4.6 GEOLOGY AND SOILS

4.6.1 Introduction

This section evaluates potential impacts concerning geology, soils, and paleontological resources that could result from the Newport Beach General Plan Housing Implementation Program (Project), including future development on the housing sites facilitated by the 2021-2029 Housing Element. This analysis summarizes existing conditions on the housing sites and the geology and soils regulatory framework that would apply to future residential development facilitated by the 2021-2029 Housing Element. This section also discusses the Project's potential impacts concerning geology, soils, and paleontological resources, including risks associated with geologic events, soil erosion and topsoil loss, unstable geologic units or soils, expansive soils, incapable soils, or unique paleontological or geological features, and mitigation to reduce impacts, as needed.

4.6.2 Regulatory Setting

Federal

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act "to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program". To accomplish this goal, the Act established the National Earthquake Hazards Reduction Program. This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRPA includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Programs under this NEHRPA 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 to. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and the U.S. Geological Service (USGS).

Soil and Water Resources Conservation Act

The purpose of the Soil and Water Resources Conservation Act of 1977 is to protect or restore soil functions on a permanent sustainable basis. Protection and restoration activities include prevention of harmful soil changes, rehabilitation of the soil of contaminated sites and of water contaminated by such sites, and precautions against negative soil impacts. Disruptions of natural soil functions and function as an archive of natural and cultural history should be avoided, as far as practicable. In addition, the federal Water Pollution Control Act (also referred to as the Clean Water Act) requirements, through the National Pollution Discharge Elimination System (NPDES) permitting process, provide guidance for protection of geologic and soil resources.

National Pollutant Discharge Elimination System

Section 402 of the Clean Water Act establishes the permit program to regulate pollutant discharge from point sources and discharge pollutants into U.S. waters. In the State of California, the U.S. Environmental Protection Agency (U.S. EPA) has authorized the State Water Resources Control Board permitting authority to implement the NPDES program. In general, the State Water Resources Control Board issues two baseline general permits: one for industrial discharges and one for construction activities. Rather than setting numeric effluent limitations for storm water and urban runoff, Clean Water Act regulation calls for the implementation of best management practices (BMPs) to reduce or prevent pollutant discharge from these activities to the Maximum Extent Practicable for urban runoff and meeting the Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology standards for construction storm water. Regulations and permits have been implemented at the federal, State, and local level to form a comprehensive regulatory framework to serve and protect the quality of the country's surface water resources.

Uniform Building Code

The Uniform Building Code (UBC) is published by the International Conference of Building Officials. It forms the basis of about half the state building codes in the United States, including California, and has been adopted by the State legislature together with Additions, Amendments, and Repeals to address the specific building conditions and structural requirements in California.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code [PRC] 2621-2624, Division 2 Chapter 7.5) was passed in 1972 to mitigate the hazard of surface faulting to structures intended for human occupancy. The Alquist-Priolo Act's main purpose is to prohibit siting buildings used for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones, known as "Earthquake Fault Zones," delineating appropriately wide earthquake fault zones to encompass potentially active and recently active traces of faults. Local agencies must regulate most development projects within these zones. Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that proposed human occupancy structures would not be constructed across active faults. A licensed geologist must prepare an evaluation and written report of a specific site. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (typically at least 50-foot setbacks are required). None of the housing sites are within an Alquist-Priolo Earthquake Fault Zone. [1]

Seismic Hazards Mapping Act

The 1990 Seismic Hazards Mapping Act (PRC §§2690–2699.6) addresses hazards such as strong ground shaking, earthquake-induced landslides, and, in some areas, zones of amplified shaking. The Act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The California Geologic Survey is the primary State agency charged with implementing the Seismic Hazards Mapping Act and provides local jurisdictions with

[1] California Department of Conservation. (ND). *California Geological Survey- Earthquake Zones of Required Investigation*. Retrieved from https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed November 27, 2023.

the seismic hazard zone maps that identify areas susceptible to liquefaction, earthquake-induced landslides, and amplified shaking. Site-specific hazard investigations are required by the Seismic Hazards Mapping Act when a development project is located within one of the Seismic Hazard Mapping Zones defined as a "zone of required investigation." It also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

Natural Hazards Disclosure Act

The Natural Hazards Disclosure Act (effective June 1, 1998), requires "that sellers of real property and their agents provide prospective buyers with a Natural Hazards Disclosure Statement when the property being sold lies within one or more state-mapped hazard areas, including a Seismic Hazard Zone." The law specifies two ways in which this disclosure can be made:

1. The Local Option Real Estate Transfer Disclosure Statement as provided in Section 1102.6a of the California Civil Code.
2. The Natural Hazard Disclosure Statement as provided in Section 1103.2 of the California Civil Code.

The Local Option Real Estate Disclosure Statement can be substituted for the Natural Hazards Disclosure Statement if it contains substantially the same information and substantially the same warning as the Natural Hazards Disclosure Statement.

California Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (CCR Code §§2690–2699.6) addresses earthquake hazards from non-surface fault rupture, including liquefaction, landslides, strong ground shaking, and other earthquake and geologic hazards. The Seismic Hazards Mapping Act also specifies that the lead agency for a project may withhold project permits until geologic or soils investigations are conducted for specific areas and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

California Building Code/California Residential Code

The 2022 California Building Code (CBC) is based on the International Building Code, which is a model building code developed by the International Code Council that sets rules specifying the minimum acceptable level of safety for building construction in the United States. The CBC is part of the California Code of Regulations (CCR), Title 24 Part 2. The California Residential Code is part of the CCR, Title 24 Part 2.5. The CBC is updated periodically. The current version of the CBC was published on July 1, 2022 and became effective on January 1, 2023. The CBC and California Residential Code contain seismic safety standards outlining design and construction requirements. Development projects must show compliance with the CBC and/or California Residential Code through the development review process. Building permits are submitted and reviewed for compliance prior to obtaining construction and building permits. The CBC includes estimates for maximum earthquake magnitudes and peak ground acceleration, soil classifications and expansion potential, seismic design categories and lateral pressure, and grading and surface drainage.

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) on September 2, 2009 (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ). The last Construction General Permit amendment became effective on July 17, 2012. The Construction General Permit 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 (NALs) for pH 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).

Public Resources Code Sections 5097–5097.6

California PRC Sections 5097–5097.6 identify that the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands is a misdemeanor. It prohibits the knowing destruction of objects of antiquity without a permit (expressed permission) on public lands, and it provides for criminal sanctions.

This section was amended in 1987 to require consultation with the Native American Heritage Commission (NAHC) whenever Native American graves are found. Violations for taking or possessing remains or artifacts are felonies. California Public Resources Code Section 5097.5 states that "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, rock art, or any other archaeological, paleontological or historic feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands."

California Coastal Act

California Coastal Act Section 30253 requires that new development (1) minimize risks to life and property in areas of high geologic, flood, and fire hazard; and (2) assures stability and structural integrity, and neither creates nor contributes significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way requires the construction of protective devices that would substantially alter landforms along bluffs and cliffs. The California Coastal Commission (Coastal Commission) indicates that an appropriate setback from a coastal bluff is at the point where a Factor of Safety (FOS) of 1.5 can be demonstrated; however, the Coastal Commission notes that it is more difficult to determine for overhanging or notched coastal bluffs or bluffs undermined by sea caves. The Coastal Act is implemented in the City through the certified Local Coastal Program, which applies to all proposed development in the City located within the Coastal Zone boundary.

The California Coastal Act, in part, authorizes the Coastal Commission to review permit applications for development within the coastal zone and, where necessary, to require reasonable mitigation measures to offset effects of that development. Permits for new development are issued with "special conditions" to ensure implementation of these mitigation measures. The Act also states that “Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required” (CCA §30244).

Local

City of Newport Beach Council Policy K-5

City Council Policy K-5 contains Paleontological and Archeological Resource Protection Guidelines, which are used to ensure that potential impacts to paleontological and archaeological resources by public or private development are properly evaluated and mitigated in accordance with the City’s General Plan, Local Coastal Program, and CEQA.

City of Newport Beach General Plan

The *City of Newport Beach General Plan 2006 Update* (General Plan) includes goals and policies to protect people and structures from geological hazards within the City. The Safety Element includes policies to increase the resilience of the City against erosion. The following General Plan goals and policies that have been adopted by the City for the purpose of avoiding or mitigating an environmental effect are applicable to future development projects associated with the proposed Project.

Safety Element

Goal S 3 **Protection of people and property from the adverse effects of coastal erosion.**

Policy S 3.9 **Shoreline Protection for New Development.** Require property owners to record a waiver of future shoreline protection for new development during the economic life of the structure (75 years) as a condition of approval of a coastal development permit for new development on a beach or shoreline that is subject to wave action, erosion, flooding, landslides, or other hazards associated with development on a beach or bluff. Shoreline protection may be permitted to protect existing structures that were legally constructed prior to the certification of the LCP, unless a waiver of future shoreline protection was required by a previous coastal development permit.

Policy S 3.10 **Bluff Stabilization.** Site and design new structures to avoid the need for shoreline and bluff protective devices during the economic life of the structure (75 years), unless an environmentally acceptable design to stabilize the bluff and prevent bluff retreat is devised.

Policy S 3.11 **New Development Impact on Coastal Erosion.** Require that applications for new development with the potential to be impacted or impact coastal erosion include slope stability analyses and erosion rate estimates provided by a licensed Certified Engineering Geologist or Geotechnical Engineer.

Policy S 3.12 **Minimization of Coastal Bluff Recession.** Require new development adjacent to the edge of coastal bluffs to incorporate drainage improvements, irrigation systems, and/or native or drought-tolerant vegetation into the design to minimize coastal bluff recession.

Goal S 4 **Adverse effects caused by seismic and geologic hazards are minimized by reducing the known level of risk to loss of life, personal injury, public and private property damage, economic and social dislocation, and disruption of essential services.**

Policy S 4.3 **Unreinforced Masonry Buildings.** Require the retrofitting of unreinforced masonry buildings during remodels to minimize damage in the event of seismic or geologic hazards.

Policy S 4.7 **New Development.** Conduct further seismic studies for new development in areas where potentially active faults may occur.

Natural Resources Element

Goal NR 3 **Enhancement and protection of water quality of all natural water bodies, including coastal waters, creeks, bays, harbors, and wetlands.**

Policy NR 3.4: **Storm Drain Sewer System Permit.** Require all development to comply with the regulations under the City's municipal separate storm drain system permit under the National Pollutant Discharge Elimination System.

Policy NR 3.9 **Water Quality Management Plan.** Require new development applications to include a Water Quality Management Plan (WQMP) to minimize runoff from rainfall events during construction and post-construction.

Policy NR 3.11 **Site Design and Source Control.** Include site design and source control BMPs in all developments. When the combination of site design and source control BMPs are not sufficient to protect water quality as required by the National Pollutant Discharge Elimination System (NPDES), structural treatment BMPs will be implemented along with site design and source control measures.

Policy NR 3.12 **Reduction of Infiltration.** Include equivalent BMPs that do not require infiltration, where infiltration of runoff would exacerbate geologic hazards.

Policy NR 3.14 **Runoff Reduction on Private Property.** Retain runoff on private property to prevent the transport of pollutants into natural water bodies, to the maximum extent practicable.

Policy NR 3.15 **Street Drainage Systems.** Require all street drainage systems and other physical improvements created by the City, or developers of new subdivisions, to be designed, constructed, and maintained to minimize adverse impacts on water quality. Investigate the possibility of treating or diverting street drainage to minimize impacts to water bodies.

Policy NR 3.19 **Natural Drainage Systems.** Require incorporation of natural drainage systems and stormwater detention facilities into new developments, where appropriate and feasible, to retain stormwater in order to increase groundwater recharge.

Policy NR 3.20 **Impervious Surfaces.** Require new development and public improvements to minimize the creation of and increases in impervious surfaces, especially directly connected impervious areas, to the maximum extent practicable. Require redevelopment to increase area of pervious surfaces, where feasible.

Goal NR 4 **Maintenance of water quality standards through compliance with the total maximum daily loads (TMDLs) standards.**

Policy NR 4.4 **Erosion Minimization.** Require grading/erosion control plans with structural BMPs that prevent or minimize erosion during and after construction for development on steep slopes, graded, or disturbed areas.

Goal NR 18 **Protection and preservation of important paleontological and archaeological resources.**

Policy NR 18.1 **New Development.** Require new development to protect and preserve paleontological and archaeological resources from destruction and avoid and minimize impacts to such resources in accordance with the requirements of CEQA. Through planning policies and permit conditions, ensure the preservation of significant archeological and paleontological resources and require that the impact caused by any development be mitigated in accordance with CEQA.

Policy NR 18.4 **Donation of Materials.** Require new development, where on-site preservation and avoidance are not feasible, to donate scientifically valuable paleontological or archaeological materials to a responsible public or private institution with a suitable repository, located within Newport Beach or Orange County, whenever possible.

Historical Resources Element

Goal HR 2 **Identification and protection of important archaeological and paleontological resources within the City.**

Policy HR 2.1 **New Development Activities.** Require that, in accordance with CEQA, new development protect and preserve paleontological and archaeological resources from destruction and avoid and mitigate impacts to such resources. Through planning policies and permit conditions, ensure the preservation of significant archeological and paleontological resources and require that the impact caused by any development be mitigated in accordance with CEQA.

Policy HR 2.2 **Grading and Excavation Activities.** Maintain sources of information regarding paleontological and archeological sites and the names and addresses of responsible organizations and qualified individuals, who can analyze, classify, record, and preserve paleontological or archeological findings. Require a qualified paleontologist/ archeologist to monitor all grading and/or excavation where there is a potential to affect cultural, archeological or paleontological resources. If these resources are found, the Applicant shall implement the recommendations of the paleontologist/ archaeologist, subject to the approval of the City Planning Department.

Policy HR 2.4 **Paleontological and Archaeological Materials.** Require new development to donate scientifically valuable paleontological or archaeological materials to a responsible public or private institution with a suitable repository, located within Newport Beach, or Orange County, whenever possible.

City of Newport Beach Local Coastal Program

The California Coastal Act directs each local government located partially or wholly within the coastal zone to prepare a Local Coastal Program (LCP) for its portion of the coastal zone. The City's Local Coastal

Program establishes the Coastal Land Use Plan for the City. The Coastal Land Use Plan sets forth goals, objectives, and policies that govern the use of land and water in the coastal zone within the City and it sphere of influence, with the exception of Newport Coast and Banning Ranch. Newport Coast is governed by the Orange County Local Coastal Program and Banning Ranch is a Deferred Certification Area (DCA) due to unresolved issues relating to land use, public access, and the protection of coastal resources. The California Coastal Act contains coastal resources planning and management policies that address public access, recreation, marine environment, land resources, development, and industrial development. The Coastal Land Use Plan addresses these topics by identifying which California Coastal Act sections are relevant to Newport Beach, followed by a narrative of the local setting and policy direction adopted by the City to address the requirements of the Coastal Act and a listing of specific policies.

The City's Coastal Land Use Plan (CLUP) includes the following policies applicable to paleontological resources:

Policy 4.5.1-2 Require a qualified paleontologist/archeologist to monitor all grading and/or excavation where there is a potential to affect cultural or paleontological resources. If grading operations or excavations uncover paleontological/archaeological resources, require the paleontologist/archeologist monitor to suspend all development activity to avoid destruction of resources until a determination can be made as to the significance of the paleontological/ archaeological resources. If resources are determined to be significant, require submittal of a mitigation plan. Mitigation measures considered may range from in-situ preservation to recovery and/or relocation. Mitigation plans shall include a good faith effort to avoid impacts to cultural resources through methods such as, but not limited to, project redesign, in situ preservation/capping, and placing cultural resource areas in open space.

Policy 4.5.1-5 Where there is a potential to affect cultural or paleontological resources, require the submittal of an archeological/cultural resources monitoring plan that identifies monitoring methods and describes the procedures for selecting archeological and Native American monitors and procedures that will be followed if additional or unexpected archeological/cultural resources are encountered during development of the site. Procedures may include, but are not limited to, provisions for cessation of all grading and construction activities in the area of the discovery that has any potential to uncover or otherwise disturb cultural deposits in the area of the discovery and all construction that may foreclose mitigation options to allow for significance testing, additional investigation, and mitigation.

Newport Beach Municipal Code[2]

The City adopts the current CBC as the basis for its own Building Code (Municipal Code Title 15, Chapter 15.04). The City's Building Code, as adopted, includes acceptable variations to the CBC related to fence heights, swimming pool depth, building materials, and sprinkler systems. The Excavation and Grading Code (Municipal Code Chapter 15.10) sets forth rules and regulations to control excavation, grading, drainage conditions, erosion control, earthwork construction including fills and embankments, and the use of earth materials as a structural component; and provides for the approval of plans and inspection

[2] City of Newport Beach (2021). *City of Newport Beach Municipal Code - Title 15 Buildings and Construction*. https://www.codepublishing.com/CA/NewportBeach/#!/NewportBeach15/NewportBeach15.html#15. Accessed November 2023.

of grading construction and drainage control. Specifically, the Excavation and Grading Code identifies, defines, and regulates grading design and operations, including hazardous conditions, plans and specifications, soils and geology reports, fills, setbacks, drainage and terracing, asphalt concrete pavement, and erosion control systems. These two code chapters stipulate the requirements for proposed new development in the City to address geotechnical issues, including all aspects of geologic and engineering site investigation, seismic-resistant foundation and building design, and slope and soil stability including erosion and sediment control. Development is required to comply with the Newport Beach Building Code, Excavation and Grading Code, and all State requirements pertaining to geologic, soil, and seismic hazards. With this regulatory framework in place, the city has the authority to enforce General Plan policies protecting the public from geotechnical hazards associated with proposed development.

4.6.3 Existing Conditions[3]

Physiographic Setting

The City and its Sphere of Influence (collectively referred herein as the "City") is located at the southern margin of the Los Angeles Basin. The central and northwestern portions of the City, known as Newport Mesa, are located on a broad mesa that extends southeast towards the San Joaquin Hills. This upland is characterized by moderate to steep bluffs along the Upper Newport Bay estuary which were created by the upland's stream erosion. Newport Mesa is nearly flat-topped and rises from 50 to 75 feet above sea level in the Newport Heights, Westcliff, and Eastbluff areas.

At City's southwestern margin, the beaches, sandbars, and mudflats of Newport Bay and West Newport have been formed by sediment flows from the two major drainage courses that transect Newport Mesa. During the 20th century, these lowland areas were significantly modified to deepen channels for navigation and to form habitable islands. For instance, Balboa Peninsula, a barrier beach that protects the bay, once contained extensive low sand dunes. In the southern part of the City, the San Joaquin Hills emerge abruptly from the sea and is divided from the shoreline by a flat, narrow shelf. This shelf (also known as a platform or a terrace) is above the water and bounded by the shoreline's steep bluffs. The coastal platform occupied by Corona Del Mar ranges from about 95 to 100 feet above sea level, and the San Joaquin Hills are elevated at 1,164 feet at Signal Peak.

The Santa Ana River and San Diego Creek contributed to the development of the City's landforms. To the City's north, numerous streams draining the foothills, including Peters Canyon Wash, Rattlesnake Wash, Hicks Canyon, Agua Chinon, and Serrano Creek, merged with San Diego Creek and collectively carved a wide channel through the mesa, later filling it with sediment (Upper Newport Bay and the harbor area). The man-made San Diego Creek Channel now contains the collected drainages, and the channel directs them into Upper Newport Bay near the intersection of Jamboree Road and University Drive. The Santa Ana Delhi Channel near Irvine Avenue and Mesa Drive also contributes water to the Bay.

Regional and Local Faults

The faulting and seismicity of Southern California is dominated by the San Andreas Fault System. A fault is classified as active by the State if it has moved during the Holocene epoch (during the last 11,000 years) or is included in an Alquist-Priolo Earthquake Fault Zone (as established by the California Geologic Survey). The City of Newport Beach is located in the northern part of the Peninsular Ranges Province, an area that

[3] Newport Beach (2006). *Newport Beach General Plan Update Draft EIR – Geology, Soils, and Mineral Resources.* https://newportbeachca.gov/PLN/General_Plan/GP_EIR/Volume_1/10_Sec4.5_Geology_Soils_Mineral_Resources.pdf. Accessed Nov 2023.

is exposed to risk from multiple earthquake fault zones. The highest risks originate from the Newport-Inglewood fault zone, the Whittier fault zone, the San Joaquin Hills fault zone, and the Elysian Park fault zone, each with the potential to cause moderate to large earthquakes that would cause ground shaking in Newport Beach and nearby communities.

Alquist-Priolo Earthquake Fault Zone mapping has been completed for the City by the State Geologist concluding that the highest risk originates from the Alquist-Priolo Earthquake Fault Zone for the Newport-Inglewood fault which terminates about two miles northwest of the City limits.

Seismic Hazards

Newport Beach's geologic diversity is strongly related to tectonic movement along the San Andreas Fault and its broad zone of subsidiary faults and is located in a landscape that is diverse in geologic hazards. Geologic hazards include earthquakes/strong ground shaking, fault rupture, landslides, liquefaction, and bluff stability, as discussed below.

Ground Shaking

Seismic shaking is the geological hazard that has the greatest potential to severely impact Newport Beach. The City is located on and near several significant faults, both onshore and offshore, that have the potential to cause moderate to large earthquakes. The City has experienced some moderate sized earthquakes in the last century and the nearby faults are expected to generate larger earthquakes in the future. Destructive secondary effects of strong seismic ground shaking include liquefaction and slope failure.

Liquefaction

Liquefaction is a geologic phenomenon that causes ground failure in loose, saturated, and sandy-textured soils during strong ground shaking. Primary factors controlling liquefaction include intensity and duration of ground accelerations, subsurface soil characteristics, in situ stress conditions, and groundwater depth.

Areas in Newport Beach that are susceptible to liquefaction include locations along the coastline such as Balboa Peninsula, in and around the Newport Bay and Upper Newport Bay, in the lower reaches of major streams in Newport Beach, and in the floodplain of the Santa Ana River. It is unlikely that residential or commercial development will occur in many of the other liquefiable areas, such as Upper Newport Bay, the Newport Coast beaches, and the bottoms of stream channels.

Seismically Induced Landslides

Seismically induces landslides are a form of slope failure due to strong ground shaking. Strong ground shaking can worsen existing unstable slope conditions, particularly if coupled with saturated ground conditions. Seismically induced landslides can overrun structures, people, or property, sever utility lines, and block roads, hindering rescue operations after an earthquake. Much of eastern Newport Beach has been identified as vulnerable to seismically induced landslides and slope failure. Approximately 90 percent of the land from Los Trancos Canyon to the Crystal Cove State Park boundary is mapped as susceptible to landslides by the California Geologic Survey.

Additionally, the sedimentary bedrock that crops out in the San Joaquin Hills is highly weathered. Strong ground shaking can cause slides or rockfalls of this material in steep areas. Rupture along the Newport-Inglewood Fault Zone and other faults in Southern California could reactivate existing landslides and cause new slope failures throughout the San Joaquin Hills. Further, slope failures can also be expected to occur

along stream banks and coastal bluffs, such as Big Canyon, around San Joaquin Reservoir, Newport and Upper Newport Bays, and Corona del Mar.

Soil and Groundwater Conditions

The City is underlain by Holocene-age alluvial sediments present in active and recently active stream channels, marshland, and intertidal deposits of Newport Harbor and Upper Newport Bay. Newport Mesa is underlain by primarily shallow marine sediments that range in age from early to late Pleistocene.

Soil Erosion

Soil erosion is the process by which soil particles are removed from a land surface by wind, water, or gravity. Topsoil is the uppermost layer of soil and is usually the top six to eight inches. Topsoil contains the highest concentration of organic matter and microorganisms and is the layer where plants generally concentrate their roots in. Topsoil erosion is a concerning because when topsoil is blown or washed away, it makes plant life or agricultural production more difficult. Erosion in Newport Beach is a significant concern along the shoreline because beach sediments and coastal bluffs are susceptible to erosion from the waves. Specific locations that are susceptible include the bluffs along Upper Newport Bay, and slopes and canyons within the San Joaquin Hills.

Compressible Soils

Compressible soils are generally young sediments with a low density and variable amounts of organic materials. Compressible soils will settle and cause distress to improvements, under the added weight of fill embankments or buildings. If sandy in composition and saturated with water, low-density soils will also be susceptible to liquefaction effects during moderate to strong earthquakes. A significant part of the City is underlain by compressible soils, typically in the lowland areas and in canyon bottoms.

Expansive Soils

Expansive soils are types of soil that shrink or swell as the moisture content decreases or increases. Structures built on these soils may experience shifting, cracking, and breaking damage as soils shrinks or expands.[4] Some of the geologic units in the City, including both surficial soils and bedrock, have fine-grained components that are moderate to highly expansive. Grading activities may uncover or expose these materials. Man-made fills can also be expansive, depending on the soils used to construct them.

Subsidence

Land subsidence occurs when the withdrawal of fluid causes the elevation of a land surface to decrease. Locations within the City that are susceptible to subsidence include major oil drilling areas and state-designated oil fields. Oil drilling areas and oil fields are predominately located at the western portion of the City in areas such as Banning Ranch, West Newport Mesa, Dover-Westcliff, Newport Shores, and Mariners Mile.[5]

[4] U.S. Geological Survey. (ND). Landslides Glossary, Definitions of landslide science terms. Retrieved from: https://www.usgs.gov/glossary/landslides-glossary#:~:text=Expansive%20soils,shrink%20and%20subside%20or%20expand. Accessed November 27, 2023.

[5] City of Newport Beach. (2006) *City of Newport Beach General Plan Update Draft EIR – Geology, Soils, and Mineral Resources, Figure 4.5-3: Oil Production Areas.* Page 4.5-26. https://newportbeachca.gov/PLN/General_Plan/GP_EIR/Volume_1/10_Sec4.5_Geology_Soils_Mineral_Resources.pdf. Accessed September 22, 2023.

Paleontological Resources[6,7]

Orange County's geologic history began 175 - 145 million years ago, in the Middle to Late Jurassic Period, and for most of its geologic history, Orange County was underwater. Tectonic forces began to uplift the land during the Pliocene (7 to 2.5 million years ago) and the sea began to slowly recede from the coast. Sandstone deposited in the Newport Beach area in the late Pliocene contains a wealth of marine mammals, sea birds and a variety of seashells. The City has known significant paleontological resources, including portions of the Vaqueros formation that underlie the Newport Coast, Banning Ranch, the Topanga and Monterey Formations, and Fossil Canyon in the Bluffs area.

4.6.4 Thresholds of Significance

The City uses the thresholds of significance that are specified in *State CEQA Guidelines, Appendix G*. Impacts related to geology, soils, and paleontological resources would be significant if the Project would:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving the 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.
- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.
- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction.
- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.
- Result in substantial soil erosion or loss of topsoil.
- 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.
- 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.
- Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

As addressed in **Section 1.5: Summary of Effects with No Impact,** the City has determined that the proposed Project would not have a significant impact on the following threshold for the reasons stated below, and that no further analysis was required:

- 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.

[6] City of Newport Beach. (2019*). Local Coastal Program, Coastal Land Use Plan, Chapter 4.5.1: Paleontological and Archaeological Resources*. Retrieved from: https://www.newportbeachca.gov/government/departments/community-development/planning-division/general-plan-codes-and-regulations/local-coastal-program/coastal-land-use-plan. Accessed November 29, 2023.

[7] City of Newport Beach (2006). *Newport Beach General Plan Update Draft EIR – Cultural Resources.* *https://newportbeachca.gov/PLN/General_Plan/GP_EIR/Volume_1/09_Sec4.4_Cultural_Resources.pdf.* Accessed November 27, 2023.

The City of Newport Beach is almost entirely built out with established utility services. Further, most housing sites are developed and connected with existing wastewater infrastructure. For the few housing sites which are currently undeveloped, there is existing infrastructure within the vicinity that could support future growth and development. The use of septic tanks or alternative wastewater disposal systems is not assumed.

4.6.5 Methodology

This analysis considers the *State CEQA Guidelines Appendix G* thresholds, as described above, in determining whether the Project would result in impacts concerning geology, soils, and paleontological resources. The evaluation was based on a review of regulations and determining their applicability to future residential development on housing sites throughout the City. The determination that the Project would or would not result in "substantial" temporary or permanent impacts concerning geology and soils considers the relevant federal, State, and local (i.e., General Plan and Municipal Code) laws, ordinances, and regulations and the future residential development's compliance with such laws, ordinances, and regulations. Secondary source information includes the General Plan EIR.

4.6.6 Project Impacts and Mitigation

Threshold 4.6-1:	**Would the Project expose people or structures to 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?**

The City of Newport Beach is located in the northern Peninsular Ranges Province, an area that is exposed to risk from multiple earthquake fault zones. The highest risks originate from the Newport-Inglewood fault zone, the Whittier fault zone, the San Joaquin Hills fault zone, and the Elysian Park fault zone, each with the potential to cause moderate to large earthquakes that would cause ground shaking in Newport Beach and nearby communities. However, none of these faults have been zoned under the guidelines of the Alquist-Priolo Earthquake Fault Zoning Act. Therefore, development on the housing sites would not expose people or structures to potential adverse effects involving rupture of a known earthquake fault in Alquist-Priolo zones.

Impact Summary: **No Impact.** 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, because there are no delineated Alquist-Priolo Earthquake Fault zones in the City.

Threshold 4.6-2:	**Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?**

The City is within a seismically active area that could be subject to strong seismic ground shaking with the highest risks originating from the Newport-Inglewood fault zone, the Whittier fault zone, the San Joaquin Hills fault zone, and the Elysian Park fault zone. Therefore, the fault zones located within the City each have the potential to cause moderate to large earthquakes that would cause ground shaking at the

housing sites. Although the City does not contain a known Alquist-Priolo zone as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, the housing sites within the Banning Ranch Focus Area are located near the Newport Inglewood Rose Canyon fault zone. The Banning Ranch Focus Area is included in the 2021–2029 Housing Element's sites inventory but is not assumed to accommodate the City's 2021–2029 RHNA growth need. Banning Ranch is considered as additional dwelling unit opportunity in addition to those that accommodate the RHNA.

The proposed Project would not directly construct new housing but would facilitate the development of residential units by adopting implementing actions associated with the 2021-2029 Housing Element.

General Plan Safety Element policies are proposed to address adverse effects caused by seismic and geologic hazards, such as strong seismic ground shaking. For example, Policy S 4.7 requires new development to conduct seismic studies in areas where potentially active faults may occur.[8] Therefore, compliance with General Plan Safety Element policies would reduce adverse impacts caused by seismic ground shaking.

Future residential development facilitated by the Project would be subject to the City's development review process and would be required to demonstrate consistency with General Plan policies and Municipal Code requirements. The City has adopted the latest CBC under Municipal Code Title 15, Building and Construction. The required geotechnical investigation for future developments per Policy S 4.7 would calculate seismic design parameters, pursuant to CBC requirements, that must be used in the design of the proposed development. Projects would be required to adhere to all federal, State, and local requirements for avoiding and minimizing seismic-related impacts, including the City's Property Development Standards (Municipal Code Chapter 21.30) and subject to future State-adopted Building Code amendments. Municipal Code Section 21.30.015(E4) (Geologic Stability Report) requires the preparation of geotechnical investigations for development proposed in shoreline areas of known or potential geologic or seismic hazards, which would include a certification that the site is suitable for proposed development and that development will not have an adverse effect on the stability of the bluff, canyon, or shoreline.

All future residential development facilitated by the Project would be required to comply to seismic design standards required by the then-current CBC (or applicable adopted code at the time of plan submittal or grading and building permit issuance for construction). Compliance with the CBC requires proper construction of building footings and foundations so that it would withstand the effects of potential ground movement. The CBC also includes provisions to reduce impacts caused by potential major structural failures or loss of life resulting from geologic hazards.

Therefore, following compliance with all relevant regulations and requirements for avoiding seismic impacts from development, the Project would result in a less than significant impact concerning adverse effects involving strong seismic ground shaking, and no mitigation is required.

Impact Summary: **Less than Significant Impact.** 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.

[8] U.S. Geologic Survey. (2023). Lateral Spread. Retrieved from: https://www.usgs.gov/media/images/lateral-spread#:~:text=Lateral%20spreading%20in%20fine%2Dgrained,occurs%20for%20no%20apparent%20reason. Accessed Nov. 29, 2023.

Threshold 4.6-3:	**Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, and landslides?**

As described in **Section 4.6.2: Existing Conditions**, liquefaction is a geologic phenomenon that causes ground failure in loose, saturated, and sandy-textured soils during strong ground shaking and seismically induced landslides are a form of slope failure due to strong ground shaking. Many of the housing sites located in the Airport Area, Banning Ranch, Coyote Canyon, Dover-Westcliff, and Newport Center Focus Areas are located in liquefaction-susceptibility zones. As depicted in **Figure 4.6-1: Housing Sites Within Liquefaction Zones** and identified on **Table 4.6-1: Housing Sites Within Liquefaction Zones**, there are 31 housing sites located within liquefaction-susceptibility zones.

Additionally, several housing sites within the noted Focus Areas are also located in landslide-susceptibility zones. As depicted in **Figure 4.6-2: Housing Sites Within Landslide Zones** and identified on **Table 4.6-2: Housing Sites Within Landslide Zones,** there are 17 housing sites located within landslide-susceptibility zones. However, liquefaction and landslide potential do not necessarily limit development potential, as site-specific geotechnical studies would be required to determine the soil properties and specific potential for liquefaction in a specific area for new proposed development, per General Plan Policy S 4.7.

Further, future residential developments facilitated by the Project would be subject to the City's development review process, and required to adhere to all federal, State, and local requirements for avoiding and minimizing seismic-related impacts. Compliance with the CBC would require an assessment of hazards related to landslides and liquefaction and the incorporation of design measures into structures to mitigate this hazard if development were considered feasible. Additionally, Municipal Code Chapter 15.10, Excavation and Grading Code, contains regulations and design requirements for hillside developments. Therefore, following compliance with all relevant regulations and requirements for avoiding seismic impacts from development, the proposed Project would result in a less than significant impact concerning adverse effects involving seismic-related ground failure including liquefaction and landslides, and no mitigation is required.

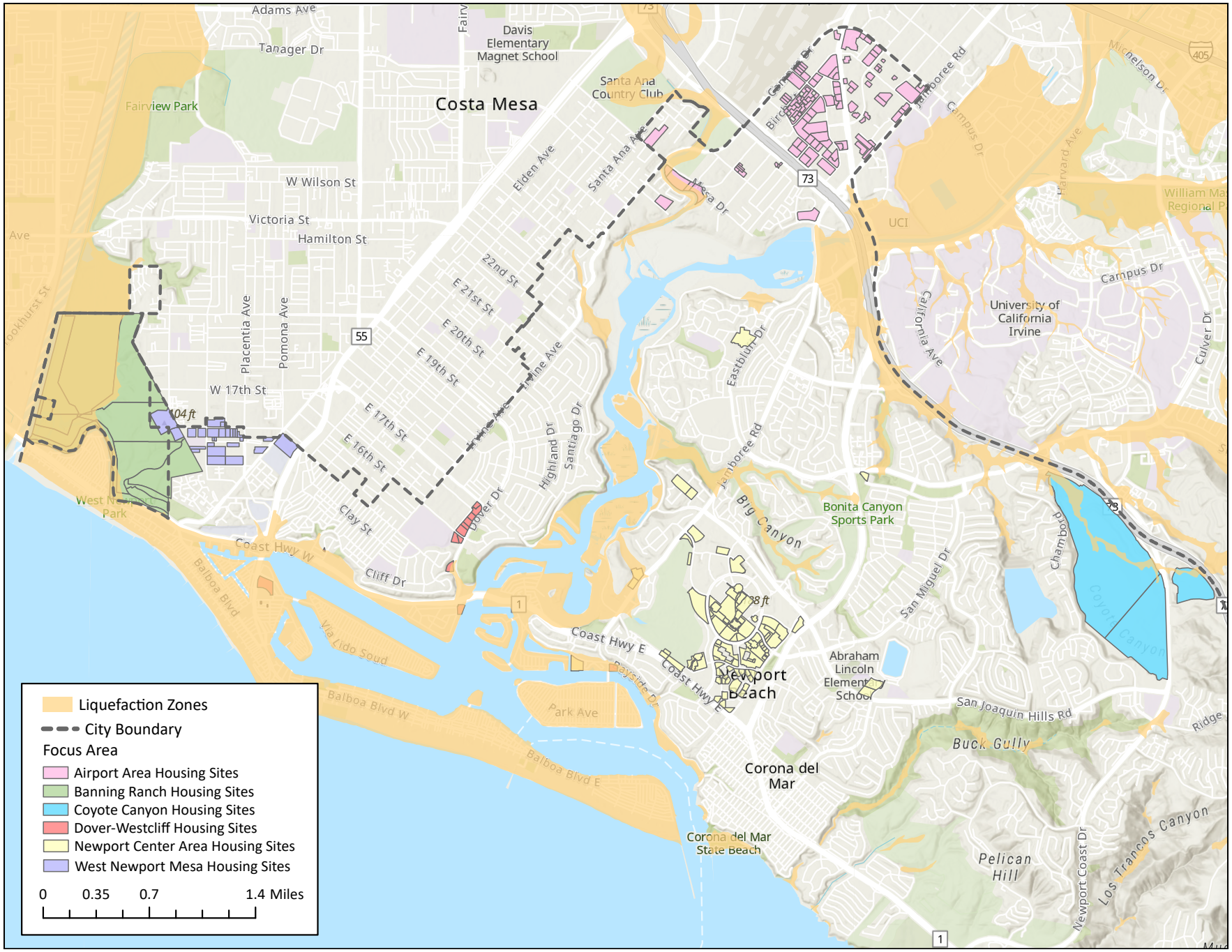

Figure 4.6-1: Housing Sites Within Liquefaction Zones
City of Newport Beach General Plan Housing Implementation
Program Environmental Impact Report

Not to Scale

Table 4.6-1: Housing Sites Within Liquefaction Zones

Housing Site	Parcel Number	Focus Area
23	119 300 17	Airport Area
24	119 310 04	Airport Area
25	119 300 15	Airport Area
26	119 300 16	Airport Area
132	049 122 03	Dover-Westcliff
133	047 041 05	Dover-Westcliff
134	047 041 25	Dover-Westcliff
144	049 271 30	Dover-Westcliff
361	049 191 30	Dover-Westcliff
337	050 391 12	Dover-Westcliff
334	423 111 01	Dover-Westcliff
154	440 132 40	Newport Center Area
184	440 132 48	Newport Center Area
B	050 442 05	Newport Center Area
131	120 571 12	Coyote Canyon
336	478 031 56	Coyote Canyon
110	114 170 72	Banning Ranch
111	114 170 52	Banning Ranch
112	114 170 50	Banning Ranch
113	114 170 52	Banning Ranch
115	114 170 71	Banning Ranch
116	114 170 76	Banning Ranch
117	N/A	Banning Ranch
118	114 170 74	Banning Ranch
120	114 170 78	Banning Ranch
123	114 170 65	Banning Ranch
126	114 170 24	Banning Ranch
127	114 170 81	Banning Ranch
128	114 170 75	Banning Ranch
130	114 170 66	Banning Ranch
110	114 170 72	Banning Ranch

Source: GIS mapping modified by Kimley-Horn, 2023.

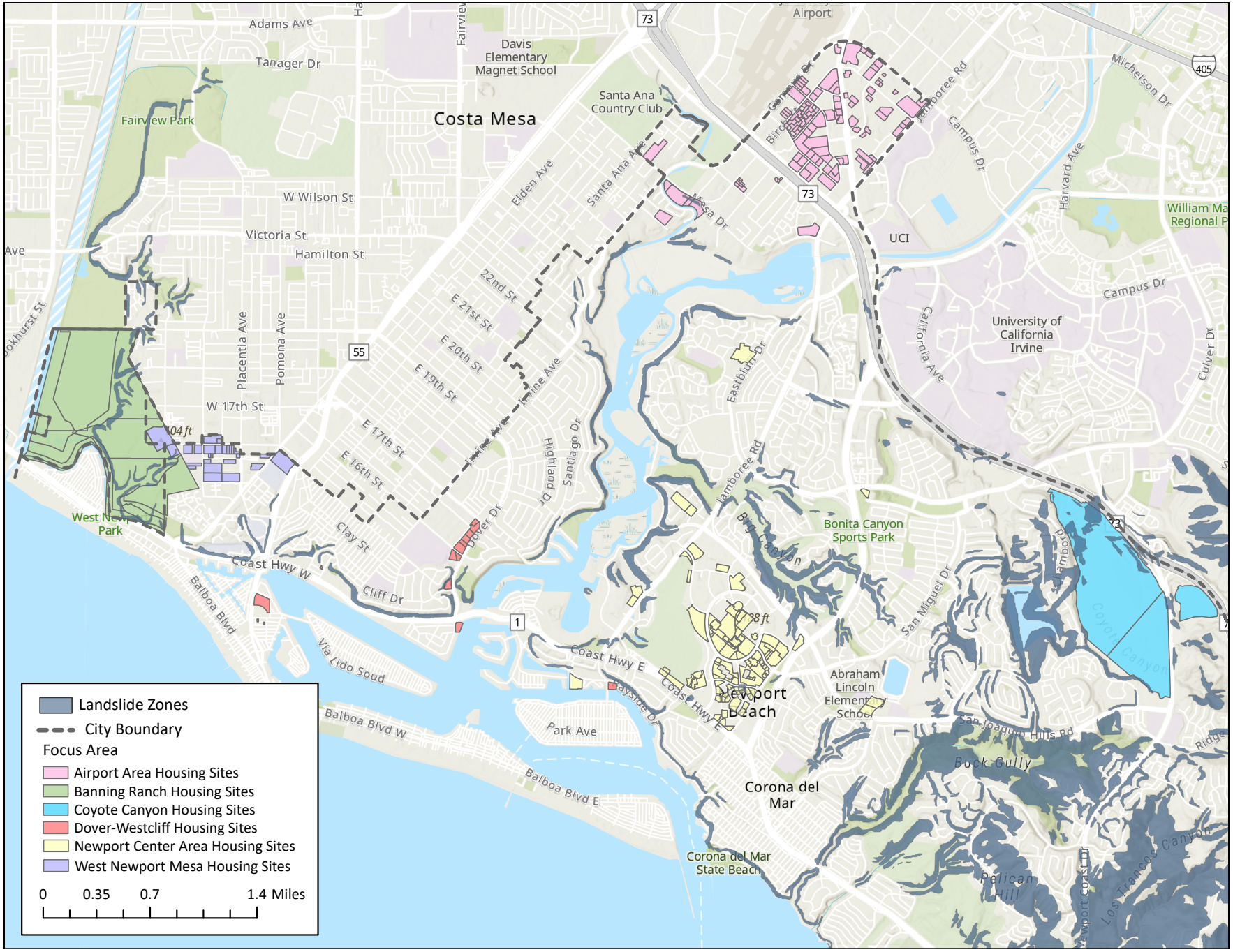

Figure 4.6-2: Housing Sites Within Landslide Zones

City of Newport Beach General Plan Housing Implementation

Program Environmental Impact Report

Not to Scale

Table 4.6-2: Housing Sites Within Landslide Zones		
Housing Site	**Parcel Number**	**Focus Area**
23	119 300 17	Airport Area
24	119 310 04	Airport Area
26	119 300 16	Airport Area
222	114 170 82	West Newport Mesa
144	049 271 30	Dover-Westcliff
169	442 271 15	Newport Center
173	442 271 14	Newport Center
175	442 271 13	Newport Center
368	442 014 22	Newport Center
131	120 571 12	Coyote Canyon
111	114 170 52	Banning Ranch
112	114 170 50	Banning Ranch
113	114 170 52	Banning Ranch
114	114 170 83	Banning Ranch
117	No APN	Banning Ranch
121	424 041 04	Banning Ranch
122	114 170 43	Banning Ranch
Source: GIS mapping modified by Kimley-Horn, 2023.		

Impact Summary: **Less than Significant Impact.** The Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, and landslides.

Threshold 4.6-4: Would the Project result in substantial soil erosion or loss of topsoil?

As previously addressed, soil erosion is the process by which soil particles are removed from a land surface by wind, water, or gravity. The main causes of erosion in the City are wind and flowing water. Erosion can be accelerated dramatically by ground-disturbing activities if effective erosion control measures are not used. Soil can be carried off construction sites or bare land by wind and water, and tracked off construction sites by vehicles. Soil erosion is a significant concern in Newport Beach, especially along the shoreline, where beach sediments and coastal bluffs are highly susceptible to erosion by wave action. Other parts of the City, including bluffs along Upper Newport Bay, canyon walls along tributary streams leading to the Bay, and slopes (both natural and man-made) within the San Joaquin Hills are also susceptible to the impacts from precipitation, stream erosion, and man's activities.

Future residential development facilitated by the Project could result in grading activities that would disrupt soil profiles, and thereby result in potential increased exposure of soils to wind and rain. Erosion on graded slopes could cause downstream sedimentation impacts. Other related impacts resulting from substantial short-term erosion or loss of topsoil include topography changes and the creation of impervious surfaces. A majority of the housing sites are currently developed with existing structures. Of the 247 housing sites, 21 housing sites are currently vacant and undeveloped; see **Table 3-12: Housing Sites** for the list of housing sites that are vacant. Future residential projects would be subject to the City's development review process and would be required to comply with General Plan Policies NR 3.10, NR

3.11, and NR 3.12 which require compliance with applicable local, State, or federal laws. Compliance with the CBC and the National Pollutant Discharge Elimination System (NPDES) permits would minimize soil erosion and loss of topsoil and ensure consistency with the Regional Water Quality Control Board (RWQCB) Water Quality Control Plan. Additionally, the NPDES permit requires preparation of a Stormwater Pollution Prevention Plan (SWPPP), which specifies BMPs to be used to minimize storm water pollution from project construction, including erosion and topsoil. All future residential projects would also be required to comply with the City's Erosion Control regulations specified under Municipal Code Chapter 15.10.130, which include but are not limited to, planting on cut-and-fill slopes, check dams, cribbing, riprap, and permanent distilling facilities. Compliance with these regulations would reduce the potential for substantial erosion or loss of topsoil. As noted above, future residential development facilitated by the Project would be required to comply with applicable General Plan and Municipal Code policies and regulations, the CBC, NPDES permits, and the RWQCB Water Quality Control Plan and therefore would not result in substantial soil erosion or loss of topsoil. Therefore, impacts would be less than significant and no mitigation is required.

Impact Summary: **Less than Significant Impact.** The Project would not result in substantial soil erosion or loss of topsoil.

Threshold 4.6-5:	**Would the 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 or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?**

As discussed above under Threshold 4.6-1, some areas of the City are susceptible to earthquake-induced landslides, lateral spreading, subsidence, liquefaction, and/or collapse. There are 32 housing sites (see **Table 4.6-1**) and 17 sites (see **Table 4.6-2**) that are located in liquefaction and landslide hazard areas, respectively. Of the sites, nine sites are located in both a liquefaction and landslide hazard area. Additionally, these housing sites could also be exposed to potential lateral spreading which is a type of liquefaction-induced ground failure that occurs on gentle slopes or near free-faces, such as river channels.[9]

Multiple areas in the City are also susceptible to subsidence and ground failure from compressible soils and expansive soils. Land subsidence is a concern in major oil drilling areas and State designated oil fields which are predominately located in the western portion of City. Housing sites in the Banning Ranch, West Newport Mesa, and Dover-Westcliff Focus Areas are the most susceptible to subsidence. Compressible soils also underly a significant part of the City, typically in the lowland areas and canyon bottoms. Compressible soils settle and cause distress to improvements under the added weight of fill embankments or buildings.

The proposed Project would not directly construct new housing, but would facilitate the development of residential units by adopting implementing actions associated with the 2021-2029 Housing Element. While multiple housing sites are located on geologic units or soils that could become unstable, future housing development facilitated by the Project would be subject to the City's development review process. Future residential developments would be required to adhere to all federal, State, and local requirements for avoiding and minimizing impacts caused by unstable geological units or soils. These housing projects would be subject to compliance with General Plan Safety Element Policy S 4.7, which

[9] U.S. Geological Survey. (2023).*Lateral Spread*. https://www.usgs.gov/media/images/lateral-spread. Accessed December 2023.

requires seismic studies for new development in areas where potentially active faults may occur. These studies would also include soil investigations and recommendations for addressing grading procedures, soil stabilization during and post-construction, foundation design, and slope stability.

As part of the construction permitting process, the City requires completed reports of soil conditions at specific construction sites to identify potentially unsuitable soil conditions including liquefaction, subsidence, and collapse. The evaluations must be conducted by registered soil professionals, and measures to eliminate inappropriate soil conditions must be applied. The design of foundation support must conform to the analysis and implementation criteria described in CBC Chapter 18 – Soils and Foundations.

Adherence to the CBC, City's codes, and General Plan policies would ensure the maximum practicable protection available for users of buildings and infrastructure and associated trenches, slopes, and foundations. Compliance with Policy S 4.7 would ensure that development is not located on unstable soils or geologic units. Therefore, the Project would result in a less than significant impact concerning potential substantial adverse effects involving exposure to unstable geological units or soils.

Impact Summary: **Less than Significant Impact.** 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.

Threshold 4.6-6:	**Would the Project 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?**

The City contains surficial soils and bedrock with fine-grained components that are moderately to highly expansive. Expansive soils shrink and swell as the moisture content in soil changes which causes shifting, cracking, and damage to structures built on these soils. Fine-grained soils, such as silts and clays, may contain variable amounts of expansive clay minerals. Most of the Newport Mesa and Corona del Mar areas are underlain by marine terrace deposits and young alluvial fan sediments that are composed primarily of granular soils (silty sand, sand, and gravel). Such units are typically in the low to moderately low range for expansion potential. However, thick soil profiles developed on the older marine deposits exposed west of Newport Bay are typically clay-rich and will probably fall in the moderately expansive range.

While housing sites may be located on expansive soils, the proposed Project would not directly construct new housing, but would facilitate the development of residential units by adopting implementing actions associated with the 2021-2029 Housing Element. Future residential development facilitated by the Project would be required to comply with applicable provisions of the CBC with regard to soil hazard-related design. The CBC specifically requires soil testing in areas likely to have expansive soils. Soil testing would determine expansive index and include special design and construction provisions for foundations of structures founded on expansive soils, as necessary.

The City's Building Code adopts the latest CBC regulations, which also requires geotechnical investigations that identifies potentially unsuitable soil conditions and contains appropriate recommendations for foundation type and design criteria that conform to the analysis and implementation criteria described in

Municipal Code Title 15 Building and Construction. Further, compliance with General Plan Policy S 4.7 requires that development not be located on unstable soils or geologic units. This impact is considered less than significant and no mitigation is required.

Impact Summary: **Less than Significant Impact.** The Project would not create substantial direct or indirect risks to life or property due to the project being located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994).

Threshold 4.6-7:	**Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

The specific underlying geology is not known for any of the housing sites at this level of programmatic analysis; however, the General Plan does note that the City contains high sensitivity to paleontological resources. The General Plan notes that areas of the City include Fossil Canyon, the North Bluffs area[10], and Banning Ranch. Although a majority of housing sites are currently developed and disturbed, there is a potential that future construction activities associated with development could affect unidentified paleontological resources through grading and other earthwork activities. In the inadvertent event of discovery of paleontological resources, impacts could be potentially significant.

As previously noted, the Project would not directly result in the construction of new housing. Future housing development facilitated by the Project would be subject to the City's development review process and would be subject to comply with City regulations and policies. Policy HR 2.1 and Policy NR 18.1 require any new development to protect and preserve archaeological resources from destruction, and that potential impacts to such resources be avoided and minimized through planning policies and permit conditions. Compliance with these policies would ensure that paleontological resources are preserved, and that any impact caused by development be mitigated. Further, development in the coastal zone would also be subject to LCP Policy 4.5.1-2 and Policy 4.5.1-5. LCP Policy 4.5.1-2 requires a qualified paleontologist/archeologist to monitor all grading and/or excavation where there is a potential to affect cultural or paleontological resources. LCP Policy 4.5.1-5 requires submittal of a monitoring plan when there is a potential to impact paleontological resources. The Newport Beach City Policy Manual also identifies Policy K-5 *Paleontological and Archaeological Resource Protection Guidelines*,[11] which requires that the City prepare and maintain sources of information regarding paleontological sites. Future development facilitated by the Project would be required to comply with the City Council Policy K-5, as set forth in **SC GEO-1**.

Compliance with **SC GEO-1**, General Plan policies within Natural Resources Element Goal NR 18, and the policies under Goal HR 2 of the Historical Resources Element would reduce impacts to paleontological resources to a less than significant level.

Impact Summary: **Less than Significant Impact.** The Project could potentially have direct impacts on paleontological resources. These impacts would be mitigated to a level considered less than significant with implementation of SC GEO-1 and compliance with applicable City policies and programs.

[10] North Bluffs area refers to bluffs in the central and northern portions of the City such as Big Canyon, around San Joaquin Reservoir, and Upper Newport Bays.

[11] Newport Beach City Council. (2017). *K-5, Paleontological and Archaeological Resource Protection Guidelines*. Retrieved from: https://ecms.newportbeachca.gov/WEB/DocView.aspx?id=1225634&dbid=0&repo=CNB. Accessed November 29, 2023.

4.6.7 Cumulative Impacts

Southern California is a seismically active region with a range of geologic and soil conditions. These conditions can vary widely within a limited geographical area due to factors, including differences in landforms and proximity to fault zones, among others. Therefore, while geotechnical impacts may be associated with the cumulative development, by the very nature of the impacts (i.e., landslides and expansive and compressible soils), the constraints are typically site specific and there is typically little, if any, cumulative relationship between the development of a proposed project and development within a larger cumulative area, such as citywide development. Additionally, while seismic conditions are regional in nature, seismic impacts on a given project site are site specific. For example, future development on one of the housing sites or in the surrounding area would not alter geologic events or soil features/ characteristics (such as ground-shaking, seismic intensity, or soil expansion); therefore, the Project would not affect the level of intensity at which a seismic event on an adjacent site is experienced. However, future housing development would expose more persons to seismic hazards.

In accordance with the thresholds of significance, impacts associated with seismic events and hazards would be considered significant if the effects of an earthquake on a property could not be mitigated by an engineered solution. The significance criteria do not require elimination of the potential for structural damage from seismic hazards. Instead, the criteria require an evaluation of whether the seismic conditions on a site can be overcome through engineering design solutions that would reduce to less than significant the substantial risk of exposing people or structures to loss, injury, or death.

State and local regulatory code requirements and their specific mandatory performance standards are designed to ensure the integrity of structures during maximum ground shaking and seismic events. Future housing would be constructed in compliance with all applicable codes and policies, which are designed to reduce the exposure of people or structures to substantial risk of loss, injury, or death related to geological conditions or seismic events. Current building codes and regulations would apply to all present and reasonably foreseeable future projects, which could also be subject to even more rigorous requirements. Therefore, the Project—in combination with past, present, and reasonably foreseeable future projects—would not result in a cumulatively significant impact by exposing people or structures to risks related to geologic hazards, soils, or seismic conditions.

Future development of the housing sites, in combination with other projects in the region where a parcel is underlain by significant fossil resources could contribute to the progressive loss of fossil-bearing strata in rock unit that could uncover fossil remains and unrecorded fossil sites. Consistent with the findings of the Newport Beach General Plan EIR, cumulative development is not expected to result in significant impacts to paleontological resources through compliance with regulatory requirements and General Plan policies. Impacts would not be cumulatively considerable.

4.6.8 Mitigation Program

As noted, all future housing development facilitated by the Project would be subject to the City's development review process, which may include review pursuant to CEQA, and would be assessed on a project-specific basis for potential effects concerning geology and soils and paleontological resources. Future housing development would be subject to compliance with relevant federal, State, and local requirements including requirements set forth in the Newport Beach General Plan and Newport Beach Municipal Code.

General Plan Policies

See **Section 4.6.2: Regulatory Setting** for complete policy text.

Geology and Soils

- Policy S 3.9
- Policy S 3.10
- Policy S 3.11
- Policy S 3.12
- Policy S 4.3
- Policy S 4.7
- Policy NR 3.4
- Policy NR 3.9
- Policy NR 3.11
- Policy NR 3.12
- Policy NR 3.14
- Policy NR 3.15
- Policy NR 3.19
- Policy NR 3.20
- Policy NR 4.4

Paleontological Resources

- Policy NR 18.1
- Policy NR 18.4
- Policy HR 2.1
- Policy HR 2.2
- Policy HR 2.4

Coastal Land Use Plan Policies

See **Section 4.6.2: Regulatory Setting** for complete policy text.

Paleontological Resources

- Policy 4.5.1-2
- Policy 4.5.1-5

Standard Conditions of Approval

SC GEO-1 In compliance with Newport Beach Council Policy Manual, *Paleontological and Archaeological Resource Protection Guidelines* (K-5), prior to the issuance of a grading permit by the City of Newport Beach, the project applicant shall retain and provide documentation of such retention to the City of Newport Beach Community Development Director. The qualified paleontologist shall be to be present during ground-disturbing activities on the site or available on an on-call basis, as determined by the City. If paleontological resources are encountered, all construction work in the general area of the find shall cease until the paleontologist assesses the find. Construction activities may continue in other areas. The paleontologist shall determine the significance of the resources and recommend next steps (e.g., additional excavation, curation, preservation, etc.). If, in consultation with the City, the discovery is determined to not be important, work will be permitted to continue in the area. Any resource shall be curated at a public, nonprofit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Cooper Center (a partnership between California State University, Fullerton and the County of Orange).

Mitigation Measures

No additional mitigation is required.

4.6.9 Level of Significance After Mitigation

Compliance with the mitigation program would preclude significant impacts related to geology and soils and paleontological resources.

4.6.10 References

California Department of Conservation. (ND). *California Geological Survey- Earthquake Zones of Required Investigation.* Retrieved from: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed November 2023.

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Newport Beach City Council. (2017). *K-5, Paleontological and Archaeological Resource Protection Guidelines*. Retrieved from: https://ecms.newportbeachca.gov/WEB/DocView.aspx?id=1225634&dbid=0&repo=CNB. Accessed November 2023.