

Dry Lake Solar Energy Zone (SEZ) Unavoidable Impact Criteria Table

The following table summarizes the BLM and Argonne National Laboratory subject matter expert responses to the process steps and criteria used to identify the unavoidable impacts that are likely to occur as a result of the Dry Lake Solar Energy Zone. The process steps and criteria for identifying unavoidable impacts are:

1. **Verify/augment the affected environment and impacts presented in the Solar PEIS (for completeness, review analysis in both the Draft and Final PEIS)**
 - a. Review the affected environment and the direct, indirect, and cumulative impacts for each resource value presented in the Solar Programmatic Environmental Impact statement (PEIS).
 - i. Is the description of the affected environment and impacts comprehensive and accurate?
 - ii. Is more detailed information available that would influence the description of impacts as provided in the PEIS?
 1. If so, prepare an amended description of impacts and document data source(s)
2. **Verify/augment the programmatic and SEZ-specific design features presented in Appendix A of the Solar PEIS ROD**
 - a. Review the programmatic and SEZ-specific design features presented in the Solar PEIS ROD.
 - i. Determine which design features are applicable to the subject SEZ.
 - ii. Are there additional measures that could be implemented in the subject SEZ to avoid and/or minimize impacts on-site?
 1. If so, describe additional measures and document data source(s)
3. **Identify the impacts that can be adequately mitigated on-site through avoidance and/or minimization including the required design features and additional measures described in 2 above.**
 - a. For each resource:
 - i. What design features and additional avoidance and minimization measures will be required?
 - ii. To what degree do the design features and additional avoidance and minimization measures mitigate the impacts on-site? Explain why/why not.
 - iii. Describe any residual impacts that may warrant off-site mitigation.

The table presented here documents the basis for the identification of unavoidable impacts, summarized in table: **Dry Lake SEZ: Resource Impacts, On-Site Mitigation, and Mitigation Priorities.**

Dry Lake SEZ: Unavoidable Impact Criteria

Resource/ Issue	Impacts comprehensive and accurate?	Impacts need to be amended?	Additional design features?	To what degree are impacts mitigated on-site?	Impacts adequately mitigated?	Impacts can/cannot be adequately mitigated on-site because:
Soils/Erosion	Yes	No	No	Little can be done on-site to mitigate the loss of up to 5,717 acres of soil. Avoidance (not developing some areas) will reduce the acreage, and soil stabilization measures can reduce soil erosion post disturbance.	No	The degree of disturbance required will result in the loss of a significant quantity of biological soils. While predicted recovery rates for biological soil crusts vary from study to study, most put the recovery rate for damaged crust between 20 to 250 years, once disturbance is removed. For desert pavement natural recovery rates are in the millennia and large scale disturbances are not thought to be recoverable.
Wildlife	Yes	No	No	Little can be done on-site to mitigate the loss of up to 5,717 acres of general wildlife habitat. Avoidance (such as not developing riparian areas or under existing power lines) will reduce the acreage.	No	Complete build-out of the Dry Lake SEZ would directly impact up to 5,717 acres of wildlife habitat (though it is not likely the entire area is developable).
Special Status Species - Animals	Yes (The PEIS list of species potentially occurring in the SEZ has been modified on the basis of BLM local data; pre-disturbance surveys to confirm absence of species potentially present but not further evaluated under the SRMP may be required of developers. If found, the need for off-site mitigation of impacts to those species would be addressed at that time.	No	No	On-site mitigation will reduce, but will not eliminate the loss of special status animal species and their habitat. Development of the Dry Lake SEZ would result in loss of individuals and/or habitat of six special status animal species (listed in the far right column) as well as the Federally-Threatened Mojave Desert Tortoise and migratory bird species protected under the MBTA. Since birds are highly mobile, they will most likely move out of harm's way during construction, except during breeding season. Effects to individual Migratory birds and bird nests can be avoided by not constructing during the breeding season (March 1- August 31). If construction takes place during the breeding season, nest surveys will be conducted. If bird nests are found, then an appropriately sized buffer will be placed around the nest. No construction will be allowed within the buffer, until the birds have fledged. Although individual Golden Eagles and their nests will not be directly affected, construction will affect Golden Eagle foraging habitat. Reptiles tend to take shelter in burrows, and do not move out of harm's way. Individual reptiles can be killed or maimed during construction. Desert tortoise minimization measures include: translocation/relocation, project fencing, education programs, perch deterrents, trash program, authorized biologists/monitors on site during construction, clearance surveys, educational signs, minimizing ground disturbance, no pooling of water (dust control), cover holes and trenches when not in use.	No	Six BLM sensitive species are known to occur or likely to occur in the SEZ (Gila monster, Mojave Desert Sidewinder, Ferruginous Hawk, Golden Eagle, Loggerhead Shrike, and LeConte's Thrasher), as well as the Federally-Threatened Mojave Desert Tortoise and migratory bird species protected under the MBTA. All would suffer unavoidable impacts. Complete buildout of the Dry Lake SEZ would directly impact up to 5,717 acres. In the context of NEPA, direct impacts on the overall range of these species would not be significant because the Dry Lake SEZ is only a small portion of the overall range (see Final PEIS for specific percentages). However, when combined with other BLM lands actions (including other renewable energy development projects, utility corridors and land disposal), multiple use activities (including as mining and OHV recreation) and threats (fragmentation, increased competition with invasive species), development of the Dry Lake SEZ could cause continued population declines of the above mentioned species.

Resource/ Issue	Impacts comprehensive and accurate?	Impacts need to be amended?	Additional design features?	To what degree are impacts mitigated on-site?	Impacts adequately mitigated?	Impacts can/cannot be adequately mitigated on-site because:
Vegetation	Yes	No	No	Little can be done on-site to mitigate the loss of up to 5,717 acres of vegetation. While the native vegetation on a small portion of the disturbed areas could be restored, the Mojave Desert is extremely slow to recover from disturbance. Estimates suggest that, without active restoration, it takes the Mojave Desert 76 years for reestablishment of perennial plant cover and 215 years for reestablishment of both perennial and annual species cover. This means the cumulative impacts of ground disturbing activities are additive over time. It also means BLM can use restoration as a way to mitigate cumulative impacts because restoration can speed up recovery time.	No	Development of the Dry Lake SEZ would result in the direct loss of up to 5,171 acres of Mojave creosote bursage scrub, salt bush scrub, and mesquite acacia woodland. These native plant communities, along with the intact biological soil crusts and desert pavement within them, provide ecosystem services including: stabilizing soils against wind and water erosion, maintaining air and water quality, maintaining nutrient cycling, maintaining landscape connectivity including the dispersal and migration of species across the landscape, protection against colonization by non-native weeds and protection against wildfire, provide shelter and forage for game species, migratory birds, six BLM special status animal species and general wildlife species. Development would result in direct removal or disturbance of these native plant communities, special soil environments, and the ecosystem services they provide. The direct impacts would probably not be significant in the sense of NEPA; however, on a larger scale the cumulative loss of these services could cost the public in terms of reduced environmental quality and cost BLM funding if it becomes necessary to implement management actions to compensate for their disruption or loss.
Special Status Species - Vegetation	Yes	Yes ¹	No	Little can be done on-site to mitigate the loss of the one special status plant species known to exist in the SEZ. Development of the Dry Lake SEZ would result in the removal of rosy two-toned penstemon plants and the alteration of 5,717 acres of habitat. Given low population densities and dispersed distribution of the species across the SEZ, avoidance of individual plants is not practical and would excessively fragment the remaining population.	No	One BLM special status plant species, the rosy two-toned penstemon (<i>Penstemon bicolor</i> ssp. <i>roseus</i>) would suffer unavoidable impacts.

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Visual Resources	Yes	No	Yes (Managed Developm ent Plan for the SEZ; coordinati on with City of North Las Vegas planners	Part of the SEZ is currently managed as VRM Class III under the applicable BLM land use plan. On-site mitigation will reduce, but will not eliminate visual impacts. The Solar PEIS identified moderate to strong visual contrasts in the following specially designated areas in the vicinity of the SEZ: Desert National Wildlife Refuge; Old Spanish National Historic Trail; Arrow Canyon WA; Muddy Mountains WA; and Nellis Dunes SRMA. Potential impact on night skies. Implementing design features such as selecting paint colors that blend with the environment, minimizing vegetation removal, and using good lighting design and operating procedures would reduce contrast.	No	Development of the Dry Lake SEZ would introduce changes in visual forms, lines, colors, and textures that would contrast strongly with the surrounding landscape in the SEZ, and because of the large size of the facilities and their highly reflective surfaces, could be visible for long distances from surrounding lands. The SEZ is a flat area devoid of tall vegetation, and consequently, solar facilities within the SEZ generally could not be screened from view from nearby lands. While on-site mitigation would reduce visual contrasts caused by solar facilities within the SEZ, it would not likely reduce impacts to less than moderate or strong levels for nearby viewers..
Specially Designated Areas	Yes	No	No	See the hydrology section. The Solar PEIS identified moderate to strong visual contrasts in the following specially designated areas in the vicinity of the SEZ: Desert National Wildlife Refuge; Old Spanish National Historic Trail; Arrow Canyon WA; Muddy Mountain WA; and Nellis Dunes SRMA.	Maybe for Coyote Springs ACEC; No for visual impacts at other SDAs	It depends if impacts on hydrology extend to the Coyote Springs ACEC. For visual impacts, full development of the SEZ with solar facilities would cause moderate to strong visual contrasts that could not be hidden from view from the SDAs.
Military	Yes	No	No	The Air Force has stated that glare, thermal effects, structure height of greater than 250 ft., lighting of structures, and transmission lines could adversely affect operations. Collision hazards can be reduced by restricting maximum development height. While the probability of flight crews parachuting into the area as a result of in-flight emergencies is low, the safety hazard posed by solar facilities cannot be completely mitigated on-site.	No	Because the development area is under the approach and departure routes for military aircraft traveling between Nellis AFB and the NV Test and Training Range, there is a heightened risk of emergencies occurring as aircraft pass over the site. Such emergencies can involve the jettisoning of ordinance, crews ejecting and parachuting, and aircraft crashing. Restriction on project height can reduce collision hazards.
Native American Concerns	Yes	No	No	See hydrology and wildlife sections	No	Tribal representatives have identified impacts on hydrology and wildlife as concerns. The extent of the impacts on hydrology depends on the technology and on the cumulative use of water resources. Unavoidable impacts on wildlife habitat are expected. a loss of wildlife habitat can be mitigated to some extent on-site,

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Invasive/ Noxious Weeds	Yes	No	No	The active and prolonged implementation of design features can greatly reduce but not eliminate the risk of the establishment and spread of invasive species.	Maybe	On-site mitigation will reduce, but will not eliminate the potential for invasive species. The degree of disturbance creates a significant opportunity for the establishment of invasive species and weeds.
Hydrology (Water/ Watershed/ Water Quality)	Yes	No	No	While it depends on the water demands of the development and whether the subsurface hydrology is affected, some impacts might be mitigated by the migration of water used for dust suppression and/or for cleaning mirrors back into the ground.	Maybe	The nature of the solar technology deployed will dictate water requirements. On-site mitigation will reduce, but will not eliminate the need for water. While the groundwater in the hydrologic basin is over-allocated, it is currently not over-used. If all allocations are fully used, the water used in solar operations in conjunction with water used outside the SEZ would contribute to a decline in the water table.
Riparian	Yes	No	No	Most impacts can be mitigated on-site by avoiding development in the washes and by the installation of engineering controls on surface water runoff/erosion. The riparian areas that occur within the SEZ are shallow ephemeral washes, and have been excluded from the developable area.	Maybe	It depends on the engineering controls. Development may alter ephemeral stream channels that can impact flooding and debris flows during storms, groundwater recharge, ecological habitats, and riparian vegetation communities. Reductions to the connectivity of these areas with existing surface waters and groundwater could limit water availability and thus alter the ability of the area to support vegetation and aquatic species. This could reduce overall stability of the natural landscape.
Cultural	Yes	No	No	A pre-construction cultural survey and the programmatic agreement establishing a protocol for treating cultural resources if they are discovered during construction decrease the risk of disturbing or destroying cultural resources. The eligible Mormon Road/Old Spanish Trail linear feature can be avoided.	Maybe	The discovery of new cultural sites is always a possibility and adequate mitigation would be dependent on the resources discovered and their relative significance in the region.
Acoustics	Yes	No	No	Some temporary acoustic impacts are expected during construction. On-site standards and monitoring are expected to keep impacts in an acceptable range.	Yes	The area is currently impacted by traffic noise from I-15 and Hwy 93 and the railroad adjacent to the site. Additional impacts from solar development are expected to be temporary, localized, and neither significantly louder than or out of character with current noise.

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Air Quality	Yes	No	No	Some temporary impacts are expected during construction, primarily from construction vehicle emissions and from dust kicked up by construction vehicles and by wind blowing over disturbed crust. On-site mitigation, such as dust suppression, and monitoring are expected to keep impacts in an acceptable range (less than the NAAQS for CO and PM).	Yes	The area is currently impacted by emission from vehicles traveling on I-15 and Hwy 93, the APEX landfill, the mines and mills operating on the south end of the SEZ, and the natural gas-fired power plants operating on and around the SEZ. Additional impacts are expected to be temporary, and are not expected to result in non-compliance with NAAQS.
Environmental Justice	Yes	No	No	No adverse impacts are anticipated.	Yes	While there are minority and/or low income populations within 50 miles, they are more than 10 miles away and views of the SEZ are restricted.
Fire	Yes	No	No	On-site mitigation can significantly reduce the chances of a wild-fire. Historically, the SEZ has seen very little fire disturbance. However, this may increase if burnable vegetation becomes established. Mitigation that reduces the establishment of burnable invasive species will maintain a low risk status. On-site mitigation would include a requirement for the development and implementation of a fire safety and emergency response plan, including fuel inventory, to be developed and executed during construction and operations, including fire/fuel breaks and design features to help minimize risk.	Yes	The area is low fire risk to begin with. This would change only if burnable invasive species were allowed to establish themselves.
Hazardous Waste	Yes	No	No	Virtually all impacts can be mitigated on-site. The design features, which require development of an Emergency Response Plan, will reduce the chances of a hazardous material release, and provide a protocol for mitigating the site should one occur.	Yes	The implementation of design features for handling any hazardous substances will reduce the risk of exposure and/or release and, should one occur, specify the emergency procedures for protecting public safety and for remediating the site.
Lands & Realty	Yes	No	No	Virtually all impacts can be mitigated on-site. According to regulation, any and all solar development must occur in deference to all previously existing rights. In addition, the BLM SNDO has made the decision remove from leasing the areas within the SEZ encumbered by existing rights-of-way (plus a 200 foot buffer).	Yes	By regulation, any new activity must occur in deference to existing rights, thus potential impacts have been avoided.
Minerals	Yes	No	No	Virtually all impacts can be mitigated on-site by avoiding existing mining and mill-site claims. The SNDO has made the decision to remove from leasing the existing mining and mill-site claims.	Yes	By regulation, any new activity must occur in deference to existing rights, thus potential impacts have been avoided.
Paleontological	Yes	No	No	No mitigation is required as no paleontological resources are known or are expected to exist in the SEZ. Design features will reduce the risk that any paleontological resources that are discovered will be destroyed.	Yes	Not applicable - there are no known paleontological resources on site, and the geology suggests the potential is low.

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Livestock Grazing	Yes	No	No	No mitigation is necessary as there are no impacts.	Yes	Not applicable – there are no grazing allotments within the SEZ.
Recreation (includes Travel Management Areas)	Yes	No	No	Virtually all impacts on recreation can be mitigated on-site. The potential impacts are primarily related to providing access to the Dry Lake and to the Arrow Canyon mountain range to the west of the SEZ. Through a combination of avoidance, design features, and the establishment of alternative access routes to these areas, the potential impacts can be adequately mitigated on-site.	Yes	Relatively little recreation currently occurs in the SEZ. Access to the Arrow Canyon Range and Dry Lake can be maintained by existing and/or new routes. If new routes are established, NEPA for those routes would be required.
Socio-economic	Yes	No	No	Possible adverse impacts of in-migrating workers required for project construction and operation (e.g. hiring of police, firefighters, and teachers and providing services to new area workers and families). On-site mitigation could include requiring developers to secure agreements for local government services as a condition of a Notice to Proceed.	Yes	Any adverse impacts caused by the requirement for local government services would be mitigated by the requirement for the developer to secure agreements as a condition of the Notice to Proceed.
Transportation	Yes	No	No	Virtually all impacts on transportation can be mitigated on-site. The potential impacts are primarily related to providing access to the Dry Lake and to the Arrow Canyon mountain range to the west of the SEZ. Through a combination of avoidance, design features, and the establishment of alternative access routes to these areas, the potential impacts can be adequately mitigated on-site.	Yes	Relatively few transportation routes would be impacted by development in the SEZ. Alternative routes to the Arrow Canyon Range and Dry Lake can be established.
Wild Horses and Burros	Yes	No	No	No mitigation is necessary as the SEZ is not part of a Herd Management Area, and no horses or burros are known to exist in the area.	Yes	The SEZ is not part of a Herd Management Area, and no horses or burros are known to exist in the area.
Wilderness & Lands with Wilderness Characteristics	Yes	No	No	No mitigation is necessary as there are no designated wilderness areas or lands with wilderness characteristics within or adjacent to the SEZ. Because of extensive existing development within the SEZ (roads, power lines, pipelines, active mill-site, electrical sub-station, and natural gas-fired power plant), the area lacks wilderness characteristics.	Yes	Not applicable – resources would not be impacted.

¹The Solar PEIS identified seven BLM Nevada special status plants that occur in and around the Dry Lake SEZ. However, only the two toned penstemon is expected to occur in the Dry Lake SEZ. To determine potential impacts on BLM special status plants, BLM reviewed occurrence data and Rare Plant Habitat Modeling (Hamilton and Kokos 2011). The habitat modeling report can be downloaded from the Clark County Desert Conservation Program website at <http://bit.ly/Qbm19H>.