Appendix D. Summary of Avoidance, Minimization, and Mitigation Strategies

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Summary of Avoidance, Minimization, and Mitigation Strategies

This appendix summarizes the strategies to avoid, minimize, or mitigate potential environmental impacts resulting from the proposed action. See Chapter 3, *Affected Environment and Environmental Consequences*, of the Tier 1 EIS for further information regarding the resources discussed below.

Land Use

Construction of the North-South Freeway would result in direct, indirect, and cumulative impacts that could require mitigation. At this stage in the development of the proposed freeway, potential mitigation measures can be identified only in general terms—such as minimizing impacts on residential and sensitive environmental areas—until a specific alignment is defined during Tier 2 studies.

The following describes potential mitigation measures to consider as future commitments to avoid, minimize, or mitigate adverse impacts on land use that may result from implementing the proposed action. ADOT may elect to modify, remove, or add measures to mitigate impacts, as appropriate and feasible, as the decision-making process advances and a preferred alternative is identified. Potential mitigation measures identified to date include:

- ADOT would continue to be an active participant in a broader effort with MPOs, local jurisdictions, resource agencies, and private stakeholders to cooperatively plan development in the study area. The effort would coordinate wildlife connectivity, local land use planning, and context-sensitive design for the facility.
- ADOT would coordinate with the entities managing affected public land (for example, ASLD, BLM, and U.S. Bureau of Reclamation) to accommodate the proposed action. In the case of ASLD, ADOT would continue to engage with the Superstition Vistas Steering Committee or other entities involved in planning efforts for this area of State Trust land.

Local Agency Mitigation Strategies

The following describes potential mitigation measures for local planning agencies to consider as future commitments to avoid, minimize, or mitigate adverse impacts on land use that may result from implementing the proposed action. ADOT would work with municipal and county partners to determine the extent to which the below-mentioned measures are appropriate.

- Amending general plans as necessary, depending on individual municipality amendment requirements as stipulated by State law. A.R.S. § 9-461.06 requires each municipality to prepare a plan for addressing major amendments to its general plan. Depending on the municipal requirements, a major amendment process may be triggered by changes to the land use plan to accommodate the proposed action (or the No-Action Alternative, in the case of Pinal County). By statute, major amendments may be considered only once per calendar year.
- Clustering development in certain areas or allowing new development patterns to accommodate a transportation corridor through the area.
- Considering, on a case-by-case basis, mitigation initiated by private landowners as advocated by affected jurisdictions to improve the compatibility of land uses adjacent to the proposed action. The implementation of this strategy would be the responsibility of the affected jurisdictions and landowners and would be subject to the affected jurisdiction’s land development approval process.
- Rezoning undeveloped land to more freeway-compatible uses.

Social Conditions

Potential measures to mitigate adverse impacts on social conditions include:

- ADOT would coordinate with municipal and County partners and affected communities to address concerns regarding the internal roadway network, connectivity with the freeway, and potential grade separations at non-interchange locations to improve local and regional connectivity.
- ADOT would coordinate with municipal and County partners as development occurs to fully integrate the freeway into the regional transportation network.
- ADOT would build upon public involvement efforts undertaken for the NSCS to engage study area residents in the EIS process to help understand community access, connectivity, and circulation concerns and opportunities.

Economics

The impact of land acquisition on property and sales taxes in the area could be mitigated as follows:

- Select action corridor alternatives that minimize full parcel takes.
- Position the freeway in the action corridor alternative in a manner that minimizes takes of taxable land.
- Select action corridor alternatives that minimize takes of land that is currently taxable.

Local Agency Mitigation Strategies

The following describes potential mitigation measures for local planning agencies to consider as future commitments to avoid, minimize, or mitigate adverse impacts on economic conditions that may result from implementing the proposed action:

- Rezone existing undeveloped land for other taxable uses that may compensate for lost tax revenue associated with the necessary takes.

Parkland and Recreational Facilities

During the Tier 2 design for the proposed action, ADOT would avoid impacts on parks and recreational facilities to the extent possible. ADOT would coordinate with the local jurisdictions regarding the affected parks and/or recreational facilities to maintain access to the resources potentially affected to the extent feasible. Where access cannot be maintained or where implementation of the proposed action would require full or partial acquisition of existing parks or recreational facilities, potential mitigation measures would be developed in consultation with the local agencies. Specific mitigation measures may include minimizing the acreage of acquisition of these areas during the Tier 2 design, selecting alternatives that avoid parks and recreational facilities, strategically locating construction equipment to suitable locations within existing parks and recreational facilities, and designing landscaping to offset vegetation removal or to establish screening for noise and visual disturbances.

Prime and Unique Farmland

During the Tier 2 design, ADOT would coordinate with affected property owners to maintain access to farmland to the extent feasible. Where access cannot be maintained, or where property acquisition is required, acquisition would be undertaken in accordance with the Uniform Act (49 CFR Part 24).

Additional mitigation measures may be implemented following consultation with NRCS during Tier 2 analysis.

Air Quality

Because the proposed action would not cause violations of existing air quality standards, and would cause small increases for other pollutants such as MSATs and GHGs, no mitigation measures are proposed.

To avoid and minimize air quality impacts during construction, best management practices would be recommended, such as minimizing wind-blown dust from blasting, particularly near community areas; control and/or avoidance of blasting on days with high winds; and/or the development of a traffic control plan to minimize traffic flow interference from construction equipment movement and activities. Specific measures would be determined during Tier 2 studies.

Noise

As a general matter, new freeway alignments constructed in otherwise quiet noise environments often result in a substantial noise increase at nearby homes (that is, 15-dBA or greater increases over existing noise levels). Under such circumstances and depending on the number of homes affected, detailed consideration of noise barriers would be warranted. Depending on the alignment selected in subsequent Tier 2 studies, expected noise impacts identified at homes may warrant noise abatement measures.

Visual Resources

ADOT would use conventional practices to blend the proposed freeway's features into the existing setting in all segments. These conventional practices would apply equally to all action corridor alternatives and may include:

- Depress the freeway to eliminate visual intrusion in sensitive areas.
- Eliminate highway lighting when not required or if it causes superfluous light pollution.
- Minimize the height of facilities to the extent possible to reduce their visibility.
- Install screening walls to screen views of the freeway.
- Design walls to blend into the character of the community through careful selection of colors, materials, and textures.
- Use plants to provide screening for sensitive visual resources and viewers.
- Design new lighting to direct light to focus where it is needed, minimize light intruding onto adjacent properties, and reduce light pollution of the night sky.
- Minimize cut and fill areas by blending them with the surrounding environment.
- Use grading designs that create natural-looking slopes, surfaces, and transitions.
- Include landscape treatments that blend stormwater channels and basins into their surroundings and create new visual resources in the landscape.

Topography, Geology, and Soils

The combined efforts of the geoscience and engineering communities have led to extensive study and development of successful mitigation practices for many geologic hazards (swelling and collapsing soils, faults, and earthquakes). Engineers, designers, and builders have studied the associated hazards and engineered solutions that, for the most part, successfully mitigate their impacts.

Unfortunately, geologists and engineers lack adequate field tools or analytical methods to determine where a narrow earth fissure crack will present itself, or when that fissure will erode and enlarge, perhaps

overnight, into a dangerous gully or chasm. It is difficult to mitigate and engineer a solution to a problem when the problem itself is not well-understood.

The state of the practice for fissure mitigation is restricted to a handful of designs by local engineers and geologists using experience and judgment to design and construct informal solutions. Generally accepted mitigation methods are lacking, and studies of mitigation failures are wholly lacking, hindering efforts to develop better and surer mitigation methods.

In Arizona, AZGS has adopted guidelines for investigating land subsidence and earth fissures. Under these guidelines, potential land subsidence and earth-fissure hazards should be investigated for proposed projects in areas of known or suspected land subsidence. Research should include reviewing existing data and reports, analyzing remote sensing data, conducting surface and subsurface investigations, conducting a geophysical investigation, and completing other more intensive investigative methods as appropriate when special conditions exist. Siting of critical structures or facilities—where long-term monitoring is crucial—warrants more intensive investigative methods. These more intensive methods include, but are not limited to, conducting aerial reconnaissance overflights, installing and monitoring piezometers, taking high-precision survey or geodetic measurements (including comparison surveys and a program of repeat surveys), measuring strain (displacement) at the surface and in borings as part of a long-term monitoring program, and age dating (AZGS 2011).

Biological Resources

Mitigation strategies for all action corridor alternatives include avoidance, minimization, and mitigation. The following mitigation measures are examples of measures that could be implemented to avoid, minimize, and mitigate impacts on protected species; to comply with state and federal regulations; and to reduce habitat fragmentation, wildlife displacement, impediments to movements, and collisions.

Prior to Initiation of the Tier 2 Biology Analysis

- ADOT would have a qualified biologist conduct surveys for acuña cactus in the study area to determine its presence or absence.
- ADOT would have a permitted avian biologist, approved by USFWS and AGFD, conduct protocol surveys for southwestern willow flycatchers, yellow-billed cuckoos, and Yuma Ridgway's rails in suitable habitats within the study area and 500 feet of disturbance areas to determine their presence or absence. The surveys would be of adequate duration to verify potential nest sites.
- ADOT would coordinate with AGFD and other stakeholders to determine wildlife connectivity data needs and study design. ADOT would facilitate implementation of identified studies prior to the initiation of the Tier 2 process, given the timeline required (likely 2 to 4 years) to collect and analyze sufficient data before draft design plans begin to limit the possible mitigations. ADOT and the stakeholders would identify potential crossing structures, design features, and supporting mitigation or conservation necessary to facilitate the movement of wildlife through the roadway barrier and would incorporate the solutions into subsequent Tier 2 studies.
- ADOT would coordinate with AGFD to develop mitigation strategies including identification of applicant proposed measures and best management practices.

Subsequent Tier 2 Analysis

- Future coordination with AGFD and USFWS regarding wildlife connectivity would be conducted early in the Tier 2 studies.
- Potential wildlife underpass/overpass features to facilitate wildlife movement and reduce vehicular collisions identified during preliminary studies would be incorporated into the Tier 2 analysis.

- Design features and supporting mitigation or conservation measures necessary to facilitate the movement of wildlife through the roadway barrier identified by ADOT and other stakeholders would be incorporated into Tier 2 studies.
- During the design phase, ADOT would coordinate with federal and state wildlife agencies, as required, to identify any species-specific mitigation measures that may be required.
- Any future North-South Freeway segments selected for construction that are located within Sonoran desert tortoise habitat would follow ADOT's existing mitigation strategies. ADOT has developed comprehensive Sonoran desert tortoise mitigation that includes, but is not limited to, education of contractors and ADOT staff regarding tortoise awareness, preconstruction surveys, relocation of tortoises, on-site monitoring of construction activities, and best management practices designed to reduce potential tortoise mortalities during construction.

Before and During Construction

- ADOT would continue to honor its commitments within the Candidate Conservation Agreement for the Sonoran desert tortoise in Arizona (USFWS 2015).
- Invasive species in the project footprint would be treated according to an invasive species management plan prior to construction. ADOT would continue standard practices for addressing noxious and invasive species during operation and maintenance of the facility.
- To comply with the Arizona Native Plant Act, ADOT would salvage plants on site and/or notify the Arizona Department of Agriculture so that it could determine the disposition of those plants.
- Prior to construction, ADOT would have a qualified biologist conduct preconstruction surveys for burrowing owls in all suitable habitat that would be disturbed. The biologist would possess a burrowing owl survey protocol training certificate issued by AGFD. If any burrowing owls or active burrows are located during construction, the contractor would stop work at that location and notify the Engineer immediately. No construction activities would take place within 100 feet of any active burrow. If the Engineer, in cooperation with the ADOT Environmental Planning Biologist, determines that burrowing owls cannot be avoided, a qualified biologist holding a permit from USFWS would relocate burrowing owls from the project area, as appropriate.
- If any Sonoran Desert tortoises are encountered during construction, the contractor would adhere to AGFD's *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects*, revised September 22, 2014.
- To avoid the introduction of noxious and invasive species seeds, and to avoid noxious and invasive species seeds from entering/leaving the sites, all construction equipment would be washed and free of all attached plant/vegetation and soil/mud debris prior to entering/leaving the construction sites.
- Active nest surveys may be conducted if clearing, grubbing, or tree/limb removal would take place during the bird breeding season (February 1 to August 31). Such surveys would be conducted prior to the removal of vegetation.

Hydrology, Floodplains, and Water Resources

Surface Water

None of the action corridor alternatives would completely avoid impacts on water resources because any roadway east of the Phoenix metropolitan area that connects US 60 with I-10 would cross the Gila River and ephemeral washes.

Mitigation strategies for all alternatives include avoidance, minimization, and mitigation. Avoidance can be accomplished by shifting the future construction footprint away from sensitive resources to the extent possible. Impact minimization could be accomplished through temporary best management practices during construction, permanent best management practices after construction, and adherence to federal and state water quality requirements.

Mitigation would be identified to:

- Reduce the quantity of pollutants reaching the Gila and Salt Rivers, if necessary, after further investigations during Tier 2 studies.
- Minimize erosion from cut and fill slopes.
- Prevent erosion along conveyance features.
- Provide settling basins to reduce the potential impact of contaminants.
- Obtain an AZPDES Construction General Permit.
- In compliance with the Construction General Permit, develop a Stormwater Pollution Prevention Plan that includes best management practices for erosion and sediment control.
- Obtain CWA Section 401 certification by ADEQ.
- Coordinate with governmental agencies, including flood control districts, and the community regarding the design of drainage features.
- Relocate irrigation district canals as necessary to allow conveyance of irrigation water from one side of the freeway to the other.
- Obtain CWA Section 402 permit authorization.
- Comply with State of Arizona Surface Water Quality Standard Rules (18 Arizona Administrative Code 11).
- Coordinate with municipal separate storm sewer system agencies.
- Improve surface water quality when the freeway would be open to operation by properly maintaining retention, detention, and stormwater runoff facilities, if necessary, after further investigations during Tier 2 studies.

Floodplains

The proposed action would affect floodplains. The Gila River and tributary floodplains extend across the entire width of the study area. None of the action corridor alternatives would completely avoid causing adverse effects because any freeway east of the Phoenix metropolitan area connecting US 60 with I-10 would necessarily encroach into floodplains.

Mitigating 100-year floodplain encroachments would be accomplished by constructing bridge and culvert structures, where appropriate, to accommodate 100-year floodwaters.

Mitigation measures would minimize the potential for property loss or hazard to life. The following measures would minimize impacts on floodplains as a result of the proposed action:

- Design bridges to cross floodplains so that their support piers and abutments do not contribute to a rise in floodwater elevation by more than 1 foot.
- Minimize floodplain impacts by implementing transverse crossings of the floodplains and avoiding longitudinal encroachments.

- Conduct comprehensive analyses of hydrology, hydraulics, sediment transport, and erosion to minimize the impacts of encroachment.
- Provide the Pinal County Floodplain Manager with an opportunity to review and comment on the design plans.
- Base design criteria for on- and off-site drainage on current ADOT guidance.
- Complete comprehensive hydrologic, hydraulic, sediment transport, and erosion-related assessments regarding potential 100-year flood effects associated with ephemeral washes.

Groundwater

The proposed action would affect groundwater resources. The following measures would minimize impacts on groundwater as a result of the proposed action:

- Field-verify depth to groundwater in high groundwater risk areas.
- Abandon or replace existing groundwater wells within the proposed ROW, as necessary.
- Prior to drilling replacement wells (for those wells that fall directly in the freeway ROW), review historical groundwater quality data in those specific areas to increase the chances of locating groundwater that meets the water quality standards for which it is intended.

Waters of the United States

It is anticipated that none of the action corridor alternatives would completely avoid potential Waters because any freeway corridor would cross the Gila River, Queen Creek, and numerous ephemeral washes. Crossing potential Waters was evaluated during the alternatives analysis for the proposed action (see Chapter 2, *Alternatives*, and Chapter 6, *Evaluation of Alternatives*).

There is a risk of impacts on Waters with both the Eastern and Western Alternatives; therefore, either a Section 404 CWA Nationwide Permit 14 (Linear Transportation Projects) with preconstruction notification or an individual permit from USACE and the respective Section 401 certification from ADEQ would be required. ADOT would comply with all terms and conditions of the CWA permitting as established by USACE.

If an individual permit under Section 404 of the CWA would be required, ADOT would follow Section 404(b)(1) guidelines. Under Section 404(b)(1), ADOT is required to select the LEDPA, considering cost, existing technology, and logistics to identify practicable alternatives, as well as the environmental impacts of alternatives that would avoid the Waters, in light of overall project purposes (40 CFR Part 230). According to Section 404(b)(1), when avoidance of Waters would not be practicable, minimization of impacts would be achieved, and unavoidable impacts would be mitigated to the extent reasonable and practicable.

The avoidance, minimization, and mitigation strategies identified in Section 3.12, *Hydrology, Floodplains, and Water Resources*, present the actions ADOT would take with regard to mitigating and reducing the impact of the proposed action on surface water and floodplains. In addition to these strategies, the following steps would be taken by ADOT should a Section 404 individual permit be required:

- minimize impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts
- rectify impacts by repairing, rehabilitating, or restoring the affected environment
- reduce impacts over time by preservation and maintenance operations during the life of the action
- compensate for impacts by replacing, enhancing, or providing substitute resources or environments

The general and special conditions of any Section 404 permit would be followed during construction.

Cultural Resources

The proposed action has the potential to adversely affect historic properties between US 60 and I-10. Therefore, ADOT will develop a programmatic agreement, pursuant to Section 106 of the NHPA, to define procedures for continuing to consider effects on historic properties during the proposed phased planning and construction of Tier 2 projects. The programmatic agreement will commit to the identification and evaluation of historic properties, determination of effects, and resolution of any adverse effects on historic properties during the NEPA process and construction of the individual Tier 2 undertakings; commit to consultation with the tribes that may ascribe traditional religious and cultural significance to historic properties that may be affected by the undertaking; commit to compliance with all applicable federal and state laws and regulations in effect at the time of each undertaking; and commit to assess and evaluate site AZ U:14:73(ASM) as a potential TCP if a Western Alternative is selected.

Potential mitigation measures could include—but are not limited to—archaeological testing and data recovery, flagging of sites for avoidance, monitoring of sites during construction, a Historic American Buildings Survey, or a Historic American Engineering Record. These types of mitigation would be guided by plans that are required by the agreement document and consulted on through the Section 106 process.

Hazardous Materials

When possible, avoidance or minimization is the primary mitigation for identified hazardous materials sites. The following list describes potential mitigation measures to avoid, reduce, or otherwise mitigate environmental impacts associated with the proposed action. However, a detailed analysis of avoidance, minimization, and mitigation strategies applicable to the action corridor alternatives, including specific responsibilities of the construction contractor, would be developed during subsequent Tier 2 analysis, described in Section 3.15.6, *Subsequent Tier 2 Analysis*.

- No activity would occur in an area that potentially has lead-based substances until a Lead-Based Paint Removal and Abatement Plan is approved and implemented.
- The engineer, in association with the contractor, would complete the National Emission Standards for Hazardous Air Pollutants documentation and submit it to the ADOT Environmental Planning hazardous materials coordinator for review 5 working days prior to it being submitted to the regulatory agency or agencies.
- No activity would occur in an area that potentially has asbestos until an Asbestos Removal and Disposal Plan is approved by the ADOT Environmental Planning hazardous materials coordinator.
- Staging for construction activities near wells or dry wells would be located in areas where accidental releases of potential contaminants would be minimized and any accompanying threat to groundwater resources minimized.
- In cooperation with the contractor, ADOT's Construction District would develop and coordinate emergency response plans with local fire authorities, local hospitals, and certified emergency responders for hazardous materials releases or chemical spills.
- Asbestos- and lead-paint-containing materials identified in structures to be demolished would be properly removed and disposed of prior to demolition.
- Existing aboveground storage tanks or underground storage tanks would be removed or relocated.
- The contractor would develop an on-site health and safety plan for construction activities.

- A hazardous waste management plan would be prepared for handling hazardous materials during construction.
- If suspected hazardous materials are encountered during construction, work would cease at that location and the engineer would be notified. The engineer would contact the ADOT Environmental Planning hazardous materials coordinator immediately and make arrangements for assessment, treatment, and disposal of the materials.

Energy

No mitigation is proposed for energy use associated with the proposed action.

Environmental Justice and Title VI

For each resource area considered, specific avoidance, minimization, and mitigation measures may be implemented to reduce the adverse effects of the proposed action and to not result in disproportionately high and adverse effects on minority and low-income populations. These specific measures would be developed during Tier 2 studies once actual alignments are developed and their impacts are evaluated in greater detail. Targeted community outreach would be conducted during Tier 2 studies to identify minimization and mitigation measures. Possible strategies could include:

- specifying commitments in terms of time frame or performance standards so that expectations are clear
- providing ongoing commitment and monitoring reports to minority and low-income populations
- conducting additional outreach to minority and low-income populations
- assigning a dedicated point-of-contact to be available for EJ-related concerns and issues during the Tier 2 process
- including monitoring requirements, and sharing the results, to alleviate concerns
- providing appropriate compensation through replacement or substitute resources
- rectifying an impact through repair, rehabilitation, or restoration

Temporary Construction Impacts

Short-term impacts associated with construction would affect the following resource areas:

- social conditions
- parkland and recreational facilities
- traffic and transportation
- air quality
- noise
- visual resources
- biological resources
- waters of the United States
- hydrology, floodplains, and water resources
- minority and low-income populations
- utilities

The following table discusses these impacts and potential mitigation measures to address such impacts.

Short-term construction impacts, by resource

Resource	Impacts	Potential mitigation
Social conditions	• Detours, lane closures, and the movement of construction-related vehicles would temporarily affect access to residential areas and businesses. Construction-related activities have the potential to affect access to community facilities and services, and the delivery of emergency services. • Construction of the proposed action would generate employment opportunities throughout the construction period.	• ADOT's traffic control management procedures would be implemented to avoid, minimize, or mitigate potentially adverse construction-related access impacts on affected neighborhoods, businesses, and community facilities and services. • Construction action and traffic control plans would identify temporary transportation impacts and the locations of potential temporary detours. The plans would help ensure that local access to homes and businesses, and access for emergency services providers, is maintained. Plans would specify time frames for temporary detours and identify the process for notifying affected parties of the construction period and changes in access. • ADOT would work with local contractors to employ workers who reside in Pinal County and/or across the larger region.
Parkland and recreational facilities	• Construction impacts on parks or recreational facilities would occur if resources are located near or in the construction area. Temporary impacts might include increased dust from ground disturbance, noise from construction equipment, views of construction activities, access restrictions, and the presence of construction staging areas.	• To minimize potential construction-related impacts, mitigation measures may include strategically locating construction equipment to suitable locations near existing parkland and recreational facilities and establishing screening for noise disturbances.
Traffic and transportation	• Construction activities would temporarily affect vehicular movements, on-street parking, and access to adjacent properties along existing streets. The number of lanes along existing arterial streets adjacent to construction activities may be reduced periodically during construction, and detours may be necessary at some locations. • The movement of construction vehicles would create temporary traffic impacts in areas close to the construction zone, the extent of which would depend on which alternative is selected as the preferred alternative, and on the amount of new development at the time of construction. In addition, the magnitude of these impacts would depend on the location of sources of fill material and of disposition sites for surplus material, land uses adjacent to the Corridor and along haul routes, duration of hauling operations, staging locations, and construction phasing.	• Traffic would be managed by detailed traffic control plans and by procedures and guidelines specified in Part VI of FHWA's *Manual on Uniform Traffic Control Devices* (FHWA 2009) and by the *Arizona Supplement to Part VI of the Manual on Uniform Traffic Control Devices* (ADOT 2012b). In planning traffic control measures, the contractor would coordinate with potentially affected public services. Access would be maintained during construction, and construction activities that may substantially disrupt traffic would not occur during peak travel times. • ADOT would coordinate with local jurisdictions regarding traffic control and construction activities during special events. Requirements for using construction notices and bulletins would be identified. The effectiveness of traffic control measures would be monitored during construction and necessary adjustments would be made. • To identify acceptable routes and times of operation for hauling operations, ADOT would prepare an agreement with local agencies regarding hauling of construction materials on public streets.

Short-term construction impacts, by resource

Resource	Impacts	Potential mitigation
Air quality	• Air quality impacts associated with construction would be limited to short-term increased fugitive dust and mobile source emissions. Fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and other earthmoving vehicles. Increased dust levels would be attributable primarily to particulate matter resuspended by vehicle movement over paved and unpaved roads and other surfaces, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks. Most fugitive dust is made up of relatively large particles (that is, greater than 100 microns in diameter) that are responsible for the reduced visibility often associated with this type of construction. Given their relatively large size, these particles tend to settle within 20 to 30 feet of their source.	• To reduce the amount of construction dust generated, particulate control measures related to construction activities would be followed. Measures to avoid, minimize, or mitigate adverse effects would be implemented in accordance with the most recent version of ADOT's *Standard Specifications for Road and Bridge Construction* (ADOT 2008b). The measures would address three phases of construction: site preparation, construction, and postconstruction.
Noise	• Roadway construction generates a substantial amount of temporary noise in localized areas. As a result, noise generated by construction activities has the potential to be a nuisance to nearby residents and businesses. • The most common noise source in construction areas would be from engine-powered machinery such as earth-moving equipment (bulldozers), material-handling equipment (cranes), and stationary equipment (generators). Mobile equipment (such as trucks and excavators) operates in a sporadic manner while stationary equipment (generators and compressors) generates noise at fairly constant levels. • Typical noise levels from construction equipment range from 69 to 106 dBA at 50 feet from the source; however, most typical construction activities fall within the 75 to 85 dBA range at 50 feet.	• ADOT's *Standard Specifications for Highway and Bridge Construction* (2008b) stipulate that all exhaust systems on equipment should be in good working order, and properly designed engine enclosures and intake silencers should be used where appropriate. • Stationary equipment would be located as far from sensitive receptors as possible. • On-site generators would be shielded from sensitive noise receptors by using temporary noise enclosures. • Construction alerts would be distributed to inform the public of ongoing construction activities near noise-sensitive locations.
Visual resources	• Temporary visual impacts would result from construction activities, such as temporary vegetation removal, disturbed soil, construction equipment, and construction equipment operation. Such impacts would occur where the proposed freeway is adjacent to existing homes and where the proposed traffic interchanges would be built. These temporary disruptions and activities would be typical of any major roadway project and are not considered adverse.	• No mitigation would be needed for temporary construction impacts on visual resources.
Biological resources	• Temporary construction impacts would occur during and for a period after construction because of reduced habitat quantity and quality in disturbed areas. • During construction, artificial lighting and noise and dust in the air generated by equipment and human activity could temporarily displace birds from foraging, resting, and nesting habitat. Disturbance-related displacement from favored breeding habitats could result in birds competing with other birds for suitable replacement habitats. This could result in nesting in less-favored areas where nests may be damaged or accessed more easily by predators, which could limit survival of offspring or adults.	• Once construction activities are complete, disturbed native desertscrub habitats adjacent to the new roadway embankment would be addressed according to a revegetation plan. • Measures to avoid, minimize, and mitigate impacts on protected species, comply with state and federal regulations, and reduce habitat fragmentation, wildlife displacement, impediments to movements, collisions, and spread of invasive species would be developed for a preferred alternative during the Tier 2 study.

Short-term construction impacts, by resource

Resource	Impacts	Potential mitigation
Waters of the United States	• Temporary construction zones may result in additional impacts on waters of the United States beyond the permanent impacts associated with road and bridge crossings for the proposed action.	• During the Tier 2 study, the preferred alternative would be evaluated for specific impacts on waters of the United States, the appropriate level of Section 404 permitting would be identified, and mitigation measures would be developed.
Hydrology, floodplains, and water resources	• Construction activities such as clearing, grading, trenching, and excavating would disturb soils and sediment. If not managed properly, disturbed soils and sediment could be washed into nearby water bodies during storms, thereby reducing water quality. • Potential areas of shallow groundwater were identified in the study area. If groundwater is determined to be shallow at locations near the proposed action, it may affect the facility's foundation and subgrade design, and could require dewatering during construction activities.	• Measures to avoid, minimize, or mitigate impacts on hydrology, floodplains, and other water resources would be implemented to address temporary construction impacts. • Ground-disturbing activities exceeding 1 acre would require an AZPDES permit from the Arizona Department of Environmental Quality. The permit must be consistent with discharge limitations and water quality standards established for the receiving water. • Construction-related activities regulated under the AZPDES permit are required to have a Stormwater Pollution Prevention Plan, which would be prepared by the contractor. • Implementing best management practices would reduce water quality impacts on the receiving waters of the Gila River and its tributaries. Both construction and operational impacts may be mitigated by using best management practices. • During design, the depth to groundwater in areas with potentially shallow groundwater would be field-verified.
Minority and low-income populations	• Construction-related impacts may disproportionately affect minority and low-income populations in the study area. These construction-related impacts include adverse effects on social conditions, parkland and recreational facilities, traffic and transportation, air quality, noise, visual resources, and utility service. These construction-related impacts would be short-term and temporary because they would occur during construction or until ground-disturbing activities are completed.	• Mitigation measures presented in this table would address construction-related impacts for both minority and low-income populations and the general population.
Utilities	• Construction may temporarily disrupt the delivery of utility services to customers near the proposed action. Table 3.18-2 identifies the number the existing public utilities that may be in conflict with the proposed action. • Potential permanent impacts, such as required utility relocations resulting from conflicts with the proposed action, may also result and would be evaluated during the Tier 2 study once a preferred alternative is selected and the specific conflicts are identified.	• Disruptions to utility services would be restricted to being short-term and localized. Advanced planning would be accomplished during the design phase so that interruption of the delivery of utility services would not occur or would be minimized. • ADOT and its contractors would coordinate with utility service providers during the design phase and throughout construction to identify potential problems and/or conflicts and to provide opportunities for their resolution before construction begins. • Utility interruptions would be scheduled and prior notification would be provided to affected parties. • Emergency response procedures would be outlined by ADOT in consultation with utility providers to ensure quick and effective repair of any inadvertent or accidental disruptions in service.

Notes: ADOT = Arizona Department of Transportation, AZPDES = Arizona Pollutant Discharge Elimination System, Corridor = North-South Corridor, dBA = A-weighted decibel, FHWA = Federal Highway Administration

Section 4(f) and Section 6(f) Resources

During Tier 2 studies, ADOT would coordinate with owners with jurisdiction over the Section 4(f) properties to identify further avoidance or minimization measures to reduce impacts on affected parks and recreational facilities (that is, city or regional parks departments, or other specific agencies) and historic properties (that is, SHPO). Efforts would be made to maintain access to the resources potentially affected to the extent feasible. ADOT would also coordinate with local agencies on planned park and recreational resources and the potential for joint development. Where access cannot be maintained or where implementation of the proposed action would require full or partial acquisition of existing parks or recreational facilities, potential mitigation measures would be developed in consultation with the local agencies. Specific mitigation measures may include minimizing the acreage of acquisition of these areas during the design phase, selecting alternatives that avoid parks and recreational facilities, strategically locating construction equipment to suitable locations within existing parks and recreational facilities, and designing landscaping to offset vegetation removal or to establish screening for noise and visual disturbances.

If the North-South Corridor advances into Tier 2 design and NEPA analysis, ADOT would examine ways to avoid or minimize impacts on Section 6(f) properties. Potential strategies ADOT could consider include, but are not limited to, defining alignments that do not use park properties and incorporating refinement details—such as using retaining walls to minimize the proposed freeway's footprint.

As part of that effort, ADOT would continue coordinating with the agencies having jurisdiction over the potentially affected properties. If land from one or more properties cannot be avoided, Section 6(f) requires replacement of park land that is converted to a transportation use. The land must be equal to or greater in value than the affected land in terms of its ability to serve as park land. To achieve this requirement, if park land cannot be avoided, ADOT would assist in identifying replacement land.

During the Tier 2 studies, if a preferred alignment would adversely affect a property or properties that are listed on or eligible for listing on the NRHP or are unevaluated (requiring more research or archaeological testing to determine their NRHP eligibility), a document such as a memorandum of agreement or a programmatic agreement would be developed through the Section 106 process. This agreement document would detail the measures FHWA and ADOT would take to mitigate any adverse effects on these properties. Potential mitigation measures could include—but are not limited to—archaeological testing and data recovery, a Historic American Buildings Survey, or a Historic American Engineering Record. These types of mitigation would be guided by plans that are required by the agreement document and consulted on through the Section 106 process.

Indirect and Cumulative Impacts

To avoid, minimize, or mitigate any potential indirect effects and cumulative impacts, ADOT would collaborate with local jurisdictions, resource agencies, the public, and private stakeholders to participate in discussions regarding development in the North-South Corridor. These efforts would coordinate local land use planning, local and regional connectivity, and context-sensitive design, while preserving and enhancing wildlife habitat and connectivity. Specific mitigation measures, to the extent required, would be identified as part of Tier 2 studies when more details of the freeway design and operation are known and project-specific indirect and cumulative impacts are identified. All mitigation strategies to address direct impacts on resources in the study area would also mitigate cumulative impacts.

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