



Alternatives Selection Report Evaluation Methodology and Criteria Report

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SUMMARY

The Federal Highway Administration (FHWA) and Arizona Department of Transportation (ADOT) have prepared this *Evaluation Methodology and Criteria Report* to outline the overall approach for developing and screening corridor alternatives for the I-11 Corridor during the Alternatives Selection Report (ASR) phase. The ASR phase process will enable the FHWA and ADOT to identify a comprehensive range of corridor alternatives that meet the Purpose and Need, and assess these alternatives through an evaluation process that uses public and agency input, as well as various topographical, environmental, and other planning information to help identify opportunities and constraints. Ultimately, the screening process will yield a reasonable range of Build Corridor Alternatives that will advance into the Draft Tier 1 Environmental Impact Statement (EIS) with a No Build Alternative (i.e., do-nothing option) for a programmatic-level environmental review.



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Acronyms and Abbreviations

| | |
|-------------|---|
| ACEC | Areas of Critical Environmental Concern |
| ADOT | Arizona Department of Transportation |
| ALRIS | Arizona Land Resource Information System |
| ASR | Alternatives Selection Report |
| BLM | Bureau of Land Management |
| EIS | Environmental Impact Statement |
| ESRI | Environmental Systems Research Institute |
| FAST | Fixing America's Surface Transportation |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FRA | Federal Railroad Administration |
| GIS | Geographic Information System |
| HPT | Historic Preservation Team |
| I-11 | Interstate 11 |
| IWCS | I-11 and Intermountain West Corridor Study |
| LOS | Level of Service |
| MAG | Maricopa Association of Governments |
| MPH | Miles Per Hour |
| MPO | Metropolitan Planning Organization |
| NDOT | Nevada Department of Transportation |
| NEPA | National Environmental Policy Act |
| NHD | National Hydrography Dataset |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| PEL | Planning and Environmental Linkages |
| Reclamation | Bureau of Reclamation |
| ROD | Record of Decision |
| ROW | Right-of-Way |
| RTC | Regional Transportation Commission of Southern Nevada |
| TAZ | Traffic Analysis Zone |
| TCP | Traditional Cultural Properties |
| US | United States |
| USFWS | US Fish and Wildlife Service |
| USFS | US Forest Service |



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]). Initially, an Alternatives Selection Report (ASR) will assess a comprehensive range of corridor alternatives through an evaluation process that uses public and agency input, as well as various topographical, environmental, and other planning information to help identify opportunities and constraints. The number of corridor alternatives will be reduced to a reasonable range to be carried forward into the Draft Tier 1 EIS, along with the No Build Alternative (i.e., do-nothing option).

1.2 Purpose of Report

This *Evaluation Methodology and Criteria Report* outlines the overall approach for developing and screening corridor alternatives for the I-11 Corridor during the ASR phase. Ultimately, the screening process will yield a reasonable range of Build Corridor Alternatives that will advance into the Draft Tier 1 EIS with a No Build Alternative that for a programmatic-level environmental review. A separate methodology report will be prepared for the Tier 1 EIS analyses.

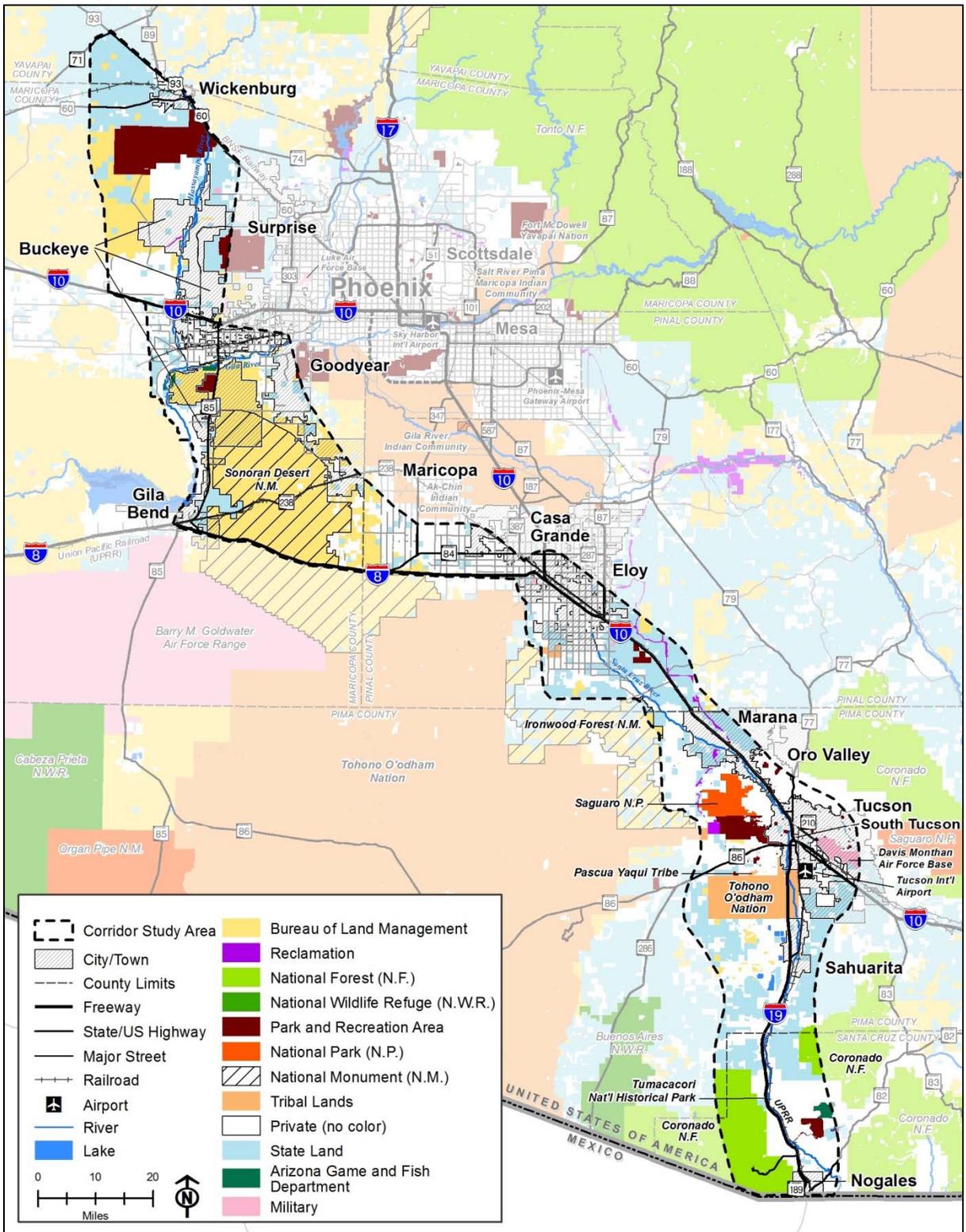


Figure 1-1 I-11 Corridor Study Area (Nogales to Wickenburg)



2 EVALUATION METHODOLOGY

The purpose of this methodology is to establish a clear process and framework to define and screen alternatives in the ASR. For purposes of the ASR, the I-11 Corridor Study Area is divided into three sections – South, Central and North (**Figure 2-1**; I-11 Corridor Study Area Sections). A broad range of alternatives will be developed within these three sections, with the ability to be pieced together into a set of end-to-end alternatives, based on an evaluation that includes information obtained during the scoping process. The evaluation of these corridor alternatives will utilize quantitative and qualitative criteria during the ASR phase, leading to a reasonable range of Build Corridor Alternatives that will undergo a programmatic-level environmental review in the Tier 1 EIS phase, along with a No Build Alternative.

2.1 Definition of Corridor Alternatives

2.1.1 Initial Range of Corridor Alternatives

An initial range of corridor alternatives will be developed based on four primary sources:

- **Prior I-11 Study:** The 2014 IWCS performed an alternatives analysis and consensus-building exercise to recommend I-11 corridor alternatives for further analysis in this environmental review process.
- **Agency Scoping Input:** During scoping, agencies and tribal communities provided feedback on potential corridor alternative preferences, considerations, and/or constraint areas, including potential locations for a transportation facility or areas to avoid.
- **Public Scoping Input:** During scoping, the general public also provided feedback on potential corridor alternative preferences, considerations, and/or constraint areas, including potential locations for a transportation facility or areas to avoid.
- **Technical Analysis:** A software tool will be used that simultaneously considers engineering factors and avoids sensitive resources to both identify and screen out corridor alternatives that potentially have substantial impacts and other issues.

To promote comprehensive coverage of the I-11 Corridor Study Area, the information and suggestions from these four sources will be used to identify reasonable potential corridor alternatives for more detailed evaluation during the ASR. More detail regarding these four sources of input are discussed in the following sections.

2.1.1.1 Prior I-11 Study

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-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.

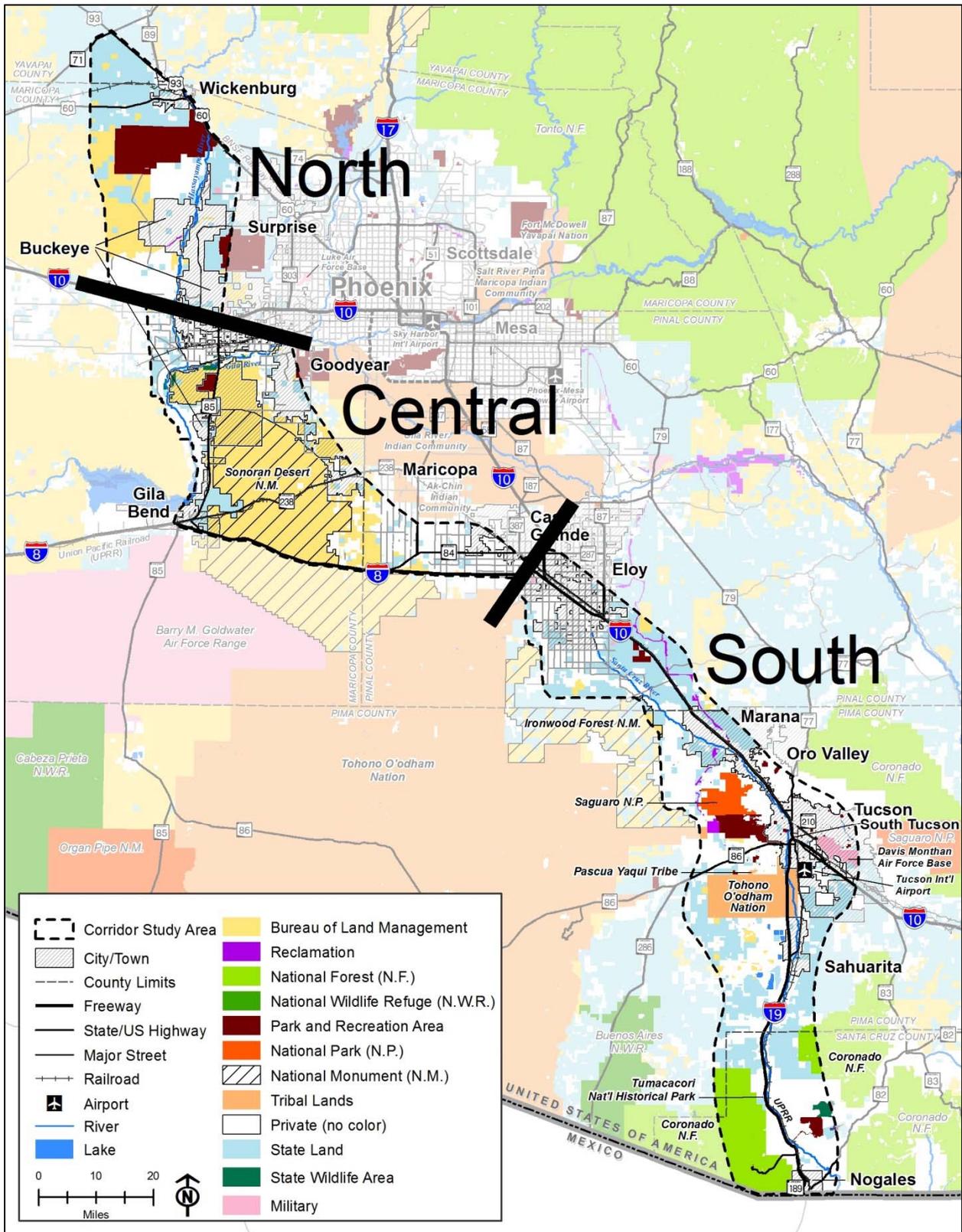


Figure 2-1 I-11 Corridor Study Area Sections



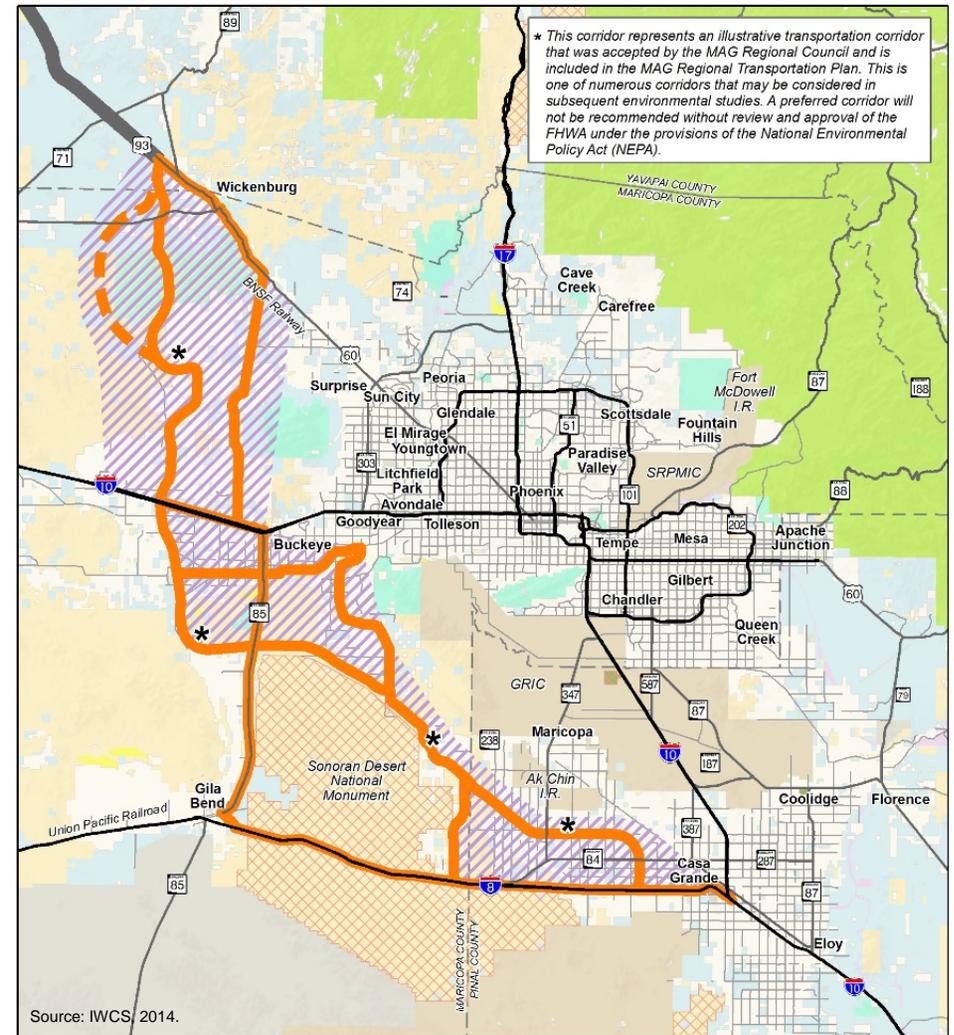
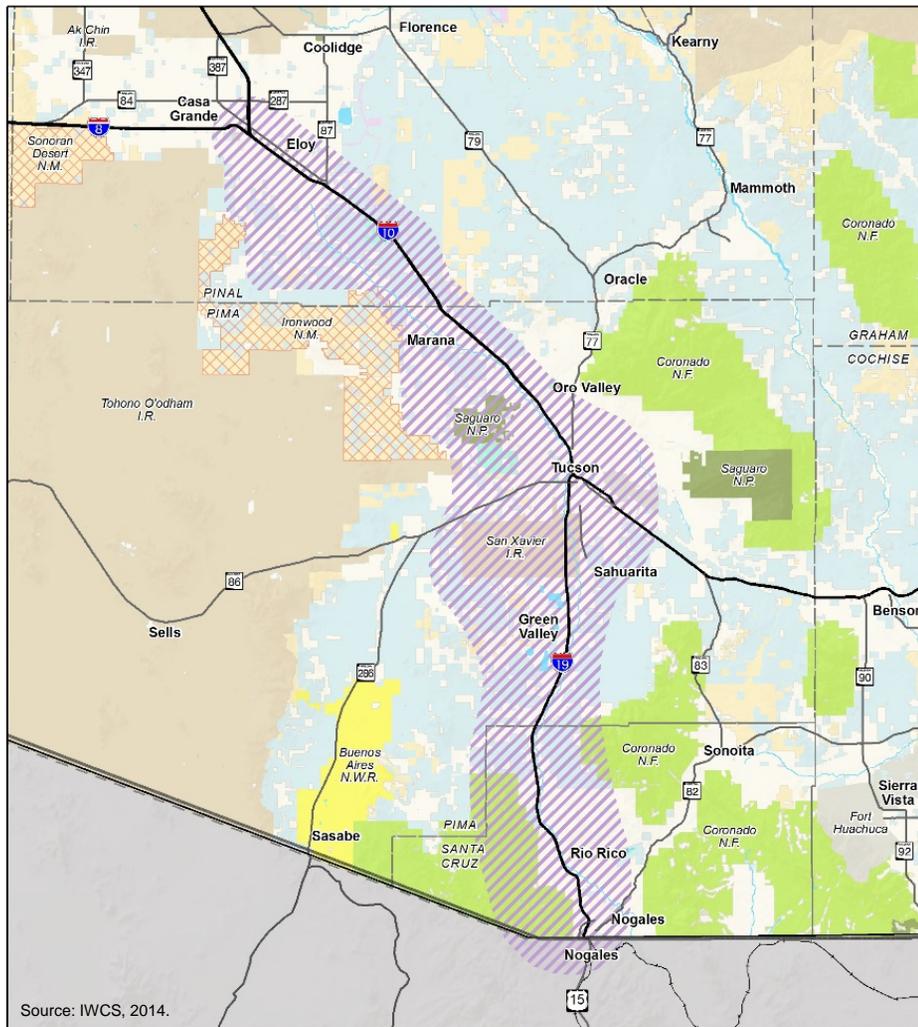
The NDOT and ADOT engaged the public and stakeholders throughout the IWCS. The study also involved a high-level environmental review of corridor alternatives through the FHWA's Planning and Environmental Linkages (PEL) process. This effort resulted in proposed Segments of Independent Utility to provide potential logical termini and independent utility for future NEPA studies. Accordingly, the IWCS provided the initial basis for the I-11 Corridor Study Area that advanced into this environmental review process, incorporating the potential corridor alternatives from Nogales to Wickenburg, as shown on **Figure 2-2** (Recommended Corridor Alternatives from Prior IWCS, 2014). The maps and information shown on **Figure 2-2** were taken directly from the IWCS (NDOT and ADOT 2014).

2.1.1.2 Agency Scoping Input

An approximate 45-day scoping period was conducted for the I-11 Corridor environmental review process, beginning on May 23, 2016 and ending on July 8, 2016. The FHWA and ADOT invited agencies, tribal communities, and organizations by letter to participate in the scoping process and attend agency scoping meetings. Three agency scoping meetings were held in the following locations along the Corridor Study Area: Casa Grande, Phoenix, and Tucson. The written and verbal comments received from the agencies and tribal communities involve common themes on potential corridor alternatives, environmental resources, and other considerations. Following is an overview of these common themes:

- Split preference for corridor alternatives on existing freeways versus new corridors
- 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
- Incorporate the highest levels of environmental design and energy efficiency
- Develop project purpose and need
- Study opportunities to foster economic development
- Protect environmentally-sensitive resources
- Consider cumulative impacts and growth-related indirect impacts
- Assess impacts to environmental justice communities
- Maintain connectivity between regional trails and parks
- Consider general support for the project as a multimodal facility for the region
- Provide early and frequent coordination with agencies and tribal communities

Figure 2-3 (Agency Scoping Corridor Alternative Options) summarizes the input received from agencies and tribal communities on potential corridor alternative options to be considered in the development of alternatives. More detailed information regarding comments from each individual agency and tribal community are provided in the *Scoping Summary Report* (ADOT 2017).



* This corridor represents an illustrative transportation corridor that was accepted by the MAG Regional Council and is included in the MAG Regional Transportation Plan. This is one of numerous corridors that may be considered in subsequent environmental studies. A preferred corridor will not be recommended without review and approval of the FHWA under the provisions of the National Environmental Policy Act (NEPA).



Figure 2-2 Recommended Corridor Alternatives from Prior IWCS, 2014

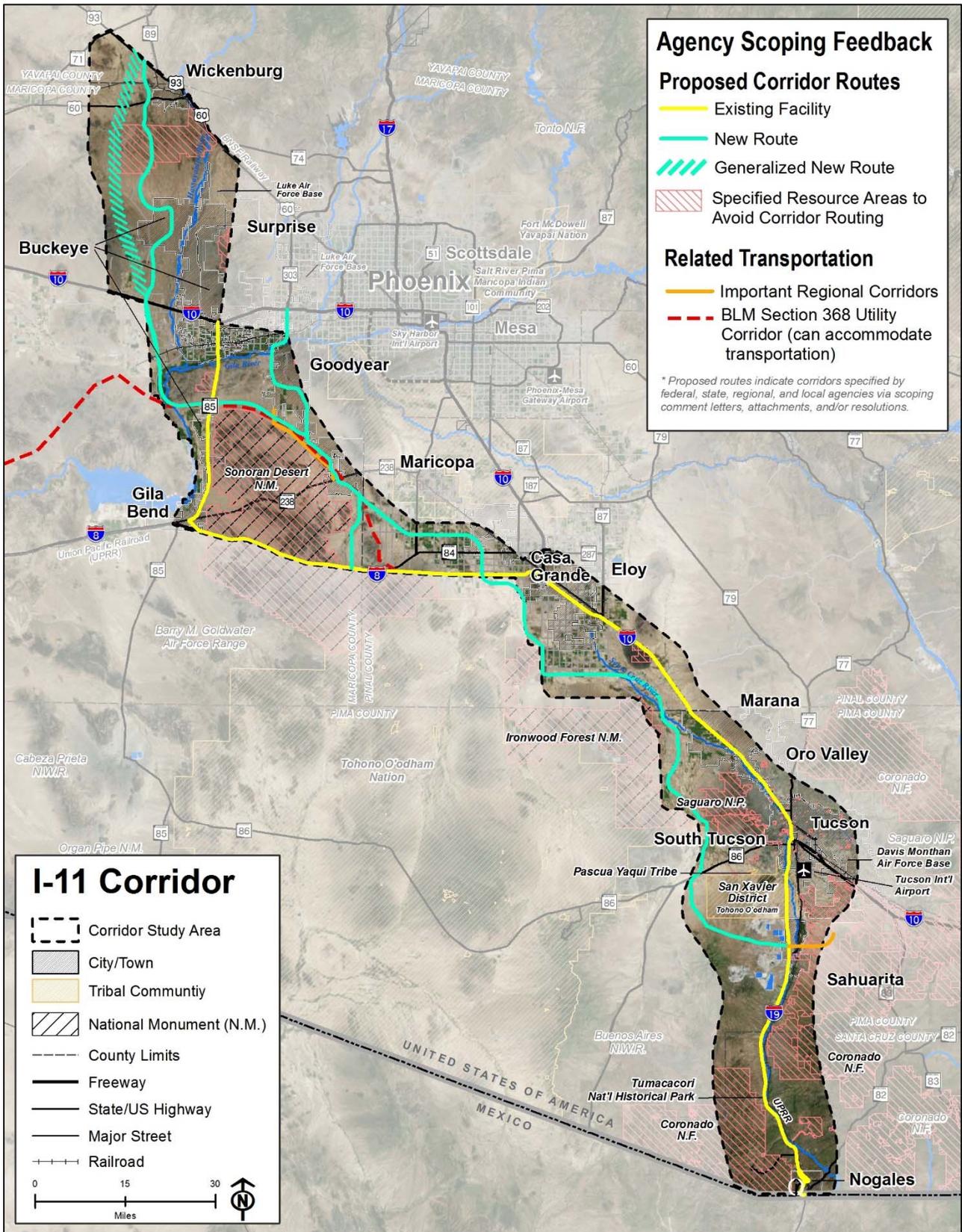


Figure 2-3 Agency Scoping Feedback on Corridor Alternative Preferences, 2016

2.1.1.3 Public Scoping Input

The public was also notified about the scoping process and public scoping meetings via newspaper advertisements, website, e-mail blasts, social media, news releases, media interviews, and blog posts. Six public scoping meetings were held in the I-11 Corridor Study Area: Buckeye, Casa Grande, Marana, Nogales, Tucson, and Wickenburg. A summary of the public scoping comments is listed below, organized into the following major categories and considerations: environmental, corridor alternatives, multimodal, economic, and other general comments. A full compilation of all public comments is provided in the *Scoping Summary Report* (ADOT 2017).

Environmental

- Concern regarding impacts to the Sonoran Desert environment, such as:
 - Environmental, historic, and archeological impacts
 - Habitats, habitat linkages, and potential impacts to wildlife migration corridors
 - Wilderness areas, air quality, Santa Cruz River, dark skies, and noise impacts
 - Farmland
- Minimize disturbances to undeveloped lands
- Avoid parks and conservation management areas (e.g., Coronado National Forest, Saguaro National Park West, Vulture Mountain Park, national monument areas, major rivers, etc.)
- Specific concerns in Avra Valley
- Preserve opportunities for recreational visitor use (e.g., hunting)
- Other general considerations, such as the effect of dust storms on interstate mobility

Corridor Alternatives

- Support for I-11 as a separate/new facility
- Improve existing freeways and interstates (e.g., I-19, I-10, I-8)
- Spot improvement suggestions and considerations
- Future connectivity considerations
- Other general comments, such as potential property impacts

Multimodal

- Accommodate rail and utilities within corridor alternatives
- Support for passenger rail as an alternative to an interstate
- Concern that freeways are an outdated model to transportation congestion
- Freight considerations, such as improving freight travel and reliability, and the potential for dedicated truck lanes

Economic

- I-11 will bring economic benefit to state and surrounding communities
- Use I-11 to grow business development
- Concern regarding property values and increased heavy truck traffic
- Concern that I-11 will hurt tourism and decrease the number of existing jobs

Other Comments

Figure 2-4 (Public Scoping Feedback on Corridor Alternative Preferences, 2016) delineates the public input received on potential corridor alternatives. This figure includes corridor alternative suggestions received through the comment forms, as well as the mark-ups of the large roll plot maps that were available at the public scoping meetings.

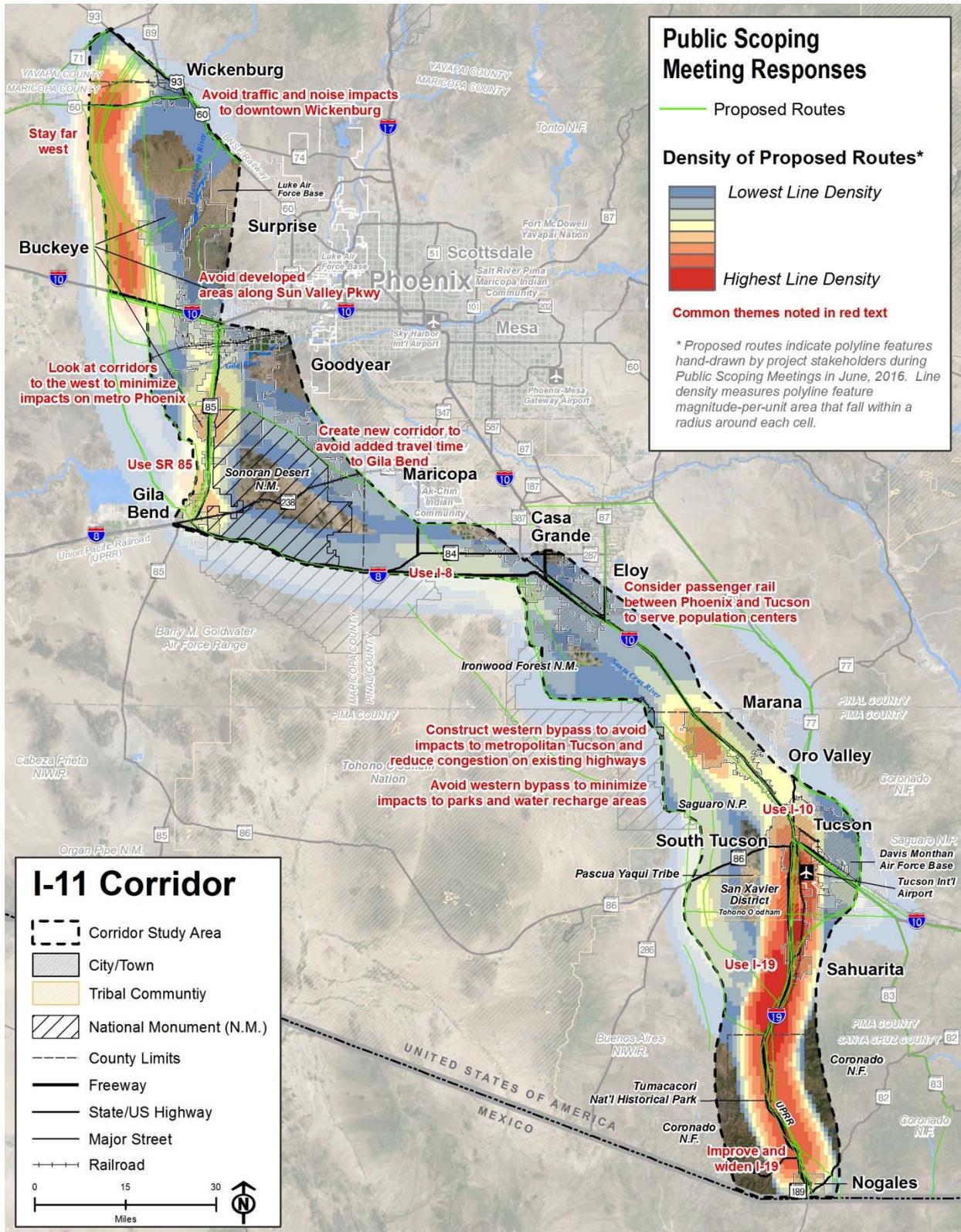


Figure 2-4 Public Scoping Feedback on Corridor Alternative Preferences, 2016

2.1.1.4 Technical Analysis

The fourth input to the development of an initial range of alternatives is the technical analysis component. The technical analysis involves the use of a software tool (Quantm) that considers both engineering and environmental factors. It maps out potential routes for a proposed transportation facility based on engineering design criteria, and at the same time, avoids sensitive environmental resources, land uses, and topographical constraints. This is meant to identify any reasonable corridor alternatives not already studied or recommended, as well as to validate or optimize previously suggested routes. For analysis purposes, the I-11 Corridor Study Area is divided into three sections – South, Central, and North – due to the large geographical coverage of the overall Corridor Study Area.

Figure 2-5 (Steps Involved in Technical Analysis) outlines the major technical analysis steps to identify potential corridor alternatives. A summary of those steps is provided below, with a more detailed discussion thereafter:

- Collect and enter **engineering and environmental inputs** into model
- Run model for a **free-to-roam analysis** looking for potential routes within Corridor Study Area
- Evaluate model outputs to identify **route trends** within I-11 Corridor Study Area
- Conduct density analysis of route trends to identify **potential corridor alternatives**.

Engineering and Environmental Inputs

The initial step of the technical analysis involves collecting and entering engineering and environmental inputs into the model. The engineering inputs are based on the design criteria for a proposed interstate freeway facility, with considerations for future multimodal elements (e.g., appropriate grades for rail). The environmental inputs include identified resources, sensitive land uses, and topographical information.

Figure 2-6 (Typical Section for Proposed Interstate Freeway Facility) is an example of the typical cross section of a proposed interstate freeway facility. The engineering input assumptions also address minimum turning radii/curves, grade/slope requirements, right-of-way (ROW) needs, etc. for a 4-lane interstate freeway. At this stage of the technical analysis, a 400-foot ROW footprint is used to take into consideration the maximum horizontal width required for a proposed interstate freeway facility. In areas of ROW constraint or where a wider footprint may not be needed (e.g., no need for frontage roads), the I-11 Corridor may be narrower than 400 feet. This is an estimate for planning purposes only during the ASR phase.

As discussed in the Purpose and Need Statement, a specific need for additional rail and utility facilities in the Corridor Study Area has not been identified. However, the engineering inputs for a proposed interstate freeway facility would allow for a multimodal facility (i.e., rail and/or utility) in the future if needed.

Figure 2-7 (Environmentally Sensitive Areas) illustrates the environmental inputs for this stage of the analysis that were collected from various sources. These sensitive areas are considered as potential avoidance areas in the technical analysis. Initial information for sensitive environmental resource and land use information was gathered from the prior IWCS and PEL process. Additional information was provided by agencies, tribal communities, and the public during the scoping period. Tribal lands will be avoided unless a tribal government requests or approves otherwise. The I-11 Corridor Study Area was scanned and inventoried for other sensitive land uses not otherwise noted (e.g., schools, landfills, prisons, etc.). **Appendix A**



(Environmentally Sensitive Resources by Section) provides a compilation of this information for the South, Central and North sections of the I-11 Corridor Study Area that will be used as a basis for the environmental inputs and potential avoidance areas in the technical analysis.

Free-to-Roam Analysis Looking for Routes

With the engineering design criteria and environmental avoidance areas established, the model is run to determine how potential routes respond to the inputs, conducting a “free-to-roam” analysis. Due to the extent and limits of the I-11 Corridor Study Area and large volumes of information, the South, Central, and North sections are run separately in the model. The model considers the engineering inputs such as slope and curvature requirements when traversing the topographic terrain layers, thereby generating potential routes that meet the design criteria of a proposed interstate freeway facility. Simultaneously, the model avoids or goes around environmentally sensitive resources when mapping out potential routes. Using these input parameters, this technical analysis screens out potential fatal flaws, while also maximizing corridor options.

Route Trends within Corridor Study Area

The free-to-roam analysis can generate as many as 50 to 100 potential routes for each section to identify the most reasonable options that meet the engineering and environmental inputs. The next step is to identify potential route trends, or groupings of routes, that generally follow a common path. These common path options will be used to identify potential corridor alternatives.

Density Analysis for Potential Corridor Alternatives

To assist in determining the most dominant route trends or groupings, the modeled routes will be imported into Geographic Information Systems (GIS) to run through a density analysis to more clearly distinguish the most common paths for the routes. The results of this multi-step process will be used to map the routing trends of the software analysis for consideration with the other corridor alternatives derived from previous studies and agency and public scoping input, as previously described.

In addition to the potential corridor alternatives generated as a result of the engineering and environmental inputs, the technical analysis will also integrate previously suggested routes (e.g., agency-studied corridors) to optimize or refine these corridors to ensure the same level of avoidance of major environmental features and compliance with base level engineering requirements. At this level of screening, not all obstacles will be avoided. The purpose of this effort is to broadly define a reasonable range of feasible corridors to undergo detailed analysis in the Tier 1 EIS.

2.1.1.5 Optimization of Corridor Alternatives

The final step in the alternatives development process incorporates all potential alternative corridors (routes proposed during scoping, those from prior studies, technical analysis outputs) back into the software tool to optimize corridor routing to ensure the alternatives are meeting the minimum engineering and environmental design criteria, to the extent possible. In addition, corridors may be slightly moved to overlay with existing roadways/right-of-way, avoid defined constraints (e.g., tribal land), or better respond to engineering constraints.

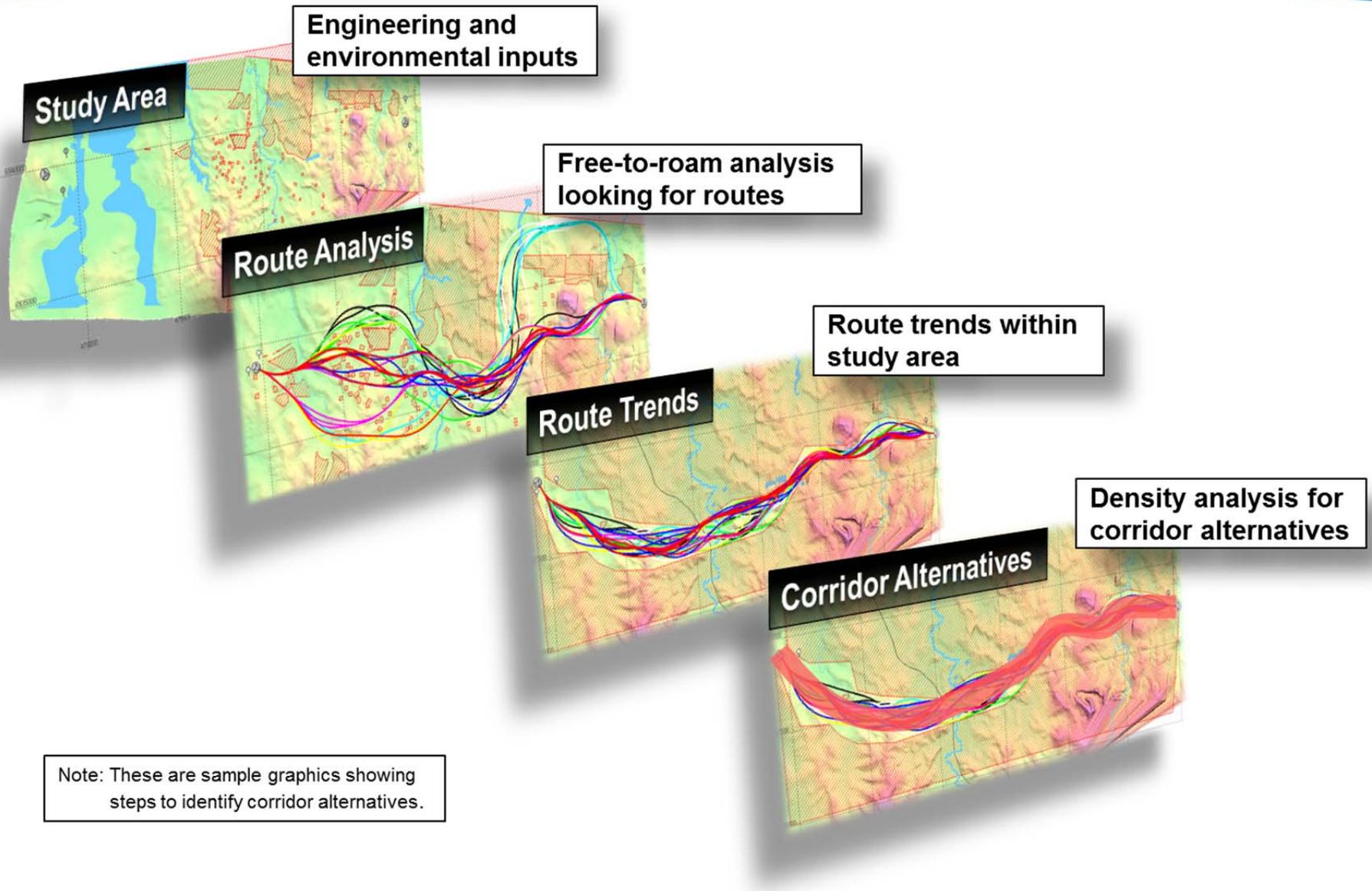
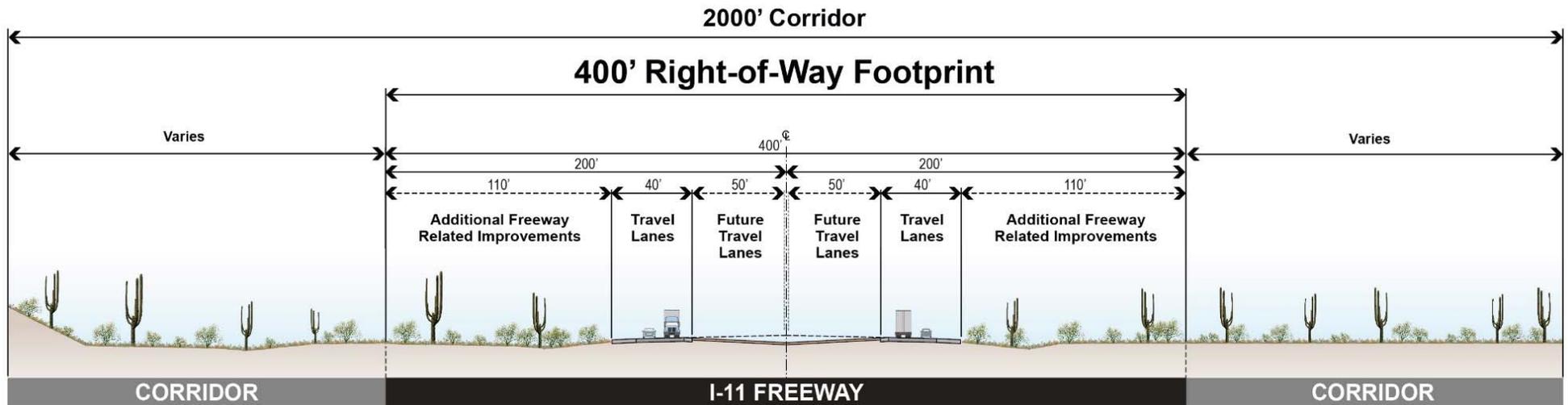


Figure 2-5 Steps Involved in the Technical Analysis



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. Additionally, in areas co-located with existing facilities with lower anticipated traffic volumes or parallel constraints, the footprint may be less than 400' wide. Widths on either side of freeway corridor may vary. Engineering inputs for grade would allow the alternative to integrate other parallel transportation or linear uses in the future, such as freight rail, passenger rail, and/or a utility corridor.

Figure 2-6 Typical Section for Proposed Interstate Freeway Facility (not to scale)

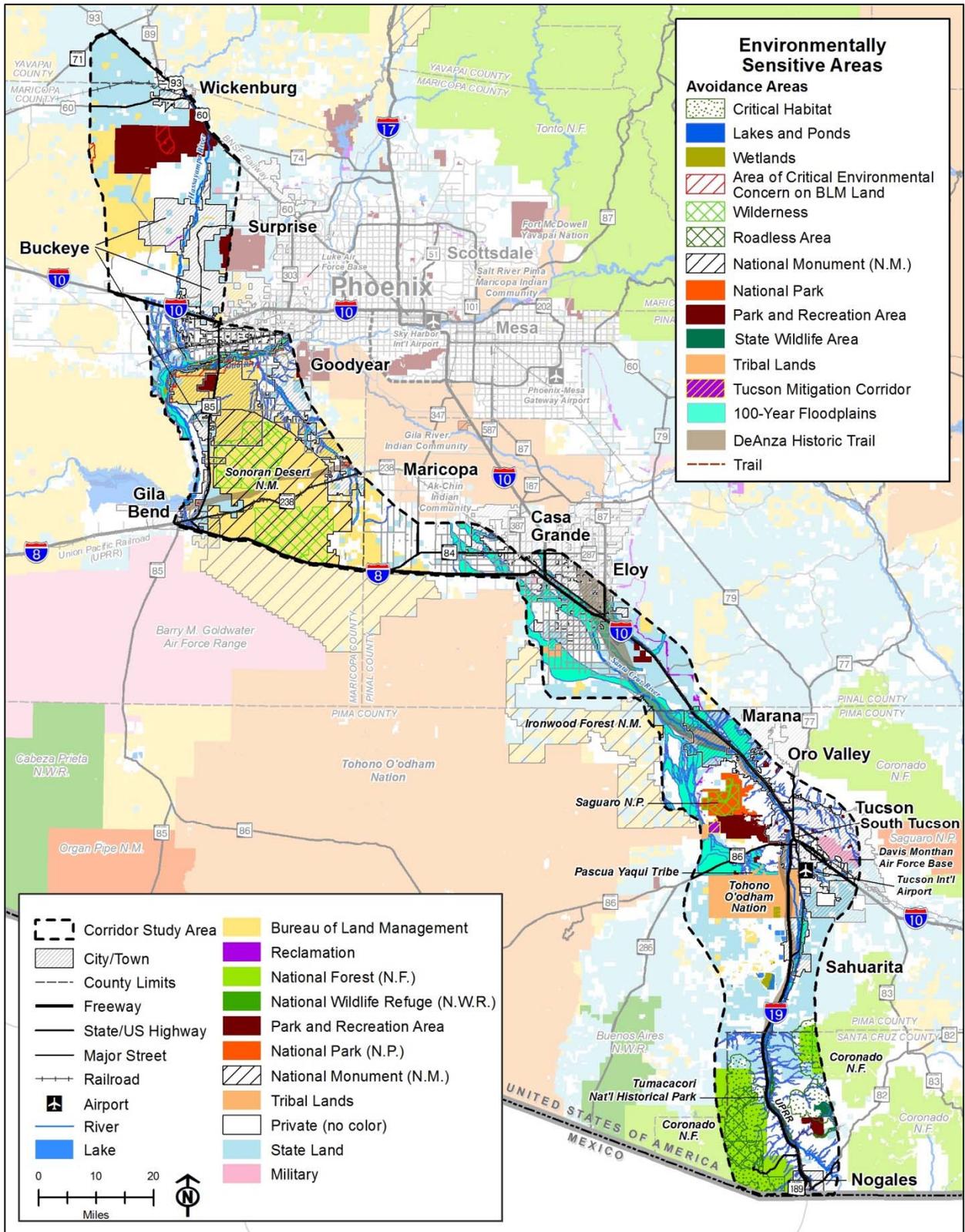


Figure 2-7 Environmentally Sensitive Areas

2.1.2 Initial Range of Corridor Alternatives

The final step in defining the initial range of corridor alternatives is to compare 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 comprehensive range of options to be evaluated during the ASR phase. This initial range of alternatives 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 following sections will elaborate on the specific measures to be employed to screen the universe of alternatives down to a reasonable range to carry forward into the Tier 1 EIS for further analysis.

2.2 Screening and Selection of Corridor Alternatives

This step in the process will screen the initial range of corridor alternatives for the I-11 Corridor Study Area using an established set of criteria. The criteria will include multiple quantitative and qualitative measures that correspond with the Purpose and Need, as well as additional planning-related factors. This will be a comparative evaluation to understand how each corridor alternative performs relative to the criteria, as well as against each other. This analysis will assist in determining the reasonable range of corridor alternatives to advance into the Tier 1 EIS.

As part of this process, public, agency, and tribal input will be solicited to obtain feedback on the development and evaluation of the corridor alternatives, including the recommended range of alternatives to move forward into the Tier 1 EIS for further study.

2.2.1 Screening Criteria

The first step of the evaluation process is to develop a series of criteria and specific measures to ensure the alternatives meet and achieve the underlying purpose of the I-11 Corridor and supporting needs.

As documented in the Purpose and Need Statement, 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.

The problems, issues, and opportunities that support the need for a proposed interstate freeway facility are:

- Population and employment growth
- Congestion and travel time reliability
- System linkages and regional and interstate mobility
- Access to economic activity centers
- Homeland security and national defense.

The screening criteria, specific measures, scale of evaluation, and source information for the criteria are found in **Table 2-1** (Evaluation Criteria and Measures).

Table 2-1 Screening Criteria and Measures

| Criteria | Description | Evaluation Measure | Scale | Source |
|---|--|---|---|--|
| Address Population and Employment Growth | | | | |
| 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 alternatives | <ul style="list-style-type: none"> ○ Low new population growth within TAZs that intersect study area on 2 miles either side of the alternative ● Moderate new population growth within TAZs that intersect study area on 2 miles either side of the alternative ● High new population growth within TAZs that intersect study area on 2 miles either side of the alternative | ADOT Statewide Travel Demand Model (based on growth projections established by the state 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 alternatives | <ul style="list-style-type: none"> ○ Low new employment growth within TAZs that intersect study area on 2 miles either side of the alternative ● Moderate new employment growth within TAZs that intersect study area on 2 miles either side of the alternative ● High new employment growth within TAZs that intersect study area on 2 miles either side of the alternative | ADOT Statewide Travel Demand Model (based on growth projections established by the state MPOs and Arizona State Demographer's office). |
| Mitigate Congestion and Improve Travel Times | | | | |
| 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 alternative, 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"> ○ <5,000 vehicles per day ● 5,000 to 10,000 vehicles per day ● >10,000 vehicles per day | 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 alternative 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"> ○ LOS E or worse ● LOS D ● LOS C or better | ADOT Statewide Travel Demand Model |
| Travel Times | Compares average travel times on corridor section alternatives; a lower average travel time indicates improved travel time relative to the other section alternatives. | Average travel time (minutes) during peak (3 PM and 6 PM), 2035 | <ul style="list-style-type: none"> ○ Slowest travel time ● Average travel time ● Fastest travel time | ADOT Statewide Travel Demand Model |
| Average Speeds | Compares average travel speeds on section alternative options; a higher average travel speed indicates improved travel speeds relative to the other options. | Average travel speed (miles per hour [mph] during peak (3 PM and 6 PM), 2035 | <ul style="list-style-type: none"> ○ < 55 mph ● 55 to 65 mph ● > 65 mph | 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 alternative section crashes on high capacity roadways, 2035 | <ul style="list-style-type: none"> <input type="radio"/> Most crashes <input type="radio"/> Some crashes <input type="radio"/> Fewest crashes | ADOT Arizona Annual System Performance Measures ¹ |
| Improve System Linkages and Interstate Mobility | | | | |
| 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 alternatives | <ul style="list-style-type: none"> <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 type="radio"/> High number of freight activity hubs within 2 miles either side of the alternative | 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 | <ul style="list-style-type: none"> <input type="radio"/> <1,000 trucks per day <input type="radio"/> 1,000-5,000 trucks per day <input type="radio"/> >5,000 trucks per day | Transearch and ADOT Statewide Travel Demand Model |
| Improve Access to Economic Activity Centers | | | | |
| 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 activity centers within 5 miles either side of corridor alternatives | <ul style="list-style-type: none"> <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 type="radio"/> High number of economic activity centers within 5 miles either side of the alternative | Regional and local plans |
| | | Additional population (compared to the No Build), within a 45-minute drive time of study area existing and emerging activity centers | <ul style="list-style-type: none"> <input type="radio"/> <10,000 persons <input type="radio"/> 10,000-70,000 persons <input type="radio"/> >70,000 persons | ADOT Statewide Travel Demand Model |
| Support Homeland Security and National Defense | | | | |
| Incident Management ² | Ability to provide alternate routes for weather, crash, emergency, and defense needs. | Provides alternate interstate freeway route (yes or no) | <ul style="list-style-type: none"> <input type="radio"/> No (existing route) <input type="radio"/> Yes (new route option) | |
| Minimize Direct Impacts on Sensitive Environmental Resources | | | | |
| Critical Habitat | Minimize the potential for loss of designated habitat. | Acres of direct impact on designated critical habitat for special status species | <ul style="list-style-type: none"> <input type="radio"/> High level of critical habitat loss <input type="radio"/> Moderate level of critical habitat loss <input type="radio"/> Low level of critical habitat loss | US Fish and Wildlife Service (USFWS), 2015; AGFD, 2015 |
| Special Designated Lands | Minimize the potential for loss of special designated lands. | Acres of direct impact on Bureau of Land Management (BLM) wildernesses, national monuments, and areas of critical environmental concern (ACEC); US Forest Service (USFS) wildernesses and Inventoried Roadless Areas; National Park Service (NPS) wildernesses; and deeded AGFD properties | <ul style="list-style-type: none"> <input type="radio"/> High level of loss of specially designated lands <input type="radio"/> Moderate level of loss of specially designated lands <input type="radio"/> Low level 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 of direct impact on known wetlands and lakes | <ul style="list-style-type: none"> ○ High level of loss of water resources ◐ Moderate level of loss of water resources ● Low level 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 of encroachment on 100-year floodplains | <ul style="list-style-type: none"> ○ High level of encroachment ◐ Moderate level of encroachment ● Low level of encroachment | Federal Emergency Management Agency (FEMA), 2011 to 2014; Yavapai County Flood Control, 2016 |
| | | Acres of encroachment on floodway | | |
| Cultural Resources | Minimize potential for impacts on cultural resources. | Likelihood of impact on cultural resources based on known locations of Traditional Cultural Properties (TCPs), archaeological sites/districts, historic properties/districts, and designated landmarks | <ul style="list-style-type: none"> ○ Very likely to impact cultural resources ◐ Moderate likelihood to impact cultural resources ● Not likely to impact cultural resources | National Register of Historic Places (NRHP), 2016; AZSITE, ADOT Historic Preservation Team (HPT) Portal, other record searches, and Section 106 consultations |
| Section 4(f) Resources | Minimize potential for impacts on Section 4(f) resources. | Likelihood of impact to publically owned parks, recreational areas, wildlife/waterfowl refuges and preserves, historic properties, and TCPs that are afforded protection under Section 4(f) | <ul style="list-style-type: none"> ○ Very likely to impact Section 4(f) resources ◐ Moderate likelihood to impact Section 4(f) resources ● Not likely to impact Section 4(f) resources | Environmental Systems Research Institute (ESRI), 2013; Arizona Land Resource Information System (ALRIS), 2014; NPS, 2016; BLM, 2016; Bureau of Reclamation (Reclamation), 2016; and continuing consultation |

¹ Crashes for new greenfield corridors were estimated using observed crash histories as part of the ADOT Arizona Annual System Performance Measures.

² 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.

In addition to the criteria outlined in Table 2-1, other information will be considered to affirm that *the set of corridor alternatives to carry forward into the Tier 1 EIS is feasible from an engineering perspective and reflects the range of input received during scoping*. These considerations include:

- **Implementation of Corridor Typical Section:** Understanding of locations where deviations from the assumed typical section may be required throughout the study corridor, and potential engineering challenges might ensue, such as major ROW constraints or geometrically complex roadway layouts.
- **Public and Agency Input:** Assessment of the adequacy of the range of alternatives in reflecting the comments and input received from the public and agency stakeholders during the scoping process and planned Spring 2017 public meetings. Based on input received, alternatives should reflect a mix of existing and new corridor options.

2.2.2 Screening Approach

Because of the long length and relatively narrow width of the study area, conducting the entire evaluation on a series of end-to-end corridors from Nogales to Wickenburg may not adequately identify specific areas of low performance or high impacts, since the accumulation of data over such a large area may produce overall similar results for the end-to-end alternatives. Therefore, the evaluation will be conducted as follows:

- **Evaluation of Corridor Options:** The screening criteria in Table 2-1 will be applied to a set of options in each of the three sections: South, Central, and North (see Figure 2-1). For some criteria, the options will be combined within each section to test scenarios, and identify potential section-based alternatives (e.g., travel times). The screening process will identify those alternatives best meeting the performance criteria through a comparative assessment.
- **Development of Tier 1 EIS Corridor Alternatives:** The outcomes of the screening will be assessed to determine if any corridor alternative options should be refined or removed. The remaining alternatives will be advanced into the Tier 1 EIS, where they will be subject to more detailed analysis. For example, the ASR will evaluate the potential impacts to the most sensitive environmental resources to identify and avoid any substantial issue areas that could result in a corridor alternative being eliminated from consideration. A more comprehensive analysis of environmental resources will be undertaken in the Tier 1 EIS at a programmatic level. The approach to the analysis for the Tier 1 EIS will be discussed in a separate memorandum.

2.3 Public Outreach and Agency Coordination

A second round of public and agency meetings is targeted for May 2017 to obtain input on the corridor alternatives development, screening, and selection process during the ASR phase and a recommendation for the set of alternatives to carry forward into the Tier 1 EIS. A total of six public information meetings are planned, with at least one in each county (i.e., Santa Cruz, Pima, Pinal, and Maricopa). Three agency information meetings will also be held, along with one online webinar for those unable to attend a meeting in person. These meetings will serve to update the public, agencies, and tribal communities on study progress and receive input on the corridor alternatives evaluation and screening process that will be documented in the ASR. In addition, ADOT and FHWA will continue specific coordination with tribal communities to discuss



input on the analysis and the approach to disseminating information and soliciting further input in tribal communities.

The input received from the public, agencies, and tribal communities will feed into the analysis and screening of corridor alternatives, as well as the ultimate decision on the reasonable range of corridor alternatives that will advance into the Tier 1 EIS.

2.4 Definition of Corridor Alternatives for Tier 1 EIS

The final step in the ASR process is to provide more detailed definition of the Corridor Build Alternatives recommended for further analysis in the Tier 1 EIS phase. The alternatives will be described in sufficient detail to identify limits of the 2,000-foot corridor alternatives, as well as the potential ROW requirements to accommodate the typical cross section of a high capacity transportation facility from Nogales to Wickenburg. This information will be the basis for determining potential impacts on the human and natural environments during the Tier 1 EIS phase.

3 SUMMARY AND NEXT STEPS

The FHWA and ADOT have prepared this *Evaluation Methodology and Criteria Report* to outline the overall approach for developing, evaluating, and screening corridor alternatives for the I-11 Corridor during the ASR phase. A separate annotated outline will be developed for the Tier 1 EIS that follows the ASR phase. A general process schedule is illustrated on **Figure 3-1** (Corridor Alternatives Development and Environmental Review Process).

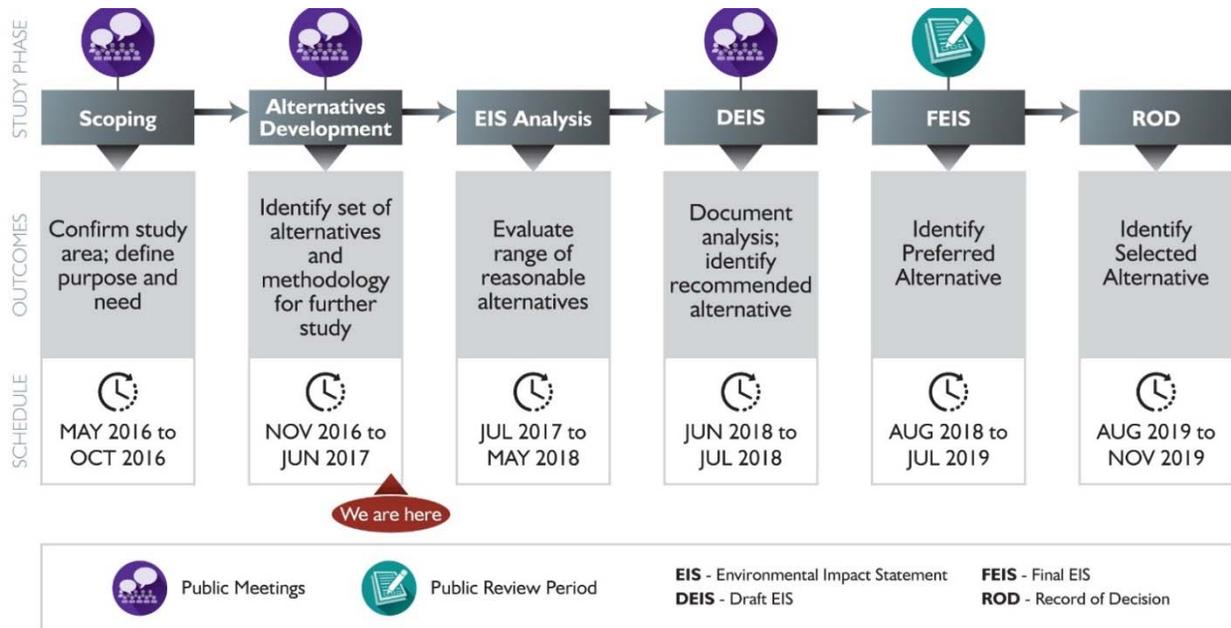


Figure 3-1 Corridor Alternatives Development and Environmental Review Process

3.1 Alternatives Selection Report

The corridor alternatives will be developed and screened based on this ASR methodology and criteria. The process and outcomes will be documented in the ASR. The screening will enable the FHWA and ADOT to eliminate and/or refine corridor alternatives, resulting in a range of options that best meet the overall Purpose and Need of the I-11 Corridor. Ultimately, the screening process will yield a reasonable range of Build Corridor Alternatives and a No Build Alternative (i.e., do-nothing option) that will advance into the Draft Tier 1 EIS for a programmatic-level environmental review.

The public, agencies, and tribal communities will have an opportunity to review and comment on the ASR methodology, criteria, and corridor alternatives. The public, agency, and tribal feedback will be incorporated into the overall evaluation and screening process as the study progresses into the Tier 1 EIS phase.



3.2 Draft Tier 1 EIS

The FHWA and ADOT will prepare a Draft Tier 1 EIS to more fully assess the reasonable range of Build Corridor Alternatives and No Build Alternative that emerge from the ASR. 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;
- Recommend a Corridor Alternative; and
- Provide opportunities for the public, agencies, and tribal communities to review and comment on the I-11 Corridor Draft Tier 1 EIS.

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

3.3 Final Tier 1 EIS and Record of Decision

The FHWA and ADOT will complete the environmental review process with the preparation of a Final Tier 1 EIS and ROD. Originally anticipated to be combined, these will be separated to allow additional opportunity for public review prior to the identification of a Selected Alternative.

Based on comments received to the Draft Tier 1 EIS, the Preferred Alternative will be identified and defined as part of the FEIS, which will be followed with a public review period. After consideration of all final comments received, the ROD will identify a Selected Corridor Alternative (Build or No Build); present the basis for the decision; describe the 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.

The primary goal of the study process is to determine what the Selected Corridor Alternative will be: either a Build Alternative corridor (approximately 2,000 feet in width) or the No Build Alternative. If a Build Alternative is selected, the Draft/Final Tier 1 EIS and ROD would include information on:

- Potential social, economic, and natural environmental impacts and required mitigation;
- 2,000-foot-wide corridor for a proposed interstate transportation facility; and
- Proposed Implementation Plan.

The Tier 1 EIS will provide a roadmap for advancing projects to the next phase – called Tier 2 environmental review. In a tiered process, Tier 2 would be similar to a traditional project-level NEPA review. During the future Tier 2 environmental reviews, ADOT and FHWA would conduct more detailed environmental and engineering studies for the proposed projects within the 2,000-foot-wide Selected Corridor Alternative.



APPENDIX A

Environmentally Sensitive Resources by Section

