

Appendix D: Paleontological Resource Assessment



October 3, 2023

Ashley Brodtkin
Senior Planner
De Novo Planning Group
180 East Main Street, #108
Tustin, California 92780
Via email to: abrodtkin@denovoplanning.com

RE: Paleontological Resource Assessment for the 820 Gainsborough Drive Project, Laguna Beach, Orange County, California

Dear Ashley Brodtkin,

Chronicle Heritage was retained by De Novo Planning Group to conduct a paleontological resource assessment for the 820 Gainsborough Project (Project) in the city of Laguna Beach, Orange County, California. This paleontological resource assessment included a fossil locality records search conducted by the Natural History Museum of Los Angeles County (NHMLAC) in Los Angeles, California. The records search was supplemented by a review of existing geologic maps and primary literature regarding fossiliferous geologic units within the proposed Project vicinity and region. This technical memorandum, which was written in accordance with the guidelines set forth by the Society of Vertebrate Paleontology (SVP, 2010), has been prepared to support environmental review under the California Environmental Quality Act (CEQA) compliance, with the City of Laguna Beach (City) acting as the lead agency under CEQA.

Project Location and Description

The Project area is along the southern edge of Gainsborough Drive at 820 Gainsborough Drive and is bounded by Gainsborough Drive to the north and single-family residences to the west, south, and east (Figure 1 and Figure 2). More specifically, it is within Township 7 South, Range 9 West, Section 25 as depicted on the Laguna Beach, California U.S. Geological Survey (USGS) topographic quadrangle.

The Project consists of the development and construction of a 0.126-acre hillside lot in the Diamond/Crestview Specific Plan area. The Project consists of the construction of a new \approx 2,500 square-foot (ft²) single-family residence and associated site improvements, including an attached garage, grading, hardscaping and landscaping, and street improvements. The Project area is currently undeveloped vacant land within Assessor's Parcel Number (APN) 644-291-08.



Paleontological Resource Assessment for the 820 Gainsborough Drive Project,
Laguna Beach, Orange County, California

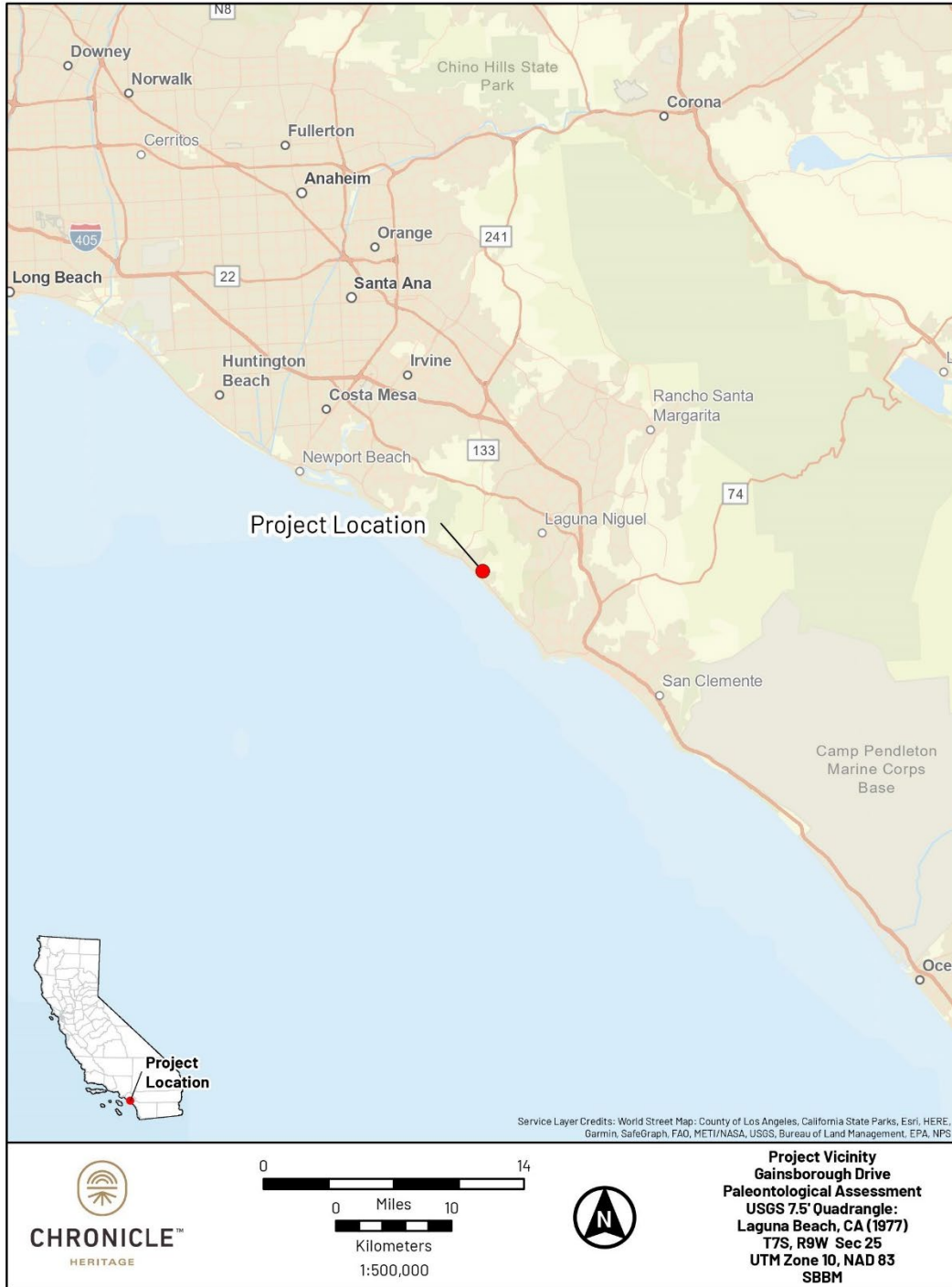


Figure 1. Project vicinity map.

Paleontological Resource Assessment for the 820 Gainsborough Drive Project,
Laguna Beach, Orange County, California

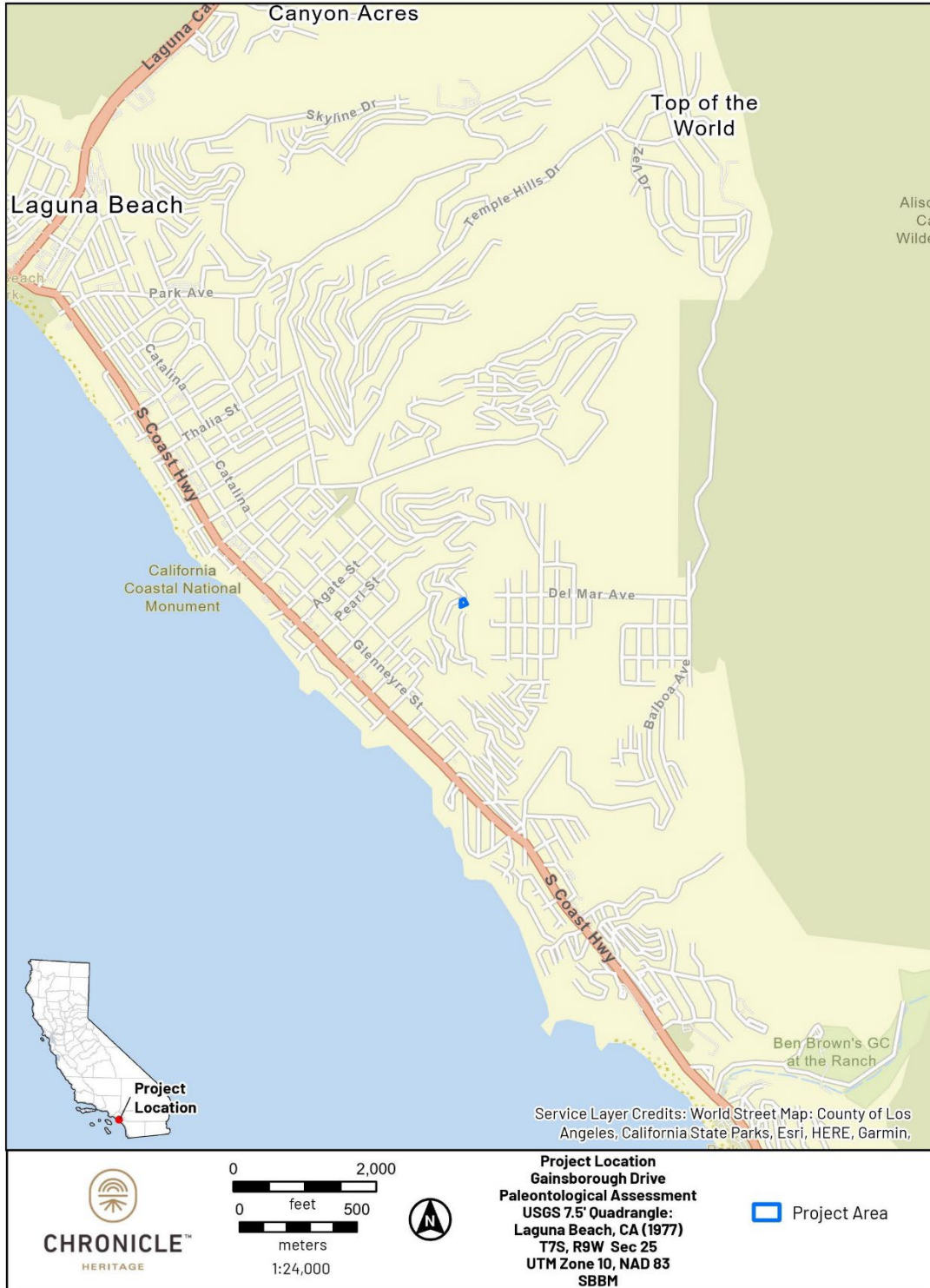


Figure 2. Project location map.

Regulatory Context

Paleontological resources (i.e., fossils) are considered nonrenewable scientific resources because once destroyed they cannot be replaced. As such, paleontological resources are afforded protection under various federal, state, and local laws and regulations. Laws pertinent to this Project are discussed below.

State Laws and Regulations

California Environmental Quality Act

CEQA requires that public agencies and private interests identify the potential environmental consequences of their projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code [PRC] Section 5020.1[b]). Appendix G in Section 15023 provides an environmental checklist of questions (PRC 15023, Appendix G, Section VII, Part f) that includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?"

CEQA does not define "a unique paleontological resource or site." However, the SVP has provided guidance specifically designed to support state and federal environmental review. The SVP broadly defines significant paleontological resources as follows:

Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years). (SVP, 2010, p. 11)

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology, paleoecology, paleophylogeography, or depositional histories. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well-represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiometric dating is possible. As such, common fossils, especially vertebrates, may be scientifically important and therefore considered significant. Significance is typically determined by the Project Paleontologist. Consultation with a regionally accredited museum may be necessary.

California Public Resources Code

Section 5097.5 of the PRC states:

No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature,

situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. (PRC, subsection a)

As used in this PRC section, "public lands" means lands owned by or under the jurisdiction of the state or any city, county, district, authority, public corporation, or any agency thereof. Consequently, public agencies are required to comply with PRC 5097.5 for their own activities including construction and maintenance as well as for permit actions (e.g., encroachment permits) undertaken by others.

Local

The *Laguna Beach General Plan Policies* (City of Laguna Beach, 2012, p. 75) identifies four sub-measures related to paleontological resources to be implemented by the City. These include:

- 12A. Promote the conservation of land having archaeological and/or paleontological importance, for its value to scientific research and to better understand the cultural history of Laguna Beach and environs.
- 12B. Develop a program which systematically inventories, records and preserves significant cultural resources in the community, in accordance with the guidelines in the City's Local Coastal Plan.
- 12C. Development adjacent to a place, structure or feature found to be of historical significance shall be designed so that the uses permitted and the architectural design will protect the visual setting of the historical site.
- 12D. Preserve cultural/scientific sites, including geologically unique formations having archaeological significance.

Paleontological Resource Potential

Absent specific agency guidelines, most professional paleontologists in California adhere to the guidelines set forth by the SVP (2010) to determine the course of paleontological mitigation for a given project. These guidelines establish protocols for the assessment of the paleontological resource potential of underlying geologic units and outline measures to mitigate adverse impacts that could result from project development. Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic units (or members thereof) underlying a project area can be assigned to one of four categories defined by SVP (2010). Although these standards were written specifically to protect vertebrate paleontological resources, all fields of paleontology have adopted the following guidelines.

In Orange County, California, there are also County specific guidelines that were developed in accordance with SVP to determine paleontological sensitivity. These guidelines are based on the following factors: the scientific significance (importance) of the fossils, defined and determined by criteria such as: new or rare taxa; the abundance (likelihood of fossils being recovered) or rarity of fossils; the quality of preservation; the geologic age (important from the perspective of evolutionary stage of the particular taxonomic group, and for correlation with stratigraphy in other localities); and the paleoecologic implications (Cooper Center, 2010). These classifications rank from very high, high, moderate, low, and none (Cooper Center, 2010).

High Potential (Sensitivity)

Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered have a high potential for containing significant nonrenewable fossiliferous resources. These units include sedimentary formations and some volcanic formations that contain significant nonrenewable.

Low Potential (Sensitivity)

Sedimentary rock units that are potentially fossiliferous but have not yielded fossils in the past or contain common or widespread invertebrate fossils of well-documented and understood taphonomic, phylogenetic species and habitat ecology. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potential for yielding significant fossils prior to the start of construction. Generally, these units will be poorly represented by specimens in institutional collections and will not require protection or salvage operations. However, as excavation for construction begins, it is possible that significant and unanticipated paleontological resources might be encountered and require a change of classification from Low to High Potential and, thus, require monitoring and mitigation if the resources are found to be significant.

Undetermined Potential (Sensitivity)

Specific areas underlain by sedimentary rock units for which little information is available have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before impact mitigation programs for such areas may be developed.

No Potential

Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources.

Methods

To assess whether a particular area has the potential to contain significant fossil resources at the subsurface, it is necessary to review published geologic mapping to determine the geology and stratigraphy of the area. Geologic units are considered "sensitive" for paleontological resources if they are known to contain significant fossils anywhere in their extent. Therefore, a search of regional museum repositories for paleontological localities within and nearby the Project area is necessary to determine if fossil localities have been previously discovered within a particular rock unit. For this Project, a museum records search was conducted at the NHMLAC. A records search of the University of California Museum of Paleontology (UCMP, 2023) online database was also conducted.

Resource Context

Geological Setting

The Project area is within the Peninsular Ranges geomorphic province of California (Yerkes and Campbell, 2005). A geomorphic province is a region of unique topography and geology that is

readily distinguished from other regions based on its landforms and diastrophic history. In the vicinity of the Project area, the Peninsular Ranges province includes portions of coastal Orange County, the Santa Ana Mountains, and the San Joaquin Hills. The Peninsular Ranges trend northwest-southeast and extend 900 miles (mi) from the Los Angeles Basin to the tip of Baja California in Mexico. The province varies from 30–100 mi wide and is bounded on the east by the Colorado Desert and on the west by the coastal plain and the Gulf of California (Norris and Webb, 1976).

Site Specific Geology and Paleontology

According to geologic mapping by Morton and Miller (2006), the Project area is underlain by the Topanga Group, undifferentiated (Tt) from the Early Miocene to Middle Miocene (Figure 3).

The Miocene Topanga Group extends throughout the Santa Monica Mountains and Los Angeles Basin and is intermittently exposed in coastal Orange County in the vicinity of the Project area (Yerkes and Campbell, 2005). The geologic unit was first described by Kew (1923) at its type section in the central Santa Monica Mountains and later redescribed by Yerkes and Campbell (1979) for exposures in the western Santa Monica Mountains.

In the vicinity of the Project area, the Topanga Group is exposed directly at the surface. The undifferentiated Topanga Group is up to 20,000 ft thick and consists of red-brown to orange marine sedimentary deposits, extrusive andesitic and vesicular basaltic volcanic rocks, and extensive dikes and sills (Oakeshott, 1958).

Numerous invertebrate remains have been recovered from the sandstone deposits within the Topanga Group, including mollusks of the Temblor Stage (Oakeshott, 1958; Weaver and North American Committee on Stratigraphy, 1944; Yerkes and Campbell, 2005). Vertebrate remains have also been identified, including specimens of whale, sea lion, and horse remains as well as shark gill rakers and fish scales (Koch et al., 2004; UCMP, 2023). In addition, a search of the Cooper Center specimen catalog indicates that at least 36 vertebrate localities have been identified within the Topanga Group within Orange County. The localities yielded over 800 vertebrate fossil specimens from within the Topanga Group, including terrestrial and marine mammals, fish, and shark (Cooper Center, 2014).

According to Bell (2023), no paleontological resources have been previously identified within the Project area; however, several significant fossils have been identified within the Topanga formation either at the surface or at a greater depth. Identified vertebrate fossils include the marine mammals Dugongidae (dugong; “sea cow”) and *Desmostylus* sp., a now extinct semi-marine mammal most closely related to the extant dugong and elephant (UCMP, 2023). Identified invertebrate fossils include mollusk and brachiopod.

The Cooper Center (2010) contains records for numerous fossils collected from the Topanga Group within Orange County, including the following taxa listed in Table 1.

Table 1. List of Paleontological Resources Identified from the Topanga Group in Orange County

Common Name	Scientific Name
Whale	Cetacea, Odontoceti, Cetotheriidae, Mysticeti, Physeteridae, <i>Scaldicetus</i>
Bird	Aves, Auceriformes, <i>Puffinus</i> , <i>Sulidae</i>
Fish	Teleostei, <i>Acanthocybium</i> , Albulidae, Balistidae, Bothidae, <i>Chauliodus</i> , Chondrichthyes, Diodontidae, Euselachii, Labridae, <i>Mola mola</i> , <i>Oplegnathidae</i> , <i>Prionurus</i> , <i>Rhinobatis</i> , Scaridae, Scombridae, <i>Semicossyphus</i> , <i>Sphyrna</i> , <i>Tetraodontidae</i> , <i>Thyrsoles</i>
Crab	Brachyura
Seal	<i>Allodesmus</i> , Pinniped, <i>Odobenidae</i> , <i>Otaridae</i>
Ray	Batoidea, <i>Dasyatis</i> , <i>Gymnura</i> , <i>Mobula</i> , <i>Myliobatis</i>
Shark	<i>Isurus</i> , Carcharhinidae, Carcharhinus, <i>Carcharocles</i> , <i>Carcharodon hastalis</i> , <i>Cetorhinus</i> , <i>Galeocerdo</i> , <i>Galeorhinus</i> , <i>Hemipristis</i> , <i>Heterodontus</i> , <i>Hexanchus</i> , <i>Isurus planus</i> , Lamnidae, <i>Mustelus</i> , <i>Negaprion</i> , <i>Pristiophorus</i> , <i>Sphyrna</i> , <i>Squalus</i> , <i>Squatina</i> , <i>Triakis</i>
Barnacle	<i>Balanus</i>
Echinoderm ("sand dollar")	Brissidae
Camel	Camelidae
Elephant	Proboscidea
Rodent	<i>Copemys</i> , <i>Leidymys</i> , <i>Miospermophilus</i> , <i>Perognathus</i> , <i>Protospermophilus</i> , <i>Tamias</i>
Dolphin	Delphinidae, <i>Kentriodontidae</i> , <i>Liolithax</i>
Turtle	Dermochelyidae, Cheloniidae
Dugong ("sea cow")	<i>Metaxytherium</i> , <i>Paleoparadoxia</i> , <i>Desmostylus</i>
Horse	Equidae

Findings

This memorandum uses the SVP (2010) classification system and in agreement with the sensitivity ratings recommended by the Cooper Center (2010) to assess paleontological sensitivity and the level of effort required to manage potential impacts to significant fossil resources. Using this system, the sensitivity of geologic units was determined based on the relative abundance and risk of adverse impacts to vertebrate fossils and significant invertebrates and plants.

Sedimentary deposits of the Miocene Topanga Group are mapped at ground surface throughout the Project area. According to the SVP (2010), these deposits have a high paleontological sensitivity due to the previously recorded Miocene vertebrate fossil localities in the unit (Figure 4). Therefore, further paleontological resource management is recommended during Project development.

Paleontological Resource Assessment for the 820 Gainsborough Drive Project,
Laguna Beach, Orange County, California



Figure 3. Geologic map of the Project area.

Paleontological Resource Assessment for the 820 Gainsborough Drive Project,
Laguna Beach, Orange County, California

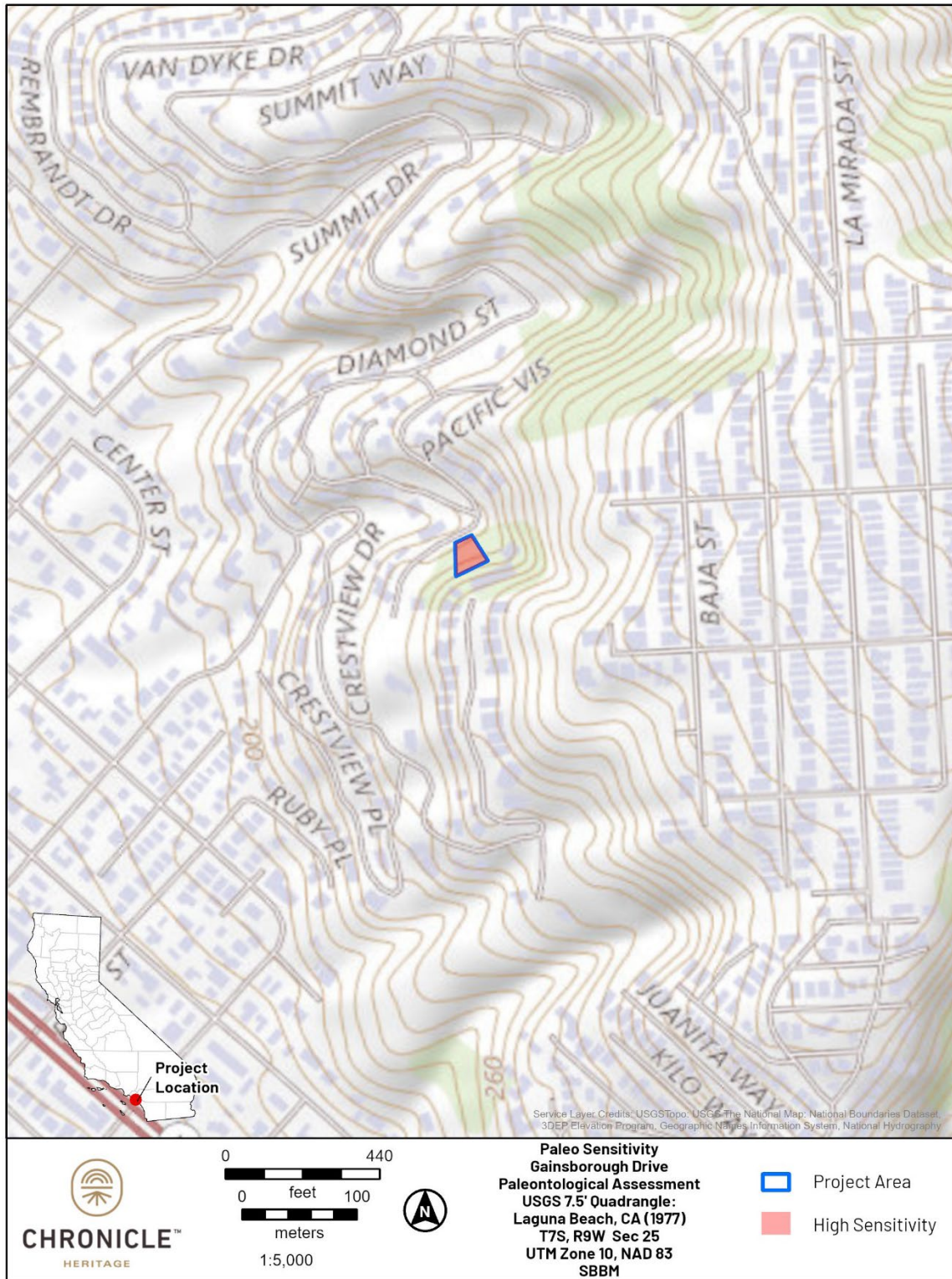


Figure 4. Paleontological sensitivity map of the Project area.

Recommendations

In general, the potential for a given project to result in negative impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project; thus, the higher the amount of ground disturbances within geological deposits with a known paleontological sensitivity, the greater the potential for negative impacts to paleontological resources. Since this Project entails grading for a single-family home, new ground disturbances are anticipated. The presence of paleontologically sensitive Miocene deposits at the surface, and likely at depth in the Project area, suggests that ground disturbance may result in significant impacts under CEQA, such as destruction, damage, or loss of scientifically important paleontological resources. A qualified paleontologist should be retained to develop and implement the measures recommended below. These measures have been developed in accordance with SVP guidelines; if implemented, these measures will satisfy the requirements of CEQA.

Workers Environmental Awareness Program (WEAP)

Prior to the start of the proposed Project activities, all field personnel will receive a worker's environmental awareness training on paleontological resources. The training will provide a description of the laws and ordinances protecting fossil resources, the types of fossil resources that may be encountered in the Project area, the role of the paleontological monitor, outline steps to follow if a fossil discovery is made and provide contact information for the Project Paleontologist. The training will be developed by the Project Paleontologist and can be delivered concurrently with other training, including cultural, biological, safety, et cetera.

Paleontological Mitigation Monitoring

Prior to the commencement of ground disturbing activities, a professional paleontologist will be retained to prepare and implement a paleontological mitigation plan for the Project. The plan will describe the monitoring required during ground disturbing activities. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. If the Project Paleontologist determines full-time monitoring is no longer warranted based on the geologic conditions at depth, they may recommend that monitoring be reduced or cease entirely.

Fossil Discoveries

If a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and, if appropriate, collected. If the resource is determined to be of scientific significance, the Project Paleontologist shall complete the following:

- **Salvage of Fossils.** If fossils are discovered, all work in the immediate vicinity should be halted to allow the paleontological monitor and/or Project Paleontologist to evaluate the discovery and determine if the fossil may be considered significant. If the fossils are determined to be potentially significant, the Project Paleontologist (or paleontological monitor) should recover them following standard field procedures for collecting paleontological resources as outlined in the mitigation plan prepared for the Project. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer

salvage periods. In this case, the paleontologist should have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.

- **Fossil Preparation and Curation.** The paleontological mitigation plan will identify the museum that has agreed to accept fossils that may be discovered during Project related excavations. Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped laboratory to a point ready for curation. Preparation may include the removal of excess matrix from fossil materials and stabilizing or repairing specimens. During preparation and inventory, the fossils specimens will be identified to the lowest taxonomic level practical prior to curation at an accredited museum. The fossil specimens must be delivered to the accredited museum or repository after all fieldwork is completed. The cost of curation will be assessed by the repository and will be the responsibility of the client.

Final Paleontological Mitigation Report

Upon completion of ground disturbing activity (and curation of fossils, if necessary), the Project Paleontologist should prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program. The report should include a discussion of the location, duration, and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated.

Thank you for contacting Chronicle Heritage for this Project. If you have any questions, please do not hesitate to contact us.

Sincerely,

Chronicle Heritage



Michaela Adler | Associate Paleontologist



Heather Clifford | Senior Paleontologist

References

- Bell, Alyssa, 2023, Paleontological resources for the 23-0621 820 Gainsborough Drive Project, Natural History Museum of Los Angeles.
- City of Laguna Beach, 2012, Laguna Beach General Plan Policies, Laguna Beach, CA, p. 75.
- John D. Cooper Center of Archaeology and Paleontology (Cooper Center), 2010, Policies, Procedures, and Guidelines for Curation of the Orange County Archaeological and Paleontological Collections, <http://www.jdcoopercenter.org/crm/>, accessed October 2014.
- John D. Cooper Center of Archaeology and Paleontology (Cooper Center), 2014, Paleontology Collections Catalog, <http://www.jdcoopercenter.org/paleocollections/>, accessed October 2014, last updated March 6, 2014.
- Kew, William Stephen Webster, 1923, Geologic formations of a part of southern California and their correlation: American Association of Petroleum Geologists Bulletin, v. 7, p. 411-420.
- Koch, Alison L., Vincent L. Santucci, and Ted R. Weasma, 2004, Santa Monica Mountains National Recreation Area Paleontological Survey, Technical Report NPS/NRGRD/GRDTR-04/01, U.S. Department of Interior, National Park Service, Geologic Resources Division, Denver, Colorado.
- Norris, Robert M., and Robert W. Webb, 1976, Geology of California, John Wiley & Sons, New York.
- Morton, D.M., and F.K. Miller, 2006, Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey, Open-File Report OF-2006-1217, scale 1:100,000.
- Oakeshott, G. B., 1958, Geology and Mineral Deposits of San Fernando Quadrangle, Los Angeles County, California, California Division of Mines and Geology Bulletin 172, plate 1, Scale 1:62,500.
- Society of Vertebrate Paleontology (SVP), 2010, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources Society of Vertebrate Paleontology, Impact Mitigation Guidelines Revision Committee, Bethesda, MD.
- University of California Museum of Paleontology (UCMP), 2023, University of California Museum of Paleontology Specimen Search, retrieved from ucmpdb.berkeley.edu.
- Weaver, C.E., Chairman, and North American Committee on Stratigraphy, 1944, Correlation of the marine Cenozoic formations of western North America: Geological Society of America Bulletin, v. 55, p. 569-598.
- Yerkes, Robert F., and Russell. H. Campbell, 1979, Stratigraphic nomenclature of the central Santa Monica Mountains, Los Angeles County, California: U.S. Geological Survey Bulletin 1457-E, p. 31.

Paleontological Resource Assessment for the 820 Gainsborough Drive Project, Laguna Beach,
Orange County, California

Yerkes, Robert F., and Russell. H. Campbell, 2005, Preliminary Geologic Map of the Los Angeles 30' x 60' Quadrangle, Southern California. U.S. Geological Survey Open-File Report 2005-1019, Department of the Interior, U.S. Geological Survey.