APPENDIX E
Paleontological Resources Assessment

PALEONTOLOGICAL RESOURCES ASSESSMENT

1 O'HILL RIDGE—GARG RESIDENCE PROJECT

LAGUNA NIGUEL, ORANGE COUNTY, CALIFORNIA

LSA

April 2020

PALEONTOLOGICAL RESOURCES ASSESSMENT

1 O'HILL RIDGE—GARG RESIDENCE PROJECT

LAGUNA NIGUEL, ORANGE COUNTY, CALIFORNIA

Submitted to:

City of Laguna Niguel
Community Development Department
30111 Crown Valley Parkway
Laguna Niguel, California 92677

Prepared by:

LSA
20 Executive Park, Suite 200
Irvine, California 92614
(949) 553-0666

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LSA

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ABSTRACT

LSA is under contract to Brion Jeannette Architecture to conduct a paleontological assessment of the proposed 1 O'Hill Ridge – Garg Residence Project (project) in Laguna Niguel, Orange County, California. The purpose of the assessment is to identify the potential for the project to impact paleontological resources. This assessment was conducted pursuant to all applicable federal, State, and City of Laguna Niguel (City) regulations and policies regarding paleontological resources, as well as guidelines established by the Society of Vertebrate Paleontology. The City is the Lead Agency responsible for compliance with the aforementioned regulations and policies.

The project proposes the construction of a custom single-family residence and ancillary structures and improvements, such as a swimming pool, fences and walls, and a tennis court. Ground-disturbing activities associated with the proposed project include grading the project area for the proposed improvements, construction of a driveway, excavation of the pool, and installation of utility infrastructure, such as gas, water, sewer, and telecommunication lines.

LSA reviewed geologic maps and relevant geological and paleontological literature to determine the geologic units within the project area and whether paleontological resources have been recovered from those or similar geologic units elsewhere in the region. A fossil locality search through the Natural History Museum of Los Angeles County was conducted in August 2006 for the adjacent property to the northeast. The results of this search encompass this project area and are therefore applicable to this project. On June 15, 2007, a systematic pedestrian survey of the project area was conducted to note the sediments and identify any paleontological resources that may be present within the project area.

Geologic mapping indicates the project area contains late Holocene Landslide Deposits, the Pliocene Niguel Formation, and the early Pliocene to late Miocene Capistrano Formation. Given the disturbed nature of any fossils the Landslide Deposits may contain, they are considered to have low paleontological sensitivity. However, both the Niguel and Capistrano Formations have produced scientifically significant fossils in the region and are considered to have high paleontological sensitivity. Development of this project will involve ground disturbance in the high sensitivity Niguel and Capistrano Formations and, therefore, has the potential to impact scientifically significant, non-renewable paleontological resources. In order to mitigate these potential impacts, LSA recommends the preparation of a monitoring program, monitoring of construction activities, appropriate treatment of newly discovered resources, and preparation of a final monitoring report as outlined in the mitigation measures included herein.

This report serves only as documentation of the paleontological findings for the project area and in no way represents a geological assessment. Therefore, this report should not be used as such.

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INTRODUCTION

LSA is under contract to Brion Jeannette Architecture to conduct a paleontological resources assessment for the 1 O'Hill Ridge – Garg Residence Project (project), in the City of Laguna Niguel (City), Orange County, California. The City is the Lead Agency responsible for compliance with the applicable regulations and policies for this project. This assessment was conducted pursuant to all applicable federal, State, and City regulations and policies regarding paleontological resources, as well as guidelines established by the Society of Vertebrate Paleontology (SVP, 2010). This assessment documents the potential for encountering paleontological resources during project development and makes recommendations on how to mitigate impacts to those resources. It is not, and should not be used as, a geological assessment.

PROJECT DESCRIPTION AND LOCATION

The project proposes the construction of a custom single-family residence and ancillary structures and improvements such as a swimming pool, fences and walls, and a tennis court. Ground-disturbing activities associated with the proposed project include grading the project area for the proposed improvements, construction of a driveway, excavation of the pool, and installation of utility infrastructure such as gas, water, sewer, and telecommunication lines.

The project area is within an approximately 6-acre parcel southeast of the terminus of O'Hill Ridge Road in the Bear Brand Ranch gated community. The parcel address is identified as 1 O'Hill Ridge. Specifically, it is in the southern San Joaquin Hills in the south half of Section 2, Township 8 South, Range 8 West, San Bernardino Baseline and Meridian and is depicted on the *San Juan Capistrano, California* United States Geological Survey 7.5-minute topographic quadrangle (USGS, 1981) (Figure 1).

REGULATORY ENVIRONMENT

STATE OF CALIFORNIA

Under State law, paleontological resources are protected by the California Environmental Quality Act (CEQA) and Public Resources Code Section 5097.5.

California Environmental Quality Act (Public Resources Code 21000 et seq.)

CEQA's purpose is to provide a statewide policy of environmental protection. As part of this protection, State and local agencies are required to analyze, disclose, and, when feasible, mitigate the environmental impacts of, or find alternatives to, proposed projects. The State *CEQA Guidelines* (California Code of Regulations 15000 et seq.) provide regulations for the implementation of CEQA and include more-specific direction on the process of documenting, analyzing, disclosing, and mitigating environmental impacts of a project. To assist in this process, Appendix G of the State *CEQA Guidelines* provides a sample checklist form that may be used to identify and explain the degree of impact a project will have on a variety of environmental aspects, including paleontological resources (Section VII[f]). As stated in Section 15002(b)(1-3) of the State *CEQA Guidelines*, CEQA applies to governmental action, including activities that are undertaken by, financed by, or require approval from a governmental agency.

California Public Resources Code, Section 5097.5

This law protects historic, archaeological, and paleontological resources on public lands within California and establishes criminal and civil penalties for violations. Specifically, Public Resources Code Section 5097.5 states that "No person shall knowingly or willfully excavate upon, remove, destroy, injure, or deface any … paleontological or historical feature, situated on public lands" and that public lands includes lands "… under the jurisdiction of the state, or any city, county, district, authority, or public corporation, or any agency thereof."

CITY OF LAGUNA NIGUEL

The Open Space/Parks/Conservation Element of the City's General Plan (City of Laguna Niguel, 1992) addresses the preservation and use of the City's important natural and cultural resources, including paleontological resources. Included in this element are the following goal, policies, and actions that provide for the protection and preservation of paleontological resources:

"Goal 7: Recognize significant cultural sites or features within the community.

Policy 7.1: Review the technical data on sensitive cultural resources for all new development proposals.

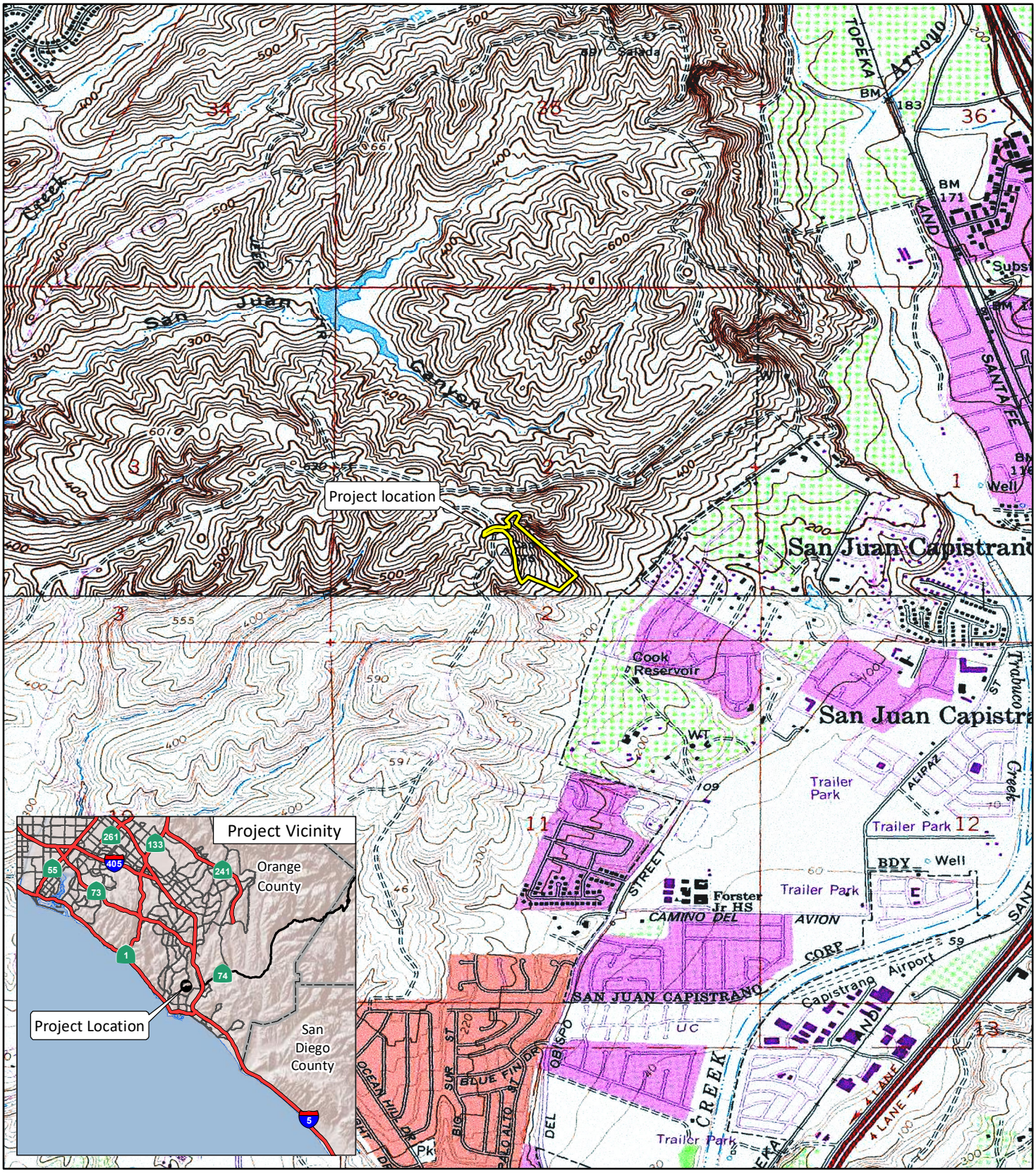
Policy 7.2: Require mitigation of impacts to significant areas of archaeological and paleontological resources.

Policy 7.3 Preserve uncovered resources in their natural state, as much as feasible, to assure their preservation and availability for later study. Require that uncovered resources are documented and retained in an appropriate museum or other institution.

Action 7.3.1: Require effective mitigation measures where development may affect archaeological or paleontological resources.

Action 7.3.2 Require the preparation of archaeological or paleontological reports in areas where there is potential to impact cultural resources.

Action 7.3.3 Require that an archaeologist or paleontologist be retained to observe grading activities in areas where the probable presence of archaeological or paleontological resources is indicated."



LSA

LEGEND

Project Location

FIGURE 1

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1 O'Hill Ridge - Garg Residence

Project Location

SOURCE: USGS 7.5' Quad. (San Juan Capistrano, 1981; Dana Point, 1975)

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PALEONTOLOGICAL SENSITIVITY

Fossils are nonrenewable resources; they cannot be replenished. Fossils form after tens of thousands of years under favorable conditions. Of the millions of plants and animals that have lived on the earth for millions of years, only a few are preserved as fossils. They give a unique view of the history of life on this planet and provide insights into evolution, climate, ecology, biodiversity, and extinction.

Planners and paleontologists have worked together to help preserve Orange County's long fossil heritage. As required by the California Environmental Quality Act, a system is used to determine the potential for the occurrence of fossils during the environmental review process. A Paleontological Resources Assessment is conducted to determine the level of paleontological sensitivity for a project. When an earth-moving project begins, a standard Paleontological Resources Impact Mitigation Program can be followed that will reduce the impacts to the fossils to less than significant levels. Sensitivity ratings developed by the Society of Vertebrate Paleontology (SVP) are "high," "low," or "undetermined" (SVP, 2010). These classifications are commonly used by paleontologists. Eisentraut and Cooper (2002) expanded these gradations based on the significance and level of preservation of fossils within certain sediments:

- **Very High:** Scientifically very significant fossils and fossils from critical time periods. Very important for scientific study.
- **High:** Quality preservation and scientifically significant fossils. Important for research and/or very important for public display.
- **Moderate:** Abundant fossils of good quality. Important for education and public display.
- **Low:** Poorly preserved fossils. Only useful for educational purposes.
- **None:** Contains no fossils, either because the sediments are too young or because they are from nondepositional rock units (i.e. igneous rocks). Although landslide deposits are generally too young to contain fossils, the underlying bedrock unit from which the landslide deposit originated often does. Therefore, the sensitivity of landslide deposits is dependent on underlying strata.

METHODS

LITERATURE REVIEW

LSA reviewed geologic maps and relevant geological and paleontological literature to determine the geologic units within the project area and whether paleontological resources have been recovered from those or similar geologic units elsewhere in the region. As geologic formations and units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas well beyond the project area.

LOCALITY SEARCH

A fossil locality search was completed through the Natural History Museum of Los Angeles County (LACM) for an adjacent parcel in August 2006, and the results of that research include the current project area. Therefore, the results of the 2006 locality search were used for the current project. The purpose of the locality search was to establish the status and extent of previously recorded paleontological resources within and surrounding the project area.

FIELD SURVEY

On June 15, 2007, Phil Fulton conducted a systematic pedestrian survey of the project area. The survey was conducted by walking a series of parallel transects, separated by 10 meters (33 feet), across the property until the entire project area had been surveyed. The survey consisted of a visual inspection of exposed soil and ground surfaces. The purpose of the survey was to note the sediments within the project area and to identify any paleontological resources that may be impacted by the proposed project. In this way, LSA could document and collect paleontological remains prior to the beginning of ground-disturbing activities and locate areas within the project that might contain abundant remains. Notes and photographs recording the general condition of the property were taken during the survey. All notes and photographs are on file at LSA.

RESULTS

LITERATURE REVIEW

The project area is along the coastal strip of the Peninsular Range Geomorphic Province, a 900-mile-long northwest-southeast trending structural block that extends from the tip of Baja California to the Transverse Ranges and includes a portion of the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). The total width of the province is approximately 362 km (225 miles), with a maximum land-bound width of 65 miles (Sharp, 1976). It contains extensive pre-Cenozoic igneous and metamorphic rocks covered by limited exposures of Cenozoic sedimentary deposits (Norris and Webb, 1976).

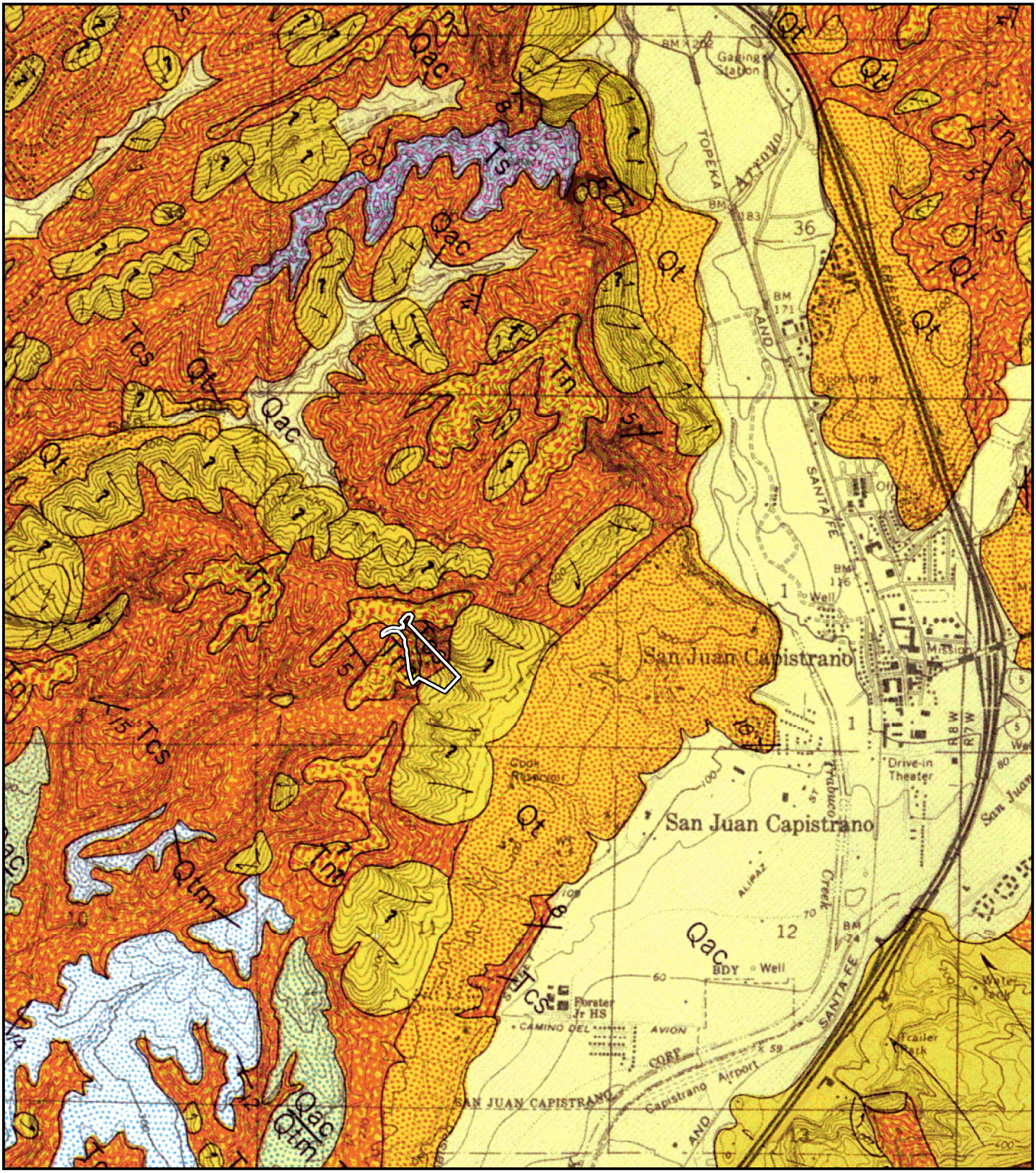
Specifically, the project is in the southern San Joaquin Hills, west of the Santa Ana Mountains. Within the project area, Morton et al. (2004) mapped late Holocene Landslide Deposits (Qls), the Pliocene Niguel Formation (Tn), and the Mio-Pliocene Capistrano Formation (Tc) (Figure 2). These geologic units are discussed in more detail below. Dates for the geologic time intervals referenced in this report are based on the *International Chronostratigraphic Chart* prepared by the International Commission on Stratigraphy (Cohen et al., 2019).

Landslide Deposits (Qls)

The Landslide Deposits consist of highly fragmented to largely coherent, unconsolidated to consolidated active landslides (Morton et al., 2004). The slides are caused by several different agents: steep slopes, expansive soils, and weathering of the bedrock (Edgington, 1974). Many of the slides originated in the Pleistocene, and all or part were reactivated during the Holocene (Morton et al., 2004). Although the late Holocene age of these deposits indicates that landslide activity occurred within the last 4,200 years, the deposits involved are from the underlying and nearby Niguel and Capistrano Formations. As such, there is a potential to find fossils from these formations in these Landslide Deposits (see discussions below). However, because these deposits have been transported from their original location and context, fossils recovered from them may not be scientifically significant. Therefore, the Landslide Deposits are considered to have low paleontological sensitivity.

Niguel Formation (Tn)

The Niguel Formation is Pliocene in age (2.58 to 5.333 million years ago) and was named by after the *Rancho Niguel* land grant (Edgington, 1974; Morton et al., 2004). It has an angular unconformity on the underlying Capistrano Formation and is a shallow (sublittoral) marine deposit that consists of fine-grained sandstone interbedded with a sandy siltstone, with a basal conglomerate (Morton et al., 1974; Morton et al., 2004). The formation also has thin layers of clay that are formed from chemical weathering (Morton et al. 2004). The formation is thin, having a regional thickness of only 350 feet (Edgington, 1974; Morton et al., 1974).



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Project Location

Geology

- Qac - Alluvium and Colluvium deposits
- Qls - Landslide deposits
- Qt - Non-marine terrace deposits
- Qtm - Marine terrace deposits
- Tn - Niguel Formation
- Tcs - Capistrano Formation, siltstone facies
- Ts - Sespe Formation

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SOURCE: Morton et al (2004).

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FIGURE 2

1 O'Hill Ridge
Garg Residence

Geologic Map

Eisentraut and Cooper (2002) report that the Niguel Formation has produced a diverse collection of molluscs, as well as a few vertebrate fossils. The basal conglomerate of the Niguel Formation has extensive invertebrate fauna of molluscs and echinoderms (Edgington, 1974; Morton et al., 1974). A thin sandy layer near the top of this formation includes littoral invertebrate species, such as the scallop *Patinopecten healyi* (Morton et al., 1974). From outcrops of this formation in Orange County, Stadum (1984) records 12 species of microfossils, 3 species of echinoderms, more than 50 species of gastropods (snails), more than 40 species of bivalves (clams), 1 species of scaphopod (tusk shells), and 2 species of arthropods (crabs and barnacles), as well as shark teeth, ray teeth, fish bones and teeth, bird bones, and marine mammal bones and teeth. This formation has produced scientifically important fossils in the region, and it is considered to have high paleontological sensitivity.

Capistrano Formation (Tc)

The marine Capistrano Formation was deposited during the early Pliocene to late Miocene (3.6–11.62 million years ago) and in this area has two facies: 1) a sandstone facies formally named the Oso Member, and 2) a siltstone facies (Morton et al., 2004). The two facies are distinguished by their depositional environments and corresponding compositions, but only the siltstone facies is present within the project area. The siltstone facies accumulated in deep shelf and slope environments and consists of white to pale gray, massive to poorly bedded, friable siltstone and mudstone, with local diatomaceous and tuffaceous beds (Morton et al., 2004; Morton et al., 1976).

This formation has produced abundant and diverse scientifically significant fossils, many of which come from the siltstone facies. These fossils include bony fish, sharks, whales, porpoises, sea lions, sea cows, and marine birds (Barnes and Raschke, 1991; Déméré and Berta, 2005; Ebeling, 1962; Eisentraut and Cooper, 2002; Smith, 2011). During pre-construction surveys and construction monitoring for the San Joaquin Hills Transportation Corridor, approximately 3.5 miles north of the project area, between Greenfield Avenue and Crown Valley Parkway, John Minch and Associates, Inc. identified a total of 213 localities that produced more than 9,500 specimens of marine and terrestrial fossils, including invertebrates (pelecypods, gastropods, and brachiopods) and vertebrates (sharks, rays, bony fishes, birds, and marine mammals) (Minch 1996a, 1996b). Among the notable fossils were a new species of dolphin of the genus *Albireo* and a nearly complete skeleton of a new genus and species of baleen whale (Minch 1996a). As the Capistrano Formation has produced an abundant and diverse scientifically significant paleontological resources, it is considered to have high paleontological sensitivity.

LOCALITY SEARCH

The LACM does not have records of fossil localities within the project area, nor from the Niguel Formation or the Landslide Deposits. However, the museum has records of two fossil localities near the project area from the Capistrano Formation: LACM 5792 and LACM 5889. Both of these localities are east-northeast of the project area, north of San Juan Creek, and east of Interstate 5. LACM 5792 produced extensive marine fauna, including sharks (Carcharinidae, Hexanchidae, and Lamnidae), rays *(Myliobatis)*, bony fishes (Labridae), eared seals (Otariidae), whales (Balaenidae, Balaeopteridae, Cetotheridae, Delphinidae, Phocoenidae, Physeteridae, and Pontoporiidae), and sea cows (Dugongidae), as well as terrestrial fauna that include Western pond turtle *(Emys)*, birds (Phalacrocoracidae, Podicipedidae), antelopes (Antilocapridae), and camels (Camelidae).

FIELD SURVEY

The project area was largely undisturbed; a graded dirt access road crossed the project area to the likely location of the future residence. Much of the project area consisted of moderate to steep slopes. Ground visibility ranged from excellent over much of the area to poor on the steep slopes on the northeast portion of the project area. Approximately 50 percent of the project area had been recently mowed and was essentially devoid of ground cover, whereas the steep slopes above a drainage on the northeast portion of the project were covered with dense thistles and coastal sage scrub. Due to the presence of surface soils, the contact between the Niguel Formation and the underlying Capistrano Formation could not be located. No fossils were noted during the field survey.

RECOMMENDATIONS

The project area contains Landslide Deposits, which have low paleontological sensitivity, and the Niguel and Capistrano Formations, both of which have high paleontological sensitivity. Development of this project will involve ground disturbance in the high-sensitivity Niguel and Capistrano Formations and, therefore, has the potential to impact scientifically significant, non-renewable paleontological resources. In order to mitigate these potential impacts, LSA recommends the preparation of a monitoring program, monitoring of construction activities, appropriate treatment of newly discovered resources, and preparation of a final monitoring report as outlined in the following mitigation measures:

Mitigation Measure PAL-1: A qualified, professional paleontologist who meets the standards set by the Society of Vertebrate Paleontology (SVP) shall be retained to develop a Paleontological Resources Impact Mitigation Program (PRIMP) for this project. The PRIMP shall be consistent with the guidelines of the SVP and shall include the methods that will be used to protect paleontological resources that may exist within the project limits, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of ground disturbance.

Mitigation Measure PAL-2: Ground-disturbing activities in deposits with high paleontological sensitivity (i.e., Niguel Formation and Capistrano Formation) shall be monitored by a qualified paleontological monitor following a PRIMP. No monitoring is required for excavations in deposits with no or low paleontological sensitivity (i.e., Landslide Deposits). If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and the paleontologist shall be contacted to assess the find and determine the appropriate actions.

Mitigation Measure PAL-3: Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a museum repository. At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.

By following the aforementioned mitigation measures, project impacts to scientifically significant paleontological resources would be reduced to a less than significant level.

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