4.5 GEOLOGY AND SOILS

This section addresses the potential for the Proposed Project to impact geologic and soil conditions on the Project site. More specifically, this section evaluates impacts associated with the Project that may potentially affect public health and safety or degrade the environment. Issues analyzed in this section include the potential paleontological sensitivity of the Project site, as well as geologic and seismic hazards such as earthquakes, expansion, landform alteration, erosion, and liquefaction that could occur with implementation of the Project. Paleontological resources include vertebrate, invertebrate, and plant fossils. Information contained in this section is summarized from the Archaeological and Paleontological Assessment Report (Cultural Resources Assessment) produced by Chambers Group in January 2021 and the Preliminary Geotechnical Report prepared for the Project by LandMark Geo-Engineers and Geologists (LandMark) in August 2020. These documents are included as Appendix D and Appendix E of this EIR, respectively.

4.5.1 <u>Existing Environmental Setting</u>

Regional Setting

The Project site is located within the Imperial Valley and is within a large geologic structure referred to as the Salton Trough, a graben or rift valley extending approximately 1,000 miles in length. This graben was created when the San Andreas Fault system and the East Pacific Rise split Baja California from mainland Mexico approximately 5 million years ago. The southern portion of this rift valley is now known as the Gulf of California, while the northern part is known as the Salton Trough. Plate tectonic activity has continued to open this rift, with the Salton Trough as the hinge point. The North American Plate is to the east, and the Pacific Plate to the west. The Colorado River may have begun depositing huge loads of silt in the upper trough as early as 5.5 million years ago.

By some time in the Pliocene Epoch (2 to 4 million years ago), the river had created a delta of sufficient height to form a dam isolating the Imperial Valley and Coachella Valley portions of the Salton Trough from the Gulf of California. This silt dam continues to keep seawater out of the Salton Trough, which is more than 200 feet below sea level. A series of very high freshwater lake stands that occurred during the late Pleistocene have been documented in the Salton Trough, suggesting that the Colorado River began flowing into the Salton Trough on an occasional basis from that time. Ranging in elevation up to 170 feet above sea level, these Pleistocene freshwater lake shorelines date to between 25,000 and 45,000 years ago. The height of these Pleistocene lake stands reflects the elevation of the natural silt dam which separates the Gulf from the Salton Trough. These Pleistocene lake stands have been called Lake Cahuilla to refer to both the Pleistocene and Holocene lakes.

<u>Paleontological Significance</u>

Lake Cahuilla was a former freshwater lake that periodically occupied a major portion of the Salton Trough during late Pleistocene to Holocene time (approximately 37,000 to 240 years ago), depositing sediments that underlie the entire Project site (mapped as Quaternary lake deposits by Jennings [1967]). Generally, Lake Cahuilla sediments consist of an interbedded sequence of both freshwater lacustrine (lake) and fluvial (river/stream) deposits. The Lake Cahuilla Beds have yielded well-preserved subfossil remains of freshwater clams and snails and sparse remains of freshwater fish. The paleontological resources of the Lake Cahuilla Beds are considered significant because of the paleoclimatic and palaeoecological information they can provide, and these deposits are therefore assigned a high paleontological potential.

Project Site

The Project site is located within the City of Calipatria, approximately 3.8 miles southwest of the community of Niland. The Project site is located on three parcels (APN 020-100-025, 020-100-044, and 020-100-046) north of West Schrimpf Road, east of Davis Road, and south of McDonald Road. Geologic hazards present within the Project site are summarized below.

Faults and Seismicity

The Project site is located in the seismically active Imperial Valley of Southern California, with numerous mapped faults of the San Andreas Fault System traversing the region. The San Andreas Fault System is composed of the San Andreas, San Jacinto, and Elsinore Fault Zones in Southern California. The Imperial fault represents a transition from the more continuous San Andreas fault to a more nearly echelon pattern characteristic of the faults under the Gulf of California. Known faults or seismic zones that lie within a 45-mile radius of the Project site are listed in Table 4.5-1.

Table 4.5-1: Known Faults or Seismic Zones within a 45-Mile Radius of the Project

Fault Name	Approximate Distance (mi)	Maximum Moment Magnitude (M_w)	Fault Length (km)	Slip Rate (mm/yr)
Elmore Ranch	5.0	6.6	29 ± 3	1 ± 0.5
Hot Springs	12.4	-	-	-
San Andreas – Coachella	13.2	7.2	96 ± 10	25 ± 5
Imperial	18.3	7.0	62 ± 6	20 ± 5
Brawley	18.6	-	-	-
Superstition Hills	18.8	6.6	23 ± 2	4 ± 2
Superstition Mountain	22.5	6.6	24 ± 2	5 ± 3
San Jacinto – Borrego	27.0	6.6	29 ± 3	4 ± 2
Rico	28.9	-	-	-
Painted Gorge Wash	29.6	-	-	-
San Jacinto – Anza	31.5	7.2	91 ± 9	12 ± 6
Yuha Well	33.9	-	-	-
Unnamed 1	34.0	-	-	-
Shell Beds	34.4	-	-	-
Vista de Anza	35.6	-	-	-
Yuha	35.8	-	-	-
Unnamed 2	36.6	-	-	-
San Jacinto – Coyote Creek	37.3	6.8	41 ± 4	4 ± 2
Ocotillo	37.8	-	-	-
Laguna Salada	38.0	7.0	67 ± 7	3.5 ± 1.5
Elsinore – Coyote Mountain	38.9	6.8	39 ± 4	4 ± 2
Borrego (Mountain)	45.0	-	-	-

Notes: mi: miles; M_w: moment magnitude; km: kilometer; mm/yr: millimeters per year

Ground Shaking

One of the seismic hazards most likely to impact the Project site is strong ground shaking during an earthquake. Ground shaking from seismic events could reach the Project site if certain seismic factors (e.g., Richter magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surficial deposits or bedrock, degree of consolidation of surficial deposits, etc.) occur nearby.

Surface Rupture

Surface rupture is an offset of the ground surface when fault rupture extends to the Earth's surface. Normal- and reverse- (collectively called dip-slip) faulting surface ruptures feature vertical offsets, while strike-slip faulting produces lateral offsets. Many earthquake surface ruptures are combinations of both. Surface rupture represents a primary or direct potential hazard to structures built on an active fault zone. However, the Project site is not located in an Alquist-Priolo Earthquake Fault Zone that is prone to surface rupture. No faults are known to align through the Project site.

Landslides

Landslides occur when slopes become unstable and collapse. Landslides are typically caused by natural factors such as fractured or weak bedrock, heavy rainfall, erosion, earthquake activity, and fire, but also by human alteration of topography and water content. A landslide at the Proposed Project site is unlikely because of the regional planar topography. No ancient landslides are shown on geologic maps of the region, and no indications of landslides were observed by Landmark during their site investigation.

Liquefaction

Liquefaction occurs when granular soil below the water table is subjected to vibratory motions, such as produced by earthquakes. With strong ground shaking, an increase in pore water pressure develops as the soil tends to reduce in volume. If the increase in pore water pressure is sufficient to reduce the vertical effective stress (suspending the soil particles in water), the soil strength decreases and the soil behaves as a liquid (similar to quicksand). Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow bearing foundations. Four conditions are generally required for liquefaction to occur: (1) the soil must be saturated (relatively shallow groundwater), (2) the soil must be loosely packed (low to medium relative density), (3) the soil must be relatively cohesionless (not clayey), and (4) ground shaking of sufficient intensity must occur to function as a trigger mechanism. All these conditions exist to some degree at the Project site; however, the risk of liquefaction is low.

Subsidence

Land subsidence is a gradual caving or sinking of an area of land that can occur as a result of tectonic deformations (e.g., earthquakes) or anthropogenic causes such as mining or groundwater extraction. According to the Imperial County Seismic and Public Safety Element, subsidence from earthquakes and other activities, including geothermal resources development, can disrupt drainage systems and cause localized flooding. Subsidence was identified as a potential issue on the Project site by the Preliminary Geotechnical Report.

Soils

The University of California, Davis California Soil Resource Lab *SoilWeb Earth* computer application for Google Earth indicates that surficial deposits at the Project site consist predominantly of silty clay loams overlying fine sands of the Imperial soil group. These loams are formed in sediment and alluvium of mixed origin (Colorado River overflows and fresh-water lake-bed sediments).

Expansive soils are characterized by their potential “shrink-swell” behavior. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in certain fine-grained clay sediments from the process of wetting and drying. Clay minerals such as smectite, bentonite, montmorillonite, beidellite, vermiculite, and others are known to expand with changes in moisture content. The higher the percentage of expansive minerals present in near-surface soils, the higher the potential for significant expansion. The greatest effects occur when moisture content changes significantly or repeatedly. Expansions of 10 percent or more in volume are not uncommon. This change in volume can exert enough force on a building or other structure to cause cracked foundations, floors, and basement walls. Damage to structures can also occur when movement in the foundation is significant. Structural damage typically occurs over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Deposits that underly the Project site are considered to have a moderate to high potential for expansion.

4.5.2 Regulatory Setting

Federal

Federal Earthquake Hazards Reduction Act

This Act is also cited as the “National Earthquake Hazards Reduction Program Reauthorization Act of 2018.” The purpose of this Act is to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. Loss of life, injury, destruction of property, and economic and social disruption can be substantially reduced through the development and implementation of earthquake hazard reduction measures. To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRPA). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act, which refined the description of agency responsibilities, program goals, and objectives. The NEHRPA designates FEMA as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and U.S. Geological Survey (USGS).

International Building Code

Published by the International Code Council, the scope of this code covers major aspects of construction and design of structures and buildings, except for detached one- and two-family dwellings and townhouses not more than three stories in height. The International Building Code (IBC) contains provisions for structural engineering design. Published every three years (most recently in 2021) by the International Code Council, the IBC addresses the design and installation of structures and building systems through requirements emphasizing performance. The IBC includes codes governing structural strength (including seismic loads and wind loads) as well as fire- and life-safety provisions covering accessibility, egress, occupancy, and roofs.

State

Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards.

The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or, prior to January 1, 1994, Special Studies Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and State agencies for their use in planning and controlling new or renewed construction. Local agencies must regulate most development projects within the zones. Projects include all land divisions and most structures for human occupancy.

Before a project can be permitted for construction, cities and counties must require a geologic investigation to demonstrate that proposed buildings will not be constructed across active faults. An evaluation and written report of a specific site must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault.

Seismic Hazards Mapping Act of 1990

The Seismic Hazards Mapping Act of 1990 (7.8 PRC 2690-2699.6) directs the Department of Conservation, California Geological Survey to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of this Act is to reduce the threat to public safety and minimize the loss of life and property by identifying and mitigating these seismic hazards. The Seismic Hazard Zone maps identify where a site investigation is required, and the site investigation determines whether structural design or modification of the Project site is necessary for safer development. The Seismic Hazards Mapping Act requires site-specific geotechnical investigations identifying the seismic hazard and formulating mitigation measures, when needed, prior to permitting most developments designed for human occupancy within the Zones of Required Investigation.

California Building Code (2019)

Development within California is required at a minimum to adhere to the provisions of the Uniform Building Code (UBC). The UBC establishes minimum standards related to development, seismic design, building siting, and grading. The purpose of the UBC is to provide minimum standards to preserve public peace, health, and safety by regulating the design, construction, quality of materials, certain equipment, location, grading, use, occupancy, and maintenance of all buildings and structures. UBC standards address foundation design, shear wall strength, and other structural related conditions. Upon incorporation, the City adopted the 1997 edition of the UBC. The most recently adopted building code is the 2019 California Building Code (CBC), which applies to projects filing for building permits on or after January 1, 2020.

Public Resources Code, Chapter 1.7, Sections 5097.5

Several sections of the California PRC protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on state lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission.

Local

County of Imperial Grading Ordinance

The Purpose of Title 9, the Land Use Ordinance for the County of Imperial, is to provide comprehensive land use regulations for all unincorporated areas of the County. These regulations are adopted to promote and protect the public health, safety, and general welfare through the orderly regulation of land uses throughout the unincorporated areas of the County. Title 9 Division 15 (Geological Hazards) of the County Land Use Ordinance has established procedures and standards for development within earthquake fault zones. Per County regulations, the construction of buildings intended for human occupancy which are located across the trace of an active fault are prohibited. An exception exists when such buildings located near the fault or within a designated Special Studies Zone are demonstrated through a geotechnical analysis and report not to expose a person to undue hazard created by the construction.

County of Imperial General Plan

Relevant Imperial County General Plan policies related to geology, soils, and seismicity are provided below. Table 4.5-2 discusses the Project's consistency with the County's General Plan policies. While this EIR analyzes the Project's consistency with the General Plan pursuant to CEQA Guidelines Section 151250, the Imperial County Board of Supervisors ultimately determines consistency with the General Plan. The Imperial County General Plan does not specify any goals or objectives for paleontological resources. However, paleontological resources are a sub-category of cultural resources, which are analyzed in Section 4.3 of this EIR.

Table 4.5-2: General Plan Consistency

General Plan Policies	Consistency with General Plan	Analysis
Seismic and Public Safety Element		
Land Use Planning and Public Safety		
Objective 1.1 – Ensure that data on geological hazards is incorporated into the land use review process, and future development process.	Consistent	A Preliminary Geotechnical Report was prepared for the Project by LandMark (2020), which details a soil engineering site evaluation and presents the geotechnical conditions at the Project site to be considered in the design and construction of the Project (Appendix E). The Project site is not located within published geohazard areas other than high seismic ground motions and liquefaction risks. The Project would be designed in accordance with the

Table 4.5-2: General Plan Consistency

General Plan Policies	Consistency with General Plan	Analysis
		California Building Code; and appropriate mitigation measures, GEO-1 and PALEO-1 through PALEO-5, have been incorporated into this EIR to address potential geologic or seismic hazards. The Project is consistent with this objective.
Objective 1.4 – Require, where possessing the authority, that avoidable seismic risks be avoided; and that measures, commensurate with risks, be taken to reduce injury, loss of life, destruction of property, and disruption of service.	Consistent	See response for Objective 1.1.
Objective 1.7 – Require developers to provide information related to geologic and seismic hazards when siting a proposed project.	Consistent	See response for Objective 1.1.
Emergency Preparedness		
Objective 2.8 – Prevent and reduce death, injuries, property damage, and economic and social dislocation resulting from natural hazards including flooding, land subsidence, earthquakes, other geologic phenomena, levee or dam failure, urban and wildland fires and building collapse by appropriate planning and emergency measures.	Consistent	See response for Objective 1.1.
Seismic/Geologic Hazards		
Policy 4 – Ensure that no structure for human occupancy, other than one-story wood frame structures, shall be permitted within fifty feet of an active fault trace as designated on maps compiled by the State Geologist under the Alquist-Priolo Geologist Hazards Zone Act.	Consistent	The Project site is not located within fifty feet of an active fault and would not be used for human occupancy. Therefore, the Project is consistent with this policy.

4.5.3 Thresholds of Significance

In order to assist in determining whether a project would have a significant effect on the environment, the County utilizes the State CEQA Guidelines Appendix G Guidelines. Appendix G states that a project may be deemed to have impacts to geology and soils if it would:

Threshold a) **i) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

ii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

iii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

iv) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

Threshold b) **Result in substantial soil erosion or the loss of topsoil?**

Threshold c) **Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?**

Threshold d) **Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?**

Threshold e) **Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?**

Threshold f) **Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?**

Please refer to **Section 6.1: Effects Found Not to Be Significant** for an evaluation of those topics that were determined to be less than significant or have no impact and do not require further analysis in the EIR**.**

4.5.4 Methodology

Geologic Investigation

Field Exploration

Subsurface exploration was performed on July 20, 2020, using Kehoe Testing and Engineering, Inc. to advance three electric cone penetrometer (CPT) soundings to approximate depths of 50 feet below existing ground surface. The soundings were made at the locations shown on the Site and Exploration Plan. The approximate sounding locations were established in the field and plotted on the site map by sighting to discernible site features. Shallow (5-foot-deep) mechanical auger borings (6-inch-diameter) were made in the future laydown yard to the west in order to obtain near-surface soil samples for laboratory analysis.

Laboratory Testing

Laboratory tests were conducted on selected bulk (auger cuttings) obtained from the soil borings to aid in classification and evaluation of selected engineering properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials

(ASTM) or other standardized methods as referenced below. The laboratory testing program consisted of the following tests:

- Plasticity Index (ASTM D4318)
- Moisture-Density Relationship (ASTM D1557)
- Chemical Analyses (soluble sulfates and chlorides, pH, and resistivity) (Caltrans Methods)

The laboratory test results are presented on the subsurface logs in Appendix E. Engineering parameters of soil strength, compressibility, and relative density utilized for developing design criteria provided within the Preliminary Geotechnical Report were either extrapolated from correlations with the subsurface CPT data or from data obtained from the field and laboratory testing program.

Liquefaction Assessment

The computer program CLiq (Version 2.2.0.32) was utilized for liquefaction assessment at the Project site. The estimated settlements have been adjusted for transition zones between layers, and the post liquefaction volumetric strain has been weighed with depth. Computer printouts of the liquefaction analyses are provided in Appendix E.

Ground Shaking Assessment

The Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps Web Application was used to obtain the site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters, which directly indicated the sites ground shaking potential. Design earthquake ground motion parameters are provided in Appendix E.

Paleontological Resources

Chambers Group conducted a desktop review that included a review of published and unpublished paleontological literature and a search of museum records obtained by the San Diego Natural History Museum (SDNHM). Using the results of the literature review and records search, Chambers Group evaluated the paleontological resource potential of the geologic units underlying the Project site. A field survey was conducted for the geologic units identified as highly sensitive to assist in determining where paleontological monitoring may be necessary during Project implementation.

Determining the probability that a given project site might yield paleontological resources requires a knowledge of the geology and stratigraphy of the site, as well as researching any nearby fossil finds by: (1) reviewing published and unpublished maps and reports; (2) consulting online databases; (3) seeking any information regarding pertinent paleontological localities from local and regional museum repositories, and (4) if needed, conducting a reconnaissance site visit or paleontological resources field survey.

The University of California Museum of Paleontology (UCMP) online paleontological database was used to search for previously recorded paleontological localities in the Project vicinity. Only a single right dentary fragment from a Camelidae species was found near Coachella in 1953 (V5303). In addition, Chambers Group obtained paleontological record search data from the SDNHM on October 27, 2020. The SDNHM determined that the Proposed Project has the potential to impact late Pleistocene to Holocene-age Lake Cahuilla Beds. Although no recorded fossil localities have been identified within a 1-mile radius of the Project site, it is recommended that, due to the high sensitivity of the Lake Cahuilla Beds, a paleontological resource mitigation program and monitoring should be conducted on excavation activities extending down into undisturbed sediment.

4.5.5 Project Impact Analysis

Threshold a) **ii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?**

The Project site is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. Ground motions are dependent primarily on the earthquake magnitude and distance to the rupture zone. Acceleration magnitudes also are dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same general area.

The CBC requires that a site-specific ground motion hazard analysis be performed in accordance with American Society of Civil Engineers (ASCE) 7-16 Section 11.4.8 for structures on Site Class D and E sites with S_1 greater than or equal to 0.2 and Site Class E sites with S_s greater than or equal to 1.0. The Project site has been classified as Site Class D and has a S_1 value of 0.6, which would require a site-specific ground motion hazard analysis. However, ASCE 7-16 Section 11.4.8 provides three exceptions which permit the use of conservative values of design parameters for certain conditions for Site Class D and E sites in lieu of a site-specific hazard analysis. The exceptions are further described in Section 3.6 of Appendix E.

In accordance with mitigation measure GEO-1, outlined below, the Project structural engineer shall confirm whether an exception applies to the Project. If none of the above exceptions apply, a qualified geo-engineer shall be consulted to perform a site-specific ground motion hazard analysis. Additionally, the Project shall adhere to all of the recommendations for construction and building as noted in the Preliminary Geotechnical Investigation and as summarized in GEO-1. With implementation of GEO-1, impacts resulting from seismic ground shaking would be less than significant.

iii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

The soils encountered at the Project site during the geotechnical exploration included saturated silts and silty sands that could liquefy during a maximum considered earthquake. Liquefaction can occur within several thin isolated sandy silty layers between depths of 8 to 49 feet. The likely triggering mechanism for liquefaction at the Project site appears to be strong ground shaking associated with the rupture of the San Andreas Fault, Elmore Fault, and Brawley Seismic Zone. According to the Preliminary Geotechnical Report, total induced settlements at the Project site are estimated to be less than ¼ inch should liquefaction occur. Additionally, ground failure in the form of small ground fissures, sand boil formation, and lateral spreading is unlikely because of the thickness of the overlying unliquefiable soil and the planar topography of the area. Based on the estimate of less than ¼ inch of liquefaction-induced settlements, no ground improvement or deep foundations are required to mitigate liquefaction settlement at the Project site. Impacts related to seismic-related ground failure would be less than significant.

Threshold c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

According to the Preliminary Geotechnical Report, the hazard of a landslide occurring is unlikely at the Project site due to the regional planar topography. No ancient landslides were identified on geologic maps, aerial photographs, and topographic maps of the region; and no indications of landslides were observed during the geotechnical site investigation.

As discussed above, liquefaction may occur in isolated silt and sand layers encountered at various depths between 8 and 49 feet below ground surface. Potential liquefaction induced settlements of less than ¼ inch have been estimated for the Project site. Additionally, there is a very low risk of ground rupture and/or sand boil formation should liquefaction occur due to the thickness of the overlying unliquefiable soil.

Collapsible soil generally consists of dry, loose, low-density material that has the potential to collapse and compact (decrease in volume) when subjected to the addition of water or excessive loading. Soils found to be most susceptible to collapse include loess (fine-grained wind-blown soils), young alluvium fan deposits in semi-arid to arid climates, debris flow deposits, and residual soil deposits. Due to the cohesive nature of the subsurface soils and shallow groundwater, the potential for hydro-collapse of the subsurface soils at the Project site is considered very low.

The Project is not located on a geologic unit or soil that is unstable or that would become unstable as a result of the Project. Impacts would be less than significant.

Threshold d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Subsurface soils encountered during the field exploration conducted on July 20, 2020, consist of approximately 18 to 23 feet of near-surface clays. A 1- to 2-foot thick layer of loose to medium dense sandy silt layer was encountered from 18 to 24 feet below ground surface. Stiff clays to clayey silt soils were encountered at a depth of 20 to 48 feet below ground surface. Very loose to loose sandy/clayey silts were encountered at 48 to 50 feet below ground surface, the maximum depth of exploration.

The native surface clays likely exhibit moderate to high swell potential (Expansion Index, EI = 70 to 110) when correlated to Plasticity Index tests (ASTM D4318) performed on the native soils. The clay is expansive when wetted and can shrink with moisture loss (drying). Thus, mitigation measure GEO-1 would be implemented to reduce potential impacts related to expansive soils at the Project site to a less than significant level.

Threshold f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

The Cultural Resources Assessment (Appendix D) determined that the Project has the potential to impact late Pleistocene to Holocene-age Lake Cahuilla Beds due to the high sensitivity of the Lake Cahuilla Beds and the potential for excavation activities extending down into undisturbed sediment. Although no recorded fossil localities have been identified within a 1-mile radius of the Project site, mitigation measures PALEO-1 through PALEO-5 would be implemented to ensure potential impacts to paleontological resources would be less than significant.

4.5.6 Cumulative Impacts

Cumulative impacts are defined in CEQA as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Section 15355). Stated in another way, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing relating impacts” (CEQA Guidelines Section 15130 [a][1]).

Geology and Soils

The geographic scope for the cumulative geology and soils setting is the Imperial Valley portion of the Salton Trough physiographic province of Southern California. A list of large-scale proposed, approved, and reasonably foreseeable renewable energy projects is identified in Table 3.0-1: Related Projects of Section 3.0, Environmental Setting. None of these projects are adjacent to or in close proximity to the Project. In general, geology and soils impacts are site-specific and limited to the boundaries of each individual project rather than cumulative in nature.

As discussed above, the Project is susceptible to geologic hazards such as ground shaking and expansive soils. Implementation of mitigation measure GEO-1 would reduce the Project’s exposure to damage resulting from these hazards to less than significant levels. Furthermore, ground shaking and expansive soil impacts are site-specific and would not combine with similar impacts of large scale proposed, approved, and reasonably foreseeable renewable energy projects identified in Table 3.0-1 in Section 3.0. The Project would have a less than cumulatively considerable contribution to ground shaking and expansive soil impacts and would result in a less than cumulatively considerable impact.

Paleontological Resources

The geographic scope of the cumulative setting for paleontological resources includes Lake Cahuilla, which encompasses the entire Imperial Valley. Due to the abundance of invertebrate and vertebrate fossils discovered in the Lake Cahuilla Beds, this formation has a high paleontological potential. Cumulative development occurring within the boundaries of Lake Cahuilla has the potential to destroy or otherwise impact paleontological resources. Excavation activities associated with the Project, in conjunction with other large-scale proposed, approved, and reasonably foreseeable renewable energy projects in the region, could contribute to the progressive loss of fossil remains. While the potential for paleontological resources beneath the Project area is unknown, this does not negate the presence of such resources given the underlying Lake Cahuilla Beds. If present, paleontological resources beneath the Project area, as well as within the boundaries of the cumulative projects listed in Table 3.0-1, could be impacted during construction.

A cumulative impact would occur if the Project, in combination with other cumulative projects, would damage or destroy paleontological resources. However, with the implementation of mitigation measures PALEO-1 through PALEO-5, the Project would have a less than cumulatively considerable contribution to impacts to paleontological resources during construction. Likewise, other projects in the cumulative setting would be required to comply with existing regulations and undergo CEQA review to assure that any paleontological impacts are appropriately evaluated and, if necessary, mitigated on a project-by-project basis. Therefore, through compliance with regulatory requirements and standard conditions of approval, cumulative impacts to paleontological resources during construction are considered less than cumulatively considerable.

4.5.7 Mitigation Measures

In order to minimize potential impacts to geology and soils, the following mitigation measures should be implemented:

GEO-1: All grading operations and construction shall be conducted in conformance with the recommendations included in the Preliminary Geotechnical Report on the Project site that has been prepared by LandMark Geo-Engineers and Geologists (LandMark) in August 2020. Design, grading, and construction shall be performed in accordance with the recommendations of the project geotechnical consultant as summarized in a final written report, subject to review by the County, prior to commencement of grading activities.

A full description of recommendations in the Preliminary Geotechnical Investigation is provided in Section 4: Design Criteria of Appendix E. Recommendations are summarized below:

- **Site Preparation:** The site shall be properly cleared and grubbed. Any excavations resulting from site clearing shall be sloped to a bowl shape to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative. Prior to placing any fills, the surface 12 inches of soil should be uniformly moisture conditioned by disking and wetting to a minimum of optimum plus 2 to 8 percent and compacted to a minimum of 90 percent of ASTM D1557 maximum density. Onsite native clays placed as engineered fill should be uniformly moisture conditioned by disking and wetting or drying to optimum plus 2 to 8 percent and compacted in 6-inch maximum lifts to a minimum of 90-percent relative compaction. Clods shall be reduced by disking to a maximum dimension of 1.0 inch prior to being placed as fill. The existing surface soil within the Project shall be removed to the appropriate recommended depths. An engineered building support pad shall be placed below mat foundations. Aggregate shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density at 2 percent below to 4 percent above optimum moisture. Imported fill soil shall be nonexpansive and should meet the Unified Soil Classification System (USCS) classifications of ML (nonplastic), SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and no less than 5 percent passing the No. 200 sieve. The geotechnical engineer should approve imported fill soil sources before hauling material to the site. Imported fill should be placed in lifts no greater than 8 inches in loose thickness and compacted to a minimum of 95 percent of ASTM D1557 maximum dry density at optimum moisture ±2 percent. An engineered support pad consisting of 12 inches of Class 2 aggregate base shall be placed below mat foundations. The aggregate base shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density at 2 percent below to 4 percent above optimum moisture. Structures that are not sensitive to settlements, not heavy loaded, or that can be economically replaced or repaired such as small tanks, pumps, and vessels, can be supported on shallow foundations on reinforced structural fill. The performance of structural fill with respect to resisting liquefaction failure mechanisms, and reducing some of the static differential settlements can be enhanced by reinforced the structural fill with geogrid fabrics. The native soils should be excavated from the designated foundation areas extending 5.0 feet beyond all exterior foundation lines to 3.0 feet below the planned bottom of foundation level. Exposed subgrade should be inspected by the geotechnical engineer and if found to be loose, shall be scarified to a depth of 8 inches, uniformly moisture conditioned to 2 to 8 percent above optimum and recompacted to a minimum of 90 percent of the maximum density determined in accordance with ASTM D1557 methods. A 6-ounce non-woven separation fabric equivalent to Mirafi 160N or equivalent should be placed over the subgrade prior to placing the reinforced structural fill. In areas other than the basin backfill which are to receive housekeeping slabs or area concrete slabs, the ground surface should be presaturated (20 percent minimum moisture content) to a minimum depth of 24 inches and then scarified to 8 inches, moisture conditioned to a minimum of 5 percent over optimum, and recompacted to a minimum of 90 percent of ASTM D1557 maximum density just prior to concrete placement. All site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. Auxiliary structures such as free-standing or retaining walls should have footings extended to a minimum of 30 inches below grade. The existing soil beneath the structure foundation should be prepared in the manner described for the building pad except the preparation need only to extend 24 inches below and beyond the footing.

- **Shallow Foundations, Structural Mats and Settlements:** The Project shall implement shallow spread footings and continuous wall footings to support the structures planned for offices, control rooms, and warehouses. Footings shall be founded on 3 feet of engineered granular fill as described in Appendix E. The foundations shall be designed using an allowable soil-bearing pressure of 2,000 pounds per square foot (psf). The allowable soil pressure shall be increased by one-third for short term loads induced by winds or seismic events. Resistance to horizontal loads shall be developed by passive earth pressure on the sides of footings and frictional resistance developed along the bases of footings and concrete slabs. Passive resistance to lateral earth pressure shall be calculated using an equivalent fluid pressure of 300 equivalent fluid pressure (pcf) (for imported sands) to resist lateral loadings. The top 1 foot of embedment shall not be considered in computing passive resistance unless the adjacent area is confined by a slab or pavement. An allowable friction coefficient of 0.35 (for imported sands) shall also be used at the base of the footings to resist lateral loading. Foundation movement under the estimated static (non-seismic) loadings and static site conditions shall not exceed 0.75 inch with differential movement of about two-thirds of total movement for the loading assumptions stated above when the subgrade preparation guidelines given above are followed. Seismically induced liquefaction settlement shall be on the order of less than 0.75 inch. Mat foundations for lightly loaded structures like pumps, small tanks, generators, etc., shall be designed using an allowable soil bearing pressure of 1,500 psf when the foundation is supported on 12 inches of compacted Class 2 aggregate base (95 percent of ASTM D1557 maximum density to ±2 percent of optimum moisture). The native soils supporting the concrete structural mat and compacted aggregate base shall be moisture conditioned and recompacted as specified in Appendix E. The allowable soil pressure shall be increased by one-third for short-term loads induced by winds or seismic events. Design criteria for these mat foundations are provided in Appendix E.

- **Flexible Tank Foundations and Settlements**: The existing soils underlying the proposed tank area shall be removed to a depth of 36 inches below ground surface or a minimum of 24 inches below the bottom of the ring wall foundation (whichever is lower), extending to a minimum of 5 feet beyond the perimeter of the tank. Exposed subgrade shall be scarified to a depth of 8 inches, uniformly moisture conditioned to 2 to 8 percent above optimum moisture content, and recompacted to a minimum of 90 percent of the maximum density determined in accordance with ASTM D1557 methods. If soft conditions are encountered at the bottom of the excavation and subgrade compaction is not achievable, the native soil at the sub-excavation and footing excavation level shall be overlain by a woven geotextile stabilizing fabric (Mirafi HP 370 or equivalent). The area shall then be brought to finish grade with engineered fill consisting of the following components:

- 36 inches of reinforced crushed aggregate base
- 8 inches of crushed rock (1" x No. 4)
- 4 inches of oiled sand

The fill shall be crowned about 40 percent of the total center settlement to allow for differential settlement between the tank perimeter and center. If compaction of sub-excavation level is achievable, the 36 inches of aggregate base shall be placed in 8-inch maximum loose lifts and compacted to a minimum 95 percent of ASTM D1557 maximum density within 2 percent of optimum moisture. If bottom of excavation subgrade compaction is not achievable and the geotextile stabilizing fabric is utilized, the first 12-inch layer of aggregate base placed over the geotextile fabric shall be compacted to a minimum of 90 percent. The remaining engineered aggregate base fill shall be placed in 8-inch maximum loose lifts and compacted to a minimum 95 percent of ASTM D1557 maximum density within 2 percent of optimum moisture. The crushed rock tank underlayment shall meet the gradation requirements of ASTM C33, Size 57 (1" x No. 4 rock). The tank shall have a perimeter ring wall foundation which supports the tank wall and roof. The interior footings and the ring wall may be proportioned for a net load (in addition to the uniform tank liquid load) for dead load of roof weight (plus sustained live load). The minimum depth of the ring wall footing shall be 24 inches below the finished ground surface. The minimum footing width shall be 12 inches. Flexible connections such "Flex-Tend" expansion joints shall be used to connect exterior piping with the tank. The tank shall be preloaded and monitored for settlement prior to making piping connections. It may be necessary to readjust piping connections after the loading sequence. The estimated settlement for the different proposed diameter tanks with an imposed pressure load of 1,500 and 2,000 psf are included in Appendix E. If estimated settlements are excessive even for the flexible steel tanks and connections supported by the engineered fill, the existing soils underlying the clarifier tank shall be improved by soil mixing or soil replacement (sand/cement) with 48-inch diameter shafts. The minimum surface area replacement ratio shall be 20 percent. Following soil mixing, the area shall be brought to finish grade with engineered fill consisting of the following components:

- 36 inches of reinforced crushed aggregate base
- 8 inches of crushed rock (1" x No. 4)
- 4 inches of oiled sand

The fill may be crowned about 40 percent of the total center settlement to allow for differential settlement between the tank perimeter and center. Tank settlements with soil mixing improvement below the tank are shown in Appendix E.

- **Soil Mixing (Rigid Mats):** The use of soil improvement like soil mixing with cement or soil replacement (sand/cement) shall be used to reduce settlement to tolerable limits. The highly plastic native clays were found not to mix well with conventional soil mixing augers (Hudson Ranch 1 Plant site), and imported sands may be required for soil-cement mixing. Structural mat foundations placed over the improved soil shall be used to support the various structural elements of the plant. Mats overlaying soil mixed columns shall be underlain by 3 feet of crushed aggregate base (Caltrans Class 2, 1-½-inch or ¾-inch grading). The existing soils shall be improved by soil mixing or soil replacement (sand/cement) with 48-inch diameter shafts. The minimum surface area replacement ratio shall be 20 percent. Soil-cement design shall be provided by a licensed specialty contractor.

- **Auger Cast Piles:** Auger cast piles (cast-in-place grout with steel cage reinforcement) has been used successfully to provide deep foundations for heavily loaded and critical elements of industrial plants. Estimated capacities of 24- and 30-inch-diameter auger cast pile are provided in Appendix E. The structural capacity of the piles shall be verified by the structural engineer. The geotechnical engineer shall observe the auger cast pile drilling and electronic logs to evaluate each pile on a case-by-case basis.

- **Driven Piles:** The use of driven steel pipes had been used successfully for elevated pipe rack supports. Special provisions for corrosion protection due to the corrosive nature of the subsurface soils shall be implemented. Steel-driven pipe for the elevated pipe rack supports have been preliminarily sized as 10-inch-diameter with a 0.5-inch-thick wall. Axial and lateral loads were applied at 2 feet above ground surface. Estimated axial and lateral capacities of a 10-inch-diameter driven steel pipe are provided in Appendix E. Complete documentation of the proposed pile driving hammer shall be submitted to the geotechnical engineer for approval prior to mobilization. Driving records shall be maintained on each pile. The numbers of blows required to drive a pile each foot shall be recorded. Driving energy necessary to insure development of full design capacity shall be established after each selection of the pile driver. The geotechnical engineer shall observe pile driving and evaluate each pile on a case-by-case basis. Pre-drilling of pilot holes for piles to a depth of half the pile depth shall be allowed without reduction in pile capacity.

- **Concrete Mixes and Corrosivity:** A minimum of 6.5 sacks per cubic yard of concrete (4,500 pounds per square inch [psi]) of Type V Portland Cement with a maximum water/cement ratio of 0.45 (by weight) shall be used for concrete placed in contact with native soil on this Project (sitework including sidewalks, housekeeping slabs, and foundations). Admixtures may be required to allow placement of this low water/cement ratio concrete. Thorough concrete consolidation and hard trowel finishes shall be used due to the aggressive soil exposure. No metallic water pipes or conduits shall be placed below foundations. Foundation designs shall provide a minimum concrete cover of 5 inches around steel reinforcing or embedded components (anchor bolts, etc.) exposed to native soil. If the 5-inch concrete edge distance cannot be achieved, all embedded steel components (anchor bolts, etc.) shall be epoxy coated for corrosion protection (in accordance with ASTM D3963/A934) or a corrosion inhibitor, and a permanent waterproofing membrane shall be placed along the exterior face of the exterior footings. Additionally, the concrete shall be thoroughly vibrated at footings during placement to decrease the permeability of the concrete. A qualified corrosion engineer shall evaluate the corrosion potential on metal construction materials and concrete at the site to obtain final design recommendations.

- **Embankment Construction and General Site Fill:** All areas to receive new fill for the embankments shall be stripped of all vegetation. The surface 12 inches of native soil shall be uniformly moisture conditioned to 2 to 8 percent above optimum moisture by disking and compacted in 6-inch maximum lifts to a minimum of 90 percent of ASTM D1557 maximum density. The embankment slopes shall be constructed no steeper than 3:1 (unless lined with concrete or high-density polyethylene/polyvinyl chloride [HDPE/PVC] sheeting) with a minimum crown width of 15 feet. Embankments shall be overbuilt by 6 inches and subsequently cut to the plan line and grade to remove loose material along the slope faces. Native cohesive soil from the site or adjacent land areas shall be used as general and embankment fill and as pond liner material. The fill soils shall consist of cohesive silty clay (CL) or clay (CH). The general and embankment fill shall be pulverized/disked to less than 1 inch maximum clod size, uniformly moisture conditioned to 2 to 8 percent over optimum, placed in 6-inch maximum lifts, and compacted to a minimum of 90 percent of ASTM D1557 maximum density.

- **Excavations:** All site excavations shall conform to California Division of Occupational Safety and Health (Cal/OSHA) requirements for Type B soil. The contractor is solely responsible for the safety of workers entering trenches. Temporary excavations with depths of 4 feet or less shall be cut nearly vertical for short duration. Excavations deeper than 4 feet shall require shoring or slope inclinations in conformance to Cal/OSHA regulations for Type B soil. Surcharge loads of stockpiled soil or construction materials shall be set back from the top of the slope a minimum distance equal to the height of the slope. All permanent slopes shall not be steeper than 3:1 to reduce wind and rain erosion. Slopes protected with ground cover may be as steep as 2:1; however, maintenance with motorized equipment shall not be implemented at this inclination.

- **Utility Trench Backfill:** Prior to placement of utility bedding, the exposed subgrade at the bottom of trench excavations shall be examined for soft, loose, or unstable soil. Loose materials at trench bottoms resulting from excavation disturbance shall be removed to firm material. If extensive soft or unstable areas are encountered, these areas shall be over-excavated to a depth of at least 2 feet or to a firm base and replaced with additional bedding material. Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) shall consist of a 4- to 8-inch bed of ⅜-inch crushed rock, sand/cement slurry, and/or crusher fines (sand) extending to a minimum of 12 inches above the top of the pipe. If crushed rock is used for pipe zone backfill for utilities, the crushed rock material shall be completed surrounded by a 6-ounce non-woven filter fabric such as Mirafi 160N or equivalent. The filter fabric shall cover the trench bottom, sidewalls, and over the top of the crushed rock to inhibit the migration of fine material into void spaces in the crushed rock, which may create the potential for sinkholes or depressions to develop at the ground surface. Pipe bedding shall be in accordance with the pipe manufacturer's recommendations and local codes and/or bedding requirements for specific types of pipes. Native backfill shall be placed and compacted only after buried pipes are encapsulated with suitable bedding and pipe envelope material. Mechanical compaction is recommended; ponding or jetting shall not be allowed, especially in areas supporting structural loads or beneath concrete slabs supported on grade, pavements, or other improvements. All trench backfill shall be placed and compacted in accordance with recommendations provided above for engineered fill. The pipe zone material (crusher fines, sand) shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density. Pipe deflection shall be checked not to exceed 2 percent of pipe diameter. Soils used for trench backfill shall be placed in maximum 6-inch lifts (loose) and compacted to a minimum of 90 percent of ASTM D1557 maximum density at a minimum of 4 percent above optimum moisture. Granular trench backfill used in building pad areas shall be plugged with a solid (no clods or voids) 2-foot width of native clay soils at each end of the building foundation to prevent landscape water migration into the trench below the building. Backfill soil of utility trenches within paved areas shall be uniformly moisture conditioned to a minimum of 4 percent above optimum moisture, placed in layers not more than 6 inches in thickness, and mechanically compacted to a minimum of 90 percent of the ASTM D1557 maximum dry density, except that the top 12 inches shall be compacted to 95 percent (if granular trench backfill).

- **Seismic Design:** Designs shall comply with the latest edition of the CBC for Site Class D using the seismic coefficients given in Appendix E.

- **Laydown Yard:** The new laydown yard shall consist of a minimum of 8.0 inches of Caltrans Class 2 aggregate base placed over 12 inches of moisture-conditioned native clay soil (minimum of 2 percent above optimum moisture) compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D1557. Alternately, the access roads shall consist of 6 inches of aggregate base placed over 9 inches of lime-treated soil compacted to a minimum of 90 percent. Preliminary estimates of lime content required to stabilize the clay soils is 6 percent hydrated lime by weight of soil.

- **Pavements:** Pavements shall be designed according to the 2020 Caltrans Highway Design Manual or other acceptable methods. The public agency or design engineer shall decide the appropriate traffic index for the site.

- The Project structural engineer shall confirm whether an ASCE 7-16 Section 11.4.8 exception applies to the Project. If none of the exceptions apply, a qualified geo-engineer shall be consulted to perform a site-specific ground motion hazard analysis.

- Development of building foundations and concrete flatwork shall include provisions for mitigating potential swelling forces and reduction in soil strength, which can occur from saturation of the soil. Typical measures considered to remediate expansive soil include:

    - Capping silt/clay soil with a non-expansive sand layer of sufficient thickness (3 feet minimum) to reduce the effects of soil shrink/swell

    - Moisture conditioning subgrade soils to a minimum of 5 percent above optimum moisture (ASTM D1557) within the drying zone of surface soils

    - Designing foundations to be resistant to shrink/swell forces of silt/clay soil

    - A combination of the methods described above

In order to minimize potential impacts to paleontological resources, the following mitigation measures shall be implemented:

PALEO-1: Developer shall retain the services of a qualified paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. The consultant shall provide a supervising paleontological specialist and a paleontological monitor to be present at the Project construction phase kickoff meeting.

PALEO-2: On the first day of construction and thus prior to any ground disturbance in the Project site, the supervising cultural resources specialist and cultural resources monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the Project construction work phase, for which the lead contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and will be performed periodically for new personnel coming onto the project as needed.

PALEO-3: The contractor shall provide the supervising paleontological resources specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours shall be provided to the consultant of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

A paleontological monitor shall be present on site at the commencement of ground-disturbing activities related to the Project. The monitor, in consultation with the supervising paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors shall have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor shall maintain a daily record of observations as an ongoing reference resource and to provide a resource for final reporting upon completion of the Project.

The supervising paleontologist, paleontological monitor, and the lead contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

PALEO-4: If paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a qualified paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.

PALEO-5: At the completion of all ground-disturbing activities, the consultant shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds, as well as providing follow-up reports of any finds to the SCIC, as required.

4.5.8 Level of Significance After Mitigation

With the implementation of mitigation measures GEO-1 and PALEO-1 through PALEO-5, the Project would ensure potential impacts related to geology and soils would remain less than significant.