**Preliminary environmental assessment of the Pālāʻau CBRE Site**

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Solar and battery storage projects have a number of impacts to the environment, cultural resources, and to activities in the surrounding area. Through the use of standard best management practices (BMPs) and other forms of due diligence - such as interviewing of local community members and experts, surveying and analysis of the build site - the project can have a successful assessment and finding of no significant impact (AFONSI).

One concern with solar projects is associated with the construction phase. Though temporary and often deemed insignificant, construction activities impact the soil, air, local ecosystems (protected plants and animals), historic and cultural resources, noise and light pollution levels, and traffic conditions. It also threatens to contaminate water via hazardous material (e.g., diesel and gasoline) and possibly introduce a burden to public services (e.g., police, fire, EMS). Though BMPs should be used to mitigate impacts and risks, the overall negative effect is minor.

Another concern with solar projects is associated with its infrastructure. The creation of impervious surfaces, though minimal, indirectly impacts local water recharge, accessibility, and quality. Glare from panels can threaten visual resources (i.e., scenic vistas and viewpoints) as well as airplane pilots flying nearby. Batteries present a fire and contamination risk and must be equipped with proper containment/suppression, monitoring, and alarm systems.

Other impacts exist, such as disturbing native animal and plant habitats or culturally significant sites (i.e., iwi kupuna burial grounds or makahiki ceremonial spaces). If protected species are discovered they are reported, given space, and activity is reduced or halted. If a culturally significant site is discovered, it is reported and a protocol is developed in close collaboration with Native Hawaiian groups.

Below is a preliminary assessment of the existing conditions at the site as well as any potential impacts and associated mitigation measures.

Surrounding Land Use

The proposed project will be located on the island of Molokai, Hawaii. The Pālāʻau site is about 3.5 miles west of Kaunakakai Town in Ahupuaʻa Naiwa. The project site is accessible by Ulili St., a smaller road off of Mauna Loa Hwy. It is a vacant lot in a heavily industrial area[[1]](#footnote-1) surrounded by dry bush land with minimal vegetation. Since it is located in an industrial area, the population is very low.

The project is not expected to impact surrounding land use and is a permitted use for existing zoning.

Climate, Topography and Soils

The climate of Hawaii is tropical and characterized by mild temperatures year-round, the presence of northeasterly trade winds, and moderate humidity. There are only two distinct seasons: a wet and a dry season. However, there is significant variation in rainfall and other environmental conditions based on topography and geography[[2]](#footnote-2).

Molokai Airport is the closest location to the project site that has documented temperatures. The average annual low temperature is 69.1ºF and the high is 82.9ºF. From 2016 to 2020, the annual rainfall in Kaunakakai, has ranged from as low as 3.47 inches to as high as 15.20 inches of rain[[3]](#footnote-3). The “winter” season from October to April generally experiences the most rainfall[[4]](#footnote-4).

Most of Hawaii is composed of volcanic rock. More specifically, the soil underlying the proposed project site is classified as very stony land and eroded (rVT2) according to a soil survey by the USDA. There is high runoff and the land is well drained[[5]](#footnote-5).

The topography of the site is characterized by sloping lands and elevations ranging from around 70ft to 99ft above sea level[[6]](#footnote-6).

Potential impacts to the soil and topography could include erosion and ground disturbance while grading, trenching to put in lines, compacting soil for construction vehicles, and creating impervious surfaces for new infrastructure. These impacts are expected to be minimal considering the low-quality soil at the site. Impacts could be mitigated by revegetation around the array if needed.

Additional potential impacts to soil could result from hazardous waste release into the environment including during panel cleaning and vegetation maintenance, removing pre-existing infrastructure that may contain asbestos or lead-based paint, or in the case of a battery failure leading to thermal runaway. Mitigation measures include: use of more innovative water-less and dry brushing techniques for panel washing; use of BMPs to manage fire hazard vegetation growing around panels to avoid use of herbicides; utilizing a Battery Management System to cool the BESS units and isolate any failing units; selecting a battery chemistry less prone to thermal runaway, such as LFP; and of operation life project decommissioning to remove, reuse, and recycle equipment (all probably to the continental U.S.)

Flood and Tsunami Hazards

According to flood maps by the Federal Emergency Management Agency (FEMA), the site is located entirely within Flood Zone X which is an “Area of Minimal Flood Hazard.” This flood zone has been determined to be outside of the annual 0.2% chance of flooding[[7]](#footnote-7).

Tsunamis do not present a significant threat to these land parcels since they are all located in the tsunami safe zone. Kaunakakai Rd is the boundary of the Tsunami evacuation zone[[8]](#footnote-8).

According to the 2017 Hawaii Sea Level Rise and Climate Adaptation Report, the project site is not located in the Sea Level Exposure Area[[9]](#footnote-9) and therefore should not experience adverse effects from sea level rise in the near future.

Because the site is outside of major hazard areas, impacts, such as equipment failure due to inundation, are not expected to result from flooding at the site.

Air Quality, Water Quality, Noise Pollution

The air quality on Molokai as well as the rest of the Hawaiian Islands is generally very good. Data from the EPA shows that the Daily AQI (Air Quality Index) values from 2010 to 2022 on Molokai, rarely dipped below the good (<= 50 AQI) which is the best possible air quality category[[10]](#footnote-10).

However, there are other potential factors that could influence the air quality at the project site. The Pālāʻau Power Plant is an electricity producing energy plant in close vicinity of the land parcels in question. According to the EPA, power plants produce emissions of sulfur dioxide, nitrogen oxides, particulate matter, carbon dioxide among other pollutants which can lead to respiratory and cardiovascular issues[[11]](#footnote-11). The emissions of this specific plant in 2019 (in tons) included 27,004 CO2, 539.5 NOx, and 48 SO2[[12]](#footnote-12).

The water quality in Maui County meets or exceeds the state and national standards. Much of the water utilized on Molokai is groundwater and the pH of the water on Molokai generally ranges from 7.2-7.9[[13]](#footnote-13).

Factors that could contribute to noise are the Maunaloa Hwy traffic, rock quarry across the street, and nearby landfill. The traffic on the highway is generally moderate and steady. Rock quarries are known to produce noise pollution and dust affecting surrounding areas[[14]](#footnote-14). The landfill may also produce some noise pollution.

Potential short-term impacts to air quality could result from vehicle and equipment exhaust and creating dust when disturbing the land. These impacts will be mitigated by using BMPs to maintain vehicles and equipment to minimize over exhaust and using electric equipment when possible.

Impacts to water quality could include decreased discharge of groundwater and runoff/contamination of surface water as a result of creation of impervious surfaces. Mitigation of these impacts could include limiting the use of impervious surfaces to only under the BESS and other necessary locations. Due to the low annual rainfall in the area, the project is not expected to significantly alter the amount of rainwater recharge into Molokai’s aquifers.

Potential impacts to noise include sound from construction operations and low levels of noise from the equipment, particularly the BESS cooling fans, during operation. Mitigations measures include: using electrically-powered equipment instead of pneumatic or IC powered when possible; siting stockpiles, equipment staging, parking, and maintenance areas away from noise-sensitive areas; loud procedures kept to weekday daylight hours; noise-producing signals limited to use for safety and warning purposes; use of mufflers, air-inlet silencers, and other shrouds, shields, and noise-reducing features to minimize construction equipment/vehicle noise.

Biology

According to satellite imagery of the area, the flora is largely dry brush land which is grassy with a few trees and with minimal vegetation. There are mangrove forests to the south along the coast line and more forested areas inland, likely due to increased rainfall in those areas. According to the Cultural Assessment prepared for Hawaiian Electric and provided to the Proposer Team, the site is likely characterized by buffelgrass (*Pennisetum ciliare*) and kiawe (Prosopis chilensis)[[15]](#footnote-15). Without access to the site, there is insufficient data to know if any threatened or endangered species of flora or fauna are present.

Potential impacts could include harming protected plants and animals, if present, or accidentally introducing invasive species. Mitigation measures include: creation of spatial and activity buffers if protected species is discovered; notifying the proper authorities if protected species is discovered; creation of education programs to help personnel identify and appropriately address protected species; pre- and post-construction plant and nesting bird surveys; restriction of construction activities to day-time, and have lights operate on a motion sensor;  and other specific protocols as needed (i.e. dawn/dusk surveillance for pueo or no tree/shrub disturbance during ‘opeʻapeʻa pupping season).

Land Use and Public Safety

Because of the industrial nature of the area and fencing around the parcel, there is not much recreational use of the land. As identified in the Cultural Report provided by the Proposer Team, some residents pass by the parcel while hunting or heading to nearby fishing spots.

The closest Police Station is the Maui County Police Department Molokai Station in Kaunakakai around 4 miles away. The closest Hospital, Molokai General Hospital, and Fire Station, Kaunakakai Fire Station, are also in Kaunakakai. The closest airport, Hoʻolehua Airport, is approximately 5 miles away.

Potential impacts to land use and public safety could include increased traffic congestion in the area and glare from panels impacting air traffic. Mitigation measures could include scheduling deliveries for off-peak traffic hours and coordinating with local agencies to ensure maintenance and safety of roads, pedestrian and bicycle paths. Because parabolic troughs, heliostats, mirrors or tall structures are not part of the project design, air traffic concerns should not be applicable.

No secondary or cumulative impacts were considered in this analysis at this time.

1. Department of Planning County of Maui. 2021.  “Island of Molokaʻi Digital Zoning Maps” <https://www.mauicounty.gov/DocumentCenter/View/130861/Molokai-Digital-Zoning-Map-effective-11262021>, 2021.  [↑](#footnote-ref-1)
2. National Weather Service.1983. “Climate of Hawaiʻi”.  <https://www.weather.gov/hfo/climate_summary> [↑](#footnote-ref-2)
3. Hawai‘i State Department of Hawaiian Homelands, Annual Reports and Records. 2020. <https://sbdc.dev.hyperspective.com/wp-content/uploads/2021/10/2020-Maui-Data-Book.pdf> [↑](#footnote-ref-3)
4. National Weather Service.1983. “Climate of Hawaiʻi”.  <https://www.weather.gov/hfo/climate_summary> [↑](#footnote-ref-4)
5. United States Department of Agriculture. “Web Soil Survey” <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.  [↑](#footnote-ref-5)
6. United States Department of Agriculture. “Molokai Topographic Map.” <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.  [↑](#footnote-ref-6)
7. State of Hawaii, Department of Land and Natural Resources. “Flood Hazard Assessment Tool.” <http://gis.hawaiinfip.org/FHAT/> [↑](#footnote-ref-7)
8. NOAA. <https://tsunami.coast.noaa.gov/#/>, 2017.  [↑](#footnote-ref-8)
9. Hawaii Sea Level Rise and Climate Adaptation Report. <https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf>, 2017.  [↑](#footnote-ref-9)
10. EPA Air Quality Data. <https://www.epa.gov/outdoor-air-quality-data/air-data-multiyear-tile-plot>.  [↑](#footnote-ref-10)
11. EPA. 2021.  “Power Plants and Neighboring Communities.” <https://www.epa.gov/airmarkets/power-plants-and-neighboring-communities>.  [↑](#footnote-ref-11)
12. ESRI. Power Plants and Neighboring Communities Mapping Tool. <https://experience.arcgis.com/experience/2e3610d731cb4cfcbcec9e2dcb83fc94>.  [↑](#footnote-ref-12)
13. County of Maui. “Water Quality”. <https://www.mauicounty.gov/faq.aspx?TID=64>. [↑](#footnote-ref-13)
14. Bansah et al. 2015. “Predicting the Levels of Noise from Quarry Operations” <https://www.researchgate.net/publication/305292420_Predicting_the_Levels_of_Noise_from_Quarry_Operations>  [↑](#footnote-ref-14)
15. University of Hawaii. 1957. “Buffelgrass for Hawaiian Ranges”. <https://scholarspace.manoa.hawaii.edu/bitstream/10125/53567/CtahrpsExtCirc380.pdf>  [↑](#footnote-ref-15)