

Appendix W

Solar PEIS Design Features

Approved Resource Management Plan Amendments/Record of Decision (ROD) for Solar Energy Development in Six Southwestern States

Design Features

The text in this appendix is taken directly from the BLM Final Solar Programmatic Environmental Impact Statement for Solar Energy Development.

A.4.1.1 Design Features for Lands and Realty

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on lands and realty from solar energy development identified and discussed in Sections 5.2.1 and 5.2.2 of the Draft and Final Solar PEIS.

A.4.1.1.1 General

LR1-1 Project developers shall consult with the BLM in the early phases of project planning to identify potential land use conflicts and constraints.

(a) Identification of potential land use conflicts shall include, but is not limited to, the following:

- Identifying potential land use conflicts in proximity to the proposed project. In coordination with the BLM, developers shall consult existing BLM land use plans and local land use plans, as well as with appropriate Federal, state, and local agencies; affected tribes; and adjacent property owners.
- Identifying legal access to private, state, and Federal lands surrounding the solar facilities and the potential to create areas that are inaccessible to the public.
- Considering the effects on the manageability and uses of public lands around boundaries of solar energy facilities.
- Considering the potential effects on prime and unique farmland.

TABLE A-4 Individual Plans Specified as Elements of the Programmatic Design Features^{a,b}

Plan Name	Applicable Design Features ^c
Decommissioning and Site Reclamation Plan	ER4-1, HMW-1
Dust Abatement Plan	ER1-1, AQC2-1
Hazardous Materials and Waste Management Plan	HMW1-1
Health and Safety Plan	HS1-1
Spill Prevention and Emergency Response Plan	WR2-1
Stormwater Pollution Prevention Plan	WR1-1

Worker Education and Awareness Plan (WEAP) LR1-1, WHB1-1, WF1-1,
ER1-1, PI-1, CR1-1

- a The need for each plan will be determined on a project-specific basis.
- b The number of plans in the Final Solar PEIS has been reduced substantially since the publication of the Draft Solar PEIS. Information associated with those plans that are no longer shown in this table will alternatively be incorporated into the Plan of Development.
- c The design features specifying the need for individual plans are listed in Sections A.2.2.1 through A.2.2.22.

- Evaluating land use impacts and constraints as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.
- Providing notification to existing BLM ROW authorization holders within solar energy development areas, pursuant to Title 43, Part 2807.14 of the *Code of Federal Regulations* (43 CFR 2807.14), to inform them that an application that might affect their existing ROW has been filed and request their comments.
- Proposed solar energy developments within one-quarter mile of any project boundary will require issuance of a Chain of Survey Certificate in conformance with the Departmental standard. In some cases, Land Description Reviews, Certificates of Inspection and Possession, Boundary Assurance Certificates, resurveys, re-monumentation, and/or referencing of Public Land Survey System (PLSS) corners may be required before the start of any action.

(b) Methods to minimize land use conflicts and constraints may include, but are not limited to, the following:

- Informing project personnel of all laws and regulations that they may be subject to, such as international borders, limitations on the removal of salable materials such as stone or wood from a project site for personal use, and use of vehicles off of the project site in limited access areas. This information should be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project worksite. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key mitigation efforts of the project worksite during all phases of the project's life. The base information the WEAP provides shall be reviewed and approved by the BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.4.1.1.2 Site Characterization, Siting and Design, Construction

LR2-1 Solar facilities shall be sited, designed, and constructed to avoid, minimize, and/or mitigate impacts on BLM land use planning designations.

(a) Methods to minimize impacts on BLM land use planning designations may include, but are not limited to, the following:

- Locating existing designated transmission corridors within the area of a proposed solar energy development project in consultation with the BLM. Reviewing future transmission capacity in the corridor to determine whether the corridor should be excluded from solar energy development or whether the capacity of the designated transmission corridor can be reduced. Options to partially relocate the corridor to retain the current planned capacity or to relocate the solar energy project outside the designated corridor may be considered.
- Identifying and protecting evidence of the PLSS and related Federal property boundaries prior to commencement of any ground-disturbing activity. This will be accomplished by contacting the BLM Cadastral Survey to coordinate data research, evidence examination and evaluation, and locating, referencing, or protecting monuments of the PLSS and related land boundary markers from destruction. In the event of obliteration or disturbance of the Federal boundary evidence, the responsible party shall immediately report the incident, in writing, to the Authorizing Official. The BLM Cadastral Survey will determine how the marker is to be restored. In rehabilitating or replacing the evidence the responsible party will be instructed to use the services of a Certified Federal Surveyor (CFedS), whose procurement shall be per qualification-based selection, or to reimburse the BLM for costs. All surveying activities will conform to the Manual of Surveying Instructions and appropriate state laws and regulations. Local surveys will be reviewed by Cadastral Survey before being finalized or filed in the appropriate state or county office. The responsible party shall pay for all survey, investigation, penalty, and administrative costs.
- Considering opportunities to consolidate access to and other supporting infrastructure for single projects and for cases where there is more than one project in close proximity to another in order to maximize the efficient use of public land and minimize impacts.

A.4.1.2 Design Features for Specially Designated Areas and Lands with Wilderness Characteristics

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on specially designated areas and lands with wilderness characteristics from solar energy development identified and discussed in Sections 5.3.1 and 5.3.2 of the Draft and Final Solar PEIS.

A.4.1.2.1 General

LWC1-1 Protection of existing values of specially designated areas and lands with wilderness characteristics shall be evaluated during the environmental analysis for solar energy projects, and the results shall be incorporated into the project planning and design.

(a) Assessing potential impacts on specially designated areas and lands with wilderness characteristics shall include, but is not limited to, the following:

- Identifying specially designated areas and lands with wilderness characteristics in proximity to the proposed projects. In coordination with the BLM, developers shall consult existing land use plans and updated inventories.
- Identifying lands that are within the geographic scope of a proposed solar energy project that have not been recently inventoried for wilderness characteristics or any lands that have been identified in a citizen's wilderness proposal in order to determine whether they possess wilderness characteristics. Developers shall consider including the wilderness characteristics evaluation as part of the processing of a solar energy ROW application for those lands without a recent wilderness characteristics inventory. All work must be completed in accordance with current BLM policies and procedures.
- Evaluating impacts on specially designated areas and lands with wilderness characteristics as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

(b) Methods to mitigate unavoidable impacts on specially designated areas and lands with wilderness characteristics may include, but are not limited to, the following:

- Acquiring wilderness inholdings from willing sellers.

- Acquiring private lands from willing sellers adjacent to designated wilderness.
- Acquiring private lands from willing sellers within proposed wilderness or Wilderness Study Areas.
- Acquiring other lands containing important wilderness or related values, such as opportunities for solitude or a primitive, unconfined (type of) recreation.
- Restoring wilderness, for example, modifying routes or other structures that detract from wilderness character.
- Contributing mitigation monies to a “wilderness mitigation bank,” if one exists, to fund activities such as the ones described above.
- Enacting management to protect lands with wilderness characteristics in the same field office or region that are not currently being managed to protect wilderness character. Areas that are to be managed to protect wilderness characteristics under
- approach must be of sufficient size to be manageable, which could also include areas adjacent to current WSAs or adjacent to areas currently being managed to protect wilderness characteristics.

A.4.1.2.2 ***Site Characterization, Siting and Design, Construction***

LWC2-1 Solar facilities shall be sited, designed, and constructed to avoid, minimize, and/or mitigate impacts on the values of specially designated areas and lands with wilderness characteristics.¹

A.4.1.3 **Design Features for Rangeland Resources—Grazing**

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on grazing from solar energy development identified and discussed in Sections 5.4.1.1 and 5.4.1.2 of the Draft and Final Solar PEIS.

A.4.1.3.1 ***General***

RG1-1 Project developers shall consult with the BLM early in project planning to identify activities that could impact rangeland resources and grazing.

- (a) Identifying impacts on rangeland resources and grazing shall include, but is not limited to, the following:

¹ See Section 4.3 of the Final Solar PEIS for details on areas included in these categories.

- Identifying rangeland resources and grazing use in proximity to the proposed projects. In coordination with the BLM, developers shall consult existing land use plans and updated inventories.
- Coordinating with affected grazing permittees/lessees to discuss how a proposed project may affect grazing operations and to address possible alternatives to avoid and minimize impacts, as well as mitigation and compensation strategies.
- Evaluating impacts on rangeland resources and grazing use as part of the environmental impact analysis for the project, and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM. Issues to be considered include, but are not limited to, maintenance or relocation of range improvements and fencing, access to water and water rights, delineation of open range, and traffic management.

A.4.1.3.2 Site Characterization, Siting and Design, Construction

RG2-1 Roads shall be constructed, improved, and maintained to minimize their impact on grazing operations. Road design shall include fencing, cattle guards, and speed control and information signs where appropriate.

A.4.1.4 Design Features for Wild Horses and Burros

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on wild horses and burros from solar energy development identified and discussed in Section 5.4.2.1 and 5.4.2.2 of the Draft and Final Solar PEIS.

A.4.1.4.1 General

WHB1-1 Project developers shall coordinate with the BLM and other stakeholders early in the project planning process to assess and consider options to avoid, minimize, and/or mitigate impacts on wild horses and burros and their management areas.

(a) Assessing impacts on wild horses and burros and their management areas shall include, but is not limited to, the following:

- Identifying wild horses and burros and their management areas in proximity to the proposed projects. In coordination with the BLM, developers shall consult existing land use plans and updated inventories.
- Evaluating potential impacts on wild horses and burros and their management areas as part of the environmental impact analysis for the

project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

(b) Methods to minimize impacts on wild horses and burros and their management areas may include, but are not limited to, the following:

- Installing fencing and access control.
- Providing for movement corridors.
- Delineating open range.
- Requiring traffic management measures (e.g., vehicle speed limits).
- Ensuring access to or replacement of water sources.
- Incorporating key elements to mitigate impacts on wild horses and burros in a WEAP that is provided to all project personnel prior to entering the project worksite. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key wild horse and burro mitigation efforts of the project worksite during all phases of the project's life. The base information the WEAP provides shall be reviewed and approved by the BLM prior to the issuance of a Notice to Proceed and incorporates adaptive management protocols for addressing changes over the life of the project, should they occur.

A.4.1.4.2 Site Characterization, Siting and Design, Construction

WHB2-1 Project access roads shall be sited, designed, constructed, fenced, and/or improved to minimize potential wild horse and burro collisions. Fences, or other appropriate structures, should be constructed to exclude wild horses and burros from solar energy project site facilities. Either water sources or access routes to water sources for horses and burros should be excluded from the solar energy development area, or alternate water sources or routes should be provided.

A.4.1.5 Design Features for Wildland Fire

The following design features have been identified to avoid, minimize, and/or mitigate potential fire risks that could be affected by solar energy development as identified and discussed in Sections 5.4.3.1 and 5.4.3.2 of the Draft and Final Solar PEIS.

A.4.1.5.1 General

WF1-1 Project developers shall coordinate with the BLM and other appropriate fire organizations early in the project planning process to determine fire risk and methods to minimize fire risk.

(a) Identifying fire risk shall include, but is not limited to, the following:

- Assessing the potential for fire risk associated with the proposed project in coordination with the BLM and other appropriate fire organizations. Developers shall consult existing land use plans and fire management plans.
- Evaluating fire risk as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate such risk in coordination with the BLM.

(b) General methods to minimize fire risk shall include, but are not limited to, the following:

- Developing and implementing fire management measures that include providing worker training.
- Incorporating key elements to mitigate the potential for fire into a WEAP that is provided to all project personnel prior to entering the project worksite. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key fire mitigation efforts of the project worksite during all phases of the project's life. The information provided in the WEAP shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.
- Incorporating inspection and monitoring measures, including adaptive management protocols, into the POD and other applicable plans to monitor and respond to fire risk during construction, operations, and decommissioning of a solar energy development.

A.4.1.5.2 Site Characterization, Siting and Design, Construction

WF2-1 Solar facilities shall be sited and designed to minimize fire risk.

(a) Methods to minimize fire risk may include, but are not limited to, the following:

- Siting and designing the solar facilities to ensure sufficient room for fire management within the ROW and its facilities to minimize the risk of fire moving outside the ROW and the risk of fire threatening the facility from outside.
- Consulting fire management personnel to determine actions, both active and passive (e.g., vegetation manipulation), that may minimize

the need for protective responses by the BLM and state and local fire organizations.

- Developing and implementing measures to integrate vegetation management to minimize the potential to increase the frequency of wildland fires and prevent the establishment of non-native, invasive species on the solar energy facility and its transmission line and roads.

A.4.1.6 Design Features for Public Access and Recreation Impacts

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on public access and recreation from solar energy development identified and discussed in Sections 5.5.1 and 5.5.2 of the Draft and Final Solar PEIS.

A.4.1.6.1 General

R1-1 Project developers shall consult with the BLM in the early phases of project planning to identify public access and recreation use areas in and adjacent to a project site.

(a) Identifying public access and recreation in and adjacent to a project shall include, but is not limited to, the following:

- Considering existing public access through or around proposed solar facilities that allows for access to and use of BLM- administered public lands and non-BLM administered lands. Developers shall conduct this assessment in coordination with the BLM and consult existing land use plans, recreation management plans, etc.
- Identifying legal access to private, state, and Federal lands surrounding the solar facilities to avoid creating areas that are inaccessible to the public.
- Evaluating impacts on public access and recreation as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

(b) Methods to minimize access and recreation conflicts may include, but are not limited to, the following:

- Considering replacement of acreage lost for identified recreation opportunities, such as off-highway vehicle use.
- Considering, to the extent practicable, providing access through or around a solar energy facility to provide for adequate public access and/or recreation.

- Incorporating environmental inspection and monitoring measures into the POD and other applicable plans to monitor and respond to impacts on recreation during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

A.4.1.6.2 ***Site Characterization, Siting and Design, Construction***

R2-1 Solar facilities shall not be sited in areas designated as unique or important recreation resources (such as Special Recreation Management Areas), where it has been determined that a solar facility or other such development of the land would be in direct conflict with the objectives of the relevant management plan.

A.4.1.7 **Design Features for Military and Civilian Aviation**

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on military and civilian aviation from solar energy development identified and discussed in Sections 5.6.1 and 5.6.2 of the Draft and Final Solar PEIS.

A.4.1.7.1 ***General***

MCA1-1 Project developers shall coordinate with the BLM, military personnel, and civilian airspace managers early in the project planning process to identify and minimize impacts on military and civilian airport and airspace use.

(a) Identifying impacts on military and civilian airport and airspace use shall include, but is not limited to, the following:

- Submitting plans for proposed construction of any facility that is 200 ft (~61 m) or taller and plans for other projects located in proximity to airports to the Federal Aviation Administration (FAA) to evaluate potential safety hazards.
- Consulting with the U.S. Department of Defense (DoD) to minimize and/or eliminate impacts on military operations, and encouraging compatible development. This consultation will be initiated by the BLM and will include both general discussions for early planning and detailed assessments of specific proposals at the local level. The BLM will accept formal DoD submissions once they have been vetted through both the Military Departments and the DoD Siting Clearinghouse.
- Evaluating impacts on military and civil aviation as part of the environmental impact analysis for the project and considering options

to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

A.4.1.8 Design Features for Soil Resources and Geologic Hazards

The following design features have been identified to avoid, minimize, and/or mitigate potential soil impacts and potential geologic hazards from solar energy development identified and discussed in Sections 5.7.1 and 5.7.2 (soil impacts) and 5.7.3 (geologic hazards) of the Draft and Final Solar PEIS.

A.4.1.8.1 General

SR1-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies early in the project planning process to assess soil erosion and geologic hazard concerns and to minimize potential impacts.

(a) Assessing soil erosion and geologic hazard concerns shall include, but is not limited to, the following:

- Identifying soil erosion and geologic hazard concerns on-site and in proximity to the proposed projects. In coordination with the BLM, developers shall consult existing land use plans, updated inventories, soil surveys, etc.
- Identifying local factors that can cause slope instability (e.g., groundwater conditions, precipitation, earthquake activity, slope angles, and the dip angles of geologic strata).
- Consulting with local Federal, state, and county agencies regarding road design on the basis of local meteorological conditions, soil moisture, and erosion potential.
- Determining the potential safety and resource impacts associated with soil erosion.
- Evaluating soil erosion and geologic hazard concerns as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

A.4.1.8.2 Site Characterization, Siting and Design, Construction

SR2-1 Solar facilities shall be sited, designed, and constructed to minimize soil erosion and geologic hazard concerns.

(a) Methods to minimize soil erosion may include, but are not limited to, the following:

- Designing structures to meet the requirements of all applicable Federal, state, and county permits and building codes.
- Minimizing ground-disturbing activities.
- Preventing channel erosion from project runoff.
- Controlling culvert outlets with appropriate structures (e.g., rock lining or apron) to reduce soil erosion and scouring.
- Recontouring and revegetating project roads that are no longer needed in order to increase infiltration and reduce soil compaction.
- Considering utilizing originally excavated materials for backfill.
- Controlling project vehicle and equipment speeds to reduce dust erosion.
- Controlling water runoff and directing it to settling or rapid infiltration basins.
- Retaining sediment-laden waters from disturbed, active areas within the project through the use of barriers and sedimentation devices (e.g., berms, straw bales, sandbags, jute netting, or silt fences). Removing sediment from barriers and sedimentation devices to restore sediment-control capacity.
- Placing barriers and sedimentation devices around drainages and wetlands.
- Siting project structures and facilities to avoid disturbance in areas with existing biological soil crusts.
- Replanting project areas with native vegetation at spaced intervals to break up areas of exposed soil and reduce soil loss through wind erosion.
- Minimizing land disturbance (including crossings) in natural drainage systems and groundwater recharge zones (i.e., ephemeral washes and dry lake beds).
- Locating and constructing drainage crossing structures so as not to decrease channel stability or increase water volume or velocity.
- Providing adequate space (i.e., setbacks) between solar facilities and natural washes to preserve hydrologic function.
- Considering the use of existing roads, disturbance areas, and borrow pits before creating new infrastructure. The use of any existing

infrastructure shall be analyzed in the environmental analysis for the proposed project.

- Siting, designing, and constructing new roads and walking trails consistent with the appropriate design standards and criteria, such as those described in BLM Manual 9113 and 43 CFR 8342.1. Roads and trails should follow natural land contours, and hill cuts should be minimized in the project area.
- Avoiding areas with unstable slopes and soils.
- Avoiding excessive grades on roads, road embankments, ditches, and drainages during site preparation and construction.
- Considering use of special construction techniques in areas of steep slopes, erodible soil, and drainageways.
- Considering implementing construction in stages to limit the areas of exposed and unstabilized soils.
- Reducing construction activity timeframes so that ground- disturbing activities take place over as short a timeframe as possible.
- Lessening fugitive dust emissions and site soils compaction by avoiding unpaved surfaces with construction traffic.
- Avoiding clearing and disturbing areas outside the construction zone.
- Clearly identifying construction zone boundaries on the ground (e.g., through the use of construction fencing) to minimize conflict with other resource concerns.
- Avoiding ground disturbance in areas with intact biological soil crusts and desert pavement.
- Burying electrical lines from solar collectors along existing features (e.g., roads or other paths of disturbance) to minimize the overall area of surface disturbance.
- Obtaining borrow materials from authorized and permitted sites.
- Conducting construction grading in compliance with industry practice (e.g., the American Society for Testing and Materials [ASTM] international standard methods) and other requirements (e.g., BLM and/or local grading and construction permits).

- Using temporary stabilization devices (i.e., erosion matting blankets, or soil stabilizing agents) for areas that are not actively under construction.
- Salvaging topsoil from all excavation and construction and reapplying it to disturbed areas upon completion of construction.
- Restoring native plant communities as quickly as possible in disturbed areas through natural revegetation or by seeding and transplanting (using weed-free native grasses, forbs, and shrubs), on the basis of BLM recommendations.
- Minimizing soil-disturbing activities on wet soils.
- Performing studies to determine the effects from construction activities on the eolian processes that maintain any nearby sand dunes, if applicable.
- Incorporating environmental inspection and monitoring measures into the POD and other applicable plans to monitor and respond to impacts on soil resources during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

(b) Methods to minimize geologic hazard concerns may include, but are not limited to, the following:

- Building project structures in accordance with the design-basis recommendations in the project-specific geotechnical investigation report.
- Considering special siting, design, and engineering strategies in areas that involve high seismic activity or have potential for flooding or debris flow.

A.4.1.8.3 Operations and Maintenance

SR3-1

Compliance with the conditions for soil resources and geologic hazards shall be monitored by the project developer. Consultation with the BLM shall be maintained through the operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

(a) Methods to maintain the soil erosion and geologic hazard design elements during operations and maintenance of the project shall include, but are not limited to, the following:

- Applying design features developed for the construction phase to similar activities during the operations phase.
- Performing routine site inspections to assess the effectiveness of maintenance requirements for erosion and sediment control systems.
- Maintaining permanent barriers and sedimentation devices to ensure effective control.
- Regularly maintaining catch basins, roadway ditches, and culverts.
- Identifying soil erosion and geologic hazard requirements within the POD and other applicable plans.

SR3-2 Permanent stabilization of disturbed areas shall occur during final grading and landscaping of the site and be maintained through the life of the facility.

A.4.1.8.4 Reclamation and Decommissioning

SR4-1 All design features for soil erosion and geologic hazards developed for the construction phase shall be applied to similar activities undertaken during the decommissioning and reclamation phase.

SR4-2 To the extent possible, the original grade and drainage pattern shall be re-established.

SR4-3 Native plant communities in disturbed areas shall be restored by natural revegetation or by seeding and transplanting (using weed-free native grasses, forbs, and shrubs), on the basis of recommendations by the BLM, once decommissioning is completed.

A.4.1.9 Design Features for Mineral Resources

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on mineral resources from solar energy development identified and discussed in Sections 5.8.1 and 5.8.2 of the Draft and Final Solar PEIS.

A.4.1.9.1 General

MR1-1 Project developers shall consult with the BLM in the early phases of project planning to identify potential impacts on mineral development activities and ways to minimize potential adverse impacts.

(a) Assessing impacts on mineral resources shall include, but is not limited to, the following:

- Identifying active mining claims or mineral development activities and potential for mineral development in proximity to a proposed project.

In coordination with the BLM, developers shall consult existing land use plans and updated inventories.

- Evaluating impacts on mineral development as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

MR1-2 All solar energy development ROWs shall contain the stipulation that the BLM retains the right to issue oil and gas or geothermal leases with a stipulation of no surface occupancy within the ROW area. Upon designation, SEZs will be classified as no surface occupancy areas for oil and gas and geothermal leasing.

A.4.1.9.2 *Site Characterization, Siting and Design, Construction*

MR2-1 Solar energy development projects shall be located to minimize conflicts with valid existing mineral rights and/or ongoing mineral development.

A.4.1.10 **Design Features for Water Resources**

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on water resources from solar energy development identified and discussed in Sections 5.9.1 and 5.9.2 of the Draft and Final Solar PEIS.

A.4.1.10.1 *General*

The following activities will be undertaken to minimize impacts on water resources. They are to be done in coordination with the appropriate local, state, and Federal regulating agencies.

WR1-1 The project developer shall control project site drainage, erosion, and sedimentation related to stormwater runoff. The project developer shall identify site surface water runoff patterns and develop measures that prevent adverse impacts associated with project related soil deposition and erosion throughout and downslope of the project site and project-related construction areas. This shall be implemented within a Stormwater Pollution Prevention Plan and incorporated into the POD, as appropriate.

(a) Assessing stormwater runoff concerns shall include, but is not limited to, the following:

- Conducting hydrologic analysis and modeling to define the 100-year, 24-hour rainfall for the project area and calculating projected runoff from this storm at the site.

- Demonstrating the project will not increase off-site flooding potential, and including provisions for stormwater and sediment retention on the project site.
- Demonstrating compliance with construction stormwater permitting through the EPA or state-run NPDES program (whichever applies within the state).
- Demonstrating compliance with the EPA requirement that any development larger than 20 acres (0.08 km²) and begun after August 2011 must monitor construction discharges for turbidity concentrations.

(b) Methods to minimize stormwater runoff concerns may include, but are not limited to, the following:

- Managing runoff from parking lots, roofs, or other impervious surfaces.
- Creating or improving landscaping used for stormwater treatment to capture runoff.
- Considering reduction of impervious surfaces through the use of permeable pavement or other pervious surfaces.
- Maintaining natural drainages and pre-project hydrographs for the project ROW to the extent practicable.
- Maintaining pre-development flood hydrograph for all storms up to and including the 100-year rainfall event.
- Incorporating environmental inspection and monitoring measures into the POD and other applicable plans to monitor and respond to impacts from stormwater runoff during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

WR1-2

Project developers shall conduct hydrologic study (or studies) that demonstrate a clear understanding of the local surface water and groundwater hydrology.

(a) Assessing surface water and groundwater hydrology may include, but is not limited to, the following:

- Determining the relationship of the project site hydrologic basin to the basins in the region.
- Identifying surface water bodies within the watershed of SEZs or individual projects (including rivers, streams, ephemeral

washes/drainages, lakes, wetlands, playas, and floodplains) and identifying the 100-year floodplain of any surface water feature on the site.

- Identifying applicable groundwater aquifers.
- Quantifying physical characteristics of surface water features, such as streamflow rates, stream cross sections, channel routings, seasonal flow rates.
- Quantifying physical characteristics of the groundwater aquifer, such as physical dimensions of the aquifer, sediment characteristics, confined/unconfined conditions, hydraulic conductivity, and transmissivity distribution of the aquifer.
- Quantifying the regional climate, including seasonal and long-term information on temperatures, precipitation, evaporation, and evapotranspiration.
- Quantifying the sustainable yield of surface waters and groundwater available to the project.
- Consulting with the U.S. Army Corps of Engineers (USACE) regarding the siting of solar energy generating facilities in relation to hydrological features that have the potential to be subject to USACE jurisdiction.

WR1-3

Project developers shall coordinate with the BLM and other Federal, state, and local agencies early in the planning process in order to identify water use for the solar energy project, and to secure a reliable and legally available water supply to meet project water needs.

(a) Assessing water use shall include, but is not limited to, the following:

- Quantifying water use requirements for project construction, operations, and decommissioning.
- Meeting potable water supply standards of Federal, state, and local water quality authorities (e.g., Sections 303 and 304 of the Clean Water Act [CWA]).
- Identifying wastewater treatment measures and new or expanded facilities, if any, to be included as part of the facility's National Pollutant Discharge Elimination System (NPDES) permit.

(b) Methods for minimizing water use may include, but are not limited to, the following:

- Utilizing appropriate water sources with respect to management practices for maintaining aquatic, riparian, and other water- dependent resources.
- Considering water conservation measures related to solar energy technology water needs to reduce project water requirements (i.e., use dry cooling, use recycled or impaired water).
- Incorporating environmental inspection and monitoring measures into the POD and other applicable plans to monitor water use during construction, operations, and decommissioning of the solar energy development, including adaptive management protocols.

WR1-4

Project developers shall avoid and/or minimize impacts on existing surface water features, including streams, lakes, wetlands, floodplains, intermittent/ephemeral streams, and playas (any unavoidable impacts would be minimized or mitigated) and in nearby regions resulting from the development in accordance with the following:

- All sections of the CWA, including Sections 401, 402, and 404, addressing licensing and permitting issues;
- Executive Orders (E.O.s) 11988 and 11990 of May 24, 1977, regarding floodplain and wetland management: E.O. 11988, “Floodplain Management” (*Federal Register*, Volume 42, page 26951 [42 FR 26951]), and E.O. 11990, “Protection of Wetlands” (42 FR 26961);
- EPA stormwater management guidelines and applicable state and local guidelines;
- Include submittal of a jurisdictional delineation for consultation with the USACE, in accordance with the 1987 wetlands delineation manual and appropriate regional supplement; avoidance, minimization and compensation proposals;
- USACE permit, Nationwide verification, or other approved jurisdiction. This includes identification of a Least Environmentally Damaging Practicable Alternative (LEDPA) within the environmental analysis. The USACE permit, Nationwide verification, or approved jurisdiction letter shall be provided to the BLM prior to a decision;
- National Wild and Scenic Rivers System (Public Law 90-542);
- *United States Code* [U.S.C.] 1271 et seq.); and

- Required CWA Section 303(d) identification of impaired surface water bodies.

A.4.1.10.2 Site Characterization, Siting and Design, Construction

WR2-1 Project developers shall avoid, minimize, and mitigate impacts on groundwater and surface water resources in accordance with the laws and policies above.

(a) Methods to minimize impacts on surface water and groundwater resources may include, but are not limited to, the following:

- Reclaiming disturbed soils as quickly as possible.
- Preventing the release of project waste materials into stormwater discharges.
- Avoiding impacts on sole source aquifers according to EPA guidelines.
- Developing measures to prevent potential groundwater and surface water contamination and incorporating them into the Spill Prevention and Emergency Response Plan and POD, as appropriate.
- Minimizing land disturbance in ephemeral washes and dry lakebeds. Stormwater facilities shall be designed to route flow through or around the facility using existing washes when feasible, instead of concrete-lined channels.
- Designing culverts and water conveyances to comply with BLM, state, and local standards, or to accommodate the runoff of a 100-year storm, whichever is larger.
- Designing stormwater retention and/or infiltration and treatment systems for storm events up to and including the 100-year storm event.
- Utilizing geotextile matting to stabilize disturbed channels and stream banks.
- Diverting worksite runoff from entering disturbed streams using earth dikes, swales, and lined ditches.
- Placing sediment control devices so that sediment-laden water can pond, thus allowing sediment to settle out.
- Considering placement of check dams (i.e., small barriers constructed of rock, gravel bags, sandbags, fiber rolls, or reusable products) across a swale or drainage ditch to reduce the velocity of flowing water.

- Considering special construction techniques in areas of erodible soil, alluvial fans, and stream channel/wash crossings.
- Backfilling foundations and trenches with originally excavated material.
- Disposing of excess excavated material according to state and Federal laws.
- Maintaining drilling fluids or cuttings in a manner so as not to contact aquatic habitats. Temporary impoundments for storing drilling fluids and cuttings shall be lined to minimize the infiltration of runoff into groundwater or surface water.
- Avoiding washing equipment or vehicles in streams and wetlands.
- Constructing entry and exit pits in work areas to trap sediments from vehicles so they do not enter streams at stream crossings.
- Providing for periodic removal of wastewater generated in association with sanitary facilities by a licensed hauler.
- Avoiding the creation of hydrologic conduits between two aquifers.
- Using herbicides and pesticides within the framework of BLM and DOI policies and standard operating procedures, to include the use of only EPA-registered pesticides/herbicides that also comply with state and local regulations.
- Transporting, storing, managing, and disposing of hazardous materials and vehicle/equipment fuels in accordance with accepted best management practices (BMPs) and in compliance with all applicable regulations, and where applicable, the SWPPP.

A.4.1.10.3 Operations and Maintenance

WR3-1

Compliance with the terms and conditions for water resource mitigation shall be monitored by the project developer. The developer shall consult with the BLM through operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

(a) Maintaining the water resource design elements during operations and maintenance of the project shall include, but not be limited to, the following:

- Monitoring water quantity and quality in areas adjacent to or downstream from development areas through the life of the project to ensure that water flows and water quality are protected.

- Treating of sanitary and industrial wastewater either on-site or off-site to comply with Federal, state, and local regulations. Any discharges to surface waters would require NPDES permitting. Any storage or treatment of wastewater on-site must use proper lining of holding ponds and tanks to prevent leaks.
- Implementing monitoring using adaptive management strategies to ensure that long-term water use during operations does not substantially and disproportionately contribute to the long-term decline of groundwater levels or surface water flows and volumes, considering any mitigation measures that have been taken.

A.4.1.10.4 Reclamation and Decommissioning

WR4-1 Reclamation of the project site shall begin immediately after decommissioning to reduce the likelihood of water resource impacts from project activities. Developers shall coordinate with the BLM in advance of interim/final reclamation to have the BLM or other designated resource specialists on-site during reclamation to work on implementing water resource requirements and BMPs.

(a) Methods for minimizing water resource impacts associated with reclamation and decommissioning activities may include, but are not limited to, the following:

- Restoring the project area to predevelopment water conditions or to the extent acceptable to the BLM.
- Considering contouring of soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas to approximate naturally occurring slopes.
- Feathering edges of vegetation to reduce form and line contrasts with the existing landscapes.
- Salvaging and reapplying topsoil from all decommissioning activities during final reclamation.
- Continuing groundwater and surface water monitoring activities for a limited period of time, if appropriate given the specific situation.

A.4.1.11 Design Features for Ecological Resources

Many design features are similar for different types of ecological resources (plant communities and habitats, wildlife, aquatic resources, and special status species²). Design features for avoiding or minimizing impacts on all these types of ecological resources in general and during the various project phases are presented in the following sections. They were identified to avoid, reduce, and/or mitigate impacts on ecological resources from solar energy development identified and discussed in Section 5.10 of the Draft and Final Solar PEIS.

A.4.1.11.1 General

ER1-1 Project developers shall consult with the BLM and other Federal, state, and local agencies in the early phases of project planning to help ensure compliance with Federal regulations that address the protection of fish, wildlife, and plant resources, with appropriate Federal, state, and local agencies.

(a) Assessing compliance with pertinent regulations for ecological resources shall include, but is not limited to, the following:

- Developing in coordination with the BLM and USFWS strategies for complying with regulatory requirements of the Bald and Golden Eagle Act.
- Developing in coordination with appropriate Federal and state agencies (e.g., BLM, USFWS, and state resource management agencies) measures to protect birds (including migratory species protected under the Migratory Bird Treaty Act [MBTA]).
- Contacting appropriate agencies (e.g., BLM, USFWS, and state resource management agencies) early in the project planning process to identify potentially sensitive ecological resources such as aquatic habitats, wetland habitats, unique biological communities, crucial wildlife habitats, and special status species locations and habitats located within or in the vicinity of the areas occupied by the solar energy facility and associated access roads and ROWs.

² Special status species include the following types of species: (1) species listed as threatened or endangered under the ESA; (2) species that are proposed for listing, under review, or candidates for listing under the ESA; (3) species that are listed as threatened or endangered by the state or are identified as fully protected by the state; (4) species that are listed by the BLM as sensitive; and (5) species that have been ranked S1 or S2 by the state or as species of concern by the state or USFWS. Note that some of the categories of species included here do not fit BLM's definition of special status species as defined in BLM Manual 6840. These species are included here to ensure broad consideration of species that may be most vulnerable to impacts.

- viewing maps and supporting information regarding desert tortoise connectivity habitat made available through the Solar PEIS project Web site (<http://solareis.anl.gov>) and consulting with the BLM and USFWS early in project planning to receive instructions on the appropriate desert tortoise survey protocols and the criteria the BLM and USFWS will use to evaluate the results of those surveys (see Appendix B, Section B.5.3, for additional information).
 - Consulting with the USACE regarding the siting of solar energy generating facilities and energy transmission infrastructure in relation to hydrological features that have the potential to be subject to USACE jurisdiction.
 - Considering restrictions on timing and duration of activities developed in coordination with the BLM, USFWS, and other appropriate agencies to minimize impacts from project activities on nesting birds (especially passerines and listed species).
 - Considering recommendations contained in Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocol and Other Recommendations in Support of Golden Eagle Management and Permit Issuance.
 - Adhering to instruction Memorandum 2010-156, the Bald and Golden Eagle Protection Act—Golden Eagle National Environmental Policy Act and Avian Protection Plan Guidance for Renewable Energy, until programmatic permits from the USFWS are available. The analysis of potential impacts on, and mitigation for, golden eagles shall be made in coordination with the USFWS.
 - Avoiding take of golden eagles and other raptors. Mitigation regarding the golden eagle shall be developed in consultation with the USFWS and appropriate state natural resource agencies. A permit may be required under the Bald and Golden Eagle Protection Act.
 - Discussing potential impacts on sensitive habitats resulting from operation of vehicles and construction of structures, including transmission lines, within the environmental analysis.
- (b) Methods to minimize regulatory conflicts for ecological resources may include, but are not limited to, the following:
- Including submittal of a jurisdictional delineation for consultation with the USACE, in accordance with the 1987 wetlands delineation manual

and appropriate regional supplement; avoidance, minimization and compensation proposals.

- Identifying an LEDPA and analyzing within the environmental analysis. A USACE permit, Nationwide verification, or approved jurisdiction letter shall be provided to the BLM prior to a decision.
- Developing measures to ensure protection of raptors in coordination with appropriate Federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).
- Developing measures to ensure protection of bats in coordination with appropriate Federal and state agencies (e.g., BLM, USFWS, and state resource agencies).
- Developing measures to ensure mitigation and monitoring of impacts on special status species in coordination with appropriate Federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).
- Consulting with the USFWS upon discovery of federally listed threatened and endangered species during any phase of the project. An appropriate course of action shall be determined to avoid, minimize, or mitigate impacts. All applicable terms and conditions and conservation measures listed in the programmatic Biological Opinion, issued by the USFWS, shall be followed.
- Informing project personnel that only qualified biologists are permitted to handle listed species according to specialized protocols approved by the USFWS.
- Considering plants, wildlife, and their habitats in the facility's Dust Abatement Plan.
- Limiting herbicide use to non-persistent, immobile substances. Only herbicides with low toxicity to wildlife and non-target native plant species shall be used, as determined in consultation with the USFWS. Section 5.10.2.1.5 of the Draft Solar PEIS discusses the potential impacts of herbicides on wildlife. All herbicides shall be applied in a manner consistent with their label requirements and in accordance with guidance provided in the Final Solar PEIS on vegetation treatments using herbicides. Prior to application of herbicide treatments, a qualified person, such as a biologist, shall conduct surveys of bird nests and of special status species to identify the special

measures or BMPs necessary to avoid and minimize impacts on migratory birds and special status species.

- Developing a SWPPP for each project that avoids, to the extent practicable, changes in surface water or groundwater quality (e.g., chemical contamination, increased salinity, increased temperature, decreased dissolved oxygen, and increased sediment loads) or flow that result in the alteration of terrestrial plant communities or communities in wetlands, springs, seeps, intermittent streams, perennial streams, and riparian areas (including the alteration of cover and community structure, species composition, and diversity) off the project site.
- Utilizing block or check valves on both sides of the waterway or habitat to minimize product release from pipelines that transport hazardous liquids (e.g., oils) that pass through aquatic or other habitats. Such pipelines shall be constructed of double-walled pipe at river crossings.
- Considering compensatory mitigation and monitoring of significant direct, indirect, and cumulative impacts on, and loss of habitat for, special status plant and animal species.
- Incorporating key elements on the identification and protection of ecological resources (especially for special status species), including knowledge of required design features, in instructions to all personnel. Incorporate the knowledge into a WEAP that is provided to all project personnel prior to entering the project worksite. The WEAP shall be provided on a regular basis, so as to ensure the continued ecological awareness of the project worksite during all phases of the project's life. The base information the WEAP provides shall be reviewed and approved by the BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing ecological changes over the life of the project, should they occur.
- Planning for vegetation management that is consistent with applicable regulations and agency policies for the control of noxious weeds and invasive plant species (Sections 5.10.1.1.2 and 5.10.1.1.4 of the Draft Solar PEIS discuss the need for local and regional native plants in revegetation and restoration).
- Developing measures for fire management and protection that minimize the potential for a human- or facility-caused fire to affect ecological resources and that respond to natural fire situations

(Sections 5.10.1.1.2 and 5.10.1.1.3 of the Draft Solar PEIS discuss the potential impacts of fire on native plant communities).

- Developing measures to investigate the possibility of revegetating parts of the solar array area.
- Designating a qualified biologist who will be responsible for overseeing compliance with all design features related to the protection of ecological resources throughout all project phases, particularly in areas requiring avoidance or containing sensitive biological resources. This person shall be reviewed and approved by the USFWS and the BLM for designation as a qualified biologist.
- Conducting pre-construction surveys, in coordination with BLM, USFWS, and state agency statutes, programs, and policies.
- Conducting seasonally appropriate inspections by a qualified biologist or team of biologists to ensure that important or sensitive species or habitats are not present in or near project areas. Attendees at the inspections may include appropriate Federal agency representatives, state natural resource agencies, and construction contractors, as appropriate. Habitats or locations to be avoided shall be clearly marked.

A.4.1.11.2 *Site Characterization, Siting and Design, Construction*

ER2-1 Solar facilities shall be sited and designed, and constructed to avoid, minimize, or mitigate impacts on ecological resources.

(a) Methods to avoid, minimize, or mitigate impacts on ecological resources may include, but are not limited to the following:

- Siting and designing projects to avoid and minimize direct and indirect impacts on important, sensitive, or unique habitats in the project vicinity, including, but not limited to waters of the United States, wetlands (both jurisdictional and non-jurisdictional), springs, seeps, streams (ephemeral, intermittent, and perennial), 100-year floodplains, ponds and other aquatic habitats, riparian habitat, remnant vegetation associations, rare or unique biological communities, crucial wildlife habitats, and habitats supporting special status species populations (including designated and proposed critical habitat).
- Incorporating measures to exclude tortoises from entering solar energy development sites. Examples include, but are not limited to, tortoise-proof fencing (fence specifications should be consistent with those

approved by the USFWS in the Desert Tortoise Field Manual [USFWS 2009]) and tortoise guards at all road access points where desert tortoise-proof fencing is interrupted.

- Reducing the attractiveness of solar energy development and infrastructure areas to opportunistic predators such as desert kit fox, coyotes, and common ravens. Examples include, but are not limited to, litter control programs; measures to discourage the presence of ravens on-site, including elimination of available water sources; designing structures to discourage their use as potential nest sites; use of hazing to discourage raven presence; and active monitoring of the site for presence of ravens.
- Considering opportunities to upgrade or maintain crossings along existing facilities (e.g., roads, railroads, and aqueducts) such that desert tortoise occupancy and connectivity are not compromised.
- Avoiding siting projects in designated critical habitat, ACECs, or other specially designated areas that are identified as necessary for special status species and habitat conservation.
- Considering siting projects on previously disturbed lands in close proximity to energy load centers to avoid and minimize impacts on remote, undisturbed lands.
- Designing project facilities to reduce the number of stream crossings within a particular stream or watershed (e.g., access roads and utilities could share common ROWs, where feasible), and locating facilities in pre-disturbed areas to reduce potential for habitat fragmentation.
- Preventing establishment and spread of invasive species and noxious weeds within the ROW and in associated areas where there is ground surface disturbance or vegetation cutting. Developers should consider siting project facilities and activities, including associated roads and utility corridors, out of occupied habitats of special status animal species.
- Determining, in coordination with appropriate Federal and state agencies, the translocation of special status species, including the steps to implement the translocation and the follow-up monitoring of populations in the receptor locations, as determined in coordination with the appropriate Federal and state agencies. Developers should plan for translocation of special status species when appropriate.

- Considering the salvage of Joshua trees (*Yucca Brevifolia*), other Yucca species, and most cactus species in coordination with the local BLM field office.
- Considering conducting interim and final restoration activities as soon as possible after development activities are completed in order to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
- Implementing revegetation, soil stabilization, and erosion reduction measures to ensure temporary use areas are restored.
- Conducting a nesting bird survey or other necessary survey for nesting birds. If active nests are detected, the nest area shall be flagged, and no activity shall take place near the nest (at a distance determined by the BLM in coordination with the USFWS and/or appropriate state agencies), or until the appropriate agencies agree that construction can proceed with the incorporation of agreed-upon monitoring measures.
- Siting and designing project activities away from habitats occupied by special status animal species. Developers should consider establishing buffers around sensitive habitats to prevent destructive impacts associated with project activities (e.g., identified in the land use plan or substantiated by best available information or science in consultation with the BLM).
- To the extent practicable, avoiding entry into aquatic habitats, such as streams and springs, during site characterization activities until surveys by qualified biologists have evaluated the potential for unique flora and fauna to be present.
- Planning for and developing measures that identify management practices to minimize increases in nuisance animals and pests in the project area. The plans should identify nuisance and pest species that are likely to occur in the area, risks associated with these species, species-specific control measures, and monitoring requirements.
- Designing solar facilities to avoid, minimize, and mitigate impacts on wetlands, waters of the United States, and other special aquatic sites.
- Locating and designing individual project facilities to minimize disruption of animal movement patterns and connectivity of habitats. Section 5.10.2.1.2 of the Draft Solar PEIS discusses the potential impacts of habitat loss and fragmentation on wildlife.

- Avoiding surface water or groundwater withdrawals that adversely affect sensitive habitats (e.g., aquatic, wetland, playa, microphyll woodland, and riparian habitats) and habitats occupied by special status species.
- Designing water intake facilities to minimize the potential for aquatic organisms from surface waters to be entrained in cooling water systems.
- Demonstrating, through hydrologic modeling, that the withdrawals required for the project are not going to affect groundwater discharges that support special status species or their habitats.
- Considering the use of fencing and netting for evaporation ponds to prevent their use by wildlife.
- To the extent practicable, locating meteorological towers, solar sensors, soil borings, wells, and travel routes to avoid sensitive habitats or areas where wildlife (e.g., sage-grouse) is known to be sensitive to human activities.
- To the extent practicable, avoiding siting solar power facilities near open water or other areas that are known to attract large numbers of birds.
- To the extent practicable, placing tall structures, such as meteorological towers and solar power towers, to avoid known flight paths of birds and bats.
- Implementing current guidelines and methodologies in the design and analysis of proposed transmission facilities in order to minimize the potential for raptors and other birds to collide or be electrocuted by them.
- Placing mechanisms to visually warn birds (permanent markers or bird flight diverters) on transmission lines at regular intervals to prevent birds from colliding with the lines.
- Designing transmission line support structures and other facility structures to discourage use by raptors for perching or nesting (e.g., by using monopoles rather than lattice support structures or by use of anti-perching devices).
- Considering spanning important or sensitive habitats with transmission line conductors within the limits of standard structure design.

- Using low-water crossings (fords) during the driest time of the year. Developers should consider using rocked approaches to fords and returning the crossing to pre-existing stream channel conditions after the need for a low-water ford has passed.
- Employing noise reduction devices (e.g., mufflers) to minimize the impacts on wildlife and special status species populations. Explosives shall be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the BLM or other Federal and state agencies.
- Minimizing the number of areas where wildlife could hide or be trapped (e.g., open sheds, pits, uncovered basins, and laydown areas). Movement of a discovered special status species that is hidden or trapped is prohibited. If necessary, the animal should be moved only to remove the animal from the path of harmful activity, until the animal can escape.
- Implementing measures for proper trash removal and storage, such as using secured containers and periodic emptying, on the project site to reduce attractive opportunistic species, such as common ravens, coyotes, and feral cats and dogs.
- Constructing, improving, and maintaining access roads to minimize potential wildlife/vehicle collisions and facilitate wildlife movement through the project area.
- Limiting project vehicle speeds and using shuttle vans and carpooling in areas occupied by special status animal species. Traffic shall yield to wildlife, allowing safe road crossing.
- Utilizing existing access roads, utility corridors, and other infrastructure to the maximum extent feasible.
- Locating staging and parking areas within the site of the utility- scale solar energy facility to minimize habitat disturbance.
- Considering rolled and compacted on-site construction access routes to allow trucks and equipment to access construction locations.
- Minimizing vehicle use off of access roads and foot traffic through undisturbed areas.
- Constructing fences (as practicable) to exclude livestock and wildlife from project facilities.

- Prohibiting project personnel from bringing firearms and pets to project sites.
- Placing food refuse and other garbage in closed containers so it is not available to scavengers.
- Reducing the collection, harassment, or disturbance of plants, wildlife, and their habitats (particularly special status species) through employee and contractor education about applicable state and Federal laws.
- Advising personnel to minimize stopping and exiting their vehicles in the winter ranges of large game while there is snow on the ground.
- Coordinating with BLM and appropriate project personnel to handle unreasonable traffic delays caused by wildlife in roads. Utilizing appropriate personnel to move live, injured, or dead wildlife off roads, ROWs, or the project site.
- Reporting any vehicle-wildlife collisions. Observations of potential wildlife problems, including wildlife mortality, shall be immediately reported to the BLM or other appropriate agency authorized officer.
- Considering road closures or other travel modifications
- ., lower speed limits, no foot travel) during crucial periods (e.g., extreme winter conditions, calving/fawning seasons, raptor nesting).
- Conducting pre-construction surveys by qualified personnel, such as a qualified biologist, in areas with potential to adversely affect special status species (Section 5.10.4.1.1 of the Draft Solar PEIS) and utilizing approved survey techniques or established species-specific survey protocols to determine the presence of special status species in the project area.
- Considering the number of qualified biological monitors (as determined by the Federal authorizing agency and USFWS) to be on-site during initial site preparation and during the construction period to monitor, capture, and relocate animals that could be harmed and are unable to leave the site on their own.
- Relocating wildlife found in harm's way from the area of the activity. Qualified personnel shall be required to relocate some animals such as rattlesnakes.
- Establishing a controlled inspection and cleaning area to visually inspect construction equipment arriving at the project area and to

remove and collect seeds that may be adhering to tires and other equipment surfaces.

- To the extent practicable, avoiding placement of transmission towers within aquatic and wetland habitats, or other sensitive habitats such as riparian habitats. If towers must be placed within these habitats, they shall be designed and installed to not impede flows or fish passage.
- Designing necessary stream crossings to provide in-stream conditions that allow for and maintain uninterrupted movement and safe passage of fish during all project periods.
- Considering cutting trees in stream buffers that are able to grow into a transmission line conductor clearance zone within 3 to 4 years.
- Considering the use of helicopters where access roads do not exist or where access roads could not be constructed without significantly impacting habitats.

A.4.1.11.3 Operations and Maintenance

ER3-1

The developer shall manage vegetation utilizing the principles of integrated pest management, including biological controls to prevent the spread of invasive species, per the *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States*, and the *National Invasive Species Management Plan, 2009*. Consultation with the BLM shall be maintained through operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

- (a) Methods to manage vegetation, including controlling for invasive species, during operations and maintenance of the project may include, but are not limited to, the following:
- Using certified weed-free seed and mulching.
 - Cleaning vehicles to avoid introducing invasive weeds.
 - Educating project personnel on weed identification, the manner in which weeds spread, and methods for treating infestations.
 - Considering periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas.
 - Limiting vegetation maintenance and performing maintenance mechanically rather than with herbicides.

- Considering retaining short (i.e., less than 7-in. [18-cm] tall) native species during maintenance and operation activities.
- Reducing risk of non-native and nuisance aquatic species introductions. Developers should decontaminate equipment used in surface water, especially equipment used to convey water (i.e., pumps).
- Monitoring for and eradicating invasive species.
- Reestablishing vegetation within temporarily disturbed areas immediately following the completion of construction activities.
- Focusing revegetation efforts on the establishment of native plant communities similar to those present in the vicinity of the project site. Considering dominant native species within the plant communities that exist in adjacent areas and have similar soil conditions for revegetation.
- Considering post-translocation surveys for target species (especially if the target species are special status species) and releasing individuals to protected off-site locations as approved by Federal and state agencies.

ER3-2

The developer shall, in consultation with the BLM and appropriate Federal, state, and local agencies, manage projects so as to minimize impacts on ecological resources during operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

(a) Methods to minimize impacts on ecological resources during operations and maintenance of the project shall include, but are not limited to, the following:

- Monitoring for increase in predation of special status species (e.g., desert tortoise, Utah prairie dog, and greater sage-grouse) from ravens and other species that are attracted to developed areas and use tall structures opportunistically to spot vulnerable prey.
- Turning off all unnecessary lighting at night to limit attracting wildlife, particularly migratory birds.

(b) Other methods for maintaining compliance with ecological resource design elements during operations and maintenance of the project may include, but are not limited to, the following:

- Monitoring for and reporting bird mortality species (e.g., raptors) that are associated with power lines to the BLM and the USFWS.

- Monitoring for the effects of groundwater withdrawals on plant communities.
- Monitoring unavoidable impacts on wetlands and waters of the United States.
- For projects that affect desert tortoise linkages, developing and implementing a Desert Tortoise Habitat Linkage Management and Monitoring Plans and a Desert Tortoise Population Connectivity Effectiveness-Monitoring Plan as described in the USFWS Biological Opinion and Conservation Review for the Solar Energy Program (July 20, 2012).
- Removing raptor nests only if the birds are not actively using the nest.
- Considering relocating nests to nesting platforms. Reporting on relocated or destroyed nests to the appropriate Federal and/or state agencies.
- Coordinating with the USFWS and BLM project personnel in the event that a raptor nest is located on a transmission line support structure.
- Removing raven nests only when inactive (i.e., no eggs or young). The removal of raven nests may be addressed in the minimization measures that incorporate the most current USFWS guidance (e.g., FONSI, *Implementation of a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise, 2008*).
- Considering trench breakers and/or sealing the trench bottom to maintain the original wetland hydrology where a pipeline trench drains a wetland.
- Minimizing removal of deadfall or overhanging vegetation in streams for crossings.
- Installing fish screens on cooling water intakes to limit the potential for impingement impacts on organisms in surface water sources used for cooling water.
- Maintaining areas left in a natural condition during construction (e.g., wildlife crossings) in as natural a condition as possible within safety and operational constraints.
- Avoiding use of guy wires to minimize impacts on birds and bats. If guy wires are necessary, permanent markers (e.g., bird flight diverters) shall be used to increase their visibility.

- Maintaining native vegetation cover and soils and minimizing grading.
- Monitoring unavoidable impacts on wetlands and waters of the United States.
- Instructing personnel to avoid harassment and disturbance of local plants and wildlife.
- Informing personnel of the potential for wildlife interactions around facility structures.

A.4.1.11.4 Reclamation and Decommissioning

ER4-1 Reclamation of the construction and project site shall begin immediately after decommissioning to reduce the likelihood of ecological resource impacts in disturbed areas as quickly as possible.

- (a) Addressing ecological resource impacts during reclamation and decommissioning shall include, but is not limited to, the following:
- Applying design features developed for the construction phase to similar activities during the decommissioning and reclamation phase.
 - Developing and implementing a Decommissioning and Site Reclamation Plan specific to the project, approved by the BLM in consultation with appropriate agencies, that incorporates adaptive management strategies.
 - Using weed-free seed mixes of native shrubs, grasses, and forbs of local sources where available, as required in the Decommissioning and Site Reclamation Plan.
 - Developing and implementing monitoring measures to ensure successful reclamation per the Decommissioning and Site Reclamation Plan.
- (b) Other methods to minimize ecological resource impacts during reclamation and decommissioning may include, but are not limited to, the following:
- Lightly raking and/or ripping and reseeding with seeds from low-stature plant species collected from the immediate vicinity in disturbed areas.
 - Reclaiming access roads when they are no longer needed, considering seasonal restrictions.

- Filling or grading holes and ruts created by the removal of structures and access roads.
- Considering maximizing area reclaimed during solar energy operations to minimize habitat loss and fragmentation.
- Maintaining a clean and orderly worksite during and after decommissioning to ensure land is clear of debris.
- Planning to return land surfaces to pre-development contours immediately following decommissioning.
- Expediting the reestablishment of vegetation for site stabilization.
- Continuing vegetation reestablishment efforts until all success criteria have been met, as identified within the Decommissioning and Site Reclamation Plan.
- Focusing revegetation on the establishment of native plant communities similar to those present in the vicinity of the project site. Considering dominant native species within the plant communities that exist in adjacent areas and have similar soil conditions for revegetation.
- Leaving the facility fencing in place for several years, or replacing it with new exclusion fencing, to assist reclamation (e.g., the fence could preclude large mammals and vehicles from disturbing revegetation efforts). Shorter times for maintaining fencing may be appropriate in cases where the likelihood of disturbance by cattle and wildlife is low.

A.4.1.12 Design Features for Air Quality and Climate

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on ambient air quality and climate from solar energy development that were identified and discussed in Sections 5.11.1 and 5.11.2 of the Draft and Final Solar PEIS.

A.4.1.12.1 General

AQC1-1 Project developers shall consult with the BLM in the early phases of project planning to help determine the potential conformance to air quality and other potential constraints.

(a) Assessing conformance to air quality and other related constraints shall include, but is not limited to, the following:

- Identifying air quality and other related constraints associated with the proposed project site. In coordination with BLM, the appropriate state

and local air regulatory authorities shall be consulted to identify air quality and related constraints and requirements.

- Determining any applicable Federal, state, and local laws and regulations related to air quality.
- Considering effects on particulate matter PM₁₀ and PM_{2.5} from the solar energy project and its facilities.
- Evaluating the cumulative impacts to air quality and air quality related values in Class I areas. Such an analysis should include the Reasonably Foreseeable Development Scenario from the Solar PEIS for all SEZs within the region of a proposed project.
- Evaluating potential contributions to air quality impacts as part of the environmental impact analysis for the project and considering options to avoid, minimize and/or mitigate adverse impacts in coordination with the BLM.

A.4.1.12.2 Site Characterization, Siting and Design, Construction

AQC2-1 Solar facilities shall be sited and designed, and constructed to minimize impacts on air quality.

- (a) Methods to minimize air quality impacts shall include, but are not limited to, the following:
- Using equipment that meets emission standards specified in the state code of regulations and meets the applicable EPA Tier 3 and Tier 4 emissions requirements.
 - Preparing a Dust Abatement Plan for the solar facilities that considers multiple methods for dust suppressant (i.e., water, paving, gravel, and/or regulation-compliant palliatives).
- (b) Other methods to minimize air quality impacts and related constraints may include, but are not limited to, the following:
- Considering surfacing access roads with aggregate that is hard enough that vehicles cannot crush it.
 - Managing unpaved roads, disturbed areas (e.g., areas of scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities as frequently as necessary to effectively minimize fugitive dust generation.
 - Using machinery that has air-emission-control devices as required by Federal, state, and local regulations or ordinances.

- Limiting travel to stabilized roads.
- Considering paving the main access road to the main power block and the main maintenance building.
- Enforcing posted speed limits (e.g., 10 mph [16 km/hour]) within the construction site to minimize airborne fugitive dust.
- Covering vehicles that transport loose materials as they travel on public roads, using dust suppressants on truck loads, and keeping loads below the freeboard of the truck bed.
- Installing wind fences around disturbed areas that could affect the area beyond the site boundaries (e.g., nearby residences).
- Suspending soil disturbance activities and travel on unpaved roads during periods of high winds. Site-specific wind speed thresholds shall be determined on the basis of soil properties determined during site characterization.
- Utilizing compatible native vegetative plantings to limit dust generation from stockpiles that will be inactive for a relatively long period.
- To the extent practicable, avoiding chemical dust suppressants that emit volatile organic compounds within or near ozone nonattainment areas.
- Considering use of ultra-low sulfur diesel with a sulfur content of 15 parts per million (ppm) or less for project vehicles.
- Limiting the idling time of equipment to no more than 5 minutes, unless idling must be maintained for proper operation (e.g., drilling, hoisting, and trenching).
- Minimizing use of dust palliatives in areas of close proximity to sensitive soil and streams.
- Accessing transmission lines from public roads and designated routes to minimize fugitive dust emissions.
- Minimizing on-site vehicle use and requiring routine preventive maintenance, including tune-ups to meet the manufacturer's specifications, to ensure efficient combustion and minimal emissions.
- Encouraging use of newer and cleaner equipment that meets more stringent emission controls.

- Limiting access to the construction site and staging areas to authorized vehicles only through the designated treated roads.
- Staging construction to limit the areas exposed at any time.
- Considering inspection and cleaning of tires of all construction- related vehicles to ensure they are free of dirt before they enter paved public roadways.
- Cleaning up visible trackout or runoff dirt on public roadways resulting from the construction site (e.g., street vacuum/ sweeping).
- Salvaging topsoil from all excavations and construction activities during reclamation or interim reclamation and reapplying to construction areas not needed for facility operation as soon as activities in that area have ceased.
- Considering atmospheric conditions when planning construction activities to minimize dust.
- To the extent practicable, avoiding ground disturbance from construction-related activities in areas with intact biological soil crusts and desert pavement. Developers should salvage soil crusts for restoration, on the basis of recommendations by the BLM once construction has been completed.
- Incorporating environmental inspection and monitoring measures into the POD and other relevant plans to monitor and respond to air quality during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

A.4.1.12.3 Operations and Maintenance

AQC3-1 Compliance with the terms and conditions for air quality shall be monitored by the project developer. Consultation with BLM shall be maintained through operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

- (a) Methods for maintaining compliance with the terms and conditions for air quality during operations and maintenance shall include, but are not limited to, the following:
- Monitoring and treating areas that have been graded, scraped, bladed, compacted, or denuded of vegetation ahead of actual construction/assembly.

(b) Other methods to maintain compliance with the terms and conditions for air quality during operations and maintenance may include, but are not limited to, the following:

- Reapplying palliatives or water as necessary for effective fugitive dust management.
- Considering use of design features for portions of facilities maintained to be free of vegetation during operations, and use of the dust control design features that were listed above under AQC2-1 to limit fugitive dust emissions during the construction phase to minimize fugitive dust emissions from bare surfaces and unpaved access roads.
- Ensuring compliance of all combustion sources with state emission standards (e.g., best available control technology requirements).

A.4.1.12.4 Reclamation and Decommissioning

AQC4-1 Reclamation of the site shall incorporate the design features listed above for construction under AQC2-1 to reduce the likelihood of air quality impacts associated decommissioning.

A.4.1.13 Design Features for Visual Resources

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on visual resources from solar energy development identified and discussed in Section 5.12.3 of the Draft and Final Solar PEIS.

A.4.1.13.1 General

VR1-1 Project developers shall consult with the BLM in the early phases of project planning to help determine the proposed project's potential conformance to VRM class designations and other potential constraints, thus avoiding costly unforeseen planning implications and re-design.

(a) Assessing conformance to VRM class designations and identifying visual resource conflicts shall include, but is not limited to, the following:

- Consulting with the appropriate BLM field office for VRM class designations and associated management objectives during the early phases of project planning, including those related to project site selection, planning, and design. The BLM visual resource inventory (VRI) class values—including those for scenic quality, sensitivity, and distance zones—shall also be factored into the project planning, design, and decision making.

- Analyzing how the visual values influence project design and how the impacts on these values will be minimized through consideration for the proposed project location and its relationship to the surrounding viewshed.
- Including a qualified professional, such as a landscape architect, with demonstrated experience of the BLM's VRM policies and procedures as part of the developer's and the BLM's respective planning teams, to evaluate visual resource issues as project siting options are considered.
- Consulting with the locally based public to provide input on identifying important visual resources in the project area and on the siting and design process. The public shall be involved and informed about the visual site design elements of the proposed solar energy facilities.
- Consulting on viewshed protection objectives and practices with the respective land management for landscapes having special designations, such as Wilderness Areas, National Scenic and Historic Trails, Wild and Scenic Rivers, National Parks, and National Wildlife Refuges located within the project's viewshed. Developers shall demonstrate a concerted effort to reconcile conflicts while recognizing that the BLM retains authority for final decisions determining project approval and conditions.
- For applications that include artifacts and remnants of a National Historic Trail, are located within the viewshed of a National Historic Trail's designated centerline, or include or are within the viewshed of a trail eligible for listing on the *National Register of Historic Places* (NRHP) by virtue of its important historical or cultural values and integrity of setting, evaluating the potential visual impacts on the trail associated with the proposed project; avoiding, minimizing, and/or mitigating adverse effects through the Section 106 consultation process; and identifying appropriate mitigation measures for inclusion as stipulations in the POD.
- Considering landscape settings observed from a unit of the National Park system, National Historic Sites, National Trails, and cultural resources of tribal concern that may be a part of the historic context contributing to the historic significance of the site or trail.
- Project developers are encouraged to obtain topographical data of engineering-design quality and use digital terrain mapping tools at a landscape-viewshed scale for project location selection, site planning

and design, visual impact analysis, and visual impact mitigation planning and design. The digital terrain- mapping tools shall be at a resolution and contour interval suitable for site design and accurate placement of proposed developments into the digital viewshed. Visual simulations shall be prepared and evaluated in accordance with BLM Handbook H-8431-1 and other agency directives, to create spatially accurate and realistic depictions of the appearance of proposed facilities. Simulations shall depict proposed project facilities from key observation points (KOPs) and other visual resource sensitive locations.

- Conducting outreach through public forums as necessary to disseminate visual resource information through methods such as offering organized tours of operating solar energy development projects, and using simulations in public presentations.
- Performing visual mitigation planning and design through field assessments, applied global positioning system (GPS) technology, photo documentation, use of computer-aided design and development software, three-dimensional GIS modeling software, and imaging software to depict visual simulations to reflect a full range of visual resource mitigation measures.

A.4.1.13.2 Site Characterization, Siting Design, and Construction

VR2-1 Solar facilities shall be sited and designed to minimize glint and glare.

(a) Identification of glint and glare effects shall include, but is not limited to, the following:

- Assessing and quantifying potential glint and glare effects and determining the potential safety and visual impacts associated with glint and glare using appropriate and commonly accepted software, procedures, and past project examples.
- Having qualified individuals conduct assessments for glint and glare.

(b) Methods to minimize glint and glare effects may include, but are not limited to, the following:

- Limiting use of signs and project construction signs. Beyond those required for basic facility and company identification for safety, navigation, and delivery purposes, commercial symbols or signs and associated lighting on buildings and other structures should be prohibited.

- Utilizing retro-reflective or luminescent markers in lieu of permanent lighting.
 - Minimizing off-site visibility of all commercial symbols and signs and associated lighting. Necessary signs should be made of non-glare materials and utilize unobtrusive colors. The reverse sides of signs and mounts should be painted or coated using a suitable color selected from the BLM Standard Environmental Color Chart to reduce contrasts with the existing landscape. However, placement and design of any signs required by safety regulations must conform to regulatory requirements.
 - Considering off-site mitigation of visual impacts. In some situations, off-site mitigation may serve as a means to offset and/or recover the loss of visual landscape integrity. For example, off-site mitigation could include reclaiming unnecessary roads, removing abandoned buildings, reclaiming abandoned mine sites, putting utility lines underground, rehabilitating and revegetating existing erosion or disturbed areas, or establishing scenic conservation easements. Appropriate off-site mitigation will be determined on a project-specific basis in consultation with the BLM. **VR2-2** Solar facilities shall be sited and designed to minimize night-sky effects. (a) Identification of night-sky effects shall include, but is not limited to, the following:
 - Assessing and quantifying potential lighting impacts on the night sky and nocturnal wildlife, while providing lighting for hazard marking, safety, and other necessary site needs.
 - Conducting assessments for night-sky effects by qualified individuals using appropriate and commonly accepted procedures and past project examples.
- (b) Methods to minimize night-sky effects may include, but are not limited to, the following:
- Using minimum intensity lighting that meets safety criteria. When accurate color rendition is not required (e.g., roadway, basic security), lighting shall be amber in color, using low-pressure sodium lamps, yellow LED lighting, or equivalent. When white light is required for accurate color rendition, it shall be equal to or less than 3500° Kelvin color temperature. Bluish-white lighting is discouraged.
 - Prohibiting the use of red or white strobe lighting unless the BLM approves its use because of conflicting mitigation requirements.

- Fully shielding all permanent lighting (e.g., full cut-off), except for collision markers required by the FAA or other emergency lighting triggered by alarms.
- Mount lighting so that no light is emitted above an imaginary horizontal plane through the fixture.
- Considering lighting control through timers, sensors, dimmers, or switches that are available to facility operators.
- Considering vehicle-mounted lights over permanently mounted lighting for nighttime maintenance activities. When possible, such vehicle-mounted lighting shall be aimed toward the ground to avoid causing glare and skyglow.

VR2-3

The siting and design of solar facilities, structures, roads, and other project elements shall explore and document design considerations for reducing visual dominance in the viewshed and shall comply with the VRM class objectives in conformance with VR1-1.

(a) Assessing visual dominance shall include, but is not limited to, the following:

- Conforming with VRM class objectives through the use of the BLM contrast rating procedures defined in BLM Handbook H-8431-1. Visual contrast rating mitigation of visual impacts shall abide by the requirements outlined in the handbook and other BLM directives. Revised project plans and simulations are to be reevaluated by using the contrast rating procedures.
- Selecting KOPs by first determining the extent of the viewshed using the viewshed modeling tools previously cited under VR1-1. The viewshed modeling shall illustrate the areas from which the proposed facilities may be seen out to 25 mi (40 km). From within the areas, KOPs are to be selected at places where people would be expected: scenic overlooks, roads, trails, campgrounds, recreationally active river corridors, residential areas, etc. For the purpose of conducting a visual contrast rating evaluation, the number of KOPs would be reduced to those that serve as the best representations for demonstrating conformance to the respective VRM class objectives. The BLM is consulted on the KOP selections, and reserves the right to require additional KOPs to further determine the extent of visual impacts and conformance to VRM class objectives.

- Integrating visual design elements into the construction plans, details, drawings, and specifications for the project.
- Incorporating facility siting measures to minimize the profile of all facility-related structures to reduce visibility and visual dominance within the viewshed, particularly for facilities proposed within the foreground/midground distance zone (0–5 mi [0–8 km]) of sensitive viewing locations.

(b) Measures to minimize visual dominance may include, but are not limited to, the following:

- Using existing topography and vegetation as screening or partially screening devices.
- Incorporating visual design elements when planning for grubbing and clearing, vegetation thinning and clearing, grading, revegetation, drainage, and structural measures.
- Minimizing visual dominance of projects by siting projects outside the viewsheds of KOPs or by diminishing dominance through maximizing visible separation with distance.
- Avoiding, when feasible, locating facilities near visually prominent landscape features (e.g., knobs and waterfalls) that naturally draw an observer’s attention.
- Avoiding visual “skylining” by placing structures, transmission lines, and other facilities away from ridgelines, summits, or other locations where they would silhouette against the sky from important viewing locations; however, consideration should be given to the potential for increased ground disturbance and other resource impacts.
- Designing linear features (e.g., ROWs and roads) to follow natural land contours rather than straight lines; however, consideration should be given to the potential for increased ground disturbance and other resource impacts.
- Locating linear developments (e.g., transmission lines, pipelines, roads) at the edges of natural clearings or natural lines of transition between vegetation type and topography.
- Considering alternative means of access in visually sensitive areas, to preserve the natural landscape conditions between tower locations.
- Minimizing vegetation and ground disturbance, and taking advantage of existing clearings where feasible.

- Reducing cut and fill for structures and roads by design and location. Retaining walls, binwalls, half bridges, etc., can be used to reduce cut and fill.
- Considering rounded and varied road-cut slopes and the cut-and-fill pitches to reduce contrasts in form and line; encouraging slope cuts to preserve specimen trees and nonhazardous rock outcroppings.
- Considering sculpting and shaping natural or previously excavated bedrock landforms when excavation of these landforms is required. For example, percent backslope, benches, and vertical variations may be integrated into a final landform that repeats the natural shapes, forms, textures, and lines of the surrounding landscape. The earthen landform may be integrated and transitioned into the excavated bedrock landform. Sculpted rock face angles, bench formations, and backslope could adhere to the natural bedding planes of the natural bedrock geology. The color contrast from the excavated rock faces may be removed by color treating with a rock stain. Native vegetation or a mix of native and non-native species (if necessary to ensure successful revegetation) could be reestablished with the benches and cavities created within the created bedrock formation.
- Designing and installing natural-looking earthwork landforms, or vegetative or architectural screening to minimize visual impacts. Considering shape and height of earthwork landforms for adaptation to the surrounding landscape.
- Repeating the size, shape, and characteristics of naturally occurring openings in vegetation for facilities, structures, roads, etc.
- Burying electrical collector lines, pipelines, and communication and local utility lines to minimize additional surface disturbance where feasible (e.g., along roads or other paths of surface disturbance).
- Minimizing visual impacts associated with solar energy and electricity transmission projects by choosing appropriate building and structural materials and surface treatments (i.e., paints or coatings designed to reduce contrast and reflectivity). A careful study of the site should be performed to identify appropriate colors and textures for materials; both summer and winter appearance shall be considered, as well as seasons of peak visitor use. Materials and surface treatments shall repeat and/or blend with the existing form, line, color, and texture of the landscape.

- Considering the typical viewing distances and landscape when choosing colors. Appropriate colors for smooth surfaces often need to be two to three shades darker than the background color to compensate for shadows that darken most textured natural surfaces. The BLM Standard Environmental Color Chart CC-001 and guidance shall be referenced when selecting colors.
- Selecting appropriately colored materials for structures, or stains/coatings to blend with the project's backdrop. Materials, coatings, or paints having little or no reflectivity shall be used whenever possible.
- Color treating solar panel/mirror/heliostat backs/supports to reduce visual contrast with the landscape setting.
- Color treating solar towers to reduce visual contrast.
- Considering multiple-color camouflage technology application projects within sensitive viewsheds and with a visibility distance that is between 0.25 and 2 mi (0.40 and 3.20 km).
- Matching aboveground pipelines' paint or coating to their surroundings.
- Considering the appropriate choice of monopoles versus lattice towers for a given landscape setting to further reduce visual impacts.
- Utilizing nonspecular conductors and nonreflective coatings on insulators for electricity transmission/distribution projects.
- Minimizing the use of signs. Where signs are necessary, they shall be made of non-glare materials and utilize unobtrusive colors. The reverse sides of signs and mounts shall be painted or coated by using the most suitable color selected from the BLM Standard Environmental Color Chart; however, placement and design of any signs required by safety regulations must conform to regulatory requirements.
- Clearly delineating construction boundaries and minimizing areas of surface disturbance; preserving vegetation to the greatest extent possible; utilizing undulating surface disturbance edges; stripping, salvaging, and replacing topsoil; using contoured grading; controlling erosion; using dust suppression techniques; and stabilizing exposed soils.
- Preserving existing rocks, vegetation, and drainage patterns to the maximum extent possible.

- Employing brush-beating, mowing, or the use of protective surface matting rather than removing vegetation.
- Considering mulching and spreading slash from vegetation removal over fresh soil disturbances.
- Avoiding leaving slash piles in sensitive viewing areas.
- Considering restoration of disturbed soils by use of weed-free native grasses, forbs, and shrubs representative of the surrounding and intact native vegetation composition and/or using non-native species, if necessary, to ensure successful revegetation.
- Reducing the visual color contrast of graveled surfaces with approved color treatment practices.
- Considering segregating and spreading topsoil from cut-and-fill activities on freshly disturbed areas to reduce color contrast.
- Avoiding leaving topsoil piles in sensitive viewing areas.
- Spreading excess cut and fill material within project disturbance area and vegetate per approved restoration plan requirements while maintaining natural drainage pathways. Where soil cannot reasonably be spread within project disturbance areas, excess cut-and-fill materials should be hauled out to minimize ground disturbance and impacts from piles.
- Removing stakes and flagging from the construction area after completion of construction.

VR2-4 Project developer shall perform a pre-construction meeting with BLM or their designated visual/scenic resource specialists, such as a landscape architect, to coordinate the project construction VRM mitigation strategy. Final design and construction documents will be reviewed with regard to the visual mitigation elements, assuring that requirements and commitments are adequately addressed. The review of construction documents will include, but not be limited to, grading, drainage, revegetation, vegetation clearing, and feathering.

A.4.1.13.3 *Operations and Maintenance*

VR3-1 Compliance with the terms and conditions for VRM mitigation shall be monitored by the project developer. Consultation with the BLM shall be maintained through operations and maintenance of the project, employing an

adaptive management strategy and modifications, as necessary and approved by the BLM.

(a) Maintaining the visual resource design elements during operations and maintenance shall include, but is not limited to, the following:

- Maintaining revegetated surfaces until a self-sustaining stand of vegetation is reestablished and visually adapted to the undisturbed surrounding vegetation. No new disturbance shall be created during operations without completion of a VRM analysis and approval by the BLM authorized officer.
- Keeping painted and color-treated facilities in good repair and repainting when the color fades or flakes.
- Using interim restoration during the operating life of the project as soon as possible after land disturbances.
- Including dust abatement and noxious weed control in maintenance activities.
- Deploying and operating mirrors/heliostats to avoid high- intensity light (glare) reflected off-site. Where off-site glare is unavoidable and project site/off-site spatial relationships favor effective results, fencing with privacy slats or similar screening materials should be considered.

A.4.1.13.4 Reclamation and Decommissioning

VR4-1

Reclamation of the construction site shall begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of temporarily disturbed areas as quickly as possible. Developers shall coordinate with BLM in advance of interim/final reclamation to have BLM or other designated visual/scenic resource specialists, such as a landscape architect, on-site during reclamation to work on implementing visual resource requirements and BMPs.

(a) Methods for minimizing visual contrast associated with reclamation and decommissioning of the project may include, but are not limited to, the following:

- Including treatments, such as thinning and feathering vegetation along project edges, enhanced contour grading, salvaging landscape materials from within construction areas, special revegetation requirements (e.g., use of mix of native and non- native species).

- Designing and implementing restoration of the project area to predevelopment visual conditions and the inventoried visual quality rating, or to that of the surrounding landscape setting conditions to the best extent possible or to conditions agreed upon by the BLM.
- Removing aboveground and near-ground-level structures. Some structures may need to be removed to a level below the ground surface to allow reclamation/restoration.
- Considering contouring soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas to approximate naturally occurring slopes. Contouring to a rough texture would trap seeds and discourage off-road travel, thereby reducing associated visual impacts. Cut slopes can be randomly scarified and roughened to reduce texture contrasts with existing landscapes and aid in revegetation.
- Utilizing native vegetation to establish a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape.
- Reapplying stockpiled topsoil to disturbed areas, where applicable, or using a mix of native and non-native species if necessary to ensure successful revegetation.
- Removing or burying gravel and other surface treatments.
- Restoring rocks, brush, and forest to approximate pre-existing visual conditions.
- Integrating feathering edges of vegetation to reduce form and line contrasts with the existing landscapes.

A.4.1.14 Design Features for Noise

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on the acoustic environment from solar energy development that were identified and discussed in Sections 5.13.1 and 5.13.2 of the Draft and Final Solar PEIS.

A.4.1.14.1 General

N1-1 Project developers shall consult with the BLM in the early phases of project planning to assess and minimize the proposed project's noise impacts on sensitive noise receptors.

(a) Assessing noise impacts shall include, but is not limited to, the following:

- Taking measurements to assess the existing background ambient sound levels both within and outside the project site and comparing these with the anticipated noise levels proposed at the facility. The ambient measurement protocols of all affected land management agencies shall be considered and utilized. Nearby residences and likely sensitive human and wildlife receptor locations shall be identified.
- Conducting assessments for noise impacts by qualified individuals using appropriate and commonly accepted software, procedures, and past project examples.
- Evaluating impacts from noise as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

A.4.1.14.2 Site Characterization, Siting and Design, Construction

N2-1 The siting and design of solar facilities, structures, roads, and other project elements shall seek to minimize impacts on sensitive noise receptors.

(a) Methods to minimize project impacts on sensitive noise receptors may include, but are not limited to, the following:

- Enclosing noisy equipment when located near sensitive receptors.
- Posting warning signs at high-noise areas and implementing a hearing protection program for work areas with noise in excess of 85 dBA.
- Implementing a noise complaint process and hotline, including documentation, investigation, evaluation, and resolution of legitimate project-related noise complaints.
- Maintaining project equipment in accordance with manufacturers' specifications. For example, suitable mufflers and/or air-inlet silencers shall be installed on all internal combustion engines (ICEs) and certain compressor components.
- Limiting low-altitude (under 1,500 ft [457 m]) helicopter flights for installation of transmission lines near noise-sensitive receptors to locations where only helicopter activities can perform the installation.
- Scheduling construction activities to minimize disruption to nearby residents and existing operations surrounding the project areas.
- Planning noisy construction activities near sensitive receptors to take place during the least noise-sensitive times of day (i.e., daytime between 7 a.m. and 7 p.m.), and on weekdays.

- Coordinating individual noisy activities to occur at the same time to reduce the frequency of site boundary noise.
- Implementing noise control measures (e.g., erection of temporary wooden noise barriers) where activities are expected near sensitive receptors.
- Notifying nearby residents in advance of noisy activities, such as blasting or pile driving, before and during the construction period.
- Considering siting immobile construction equipment (e.g., compressors and generators) away from nearby residences and other sensitive receptors.
- Siting permanent sound-generating facilities (e.g., compressors, pumps) away from residences and other sensitive receptors. The use of acoustic screening may be required.
- Incorporating low-noise systems (e.g., for ventilation systems, pumps, generators, compressors, and fans) and selecting equipment without prominent discrete tones.
- Siting louvered side(s) of wet cooling tower(s) away from sensitive receptors. Noise impacts may be further reduced by selecting quieter fans and fans that operate at a lower speed, particularly if they operate at night. Silencers on fan stacks may also be used.
- Including noise reduction measures such as siting noise sources to take advantage of existing topography and distances and constructing engineered sound barriers and/or berms or sound-insulated buildings to reduce potential noise impacts at the locations of nearby sensitive receptors.
- Incorporating environmental inspection and monitoring measures into PODs or other relevant plans to monitor and respond to impacts from noise during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

A.4.1.14.3 Operations and Maintenance

N3-1 Compliance with the terms and conditions for noise shall be monitored by the project developer. Consultation with the BLM shall be maintained through operations and maintenance of the project, employing an adaptive management strategy and modifications as necessary and approved by the BLM.

(a) Methods for maintaining compliance with the noise design elements during operations and maintenance may include, but are not limited to, the following:

- Managing noise levels from cooling systems and dish engine technology so that levels at the nearest residences and sensitive receptor areas near the facility boundary are kept within applicable guidelines.
- Operating vehicles traveling within and around the project area in accordance with posted speed limits to reduce vehicle noise levels.
- Scheduling activities to minimize disruption to nearby residents and existing operations surrounding the project areas.
- Notifying nearby residents in advance of noisy activities, such as blasting or pile driving, before and during the reclamation and decommissioning activities.
- Monitoring and maintaining transformer noise levels. Considering installation of new transformers with reduced flux density, which generate noise levels as much as 10 to 20 dB lower than National Electrical Manufacturers Association (NEMA) standard values, or use of barrier walls, partial enclosures, or full enclosures to shield or contain the noise.

A.4.1.14.4 Reclamation and Decommissioning

N4-1 Reclamation of the construction site shall minimize the project's noise impacts on sensitive noise receptors.

A.4.1.15 Design Features for Paleontological Resources

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on paleontological resources from solar energy development that were identified and discussed in Sections 5.14.1 and 5.14.2 of the Draft and Final Solar PEIS.

A.4.1.15.1 General

P1-1 Project developers shall coordinate with the BLM early in the project planning process to identify and minimize impacts on paleontological resources.

(a) Identifying paleontological resources shall include, but is not limited to, the following:

- Determining in coordination with the BLM whether paleontological resources exist in a project area.

- Determining the potential presence of paleontological resources on the basis of the following: the sedimentary context of the area and its potential to contain paleontological resources (potential fossil yield classification [PFYC] class, if it is available); a records search of published and unpublished literature for past paleontological finds in the area; coordination with paleontological researchers working locally in potentially affected geographic areas and geologic strata; and/or depending on the extent of existing information, the completion of a paleontological survey.

(b) Methods to minimize impacts on paleontological resources may include, but are not limited to, the following:

- Instituting BMPs, such as training/education programs (see WEAP bullet below), to reduce the amount of inadvertent destruction to paleontological sites (see also P2-2 below). Project-specific management practices shall be established in coordination with the BLM, incorporating BLM IM 2009-011.
- Planning for management and mitigation of paleontological resources of the project area for areas of known presence or high potential of presence.
- Identifying measures to prevent potential looting/vandalism or erosion impacts and addressing the education of workers and the public to make them aware of the consequences of unauthorized collection of fossils on public land.
- Incorporating key elements to mitigate the impacts on paleontological resources into a WEAP that is provided to all project personnel prior to entering the project worksite. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key mitigation efforts for paleontological resources of the project worksite during all phases of the project's life. The base information the WEAP provides shall be reviewed and approved by the BLM prior to the issuance of a Notice to Proceed and shall incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.
- Incorporating environmental inspection and monitoring measures into PODs and other relevant plans to monitor and respond to paleontological resource impacts during construction, operations, and

decommissioning of a solar energy development, including adaptive management protocols.

A.4.1.15.2 Site Characterization, Siting and Design, Construction

P2-1 Project developers shall use a qualified paleontological monitor during excavation and earthmoving activities in areas with high potential for paleontological resources.

P2-2 Project developers shall notify the BLM immediately upon discovery of fossils. Work shall be halted at the fossil site and continued elsewhere until qualified personnel, such as a paleontologist, can visit the site, determine the significance of the find, and, if significant, make site-specific recommendations for collection or other resource protection. The area of the discovery shall be protected to ensure that the fossils are not removed, handled, altered, or damaged until the site is properly evaluated and further action determined.

A.4.1.16 Design Features for Cultural Resources

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on cultural resources from solar energy development that were identified and discussed in Sections 5.15.1 and 5.15.2 of the Draft and Final Solar PEIS.

A.4.1.16.1 General

CR1-1 Project developers shall coordinate with the BLM early in the planning process to identify and minimize cultural resource impacts; the BLM will consult with other Federal, tribal, state, and local agencies as appropriate.

(a) Determining cultural resource impacts shall include, but is not limited to, the following:

- Initiating Section 106 consultations between the BLM, SHPOs, Indian tribes, and other consulting parties early in the project planning process. Thresholds for the involvement of and review by the Advisory Council on Historic Preservation (ACHP) include non-routine interstate and/or interagency projects or programs; undertakings adversely affecting National Historic Landmarks; undertakings that the BLM determines to be highly controversial; and undertakings that will have an adverse effect and with respect to which disputes cannot be resolved through formal agreement between the BLM and SHPO, such as a Memorandum of Agreement (MOA).

- Conducting site-specific Section 106 review for individual projects. The BLM will require the completion of inventory, evaluation, determinations of effect, and treatment in accordance with the Solar PA. This Solar PA is titled “Programmatic Agreement among the United States Department of the Interior, Bureau of Land Management, the Arizona State Historic Preservation Officer, the California State Historic Preservation Officer, the Colorado State Historic Preservation Officer, the New Mexico State Historic Preservation Officer, the Nevada State Historic Preservation Officer, the Utah State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Solar Energy Development on Lands Administered by the Bureau of Land Management.”

(b) General methods to minimize cultural resource impacts may include, but are not limited to, the following:

- If historic properties that could be adversely affected are present in the project location, developing an MOA tiered to the Solar PA to address the mitigation steps that will be followed to avoid, minimize, or mitigate adverse effects on historic properties.
- Where the BLM determines that a specific proposed solar energy project has the potential to adversely affect historic properties but those effects cannot be determined prior to its approval, the BLM may elect to review a proposed solar energy project using an undertaking-specific PA executed pursuant to 36 CFR 800.6, instead of following the procedures outlined in the overarching Solar PA.
- Using training/educational programs for solar company workers to reduce occurrences of disturbances, vandalism, and harm to nearby historic properties. The specifics of these sensitivity training programs shall be established in project-specific consultations between the applicant, BLM, SHPO, and affected Indian tribes, and will be articulated in a WEAP. Such education and awareness plans will incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.
- Securing a performance and reclamation bond for all solar energy generation facilities to ensure compliance with the terms and conditions of the ROW authorization. When establishing bond amounts and conditions, the BLM authorized officer shall require coverage of all expenses tied to cultural resources identification, protection, and mitigation. These may include, but are not limited to, costs for

ethnographic studies, inventory, testing, geomorphological studies, data recovery, curation, monitoring, treatment of damaged sites, and generation and submission of reports (see ROW authorization policies, Section 2.2.1.1 of the Final Solar PEIS).

A.4.1.16.2 Site Characterization, Siting and Design, Construction

CR2-1 Solar facilities shall be characterized, sited and designed, and constructed in coordination with the BLM to minimize cultural resource impacts.

(a) Methods to minimize impacts on cultural resources shall include, but are not limited to, the following:

- The BLM determining the APE for each proposed solar energy project, to include a review of existing information, and efforts to seek information from and views of tribes and other parties likely to have knowledge of or concerns with historic properties in the APE. This information will be supplemented by discussions at pre-application meetings with the solar energy project applicant, SHPO, and affected tribes regarding project designs, sacred sites, traditional cultural properties (TCPs), and proposed cultural resource inventory strategies.
- The BLM consulting the SHPO, affected tribes (regarding the treatment of adverse effects for those property types on which the tribes indicate at pre-application or other meetings they wish to provide input), and any other consulting parties, if *National Register of Historic Places* (NRHP)-eligible properties are present at the site and would be adversely affected. The BLM will seek agreement to avoid, minimize, or mitigate adverse effects on historic properties. The BLM will execute an MOA with the SHPO to conclude the Section 106 process and will file a copy with the ACHP. Where the BLM and the SHPO are unable to execute an MOA, the BLM will invite the ACHP to participate in an undertaking-specific MOA. The MOA will specify the treatment for which the BLM will be responsible, and which will be implemented by the solar applicant.
- Undertaking a Class III inventory of the APE. If the BLM decides to require less than a Class III inventory for the entire APE, the BLM will seek additional views of the SHPO, affected tribes, and other parties and determine the final inventory strategy that best represents a reasonable and good-faith effort to carry out appropriate identification efforts.

- Conducting inventories according to the standards set forth in the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716); BLM Handbook H-8110 (*Handbook for Identifying Cultural Resources*); revised BLM Manual 8110; and applicable BLM or SHPO survey, site record, or reporting standards. All inventory data must be provided to the BLM in digitized or paper format that meets BLM accuracy standards, including shape files for surveyed areas.
- Bringing any unexpected discovery of cultural resources during any phase of development (construction, operations and maintenance, or decommissioning) to the attention of the responsible BLM authorized officer immediately, as specified in the PA. Work shall be halted in the vicinity of the find. The area of the find shall be protected to ensure that the resources are not removed, handled, altered, or damaged while they are being evaluated and to ensure that appropriate mitigative or protective measures can be developed and implemented.

(b) Methods to minimize cultural resource impacts may include, but are not limited to, the following:

- Including in the MOAs measures for management of historic properties, in situations where historic properties require management or monitoring for avoidance and protection within or near a project's boundaries. Such measures will specify the preparation and implementation of steps to lessen the adverse effects of the undertaking upon those aspects of NRHP eligibility criteria that make the historic properties eligible for nomination to the NRHP.
- Requiring that surface disturbance be restricted or prohibited within the viewshed of such property types when their eligibility is tied to their visual setting to protect NRHP-eligible traditional cultural properties, sacred sites, or historic trails from visual intrusion and to maintain the integrity of their historic setting unless acceptable mitigation is proposed.
- Employing cultural field monitors (appropriate for the resource anticipated) to monitor ground-disturbing activities (for example in geomorphic settings, such as in shifting sands, where buried deposits may be present) in cases where there is a probability of encountering cultural resources during construction that could not be detected during prior Class III inventories. Monitoring plans shall be specified within MOAs.

- Encouraging the use of previously disturbed lands and lands determined by archeological inventories to be devoid of historic properties.

A.4.1.16.3 Reclamation and Decommissioning

CR3-1 Prior to reclamation activities, the BLM may require further planning for treatment of historic properties or planning for mitigation addressing reclamation activities.

CR3-2 The BLM shall be notified prior to the demolition or substantial alteration of any building or structure. If judged necessary by the BLM, the developer will be required to evaluate the structures for their significance employing professionally qualified architects or historic architects. If structures slated for demolition are found to be eligible for listing on the NRHP, they will be recorded to Historic American Building Survey and/or Historic American Engineering Record standards before alteration or removal.

CR3-3 Project developers shall confine soil-disturbing reclamation and decommissioning activities to previously disturbed areas. Known historic properties will be avoided during these activities.

A.4.1.17 Design Features for Native American Concerns

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts in areas of Native American concern regarding solar energy development; they are identified and discussed in Sections 5.16.1 and 5.16.2 of the Draft and Final Solar PEIS.

A.4.1.17.1 General

NA1-1 The BLM shall consult with federally recognized Indian tribes early in the planning process to identify issues and areas of concern regarding any proposed solar energy project as required by the National Historic Preservation Act (NHPA) and other authorities to determine whether construction and operation of a project is likely to disturb traditional cultural properties or sacred sites, impede access to culturally important locations, disrupt traditional cultural practices, affect movements of animals important to tribes, or visually affect culturally important landscapes.

(a) Identifying issues and areas of concern to federally recognized Indian tribes shall include, but is not limited to, the following:

- Covering planning, construction, operation, and reclamation activities during consultation. Agreements or understandings reached with

affected tribes shall be carried out in accordance with the terms of MOAs or State Specific Procedures as defined within the Solar PA.

- The BLM consulting with affected Indian tribes during the Section 106 process at the points specified in the Solar PA.
- The BLM consulting with Indian tribes under the terms of the Native American Graves Protection and Repatriation Act (NAGRA). Any planning for treatment of historic properties or mitigation will take such consultations into account.
- The BLM seeking, during consultation, to develop agreements with affected tribes on how to appropriately respond to input and concerns in advance to save time and avoid confusion.

(b) Methods to minimize issues and areas of concern to federally recognized Indian tribes may include, but are not limited to, the following:

- Employing standard noise design features for solar facilities located near sacred sites to minimize the impacts of noise on culturally significant areas.
- Employing health and safety design features for the general public for solar facilities located near Native American traditional use areas in order to minimize potential health and safety impacts on Native Americans.
- Avoiding known human burial sites. Where there is a reasonable probability of encountering undetected human remains and associated funerary objects by a solar energy project, the BLM will carry out discussions with Indian tribes before the project is authorized, in order to provide general guidance on the treatment of any cultural items (as defined by NAGPRA) that might be exposed.
- Avoiding visual intrusion on sacred sites through the selection of the solar facility location and solar technology. When complete avoidance is not practicable or economically feasible, the BLM shall engage in timely and meaningful consultation with the affected tribe(s) and shall attempt to formulate a mutually acceptable plan to mitigate or reduce the adverse effects.
- Avoiding rock art (panels of petroglyphs and/or pictographs). These panels may be just one component of a larger sacred landscape, in which avoidance of all impacts may not be possible. Mitigation plans for eliminating or reducing potential impacts on rock art shall be

formulated in consultation with the appropriate tribal cultural authorities.

- Avoiding springs and other water sources that are or may be sacred or culturally important. If it is necessary for construction, maintenance, or operational activities to take place in proximity to springs or other water sources, appropriate measures, such as the use of geotextiles or silt fencing, shall be taken to prevent silt from degrading water sources. The effectiveness of these mitigating barriers shall be monitored. Measures for preventing water depletion impacts on springs shall also be employed. Particular mitigations shall be determined in consultation with the appropriate Indian tribe(s).
- Avoiding culturally important plant species. When it is not possible to avoid affecting these plant resources, consultations shall be undertaken with the affected Indian tribe(s). If the species is available elsewhere on agency-managed lands, guaranteed access may suffice. For rare or less-common species, establishing (transplanting) or propagating an equal amount of the plant resource elsewhere on agency-managed land accessible to the affected tribe may be acceptable (e.g., for mesquite groves and rice grass fields, identified as tribally important plant species in the ethnographic studies).
- Avoiding culturally important wildlife species and their habitats. When it is not possible to avoid these habitats, solar facilities shall be designed to minimize impacts on game trails, migration routes, and nesting and breeding areas of tribally important species. Mitigation and monitoring procedures shall be developed in consultation with the affected tribe(s).
- Securing a performance and reclamation bond for all solar energy generation facilities to ensure compliance with the terms and conditions of the ROW authorization. When establishing bond amounts and conditions, the BLM authorized officer shall require coverage of all expenses tied to identification, protection, and mitigation of cultural resources of concern to Indian tribes. These may include, but are not limited to, costs for ethnographic studies, inventory, testing, geomorphological studies, data recovery, curation, monitoring, treatment of damaged sites, and generation and submission of reports (see ROW authorization policies, Section 2.2.1.1 of the Final Solar PEIS).

A.4.1.17.2 Site Characterization, Siting and Design, Construction

NA2-1 Prior to construction, the project developer shall provide training to contractor personnel whose activities or responsibilities could affect issues and areas of concern to federally recognized Indian tribes.

A.4.1.17.3 Operations and Maintenance

NA3-1 Consultation with affected federally recognized Indian tribes shall be ongoing during the life of the project.

NA3-2 The project developer shall train facility personnel regarding their responsibilities to protect any known resources of importance to federally recognized Indian tribes.

A.4.1.17.4 Reclamation and Decommissioning

NA4-1 The project developer shall confine reclamation and decommissioning activities to previously disturbed areas and existing access roads to the extent practicable.

NA4-2 The project developer shall return the site to its pre-construction condition, to the extent practicable and approved by the BLM.

A.4.1.18 Design Features for Socioeconomic Impacts

The following design features have been identified to avoid, minimize, and/or mitigate potential socioeconomic impacts from solar energy development identified and discussed in

Sections 5.17.1 and 5.17.2 of the Draft and Final Solar PEIS.

A.4.1.18.1 General

S1-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies to identify and minimize potential socioeconomic impacts.

(a) Identifying socioeconomic impacts shall include, but is not limited to, the following:

- Assessing the potential for socioeconomic impacts associated with the proposed project in coordination with the BLM and other qualified experts. Project developers shall collect and evaluate available information describing the socioeconomic conditions in the vicinity of the proposed project, as needed, to predict potential impacts of the project.

- Evaluating socioeconomic impacts as part of the environmental impact analysis for the project and considering options to minimize and/or mitigate impacts in coordination with the BLM.

(b) Methods to minimize socioeconomic impacts may include, but are not limited to, the following:

- Developing a community monitoring program that would be sufficient to identify and evaluate socioeconomic impacts resulting from solar energy development. Measures developed for monitoring may include the collection of data reflecting the economic, fiscal, and social impacts of development at the state, local, and tribal level.
- Developing community outreach programs that would help communities adjust to changes triggered by solar energy development.
- Establishing vocational training programs for the local workforce to promote development of skills required by the solar energy industry.
- Developing instructional materials for use in area schools to educate the local communities on the solar energy industry.
- Supporting community health screenings.
- Providing financial support to local libraries for the development of information repositories on solar energy, including materials on the hazards and benefits of commercial development. Electronic repositories established by the project developer could also be of great value.

A.4.1.19 Design Features for Environmental Justice Impacts

The following design features have been identified to avoid, minimize, and/or mitigate potential environmental justice impacts from solar energy development identified and discussed in Sections 5.18.1 and 5.18.2 of the Draft and Final Solar PEIS.

A.4.1.19.1 General

EJ1-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies to identify and minimize the potential for environmental justice impacts.

(a) Identifying environmental justice impacts shall include, but is not limited to, the following:

- Assessing the potential for environmental justice impacts associated with the proposed project in coordination with the BLM and other

qualified experts. Project developers shall collect and evaluate available information describing the socioeconomic conditions in the vicinity of the proposed project, as needed, to predict potential environmental justice impacts of the project (i.e., environmental, economic, cultural, and health impacts on low-income and minority populations). This will include the identification of all environmental justice communities in proximity to a proposed project.

- Evaluating environmental justice impacts as part of the environmental impact analysis for the project and consider options to avoid, minimize, and/or mitigate such risk in coordination with the BLM.

(b) Methods to minimize environmental justice impacts may include, but are not limited to, the following:

- Developing and implementing focused public information campaigns to provide technical and environmental health information directly to low-income and minority groups or to local agencies and representative groups. Including key information such as any likely impact on air quality, drinking water supplies, subsistence resources, public services, and the relevant preventative/minimization measures that may be taken.
- Providing community health screenings for low-income and minority groups.
- Providing financial support to local libraries in low-income and minority communities for the development of information repositories on solar energy, including materials on the hazards and benefits of commercial development.
- Establishing vocational training programs for the local low-income and minority workforce to promote development of skills for the solar energy industry.
- Developing instructional materials for use in area schools to educate the local communities on the solar energy industry.
- Providing key information to local governments and directly to low-income and minority populations on the scale and timeline of expected solar energy projects and on the experience of other low-income and minority communities that have followed the same energy development path.

- Considering making available information about planning activities that may be initiated to provide local infrastructure, public services, education, and housing.

A.4.1.20 Design Features for Transportation Impacts

The following design features have been identified to avoid, minimize, and/or mitigate potential transportation impacts from solar energy development identified and discussed in Sections 5.19.1 and 5.19.2 of the Draft and Final Solar PEIS.

A.4.1.20.1 *Site Characterization, Siting and Design, Construction*

T2-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies to identify and minimize impacts on transportation.

(a) Identifying impacts on transportation shall include, but is not limited to, the following:

- Assessing the potential for transportation impacts associated with the proposed project in coordination with the BLM and other appropriate state and local agencies. Consulting land use plans, transportation plans, and local plans as necessary. The developer may be required to perform traffic studies, analyses, or other studies of the capacity of existing and proposed new roads to physically handle the added wear and tear from increased construction commuter and truck traffic.
- Evaluating transportation impacts as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate such risk in coordination with the BLM.

(b) Methods to minimize impacts on transportation may include, but are not limited to, the following:

- Incorporating site access into the local and regional road network. Incorporation must be done under the supervision of the pertinent local, county, state, and Federal agencies.
- Considering public roadway corridors through a site to maintain proper traffic flows and retain more direct routing for the local population.
- Considering implementing local road improvements, providing multiple site access locations and routes, staggering work schedules, and implementing a ride-sharing or shuttle program to minimize daily commutes of construction workers.

- Implementing traffic control measures to reduce hazards for incoming and outgoing traffic and streamline traffic flow, such as intersection realignment and speed limit reductions; installing traffic lights and/or other signage; and adding acceleration, deceleration, and turn lanes on routes with site entrances.
- Incorporating environmental inspection and monitoring measures into the POD and other relevant plans to monitor and respond to transportation impacts during construction, operations, and decommissioning of a solar energy development, including adaptive management protocols.

A.4.1.21 Design Features for Hazardous Materials and Waste

The following design features have been identified to avoid, minimize, and/or mitigate potential hazardous materials and waste impacts from solar energy development identified and discussed in Sections 5.20.1 and 5.20.2 of the Draft and Final Solar PEIS.

A.4.1.21.1 General

HMW1-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies early in the planning process to assess hazardous material and waste concerns and to minimize potential impacts.

(a) Assessing hazardous material and waste concerns shall include, but is not limited to, the following:

- Identifying expected waste generation streams at the solar energy site and hazardous waste storage locations for consideration in the environmental analysis evaluating the proposed project.
- Conducting site characterization, construction, operation, and decommissioning activities in compliance with applicable Federal and state laws and regulations, including the Toxic Substances Control Act of 1976, as amended (15 USC 2601, et seq.). An example of complying with applicable law is reporting any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, Section 102b.
- Evaluating impacts related to potential hazardous material and waste as part of the environmental impact analysis for the project and considering options to minimize and/or mitigate impacts in coordination with the BLM.

(b) Methods to minimize hazardous material and waste related impacts shall include, but are not limited to, the following:

- Developing a Hazardous Materials and Waste Management Plan that addresses the selection, transport, storage, and use of all hazardous materials needed for construction, operations, and decommissioning of the facility for local emergency response and public safety authorities and for the designated BLM land manager. Furthermore, the plan shall address the characterization, on-site storage, recycling, and disposal of all resulting wastes.³ At minimum, the plan will discuss facility identification; comprehensive hazardous materials inventory; Material Safety Data Sheets (MSDSs) for each type of hazardous material; emergency contacts and mutual aid agreements, if any; site map showing all hazardous materials and waste storage and use locations; copies of spill and emergency response plans, and hazardous materials–related elements of a Decommissioning and Site Reclamation Plan.
- Planning for waste management will address all solid and liquid wastes that may be generated at the site in compliance with the CWA requirements to obtain the project’s NPDES or similar permit.
- Considering fire management in developing hazardous materials and waste management measures.
- Identifying and implementing prevention measures, including material substitution of less hazardous alternatives, recycling, and waste minimization.
- Establishing procedures for fuel storage and dispensing that consider health and safety of personnel and methods for safe use (i.e., fire safety, authorized equipment use).
- Ensuring vehicles and equipment are in proper working condition to reduce potential for leaks of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.
- Considering establishing schedules regular removal of wastes (including sanitary wastewater generated in temporary, portable sanitary facilities) for delivery and removal by licensed haulers to appropriate off-site treatment or disposal facilities.

³ It is not anticipated that any solar energy facility would have hazardous chemicals present on-site in such quantities as to require development of a Risk Management Plan as specified in 40 CFR Part 68.

A.4.1.21.2 Site Characterization, Siting and Design, Construction

HMW2-1 Solar facilities shall be characterized, sited and designed, and constructed to minimize hazardous materials and waste management design elements.

(a) Methods to minimize hazardous material and waste management impacts may include, but are not limited to, the following:

- Indemnifying the United States against any liability arising from the release of any hazardous substance or hazardous waste on the facility or associated with facility activities.
- Providing a copy of any report required or requested by any Federal agency or state government as a result of a reportable release or spill of any toxic substances shall be furnished to the BLM authorized officer concurrent with the filing of the reports to the involved Federal agency or state government.
- Designing and operating systems containing hazardous materials in a manner that limits the potential for their release.
- Establishing measures for construction with compatible materials in safe conditions.
- Establishing dedicated areas with secondary containment for offloading hazardous materials transport vehicles.
- Implementing “just-in-time” ordering procedures designed to limit the amounts of hazardous materials present on the site to quantities minimally necessary to support continued operations. Excess hazardous materials shall receive prompt disposition.
- Surveying project sites for unexploded ordnance, especially if projects are within 20 mi (32 km) of a current DoD installation or formerly utilized defense site.
- Siting refueling areas away from surface water locations and drainages and on paved surfaces; features shall be added to direct any spilled materials to sumps or safe storage areas where they can be subsequently recovered.
- Designating hazardous materials and waste storage areas and facilities. Limiting access to designated areas to authorized personnel only.

A.4.1.21.3 Operations and Maintenance

HMW3-1 Compliance with the terms and conditions for hazardous materials and waste management shall be monitored by the project developer. Consultation with

the BLM shall be maintained through the operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by the BLM.

(a) Methods for maintaining compliance with the terms and conditions for hazardous materials and waste management during operations and maintenance of the project may include, but are not limited to, the following:

- Installing sensors or other devices to monitor system integrity.
- Implementing robust site inspection and repair procedures.

A.4.1.21.4 Reclamation and Decommissioning

HMW4-1 Project developers shall maintain emergency response capabilities throughout the reclamation and decommissioning period as long as hazardous materials and wastes remain on-site.

HMW4-2 All design features developed for the construction phase shall be applied to similar activities during the reclamation and decommissioning phases.

A.4.1.22 Design Features To Ensure Health and Safety

The following design features have been identified to avoid, minimize, and/or mitigate potential health and safety impacts from solar energy development identified and discussed in Sections 5.21.1 and 5.22.2 of the Draft and Final Solar PEIS.

A.4.1.22.1 General

HS1-1 Project developers shall coordinate with the BLM and other Federal, state, and local agencies early in the planning process to identify project health and safety risks and methods to minimize those risks.

(a) Assessing project health and safety risks shall include, but is not limited to, the following:

- Identifying and establishing Federal and state occupational health and safety standards, such as the Occupational Health and Safety Administration's (OSHA's) Occupational Health and Safety Standards, 29 CFR Parts 1910 and 1926, respectively, for all phases of the project.
- Identifying safety zones or setbacks for solar facilities and associated transmission lines from residences and occupied buildings, roads, ROWs, and other public access areas that are sufficient to prevent accidents resulting from various hazards during all phases of development.

(b) Methods to minimize project health and safety risks may include, but are not limited to, the following:

- Identifying and accounting for general project injury prevention within the POD and the Health and Safety Plan, such as established PPE requirements, respiratory protection, hearing conservation measures, electrical safety considerations, hazardous materials safety and communication, housekeeping and waste handling, confined space identification, and rescue response and emergency medical support, including on-site first-aid capability.
- Implementing training and awareness measures for workers and the general public to minimize and address standard practices (such as OSHA's) for the safe use of explosives and blasting agents; occupational electric and magnetic field (EMF) exposures; fire safety and evacuation procedures; and safety performance standards (e.g., electrical system standards and lighting protection standards). Consider further training for additional health and safety risks from the solar energy project and its ancillary facilities.
- Establishing measures to document training activities and reporting of serious accidents to appropriate agencies.
- Assessing cancer and noncancer risks to workers and the general public from exposure to facility emission sources that exceed threshold levels.
- Considering implementation of measures to reduce site emissions and the cancer and noncancer from exposure to facility emissions.
- Implementing a reporting structure for accidental release of hazardous substances to the environment where project developers shall document the event, including a root cause analysis, a description of appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event shall be provided to the permitting agencies and other Federal and state agencies within 30 days.
- Considering manufacturer requirements, and Federal and state standards, when establishing safety zones or setbacks for solar facilities and associated transmission lines.
- Project developers coordinating with the BLM and appropriate agencies (e.g., the DOE and Transportation Security Administration [TSA]) to address critical infrastructure and key resource

vulnerabilities at solar facilities in order to minimize and plan for potential risks from natural events, sabotage, and terrorism.

A.4.1.22.2 *Site Characterization, Siting and Design, Construction*

HS1-1 Solar facilities shall be characterized, sited and designed, and constructed to minimize risk to health and safety.

(a) Methods to minimize risk to health and safety may include, but are not limited to, the following:

- Designing electrical systems to meet all applicable safety standards (e.g., National Electrical Code [NEC]) and to comply with the interconnection requirements of the transmission system operator.
- Complying with applicable FAA regulations, including lighting requirements, to avoid or minimize potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.
- Considering temporary fencing and other measures for staging areas, storage yards, and excavations during construction or decommissioning activities to limit public access to health and safety risks.
- Planning for traffic management of site access to ensure that traffic flow would not be unnecessarily affected and that specific issues of concern (e.g., the locations of school bus routes and stops) are identified and addressed. Planning may include measures such as informational signs and temporary lane configurations. Planning shall be coordinated with local planning authorities.
- Considering use of alternative dielectric fluids that do not contain sulfur hexafluoride (SF₆) to reduce the global warming potential.
- Considering measures to reduce occupational EMF exposures, such as backing electrical generators with iron to block the EMF, shutting down generators when work is being done near them, and otherwise limiting exposure time and proximity while generators are running.

A.4.1.22.3 *Operations and Maintenance*

HS3-1 Compliance with the terms and conditions for health and safety shall be monitored by the project developer. Consultation with the BLM shall be maintained through operations and maintenance of the project, employing an

adaptive management strategy and modifications, as necessary and approved by the BLM.

A.4.1.23 Design Features for National Scenic and Historic Trails, Suitable Trails, and Study Trails

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on trails from solar energy development that were identified and discussed in Sections 5.3, 5.12 and 5.15 of the Draft and Final Solar PEIS.

A.4.1.23.1 General

NSHT1-1 Project developers shall consult with the BLM and the trail administering agency early in the project planning to help determine the proposed project's conformance with trail management prescriptions and other potential trail-related constraints.⁴

(a) Assessing conformance to trail management prescriptions and other potential trail related constraints shall include, but is not limited to, the following:

- Considering National Trail management corridors established through the land use planning process as exclusion areas (see Section 2.2.2.1 of the Final Solar PEIS) in order to prevent substantial interference with the nature and purposes of designated National Scenic and Historic Trails, and to make efforts to avoid activities incompatible with trail purposes (NTSA Sec. 7(c)). Where no National Trail management corridor is established in a land use plan, or in adequate protections for suitable trails or trails under study, an accepted National Trail inventory process must be conducted by the applicant, in consultation with the trail administering agency. The inventory process will identify the potential area of adverse impact on the resources, qualities, values, and associated settings, and the primary use or uses of the trails within the viewshed; prevent substantial interference; and determine any areas unsuitable for development. Residual impacts on trails will be avoided, minimized, and/or mitigated to the extent practicable according to program policy standards.
- Determining the size of the area of possible adverse impact through the results of the required inventory, in consultation with the trail administering agency. There is no current established minimum or

⁴ Further guidance will be included in the forthcoming BLM National Trails System manual series and other NLCS-related policy manuals.

maximum limit on the size of the area of possible adverse impact. Other design feature requirements and coordination requirements, such as those for Cultural Resources, Recreation and Visitor Services, Visual Resources, or NLCS must also be met.

- Review adequacy of information from National Scenic or Historic Trail inventory projects underway during the development of the Solar PEIS by the BLM at the field office level in coordination with the trail administering agency, and application of the data to determine the area of possible adverse impact for any anticipated development. Such inventory projects may reveal unanticipated or undocumented remnants, artifacts, trail tread or trace, the location of high potential historic sites and high-potential route segments, trail features, and/or the associated settings for National Scenic or Historic Trails adjacent to or within SEZ.
- Applying on-site or off-site mitigation for any residual adverse impact according to program policy standards, and mitigation or impact reduction measures identified for related program areas in this document.

A.4.2 SEZ-Specific Design Features

The SEZ-specific design features identified in the Final Solar PEIS are listed in Table A-5.

California

Design Features for Imperial East SEZ

Specially Designated Areas and Lands with Wilderness Characteristics: Because of the potential increase in human use of the two adjacent ACECs, once solar energy facility construction begins, monitoring of the resources of the ACECs will be used to determine whether additional protection measures are needed to protect existing prehistoric resources.

Military and Civilian Aviation: If power tower facilities are proposed for the SEZ, coordination across the international border should be required to ensure that there is no airspace management concern associated with the Mexicali Airport.

Minerals: To protect the potential for geothermal leasing under solar energy facilities, ROW authorizations for solar energy facilities should be made subject to future geothermal leasing with no surface occupancy stipulations.

Water Resources: Groundwater analyses suggest that full build-out of wet-cooled technologies is not feasible; for mixed-technology development scenarios, any proposed wet-cooled projects should utilize water conservation practices.

Wildlife (Amphibians and Reptiles): The potential for indirect impacts on several amphibian species could be reduced by maximizing the distance between solar energy development and the All American Canal.

Wildlife (Amphibians and Birds): Wetland habitats along the southern boundary of the SEZ boundary shall be avoided to the extent practicable. The wetlands along the southern boundary of the SEZ have been designated as undevelopable, but other wetland areas may exist within the SEZ.

Wildlife (Mammals): Solar project development shall not prevent mule deer free access to the unlined section of the All American Canal.

Special Status Species: Occupied habitats for species that are designated as California fully protected species should be completely avoided. Under California Fish and Game Code Sections 3511, 4700, 5050, and 5515, take or possession of these species is prohibited at any time. Minimization and mitigation measures cannot be developed for California fully protected species. This policy applies to the following California fully protected species that may occur in the affected area of the Imperial East SEZ: California black rail and Yuma clapper rail.

Acoustic Environment: Because of the proximity of the proposed Imperial East SEZ to nearby residences and the East Mesa ACEC, and relatively high noise levels around the SEZ due to I-8 and State Route 98, refined modeling, along with background noise measurements, should be conducted in conjunction with project-specific analyses.

Cultural Resources: Consultation efforts should include discussions on significant archaeological sites and traditional cultural properties and on sacred sites and trails with views of the proposed SEZ. The possibility for discovering human burials in the vicinity of the proposed Imperial East SEZ, and its location along the Yuma-San Diego Trail interconnecting a sacred landscape and its associated sites should be discussed. Tribal participation in the Section 106 process will take place according to the Solar Programmatic Agreement (PA), including opportunities for tribal input regarding inventory design and treatment decisions and procedures for inadvertent discoveries during construction and operations.

Design Features for Riverside East SEZ

Specially Designated Areas and Lands with Wilderness Characteristics: Once construction of solar energy facilities begins, the BLM would monitor whether there are increases in human traffic to the seven ACECs in and near the SEZ and determine whether additional design features are required to protect the resources in these areas.

Recreation: A buffer area should be established between the Midland Long Term Visitor Area (LTVA) and solar development to preserve the setting of the LTVA. The size of the buffer should be determined based on the site and visitor-specific criteria.

Water Resources: Groundwater analyses suggest that full build-out of wet-cooled or dry-cooled technologies is not feasible; for mixed-technology development scenarios, any proposed wet- or dry-cooled projects should utilize water conservation practices.

During site characterization, coordination and permitting with CDFG regarding California's Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features.

The use of groundwater in the Chuckwalla Valley and Palo Verde Mesa should be planned for and monitored in cooperation with the BOR and the USGS in reference to the Colorado River Accounting Surface and the rules set forth in the Law of the River.

Wildlife (Mammals): The fencing around the solar energy development should not block the free passage of mule deer between the Colorado River and mountains or foothills.

Wildlife and Special Status Species: Within the SEZ, two north–south wildlife corridors of sufficient width (a minimum width of 1.3 mi [2 km], but wider if determined to be necessary through future site-specific studies) should be identified by the BLM in coordination with the FWS and the California Department of Game and Fish. These corridors should be identified as non-development areas within the SEZ on the basis of modeling data and subsequent field verification of permeability for wildlife.

Visual Resources: Special visual impact mitigation shall be considered for solar development on lands in the SEZ within areas west of Township 005S and Range 017E and north of Township 006S and Range 016E, as well as north of Sections 26, 27, 28, and 29 of Township 005S and Range 017E.

Cultural Resources: Consultation efforts should include discussions on significant archaeological sites and traditional cultural properties and on sacred sites and trails with views of the proposed SEZ, such as the Salt Song, Cocomaricopa, and *Xam Kwatchan* Trails, which connect spiritual landscapes and sacred sites in the area. The possibility of discovering human burials in the vicinity of the proposed Riverside East SEZ should also be discussed.

Significant resources clustered in specific areas, such as those surrounding Ford Dry Lake or within the DTC/C-AMA area, which retain sufficient integrity, should be avoided unless impacts can be sufficiently minimized or mitigated.

Monitoring is recommended in sand sheet and colluvium environments similar to those in which buried sites were recently discovered during construction of the Genesis Solar development.

Because the proposed Riverside East SEZ is located adjacent to or near six ACECs, it is possible that the ACECs could be subject to an increase in human and vehicle traffic. Potential construction vehicle corridors should be discussed prior to development of the proposed SEZ in order to avoid possible impacts on historic resources within these ACECs and to determine alternative roads or paths to the development area.

REFERENCES FOR APPENDIX A

BLM (Bureau of Land Management), 2005, *Land Use Planning Handbook*, H-1601-1, U.S. Department of the Interior, Washington, D.C., March.

BLM and DOE (Bureau of Land Management and U.S. Department of Energy), 2010, *Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States*, DES 10-59, DOE/EIS-0403, Dec.

BLM and DOE, 2011, Supplement to the Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States, DES 11-49, DOE/EIS-0403D-S, Oct.

USFWS (U.S. Fish and Wildlife Service), 2009, Desert Tortoise (Mojave Population) Field Manual (*Gopherus agassizii*), Region 8, Sacramento, CA.