imminent capacity improvements. Over time, statewide and regional travel demand models would need to be recalibrated to account for these travel trends. For example, if one of these emerging technologies becomes a dominant travel trend before the I-11 Corridor is constructed, the Tier 2 environmental studies would update the approach and data regarding travel demand modeling and patterns.

## 7 NEXT STEPS

FHWA and ADOT have prepared this *Alternatives Selection Report* to document the alternatives development and analysis that precedes the Tier 1 EIS. This effort has included identifying a universe of corridor options from various sources, screening these options against criteria based on the Purpose and Need, and determining that a reasonable range of corridor options are available to advance into the Tier 1 EIS that reflect the corridor needs, technical requirements, and stakeholder input.

The Tier 1 EIS will assemble the end-to-end Build Corridor Alternatives that will undergo more detailed programmatic environmental review to assess potential environmental impacts and mitigation strategies. A general process schedule is illustrated on **Figure 7-1** (Corridor Alternatives Development and Environmental Review Process).



**Figure 7-1 Corridor Alternatives Development and Environmental Review Process**

### 7.1 Draft Tier 1 EIS

FHWA and ADOT will prepare a Draft Tier 1 EIS to more fully assess the reasonable range of the corridor options and their assembly into Build Corridor Alternatives from Nogales to Wickenburg, and No Build Alternative. The Draft Tier 1 EIS will:

- Identify the Purpose and Need for the I-11 Corridor;
- Describe the screening process and each of the Build Corridor Alternatives;



- Evaluate the affected environment and potential environmental impacts based on agreed upon assessment methodologies for the environmental resource areas; and
- Recommend an Alternative.

The Draft Tier 1 EIS document will be circulated for public and agency comment over a 45-day review period. During this time, public hearings will be held to present the results of the Draft Tier 1 EIS and formally record all comments received.

## 7.2 Final Tier 1 EIS and Record of Decision

FHWA and ADOT will complete the environmental review process with the preparation of a Final Tier 1 EIS and Record of Decision (ROD).

Based on the impacts analysis and the comments received on the Draft Tier 1 EIS, the Final Tier 1 EIS will identify and define a Preferred Corridor Alternative. The issuance of the Final Tier 1 EIS will be followed with a public review period.

After consideration of all final comments received, the ROD will:

- Identify a Selected Alternative (Build or No Build);
- Present the basis for the decision;
- Describe the corridor alternatives considered; and
- Provide strategies to avoid, minimize, and mitigate for environmental impacts.

As the Federal Lead Agency under NEPA, FHWA will issue the ROD at the conclusion of the NEPA process.

In a tiered EIS process, a future Tier 2 environmental review would require the development of a specific alignment and would be similar to a traditional project-level NEPA process. During any future Tier 2 environmental reviews, ADOT and FHWA would conduct more detailed environmental and engineering studies for the proposed alignments consistent with the Selected Alternative, to establish the footprint and needed right-of-way for that portion of I-11.



## APPENDIX A

### Detailed Evaluation of Corridor Options

## Appendix A. Detailed Evaluation of Corridor Options

This appendix provides additional detail and context for the screening of corridor options, as described in Chapter 4 of the ASR. The sections below relate to the categories of screening criteria listed in **Table 4-1**, which correspond to the key elements in the Purpose and Need (see <http://i11study.com/Arizona/Documents.asp>). The discussion of each criterion is organized in four parts:

- Overview of the evaluation criteria and measures
- Existing corridor conditions
- Screening comparison of corridor options
- Summary conclusions

**Appendix B** includes detailed tables presenting the quantitative results for all corridor options.

### A1. Address Population and Employment Growth

The Purpose and Need provides the basis for identifying, evaluating, and screening corridor options, ultimately leading to the decision regarding a Selected Alternative at the end of the Tier 1 EIS process. The project has been proposed to support improved regional mobility and connectivity for people and goods. Previous studies identified key transportation-related problems, issues, and opportunities that support the need for the project, two of which are population and employment growth along the corridor. The criteria associated with population and employment growth were developed to evaluate the ability of each corridor option to serve projected areas of population and employment growth within the Study Area.

#### A1.1. Overview of Methodology and Criteria

The following measures were used to evaluate the Population and Employment Growth criteria:

- **Population Growth:** Increase in persons (2015-2035) in traffic analysis zones (TAZs) within two miles of the corridor option.
- **Employment Growth:** Increase in jobs (2015-2035) in TAZs within two miles of the corridor option.

Projected population and employment growth is an indicator of future travel demand within the Study Area. These growth measures are based on the quantitative increase in persons or jobs within two miles of the corridor options. Estimates for 2035 were determined using the socioeconomic inputs contained in ADOT's Arizona Travel Demand Model (Arizona Model).

A 2-mile buffer was used to evaluate the potential for population and employment growth based on a review of regional comprehensive and municipal general plans throughout the corridor, as well as the current pattern of development in the broader Phoenix and Tucson metropolitan areas. Currently, most employment growth is concentrated very closely to freeway corridors. Most freeway-related economic development occurs within the adjacent 1/2 to 1 mile, and up to 2 to 3 miles where a corridor runs at a diagonal, but the street system is still on a grid (e.g., I-10). Access to employment centers will be further explored for the economic activity center criteria.

**A1.2 Existing Corridor Conditions**

**Table A-1** (Population and Employment Growth, 2015 to 2035) lists the growth anticipated in the five counties that intersect the Study Area, along with the portions of population and employment within the Study Area. Within the Maricopa County portion of the Study Area, population and employment are projected to more than triple, increasing by 284 percent and 320 percent from 2015 to 2035, respectively. Much of this growth is focused in Buckeye, Goodyear, and Wickenburg, both along existing transportation corridors (I-10, US 93) and anticipated future routes (SR 303L south extension). During that same time period, similar high growth rates are also forecasted for employment within the Pinal County portion of the Study Area at 342 percent. While the percent growth is lower in Pima County, much of the expected growth is focused within the Study Area in Tucson’s central core along I-10. The rate and location of this population and employment growth contributes to increasing congestion and travel time reliability issues, and exacerbates lack of connectivity as employment and commerce patterns shift.

**Table A-1 Population and Employment Growth, 2015 to 2035**

County	Population					
	County Totals			Within Corridor Study Area		
	2015	2035	% Growth	2015	2035	% Growth
Santa Cruz	49,500	67,300	36%	46,100	62,800	36%
Pima	1,007,300	1,277,300	27%	819,000	1,038,500	27%
Pinal	369,100	728,700	97%	50,200	99,100	97%
Maricopa	4,110,600	5,684,400	38%	74,500	285,900	284%
Yavapai	218,500	302,300	38%	400	500	25%
<b>TOTAL</b>	<b>5,755,000</b>	<b>8,060,000</b>	<b>40%</b>	<b>990,200</b>	<b>1,486,800</b>	<b>50%</b>
County	Employment					
	County Totals			Within Corridor Study Area		
	2015	2035	% Growth	2015	2035	% Growth
Santa Cruz	13,400	19,000	42%	12,900	18,300	42%
Pima	351,800	472,600	34%	323,500	434,300	34%
Pinal	54,000	244,100	352%	13,000	57,500	342%
Maricopa	1,732,600	2,636,800	52%	11,000	46,200	320%
Yavapai	57,200	83,700	46%	20	30	50%
<b>TOTAL</b>	<b>2,209,000</b>	<b>3,456,200</b>	<b>56%</b>	<b>360,420</b>	<b>556,330</b>	<b>54%</b>

SOURCE: Arizona Statewide Travel Demand Model, 2015.

**A1.3 Screening Comparison of Corridor Options**

The results of the alternatives screening for the Population and Employment Growth criteria are summarized in **Table A-2**. **Figures A-1 and A-2** illustrate the forecasted 2035 population and employment growth along the corridor.

**Table A-2 I-11 Alternatives Screening: Population and Employment Growth**

Corridor Options	Measures			
	Population Growth		Employment Growth	
	Increase in population (persons) within 2 miles, 2015 to 2035		Increase in employment (jobs) within 2 miles, 2015 to 2035	
<b>South Section</b>				
A	16,913	●	5,412	●
B	102,973	●	52,074	●
C	10,102	●	935	○
D	22,267	●	2,562	○
E	6,345	○	1,438	○
F	14,929	●	2,480	○
G	21,809	●	11,064	●
<b>Central Section</b>				
H	1,216	○	397	○
I	6,848	○	4,334	○
J	1,500	○	-120	○
K	-2,443	○	-640	○
L	529	○	50	○
M	5,778	○	1,547	○
N	80,638	●	17,982	●
O	5,624	○	6,121	●
P	8,211	○	6,587	○
Q	25,360	●	7,318	○
R	24,406	●	8,228	○
<b>North Section</b>				
S	15,574	●	2,496	○
T	15,017	●	2,478	○
U	24,062	●	7,126	●
V	16,189	●	6,871	●
W	86,355	●	8,392	●

Scale: ● Best meets criteria    ● Moderately meets criteria    ○ Least meets criteria

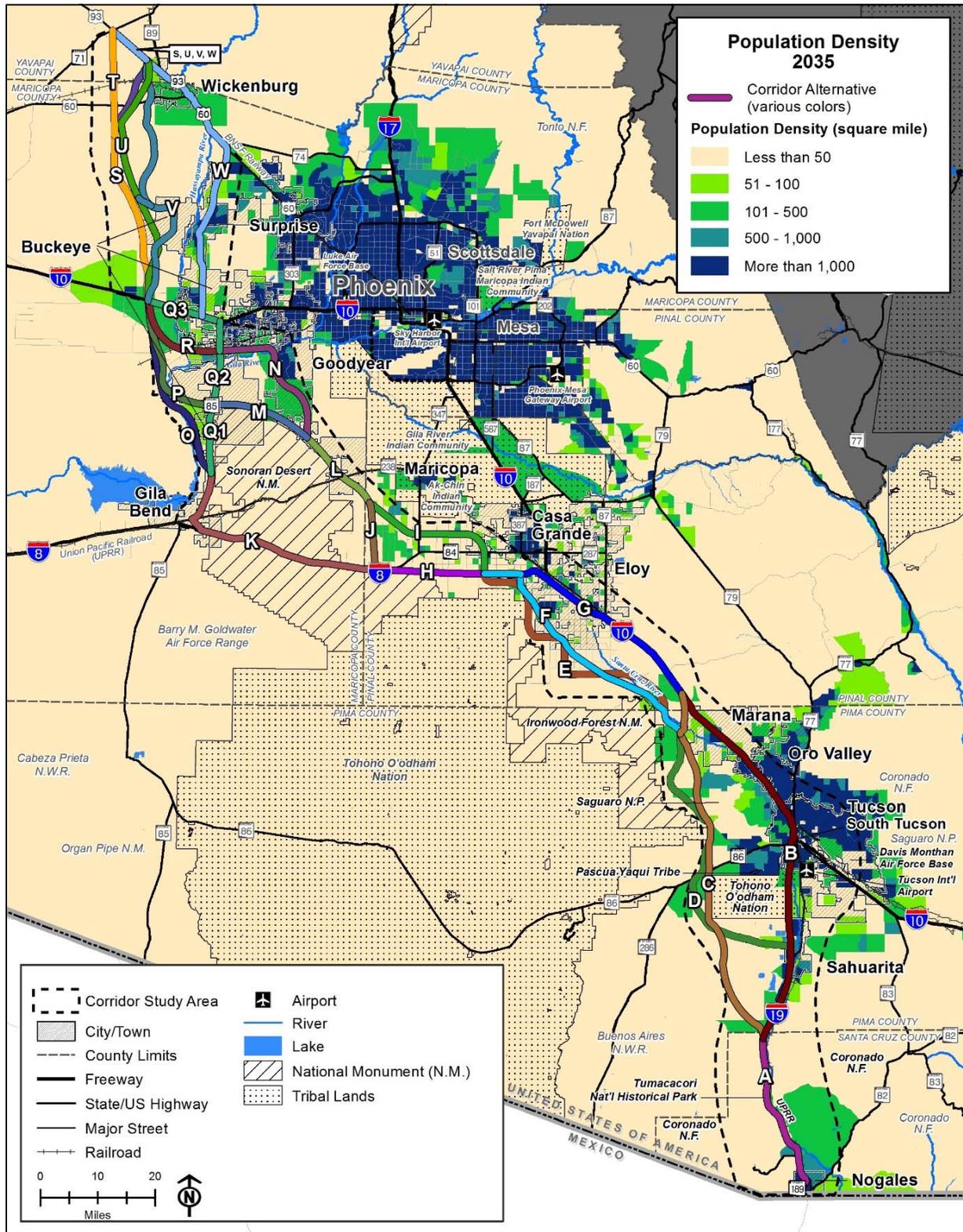


Figure A-1 2035 Population Density Along I-11 Corridor

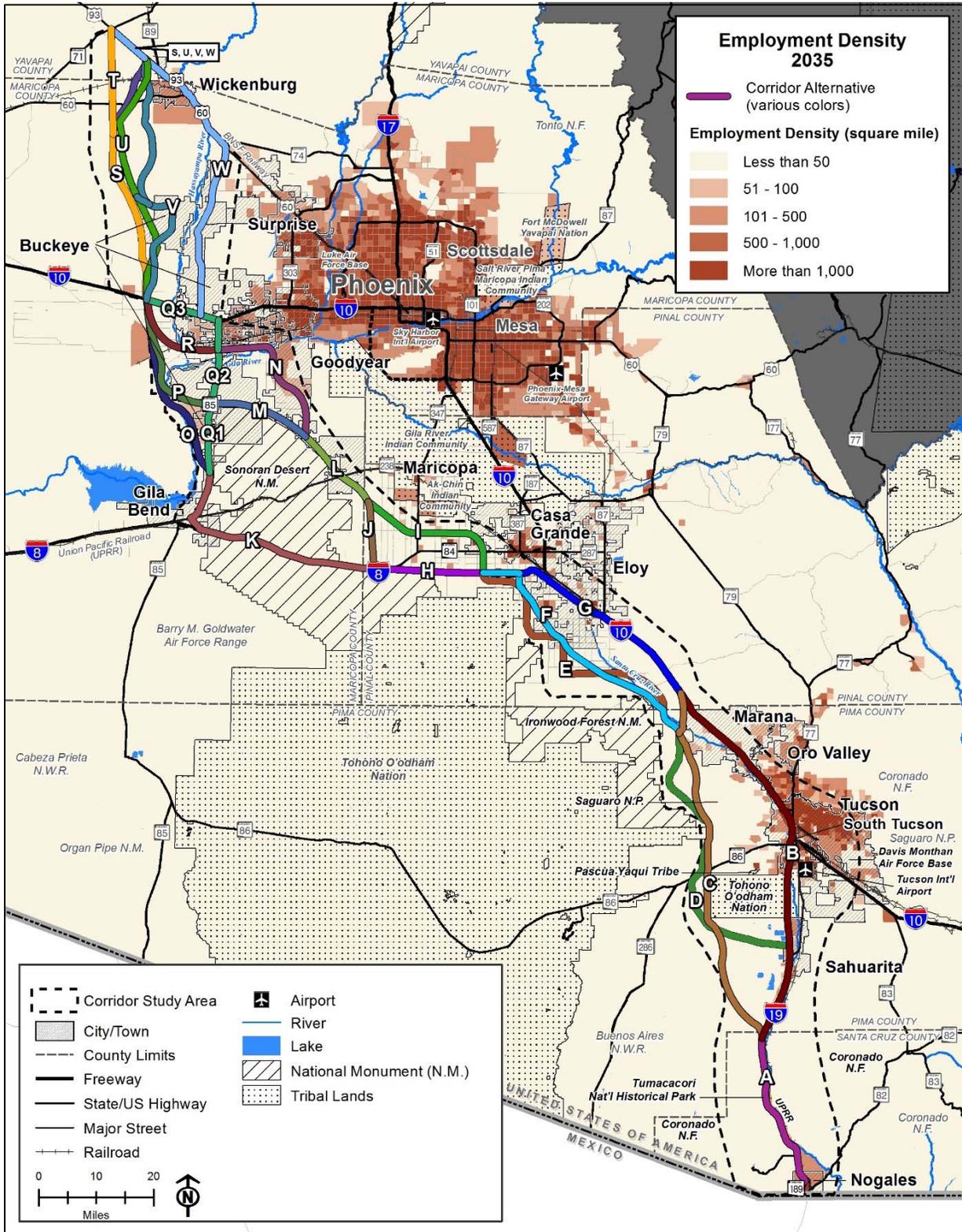


Figure A-2 2035 Employment Density Along I-11 Corridor

As shown in **Table A-2**, population and employment growth among the corridor options varies, but generally track with each other.

The corridor options with the highest anticipated population and employment growth are those located closest to major metropolitan areas, including B (through central Tucson), N (through Goodyear and an extension of the existing and expanding Phoenix metropolitan area), and W (through Wickenburg).

In the South Section, the new corridor options (C, D, E, F) tend to have lower population and employment growth, as limited growth is expected due to presence of tribal land, parks and recreation areas, and major floodplains. New corridor options are intended to provide better access between Nogales and Wickenburg, often routing around congested urban areas. Potential new growth is likely to be clustered at intersections with existing interstates (I-19, I-10).

Similarly in the Central Section, several corridor options are forecasted to see minimal or even negative growth in the future (H, J, K, L). The Sonoran Desert National Monument spans a large portion of the Central Section, and development is prohibited within its boundaries. This sets the foundation for no growth for those corridors passing through (K) or limits growth to one side of the corridor alternative for those located adjacent to the monument (H, L, M, Q). Higher population and employment growth in the Central Section are expected around existing population and employment centers in Goodyear and Buckeye (N, R; these corridor options are also defined as proposed transportation facilities in municipal plans). While not as high as some other corridor options, option I is expected to see the greatest growth in Pinal County.

In the North Section, moderate new population – and to some extent employment – growth is anticipated in Buckeye and Maricopa County along the southern half of the corridor options (approximately south of Bell Road). Growth in the northern portion is focused around Wickenburg’s existing planning area (near US 60/US 93).

#### **A1.4 Summary Conclusions**

The Population and Employment Growth criteria revealed several findings. The highest population growth is expected in Pima County along existing corridors, and in Maricopa County on new proposed corridors. Much of the new growth is located proximate to the existing metropolitan areas of Tucson and Phoenix.

Large masses of protected lands (tribal, parks, forests, national monuments, etc.) exist within the Study Area, driving population and employment growth to be more clustered in areas with existing high capacity transportation facilities, or expanding growth along proposed transportation routes.

Some routes, such as portions of I-19, west of Tucson corridor options (C and D), I-8, and SR 85, show nearly no population growth because of undevelopable corridor features as the Coronado National Forest, Tohono O’odham Nation, Saguaro National Park, Ironwood Forest National Monument, and Sonoran Desert National Monument.

#### **A2. Mitigate Congestion and Improve Travel Times**

The Arizona Model was developed by ADOT as a trip-based model to estimate the statewide interaction between travel movements (passenger cars and trucks) and the transportation network. The Arizona Model is applied using a traditional four-step forecasting approach with trip generation, trip distribution, mode choice, and trip assignment. It was first developed in 2008 for

bqAZ (Building a Quality Arizona) ADOT's Statewide Transportation Framework Study. In its current version, the model covers the entire state of Arizona's transportation network and has more than 6,000 TAZs representing population, employment, and other socioeconomic data for different regions (e.g., MPOs and COGs, counties, and cities/towns) of the state. Key inputs into the model include TAZ geography, socioeconomic projections, and roadway network elements consistent with and used in the regional travel demand models maintained by Arizona's MPOs.

The Arizona Model is maintained by the ADOT Travel Demand Modeling Group, which produces forecasts based on population and employment growth projections established by the state's MPOs and Arizona State Demographer's Office. At the time of this analysis, the latest future horizon year contained in the Arizona Model considered 2035 conditions. In support of the ASR, the Arizona Model was applied to assess existing (2015) conditions, future (2035) No Build conditions, and future (2035) build conditions and performance for each alternative.

## A2.1 Overview of Methodology and Criteria

The following measures were used to evaluate the Congestion and Travel Times criteria:

- **Traffic Volumes:** Average weekday traffic volumes on each corridor option, 2035.
- **Level of Service (LOS):** Traffic flow on each corridor option (A to F), 2035.
- **Travel Times:** Average travel time (minutes) during peak (3 PM – 6 PM), 2035.
- **Average Speeds:** Average travel speed (mph) during peak (3 PM – 6 PM), 2035.
- **Safety:** Comparison of corridor option crashes on high capacity roadways, 2035.
- **Incident Management:** Provides alternate interstate freeway route.

### Traffic Volumes

The Arizona Model was applied to estimate both short and long distance travel demand for passenger vehicles and commercial trucks in the corridor and statewide. Short-distance trips were considered to be less than 50 miles, while long distance trips were considered to be longer than 50 miles. FHWA's Freight Analysis Framework data were used in the Arizona Model structure to support the estimation of long-distance truck trip-making.

### Level of Service (LOS)

LOS is a quantitative measurement of the operational characteristics of traffic and the perception of traffic conditions by both motorists and passengers. The six levels of service defined by the Transportation Research Board's Highway Capacity Manual 2010 were used in this analysis. With widely varying travel conditions in the corridor, a generalized approach was used to estimate daily freeway capacities from the Arizona Model. **Table A-3** shows the maximum service volumes used to determine LOS on the I-11 study area freeways and state highways.

**Table A-3 Level of Service Maximum Service Volumes**

Freeway/Interstate (1,000s vehicles per day)				
Lanes	B	C	D	E
4	47.0	64.7	78.8	89.5
6	70.5	97.0	118.2	134.3
8	93.9	129.4	157.6	179.0
10	115.0	160.0	195.0	223.0
12	162.4	216.7	256.6	268.9

Limited Access State Highway (1,000s vehicles per day)				
Lanes	B	C	D	E
4	38.6	55.4	68.9	78.6

NOTE: Neither the Highway Capacity Manual nor the Florida handbook provides service volumes for LOS A or LOS F. The volumes shown present maximum service volumes, or the highest numbers of vehicles, for a given LOS. Any number greater than the value shown for a roadway with a given number of lanes would drop the LOS to the next letter grade. For example, if the volume shown in a table for a four-lane freeway at LOS C is 64,700 then 64,701 would represent LOS D.

**SOURCES:**

Highway Capacity Manual Version 6.0, Chapter 12/Basic Freeway and Multilane Highway Segments  
 Florida Department of Transportation Quality / Level of Service Handbook, Table 1

**Travel Times**

A comparison of travel times between key city pairs in the I-11 Corridor was computed for 2035 afternoon peak period conditions. These travel times were estimated from Google Maps which was used to estimate a range of travel times for any given path. The midpoint between the minimum and maximum travel time estimate was used to compute existing conditions and this approach was replicated in the Arizona Model to estimate 2035 travel times for the corridor options.

**Average Speeds**

Average travel speeds, also used to compute travel times, for each corridor option were estimated from the Arizona Model.

**Safety**

Using the same approach from the Arizona Statewide Freight Plan, observed crash history data provided by the ADOT Traffic Safety Division, in combination with a Highway Safety Manual-based crash prediction model, was used to identify potential crashes in the Study Area.

**Incident Management**

The incident management measure is intended to evaluate the ability of each corridor option to provide alternate routes in the regional transportation system for emergency and defense needs. Alternate routes represent a key response strategy to manage traffic demand during incidents such as major traffic accidents, emergency access needs, environmental disasters (e.g., dust storms, floods), security-related issues, or other events that requires road closures.

This measure was evaluated based on a qualitative scale of yes or no (e.g., an alternative that provides very few or no local or regional connections received a “no”).

## A2.2 Existing and Future Corridor Conditions

### Existing Congestion

ADOT’s State Highway System Performance Assessment was used to identify existing congestion and mobility conditions in the Study Area. The Travel Time Index (TTI) was used to compare observed average peak travel times to free flow travel times based on posted speed limits. The index divides highway travel time into three categories:

- Good: < 1.35 (peak travel time less than 35 percent longer)
- Fair: 1.35 to 2.50 (peak travel time between 35 percent and 150 percent longer)
- Poor: >2.50 (peak travel time more than 150% longer)

**Figure A-3** (Peak Period Travel Time Ratings, Existing) shows the existing travel time ratings for all traffic in the Study Area. Congestion in the Phoenix and Tucson urban areas is reflected by poor travel time ratings on highways serving these regions. I-19 also has poor travel time ratings in Nogales related to urban traffic congestion and activity at both DeConcini and Mariposa Land Ports of Entry (LPOEs). The northbound U.S. Customs and Border Protection checkpoint at milepost 25 (near Tubac) also contributes to traffic delays. Elsewhere, the travel time ratings show that I-10, I-8 and SR 85 provide good mobility with some delays occurring at congested interchanges.

### Level of Service

**Figure A-4** (Weekday Level of Service, 2035) shows generalized LOS for the Study Area based on forecasts from the Arizona Model for the 2035 No Build. It shows that projected population and employment growth are expected to increase travel demand and congestion in the Study Area. Congestion is expected to be most apparent along the I-10 corridor where the Interstate is forecast to operate at LOS D or worse between Phoenix and Tucson indicating considerable delays. However, even with the worsening congestion on I-10 between Casa Grande and Phoenix, I-8 is still forecast to operate at LOS C or better. The southern portion of SR 85 between I-8 and I-10 will operate at LOS C or better but operations on the northern portion are forecast to LOS E. [Note: the map originally shown in the *Purpose and Need Memorandum* for 2035 LOS illustrated results that included an error within the model; this was corrected and Figure A-4 reflects the correct information.]

### Existing Safety

**Figure A-5** (Safety Index, Existing) shows that corridors in the Study Area have safety ratings either below or slightly below the state average. Between 2010 and 2014, an average of 1,800 crashes per year occurred on I-19, I-10, I-8, and SR 85 in the Study Area. By 2035 in No Build conditions, the number of crashes is expected to reach to 3,300 annually on these facilities. While no change in the annual crash rate is assumed, the number of crashes is expected to grow due to increases in overall traffic volumes.



### Travel Times and Average Speeds

Travel times and average speeds are another measure of highway congestion. **Table A-4** (Afternoon Peak Period Travel Times for City Pairs, 2015 and 2035) shows that travel times through the Phoenix urban area will increase substantially from 2015 to 2035. This shows that travelers between Casa Grande and Wickenburg could divert west to faster, but longer, routes. Travel times between Casa Grande and Tucson are also forecast to increase by 2035. By 2035 travel times between Nogales and Tucson are expected to be similar to 2015.

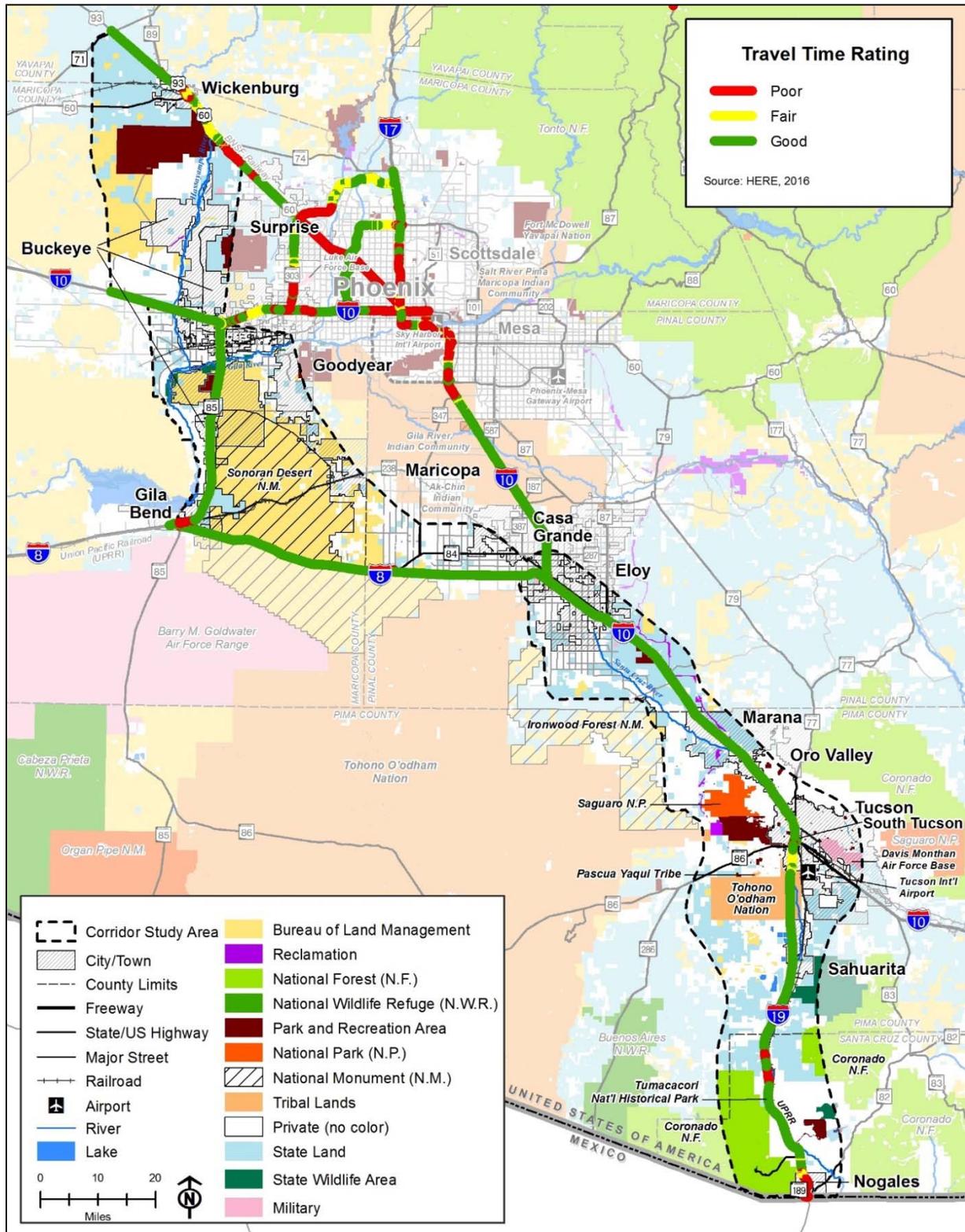


Figure A-3 Peak Period Travel Time Ratings, Existing

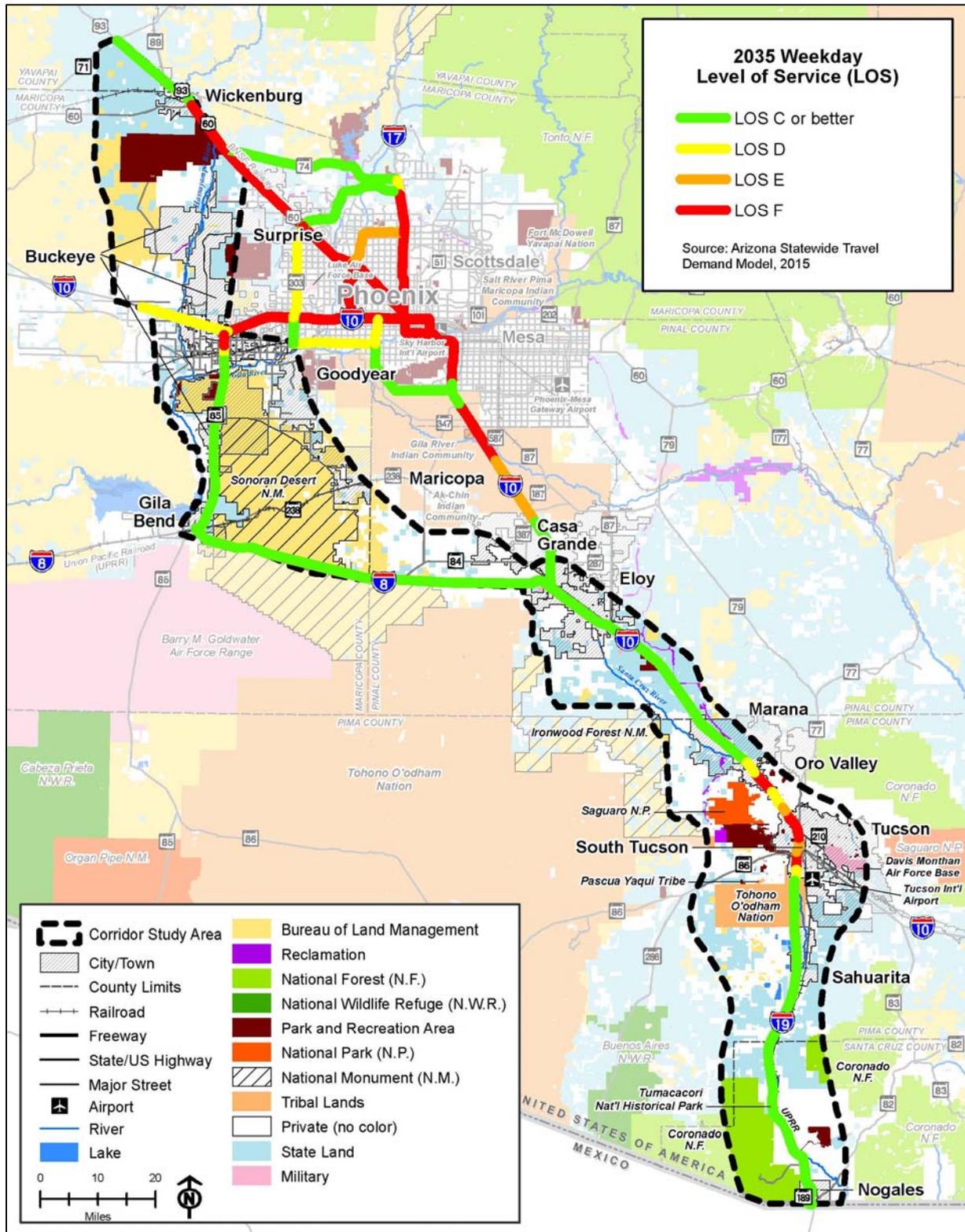


Figure A-4 Weekday Level of Service, 2035

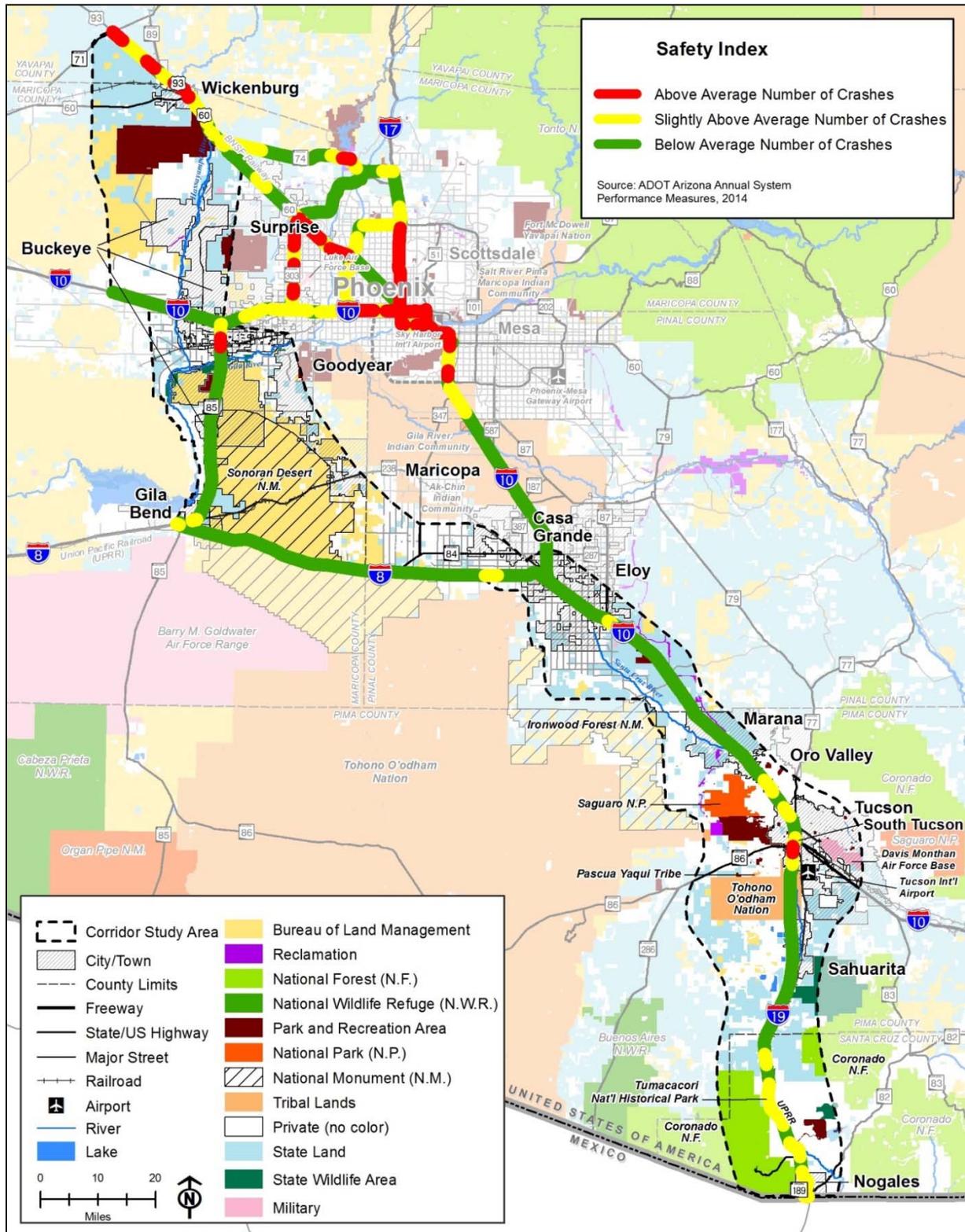


Figure A-5 Safety Index, Existing

**Table A-4 Afternoon Peak Period Travel Times for City Pairs, 2015 and 2035**

City Pair	Northbound			Southbound		
	Distance (miles)	Travel Time (minutes)	Average Speed (mph)	Distance (miles)	Travel Time (minutes)	Average Speed (mph)
<b>2015</b>						
Nogales – Tucson	66	68	58	66	68	58
Tucson – Casa Grande	66	68	58	66	65	61
Casa Grande – Phoenix	50	70	43	50	80	38
Phoenix – Wickenburg	65	85	46	65	68	57
Casa Grande – Wickenburg	116	145	48	114	140	50
<b>2035</b>						
Nogales – Tucson	66	68	58	66	68	58
Tucson – Casa Grande	66	85	47	66	80	50
Casa Grande – Phoenix	52	84	37	53	93	34
Phoenix – Wickenburg	87	168	31	67	126	41
Casa Grande – Wickenburg	146	186	47	142	178	49
<b>Difference</b>						
Nogales – Tucson	0	0	0	0	0	0
Tucson – Casa Grande	0	17	-11	0	15	-11
Casa Grande – Phoenix	2	14	-6	3	13	-4
Phoenix – Wickenburg	22	83	-15	2	58	-16
Casa Grande – Wickenburg	30	41	-1	28	38	-1

NOTE: 2015 travel times based on Google estimates for a 4 p.m. departure on March 15, 2016. 2035 travel times were derived from the Arizona Statewide Travel Demand Model.

SOURCE: Arizona Statewide Travel Demand Model 2016; Google Maps 2016;

**Table A-4** also shows that travel times along various routes may increase from existing to future conditions by over 83 minutes and average speeds would decrease by as much as 16 mph due to growing congestion on existing freeways and arterials. Average speeds are forecast to decrease the most in the North and Central Sections of the Study Area.

### **Incident Management**

The original interstate system was planned in part as a primary and necessary element of the national defense system. One of the original purposes of the system was to provide ground transportation for military supplies and troop deployments. The I-11 Corridor will likely be an additional element of the Strategic Highway Network (STRAHNET), which is designated by the FHWA and Department of Defense. The network is intended to provide defense access, continuity, and emergency capabilities for movement of personnel and equipment in both peace and war.

Existing congestion levels on I-10 and other major state networks may inhibit efficient and safe evacuation procedures. The presence of the Palo Verde Nuclear Generating Station, military facilities, and manufacturing to support them elevates the need for alternative and adequate

routes. There is also the potential for disruptions to commerce in the event of limitations on other major north-south corridors such as California's I-5, or in the event of a closure due to a fatal traffic accident or inclement weather condition, such as a dust storm. Together with infrastructure improvements and other strategic initiatives set in place, the implementation of an I-11 Corridor that provides an alternate route to the regional transportation system would strengthen defense movements, emergency access conditions, and international traffic movement and security of the border.

### A2.3 Screening Comparison of Corridor Options

The results of the assessment of transportation performance screening criteria are summarized in **Table A-5** (I-11 Alternatives Screening: Congestion and Travel Times). The congestion and travel time performance measures presented in **Table A-4** compare the corridor option traffic volumes, levels of service, travel times, average speeds, safety, and incident management by the South, Central, and North Sections. The screening results are comparative to each other. For example, corridor options in the South Section were compared to one another, as were the options in the Central and North Sections.

The methods used to prepare the Existing Conditions analysis were also used to prepare the 2035 corridor option traffic volumes, LOS, travel times, average speeds, safety, and incident management measures presented in this section. The Arizona Model's 2035 future forecast of socioeconomic and travel demand for the Study Area and state were the primary analysis tool to support this analysis.

#### Traffic Volumes

Using the Arizona Model, 2035 average weekday traffic volumes, including passenger vehicles and trucks, were evaluated for each corridor option. It should be noted that the Arizona Model's traffic projections do not account for land use changes that may occur as a result of new interstate construction. The potential impacts and implications of that are accommodated in the "economic activity centers" criteria. Corridor options with higher traffic volumes performed better than those with lower volumes, as higher traffic volumes are an indicator of high corridor usage, paired with reduced traffic volumes on already congested roadway facilities in the Study Area.

In the South Section, the range of estimated 2035 average weekday traffic volumes using the I-11 corridor options included a low of 2,100 and a high of 87,500, with option F the lowest and option B the highest. Corridor options A, B, C, and G are expected to generate high volumes, while options D, E, and F are expected to generate moderate to low volumes respectively.

In the Central Section, the range of estimated 2035 average weekday traffic volumes included a low of 2,300 and high of 48,000, with option O the lowest and option Q the highest. All of the corridor options (e.g., H, I, J, K, L, M, N, P, Q, and R) with the exception of option O are expected to generate relatively high volumes and perform well against the criteria.

In the North Section, the range of estimated 2035 average weekday traffic volumes included a low of 3,900 and high of 19,000, with option V as the lowest and option W as the highest, with options S, T, and U expected to generate moderate volumes.

**Table A-5 I-11 Alternatives Screening: Congestion and Travel Times**

Corridor Options	Measures											
	Traffic Volumes		Level of Service		Travel Times		Average Speeds		Safety		Incident Management	
	Average weekday traffic volumes on each corridor alternative, 2035		LOS on each corridor option (traffic flow from A to F), 2035		Average travel time (minutes) during peak (3 PM – 6 PM), 2035		Average travel speed (mph) during peak (3 PM – 6 PM), 2035		Comparison of corridor option crashes on high capacity roadways, 2035		Provides alternate interstate freeway route	
<b>South Section</b>												
A	32,800	●	C or better	●	22	☉	73	●	240	☉	No	○
B	87,500	●	D	☉	75	○	52	○	1,700	○	No	○
C	14,400	●	C or better	●	48	☉	74	●	1,400	○	Yes	●
D	9,500	☉	C or better	●	54	☉	67	●	1,500	○	Yes	●
E	2,100	○	C or better	●	38	☉	74	●	16	●	Yes	●
F	2,100	○	C or better	●	33	☉	74	●	14	●	Yes	●
G	66,000	●	C or better	●	44	☉	56	☉	532	☉	No	○
<b>Central Section</b>												
H	20,200	●	C or better	●	17	☉	74	●	72	☉	No	○
I	21,800	●	C or better	●	24	☉	67	●	106	○	Yes	●
J	15,500	●	C or better	●	12	☉	66	●	33	●	Yes	●
K	10,300	●	C or better	●	36	☉	68	●	101	○	No	○
L	17,900	●	C or better	●	16	☉	68	●	51	☉	Yes	●
M	18,300	●	C or better	●	11	☉	68	●	39	●	Yes	●
N	26,300	●	C or better	●	18	☉	67	●	96	☉	Yes	●
O	2,300	○	C or better	●	28	☉	68	●	12	●	Yes	●
P	21,000	●	C or better	●	21	☉	67	●	91	☉	Yes	●
Q	48,000	●	C or better	●	5	☉	60	☉	45	☉	No	○
R	29,800	●	C or better	●	16	☉	62	☉	93	☉	Yes	●
<b>North Section</b>												
S	6,600	☉	C or better	●	44	●	68	●	56	●	Yes	●
T	6,600	☉	C or better	●	41	●	68	●	56	●	Yes	●
U	6,600	☉	C or better	●	44	●	68	●	56	●	Yes	●
V	3,900	○	C or better	●	47	☉	68	●	32	☉	Yes	●
W	19,000	●	C or better	●	53	☉	64	☉	188	○	No	○

Scale: ● Best meets criteria    ☉ Moderately meets criteria    ○ Least meets criteria

NOTE: In the South Section, corridor options C and D show travel diversion benefits from option B, meaning that they will attract current traffic from I-19 and I-10 along option B and divert it to options C or D. Regarding the safety criterion, this means that the crashes presented for corridor option B represent the total estimated option B crashes. Those for alternative option C represent the total reduced option B crashes, plus new option C crashes to show travel diversion benefits (leading to a reduced overall crash rate). Those for corridor option D represent the total reduced option B crashes, plus new option D crashes to show travel diversion benefits (also leading toward a reduced overall crash rate).



### **Level of Service**

Future 2035 expected congestion levels, reported with LOS, were computed using the Arizona Model for each of the corridor options, with options compared to one another by section. Corridor options with LOS C or better were considered less congested – and therefore best meeting the criteria – than those with LOS D, E or worse.

The majority of corridor options in each of the three sections are expected to operate at LOS C or better, with the exception of options B and G in the South Section which are expected to operate with more congestion with LOS D. This means that co-locating an I-11 Corridor with I-10 in corridor options B and G will degrade traffic conditions without additional improvements, seeing an increased level of congestion over today.

### **Travel Times**

Using the methods defined earlier, including the application of the Arizona Model and 2035 forecasts of travel demand and socioeconomic data, a comparison of travel times between key city pairs in the Study Area was computed to represent 2035 afternoon peak period conditions for each corridor option. Travel times for each of the corridor options were then compared to the 2035 No Build travel times to define the performance. Those with the slowest travel times least meet the criteria, while those with the fastest travel times best meet the criteria.

Travel times for each corridor option by section varied based on the unique travel distances, congestion levels, and associated travel times between the key city pairs evaluated. Due to these factors, travel time assessments were used to compare 2035 No Build to individual 2035 corridor options, rather than comparing the performance of each corridor option to one another. This is due to the fact that each corridor option is a different length, and therefore total travel times are not directly comparable.

In the South Section, the travel times for all of the corridor options improved moderately from the 2035 No Build condition. In the Central Section, all of the corridor options are expected to generate moderate improvements in travel times. In the North Section, corridor options S, T, and U are expected to generate the fastest or best travel times in the North Section, with options V and W expected to generate moderate improvements in travel times over the No Build scenario.

### **Average Speeds**

Future 2035 average travel speeds were computed using the Arizona Model for each corridor option reflecting congestion, travel times, and travel distances. Afternoon peak period average travel speeds for each corridor option were assessed and compared to one another with slow speeds (under 55 mph) least meeting the criteria, and fast travel speeds (over 65 mph) as best meeting the criteria.

In the South Section, average travel speeds are expected to range from 43 to 74 miles per hour, with corridor options B and G expected to operate at slow to moderate speeds of 52 and 56 miles per hour respectively. All other corridor options in the South Section are expected to operate at fast average travel speeds.

In the Central Section, the average travel speeds for all corridor options are expected to range from 60 to 74 miles per hour, with options Q and R operating at moderate speeds of 60 and 62 miles per hour respectively. All other corridor options are expected to operate at fast average travel speeds.

In the North Section, the average travel speeds for all corridor options in this section are expected to range from 64 to 68 miles per hour, with corridor option W operating at moderate travel speeds of 64 miles per hour, while options S, T, U, and V operating at fast speeds of 68 miles per hour.

### **Safety**

Observed crash history data provided by the ADOT Traffic Safety Division were used in combination with 2035 travel demand forecasts from the Arizona Model and a Highway Safety Manual-based crash prediction model to identify crashes for each corridor option. The scale used in the safety computations compared the corridor options to one another by section, where those options that projected the most crashes rated the poorest – least meeting the criteria, while those with the fewest crashes best met the criteria.

The number and range of expected crashes for all of the corridor options by section remains lower than the 3,300 annual crashes expected in 2035 No Build conditions for other major facilities in the Study Area including I-19, I-10, I-8, and SR 85.

In the South Section, the range of number crashes for each corridor option is expected to be between 14 and 1,700 crashes. Corridor options E and F are expected to generate the fewest crashes at 14 and 16 respectively, with options A and G expected to generate moderate numbers of crashes with 240 and 530 respectively. Corridor options B, C, and D are expected to generate the most crashes at 1,700, 1,400, and 1,500 respectively. However, it should be noted that options C and D are expected to attract and divert traffic from option B. Therefore, the crash estimates for options C and D represent both the crashes expected on corridor options B and C/D – which signify an overall reduction in total crashes. Generally speaking, a new facility with lower traffic volumes and a lower crash rate (represented by either corridor options C or D) would divert traffic from a higher crash rate facility (option B), resulting in a net decrease in crashes for the whole system.

In the Central Section, the range of anticipated crashes was relatively low (12 to 106) when compared to 2035 No Build conditions. Corridor options I and K are expected to generate the highest number of crashes (101 to 106), options H, L, N, P, and R are expected to generate moderate levels of crashes (51 to 96), and options J, M, O, and Q are expected to generate the lowest number of crashes (12 to 45).

In the North Section, the range of anticipated crashes was also relatively low (32 to 188) when compared to 2035 No Build conditions. Corridor option W is expected to generate the highest number of crashes (188), while options S, T, U, and V are expected to generate the lowest number of crashes (32 to 56).

### **Incident Management**

The ratings for the incident management criterion directly reflect use of an existing transportation facility (i.e., interstate) versus a new corridor that introduces an alternate route to the regional transportation system to strengthen defense movements, emergency access, and international traffic movement and security of the border.

Incident management was measured by assessing the corridor options with provision of a new freeway route (yes) or not (no). In the South Section, corridor options C, D, E, and F met this criterion, while options A, B, and G did not. In the Central Section, the majority of corridor options (I, J, L, M, N, O, P, and R) met this criterion, while options H, K, and Q did not. In the North Section, all of the corridor options (S, T, U, and V) met this criterion with the exception of option W.

#### A2.4 Summary Conclusions

The screening conducted for the 23 corridor options generated different magnitudes of traffic volumes and diversions, levels of service, travel times, average speeds, safety, and incident management performance. The evaluations also provided a range of expected congestion improvements to the freeways and roadway facilities expected to be in-place by 2035. A summary of the evaluations follows:

- **Traffic Volumes:** In the South Section, the existing corridors of I-10 and I-19 are expected to generate the highest volumes. Projected volumes are relatively similar in the “high” range for all corridor options in the Central Section, with the exception of corridor option O, which ranks poorly. In the North Section, option V is expected to generate the lowest volumes, option W will generate the highest, with options S, T, and U expected to generate moderate volumes.
- **Level of Service:** The majority of corridor options in each of the three sections are expected to operate at C or better level of service, with the exception of option B in the South Section which is expected to operate with more congestion with LOS D – deemed an acceptable LOS in urban areas, according to ADOT’s *Roadway Design Guidelines*.
- **Travel Times:** In the South Section, travel times for all of the corridor options improved moderately from the 2035 No Build condition, with the exception of corridor option B, which generated slower travel times. In the Central Section, all of the corridor options are expected to generate moderate improvements in travel times compared to the 2035 No Build. In the North Section, corridor options S, T and U are expected to generate the fastest or best travel times, while options V and W are expected to generate moderate improvements in travel times.
- **Average Travel Speeds:** In the South Section, corridor options B and G expected to operate at slow to moderate speeds, while all other corridor options are expected to operate at fast average travel speeds. In the Central Section, corridor options Q and R are expected to operate at moderate speeds while all other corridor options are expected to operate at fast average travel speeds. In the North Section, corridor option W is expected to operate at moderate travel speeds, while options S, T, U, and V are expected to operate at fast speeds.
- **Safety:** In the South Section, corridor options E and F are expected to generate the fewest crashes, options A and G are expected to generate moderate numbers of crashes, and options B, C, and D are expected to generate the most crashes, although C and D will reduce the overall crashes occurring on the existing highway system. In the Central Section, corridor options I and K are expected to generate the highest number of crashes, options H, L, N, P, and R moderate levels of crashes, and options J, M, O, and Q the lowest number of crashes. In the North Section, corridor option W is expected to generate the highest number of crashes, while options S, T, U, and V the lowest number of crashes.
- **Incident Management:** Improving existing highway corridors does not help incident management. To meet the homeland security and national defense needs element of the

Purpose and Need, the I-11 Corridor would introduce new routes into the regional transportation system to support those that exist today. In the South Section, corridor options C, D, E, and F are expected to provide this redundancy, while options A, B, and G will not. In the Central Section, the majority of corridor options (I, J, L, M, N, O, P, and R) are expected to meet this need, while options H, K, and Q will not. In the North Section, alternatives corridor options (S, T, U, and V) are expected to meet this need while option W will not.

Altogether from a mobility perspective, co-locating I-11 with an existing highway tends to lower the transportation performance of the corridor option, while new corridors generally have lower expected travel times, higher speeds, and less crashes.

### A3. Improve System Linkages and Interstate Mobility

The concept of a north-south trade corridor through Arizona and the western U.S. is not new. The lack of an improved north-south interstate freeway link in the Intermountain West region to enhance trade and economic development, improve efficiency of mobility, and provide an alternative route for freight movement has been acknowledged in various pieces of federal legislation that have established the need and general corridor vicinity (ISTEA, NAFTA, High Priority Corridors, MAP-21, FAST Act) over the past 20 years.

The increasing importance of Mexico as a trading partner, emergence of nearshoring as a strongly growing structural feature of US commerce, and continuation of historic growth in the region all suggest that demands on the Intermountain West region's interstate freeway infrastructure will substantially increase during the next few decades. Thus, the System Linkages and Interstate Mobility criteria seeks to assess the ability of each corridor alternative to connect freight activity centers and accommodate freight traffic.

#### A3.1 Overview of Methodology and Criteria

The following measures were used to evaluate the System Linkages and Interstate Mobility criteria:

- **Modal Interrelationships:** Number of freight activity hubs within 2 miles on either side of the corridor options.
- **Freight Truck Flows:** Estimated daily freight truck units, as projected in 2035.

The number of freight activity hubs within two miles of a corridor option is an indicator of the linkage provided by the alternative. Typically, trucks prefer intermodal or shipping destinations close to the freeway to allow easy access without disrupting the local transportation system. Additionally, freight activity hubs tend to incorporate more than one transportation mode (trucking, rail, aviation, etc.), and often tend to locate near transportation junctions (freeway system interchanges, airports, intermodal rail yards, etc.), to minimize extra travel distances. A two-mile buffer was used to evaluate the number of freight activity hubs in close proximity to the I-11 corridor options that could benefit from access to a major freeway corridor.

Projected 2035 freight truck flows indicate the enhanced mobility provided by the I-11 Corridor. Estimates for 2035 were determined using the ADOT's Arizona Model.

**A3.2 Existing Corridor Conditions**

The 2013 MAG *Freight Transportation Framework Study* noted the I-11 Corridor as the “cornerstone for seamless and efficient transportation of goods, services, people, and information between Canada, Mexico, and the United States.” This was a joint effort conducted on behalf of the MPOs spanning the Tucson to Phoenix corridor, or the Sun Corridor. The goal was to plan the appropriate transportation infrastructure to attract freight-related economic development by taking advantage of the Sun Corridor’s prime location to serve the West Coast, Intermountain West, and Mexican deep-water ports within a day’s truck drive.

**Figure A-6** (Freight Hubs and Other Related Planning Recommendations in I-11 Corridor Study Area) identifies freight industry focus areas that were identified in the study, as well as other planned transportation facilities, to add context to the placement of these growth areas.

These freight industry focus areas take advantage of existing and planned transportation infrastructure, with the expectation that freight industries (intermodal, warehousing/distribution, transfer facilities, etc.) will expect immediate access to freeway and other multimodal transportation facilities, such as freight rail corridors and yards, and cargo airports.

**Table A-6** (State-to-State Daily Freight Truck Flows, 2013 and 2035) shows the state-to-state freight truck flows that have the potential to use the I-11 Corridor. Export cargo values from Arizona to Mexico are forecasted to more than triple through 2035. The Arizona to Nevada market is also fast growing, with a projected increase of 175 percent in daily freight truck units between 2013 and 2035.

**Table A-6 State-to-State Daily Freight Truck Flows, 2013 and 2035**

State Pair	Cargo Value (1,000s) <sup>(1)</sup>			Daily Freight Truck Units <sup>(1)</sup>		
	2013	2035	% Change	2013	2035	% Change
Arizona – Mexico	\$10,908	\$47,840	339%	107	378	253%
Arizona – Nevada	\$8,647	\$20,047	132%	559	1537	175%
Arizona – Idaho	\$2,145	\$13,009	506%	82	181	121%
Arizona – Canada	\$1,716	\$6,268	265%	33	107	224%
Nevada – Mexico	\$446	\$2,515	464%	2	11	450%
Idaho – Mexico	\$29	\$110	279%	2	5	150%

(1) Per the FHWA Office of Freight Management and Operations methodology, annual flows are divided by 365 days per year.

SOURCE: Arizona Statewide Travel Demand Mode, 2016; Transearch, 2013/

**Table A-7** (County-to-County Daily Freight Truck Flows, 2013 and 2035) presents the freight movements carried by trucks between the counties within the Study Area from 2013 to 2035. The greatest percentage increase is expected to occur between Santa Cruz and Pima counties, with a growth of 204 percent in daily freight truck units by 2035. County-to-county daily freight truck flows are also projected to double between Pinal and Maricopa counties over that same time period.

**Table A-7 County-to-County Daily Freight Truck Flows, 2013 and 2035**

County Pair	Cargo Value (1,000s) <sup>(1)</sup>			Daily Truck Units <sup>(1)</sup>		
	2013	2035	% Change	2013	2035	% Change
Santa Cruz – Pima	\$335	\$721	115%	66	200	203%
Santa Cruz – Maricopa	\$128	\$279	118%	8	21	163%
Pima – Pinal	\$934	\$2,167	132%	485	789	63%
Pima – Maricopa	\$10,988	\$22,089	101%	773	1290	67%
Pinal – Maricopa	\$6,044	\$10,279	70%	2573	5137	100%
Maricopa – Yavapai	\$1,633	\$4,048	148%	296	411	39%

(1) Per the FHWA Office of Freight Management and Operations methodology, annual flows are divided by 365 days per year.

SOURCE: Arizona Statewide Travel Demand Model 2016; Transearch 2013/

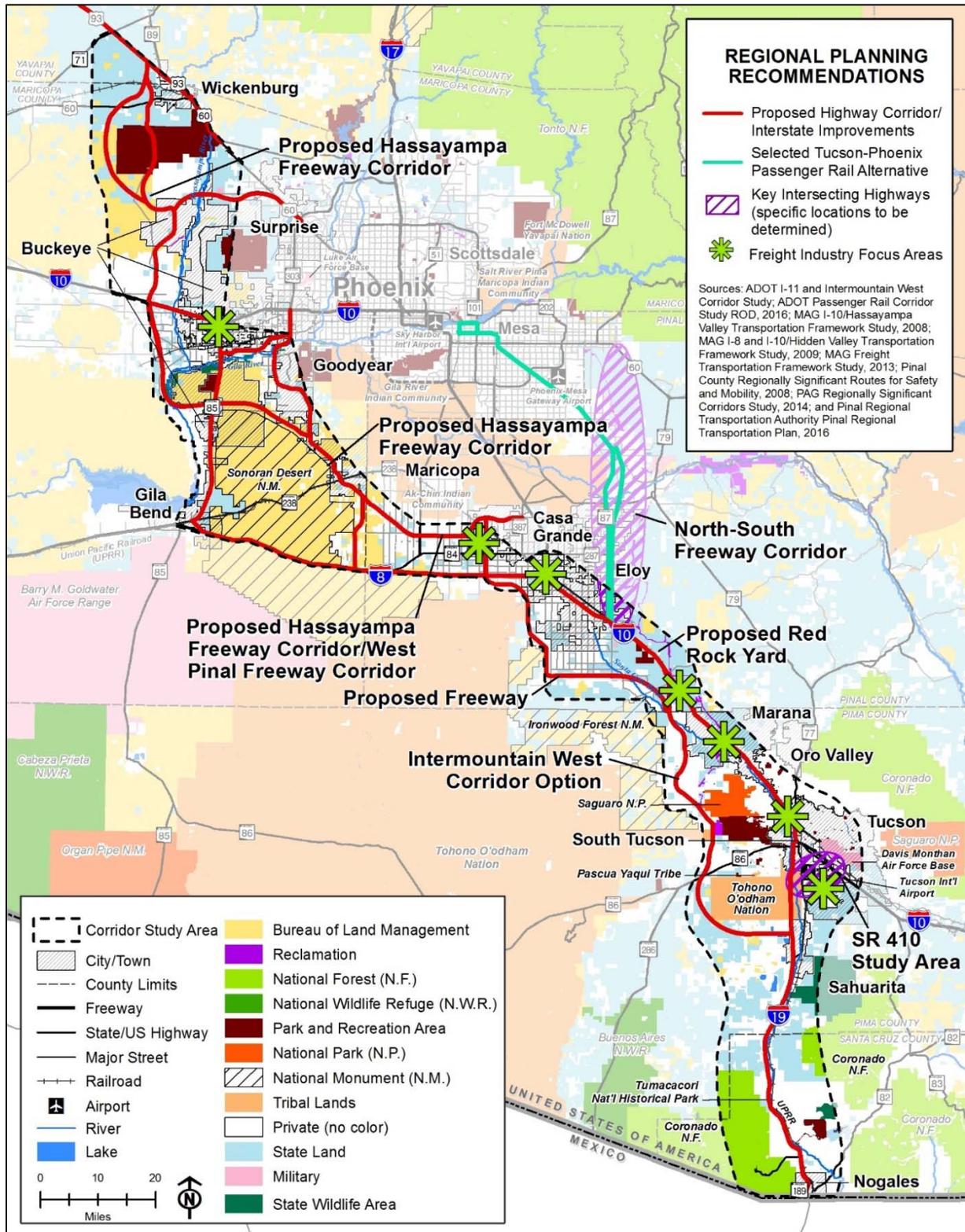


Figure A-6 Freight Hubs and Other Related Planning Recommendations in I-11 Corridor Study Area

### A3.3 Screening Comparison of Corridor Options

As shown in **Table A-8**, modal interrelationships and freight traffic flows are two distinct measures which do not always directly relate to each other when comparing smaller corridor options. Modal interrelationships are determined by the locational distribution of freight activity hubs (or freight industry focus areas), while freight traffic flows are a function of shortest and fastest route options. Freight traffic flows are also the highest along established interstate highway corridors.

**Table A-8 I-11 Alternatives Screening: System Linkages and Interstate Mobility**

Corridor Options	Measures			
	Modal Interrelationships		Freight Truck Flows	
	Number of freight activity hubs within 2 miles either side of corridor options		Estimated daily freight truck units, 2035	
<b>South Section</b>				
A	0	○	7,800	●
B	4	●	7,800	●
C	1	◐	5,800	●
D	1	◐	2,100	◐
E	1	◐	500	○
F	1	◐	500	○
G	1	◐	19,000	●
<b>Central Section</b>				
H	0	○	12,000	●
I	1	◐	12,000	●
J	0	○	12,000	●
K	0	○	3,000	◐
L	0	○	12,000	●
M	0	○	12,000	●
N	0	○	12,700	●
O	0	○	300	○
P	0	○	12,000	●
Q	1	◐	15,000	●
R	0	○	12,600	●
<b>North Section</b>				
S	0	○	1,500	◐
T	0	○	1,800	◐
U	0	○	1,500	◐
V	0	○	840	○
W	0	○	2,500	◐

Scale: ● Best meets criteria    ◐ Moderately meets criteria    ○ Least meets criteria

The corridor options with the highest number of freight activity hubs are located in the South Section, within the Tucson Metropolitan Area. Corridor option B scores the highest due to proximity to four freight/economic activity hubs (Sonoran Corridor, Downtown Tucson, Tangerine Road Corridor, and Marana Transportation Logistics Zone). Corridor option B represents the I-10/I-19 corridor through Tucson, which is paralleled by a mainline UPRR railroad corridor. With no alternate existing or planned major transportation facilities through the Tucson metropolitan area, it is to be expected that freight activity be concentrated along this corridor. Similar, freight traffic flows are higher along the corridor options that follow the existing I-19 and I-10 corridors (corridor options A, B, and G).

In the Central Section, freight hubs are focused near the junction of I-8 and I-10, including near a planned highway along the Montgomery Road corridor north of I-8. These freight hubs take advantage of highway and rail facilities. In the northern portion of the Central Section, a freight hub is located at I-10 and SR 85 – another transportation junction that includes rail access. Otherwise, the majority of the Central Section is not expected to see major freight development, and therefore ranks relatively low in this criterion. Generally speaking, as in the case of South Section, here too freight traffic flows are highest along the existing transportation corridors (I-10, I-8, SR 85) because of the lack of any alternate facilities.

In the North Section, none of the freight/economic activity hubs are located within the two-mile buffer along the corridor options. Locally, freight-related economic development is planned, but on the regional scale of the freight focus areas. Freight traffic flows are not very high due to the absence of an interstate highway corridor. Corridors that use part of the existing US 60 corridor (S, T, U, W) score moderately favorable on this criterion, in that US 60 is the only transportation option northwest out of the Phoenix metropolitan area, paralleled by the BNSF Phoenix Subdivision.

#### **A3.4 Summary Conclusions**

The System Linkages and Interstate Mobility criteria revealed a few important findings. The majority of freight activity hubs are located within the Tucson metropolitan area, generally along the existing I-10 corridor, leading to corridor option B scoring the highest among all alternatives. Freight activity focus areas tend to be located near transportation junctions (the intersection of more than one highway or rail facility), especially those located in populated areas with access to an employment base.

Large volumes of freight truck traffic is projected along the existing interstate highway corridors (I-8, I-10, I-19) since these are established freight corridors with most favorable travel times. In the Central Section, freight traffic volumes along new corridor options are projected to be equal, if not significantly higher than the existing routes, indicating that they may be able to attract freight traffic from established freight routes, likely due to the shorter distances and travel times, and increased reliability.

#### **A4. Improve Access to Economic Activity Centers**

Various transportation studies, plans, and other reports conducted within the Study Area express strong support for commerce and business by connecting people to employment hubs and economic activity centers. Communities within the Study Area have identified various goals and initiatives in support of a proposed interstate freeway facility to enhance access to economic development opportunities and support job creation. The communities are largely focused on aerospace, advanced manufacturing, and transportation/logistics industries – all of which require easy and safe access to employees, suppliers, and markets.

#### A4.1 Overview of Methodology and Criteria

The following measures were used to evaluate the Economic Activity Centers criterion:

- **Existing/Emerging Economic Activity Centers:** Number of existing and emerging economic activity centers within five miles either side of corridor options.
- **Population Access:** Additional population (compared to the No Build), within a 45-minute drive time of study area existing and emerging economic activity centers.

High capacity and well-connected transportation systems are commonly associated with high quality development. When a transportation system is efficient, it provides economic and social opportunities and benefits that result in positive quality of life factors such as better accessibility to jobs and economic markets, improved ability to provide goods and services, reduced transportation costs, higher grade employment opportunities, and value-added investments in local communities.

A proposed high capacity, access-controlled transportation facility would facilitate improved access and connectivity to major employment areas, economic development opportunities, warehouse/distribution facilities, and airports. While smaller clusters of employment growth are typically located within two miles of adjacent freeway facilities, larger activity centers can range up to five miles from a major transportation facility because of the size of the activity center itself. In all cases however, transportation access is a high priority for economic activity centers – both from a population access perspective (ease or ability for employees to drive to work) and goods/commodities access.

#### A4.2 Existing Corridor Conditions

Several major economic activity centers are located within the Study Area that would benefit from improved interstate freeway access, as shown on **Figure A-7** (Economic Activity Centers). These were compiled by reviewing regional comprehensive and municipal general plans and economic development plans and strategies that illustrate existing and emerging growth centers. Examples of these existing and emerging economic centers within the Study Area include, but are not limited to:

- **Mariposa International Commerce/Industry Park Area:** Employment center, Industrial parks, and distribution facilities near the Mariposa LPOE, which is the third largest international border in the US.
- **Sonoran Corridor:** Planned 50-square mile import/export logistics hub area that includes aviation and defense-related uses (e.g., Raytheon Missile Systems, Davis-Monthan Air Force Base, Tucson International Airport, University of Arizona Tech Park, etc.).
- **Port of Tucson:** An intermodal freight facility fulfilling both domestic and international shipments along I-10 east of Tucson.
- **Downtown Tucson:** Primary employment center in the Tucson metropolitan area, located along I-10 north of the I-10/I-19 junction. Includes a mix of employment types, including office, commercial, institutional, and industrial, combined with residential and other mixed uses.

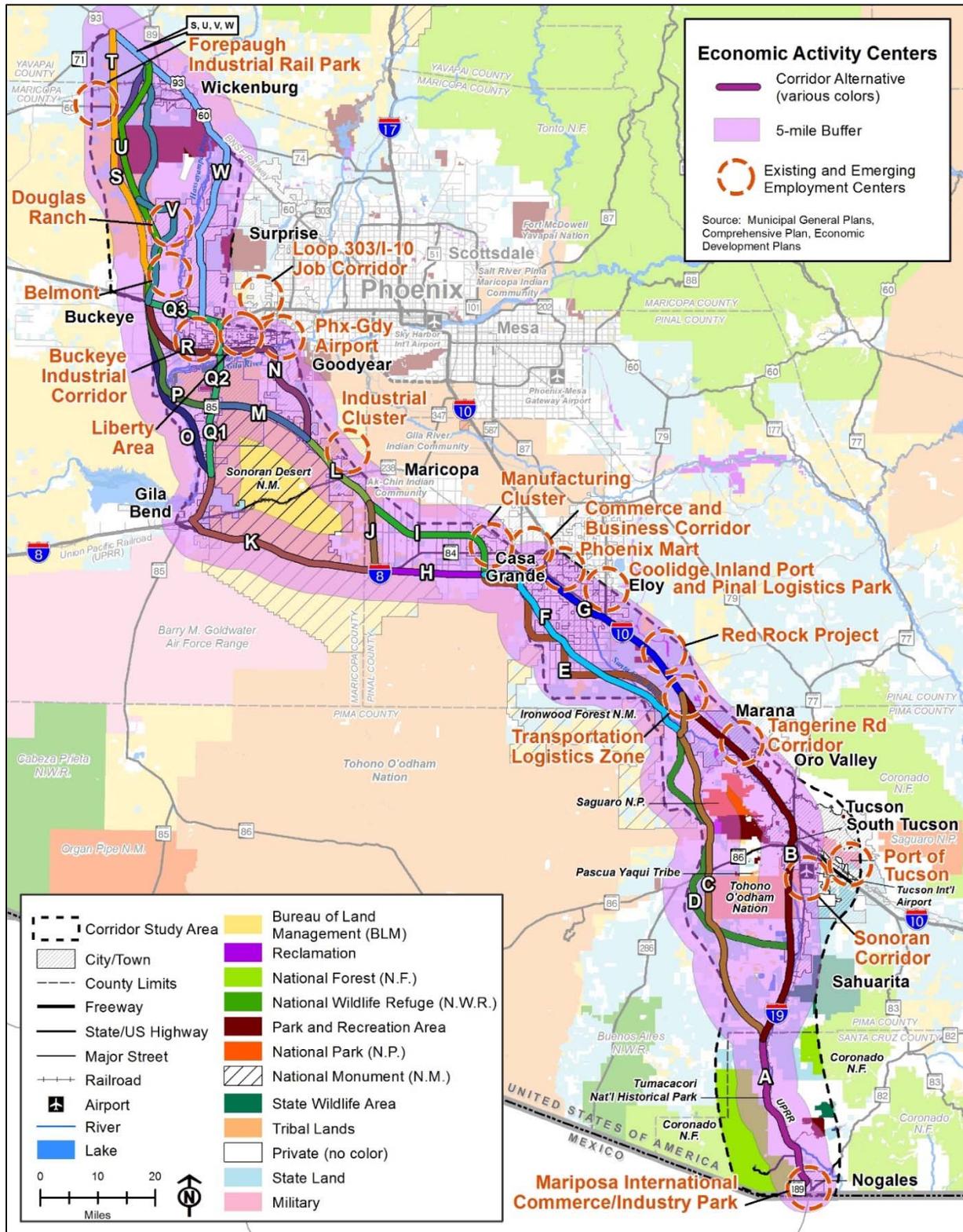


Figure A-7 Economic Activity Centers

- **Tangerine Road Corridor:** Planned activity center targeted for high-tech business park development, with surrounding residential and commercial mixed use development.
- **Transportation Logistics Zone:** Area encompassing the Pinal Airpark, I-10, and planned rail system improvements.
- **UPRR Red Rock Classification Yard:** Major rail yard proposed by UPRR to serve its Sunset Limited mainline corridor approximately 35 miles north of Tucson; intended to be one of the largest logistics centers in the western US.
- **Phoenix Mart:** Mixed use development and proposed global trade center in Casa Grande that would be an international exposition center similar to the Merchandise Mart in Chicago, with numerous business and showroom suites, as well as facilities to conduct major events.
- **Casa Grande Commerce Park:** Employment area, consisting of nearly 600 acres.
- **Coolidge Inland Port and Pinal Logistics Park:** Nearly 1,000 acres, this project is in the initial planning stages to deliver marketplace access to international, intermodal, domestic intermodal, and carload services.
- **Commerce and Business Corridor:** Linear economic growth areas in Casa Grande focused on commerce and business development along I-10 and I-8.
- **Manufacturing Cluster:** Planned manufacturing/industrial growth cluster in Casa Grande along the UPRR corridor and near future expressway corridors.
- **Industrial Cluster:** Planned industrial growth cluster in southern Goodyear near the junction of SR 238/UPRR corridor and the Sonoran Valley Parkway corridor.
- **Phoenix-Goodyear Airport:** Existing growth area of warehouse, distribution, and manufacturing development focused around the Phoenix-Goodyear Airport area.
- **Loop 303/I-10 Job Corridor:** Planned growth area of business and commerce-oriented development along the I-10 and SR 303L corridors in Goodyear.
- **Buckeye Industrial Corridor:** Over 16 miles of industrial and business park property supporting both domestic and international business, oriented around the Buckeye Municipal Airport.
- **Liberty Area:** Business park development focus in eastern Buckeye between the UPRR Phoenix Subdivision and planned SR 801 freeway corridor.
- **Belmont:** A 20,800-acre master planned community north of I-10 in Buckeye, with approximately 72,800 planned residential units and 2,100 acres of commercial and employment use.
- **Douglas Ranch:** A 33,800-acre master planned community approximately 40 miles north of I-10 in Buckeye, with over 104,000 planned residential units and 55 million square feet of business and commercial use.
- **Forepaugh Industrial Rail Park:** A 76-acre industrial park approximately 10 miles west of Wickenburg that is planned for over 700 acres of light and heavy industrial uses that would serve as a transportation distribution center.

**Table A-9** (Household Population within 45 Minutes of Economic Centers, 2015 and 2035) presents a summary of the number of people that would be attracted to Study Area economic activity centers under a No Build condition both in 2015 or 2035. This shows that 2035 projected population growth will increase the markets for many of the economic centers in the Study Area,

however with no additional corridor improvements, increased traffic congestion may reduce the market size of the Mariposa Industrial Park in Nogales, the Red Rock Project near Eloy, the Commerce and Business Corridor in Casa Grande, the Coolidge Inland Port, and the Transportation Logistics Zone near Marana. With development of a new I-11 Corridor, the economic activity centers located along new corridors can expect higher attraction rates.

**Table A-9 Household Population within 45 Minutes of Economic Centers, 2015 and 2035**

Economic Activity Center	No Build			
	2015	2035	Difference	Pct. Diff.
Belmont (Buckeye)	200,000	551,000	351,000	176%
Buckeye Industrial Corridor	1,093,000	1,433,000	340,000	31%
Casa Grande Commerce Park	147,000	283,000	136,000	93%
Commerce and Business Corridor (Casa Grande)	531,000	290,000	-241,000	-45%
Coolidge Inland Port	667,000	351,000	-316,000	-47%
Douglas Ranch (Buckeye)	267,000	638,000	371,000	139%
Downtown Tucson	1,000,000	1,229,000	229,000	23%
Forepaugh Industrial Rail Park (Wickenburg)	10,000	21,000	11,000	110%
Industrial Cluster (Goodyear)	54,000	115,000	61,000	113%
Liberty Area (Buckeye)	1,397,000	1,814,000	417,000	30%
Loop 303/I-10 Job Corridor (Goodyear)	2,183,000	2,609,000	426,000	20%
Manufacturing Cluster (Casa Grande)	159,000	290,000	131,000	82%
Mariposa Industrial Park (Nogales)	88,000	86,000	-2,000	-2%
Phoenix Mart (Eloy)	240,000	261,000	21,000	9%
Phoenix-Goodyear Airport	2,328,000	2,911,000	583,000	25%
Port of Tucson	893,000	989,000	96,000	11%
Red Rock Project (Marana)	281,000	264,000	-17,000	-6%
Sonoran Corridor (Tucson metro)	949,000	1,058,000	109,000	11%
Tangerine Road Corridor (Tucson metro)	758,000	783,000	25,000	3%
Transportation Logistics Zone (Marana)	634,000	484,000	-150,000	-24%

SOURCE: Arizona Statewide Travel Demand Model 2016.

### A4.3 Screening Comparison of Corridor Options

The results of the alternatives screening for the Economic Activity Center criterion are summarized in **Table A-10**.

**Table A-10 I-11 Alternatives Screening: Economic Activity Centers**

Corridor Options	Measures			
	Existing/Emerging Economic Activity Centers		Population Access	
	Number of existing and emerging economic activity centers within five miles either side of corridor options		Additional population (compared to the No Build), within a 45-minute drive time of Study Area existing and emerging economic activity centers	
<b>South Section</b>				
A	1	●	<10,000 persons	○
B	3	●	<10,000 persons	○
C	1	●	>70,000 persons	●
D	1	●	<10,000 persons	○
E	2	●	<10,000 persons	○
F	2	●	<10,000 persons	○
G	5	●	<10,000 persons	○
<b>Central Section</b>				
H	2	●	<10,000 persons	○
I	2	●	10,000-70,000 persons	●
J	0	○	<10,000 persons	○
K	0	○	<10,000 persons	○
L	1	●	10,000-70,000 persons	●
M	1	●	10,000-70,000 persons	●
N	2	●	> 70,000 persons	●
O	0	○	<10,000 persons	○
P	0	○	10,000-70,000 persons	●
Q	2	●	10,000-70,000 persons	●
R	1	●	> 70,000 persons	●
<b>North Section</b>				
S	3	●	10,000-70,000 persons	●
T	3	●	10,000-70,000 persons	●
U	3	●	10,000-70,000 persons	●
V	2	●	10,000-70,000 persons	●
W	2	●	> 70,000 persons	●

**Existing/Emerging Economic Activity Centers**

Overall, corridor option G has the highest concentration of existing or emerging economic activity centers within the entire Study Area. This corridor option represents I-10 between Casa Grande and Marana, which is paralleled by the UPRR mainline corridor. These two transportation facilities in close proximity attract much industrial and warehousing development, including the existing Transportation and Logistics Zone in Marana, surrounding Pinal Air Park; the planned Red Rock Project, Coolidge Inland Port and Pinal Logistics Park; Phoenix Mart; and Casa Grande’s Commerce and Business Corridor.

In the South Section, all of the economic activity centers are located along I-10 and I-19. Both corridors are paralleled by freight railroad facilities and connect large and moderate commercial

and cargo airports. Because of the limited amount of private land constrained widths along corridor options C and D, little growth beyond rural residential development is planned. Located between tribal and state and federal protected lands, this area is not as conducive to major freight activity as the existing interstate facilities.

In the Central Section, the economic activity centers are primarily in two clusters: in Casa Grande near the I-10/I-8 system interchange and along the planned West Pinal corridor route (corridor option I), and near Buckeye and Goodyear along I-10, SR 303L, and the planned SR 30 route (N and R). Because of the Sonoran Desert National Monument and extensive amounts of BLM land, limited to no development is expected along the western portion of I-8 (K) and much of SR 85 (Q1 and Q2). Goodyear has annexed lands south to Mobile, with some expected economic activity near Mobile and potentially north along the extended SR 303L route (L).

The North Section is the least developed of the three sections today. While much residential development is planned in Maricopa County and Buckeye, these developments mostly include small employment clusters, with the exception of Belmont and Douglas Ranch, both more than 20,000 acres in size with at least 2,000 acres dedicated to large commercial/employment activity centers. Both of these are located along corridor option V, but proximate to options S, U, and T as well. In the north portion, Wickenburg's planned Forepaugh Industrial Rail Park is located near options S and T – taking advantage of the Arizona & California Railroad line which connects to the BNSF Phoenix Subdivision along US 93/US 60.

### **Population Access**

The corridor options were evaluated for potential transportation access and connectivity to major economic activity centers. The Arizona Model was used to measure population within 45 minutes driving time to these centers. The intent of this criterion is to show the additional population markets that may be available to the economic activity centers in the I-11 Corridor study by 2035. This offers two outcomes: (1) economic centers may thrive with the additional population it reaches for employees and customers, or (2) increased traffic congestion may reduce the market size of these economic centers.

In the South Section, corridor option C provides the greatest potential to attract new population to employment centers, whereas options A and B have the potential to reduce the successfulness of economic centers due to added congestion on the roadways.

In the Central Section, corridor option N provides the greatest potential to attract surrounding, additional people to activity centers located along the corridor. This option is located within the City of Goodyear and proximate to economic activity centers near I-10, SR 303L, and SR 30. Corridor options I, L, and M have the next highest attraction rates, followed by Q. The remainder of corridor options rate relatively low in this criterion, due to the limited amount of population or employment growth expected in the vicinity.

In the North Section, corridor option W provides the greatest potential to attract new population to economic activity centers, although few centers are planned in this area. The high attraction factor is mostly due to the proximity to nearby population centers (Wickenburg, Surprise) and transportation connections. The remainder of the corridor options rate similarly. These are all located toward the western end of the Vulture Mountain Recreation Area, which forms a barrier to growth and transportation connectivity in this section.

#### A4.4 Summary Conclusions

Economic activity centers require two features: transportation connectivity (multimodal connectivity, where available) and access to population centers. To that end, most economic activity centers in the Study Area are clustered along existing corridors like I-19, I-10, and SR 85 (A, B, G, Q), or those corridors already planned in municipal general plans or regional transportation plans (West Pinal route [I], SR 303L south extension [N], Hassayampa Freeway [L, M, U]). These corridors provide the greatest ability for regional transportation connections, as well as are located within a shed of population growth, allowing a broad base to attract employees and customers. As a key tenant of the I-11 Corridor's Purpose and Need to develop a transcontinental trade corridor, the ability to foster, expand, and/or serve economic activity centers is a critical characteristic.

Several new corridor options, or those constrained to future growth due to protected or undevelopable lands (e.g., national monuments, national parks, national forests, etc.) have less potential to attract economic activity.

#### A5. Minimize Potential for Direct Impacts on Sensitive Environmental Resources

The Tier 1 EIS will conduct a detailed analysis of potential direct and indirect impacts on sensitive environmental resources. At the ASR level, the goal is to screen out corridor options that may have relatively greater impacts and to avoid major constraints, such as mountains, tribal land, or Section 4(f) resources, while still maintaining a range of alternatives.

##### A5.1 Overview of Methodology and Criteria

The following measures were used to evaluate the impacts on sensitive environmental resources:

- **Critical Habitat:** Acres within corridor options of designated critical habitat for special status species
- **Special Designated Lands:** Acres within corridor options of BLM wildernesses, national monuments, and areas of critical environmental concern (ACEC); USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties
- **Wetlands and Lakes:** Acres within corridor options of wetlands and lakes, based on available data
- **100-Year Floodplains:** Acres within corridor options of 100-year floodplains and floodways
- **Cultural Resources:** Likelihood of impact on historic properties listed in the NRHP
- **Section 4(f) Resources:** Likelihood of impacts to publicly-owned parts, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)

The avoidance of sensitive environmental resources was one type of input into the technical analysis conducted to develop the corridor options, therefore the screening results may show zero acres of impact for resources that were successfully avoided. In some cases, a corridor option was derived from another source (e.g., previous study) or had unavoidable conflicts, in which caused encroachment on some of these resources. Avoidance, minimization, or mitigation measures or strategies will be explored further in the Tier 1 EIS, as needed.

## A5.2 Existing Corridor Conditions

**Figure A-8** (I-11 Corridor Study Area Environmentally Sensitive Areas) illustrates the environmentally sensitive areas within the entire Study Area corridor, overlain with the range of corridor options. **Figures A-9** through **A-11** illustrate the environmentally sensitive areas within the South, Central, and North Sections of the Study Area.

In the South Section, sensitive environmental areas include the Coronado National Forest and related wilderness areas west of I-19, and critical habitat areas east of I-19 in Santa Cruz County. Saguaro National Park is located west of Tucson, abutting the Tucson Mountain County Park in Pima County. This area also includes Ironwood Forest National Monument managed by BLM and the Tucson Mitigation Corridor (a 2,514-acre protected area owned by the Bureau of Reclamation) which prohibits any future development within the area other than existing wildlife habitat improvements or developments agreed to by Reclamation, AGFD, Pima County, and USFWS. This prohibition is intended to preserve habitat from urbanization while maintaining an open wildlife movement corridor. Northern Pima County and southern Pinal County also include a network of washes and extensive areas that fall within the 100-year floodplains. Major historic properties in this Section include the Tumacacori National Historic Park, several properties at Tubac, Canoa Ranch Headquarters District, Titan II Missile Museum, San Xavier del Bac, Desert Laboratory, Gunsight Mountain Archaeological District, numerous districts and properties in Tucson, Los Robles Archaeological District, Picacho Pass Civil War Skirmish Site and Overland Mail Company State Station, and McClelland Wash Archaeological District.

In the Central Section, the Sonoran Desert National Monument and associated wilderness areas form the bulk of the environmentally sensitive areas in Maricopa County. The Gila River flows through a large part of the Central Section, with 100-year floodplains along the river as well as various washes in the area, including its confluence with the Hassayampa River west of SR 85. An ACEC is located along the Gila River, limiting crossing opportunities. Park and recreational areas are located along the west side of SR 85 in Maricopa County. Major historic properties in this Section include the Juan Bautista de Anza Trail/Butterfield Overland Stage Route and Gillespie Dam Highway Bridge.

In the North Section, the Vulture Mountain Recreation Area spans a significant width of the study corridor. Within the recreation area is a BLM-designated ACEC, along with a multi-use utility corridor designated by BLM that includes a major powerline corridor. The Hassayampa River generally flows north-south through this section, with various washes and streams flowing into the river. This creates a network of drainage channels and associated 100-year floodplains. In addition, the presence of the White Tank Mountains at the east side of the Study Area creates a series of alluvial washes flowing into the river. With the White Tank Mountains to the east and the Belmont Mountains to the west, the central part of the study area is a key wildlife connection between these two habitat areas. Major historic properties in the North Section include several buildings in Wickenburg.

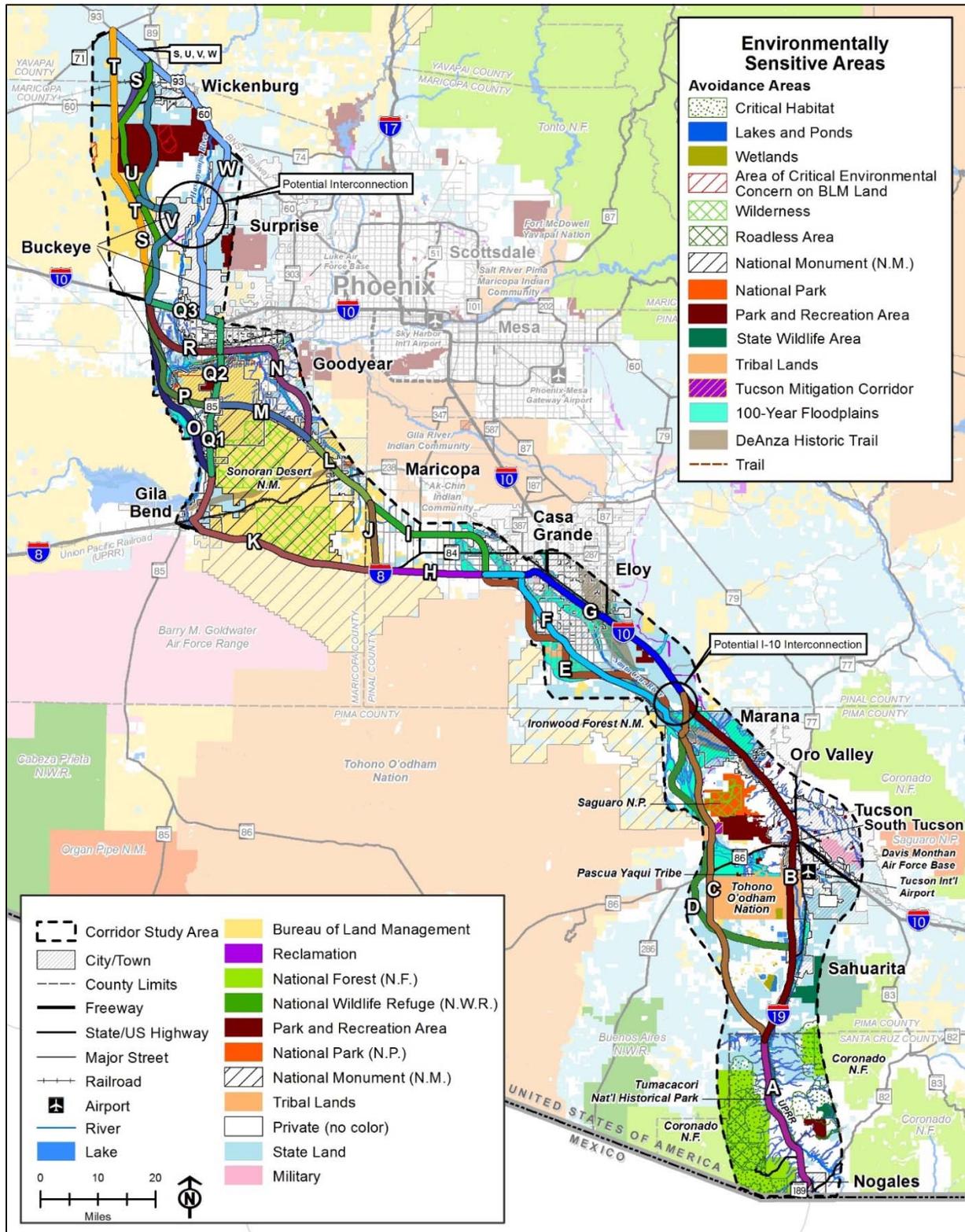


Figure A-8 I-11 Corridor Study Area Environmentally Sensitive Areas

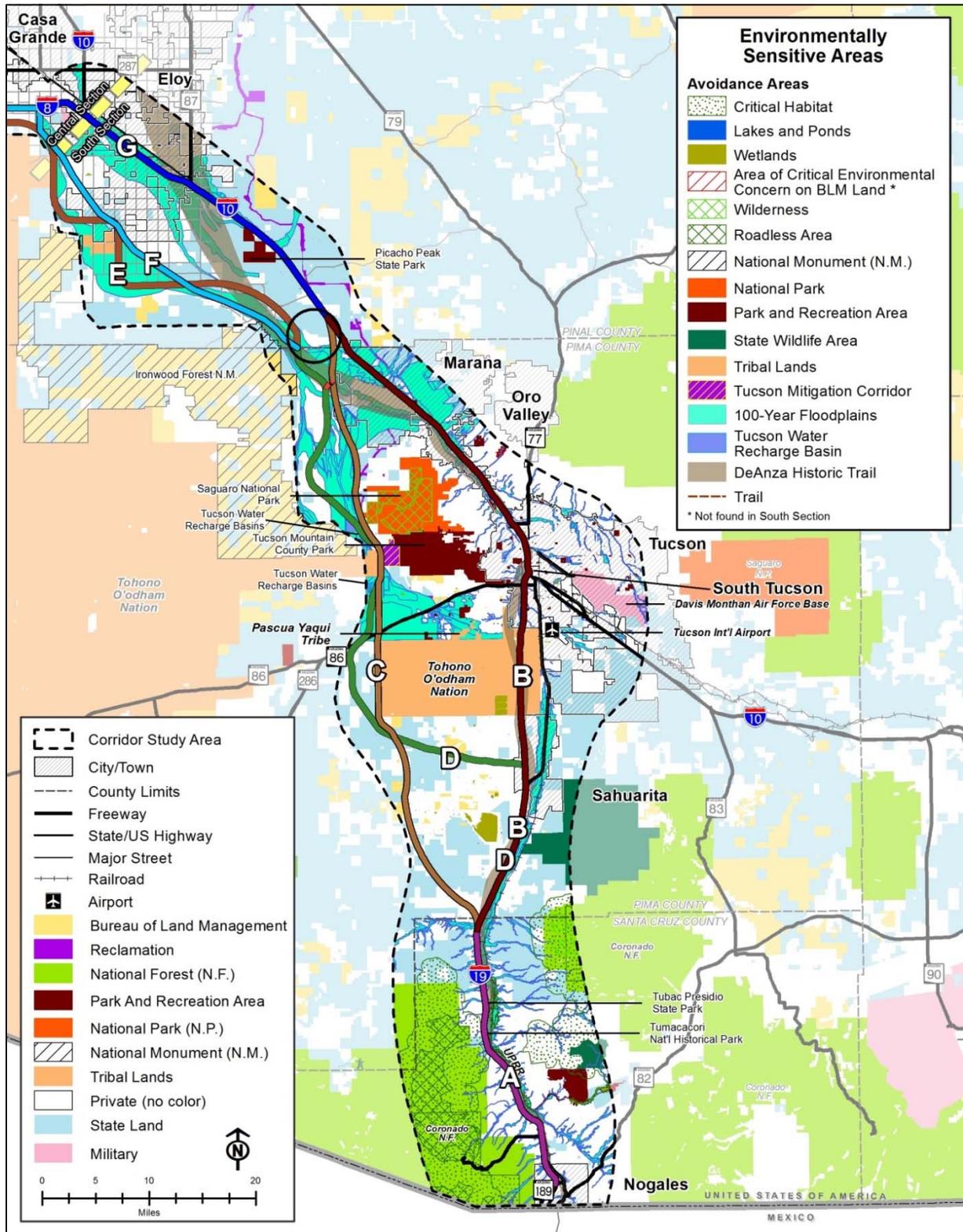


Figure A-9 I-11 Corridor Study Area Environmentally Sensitive Areas: South Section

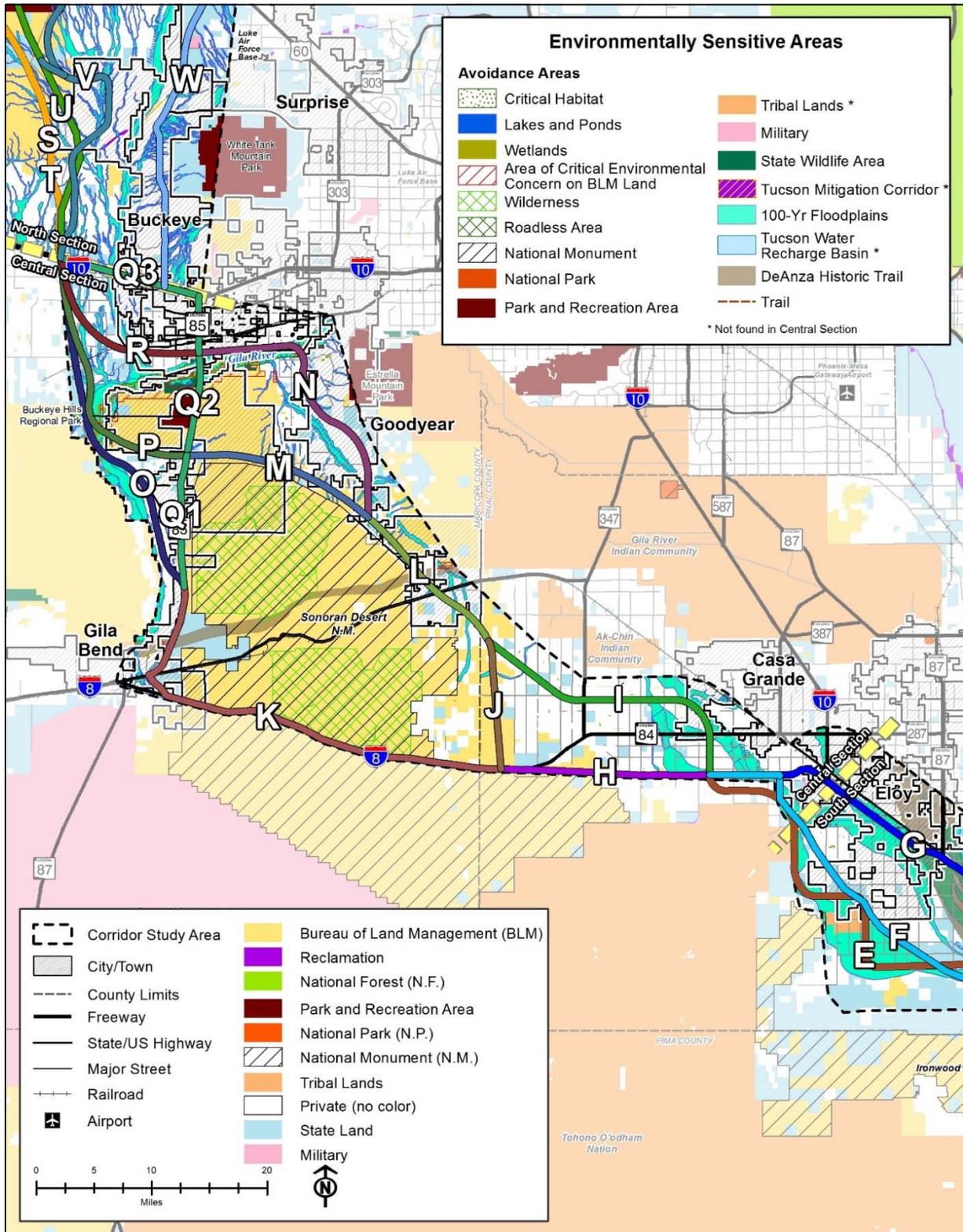


Figure A-10 I-11 Corridor Study Area Environmentally Sensitive Areas: Central Section

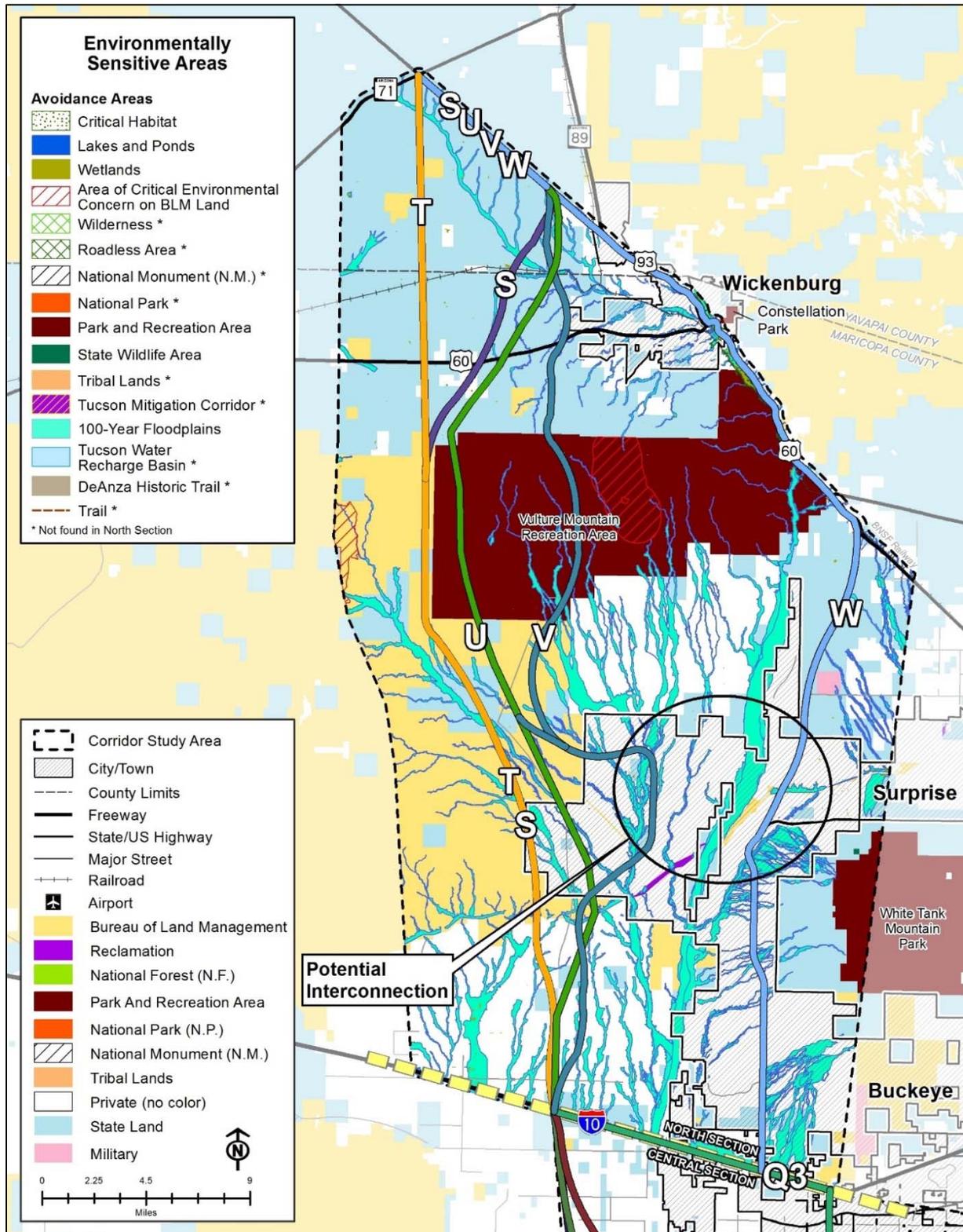


Figure A-11 I-11 Corridor Study Area Environmentally Sensitive Areas: North Section

### A5.3 Screening Comparison of Corridor Options

The results of the alternatives screening for the Sensitive Environmental Resources criteria are summarized in **Table A-11** (I-11 Alternatives Screening: Sensitive Environmental Resources).

#### **Critical Habitat**

The potential for impacts to critical habitat would occur in the North Section at the widening of US 60 near Wickenburg, and in the Central Section at any crossings of the Gila River. In the North Section, corridor option W has a high potential impact due to the option's proximity to the Hassayampa River, Vulture Mountain Recreation Area, and White Tank Mountains. With respect to the Gila River, impacts could be reduced with corridor option Q that utilizes the SR 85 right-of-way, which is a previously disturbed area. Corridor option N traverses an area of critical habitat at its crossing with the Gila River in Goodyear.

#### **Special Designated Lands**

Impacts to special designated lands are concentrated in the Central Section along I-8, as widening to a 400-foot right-of-way would encroach on the Sonoran Desert National Monument. However, through initial review of traffic projections, it is not likely that this stretch of interstate would require widening. It can likely accommodate a co-located I-11 Corridor within the existing right-of-way and travel lanes. This is a key consideration to be explored further before developing the Tier 1 EIS alternatives. Should widening of I-8 be needed, corridor options I, J, L, and M would minimize these direct impacts in the Central Section. Although it is recognized that these alternatives might introduce new impacts related to a new linear facility in proximity to the northern boundary of the Sonoran Desert National Monument, such as wildlife connectivity; these indirect impacts would be evaluated for any alternatives that are advanced to the Tier 1 EIS.

Additionally in the Central Section, an ACEC is located on BLM-managed lands along the Gila River, and corridor options that would require a new Gila River crossing may require right-of-way through this ACEC. Options N and O are moderately favorable as they traverse this ACEC within private land – which is not managed by the BLM and therefore open to development.

#### **Wetlands and Lakes**

The probability of impacts to wetlands and lakes within the broad 2,000-foot corridors are present through most of the study area, especially along corridor options that parallel or traverse river corridors (e.g., Santa Cruz River, Gila River, Hassayampa River). Specific impacts will be evaluated in more detail in the Tier 1 EIS.

#### **100-Year Floodplains**

Impacts to 100-year floodplains are expected to be highest along corridor option E in southern Pinal County due to the Santa Cruz River floodplain. The floodplain parallels many of the new corridor options in the South Section, however impacts along other alternatives may be mitigated through avoidance and design.

#### **Cultural Resources**

Impacts to cultural resources may occur throughout the corridor, and the technical analysis of alternatives considered the locations of historic properties listed in the NRHP. Not all cultural

resources are known at this time in unsurveyed areas. As the project moves into the Tier 1 EIS phase, further examination of available data sources and continuing consultation with Section 106 consulting parties will be completed to identify areas with higher potential for impacts.

### **Section 4(f) Resources**

Options in all three corridor sections may affect resources afforded protection under Section 4(f). In the South Section, resources that may be protected under 4(f) are located along corridor option B (local parks, Santa Cruz River Park, and Oury Park along I-10), corridor option C (Tucson Mitigation Corridor and corner of Saguaro National Park), and corridor option D (Tucson Mitigation Corridor). In the Central Section, impacts to Section 4(f) resources are expected as a result of impacts to AGFD-owned and managed wildlife areas along alternatives O and P. The largest Section 4(f) resource impacts in the North Section are expected to result from alternatives with the potential to affect the Vulture Mountain Recreation Area. Any corridor options that cross or may require right-of-way from the recreation area (options U, V, and W) performed more poorly against the environmental criteria, since this area includes an ACEC for the purpose of protecting raptor species and is managed for recreation use. Options that travel west of the Vulture Mountain Recreation Area (alternatives S and T) would avoid this issue.

### **A5.4 Summary Conclusions**

From the high-level analysis of direct impacts to sensitive environmental resources, the following conclusions can be made:

- **Critical habitats** are more likely to be impacted along the Gila River (option N) and near the Hassayampa River and Vulture Mountain Recreation Area (option W).
- If 400 feet of right-of-way is required, **special designated lands** may be impacted by corridor options N and O (ACEC along the Gila River), as more limited right-of-way is available today.
- **Wetlands** (Gila River) along corridor options O and P are likely to be impacted. Other alternatives may have fewer direct impacts to wetlands and lakes.
- Major impacts to **100-year floodplains** are expected along corridor option E in southern Pinal County. Impacts along other alternatives may be mitigated through avoidance and design.
- **Cultural resource** impacts could occur throughout the Study Area, with the majority of known historic properties located in the South Section. Additional cultural resource identification and analysis as well as mitigation and avoidance options will be explored in the Tier 1 EIS.
- **Section 4(f)** properties may include the Tucson Mitigation Corridor (options C and D) and the Vulture Mountain Recreation Area (options S, U, V).

Table A-11 I-11 Alternatives Screening: Sensitive Environmental Resources

Corridor Options	Measures <sup>(1)</sup>											
	Critical Habitat		Special Designated Lands		Wetlands and Lakes		100-Year Floodplains		Cultural Resources <sup>(2)</sup>		Section 4(f) Resources	
	Acres within corridor that could impact designated critical habitat for special status species		Acres within corridor that could impact BLM wildernesses, national monuments, and areas of critical environmental concern; USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties		Acres within corridor that could impact wetlands and lakes		Acres within corridor that could impact 100-year floodplains and floodways		Likelihood of impact on historic properties listed in the NRHP		Likelihood of impacts to publicly-owned parts, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)	
<b>South Section</b>												
A	11	●	0	●	1	●	43	●	0	●	0	●
B	0	●	0	●	1	●	122	●	10	●	17	●
C	0	●	0	●	8	●	841	●	0	●	70	○
D	0	●	0	●	1	●	996	●	32	○	89	○
E	0	●	0	●	5	●	1,378	○	0	●	0	●
F	0	●	0	●	6	●	983	●	0	●	0	●
G	0	●	0	●	1	●	86	●	0	●	11	●
<b>Central Section</b>												
H	0	●	16	●	0	●	44	●	0	●	0	●
I	0	●	0	●	17	●	194	●	0	●	0	●
J	0	●	0	●	0	●	13	●	0	●	0	●
K	0	●	311 <sup>(3)</sup>	●	0	●	5	●	0	●	0	●
L	0	●	0	●	0	●	85	●	0	●	0	●
M	0	●	0	●	0	●	61	●	0	●	0	●
N	41	○	16	●	4	●	265	●	0	●	0	●
O	0	●	8	●	37	●	313	●	0	●	18	○
P	0	●	0	●	41	●	384	●	0	●	83	○
Q	0	●	0	●	0	●	0	●	0	●	0	●
R	0	●	0	●	1	●	170	●	0	●	0	●
<b>North Section</b>												
S	0	●	0	●	1	●	157	●	0	●	0	●
T	0	●	0	●	3	●	120	●	0	●	0	●
U	0	●	0	●	1	●	112	●	0	●	371	○
V	0	●	0	●	5	●	294	●	0	●	418	○
W	73	○	0	●	22	●	293	●	0	●	63	○

Scale: ● Best meets criteria    ● Moderately meets criteria    ○ Least meets criteria

- (1) Although potential impacts on environmental resources were quantified using available GIS data, the location of the actual I-11 Corridor within the broader 2,000-foot study corridor could minimize or negate some potential impacts. Therefore, any quantities represented in the analysis reflect the possibility or likelihood of encountering impacts, rather than a precise impact assessment.
- (2) Not all cultural resource locations are definitively known. A "0" acres of impact does not necessarily mean that no impacts will occur, but rather that additional information is required, which will be part of the Tier 1 EIS data collection and analysis effort.
- (3) Post-analysis, but before the May 2017 Public Information Meetings, it was determined that I-8 would not need to be widened to accommodate a co-located I-11 Corridor and therefore this ranking scores as "best meets criteria" as the additional right-of-way required to complete a 400-foot typical section would not be required.



## APPENDIX B

### Detailed Alternatives Screening Matrix

I-11 Corridor Options Evaluation: South Section

South Section

Criteria	Evaluation Measure	Scale	Corridor Options						
			A	B	C	D	E	F	G
<b>Address Population and Employment Growth</b>									
Population Growth	Population growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li><input type="radio"/> Low new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> Moderate new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> High new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	16,913	102,973	10,102	22,267	6,345	14,929	21,809
			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employment Growth	Employment growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li><input type="radio"/> Low new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> Moderate new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> High new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	5,412	52,074	935	2,562	1,438	2,480	11,064
			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Mitigate Congestion and Improve Travel Times</b>									
Traffic Volumes	Average weekday traffic volumes on each corridor alternative, 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Lower traffic volumes including traffic diverted from more congested routes</li> <li><input type="radio"/> Moderate traffic volumes including traffic diverted from more congested routes</li> <li><input type="radio"/> Higher traffic volumes including traffic diverted from more congested routes</li> </ul>	32,800	87,500	14,000	9,500	2,100	2,100	66,000
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Level of Service	LOS on each corridor option (traffic flow from A to F), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> LOS E or worse</li> <li><input type="radio"/> LOS D</li> <li><input type="radio"/> LOS C or better</li> </ul>	C or better	D	C or better				
			<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Travel Times	Average travel time (minutes) during peak (3 PM – 6 PM), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Slowest travel time</li> <li><input type="radio"/> Average travel time</li> <li><input type="radio"/> Fastest travel time</li> </ul>	22	75	48	54	38	33	44
			<input type="radio"/>						
Average Speeds	Average travel speed (mph) during peak (3 PM – 6 PM), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> &lt; 55 mph</li> <li><input type="radio"/> 55 to 65 mph</li> <li><input type="radio"/> &gt; 65 mph</li> </ul>	73	52	74	74	74	74	56
			<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Safety	Comparison of corridor alternative section crashes on high capacity roadways, 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Most crashes</li> <li><input type="radio"/> Some crashes</li> <li><input type="radio"/> Fewest crashes</li> </ul>	240	1,700	1,400	1,500	16	14	530
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

I-11 Corridor Options Evaluation: South Section

South Section									
Criteria	Evaluation Measure	Scale	Corridor Options						
			A	B	C	D	E	F	G
Incident Management	Provides alternate interstate freeway route	<input type="radio"/> No (existing route) <input checked="" type="radio"/> Yes (new route option)	No	No	Yes	Yes	Yes	Yes	No
			<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<b>Improve System Linkages and Interstate Mobility</b>									
Modal Interrelationships	Number of freight activity hubs within 2 miles either side of corridor options	<input type="radio"/> Low number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> Moderate number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> High number of freight activity hubs within 2 miles either side of the alternative	0	4	1	1	1	1	1
			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Freight Truck Flows	Estimated daily freight truck units, 2035	<input type="radio"/> Relatively low daily truck units <input checked="" type="radio"/> Moderate daily truck units <input checked="" type="radio"/> Relatively high daily truck units	7,800	20,000	5,800	2,100	500	500	19,000
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<b>Improve Access to Economic Activity Centers</b>									
Economic Activity Centers	Number of existing and emerging economic activity centers within 5 miles either side of corridor options	<input type="radio"/> Low number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> Moderate number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> High number of economic activity centers within 5 miles either side of the alternative	1	3	1	1	2	2	5
			<input checked="" type="radio"/>						
	Additional population (compared to the No Build), within a 45-minute drive time of Study Area existing and emerging economic activity centers	<input type="radio"/> Relatively low level of additional population served <input checked="" type="radio"/> Moderate level of additional population served <input checked="" type="radio"/> Relatively high level of additional population served	<10,000 persons	<10,000 persons	>70,000 persons	<10,000 persons	<10,000 persons	<10,000 persons	<10,000 persons
<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<b>Minimize Direct Impacts on Sensitive Environmental Resources</b>									
Critical Habitat	Acres within corridor that could impact designated critical habitat for special status species	<input type="radio"/> High risk of critical habitat loss <input checked="" type="radio"/> Moderate risk of critical habitat loss <input checked="" type="radio"/> Low risk of critical habitat loss	11	0	0	0	0	0	0
			<input checked="" type="radio"/>						
Special Designated Lands	Acres within corridor that could impact BLM wildernesses, national monuments, and areas of critical environmental concern; USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties	<input type="radio"/> High risk of loss of special designated lands <input checked="" type="radio"/> Moderate risk of loss of special designated lands <input checked="" type="radio"/> Low risk of loss of special designated lands	0	0	0	0	0	0	0
			<input checked="" type="radio"/>						

I-11 Corridor Options Evaluation: South Section

South Section									
Criteria	Evaluation Measure	Scale	Corridor Options						
			A	B	C	D	E	F	G
Wetlands and Lakes	Acres within corridor that could impact wetlands and lakes	<input type="radio"/> High risk of loss of water resources <input type="radio"/> Moderate risk of loss of water resources <input type="radio"/> Low risk of loss of water resources	1	1	8	1	5	6	1
			●	●	●	●	●	●	●
100-Year Floodplains	Acres within corridor that could impact 100-year floodplains and floodways	<input type="radio"/> High risk of encroachment <input type="radio"/> Moderate risk of encroachment <input type="radio"/> Low risk of encroachment	43	122	841	996	1,378	984	86
			●	●	◐	◐	○	◐	●
Cultural Resources	Likelihood of impact on historic properties listed in the NRHP	<input type="radio"/> Very likely to impact cultural resources <input type="radio"/> Moderate likelihood to impact cultural resources <input type="radio"/> Not likely to impact cultural resources	0	10	0	32	0	0	0
			●	◐	●	○	●	●	●
Section 4(f) Resources	Likelihood of impacts to publicly-owned parks, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)	<input type="radio"/> Very likely to impact Section 4(f) resources <input type="radio"/> Moderate likelihood to impact Section 4(f) resources <input type="radio"/> Not likely to impact Section 4(f) resources	0	17	70	89	0	0	11
			●	◐	○	○	●	●	◐

Scale:  
 ● Best meets criteria  
 ◐ Reasonably meets criteria  
 ○ Least meets criteria

- NOTES:
- For the "safety" criterion, crashes for new corridors were estimated using observed crash histories as part of the ADOT Arizona Annual System Performance Measures. In this section, corridor options C and D show travel diversion benefits from option B, meaning that they will attract current traffic from I-19 and I-10 along B and divert it to options C or D. Therefore, the crashes presented for corridor option B represent the total estimated option B crashes. Those for alternative option C represent the total reduced option B crashes, plus new option C crashes to show travel diversion benefits. Those for alternative option D represent the total reduced option B crashes, plus new option D crashes to show travel diversion benefits.
  - The "incident management" criterion correlates to the Purpose and Need item "Support Homeland Security and National Defense," but is documented in the evaluation as a sub-measure of the "Mitigate Congestion and Improve Travel Times" category.
  - Although potential impacts on environmental resources were quantified using available GIS data for the "sensitive environmental resources criterion", the location of the actual I-11 Corridor within the broader 2,000-foot study corridor could minimize or negate some potential impacts. Therefore, any quantities represented in the analysis reflect the possibility or likelihood of encountering impacts, rather than precise impact assessments.
  - Not all cultural resource locations are definitively known. A "0" acres of impact does not necessarily mean that no impacts will occur, but rather that additional information is required, which will be part of the Tier 1 EIS data collection and analysis effort.



I-11 Corridor Options Evaluation: Central Section

Central Section													
Criteria	Evaluation Measure	Scale	Corridor Options										
			H	I	J	K	L	M	N	O	P	Q	R
<b>Address Population and Employment Growth</b>													
Population Growth	Population growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	○ Low new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative	1,216	6,848	1,500	-2,443	529	5,778	80,638	5,624	8,211	25,360	24,406
		● Moderate new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative	○	○	○	○	○	○	●	○	○	●	●
Employment Growth	Employment growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	○ Low new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative	397	4,334	-120	-640	50	1,547	17,982	6,121	6,587	7,318	8,228
		● Moderate new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative	○	○	○	○	○	○	○	●	●	○	○
<b>Mitigate Congestion and Improve Travel Times</b>													
Traffic Volumes	Average weekday traffic volumes on each corridor alternative, 2035	○ Lower traffic volumes including traffic diverted from more congested routes	20,200	21,800	15,500	10,300	17,900	18,300	26,300	2,300	21,000	48,000	29,800
		● Moderate traffic volumes including traffic diverted from more congested routes	●	●	●	●	●	●	●	○	●	●	●
Level of Service	LOS on each corridor option (traffic flow from A to F), 2035	○ LOS E or worse	C or better	C or better	C or better	C or better	C or better	C or better	C or better	C or better	C or better	C or better	C or better
		● LOS D	●	●	●	●	●	●	●	●	●	●	●
Travel Times	Average travel time (minutes) during peak (3 PM – 6 PM), 2035	○ Slowest travel time	17	24	12	36	16	11	18	28	21	5	16
		● Average travel time	●	●	●	●	●	●	●	●	●	●	●
Average Speeds	Average travel speed (mph) during peak (3 PM – 6 PM), 2035	○ < 55 mph	74	67	66	68	68	68	67	68	67	60	62
		● 55 to 65 mph	●	●	●	●	●	●	●	●	●	●	●
Safety	Comparison of corridor alternative section crashes on high capacity roadways, 2035	○ Most crashes	72	106	33	101	51	39	96	12	91	45	93
		● Some crashes	●	○	●	○	●	●	●	●	●	●	●

I-11 Corridor Options Evaluation: Central Section

Central Section													
Criteria	Evaluation Measure	Scale	Corridor Options										
			H	I	J	K	L	M	N	O	P	Q	R
Incident Management	Provides alternate interstate freeway route	<input type="radio"/> No (existing route) <input checked="" type="radio"/> Yes (new route option)	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<b>Improve System Linkages and Interstate Mobility</b>													
Modal Interrelationships	Number of freight activity hubs within 2 miles either side of corridor options	<input type="radio"/> Low number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> Moderate number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> High number of freight activity hubs within 2 miles either side of the alternative	0	1	0	0	0	0	0	0	0	1	0
			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Freight Truck Flows	Estimated daily freight truck units, 2035	<input type="radio"/> Relatively low daily truck units <input checked="" type="radio"/> Moderate daily truck units <input checked="" type="radio"/> Relatively high daily truck units	12,000	12,000	12,000	3,000	12,000	12,000	12,700	300	12,000	15,000	12,600
			<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>						
<b>Improve Access to Economic Activity Centers</b>													
Economic Activity Centers	Number of existing and emerging economic activity centers within 5 miles either side of corridor options	<input type="radio"/> Low number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> Moderate number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> High number of economic activity centers within 5 miles either side of the alternative	2	2	0	0	1	1	2	0	0	2	1
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Additional population (compared to the No Build), within a 45-minute drive time of Study Area existing and emerging economic activity centers	<input type="radio"/> Relatively low level of additional population served <input checked="" type="radio"/> Moderate level of additional population served <input checked="" type="radio"/> Relatively high level of additional population served	<10,000 persons	10,000-70,000 persons	<10,000 persons	<10,000 persons	10,000-70,000 persons	10,000-70,000 persons	> 70,000 persons	<10,000 persons	10,000-70,000 persons	10,000-70,000 persons	> 70,000 persons
			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
<b>Minimize Direct Impacts on Sensitive Environmental Resources</b>													
Critical Habitat	Acres within corridor that could impact designated critical habitat for special status species	<input type="radio"/> High risk of critical habitat loss <input checked="" type="radio"/> Moderate risk of critical habitat loss <input checked="" type="radio"/> Low risk of critical habitat loss	0	0	0	0	0	0	41	0	0	0	0
			<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>					
Special Designated Lands	Acres within corridor that could impact BLM wildernesses, national monuments, and areas of critical environmental concern; USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties	<input type="radio"/> High risk of loss of special designated lands <input checked="" type="radio"/> Moderate risk of loss of special designated lands <input checked="" type="radio"/> Low risk of loss of special designated lands	16 *	0	0	311 *	0	0	16	8	0	0	0
			<input checked="" type="radio"/>										

I-11 Corridor Options Evaluation: Central Section

Central Section													
Criteria	Evaluation Measure	Scale	Corridor Options										
			H	I	J	K	L	M	N	O	P	Q	R
Wetlands and Lakes	Acres within corridor that could impact wetlands and lakes	<input type="radio"/> High risk of loss of water resources <input type="radio"/> Moderate risk of loss of water resources <input checked="" type="radio"/> Low risk of loss of water resources	0	17	0	0	0	0	4	37	41	0	1
			●	●	●	●	●	●	●	●	●	●	●
100-Year Floodplains	Acres within corridor that could impact 100-year floodplains and floodways	<input type="radio"/> High risk of encroachment <input type="radio"/> Moderate risk of encroachment <input checked="" type="radio"/> Low risk of encroachment	44	194	13	5	85	61	265	313	384	0	170
			●	●	●	●	●	●	●	●	●	●	●
Cultural Resources	Likelihood of impact on historic properties listed in the NRHP	<input type="radio"/> Very likely to impact cultural resources <input type="radio"/> Moderate likelihood to impact cultural resources <input checked="" type="radio"/> Not likely to impact cultural resources	0	0	0	0	0	0	0	0	0	0	0
			●	●	●	●	●	●	●	●	●	●	●
Section 4(f) Resources	Likelihood of impacts to publicly-owned parks, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)	<input type="radio"/> Very likely to impact Section 4(f) resources <input type="radio"/> Moderate likelihood to impact Section 4(f) resources <input checked="" type="radio"/> Not likely to impact Section 4(f) resources	0	0	0	0	0	0	0	18	83	0	0
			●	●	●	●	●	●	●	○	○	●	●

Scale:

- Best meets criteria
- Reasonably meets criteria
- Least meets criteria

Notes:

- For the "safety" criterion, crashes for new corridors were estimated using observed crash histories as part of the ADOT Arizona Annual System Performance Measures.
- The "incident management" criterion correlates to the Purpose and Need item "Support Homeland Security and National Defense," but is documented in the evaluation as a sub-measure of the "Mitigate Congestion and Improve Travel Times" category.
- Although potential impacts on environmental resources were quantified using available GIS data for the "sensitive environmental resources criterion", the location of the actual I-11 Corridor within the broader 2,000-foot study corridor could minimize or negate some potential impacts. Therefore, any quantities represented in the analysis reflect the possibility or likelihood of encountering impacts, rather than precise impact assessments.
- Not all cultural resource locations are definitively known A "0" acres of impact does not necessarily mean that no impacts will occur, but rather that additional information is required, which will be part of the Tier 1 EIS data collection and analysis effort.

\* Post-analysis, but before the May 2017 Public Information Meetings, it was determined that I-8 would not need to be widened to accommodate a co-located I-11 Corridor and therefore this ranking scores as "best meets criteria" as the additional right-of-way required to complete a 400-foot typical section would not be required.



I-11 Corridor Options Evaluation: North Section

North Section							
Criteria	Evaluation Measure	Scale	Corridor Options				
			S	T	U	V	W
<b>Address Population and Employment Growth</b>							
Population Growth	Population growth (2015 to 2035) TAZs that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li><input type="radio"/> Low new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input checked="" type="radio"/> Moderate new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> High new population growth within TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	15,574	15,017	24,062	16,189	86,355
			<input checked="" type="radio"/>				
Employment Growth	Employment growth (2015 to 2035) in TAZs that are located within 2 miles either side of corridor options	<ul style="list-style-type: none"> <li><input type="radio"/> Low new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input checked="" type="radio"/> Moderate new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> <li><input type="radio"/> High new employment growth in TAZs that intersect Study Area on 2 miles either side of the alternative</li> </ul>	2,496	2,478	7,126	6,871	8,392
			<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
<b>Mitigate Congestion and Improve Travel Times</b>							
Traffic Volumes	Average weekday traffic volumes on each corridor alternative, 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Lower traffic volumes including traffic diverted from more congested routes</li> <li><input checked="" type="radio"/> Moderate traffic volumes including traffic diverted from more congested routes</li> <li><input type="radio"/> Higher traffic volumes including traffic diverted from more congested routes</li> </ul>	6,600	6,600	6,600	3,900	19,000
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Level of Service	LOS on each corridor option (traffic flow from A to F), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> LOS E or worse</li> <li><input checked="" type="radio"/> LOS D</li> <li><input type="radio"/> LOS C or better</li> </ul>	C or better				
			<input checked="" type="radio"/>				
Travel Times	Average travel time (minutes) during peak (3 PM – 6 PM), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Slowest travel time</li> <li><input checked="" type="radio"/> Average travel time</li> <li><input type="radio"/> Fastest travel time</li> </ul>	44	41	44	47	53
			<input checked="" type="radio"/>				
Average Speeds	Average travel speed (mph) during peak (3 PM – 6 PM), 2035	<ul style="list-style-type: none"> <li><input type="radio"/> &lt; 55 mph</li> <li><input checked="" type="radio"/> 55 to 65 mph</li> <li><input type="radio"/> &gt; 65 mph</li> </ul>	68	68	68	68	64
			<input checked="" type="radio"/>				
Safety	Comparison of corridor alternative section crashes on high capacity roadways, 2035	<ul style="list-style-type: none"> <li><input type="radio"/> Most crashes</li> <li><input checked="" type="radio"/> Some crashes</li> <li><input type="radio"/> Fewest crashes</li> </ul>	56	56	56	32	188
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

I-11 Corridor Options Evaluation: North Section

North Section							
Criteria	Evaluation Measure	Scale	Corridor Options				
			S	T	U	V	W
Incident Management	Provides alternate interstate freeway route	<input type="radio"/> No (existing route) <input checked="" type="radio"/> Yes (new route option)	Yes	Yes	Yes	Yes	No
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<b>Improve System Linkages and Interstate Mobility</b>							
Modal Interrelationships	Number of freight activity hubs within 2 miles either side of corridor options	<input type="radio"/> Low number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> Moderate number of freight activity hubs within 2 miles either side of the alternative <input checked="" type="radio"/> High number of freight activity hubs within 2 miles either side of the alternative	0	0	0	0	0
			<input type="radio"/>				
Freight Truck Flows	Estimated daily freight truck units, 2035	<input type="radio"/> Relatively low daily truck units <input checked="" type="radio"/> Moderate daily truck units <input checked="" type="radio"/> Relatively high daily truck units	1,500	1,800	1,500	840	2,500
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<b>Improve Access to Economic Activity Centers</b>							
Economic Activity Centers	Number of existing and emerging economic activity centers within 5 miles either side of corridor options	<input type="radio"/> Low number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> Moderate number of economic activity centers within 5 miles either side of the alternative <input checked="" type="radio"/> High number of economic activity centers within 5 miles either side of the alternative	3	3	3	2	2
			<input checked="" type="radio"/>				
	Additional population (compared to the No Build), within a 45-minute drive time of Study Area existing and emerging economic activity centers	<input type="radio"/> Relatively low level of additional population served <input checked="" type="radio"/> Moderate level of additional population served <input checked="" type="radio"/> Relatively high level of additional population served	10,000-70,000 persons	10,000-70,000 persons	10,000-70,000 persons	10,000-70,000 persons	> 70,000 persons
			<input checked="" type="radio"/>				
<b>Minimize Direct Impacts on Sensitive Environmental Resources</b>							
Critical Habitat	Acres within corridor that could impact designated critical habitat for special status species	<input type="radio"/> High risk of critical habitat loss <input checked="" type="radio"/> Moderate risk of critical habitat loss <input checked="" type="radio"/> Low risk of critical habitat loss	0	0	0	0	72
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Special Designated Lands	Acres within corridor that could impact BLM wildernesses, national monuments, and areas of critical environmental concern; USFS wildernesses and Inventoried Roadless Areas; NPS wildernesses; and deeded AGFD properties	<input type="radio"/> High risk of loss of special designated lands <input checked="" type="radio"/> Moderate risk of loss of special designated lands <input checked="" type="radio"/> Low risk of loss of special designated lands	0	0	0	0	0
			<input checked="" type="radio"/>				

I-11 Corridor Options Evaluation: North Section

North Section							
Criteria	Evaluation Measure	Scale	Corridor Options				
			S	T	U	V	W
Wetlands and Lakes	Acres within corridor that could impact wetlands and lakes	<input type="radio"/> High risk of loss of water resources <input type="radio"/> Moderate risk of loss of water resources <input checked="" type="radio"/> Low risk of loss of water resources	1	3	1	5	22
			<input checked="" type="radio"/>				
100-Year Floodplains	Acres within corridor that could impact 100-year floodplains and floodways	<input type="radio"/> High risk of encroachment <input type="radio"/> Moderate risk of encroachment <input checked="" type="radio"/> Low risk of encroachment	157	120	112	294	293
			<input checked="" type="radio"/>				
Cultural Resources	Likelihood of impact on historic properties listed in the NRHP	<input type="radio"/> Very likely to impact cultural resources <input type="radio"/> Moderate likelihood to impact cultural resources <input checked="" type="radio"/> Not likely to impact cultural resources	0	0	0	0	0
			<input checked="" type="radio"/>				
Section 4(f) Resources	Likelihood of impacts to publicly-owned parks, recreational areas, wildlife/waterfowl refuges, and historic sites that are afforded protection under Section 4(f)	<input type="radio"/> Very likely to impact Section 4(f) resources <input type="radio"/> Moderate likelihood to impact Section 4(f) resources <input checked="" type="radio"/> Not likely to impact Section 4(f) resources	0	0	371	418	63
			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Scale:  
 Best meets criteria  
 Reasonably meets criteria  
 Least meets criteria

Notes:  
 - For the "safety" criterion, crashes for new corridors were estimated using observed crash histories as part of the ADOT Arizona Annual System Performance Measures.  
 - The "incident management" criterion correlates to the Purpose and Need item "Support Homeland Security and National Defense," but is documented in the evaluation as a sub-measure of the "Mitigate Congestion and Improve Travel Times" category.  
 - Although potential impacts on environmental resources were quantified using available GIS data for the "sensitive environmental resources criterion", the location of the actual I-11 Corridor within the broader 2,000-foot study corridor could minimize or negate some potential impacts. Therefore, any quantities represented in the analysis reflect the possibility or likelihood of encountering impacts, rather than precise impact assessments.  
 - Not all cultural resource locations are definitively known. A "0" acres of impact does not necessarily mean that no impacts will occur, but rather that additional information is required, which will be part of the Tier 1 EIS data collection and analysis effort.



## **APPENDIX C**

### **May 2017 Agency and Public Information Meetings Summary**

## Appendix C. Public Outreach and Agency Coordination

A series of agency and public information meetings were held in May 2017 to solicit input and feedback on the corridor options, with the goal of identifying a more narrow and reasonable range of options to be assembled into a series of end-to-end alternatives and further evaluated in the Tier 1 EIS. Corridor options were available for review and comment at the meetings and throughout a 30-day comment period, from May 2 through June 2, 2017.

Participants were encouraged to submit comments in a variety of ways, including comment forms, large table maps at the meetings, an online mapping comment tool, email, voicemail, or letter. Although participants were invited to voice their preferences on what corridor options should be studied further – or eliminated – this was not a voting process. The input received does not constitute a statistically-valid survey, but rather reflects the opinions of those that attended the meetings and participated or commented in other ways. The goal of this exercise was to communicate to stakeholders about how the corridor alternatives are being developed at a time when public input is actionable, and better understand issues or constraints that should be considered as the corridor alternatives are defined or during more detailed analysis in the Tier 1 EIS.

### C1. Agency Coordination

#### C1.1 Agency Meetings

Four agency meetings were held throughout the Study Area in Tucson, Marana, Casa Grande, and Avondale. A webinar was included during the Marana meeting, to enable participation from remote locations. Agencies and tribal governments were invited by email and letter to join at their convenience. **Table C-1** (Agency Information Meetings) includes a summary of the meeting dates, times, locations and attendance.

#### C1.2 Summary of Agency Feedback

Each agency meeting included a presentation by ADOT staff, followed by a facilitated session to elicit questions and comments. The full summary of meeting activities and comments will be compiled in an *Agency and Public Information Meeting Summary Report*, to be posted on the project website.

An overview of feedback received includes:

- Support for eliminating the corridor options proposed for elimination (J, O, P, and portions of V), along with eliminating corridor option W
- Support for contrasting existing corridors versus new corridor options in more detail in the Tier 1 EIS, including identifying the “potential interconnection” areas for flexibility in developing end-to-end alternatives
- Town of Wickenburg official position to propose a new route in the North Section between corridor options S and T, reflecting input from a Sonoran Institute-led community charrette, and noting strong opposition against corridor option W where it runs along US 60
- Clarification on planning history of corridor option E, based on Pinal County and City of Eloy planning documents

- Recommendations for coordinating with ongoing studies (e.g., Santa Cruz River Floodplain Study, Sonoran Parkway EIS, Sonoran Corridor Tier 1 EIS, North-South Corridor Study Tier 1 EIS, etc.)
- Recommendations for considerations for the Tier 1 EIS analysis, such as induced growth, direct and reliable freight routes, flood control structures, and wildlife linkages and connectivity

**Table C-1 Agency Information Meetings**

Meeting Date and Time	Location	Agencies Represented	Total Staff Attended
<b>Tucson</b> May 2, 2017 10:00 AM to 12:00 PM	Pima Association of Governments, Large Conference Room 1 E. Broadway Boulevard #401, Tucson, AZ	7 <sup>(1)</sup>	14
<b>Marana (Webinar)</b> May 3, 2017 1:00 PM to 3:00 PM	Town of Marana City Council Chambers 11555 W. Civic Center Drive, Marana, AZ	8 <sup>(2)</sup>	12
<b>Casa Grande</b> May 10, 2017 10:00 AM to 12:00 PM	Peart Center 350 E. 6 <sup>th</sup> Street, Casa Grande, AZ	5 <sup>(3)</sup>	7
<b>Avondale</b> May 12, 2017 10:00 AM to 12:00 PM	Estrella Mountain Community College 3000 N. Dysart Road, Avondale, AZ	6 <sup>(4)</sup>	7
<b>TOTAL</b>		<b>24<sup>(5)</sup></b>	<b>40</b>

NOTES:

- (1) City of Tucson, Pima Association of Governments, Pima County (City Manager’s Office, Planning, and Transportation), Tucson Electric Power, and Tucson Water.
- (2) Arizona Game and Fish Department, Arizona State Land Department, Bureau of Land Management, Environmental Protection Agency, Maricopa County (Transportation), National Park Service, Town of Marana, Town of Oro Valley, and Western Area Power Administration.
- (3) Arizona Game and Fish Department, City of Casa Grande, City of Maricopa, Greene Reservoir Flood Control District, and Sun Corridor MPO.
- (4) Bureau of Land Management, Maricopa County (Air Quality, Flood Control District, Parks), and US Army Corps of Engineers.
- (5) Arizona Game and Fish Department and Bureau of Land Management were present at multiple meetings.

## C2. Public Coordination

### C2.1 Public Information Meetings

Six public meetings were held throughout the Study Area in Tucson, Marana, Nogales, Casa Grande, Wickenburg, and Buckeye. **Table C-2** (Public Information Meetings) includes a summary of the meeting dates, times, locations and attendance. In anticipation of the meetings, ADOT issued press releases and advertised the meetings in Study Area newspapers, posted an announcement of the meetings on the study’s website, sent e-mail blasts to stakeholders listed in the study database, and ran radio advertisements on two Tribal radio stations. The ADOT Public Information Office conducted and coordinated several media interviews about the meetings before, during, and after the public information meetings.

**Table C-2 Public Information Meetings**

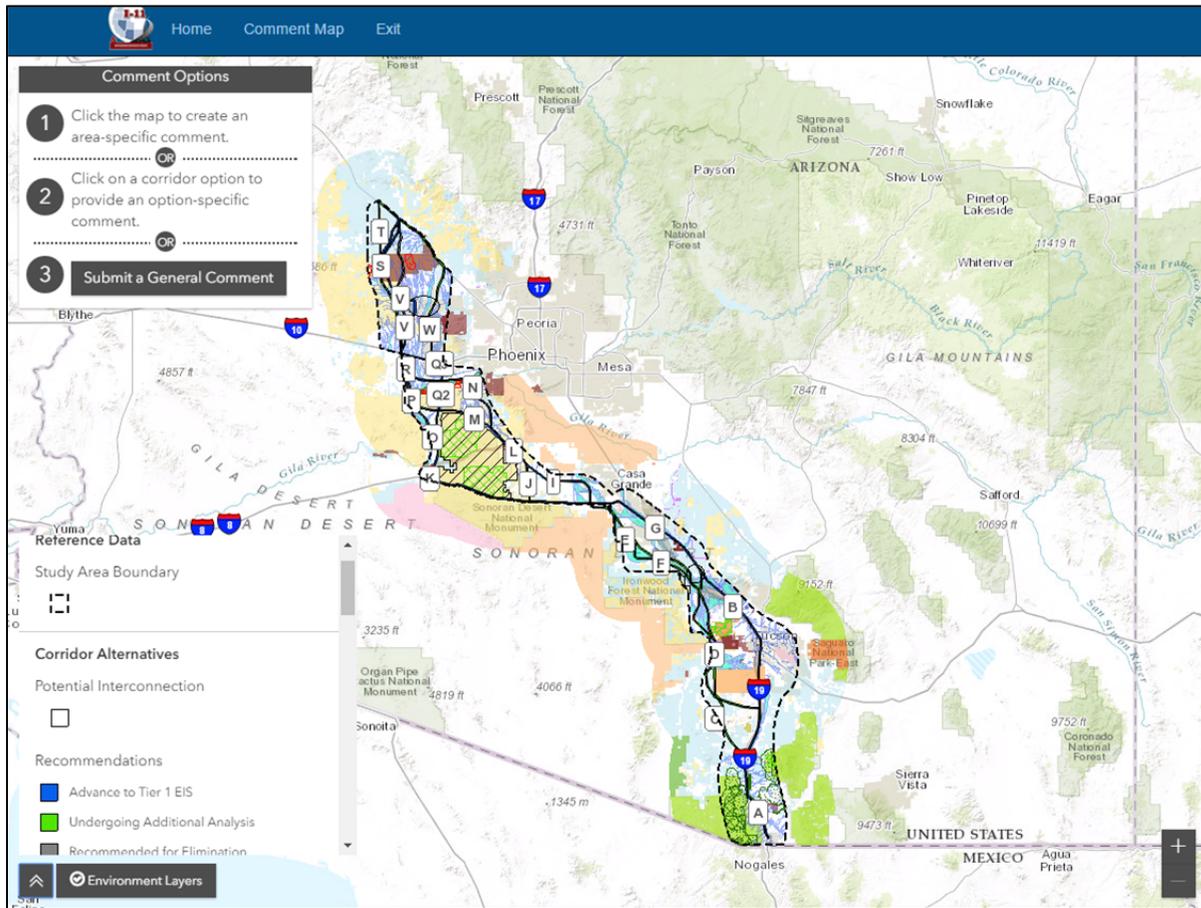
Meeting Date and Time	Location	Attendees
<b>Tucson</b> May 2, 2017; 5:00 PM to 7:00 PM	Arizona Riverpark Inn 777 W. Cushing Street, Tucson, AZ	163
<b>Marana</b> May 3, 2017; 5:00 PM to 7:00 PM	Marana Middle School Gymnasium 11285 W. Grier Road, Marana, AZ	202
<b>Nogales</b> May 4, 2017; 5:00 PM to 7:00 PM	Nogales High School Cafeteria 1905 N. Apache Boulevard, Nogales, AZ	32
<b>Casa Grande</b> May 11, 2017; 5:00 PM to 7:00 PM	Dorothy Powell Senior Adult Center Dining Room 405 E. 6th Street, Casa Grande, AZ	71
<b>Wickenburg</b> May 12, 2017; 5:00 PM to 7:00 PM	Wickenburg Community Center 160 N. Valentine Street, Wickenburg, AZ	82
<b>Buckeye</b> May 16, 2017; 5:00 PM to 7:00 PM	Buckeye Community Center – Multipurpose Room 201 E. Centre Avenue, Buckeye, AZ	58
<b>TOTAL</b>		<b>608</b>

Each public meeting included a presentation by ADOT staff, followed by open house format, allowing meeting participants to walk around the room and learn more about the study progress through a series of poster boards and the opportunity for discussions with study team members (**Figure C-1**, Public Meeting in Tucson). Staff from the study team were available to provide clarification on the study process and answer any questions. In addition, participants were able to provide verbal comments directly to a court reporter that was present at each public information meeting.

Meeting attendees could also complete a comment form at the meeting, take it with them to submit after the meeting, use a computer to make notes on the online mapping tool (**Figure C-2**, Online Comment Mapping Tool), and draw or make notes on large table maps. A summary of the types of feedback received is listed in **Table C-3** (Summary of Public Comments Received).



**Figure C-1 Public Meeting in Tucson**



**Figure C-2 Online Comment Mapping Tool**

**Table C-3 Summary of Public Comments Received**

Comment Type	Corridor Study Area Section <sup>(1)</sup>			Total Number
	North	Central	South	
<b>Comments Submitted at Meetings <sup>(2)</sup></b>				
Comment Form	5	7	61	73
Transcribed Verbally	4	0	22	26
<b>Sub-Total</b>				
<b>Other Comments Submitted</b>				
Online Survey				1,165
E-mail				408 (138=form letter)
Mail				550 (529=form postcard)
Comment Forms Mailed				17
Voicemail				39
<b>TOTAL</b>				<b>2,278</b>

NOTES: (1) Comments submitted by people who attended meetings within South (Nogales, Tucson, Marana), Central (Buckeye, Casa Grande), or North (Wickenburg) sections of Corridor Study Area; (2) Comments written on maps at meetings not included in total, but will be summarized in the *Agency and Public Information Summary Report*.

## C2.2 Summary of Public Feedback

The full summary of meeting activities and comments will be compiled in a separate *Agency and Public Information Meeting Summary Report*, to be posted on the project website, with e-blast and blog notifications when it is available.

An overview of the general feedback received includes:

- General support and agreement with recommendations for options to eliminate
- Support for advancing existing corridor options into the Tier 1 EIS
- Many opposed to new roadway because of environmental, built, and social impacts
- Those in favor of new roadways cited congestion on existing highways as rationale
- Concern about potential for impacts on parks and recreation areas

Major themes regarding the corridor options by section include the following.

### South Section

- Use existing corridors and infrastructure to minimize and avoid natural and economic environmental impacts and lessen capital costs.
- Opposition to corridor options C and D due to their proximity to the Avra Valley and Picture Rocks communities, local park and recreation areas (Tucson Mountain Park, Saguaro National Park), and wildlife; no clear distinction between the two options.
- Split preferences on corridor options E and F; provides alternate to a congested portion of I-10, however traverses the Santa Cruz River area; no clear distinction between the two options.

### Central Section

- Strong interest in corridor options L and N as an efficient bypass of the Phoenix metropolitan area.
- General concerns and opportunities regarding natural, economic, and environmental features raised, regardless of preferred corridor option.

### North Section

- General opposition to corridor option W because of environmental impacts south of US 60, and community impacts through the Town of Wickenburg (potential for negative impacts on existing business and residential properties).
- Support for eliminating top portion of option V that traverses the Vulture Mountain Recreation Area along Vulture Mine Road.
- Strong support for the proposed corridor option recommended in the Sonoran Institute's *Preserving Wickenburg's Heritage in the Face of the Nation's New International Infrastructure Corridor: A Context Sensitive Design Report*, which avoids the Vista Royale community and other developments, and yet is close enough to the Town.



## APPENDIX D

### Study Area Highway System General Purpose Lanes



**Study Area Highway System General Purpose Lanes: 2016 and No Build Condition**

From	To	General Purpose Lanes	
		2016	Existing plus Committed (No Build)
<b>I-19 Santa Cruz County</b>			
Mariposa Rd	Grand Ave	4	4
Grand Ave	Ruby Rd	4	4
Ruby Rd	Rio Rico Dr	4	4
Rio Rico Dr	Peck Canyon Rd	4	4
Peck Canyon Rd	Palo Parado Rd	4	4
Palo Parado Rd	Tumacacori-Carmen	4	4
Tumacacori-Carmen	Tubac	4	4
Tubac	Chavez Siding Rd	4	4
Chavez Siding Rd	Agua Linda Rd	4	4
Agua Linda Rd	Arivaca Rd	4	4
<b>I-19 Pima County</b>			
Arivaca Rd	Canoa Rd	4	4
Canoa Rd	Continental Rd	4	4
Continental Rd	Esperanza Blvd	4	4
Esperanza Blvd	Duval Mine Rd	4	4
Duval Mine Rd	Sahuarita Rd	4	4
Sahuarita Rd	Pima Mine Rd	4	4
Pima Mine Rd	Papago Rd	4	4
Papago Rd	San Xavier Rd	4	4
San Xavier Rd	Valencia Rd	4	4
Valencia Rd	Irvington Rd	4	4
Irvington Rd	Ajo Way	4	4
Ajo Way	I-10	6	6
<b>I-10 Pima County</b>			
I-19	Congress St	8	8
Congress St	Speedway Blvd	8	8
Speedway Blvd	Grant Rd	8	8
Grant Rd	Miracle Mile	8	8
Miracle Mile	Prince Rd	8	8
Prince Rd	Ruthrauff Rd	6	8
Ruthrauff Rd	Sunset Rd	6	8
Sunset Rd	Orange Grove Rd	6	8
Orange Grove Rd	Ina Rd	6	8
Ina Rd	Cortaro Rd	6	6
Cortaro Rd	Twin Peaks Rd	6	6



From	To	General Purpose Lanes	
		2016	Existing plus Committed (No Build)
Twin Peaks Rd	Avra Valley Rd	6	6
Avra Valley Rd	Tangerine Rd	6	6
Tangerine Rd	Marana Rd	6	6
<b>I-10 Pinal County</b>			
Marana Rd	Pinal Air Park Rd	6	6
Pinal Air Park Rd	Red Rock	6	6
Red Rock	Picacho Peak Rd	6	6
Picacho Peak Rd	Picacho	6	6
Picacho	SR 87	4	6
SR 87	Sunshine Blvd	4	6
Sunshine Blvd	Toltec Rd	6	6
Toltec Rd	Sunland Gin Rd	6	6
Sunland Gin Rd	I-8	6	6
<b>I-8 Pinal County</b>			
I-10	Trekell Rd	4	4
Trekell Rd	Thornton Rd	4	4
Thornton Rd	Bianco Rd	4	4
Bianco Rd	Montgomery Rd	4	4
Montgomery Rd	Stanfield Rd	4	4
Stanfield Rd	SR 84	4	4
<b>I-8 Maricopa County</b>			
SR 84	Vekol Valley Rd	4	4
Vekol Valley Rd	Freeman Rd	4	4
Freeman Rd	Butterfield Trail	4	4
<b>SR 85 Maricopa County</b>			
Butterfield Trail	Fornes Rd	4	4
Fornes Rd	Lewis Prison Rd	4	4
Lewis Prison Rd	Buckeye Hills Dr	4	4
Buckeye Hills Dr	Narramore Rd	4	4
Narramore Rd	Hazen Rd	4	4
Hazen Rd	MC 85	4	4
MC 85	Baseline Rd	4	4
Baseline Rd	Broadway Rd	4	4
Broadway Rd	I-10	4	4



From	To	General Purpose Lanes	
		2016	Existing plus Committed (No Build)
<b>US 60 Maricopa County</b>			
SR 74	US 93	4	4
<b>US 93 Maricopa County</b>			
US 60	Yavapai County Line	2	2
<b>US 93 Yavapai County</b>			
Maricopa County Line	SR 71	2	2
<b>I-10 Maricopa County</b>			
SR 85	Sun Valley Parkway	4	4
Sun Valley Parkway	Hassayampa Rd	4	4
Hassayampa Rd	Wintersburg Rd	4	4