4.7 GEOLOGY AND SOILS

This section provides a discussion of the existing geology and soils setting and an analysis of the Development Site and the potential impacts of Development Project implementation related to geology and soils. In addition, this section addresses potential impacts due to the local geology underlying the Development Site, as well as slope stability, ground settlement, soil conditions, grading, and regional and local seismic conditions. This section also summarizes information provided in the Geologic and Geotechnical Review, Sunset Crossroads Specific Plan, Approximately 533.8-Acre Site, City of Banning, California (Geotechnical Assessment).[1] This report is included as **Appendix F-1** to this Environmental Impact Report (EIR). This section also evaluates potential impacts to paleontological resources and summarizes information provided in the Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, City of Banning, Riverside County, California (Paleontological Assessment),[2] which is included as **Appendix F-2** to this EIR. Data from the City of Banning (City) and Riverside County General Plans, numerous State and federal studies of geologic and seismic hazards in the vicinity of the City, site-specific investigations within the Development Site, and field observations are incorporated into this section.

While development of the Mt. San Jacinto College (MSJC) Site is not anticipated at this time, a programmatic discussion of potential impacts to geology and soils that may result from future development is provided in **Chapter 5.0** of this EIR.

4.7.1 Scoping

The City received nine comment letters during the public review period of the Notice of Preparation (NOP) (see **Appendix A-2**). No comment letters were received that addressed geology and soils, and no formal comments pertaining to geology and soils were received during the Scoping Meeting that occurred on Thursday, February 18, 2021.

4.7.2 Methodology

To assess the impacts of the Development Project with respect to geological and soil conditions, Leighton and Associates, Inc. (Leighton) conducted a Geotechnical Assessment and field explorations and reviewed previous geotechnical reports prepared by others with respect to the Development Site. The discussion below describes the scope of the exploration, including methods used during site reconnaissance and the results of pertinent prior explorations, laboratory tests, and engineering analyses.

To assess the impacts of the Development Project with respect to paleontological resources, Brian F Smith and Associates, Inc. (BFSA) conducted a fossil locality search and field survey, both of which are described below.

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1 Leighton and Associates, Inc. 2022. Geologic and Geotechnical Review, Sunset Crossroads Specific Plan, Approximately 533.8-Acre Site, City of Banning, California. June 23.

2 Brian F. Smith and Associates, Inc. 2022. Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, City of Banning, Riverside County, California. Revised January 28.

4.7.2.1 Background Research and Data Review

Leighton reviewed existing geologic literature (i.e., geologic maps, boring logs, and other applicable data).

The paleontological resources record search for the Development Site was performed by the Division of Earth Sciences at the San Bernardino County Museum (SBCM) in Redlands, California. A review of published and unpublished literature was also performed for potential paleontological resources that are known in the vicinity of the Development Site. In addition, BFSA performed an in-house record search for paleontological resources that are known in the vicinity of the Development Site. Sources for records include those held by the Los Angeles County Natural History Museum (LACM), the SBCM, the University of California, Museum of Paleontology (UCMP) in Berkeley, and primary literature.

4.7.2.2 Field Investigation and Laboratory Testing

The field exploration for the Geotechnical Assessment consisted of mapping geologic site soil conditions and the excavation of 11 exploratory 8-inch-diameter borings in the Southern Portion of the Development Site. In 2003/2004, 13 borings were also excavated, logged, and sampled from the Development Site. Logs of the exploratory borings from current and previous explorations are included as Appendix A of the Geotechnical Assessment.

Laboratory testing was performed on representative samples to evaluate the in-situ moisture/density, sieve analysis, Atterberg limits, maximum density/optimum moisture, expansion potential, hydro-collapse potential, soluble sulfate content, pH, resistivity, and chloride content. The laboratory test data for this and previous Development Site explorations are presented in Appendix B of the Geotechnical Assessment, which itself is included as **Appendix F-1** of this EIR.

A pedestrian survey of the Development Site was conducted between August 31 and September 2, 2020 in 15- to 20-meter transects to determine the potential for paleontological finds. All exposed ground surfaces, rodent burrows, and disturbed areas were inspected on the Development Site.

4.7.3 Existing Environmental Setting

4.7.3.1 Regional Geology

The Development Site is in the San Gorgonio Pass, an elongated east-west-trending valley between the San Bernardino and San Jacinto Mountains. This valley is part of the major drainage divide between the Pacific Ocean and Salton Trough and is filled with alluvial deposits that are mainly derived from the San Bernardino Mountains. The San Gorgonio Pass slopes downward to the east until it merges with the alluvial-filled Coachella Valley. To the west, the valley merges with older alluvial soils of the Beaumont Plain.

The San Gorgonio Pass marks the boundary between two geomorphic provinces: the Peninsular Ranges Geomorphic Province to the south and the Transverse Ranges Geomorphic Province to the north. The Peninsular Ranges Geomorphic Province is a series of northwest-trending mountain ranges and valleys that includes the San Jacinto Mountains. The Transverse Ranges Geomorphic Province is an east-west-trending series of steep mountain ranges and valleys that includes the San Bernardino Mountains.

The San Andreas Fault Zone (SAFZ) is located approximately 6 miles to the northeast of the Development Site. The active Banning Fault Zone, a branch of the SAFZ, is located 2.75 miles northeast of the Development Site, and the San Gorgonio Fault Zone is located 0.6 mile north of the Development Site. The San Jacinto Fault Zone is located 9 miles southwest of the Development Site. This area of Southern California has and continues to experience earthquake activity as the SAFZ marks the boundary between the Pacific and North American tectonic plates. The Peninsular Ranges geomorphic province, located on the Pacific Plate, is moving northwesterly relative to the Transverse Ranges Geomorphic Province, located within the North American Plate. The bulk of the generally right-lateral transform movement between the plates occurs along the SAFZ and its associated faults. The San Gorgonio Pass is an area that is being stressed along the Banning/San Andreas Faults, which separate the San Bernardino Mountains to the north and the San Jacinto Fault Zone and San Jacinto Mountains to the south.

4.7.3.2 Development Site

The Development Site is an approximately 533.8-acre, generally rectangular parcel of land bounded by Union Pacific Railroad/Interstate 10 (I-10) to the north, Sunset Avenue to the east, Bobcat Road to the south, and Highland Home Road to the west. Topographically, the Development Site elevation ranges from a low elevation of approximately 2,399 feet above mean sea level (amsl) located at the Pershing Creek streambed in the southeast corner of the Development Site, to a high elevation of approximately 2,523 feet amsl located at the northwestern corner of the Development Site. There is a difference of approximately 124 feet in elevation change from southeast to northwest.

Overhead and underground utility lines are present along the perimeter boundaries. Although no other significant structures were observed, some development associated with past agricultural use is possible. Buried remnants of foundations, pavement, irrigation lines, and septic systems may exist on site.

The Geotechnical Assessment found that the majority of the Development Site is underlain by older alluvium with younger alluvium expected within the drainage areas. Some limited areas of existing fill were also noted along the existing agricultural roads, the unimproved extensions of Westward Avenue and Lincoln Street, drainage berms, and fill associated with underground pipelines. A brief description of each unit is as follows:

- **Undocumented Artificial Fills (Afu):** Undocumented artificial fill soils were observed at numerous locations during the Geotechnical Assessment and previous investigations on the Development Site. Undocumented fills are related to grading activities to construct on-site access roads, perimeter dirt roads, and exploratory excavations. Other undocumented fills exist as limited water retention berms to collect seasonal runoff. All undocumented fills are considered unsuitable for support of additional fill or structures or other planned improvements in their present condition.

- **Alluvium (Qal):** Recent alluvial soils are generally encountered within the on-site creeks/drainage areas. The alluvial soils generally consist of silty sand to gravelly sand and silts. The thickness of the alluvium is expected to extend to 15 feet, with deeper accumulations in localized areas.

- **Older Alluvium Fan Deposits (Qf):** Older alluvial fan deposits were encountered throughout the Development Site and underlie the young alluvium at depth. As encountered in the exploratory excavations, these materials generally consist of medium dense to very dense, silty to clayey sands and poorly to well-graded sand with interbedded layers of sandy clay. The upper 5 to 10 feet of these materials possess slight to high collapse potential with very low to low expansion potential.

4.7.3.3 Seismicity and Faulting

The geologic structure of the entire Southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The San Andreas Fault Zone is located approximately 6 miles to the northeast, and the active Banning Fault Zone, a branch of the San Andreas Fault Zone, is located approximately 2.75 miles northeast of the Development Site. The San Jacinto Fault Zone is located approximately 9 miles southwest of the Development Site. The nearest known active fault is the San Gorgonio Fault Zone, which is located 0.6 mile north of the Development Site. This area of Southern California continues to experience earthquake activity as the San Andreas Fault Zone marks the boundary between the Pacific and North American Plates. While the Development Site is in a seismically active region, no active or potentially active fault is known to exist at the Development Site, nor is the Development Site situated within an "Alquist-Priolo" Earthquake Fault Zone.[3] Given the relatively dense nature of the underlying soils and lack of groundwater, the Development Site possesses a very low potential for liquefaction.[4] It is not located within a State of California Seismic Hazard Zone for earthquake-induced landsliding according to the City of Banning and County of Riverside General Plans.

A detailed review of aerial photographs and subsequent field observations did not provide evidence supporting the existence of faulting on the Development Site. Detailed review of sequential historical aerial photographs for this area did not reveal any photo-lineaments that are typically associated with faulting in this region. The recent (<11,000 years) geologic history of this area reflects that the Development Site is undergoing a regressive, erosional sequence of events and, as such, as observed in the aerial photographs, there are numerous deeply cut abandoned drainage channels and heavily eroded terraces that do not show any horizontal displacement that may be associated with active faulting.

4.7.3.4 Groundwater and Surface Water Conditions

Three primary northwest-to-southeast-trending drainages transect the Development Site. The eastern drainage has been referred to as Pershing Creek. The western two drainages coalesce at Westward Avenue and are referred to as Smith Creek and Highland Wash. The drainages appear to carry ephemeral flows from both on-site and off-site sources. The off-site flows appear to originate north of I-10 and enter the Development Site through a series of drainage culverts. Drainage from the Development Site sheet flows toward existing creeks. The natural drainage has been locally altered through several man-made diversion berms along the eastern edge of Pershing Creek. Concentrated

[3] California Department of Conservation (DOC). 2010. Fault Activity Map of California. Website: https://www.conservation.ca.gov/cgs/publications/fam (accessed August 16, 2023).

[4] Leighton and Associates, Inc. 2022. Geologic and Geotechnical Review, Sunset Crossroads Specific Plan, Approximately 533.8-Acre Site, City of Banning, California. June 23.

runoff has created some incised erosion along the banks of Pershing Creek. The highest natural slopes are located along the southerly portion of Pershing Creek and are locally more than 30 feet in height.

No groundwater was encountered during the on-site boring to the total depth explored to 50 feet; however, based on historical groundwater levels, groundwater is expected 100 feet below the ground surface of the Development Site. Groundwater on site is monitored by the City of Banning Public Works Department via four on-site wells. The City-monitored wells (M7, M10, M11, and M12) recorded water depths of 375 to 475 feet below ground surface (bgs) in September 2003. Groundwater levels can be expected to fluctuate seasonally within the Development Site. During the rainy season, groundwater and/or seepage may be prevalent in the creek bottoms and drainage areas.

4.7.3.5 Liquefaction, Lateral Spreading, and Landslides

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, saturated, granular soils or soils of low plasticity are susceptible to liquefaction and dynamic settlement. Liquefaction is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to act as a viscous liquid. This effect may be manifested by excessive settlements and sand boils at the ground surface.

Given the relatively dense nature of the underlying soils (Older Alluvium Fan deposit) and lack of groundwater, the Development Site possesses a very low potential for liquefaction. Seismic densification, however, is possible on granular (greater than 50 percent sand) fills, or native unconsolidated earth materials. Based on analyses included in the Geotechnical Assessment, the dynamic dry settlement is not considered a geologic hazard and expected to be less than 3 inches. Due to the proposed remedial grading associated with the Development Project and relatively homogenous subsurface soils between adjacent columns, the seismic differential settlement is expected to be less than 0.5 inch in a 40-foot horizontal distance within the Development Site.

Lateral spreading may occur on very gentle slopes or flat terrain. The dominant mode of movement is lateral extension accompanied by shear or tensile fracture. This failure is caused by liquefaction and is usually triggered by rapid ground motion, such as that experienced during an earthquake. As stated above, the on-site potential for liquefaction, and therefore, lateral spreading, is very low.

Landslides and other forms of mass wasting, including mud flows, debris flows, and soil slips, occur as soil moves downslope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking. Because the Development Site is located in a relatively flat area, landslides or other forms of natural slope instability do not represent a significant hazard to the Development Project. In addition, the Development Site is not within a State of California Seismic Hazard Zone for earthquake-induced landsliding according to the City of Banning and County of Riverside General Plans. Soils along and adjacent to some drainage courses have been eroded by water, with concentrated runoff creating incised erosion along the banks of Pershing Creek. However, these areas are restricted to the immediate creek areas.

4.7.3.6 Soils

Older alluvial fan deposits were encountered throughout the Development Site and underlie the young alluvium at depth. The upper 5 to 10 feet of these materials possess slight to high collapse

potential. Additionally, due to the granular nature of the on-site soils, unprotected slopes may be subject to increased wind or water erosion.

Ground subsidence is a gradual settling or sinking of the ground surface that is typically associated with oil, gas, or groundwater extraction. According to the Riverside County General Plan, the Development Site is located in an area that is susceptible to regional land subsidence. However, the City of Banning General Plan indicates that subsidence has not been observed within the City. There are also no oil or gas fields within or near the Development Site. Consequently, regional land subsidence due to the extraction of oil or gas is not a hazard to the Development Project.

Expansive soils are soils that experience volumetric changes in response to increases or decreases in moisture content. Older alluvial fan deposits were encountered throughout the property and underlie the young alluvium at depth. As encountered in the exploratory excavations, these materials generally consist of medium dense to very dense, silty to clayey sands and poorly to well-graded sand with interbedded layers of sandy clay. Based on laboratory test results and review of the referenced reports, the predominate earth materials underlying the subject site are expected to possess a very low to low expansive soil (Expansion Index [EI] <51). Locally, higher expansive soils may be encountered in deeper excavations in the Older Alluvium.

4.7.3.7 Paleontological Resources

Regionally, the Development Project lies within Cherry Valley in the greater San Gorgonio Pass fault zone valley that separates the granitic mountain blocks of the San Bernardino Mountains to the north and the San Jacinto Mountains to the southeast. The region of Cherry Valley, however, is characterized by a variety of older and younger alluvial fan sediments that have been shed off the topographic highs of the San Bernardino Mountains and redeposited onto the valley floor below. At the Development Site, sediments mapped as young alluvial fan sediments ("Qyf") are assigned a Holocene to late Pleistocene age (present day to approximately 120,000 years ago), and old alluvial fan sediments ("Qof") are assigned an age of late to middle Pleistocene (approximately 11,700 to 780,000 years ago). Modern drainage channels are lined with Holocene (less than 11,700 years ago) alluvial wash deposits ("Qw"). In the center of the Development Site, aligned northwest-southeast, are Holocene to late Pleistocene young alluvial valley deposits ("Qya") (present day to approximately 120,000 years ago). All of these deposits variably consist of gravels, sands, silts, and clays but have differing degrees of soil development, weathering, and consolidation, in large part depending on their age of deposition.

The results of the record search indicated that no fossil localities are known from within the boundary or within 1 mile of the Development Site. However, approximately 2 miles south of the Development Site, 10 fossil localities from the Plio-Pleistocene-aged San Timoteo Formation are known, consisting of plant and snail remains along with fish remains and proboscidean (a relative of the elephant) and other mammal bones. These San Timoteo Formation localities are located along Highland Springs Road south of Banning and are approximately 2.2 million years old. The plant fossils included willow,

oak, magnolia, and water reeds.[5] Plant remains and bones from a camel, *Camelops* sp., were recovered from Pleistocene deposits 4.5 miles north of the Development Site.

No fossil localities are known from within the Development Site boundaries. The closest known fossil locality is approximately 2 to 3 miles north-northwest of the Development Site, between Beaumont and Banning, where a specimen of *Bison antiquus* was recovered from late Pleistocene alluvial sediments. Several other fossil vertebrate localities are known in the San Gorgonio Pass region, most from the San Timoteo Formation in the San Timoteo Badlands west and south of the Development Site. Fossils from the San Timoteo Formation include the remains from a variety of amphibians and reptiles, birds, shrews, ground sloth, rabbits, rodents (including porcupine), two species of saber-toothed cat, dire wolf, horses (*Plesippus* and *Equus* sp.), llama, camels, rhinoceros, and mammoth.

A pedestrian survey of the Development Site was conducted between August 31 and September 2, 2020 in 15- to 20-meter transects to determine the potential for paleontological finds. All exposed ground surfaces, rodent burrows, and disturbed areas were inspected on the Development Site. Noted disturbances to the property during the survey included the impacts associated with the adjacent City of Banning facilities, including pipelines and pumping stations along the currently unimproved Sun Lakes Boulevard alignment; a gas pipeline alignment also extending through the northern half of the Development Site in an east to west trajectory; multiple dirt access roads; and dumping of garbage and building materials throughout the Development Site, including within the drainage. Homeless encampments observed during the 2020 pedestrian survey have been subsequently removed. During the survey, ground visibility was characterized as moderate to poor due to dense vegetation, and other constraints included steep banks of Smith and Pershing Creeks and the inability to access some areas of the drainages due to encampments. No evidence of paleontological resources was observed during the field survey.

4.7.4 Regulatory Setting

4.7.4.1 Federal Regulations

There are no federal policies or regulations related to geology and soils that are applicable to the Development Project.

4.7.4.2 State Regulations

Alquist-Priolo Earthquake Fault Zoning Act (1972). The Alquist-Priolo Earthquake Fault Zoning Act of 1972 and updates (California Public Resources Code [PRC,] Section 2621 et seq.) is the principal California State guidance to prevent the construction of habitable structures on the surface trace of active earthquake faults. If an active fault is found, a structure for human occupancy must be set back from the fault (generally 50 feet). The Alquist-Priolo Earthquake Fault Zoning Act only addresses the hazard of surface fault rupture; it does not consider other earthquake hazards.

California Building Code. 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

[5] Reynolds, R.E., and W.A. Reeder. 1986. Age and fossil assemblages of the San Timoteo Formation, Riverside County, California, in, Kooser, M.A., and Reynolds, R.E., eds., Geology around the margins of the eastern San Bernardino Mountains. *Publications of the Inland Geological Society*, v. 1, Redlands, California.

days of its publication. Local jurisdictions often adopt 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[6] and other Codes (collectively "Construction Codes") have been adopted by reference in Chapter 15.08[7] of the City's Municipal Code).

The CBC contains provisions for earthquake safety based on factors including occupancy type, the types of soil and rock on site, and the strength of ground shaking with a specified probability at a site.

California Public Resources Code Section 5097.5. PRC Section 5097.5 protects nonrenewable cultural and paleontological resources including fossils and prohibits the removal, destruction, injury, or defacement of archaeological and paleontological features on any lands under the jurisdiction of State or local authorities. It provides as follows:

- 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 such lands.

- As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

- A violation of this section is a misdemeanor.

Requirements for Geotechnical Investigations. Requirements for geotechnical investigations for subdivisions requiring tentative and final maps and for other types of structures are provided in the California Health and Safety Code, Sections 17953 through 17955, and in Section 1802 of the CBC. Testing of samples from subsurface investigations is required, such as from borings or test pits. 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.

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6 The California Building Standards Commission published the 2022 California Building Standards Code on July 1, 2022, with an effective date of January 1, 2023.

7 City of Banning Municipal Code (Chapter 15.08) states, "Except as otherwise provided in this chapter, for the purposes of prescribing regulations for erecting, construction, enlargement, alteration, repair, improving, removal, conversion, demolition, occupancy, equipment use, height, and area of building and structures, the following construction codes are hereby adopted by reference as 'Chapter 15.08, Construction Codes,' and all appendices, tables, and indices thereto, as the same existed on December 31, 2022, are hereby adopted by reference and incorporated as if fully set out herein, and the provisions thereof shall be controlling within the limits of the city." Construction Codes incorporated by reference under BMC Chapter 15.08 include (but are not limited to) the California Administrative Code (2022), California Building Code (2022), California Residential Code (2022), California Electrical Code (2022), California Mechanical Code (2022), California Plumbing Code (2022), California Green Building Standard Code (2022), and California Energy Code (2022).

Seismic Hazard Mapping Act (1990). The Seismic Hazard Mapping Act (SHMA) was adopted by the State in 1990 to address the potential hazards posed by secondary effects of seismic activity, including strong ground shaking, soil liquefaction, and associated ground failure, and seismically induced landslides. The California Geological Survey (CGS) 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 seismic hazard zones are referred to as "zones of required investigation" because site-specific geological investigations are required for construction projects located within these areas. Before a project can be permitted, a geologic investigation, evaluation, and written report must be prepared by a licensed geologist to demonstrate that the potential hazards can be successfully mitigated.

4.7.4.3 Local Regulations

City of Banning Municipal Code. Building and construction in the City are subject to the regulations of the City of Banning Municipal Code (BMC). CCR Title 24, Part 2, of the CBC (2019), provides minimum standards for building design in the State. Local codes are permitted to be more restrictive than Title 24, but not less restrictive. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system height, and seismic design category. The seismic ratings used in the CBC are derived from the International Building Code specifications. Most of Southern California, including the Development Site, is located in Seismic Design Category D. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in the California Occupational Safety and Health Administration (Cal/OSHA) regulations (CCR, Title 8). In addition, uses constructed as part of the Development Project would adhere to the seismic and building standards in the City's Building Code that have adopted the CBC with amendments and modifications.

The following provision of the City's Municipal Code addresses geologic hazards and paleontological resources:

> **Chapter 18.06 (Grading Application Requirements).** Project applicants are required to submit a grading application to obtain a grading permit. The application shall be supplemented by a geotechnical report/seismicity report to determine the surface and subsurface geologic conditions of the project.
>
> **Chapter 18.06.060 - Geotechnical (Soils) Reports:**
>
> a. **Surface and Subsurface Conditions.** The city engineer shall require a geotechnical report to correlate surface and subsurface conditions with the proposed grading plan. The results of the investigation shall be presented in a report in conformance with the requirements of this ordinance and Subarticle 3 of the grading manual.
>
> b. **Supplemental Reports/Data.** The city engineer shall require such supplemental reports and data, as he deems necessary upon his review of the site and the reports and other data submitted. Such required data may include tests for soil fertility and agricultural suitability to be performed at the conclusion of rough grading by a recognized agronomic soil-testing laboratory, with written analysis and recommendation, to be utilized during any required revegetation.

c. **Waiver of Geotechnical Report Requirements.** For a specific project, the city engineer may determine that the geological and geotechnical conditions at the site are such that public safety is adequately protected and no mitigation is required. This finding shall be based on a report presenting evaluations of sites in the immediate vicinity having similar geologic and geotechnical characteristics. The report shall be prepared by a certified engineering geologist or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation. The city engineer shall provide a written commentary that addresses the report conclusions as justification for waiving the requirement of a geotechnical report for the project. All such waivers shall be recorded with the Riverside County Recorder and a separate copy, together with the report and commentary, filed with the state geologist within thirty days of the waiver, in accordance with Public Resources Code Section 2697(a).

Chapter 17.24.070. All development proposals shall be reviewed for compliance with CEQA. If the proposal is determined to qualify as a project under CEQA, the project proponent may be required to submit specialized studies to determine the effect on specific resources and hazards, including, but not limited to, biological resources, cultural resources, geotechnical hazards, hydrology, air quality, noise, and traffic. No project shall be approved without first satisfying the requirements of CEQA.

4.7.5 Thresholds of Significance

The thresholds for geology and soils impacts used in this analysis are from Appendix G of the *CEQA Guidelines* and the City's *Initial Study/Environmental Checklist*. The Development Project would result in a significant impact with respect to geology and soils if it would:

Threshold 4.7.1: **Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: (i) 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 known fault. (Refer to Division of Mines and Geology Special Publication 42) (ii) Strong seismic ground shaking. (iii) Seismic-related ground failure, including liquefaction. (iv) Landslides.**

Threshold 4.7.2: **Result in substantial soil erosion or the loss of topsoil.**

Threshold 4.7.3: **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-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.**

Threshold 4.7.4: **Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property.**

Threshold 4.7.5: **Have 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.**

Threshold 4.7.6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.7.6 Impact Discussion

4.7.6.1 Rupture of a Known Earthquake Fault

Threshold 4.7.1(i): Would the Development Project 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 known fault? (Refer to Division of Mines and Geology Special Publication 42.)

No Alquist-Priolo earthquake fault zones are mapped on or adjacent to the Development Site. While active faults are not known to exist on the Development Site, the Banning Fault located approximately 2.75 miles to the northeast along with the nearby San Andreas and San Jacinto fault zones can produce strong ground shaking in case of a fault rupture in this area. However, this is common for virtually all of Southern California, and structures are designed in accordance with the CBC and other applicable codes to withstand the ground shaking during the assumed design seismic event. Additionally, secondary seismic hazards (i.e., lurching, ground rupture, liquefaction, dynamic settlement, flooding, tsunamis, and seiches) are expected to be very low at this site. Therefore, although the Development Site is in a seismically active region, it is not located in an Alquist-Priolo earthquake fault zone and does not show evidence of active faulting and therefore would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving the rupture of a known Alquist-Priolo earthquake fault or based on other substantial evidence of known fault. ***No impact*** would occur with implementation of the Development Project.

Level of Significance Prior to Mitigation: No Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: No Impact.

4.7.6.2 Directly or Indirectly Cause Adverse Effects Involving Seismic Ground Shaking

Threshold 4.7.1(ii): Would the Development Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Strong seismic ground shaking?

While active faults are not known to exist on the Development Site, the Banning Fault located approximately 2.75 miles to the northeast along with the nearby San Andreas and San Jacinto fault zones can produce strong ground shaking in case of a fault rupture in this area. However, this is common for virtually all of Southern California, and structures are designed in accordance with the CBC and other applicable Codes (per BMC Chapter 15.08) to withstand the ground shaking during the assumed design seismic event. As previously noted, secondary seismic hazards are expected to be very low at this site. The Development Site is not at greater risk of seismic activity or impacts than other areas of Southern California. The severity of the shaking would be influenced by the magnitude of the earthquake, the distance of the Development Site to the seismic source, the soil conditions, the depth to groundwater, and the duration of the seismic event.

Peak ground acceleration (PGA) is a measure of earthquake acceleration on the ground and an important input parameter for earthquake engineering. Based on the Geotechnical Assessment, a design-level PGA of 0.89 gravity (g) has been calculated for the Development Project. This acceleration is consistent with other areas in this region of California that are underlain by similar geologic materials and indicates that strong seismic ground shaking generated by seismic activity is considered a potentially significant impact that may affect Development Project people or structures.

State and local jurisdictions regulate development in California through a variety of tools that reduce hazards from earthquakes and other geologic hazards. The CBC (adopted by reference in Chapter 15.08 [Construction Codes] of the City's Municipal Code) contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. The CBC contains provisions for earthquake safety based on factors including occupancy type, the types of soil and rock on site, and the strength of ground motion with specified probability of occurring at the Development Site. The design and construction of the Development Project uses would be required to adhere to the provisions of the CBC and other Codes (per BMC Chapter 15.08). Compliance with these provisions would reduce hazards from strong seismic ground shaking.

Furthermore, Development Project uses would be required to have a site-specific geotechnical investigation report prepared by the Applicant's geotechnical consultant, in accordance with Appendix J Section J104 (Engineered Grading Requirements) of the CBC (see **Regulatory Compliance Measure [RCM] GEO-1** below); such investigation would determine seismic design parameters for the Development Project building types pursuant to CBC requirements. Compliance with the design parameters and recommendations of the geotechnical investigation report would be required as a condition of a grading permit and/or building permit. Thus, impacts resulting from strong ground shaking are anticipated to be ***less than significant***.

Level of Significance Prior to Mitigation: Less Than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, RCM GEO-1 identified below would be applicable and implemented by the Development Project.

RCM GEO-1 **Construction Code Compliance.** All structures shall be designed in accordance with the seismic parameters presented in the Geologic and Geotechnical Review prepared for this Development Project and applicable sections of the most current California Building Code (CBC) and other applicable Codes (per Chapter 15.08 of the Banning Municipal Code). Prior to the issuance of building permits for planned structures, the Soils Engineer and the City of Banning Chief Building Official, or designee, shall review building plans to verify that the structural design conforms to the requirements of the Geologic and Geotechnical Review and the applicable provisions of the aforementioned codes.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.3 Directly or Indirectly Cause Adverse Effects Involving Ground Failure, Including Liquefaction

Threshold 4.7.1(iii): Would the Development Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Seismic-related ground failure, including liquefaction?

As previously discussed, the Development Site is considered to have a low risk of liquefaction due to the relatively dense nature of the underlying soils (Older Alluvium Fan deposit) and deep groundwater; groundwater is expected to be approximately 100 feet or more bgs. Seismic densification, however, is possible on granular (greater than 50 percent sand) fills, or native unconsolidated earth materials. The dynamic dry settlement is not considered a geologic hazard and expected to be less than 2 inches. Due to the proposed remedial grading and relatively homogenous subsurface soils between adjacent columns, the seismic differential settlement is expected to be less than 0.5 inch in a 40-foot horizontal distance within the Development Site. No groundwater was encountered during the Geotechnical Assessment within the borings that were drilled to a depth of 50 feet. Development Project uses that would be constructed are required to comply with the CBC and other applicable Codes (per BMC Chapter 15.08) as well as the recommendations in the geological and geotechnical assessment prepared for the Development Project. Therefore, implementation of the Development Project would not place people or structures at risk due to liquefaction, and impacts would be ***less than significant***.

Level of Significance Prior to Mitigation: Less Than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.4 Directly or Indirectly Cause Adverse Effects Involving Ground Failure, Including Landslides

Threshold 4.7.1(iv): Would the Development Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Landslides?

The Development Site and vicinity are relatively flat, and the Development Site is not located within a zone of earthquake-induced landslide as mapped by the State, City, or County. Soils along and adjacent to some drainage courses have been eroded by water, with concentrated runoff creating incised erosion along the banks of Pershing Creek. However, these areas are restricted to the immediate creek areas which are proposed to be conserved and will not be developed.

As established by **RCM GEO-1**, construction contractors would be required to adhere to recommendations of the geologic and geotechnical review, the CBC, and other applicable Codes (per BMC Chapter 15.08) for temporary slopes and for shoring or shielding for temporary excavations over 5 feet deep, as required by the City of Banning. Therefore, implementation of the Development Project would result in ***less than significant*** impacts related to landslide hazards.

Level of Significance Prior to Mitigation: Less Than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.5 Substantial Soil Erosion or the Loss of Topsoil

Threshold 4.7.2: Would the Development Project result in substantial soil erosion or the loss of topsoil?

Construction of the Development Project uses would involve excavation, grading, and construction activities that disturb soil and leave exposed soil on the ground surface. Grading temporarily increases the potential for erosion by removing protective vegetation, changing natural drainage patterns, and constructing slopes. Common means of soil erosion from construction sites include water, wind, and being tracked off site by vehicles. These activities could result in soil erosion if effective erosion-control measures are not used. Additionally, due to the granular nature of the on-site soils, unprotected slopes may be subject to increased wind or water erosion.

Cut and fill slopes created during Development Site construction would be provided with appropriate drainage features and landscaped with drought-tolerant, slope stabilizing vegetation as soon as possible after grading to reduce the potential for erosion. Berms would be provided at the top of fill slopes, and brow ditches would be constructed at the top of all cut slopes. V-ditches cut on the Development Site would be founded in dense fill or cut, but not in topsoil colluvium, and lot drainage would be directed such that runoff on slope faces is minimized. Inadvertent oversteepening of cut and fill slopes would be avoided during final grading and building construction. If seepage is encountered in slopes, special drainage features would be recommended by the geotechnical consultant to minimize soil erosion effects. Due to the granular nature of some of the site soils, construction of the fill slopes may warrant blending of cohesive soils into very sandy soils in order to increase surficial slope stability. Medium to high expansive clayey soils, if placed within 15 feet of a slope face, may be subject to artificial instability or slope creep resulting in soil erosion or the loss of topsoil; as such, clayey soils would be thoroughly mixed with poorly graded sands on the Development Site to produce a better-quality fill material that would be more effective in reducing erosion and increasing surficial stability.

The conceptual grading design identifies approximately 2,266,112 cubic yards (CY) of cut and approximately 2,118,698 CY of fill.[8] Maximum daily disturbance would be approximately 10,000 CY and would have an average daily disturbance ranging from 7,500 to 9,500 CY. As described in **Section 3.5.3.9** of this EIR, grading would occur over the entire Development Site in two phases. However, except as warranted for the construction of the Lincoln Street crossings of Pershing Wash and Smith Creek, no Development Project associated grading would occur within Planning Areas 13 through 19 (which accommodate the existing natural drainage features).[9] The natural open space located in Planning Area 12 could be graded for trails or related passive park improvements. Planning Area 11

[8] The conceptual grading design provides an overall balanced earthwork condition with approximately 2,266,112 cubic yards (CY) of cut and approximately 2,118,698 CY of fill. The grading of the Specific Plan is anticipated to occur in two phases: (1) north of SLB Extension, and (2) south of SLB Extension. No import or exporting of earthwork is anticipated; however, earthwork may be transferred between the two grading phases.

[9] Grading would be governed by the grading improvement standards set forth in Section 2.7.1 of the Specific Plan.

would include a publicly accessible 5-acre passive park, natural open space, fuel modification areas, trails, and landscaping.

As necessary, minor borrow or export between Planning Areas may be needed to account for shrinking and subsidence of soils during grading operations. As phases are developed, precise grading would be conducted to accommodate planned buildings, internal roadways, and ancillary features. Disturbance within drainage areas would be limited to the extent required to install crossing features.

All grading would be subject to local and State codes and requirements for erosion control and grading during construction. For example, the Development Project uses constructed would be required to comply with standard regulations, including South Coast Air Quality Management District (SCAQMD) Rules 402 and 403, which would reduce construction erosion impacts. Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emissions source. Rule 402 requires that dust suppression techniques be implemented to prevent dust and soil erosion from creating a nuisance off site. For example, control measures to reduce erosion during grading and construction activities include stabilizing backfilling materials when not actively handling soils, stabilizing soils during clearing and grubbing activities, and stabilizing soils during and after cut and fill activities. As required by **RCM GEO-2**, all recommendations presented in the Final Geotechnical Assessment for the Development Project shall be implemented to the satisfaction of the City's Building and Safety Director or designee to ensure reduced effects to geology and soils on the Development Site during Development Project construction and operation.

Additionally, the Construction General Permit (CGP) issued by the State Water Resources Control Board (SWRCB) regulates construction activities to minimize water pollution, including sediment. The Development Project uses constructed would be subject to National Pollutant Discharge Elimination System (NPDES) permitting regulations, including the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for each phase of the Development Project. The construction contractor would be required to prepare and implement an SWPPP and associated best management practices (BMPs) in compliance with the CGP during grading and construction as outlined in **RCMs WQ-1**, **WQ-2,** and **WQ-3** provided in **Section 4.10** of this EIR and presented below. Adherence to the BMPs in the SWPPP would reduce, prevent, or minimize soil erosion from future Development Site-related grading and construction activities. Additionally, the future Development Site-related grading activities would be required to adhere to the provisions of the City's grading ordinances, requirements of the Geotechnical Study prepared for the Development Site, and CBC. Therefore, impacts from soil erosion or loss of topsoil would be ***less than significant***.

Level of Significance Prior to Mitigation: Less than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: The following Regulatory Compliance Measures are existing regulations that are applicable to the Development Project and are considered in the analysis of potential impacts related to hydrology and water quality and are also applicable to potential impacts related to soils and geology. The City of Banning considers these requirements to be mandatory; therefore, they are not mitigation measures.

RCM GEO-2 Prior to the issuance of grading and/or building permits, the Applicant shall provide evidence to the City for review and approval that proposed structures, features, facilities, and earthworks to be constructed on the Development Site have been designed to conform to applicable provisions of the California Building Code and other applicable Codes (per BMC Chapter 15.08) in effect at the time of development application as well as the design recommendations detailed in the final geologic and geotechnical review.

Additionally, the Applicant shall provide evidence to the City that the recommendations cited in a project-specific final geologic and geotechnical review are incorporated into project plans and/or implemented as deemed appropriate by the City. The final geologic and geotechnical review recommendations may include, but are not limited to, removal of existing vegetation, utilities, and any other surface and subsurface improvements that would not remain in place for use with the structures constructed on the Development Site. Remedial earthwork, over-excavation, and ground improvement shall occur to depths specified in the final geologic and geotechnical review to provide a sufficient layer of engineered fill or densified soil beneath structural footings/foundations, as well as proper surface drainage devices and erosion control. Retaining wall parameters shall be in accordance with the Final Geotechnical Assessment to protect against lateral spreading and on-site landslides. Construction of concrete structures in contact with subgrade soils determined to be corrosive shall include measures to protect concrete, steel, and other metals. Verification testing must be performed upon completion of ground improvements to confirm that the compressible soils have been sufficiently densified. The structural engineer must determine the ultimate thickness and reinforcement of the building flood slabs based on the imposed slab loading. The recommendations of the Final Geotechnical Assessment shall be implemented to the satisfaction of the City's Building and Safety Director or designee.

RCM WQ-1 **Construction General Permit.** Prior to commencement of construction activities, the Applicant shall obtain coverage under the *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit),* NPDES No. CAS000002, Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ, or any other subsequent permit. This shall include submission of Permit Registration Documents (PRDs), including permit application fees, a Notice of Intent (NOI), a risk assessment, a site plan, a Storm Water Pollution Prevention Plan (SWPPP), a signed certification statement, and any other compliance-related documents required by the permit, to the State Water Resources Control Board via the Stormwater Multiple Application and Report Tracking System (SMARTS). Construction activities shall not commence until a Waste Discharge Identification Number (WDID) is obtained for the Development Project from the SMARTS and

provided to the Director of the City of Banning Public Works Department, or designee, to demonstrate that coverage under the Construction General Permit has been obtained. Development Project construction shall comply with all applicable requirements specified in the Construction General Permit, including but not limited to, preparation of an SWPPP and implementation of construction site Best Management Practices (BMPs) to address all construction-related activities, equipment, and materials that have the potential to impact water quality for the appropriate risk level identified for the Development Project. The SWPPP shall identify the sources of pollutants that may affect the quality of storm water and shall include BMPs (e.g., Sediment Control, Erosion Control, and Good Housekeeping BMPs) to control the pollutants in storm water runoff. Upon completion of construction activities and stabilization of the Development Site, a Notice of Termination shall be submitted via SMARTS.

RCM WQ-2 In compliance with City of Banning Ordinance No. 1388 Grading, Erosion, and Sediment Control, the Development Project Applicant shall submit a grading plan and erosion control plan to the Director of the City of Banning Public Works Department, or designee, for review and approval prior to issuance of a grading permit for each individual development that would occur within the Specific Plan area. The Applicant shall also submit erosion and sediment control plans annually to the Director of the City of Banning Public Works Department, or designee, for review and approval.

RCM WQ-3 Prior to issuance of a grading permit, the Applicant shall submit a Final Water Quality Management Plan (WQMP) to the Director of the City of Banning Public Works Department or designee for review and approval. The Final WQMP shall specify: 1) the BMPs to be incorporated into the Development Project design to target pollutants of concern in runoff from the Development Site and from each proposed land use; 2) the target pollutant(s) to be captured from each building/land use and treated by each BMP; 3) the metric for ensuring the BMP is addressing the target pollutant(s) of concern; 4) the necessary operation and maintenance activity for each BMP; and 5) the specific action to be taken if it is determined that the BMP is not meeting its intended goal(s). The Final WQMP shall also incorporate the results of the Final Hydrology and Hydraulic Analyses to demonstrate that the detention facilities meet the hydromodification requirements of the Whitewater River Watershed MS4 Permit. The Director of the City of Banning Public Works Department, or designee, shall ensure that the BMPs specified in the Final WQMP are incorporated into the final Development Project design.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.6 Unstable Soils

Threshold 4.7.3: Would the Development Project 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-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?

Landslides. Because the Development Site is located in a relatively flat area, landslides or other forms of natural slope instability do not represent a significant hazard on or adjacent to the Development Site or to the Development Project. In addition, as stated above, the Development Site is not within a State-designated hazard zone for an earthquake-induced landslide. Therefore, potential impacts related to landslides would be ***less than significant*.**

Lateral Spreading and Liquefaction. As previously noted, given the relatively dense nature of the underlying soils and lack of groundwater, the Development Site possesses a very low potential for liquefaction. As indicated with respect to Threshold 4.7.1(iii), above, liquefaction potential at the site is considered low. As stated above, the on-site potential for liquefaction, and therefore, lateral spreading, is very low. Thus, impacts from lateral spreading and liquefaction would be ***less than significant***.

Subsidence and Collapsible Soils. Ground subsidence is a gradual settling or sinking of the ground surface that is typically associated with oil, gas, or groundwater extraction. According to the Riverside County General Plan and as previously noted, the Development Site is located in an area that is susceptible to regional land subsidence. However, the City of Banning General Plan indicates that subsidence has not been observed within the City. There are also no oil or gas fields within or near the Development Site. Consequently, regional land subsidence due to the extraction of oil or gas is not a hazard to the Development Project.

Subsidence can also occur as an effect of soil shrinkage, which is the decrease in volume of soil upon removal and recompaction expressed as a percentage of the original in-place volume. Subsidence occurs as natural ground is densified to receive fill. In addition, shrinkage of surficial soils removed and recompacted during grading would be anticipated to be approximately 10 to 15 percent in the upper 10 feet, including from compression of surface material due to heavy equipment. The degree to which fill soils are compacted and variations in the density of existing soils will influence earth volume changes. Consequently, some adjustments in grades near the completion of grading could be required to balance the earthwork.

As noted above, groundwater on site is monitored by the City of Banning Public Works Department via four on-site wells. The City-monitored wells (M7, M10, M11, and M12) recorded water depths of 375 to 475 feet bgs in September 2003. Groundwater levels can be expected to fluctuate seasonally within the Development Site. During the rainy season, groundwater and/or seepage may be prevalent in the creek bottoms and drainage areas. Any existing water wells should be removed or abandoned prior to grading, in accordance with the Riverside County Department of Health Services guidelines. With these wells removed or abandoned, subsidence from wells at the Development Project would not occur.

Young alluvium, topsoil, undocumented fill soils, and weathered Older Alluvium on the Development Site are potentially compressible in their present state and may settle under the surcharge of fills or foundation loading. To address and avoid the potential for land subsidence, soils would be removed down to competent dense materials as determined by the geotechnical engineer during grading in accordance with the following recommendations:

- **Buildings 1 through 7:** The removal depth is expected to vary from 8 to 10 feet below existing ground surface. The removal depth will extend to a depth of 12 feet for the southern portions of Buildings 1 and 2 due to high collapse potential.

- **Buildings 8 and 9 and Commercial Lot:** The removal depth is expected to extend 5 feet below existing grade surface or 3 feet below bottom of footings, whichever is deeper.

- **Streets and Paved Areas:** The removal depth is expected to be 5 feet below existing grade surface or 3 feet below design subgrade, or whichever is deeper. This removal depth may be reduced to 3 feet below existing grade surface or 2 feet below design subgrade in paved areas associated with Buildings 8 and 9 and the commercial area of the Development Site.

Additionally, recommendations for soil removal would be planned in more detail by a certified geotechnical engineer or engineering geologist when grading plans for individual phases of the Development Project are prepared. Actual depths and limits of removals should be further verified by the geotechnical consultant during grading based on conditions encountered in the field or future studies. Subsequent detailed geotechnical investigation will be required, and the Development Project will be required to comply with a site-specific geotechnical investigation report prepared by a geotechnical consultant, in accordance with Appendix J Section J104 (Engineered Grading Requirements) of the CBC. Such investigation would assess hazardous soil conditions on site and would provide recommendations as needed to minimize these potential collapsible soil hazards, which may include over-excavation of certain soils and replacement with compacted fill. The Development Project would implement recommendations from the Final Geotechnical Assessment as required by **RCM GEO-1** to ensure compliance with the most current CBC requirements. Therefore, implementation of **RCM GEO-**1 and compliance with existing regulations would ensure that a ***less than significant*** impact from collapsible soils would occur.

Level of Significance Prior to Mitigation: Less Than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.7 Expansive Soils

Threshold 4.7.4: Would the Development Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?

Expansive soils are soils that experience volumetric changes in response to increases or decreases in moisture content. Older alluvial fan deposits were encountered throughout the property and underlie

the young alluvium at depth. As encountered in the exploratory excavations, these materials generally consist of medium dense to very dense, silty to clayey sands and poorly to well-graded sand with interbedded layers of sandy clay. Based on laboratory test results and review of the referenced reports, the predominate earth materials underlying the subject site are expected to possess a very low to low expansive soil (EI<51). Locally, higher expansive soils may be encountered in deeper excavations in the Older Alluvium. In the event that, following the completion of grading, it is determined that near-surface soils within building pad areas exhibit an elevated expansion potential, the potential impact of those expansive soils would be addressed through design of structural foundations and floor slabs in compliance with applicable requirements in the CBC, as adopted by the City of Banning in its Municipal Code (**RCM GEO-1** and **RCM GEO-2**). Since the potential for expansive soils is low and any potential expansion would be addressed through compliance with applicable State and local Code requirements, the Development Project would not create substantial potential risks to life or property, and there would be a ***less than significant*** impact.

Level of Significance Prior to Mitigation: Less Than Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures would be required. RCMs GEO-1 and GEO-2 would be implemented by the Development Project.

Level of Significance After Mitigation: Less Than Significant Impact.

4.7.6.8 Septic Tanks or Alternative Wastewater Disposal

Threshold 4.7.5: Would the Development Project have 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?

The Development Project uses would not include the use of septic tanks or alternative wastewater disposal systems because sanitary sewer and wastewater facilities are available in the vicinity of the Development Site. The Development Project uses would be required to connect to City sanitary sewer and wastewater facilities. Therefore, the Development Project would have ***no impact*** with respect to septic tanks or alternative wastewater disposal systems.

Level of Significance Prior to Mitigation: No Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: No Impact.

4.7.6.9 Paleontological Resources

Threshold 4.7.6: Would the Development Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

A paleontological sensitivity map generated by the Riverside County Land Information System in August 2020 ranks the Quaternary sediments across the Development Site as having an "Undetermined" paleontological sensitivity. Typically, sediments mapped as Quaternary older and younger alluvial fan sediments (Qof and Qyf) in western Riverside County are assigned a High (High A

or High B) paleontological sensitivity based on the well documented record of yielding important Ice Age fossils, such as large terrestrial vertebrates (e.g., bison, mammoth, mastodon, horse, camel, giant ground sloth, short-faced bear, saber-toothed cat, and others).[10] The SBCM in Redlands and the Western Science Center Museum in Hemet both regard Quaternary older alluvial fan sediments as having a high potential to contain significant paleontological resources and, therefore, typically recommend that a monitoring program be implemented to "mitigate impacts to [potential] nonrenewable paleontological resources." **Mitigation Measure Geology-1 (MM GEO-1)** requires paleontological monitoring during mass grading and excavation activities in undisturbed Quaternary older alluvial fan sediments to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. For excavation of young alluvial fan and alluvial valley deposits at the Development Site, periodic "spot check" monitoring would be required, consisting of approximately one to three scheduled Development Site visits per week by a paleontological monitor during construction ground disturbance. If fossils are discovered, work in the immediate area of the discovery would be halted and the qualified paleontologist would assess the discovery. These procedures would mitigate potential impacts to scientifically significant, nonrenewable paleontological resources to a ***less than significant*** impact**.**

Level of Significance Prior to Mitigation: Potentially Significant Impact.

Regulatory Compliance Measures and Mitigation Measures: The following Mitigation Measure shall be implemented to reduce impacts to paleontological resources that could be discovered on the Development Site during Development Project grading/excavation activities.

MM GEO-1 **Paleontological Resources Monitoring.** All mass grading, excavation, drilling, and trenching activities within the old alluvial fan deposits ("Qof"), which underlie the majority of the Development Site, starting at the surface shall be monitored full-time by a qualified paleontological monitor for paleontological resources. Prior to initiation of any grading, drilling, and/or excavation activities, a pre-construction meeting shall be held and attended by the paleontologist of record, the grading contractor and subcontractors, the Development Site applicant, and a representative of the lead agency. The nature of potential paleontological resources shall be discussed, as well as the protocol that is to be implemented following discovery of any fossiliferous materials.

For earthmoving within young alluvial fan deposits ("Qyf") and young alluvial valley deposits ("Qya") mapped at the Development Site, periodic "spot check" monitoring shall be conducted, consisting of approximately one to three scheduled site visits per week by a qualified paleontological monitor during construction ground disturbance. If fossils are discovered, full-time monitoring for paleontological resources shall be warranted.

In the field, the primary monitor or the monitors under the direction and supervision of the site-specific paleontologist shall be the responsible persons on

[10] Jefferson, G.T. 2009. [A] Catalogue of late Quaternary vertebrates from California. Unpublished manuscript, 1991, revised 11 March 2009; Natural History Museum of Los Angeles County.

site with the assigned authority and responsibility to control all grading operations that might adversely affect any salvage efforts.

Isolated fossils will be collected by hand, wrapped in paper, and placed in temporary collecting flats or five-gallon buckets. Notes will be taken on the map location and stratigraphy of the site, which will be photographed before it is vacated and the fossils are removed to a safe place.

All paleontological monitors shall immediately notify all concerned parties (client and lead agency [i.e., the City of Banning]) at the time of any discovery. The City of Banning shall ensure that the recommendations from the qualified, professional paleontologist shall be followed by the Applicant/Developer.

Within 90 days of final paleontological monitoring, a final monitoring and mitigation report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to, and accepted by, the appropriate lead agency, will signify satisfactory completion of the Project program to mitigate impacts to any potential nonrenewable paleontological resources (i.e., fossils) that might have been lost or otherwise adversely affected without such a program in place.

Level of Significance After Mitigation: Less Than Significant Impact