

3.5 GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

This section evaluates the potential impacts to geology, soils, and paleontological resources that would result from implementation of the proposed Master Plan Update. This section presents the regulatory setting, environmental setting, methodology for determining potential impacts, impact analysis, proposed measures to mitigate significant impacts, and an analysis of potential cumulative impacts pertaining to geology, soils, and paleontological resources. This section is based, in part, on the Paleontological Resources Memorandum included as Appendix G.

As discussed further in Section 3.5.3, Methodology, the CEQA Guidelines Appendix G checklist questions related to geology and soils (i.e., rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, landslides, soil erosion, unstable geologic unit, expansive soils, septic tanks) were found to have no impact or a less than significant impact in the Initial Study prepared for the Master Plan Update, and thus, are not discussed in detail in this EIR.

No comments related to geology, soils, and paleontological resources were received in response to the NOP. For a complete list of public comments received during the public scoping period, refer to Appendix A.

3.5.1 Regulatory Setting

State

California Public Resources Code Section 5097.5

California Public Resources Code Section 5097.5 defines and details the unauthorized disturbance or removal of archaeological, paleontological, or historical resources located on public lands which is considered a misdemeanor violation:¹

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

3.5.2 Environmental Setting

Of the 11 geomorphic provinces of California, the CSULB main campus and Beachside Village property are located along the western flank of the Peninsular Ranges geomorphic province, distinguished by northwest-trending mountain ranges and valleys following the branching San Andreas fault. Dominated by Peninsular Ranges batholith, this geomorphic province also includes physiogeographic features such as the Los Angeles Basin, the southern members of the Channel Islands, and the continental shelf.

The CSULB main campus and Beachside Village property are within the southwestern block of the actively subsiding Los Angeles Basin. This basin is bound by the Santa Monica and San Gabriel Mountains to the north, the Pacific Ocean to the west, the Santa Ana Mountains to the east, and partially by the San Joaquin Hills to the southeast.

¹ California Public Resources Code, Chapter 1.7, Section 5097.5.

The mapped geological units at the surface of the CSULB main campus and immediately adjacent areas include young alluvial deposits (Qya₂) of Holocene to late Pleistocene age (present to 126,000 years old). At unknown depths beneath these deposits, old shallow marine deposits (Qom) of late to middle Pleistocene age (126,000 to 774,000 years old) underlie the CSULB campus and immediately adjacent areas. Although young alluvial deposits of this region can be as young as Holocene in age, a period that overlaps with archaeological concern, these sediments can also range as old as late Pleistocene in age and possibly contain significant fossil resources. Old shallow marine deposits (Qom) of late to middle Pleistocene age (126,000 to 774,000 years old) have also been mapped at the surface of the Beachside Village property, and generally south of Bouton Creek of the CSULB main campus. Sedimentary deposits of Pleistocene age in southern California can possibly contain significant fossil resources. According to the Society of Vertebrate Paleontology's (SVP) *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*, the rock formations present within the CSULB campus are considered to have a high paleontological sensitivity. The geologic units are mapped in Figure 3.5-1.

Stratigraphic cross-sections from previous scientific excavations on the CSULB main campus identified undisturbed paleosols (i.e., distinct buried soil deposits or strata) at a minimum depth of approximately 5 feet; however, a variability of the depth of undisturbed paleosols in the stratigraphic cross-sections across campus was observed which suggests undisturbed paleosols could be found at a shallower depth. Geotechnical reports previously prepared for projects on campus have also discovered through coring efforts that artificial fill lies immediately at the surface of the main campus and that native sedimentary layers can be found at varying depths of excavation. Most geotechnical efforts encountered subsurface exposures of native sedimentary layers between 4 and 6 feet below surface. Geologic formations of similar ages in nearby portions of the Los Angeles Basin (e.g., Palos Verdes Sand and San Pedro Sand) contain numerous marine and terrestrial fossils, including bones, teeth, shells, plant material, and microscopic organisms. Additional examples of vertebrate fossils from these geologic formations include fishes, birds, cetaceans (whales and dolphins), carnivores, rodents, ungulates (hooved mammals), proboscideans (e.g., elephants and mammoths), turtles, and frogs.

Previous archaeological work has demonstrated relatively uniform stratigraphy across most of the CSULB main campus north of Bouton Creek, with the top four rock layers (strata) consisting of fill deposit, a culturally sterile alluvial layer deposited by flooding of Bouton Creek, a single major flood deposit, and an archaeological layer. Based on reviews of previous geotechnical and archaeological studies conducted on campus, it is likely that the fifth stratum contains native sedimentary layers, which have a potential for paleontological resources, typically between 4 and 6 feet below surface.

Archival Research

A paleontological records search was conducted for the CSULB campus with the Natural History Museum of Los Angeles County (NHMLA) on March 15, 2022. Although no previously identified fossil localities exist within the CSULB main campus and Beachside Village property, ten fossil localities from similar sedimentary deposits as those found within the CSULB main campus occur within 4 miles of the campus, and an additional one locality was identified at an unknown distance from the campus, either at the surface or at the depth listed in Table 3.5-1. The NHMLA paleontological records search was supplemented with additional paleontological database searches using the University of California Museum of Paleontology Locality Search, San Diego Natural History Museum Collection Database, and the Paleobiology Database, as well as a review of scientific literature.

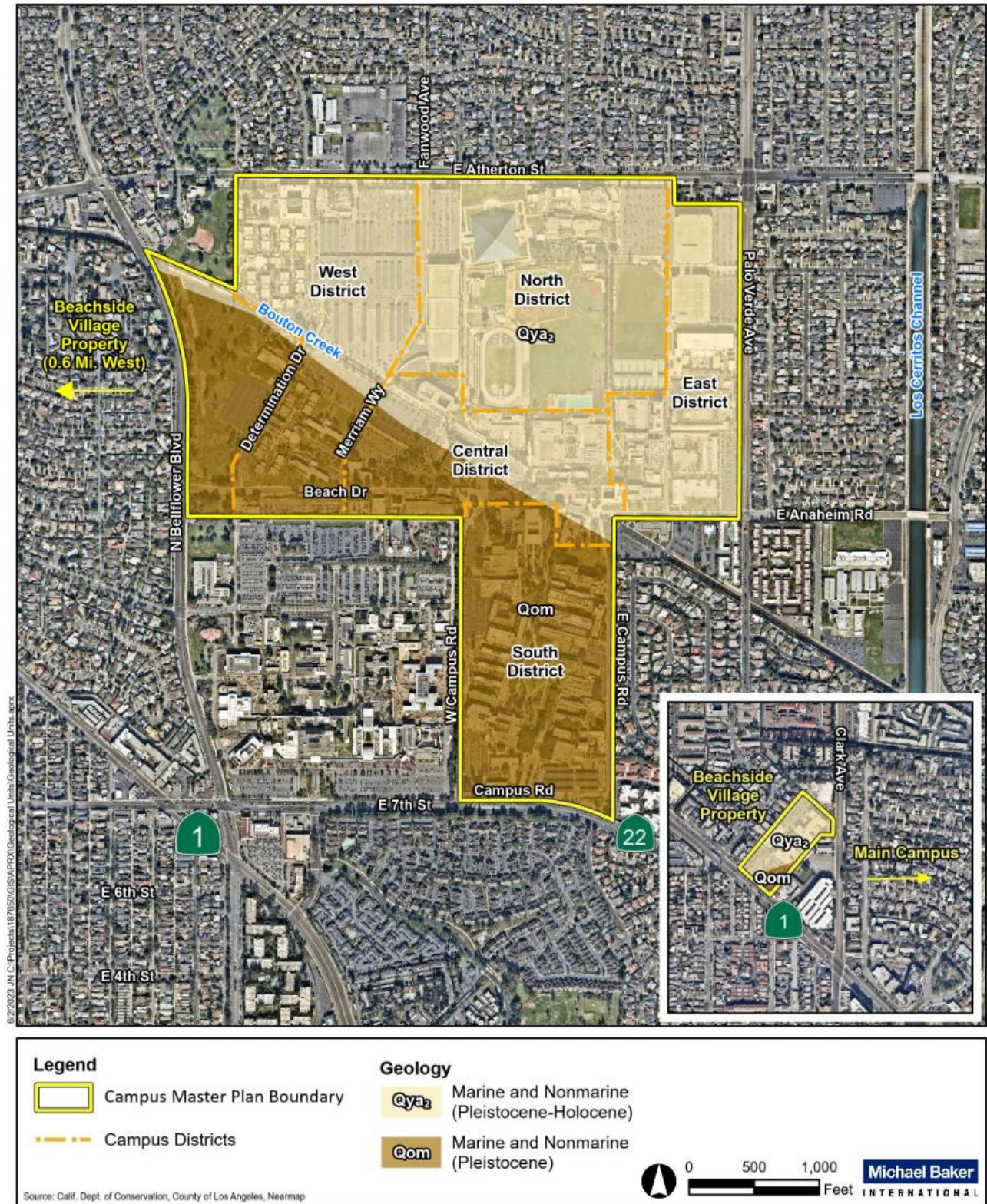


Figure 3.5-1: Campus Districts Overlaid on Geological Map

Table 3.5-1: Previously Recorded Paleontological Resources

Collection Number	Taxa	Formation	Intervals	Distance to CSULB Main Campus
LACM IP 4737, 4854, 4865, 4568	Invertebrates: decapods (crabs, lobsters, shrimp, etc.), sand dollars, gastropods (snails), bivalves (clams, oysters, mussels, etc.), trace fossils	Palos Verdes Sand	Pleistocene	Within 1 Mile
LACM IP 339, 2686	Invertebrates: limpets, gastropods (snails), clams, oysters	Unknown	Pleistocene	Within 2 Miles
LACM VP 7493	Vertebrates: camels	Lakewood Formation	Pleistocene	Within 2 Miles
LACM VP 7739	Invertebrates: snails, clams, barnacles, crabs, urchins, tusk shells Vertebrates: sharks, eels, croakers, flounders, guitarfish, toadfish, perch, rays, flatfish, sole, skates, barracudas	Coastal deposits	Late Pleistocene	Within 3 Miles
LACM VP 3660	Vertebrates: mammoths	Unknown	Pleistocene	Within 4 Miles
LACM VP 3260	Vertebrates: bison	Unknown	Pleistocene	Unknown
UCMP	Unspecified	Palos Verdes Sand	Pleistocene	Within 3 Miles
PBDB	Snails, scallops, clams, oysters, tusk shells, barnacles, crabs, sand dollars, polychaete worms	Palos Verdes Sand	Pleistocene	Within 3 Miles
PBDB	Scallops, snails, clams	San Pedro	Early Pleistocene	Within 3 Miles
PBDB	Sharks, rays, bony fish, clams	Unknown	Late Pleistocene	Within 3 Miles

Notes: IP = Invertebrate Paleontology; PBDB = Paleobiology Database; UCMP = University of California Museum of Paleontology; VP = Vertebrate Paleontology

Sources: Refer to Appendix Appendix G, Paleontological Resources Memorandum; University of California Museum of Paleontology, 2022, Locality search, available at: <https://ucmpdb.berkeley.edu/loc.html>, accessed May 2022; Paleobiology Database, 2022, Web-based mapping interface in 3-miles of project area, available at: <https://paleobiodb.org/navigator/>, accessed May 2022.

Fossil-bearing units from the same sedimentary deposits as those found within the project site have been identified within a mile of the campus. Previous paleontological resources described in the scientific literature have been identified from similar sediments to those found underlying the CSULB main campus. Gastropod, bivalve, scaphopod, crustacean, and foraminifer fossils collected from Signal Hill, less than 3 miles northeast of the CSULB main campus, and Long Beach City College, approximately 3 miles north of the CSULB main campus, indicate Pleistocene sediments in this region were deposited in cool, shallow waters. Pleistocene marine deposits from other regions within Long Beach and the nearby Palos Verdes Peninsula have further yielded marine and terrestrial mammals, seabirds, reptiles, and fish. Therefore, due to the fossil sensitivity of the rock formations present within the campus (alluvium of Holocene to late Pleistocene age

and shallow marine deposits of late to middle Pleistocene age), fossil-bearing units have the potential to be present in the project area.

3.5.3 Methodology

The evaluation of impacts related to paleontological resources was based on the Paleontological Resources Memorandum included as Appendix G. A thorough review of geological units, results from the NHMLA records search and supplemental paleontological databases, related background reports and literature for the project area, and previous geotechnical reports for other projects at CSULB was conducted by a paleontologist meeting the SVP standards. Information from these sources were reviewed and compared to the mitigation impact guidelines set forth by the SVP to determine the level of significance for paleontological impacts associated with the implementation of the Master Plan Update.

Thresholds of Significance

The significance thresholds used to evaluate the impacts of the Master Plan Update related to geology, soils, and paleontological resources are based on Appendix G of the CEQA Guidelines. Based on Appendix G, a project would have a significant impact related to geology and soils if it would:

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

Issues Not Evaluated Further

The Master Plan Update would not result in significant impacts related to the following Appendix G checklist questions, as determined in the Initial Study (Appendix A), and therefore are not evaluated further in this Draft EIR.

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

The CSULB campus is not located within a state-designated Alquist-Priolo Fault Hazard Zone.² The nearest Alquist-Priolo Fault Hazard Zone is the Newport-Inglewood fault, located approximately 0.6 miles and 0.1 miles southwest of the main campus and the Beachside Village student housing complex, respectively. Additionally, the Los Alamitos fault is located approximately 1.5 miles and 2.3 miles north of the main campus and the Beachside Village student housing complex, respectively.³ However, no active faults are known to cross the CSULB campus. The Master Plan Update would involve proposed improvements to campus facilities, including renovation, replacement, and new construction. The Master Plan Update also identifies goals and strategies to improve open space, sustainability and resiliency, and mobility and parking. The CSU Seismic Requirements, prepared by the Office of the Chancellor, include specific requirements for the construction of new

² California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, available at: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>, accessed February 16, 2022.

³ Ibid.

buildings and the renovation of existing buildings.⁴ All habitable structures would be designed and constructed in accordance with the latest version of the relevant building codes and all other applicable federal, state, and local codes relative to seismic criteria pursuant to the CSU Seismic Requirements. These building codes are designed to ensure safe construction. Compliance with existing regulations and adherence to the CSU Seismic Requirements would ensure that impacts related to fault rupture would be less than significant.

- *Strong seismic ground shaking?*

The campus is located in a seismically active area, as is most of southern California, and is subject to strong seismic ground shaking. However, all improvements implemented under the Master Plan Update would be designed and constructed in accordance with the latest version of the relevant building codes and all other applicable federal, state, and local codes relative to seismic criteria pursuant to the CSU Seismic Requirements. Compliance with existing regulations and adherence to the CSU Seismic Requirements would ensure a less than significant impact related to strong seismic ground shaking.

- *Seismic-related ground failure, including liquefaction?*

The northeastern section of the CSULB main campus is located within an area identified as being susceptible to liquefaction.⁵ All improvements implemented under the Master Plan Update would be designed and constructed pursuant to the CSU Seismic Requirements. Per the CSU Seismic Requirements, site-specific geotechnical investigations are required for any new development on the campus to assess and classify the subsurface conditions at the site. Geotechnical investigations conducted for any future development or renovations proposed by the Master Plan Update are required to include consideration of all seismically induced site failure hazards, including liquefaction, differential settlement, lateral spreading, landslides, and surface faulting.⁶ Additionally, the CSU has determined campus-specific seismic design ground motion parameters to be used for new and modification of existing buildings, which supersede those in the California Building Code.⁷ Compliance with existing regulations and adherence to the CSU Seismic Requirements would ensure a less than significant impact related to liquefaction.

- *Landslides?*

The CSULB campus is not located in an area identified as being susceptible to landslides.⁸ Therefore, no impact related to landslide would occur.

- *Would the project result in substantial soil erosion or the loss of topsoil?*

Construction of the projects developed under the Master Plan Update would include ground-disturbing activities, such as grading and excavation, which could result in the potential for erosion to occur at the individual development sites. Per the CSU

⁴ The California State University, Office of the Chancellor, March 2020, *CSU Seismic Requirements*.

⁵ California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, available at: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>, accessed February 16, 2022.

⁶ The California State University, Office of the Chancellor, *CSU Seismic Requirements*, March 2020.

⁷ Ibid.

⁸ California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, available at: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>, accessed February 16, 2022.

standards set forth in PolicyStat, all development projects on the CSULB campus are required to implement standard temporary construction controls for erosion and sediment control, including, but not limited to: trapping sediments before they leave the site using such techniques as check dams, sediment ponds, or siltation fences; preventing runoff from flowing over unprotected slopes; stabilizing disturbed areas; and removing mud from tires of each moving equipment.⁹ Additionally, any proposed improvements that would disturb more than one acre of land would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) stipulating erosion control measures in compliance with the latest National Pollutant Discharge Elimination System (NPDES) permit requirements for storm water discharges. Compliance with existing regulations and adherence to the CSU standards for erosion control would ensure a less than significant impact.

- *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?*

All improvements implemented under the Master Plan Update would be designed and constructed pursuant to the CSU Seismic Requirements, including the preparation of site-specific geotechnical investigations to assess and classify the subsurface conditions at individual development sites. Geotechnical investigations conducted for any future development or renovations proposed by the Master Plan Update are required to include consideration of all seismically induced site failure hazards, including liquefaction, differential settlement, lateral spreading, landslides, and surface faulting. Compliance with existing regulations and adherence to the CSU Seismic Requirements would ensure a less than significant impact related to unstable geologic units or soils.

- *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?*

Expansive soils are clay-based soils that tend to expand (increase in volume) as they absorb water and shrink (lessen in volume) as water is drawn away. If soils consist of expansive clays, foundation movement and/or damage can occur if wetting and drying of the clay does not occur uniformly across the entire area. The geologic materials underlying the CSULB campus include marine deposits consisting of dense silty sand and gravel, and soft sands and silts mixed with some clay, which are not highly susceptible to expansion. Additionally, as previously discussed, all improvements implemented under the Master Plan Update would be designed and constructed pursuant to the CSU Seismic Requirements, and would include preparation of site-specific geotechnical investigations to assess and classify the subsurface conditions at individual development sites as well as sites that have near-surface fine-grained materials with moderate to high expansion potential. Compliance with existing regulations and adherence to the CSU Seismic Requirements would ensure a less than significant impact related to expansive soils.

⁹ The California State University, PolicyStat, Section XI: Project Plan Development for Major Capital Construction Projects, Section 9235, Construction Document Phase of Project Development, available at: <https://calstate.policystat.com/policy/6654819/latest#autoid-83nrg>, accessed February 15, 2022.

- *Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

The CSULB campus is served by existing sewer infrastructure. No septic tanks or alternative wastewater disposal systems are included as part of the Master Plan Update. Therefore, no impact associated with the use of such systems would occur.

3.5.4 Impact Analysis

The impact analysis below is organized into a program-level analysis and a project-level analysis. For the program-level analysis, the Master Plan Update is evaluated as an overall program of development over a multi-year planning horizon for the CSULB campus. For the project level analysis, near- and mid-term development projects that would be implemented under the Master Plan Update are analyzed. The analysis of near- and mid-term projects below is organized to separately address renovation projects, which involve renovation of existing facilities and additions to existing facilities; replacement projects, which involve demolition and replacement of existing facilities in the same physical location; and new projects, which involve construction of new facilities with new uses.

GEO-1 Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Program-Level Analysis for Master Plan Update

Construction

As discussed in Section 3.5.2, Environmental Setting, there are no documented fossil localities within the CSULB main campus or Beachside Village property. However, fossil-bearing units from the same sedimentary deposits as those found within the CSULB main campus and Beachside Village property (alluvium of Holocene to late Pleistocene age and shallow marine deposits of late to middle Pleistocene age) have been identified within a few miles of the campus. In addition, undisturbed paleosols on campus have been previously identified at a depth of approximately 4 to 6 feet. Therefore, proposed development under the Master Plan Update has a high potential to disturb paleontological resources within undisturbed alluvium (older than 5,000 years) and geologic contexts (i.e., undisturbed bedrock or subsurface geologic deposits in previously undisturbed areas). As such, discoveries of yet unknown paleontological resources during ground-disturbing activities in undisturbed geologic contexts (i.e., undisturbed bedrock or subsurface geologic deposits in previously undisturbed areas) associated with the proposed Master Plan Update could still occur with the potential to directly or indirectly destroy the paleontological resource. A significant impact to paleontological resources could result if an inadvertent discovery is made during ground-disturbing activities for development projects associated with the Master Plan Update.

During construction of the improvements associated with the Master Plan Update, ground-disturbing activities would occur throughout various locations on the CSULB campus. Ground disturbance refers to activities that would impact subsurface geologic deposits, such as grading, excavation, boring, drilling, and trenching, including for utilities. All improvements implemented pursuant to the Master Plan Update would be designed and constructed pursuant to the CSU Seismic Requirements. Per the CSU Seismic Requirements, site-specific surface conditions are to be determined for the building/facility site by a geotechnical engineer as part of a project's development. This could include geotechnical investigations for development on the campus that would involve expanded footprints or deeper foundations. However, due to the fossil

sensitivity of the rock formations present within the CSULB campus, construction of the individual development projects associated with implementation of the Master Plan Update may result in significant impacts to paleontological resources. Thus, implementation of Mitigation Measures GEO-A through GEO-D may be required. If a project would require ground-disturbing activities at depths of 4 feet or greater, Mitigation Measure GEO-A would be required. Mitigation Measure GEO-A would require CSULB to retain an SVP-qualified paleontologist to review the proposed scope of work for a project requiring ground-disturbing activities at depths 4 feet below existing grade or greater in undisturbed geologic contexts, including excavation plans and geotechnical studies or borings, to determine if project excavations have the potential to impact paleontological resources. If the qualified paleontologist determines that a project would not impact paleontological resources, then no further work is necessary. However, if the qualified paleontologist determines that the proposed scope of work is found to not meet the SVP Standards or the geotechnical investigation identifies medium- to high-potential to encounter undisturbed geologic contexts, the qualified paleontologist, in consultation with CSULB, shall include recommendations for the project, including paleontological monitoring in accordance with Mitigation Measure GEO-B and worker environmental awareness training in accordance with Mitigation Measure GEO-D.

Mitigation Measure GEO-B would include paleontological monitoring and provides directions for full- or part-time monitoring, provides guidance in the event fossils are discovered, including redirecting work and assessing the significance of the find. If the qualified paleontologist determines that the find is significant in accordance with SVP standards, then Mitigation Measure GEO-C would apply. If any find is determined not to be significant, then work could proceed.

If the fossils are determined to be significant, then Mitigation Measure GEO-C would require an SVP-qualified paleontologist to prepare and implement a data recovery plan that includes cleaning, identifying, cataloging, and curating significant finds. The data recovery plan would include a report and a letter of acceptance from the curation institution.

Mitigation Measure GEO-D would require, at the discretion of the qualified paleontologist, that a worker environmental awareness training providing paleontological sensitivity training be given to the construction crew associated with ground-disturbing activities prior to the beginning of construction that could be administered along with other environmental awareness programs for the same project. Mitigation Measures GEO-A through GEO-D are designed to identify and protect fossils during construction. Therefore, with implementation of Mitigation Measure GEO-A through GEO-D, impacts would be reduced to less than significant.

Operation

Following construction for all improvements implemented pursuant to the Master Plan Update, no additional ground disturbance would occur in undisturbed geologic contexts which would have the potential to impact unknown, buried paleontological resources. As such, operation of the Master Plan Update would have no impact on paleontological resources.

Project-Level Analysis for Near- and Mid-Term Development Projects

Construction

Construction activities associated with the proposed near- and mid-term development projects would result in similar impacts to those described above at the program level for implementation of the Master Plan Update. As previously discussed, there are no documented fossil localities within the CSULB campus; however, fossil-bearing units from the same sedimentary deposits as those found within the CSULB main campus and Beachside Village property have been identified

within a few miles of the campus. In addition, undisturbed paleosols have been previously identified at a depth of approximately 4 to 6 feet on campus. Therefore, proposed development under the Master Plan Update has high potential to disturb paleontological resources within undisturbed alluvium and geologic contexts.

Thus, construction activities for proposed near and mid-term development projects that include ground disturbance such as grading, excavation, boring, drilling, and trenching, including for utilities, at depths 4 feet below existing grade or greater in undisturbed geologic contexts (i.e., undisturbed bedrock or subsurface geologic deposits in previously undisturbed areas) would have the potential to disturb unknown paleontological resources.

The following near- and mid-term projects would require only interior renovations with no ground-disturbing activities, and therefore have no potential to disturb unknown paleontological resources: Lecture Hall 150-151 Renovation, Fine Arts 1/2 Renovation, Fine Arts 4 Renovation, Theatre Arts Renovation, University Theatre Renovation, Microbiology Student Success Center Renovation, Nursing Building Renovation, and Engineering Tech Renovation. Additionally, the Baseball Field Conversion to Multi-Use Field, Central Plant Decarbonization, and Relocated Archery Field would not require ground-disturbing activities greater than 4 feet in depth. Therefore, no impacts to paleontological resources would occur as the result of construction of these near- and mid-term projects.

While some projects are located on developed areas with previous ground disturbance and likely contain artificial fill, it is assumed that projects that may require excavation for foundations that may reach undisturbed geologic contexts include the replacement projects (Engineering Replacement Building and New Parkside Housing Village), new projects (Faculty and Staff Housing, New 7th St. Community Outreach Facility), and renovation projects that include additions and/or renovations to the exterior of existing facilities (USU Renovation/Addition and Cafeteria Replacement, Hillside College Renovations/Addition, Beachside Housing, Aquatics Center and Pool Renovation, College of the Arts Replacement Building, Jack Rose Track/Commencement Facilities, Walter Pyramid Renovation, Pedestrian/Bike Lane Improvements, Liberal Arts 5 Renovation, Student Health Services Addition, Corporation Yard Renovations, Friendship Walk Stairs Revitalization, Improved Campus Entrance and Gateway, University Music Center Renovation/Addition, and Redefining the Campus Quad).

All improvements implemented pursuant to the Master Plan Update would be designed and constructed pursuant to the CSU Seismic Requirements. Per the CSU Seismic Requirements, site-specific surface conditions are to be determined for the building/facility site by a geotechnical engineer as part of a project's development. This could include geotechnical investigations for development on the campus that would involve expanded footprints or deeper foundations. However, due to the fossil sensitivity of the rock formations present within the CSULB campus, construction of replacement, new, and renovation projects discussed above may result in significant impacts to paleontological resources.

Thus, implementation of Mitigation Measures GEO-A through GEO-D, as discussed under the program-level analysis, may be required. If a project would require ground-disturbing activities at depths of 4 feet or greater, Mitigation Measure GEO-A would be required, which would require CSULB to retain an SVP-qualified paleontologist to review the proposed scope of work for a project to determine if project excavations have the potential to impact paleontological resources. If the qualified paleontologist determines that a project would not impact paleontological resources, then no further work is necessary. However, if the qualified paleontologist determines that the proposed scope of work is found to not meet the SVP Standards or the geotechnical

investigation identifies medium- to high-potential to encounter undisturbed geologic contexts, the qualified paleontologist, in consultation with CSULB, shall include recommendations for the project, including paleontological monitoring in accordance with Mitigation Measure GEO-B and worker environmental awareness training in accordance with Mitigation Measure GEO-D.

During the course of paleontological monitoring under Mitigation Measure GEO-B, if the qualified paleontologist determines that a find is significant in accordance with SVP standards, then Mitigation Measure GEO-C would apply. If a find is determined not to be significant, then work could proceed and no further mitigation would be required.

Mitigation Measures GEO-A through GEO-D are designed to identify and protect fossils during construction. Therefore, with implementation of Mitigation Measure GEO-A through GEO-D, direct and indirect impacts to paleontological resources would be reduced to less than significant.

Operation

Following construction for all improvements implemented pursuant to the Master Plan Update, no additional ground disturbance would occur into undisturbed geologic contexts which would have the potential to impact unknown, buried paleontological resources. As such, no impacts associated with operation of the Master Plan Update would occur.

3.5.5 Mitigation Measures

The following mitigation measures would be required to reduce impacts related to paleontological resources during construction of development projects requiring ground-disturbing activities in undisturbed geologic contexts (i.e., undisturbed bedrock or subsurface geologic deposits in previously undisturbed areas).

GEO-A Prior to the commencement of any ground-disturbing activities that would impact native soils (including, but not limited to grading, boring, excavating, digging, trenching, rig anchor installation, drilling, tunneling, auguring, and blasting) at a depth of 4 feet or greater below ground surface, CSULB shall consult with an SVP-qualified paleontologist.

The qualified paleontologist shall review:

- The proposed scope of work;
- Excavation plans against the data and the analysis in the Paleontological Resources Memorandum; and
- Any available geotechnical studies or boring logs.

The paleontologist shall determine to what level the proposed project excavations have the potential to impact paleontological resources. Any geotechnical boring, potholing, or other project-specific exploratory ground disturbance shall be monitored at the qualified paleontologist's discretion.

If the paleontologist determines that the project will not impact paleontological resources:

- Mitigation Measures GEO-B and GEO-C shall not apply.

If the paleontologist determines the proposed scope of work is found to not meet the SVP Standards or the geotechnical investigation identifies medium- to high-potential to encounter undisturbed geologic contexts, the qualified paleontologist, in consultation with CSULB, shall include recommendations for the project.

Recommendations can include:

- Paleontological monitoring by a qualified paleontologist in accordance with Mitigation Measure GEO-B; and
- Worker environmental awareness training in accordance with Mitigation Measure GEO-D.

GEO-B As determined by the SVP-qualified paleontologist in consultation with CSULB, paleontological monitoring shall be required for the following types of projects:

- Found not to meet the SVP Standards;
- The geotechnical investigation identifies medium- to high-potential to encounter undisturbed geologic contexts; or
- Ground-disturbing construction activities (including, but not limited to grading, boring, excavating, digging, trenching, rig anchor installation, drilling, tunneling, auguring, and blasting) into native Pleistocene-age soil and bedrock at a depth of 4 feet or greater below ground surface are required.

At the discretion of the qualified paleontologist, the level of monitoring may range from full-time or part-time (spot-check), based on the qualified paleontologist's review of plans and relevant documentation as well as on-site observations.

- If no significant fossils are recovered after 50 percent of ground-disturbing activities has been completed, full-time monitoring may be modified to weekly spot-check monitoring.
- If it is determined during the course of ground-disturbing activities that project excavations are located within fill or previously disturbed soils, or that the sensitivity for significant paleontological resources is otherwise low, monitoring may be reduced or suspended.
- The determination to reduce or discontinue paleontological monitoring in the project area shall be based on the professional opinion of the qualified paleontologist regarding the potential for fossils to be present after a reasonable extent of the geology and stratigraphy has been evaluated.

The qualified paleontologist shall attend preconstruction meetings, as deemed necessary by the paleontologist in consultation with CSULB, and manage the paleontological monitor(s) if the qualified paleontologist is not doing the monitoring. The paleontological monitor shall maintain logs and provide a final summary report of all ground-disturbing activities monitored with the potential to disturb paleontological resources.

In the event that fossils are discovered during grading at any depth, the following shall be required:

- The on-site construction supervisor shall be notified immediately and shall redirect work away from the location of the discovery.
- The contractor shall notify CSULB and consult with the qualified paleontologist to assess the significance of the find in accordance with SVP Standards.

If any find is determined to be significant, appropriate avoidance measures recommended by the qualified paleontologist and approved by CSULB shall be followed. If avoidance is unnecessary or infeasible, then Mitigation Measure GEO-C shall be implemented. The recommendations of the paleontologist shall be implemented with respect to the evaluation and recovery of fossils, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the fossil discovery.

If any find is determined not to be significant, then work shall proceed, and Mitigation Measure GEO-C would not apply.

GEO-C If the fossils are determined to be significant, then the SVP-qualified paleontologist shall prepare and implement a data recovery plan. The plan shall generally detail the nature and purpose of the paleontological investigation.

The plan shall:

- Incorporate resource context;
- Incorporate appropriate field methods for data collection depending on the type of fossils found; and
- Detail how the fossils will be prepared, cleaned, identified, catalogued, temporarily housed, and permanently curated with an appropriate institution with a research interest in the materials (which may include the Natural History Museum of Los Angeles County).

The qualified paleontologist shall ensure that curation of fossils is completed in consultation with CSULB. A letter of acceptance from the curation institution shall be submitted to CSULB.

Ground-disturbing construction activities may commence once excavations are completed in accordance with the data recovery plan and to the satisfaction of CSULB in consultation with the qualified paleontologist. However, the data recovery work shall not be considered complete until excavations and associated analyses are completed and a final report is prepared. The report shall be completed and presented to CSULB for comment within 18 months of the completion of excavations.

GEO-D As determined by the SVP-qualified paleontologist in consultation with CSULB, and prior to the beginning of ground-disturbing activities (including, but not limited to grading, boring, excavating, digging, trenching, rig anchor installation, drilling, tunneling, auguring, and blasting) by the construction crew, the construction crew associated with ground-disturbing activities shall be informed on how to identify paleontological localities, such as fossils, and of the regulatory protections afforded

those resources. The crew shall also be informed of procedures relating to the discovery of unanticipated paleontological resources. The crew shall be cautioned not to collect fossils, and directed to inform a construction supervisor and the on-site paleontological monitor, if available, in the event that paleontological resources are discovered during the course of construction.

The initial training shall be conducted by the on-site paleontological monitor and can be incorporated into the project's construction safety training. A supplemental briefing shall be provided to all new construction personnel that are associated with ground-disturbing activities prior to their commencement of ground-disturbing activities, and may consist of reviewing presentation slides or viewing a recording.

3.5.6 Level of Significance After Mitigation

Mitigation Measures GEO-A through GEO-D would require initial project review of the proposed scope of work and recommendations for individual development projects by an SVP-qualified paleontologist, paleontological monitoring, implementation of a data recovery plan in the event of a discovery of any paleontological resources, and paleontological sensitivity training. These mitigation measures would minimize or avoid potential direct or indirect impacts to a unique paleontological resource, site, or unique geologic feature. Impacts would be less than significant.

3.5.7 Cumulative Impacts

The development projects associated with the Master Plan Update, in combination with other projects requiring ground-disturbing activities in the region with the same sedimentary deposits, could result in a cumulative loss of paleontological resources which are finite. Implementation of the Master Plan Update would result in less than significant impacts with the implementation of Mitigation Measures GEO-A through GEO-D. Through paleontological monitoring and the recovery of fossil remains, impacts to paleontological resources would not be cumulatively considerable. Cumulative impacts would be less than significant.