BLM

U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment

DOI-BLM-CA-D070-2019-0016-EA

Truckhaven Geothermal Exploration Well Project

PREPARING OFFICE

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Bureau of Land Management
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Environmental Assessment

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1. Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the potential environmental impacts for the drilling of up to four geothermal exploration wells (Proposed Action) on Bureau of Land Management (BLM) administered lands for the purpose of identifying a viable geothermal resource. These lands are currently under BLM lease (CA-55559) to Orni 5 LLC.

The EA will assist the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any significant environmental impacts (effects) could result from the analyzed actions. “Significance” is defined by NEPA and in 40 Code of Federal Regulations 1508.27. Additionally, an EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). If, following the analysis in the EA, the decision maker determines that this project has “significant” impacts then an EIS would be prepared for the Proposed Action. If no such significant impacts are found, a Decision Record may be signed for the EA approving the selected alternative, whether the Proposed Action or another alternative. A Decision Record, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in new “significant” environmental impacts that have not already been analyzed.

1.1. Identifying Information:

1.1.1. Title, EA number, and type of project:

The drilling of up to four geothermal exploratory wells (Proposed Action) is the subject of this EA (DOI-BLM-CA-D070-2019-0016-EA). The Proposed Action includes drilling and monitoring the proposed geothermal resource wells. The geothermal wells are designed to drill into and flow test the anticipated underlying geothermal reservoir to confirm the characteristics of the geothermal reservoir and detect if the geothermal resource is commercially viable.

1.1.2. Location of Proposed Action:

The proposed well sites (see Figure 1) are located in the "Truckhaven Geothermal Leasing Area" analyzed by the BLM in the "Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area" (October 2007). The proposed well sites (see Figure 1) are located in an area analyzed in the Geothermal Overlay Zone for Imperial County's "Final Programmatic Environmental Impact Report - Renewable Energy and Transmission Element Update" (July 2015).

The proposed well sites are currently vacant, unirrigated, desert land that is sparsely vegetated and primarily flat. Tule Wash and Surprise Ditch flow northeast and eventually empty into the Salton Sea. The well sites were selected to minimize surface disturbance, reduce the potential for adverse environmental effects, and make the best use of existing access within the limitation of testing the targeted geothermal resource. To the degree possible existing roads, trails and existing disturbed areas will be used for access.

Primary highway access to the proposed well sites are off State Highway 86 to Airpark Drive or County Dump Road (see Figure 2). Existing access roads would be utilized to the extent practical. The access roads would be constructed or improved with gravel and/or maintained as needed to safely accommodate the traffic required for the exploration well drilling activities. Road beds would typically be approximately twenty (20) feet across. Table 1 lists general information, well site designations, acres of disturbance and access information for each well site.

Table 1: Project Well Land Ownership and Access Information

Well Site	Assessor's Parcel Number (APN)	Surface Land Owner	Geothermal Rights Owner	Well Site Access	Nearest Residence	Acres of Disturbance (Well Pad and New Access Road)
84-6	017-970-001 (649.51 acres)	BLM	BLM	Access from Dump Road	0.63 mile	Well Pad: 3.7 acres; Access Road: 0.78 acre
87-6	017-970-001 (649.51 acres)	BLM	BLM	Access from Dump Road	0.82 mile	Well Pad: 3.7 acres; Access Road: 0.60 acre
48-6	017-970-001 (649.51 acres)	BLM	BLM	New driveway from County Dump Road	1.29 miles	Well Pad: 3.7 acres; Access Road: 0.05 acre
21-8	017-340-014 (640 acres)	BLM	BLM	New driveway from County Dump Road	0.74 mile	Well Pad: 3.7 acres; Access Road: 0.05 acre

1.1.3. Name and Location of Preparing Office:

Lead Office - and number

Bureau of Land Management – El Centro Field Office
1661 South 4th Street
El Centro, CA 92243

Office: (760) 337-4400

Case file/serial number

Geothermal Lease: CA-055559

Geothermal Drilling Permit: CA-058494

1.1.4. Applicant Name:

Orni 5 LLC

1.2. Purpose and Need for Action:

The purpose of the Proposed Action is to provide ORNI 5 LLC's (the Applicant) the opportunity for exploratory geothermal well drilling within the Truckhaven Geothermal Leasing Area to drill and flow test the anticipated underlying geothermal reservoir on public lands administered by the BLM. The need for the action is established by the BLM's responsibility under the Geothermal Steam Act, its revisions of 2007, and its implementing regulations under 43 Code of Federal Regulations (CFR) 3200 (et seq.); the Minerals Leasing Act of 1920, as amended; and Secretarial Order 3285 A1 of February 22, 2010 (which establishes the development of environmentally responsible renewable energy as a priority for the U.S. Department of the Interior (DOI)); and other applicable federal laws, regulations, and policies. The BLM must respond to the Geothermal Drilling Permit Application (the Geothermal Drilling Permit Project Description is included as Appendix A) submitted by ORNI 5 LLC for the exploration, construction, and operation of the Proposed Action. The Proposed Action is consistent with the National Energy Policy, which encourages the development of energy resources including geothermal resources on federally managed lands. Executive Order 13212, Actions to Expedite Energy-Related Projects, issued on May 18, 2001, states, "[T]he increased production and transmission of energy in a safe and environmentally sound manner is essential."

1.3. Scoping, Public Involvement and Issues:

BLM staff internally reviewed the proposed action and determined that air quality, cultural resources, paleontology, noise, hydrology and water quality, recreation, soils, special status vegetation and wildlife species, and visual resources had the potential to be affected and therefore should be analyzed in this EA. The BLM will circulate this EA and an unsigned FONSI for a 30-day public review period, during which time the public can comment on the Proposed Action, the No Action Alternative, and the analysis presented in this EA.

Internal scoping was performed by an interdisciplinary team of BLM resource specialists to analyze the resources that may potentially be impacted by implementation of the Proposed Action. While many potential impacts to various environmental resources may arise during scoping, not all impacts warrant analysis. The potential effects to environmental resources identified during internal scoping were carried forward for detailed analysis if: • analysis of the effect was necessary to make a reasoned choice between alternatives; • the effect was likely to have a noticeable or measurable impact to a resource value or values; • analysis of the effect was necessary to determine whether or not it would have direct or indirect impacts and, if so, the magnitude of those impacts; • the effect had the potential to violate a law imposed to protect the

environment, or any other law or regulation, without mitigation imposed; or, • an issue would add a measurable incremental impact to past, present, and reasonably foreseeable actions and therefore have a possible cumulatively substantial impact. External scoping was performed with staff from the Ocotillo Wells State Vehicular Recreation Area, the County of Imperial Planning Department and Indian Tribes since 2016. Potential impacts to the resources listed in the Resources Evaluation Table (Appendix B) were evaluated in accordance with criteria listed above to determine if detailed analysis was required. Through this process, the interdisciplinary team determined that the following resources are present and that the potential impacts to them warrant detailed analysis in the EA:

- Air Quality
- Cultural Resources;
- Paleontology
- Noise
- Hydrology/Water Quality
- Recreation
- Soils
- Special Status Species (Wildlife and Vegetation);
- Visual Resources;

Rationale is provided in the Resources Evaluation Table for resources that are present but whose impacts do not warrant detailed analysis based on the criteria listed above.

Figure 1: Project Vicinity

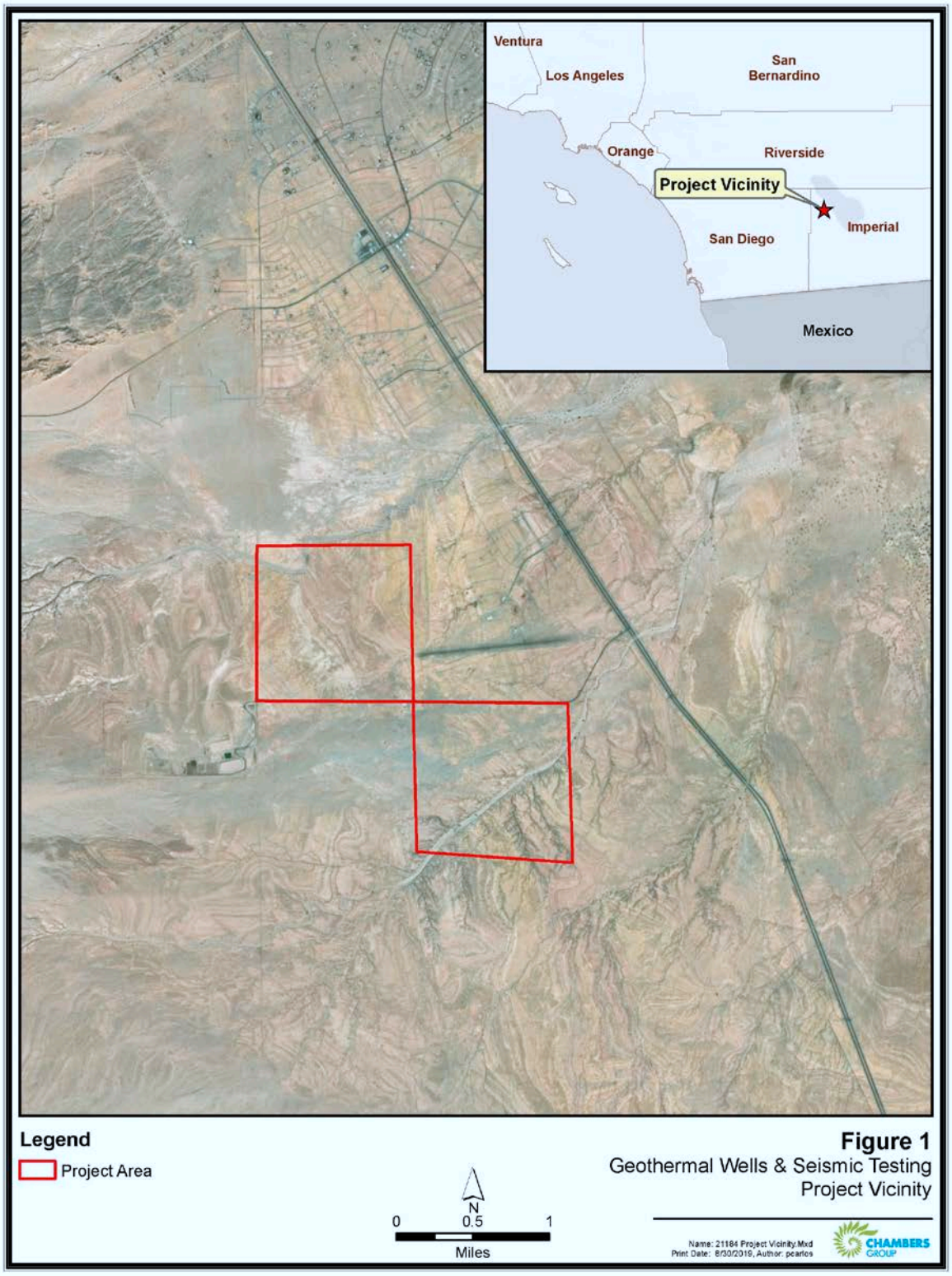
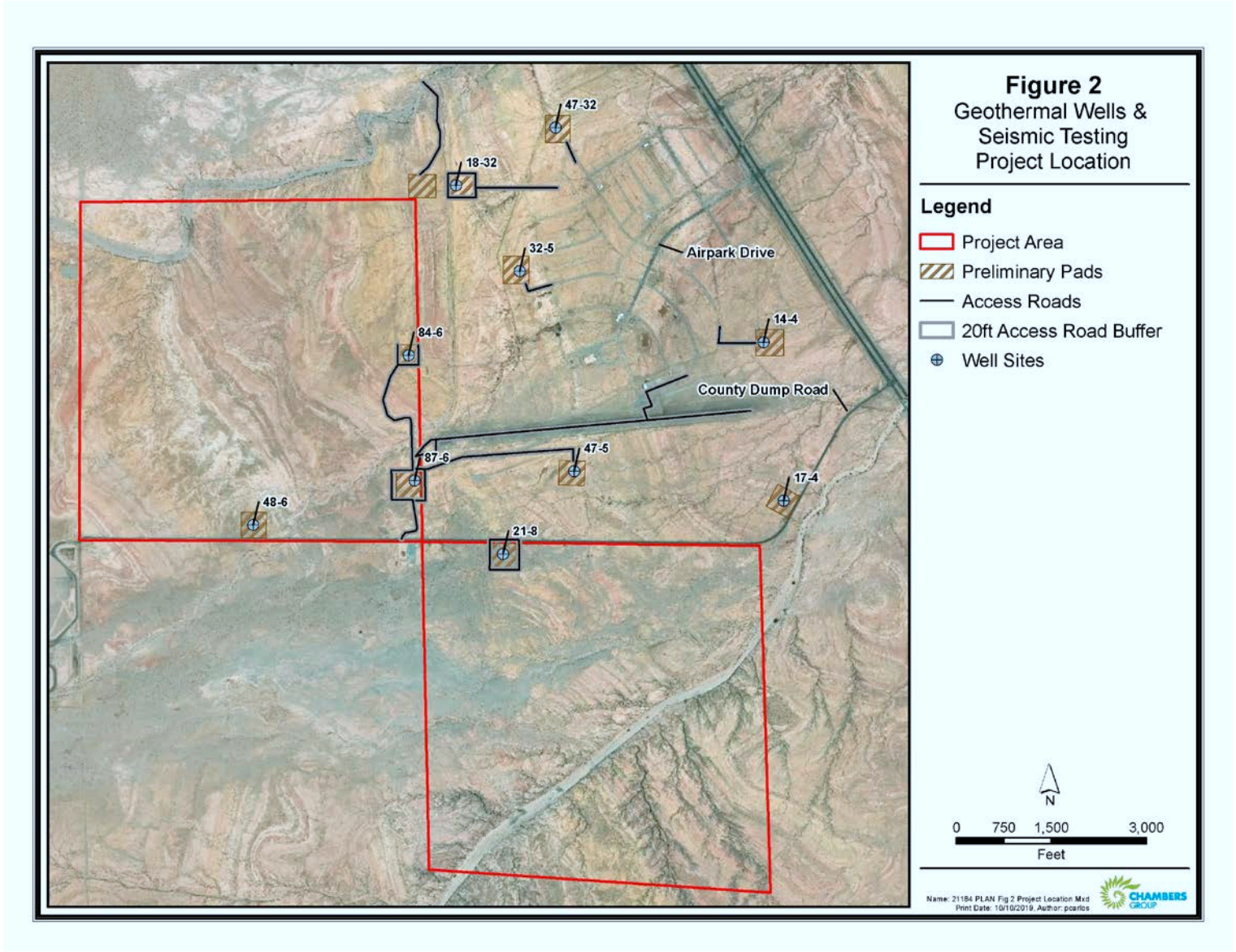


Figure 2: Geothermal Wells and Seismic Testing Project Location



2. Proposed Action and Alternatives

2.1. Description of the Proposed Action:

The Proposed Action includes drilling and testing up to four geothermal exploration wells on public lands managed by the BLM as described in Appendix A Geothermal Drilling Permit Application and Project Description.

2.1.1. Well Pad Layout and Construction

One well pad will be constructed for each drill site. Each exploration well pad will be approximately 400 feet by 400 feet (for a total surface area of about 3.7 acres), except for well pad 84-6, which is 2.2 acres to avoid sensitive resources. See Figure 3 for a typical layout of the well pads.

Additionally, construction of the access roads for each exploratory well will result in the following impacts per well site:

- Well Site 84-6: 0.78 acre
- Well Site 87-6: 0.60 acre
- Well Site 48-6: 0.05 acre
- Well Site 21-8: 0.05 acre

Well pad preparation activities would include clearing, earthwork, drainage, and other improvements necessary for efficient and safe operation. The site selection process included minimizing cut and fill requirements. Measures to prevent soil erosion and loss of topsoil would include the preparation of an erosion control plan before grading to adequately control erosion during construction.

Each proposed well site would be prepared to create a level pad for the drill rig, and a graded gravel (if needed) surface for the support equipment. Runoff from undisturbed areas around the constructed sites would be directed into ditches and energy dissipaters (if needed) around each proposed well site, consistent with BLM best management practices (BMPs) for stormwater. All machinery, drilling platforms, and oil and fuel storage would be in areas tributary to the containment basin in order to prevent the movement of storm water from these areas off of the construction site. The proposed well sites would be graded to direct runoff from the pad into the cellar which would be pumped to the containment basin.

Containment basins would be constructed at each proposed well site for the containment and temporary storage of drilling mud and cuttings and stormwater runoff from the construction site. Each containment basin would be approximately 100 feet by 250 feet by 7 feet deep, and would hold roughly 420,000 gallons with a 2-foot freeboard. Each containment basin would be lined with a 40-milimeter synthetic liner, in accordance with requirements of the Colorado River Water Quality Control Board (CRWQCB) and the State Water Resources Control Board (SWRCB). Compliance with California construction stormwater notification and permitting requirements would be performed for each proposed wellsite and new access road.

2.1.2. Well Drilling

Proposed activities include the drilling (and re-drilling, if necessary) of up to four geothermal exploration wells. Each proposed well would be drilled to a total depth of approximately 5,000 to 7,000 feet (into the geothermal zone) from the constructed well drilling pads.

Geothermal well drilling would be conducted from the constructed well pads described above. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 days to complete. The drilling operation would employ about 25 people in 6-person shifts. Well pad construction and drilling would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12 - 16 small trucks/service vehicles/worker vehicles).

The BLM regulates geothermal well drilling operations on geothermal leases issued on public lands managed by the BLM. The BLM El Centro Field Office must review and approve an operations plan, prepared and submitted by the lessee to describe how the wells would be drilled and tested and the environment protected. With technical assistance from the BLM Ridgecrest Field Office and the California State Office the BLM El Centro Field Office also reviews and approves the drilling permit application submitted for each well by the lessee, including the detailed proposed well drilling program for each well, to ensure the drilling operations are safe and protect the environment.

Standard geothermal well drilling equipment would be used during well drilling operations conducted for the Proposed Action. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Equipment Registration Program (PERP). During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface (including non-LED aircraft safety lighting), and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and pipe stands; draw works; derrick; drill pipe; trailers; drilling mud; fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared well pad on approximately 40 or more large tractor-trailer trucks. The placement of this equipment on each prepared well pad would depend on rig-specific requirements and site-specific conditions.

Each geothermal well would also be drilled and cased to the design depth of approximately 5,000 to 7,000 feet. A geothermal well drilling and completion program for each well would be submitted to BLM.

Additionally, blowout prevention equipment (BOPE) inspected and approved by the BLM would be utilized while drilling below the surface casing. Well casing (typically 20") would be cemented to a depth of approximately 1,800 feet below Kelly bushing (bkb). A slotted liner (typically 9-5/8") would be hung from approximately 1,750 feet to near total depth. All these numbers are subject to change and would be formalized when the drilling programs are submitted to the BLM.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. Rock cuttings would be captured in the

containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 5,000 to 7,000 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

2.1.3. Drill Pad and Access Road Aggregate

Aggregate required for well pad and access road construction would likely be purchased from the Aggregate Products Inc. Salton Sea quarry facility, located approximately 2 miles west of the town of Salton Sea Beach and 10 miles north-northwest of the Proposed Action.

2.1.4. Water Requirements and Sources

Water required for well pad and access road construction and well drilling would typically average about 50,000 gallons per day. Water necessary for these activities would be purchased from the Coachella Water District via a fire hydrant. Water would be picked up from the source and delivered over existing roads to each construction location or drilling site by a water truck which would be capable of carrying approximately 4,000 gallons per load. This would result in the requirement of approximately 13 truck trips per day to accommodate water needs; and it is anticipated that the fire hydrant from which the water is obtained would be located in Salton City, approximately 1 mile to the northeast of the Proposed Action area. The water would be used for road grading, construction and dust control.

2.1.5. Testing

Wells would be initially flow tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the drilling sump. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam and non-condensable gasses from the geothermal fluid would be discharged to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would be moved from the well site following completion of these short-term test(s). Following the short-term test(s), all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut-in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam and non-condensable gasses from the geothermal fluid would typically be discharged to

the atmosphere. The remaining geothermal fluid would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed above ground along the well site access roads or, if following access roads is not feasible, along other previously approved routes (see Figure 2).

2.1.6. Geothermal Well Monitoring

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would typically consist of several valves on top of the surface casing; which would be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism. Pressure and temperature sensors may be installed in the hole at fixed depths to monitor any changes in these parameters over time. A temperature profile of the well may also be run. The monitoring would occur on a weekly basis and may be continued indefinitely.

2.1.7. Abandonment Program

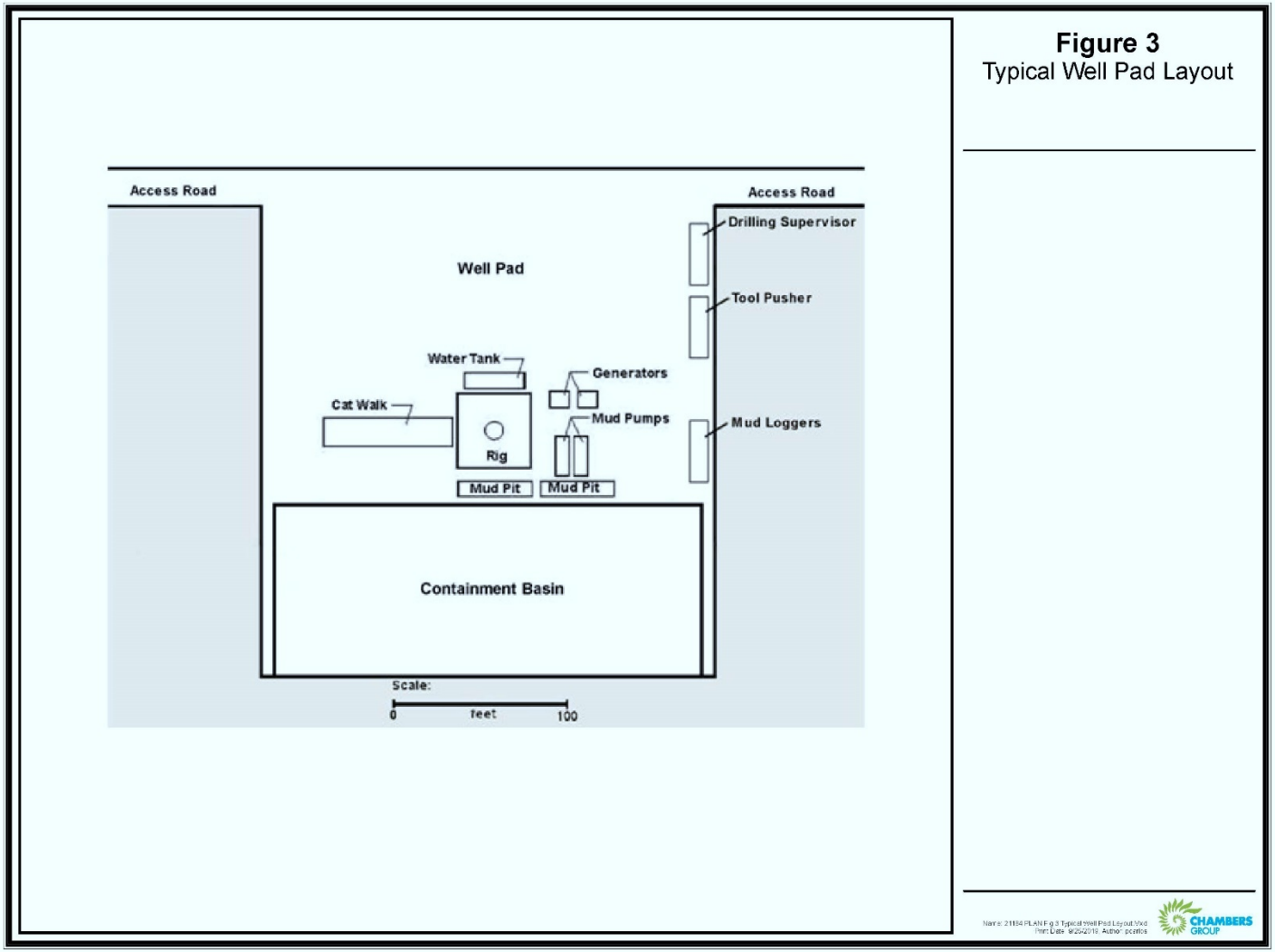
After drilling operations are completed on each well, the liquids from the containment basin would either be evaporated, pumped back down the well, and/or disposed of in accordance with the requirements of the BLM.

The solid contents remaining in each containment basin, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, would be tested as required by the BLM. The solids would be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If allowed they may be used as daily cover at the nearby landfill. After the materials in the containment basins have been removed the containment basin area may be reclaimed depending on if there may be a need for its use in the future.

Upon the completion of well drilling and flow testing, a decision would be made by the Applicant regarding the commercial potential of each well. If a well is judged by the Applicant to have any commercial potential, well operations would likely be suspended pending application for and receipt of regulatory approvals to place the well into commercial service through a new pipeline to a new geothermal power plant or direct use facility. The well would likely continue to be monitored while the application is being processed and under review. If a well is judged to not have commercial potential, it may continue to be monitored, or it may be abandoned in conformance with the well abandonment requirements of the BLM, as applicable. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The well head (and any other equipment) would be removed, and the casing cut off at least six feet below ground surface.

Following abandonment of the well, the well site itself would be reclaimed, typically by re-grading the entire well pad and access road area to approximately the same topography as existed prior to construction of the site, including the spreading the topsoil (if any) over the surface. Revegetation would be in conformance with the requirements of the BLM.

Figure 3: Typical Well Pad Layout



2.2. Project Design Features and Best Management Practices

The Applicant is proposing to implement the following project design features to reduce impacts associated with implementation of the Proposed Action.

PDF-CUL-1: The Applicant shall, prior to construction, prepare a monitoring and discovery plan that identifies procedures for monitoring and implementation of a discovery plan. Consistent with the monitoring and discovery plan prepared for the Proposed Action, the Applicant shall retain qualified archaeological monitors for all ground disturbing activities associated with the development of access roads and construction of the drill pads. If a significant cultural resource site is found during ground disturbing activities associated with well pad or access road construction the Project features will either be moved, or the resource will be protected in place, or data recovery will be initiated, consistent with the monitoring and discovery plan.

PDF-CUL-2: All workers involved with ground disturbing activities associated with the Proposed Action will undergo worker resources awareness training prior to being allowed to work in the Proposed Action area. The BLM will review and approve the worker training content in advance of any project work on BLM lands.

PDF-PAL-1: Prior to the commencement of ground-disturbing activities, a qualified professional paleontologist shall be retained to prepare and implement a Paleontological Resource Mitigation Plan for the Proposed Action. The Plan should address the recommended approach to additional specimen collection, the specific locations and intensity of monitoring recommended for each geologic unit, and monitoring intensity. Paleontological monitoring will be required for all ground disturbing activities within the previously undisturbed Arroyo Diablo Formation, Borrego Formation, Brawley Formation, Lake Cahuilla deposits, and Quaternary older alluvium, which underlies the Project area. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected.

PDF-PAL-2: All Project personnel and other on-site workers shall receive environmental awareness training on paleontological resources prior to the start or continuation of any elements of the Project that include ground disturbing activities. The training will be conducted by a qualified, BLM- and DPR-permitted paleontologist and will provide a description of the fossil resources that may be encountered in the Proposed Action area, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist. The training may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.) and may also be videotaped or presented in an informational brochure for future use by field personnel not present at the start of the Project. The workers should be informed that any unlawful collection of paleontological resources may be subject to a misdemeanor, a fine, or both.

PDF-NOI-1: All construction equipment shall use noise-reduction features (e.g., mufflers and engine shrouds that are no less effective than those originally installed by the manufacturer;

PDF-NOI-2: All non-essential well drilling equipment and truck deliveries shall be limited to operating during the allowable construction times of between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday;

PDF-NOI-3: The portable office and any storage containers used during the well drilling phase shall be placed between the drilling equipment and nearest home, in order to effectively act as a sound wall and provide attenuation to the nearest home.

PDF-BIO-1: A qualified biologist(s) will monitor all construction activities to ensure that standard and special status species-specific avoidance and minimization recommendations are adhered to. The monitor will retain stop work authority in the event there is the likelihood of eminent take of special status species. The biological monitor will conduct a general preconstruction survey no more than 14 days prior to the start of construction to verify that no special status species are in the Proposed Action area or its buffers. The monitor shall also conduct a daily survey in and around work areas before activities start.

PDF-BIO-2: A worker education program will be prepared and presented to all employees working on the Proposed Action in special species habitat. The education program will include identification of target species and their habitats, any project mitigation measures and stipulations, reporting requirements, and penalties for failure of compliance.

PDF-BIO-3: Should construction activities occur between February 15 and August 15, the time period typically referenced in California for the general bird nesting season, preconstruction nesting surveys will be conducted in the Proposed Action area by a qualified biologist within two weeks of the start of construction. If no active bird nests are found within this area, no further mitigation is required. If an active nest is found, a buffer shall be instated around the nest if it belongs to a non-listed or migratory bird. If the nest belongs to a listed or fully-protected species, a larger buffer shall be instated around the nest, at a distance approved prior to construction activities.

PDF-BIO-4: Avoid burrows that may be utilized by special status wildlife species with a minimum buffer of 20-feet from burrows suitable for flat-tailed horned lizard and a minimum buffer of 30-feet from burrows suitable for burrowing owls.

PDF-BIO-5: If flat-tailed horned lizards are observed within the construction area, the qualified biological monitor, with prior approval through project acquired permits or permissions, will relocate the individual out of the construction area, adjacent to where it was moved from.

PDF-BIO-6: If burrowing owls are observed within the Project area prior to or during construction activities, occupied burrows shall not be disturbed during the owl nesting season, February 1 and August 31. If burrows are found, the appropriate California Department of Fish and Wildlife (CDFW)-recommended buffer, or a buffer deemed appropriate by the qualified biological monitor, shall be instated until occupancy status is determined. If the buffer cannot be maintained during the non-breeding season, owls may be evicted from the burrows using accepted methodology as approved by resource agencies. Eviction will not occur during the breeding season.

PDF-BIO-7: Avoid special status perennial plant species with a minimum buffer of 5 to 10 feet, depending on the root structure and as determined by the biological monitor.

PDF-BIO-8: Access to proposed well sites will be via pre-existing access routes, to the greatest extent possible, and the work area boundaries will be delineated with staking, flagging, or other comparable markings to minimize surface disturbance associated with vehicle straying. Signs and/or fencing will be placed around the Proposed Action area to restrict access to project-related vehicles.

PDF-BIO-9: Project-related equipment will be washed prior to entering the project area for the first time to reduce the chance of transporting noxious weed seeds from outside the area.

PDF-GEO-1: An erosion control plan will be prepared and approved before grading to adequately control erosion during construction.

PDF-HAZ-1: Solid waste materials (trash) will be deposited at an authorized landfill by a disposal contractor. Portable chemical sanitary facilities will be used by all personnel. These facilities will be maintained by a local contractor. Diesel fuel, lubricants, drilling mud and drilling mud additives would be transported to, stored on and used by the Project at the proposed well sites. The Project would conform to federal and state hazardous materials handling requirements.

PDF-HAZ-2: The private airstrip owner within 1 mile of each proposed exploratory well will be given prior notification of all the drilling operations. Notices to the Federal Aviation Administration (FAA) are also required, and will be delivered, and the drilling rigs will be properly lighted, as required by the FAA, to avoid air traffic hazards.

PDF-HAZ-3: The Project has adopted blowout prevention measures in conformance with BLM and the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CDOGGR) requirements to minimize the potential for a well to “blow out,” or flow uncontrollably. Should the well start to flow hot or cold water, the drilling company would use heavier drilling mud or other specialized drilling materials (which would be stored on site) to stop the flow.

2.3. Description of Additional Alternatives Analyzed in Detail:

In addition to the Proposed Action (Alternative 1) as described above, the BLM is analyzing a second alternative, the No Action.

Alternative 2 – No Action Alternative

The No Action Alternative would preclude the drilling, completion, and flow testing of up to four geothermal exploratory wells within the "Truckhaven Geothermal Leasing Area". Under the No Action Alternative, the BLM would deny ORNI 5 LLC’s application and no geothermal exploratory wells would be drilled.

2.4. Conformance

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations (40 Code of Federal Regulations (CFR) 1500-1508) implementing NEPA, and the Federal Land Policy and Management Act (FLPMA) of 1976, and is in conformance with the applicable BLM land use plans.

Land Use Plan (LUP) Name:

California Desert Conservation Area Plan (CDCA)

Date Approved:

1980

The Proposed Action is in conformance with the applicable LUP because it is specifically provided for in the following LUP decision(s):

The Proposed Action is subject to the 1980 California Desert Conservation Area (CDCA) Plan, as amended. As part of 1976 Federal Policy Management Act (FLPMA), the CDCA Plan was developed to guide land use management of BLM lands within this portion of California. The Proposed Action encumbers an area entirely located on BLM-administered public lands in Imperial County, California. The CDCA Plan addresses geothermal development in Chapter 3 Geology, Energy and Mineral (G-E-M) Resource Elements:

The general goals of the G-E-M Resource Elements are to:

1. Within the multiple-use management framework, assure the availability of known mineral resource lands for exploration and development.
2. Encourage the development of mineral resources in a manner which satisfies national and local needs and provides for economically and environmentally sound exploration, extraction and reclamation processes.
3. Develop a mineral resource inventory, GEM database, and professional, technical, and managerial staff knowledgeable in mineral exploration and development.

Land Use Plan Amendment Name:

Desert Renewable Energy Conservation Plan (DRECP)/BLM Land Use Plan Amendment (LUPA)

Date Approved:

2016

The Proposed Action is in conformance with the applicable LUPA because it is specifically provided for in the following LUPA decision(s):

The DRECP LUPA to the CDCA created new land use allocations to replace the multiple use classes within the CDCA for those areas of the CDCA within the DRECP LUPA Decision Area. The Proposed Action lies within BLM-administered public lands designated as a Development Focus Area (DFA) and the Ocotillo Wells East Special Recreation Management Area (SRMA). DFAs are defined as “locations where renewable energy generation is an allowable use, incentivized, and could be streamlined for approval under the DRECP LUPA.” The Proposed Action is located on DFA lands designated for geothermal development and geothermal development with a no surface occupancy stipulation. The no surface occupancy stipulation only applies to new leases issued after the 2016 LUPA and does not pertain to the Orni 5 LLC lease.

The general goals and objectives for SRMAs are:

- Protect SRMAs for their unique/special recreation values.
- Manage SRMAs for their targeted recreation activities, experiences and benefits.
- Maintain (and where possible enhance) the recreation setting characteristics – physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls (refer to recreation setting characteristics matrix).

Under the specific Ocotillo Wells East SRMA management plan that was published in the DRECP, geothermal energy is an allowable use however the following mitigation measures are specifically required. Relevant measures are included within the recreation section of this EA.

1. Maintain through traffic motorized route network connectivity with roads and trails leading into and through the Ocotillo Wells East SRMA.
2. Manage renewable energy development on adjacent and nearby lands to avoid traffic conflicts with visitors & permitted uses.
3. The proponent will manage "surface occupancy" to consider public health and safety by providing education, signage, fencing, etc. as determined by OWSVRA and the BLM.
4. The proponent will replace any existing facilities that are no longer accessible by the public due to renewable energy development.
5. The proponent will provide or mitigate for alternative routes with like skill level and recreational experience.

The DRECP also requires that applicants must abide by the DRECP's applicable Conservation and Management Actions (CMAs). CMAs are proactive measures, as well as mitigation measures and criteria that guide day-to-day activities, which protect sensitive resource values. Applicable CMAs have been incorporated into Chapter 3 along with the relevant SRMA requirements above. The completed DRECP CMA table is on file at the El Centro Field Office. Applicable CMAs are listed in Appendix D to this EA.

NEPA Document:

Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area (TGLA) and Record of Decision

Date Approved:

2008

The Proposed Action is in conformance with and tiers from the applicable NEPA document:

The TGLA EIS analyzed the potential impacts of proposed leasing and development of federally owned geothermal resources in the Truckhaven Geothermal Leasing Area in Imperial County, California. Under the Record of Decision, BLM determined that it would approve leases for tracts with pending noncompetitive leasing applications and also offer competitive leases for all other federal mineral resources at Truckhaven.

The TGLA EIS identified impacts that would potentially result from the leasing of the geothermal energy resources, including impacts to the flat-tailed horned lizard, cultural resources, off-highway vehicle recreation, and other sensitive resource values. The Proposed Action must abide by the TGLA EIS's applicable best management practices and mitigation measures. Applicable best management practices and mitigation measures from the TGLA EIS are included in Chapter 3.

3. Affected Environment and Environmental Effects:

The following list of resources are present within the project area and the Proposed Action may result in potential impacts: air quality, cultural resources, paleontology, noise, water resources, recreation, soils, special status vegetation and wildlife species, and visual resources. Therefore, these resources areas are analyzed further in this EA. See Appendix B for a comprehensive list of the resources and issues reviewed by the BLM and determined to be either not present or not affected by the Proposed Action.

3.1. Air Quality

3.1.1. Affected Environment

The site of the Proposed Action is located within the Salton Sea Air Basin (Air Basin), which is under the jurisdiction of the Imperial County Air Pollution Control District (IAPCD); the Air Basin is designated as either in attainment or unclassified for all federal and state air pollutant standards, with the exception of 8-hour Ozone, PM10, and PM2.5. Imperial County is classified as a "serious" nonattainment area for PM10 for the National Ambient Air Quality Standards (NAAQS). On November 13, 2009, the Environmental Protection Agency (EPA) published Air Quality Designations for the 2006 24-Hour Fine Particle (PM2.5) NAAQS wherein Imperial County was designated in nonattainment for the 2006 24-hour PM2.5 NAAQS. This nonattainment designation is only for the urban area within the County and the Proposed Action is not located within the nonattainment boundaries for PM2.5. On April 10, 2014, the CARB gave final approval to the 2013 Amendments to Area Designations for California Ambient Air Quality Standards (CAAQS). For the state PM2.5 standard, effective July 1, 2014, the City of Calexico will be designated nonattainment, while the rest of the Air Basin will be designated attainment.

Section 176(c) of the Clean Air Act (42 U.S.C. 7401 et seq.) requires federal agencies to comply with the General Conformity Regulations and demonstrate conformity for the projects in nonattainment areas; otherwise, the projects cannot proceed.

The analysis in the Truckhaven Geothermal Leasing Area (TGLA) Environmental Impact Statement (2007) determined that projects such as the Proposed Action would not result in annual emissions of criteria pollutants that exceed the 100 tons per year de minimis threshold; therefore, the Proposed Action is exempt from the General Conformity Rule and would not require a conformity review.

3.1.2. Environmental Effects

Alternative 1 – Proposed Action

The potential risk of impacts on air quality is assessed with respect to three criteria. Potential impacts on air quality are based on the following:

- The Proposed Action or Alternative would conflict with or obstruct implementation of the applicable air quality attainment plan;
- The Proposed Action or Alternative would violate any stationary source air quality standard or contribute to an existing or projected air quality violation; or
- The Proposed Action or Alternative would expose sensitive receptors (e.g., concentrations of children, the elderly, or persons with respiratory conditions) to major pollutant concentrations.

The current conformity rule only applies to nonattainment and maintenance areas. Temporary emissions are not exempt from general conformity.

If an action is in a nonattainment area and the total emissions (see Table 2, below) are below de minimis levels, a determination of whether the project is regionally significant is still needed; a project is regionally significant if it results in 10 percent of the area emission inventory. If it is not regionally significant, then the conformity requirements do not apply to this project based on its projected emissions. Regional significance is determined by calculating 10 percent of a total nonattainment or maintenance area's emission inventory for the specific pollutant. In determining regional significance, emissions from both stationary and mobile source emissions should be calculated.

Construction actions that generally require a conformity review include:

- Construction or modification of any air emission source not covered under a New Source Review or Prevention of Significant Deterioration permit or a hazardous waste remediation action; or
- Construction, renovation, or demolition of buildings or facilities.

As previously stated, the Proposed Action is located in an area designated as a federal and/or state nonattainment area for ozone, PM10, and PM2.5.

Construction Emissions

Construction of the Proposed Action would create air emissions primarily from equipment exhaust and fugitive dust. The air emissions from the Proposed Action were analyzed through use of the CalEEMod model (see Appendix E). Construction activities for the Proposed Action are anticipated to begin late 2019 or early 2020 and each well would take approximately one to two months to complete, or approximately four to eight months for all four wells as it is anticipated that after a well is completed the crew would move to the next well location, so no concurrent well construction activities are anticipated. The anticipated construction phases for each well location would include: 1) Well pad and access road construction; 2) Well drilling; 3) Well testing; and 4) Well clean-up.

Table 2 shows the estimated worst-case summer or winter daily emissions that would be predicted from each phase of the Proposed Action for one well site, which is based on the construction equipment provided by the applicant of what is anticipated to be used during construction activities.

Table 2: Construction-Related Criteria Pollutant Emissions from One Well Site

Activity	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Well Pad & Access Road Construction	2.07	22.61	11.20	0.02	22.67	4.35
Well Drilling	3.75	33.21	30.92	0.07	108.06	12.18
Well Testing	1.99	18.12	16.09	0.03	9.62	1.82
Well Clean-Up	0.87	9.35	6.78	0.01	16.95	2.05
Maximum Daily Construction Emissions	**3.75**	**33.21**	**30.92**	**0.07**	**108.06**	**12.18**
ICAPCD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceed Thresholds?	No	No	No	No	No	No

Pollutant Emissions in pounds/day
Source: CalEEMod Version 2016.3.2.

As shown in Table 2, the Proposed Action's emissions for one well site would not exceed ICAPCD's construction-related criteria pollutant thresholds. In addition, construction emissions would be short-term, limited only to the period when construction activity is taking place and all construction activities are required to comply with ICAPCD regulations for controlling fugitive dust emissions, including: Rule 800 – General Requirements for Control of PM10; Rule 802; Rule 802 – Bulk Materials; Rule 803 – Carry-Out and Track-Out; Rule 804 – Open Areas; and Rule 805 – Unpaved Roads. As noted in Section 2.1.4, the Proposed Action would require up to 50,000 gallons of water a day for construction, a portion of which would be used for dust control.

Operational Emissions

The Proposed Action consists of development of four exploratory geothermal wells, which would be tested after completion of the well drilling phase in order to determine the commercial potential of each well. If a well is judged to have commercial potential, well monitoring may be continued indefinitely until the applicant proceeds with the approval process to place the well into commercial service. Therefore, the operational emissions would be limited to well monitoring activities that may be limited to weekly vehicle trips to the well sites to obtain pressure and temperature measurements. As such, only nominal air emissions would be created from the on-going operation of the Proposed Action.

Accordingly, the Proposed Action would not result in a cumulative considerable net increase of any criteria pollutant.

Although the Proposed Action area is located in an area designated as nonattainment for both ozone and particulate matter less than 10 microns in diameter (PM10), the Proposed Action would not require a conformity review because the annual emissions are below the 100 tons per year de minimis threshold (BLM 2007).

Additionally, the nearest sensitive receptor is approximately 1 mile to the northeast; therefore, the Proposed Action would not expose sensitive receptors to major pollutant concentrations.

Any potential impacts to air quality would be reduced via implementation of the mitigation measures listed below.

MM-AQ-1: Fugitive dust emissions from roads would be mitigated by periodic watering.

MM-AQ-2: The Operator shall be responsible for dust abatement within the limits of the approved work area and is responsible for obtaining all necessary permits from appropriate authorities for acceptable dust abatement and control methods (e.g., water, chemicals). The Operator shall be solely responsible for all violations of any air quality permit, law or regulation, as a result of its action, inaction, use or occupancy.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no air quality impacts would occur as a result of the No Action Alternative.

3.1.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no impacts to air quality are expected after mitigation, no cumulative effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in impacts to air quality as the Proposed Action would not occur, therefore this alternative would not contribute to a cumulative impact.

3.2. Cultural Resources

3.2.1. Affected Environment

In accordance with NEPA and 36 Code of Federal Regulations Part 800 regulations that implement Section 106 of the National Historic Preservation Act (NHPA), POWER Engineers, Inc. (POWER) undertook a Class III cultural resource inventory with cultural resources located on BLM lands associated with the Proposed Action. The archaeological Class III inventory is located within a 5.4-mile (east/west) by 4.5-mile (north/south) block of land surrounding the Salton Sea Airport; the inventory fully envelopes the Proposed Action's area of potential effects (APE) which includes the exploratory drill locations and access road areas.

The cultural resources identified within the Proposed Action area were delineated and discussed in the resultant report *Class III Cultural Resources Survey of the Truckhaven Geothermal Project: Test Well Pads and Access Roads* (POWER 2018).

Based on the records search provided to POWER by the staff of the Southern Coastal Information Center (SCIC) at San Diego State University in December 2015, 31 cultural resource studies have been conducted within 0.5 mile of the Proposed Action area. One report, not filed with the SCIC as of the 2016 field season (McGinnis and Murphy 2010), was added to the background list that makes a total of 21 previous studies. The records search identified 67 archaeological sites and 90 isolates within 0.5 mile of the Proposed Action area.

The intensive pedestrian cultural resource surveys in 2016 and 2017 covered 174.77 acres on BLM, State, and private lands. A total of 12 archaeological sites were newly recorded during the Truckhaven Wells analysis (POWER 2018): five located on BLM managed lands, two on private lands, and five on state lands. 12 isolates were also recorded during the inventory. All archaeological and historic-era sites encountered during the inventory are considered eligible for the National Register of Historic Places (NRHP) until a formal evaluation is undertaken. Isolated resources are, by definition, not considered eligible for listing to the NRHP and are not considered further.

3.2.2. Environmental Effects

Alternative 1 – Proposed Action

The potential risk of impacts is assessed with respect to four criteria. Potential impacts on these resources could occur if the Proposed Action or Alternative would:

- Result in the physical destruction of the property or a portion of the property;
- Isolate the property or alter the character of the property's setting when that character contributes to the property's qualifications for the NRHP;
- Introduce visual, audible, or atmospheric elements that are out of character with the property or changes that may alter its setting;
- Cause a property to be neglected, resulting in its deterioration or destruction; or
- Result in the transfer, lease, or sale of a property without adequate provisions to protect the property's historic integrity.

Typical impacts from the Proposed Action would be likely to occur from any ground-disturbing activities, including the development of the proposed wells sites and access road grading. The inventory identified 12 archaeological resources within the APE. Construction of the pad and access roads at well site 84-6 originally had the potential to impact two cultural resources (CA-IMP-006249 and CA-IMP-012788), however, Project components associated with the Proposed Action have been moved to locations that would avoid all resources. The Applicant will implement the project design features PDF-CUL-1 and PDF-CUL-2 identified in Chapter 2 to avoid impacts to cultural resources. This includes archaeological monitoring during construction. If a significant cultural resource site is found during ground disturbing activities associated with well pad or access road construction, the Project features will either be moved, or the resource will be protected in place, or data recovery will be initiated, consistent with the monitoring and discovery plan.

All avoided archaeological sites will be treated as eligible for inclusion to the NRHP for Project management purposes. In addition, the project design features would be further modified by the mitigation measures below.

MM-CUL-1: All ground disturbing work associated with the project will be monitored by a qualified archaeologist who has a current BLM El Centro Fieldwork Authorization. This includes any restoration activities. Monitoring work will be conducted in accordance with a BLM approved monitoring and discovery plan.

MM-CUL-2: Activities that require or result in new surface disturbance that have not been previously surveyed will require BLM review under Section 106 of the National Historic Preservation Act.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to cultural resources would occur as a result of this Alternative.

3.2.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no impacts are expected, no cumulative effects would occur.

Alternative 2 – No Action

The No Action Alternative would not result in impacts to cultural resources as the Proposed Action would not occur. Therefore, there will be no cumulative effects.

3.3. Paleontology

3.3.1. Affected Environment

Applied EarthWorks, Inc. was retained to conduct a paleontological resources assessment for the Proposed Action. The study consisted of a museum records search, literature review, field survey, and preparation of the technical report.

The assessment included a comprehensive review of published and unpublished literature and museum collections records maintained by the Natural History Museum of Los Angeles County. The purpose of the literature review and museum records search was to identify the geologic units underlying the Proposed Action area and to determine whether previously recorded paleontological localities occur either within the Project Action boundaries or within the same geologic units elsewhere. The museum records search was supplemented by a search of the University of California Museum of Paleontology's online collections database. Using the results of museum records search and literature review, the paleontological resource potential and Potential Fossil Yield Classification (PFYC) of geologic units within the Project area was recommended in accordance with the Society of Vertebrate Paleontology (2010) and BLM (2008) guidelines, respectively.

The study found Pliocene to Holocene geologic units underlying the Project Action area that have a recommended paleontological sensitivity of low (PFYC Class 2) to very high (PFYC Class 5). Although a review of available online museum records indicated that no paleontological resources have been found within the Project Action area, geologic units underlying the Project Action area have been known to yield significant fossils nearby.

3.3.2. Environmental Effects

Alternative 1 – Proposed Action

The potential risk of impacts could occur if the Proposed Action or Alternatives would result in the physical destruction of the paleontological resource or a portion of the resource. In general, the potential for a given project to result in adverse impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project. Each of the proposed geothermal exploration wells would be located on separate, individual well pads. Ground disturbing activities are anticipated and the likelihood of impacting fossils is related to both the type and extent of disturbance and the geologic unit in which the disturbance occurs. Ground disturbances are proposed along areas underlain by previously undisturbed Arroyo Diablo Formation, Borrego Formation, Brawley Formation, Lake Cahuilla deposits, and Quaternary older alluvium, which have proven to yield vertebrate remains throughout the western Colorado Desert, including Imperial County, eastern San Diego County, and southern Riverside County. Ground disturbance is also planned for portions of the Proposed Action area that are underlain Quaternary alluvium, which will likely impact previously undisturbed lithology in those deposits. Significant fossils have not been reported within these deposits, but they may shallowly overlie older sensitive units at an unknown depth. In order to reduce effects on paleontological resources, the project design features PDF-PAL-1 through PDF-PAL-3 will be implemented; these measures are defined in Chapter 2 of this EA. In addition, these project design features are further modified by the mitigation measure below:

MM-PAL-1: Should ground disturbing work associated with the project need to be monitored for paleontological resources, it shall be done by a qualified paleontologist who holds a current BLM El Centro Fieldwork Authorization. This includes any restoration activities. Monitoring work will be conducted in accordance with a BLM approved paleontological monitoring and discovery plan.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to paleontological resources would occur as a result of the No Action Alternative.

3.3.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no impacts are expected, no cumulative effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to paleontological resources as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.4. Noise

3.4.1. Affected Environment

The Proposed Action area is located in an area with primarily recreational land uses. The nearest noise-sensitive receptors to the Proposed Action area are single-family residences located in Salton City approximately .6 to 1 mile north of the northernmost BLM parcels. Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. These can include residences, schools, hospitals, parks, and places of business requiring low levels of noise.

As identified in the Truckhaven Geothermal Leasing Final EIS, off-highway vehicle (OHV) activity within Ocotillo Wells State Vehicular Recreation Area (OWSVRA) are the primary sources of noise within the Truckhaven Geothermal Leasing Area. The Truckhaven Geothermal Leasing Final EIS determined that 92 dBA is the average noise level assumed at 50 feet for off-highway vehicle (OHV) use within the OWSVRA (BLM 2007).

The level of recreational activities in or near the Proposed Action area varies throughout the year with little, if any, OHV use and noise during the summer months. Virtually all OHV usage in OWSVRA occurs from approximately mid-October to Easter, with an estimated 50 percent of OHV usage occurring on the following six holiday weekends: Halloween, Thanksgiving, New Year's, Martin Luther King Jr., President's Day, and Easter. During these high-use weekends, OHV-related noise levels can be relatively high within certain areas of the OWSVRA. The remaining 50 percent of annual OHV usage occurs primarily on other weekends throughout the October to May period. Therefore, background OHV noise levels in and around the Truckhaven Geothermal Leasing Area range from low during weekdays to moderate during moderate-use weekends and high during the six high-use weekends. According to the State, based on an annual visitation of 1.9 million people and an average of three occupants per vehicle, there would be approximately 633,000 vehicle trips to the recreation area with the vast majority occurring between October and May (BLM 2007).

The closest area of likely sensitive receptors would be within the town of Salton City, located approximately 1 mile north of the most northerly proposed well on BLM lands.

3.4.2. Environmental Effects

Alternative 1 – Proposed Action

A project would have a significant noise effect if it generates new sources of substantial noise, increases the intensity or duration of noise levels to sensitive receptors, or results in exposure of more people to high noise levels. Both construction and operation of the Proposed Action would have the potential to generate noise effects.

Construction-Related Noise

The Proposed Action would limit construction activities to between 7 a.m. and 7 p.m. Monday through Friday and between 9 a.m. and 5 p.m. on Saturday; additionally, construction would not exceed 75 dBA Leq at the nearby homes. The well pad and access road construction, well

testing, and well clean-up activities will adhere to these time limits, as such the construction noise level threshold for these activities is 75 dBA Leq at the property lines of the nearest homes. However, the well drilling phase of construction is required to operate 24-hours per day in order to minimize a risk of cave-in of the borehole. As such, the noise level threshold for the well drilling phase of construction is 45 dBA at the property line of the nearest home, which is based on the most restrictive nighttime residential noise standard.

The Federal Highway Administration (FHWA) compiled noise level data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. From this acquired data, FHWA developed the Roadway Construction Noise Model (RCNM). The RCNM, which uses the Spec 721.560 Lmax at 50 feet, has been used to calculate the construction equipment noise emissions.

Construction noise created during well pad and access road construction, well testing, and well cleanup and abandonment would be below the 75 dBA noise standard that is applicable when construction activities are exempt from the County's residential noise standards.

Operational-Related Noise

If a well is judged to have commercial potential, weekly well monitoring may be continued indefinitely until the Applicant proceeds with the approval process to place the well into commercial service. Therefore, the operational emissions would be limited to well monitoring activities that may be limited to weekly vehicle trips to the well sites to obtain pressure and temperature measurements. As such, only nominal operational noise levels would be created from the on-going operation of the Proposed Action.

In order to reduce noise effects, the Applicant would implement PDF-NOI-1 through PDF-NOI-3; these are defined in Chapter 2. Additionally, the following mitigation measure identified in the TGLA EIS would be implemented to reduce noise effects.

MM-NOI-1: Whenever reasonably possible, geothermal well drilling or major facility construction operations proposed within 1,000 feet of the OWSVRA boundary would be restricted to non-sleeping hours (7:00 am to 10:00 pm), or appropriate, reasonable methods would be employed to limit the hourly average noise levels at the OWSVRA to 60 dBA or below. If this is not reasonably possible, the geothermal lessee would provide at least a one-month notice to the OWSVRA manager of the date scheduled and location of the proposed operation so the California Department of Parks and Recreation can provide and post notice within the OWSVRA of the proposed activity. For unscheduled (emergency) operations, the geothermal lessee would immediately contact the OWSVRA manager so the California Department of Parks and Recreation can provide appropriate notice to the adjacent OWSVRA users.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no noise impacts would occur as a result of the No Action Alternative.

3.4.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no impacts are expected, no cumulative effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects associated with noise as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.5. Water Resources

3.5.1. Affected Environment

The Proposed Action includes the Clark, West Salton Sea, and Anza-Borrego Hydrologic Units. Surface water in this area drains mainly to the Salton Sea, or towards two smaller internal drainages in Clark and Borrego Valley. The average annual precipitation ranges from less than three inches along the eastern boundary bordering Imperial Valley, to 25 inches in the mountain divide between the Salton Sea and Pacific Ocean drainages. Winter precipitation and summer thunderstorms drive runoff, especially in the higher elevations.

Most of the Proposed Action area is in the West Salton Hydrologic Unit. The southern approximate one-third of the area is in the Ocotillo Lower Felipe Hydrologic Sub-Area. Surface drainage is northeastward to the Salton Sea. The southeast corner of the Proposed Action area drains south and east to Tarantula Wash and San Felipe Creek, then to the Salton Sea. Among the major intermittent drainages within the Proposed Action area are Arroyo Salada, located in the northern quarter of the lease area; and Tule Wash, which drains much of the central and northern portion of the area (CEPA 2005). The Water Quality Control Plan for the Colorado River Basin lists the beneficial uses of surface water from San Felipe Creek and Tule Creek as agriculture supply, groundwater recharge, recreation, warm freshwater habitat, and wildlife habitat (CEPA 2005). These two creeks have some water in them much of the year. The major drainages are subject to flash floods during heavy rainfall.

The Proposed Action is located within the West Salton Sea Sub-basin of the Colorado River Hydrologic Region. The beneficial use of groundwater in the West Salton Sea Hydrologic Unit are listed in the Water Quality Control Plan as municipal and agricultural (CEPA 2005), with municipal usage limited to only a small portion of the hydrologic unit. Groundwater is found in unconsolidated younger Quaternary alluvial deposits and the underlying unconsolidated to semi-consolidated older Tertiary to Quaternary alluvial deposits. Fine-grained lacustral deposits of the former Lake Cahuilla may form confining layers that impede the downward and lateral movement of groundwater in the Proposed Action area (CDWR 2003; CEPA 2005). There are few wells and little information available on the groundwater quality, use, capacity, or budget in this area; however, groundwater levels have reportedly dropped 64 feet in a well located in the northeast part of the basin between 1979 and 2000 (CDWR 2003).

The project area is located within a motorized OHV recreation area. OHV use creates tire tracks, slide slope trails carved on steep slopes, and overly sparse vegetation due to ground compaction;

all of which contribute to soil erosion through upturning highly erodible subsoil and reducing potential for ground-stabilizing vegetation. Existing erosion potential created by OHVs is substantial compared to erosion potential associated with the Proposed Action.

3.5.2. Environmental Effects

Alternative 1 – Proposed Action

The potential for impacts affecting water resources is assessed with respect to six criteria. Impacts could occur if the Proposed Action or Alternatives would:

- Violate Federal, State, or local water quality standards or objectives;
- Impair existing or potential beneficial uses of waters of the U.S. or State of California;
- Result in water or sediment quality conditions that could be harmful to aquatic life or human health, even if an accepted standard were not formally violated;
- Increase the potential for a substantial off-site flood hazard (the substantial flood hazard is greater than 1 percent, or once in a hundred years);
- Result in erosion or sedimentation that would alter or impair the course of a permanent stream or substantially alter the area or capacity of a surface water feature; or
- Result in uses or facilities that would substantially degrade surface or groundwater quality.

The Proposed Action is located within undeveloped desert land; the primary focus on the land associated with the Proposed Action is motorized recreation. The new surfaces created for the project, such well pads and access roads, would be a relatively minor source of increased surface runoff and would not substantially change runoff characteristics. Construction activities could impact surface water quality, especially through erosion of disturbed soil from stormwater however the mitigation measures listed below would be implemented to prevent stormwater from leaving a drill site. Grading would not require significant landform modification.

Water supplies required for the Proposed Action would be purchased from the Coachella Valley Water District to be used for dust control and well drilling. There will be no use of groundwater from the local aquifer.

In order to reduce impacts to water resources, the following mitigation measures identified in the TGLA EIS and the DRECP would be implemented.

MM-WTR-1: Before on-site grading, an erosion control plan would be prepared by an erosion control specialist certified by the International Erosion Control Society to adequately control erosion during construction.

MM-WTR-2: All graded pads would have drainage swales to direct stormwater runoff or irrigation runoff away from structures or the tops of slopes to control drainage facilities. No stormwater would be allowed to discharge over the top of cut or fill slopes.

MM-WTR-3: Proposed geothermal exploration and development would comply with the Clean Water Act as implemented by the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, a general permit for

construction activities, and the associated Order No. 92-08-DWQ, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity. Projects of 1 acre or more are subject to this general construction permit process.

MM-WTR-4: The Operator is required to eliminate or reduce non-stormwater discharges to stormwater systems, develop a Stormwater Pollution Prevention Plan (SWPPP) prior to beginning construction, inspect all stormwater control structures, and implement other pollution prevention measures, such as applicable BMPs and conservation measures during construction.

- The SWPPP would include the specific measures and techniques for implementation to protect the project sites and adjacent areas from erosion and deposition during site grading, construction, and post-construction stabilization of sediment on the site.
- The contractor would provide a copy of the SWPPP for the various crews performing work on the construction site, and a copy would be kept on-site during the project to satisfy the requirements of the NPDES permit. A draft of this SWPPP would be forwarded to the BLM for review prior to its finalization.

MM-WTR-5: The 100-year floodplain boundaries for any surface water feature in the vicinity of the project will be identified. If maps are not available from the Federal Emergency Management Agency (FEMA), these boundaries will be determined via hydrologic modeling and analysis as part of the environmental review process. Construction within, or alteration of, 100-year floodplains will be avoided where possible, and permitted only when all required permits from other agencies are obtained.

MM-WTR-6: Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to water resources would occur as a result of the No Action Alternative.

3.5.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no impacts to water resources are expected with the prescribed mitigation measures, no cumulative effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to water resources as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.6. Recreation

3.6.1. Affected Environment

The California Department of Parks and Recreation (CDPR) manages the public land within the Truckhaven Geothermal Leasing Area as a majority of the Proposed Action area lies within the OWSVRA. Although BLM owns 23 sections of land in the Truckhaven Geothermal Leasing Area that are within the OWSVRA, the CDPR administers those BLM parcels via a Memorandum of Understanding (MOU; U.S. DOI and CDPR 1999) between the two agencies. Although the MOU allows the State to administer access to these BLM lands for recreation purposes, it does not grant the State the authority to approve or reject the pending application to drill exploratory wells for those parcels. It should be also be noted, the public lands within the SVRA were designated a Special Recreation Management Area (SRMA) under the DRECP in 2016. Geothermal exploration and development upon lands under lease at the time the DRECP was signed (which is the case for the Proposed Action) are excluded from the no surface occupancy management prescription in the SRMA plan.

The OWSVRA is located within a three-hour drive from Los Angeles, Orange County, Riverside, and San Diego, and a five-hour drive from Phoenix. The OWSVRA is a highly valued and unique recreation resource within the southwestern United States because: (1) it is an OHV area of an unparalleled size; and (2) it fills a unique and valued niche for providing motorized recreational opportunities in close proximity to the population centers of Southern California (BLM 2007).

Continued population growth in Southern California, the expanding popularity of OHV recreation, and a decrease in the acres available to OHV recreation in the California Desert has resulted in a steady increase in visitation at the OHV areas in Imperial County, including the OWSVRA and the Imperial Sand Dunes Recreation Area.

Although camping is allowed near the project site, it has never been used as a main camping area. There are currently no designated OHV routes to the proposed project sites and camping in this area is only allowed adjacent to such routes. However, the Pole Line Road, about .05 mile to the west is frequently used as a north – south corridor for OHV travel in the OWSVRA. Popular camping areas in the OWSVRA are located adjacent to S22 at the 4x4 training area and Holly Road approximately 3 miles northwest of the proposed project site. Camping is also popular, approximately 7 miles to the south of the project adjacent to Pole Line Road near of Hwy 78. The OWSVRA is managed to provide motorized recreational opportunities to area residents and visitors. In addition to OHV recreation, the OWSVRA connects with Anza Borrego State Park which provides other recreational opportunities, including hiking, horseback riding, wildlife and scenery viewing, picnicking, photography, nature study, and environmental education, camping, sightseeing, and driving for pleasure. The OWSVRA provides wide-open spaces where visitors can seek either solitude or a highly intensified motorized recreational use experience.

The vehicle types utilized at the OWSVRA include off-road and street-legal vehicles, including sand rails, dune buggies, all-terrain vehicles, motorcycles, two- and four-wheel drive pickups, sport utility vehicles, and custom-built off-road vehicles.

3.6.2. Environmental Effects

Alternative 1 – Proposed Action

Impacts to recreational resources could occur if the Proposed Action or Alternatives would:

- Remove substantial recreational opportunities;
- Diminish the enjoyment of existing recreational opportunities.

Recreational activities could be disrupted through the physical restriction of recreational areas and unofficially designated OHV trails; the blocking of facility entrances by construction activities and equipment; interference during implementation of the Proposed Action; and disruption of the user's enjoyment of the recreational experience. Recreational resources at the OWSVRA are valued for the opportunity for participating in outdoor recreation activities in a natural, scenic setting. Noise, vibration, dust, visual impacts, and odor from construction activities could disrupt users' enjoyment of the area. Similarly, views of construction equipment or the addition or change of industrial structures conflict with the natural background of many of these recreational resources and could also disrupt the individual's enjoyment and recreational activities. The proposed well sites are not spread over a large geographic area and substantial changes to the existing recreational environment are not required.

The proposed well sites have been located away from designated trails to the maximum extent possible. Conflicts with recreational users could occur when construction vehicles are either traveling to and from construction sites. Construction vehicles would be parked off-trail in designated vehicle staging areas to minimize any temporary loss of access that would occur during construction. The siting of proposed wells and access roads away from designated trails is designed to minimize conflicts with other users of public lands, thereby minimizing the impacts that construction and operation of well sites would have on recreational resources. Additionally, once the wells have been constructed and the drilling has ceased, future use of the recreational facilities will not be impacted by the Proposed Action; therefore, these impacts are also considered temporary.

In order to reduce impacts to recreational resources, the following mitigation measures identified in the TGLA EIS and DRECP would be implemented.

MM-REC-1: Any necessary temporary route closures for construction would be coordinated with BLM and OWSVRA before beginning construction.

MM-REC-2: Signs and/or flagging that advise recreational users of construction activities would be posted in coordination with BLM and OWSVRA. Whenever active work is being performed, the area should be posted with "construction ahead" signs on any adjacent access roads or trails that might be affected.

MM-REC-3: Construction-related traffic would be restricted to routes approved by the authorized agency(ies). Construction of new access roads or cross-country vehicle travel would not be permitted unless prior written approval is given by the authorized officer. Authorized roads used by the proposed action will be rehabilitated when construction activities are complete.

The agency(ies) would work with the proponent to develop site-specific standards for route reconstruction.

MM-REC-4: Signs directing vehicles to alternative park access and parking would be posted in the event construction temporarily obstructs parking areas near trailheads.

MM-TRA-1: The Operator would be required to file a traffic control plan indicating how and where construction traffic would be routed and traffic control measures would be emplaced to ensure accidents do not occur.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to recreational resources would occur as a result of the No Action Alternative.

3.6.3. Cumulative Impacts

Alternative 1 – Proposed Action

The Proposed Action would result in temporary impacts to recreational resources; however, these would be short term in nature. Additionally, there are no other ongoing or proposed projects that would overlap with the geographic scope of analysis for recreation resources, which is defined as the OWSVRA. Therefore, no cumulative impact would occur.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to recreational resources as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.7. Soils

3.7.1. Affected Environment

All of the BLM-administered lands within the Proposed Action area belong to the Rillito-Beeline-Badland soil association. Rillito-Beeline-Badland soils includes areas of bare rock outcrop, very shallow poorly developed soils over bedrock, and very shallow to deep soils formed in alluvium. Soil types vary from shallow gravelly sandy loam to sandy loam and sandy loams to deep gravelly sandy loam and gravelly loam.

Soil erosion affects stormwater quality and can damage surface structures such as roads and affect wildlife and vegetation. Therefore, soil erodibility should be considered when planning and designing access roads and well pads. Soil erodibility is rated as slight, moderate, and severe. The rating is slight when the surface layer texture is clay that holds together, is thicker than 40 inches, and occurs on slopes of less than 15 percent. A moderate rating is given when the surface layer texture is clay loam, loam, or sandy loam that holds together moderately well, is between 20 and 40 inches thick, and occurs on slopes of between 15 percent and 30 percent. A severe rating is given to soils when the surface layer texture is sand or loamy sand that is weakly held together, is less than 20 inches thick, and lies on slopes of greater than 30 percent. Soils that

exhibit potentially severe and severe-to-very-severe water or wind erodibility occur throughout the Proposed Action area (BLM 2007).

Although the soils within the Proposed Action area are not rated for erosion hazard potential; these soils are prone to wind and water erosion and are subject to flash flooding and ponding (Zimmerman 1981).

3.7.2. Environmental Effects

Alternative 1 – Proposed Action

The Proposed Action would include ground disturbing activities such as constructing or improving access roads, grading and leveling well pads, digging containment basins, drilling the proposed wells, and re-grading and spreading topsoil following abandonment. Grading and drilling exposes highly erodible subsoil to the elements; therefore, construction associated with the Proposed Action would make the soil more vulnerable to erosion from wind and water. Analysis of impacts to soil resources considers whether the Proposed Action would:

- Result in substantial soil erosion or loss of topsoil;
- Be located on unstable strata or soil or that would become unstable as a result of the project, potentially resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse; or
- Be located on expansive soil creating substantial risks to life or property.

The Proposed Action area is located in a relatively flat portion of Imperial County and is not identified as an area at risk of landslide. It is also not located in an area at risk of liquefaction nor is it known to contain expansive soils (County of Imperial 1997). The Proposed Action would require the preparation of a Stormwater Pollution Prevention Plan (MM-WTR-4). The SWPPP would identify BMPs that would reduce any impacts associated with soil erosion or loss of topsoil. Additionally, the Proposed Action would require preparation of an Erosion Control Plan (MM-WTR-1) before grading to adequately control erosion during construction.

Well field programs covering production and injection plans are required by the BLM and the CDOGGR for each major geothermal project. Detrimental subsidence from geothermal development needs to be avoided through careful permit review by the BLM, establishment of standards for each project, and through impact mitigation and monitoring programs..

In order to further reduce impacts to soils, the following mitigation measures identified in the TGLA EIS would be implemented.

MM-SOI-1: A detailed geotechnical analysis would be performed prior to the construction of any structures so they could be sited to avoid any hazards from subsidence or liquefaction (i.e., the changing of a saturated soil from a relatively stable solid state to a liquid during earthquakes or nearby blasting).

MM-SOI-2: Standard soil and geotechnical engineering investigations would be conducted to ensure foundation stability.

MM-SOI-3: Grading would be performed so all identified compressible materials would be removed and recompacted, and fill soils would be placed and compacted to at least 90 percent relative compaction.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to soils would occur as a result of the No Action Alternative.

3.7.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no direct or indirect adverse effects are expected after mitigation, no cumulatively adverse effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to soils as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.8. Special Status Vegetation and Wildlife Species

3.8.1. Affected Environment

Desert vegetation and wildlife are adapted to survive under extreme environmental conditions. Vegetation and wildlife within the Proposed Action area has adapted to the arid climate of the Borrego Valley-Mesa subsection of the Colorado Desert ecoregion. This subsection is located on the southwest border of Imperial Valley, with elevations ranging from 230 feet below sea level to 2,200 feet above sea level and an average annual precipitation of approximately 3 to 4 inches. Temperatures in the ecoregion can range from 70° Fahrenheit in the winter to 107° Fahrenheit in the summer.

POWER prepared a Biological Resources Evaluation Report that covers the Proposed Action area. The report combines the results of 2016 and 2018 biological resources surveys conducted within the Proposed Action area.

Preliminary investigation included review of information obtained from literature searches, examinations of habitat as discernible from aerial photographs, database searches including California Native Plant Society (CNPS) and the California Natural Diversity Database (CNDDB) records (CNPS 2016; CDFW 2016 and 2018), and previous surveys (. POWER 2017). No changes were noted between the California Department of Fish and Wildlife (CDFW) and CNPS 2016 and 2018 data. To identify the existing and potential biological resources present in the vicinity of the Proposed Action, a geographic information system search was performed. This consisted of mapping baseline biological resource data (e.g., vegetation mapping, CNDDB records).

Biological resource evaluation surveys were conducted in April and May of 2016 and March and April of 2018. POWER provided a wildlife biologist and a botanist for the survey. The role of the wildlife biologist was to record observations of wildlife species, with emphasis on special status species such as flat-tailed horned lizard (*Phrynosoma mcallii*) and burrowing owl (Athene cunicularia), and record active or potential burrows for a variety of wildlife species.

BLM special status species are: (1) species listed or proposed for listing under the Endangered Species Act (ESA), and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. It should be noted that no threatened or endangered plant or wildlife species were identified during surveys, only CDFW special status plant species.

The botanist was tasked with creating a vegetation map of the corridors that were surveyed, extending as far as they could reliably determine using line-of-sight and aerial imagery, and identifying and recording plant species encountered, with emphasis on special status plant species. Botanists also recorded occurrences of seeps encountered. All biologists were preauthorized for conducting surveys on private, BLM, and State Parks land by State Parks and CDFW.

All detected wildlife and botanical species were recorded, as were observed vegetation communities within and adjacent to the survey corridors. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat). The botanical inventory was floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special status plant species. Vegetation communities were classified according to Holland (1986).

Vegetation

The vegetation communities located within the Proposed Action area include Sonoran creosote bush scrub, Desert saltbush scrub, Desert sink scrub, Desert wash, and bare ground/disturbed. (POWER 2018).

Sonoran Creosote Bush Scrub

Sonoran creosote bush scrub is a widely spaced open community generally dominated by creosote (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*), usually with abundant bare ground between larger shrubs. Growth in this community occurs from winter to early spring and later, with sufficient rainfall, with the shrubs often dormant for long periods. During years of sufficient rainfall, the bare ground is filled with ephemeral herbs. This community typically occurs on well-drained secondary soils of slopes, fans, and valley, rather than upland sites, with winter temperatures seldom below freezing (Holland 1986).

This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" Sonoran creosote bush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.

Desert Saltbush Scrub

Desert saltbush scrub is a low-growing open community dominated by chenopod bushes (*Atriplex* spp.), usually with a low-growing herbaceous cover. Total cover in this community is often low, with abundant bare ground between widely spaced shrubs. Stands of shrubs are typically dominated by a single Atriplex species. Common species in this community include four-wing saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenolytra*), shadscale (*Atriplex confertifolia*), allscale (*Atriplex polycarpa*), and hop sage (*Grayia spinosa*). This community typically occurs on fine-textured, poorly drained soils with high alkalinity and/or salinity (Holland 1986).

This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" saltbush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.

Desert Wash

Desert wash is a sparsely vegetated to bare community occurring throughout the Proposed Action area. These sandy to hardened silty-mud substrate washes most closely resemble the Holland (1986) vegetation descriptions of tamarisk scrub and arrowweed scrub communities. Where vegetation occurs in the washes, tamarisk (*Tamarix* sp.) was the largest shrub, while arrow weed (*Pluchea sericea*) was the most common. Occasionally, these washes also harbored Sonoran creosote bush scrub and desert saltbush scrub vegetation. Seeps occurred intermittently within desert washes, and were comprised mainly of salt grass (*Distichlis spicata*).

Bare Ground/Disturbed

Bare ground and disturbed areas within the Proposed Action area occurred mainly adjacent to developed areas and infrastructure, generally in the form of bare, compacted soils from human activities. Vegetation in these areas tended to be sparse and weedy. Occasional individuals of the special status Salton milk-vetch (*Astragalus crotalariae*), which thrives on disturbance, occur in disturbed areas and the edges of developed areas.

Special Status Plant Species

A total of 38 plant species have the potential to occur within the Proposed Action area. Of the 38 plant species considered to have a potential to occur, seven were observed during a survey. Three species were determined to have a moderate potential for occurrence within the Proposed Action area, and seven had a low potential, while the remaining were determined to be absent. Potential for occurrence was based on habitat, elevation, soil, and proximity to known recorded occurrences of a species. Appendix C of the Biological Resources Evaluation Report includes the special status plant species and their potential to occur within the Proposed Action area (POWER 2018). The special status plant species listed below were observed or were determined to have at least a moderate potential to occur within the Proposed Action area:

- chaparral sand-verbena
- Salton milk-vetch
- Harwood's milk-vetch

- Peirson's pincushion
- Wiggin's croton
- ribbed cryptantha
- sand food
- Olney's three-square rush
- Orcutt's woody aster

Special Status Wildlife Species

A total of 10 special status wildlife species were initially determined by the literature review to potentially occur within the Proposed Action area. Two additional species were added, based on personal communication with State Parks (2017), bringing the number to 12. Of the 12 wildlife species, one species was present, one had a high potential for occurrence within the Biological Survey Area (BSA), three had a moderate potential, one had a low potential, and the remainder were determined to be absent. Their habitat description, status, and potential for occurrence within the survey area are provided in Appendix D of the Biological Resources Evaluation Report (POWER 2018). One special status wildlife species, flat-tailed horned lizard (FTHL), was detected during the field surveys. In addition to these confirmed sightings, there were occasional small mammal burrows throughout the BSA that can provide suitable cover for the FTHL and for burrowing owls (Figure 2 of the Biological Resources Evaluation Report). The following special status wildlife species have at least a moderate potential to occur within the Proposed Action area, or were observed during fieldwork:

- Burrowing Owl
- Prairie Falcon
- Palm Springs Pocket Mouse
- Flat-tailed Horned Lizard
- Le Conte's Thrasher

3.8.2. Environmental Effects

Alternative 1 – Proposed Action

Potential impacts affecting special status vegetation and wildlife species could occur if the Proposed Action was to:

- Adversely affect a species, natural community, or habitat recognized for scientific, recreational, ecological, or commercial importance;
- Alter or destroy habitat that would prevent biological communities that inhabited the area prior to the project from reestablishing;
- Extensively alter or cause the loss of biological communities in high quality habitat for longer than one year; or
- Affect unique communities or communities of limited distribution within the Proposed Action area.
- Adversely affect a population by substantially reducing its numbers, causing a population to drop below self-sustaining levels or causing a substantial loss or disturbance of habitat;

such effects could include vehicle impacts and crushing, increased predation, and toxic effects from contaminated soils;
- Cause a substantial net loss in the functional habitat value of a sensitive biological habitat;
- Introduce invasive wildlife species, natural community, or habitat that is recognized specifically as biologically significant in Federal policies, statutes, or regulations;
- Have a substantial adverse impact on nesting migratory birds, including raptors, as protected under the Migratory Bird Treaty Act; and
- Substantially interfere with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

The construction of the well pads would result in approximately 400ft by 400ft (3.7 acres) area of disturbance, except for proposed well pad 84-6, which is limited to 2.2 acres in order to avoid sensitive resources. Additionally, construction of the access roads for each exploratory well will result in the following impacts per well site:

- Well Site 84-6: 0.78 acre
- Well Site 87-6: 0.60 acre
- Well Site 48-6: 0.05 acre
- Well Site 21-8: 0.05 acre

Construction of the well pads and new access roads would cause a net loss in functional habitat for special status species. While reclamation would be required should the well pads and access roads be determined as no longer necessary, full restoration of biological resources and habitat is not assured.

Impacts to vegetation and special status species would be avoided where feasible and reduced via implementation of applicant project design features PDF-BIO-1 through PDF-BIO-9 as defined in Chapter 2 of this EA as well as the following additional agency required mitigation measures:

MM-BIO-1: The Operator shall be required to restore disturbed areas in a manner that would assist re-establishment of biological values. The Operator shall develop a project-specific habitat restoration plan for BLM approval. The plan shall consider and include as appropriate the following methods: replacement of topsoil, seedbed preparation, fertilization, seeding of species native to the project area, noxious weed control, and additional erosion control.

MM-BIO-2: The Operator shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with environmental stipulations, migratory bird pre-construction surveys, and for coordination on compliance with the BLM. The FCR must be on-site during all project activities. The FCR shall have the authority to halt all project activities that are in violation of the stipulations. The FCR shall have a copy of all stipulations when work is being conducted on the site. The FCR may be a crew chief or field supervisor, a project manager, any other employee of the Operator, or a contracted biologist.

MM-BIO-3: A biological monitor, approved by the BLM, shall be present in each area of active surface disturbance throughout the work day during implementation of the Project. The monitor(s) shall perform the following functions:

- Share biological information as part of a Worker Environmental Education Program. The education program shall include the following aspects at a minimum:
    - biology and status of the Flat-tailed Horned Lizard,
    - protection measures designed to reduce potential impacts to the species, as well as other species that may be present in the project areas
    - function of flagging and designating authorized work areas,
    - reporting procedures to be used if a Flat-tailed Horned Lizard is encountered in the field, and
    - importance of exercising care when commuting to and from the project area to reduce mortality of Flat-tailed Horned Lizards on roads.
- Ensure that all project-related activities comply with these measures. The biological monitor shall have the authority and responsibility to halt activities that are in violation of these terms and conditions.
- Work with the project supervisor to take steps, as necessary, to avoid disturbance to Flat-tailed Horned Lizards and their habitat. If avoiding disturbance to Flat-tailed Horned Lizard is not possible or if a Flat-tailed Horned Lizard is found trapped in an excavation, the affected lizard shall be captured by hand and relocated.
- If burrowing owls are encountered, the biological monitor will ensure avoidance of occupied burrows and establishment of the 656 feet (200 meter) setback to sufficiently minimize disturbance during the nesting period on all activity sites, when practical.
- Submit a monitoring report to the BLM at the conclusion of the project.

MM-BIO-4: The Operator or its agents shall be prohibited from collecting plants and wildlife.

MM-BIO-5: If any wildlife is encountered during the course of project activities, said wildlife shall be allowed to freely leave the area unharmed or moved out of harm's way.

MM-BIO-6: All potential pitfalls to wildlife will be covered or backfilled when not attended. Topsoil shall be conserved during excavation activities and reused as backfill following activities.

MM-BIO-7: The Operator or its agents shall preserve existing vegetation to the extent practicable. Precautions shall be taken to avoid damage to vegetation by people or equipment. Creosote bush rings larger than 5 meters in diameter (longest diameter if the "ring" forms an ellipse rather than a circle) shall be avoided.

MM-BIO-8: To prevent the introduction of noxious weeds or new invasive weedy plant species into the project area, the Operator shall require the following:

- Thoroughly clean the tires and undercarriage of all vehicles entering or reentering the project site to remove potential weeds.
- Store project vehicles on site in designated areas to minimize the need for multiple washings whenever vehicles re-enter the project site.

- Monitor and quickly implement control measures to ensure early detection and eradication of weed invasions.
- Maintain a log of the vehicle cleaning schedule.

MM-BIO-9: Domestic pets are prohibited on site. This prohibition does not apply to the use of domestic animals that may be used to aid in official and approved monitoring procedures/protocols, or service animals under Titles II and III of the Americans with Disabilities Act.

MM-BIO-10: Long-term nighttime lighting on project features will be limited to the minimum necessary for project security, safety, and compliance with Federal Aviation Administration requirements and will avoid the use of constant-burn lighting. Security lighting for on-ground facilities, equipment and infrastructure should be motion or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird and wildlife attraction and eliminate constant nighttime illumination, but still allow safe nighttime access to the site.

MM-BIO-11: The Operator shall limit its vehicular traffic within all areas of the approved Project to a maximum speed of 15 miles per hour. Any wildlife encountered on the roads shall be avoided by drivers (i.e. driver will maneuver around it, stop and let it pass).

MM-BIO-12: All trash and food items shall be promptly contained within closed, raven-proof containers. These shall be regularly removed from the project site to reduce the attractiveness of the area to ravens and other predators. Feeding of wildlife and/or leaving of food or trash as an attractive nuisance to wildlife is prohibited. Particular attention will be paid to "micro-trash" (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny). All trash and food items shall be promptly contained within closed, wildlife-proof containers. These shall be regularly removed from the project site to reduce the attractiveness of the area to ravens and other predators.

MM-BIO-13: The permittee shall limit the area of disturbance of vegetation and soils to the minimum required for the project. Clearing of vegetation and grading shall be minimized. Wherever possible, rather than clearing vegetation and grading well pads and new access roads, equipment and vehicles shall use existing surfaces or previously disturbed areas. Where grading is necessary, surface soils shall be stockpiled and replaced following construction to facilitate habitat restoration. To the extent possible, disturbance of shrubs and surface soils due to stockpiling shall be minimized.

MM-BIO-14: To mitigate for loss of FTHL habitat outside of a designated FTHL Management Area, the permittee shall provide compensation at a 1:1 ratio. A final acreage amount of both temporary and permanent disturbances will be calculated based on the final approved geothermal drilling permit and Project Description. Compensation is required in accordance with the FTHL Rangewide Management Strategy (2003).

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to special status plant and wildlife species would occur as a result of the No Action Alternative.

3.8.3. Cumulative Impacts

Alternative 1 – Proposed Action

A cumulative effect on special status vegetation or wildlife would occur if the Proposed Action or its alternatives, combined with the past, present, and reasonably foreseeable projects or activities would affect the resource even where the Proposed Action or its alternatives alone would not. Examples of cumulative effects include special-status biological resources becoming limited in geographic extent or population sizes within the cumulative analysis area due to combined effects of the Proposed Action and one or more other projects or activities. The Proposed Action would result in impacts to special status vegetation and wildlife species from the conversion of habitat, albeit temporary. Impacts would mostly be short term in nature and would be reduced due to implementation of project design features and mitigation measures.

The geographic scope for potential cumulative impacts to FTHL is the Ocotillo Wells FTHL Research Area (RA), as defined in the 2003 FTHL Rangewide Management Strategy (RMS). The RA is about 77,000 acres in size. About 47,000 acres of the RA are owned by the state and 22,000 acres are owned by BLM, all of which are managed as OWSVRA.

Within this geographic area, past, present, and reasonably foreseeable future actions include activities associated with ongoing OHV usageand the implementation of a seismic survey to support geothermal exploratory efforts.

OHV usage within the Ocotillo Wells RA is predominantly restricted to established or designated routes. Some areas allow "open riding", however even in these "open riding" areas, protection of natural resources is required, and riders may be cited for causing damage to land, vegetation, wildlife, or wildlife habitat. Further, the Ocotillo Wells RA is subject to ongoing wildlife conservation and monitoring efforts which will reduce impacts from habitat loss.

The seismic survey data collection process requires the use of off-road buggy vibrators that would cross uneven terrain within that project footprint. Biological resources surveys were conducted to provide clearance for the vibrators to conduct the seismic data collection within defined corridors of vehicular movement. No habitat conversion would occur as a result of the seismic survey and project design features have been included in the action to avoid impacts to FTHL including biological monitoring. Therefore, it is not expected that the seismic survey would contribute to potential cumulative impacts to FTHL and their habitat.

Habitat acreage impacts from the project, in combination with the past, present and reasonably foreseeable future actions will be far under 1% of the Ocotillo Wells RA. Further, impacts from each of the projects will be mitigated in accordance with the RMS..

Cumulative impacts such as the introduction of invasive species could occur on lands adjacent to the Truckhaven Geothermal Leasing Area. The facilitation of seed dispersal could result from

construction equipment transporting invasive species from the construction areas to adjacent lands along access roads and main roads. In addition, exploratory drilling or uncontrolled releases, spills, seepages, or well blowouts could result in the addition of toxic, mineralized, or saline geothermal waters to the soil, streams, ponds, or wetlands. This contamination could adversely impact vegetation growth and distribution. However, implementation of Project Design Features and Mitigation Measures would reduce impacts to vegetation. No cumulative impact to vegetation would occur.

Loss of vegetation is an important factor contributing to the increase in the number of species listed as threatened or endangered in recent years. Although construction and operation of wells, and associated seismic testing, in the vicinity of the Proposed Action is likely, it is BLM policy to avoid critical habitat, which would reduce impacts to these plant species and habitat. Mitigation measures implemented for the Proposed Action would reduce the potential of a cumulative impact. Further, specific mitigation measures will be implemented to reduce impacts associated with exploratory wells and seismic investigation on private and state lands. With implementation of the design features and mitigation measures, the cumulative contribution to impacts on special status vegetation, habitat and wildlife from the Proposed Action or the alternatives would not be substantial.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to special status plant and wildlife species as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

3.9. Visual Resources

3.9.1. Environment

Under the DRECP, the BLM designated the area encompassed by the Project as a Visual Resource Management class four in order to allow for industrial scale development. The most visibly apparent human-made structures and uses in the Truckhaven Geothermal Leasing Area are an Imperial Irrigation District (IID) transmission line, an IID H-frame structure east of the Proposed Action, the County landfill on the northwest comer of the proposed action area, State Highways 78 and 86, and the extensive OWSVRA. There is also an airport nearby.

Due to the extensive OHV use throughout the Proposed Action area, some scenic qualities of the landscape have been diminished. Evidence of the OHV use includes extensive road and trail networks that contrast with the natural color of the surrounding landscape, tire tracks visible nearly everywhere, slide slope trails carved on steep slopes that causes landform contrast, overly sparse vegetation due to ground compaction, and litter in some places. OHV use is officially allowed at the OWSVRA, but some users ride off the State parcels and enter BLM and other private parcels within the proposed action area.

Despite the mostly flat terrain, subtle undulations in the topography result in a large portion of the Proposed Action area being visible from outside the boundary. The remaining portion of the Proposed Action area is not visible from sensitive viewpoints because of several topographic obstructions and protrusions that block views of portions of the area.

3.9.2. Environmental Effects

Alternative 1 – Proposed Action

During drilling, the drill rigs may be visible from State Highway 86, County Route S22, Pole Line Road and County Dump Road. There are six residences in the area, scattered around the airport subdivision. The next closest residences are about 0.5 mile or more from the nearest proposed well. During flow testing, geothermal steam and water vapor plumes up to several hundred feet high (depending on the weather conditions during the flow test) could also be visible from the roads and nearby communities. Well drilling operations would be temporary and short term, taking an average of 30 to 45 days to drill. Following the completion of drilling and flow testing there would be essentially no visual impact, as the well surface equipment are less than 20 feet tall.

Drilling and flow tests would be conducted 24 hours a day, and the lighted drill rigs and test equipment would be visible at night. However, light sources during drilling and flow testing would be confined to the drill rig and other operational areas as required for safety. The light from the drill site during drilling and flow testing would be focused downwards and inwards, and should not be directly visible at a distance.

In order to reduce impacts to visual resources, the following mitigation measure identified in the TGLA EIS would be required.

MM-VIS-1: All facilities, including geothermal production and injection pipelines, wellheads, powerplants, maintenance buildings, etc. would be painted a color that blends into the natural setting.

Alternative 2 – No Action

Under Alternative 2 – No Action, the Proposed Action would not be implemented; therefore, no impacts to visual resources would occur as a result of the No Action Alternative.

3.9.3. Cumulative Impacts

Alternative 1 – Proposed Action

Because no direct or indirect adverse effects to visual resources are expected after mitigation, no cumulatively adverse effects are expected.

Alternative 2 – No Action

The No Action Alternative would not result in negative effects to visual resources as the Proposed Action would not occur. As no action would occur, this alternative would not contribute to a cumulative impact.

4. Tribes, Individuals, Organizations, or Agencies Consulted:

The persons, groups, agencies, or other parties consulted or coordinated with during the preparation of this analysis:

State and local agencies:

- California State Parks
- California State Lands Commission
- California Department of Conservation, Division of Oil, Gas, and Geothermal Resources
- County of Imperial

Indian Tribes:

- Barona Band of Mission Indians
- Campo Band of Mission Indians
- Cocopah Indian Tribe
- Ewiiaapaayp Band of Kumeyaay Indians
- Fort Yuma Quechan Indian Tribe
- Iipay Nation of Santa Ysabel
- Jamul Indian Village
- Kwaaymii Laguna Band of Indians
- La Posta Band of Kumeyaay Indians
- Manzanita Band of Kumeyaay Indians
- Mesa Grande Band of Mission Indians
- San Pasqual Band of Diegueño Indians
- Sycuan Band of Kumeyaay Nation
- Torres-Martinez Desert Cahuilla Indians
- Viejas Band of Kumeyaay Indians

Flat-tailed Horned Lizard Interagency Coordinating Committee and Management Oversight Group

6. *List of Preparers*

Table 3: List of Preparers

Name	Title
Carrie Sahagun	Assistant Field Manager, BLM El Centro Field Office
Katherine Crosmer	Archeologist, BLM El Centro Field Office
Neil Hamada	Supervisory Outdoor Recreation Specialist, BLM El Centro Field Office
Matthew Wokosin	Petroleum Engineering Technician, BLM Ridgecrest Field Office
Edward Klimasauskas	Acting Geothermal Program Lead Division of Energy and Minerals, BLM California State Office
Corinne Lytle-Bonine	Director of Environmental Planning/Senior Project Manager, Chambers Group
Thomas Strand	Environmental Planner, Chambers Group
Elizabeth Fortin	Assistant Environmental Planner, Chambers Group
Greg Tonkovich	Air Quality and Noise Specialist, Chambers Group
Phillip Carlos	GIS Analyst, Chambers Group

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Appendix A: Geothermal Drilling Permit Project Description

ORMAT®

PROJECT DESCRIPTION

TRUCKHAVEN GEOTHERMAL EXPLORATION WELL PROJECT

OCTOBER 2019

Submitted by:

ORNI 5
6225 Neil Road
Reno, NV 89511

PROJECT DESCRIPTION
TRUCKHAVEN GEOTHERMAL EXPLORATION WELL PROJECT

OCTOBER 2019

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PROJECT DESCRIPTION

TRUCKHAVEN GEOTHERMAL EXPLORATION WELL PROJECT

1. PROJECT DESCRIPTION

1.1 Introduction

ORNI 5 LLC (ORNI 5) proposes to drill and test up to six (6) geothermal exploration wells on private and State lands, and up to four (4) geothermal exploration wells on public land managed by the U.S. Bureau of Land Management (BLM), in the Truckhaven Geothermal Exploration Area, located south-southwest of Salton City in western Imperial County, California (see Figure 1**)**. The public lands managed by the BLM are also managed, for recreational purposes, by the California Department of Parks and Recreation (CDPR) as the Ocotillo Wells State Vehicular Recreation Area (SVRA). The proposed wells are located in an area west of State Highway 86 (SR86) and generally north of County Dump Road (see Figure 2). Each of the proposed geothermal exploration wells would be located on separate, individual well pads that would be constructed on lands under geothermal lease to ORNI 5.

The well sites are located in the "Truckhaven Geothermal Leasing Area" analyzed by the BLM in the "Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area" (October 2007) (see Figure 3). The same area is analyzed in the Geothermal Overlay Zone for Imperial County's "Final Programmatic Environmental Impact Report - Renewable Energy and Transmission Element Update" (July 2015). Additionally, Westec Services, Inc. prepared an EIR for Imperial County in 1981 on Phillips Petroleum's "Truckhaven Prospect Geothermal Exploration Wells."

The purpose of this geothermal exploration well project (Project) is to drill, complete, test and monitor these geothermal resource wells. The geothermal wells are designed to drill into and flow test the anticipated underlying geothermal reservoir to confirm the characteristics of the geothermal reservoir and determine if the geothermal resource is commercially viable.

The well sites were selected based on past geologic investigations going back to the 1980's, including geologic mapping, geophysical surveys and temperature gradient holes. Additionally, Phillips Petroleum drilled an exploration well in 1981 in the Project vicinity and Iceland America Energy drilled a full size exploration well in 2007 about a mile west of the Project (see Figure 1). Although ORNI 5 has selected ten geothermal exploration well targets as best as possible at the present time, as with all geothermal exploration, geothermal reservoir targets are often refined (and geothermal exploration wells relocated) as more data are collected and analyzed.

ORNI 5 proposes to commence Project operations when all required permits are acquired.

1.2 Existing and Planned Site Access

Primary highway access to the Project is off State Highway 86 to Airpark Drive or County Dump Road (see Figure 2). Existing access roads will be utilized to the extent practical. The access roads

will be constructed or improved with gravel and/or maintained as needed to safely accommodate the traffic required for the exploration well drilling activities. Road beds will typically be approximately twenty (20) feet across. Table 1 shows the land ownership and general information for access to each well site.

If necessary, encroachment permits for ingress/egress will be obtained from the Imperial County Public Works Department for roads and/or well pads off County Dump Road.

The proposed Project is currently vacant, unirrigated, desert land that is sparsely vegetated and primarily flat. Tule Wash and Surprise Ditch flow northeast and eventually empty into the Salton Sea. The well sites were selected to minimize surface disturbance, reduce the potential for adverse environmental effects, and make the best use of existing access within the limitation of testing the targeted geothermal resource. To the degree possible existing roads, trails and disturbances are used for access. However, some road improvements will be necessary to allow large vehicle access to the well-pad sites, especially due to the sandy nature of the area or where paved roads have not been maintained.

Table 1: Project Well Land Ownership and Access Information

Well Site	Assessor's Parcel Number	Surface Land Owner	Geothermal Rights Owner	Well Site Access	Nearest Residence
32-5	APN: 017-970-011 (209.40 acres)	Burrtec Waste Industries 9890 Cherry Avenue Fontana, CA 92335	Burrtec Waste Industries 9890 Cherry Avenue Fontana, CA 92335	Airpark Drive to Desert Air Court. Access is ~500 feet of new dirt road. .23 acres of disturbance.	0.34 miles
47-5	APN: 017-970-012 (50 Acres)	Burrtec Waste Industries 9890 Cherry Avenue Fontana, CA 92335	Burrtec Waste Industries 9890 Cherry Avenue Fontana, CA 92335	From Dump Road, access is ~1,450 feet north on existing dirt road, then 2,500 feet east on a new dirt road. 1.45 acres of disturbance.	0.44 miles
18-32	APN: 017-010-053 (520 acres)	ORNI 5 6225 Neil Road Reno, NV 89511	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	Airpark Drive to Skyway Drive to La Guardia Ave to Starlite Drive. Access is ~600 feet west on existing road plus ~1,000 feet of new road. .59 acres of disturbance.	0.40 miles
47-32	APN: 017-010-053 (520 acres)	ORNI 5 6225 Neil Road Reno, NV 89511	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	Airpark Drive to Skyway Drive. Access is north-northwest on ~300 feet of existing dirt road. .14 acres of disturbance.	0.20 miles
14-4	APN: 017-340-003 (213.60 acres)	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	Airpark Drive to Skyway Drive. Access is ~400 feet south on existing dirt road and ~700 feet south and east on a new dirt road. .32 acres of disturbance.	0.28 miles

Well Site	Assessor's Parcel Number	Surface Land Owner	Geothermal Rights Owner	Well Site Access	Nearest Residence
17-4	APN: 017-340-003 (213.60 acres)	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	State of California 200 Oceangate #12 Floor Long Beach, CA 90802-4331	New driveway from County Dump Road. .05 acres of disturbance.	0.58 miles
84-6	APN: 017-970-001 (649.51acres)	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Access is from Dump Road ~1,500 feet north on existing dirt road then ~1,700 feet north of new dirt road. .9 acres of disturbance.	0.63 miles
87-6	APN: 017-970-001 (649.51acres)	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Access is from Dump Road ~850 feet north on existing dirt road. .6 acres of disturbance.	0.82 miles
48-6	APN: 017-970-001 (649.51acres)	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	New driveway from County Dump Road. .05 acres of disturbance.	1.29 miles
21-8	APN: 017-340-014 (640 acres)	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	Bureau of Land Management El Centro Field Office 1661 S 4th Street El Centro, CA 92243	New driveway from County Dump Road. .05 acres of disturbance.	0.74 miles

1.3 Well Pad Layout and Construction

One well pad will be constructed for each drill site. Each exploration well pad will be approximately 400 feet by 400 feet (for a total surface area of about 3.7 acres), except for well pad 84-6, which is 2.2 acres to avoid sensitive resources. See Figure 4 for a typical layout of the well pads.

Well pad preparation activities will include clearing, earthwork, drainage and other improvements necessary for efficient and safe operation. Cut and fill were minimized in the site selection process. Measures to prevent soil erosion and loss of topsoil would include the preparation of an erosion control plan before grading to adequately control erosion during construction.

Each site will be prepared to create a level pad for the drill rig, and a graded gravel (if needed) surface for the support equipment. Runoff from undisturbed areas around the constructed sites will be directed into ditches and energy dissipaters (if needed) around the site, consistent with California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB), and Imperial County or BLM, as appropriate, best management practices for storm water. All machinery, drilling platforms, and oil and fuel storage will be in areas tributary to the containment basin in order to prevent the movement of storm water from these areas off of the constructed site. The site will be graded to direct runoff from the pad into the cellar which will be pumped to the containment basin.

Containment basins will be constructed at each site for the containment and temporary storage of drilling mud and cuttings and storm water runoff from the constructed site. Each containment basin will be approximately 100 feet by 250 feet by 7 feet deep and will hold roughly 420,000 gallons with a 2-foot freeboard. Each containment basin will be lined with a 40-mil synthetic liner, in accordance with requirements of the CRWQCB. Compliance with California construction storm water notification and permitting requirements will be performed for each well pad and new access road.

1.4 Well Drilling

Proposed activities include the drilling (and re-drilling, if necessary) of up to ten geothermal resource exploration wells, each to a total depth of approximately 5,000 to 7,000 feet (into the geothermal zone) from one of the constructed well drilling pads.

Geothermal well drilling would be conducted from the constructed well pads described above. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 - 45 days to complete. The drilling operation will employ about 25 people in 6-person shifts. Well pad construction and drilling would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12 - 16 small trucks/service vehicles/worker vehicles).

The California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CDOGGR) regulates geothermal well drilling operations on private and state lands in California.

CDOGGR authorizes the drilling of the wells under a Notice of Intent. CDOGGR reviews and approves the drilling program for each well including the blow out prevention equipment (BOPE) to ensure the drilling operations are safe, protect the community, and protect land and water resources.

The Bureau of Land Management (BLM) regulates geothermal well drilling operations on geothermal leases issued on public lands managed by the BLM. The BLM El Centro Field Office must review and approve an operations plan, prepared and submitted by the lessee to describe how the wells will be drilled and tested and the environment protected. With technical assistance from the BLM Ridgecrest Field Office, the BLM El Centro Field Office also reviews and approves the drilling permit application submitted for each well by the lessee, including the detailed proposed well drilling program for each well, to ensure the drilling operations are safe and protect the environment.

Standard geothermal well drilling equipment would be used and well drilling operations conducted for the Project. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Equipment Registration Program (PERP). The wells would be drilled with water- or gel-based drilling mud to circulate the drill cuttings to the surface. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface (including non-LED aircraft safety lighting), and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and pipe stands; draw works; derrick; drill pipe; trailers; drilling mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared well pad on approximately 40 or more large tractor-trailer trucks. The placement of this equipment on each prepared well pad would depend on rig-specific requirements and site-specific conditions.

Each geothermal well will also be drilled and cased to the design depth of approximately 5,000 to 7,000 feet, or the depth selected by the Project geologist. A geothermal well drilling and completion program for each well will be submitted to CDOGGR or BLM, as appropriate. Blowout prevention equipment (BOPE) inspected and approved by CDOGGR or BLM, as appropriate, will be utilized while drilling below the surface casing. Well casing (typically 20”) will be cemented to a depth of approximately 1,800 feet below Kelly bushing (bkb). A slotted liner (typically 9-5/8”) will be hung from ±1,750 feet to near total depth. All these numbers are subject to change and will be finalized when the drilling programs are submitted to CDOGGR or BLM, as appropriate.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. Rock cuttings would be captured in the containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 5,000 to 7,000 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination

of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

1.5 Drill Pad and Access Road Aggregate

Aggregate required for well pad and access road construction will likely be purchased from the Aggregate Products Inc. Salton Sea quarry facility, located approximately two miles west of the town of Salton Sea Beach and ten miles north-northwest of the Project.

1.6 Water Requirements and Sources

Water required for well pad and access road construction and well drilling will typically average about 50,000 gallons per day. Water necessary for these activities will be purchased from the Coachella Water District via a fire hydrant. Water will be picked up from the source and delivered over existing roads to each construction location or drilling site by a water truck which will be capable of carrying approximately 4,000 gallons per load. This includes the water needed for road grading, construction and dust control.

1.7 Well Testing

Wells would be initially flow tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the drilling sump. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam and noncondensable gasses from the geothermal fluid would be discharged to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Following the short-term test(s), all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut-in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam and no condensable gasses from the geothermal fluid would typically be discharged to the atmosphere. The remaining geothermal fluid would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed above ground along the well site access roads or, if following access roads is not feasible, along other previously disturbed routes (see Figure 2).

1.8 Geothermal Well Monitoring

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment will be removed from the site. The surface facilities remaining on the site will typically consist of several valves on top of the surface casing, which will be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism. Pressure and temperature sensors may be installed in the hole at fixed depths to monitor any changes in these parameters over time. A temperature profile of the well may also be run. This monitoring may be continued indefinitely.

1.9 Abandonment Program

After drilling operations are completed on each well, the liquids from the containment basin will either be evaporated, pumped back down the well, and/or disposed of in accordance with the requirements of the CRWQCB and BLM or Imperial County Public Health Department, as applicable.

The solid contents remaining in each containment basin, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, will be tested as required by the CRWQCB or BLM, as applicable. The solids will be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If allowed they may be used as daily cover at the nearby landfill. After the materials in the containment basins have been removed the containment basin area may be reclaimed depending on if there may be a need for its use in the future.

Upon the completion of well drilling and flow testing, a decision will be made by ORNI 5 regarding the commercial potential of each well. If a well is judged by ORNI 5 to have any commercial potential, well operations will likely be suspended pending application for and receipt of regulatory approvals to place the well into commercial service through a new pipeline to a new geothermal power plant or direct use facility. The well will likely continue to be monitored while these approvals are being processed. If a well is judged to not have commercial potential, it may continue to be monitored, or it may be abandoned in conformance with the well abandonment requirements of the CDOGGR or BLM, as applicable. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids will not move across into different aquifers. The well head (and any other equipment) will be removed, and the casing cut off at least six feet below ground surface.

Following abandonment of the well, the well site itself would be reclaimed, typically by re-grading the entire wellpad and access road area to approximately the same topography as existed prior to construction of the site, including the spreading the topsoil (if any) over the surface. Revegetation would be in conformance with the requirements of the surface managing agency.

2. ENVIRONMENTAL INFORMATION

2.1 Project Designed to Avoid Significant Impacts

ORNI 5 has carefully crafted a plan to avoid significant adverse impacts from the proposed Project. The measures incorporated into Project design are summarized in the sections below.

2.2 Summary of Potential Environmental Impacts and Protection Measures Incorporated into Project

The Truckhaven Prospect Geothermal Exploratory Wells EIR (Westec, 1981) considered the environmental impacts of geothermal exploration, drilling, production and injection wells. The BLM's "Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area" (October 2007), and the Imperial County's "Final Programmatic Environmental Impact Report - Renewable Energy and Transmission Element Update" (July 2015), also addressed exploration drilling, production and injection wells in addition to pipelines and power plants. This Truckhaven Geothermal Exploration Well Project is not in conflict with either the EIRs or EIS.

ORNI 5 has incorporated environmental constraints and considerations into the Project at the earliest feasible time, during the Project planning. The goal of this is to avoid potential environmental effects from the Project.

A review of potential impacts and measures incorporated into the Project to reduce these impacts are summarized below.

2.2.1 Aesthetics

The Project is located in northwestern Imperial County, California in a rural area south-southwest of Salton City (see Figure 1). The Project and vicinity are primarily desert, but for a few homes in the subdivisions to the northeast of the Project. The proposed well sites are not located in any scenic or scenic vista area. The nearest scenic highway is that portion of State Route 78 within the Anza Borrego Desert State Park, in San Diego County. The Project would not be visible from this designated state scenic highway. That portion of State Route 78 in Imperial County from Anza Borrego Desert State Park to the junction with Highway 86, approximately eight miles south of the Project, is an eligible state scenic highway but is not officially designated. The Project would also not be visible from this section of State Route 78.

During drilling the drill rigs may be visible from State Highway 86, County Route S22, Pole Line Road and County Dump Road. There are about six residences in the area, scattered around the airport subdivision (see Table 1 for each well's distance to the nearest residence). The next closest residences are about one half mile or more from the nearest proposed well. During flow testing, geothermal steam and water vapor plumes up to several hundred feet high (depending on the weather conditions during the flow test) could also be visible from the roads and nearby communities. Project well drilling operations would be temporary and short-term, taking an average of 30 to 45 days to drill. Following the completion of drilling and flow testing there would be essentially no visual impact, as the well surface equipment are less than 20 feet tall.

Drilling and flow tests would be conducted 24-hours a day, and the lighted drill rigs and test equipment would be visible at night. However, light sources during drilling and flow-testing would be confined to the drill rig and other operational areas as required for safety. The light from the drill site during drilling and flow-testing would be focused downwards and inwards, and should not be directly visible at a distance.

2.2.2 Agricultural Resources

The proposed well sites and access roads are not located in an agricultural area. There is no farmland of any quality mapped by the California Department of Conservation, Farmland Mapping and Monitoring Program within the Project.

2.2.3 Air Quality

An application will be submitted to the Imperial County Air Pollution Control District (ICAPCD) for an Authority to Construct permit for the exploration wells. The Project will comply with the ICAPCD permit conditions of approval to limit emissions from the Project activities covered by the Authority to Construct. The ICAPCD has standard permit conditions for the construction of geothermal wells which would likely include the following requirements (taken from ATC 3593 for the Highline Exploration Project):

- Diesel engines that run well-drilling equipment have the potential to emit nitrogen oxides (NOx), reactive organic compounds (ROCs), carbon monoxide, sulfur oxides, and particulate matter (PM_{10} and $PM_{2.5}$). These are regulated air pollutants and well-drilling diesel engines must comply with ICAPCD rules and regulations. District Rule 207 (New Source Review) requires that any new or modified source emitting regulated air pollutants in excess of 25 pounds/day quantities utilize best available control technology (BACT), and must "offset" emissions of regulated air pollutants associated with ozone or PM_{10} in excess of 137 pounds/day. Well-drilling diesel engines may emit sufficient regulated air pollutants to exceed 137 pound/day; however, since the Project is using engines permitted under the CARB PERP they already meet BACT and will not require offsets.
- District Regulation VIII (Fugitive Dust Requirements for Control of Fine Particulate Matter (PM_{10})) requires specific actions by active operations to control the fugitive emission of fine particulate matter (fugitive dust, or PM_{10}). Fugitive dust emissions result from earthmoving activities during construction; travel on unpaved roads, and from open areas within well sites following construction. To comply with the applicable sections of District Regulation VIII, the applicants must prepare and implement a dust control plan and apply Best Available Control Technology (BACT) (such as watering or limiting vehicle traffic on unpaved access roads to 15 miles per hour) to reduce fugitive dust emissions from earthmoving activities during construction and travel on unpaved access roads, and apply BACT (such as gravel) to reduce fugitive dust emissions from open areas within the well site following construction.

In addition, when conducting operations within the SVRA, ORNI 5 will comply with the applicable portions of the "Final Dust Control Plan for Ocotillo Wells and Heber Dunes State Vehicular Recreation Areas, Imperial County, California."

The Project is located in a rural area with no nearby sensitive receptors (schools, pre-schools, hospitals, long-term care facilities, etc.). Emissions to the atmosphere from the Project would be short-term and unlikely to result in exposure of any sensitive receptors, or residences, to measurable increases in air pollutant concentrations.

The concentrations of H_2S measured in the geothermal fluids from previous wells drilled and flow-tested in the Truckhaven geothermal area are relatively small, and H_2S emissions (if any) during drilling and flow-testing would be short-term and temporary. Further, since no residences or sensitive receptors are located within 1,000 feet of any of the proposed well sites, emissions of H_2S during drilling and flow testing would not create objectionable odors affecting a substantial number of people.

2.2.4 Biological Resources

The Project is located principally on vacant desert lands in Imperial County. ORNI 5 has contracted for several biological surveys of the area in preparation for the proposed Project.

Pedestrian biological surveys were conducted of the area (and beyond) located just west of the Salton Sea, Imperial County, California, including the Project, in the spring of 2016 and 2017 (Power Engineers, Inc., Ormat Nevada, Inc. Truckhaven Geothermal Project Proposed Well Sites Biological Resources Evaluation Report, April 2018). The report of these surveys is attached as APPENDIX A to this Project Description.

Surveys conducted in April and May of 2016 were focused on wildlife and covered a larger than just the project area. Surveys conducted in May and June of 2017 focused on special-status plant species, but also included observations of wildlife. POWER provided a wildlife biologist and botanist for the surveys. The role of the wildlife biologist was to record observations of wildlife species, with emphasis on special-status species such as flat-tail horned lizard (*Phrynosoma mcallii*) and burrowing owl (*Athene cunicularia*), and record active or potential burrows for a variety of wildlife species. The botanist was tasked with identifying and recording plant species encountered, with emphasis on special-status plant species. Biologists surveying on private lands were preauthorized for conducting surveys by CDFW.

All detected wildlife and botanical species were recorded, as was observed vegetation communities within and adjacent to the project area. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat). The botanical inventory was floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special-status plant species. Vegetation communities were classified according to Holland (1986). Figure 3 (Biological Resources) of the report (APPENDIX A) maps the vegetation and sensitive flora and fauna.

Vegetation communities consisted primarily of Sonoran creosote bush scrub and desert saltbush scrub. Of the 38 plant species considered to have a potential to occur within the vicinity, one species (Salton milk-vetch [*Astragalus crotalariae*]) was observed during the survey, seven were determined to have a moderate potential for occurrence within the biological survey area, and seven had a low potential, while the remaining were determined to be absent. The Salton milk-vetch is included on List 4.3 (Plants of Limited Distribution [A Watch List] - Not very threatened in California) of the California Native Plant Society (CNPS) online Inventory. The report concluded that, while Salton milk-vetch has no federal or State status, it is considered a plant of limited distribution, and should be avoided, if feasible. No other special-status plant species were observed during the surveys.

No special-status wildlife species were detected within the biological survey area during the surveys. Few wildlife species were observed within the survey area, but wildlife sign was observed more frequently. Burrows of varying sizes were present intermittently throughout the survey area, including rodent and potentially burrowing owls. A small number of unoccupied bird nests were also observed.

A total of 10 special-status wildlife species were determined by the literature review to potentially occur within the biological survey area. Two additional species were added, based on personal communication with State Parks, bringing the number to 12. Of the 12 wildlife species, one species (flat-tailed horned lizard [*Phrynosoma mcallii*]) had a high potential for occurrence within the survey area, two (burrowing owl [*Athene cunicularia*] and Palm Springs pocket mouse [*Perognathus longimembris bangsi*]) had a moderate potential, five had a low potential, and the remainder were determined to be absent. The flat-tailed horned lizard is designated by the CDFW as a Species of Special Concern and by BLM as sensitive.

Direct impacts to wildlife habitat and botanical resources will be minimized by clearing only the small area required for each well pad and access road only when that well is scheduled for drilling.

ORNI 5 will comply with the applicable mitigation and/or compensation requirements of the "Flat-tailed Horned Lizard Rangewide Management Strategy, 2003 Revision [An Arizona-California Conservation Strategy], prepared and edited by the Flat-tailed Horned Lizard Interagency Coordinating Committee" applicable to the BLM lands disturbed by the wells and access roads.

2.2.5 Cultural and Paleontological Resources

A BLM Class III intensive cultural resources survey was conducted of all the proposed exploration drill pads, proposed unimproved access roads, and appropriate buffer areas by Power Engineers, Inc. A Tribal Monitor accompanied the crew of the pedestrian survey. The draft confidential cultural resource report prepared for this Project is currently under review by the BLM-ECFO. When BLM provides comments, Power Engineers will produce a non-confidential version of the Class III report for public review and attachment as APPENDIX B to this Project Description.

Power Engineers[1] has stated that the currently proposed well pads and access roads avoid all significant cultural resources and has recommended that archaeological monitoring take place during construction. If significant cultural resource sites are found during monitoring of the construction of a well pad or access road, the well pad or access road will either be moved with the concurrence of the land use agency responsible for cultural resource protection, or the resource will be protected in place, or data recovery will be initiated.

At the request of Power Engineers, on behalf of ORNI 5, Applied EarthWorks, Inc. (Æ) was retained to conduct a paleontological resources assessment covering the area in which the currently proposed well pads and access roads are located. The study consisted of a museum records search, literature review, field survey, and preparation of a technical report, which provides specific management recommendations.

Although the BLM has not officially released the report, Power Engineers[2] has indicated that, using the results of museum records search and literature review, the paleontological resource potential and Potential Fossil Yield Classification (PFYC) of geologic units within the survey area was recommended in accordance with the Society of Vertebrate Paleontology (2010) and BLM (2008) guidelines, respectively. As a result of the study, the Pliocene to Holocene geologic units underlying the survey area have a recommended paleontological sensitivity of low (PFYC Class 2) to very high (PFYC Class 5), pending concurrence with the BLM. Consequently, the likelihood of impacting scientifically significant vertebrate fossils as a result of Project development is high. Therefore, the report recommends that a Management Strategy with Project-specific mitigation measures be established in order to protect paleontological resources from inadvertent damage, including retaining a qualified paleontologist to develop and implement a Paleontological Resource Mitigation Plan and oversee monitoring efforts during ground disturbance. When BLM officially releases the report it will be attached as APPENDIX C to this Project Description.

2.2.6 Geology and Soils

Geologic conditions in the Truckhaven Geothermal area were extensively documented by the Bureau of Land Management in their "Truckhaven Geothermal Leasing Area Final Environmental Impact Statement" (February 2008) and Imperial County's EIR "Truckhaven Prospect Geothermal Exploration Wells" (WESTEC Services, Inc. 1981).

The Salton trough is in a geologically active area. The San Andreas Fault zone is found on the east side of the Salton Sea, while the Imperial Fault is found south of the sea, and the San Jacinto and Elsinore faults are found on the west side of the sea. Most of these faults exhibit right lateral strike-slip motion. The Brawley seismic spreading zone is found along the southeast of the sea and is an active geothermal area.

According to the BLM EIS, active surface fault rupture has not been mapped in the Project lands as part of the Alquist-Priolo Earthquake Fault Zoning Act. The Act was passed in 1972 to mitigate

[1] Michael Dice, Senior Cultural Resource Specialist I, Power Engineers, Inc.
[2] Michael Dice, Senior Cultural Resource Specialist I, Power Engineers, Inc.

the hazard of surface faulting to structures for human occupancy. However, fault ruptures from 1968, 1979, and 1987 have been mapped within a few miles of the Truckhaven area (CGS 1974a, 1974b, 1990). In 1987, 90 centimeters (35 inches) of displacement was associated with the Richter magnitude 6.6 earthquake on the Superstition Hills Fault.

Other faults cutting Pliocene age strata have been mapped on BLM-administered land within the Truckhaven area. These faults include the Dump Fault, Echelon Faults, Powerline Fault, and Sand Dunes Fault (Kirby 2005).

The Project lands are located within the Colorado Desert geomorphic province near the Salton Sea in Imperial County, California. This area within the Colorado Desert is characterized by a structural depression known as the Salton Trough, which is crossed by the San Andreas Fault system and other major faults. The Salton Trough is characterized by flat topography, generally below mean sea level (MSL) adjacent to the Salton Sea, with the Chocolate Mountains to the east and the Superstition Hills to the west. Surface deposits consist mainly of (from youngest to oldest): Holocene or recent surficial deposits including alluvium, Lake Cahuilla deposits, and sand dunes; Pleistocene Brawley Formation, a fine-grained sandstone and mudstone from the Colorado River; the Pliocene Borrego Formation, consisting of mudstone and clay stone dominantly from the Colorado River; a Pliocene transitional unit of mudstone and sandstone; and the Pliocene Diablo Formation. The Diablo Formation includes cross-bedded Colorado River-derived sandstone and red massive mudstone (Kirby 2005).

All of the lands within the Project belong to the Rillito-Beeline-Badland soil association, which includes some rock outcrops. The Rillito and Beeline soils are well-drained soils that form on mixed alluvium, fan terraces, and hill slopes. These soils form on nearly level land and are well drained fine sand to silt loam. They tend to have high permeability and very low runoff characteristics. These soils are prone to wind and water erosion but not much ponding or flooding.

The Project would not expose people or structures to potential substantial adverse effects. The Project would not induce any substantial ground shaking from the drilling and testing operation which could affect any habitable structures. Soil liquefaction during major seismic ground shaking is a small possibility for the well sites, but the drilling rig, which would be placed on a stand to raise the drilling floor above the blowout prevention equipment (BOPE), is placed and braced on the pad to minimize any potential adverse effects of seismic-induced ground failure. The Project would be located on stable areas with no potential for landslides, and away from steep-walled arroyos.

Measures to prevent soil erosion and loss of topsoil have been adopted by the Project, including the preparation of an erosion control plan before grading to adequately control erosion during construction. The Project facilities would be located on relatively flat terrain and/or alluvial surfaces having little to no potential instabilities. The well casing programs have been designed to accommodate artesian ground water aquifers which may underlie the Project. The Project would not use or construct facilities that would be impacted by any expansive soils.

2.2.7 Hazards and Hazardous Materials

There are no commercial vehicle fueling or hazardous material storage facilities in the Project lands and few hazardous materials are known to be used in the Project lands. The privately owned former Salton Sea Airport likely contains oil and fuels to support the owners' aviation operations. The Burrtec Waste Industries landfill, formerly owned by Imperial County, sits at the end of County Dump Road at Pole Line Road. The transport and handling of hazardous materials in California are subject to numerous federal and state laws and regulations.

A containment basin will be located on the drilling pad and all used mud and cuttings will be contained in this basin until drilling operations are complete.

After drilling operations are complete, the fluid in the mud and cuttings will be allowed to evaporate. The residual solids will be tested for pH, oil and grease, and metals (TTLC and TCLP). The solids will be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If approved they may be used as daily cover at a landfill.

Solid waste materials (trash) will be deposited at an authorized landfill by a disposal contractor. Portable chemical sanitary facilities will be used by all personnel. These facilities will be maintained by a local contractor.

All of the proposed well sites are located within one mile of the private airport. The private airstrip owner will be given prior notification of all the drilling operations. Notices to the Federal Aviation Administration (FAA) are also required, and will be delivered, and the drilling rigs will be properly lighted, as required by the FAA, to avoid air traffic hazards.

Diesel fuel, lubricants, drilling mud and drilling mud additives would be transported to, stored on and used by the Project at the proposed well sites. The Project would conform to federal and state hazardous materials handling requirements.

The Project has adopted blowout prevention measures in conformance with BLM and CDOGGR requirements to minimize the potential for a well to "blow out," or flow uncontrollably. Should the well start to flow hot or cold water, the drilling company would use heavier drilling mud or other specialized drilling materials (which would be stored on site) to stop the flow.

There are no schools within the Project lands, and Project activities would not be conducted within one-quarter mile of any existing or proposed school. The Project would not be located on any site which is included on any lists of hazardous materials sites compiled pursuant to Government Code Section 65962.5. There are no known public emergency action or evacuation plans applicable to the Project lands, so that the Project would have no potential to impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

Most of the Project lands are vacant desert with minimal vegetation, resulting in low wildland fire danger. The Project has adopted specific measures to prevent and control fires, including clearing

the well sites and access roads, having fire extinguishers available on the site and around the drilling rig, making water that is used for drilling available for firefighting, and allowing smoking only in designated areas.

2.2.8 Hydrology and Water Quality

The Project will apply for Waste Discharge Orders for the proposed well pad containment basins from the California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB), and once issued, will comply with the CRWQCB permit conditions to protect water resources. Compliance with California construction storm water notification and permitting requirements will also be performed for each well pad and new access road. The Project would direct runoff from undisturbed areas around the constructed sites onto undisturbed ground consistent with CRWQCB best management practices for storm water.

The well site locations have been selected to minimize the potential for surface water pollution from runoff during construction, drilling, and testing. Water for dust control, site grading and construction and well drilling will be purchased from the Coachella Water District and trucked to the sites from a near-by fire hydrant. Water for well drilling would be stored in one or more large portable tanks located on each active well site.

There are no known groundwater aquifers in the area of the Project or vicinity being used for domestic or agricultural use.

Only non-toxic, non-hazardous drilling mud will be utilized during drilling operations. Waste drilling mud and drill cuttings will be stored in the lined containment basin. Any runoff from the site will be discharged into the containment basin. Geothermal fluids produced from the wells would be injected back into the geothermal reservoir.

Surface water and ground water pollution from drilling and testing will be prevented by metal casing cemented to below these zones. The exploration wells will be cased and cemented to prevent interzonal migrations of fluids and reduce the possibility of blowouts.

The FEMA flood zone map for the area of the Project and vicinity shows that each of the Project well pads would be located outside the mapped flood zones (Figure 5). No Project structures would impede or redirect flood flows.

2.2.9 Land Use and Planning

The Project is located within the Truckhaven geothermal overlay zone created in 2015 by the Imperial County Board of Supervisors. The Project is located within an area with very few rural residences and would not physically divide and established community. The Project is not in conflict with the County adopted land-use plans or policies. It is consistent with the County's General Plan, the Renewable Energy and Transmission Element Update, and the applicable sections of the Imperial County Land Use Ordinance (Title 9). There are no known habitat conservation plans or natural community conservation plans encompassing the Project.

2.2.10 Mineral Resources

The Project is located in Imperial County in southern California. A wide variety of minerals are found throughout Imperial County. Gold, gypsum, sand, gravel, lime, clay, and stone have the highest economic value and are presently extracted for profit in the County. Industrial materials are also readily available, including kyanite, mineral fillers (clay, limestone, sericite and mica, and tuff), salt, potash, calcium chloride, manganese, and sand (Imperial County 1993). The geothermal resources to be developed by the proposed Project are the only known regionally or locally important mineral resources in the area.

2.2.11 Noise

Existing noise sources and levels in the area were described in the Truckhaven EIR (Westec, 1981) and the BLM leasing EIS (2008). The proposed well sites can be characterized as primarily rural open desert with relatively low ambient noise levels except during use by off road vehicles and the traffic to the landfill. The well sites located near Highway 86 and Dump Road will have the highest background noise levels, with levels up to 70 dBA when trucks are passing. For sites farther away from the highway and Dump Road, the background noise levels are likely around 45 – 52 dBA except during the OHV season (mostly during the winter). This is consistent with typical rural area noise levels in areas with only intermittent noises from traffic. There are no schools, hospitals, churches or other noise sensitive receptors in the Project lands or vicinity.

The Project would comply with the applicable measures from the recently adopted update to the Imperial County Land Use Code (Title 9) specific to geothermal projects (Division 17), including the following:

- Each operator shall limit drilling noise to a sound level equivalent to CNEL 65 dB(A). (Land Use Code 91703.01.B.1) [*equivalent to a constant noise level of 61.0 dB(A)*]
- The limited sound level may be exceeded by ten percent (10%) if the noise is intermittent and during daylight hours only. (Land Use Code 91703.01.B.2)
- The noise levels shall be measured at the nearest human receptor site outside the parcel boundary, or one-half mile from the sound, whichever is greater. (Land Use Code 91703.01.B.3)
- Sound pressure levels shall be measured at the points specified and shall be measured with a sound level meter and associated octave band analyzer conforming to the above standard. (Land Use Code 91703.01.B.4)
- Diesel equipment used for drilling within three hundred feet (300 ft.) of any residence shall be equipped with hospital-type mufflers. Well venting and testing at these wells shall be accompanied by the use of an effective muffling device or “silencer”. (Land Use Code 91703.01.B.5)
- Impulse noises such as sudden steam venting shall be controlled by discharge through a muffler or other sound attenuating system, as appropriate. (Land Use Code 91703.01.B.5)
- All work in preparation of the site for drilling shall only be done between the hours of 7 a.m. and 7 p.m. for any wells within three hundred feet (300 ft.) of any residence. Exceptions may be made during summer hours to minimize effects of heat with prior notice

to the Director of Planning and Development Services and approval thereof. (Land Use Code 91703.01.G)

- Drill pipes shall be racked and/or made up between the hours of 7 a.m. to 7 p.m. for wells within three hundred feet (300 ft.) of a residence. Exception may be allowed where sound proofing is provided, or during summer hours to minimize the effects of heat with prior notice to the Director of Planning and Development Services and approval thereof. (Land Use Code 91703.01.K)
- Drilling may be on a twenty-four (24) hour basis provided the standards above are met. ((Land Use Code 91703.01(P)).

Drill site construction and well drilling activities would likely use equipment that would generate a noise level of about 83 dBA at a distance of 50 feet (referenced from Crocker and Kessler 1982 and Environmental Science Associates 2002). Using the simple and usually conservative assumption of hemispherical attenuation of sound with distance, a reduction of 6 dBA per doubling of the distance is calculated. Table 2 provides an estimate of the projected noise level from the proposed Project drilling and testing activities at the nearest residences to the respective well sites. This historical data does not take into account the Project will be using new diesel engines with hospital type mufflers near residences and are, thus, conservative numbers.

Table 2: Projected Sound Levels at Nearest Receptors During 45-day Well Construction Period

Well Site	Distance to Nearest Residence	Projected Sound Level from each Well Pad at the Nearest Residence (excludes background noise), dBA
32-5	1,735	52.2
47-5	2,276	49.8
18-32	2,252	49.9
47-32	1,049	56.6
14-4	1,447	53.8
17-4	3,110	47.1
48-6	6,900	40.2
84-6	3,372	46.4
87-6	4,495	43.9
21-8	3,991	45.0

Although persons in the immediate vicinity of the well sites during drilling activities would be exposed to noise levels that are elevated above background, sound levels from the Project at the nearest sensitive receptors are projected by Table 2 to be within or below the normally acceptable range (sound level of 50-60 dBA - Noise Element to the Imperial County General Plan). As such, the Project would not be in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies to residents within the Project lands.

The Project is both short-term and temporary, as the principal noise sources would be the diesel engines on the construction equipment during construction and drilling rig and the movement of

pipe and casing during the expected 45-day drilling period for each well. Thus, the Project would not cause a substantial permanent increase in ambient noise levels in the Project or its vicinity.

2.2.12 Population and Housing

The Project is located within an area with very few rural residences. The nearest populated area is the town of Salton City. Because the Project is both short-term and temporary, the few persons actively working on the Project would commute to the Project site from offsite local accommodations, and there is no potential for the Project to induce substantial population growth in the area, or generate the need for additional housing.

2.2.13 Public Services

Public services in the Project lands and vicinity are provided by Imperial County and Salton Community Services District.

Fire Protection: The well sites and access roads will be cleared of all vegetation. The cleared areas will be maintained during drilling operations. Fire extinguishers will be available on the site and around the drilling rig. Water that is used for drilling will also be available for firefighting. Personnel will be allowed to smoke only in designated areas. Because activities conducted by the Project are small, short-term and temporary, and the Project has agreed to adopt standard fire-prevention and control measures, there would be negligible need for additional fire protection services.

Police Protection: Because the Project is small, short-term and temporary, there would be negligible need for additional police or security protection services.

Schools: The temporary construction and drilling work force used for the Project would not bring their families to the area because the Project activities are short-term and temporary. As such, there would be no demand for school-related services as a result of the Project.

Parks and Other Public Facilities: The Project would not increase the demand on existing parks nor create a need for any new parks or other public services.

Waste Disposal: Small quantities of solid waste materials (trash) would be temporarily collected in covered containers on each well pad before disposal at an authorized landfill by a disposal contractor. Portable chemical sanitary facilities will be used by all personnel. These facilities will be maintained by a local contractor.

2.2.14 Recreation

Six of the proposed well sites are located on private or State lands located outside of the boundary of the Ocotillo Wells State Vehicular Recreation Area (SVRA) (Figure 6). These six wells would have no effect on the recreational activities conducted in SVRA.

The other four proposed well sites (48-6, 84-6, 87-6 and 21-8) are located within the boundary of the SVRA. They are each located on public lands on which the BLM manages both surface and mineral resources (see Table 1), except that the SVRA is responsible for managing recreational resources under a Memorandum of Understanding between the two parties. To minimize the impacts of geothermal exploration well sites and new roads on SVRA recreational resources, these four geothermal wells have been located as close to the outer border of the SVRA as possible. Further, measures discussed above which reduce aesthetic and noise impacts from the construction, drilling and flow-testing would also be implemented to reduce these impacts to the SVRA.

2.2.15 Transportation/Traffic

Primary highway access to the Project vicinity is provided by State Highway 86, a four-lane highway running north-south through Imperial County on the west side of the Salton Sea. The immediate access to the Project and some of the proposed well sites is from State Highway 86 to Airpark Drive (see Figure 2). Access to the rest of the proposed well sites is from State Highway 86 to County Dump Road. Both Airpark Drive and County Dump Road are two-lane roads with very low traffic volume. Because the Project is short-term and temporary, and the traffic volumes generated by construction and well drilling so small, the potential for the Project to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system is negligible.

2.2.16 Utilities and Service Systems

There are no public utilities or services currently available in the area of the Project. The Project would not generate wastewater that would need to be treated by a wastewater treatment facility. Storm water control would be implemented for each well pad and access road. Water for dust control and drilling would be purchased from the Coachella Water District via a nearby fire hydrant. Solid wastes generated by the Project would be handled in conformance with all applicable statutes and regulations. The potential for the small amount of waste generated by the Project to exceed the available landfill disposal capacity is negligible.

Small amounts drilling mud and cuttings would be generated from the Project drilling operations. These wastes would be temporarily stored in the on-site containment basin or tanks. The solid contents remaining in each containment basin, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, will be tested as required by the CRWQCB and BLM, as applicable. The solids will be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If allowed they may be used as daily cover at the nearby landfill.

FIGURES

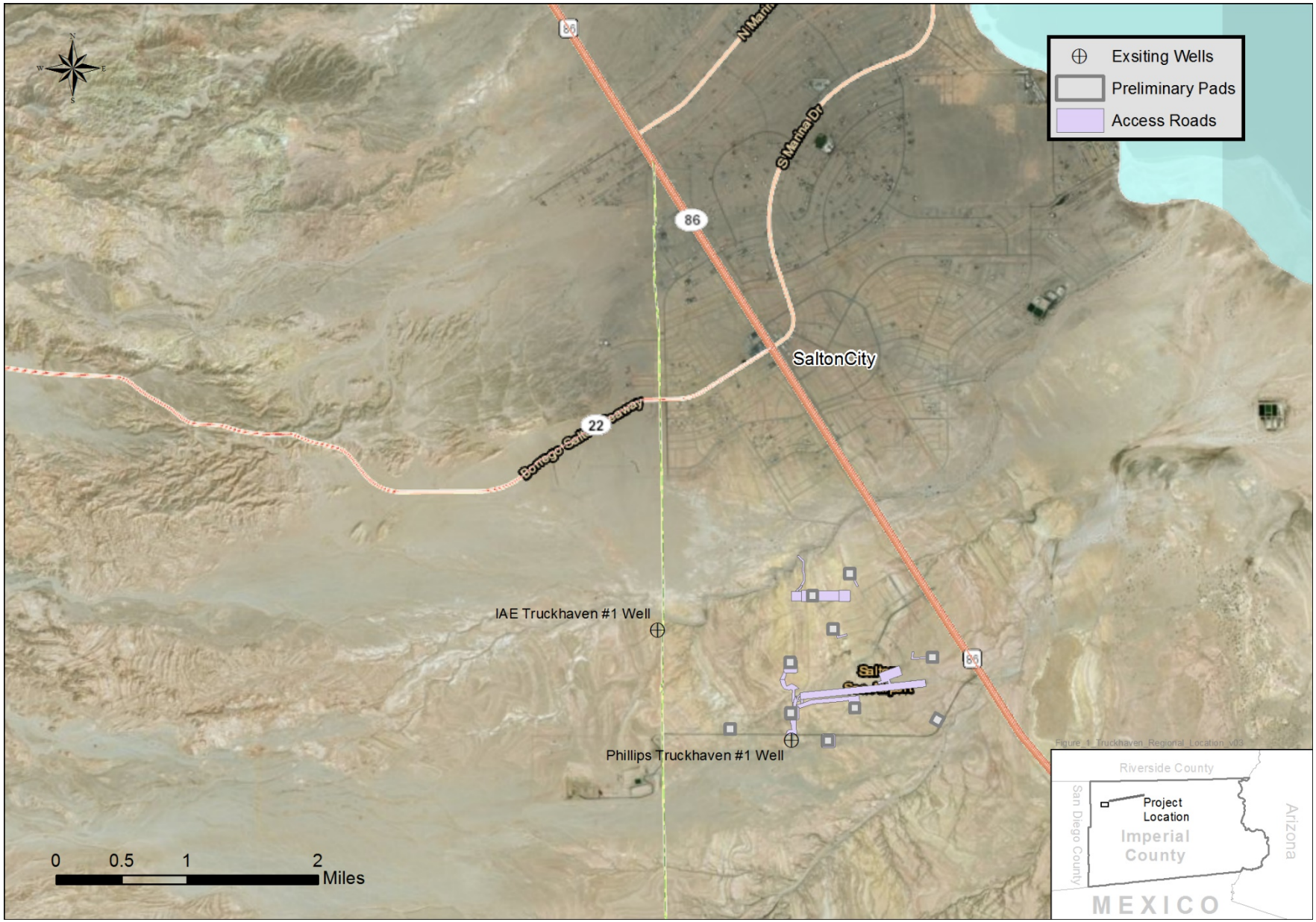

Figure 1: Truckhaven Geothermal Exploration Well Project – Regional Location

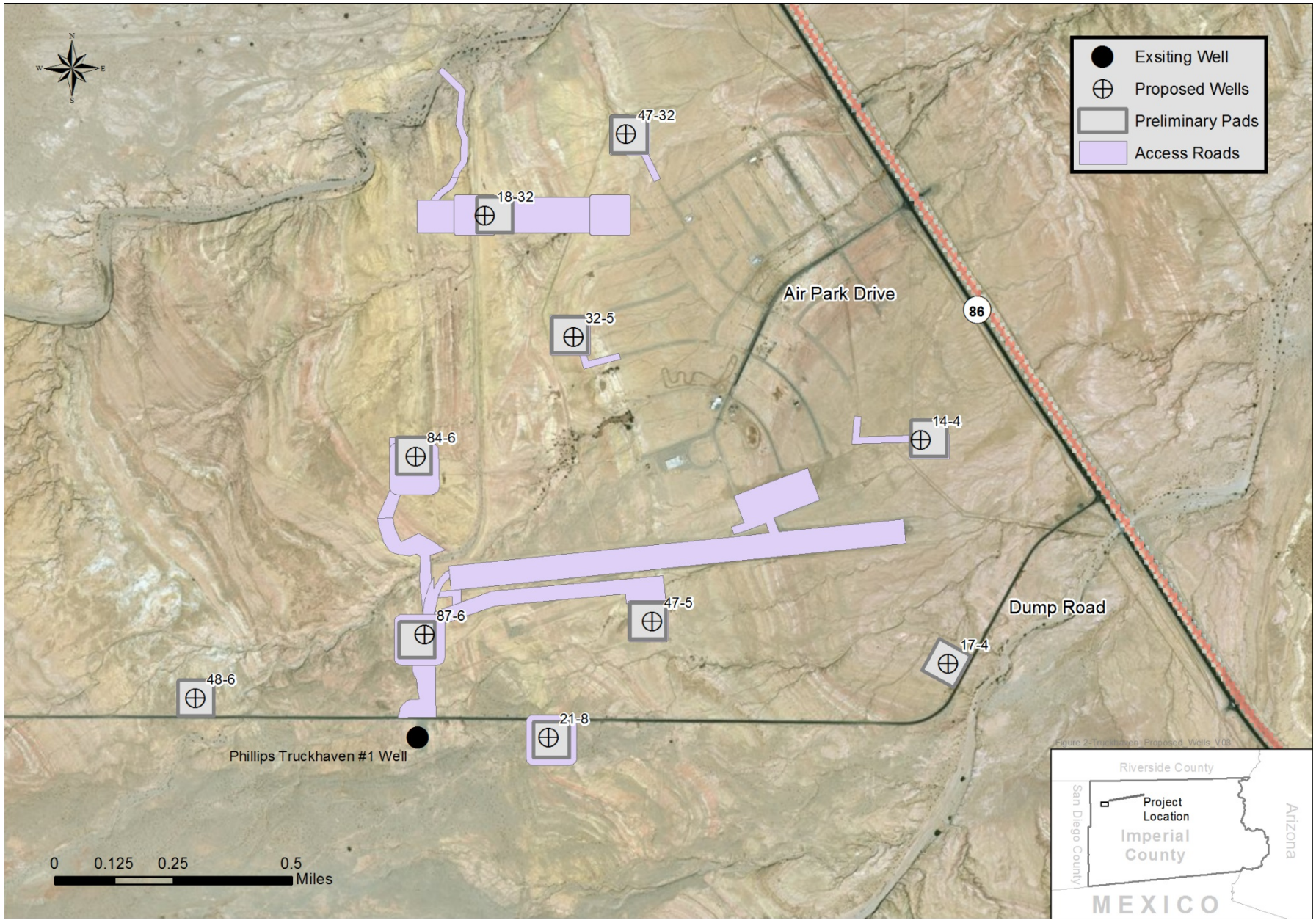

Figure 2: Proposed Geothermal Well Sites and Access Roads

Figure 3: BLM Truckhaven Geothermal Leasing Area

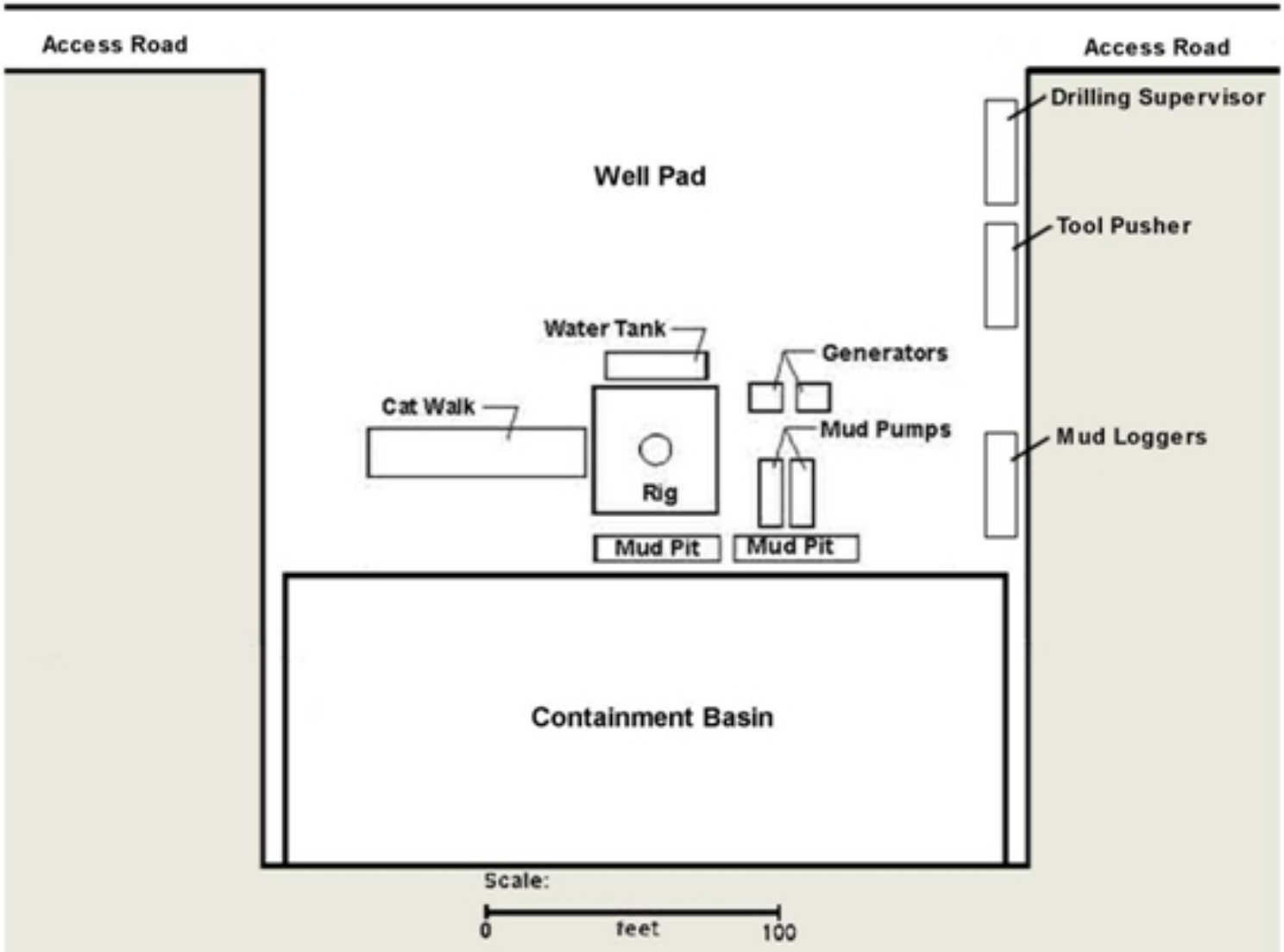

Figure 4: Typical Well Pad Layout

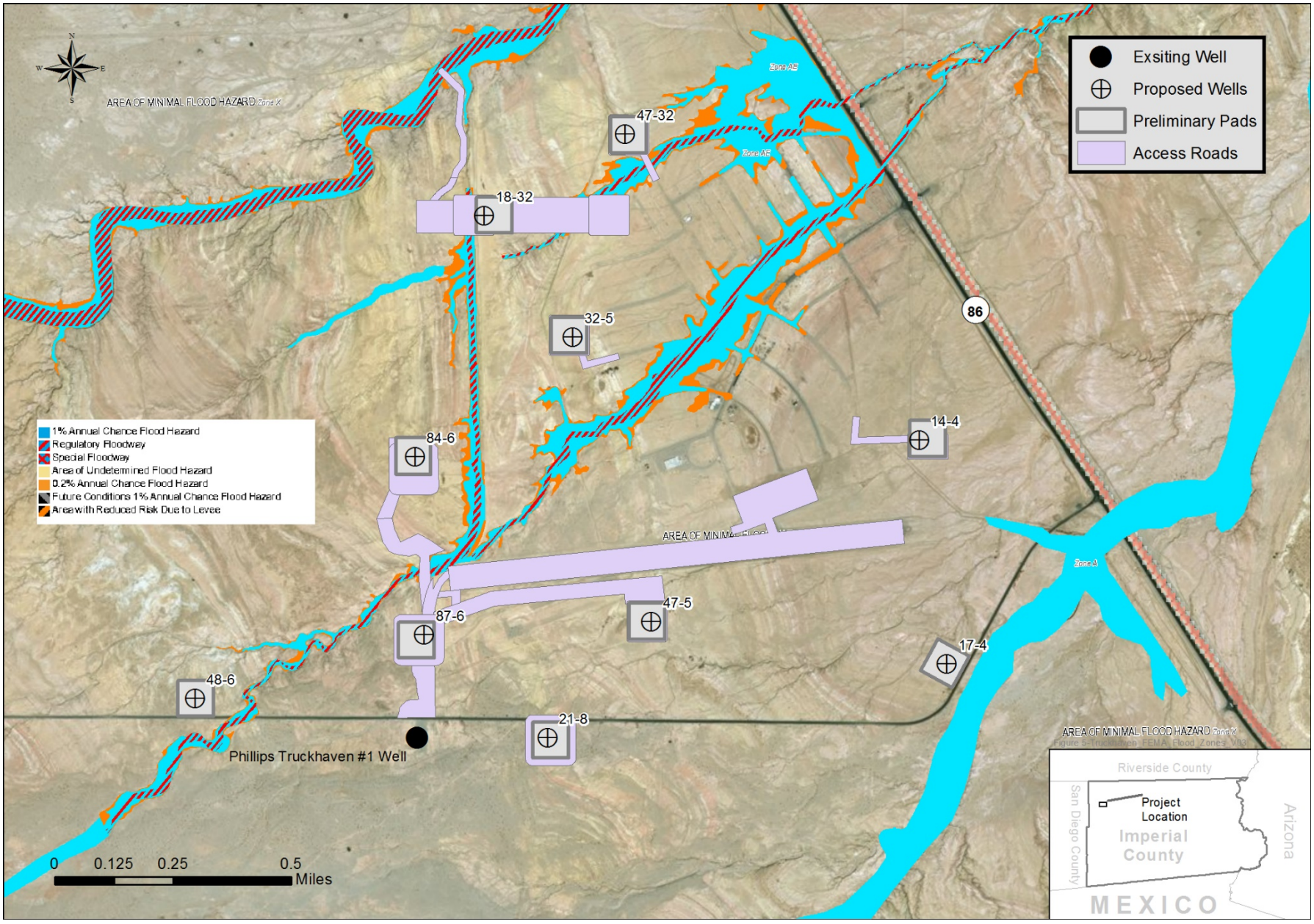

Figure 5: FEMA Flood Zone Map of the Project Lands and Vicinity

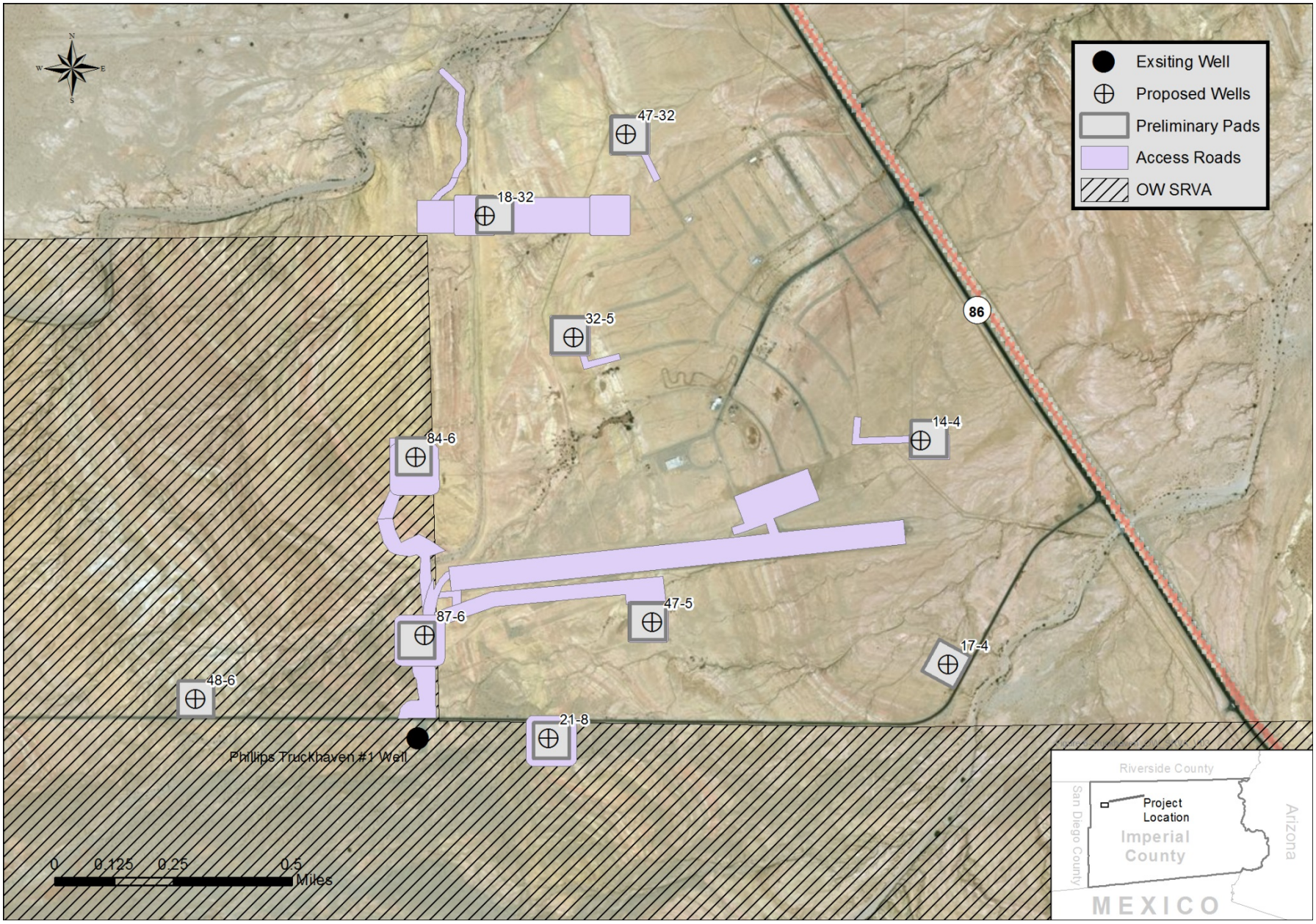

Figure 6: Ocotillo Wells State Vehicular Recreation Area Boundary

Appendix B: Resources Evaluation Table

Appendix B: Resource Evaluation Table

The following table is a list of all resources considered in the evaluation of the Proposed Action and alternative. The resources found that may be affected by this proposal have been carried forward for analysis and are discussed further in the EA. The resources that are not present or found to not be affected by the Proposed Action will not be discussed further.

Resource	May be Impacted (carry forward for analysis)	Not Present or Not Impacted	Rationale
Air Quality	x		Potential effects associated with air quality could occur as a result of the Proposed Action. Analysis carried through to the EA.
Conservation Lands		x	The Proposed Action does not occur in any Conservation Lands.
Cultural Resources	x		The Proposed Action could potentially impact cultural resources. The analysis is carried through to the EA.
Environmental Justice/Socioeconomics		x	The Proposed Action will not adversely or disproportionally impact minority populations, low-income communities, or Tribes. The Proposed Action would not have a disproportionately high or adverse effect that would place socioeconomic burdens on the citizens of Imperial County due to the limited context and intensity of the proposal. No group of people, including racial, ethnic, or socioeconomic group would bear a disproportionate share of the negative environmental consequences resulting from the Proposed Action.
Fish and Wildlife Excluding Federally Listed Species	x		The Proposed Action could potentially impact wildlife resources. The analysis is carried through to the EA.
Floodplains		x	The Proposed Action would not impact floodplains.
Forestry		x	Resource not present.

Resource	May be Impacted (carry forward for analysis)	Not Present or Not Impacted	Rationale
Fuels and Fire Management		x	Proposed Action would not affect fuel loads or fire management.
Geology/Mineral Resources		x	The Proposed Action would not affect the presence or availability of mineral resources.
Hydrologic Conditions	x		This analysis is contained in the Water Resources section of the EA. Analysis is carried through to the EA.
Indian Trust Assets		x	Resource not present.
Invasive Species/Noxious Weeds		x	Potentially present, the Proposed Action would implement PDF-BIO 9 to eliminate impacts associated with noxious weeds.
Land and Realty		x	The Proposed Action is located in the Truckhaven Geothermal Leasing Area, and the proposal includes allowable uses covered within the TGLA EIS.
Livestock Grazing		x	Resource not present.
Migratory Birds		x	Although potentially effected by the Proposed Action, implementation of PDF-BIO-3 would minimize any impacts associated with migratory birds.
Native American Concerns		x	Tribal consultation on the propose action was conducted by the BLM. Areas of religious or cultural concerns would not be impacted based on consultations and coordination. Also, no adverse effects to any historic properties.
Paleontological Resources	x		The Proposed Action could potentially impact paleontological resources. The Proposed Action would implement PDF-PAL-1 and PDF-PAL-2 to minimize impacts to paleontological resources. The analysis is carried through to the EA.
Recreation/Travel/Wild and Scenic Rivers	x		Temporary impacts to recreation could occur. Analysis carried through to the EA.

Resource	May be Impacted (carry forward for analysis)	Not Present or Not Impacted	Rationale
Soils	x		Soils could be directly impacted due to implementation of the Proposed Action. Analysis carried through to the EA.
Threatened, Endangered, or Candidate Animal Species	x		No Threatened or Endangered species are located within the Proposed Action area. Special status species are located on-site. Analysis carried through to EA.
Threatened, Endangered, or Candidate Plant Species	x		No Threatened or Endangered species are located within the Proposed Action area. Special status species are located on-site. Analysis carried through to EA.
Transmission Corridors		x	Resource not affected.
Vegetation	x		Vegetation would be impacted under the Proposed Action. Analysis carried through to EA.
Visual Resources	x		Drill rig and well pad could have temporary impacts with regards to the natural environment. Analysis carried through to EA.
Wastes (hazardous or solid)		x	The Proposed Action will result in the production of waste however project design features will eliminate impacts.
Water Resources	x		The Proposed Action could potentially affect water resources and hydrology. Analysis carried through to EA.
Wetlands and Riparian Areas		x	The Proposed Action does not occur in a wetland/riparian zone.
Wild Horse and Burros		x	The Proposed Action is not located within a herd management area and will have no impact on wild horse or burro populations.
Wilderness		x	Resource not present.

Appendix C: Project Design Features and BLM Mitigation Measures

Appendix C: Project Design Features and Mitigation Measures

Project Design Features Tables

Cultural Resources	Project Design Feature Description
PDF-CUL-1	The Applicant shall, prior to construction, prepare a monitoring and discovery plan that identifies procedures for monitoring and implementation of a discovery plan. Consistent with the monitoring and discovery plan prepared for the Proposed Action, the Applicant shall retain qualified archaeological monitors for all ground-disturbing activities associated with the development of access roads and construction of the drill pads. If a significant cultural resource site is found during ground-disturbing activities associated with well pad or access road construction the Project features will either be moved, or the resource will be protected in place, or data recovery will be initiated, consistent with the monitoring and discovery plan.
PDF-CUL-2	All workers involved with ground-disturbing activities associated with the Proposed Action will undergo worker resources awareness training prior to being allowed to work in the Proposed Action area. The BLM will review and approve the worker training content in advance of any project work on BLM lands.

Paleontological Resources	Project Design Feature Description
PDF-PAL-1	Prior to the commencement of ground-disturbing activities, a qualified professional paleontologist shall be retained to prepare and implement a Paleontological Resource Mitigation Plan for the Proposed Action. The Plan should address the recommended approach to additional specimen collection, the specific locations and intensity of monitoring recommended for each geologic unit, and monitoring intensity. Paleontological monitoring will be required for all ground-disturbing activities within the previously undisturbed Arroyo Diablo Formation, Borrego Formation, Brawley Formation, Lake Cahuilla deposits, and Quaternary older alluvium, which underlies the Project area. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected.

Paleontological Resources	Project Design Feature Description
PDF-PAL-2	All Project personnel and other on-site workers shall receive environmental awareness training on paleontological resources prior to the start or continuation of any elements of the Project that include ground-disturbing activities. The training will be conducted by a qualified, BLM- and DPR-permitted paleontologist and will provide a description of the fossil resources that may be encountered in the Proposed Action area, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist. The training may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.) and may also be videotaped or presented in an informational brochure for future use by field personnel not present at the start of the Project. The workers should be informed that any unlawful collection of paleontological resources may be subject to a misdemeanor, a fine, or both.

Noise	Project Design Feature Description
PDF-NOI-1	All construction equipment shall use noise-reduction features (e.g., mufflers and engine shrouds that are no less effective than those originally installed by the manufacturer.
PDF-NOI-2	All non-essential well drilling equipment and truck deliveries shall be limited to operating during the allowable construction times of between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday
PDF-NOI-3	The portable office and any storage containers used during the well drilling phase shall be placed between the drilling equipment and nearest home, in order to effectively act as a sound wall and provide attenuation to the nearest home

Special Status Vegetation and Wildlife Species	
PDF-BIO-1	A qualified biologist(s) will monitor all construction activities to ensure that standard and special status species-specific avoidance and minimization recommendations are adhered to. The monitor will retain stop work authority in the event there is the likelihood of eminent take of special status species. The biological monitor will conduct a general preconstruction survey no more than 14 days prior to the start of construction to verify that no special status species are in the Proposed Action area or its buffers. The monitor shall also conduct a daily survey in and around work areas before activities start.
PDF-BIO-2	A worker education program will be prepared and presented to all employees working on the Proposed Action in special species habitat. The education program will include identification of target species and their habitats, any project mitigation measures and stipulations, reporting requirements, and penalties for failure of compliance.
PDF-BIO-3	Should construction activities occur between February 15 and August 15, the time period typically referenced in California for the general bird nesting season, preconstruction nesting surveys will be conducted in the Proposed Action area by a qualified biologist within two weeks of the start of construction. If no active bird nests are found within this area, no further mitigation is required. If an active nest is found, a buffer shall be instated around the nest if it belongs to a non-listed or migratory bird. If the nest belongs to a listed or fully-protected species, a larger buffer shall be instated around the nest, at a distance approved prior to construction activities.
PDF-BIO-4	Avoid burrows that may be utilized by special status wildlife species with a minimum buffer of 20-feet from burrows suitable for flat-tailed horned lizard and a minimum buffer of 30-feet from burrows suitable for burrowing owls.
PDF-BIO-5	If flat-tailed horned lizards are observed within the construction area, the qualified biological monitor, with prior approval through project acquired permits or permissions, will relocate the individual out of the construction area, adjacent to where it was moved from.

Special Status Vegetation and Wildlife Species	
PDF-BIO-6	If burrowing owls are observed within the Project area prior to or during construction activities, occupied burrows shall not be disturbed during the owl nesting season, February 1 and August 31. If burrows are found, the appropriate CDFW-recommended buffer, or a buffer deemed appropriate by the qualified biological monitor, shall be instated until occupancy status is determined. If the buffer cannot be maintained during the non-breeding season, owls may be evicted from the burrows using accepted methodology as approved by resource agencies. Eviction will not occur during the breeding season.
PDF-BIO-7	Avoid special status perennial plant species with a minimum buffer of 5 to 10 feet, depending on the root structure and as determined by the biological monitor.
PDF-BIO-8	Access to proposed well sites will be via pre-existing access routes, to the greatest extent possible, and the work area boundaries will be delineated with staking, flagging, or other comparable markings to minimize surface disturbance associated with vehicle straying. Signs and/or fencing will be placed around the Proposed Action area to restrict access to project-related vehicles.
PDF-BIO-9	Project-related equipment will be washed prior to entering the project area for the first time to reduce the chance of transporting noxious weed seeds from outside the area.

Soils	**Project Design Feature Description**
PDF-GEO-1	An erosion control plan will be prepared and approved before grading to adequately control erosion during construction.

Hazards	**Project Design Feature Description**
PDF-HAZ-1	Solid waste materials (trash) will be deposited at an authorized landfill by a disposal contractor. Portable chemical sanitary facilities will be used by all personnel. These facilities will be maintained by a local contractor. Diesel fuel, lubricants, drilling mud and drilling mud additives would be transported to, stored on and used by the Project at the proposed well sites. The Project would conform to federal and state hazardous materials handling requirements.

Hazards	Project Design Feature Description
PDF-HAZ-2	The private airstrip owner within one mile of each proposed exploratory well will be given prior notification of all the drilling operations. Notices to the Federal Aviation Administration (FAA) are also required, and will be delivered, and the drilling rigs will be properly lighted, as required by the FAA, to avoid air traffic hazards.
PDF-HAZ-3	The Project has adopted blowout prevention measures in conformance with BLM and CDOGGR requirements to minimize the potential for a well to "blow out," or flow uncontrollably. Should the well start to flow hot or cold water, the drilling company would use heavier drilling mud or other specialized drilling materials (which would be stored on site) to stop the flow

Mitigation Measures Tables

Air Quality	Mitigation Measure Description
MM-AQ-1	Fugitive dust emissions from roads would be mitigated by periodic watering.
MM-AQ-2	The Operator shall be responsible for dust abatement within the limits of the approved work area and is responsible for obtaining all necessary permits from appropriate authorities for acceptable dust abatement and control methods (e.g., water, chemicals). The Operator shall be solely responsible for all violations of any air quality permit, law or regulation, as a result of its action, inaction, use or occupancy.

Cultural Resources	Mitigation Measure Description
MM-CUL-1	All ground-disturbing work associated with the project will be monitored by a qualified archaeologist who has a current BLM El Centro Fieldwork Authorization. This includes any restoration activities. Monitoring work will be conducted in accordance with a BLM approved monitoring and discovery plan.
MM-CUL-2	Activities that require or result in new surface disturbance that have not been previously surveyed will require BLM review under Section 106 of the National Historic Preservation Act.

Paleontological Resources	Mitigation Measure Description
MM-PAL-1	Should ground-disturbing work associated with the project need to be monitored for paleontological resources, it shall be done by a qualified paleontologist who holds a current BLM El Centro Fieldwork Authorization. This includes any restoration activities. Monitoring work will be conducted in accordance with a BLM approved paleontological monitoring and discovery plan.

Noise	Mitigation Measure Description
MM-NOI-1	Whenever reasonably possible, geothermal well drilling or major facility construction operations proposed within 1,000 feet of the OWSVRA boundary would be restricted to non-sleeping hours (7:00 am to 10:00 pm), or appropriate, reasonable methods would be employed to limit the hourly average noise levels at the OWSVRA to 60 dBA or below. If this is not reasonably possible, the geothermal lessee would provide at least a one-month notice to the OWSVRA manager of the date scheduled and location of the proposed operation so the California Department of Parks and Recreation can provide and post notice within the OWSVRA of the proposed activity. For unscheduled (emergency) operations, the geothermal lessee would immediately contact the OWSVRA manager so the California Department of Parks and Recreation can provide appropriate notice to the adjacent OWSVRA users.

Water Resources	Mitigation Measure Description
MM-WTR-1	Before on-site grading, an erosion control plan would be prepared by an erosion control specialist certified by the International Erosion Control Society to adequately control erosion during construction.
MM-WTR-2	All graded pads would have drainage swales to direct stormwater runoff or irrigation runoff away from structures or the tops of slopes to control drainage facilities. No stormwater would be allowed to discharge over the top of cut or fill slopes.
MM-WTR-3	Proposed geothermal exploration and development would comply with the Clean Water Act as implemented by the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, a general permit for construction activities, and the associated Order No. 92-08-DWQ, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity. Projects of 1 acre or more are subject to this general construction permit process.

Water Resources	Mitigation Measure Description
MM-WTR-4	The Operator is required to eliminate or reduce non-stormwater discharges to stormwater systems, develop a Stormwater Pollution Prevention Plan (SWPPP) prior to beginning construction, inspect all stormwater control structures, and implement other pollution prevention measures, such as applicable BMPs and conservation measures during construction. • The SWPPP would include the specific measures and techniques for implementation to protect the project sites and adjacent areas from erosion and deposition during site grading, construction, and post-construction stabilization of sediment on the site. • The contractor would provide a copy of the SWPPP for the various crews performing work on the construction site, and a copy would be kept on-site during the project to satisfy the requirements of the NPDES permit. A draft of this SWPPP would be forwarded to the BLM for review prior to its finalization.
MM-WTR-5	The 100-year floodplain boundaries for any surface water feature in the vicinity of the project will be identified. If maps are not available from the Federal Emergency Management Agency (FEMA), these boundaries will be determined via hydrologic modeling and analysis as part of the environmental review process. Construction within, or alteration of, 100-year floodplains will be avoided where possible, and permitted only when all required permits from other agencies are obtained.
MM-WTR-6	Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.

Recreation	Mitigation Measure Description
MM-REC-1	Any necessary temporary route closures for construction would be coordinated with BLM and OWSVRA before beginning construction.
MM-REC-2	Signs and/or flagging that advise recreational users of construction activities would be posted in coordination with BLM and OWSVRA. Whenever active work is being performed, the area should be posted with “construction ahead” signs on any adjacent access roads or trails that might be affected.

Recreation	Mitigation Measure Description
MM-REC-3	Construction-related traffic would be restricted to routes approved by the authorized agency(ies). Construction of new access roads or cross-country vehicle travel would not be permitted unless prior written approval is given by the authorized officer. Authorized roads used by the proposed action will be rehabilitated when construction activities are complete. The agency(ies) would work with the proponent to develop site-specific standards for route reconstruction.
MM-REC-4	Signs directing vehicles to alternative park access and parking would be posted in the event construction temporarily obstructs parking areas near trailheads.
MM-TRA-1	The Operator would be required to file a traffic control plan indicating how and where construction traffic would be routed and traffic control measures would be emplaced to ensure accidents do not occur.

Soils	Mitigation Measure Description
MM-SOI-1	A detailed geotechnical analysis would be performed prior to the construction of any structures so they could be sited to avoid any hazards from subsidence or liquefaction (i.e., the changing of a saturated soil from a relatively stable solid state to a liquid during earthquakes or nearby blasting).
MM-SOI-2	Standard soil and geotechnical engineering investigations would be conducted to ensure foundation stability.
MM-SOI-3	Grading would be performed so all identified compressible materials would be removed and recompacted, and fill soils would be placed and compacted to at least 90 percent relative compaction.

Special Status Vegetation and Wildlife Species	Mitigation Measure Description
MM-BIO-1	The Operator shall be required to restore disturbed areas in a manner that would assist re-establishment of biological values. The Operator shall develop a project-specific habitat restoration plan for BLM approval. The plan shall consider and include as appropriate the following methods: replacement of topsoil, seedbed preparation, fertilization, seeding of species native to the project area, noxious weed control, and additional erosion control.

Special Status Vegetation and Wildlife Species	Mitigation Measure Description
MM-BIO-2	The Operator shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with environmental stipulations, migratory bird pre-construction surveys, and for coordination on compliance with the BLM. The FCR must be on-site during all project activities. The FCR shall have the authority to halt all project activities that are in violation of the stipulations. The FCR shall have a copy of all stipulations when work is being conducted on the site. The FCR may be a crew chief or field supervisor, a project manager, any other employee of the Operator, or a contracted biologist.

Special Status Vegetation and Wildlife Species	**Mitigation Measure Description**

MM-BIO-3	A biological monitor, approved by the BLM, shall be present in each area of active surface disturbance throughout the work day during implementation of the Project. The monitor(s) shall perform the following functions:
	• Share biological information as part of a Worker Environmental Education Program. The education program shall include the following aspects at a minimum:
	  • biology and status of the Flat-tailed Horned Lizard,
	  • protection measures designed to reduce potential impacts to the species, as well as other species that may be present in the project areas
	  • function of flagging and designating authorized work areas,
	  • reporting procedures to be used if a Flat-tailed Horned Lizard is encountered in the field, and
	  • importance of exercising care when commuting to and from the project area to reduce mortality of Flat-tailed Horned Lizards on roads.
	• Ensure that all project-related activities comply with these measures. The biological monitor shall have the authority and responsibility to halt activities that are in violation of these terms and conditions.
	• Work with the project supervisor to take steps, as necessary, to avoid disturbance to Flat-tailed Horned Lizards and their habitat. If avoiding disturbance to Flat-tailed Horned Lizard is not possible or if a Flat-tailed Horned Lizard is found trapped in an excavation, the affected lizard shall be captured by hand and relocated.
	• If burrowing owls are encountered, the biological monitor will ensure avoidance of occupied burrows and establishment of the 656 feet (200 meter) setback to sufficiently minimize disturbance during the nesting period on all activity sites, when practical.
	• Submit a monitoring report to the BLM at the conclusion of the project.

Special Status Vegetation and Wildlife Species	**Mitigation Measure Description**
MM-BIO-4	The Operator or its agents shall be prohibited from collecting plants and wildlife.
MM-BIO-5	If any wildlife is encountered during the course of project activities, said wildlife shall be allowed to freely leave the area unharmed or moved out of harm's way.
MM-BIO-6	All potential pitfalls to wildlife will be covered or backfilled when not attended. Topsoil shall be conserved during excavation activities and reused as backfill following activities.
MM-BIO-7	The Operator or its agents shall preserve existing vegetation to the extent practicable. Precautions shall be taken to avoid damage to vegetation by people or equipment. Creosote bush rings larger than 5 meters in diameter (longest diameter if the "ring" forms an ellipse rather than a circle) shall be avoided.
MM-BIO-8	To prevent the introduction of noxious weeds or new invasive weedy plant species into the project area, the Operator shall require the following: • Thoroughly clean the tires and undercarriage of all vehicles entering or reentering the project site to remove potential weeds. • Store project vehicles on site in designated areas to minimize the need for multiple washings whenever vehicles re-enter the project site. • Monitor and quickly implement control measures to ensure early detection and eradication of weed invasions. • Maintain a log of the vehicle cleaning schedule.
MM-BIO-9	Domestic pets are prohibited on site. This prohibition does not apply to the use of domestic animals that may be used to aid in official and approved monitoring procedures/protocols, or service animals under Titles II and III of the Americans with Disabilities Act.
MM-BIO-10	Long-term nighttime lighting on project features will be limited to the minimum necessary for project security, safety, and compliance with Federal Aviation Administration requirements and will avoid the use of constant-burn lighting. Security lighting for on-ground facilities, equipment and infrastructure should be motion or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird and wildlife attraction and eliminate constant nighttime illumination, but still allow safe nighttime access to the site.
MM-BIO-11	The Operator shall limit its vehicular traffic within all areas of the approved Project to a maximum speed of 15 miles per hour. Any wildlife encountered on the roads shall be avoided by drivers (i.e. driver will maneuver around it, stop and let it pass).

Special Status Vegetation and Wildlife Species	**Mitigation Measure Description**
MM-BIO-12	All trash and food items shall be promptly contained within closed, raven-proof containers. These shall be regularly removed from the project site to reduce the attractiveness of the area to ravens and other predators. Feeding of wildlife and/or leaving of food or trash as an attractive nuisance to wildlife is prohibited. Particular attention will be paid to "micro-trash" (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny). All trash and food items shall be promptly contained within closed, wildlife-proof containers. These shall be regularly removed from the project site to reduce the attractiveness of the area to ravens and other predators.
MM-BIO-13	The permittee shall limit the area of disturbance of vegetation and soils to the minimum required for the project. Clearing of vegetation and grading shall be minimized. Wherever possible, rather than clearing vegetation and grading well pads and new access roads, equipment and vehicles shall use existing surfaces or previously disturbed areas. Where grading is necessary, surface soils shall be stockpiled and replaced following construction to facilitate habitat restoration. To the extent possible, disturbance of shrubs and surface soils due to stockpiling shall be minimized.
MM-BIO-14	To mitigate for loss of FTHL habitat outside of a designated FTHL Management Area, the permittee shall provide compensation at a 1:1 ratio. A final acreage amount of both temporary and permanent disturbances will be calculated based on the final approved geothermal drilling permit and Project Description. Compensation is required in accordance with the FTHL Rangewide Management Strategy (2003).
Visual Resources	
MM-VIS-1	All facilities, including geothermal production and injection pipelines, wellheads, powerplants, maintenance buildings, etc. would be painted a color that blends into the natural setting.

Appendix D: Applicable DRECP Conservation and Management Actions Table

Appendix D – Applicable DRECP Conservation and Management Actions (CMA) Table

Land Use Plan Amendment (LUPA) Wide

Category	CMA #	CMA Text	Applicability	Comments
Biological Resources	**LUPA-BIO-1**	Conduct a habitat assessment (see Glossary of Terms) of Focus and BLM Special Status Species' suitable habitat for all activities and identify and/or delineate the DRECP vegetation types, rare alliances, and special features (e.g., Aeolian sand transport resources, Joshua tree, microphyll woodlands, carbon sequestration characteristics, seeps, climate refugia) present using the most current information, data sources, and tools (e.g., DRECP land cover mapping, aerial photos, DRECP species models, and reconnaissance site visits) to identify suitable habitat (see Glossary of Terms) for Focus and BLM Special Status Species. If required by the relevant species specific CMAs, conduct any subsequent protocol or adequate presence/absence surveys to identify species occupancy status and a more detailed mapping of suitable habitat to inform siting and design considerations. If required by relevant species specific CMAs, conduct analysis of percentage of impacts to suitable habitat and modeled suitable habitat.	Yes	Consistent. A Biological Resources Evaluation Report was prepared for the Proposed Project, which included an assessment of habitat communities and sensitive species on site.
		BLM will not require protocol surveys in sites determined by the designated biologist to be unviable for occupancy of the species, or if baseline studies inferred absence during the current or previous active season.	Yes	Consistent. Pedestrian surveys and desktop review determined species potentially present within Proposed Action area. Only pre-construction surveys for special status species that were observed during pedestrian surveys would be required.
	LUPA-BIO-2	Designated biologist(s) (see Glossary of Terms), will conduct, and oversee where appropriate, activity-specific required biological monitoring during pre-construction, construction, and decommissioning to ensure that avoidance and minimization measures are appropriately implemented and are effective. The appropriate required monitoring will be determined during the environmental analysis and BLM approval process. The designated biologist(s) will submit monitoring reports directly to BLM.	Yes	Consistent. The Proposed Action will comply with this CMA for biological monitoring.

Category	CMA #	CMA Text	Applicability	Comments
Resource Setback Standards	**LUPA-BIO-3**	Resource setbacks (see Glossary of Terms) have been identified to avoid and minimize the adverse effects to specific biological resources. Setbacks are not considered additive and are measured as specified in the applicable CMA. Allowable minor incursions (see Glossary of Terms), as per specific CMAs do not affect the following setback measurement descriptions. Generally, setbacks (which range in distances for different biological resources) for the appropriate resources are measured from:	Yes	Consistent. The Proposed Action will be conducted in a manner that disturbance is minimal.
		The edge of each of the DRECP desert vegetation types, including but not limited to those in the riparian or wetland vegetation groups (as defined by alliances within the vegetation type descriptions and mapped based on the vegetation type habitat assessments described in LUPA-BIO-1).	Yes	Consistent. The Proposed Action will be conducted in a manner that disturbance is minimal.
		The edge of the mapped riparian vegetation or the Federal Emergency Management Agency (FEMA) 100-year floodplain, whichever is greater, for the Mojave River.	Yes	Consistent. Impact minimization measures would be implemented in agreeance with this CMA.
		The edge of the vegetation extent for specified Focus and BLM sensitive plant species.	Yes	Consistent. The Proposed Action will be conducted in a manner that sensitive plant species shall be avoided and impact minimizations implemented.
		The edge of suitable habitat or active nest substrates for the appropriate Focus and BLM Special Status Species.	Yes	Consistent. The Proposed Action will be conducted in a manner that sensitive species shall be avoided and impact minimizations implemented.
Seasonal Restrictions	**LUPA-BIO-4**	For activities that may impact Focus and BLM Special Status Species, implement all required species-specific seasonal restrictions on pre-construction, construction, operations, and decommissioning activities.	Yes	Consistent. The Proposed Action will be monitored during designated seasons and impact minimization measures would be implemented to avoid impacts to species.
		Species-specific seasonal restriction dates are described in the applicable CMAs.	Yes	Consistent. The Proposed Action will be monitored during designated seasons and impact minimization measures would be implemented to avoid impacts to species.

Category	CMA #	CMA Text	Applicability	Comments
		Alternatively, to avoid a seasonal restriction associated with visual disturbance, installation of a visual barrier may be evaluated on a case-by-case basis that will result in the breeding, nesting, lambing, fawning, or roosting species not being affected by visual disturbance from construction activities subject to seasonal restriction. The proposed installation and use of a visual barrier to avoid a species seasonal restriction will be analyzed in the activity/project specific environmental analysis.	Yes	Consistent. The Proposed Action will be monitored during designated seasons and impact minimization measures would be implemented to avoid impacts to species.
Worker Education	**LUPA-BIO-5**	All activities, as determined appropriate on an activity-by-activity basis, will implement a worker education program that meets the approval of the BLM. The program will be carried out during all phases of the project (site mobilization, ground disturbance, grading, construction, operation, closure/decommissioning or project abandonment, and restoration/reclamation activities). The worker education program will provide interpretation for non-English speaking workers, and provide the same instruction for new workers prior to their working on site. As appropriate based on the activity, the program will contain information about:	Yes	Consistent. The Proposed Action will include worker training/education programs pursuant to this CMA.
		Site-specific biological and nonbiological resources.	Yes	Consistent. The training/education programs would provide this information.
		Information on the legal protection for protected resources and penalties for violation of federal and state laws and administrative sanctions for failure to comply with LUPA CMA requirements intended to protect site-specific biological and nonbiological resources.	Yes	Consistent. The training/education programs would provide this information.
		The required LUPA and project-specific measures for avoiding and minimizing effects during all project phases, including but not limited to resource setbacks, trash, speed limits, etc.	Yes	Consistent. The training/education programs would provide this information.
		Reporting requirements and measures to follow if protected resources are encountered, including potential work stoppage and requirements for notification of the designated biologist.	Yes	Consistent. The training/education programs would provide this information.
		·Measures that personnel can take to promote the conservation of biological and nonbiological resources.	Yes	Consistent. The training/education programs would provide this information.

Category	CMA #	CMA Text	Applicability	Comments
Subsidized Predators Standards	**LUPA-BIO-6**	Subsidized predator standards, approved by BLM, in coordination with the USFWS and CDFW, will be implemented during all appropriate phases of activities, including but not limited to renewable energy activities, to manage predator food subsidies, water subsidies, and breeding sites including the following:	Yes	Consistent. The Proposed Action would implement BLM predator standards as applicable.
		Common Raven management actions will be implemented for all activities to address food and water subsidies and roosting and nesting sites specific to the Common Raven. These include identification of monitoring reporting procedures and requirements; strategies for refuse management; as well as design strategies and passive repellant methods to avoid providing perches, nesting sites, and roosting sites for Common Ravens.	Yes	Consistent. The Proposed Action would implement BLM predator standards as applicable.
		The application of water and/or other palliatives for dust abatement in construction areas and during project operations and maintenance will be done with the minimum amount of water necessary to meet safety and air quality standards and in a manner that prevents the formation of puddles, which could attract wildlife and wildlife predators.	Yes	Consistent. The Proposed Action will include dust abatement procedures for dust management in a manner which would prevent formation of puddles.
		Following the most recent national policy and guidance, BLM will take actions to not introduce, dispose of, or release any non- native species into areas of native habitat, suitable habitat, and natural or artificial waterways/water bodies containing native species.	Yes	Consistent. Best management practices and mitigations would be implemented to limit the introduction of non native species.
		All activity work areas will be kept free of trash and debris. Particular attention will be paid to “micro-trash” (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny) and organic waste that may subsidize predators. All trash will be covered, kept in closed containers, or otherwise removed from the project site at the end of each day or at regular intervals prior to periods when workers are not present at the site.	Yes	Consistent. The Proposed Action includes measures to prevent littering and the introduction of biodegradable and non-biodegradable debris in the area.

Category	CMA #	CMA Text	Applicability	Comments
		In addition to implementing the measures above on activity sites, each activity will provide compensatory mitigation that contributes to LUPA-wide raven management.	Yes	Consistent. The Proposed Action would implement M-BIO-13 which would reduce impacts to ravens. Additionally, the Proposed Action includes implementation of PDF-BIO-1, PDF-BIO-2, and PDF-BIO-3 to reduce impacts to species found on-site, including the raven. Implementaiton of these measures would reduce impacts to ravens potentially impacts by the Proposed Action.
Restoration of Areas Disturbed by Construction Activities But Not Converted by Long-Term Disturbance	**LUPA-BIO-7**	Where DRECP vegetation types or Focus or BLM Special Status Species habitats may be affected by ground- disturbance and/or vegetation removal during pre-construction, construction, operations, and decommissioning related activities but are not converted by long-term (i.e., more than two years of disturbance, see Glossary of Terms) ground disturbance, restore these areas following the standards, approved by BLM authorized officer, following the most recent BLM policies and procedures for the vegetation community or species habitat disturbance/impacts as appropriate, summarized below:	Yes	
		Implement site-specific habitat restoration actions for the areas affected including specifying and using:	Yes	
		The appropriate seed (e.g., certified weed- free, native, and locally and genetically appropriate seed)	Yes	Consistent. If seed is used it will follow this requirement.
		Appropriate soils (e.g., topsoil of the same original type on site or that was previously stored by soil type after being salvaged during excavation and construction activities)	Yes	Consistent. Soils removed during excavation and grading would be reused for backfill and restorative uses on-site, as practicable.
		Equipment	Yes	Consistent. Equipment used would be consistent with BLM standards.
		Timing (e.g., appropriate season, sufficient rainfall)	Yes	Consistent. The Proposed Action would occur in the appropriate season with respect to species considerations.

Category	CMA #	CMA Text	Applicability	Comments
		Location	Yes	Consistent. Location would be specified for habitat restoration.
		Success criteria	Yes	Consistent. Success criteria would be specified for habitat restoration by the surface managing agency.
		Monitoring measures	Yes	Consistent. Monitoring would be conducted in accordance with requirements set by the surface managing agency.
		Contingency measures, relevant for restoration, which includes seeding that follows BLM policy when on BLM administered lands.	Yes	Consistent.Appropriate contingency measures will be applied in consultation with BLM.
		Salvage and relocate cactus, nolina, and yucca from the site prior to disturbance using BLM protocols. To the maximum extent practicable for short-term disturbed areas (see Glossary of Terms), the cactus and yucca will be re-planted back to the original site.	Yes	Consistent. Cactus will be salvaged to the extent practicable for short term disturbed areas.
		Restore and reclaim short-term (i.e. 2 years or less, see Glossary of Terms) disturbed areas, including pipelines, transmission projects, staging areas, and short-term construction-related roads immediately or during the most biologically appropriate season as determined in the activity/project specific environmental analysis and decision, following completion of construction activities to reduce the amount of habitat converted at any one time and promote recovery to natural habitats and vegetation as well as climate refugia and ecosystem services such carbon storage.	Yes	Consistent. The Proposed Action involves regrading and revegetation in conformance with requirements set by the surface managing agency.
General Closure and Decommissioning Standards	**LUPA-BIO-8**	All activities that are required to close and decommission the site (e.g., renewable energy activities) will specify and implement project-specific closure and decommissioning actions that meet the approval of BLM, and that at a minimum address the following:	Yes	Consistent. BLM protocols will be used to decommission the site, per the Abandoment Program outlined in Section 1.1.8 of Chapter 2 of the Environmental Assessment.
		Specifying and implementing the methods, timing (e.g., criteria for triggering closure and decommissioning actions), and criteria for success (including quantifiable and measurable criteria).	Yes	Consistent. BLM protocols will be used to decommission the site, per the Abandoment Program outlined in Section 1.1.8 of Chapter 2 of the Environmental Assessment.

Category	CMA #	CMA Text	Applicability	Comments
		Recontouring of areas that were substantially altered from their original contour or gradient and installing erosion control measures in disturbed areas where potential for erosion exists.	Yes	Consistent. The Proposed Action involves regrading and revegetation in conformance with requirements set by the surface managing agency.
		Restoring vegetation as well as soil profiles and functions that will support and maintain native plant communities, associated carbon sequestration and nutrient cycling processes, and native wildlife species.	Yes	Consistent. The Proposed Action involves regrading and revegetation in conformance with requirements set by the surface managing agency.
		Vegetation restoration actions will identify and use native vegetation composition, native seed composition, and the diversity to values commensurate with the natural ecological setting and climate projections.	Yes	Consistent. The Proposed Action involves regrading and revegetation in conformance with requirements set by the surface managing agency.
Water and Wetland Dependent Species Resources	**LUPA-BIO-9**	Implement the following general LUPA CMA for water and wetland dependent resources Implement construction site standard practices to prevent toxic chemicals, hazardous materials, and other fluids from entering vegetation type streams, washes, and tributary networks through water runoff, erosion, and sediment transport by, at a minimum, implementing the following:	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which identifies BMPsto reduce impacts.
		On project sites, vehicles and other equipment will be maintained in proper working condition and only stored in designated containment areas where runoff is collected or controlled and that are located outside of streams, washes, and distributary networks to minimize accidental fluids and hazardous materials spills.	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes BMPs to maintain equipment, minimize spills, and provide proper containment procedures in the event of a spill.
		Hazardous material leaks, spills, or releases will be immediately cleaned and equipment will be repaired upon identification. Removal and disposal of spill and related clean-up materials will occur at an approved off-site landfill.	Yes	Consistent. The Proposed Action includes BMPs for storage, handling, and clean up of hazardous materials.
		Maintenance and operations vehicles will carry the appropriate equipment and materials to isolate, clean up, and repair any hazardous material leaks, spills, or releases.	Yes	Consistent. The Proposed Action includes BMPs for storage, handling, and clean up of hazardous materials.

Category	CMA #	CMA Text	Applicability	Comments
		Activity-specific drainage, erosion, and sedimentation control actions, which meet the approval of BLM and the applicable regulatory agencies, will be carried out during all appropriate phases of the approved project. These actions, as needed, will address measures to ensure the proper protection of water quality, site-specific stormwater and sediment retention, and design of the project to minimize site disturbance, including the following:	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes BMPs to reduce any impacts associated with stormwater or runoff.
		Identify site-specific surface water runoff patterns and implement measures to prevent excessive and unnatural soil deposition and erosion.	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes BMPs to reduce any impacts associated with soil depletion and erosion.
		Implement measures to maintain natural drainages and to maintain hydrologic function in the event drainages are disturbed.	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes BMPs to reduce any impacts to hydrologic function.
		Reduce the amount of area covered by impervious surfaces through use of permeable pavement or other pervious surfaces. Direct runoff from impervious surfaces into retention basins.	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes BMPs to reduce any impacts associatedwith impervious surfaces.
		Stabilize disturbed areas following grading in the manner appropriate to the soil type so that wind or water erosion is minimized.	Yes	Consistent. The Proposed Action includes BMPs to reduce any impacts associatedstormwater or runoff.
		Conduct regular inspections and maintenance of long-term erosion control measures to ensure long-term effectiveness.	Yes	Consistent. The Proposed Action requires preparation of a SWPPP, which includes lpng-term erosion control measures.
		The use of evaporation ponds for water management will be avoided when the water could harm birds or other terrestrial wildlife due to constituents of concern present in the wastewater (e.g., selenium, hypersalinity, etc.). Evaporation ponds will be configured to minimize attractiveness to shorebirds (e.g., maintain water depths over two feet; maintain steep slopes along edge; enclose evaporation ponds in long-term structures; or obscure evaporation ponds from view using materials that blend in with the natural surroundings).	Yes	Consistent. This will be required.

Category	CMA #	CMA Text	Applicability	Comments
		Ramps that allow the egress of wildlife from ponds or other water management infrastructure will be installed.	Yes	Consistent. This will be required.
Standard Practices for Weed Management	**LUPA-BIO-10**	Consistent with BLM state and national policies and guidance, integrated weed management actions, will be carried out during all phases of activities, as appropriate, and at a minimum will include the following:	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Thoroughly clean the tires and undercarriage of vehicles entering or reentering the project site to remove potential weeds.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Store project vehicles on site in designated areas to minimize the need for multiple washings whenever vehicles re-enter the project site.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Properly maintain vehicle wash and inspection stations to minimize the introduction of invasive weeds or subsidy of invasive weeds.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Closely monitor the types of materials brought onto the site to avoid the introduction of invasive weeds and non-native species.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Reestablish native vegetation quickly on disturbed sites.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Monitor and quickly implement control measures to ensure early detection and eradication of weed invasions to avoid the spread of invasive weeds and non-native species on site and to adjacent off-site areas.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
		Use certified weed-free mulch, straw, hay bales, or equivalent fabricated materials for installing sediment barriers.	Yes	Consistent. The Proposed Action will include standard practices for weed management.
Nuisance Animals and Invasive Species	**LUPA-BIO-11**	Implement the following CMAs for controlling nuisance animals and invasive species:	Yes	Consistent. The Proposed Action will implement measures for controlling nuisance animals and invasive species.
		No fumigant, treated bait, or other means of poisoning nuisance animals including rodenticides will be used in areas where Focus and BLM Special Status Species are known or suspected to occur.	Yes	Consistent however, the Proposed Action does not include baiting or poisoning nuisance animals.

Category	CMA #	CMA Text	Applicability	Comments
		Manage the use of widely spread herbicides and do not apply herbicides effective against dicotyledonous plants within 1,000 feet from the edge of a 100-year floodplain, stream and wash channels, and riparian vegetation or to soils less than 25 feet from the edge of drains. Exceptions will be made when targeting the base and roots of invasive riparian species such as tamarisk and Arundo donax (giant reed). Manage herbicides consistent with the most current national and California BLM policies.	Yes	Consistent, however the Proposed Action does not include the use of herbicides.
Noise	**LUPA-BIO-12**	For activities that may impact Focus or BLM Special Status Species**,** implement the following LUPA CMA for noise:	Yes	
		To the extent feasible, and determined necessary by BLM to protect Focus and BLM sensitive wildlife species, locate stationary noise sources that exceed background ambient noise levels away from known or likely locations of and BLM sensitive wildlife species and their suitable habitat.	Yes	Consistent. The Proposed Action requires measures to protect Focus and BLM sensitive species from excessive noise.
		Implement engineering controls on stationary equipment, buildings, and work areas including sound-insulation and noise enclosures to reduce the average noise level, if the activity will contribute to noise levels above existing background ambient levels.	Yes	Consistent. The Proposed Action requires measures to protect Focus and BLM sensitive species from excessive noise.
		Use noise controls on standard construction equipment including mufflers to reduce noise	Yes	Consistent. The Proposed Action requires measures to protect Focus and BLM sensitive species from excessive noise.
General Siting and Design	**LUPA-BIO-13**	Implement the following CMA for project siting and design	Yes	
		To the maximum extent practicable site and design projects to avoid impacts to vegetation types, unique plant assemblages, climate refugia as well as occupied habitat and suitable habitat for Focus and BLM Special Status Species (see “avoid to the maximum extent practicable” in Glossary of Terms).	Yes	Consistent. The Proposed Action includes measures to avoid impacts to Focus and BLM sensitive species, as outlined in Chapter 2 of the EA.
		Delineate the boundaries of areas to be disturbed using temporary construction fencing and flagging prior to construction and confine disturbances, project vehicles, and equipment to the delineated project areas to protect vegetation types and focus and BLM Special Status Species.	Yes	Consistent. Fence and boundary installations will be implemented in compliance with the CMA.

Category	CMA #	CMA Text	Applicability	Comments
		Long-term nighttime lighting on project features will be limited to the minimum necessary for project security, safety, and compliance with Federal Aviation Administration requirements and will avoid the use of constant-burn lighting.	Yes	Consistent. Nighttime lighting will be limited to the minimum necessary and the Proposed Action will avoid the use of constant-burn lighting in compliance with the CMA.
		All long-term nighttime lighting will be directed away from riparian and wetland vegetation, occupied habitat, and suitable habitat areas for Focus and BLM Special Status Species. Long- term nighttime lighting will be directed and shielded downward to avoid interference with the navigation of night-migrating birds and to minimize the attraction of insects as well as insectivorous birds and bats to project infrastructure.	Yes	Consistent. Nighttime lighting will be limited to the minimum necessary and the Proposed Action will avoid the use of constant-burn lighting in compliance with the CMA.
		To the maximum extent practicable (see Glossary of Terms), restrict construction activity to existing roads, routes, and utility corridors to minimize the number and length/size of new roads, routes, disturbance, laydown, and borrow areas.	Yes	Consistent. Access road construction activities would comply with this CMA.
		To the maximum extent practicable (see Glossary of Terms), confine vehicular traffic to designated open routes of travel to and from the project site, and prohibit, within project boundaries, cross- country vehicle and equipment use outside of approved designated work areas to prevent unnecessary ground and vegetation disturbance.	Yes	Consistent. Access road construction activities would comply with this CMA.
		To the maximum extent practicable(see Glossary of Terms) , construction of new roads and/or routes will be avoided within Focus and BLM Special Status Species suitable habitat within identified linkages for those Focus and BLM Special Status Species, unless the new road and/or route is beneficial to minimize net impacts to natural or ecological resources of concern. These areas will have a goal of “no net gain” of project roads and/or routes	Yes	Consistent. Access road construction activities would comply with this CMA.
		To the maximum extent practicable (see Glossary of Terms), any new road and/or route considered within Focus and BLM Special Status Species suitable habitat within identified linkages for those Focus and BLM Special Status Species will not be paved so as not to negatively affect the function of identified linkages.	Yes	Consistent. Access road construction activities would comply with this CMA.
		Use nontoxic road sealants and soil stabilizing agents.	Yes	Consistent. Access road construction activities would comply with this CMA.

Category	CMA #	CMA Text	Applicability	Comments
Biology: General Standard Practices	**LUPA-BIO-14**	Implement the following general standard practices to protect Focus and BLM Special Status Species:	Yes	
		Feeding of wildlife, leaving of food or trash as an attractive nuisance to wildlife, collection of native plants, or harassing of wildlife on a site is prohibited.	Yes	Consistent. The Proposed Action will implement measures to limit these activities.
		Any wildlife encountered during the course of an activity, including construction, operation, and decommissioning will be allowed to leave the area unharmed.	Yes	Consistent. The Proposed Action will implement measures to limit these activities.
		Domestic pets are prohibited on sites. This prohibition does not apply to the use of domestic animals (e.g., dogs) that may be used to aid in official and approved monitoring procedures/protocols, or service animals (dogs) under Title II and Title III of the American with Disabilities Act.	Yes	Consistent. No pets will be allowed.
		All construction materials will be visually checked for the presence of wildlife prior to their movement or use. Any wildlife encountered during the course of these inspections will be allowed to leave the construction area unharmed.	Yes	Consistent. The Proposed Action will implement measures to limit these activities.
		All steep-walled trenches or excavations used during the project will be covered, except when being actively used, to prevent entrapment of wildlife. If trenches cannot be covered, they will be constructed with escape ramps, following up-to-date design standards to facilitate and allow wildlife to exit, or wildlife exclusion fencing will be installed around the trench(s) or excavation(s). Open trenches or other excavations will be inspected by a designated biologist immediately before backfilling, excavation, or other earthwork.	Yes	Consistent. All open trenches associated with construction of the geothermal exploration wells would be covered when not actively used.
		Minimize natural vegetation removal through implementation of crush and drive or cut or mow vegetation rather than removing entirely.	Yes	Consistent. The Proposed Action has been designed to minimize the disturbance to the natural environment. Following well drilling, a revegetation plan will be implemented to revegetate areas.
	LUPA-BIO-15	Use state-of-the-art, as approved by BLM, construction and installation techniques, appropriate for the specific activity/project and site, that minimize new site disturbance, soil erosion and deposition, soil compaction, disturbance to topography, and removal of vegetation.	Yes	Consistent. The Proposed Action will conduct BLM approved measures.

Category	CMA #	CMA Text	Applicability	Comments
Activity-Specific Bird and Bat CMAs	**LUPA-BIO-16**	For activities that may impact Focus and BLM sensitive birds, protected by the ESA and/or Migratory Bird Treaty Act of 1918, and bat species, implement appropriate measures as per the most up-to-date BLM state and national policy and guidance, and data on birds and bats, including but not limited to activity specific plans and actions. The goal of the activity -specific bird and bat actions is to avoid and minimize direct mortality of birds and bats from the construction, operation, maintenance, and decommissioning of the specific activities.	Yes	
		Activity-specific measures to avoid and minimize impacts may include, but are not limited to:	Yes	
		Siting and designing activities will avoid high bird and bat movement areas that separate birds and bats from their common nesting and roosting sites, feeding areas, or lakes and rivers.	Yes	Consistent. The Proposed Action will implement avoidance and minimization measures as needed.
		For activities that impact bird and bat Focus and BLM Special Status Species, during project siting and design, conducting monitoring of bird and bat presence as well as bird and bat use of the project site using the most current survey methods and best procedures available at the time.	Yes	Consistent. The Proposed Action will implement avoidance and minimization measures as needed.
		When fencing is necessary, use bird and bat compatible design standards.	Yes	Consistent. Avoidance measures will be implement to avoid adverse effects during signage and fencing installations.
		Using lighting that does not attract birds and bats or their prey to project sites including using non-steady burning lights (red, dual red and white strobe, strobe- like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen).	Yes	Consistent. The Proposed Action will uselighting in compliance with the CMA.
		Implementing a robust monitoring program to regularly check for wildlife carcasses, document the cause of mortality, and promptly remove the carcasses.	Yes	Consistent. Monitoring will be conducted consistent with this CMA.
		·Incorporating a bird and bat use and mortality monitoring program during operations using current protocols and best procedures available at time of monitoring	Yes	Consistent. Monitoring will be conducted consistent with this CMA.

Category	CMA #	CMA Text	Applicability	Comments
i	**LUPA-BIO-PLANT-2**	Implement an avoidance setback of 0.25 mile for all Focus and BLM Special Status Species occurrences. Setbacks will be placed strategically adjacent to occurrences to protect ecological processes necessary to support the plant Species (see Appendix Q, Baseline Biology Report, in the Proposed LUPA and Final EIS [2015], or the most recent data and modeling).	Yes	Consistent. Avoidance measures will be implemented to minimize impacts to ecological processes.
	LUPA-BIO-PLANT-3	Impacts to suitable habitat for Focus and BLM Special Status plant species should be avoided to the extent feasible, and are limited [capped] to a maximum of 1% of their suitable habitat throughout the entire LUPA Decision Area. The baseline condition for measuring suitable habitat is the DRECP modeled suitable habitat for these species utilized in the EIS analysis (2014 and 2015), or the most recent suitable habitat modeling.	Yes	Consistent. Avoidance measures will be implemented to minimize impacts to existing habitats.
Special Vegetation Features (SVF)	**LUPA-BIO-SVF-3**	Creosote bush rings (see Glossary of Terms) larger than 5 meters in diameter (longest diameter if the "ring" forms an ellipse rather than a circle) shall be avoided.	Yes	Consistent. Avoidance measures will be implemented to minimize impacts to special vegetation features.
General Vegetation Management (VEG)	**LUPA-BIO-VEG-1**	Management of cactus, yucca, and other succulents will adhere to current up-to-date BLM policy.	Yes	Consistent. The Proposed Action will comply with BLM policy for vegetation management.
	LUPA-BIO-VEG-5	All activities will follow applicable BLM state and national regulations and policies for salvage and transplant of cactus, yucca, other succulents, and BLM Sensitive plants.	Yes	Consistent. The Proposed Action will comply with BLM policy for vegetation management.
Flat-Tailed Horned Lizard	**LUPA-BIO-IFS-10**	Comply with the conservation goals and objectives, criteria, and management planning actions identified in the most recent revision of the Flat-tailed Horned Lizard Rangewide Management Strategy (RMS). Activities will include appropriate design features using the most current information from the RMS and RMS Interagency Coordinating Committee to minimize adverse impacts during siting, design, pre-construction, construction, operation, and decommissioning; ensure that current or potential linkages and habitat quality are maintained; reduce mortality; minimize other adverse impacts during operation; and ensure that activities have a neutral or positive effect on the species.	Yes	Consistent. The Proposed Action will comply with appilcable RMS for Flat-Tailed Horned Lizard. Flat-Tailed Hornde Lizard burrows will be avoided and any observed will be reolcated outside the construction area.

Category	CMA #	CMA Text	Applicability	Comments
Burrowing Owl	**LUPA-BIO-IFS-12**	If burrowing owls are present, a designated biologist (see Glossary of Terms) will conduct appropriate activity-specific biological monitoring (see Glossary of Terms) to ensure avoidance of occupied burrows and establishment of the 656 feet (200 meter) setback to sufficiently minimize disturbance during the nesting period on all activity sites, when practical.	Yes	Consistent. Monitoring will be conducted consistent with this CMA.
	LUPA-BIO-IFS-13	If burrows cannot be avoided on-site, passive burrow exclusion by a designated biologist (see Glossary of Terms) through the use of one-way doors will occur according to the specifications in Appendix D or the most up-to-date agency BLM or CDFW specifications. Before exclusion, there must be verification that burrows are empty as specified in Appendix D or the most up-to-date BLM or CDFW protocols. Confirmation that the burrow is not currently supporting nesting or fledgling activities is required prior to any burrow exclusions or excavations.	Yes	Consistent. The Proposed Action will include nesting surveys and avoidance measures and will comply with this CMA.
	LUPA-BIO-IFS-14	Activity-specific active translocation of burrowing owls may be considered, in coordination with CDFW.	Yes	Consistent. Translocation of burrowing owls will be in coordination and compliance with CDFW
Compensation	**LUPA-BIO-COMP-1**	Impacts to biological resources, identified and analyzed in the activity specific environmental document, from activities in the LUPA Decision Area will be compensated using the standard biological resources compensation ratio, except for the biological resources and specific geographic locations listed as compensation ratio exceptions, specifics in CMAs **LUPA-BIO-COMP-2** through **-4**, and previously listed CMAs. Compensation acreage requirements may be fulfilled through non-acquisition (i.e., restoration and enhancement), land acquisition (i.e., preserve), or a combination of these options, depending on the activity specifics and BLM approval/authorization.	Yes	Flat-tailed horned lizard (FTHL) compensation will be required at a 1:1 ratio per the Rangewide Management Strategy.
		Refer to CMA **LUPA-COMP-1** and **2** for the timing requirements for initiation or completion of compensation.	Yes	
Air Resources	**LUPA-AIR-1**	All activities must meet the following requirements:	Yes	
		Applicable National Ambient Air Quality Standards (Section 109)	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.

Category	CMA #	CMA Text	Applicability	Comments
		State Implementation Plans (Section 110)	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
		Control of Pollution from Federal Facilities (Section 118) including non-point source	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
		Prevention of Significant Deterioration, including visibility impacts to mandatory Federal Class I Areas (Section 160 et seq.)	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
		Conformity Analyses and Determinations (Section 176[c])	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
		Apply best management practices on a case by case basis	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
		Applicable local Air Quality Management Jurisdictions (e.g., 403 SCAQMD)	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
	LUPA-AIR-2	Because project authorizations are a federal undertaking, air quality standards for fugitive dust may not exceed local standards and requirements.	Yes	Consistent. The Proposed Action will comply with this CMA and other air quality regulations and standards as applicable.
	LUPA-AIR-4	Because fugitive dust is the number one source of PM_{10} and $PM_{2.5}$ emissions in the Mojave and Sonoran Deserts, fugitive dust impacts to air quality must be analyzed for all activities/projects requiring an Environmental Impact Statement and Environmental Assessment.	Yes	Consistent.

Category	CMA #	CMA Text	Applicability	Comments
		The NEPA air quality analysis may include modelling of the sources of PM10 and PM2.5 that occur prior to construction and/or ground disturbance from the activity/project, and show the timing, duration and transport of emissions off site. When utilized, the modeling will also identify how the generation and movement of PM10 and PM2.5 will change during and after construction and/or ground disturbance of the activity/project under all activity/project specific NEPA alternatives. The BLM air resource specialist and Authorizing Officer will determine if modelling is required as part of the NEPA analysis based on estimated types and amounts of emissions.	Yes	Consistent.
	LUPA-AIR-5	A fugitive Dust Control Plan will be developed for all projects where the NEPA analysis shows an impact on air quality from fugitive dust.	Yes	Consistent. Dust control measures will be included in the Proposed Action.
LUPA-Wide Conservation and Management Actions for Comprehensive Trails and Travel Management	**LUPA-CTTM-1**	Maintain and manage adequate Road, Primitive Road, and Trail Access to and within SRMAs, ERMAs, OHV Open Areas, and Level 1, 2, and 3 Recreation Facilities.	Yes	Consistent. Access will be maintained within the Ocotillo Wells East SRMA.
	LUPA-CTTM-2	Avoid activities that would have a significant adverse impact on use and enjoyment within 0.5 mile from centerline of tier 2 Roads/Primitive Roads, and 300 feet from centerline of tier 3 primitive roads/trails. If avoidance of Tier 2 and 3 roads, primitive roads and trails is not practicable, relocate access to the same or higher standard and maintain the setting characteristics and access to recreation activities, facilities, and destinations.	Yes	Consistent. No BLM designated routes will be impacted by the Proposed Action
Cultural Resources and Tribal Interests	**LUPA-CUL-3**	Identify places of traditional cultural and religious importance to federally recognized Tribes and maintain access to these locations for traditional use.	Yes	
	LUPA-CUL-4	Design activities to minimize impacts on cultural resources including places of traditional cultural and religious importance to federally recognized Tribes.	Yes	Consistent. Measures will be implemented to minimize impacts on cultural resources.

Category	CMA #	CMA Text	Applicability	Comments
Lands and Realty	**LUPA-LANDS-3**	Within land use allocations where renewable energy and ancillary facilities are not allowed, an exception exists for geothermal development. Geothermal development will be an allowable use if a geothermal-only DFA overlays the allocation and the lease includes a no surface occupancy stipulation with exception of three specific parcels in the Ocotillo Wells SRMA (refer to the Ocotillo Wells SRMA Special Unit Management Plan in Appendix C).	Yes	Proposed Action is located in Truckhaven Geothermal Leasing Area.
Minerals	**LUPA-MIN-2**	Existing Mineral/Energy Operations	Yes	The project area is located within an existing geothermal lease.
		Existing authorized mineral/energy operations, including existing authorizations, modifications, extensions and amendments and their required terms and conditions, are designated as an allowable use within all BLM lands in the LUPA Decision Area, and unpatented mining claims subject to valid existing rights. Amendments and expansions authorized after the signing of the DRECP LUPA ROD are subject to applicable CMAs, including ground disturbance caps within Ecological and Cultural Conservation Areas, subject to valid existing rights, subject to governing laws and regulations.	Yes	
	LUPA-MIN-6	New or expanded mineral operations will be evaluated on a case-by-case basis, and authorizations are subject to LUPA requirements, and the governing laws and regulations.	Yes	Geothermal is considered a mineral resource and therefore this applies. Proposed exploration or development is subject to this CMA.
Paleontology	**LUPA-PALEO-1**	If not previously available, prepare paleontological sensitivity maps consistent with the Potential Fossil Yield Classification for activities prior to NEPA analysis.	Yes	Consistent. Reports for the area have been previously prepared.
	LUPA-PALEO-2	Incorporate all guidance provided by the Paleontological Resources Protection Act.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
	LUPA-PALEO-3	Ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated.	Yes	Consistent. Measures will be implemented to minimize impacts to paleontological resources.
Recreation and Visitor Services	**LUPA-REC-1**	Maintain, and where possible enhance, the recreation setting characteristics – physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls.	Yes	Consistent. The Proposed Action would not significantly effect recreational resources pursuant to this CMA.

Category	CMA #	CMA Text	Applicability	Comments
	LUPA-REC-2	Cooperate with the network of communities and recreation service providers active within the planning area to protect the principal recreation activities and opportunities, and the associated conditions for quality recreation, by enhancing appropriate visitor services, and by identifying and mitigating impacts from development, inconsistent land uses and unsustainable recreation practices such as minimizing impacts to known rockhounding gathering areas.	Yes	Consistent. The Proposed Action would not significantly effect recreational resources pursuant to this CMA.
	LUPA-REC-4	Prohibit activities that have a significant adverse impact and that do not enhance conservation or recreation values within one mile of Level 1 and Level 2 Recreation facility footprint.	Yes	Consistent. The Proposed Action would not significantly effect recreational resources pursuant to this CMA.
	LUPA-REC-5	Avoid activities that have a significant adverse impact and that do not enhance conservation or recreation values within one-half mile of Level 3 Recreation facility footprint including route access and staging areas. If avoidance is not practicable, the facility must be relocated to the same or higher recreation standard and maintain recreation objectives and setting characteristics.	Yes	Consistent. The Proposed Action would not significantly effect recreational resources pursuant to this CMA.
Soil and Water General	**LUPA-SW-1**	Stipulations or conditions of approval for any activity will be imposed that provide appropriate protective measures to protect the quantity and quality of all water resources (including ephemeral, intermittent, and perennial water bodies) and any associated riparian habitat (see biological CMAs for specific riparian habitat CMAs). The water resources to which this CMA applies will be identified through the activity-specific NEPA analysis.	Yes	Consistent. The Proposed Action would not significantly effect water resources pursuant to this CMA. All water used for the Proposed Action will be from the Coachella Water District via a nearby fire hydrant.
	LUPA-SW-2	Buffer zones, setbacks, and activity limitations specifically for soil and water (ground and surface) resources will be determined on an activity/site-specific basis through the environmental review process, and will be consistent with the soil and water resource goals and objectives to protect these resources . Specific requirements, such as buffer zones and setbacks, may be based, in part, on the results of the Water Supply Assessment defined below. In general, placement of long-term facilities within buffers or protected zones for soil and water resources is discouraged, but may be permitted if soil and water resource management objectives can be maintained.	Yes	Consistent. The Proposed Action would not significantly effect water resources pursuant to this CMA. All water used for the Proposed Action will be from the Coachella Water District via a nearby fire hydrant.

Category	CMA #	CMA Text	Applicability	Comments
Groundwater Resources	**LUPA-SW-5**	Exceptions to any of the specific soil and water stipulations contained in this section, as well as those listed below under the subheadings "Soil Resources," "Surface Water," and "Groundwater Resources," may be granted by the authorized officer if the applicant submits a plan, or, for BLM-initiated actions, the BLM provides documentation, that demonstrates:	Yes	
Soil Resources	**LUPA-SW-6**	In addition to the applicable required governmental safeguards, third party activities will implement up-to-date standard industry construction practices to prevent toxic substances from leaching into the soil.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
	LUPA-SW-7	Prepare an emergency response plan, approved by the BLM contaminant remediation specialist, that ensures rapid response in the event of spills of toxic substances over soils.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
	LUPA-SW-8	As determined necessary on an activity specific basis, prepare a site plan specific to major soil types present (≥5% of footprint or laydown surfaces) in Wind Erodibility Groups 1 and 2 and in Hydrology Soil Class D as defined by the USDA Natural Resource Conservation Service to minimize water and air erosion from disturbed soils on activity sites.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
	LUPA-SW-10	The extent of additional sensitive soil areas (cryptobiotic soil crusts, hydric soils, highly corrosive soils, expansive soils, and soils at severe risk of erosion) shall be mapped if it is anticipated that an activity will impact these resources. To the extent possible, avoid disturbance of desert biologically intact soil crusts, and soils highly susceptible to wind and water erosion.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
	LUPA-SW-11	Where possible, side casting shall be avoided where road construction requires cut- and-fill procedures.	Yes	Consistent. Road construction implemented during the Proposed Action would comply with this CMA as applicable.
Surface Water	**LUPA-SW-16**	The 100-year floodplain boundaries for any surface water feature in the vicinity of the project will be identified. If maps are not available from the Federal Emergency Management Agency (FEMA), these boundaries will be determined via hydrologic modeling and analysis as part of the environmental review process. Construction within, or alteration of, 100-year floodplains will be avoided where possible, and permitted only when all required permits from other agencies are obtained.	Yes	Consistent. Permits will be obtained for the Proposed Action.

Category	CMA #	CMA Text	Applicability	Comments
Groundwater	**LUPA-SW-20**	After application of applicable avoidance and minimization measures, all remaining unavoidable residual impacts to surface waters from the proposed activity shall be mitigated to ensure no net loss of function and value, as determined by the BLM.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable. The Proposed Action involves the preparation of a SWPPP, which includes measures to minimize impacts to surface waters.
	LUPA-SW-21	Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable. The Proposed Action involves the preparation of a SWPPP, which includes measures to minimize impacts to surface waters.
	LUPA-SW-22	All hydrologic alterations shall be avoided that could reduce water quality or quantity for all applicable beneficial uses associated with the hydrologic unit in the project area, or specific mitigation measures shall be implemented that will minimize unavoidable water quality or quantity impacts, as determined by BLM in coordination with USFWS, CDFW, and other agencies, as appropriate. These beneficial uses may include municipal, domestic, or agricultural water supply; groundwater recharge; surface water replenishment; recreation; water quality enhancement; flood peak attenuation or flood water storage; and wildlife habitat.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable. The Proposed Action involves the preparation of a SWPPP, which includes measures to minimize impacts to water quality or quantity.
	LUPA-SW-30	Activities shall comply with local requirements for any long term or short term domestic water use and wastewater treatment.	Yes	Consistent. The Proposed Action will comply with this CMA as applicable.
Visual Resources Management	**LUPA-VRM-1**	Manage Visual Resources in accordance with the VRM classes shown on Figure 9.	Yes	Consistent. The Proposed Action will manage visual resources in compliance with the VRM classes.
	LUPA-VRM-2	Ensure that activities within each of the VRM Class polygons meets the VRM objectives described above, as measured through a visual contrast rating process.	Yes	Consistent. The Proposed Action will manage visual resources in compliance with the VRM classes.

Compensation

Category	CMA #	CMA Text	Applicability	Explanation: Why CMA is not applicable	Comments
	LUPA-COMP-1	For third party actions, compensation activities must be initiated or completed within 12 months from the time the resource impact occurs (e.g. ground disturbance, habitat removal, route obliteration, etc. for construction activities; wildlife mortality, visual impacts, etc. due to operations).	Yes		Consistent. The Applicant will work with the BLM on compensation timing. If required. Proposed Action has been designed to minimize impacts to resources.
		BLM will determine, in the environmental analysis, the activity/project-level timing of the compensation (i.e. initiated, completed or a combination) based on the specific resources being impacted, and scope and content of the activity.	Yes		Consistent. The Applicant will work with the BLM on compensation timing. If required. Proposed Action has been designed to minimize impacts to resources.
		A 6 month extension may be authorized, subject to approval by the authorizing officer, dependent on the resources impacted and compensation due diligence of the project developer.	Yes		Consistent. The Applicant will work with the BLM on compensation timing. If required. Proposed Action has been designed to minimize impacts to resources.

Special Recreation Management Area (SRMAs)

Category	CMA #	CMA Text	Applicability	Explanation: Why CMA is not applicable	Comments
Comprehensive Trails and Travel Management	**SRMA-CTTM-1**	Refer to the individual SRMA Special Unit Management Plans (Appendix C) for SRMA/Recreation Management Zone specific objectives, management actions, and allowable uses. Protect SRMAs for their unique/special recreation values. Manage roads/primitive roads/trails consistent with SRMA objectives and as designated in Transportation and Travel Management Plan/RMPs.	Yes		Consistent. The SRMA plan recognizes geothermal development as an authorized use. The Proposed action will not affect any BLM designated routes or other recreation facilities.
Lands and Realty	**SRMA-LANDS-1**	Renewable energy development is not an allowable use in SRMAs due to the incompatibility with the values of the SRMA. Two exceptions to this management action are:	Yes		
		Geothermal development is an allowable use if a geothermal-only DFA overlays the SRMA designation and complies with a "no surface occupancy" restriction; with exception of the Ocotillo Wells SRMA (refer to the technology specifics for the DFA and the Special Unit Management Plan in Appendix C)	Yes		The Proposed Action is located in the Truckhaven Geothermal Leasing Area which is with the Ocotillo Wells East SRMA and is a designated DFA for geothermal.
	SRMA-LANDS-2	Acquired land within the SRMAs will be managed according to the goals and objectives of the SRMA, and activities on these lands will be consistent with the CMAs for SRMAs.	Yes		Consistent. The Proposed Action area will be managed in compliance with the CMAs for SRMAs.
Recreation & Visitor Services	**SRMA-REC-1**	Manage SRMAs for their targeted recreation activities, experiences and benefits. Maintain (and where possible enhance) the recreation setting characteristics—physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls.	Yes		Consistent. The Proposed Action would not significantly effect recreational resources pursuant to this CMA.

Development Focus Areas (DFAs)

Category	CMA #	CMA Text	Applicability	Explanation: Why CMA is not applicable	Comments
Biological Resources	**DFA-BIO-IFS-1**	Conduct the following surveys as applicable in the DFAs as shown in **Table 21**.	Yes		Consistent. Surveys were conducted and monitoring measures are included for the Proposed Action to avoid impacts.
	DFA-BIO-IFS-2	Implement the following setbacks shown below in **Table 22** as applicable in the DFAs.	Yes		Consistent. The Proposed Action implements setbacks to avoid impacts.
Recreation	**DFA-REC-1**	Retain, to the extent possible, the identified recreation setting characteristics: physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls (see recreation setting characteristics matrix).	Yes		Consistent. The Proposed Action involves geothermal energy and is compatible with recreational values.
	DFA-REC-3	SRMAs are exclusion areas for renewable energy development due to the incompatibility with the values of SRMAs. Two exceptions to this management action are:	Yes		
		1. geothermal development is an allowable use in the few instances in Imperial County where a geothermal-only DFA overlays the SRMA designation and the lease includes a "no surface occupancy" stipulation, with exception of three specific parcels in the Ocotillo Wells SRMA (the Special Unit Management Plan in Appendix C)	Yes	The Proposed Action is located in the Truckhaven Geothermal Leasing Area which is the Ocotillo Wells East SRMA and a BLM DFA for geothermal.	

Appendix E: CalEEMod Model Results

Truckhaven Geothermal Exploration Wells - 1 Well Calculations

Imperial County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	160.00	1000sqft	3.67	160,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2021
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1 Well Pad = 400 ft x 400 ft = 3.67 acres

Construction Phase - Construction Schedule Provided by Applicant

Off-road Equipment - Well Cleanup - 1 Rubber Tired Loader, 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Drilling - 1 Drill Rig 24-hours, 1 Mud Tank (Pump) 24-hours, 1 diesel generator (for lights) 12 hours, 1 Forklift 8 hours, 1 air compressor 8 hours

Off-road Equipment - Well Pad - 1 Rubber Tired Dozer, 1 Grader, and 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Testing - 1 Crane 8 hours, 1 pump 24 hours, 1 Tractor/Loader/Backhoe 8 hours

Trips and VMT - 6 vendor truck trips per day added to Well Pad Construction and Well Cleanup to account for Water Trucks (already accounted for in Well Drilling)

Grading -

On-road Fugitive Dust - 90% of construction trips on pavement

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Regulation VIII minimum requirements

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00

tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.7504	33.1484	30.9164	0.0756	106.5738	1.4856	108.0594	10.7298	1.4525	12.1823	0.0000	7,320.0557	7,320.0557	1.2024	0.0000	7,350.1154
Maximum	**3.7504**	**33.1484**	**30.9164**	**0.0756**	**106.5738**	**1.4856**	**108.0594**	**10.7298**	**1.4525**	**12.1823**	**0.0000**	**7,320.0557**	**7,320.0557**	**1.2024**	**0.0000**	**7,350.1154**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.7504	33.1484	30.9164	0.0756	106.5738	1.4856	108.0594	10.7298	1.4525	12.1823	0.0000	7,320.0557	7,320.0557	1.2024	0.0000	7,350.1154
Maximum	**3.7504**	**33.1484**	**30.9164**	**0.0756**	**106.5738**	**1.4856**	**108.0594**	**10.7298**	**1.4525**	**12.1823**	**0.0000**	**7,320.0557**	**7,320.0557**	**1.2024**	**0.0000**	**7,350.1154**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Well Pad & Access Rd Construction	Site Preparation	3/1/2020	3/14/2020	5	10	
2	Well Drilling	Building Construction	3/15/2020	4/28/2020	7	45	
3	Well Testing	Trenching	4/29/2020	4/30/2020	5	2	
4	Well Cleanup-Abandoment	Grading	5/1/2020	5/7/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.67

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Well Pad & Access Rd Construction	Graders	1	8.00	187	0.41
Well Pad & Access Rd Construction	Rubber Tired Dozers	1	8.00	247	0.40
Well Pad & Access Rd Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Cleanup-Abandoment	Rubber Tired Loaders	1	8.00	203	0.36
Well Cleanup-Abandoment	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Drilling	Air Compressors	1	8.00	78	0.48
Well Drilling	Bore/Drill Rigs	1	24.00	221	0.50
Well Drilling	Forklifts	1	8.00	89	0.20

Well Drilling	Generator Sets	1	12.00	84	0.74
Well Drilling	Pumps	1	24.00	84	0.74
Well Testing	Cranes	1	8.00	231	0.29
Well Testing	Pumps	1	24.00	84	0.74
Well Testing	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Well Pad & Access Rd Construction	4	10.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Cleanup-Abandoment	3	8.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Drilling	5	67.00	26.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Testing	3	8.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Well Pad & Access Rd Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416		2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**6.5523**	**1.0234**	**7.5758**	**3.3675**	**0.9416**	**4.3091**		**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0696	0.0431	0.5064	5.7000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		56.6403	56.6403	4.8100e-003		56.7605
Total	**0.0965**	**0.7228**	**0.6940**	**2.5200e-003**	**18.6988**	**4.5300e-003**	**18.7033**	**1.8832**	**4.3200e-003**	**1.8875**		**260.6852**	**260.6852**	**0.0154**		**261.0711**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416	0.0000	2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**2.9486**	**1.0234**	**3.9720**	**1.5154**	**0.9416**	**2.4569**	**0.0000**	**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0696	0.0431	0.5064	5.7000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		56.6403	56.6403	4.8100e-003		56.7605
Total	**0.0965**	**0.7228**	**0.6940**	**2.5200e-003**	**18.6988**	**4.5300e-003**	**18.7033**	**1.8832**	**4.3200e-003**	**1.8875**		**260.6852**	**260.6852**	**0.0154**		**261.0711**

3.3 Well Drilling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329		6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**		**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1163	2.9452	0.8129	8.4600e-003	34.2541	0.0180	34.2721	3.4563	0.0172	3.4735		884.1949	884.1949	0.0460		885.3460
Worker	0.4665	0.2888	3.3930	3.8500e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		379.4897	379.4897	0.0322		380.2952
Total	**0.5828**	**3.2340**	**4.2060**	**0.0123**	**106.5738**	**0.0206**	**106.5944**	**10.7298**	**0.0196**	**10.7494**		**1,263.6846**	**1,263.6846**	**0.0783**		**1,265.6412**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329	0.0000	6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**	**0.0000**	**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1163	2.9452	0.8129	8.4600e-003	34.2541	0.0180	34.2721	3.4563	0.0172	3.4735		884.1949	884.1949	0.0460		885.3460
Worker	0.4665	0.2888	3.3930	3.8500e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		379.4897	379.4897	0.0322		380.2952
Total	**0.5828**	**3.2340**	**4.2060**	**0.0123**	**106.5738**	**0.0206**	**106.5944**	**10.7298**	**0.0196**	**10.7494**		**1,263.6846**	**1,263.6846**	**0.0783**		**1,265.6412**

3.4 Well Testing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486		2,728.6619	2,728.6619	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**		**2,728.6619**	**2,728.6619**	**0.3898**		**2,738.4074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0557**	**0.0345**	**0.4051**	**4.6000e-004**	**8.6352**	**3.0000e-004**	**8.6355**	**0.8685**	**2.8000e-004**	**0.8688**		**45.3122**	**45.3122**	**3.8500e-003**		**45.4084**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486	0.0000	2,728.6618	2,728.6618	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**	**0.0000**	**2,728.6618**	**2,728.6618**	**0.3898**		**2,738.4074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0557**	**0.0345**	**0.4051**	**4.6000e-004**	**8.6352**	**3.0000e-004**	**8.6355**	**0.8685**	**2.8000e-004**	**0.8688**		**45.3122**	**45.3122**	**3.8500e-003**		**45.4084**

3.5 Well Cleanup-Abandoment - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796		1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**0.0000**	**0.4126**	**0.4126**	**0.0000**	**0.3796**	**0.3796**		**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0825**	**0.7142**	**0.5927**	**2.4100e-003**	**16.5400**	**4.4500e-003**	**16.5444**	**1.6661**	**4.2500e-003**	**1.6703**		**249.3572**	**249.3572**	**0.0145**		**249.7190**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796	0.0000	1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**0.0000**	**0.4126**	**0.4126**	**0.0000**	**0.3796**	**0.3796**	**0.0000**	**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0825**	**0.7142**	**0.5927**	**2.4100e-003**	**16.5400**	**4.4500e-003**	**16.5444**	**1.6661**	**4.2500e-003**	**1.6703**		**249.3572**	**249.3572**	**0.0145**		**249.7190**

Truckhaven Geothermal Exploration Wells - 1 Well Calculations

Imperial County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	160.00	1000sqft	3.67	160,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2021
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1 Well Pad = 400 ft x 400 ft = 3.67 acres

Construction Phase - Construction Schedule Provided by Applicant

Off-road Equipment - Well Cleanup - 1 Rubber Tired Loader, 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Drilling - 1 Drill Rig 24-hours, 1 Mud Tank (Pump) 24-hours, 1 diesel generator (for lights) 12 hours, 1 Forklift 8 hours, 1 air compressor 8 hours

Off-road Equipment - Well Pad - 1 Rubber Tired Dozer, 1 Grader, and 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Testing - 1 Crane 8 hours, 1 pump 24 hours, 1 Tractor/Loader/Backhoe 8 hours

Trips and VMT - 6 vendor truck trips per day added to Well Pad Construction and Well Cleanup to account for Water Trucks (already accounted for in Well Drilling)

Grading -

On-road Fugitive Dust - 90% of construction trips on pavement

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Regulation VIII minimum requirements

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00

tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.6628	33.2174	30.1988	0.0747	106.5738	1.4858	108.0596	10.7298	1.4527	12.1825	0.0000	7,227.2488	7,227.2488	1.2014	0.0000	7,257.2827
Maximum	**3.6628**	**33.2174**	**30.1988**	**0.0747**	**106.5738**	**1.4858**	**108.0596**	**10.7298**	**1.4527**	**12.1825**	**0.0000**	**7,227.2488**	**7,227.2488**	**1.2014**	**0.0000**	**7,257.2827**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.6628	33.2174	30.1988	0.0747	106.5738	1.4858	108.0596	10.7298	1.4527	12.1825	0.0000	7,227.2488	7,227.2488	1.2014	0.0000	7,257.2827
Maximum	**3.6628**	**33.2174**	**30.1988**	**0.0747**	**106.5738**	**1.4858**	**108.0596**	**10.7298**	**1.4527**	**12.1825**	**0.0000**	**7,227.2488**	**7,227.2488**	**1.2014**	**0.0000**	**7,257.2827**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Well Pad & Access Rd Construction	Site Preparation	3/1/2020	3/14/2020	5	10	
2	Well Drilling	Building Construction	3/15/2020	4/28/2020	7	45	
3	Well Testing	Trenching	4/29/2020	4/30/2020	5	2	
4	Well Cleanup-Abandoment	Grading	5/1/2020	5/7/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.67

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Well Pad & Access Rd Construction	Graders	1	8.00	187	0.41
Well Pad & Access Rd Construction	Rubber Tired Dozers	1	8.00	247	0.40
Well Pad & Access Rd Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Cleanup-Abandoment	Rubber Tired Loaders	1	8.00	203	0.36
Well Cleanup-Abandoment	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Drilling	Air Compressors	1	8.00	78	0.48
Well Drilling	Bore/Drill Rigs	1	24.00	221	0.50
Well Drilling	Forklifts	1	8.00	89	0.20

Well Drilling	Generator Sets	1	12.00	84	0.74
Well Drilling	Pumps	1	24.00	84	0.74
Well Testing	Cranes	1	8.00	231	0.29
Well Testing	Pumps	1	24.00	84	0.74
Well Testing	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Well Pad & Access Rd Construction	4	10.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Cleanup-Abandoment	3	8.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Drilling	5	67.00	26.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Testing	3	8.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Well Pad & Access Rd Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416		2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**6.5523**	**1.0234**	**7.5758**	**3.3675**	**0.9416**	**4.3091**		**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0560	0.0452	0.3825	4.8000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		47.5073	47.5073	3.8800e-003		47.6043
Total	**0.0837**	**0.7375**	**0.5961**	**2.3600e-003**	**18.6988**	**4.5900e-003**	**18.7034**	**1.8832**	**4.3800e-003**	**1.8876**		**244.2563**	**244.2563**	**0.0157**		**244.6489**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416	0.0000	2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**2.9486**	**1.0234**	**3.9720**	**1.5154**	**0.9416**	**2.4569**	**0.0000**	**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0560	0.0452	0.3825	4.8000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		47.5073	47.5073	3.8800e-003		47.6043
Total	**0.0837**	**0.7375**	**0.5961**	**2.3600e-003**	**18.6988**	**4.5900e-003**	**18.7034**	**1.8832**	**4.3800e-003**	**1.8876**		**244.2563**	**244.2563**	**0.0157**		**244.6489**

3.3 Well Drilling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329		6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**		**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1203	3.0000	0.9260	8.1600e-003	34.2541	0.0183	34.2724	3.4563	0.0175	3.4738		852.5789	852.5789	0.0512		853.8599
Worker	0.3750	0.3030	2.5624	3.2200e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		318.2988	318.2988	0.0260		318.9485
Total	**0.4953**	**3.3030**	**3.4884**	**0.0114**	**106.5738**	**0.0208**	**106.5946**	**10.7298**	**0.0198**	**10.7496**		**1,170.8777**	**1,170.8777**	**0.0772**		**1,172.8084**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329	0.0000	6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**	**0.0000**	**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1203	3.0000	0.9260	8.1600e-003	34.2541	0.0183	34.2724	3.4563	0.0175	3.4738		852.5789	852.5789	0.0512		853.8599
Worker	0.3750	0.3030	2.5624	3.2200e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		318.2988	318.2988	0.0260		318.9485
Total	**0.4953**	**3.3030**	**3.4884**	**0.0114**	**106.5738**	**0.0208**	**106.5946**	**10.7298**	**0.0198**	**10.7496**		**1,170.8777**	**1,170.8777**	**0.0772**		**1,172.8084**

3.4 Well Testing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486		2,728.6619	2,728.6619	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**		**2,728.6619**	**2,728.6619**	**0.3898**		**2,738.4074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0448**	**0.0362**	**0.3060**	**3.8000e-004**	**8.6352**	**3.0000e-004**	**8.6355**	**0.8685**	**2.8000e-004**	**0.8688**		**38.0058**	**38.0058**	**3.1000e-003**		**38.0834**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486	0.0000	2,728.6618	2,728.6618	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**	**0.0000**	**2,728.6618**	**2,728.6618**	**0.3898**		**2,738.4074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0448**	**0.0362**	**0.3060**	**3.8000e-004**	**8.6352**	**3.0000e-004**	**8.6355**	**0.8685**	**2.8000e-004**	**0.8688**		**38.0058**	**38.0058**	**3.1000e-003**		**38.0834**

3.5 Well Cleanup-Abandoment - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796		1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**0.0000**	**0.4126**	**0.4126**	**0.0000**	**0.3796**	**0.3796**		**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0725**	**0.7285**	**0.5196**	**2.2600e-003**	**16.5400**	**4.5100e-003**	**16.5445**	**1.6661**	**4.3100e-003**	**1.6704**		**234.7548**	**234.7548**	**0.0149**		**235.1280**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796	0.0000	1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**0.0000**	**0.4126**	**0.4126**	**0.0000**	**0.3796**	**0.3796**	**0.0000**	**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0725**	**0.7285**	**0.5196**	**2.2600e-003**	**16.5400**	**4.5100e-003**	**16.5445**	**1.6661**	**4.3100e-003**	**1.6704**		**234.7548**	**234.7548**	**0.0149**		**235.1280**