5.7 Geology and Soils

5.7.1 INTRODUCTION

This section addresses potential environmental effects of the Project related to geologic hazards such as earthquakes, liquefaction, and expansive soils as well as impacts on the environment related to soil erosion, sedimentation, and paleontological resources. The analysis in this section is based, in part, on the following documents and resources:

- *City of Perris General Plan 2030*, Adopted 26 April 2005
- *City of Perris General Plan 2030 Environmental Impact Report*, Certified 26 April 2005
- Perris Municipal Code
- *Geotechnical Investigation Harvest Landing Business Park,* prepared by Southern California Geotechnical, 2024, included as EIR Appendix K
- *Paleontological Assessment Review and Update for the Harvest Landing Retail Center & Business Park Project,* prepared by BFSA Environmental Services, 2024, included as EIR Appendix L

5.7.2 REGULATORY SETTING

5.7.2.1 Federal Regulations

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1997 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the Act established the National Earthquake Hazards Reduction Program that provides characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. Programs under this Act provide building code requirements such as emergency evacuation responsibilities and seismic code standards such as those to which development under the proposed Project would be required to adhere.

5.7.2.2 State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish "Earthquake Fault Zones" and publish appropriate maps that depict these zones. The boundary of an Earthquake Fault Zone is generally about 500 feet from major active faults and 200 to 300 feet from well-defined minor faults. The Alquist-Priolo Earthquake Fault Zoning Act also requires local agencies to regulate development within Earthquake Fault Zones. Before a development project can be permitted within an Earthquake Fault Zone, a geologic investigation is required to demonstrate that proposed buildings would not be constructed across active faults. A site-specific evaluation and written report must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back a minimum of 50 feet from the fault.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act addresses earthquake hazards related to liquefaction and seismically induced landslides. Under the Seismic Hazards Mapping Act, seismic hazard zones are mapped by the State Geologist to assist local governments in land use planning. The Seismic Hazards Mapping Act states "it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety." Section 2697(a) of the Seismic Hazards Mapping Act states that "cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard."

California Building Code

The California Building Code is included in Title 24 of the California Code of Regulations. The current California Building Code was adopted by the City of Hemet and is included in Chapter 14, Article II, Division 3 of the Perris Municipal Code. The code provides standards to protect property and public safety. The California Building Code regulates the design and construction of excavations, foundations, building frames, retaining walls, and other building elements, and thereby mitigate the effects of seismic shaking and adverse soil conditions. The code also regulates grading activities, including drainage and erosion control.

California Construction General Permit

The State of California adopted a Statewide National Pollutant Discharge Elimination System (NPDES) Permit for General Construction Activity (Construction General Permit) that regulates construction site storm water management. Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the general permit for discharges of storm water associated with construction activity.

To obtain coverage under this permit, project operators must electronically file Permit Registration Documents, which include a Notice of Intent, a Storm Water Pollution Prevention Plan (SWPPP), and other compliance-related documents, including a risk-level assessment for construction sites, an active storm water effluent monitoring and reporting program during construction, rain event action plans, and numeric action levels for pH (potential of hydrogen) and turbidity, as well as requirements for qualified professionals to prepare and implement the plan. The Construction General Permit requires the SWPPP to identify best management practices (BMPs) that will be implemented to reduce soil erosion. Types of BMPs include preservation of vegetation and sediment control (e.g., fiber rolls). The SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a monitoring plan if the site discharges directly to a water body listed on the State's 303(d) list of impaired waters.

Requirements for Geotechnical Investigations

Requirements for geotechnical investigations are included in California Building Code Appendix J, Grading, Section J104; additional requirements for subdivisions requiring tentative and final maps and for other specified types of structures are in the California Health and Safety Code Sections 17953 to 17955 and in California Building Code Section 1803. Testing of samples from subsurface investigations is required, such as from borings or test pits. Studies must be done as needed to evaluate site geology, 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. California Building Code Section J105 sets forth requirements for inspection and observation during and after grading.

Public Resources Code Section 5097.5

Requirements for paleontological resource management are included in the Public Resources Code Division 5, Chapter 1.7, Section 5097.5, and Division 20, Chapter 3, Section 30244, which states: No person shall 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, 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. Violation of this section is a misdemeanor. These statutes prohibit 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 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. 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.

5.7.2.3 Local and Regional Regulations

City of Perris General Plan 2030

The City of Perris General Plan 2030 contains the following policies related to geology and soils that are applicable to the Project:

Conservation Element

Policy IV.A.1 For all private and public projects involving new construction, substantial grading, or demolition, including infrastructure and other public service facilities, staff shall require appropriate surveys and necessary site investigations in conjunction with the earlier environmental document prepared for a project.

Policy IV.A.4 In Area 1 and Area 2 shown on the Paleontological Sensitivity Map, paleontological monitoring of all projects requiring subsurface excavations will be required once any excavation begins. In Areas 4 and 5, paleontological monitoring will be required once subsurface excavations reach five feet in depth, with monitoring levels reduced as appropriate, at the discretion of a certified Project Paleontologist.

Policy VII.A Preserve significant hillsides and rock outcroppings in the planning area.

Safety Element

Policy S-7.1 Require all development to provide adequate protection from damage associated with seismic incidents.

Policy S-7.2 Require geological and geotechnical investigations by State-licensed professionals in areas with potential for seismic and geologic hazards as part of the environmental and development review and approval process.

5.7.3 ENVIRONMENTAL SETTING

5.7.3.1 Regional Setting

The City of Perris generally lies within the Perris block of the Peninsular Ranges of Southern California. The Peninsular Ranges are characterized by steep, elongated ranges and valleys that generally trend northwestward. The bedrock geology that dominates the eastern portion of the Perris Block specifically, consists of Cretaceous and older crystalline and metamorphic rock. The Peninsular Ranges have been significantly disrupted by Tertiary and Quaternary strike-slip faulting along the Elsinore and San Jacinto faults. This tectonic activity has resulted in the present terrain (City of Perris, 2011).

5.7.3.2 Faults and Ground Shaking

The Project site is not within an Alquist-Priolo Earthquake Fault Zone, nor is it within a Riverside County fault zone. According to the Geotechnical Investigation prepared by Southern California Geotechnical (included as EIR Appendix K), there is no evidence of faulting within the Specific Plan Area, therefore the possibility of ground rupture is onsite low. The nearest active fault zones are the San Jacinto Fault Zone, located approximately 9 miles northeast of the Specific Plan Area, and the Elsinore Fault Zone, located approximately 13.1 miles southwest of the Specific Plan Area. However, both of these faults, as well as other faults in the Southern California region could cause moderate to intense ground shaking at the Specific Plan Area (EIR Appendix K).

5.7.3.3 Ground Rupture

Ground rupture occurs when movement on a fault breaks through to the surface. Surface rupture usually occurs along pre-existing fault traces where zones of weakness exist. The State has established Earthquake Fault Zones for the purpose of mitigating the hazard of fault rupture by prohibiting the location of most human occupancy structures across the traces of active faults. Earthquake Fault Zones are regulatory zones that encompass surface traces of active faults with a potential for future surface fault rupture. The nearest Earthquake Fault Zone is the San Jacinto Fault Zone. As described above, there are no fault zones within the vicinity of the Specific Plan Area. Therefore, ground rupture potential is considered to be low within and surrounding the Specific Plan Area.

5.7.3.4 Soils

The Geotechnical Investigation describes that young and old native alluvium was encountered at the ground surface of all boring locations (shown in Appendix A of the Geotechnical Investigation). The young native alluvial soil extends to depths of approximately 2.5 to 5.5 feet below existing site grades and consists of loose to medium dense silty fine sands, silty fine to medium sands, fine sandy silts, and clayey fine sands. Older native alluvium was encountered beneath the younger native alluvial soils at all boring locations, extending at least to the maximum depth explored of 50 feet below ground surface. The alluvium generally consists of medium dense to very dense well- to poorly-graded silty sands with varying clay content, well-graded to poorly-graded sandy silts with varying clay content, well-graded to poorly graded clayey sands with varying silt content, and clayey silts. Additionally, layers of very stiff to hard fine sandy clays and silty clays were encountered (EIR Appendix K).

5.7.3.5 Expansive Soils

Expansive soils are soils containing water-absorbing minerals that expand as they take in water. These soils can damage buildings due to the force they exert as they expand. Expansive soils contain certain types of

clay minerals that shrink or swell as the moisture content changes; the shrinking or swelling can shift, crack, or break structures built on such soils. Arid or semiarid areas with seasonal changes of soil moisture experience a much higher frequency of problems from expansive soils than areas with higher rainfall and more constant soil moisture. The Geotechnical Investigation describes that the near-surface soils within the Specific Plan Area consist of loose to medium dense silty fine sands, silty fine to medium sands, fine sandy silts, clayey fine sands. The Geotechnical Investigation explains and concludes that these soils are classified as having low to very low expansion potential (EIR Appendix K).

5.7.3.6 Groundwater

Groundwater was not encountered during drilling at the maximum explored depth of 50 feet below ground surface. The nearest monitoring well is located on the northeast corner of the Specific Plan Area. Water level readings within this monitoring well from March 2023 indicates a groundwater level of approximately 40 feet below ground surface (EIR Appendix K).

5.7.3.7 Liquefaction, Lateral Spreading, and Settlement

Liquefaction occurs when vibrations or water pressure within a mass of soil cause the soil particles to lose contact with one another. As a result, the soil behaves like a liquid, has an inability to support weight, and can flow down very gentle slopes. This condition is usually temporary and is most often caused by an earthquake vibrating water-saturated fill or unconsolidated soil. Soils that are most susceptible to liquefaction are clean, loose, saturated, and uniformly graded fine-grained sands that lie below the groundwater table within approximately 50 feet below ground surface. Clayey (cohesive) soils or soils which possess clay particles in excess of 20 percent are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

Different phenomena associated with liquefaction are described below:

Lateral Spreading: Lateral spreading is the lateral movement of stiff, surficial blocks of sediments as a result of a subsurface layer liquefying. The lateral movements can cause ground fissures or extensional, open cracks at the surface as the blocks move toward a slope face, such as a stream bank or in the direction of a gentle slope. When the shaking stops, these isolated blocks of sediments come to rest in a place different from their original location and may be tilted.

Ground Oscillation: Ground oscillation occurs when liquefaction occurs at depth but the slopes are too gentle to permit lateral displacement. In this case, individual blocks may separate and oscillate on a liquefied layer. Sand boils and fissures are often associated with this phenomenon.

Bearing Strength Loss: Bearing strength is the maximum stress load, or force, that the soil can support. Bearing strength decreases with a decrease in effective stress, which is the force that allows soil to remain cohesive. Loss of bearing strength occurs when the effective stresses are reduced due to the fluctuating stresses or strains caused by an earthquake. Even if the soil does not liquefy, the bearing of the soil may be reduced below its value either prior to or after the earthquake. If the bearing strength is sufficiently reduced, structures supported on the sediments can settle, tilt, or even float upward in the case of lightly loaded structures such as gas pipelines.

Ground Fissuring and Sand Boils: A ground fissure is a long narrow crack in the earth's surface while a sand boil is an eruption of water from sand. As apparent from the above descriptions, the likelihood of ground fissures developing is high when lateral spreading, ground oscillations, and flow failure occur. Sand boils occur when the high water pressures are relieved by drainage to the surface along weak spots that may have been created by fissuring. As the water flows to the surface, it can carry sediments, and if the pore

water pressures are high enough create a gusher (sand boils) at the point of exit. The following conditions are conducive to the formation of these phenomena:

- Sediments must be relatively young in age and must not have developed large amounts of cementation;
- Sediments must consist mainly of cohesionless sands and silts;
- The sediment must not have a high relative density;
- Free groundwater must exist in the sediment; and
- The site must be exposed to seismic events of a magnitude large enough to induce straining of soil particles.

During the Geotechnical Investigation, groundwater was not encountered within the Specific Plan Area at the maximum explored depth of 50 feet below ground surface. According to the Riverside County Geographic Information System (GIS) website, the Specific Plan Area is located within a zone of low liquefaction susceptibility (Riverside County, 2023). In addition, the subsurface conditions encountered at the boring locations are not considered to be conducive to liquefaction (EIR Appendix K).

Due to the lack of active faults or fault zones within the vicinity, the Specific Plan Area has low potential for lateral spreading. The Geotechnical Investigation concluded that soils within the Specific Plan Area have a low potential for collapse (EIR Appendix K).

5.7.3.8 Subsidence

Ground subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement, and occurs in areas with subterranean oil, gas, or groundwater. Effects of subsidence include fissures, sinkholes, depressions, and disruption of surface drainage. According to the Geotechnical Investigation, an estimated shrinkage potential of 4 to 12 percent would be expected during removal and recompaction of the artificial fill and near-surface native soils. A subsidence of 0.1 feet is estimated to occur within the Specific Plan Area (EIR Appendix K).

5.7.3.9 Landslides

Landslides are the downhill movement of masses of earth and rock and are often associated with earthquakes; but other factors, such as the slope, moisture content of the soil, composition of the subsurface geology, heavy rains, and improper grading can influence the occurrence of landslides. Earthquake-induced land sliding often occurs in areas where previous landslides have moved and in areas where the topographic, geologic, geotechnical, and subsurface groundwater conditions are conducive to permanent ground displacements. The Specific Plan Area, while relatively flat, slopes downward to the east at a gradient of approximately 1.5 percent (EIR Appendix K). There are no slopes within the immediate vicinity of the Specific Plan Area.

5.7.3.10 Unique Geologic Feature

Unique geologic features refer to unique physical features or structures on the earth's crust. The Specific Plan Area consists of Holocene-aged alluvial fan deposits overlaying Pleistocene (over 11,700 years ago) alluvial fan deposits (Qvof). The geologic processes that occurred on the Specific Plan Area and in the vicinity are generally the same as those in other parts of the city and throughout the state (EIR Appendix L).

5.7.3.11 Paleontological Resources

Paleontological resources include fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on

earth. Significant paleontological resources are defined as fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or important to define a particular time frame or geologic strata, or that add to an existing body of knowledge in specific areas, in local formations, or regionally.

The young Holocene-aged alluvial fan deposits mapped at the surface in the Project are considered to have low potential to yield significant paleontological resources. However, the underlying Pleistocene alluvial fan deposits are considered to have high paleontological sensitivity (EIR Appendix L).

A Paleontological Assessment Review was conducted for the Specific Plan Area (included as EIR Appendix L). The records search did not identify any previously recorded fossil localities within the boundaries and offsite disturbance areas of the Project. The closest known recorded fossil locality is 1.25 northeast of the Specific Plan Area, consisting of the bones of a pond turtle (*Actinemys* cf. *pallida*), Pacific mastodon (*Mammut pacificus*), extinct horse (*Equus* sp.), and extinct bison (*Bison* sp.) (EIR Appendix L). Based on the presence of nearby significant fossil localities, the underlying Pleistocene old alluvial fan deposits mapped at the Specific Plan Area are considered to have a high potential to yield significant paleontological resources (EIR Appendix L).

5.7.4 THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines indicates that a Project could have a significant effect if it were to:

GEO-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 a known fault (refer to Division of Mines and Geology Special Publication 42);
- ii) Strong seismic ground shaking;
- iii) Seismic-related ground failure, including liquefaction; or
- iv) Landslides.

GEO-2 Result in substantial soil erosion or the loss of topsoil.

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.

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.

GEO-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?

GEO-6 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

5.7.5 METHODOLOGY

A site-specific Geotechnical Investigation (EIR Appendix K) was prepared for the Specific Plan Area. The following were conducted as part of the site-specific Geotechnical Investigation: visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development.

The laboratory testing determined the characteristics of the geology and soils that underlie the Specific Plan Area. The subsurface conditions were then analyzed to identify potential significant impacts resulting from construction and operation of the proposed development of the Project in relation to geology and soils.

In determining whether a geotechnical related impact would result from the Project, the analysis includes consideration of State law, including the California Building Code that is integrated into the Perris Municipal Code, and implemented/verified during permitting approvals. In general, existing State law, building codes, and ordinances that are implemented by the approving agency provide for an adequate level of safety or reduction of potential effects such that projects developed and operated to code reduce potential of impacts.

A Paleontological Assessment Review (EIR Appendix L) was prepared to determine the Project's potential impacts to paleontological resources. The analysis included record searches of past identified resources, consideration of the types of soils that exist, the paleontological sensitivity of those soils, the past disturbance on the site and offsite infrastructure areas, and the proposed excavation. The analysis combines these factors to identify the potential of the proposed construction to impact unknown paleontological resources on the site. As described in the Paleontological Assessment Review, a resource records search was conducted at the San Bernardino County Museum, and the Western Science Center to identify any previously discovered fossil localities in or near the Specific Plan Area.

5.7.6 ENVIRONMENTAL IMPACTS

As detailed in Section 3.0, *Project Description*, the proposed Project includes a Specific Plan Amendment to modify the existing land uses and development of the Project site pursuant to the proposed new land uses over two phases that are summarized below.

Phase 1 Development

Within Phase 1, the Project would construct and operate a 139.89-acre business park with seven buildings including a parcel hub, high cube warehouses, and light industrial buildings that would total 1,727,579 square feet; construct and operate a 22.16-acre shopping center with buildings totaling 250,457 square feet; and construct and operate a 167,060 square foot big box store on a 24.33-acre site with a 12-pump gas station and two fast-food restaurant parcels for two restaurants that would each be approximately 5,500 square feet.

In addition, during construction of Phase 1 the Project would implement street improvements on Indian Avenue, Orange Avenue, Frontage Road, Perris Boulevard, Barrett Avenue, Harvest Landing Way, and Private Drive A; install drainage infrastructure improvements in Perris Boulevard, Barrett Avenue, Orange Avenue, Indian Avenue, and Private Drive A; implement sewer line improvements in Perris Boulevard; implement water lines improvements in Barrett Avenue, Orange Avenue, Frontage Road, Walmart Supercenter Drive; and install a new water well for landscaping irrigation in the proposed drainage basin. Construction and operation of the Phase 1 development is analyzed at a project-specific level within this section.

Phase 2 Buildout

The proposed amended Specific Plan buildout of the Phase 2 development area without inclusion of the overlay area would allow up to 3,659,693 square feet of warehouse, light industrial, and/or manufacturing uses under the Multiple Business Use (MBU) designation, at a maximum floor area ratio of 0.75. Development of the 10.66-acre overlay area would include approximately 348,262 square feet of warehouse, light industrial, and/or manufacturing uses under the MBU designation. Total development within the Phase 2

area, including the overlay area, would include up to 4,007,955 square feet of building area.[1] The analysis within this section assumes that construction would begin in 2026 and be completed by 2030, thereby overlapping with operation of Phase 1 developments. Construction and operation of the Phase 2 buildout is analyzed at a programmatic level within this section.

IMPACT GEO-1I: THE PROJECT WOULD NOT 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).

Specific Plan Area

No Impact. The Specific Plan Area is not within an Alquist Earthquake Fault Zone, and there are no known active faults within 500 feet. The nearest active fault zones are the San Jacinto Fault Zone, located approximately nine miles northeast of the Project site and the Elsinore Fault Zone, located approximately thirteen miles southwest of the Project site (California Department of Conservation, 2021). Since the site is not located within an Alquist-Priolo Earthquake Fault Zone, impacts related to the surface rupture of a known earthquake fault would not occur within the Specific Plan Area.

IMPACT GEO-1II: THE PROJECT WOULD NOT DIRECTLY OR INDIRECTLY CAUSE POTENTIAL SUBSTANTIAL ADVERSE EFFECTS, INCLUDING THE RISK OF LOSS, INJURY, OR DEATH INVOLVING STRONG SEISMIC GROUND SHAKING.

Specific Plan Area

Less than Significant Impact. As stated above, the Specific Plan Area is not located within 500 feet of any active faults. However, the Project site is located within a seismically active region, with numerous faults capable of producing significant ground motions. Project development could subject people and structures to hazards from ground shaking. However, seismic shaking is a risk throughout Southern California, and the Specific Plan Area is not at greater risks of seismic activity or impacts as compared to other areas within the region.

The California Building Code includes provisions to reduce impacts caused by major structural failures or loss of life resulting from earthquakes or other geologic hazards. Chapter 16 of the California Building Code contains requirements for design and construction of structures to resist loads, including earthquake loads. The California Building Code provides procedures for earthquake resistant structural design that include consideration for onsite soil conditions, occupancy, and the configuration of the structure, including the structural system and height.

The City has adopted the California Building Code as part of the Perris Municipal Code (Section 16.08.050), which regulates all building and construction projects within the City and implements a minimum standard for building design and construction that includes specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. All structures within the City are required to be built in compliance with the California Building Code. Because Project structures within both Phase 1 and Phase 2 would be required to be constructed in compliance with the California Building Code and the Perris Municipal

[1] The Phase 2 buildout square footage of 4,007,955 square feet was based on the gross acreage of parcels within the Phase 2 area prior to roadway dedications. After roadway dedications, the maximum allowable development within Phase 2 would actually be 4,001,748 square feet. However, for purposes of providing a conservative analysis, a buildout of 4,007,955 square feet was assumed.

Code, which would be verified through the City's plan check and permitting process, the Project would result in a less-than-significant impact related to strong seismic ground shaking.

IMPACT GEO-1III: THE PROJECT WOULD NOT DIRECTLY OR INDIRECTLY CAUSE POTENTIAL SUBSTANTIAL ADVERSE EFFECTS, INCLUDING SEISMIC-RELATED GROUND FAILURE, INCLUDING LIQUEFACTION.

Specific Plan Area

Less than Significant Impact. According to the Riverside County GIS website, the Specific Plan Area is located within a zone of low liquefaction susceptibility (Riverside County, 2023). Additionally, the soil conditions onsite are not conducive to liquefaction, due to the presence of moderate to high strength soils and the lack of a shallow groundwater table. Free water was not encountered during soil borings, which were sampled to a maximum depth of 50 feet below existing site grades (EIR Appendix K). Furthermore, the Project would be developed in compliance with construction requirements under the California Building Code, as adopted in the Perris Municipal Code under Section 16.08.050. Specific engineering design recommendations would be incorporated into grading plans and building specifications as a condition of construction permit approval to ensure that structures would withstand the effects of seismic ground movement, including liquefaction and settlement. Therefore, potential impacts related to hazards from seismic-related ground failure would be less than significant.

IMPACT GEO-1IV: THE PROJECT WOULD NOT DIRECTLY OR INDIRECTLY CAUSE POTENTIAL SUBSTANTIAL ADVERSE EFFECTS, INCLUDING LANDSLIDES.

Specific Plan Area

No Impact. Landslides and other slope failures are secondary seismic effects that are common during or soon after earthquakes. Areas that are most susceptible to earthquake induced landslides are steep slopes underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. As described above, the Specific Plan Area is located in a seismically active region subject to strong ground shaking. However, the Project site is located in a flat area that does not contain nor is adjacent to large slopes, and the Project would not create large slopes. In addition, the Project site is not located within a landslide hazard zone as shown in Figure S-7 of the City of Perris General Plan Safety Element (City of Perris, 2022). As a result, implementation of the Project would not expose people or structures to substantial adverse effects involving landslides, and potential impacts related to landslides would not occur.

IMPACT GEO-2: THE PROJECT WOULD NOT RESULT IN SUBSTANTIAL SOIL EROSION OR THE LOSS OF TOPSOIL.

Specific Plan Area

Less than Significant Impact.

Construction

Construction of the proposed Project has the potential to contribute to soil erosion and the loss of topsoil. The Project would involve excavation, grading, stockpiling, and import of soil to the Specific Plan Area. Grading increases the potential for erosion by removing the protective vegetation and changing the natural drainage patterns, allowing for loose soil to be carried out by wind or water. However, as further described in Section 5.10, *Hydrology and Water Quality*, under Chapter 14.22 of the Perris Municipal Code, the Project would be required to comply with the NPDES Storm Water Permit (MS4 Permit) construction permit regulations, which require the preparation and implementation of a site-specific SWPPP. As a part of the SWPPP, erosion

and sediment control BMPs would be used to reduce or eliminate pollutants entering the City's stormwater system. These BMPs may include the use of:

- Silt fences;
- Geotextile/plastic covers;
- Erosion control blankets/mats;
- Soil binders;
- Fiber rolls;
- Gravel bag berms;
- Sandbag barriers; and/or
- Straw bale barriers.

Implementation of construction BMPs in compliance with the City's permitting requirements would cover exposed soil or impede stormwater runoff, reducing the potential for erosion. Therefore, potential construction impacts related to erosion would be less than significant.

Operation

Once constructed, the developed areas within the Specific Plan would contain buildings, pavement and landscaping, minimizing the potential for soil erosion and loss of topsoil. Also, as described in Section 5.10, *Hydrology and Water Quality*, onsite drainage features would be installed as part of the proposed development, which would be designed to filter and slowly discharge stormwater into the offsite drainage system and further reduce the potential for stormwater to erode topsoil. Additionally, future developments within Phase 2 would require a site-specific Water Quality Management Plan (WQMP), which would ensure that the Regional Water Quality Control Board requirements, and appropriate operational BMPs would be implemented to minimize or eliminate the potential for soil erosion or loss of topsoil to occur. Therefore, with the implementation of the proposed landscape and drainage features, as well as compliance with City regulations, potential impacts related to soil erosion would be less than significant.

IMPACT GEO-3: THE PROJECT WOULD NOT 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.

Less than Significant Impact.

Phase 1 Development

The Geotechnical Investigation describes that the older alluvium soils encountered beneath the younger alluvium soils at all of the boring locations generally possess medium dense to very dense well- to poorly-graded silty sands with varying clay content, well-graded to poorly-graded sandy silts with varying clay content, well-graded to poorly graded clayey sands with varying silt content, and clayey silts. The Geotechnical Investigation describes that the recommended remedial grading would remove the existing upper portion of near-surface native alluvial soils and replace these soils with compacted structural fill within the proposed building areas (EIR Appendix K). Excavation and recompaction of compacted structural fill would be conducted in compliance with the California Building Code as required through the City's permitting process.

As discussed previously, the Specific Plan Area and the adjacent parcels are relatively flat and do not contain any hills or steep slopes. There is a 1.5 percent slope downward to the east throughout the site (EIR Appendix K). In addition, remedial grading and site preparation would further level the Project grades. Therefore, impacts related to landslides resulting from the proposed Project would be less than significant.

According to the Geotechnical Investigation, an estimated shrinkage potential of 4 to 12 percent is expected during removal and recompaction of the artificial fill and near-surface native soils. A subsidence of 0.1 feet in the soils below the zone of removal is estimated to occur within the Specific Plan Area (EIR Appendix K). As discussed previously, the Specific Plan Area is not located within a liquefaction hazard zone. In addition, the soil and groundwater conditions onsite are not conductive to liquefaction. Due to the low probability of liquefaction onsite, risks related to lateral spreading are also considered low (EIR Appendix K).

Soils within the Specific Plan Area were determined to be mildly corrosive to ductile iron pipe and corrosive to copper pipe. However, compliance with the California Building Code would require the use of coating or protection to such pipes in direct contact with the soil. Therefore, impacts related to corrosive soil-induced collapse would be less than significant.

The proposed Project would be required to adhere to California Building Code grading and earthwork operation recommendations to limit risk associated with subsidence, collapse, liquefaction, and lateral spreading. Compliance with the California Building Code would be required by the City of Perris Building Division. Compliance with the requirements of the California Building Code as part of the building plan check and development review process, would ensure that impacts related to subsidence would be less than significant.

Phase 2 Buildout

While there are no areas of landslide or liquefaction susceptibility within or adjacent to the Phase 2 area of the Specific Plan, inclusive of the MBU Overlay area, Applicants for future developments would be required to prepare site-specific geotechnical investigations in compliance with the California Building Code. Future developments would be required to comply with geotechnical recommendations set forth in those site-specific geotechnical investigations, as required by California Building Code guidelines. Accordingly, the developments would be designed and constructed to address potential geological conditions in accordance with Perris Municipal Code and California Building Code requirements. Therefore, potential impacts related to landslide, lateral spreading, subsidence, liquefaction, or collapse would be less than significant.

IMPACT GEO-4: THE PROJECT WOULD NOT BE LOCATED ON EXPANSIVE SOIL, AS DEFINED IN TABLE 18-1-B OF THE UNIFORM BUILDING CODE (1994), CREATING SUBSTANTIAL IRECT OR INDIRECT RISKS TO LIFE OR PROPERTY.

Less than Significant Impact.

Phase 1 Development

Expansive soils contain significant amounts of fine-grained silt and clay particles that swell when wet and shrink when dry. The amount of swelling and contracting is subject to the amount of fine-grained clay materials present in the soils, and the amount of moisture that the soil is exposed to. Foundations constructed on expansive soils are subjected to forces caused by the swelling and shrinkage of the soils, which can cause physical distress on the structure. Without proper measures taken, heaving and cracking of both building foundations and slabs-on-grade could result.

The Geotechnical Investigation describes that the Specific Plan Area's near-surface soils consist of silty sands and sandy silts with occasional clay content as well as clayey sands and occasional sandy clays and silty clays. According to the Geotechnical Investigation, these materials are considered to have a low to very low expansion potential (EIR Appendix K). In addition, as described above, compliance with the California Building Code and the recommendations provided within the Geotechnical Investigation is a standard City practice. Therefore, compliance with the requirements of the California Building Code as part of the building plan check and development review process, would ensure that expansive soil related impacts would be less than significant.

Phase 2 Buildout

Applicants for future developments within the Phase 2 portion of the Specific Plan would be required to prepare site-specific geotechnical investigations in compliance with the California Building Code. Future development within Phase 2 would comply with geotechnical recommendations set forth in site-specific geotechnical investigations and California Building Code guidelines to determine expansive soil potential and if warranted, soils would be mitigated to standards established by California Building Code regulations. Therefore, potential impacts related to unstable expansive soils within Phase 2 would be less than significant.

IMPACT GEO-5: THE PROJECT WOULD NOT 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.

Specific Plan Area

No Impact. The Project would connect to the existing sewer infrastructure and would not use septic tanks or alternative methods for disposal of wastewater into subsurface soils. Therefore, impacts related to septic tanks or alternative wastewater disposal methods would not occur.

IMPACT GEO-6: THE PROJECT WOULD NOT DIRECTLY OR INDIRECTLY DESTROY A UNIQUE PALEONTOLOGICAL RESOURCE OR SITE OR UNIQUE GEOLOGIC FEATURE.

Specific Plan Area

Less than Significant with Mitigation Incorporated. Earthmoving activities, including grading and trenching activities, have the potential to disturb previously unknown paleontological resources. The Paleontological Assessment Report describes that the Specific Plan Area is underlain by deposits of undocumented fill that overlies very old alluvial fan deposits. Due to the occurrence of terrestrial vertebrate fossils at shallow depths from Pleistocene alluvial fan sediments across the Inland Empire, the sediments underlying the Specific Plan Area are considered as having high paleontological sensitivity (EIR Appendix K).

The records search completed as part of the Paleontological Assessment did not reveal any previously recorded fossil localities within the Specific Plan Area. However, various mammalian fossils had been discovered within two miles of the Specific Plan Area (EIR Appendix K). Based on the presence of nearby significant fossil localities, the underlying Pleistocene old alluvial fan deposits mapped at the Specific Plan Area are considered to have a high potential to yield significant paleontological resources. As such, the Paleontological Assessment concluded that the Specific Plan Area has a high sensitivity for paleontological resources. As a result, Mitigation Measure PAL-1 is included to require preparation of a Paleontological Resources Impact Mitigation Program (PRIMP) and that ground disturbing activities be monitored to identify and recover any significant fossil remains. With implementation of Mitigation Measure PAL-1, potential impacts to paleontological resources would be less than significant.

5.7.7 CUMULATIVE IMPACTS

Geology and Soils: Geotechnical impacts are site-specific rather than cumulative in nature. Direct and indirect impacts related to geology and soils would be mitigated through mandatory conformance with the California Building Code, Perris Municipal Code, and site-specific geotechnical recommendations, which will be incorporated as part of the Project's design and construction efforts. With the exception of erosion hazards, potential hazardous effects related to geologic and soil conditions are unique to each project site, and inherently restricted to the developments proposed. That is, issues including fault rupture, seismic ground shaking, liquefaction, landslides, and expansive soils would involve effects to (and not from) the development,

are specific to conditions on the property, and are not influenced by or additive with the geologic and/or soils hazards that may occur on other, offsite properties. Because of the site-specific nature of these potential hazards and the measures to address them, there would be no direct or indirect connection to similar potential issues or cumulative effects at the Project site.

Impacts related to erosion and loss of topsoil could be cumulatively considerable. However, as discussed in Impact GEO-2, mandates related to the NPDES permit, preparation of a WQMP, Erosion Control Plan, and SWPPP, as well as compliance with South Coast Air Quality Management District Rule 403 (Fugitive Dust) incorporate measures during construction activities to ensure that significant erosion impacts do not occur. Other development projects in the vicinity of the Specific Plan Area would be required to comply with the same regulatory requirements as the Project to preclude substantial adverse water and wind erosion impacts. Because the Project and related projects within the cumulative study area, as shown on Figure 5-1, would be subject to similar mandatory regulatory requirements to control erosion hazards during construction and long-term operation, cumulative impacts associated with wind and water erosion hazards would be less than significant.

Paleontological Resources: The cumulative paleontological impact assessment considers the development of the Project in conjunction with other development projects, as listed in Section 5.0 of this EIR, in the context of the Riverside County region, which is identified as sensitive for paleontological resources. The geographic area of potential cumulative impacts related to paleontological resources includes areas that are underlain by similar geologic units from the same time period. A cumulative impact could occur if development projects incrementally result in the loss of the same types of unique paleontological resources. As detailed previously, the Perris Valley area of Riverside County, including the Specific Plan Area, is underlain by deep sediments that are sensitive to paleontological resources. However, with incorporation of Mitigation Measure PAL-1, ground excavation that could impact paleontological resources would be monitored to reduce potential significant impacts that could become cumulatively considerable. Thus, with incorporation of mitigation measures the potential for cumulatively considerable impacts would be less than significant.

5.7.8 EXISTING REGULATIONS

- Public Resources Code Section 5097.5
- Perris Municipal Code, Section 16.08.050
- Construction General Permit, Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ, 2012-0006-DWQ, and 2022-0057-DWQ
- Regional MS4 permit (Order No. Order No. R8- 2002-0011, NPDES No. CAS 618033)

5.7.9 LEVEL OF SIGNIFICANCE BEFORE MITIGATION

Upon implementation of regulatory requirements, Impacts GEO-1i, GEO-1iv, and GEO-5 would result in no impact, and Impacts GEO-1ii, GEO-1iii, GEO-2, GEO-3, and GEO-4 would be less than significant.

Without mitigation, the following impact would be **potentially significant**:

Impact GEO-6: Project implementation could uncover subsurface paleontological resources.

5.7.10 MITIGATION MEASURES

Mitigation Measure PAL-1: Paleontological Monitoring. Prior to the issuance of grading permits, the Project proponent/developer shall submit to and receive approval from the City, a Paleontological Resource Impact Mitigation Monitoring Program (PRIMMP). The PRIMMP shall include the provision for a qualified professional

paleontologist (or his or her trained paleontological representative) to be onsite for any project-related excavations. 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 project site or within the offsite 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. 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.

5.7.11 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Compliance with existing regulatory programs and implementation of Mitigation Measure PAL-1 would reduce potential impacts associated with potential geotechnical hazards and unique paleontological resource impacts to a level that is less than significant. Therefore, no significant and unavoidable adverse impacts related to geology and soils and paleontological resources would occur.

5.7.12 REFERENCES

BFSA Environmental Services. (2024). *Paleontological Assessment Report and Update for the Harvest Landing Retail Center & Business Park Project.* **(EIR Appendix L)**

California Department of Conservation. (2022). *Seismic Hazard Zones: Alquist-Priolo Fault Zones*. Retrieved September 2024 from: https://www.arcgis.com/apps/mapviewer/index.html?url=https://services2.arcgis.com/zr3KAIbsRSUyARHG/ArcGIS/rest/services/CGS_Alquist_Priolo_Fault_Zones/FeatureServer&source=sd

City of Perris. (April 2005a). *Environmental Impact Report, City of Perris General Plan 2030*. Retrieved August 1, 2024, from https://www.cityofperris.org/home/showpublisheddocument/451/637203139698630000

City of Perris. (July 2005b). *General Plan Conservation Element*. Retrieved August 1, 2023, from https://www.cityofperris.org/home/showpublisheddocument/449/637203139693370000

City of Perris. (2011). *Perris Valley Commerce Center Specific Plan Final Environmental Impact Report*. Retrieved September 12, 2023, from https://www.cityofperris.org/home/showpublisheddocument/2645/637455522835370000.

City of Perris. (July 2022). *General Plan Safety Element*. Retrieved August 1, 2023, from https://www.cityofperris.org/home/showpublisheddocument/15024/637807110903270000

Riverside County. (2023) *Riverside County Mapping Portal- Liquefaction*. Retrieved September 2024 from: https://gisopendata-countyofriverside.opendata.arcgis.com/datasets/8b4d6c0ed6154902b03be41faebdf588_250/explore?location=33.742901%2C-116.055500%2C7.88

Southern California Geotechnical. (2024). *Geotechnical Investigation Harvest Landing Business Park*. **(EIR Appendix K)**

SVP (Society of Vertebrate Paleontology). (June 2020). *Handbook for Society of Vertebrate Paleontology*. Retrieved September 2024 from: https://vertpaleo.org/wp-content/uploads/2021/01/SVP-Handbook_v1-10.pdf