

July 11, 2022

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**Subject: Paleontological Resources Inventory Report for the 517 Shinohara Lane Project, City of Chula Vista, San Diego County, California**

Dear Steven Schwarz:

This letter documents the results of the paleontological resources inventory in support of the 517 Shinohara Lane project (project), located in the City of Chula Vista, San Diego County, California (Figure 1) (Figures provided at the end of this memorandum). The project includes the development of a new warehouse/distribution facility on a currently vacant property. The City of Chula Vista (City) is the lead agency responsible for compliance with the California Environmental Quality Act (CEQA).

In accordance with CEQA guidelines, Dudek performed a paleontological resources inventory for the project. The inventory consisted of a San Diego Natural History Museum (SDNHM) records search, review of geological mapping and geological and paleontological literature, and intensive pedestrian surveys of the project site. The results of the paleontological records search were negative for paleontological resources within the project site; however, the SDNHM reported fossil localities nearby from the same geological units that underlie the project site. Fragmentary, fossilized exoskeletal remains were documented during the supplemental pedestrian survey (Figures 3 - 5). N. Scott Rugh, an expert in invertebrate fossil identification, identified the exoskeletal material as likely belonging to the crab, *Randallia* sp. (Rugh. Pers. Comm. 2020).

As the project site has been never developed, there is a potential to encounter intact subsurface paleontological resources. As such, a paleontological monitoring program, which includes the preparation and implementation of a Paleontological Resources Impact Mitigation Program (PRIMP), is necessary to reduce impacts to any potential paleontological resources onsite.

## 1 Project Location

The property (i.e., site) occupies 10.03 acres and is located approximately 0.2 miles east of the Interstate 805 (I-805) freeway between Main Street and Olympic Parkway at 517 Shinohara Lane in the City of Chula Vista, California (Figure 1). The site is located on Shinohara Lane accessed from Brandywine Avenue and is located within Section 19 of Township 18 South, Range 2 West and the San Bernardino Base and Meridian on the Imperial Beach, CA 7.5-minute United States Geological Survey (USGS) Topographic Quadrangle Map (Figure 1). The Assessor's Parcel Number is 644-040-01-00. The site exists within an urban portion of the City and is bound on the south and east by industrial buildings, to the west by single-family residences, and to the north by multifamily condominiums.

## 2 Project Description

The project plans to develop one parcel, consisting of 10.03 vacant acres. The site is planned for one parcel and a 195,216 square foot warehouse/distribution building, including a 7,468 square foot leasing office. The proposed building height is 40 feet. Access to the project will be provided via a driveway at the terminus of Shinohara Lane. Due to the topography of the site, retaining walls are expected. The site is General Plan designated IL – Limited Industrial and Zoned ILP – Limited Industrial P.

Project grading plans indicate cut quantities of 133,000 cubic yards to a maximum cut depth of 52 feet. The cut quantities are estimated and do not include trenching for utilities, retaining wall excavations, or building foundations/footings (Pasco Laret Suiter and Associates 2021).

## 3 Paleontological Resources

Paleontological resources are the remains or traces of plants and animals that are preserved in earth's crust, and per the Society of Vertebrate Paleontology ([SVP] 2010) guidelines, are older than written history or older than approximately 5,500 years. They are limited, nonrenewable resources of scientific and educational value, which are afforded protection under state laws and regulations. This analysis also complies with guidelines and significance criteria specified by SVP (2010). Table 1 provides definitions for high, moderate, low, marginal, and no paleontological resource potential, or sensitivity, as set forth in and in agreement with the County of San Diego's (2009) Guidelines for Determining Significance: Paleontological Resources.

**Table 1. Paleontological Resources Sensitivity Criteria**

Resource Sensitivity/Potential	Definition
High	High resource potential and high sensitivity are assigned to geologic formations known to contain paleontological localities with rare, well preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleoclimatic, paleobiological and/or evolutionary history (phylogeny) of animal and plant groups. In general, formations with high resource potential are considered to have the highest potential to produce unique invertebrate fossil assemblages or unique vertebrate fossil remains and are, therefore, highly sensitive.
Moderate	Moderate resource potential and moderate sensitivity are assigned to geologic formations known to contain paleontological localities. These geologic formations are judged to have a strong, but often unproven, potential for producing unique fossil remains (Deméré and Walsh 1993).
Low	Low resource potential and low sensitivity are assigned to geologic formations that, based on their relatively young age and/or high-energy depositional history, are judged unlikely to produce unique fossil remains. Low resource potential formations rarely produce fossil remains of scientific significance and are considered to have low sensitivity. However, when

	fossils are found in these formations, they are often very significant additions to our geologic understanding of the area.
Marginal	Marginal resource potential and marginal sensitivity are assigned to geologic formations that are composed either of volcanoclastic (derived from volcanic sources) or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain formations at localized outcrops. Volcanoclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by heat and/or pressure caused by volcanoes or plutons are called metasedimentary. If the sedimentary rocks had paleontological resources within them, those resources may have survived the metamorphism and still be identifiable within the metasedimentary rock, but since the probability of this occurring is so limited, these formations are considered marginally sensitive.
No Sensitivity	No resource potential is assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no paleontological resource potential, i.e., they are not sensitive.

**Source:** County of San Diego 2009.

## 4 Regulatory Framework

### 4.1 California Environmental Quality Act

The CEQA Guidelines require that all private and public activities not specifically exempted be evaluated against the potential for environmental damage, including effects to paleontological resources. Paleontological resources, which are limited, nonrenewable resources of scientific, cultural, and educational value, are recognized as part of the environment under these state guidelines. This study satisfies project requirements in accordance with CEQA (13 PRC [Public Resources Code], 21000 et seq.).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the “Environmental Checklist Form,” which addresses the potential for adverse impacts to “unique paleontological resource[s] or site[s] or ... unique geological feature[s].” This provision covers fossils of signal importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth.

### 4.2 PRC Section 5097.5

The PRC Section 5097.5 (Stats 1965, c 1136, p. 2792) regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

## 4.3 City of Chula Vista Regulations

### 4.3.1 City of Chula Vista's General Plan

The environmental chapter of the City of Chula Vista General Plan (Chapter 9, Section 3.1.10) specifically addresses potential impacts to non-renewable paleontological resources and outlines policies to mitigate negative impacts (City of Chula Vista 2005). The objective and policies protecting paleontological resources are outlined below:

**Objective E-10:** Protect important paleontological resources and support and encourage public education and awareness of such resources.

**Policy E-10.1:** Continue to assess and mitigate the potential impacts of private development and public facilities and infrastructure to paleontological resources in accordance with the California Environmental Quality Act.

**Policy E-10.2:** Support and encourage public education and awareness of local paleontological resources, including the establishment of museums and educational opportunities accessible to the public.

## 5 Methods

### 5.1 Geological Map and Literature Review

Published geological maps (Kennedy 1975; Kennedy and Tan 2008) and published and unpublished reports were reviewed to identify geological units on the site and determine their paleontological sensitivity.

### 5.2 Paleontological Records Search

A paleontological records search request was sent to the SDNHM on March 01, 2019. The purpose of the museum records search is to determine whether there are any known fossil localities in or near the project site, identify the sensitivity of geological units present within the project site, and aide in determining whether a paleontological mitigation program is warranted to avoid or minimize potential adverse effects of construction on paleontological resources.

### 5.3 Field Survey

Dudek archaeologist, Scott Wolf, who is cross-trained in paleontological field techniques, conducted the pedestrian survey of the project site on March 08, 2019. The survey was conducted to determine if any surficial paleontological resources are present within the project site. The survey utilized standard paleontological survey procedures and consisted of systematic surface inspection of the project site on 15 m interval transects. The ground surface was examined for the presence of exposed surficial fossils. Ground disturbances such as burrows and eroded hillsides were also visually inspected for exposed subsurface fossils and sediments.

A supplemental paleontological survey was conducted by Dudek field paleontologist Jason Collins on June 24, 2020. While the entire project site with exposed strata was surveyed for paleontological resources, the survey

focused on an outcropping of the San Diego Formation exposed on an eroded hillside in the northern portion of the project site. In addition to inspecting exposed strata for paleontological resources, sedimentological and taphonomic characteristics were noted.

## 6 Results

### 6.1 Geological Map Review, Literature Review, and Records Search

The project site lies within the Peninsular Ranges Geomorphic Province (California Geological Survey, 2002). This province extends from the tip of the Baja California Peninsula to the Transverse Ranges (the San Gabriel and San Bernardino Mountains) and includes the Los Angeles Basin, offshore islands (Santa Catalina, Santa Barbara, San Nicholas, and San Clemente), and continental shelf. The eastern boundary is the Colorado Desert Geomorphic Province (California Geological Survey 2002; Morton and Miller 2006). The ancestral Peninsular Ranges were formed by uplift of plutonic igneous rock resulting from the subduction of the Farallon Plate underneath the North American Plate during the latter portion of the Mesozoic era (approximately 125 to 90 million years ago [mya]) (Abbott 1999).

According to surficial geological mapping at a scale of 1:100,000 and the results of a paleontological records search conducted by the SDNHM (Confidential Appendix A), the project site is underlain by the late Pliocene to early Pleistocene (~ 3.6 mya to 1.8 mya) San Diego Formation (map unit Tsdss), early to middle Pleistocene (~2.58 mya to 774,000 years ago) Undivided Very Old Paralic Deposits (map unit Qvop), and middle to late Pleistocene (~774,000 to 11,700 years ago) Old Alluvial Floodplain Deposits (map unit Qoa) (Cohen et al. 2022; Kennedy and Tan 2008) (Figure 2). Undivided Very Old Paralic Deposits were originally assigned to the Lindavista Formation in older geological/ paleontological maps and literature (e.g., Kennedy 1973; Kennedy 1975). However, more recent geological mapping of Kennedy and Tan (2008) separated the Lindavista Formation into a number of distinct units (Very Old Paralic Deposits) that are considered equivalent due to where they are geographically located and the similarity of geological ages, paleoenvironments, and lithologies. The SDNHM paleontological records search letter addressed this geological unit as the Lindavista Formation. This report will follow the nomenclature of Kennedy and Tan (2008) and use Undivided Very Old Paralic Deposits.

Boring logs and test pit analyses within the geotechnical report for the project indicate the majority of the project site is underlain by up to six feet of artificial fill, which is in turn underlain by the San Diego Formation (Partner Engineering and Science 2019).

The paleontological records search results letter from the SDNHM was received on March 13, 2019, and no records of fossil localities were found within the boundaries of the project site. However, 12 fossil localities from the same geological units mapped within the project site are located within a 1-mile radius buffer zone of the project site. Of these, 11 fossil localities are from the San Diego Formation and a single locality is from Undivided Very Old Paralic Deposits (Table 2) (Confidential Appendix A). The following paragraphs summarize the paleontological records search results and geological units present within the project site from oldest to youngest.

**Table 2. Geological Units, Paleontological Sensitivities, and SDNHM Localities within a 1-Mile Radius Buffer Zone of the Project Site**

Geological Unit	Epoch, Period, or Era	Geological Age (Millions of Years)	Paleontological Sensitivity	No. of SDNHM Localities within One Mile of Project Site
San Diego Formation (Tsdss)	Late Pliocene to Early Pleistocene	~ 3.6 – 1.8	High	11
Undivided Very Old Paralic Deposits (Qvop)	Early to Middle Pleistocene	~ 2.58 – 0.774	Moderate	1
Old Alluvial Floodplain Deposits (Qoa)	Middle to Late Pleistocene	~ 0.774 – 0.117	Moderate	0

### 6.1.1 San Diego Formation (Tsdss)

The late Pliocene to early Pleistocene, marine San Diego Formation is mapped in the northwestern portion of the project site and consists of fossiliferous yellowish-gray to yellowish-brown, weakly consolidated, fine-grained sandstones, poorly sorted gravels, pebble conglomerates, and bedded claystones (Deméré and Walsh 1993; Kennedy 1975). The San Diego Formation is abundantly fossiliferous and has produced significant marine and terrestrial fossils throughout its extent in San Diego County. Jefferson (2003) reported a variety of birds and small and large terrestrial mammals in his compilation of early late Pliocene to early Pleistocene fossil localities. The SDNHM reported 11 fossil localities within the 1-mile radius buffer zone for the project site. These localities yielded fossil burrows, leaf and seed pod impressions and remains, brachiopods, gastropods, bivalves, tusk shells, sand dollars, barnacles, crabs, sharks, rays, sea birds, toothed whales, baleen whales, walruses, rabbits, and horses (Table 2). Based on the productivity of the San Diego Formation, it is assigned high paleontological sensitivity (Confidential Appendix A).

### 6.1.2 Undivided Very Old Paralic Deposits (Qvop)

Early to middle Pleistocene Undivided Very Old Paralic Deposits are mapped in the northeastern corner of the project site and are fossiliferous, nearshore marine and partly terrestrial (deltaic) geological unit that consists of interfingering cobble-rich conglomerates and sandstones that are oxidized to a reddish-brown color (Kennedy 1973; Kennedy 1975). The formation has yielded scientifically significant marine invertebrate and vertebrate specimens, including molluscs (gastropods and bivalves), Polychaeta worm burrows, echinoderms, and crustaceans (Kennedy 1973; Kennedy 1975). The SDNHM reported one Undivided Very Old Paralic Deposit fossil locality from within the 1-mile radius buffer zone of the project site that consisted of fossil steinkerns (internal molds) of pholad clams and burrows. This geological unit is assigned moderate paleontological sensitivity in the area of the project site (Table 2) (Confidential Appendix A).

### 6.1.3 Old Alluvial Floodplain Deposits (Qoa)

Pleistocene Old Alluvial Floodplain deposits are mapped on the surface in the southern project site. These deposits consist of varying amounts of clays, sands, silts, and gravels that are usually moderately indurated and oxidized. Old Alluvial Floodplain Deposits have produced significant paleontological resources in San Diego County. In his compilation of Quaternary (~2.58 mya – recent) vertebrates from California, Jefferson (1991a, 1991b) reported numerous fossil localities from old alluvial floodplain deposits in San Diego County that produced fossil amphibian, reptile, bird, and mammal specimens. The SDNHM reported no fossil localities from Old Alluvial Floodplain Deposits within the 1-mile radius buffer zone of the project site; however, they do have fossil localities from other areas of San Diego County that have yielded fossil reptiles, birds, small mammals, and Ice-Age megafauna (e.g., mammoth, bison, horse, and camel). This geological unit is assigned moderate paleontological sensitivity in the area of the project (Table 2) (Confidential Appendix A).

## 6.2 Survey

The majority of the project site terrain consists of a modestly sloping hillside with a moderately dense cover of mixed-grass scrub brush communities and landscaped trees and vegetation. Much of the ground surface was obscured by vegetation when the initial survey was conducted on March 08, 2019 (Figure 3); however, there was much greater surface visibility during the supplemental survey on June 24, 2020 (Figure 4). While surveying an exposed San Diego Formation outcrop in the northern portion of the project site on June 24, 2020, Dudek field paleontologist Jason Collins discovered a fragmentary fossil crab weathering out on the surface (Figure 5). The strata dipped slightly to the southwest and were composed of fine-grained, silty sandstone.

## 7 Summary and Management Recommendations

Dudek's review of records search data, geological mapping, geological and paleontological literature did not identify any existing paleontological resources within the project site; however, a fragmentary fossil crab was documented during the supplemental survey from San Diego Formation deposits. In addition, the paleontological records search conducted by the SDNHM revealed 12 localities within a 1-mile radius buffer zone of the project site boundary from the same geological units that underlie the project site. Based on the records search results, survey results, and map and literature review, the geological units underlying the project site have moderate to high potential to produce paleontological resources during planned construction activities, which includes approximately 133,000 cubic yards of excavated material to a depth of 52 feet below the ground surface. The geological units include the San Diego Formation (high paleontological sensitivity), Undivided Very Old Paralic Deposits (moderate paleontological sensitivity), and Old Alluvial Floodplain Deposits (moderate paleontological sensitivity). A qualified paleontologist should be retained for the project who meets or exceeds the qualifications set forth in the SVP (2010) guidelines. The qualified paleontologist shall prepare and adopt a paleontological resources impact mitigation program (PRIMP) prior to the commencement of project-related earthmoving activities. Implementation of a paleontological mitigation program would reduce any potential impacts to below a level of significance for paleontological resources.

Prior to the issuance of grading permits, the applicant shall provide written confirmation to the City of Chula Vista that a qualified paleontologist has prepared a PRIMP and has been retained to carry out the PRIMP. A qualified

paleontologist is defined as an individual with an MS or PhD in paleontology or geology who is familiar with paleontological procedures and techniques and has expertise in local geology, stratigraphy, and biostratigraphy. The PRIMP shall be consistent with the SVP (2010) guidelines and contain the following components:

- Introduction to the project, including project location, description grading activities with the potential to impact paleontological resources, and underlying geologic units.
- Description of the relevant laws, ordinances, regulations, and standards pertinent to the project and potential paleontological resources.
- Requirements for the qualified paleontologist to attend the pre-construction meeting and provide worker environmental awareness training at the pre-construction meeting as well as at the jobsite the day grading is to be initiated. In addition, the qualified paleontologist shall inform the grading contractor and City Resident Engineer of the paleontological monitoring program methodologies.
- Identification of where paleontological monitoring of excavations impacting the San Diego Formation, Very Old Paralic Deposits, and Old Alluvial Floodplain Deposits, is required within the project site based on construction plans and/or geotechnical reports.
- Procedures for adequate paleontological monitoring (including necessary monitoring equipment), methods for treating fossil discoveries, fossil recovery procedures, and sediment sampling for microvertebrate fossils, including the following requirements:
  - A paleontological monitor shall be on site at all times during the original cutting of previously undisturbed sediments of moderately to highly sensitive geologic units (e.g., San Diego Formation, very old paralic deposits, and old alluvial floodplain deposits) to inspect cuts for contained fossils. (A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials.) The paleontological monitor shall work under the direction of a qualified paleontologist. Monitoring is not required during excavation within low resource sensitivity geological units (e.g., young alluvial flood-plain deposits) if determined to be present within the project site.
  - Paleontological monitoring is not required in areas underlain by artificial fill unless grading activities are anticipated to extend beneath the veneer of fill and impact underlying geological units with moderate to high paleontological sensitivity (e.g., San Diego Formation, Very Old Paralic Deposits, and/or Old Alluvial Floodplain Deposits).
  - If fossils are discovered, the qualified paleontologist and/or paleontological monitor shall recover them. The paleontologist (or paleontological monitor) shall be allowed to temporarily direct, divert, or halt grading within 50 feet of the resource to allow recovery of fossil remains. Because of the potential for the recovery of small fossil remains, it may be necessary in certain instances, and at the discretion of the qualified paleontologist, to set up a screen-washing operation on the project site. Alternatively, sediment samples can be collected and processed off-site.
- Paleontological reporting, and collections management:
  - Prepared fossils along with copies of all pertinent field notes, photos, maps, and the final paleontological monitoring report discussed below shall be deposited in a scientific institution with paleontological collections such as the San Diego Natural History Museum within 90 days of completion of monitoring unless the City and the qualified paleontologist determine the extent of fossils recovered will require more preparation, stabilization, and/or curatorial time. Any curation costs shall be paid for by the applicant.

- A final paleontological monitoring report shall be completed. This report shall include discussions of the methods used, stratigraphy exposed, fossils collected, and significance of recovered fossils, and shall be submitted to the designated scientific institution within 90 days of the completion of monitoring unless the City and the qualified paleontologist determine the extent of fossils recovered will require more preparation, stabilization, and/or curatorial time.

Should you have any questions relating to this report and its findings please contact Michael Williams (mwilliams@dudek.com) or Sarah Siren (ssiren@dudek.com).

Sincerely,



Michael Williams, Ph.D.  
Senior Paleontologist

Att.: *Figure 1, Regional Location Map*  
*Figure 2, Geological Map*  
*Figures 3 – 5, Survey Photos*  
*Appendix A, Confidential SDNHM Paleontological Records Search Results*

cc: *Sarah Siren, Dudek*

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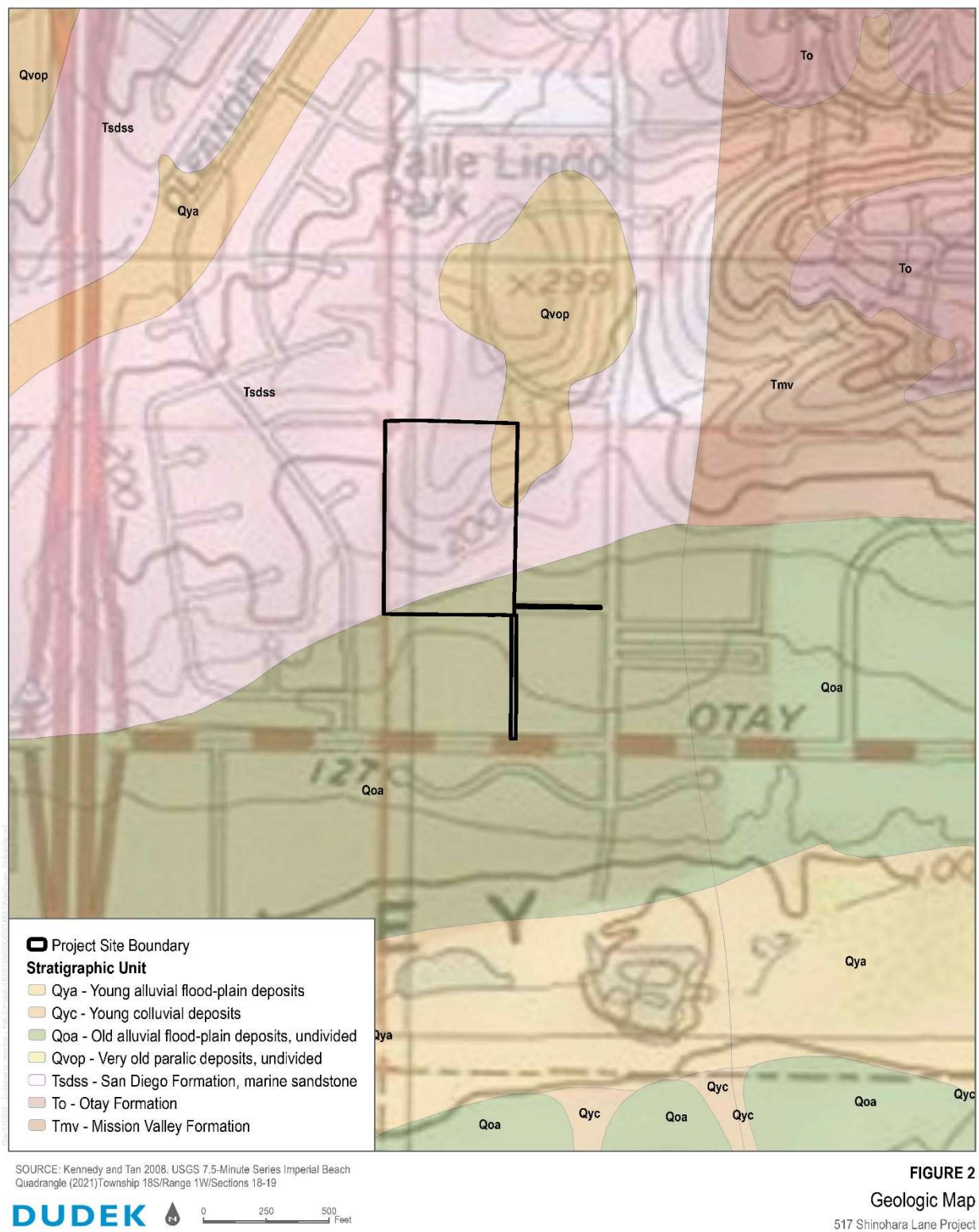




Figure 3. Photograph from original survey on March 03, 2019 showing vegetation minimizing surface visibility.



Figure 4. Eroded San Diego Formation outcrop at north end of the project site.



**Figure 5. Fragmentary fossil crab weathering out of a San Diego Formation outcrop.**