

Attachment A: Christopher Creek Highway Project Environmental Impact Mitigation Measures

The effects of the recommended build alternative have been assessed and documented in the project's Final Environmental Impact Statement (FEIS). The findings of the FEIS and the mitigation commitments made therein will remain in effect for three years following FHWA's Record of Decision (ROD). For all design segments of the recommended alternative subsequent to the post-ROD three-year period, project reevaluations must be conducted to confirm the final design is in accordance with the provisions stipulated in the FEIS. If a design change is proposed, supplemental documentation must be prepared as part of a Design Change Reevaluation to assure compliance with NEPA requirements and FHWA guidelines.

The mitigation commitments provided below have been taken from the approved FEIS. This list applies to all segments of the recommended alternative for the proposed widening of SR 260 between Payson and Heber. Where required, site specific mitigation measures must be developed through consultation between ADOT and the Forest Service during final design of each construction segment. ADOT will implement the mitigation measures by incorporating details into the construction plans, specifications, and special provisions, and by construction monitoring. The Forest Service will approve plans and specifications, and will monitor construction on National Forest land. On private land, ADOT will provide a comparable level of effort to adhere to the agreed-upon ADOT/Forest Service standards of resource protection. ADOT, with input from the Forest Service, will also direct all activities performed by the construction contractor(s).

In addition to the mitigation commitments, some techniques used to accomplish the mitigation objectives are also listed. The Forest Service's best management practices appropriate to this project have also been incorporated. An erosion control plan and a reclamation/revegetation plan must be prepared during the design of all segments of the recommended alternative. The plans will be approved by the Forest Service prior to construction, implemented by ADOT during construction, and monitored by ADOT and the Forest Service following construction.

Minimizing erosion within and adjacent to the highway contributes to the protection of many resources. It is important to prevent erosion to stabilize highway cut and fill slopes, and thus maintain the safety and integrity of the highway. It is also important to keep topsoil in place to enable revegetation; once vegetation is re-established, it helps to minimize further erosion. Vegetation and the absence of erosional scars preserve the visual quality of the landscape. By preventing sediments from entering streams, water quality is preserved for the designated protected uses of the streams in the study area; e.g., Tonto Creek and Christopher Creek. Therefore, the following measures are identified to minimize erosion during and after construction.

- ADOT will prepare an erosion control plan for each construction segment to submit for Forest Service approval prior to advertising for construction bids. Pursuant to 23 CFR Part 650, Subpart B, project designs will include features to reduce erosion and minimize sedimentation during and after construction. The plan will identify locations where specific erosion control measures will be implemented, and will specify methods and procedures to control erosion during specified construction stages and times of the year.

- All construction work will be planned and completed to minimize increases in the potential for sheet, gully, and rill erosion. All earthwork will be shaped in a manner that will permit storm runoff with a minimum of erosion. Other measures to minimize erosion may be specified in the construction documents to include temporary and/or permanent berms, dikes, dams, sediment basins and slope drains, and may include the use of temporary mulches, native seeds, hay or straw bale check dams, silt fences, and other devices or methods. Progressive seeding will be done early in the construction phase to establish a vegetative cover on exposed slopes, and minimize slope erosion.
- All temporary pollution and erosion control structures will be operated and maintained in a functional condition. During construction, accumulated sediment will be removed on a regular basis and incorporated into the project. After construction is completed, sediment will be disposed at locations approved by each Ranger District.
- Sediment structures will remain in service until all disturbed areas draining into the structure have been satisfactorily stabilized, as specified in the erosion control plan.
- The outlets of all ditches, drains, and pipes will be protected to prevent erosion. Outlets will not be located where discharge will initiate accelerated erosion down-gradient from the outlet. Scour protection will be provided where conditions warrant, as indicated in the ADOT Drainage Manual.

Water quality may be impaired by a number of pollutants such as sediment from erosion, fuels and lubricants used in construction equipment, construction waste, and trash. The following measures are intended to minimize polluting sources and to keep pollutants from entering water bodies.

- As described in the erosion control plan, precautions will be taken to prevent the pollution of streams with discarded materials, soils, sediment, muddy water, or other harmful materials. These materials will not be discharged into any channels leading to streams, lakes, or reservoirs.
- Wash water from aggregate washing or other operations containing mud or silt will be treated by filtration or retention in settling structures that are adequate to prevent muddy water from entering the Rim-area lakes or the perennial streams below the Mogollon Rim (i.e., Christopher, Hunter and Tonto Creeks).
- All discarded matter (including but not limited to human waste, trash, garbage, oil drums, fuel, ashes, equipment, concrete, and chemicals) that is generated by construction activities will be removed or disposed of according to state and federal regulations. Construction areas will be maintained in a sanitary condition at all times.
- Contractor staging areas and storage areas for petroleum products and other chemicals used by the contractor will be located or protected so that spills do not enter stream channels or impact ground water. Hazardous or toxic waste generated or used on site will be disposed in a manner consistent with federal and state regulations.

- Portland cement, fresh Portland cement concrete, and wash water from concreting operations will not be deposited on National Forest land outside of the construction roadway prism.
- Where the construction area encroaches on a perennial, ephemeral, or intermittent stream, barriers will be constructed and maintained between the working areas and the stream or streambed to prevent the discharge of any contaminants. Stream channels and floodplains will be promptly cleared of all piling, debris, and other obstructions placed by or resulting from construction operations.
- All crossings and equipment in stream channels will be closely monitored. Mechanical equipment will not be operated in running streams. Perennial and intermittent streams will be crossed by installing temporary crossing structures at predetermined or approved locations.

Because construction activities will occur on or adjacent to private and public lands, specific requirements are needed to ensure the disturbance to the landscape is kept to a minimum and appropriate restoration measures are implemented. The following measures are proposed to achieve this objective.

- The limits of ground disturbance for construction access will be pre-approved by the Forest Service and shown on the project plans. Locations for equipment yards, batch plants, and other construction-related activities will be shown on resource protection plans included in the final design plans package following Forest Service concurrence on their location. All construction vehicle movement outside of these limits will be restricted to predesignated roads. All construction work will be restricted to and confined within the predetermined limits to minimize the amount of disturbed area.
- The contractor will preserve and protect all vegetation on or adjacent to the work site that does not unreasonably interfere with the work required under the construction contract. The contractor will only remove trees when specifically authorized to do so, and will avoid damaging vegetation that will remain in place.
- The clearing limits will be irregular and will be staked by the construction contractor for approval by a Ranger District representative prior to the start of clearing. Limits of clearing will generally extend from top of cut (including rounding) to toe of fill. Long, straight clearing lines will be avoided when possible by deliberately varying the width of the area to be cleared, or by deliberately leaving selected clumps of vegetation within but near the edge of the clearing limit. The objective will be to feather in different types of vegetation.
- Slash (tree trunks, branches, stumps, and other vegetation) created from clearing operations, litter, and debris will be disposed of by chipping brush, roots, or other debris; hauling slash to a disposal site on private land; or burning the material within the right-of-way or in a designated spot on the Forest following authorization by the District Ranger.
- Every effort will be made to balance earthwork within each construction contract. The earthwork balance will be determined by the 30% final design phase. If not attainable, the method(s) for excess material disposal will be subject to joint

approval by ADOT and the Forest Service, and may include one or more of the following options:

- Minor adjustments to the roadway line and/or grade;
 - Stockpile for use on adjoining segments to be constructed in the near future;
 - Deposit on abandoned/obliterated sections of the existing highway;
 - Stockpile for use on future Forest Service projects;
 - Use in reclaiming old borrow pits;
 - Adjust the roadway cross-section (prism) on designated fill slopes, especially to improve safety and to enhance the potential for revegetation;
 - Dispose the material at predetermined waste sites in the National Forest relatively close to the project; or
 - Remove the material from National Forest land.
- Construction staging areas within each construction segment will be determined by 30% final design based upon consultation between ADOT and the Forest Service.
 - Waste material from the old roadbed (asphalt and concrete) will be removed from the Forest if it cannot be used as fill material in the areas of new construction. Old roadbed material will not be used for fill where the material could affect streams.
 - Disturbed soils in all construction-related areas will be restored to their natural state and contours to the extent that is practical without unacceptable loss of vegetation. All construction roads will be obliterated and revegetated. Until this work is complete, construction roads will be blocked by boulders, berms, fencing, or other methods to prevent use by off-highway vehicles.
 - Site-specific reclamation and revegetation plans will be prepared by ADOT, and included in the construction documents. The plans will include preserving existing vegetation, limiting the clearing area, disposing of slash, and revegetating methods.
 - Revegetation will include all areas disturbed by new construction or by the evaluation of cultural resources as well as abandoned and obliterated sections of existing SR 260. Areas that are barren because of previous disturbance from abandoned roads that are not part of the new construction, but are within the limits of construction, will also be revegetated when suitable, according to special details as shown on the plans. Seeding will be according to the revegetation plan and/or special provisions and will specify method, seed, and mulch.
 - Native species will be used to revegetate disturbed areas. Non-native species may be used where immediate soil protection is necessary. Cut slopes in rock will not be revegetated. ADOT, in coordination with the Forest Service, will visit the project area for two seasons after the area is seeded to assess the re-establishment of vegetative cover. To shorten habitat recovery time, revegetation will include the use of varying sizes of plants, where possible.

- Riparian vegetation that is removed or injured during construction will be replaced. The reclamation and revegetation plan will specify locations, plant materials, and methods required to assure no net loss of riparian vegetation.

Because SR 260 traverses rolling and mountainous terrain, specific measures are needed to reduce the visual contrast of the proposed roadway improvements in both national forests. The following measures were developed to mitigate the effects of new cut and fill slopes along the route and blend the improvements into the surrounding landscape.

- Final cut and fill slope faces will blend with the form, line, color, and texture of the surrounding landscape. The appearance of constructed slopes will be improved by rounding the toe and top of slopes, warping, blending the ends of slopes, varying slope ratios, utilizing staggered ledges and roughening the face of cut slopes, either by ripping or blasting in accordance with the *Guidelines for Highways on National Forest Land* (ADOT and USDA/forest Service, September 1994). These measures should be applied at the locations identified in Appendix D.
- Rock slope surface treatments will be applied to cut slopes in competent rock areas as identified in the geotechnical testing results. These treatments include roughening of the cut faces to incorporate short, staggered ledges, minor warping, planting pockets, or other irregularities in the rock in order to create a natural appearance. Steep slopes (i.e., 1.5:1 or steeper) will be limited to rock cut areas. All other side slopes will be 2:1 or flatter. If necessary, retaining walls will be incorporated into the design to achieve 2:1 slopes.
- Roadside structures, guardrails, walls, fences, and culvert end sections will be designed to minimize visual impacts within the constraints of acceptable standards.
- At the 30 percent design submittal, the centerline and profile alignment will be refined to reduce visual impacts caused by landform and vegetation contrasts or project visibility.
- The borrow pit located north of the highway near Milepost 264.7 (between Station 663+00 and Station 680+00) will be screened from view from SR 260.

The proposed improvements will impact cultural and biological resources within both national forests. In order to mitigate the disturbance to archaeological sites and protect sensitive species, the following measures shall be implemented.

- Pursuant to the Programmatic Agreement between ADOT, FHWA, the State Historic Preservation Officer (SHPO), Forest Service, and the Advisory Council on Historic Preservation, the following activities must be completed regarding cultural resources prior to any ground disturbance associated with each construction project.

- A historic properties inventory of the proposed roadway right-of-way and all staging/use areas will be conducted during the design of any improvements to SR 260. Historic properties include, but are not limited to, archaeological sites, historic buildings, and historic roads. All inventory reports will be submitted to the Forest Service and SHPO for review and comment regarding the adequacy of the inventory and determinations of eligibility.
- If historic properties cannot be avoided, Treatment Plans, Monitoring/Discovery Plans, and Data Recovery Plans will be developed to mitigate the effects on historic properties, and submitted to the Forest Service and SHPO for review and concurrence prior to implementation.
- If data recovery is required, ADOT will maintain informal weekly contact with the Forest Service regarding discoveries and incidents of damage to properties once data recovery is initiated. In addition, monthly progress reports will be prepared and submitted to the Forest Service regarding all monitoring activities.
- Data recovery operations in the field must be completed prior to the onset of ground clearing activities for any construction project.
- If, during construction, any previously unrecorded archaeological or historical sites are encountered, construction will be suspended at such site and proper treatment will be determined by those parties noted above.
- ADOT will prepare written instructions for all supervisory construction personnel on the protection of cultural and ecological resources, including all agreed-to environmental stipulations for the project. The instructions will also address (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
- The following activities regarding the Mexican spotted owl will be completed prior to construction of any highway segment within designated owl critical habitat and/or suitable habitat.
- Field behavioral studies for the Mexican spotted owl will be conducted within the designated critical habitat zones and suitable habitat along SR 260 to better determine this endangered species' seasonal movements as well as foraging and dispersal behavior. These studies will be initiated 3 to 5 years prior to starting construction in areas that contain critical and or suitable habitat. If protected species are found, additional agency coordination will be required, and the need for special mitigation (e.g., limiting construction during the breeding/nesting season) will be evaluated.
- Additional Mexican spotted owl surveys will be conducted in all potential habitat according to the current standardized Forest Service protocol for the two years preceding the commencement of construction of each road segment. Additional surveys will not be required in the areas in which the behavioral study is being conducted.

- Measures will be developed to minimize any noise disturbance to the Mexican spotted owl by heavy machinery during construction or, when possible, construction will be conducted during the non-breeding season. Nighttime construction activities requiring the use of lights will be avoided.
- Field reconnaissance surveys for protected species, such as the southwestern willow flycatcher, will be conducted in those areas where there is a reasonable probability of the occurrence of federal or state listed endangered and threatened species, and Forest Service sensitive species.
- Important wildlife crossing locations have been identified, and will be mitigated by incorporating additional bridges, where possible, to allow animals to safely cross under the highway. When structures are designed for wildlife crossings, input from the U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department, and the Forest Service will be considered to help ensure the crossing is adequately sized for the specific wildlife passage.
- Important travel corridors for sensitive bird species (e.g., Mexican spotted owl and northern goshawk) exist above the Mogollon Rim where densely vegetated canyons either abut or approach the existing highway; i.e., Willow Springs Canyon (MP 283.5), Willow Creek Canyon (MP 284.1), Smith Canyon (MP 290.5), Little Wildcat Canyon (MP 292.0), Brookbank Canyon (MP 293.0), Middle Fork of Brookbank Canyon (MP 293.5), and the East Fork of Brookbank Canyon (MP 294.0). In order to maintain the integrity of these corridors, the vegetation will be retained adjacent to the highway within these corridors, and guardrail will be installed along the travel lanes to avoid clearing all vegetation within a 10-m (30-ft) recovery area. The existing conditions, i.e., varying height tree canopies and percent closure, will be retained to the greatest extent possible.
- Because there is an expected direct loss of roosting and foraging habitat for bats as a result of this project, opportunities to replace or enhance roosting habitat for bats will be identified and evaluated during final design. The practicality of the use of bridge designs that enhance bat roosting opportunities (e.g., box beam designs) or modification of wildlife culvert crossings to address the needs of roosting bats will be evaluated. The practicality of incorporating some structural device to the underside of new/old bridges along the highway for bats will be evaluated. Bat boxes/houses will be placed at intervals along the highway in the more remote, forested areas.

The proposed widening of SR 260 from two to four lanes will result in the direct loss of wildlife habitat and indirectly reduce the functional value of habitat adjacent to the expanded facility. Although total compensation cannot be achieved, the following measures shall be implemented to mitigate habitat losses and partially restore functional values. Specific details of how these measures will be applied shall be developed through consultation between ADOT, AGFD, and the Forest Service during final design.

- Abandoned sections of the existing roadway will be obliterated and revegetated to replace displaced upland habitat, and disturbed areas will be contoured, prior to revegetation, to approximate the natural topography. If the abandoned roadway areas are used as waste sites for excess materials, the areas will be graded to blend with the adjacent terrain prior to revegetation.
- Habitat enhancement measures for elk, e.g., facilitating understory growth to provide shelter or establishing grassed meadows for foraging, will be developed away from the roadway.
- Install additional water catchments on the opposite side of the highway, and away from the highway, from the catchments that currently exist to enhance habitat values for all wildlife, and discourage animals (particularly large game) from crossing the highway to reach water.
- Impacts to the wetlands associated with Lakes One and Two will be avoided by locating the future edge of shoulder pavement in the same location as the existing edge of the nearest travel lane, and constructing the roadway improvements to the north and south, respectively. Other wetland impacts will be mitigated by raising culvert inverts or constructing low berms under bridges (e.g., at Willow Springs Draw and Willow Creek) to retain water in those areas where the roadway embankment has impounded water and created wetlands as defined by either the Corps of Engineers or USFWS. In addition, bridge abutments will be located outside of all wetland boundaries.
- To further protect wetland areas, wetland delineations will be performed during final design to accurately determine wetland boundaries relative to the final location of the planned improvements. The wetland boundaries will be surveyed and tied to the limit of construction boundaries on the final plans so the construction contractor is fully aware of the wetland limits, and that these areas are not to be entered. The delineations will be performed by certified specialists in accordance with the Corps of Engineers' 1987 Manual, and the Corps' concurrence in the accuracy of the delineations will be obtained prior to the 100% plans submittal.
- Riparian habitat that is disturbed during construction will be replaced in-kind. Consideration will also be given to enhancing other riparian areas within the project area that have been stressed by human activity (e.g., hiking).
- Trees and other indigenous vegetation will be planted near new drainage facilities to improve wildlife habitat and restore some functional values lost by roadway construction.

As documented in Chapter 5-Section 4(f) Evaluation, widening of SR 260 to a four-lane divided roadway will displace campground facilities at the Ponderosa and Tonto Creek Campgrounds within the Tonto National Forest. To mitigate this impact, ADOT will replace the 100-unit group campground from the Ponderosa Campground and the 28 individual campsites from the Upper and Lower Tonto Creek Campgrounds at either the Ponderosa Campground or the planned future campground site located west of Sharp Creek on the south side of SR 260. The replacement facilities will be designed and constructed to current standards, and the replacement will be phased in consultation with the Payson District Ranger so that the number of available campsites will remain constant during the displacement/replacement cycle.

Because Design Concept Alternative H1-1 will result in increased noise levels that exceed the 67 dBA NAC at two separate cabin locations in Forest Lakes Estates, noise abatement measures were considered to reduce the future noise level to a satisfactory range that will not approach within 2 dBA of the NAC. As a result, 3-m (10-ft) high noise barriers are proposed at the cabins near the Country Store (Receptor 12) on the south side of SR 260 at MP 288.2 and at the cabins located on the north side of SR 260 at MP 289.0 (Receptor 14). Construction of a 137-m (450-ft) long barrier at Receptor 12 will cost \$74,250, while a 198-m (650-ft) long barrier at Receptor 14 will cost \$107,250. A final decision on the installation of these barriers will be prior to completion of final design.

- Install additional water catchments on the opposite side of the highway, and away from the highway, from the catchments that currently exist to enhance habitat values for all wildlife, and discourage animals (particularly large game) from crossing the highway to reach water.
- Impacts to the wetlands associated with Lakes One and Two will be avoided by locating the future edge of shoulder pavement in the same location as the existing edge of the nearest travel lane, and constructing the roadway improvements to the north and south, respectively. Other wetland impacts will be mitigated by raising culvert inverts or constructing low berms under bridges (e.g., at Willow Springs Draw and Willow Creek) to retain water in those areas where the roadway embankment has impounded water and created wetlands as defined by either the Corps of Engineers or USFWS. In addition, bridge abutments will be located outside of all wetland boundaries.
- To further protect wetland areas, wetland delineations will be performed during final design to accurately determine wetland boundaries relative to the final location of the planned improvements. The wetland boundaries will be surveyed and tied to the limit of construction boundaries on the final plans so the construction contractor is fully aware of the wetland limits, and that these areas are not to be entered. The delineations will be

performed by certified specialists in accordance with the Corps of Engineers' 1987 Manual, and the Corps' concurrence in the accuracy of the delineations will be obtained prior to the 100% plans submittal.

- Riparian habitat that is disturbed during construction will be replaced in-kind. Consideration will also be given to enhancing other riparian areas within the project area that have been stressed by human activity (e.g., hiking).
- Trees and other indigenous vegetation will be planted near new drainage facilities to improve wildlife habitat and restore some functional values lost by roadway construction.