

## 4.6 Geology and Soils

This section evaluates the potential for impacts on geology and soils resulting from implementation of The Cubes at Placentia Industrial Project (Proposed Project or Project).

- Geotechnical Investigation, Proposed Warehouse, NWC Placentia Avenue at Murrieta Road, Perris, California prepared by Southern California Geotechnical (2021) and included in Appendix F of this Environmental Impact Report (EIR)

No comments were received in response to the Notice of Preparation regarding geology and soils. At the Draft EIR public scoping meeting on December 19, 2023, there were no comments regarding geology and soils received in response from Planning Commissioners, organizations' representatives, or members of the public.

### 4.6.1 Environmental Setting

The following sections describe the environmental setting for the Proposed Project as it relates to geology and soils.

#### 4.6.1.1 Regulatory Setting

This section describes the federal, state, and local regulatory framework adopted to address geology and soils.

#### **Federal**

##### ***Antiquities Act (16 USC 431–433)***

The Antiquities Act of 1906 states, in part, the following:

That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the act itself or in the act's uniform rules and regulations (43 CFR 3), the term "objects of antiquity" has been interpreted to include fossils by the National Park Service, Bureau of Land Management, U.S. Forest Service, and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this act. However, due to the large gray areas left open to

interpretation due to the imprecision of the wording, agencies are hesitant to interpret this act as governing paleontological resources.

***Paleontological Resources Preservation, Omnibus Public Lands Act, Public Law 111-011, Title VI, Subtitle D***

This legislation directs the Secretaries of the U.S. Department of the Interior and U.S. Department of Agriculture to manage and protect paleontological resources on federal land using “scientific principles and expertise.” To formulate a consistent paleontological resources management framework, the act incorporates most of the recommendations from the Secretary of the Interior’s report Assessment of Fossil Management on Federal and Indian Lands (USDI 2000). In passing the act, Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The act codifies existing policies of the Bureau of Land Management, National Park Service, U.S. Forest Service, Bureau of Reclamation, and U.S. Fish and Wildlife Service and provides the following:

- Uniform criminal and civil penalties for illegal sale and transport and theft and vandalism of fossils from federal lands
- Uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants)
- Uniform definitions for “paleontological resources” and “casual collecting”
- Uniform requirements for curation of federal fossils in approved repositories

**State**

***Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code, Section 2621 et seq.)***

The Alquist-Priolo Earthquake Fault Zoning Act was signed into state law in 1972. Its primary purpose is to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The act delineates “Earthquake Fault Zones” along faults that are “sufficiently active” and “well defined.” The act also requires that cities and counties withhold development permits for sites within an earthquake fault zone until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Pursuant to this act, structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

***California Building Code (California Code of Regulations, Title 14, Part 2)***

Current law states that every local agency enforcing building regulations, such as cities and counties, must adopt the provisions of the California Building Code (CBC) within 180 days of its publication. The publication date of the CBC is established by the California Building Standards

Commission, and the code is also known as Title 24, Part 2, of the California Code of Regulations. The most recent building standard adopted by the legislature and used throughout the state is the 2019 version of the CBC (effective January 1, 2020), often with local, more restrictive amendments that are based on local geographic, topographic, or climatic conditions. These codes provide minimum standards to protect property and public safety by regulating the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The CBC contains provisions for earthquake safety based on factors including occupancy type, types of soil and rock on site, and strength of ground shaking with specified probability of occurring at a site.

***California Public Resources Code, Section 5097.5***

Paleontological sites are protected under a variety of state policies and regulations in the California Public Resources Code. In addition, paleontological resources are recognized as nonrenewable resources and receive protection under the California Public Resources Code and California Environmental Quality Act (CEQA). California Public Resources Code, Section 5097.5, states the following:

A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. . . . A violation of this section is a misdemeanor.

This statute prohibits the removal, without permission, of any paleontological site or feature from lands under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. As a result, local agencies are required to comply with California Public Resources Code, Section 5097.5, for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. California Public Resources Code, Section 5097.5, also establishes the removal of paleontological resources as a misdemeanor and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) lands.

***Natural Hazards Disclosure Act (California Civil Code, Section 1103.2)***

The Natural Hazards Disclosure Act requires that sellers of real property and their agents provide prospective buyers with a Natural Hazard Disclosure Statement when the property being sold lies within one or more state-mapped hazard areas, including a seismic hazard zone. California law also requires that, when houses built before 1960 are sold, the seller must give the buyer a completed earthquake hazards disclosure report and the booklet *The Homeowners Guide to Earthquake Safety*. This publication was written and adopted by the California Seismic Safety Commission.

### ***Seismic Hazard Mapping Act (California Public Resources Code, Sections 2690–2699.6)***

The Seismic Hazard Mapping Act was adopted by the state in 1990 to protect the public from the effects of non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, seismically induced landslides, or other ground failure caused by earthquakes. The goal of the act is to minimize loss of life and property by identifying and mitigating seismic hazards. The California Geological Survey prepares and provides local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The act requires responsible agencies to only approve projects within seismic hazard zones following a site-specific investigation to determine if the hazard is present, and if so, the inclusion of appropriate mitigation. In addition, the act requires real estate sellers and agents at the time of sale to disclose if a property is in one of the designated seismic hazard zones.

### ***Soils Investigation Requirements***

California Health and Safety Code, Sections 17953–17955, and CBC Section 1802 include requirements for soils investigations for subdivisions requiring tentative and final maps and for other specified types of structures. Testing of samples from subsurface investigations, such as from borings or test pits, is required. Studies must be done as needed to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on load-bearing capacity, compressibility, liquefaction, differential settlement, and expansiveness.

## **Local**

### ***City of Perris General Plan***

The specific policies outlined in the City of Perris General Plan that are related to geology and soils and that apply to the Proposed Project are listed in Table 4.10-3, City of Perris General Plan Consistency Analysis, of Section 4.10, Land Use and Planning, of this EIR. Notably, the Safety Element policies applicable to the analysis of geology and soils include:

**Policy I.E.** All development will be required to include adequate protection from damage due to seismic incidents.

- |                      |                                                                                                                                                                                                                                                                   |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measure I.E.1</b> | Require geological and geotechnical investigations by State-licensed professionals, in areas with potential for earthquake-induced liquefaction, landsliding, other slope instability, or settlement as part of the environmental and development review process. |
| <b>Measure I.E.2</b> | Require implementation of mitigation measures identified in such investigations mentioned above [in Measure I.E.1], prior to the issuance of grading and building permits.                                                                                        |

- Measure I.E.5** Adopt and enforce the most current version of the California Building Code (CBC).

### ***City of Perris Building Code***

Chapter 16.08 (Building, Plumbing and other Codes Adopted), of the City of Perris Municipal Code includes the City's Building Code. Building construction is governed by the CBC; however, the City has amended and provided exemptions to the CBC that address specific geologic considerations in the City. As identified in Chapter 16.08.050 (Adoption of the 2019 CBC), the 2019 CBC shall become the building codes of the City for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area, and maintenance of all buildings and structures in the City.

#### **4.6.1.2 Existing Conditions**

##### **Soils and Geology**

As required by the Perris Valley Commerce Center Specific Plan (PVCCSP) EIR mitigation measure MM Geo 1 presented below, a Geotechnical Investigation of the Project Site was conducted, and is included in Appendix F of this EIR. The Geotechnical Investigation included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for Project design. A total of 7 borings were advanced to depths of approximately 10 to 50 feet below existing site grades.

Native alluvium was encountered at the ground surface at all the boring locations, extending to at least the maximum depth explored of 50 feet. The alluvial soils generally consist of interbedded layers of medium dense to very dense silty sands, sandy silts, and clayey sands with varying clay and fine gravel content and very stiff to hard silty clays, clayey silts and sandy clays with varying sand and silt content.

##### **Groundwater**

Free water was encountered during the drilling at 3 of the boring locations. Water was encountered at depths of 27 to 30 feet below existing site grades at Boring Nos. B-1, B-5 and B-9. The remaining boreholes were dry at the time of completion of drilling. Therefore, the static groundwater table is considered to have been present at depths of 27 to 30 feet below the existing site grades at the time of subsurface exploration. Recent water level data indicates that the nearest monitoring well is located approximately 3,168 feet northeast from the Project Site (California Department of Water Resources 2021). Water level readings within this monitoring well indicate a high groundwater level of 25 feet below the ground surface in November 2020.

##### **Topography**

The Project Site consists of a rectangular-shaped parcel, 27.26 net acres in size. The Project Site is currently vacant and undeveloped. The ground surface consists of hummocky soil covered by

dense native grass and weed growth. The Project Site is relatively level with localized undulations of 1 to 2 feet.

### **Faulting and Seismicity**

Research of available maps indicates that the Project Site is not located within an Alquist-Priolo Earthquake Fault Zone. No evidence of faulting was identified during the Geotechnical Investigation. Accordingly, the potential for fault rupture at the Project Site is extremely low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the Project Site is considered low.

### **Surface Fault Rupture**

Ground surface rupture along an earthquake fault may cause damage to aboveground infrastructure and other features. The State of California has mapped known active faults that may cause surface fault rupture in inhabited areas as part of the Alquist-Priolo Earthquake Fault Zoning Act. There are no known active faults crossing the Project Site and, as discussed above, it is not located within an Alquist-Priolo Earthquake Fault Zone as defined by the state. The likelihood of surface fault rupture at the Project Site is relatively low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

### **Seismically Induced Ground Shaking**

Strong ground shaking from an earthquake can result in damage associated with landslides, ground lurching, structural damage, and liquefaction. The Project Site is subject to moderate levels of seismically induced ground shaking due to its proximity to active faults capable of producing a maximum moment magnitude of 6.0 or more. According to the United States Geologic Survey, the de-aggregated mean magnitude for the Project Site is 6.97, based on the peak ground acceleration and soil classification D.

### **Liquefaction**

Liquefaction is the loss of soil strength or stiffness due to a build-up of water pressure between soil particles during severe ground shaking or other rapid loading. This condition is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils that often make up alluvial materials. Lateral spreading is the finite, horizontal movement of material associated with pore pressure build-up or liquefaction. This process can occur in a shallow underlying deposit during an earthquake in areas susceptible to liquefaction. To occur, lateral spreading requires the existence of a continuous and laterally unconstrained liquefiable zone.

The Project Site is located within a zone of moderate liquefaction susceptibility as mapped by the County of Riverside. Potentially liquefiable soils were encountered at one of the 50-foot-deep

boring locations. The potentially liquefiable soils were generally encountered at depths between 27 and 37 feet.

### **Lateral Spreading**

Lateral spreading is the finite, horizontal movement of material associated with pore pressure build-up or liquefaction. This process can occur in a shallow underlying deposit during an earthquake in areas susceptible to liquefaction. To occur, lateral spreading requires the existence of a continuous and laterally unconstrained liquefiable zone. Lateral spreading can occur on gently sloping and on flat ground close to rivers and lakes. The potential for lateral spreading affecting the Project Site is considered low.

### **Landslides**

Landslides are gravity-driven movements of earth materials that may include rock, soil, unconsolidated sediment, or combinations of such materials. The primary factors influencing the stability of a slope are the nature of the underlying soil or bedrock, the geometry of the slope (height and steepness), and rainfall. The presence of historical landslide deposits is a good indicator of future landslides. Landslides are commonly triggered by unusually high rainfall and the resulting soil saturation, by earthquakes, or a combination of these conditions. The Slope Instability Map of the Safety Element of the City of Perris General Plan indicates that the Project Site is not mapped in an area susceptible to seismically induced landslides (City of Perris 2022).

### **Paleontological Setting**

Paleontological resources are nonrenewable scientific and educational resources. Projects subject to CEQA must determine if a project would “directly or indirectly destroy a unique paleontological resource.” An impact to paleontological resources would be considered a significant impact if a project results in the direct or indirect destruction of a unique or important paleontological resource or site. A project site is deemed paleontologically sensitive if (1) it has fossils that have previously been recovered from a particular geologic unit; (2) there are recorded fossil localities within the same geologic units as occur within the project area; and (3) the types of fossil materials that have been recovered from the geologic unit are unique or important.

### **Paleontological Resources**

The City of Perris General Plan Conservation Element Exhibit CN-7, Paleontological Sensitivity, identifies the potential for areas of the City to contain paleontological resources. The Project Site is located within Paleontological Sensitivity Area #5, low to high sensitivity, with younger alluvium overlying older fan alluvium at depth. Once excavation in this area reaches 5 feet below ground surface, the potential for impacts to paleontological resources changes from low to high potential.

### 4.6.2 Thresholds of Significance

According to Appendix G of the Guidelines for Implementation of the California Environmental Quality Act (CEQA Guidelines), the Project would have a significant impact on geology and soils if it would:

- **Threshold GEO-1:** 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.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- **Threshold GEO-2:** Result in substantial soil erosion or the loss of topsoil.
- **Threshold GEO-3:** 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 GEO-4:** 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 GEO-5:** 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 GEO-6:** Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

### 4.6.3 Regulatory Requirements

- RR GEO-1**      The Proposed Project will comply with specific policies outlined in the City of Perris General Plan that are related to geology and soils including Policy I.E, Measure I.E.1, Measure I.E.2, and Measure I.E.5.
- RR GEO-2**      The Project will comply with Chapter 16.08 (Building, Plumbing and other Codes Adopted), of the Perris Municipal Code includes the City's Building Code. As identified in Chapter 16.08.050 (Adoption of the 2019 California Building Code), the 2019 CBC shall become the building codes of the City for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures in the City.

#### **4.6.4 Environmental Impacts**

The following sections address various potential impacts relating to geology and soils that could result from implementation of the Proposed Project.

##### **Applicable PVCCSP Standards and Guidelines and Mitigation Measures**

There are no PVCCSP Standard and Guidelines applicable to the analysis of geology and soils. The PVCCSP EIR includes mitigation measure MM Geo 1 for potential impacts related to geology and soils. As required by PVCCSP EIR mitigation measure MM Geo 1, a site-specific Geotechnical Investigation has been prepared for the Proposed Project and is included in Appendix F of this EIR.

**MM Geo 1** Concurrent with the City of Perris' review of implementing development projects, the Project proponent of the implementing development Project shall submit a geotechnical report prepared by a registered geotechnical engineer and a qualified engineering geologist to the City of Perris Public Works/Engineering Administration Division for its review and approval. The geotechnical report shall assess the soil stability within the implementing development project affecting individual lots and building pads, and shall describe the methodology (e.g., over-excavated, backfilled, compaction) being used to implement the project's design.

The Cultural Resources section of the PVCCSP EIR also identifies mitigation measure MM Cultural 5 for the discovery of paleontological resources. Project-level mitigation measure MM GEO-1 presented below implements PVCCSP EIR mitigation measure MM Cultural 5, as subsequently revised by the City of Perris.

##### **4.6.4.1 Threshold GEO-1: Exposure to Seismic-Related Hazards**

##### **Impact Analysis**

Fault rupture can occur along pre-existing, known active fault traces; however, fault rupture also can splay from known active faults or rupture along unidentified fault traces. Section 3, Geology and Soils, of the PVCCSP EIR Initial Study determined that the Perris Valley Commerce Center (PVCC) area is not located in an Alquist-Priolo Earthquake Fault Zone, and no other known faults are in the vicinity. This is consistent with the conclusions of the site-specific geotechnical studies, which identify that research of available maps indicate that the Project Site is not located within an Alquist-Priolo Earthquake Fault Zone, and that SCG did not identify any evidence of faulting during the Geotechnical Investigation. Accordingly, the Geotechnical Investigation concludes that the potential for fault rupture on the Project Site is extremely low. There would be no impact related to the potential to directly or indirectly expose people or structures to substantial adverse effects related to ground rupture.

Section 3, Geology and Soils, of the PVCCSP EIR Initial Study concludes that the PVCC area, which includes the Project Site, would be subject to strong ground shaking, typical of Southern California, and that design and construction in accordance with current building codes and all geotechnical recommendations would reduce potential impacts from ground shaking to a less than significant level.

Consistent with PVCCSP EIR Perris Valley Commerce Center (MM Geo 1 above, a site-specific Geotechnical Investigation has been prepared by a registered geotechnical engineer for the Project Site. The nearest earthquake fault is the San Jacinto Fault, located approximately 6.7 miles northeast of the Project Site. The risk for seismic hazards is not substantially different than the risk to properties throughout the Southern California area.

The Geotechnical Investigation includes site-specific seismic design parameters and provides design/construction recommendations for geotechnical design, grading, construction, foundations, floor slabs, exterior flatwork, retaining walls, and pavement. Consistent with City of Perris General Plan policies cited above, the Proposed Project would be designed and constructed in accordance with all final Geotechnical Investigation recommendations (referred to as mitigation measures in General Plan Safety Element Implementation Measure I.E.2 above), which are based on CBC requirements. The Geotechnical Investigation concludes that the Proposed Project is considered feasible from a geotechnical standpoint.

Further, the PVCCSP EIR and the Perris Building Code, which incorporates the CBC, provide guidelines and parameters that reduce the effects of ground shaking produced by regional seismic events. The Project Owner/Developer is required to implement seismic design considerations in accordance with the CBC, which is reflected in General Plan Safety Element Implementation Measure I.E.5. Notably, the City would apply a mandatory condition of approval on the Proposed Project that would require all buildings to be constructed in accordance with the City of Perris Building Code, which incorporates the CBC.

Consistent with General Plan Safety Element measures cited above and PVCCSP EIR mitigation measure MM Geo 1, the Proposed Project would be designed and constructed in accordance with all final Geotechnical Investigation recommendations (referred to as mitigation measures in General Plan Safety Element Implementation Measure I.E.2 above) and the Geotechnical Investigation shall be reviewed and approved by the City Engineer. With adherence to the City of Perris General Plan policies, compliance with the CBC, and City of Perris Building Code, and mandatory compliance with the recommendations of the final Geotechnical Investigation related to design and construction, the Proposed Project would not directly or indirectly expose people or structures to substantial adverse effects, including loss, injury or death, involving strong seismic ground shaking. This potential impact would be less than significant.

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions, which causes the soil to behave as a viscous liquid. Liquefaction is generally limited to the upper 50 feet of subsurface soils. Research and historical data indicate that loose granular soils of Holocene to late Pleistocene age below a near-surface groundwater table are most susceptible to liquefaction, while the stability of most clayey material is not adversely affected by vibratory motion.

Section 3, Geology and Soils, of the PVCCSP EIR Initial Study identifies that the PVCC area includes locations with varying liquefaction potential, from low to very high, and that site-specific geotechnical studies shall determine the liquefaction risk for each project. As previously discussed, based on review of the Riverside County GIS website, the site-specific Geotechnical Investigation indicate the Project Site is located within a zone of moderate liquefaction susceptibility.

Potentially liquefiable soils were encountered at one of the 50-foot-deep boring locations. The potentially liquefiable soils were generally encountered at depths between 27 to 37 feet. Settlement analysis was performed for the potentially liquefiable stratum.

The result of the settlement analyses, total dynamic settlements due to liquefaction are expected to range from 0.0 to 0.8 inches. The resulting differential settlements are expected to be on the order of 0.5 inches. The estimated differential settlement can be assumed to occur across a distance of 100 feet, indicating a maximum angular distortion of less than 0.001 inches.

It is considered feasible to support the proposed structure on shallow foundations. Such a foundation system can be designed to resist the effects of the anticipated differential settlements, to the extent that the structure would not catastrophically fail. Designing the proposed structure to remain completely undamaged during a major seismic event is not considered to be economically feasible. Based on this understanding, the use of shallow foundation systems is considered to be the most economical means of supporting the proposed structure.

To support the proposed structure on shallow foundations (such as spread footings) the structural engineer would be required to verify that the structure would not catastrophically fail due to the predicted dynamic differential settlements. Any utility connections to the structure should be designed to withstand the estimated differential settlements. It should also be noted that minor to moderate repairs, including re-leveling, restoration of utility connections, and repair of damaged drywall and stucco, would likely be required after occurrence of the liquefaction-induced settlements.

The use of a shallow foundation system, as described in the Geotechnical Investigation, is typical for buildings of this type, where they are underlain by the extent of liquefiable soils encountered at the Project Site. The post-liquefaction damage that could occur within the building proposed for the Project Site would be typical of similar buildings in the vicinity of the Proposed Project.

Consistent with General Plan measures cited above and PVCCSP EIR mitigation measure MM Geo 1, the Proposed Project would be designed and constructed in accordance with all final Geotechnical Investigation recommendations (referred to as mitigation measures in General Plan Safety Element Implementation Measure I.E.2 above) and the Geotechnical Investigation shall be reviewed and approved by the City Engineer. With adherence to the City of Perris General Plan policies, compliance with the CBC and City of Perris Building Code, and mandatory compliance with the recommendations of the final Geotechnical Investigation related to design and construction, the Proposed Project would not directly or indirectly expose people or structures to substantial adverse effects, including loss, injury or death from seismic-related ground failure, including liquefaction. This potential impact would be less than significant.

Section 3, Geology and Soils, of PVCCSP EIR Initial Study concludes that there would be no impacts related to landslides, as the PVCC area, which includes the Project Site, is relatively flat and not located near any areas that possess potential landslide characteristics. There are no hillsides or steep slopes at the Project Site or in the immediate vicinity of the area. Accordingly, implementation of the Proposed Project would not expose people or structures at the Project Site to substantial landslide risks, and implementation of the Proposed Project would not pose a substantial direct or indirect landslide risk to properties surrounding the Project Site. No impact would occur.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.2 Threshold GEO-2: Soil Erosion or Topsoil Loss**

##### **Impact Analysis**

Erosion is the process by which the upper layers of the surface (such as soils) are worn and removed by the movement of water or wind. Soils with characteristics such as low permeability or low cohesive strength are more susceptible to erosion than those soils having higher permeability and cohesive strength. Wind erosion can damage land and natural vegetation by removing soil from one place and depositing it in another. It mostly affects dry, sandy soils in flat, bare areas, but wind erosion may occur wherever soil is loose, dry, and finely granulated. Under existing conditions, the Project Site has the potential to contribute windblown soil and sand because it is undeveloped with no or little vegetative cover and contains loose and dry topsoil conditions.

The PVCCSP EIR Initial Study concludes that no long-term soil erosion would occur, as PVCCSP implementing projects would involve the development of structures, paving (i.e., hardscape), and landscaping; short-term construction-related erosion potential would be addressed through compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements, and impacts would be less than significant.

***Construction-Related Erosion***

The largest source of erosion and topsoil loss, particularly in a developed environment, is uncontrolled drainage during construction. The Project Site is relatively flat. Ground disturbance (including over excavation, utility trenching, and foundation excavation during construction activities on exposed soils) could lead to erosion and topsoil loss during heavy rains and windy conditions. Grading for the Proposed Project would be limited to relatively minor cuts and fills to establish design grades, to prepare building foundations, and for utility trenching/infrastructure excavation.

As further discussed in Section 4.9, Hydrology and Water Quality, of this EIR, pursuant to the requirements of the State Water Resources Control Board, the Project Owner/Developer would be required to obtain an NPDES permit for construction activities, including grading. The NPDES permit is required for all development projects that include construction activities, such as clearing, grading, or excavation that disturb at least 1 acre of total land area. The City's Municipal Separate Storm Sewer System (MS4) NPDES Permit requires development projects to prepare and submit to the City for approval a site-specific Storm Water Pollution Prevention Plan to demonstrate compliance with the NPDES permit requirements. The Storm Water Pollution Prevention Plan is required to identify a combination of erosion control and sediment control measures (i.e., Best Management Practices) that would reduce or eliminate sediment discharge to surface water from stormwater and non-stormwater discharges during construction. In addition, as discussed in Section 4.2, Air Quality, of this EIR, the Project Owner/Developer would be required to comply with South Coast AQMD Rule 403's requirements related to fugitive dust control, which would reduce the amount of particulate matter in the air and minimize the potential for wind erosion. With mandatory compliance with all applicable regulatory requirements as presented in the Air Quality and Hydrology and Water Quality sections of this EIR, the potential for water or wind erosion at the Project Site during construction activities would be less than significant.

***Post-Development Erosion***

Regarding erosion during long-term Project operation, consistent with the PVCCSP EIR Initial Study, the Project Site would be landscaped or covered with impervious surfaces and surface runoff would be captured and treated by an on-site storm drain system. Implementation of the Proposed Project would result in less long-term erosion and loss of topsoil than under existing conditions.

Operations of the Proposed Project would result in an increase in impervious areas and uses that could increase runoff or pollutants into surface water or groundwater. The Proposed Project would comply with the Section G, New Development and Redevelopment, of the Municipal Regional Stormwater Permit (NPDES Permit No. CAS 618033) which aims to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff from projects. The provision requires regulated projects to include low-impact

development practices, such as pollutant source control measures and stormwater treatment features aimed to maintain or restore the Project Site's natural hydrologic functions.

The Municipal Regional Stormwater Permit also requires that stormwater treatment measures are properly installed, operated, and maintained to ensure long-term management of on-site flows.

Further, as required by the City's Stormwater/Urban Runoff Management and Discharge Control Ordinance, the Proposed Project would be required to submit a preliminary Water Quality Management Plan (WQMP) for review and approval, prior to the City's consideration of the first discretionary approval of the Proposed Project (land use entitlement permit); and a final WQMP, prior to the issuance of grading permits. The Project-specific WQMP would be consistent with the City's Ordinance and the Riverside County WQMP, and include appropriate site design, source control, and treatment control BMPs to minimize runoff and soil erosion throughout Project operations. Therefore, potential operational impacts related to substantial soil erosion or loss of topsoil would be less than significant.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.3 Threshold GEO-3: Geologic Stability**

##### **Impact Analysis**

Section 3, Geology and Soils, of the PVCCSP EIR Initial Study concludes that the potential for lateral spreading and landslide is low, as the PVCCSP area is relatively flat; however, the potential for subsidence is high. Seismic-related ground failure is addressed under Threshold a(iii) above. Expansive soil is addressed under Threshold d below. The following discussion of the potential settlement and shrinkage/subsidence potential is summarized from the Geotechnical Investigation, as applicable.

##### ***Settlement Potential***

Settlement refers to unequal compression of a soil foundation, shrinkage, or undue loads being applied to a building after its initial construction that affect the soil foundation. The results of the liquefaction evaluation indicate total dynamic settlements ranging between 0.0 and 0.8 inches.

Remedial grading, as recommended in the Geotechnical Investigation, would remove most of these soils from within the zone of influence of the new foundations. The native alluvium that will remain in place below the recommended depth of over excavation will not be significantly influenced by the foundation loads of the new structure. Provided that the recommended remedial grading is completed, the post construction settlements of the proposed structure are expected to be within tolerable limits.

Based on the estimate magnitude of the differential settlements, the proposed structure may be supported on shallow foundations. Further, the potential for seismically induced settlement is considered low. Refer to Threshold GEO-1, Exposure to Seismic-Related Hazards, above for further discussion on liquefaction and settlement. The Project Owner/Developer would comply with the site-specific ground preparation and construction recommendations contained in the Proposed Project's Geotechnical Investigation. Therefore, potential impacts would be less than significant.

### ***Shrinkage/Subsidence Potential***

Potential Subsidence is a gradual settling or sudden sinking of the ground surface (i.e., loss of elevation). The principal causes of subsidence are aquifer-system compaction, drainage of organic soils, underground mining, and natural compaction. Shrinkage is the reduction in volume in soil as the water content of the soil drops (i.e., loss of volume).

Removal and recompaction of the artificial fill and near-surface native soils is estimated to result in an average shrinkage of 5 to 13 percent. Shrinkage estimates for the individual samples range between 0 and 22 percent based on the results of density testing and the assumption that the on-site soils will be compacted to about 92 percent of the ASTM D-1557 maximum dry density. It should be noted that the shrinkage estimate is based on the results of dry density testing performed on small-diameter samples of the existing soils taken at the boring locations.

Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.1 to 0.15 foot. This estimate may be used for grading in areas that are underlain by native alluvial soils. According to the Geotechnical Investigation, the potential for subsidence affecting the Project Site is considered low.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The Project Owner/Developer would comply with the site-specific ground preparation and construction recommendations contained in the Proposed Project's Geotechnical Investigation. Based on the foregoing, potential impacts related to soil shrinkage/subsidence and collapse would be less than significant.

### ***Lateral Spreading Potential***

According to the Geotechnical Investigation, the potential for lateral spreading affecting the Project Site is considered low.

Consistent with the City of Perris General Plan measures cited above and PVCCSP EIR mitigation measure MM Geo 1, the Proposed Project would be designed and constructed in accordance with all Geotechnical Investigation recommendations (referred to as mitigation measures in General Plan Safety Element Implementation Measure I.E.2 above); and the Geotechnical Investigation shall be reviewed and approved by the City Engineer. Furthermore, the City of Perris would

conduct a thorough administrative review of future grading permits to ensure that earthwork activities do not result in any conditions that could result in unstable soils. Therefore, with compliance with City General Plan measures and the recommendations of the final Geotechnical Investigation, potential impacts related to location on an unstable geologic unit or soil would be less than significant; and no additional mitigation is required.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.4 Threshold GEO-4: Expansive Soils**

##### **Impact Analysis**

Expansive soils are soils that exhibit cyclic shrink and swell patterns in response to variations in moisture content.

The expansion potential of the on-site soils was determined in general accordance with ASTM D-4829. The testing apparatus is designed to accept a 4-inch diameter, 1-inch high, remodeled sample. Results of laboratory testing indicate the on-site soils to possess a medium expansion potential (EI) of 56 and the soils to be corrosive to buried metal pipes.

Based on the presence of expansive soils at the Project Site, care should be given to proper moisture conditioning the building pad subgrade soils to a moisture content of 2 to 4 percent above the ASTM D-1557 optimum during site grading. In addition to adequately moisture conditioning the subgrade soils and fill soils during grading, special care must be taken to maintaining moisture content of these soils at 2 to 4 percent above the optimum moisture content. This will require the contractor to frequently moisture condition these soils throughout the grading process, unless grading occurs during a period of relatively wet weather.

The Proposed Project would be required to be constructed in conformance with the CBC and City of Perris Municipal Code Title 16. Additionally, consistent with General Plan measures cited above and PVCCSP EIR mitigation measure MM Geo 1, the Proposed Project would be designed and constructed in accordance with all final Geotechnical Investigation recommendations (referred to as mitigation measures in General Plan Safety Element Implementation Measure I.E.2 above); and the Geotechnical Investigation shall be reviewed and approved by the City Engineer. Further, provisions would be made to limit the potential for surface water to penetrate the soils immediately adjacent to the new structure. These provisions should include directing surface runoff into rain gutters and area drains, reducing the extent of landscaped areas around the structure, and sloping the ground surface away from the building. Where possible, it is recommended that landscaped planters not be located immediately adjacent to the proposed building. If landscaped planters around the building are

necessary, it is recommended that drought-tolerant plants or a drip irrigation system be used to minimize the potential for deep moisture penetration around the structure.

Per Section 19.71.050 of the Perris Municipal Code, irrigation shall be provided as appropriate for tree species and location. No tree shall be planted on City property without automatic irrigation and controls. Highly drought-tolerant trees, or trees newly planted in irrigated turf areas may have temporary irrigation systems as approved by the City's landscape architect for a minimum of 2 years. Tolerance for recycled water as provided by the Eastern Municipal Water District shall be ensured. Through conformance with the CBC and Perris Municipal Code Title 16, and implementation of the provisions and recommendations outlined in the Geotechnical Investigation (Appendix F), a less than significant impact would occur.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.5 Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

##### **Impact Analysis**

The Project Site would connect to the existing sewer system and would not require the use of septic tanks. Thus, soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater is not applicable to the Proposed Project.

### **Significance of Impact**

No Impact.

#### **4.6.4.6 Threshold GEO-6: Paleontological Resources**

##### **Impact Analysis**

The PVCCSP EIR concludes that, with implementation of identified mitigation measures, development of allowed uses and infrastructure projects identified in the PVCCSP would not directly or indirectly destroy unique paleontological resources, paleontological sites, or unique geologic features.

Paleontological resources are typically found in geologic strata that was deposited during the Pleistocene Epoch which includes the time between 2.6 million years ago until approximately 11,700 years ago. The Holocene Epoch began about 11,700 years ago and consists of younger sedimentary deposits and fossils that are considered less likely to be found. Construction of the Proposed Project would require grading and excavation of soils, and therefore, would have high potential to encounter paleontological resources during activities beyond this depth. Accordingly,

the Proposed Project would be required to demonstrate compliance with City of Perris General Plan Conservation Element Implementation Measure IV.A.4 which requires paleontological monitoring of development sites within Paleontological Sensitivity Area #5 once subsurface excavations reach 5 feet in depth, with monitoring levels reduced if appropriate, at the discretion of a certified Project paleontologist. This requirement is applied to the Proposed Project as Project-level mitigation measure MM GEO-1. Implementation of Project-level mitigation measure MM GEO-1 would reduce potential impacts to a less than significant level.

### **Significance of Impact**

Potentially significant without mitigation.

#### **4.6.5 Cumulative Impacts**

The following sections address various potential cumulative impacts relating to geology and soils that could result from implementation of the Proposed Project.

As noted in the foregoing analysis, the potential Project-related impacts related to geology and soils would be considered less than significant with adherence to the City's General Plan policies and implementing measures, compliance with the CBC and City of Perris Building Code, and required incorporation of site-specific geotechnical recommendations contained in the Geotechnical Investigations into the Project design. Geology and soil-related impacts are generally site-specific and are determined by particular on-site soil characteristics, proximity to faults, topography, and proposed land uses. Development projects are analyzed on an individual basis and must comply with established requirements of the applicable jurisdiction's development standards and the CBC as they pertain to protection against known geologic hazards and potential geologic and soil-related impacts.

##### **4.6.5.1 Cumulative Threshold GEO-1: Exposure to Seismic-Related Hazards**

Cumulative effects related to geology resulting from the implementation of future development of the Proposed Project as well as surrounding areas could expose more people and property to potential impacts due to seismic activity. Long-term impacts related to geology include the exposure of people to the potential for seismically induced ground shaking. Implementation of other cumulative projects would incrementally increase the number of people and structures subject to a seismic event. Seismic and geologic significance is considered on a project-by-project basis through the preparation of design-level geotechnical studies. The potential for any project to be affected by or any project to exacerbate an existing geotechnical hazard would be minimized or not occur through strict engineering guidelines as they pertain to protection against known geologic hazards and potential geologic and soil-related impacts.

#### **4.6.5.2 Cumulative Threshold GEO-2: Soil Erosion or Topsoil Loss**

With respect to erosion, as discussed under Threshold GEO-2, regulatory requirements mandate that the Proposed Project incorporate measures design during construction and long-term operation to ensure that significant erosion impacts do not occur. Other development projects in the vicinity of the Proposed Project would be required to comply with the same regulatory requirements as the Proposed Project to preclude substantial adverse water and wind erosion impacts. Because the Proposed Project and other cumulative projects would be subject to similar mandatory regulatory requirements to control erosion hazards during construction and long-term operation, the Proposed Project would not result in a cumulatively considerable contribution to a significant cumulative impact related to erosion.

#### **4.6.5.3 Cumulative Threshold GEO-3: Geologic Stability**

#### **4.6.5.4 Cumulative Threshold GEO-4: Expansive Soils**

Development of the Proposed Project as well as all past, present, and future projects would be required to be constructed in accordance with the latest edition of the CBC and to adhere to all current earthquake construction standards, including those relating to soil characteristics set forth by the City. Therefore, no elements of the Proposed Project would contribute to any cumulatively considerable geologic and soils impacts.

#### **4.6.5.5 Cumulative Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

As previously indicated, the Proposed Project would connect to existing sewer lines and would not cause an impact with regard to septic tanks or alternative wastewater disposal systems, impacts would not be cumulatively considerable.

#### **4.6.5.6 Cumulative Threshold GEO-6: Paleontological Resources**

Although development activities on the Project Site would not impact any known paleontological resources, there is the potential that such resources are buried beneath the surface of the Project Site and could be impacted during construction. Other projects within the region would similarly have the potential to impact unknown, subsurface paleontological resources during ground-disturbing activities. However, implementation of Project-level mitigation measure MM GEO-1 for the Proposed Project, and similar mitigation requirements for development in the PVCC area and the City, would ensure the proper identification and subsequent treatment of any paleontological resources that may be encountered during ground-disturbing activities associated. With implementation of Project-level mitigation measure MM GEO-1, the Proposed Project would not result in a cumulatively considerable contribution to a significant cumulative impact to paleontological resources.

#### **4.6.6 Level of Significance Before Mitigation**

##### **4.6.6.1 Threshold GEO-1: Exposure to Seismic-Related Hazards**

With adherence to the City's General Plan policies, compliance with the CBC and City of Perris Building Code, mandatory and compliance with the recommendations of the final Geotechnical Investigation related to design and construction, the Proposed Project would have a less than significant impact with regard to exposure to seismic-related hazards.

##### **4.6.6.2 Threshold GEO-2: Soil Erosion or Topsoil Loss**

The Proposed Project would not result in a substantial adverse impact with regard to substantial soil erosion or the loss of topsoil.

##### **4.6.6.3 Threshold GEO-3: Geologic Stability**

With compliance with City General Plan measures, and the recommendations of the final Geotechnical Investigation, potential impacts related to location on an unstable geologic unit or soil would be less than significant.

##### **4.6.6.4 Threshold GEO-4: Expansive Soils**

With conformance with the CBC and Perris Municipal Code Title 16, compliance with City General Plan measures, and the recommendations of the final Geotechnical Investigation, potential impacts related to expansive soils would be less than significant.

##### **4.6.6.5 Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

The Proposed Project would be connected to existing sewer lines, and there would be no impact related to on-site soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.

##### **4.6.6.6 Threshold GEO-6: Paleontological Resources**

The Proposed Project would have the potential to directly or indirectly destroy a unique paleontological resource.

#### **4.6.7 Mitigation Measures**

**MM GEO-1** Prior to the issuance of grading permits, the Project Owner/Developer shall submit to and receive approval from the City, a Paleontological Resource Impact Mitigation Monitoring Program. The Paleontological Resource Impact Mitigation Monitoring Program shall include the provision of a qualified professional paleontologist (or his or her trained paleontological monitor representative) during on- and off-site subsurface excavation that exceeds 5 feet in depth below the pre-

grade surface. Selection of the Project paleontologist shall be subject to approval of the City of Perris Planning Manager and no grading activities shall occur at the site or within off-site Project improvement areas until the Project paleontologist has been approved by the City.

Monitoring shall be restricted to undisturbed subsurface areas of older Quaternary alluvium, which might be present below the surface. The Project paleontologist shall be prepared to quickly salvage fossils as they are unearthed to avoid construction delays. The Project paleontologist shall also remove samples of sediments which are likely to contain the remains of small fossil invertebrates and vertebrates. The Project paleontologist shall have the power to temporarily halt or divert grading equipment to allow for removal of abundant or large specimens.

Collected samples of sediments shall be washed to recover small invertebrate and vertebrate fossils. Recovered specimens shall be prepared so that they can be identified and permanently preserved. Specimens shall be identified and curated and placed into an accredited repository (such as the Western Science Center or the Riverside Metropolitan Museum) with permanent curation and retrievable storage.

A report of findings, including an itemized inventory of recovered specimens, shall be prepared upon completion of the steps outlined above. The report shall include a discussion of the significance of all recovered specimens. The report and inventory, when submitted to the City of Perris Planning Division, will signify completion of the program to mitigate impacts to paleontological resources.

#### **4.6.8 Level of Significance After Mitigation**

##### **4.6.8.1 Threshold GEO-6: Paleontological Resources**

The Proposed Project would have a less than significant impact with incorporation of Project-level mitigation measure MM GEO-1.

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