

PALEONTOLOGICAL ASSESSMENT FOR THE MORNINGSTAR MARGUERITE PROJECT

MISSION VIEJO, ORANGE COUNTY,
CALIFORNIA

Prepared for:

T&B Planning, Inc.
17542 East 17th Street, Suite 100
Tustin, California 92780

Submitted to:

City of Mission Viejo
Planning Division
200 Civic Center
Mission Viejo, California 92691

Prepared by:

Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064



July 8, 2019

Paleontological Database Information

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Report Date: July 8, 2019

Report Title: Paleontological Assessment for the MorningStar Marguerite
Project, Mission Viejo, Orange County, California

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USGS Quadrangle: *San Juan Capistrano, California (7.5 minute)*

Study Area: 2.92 acres

Key Words: Paleontological assessment; high sensitivity; Capistrano
Formation; Niguel Formation; City of Mission Viejo; High
sensitivity; County of Orange.

I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the MorningStar Marguerite Project site, located northeast of the intersection of Avery Parkway and Marguerite Parkway, east of the I-5 freeway, in Mission Viejo, Orange County, California (Figures 1 and 2). The 2.92-acre project site (Assessor's Parcel Number 740-012-21) proposes construction of a 132-unit senior care facility at the site, consisting of a three-story building as well as one level of underground parking. Depths of excavation are planned to be up to 20 feet. On the U.S. Geological Survey 7.5-minute, 1:24,000-scale *San Juan Capistrano, California* topographic quadrangle map, the project site is located in the southwest quarter of Section 24, Township 7 South, Range 8 West, San Bernardino Base and Meridian. A two-story commercial building with an asphalt parking lot and a landscaped engineered fill slope currently occupy the site.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), patterned after the National Environmental Protection Act (NEPA), is the overriding environmental document that sets the requirement for protecting California's cultural and paleontological resources. The document does not establish specific rules that must be followed, but mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 1, Chapter 3, California Code of Regulations: 15000 et seq.), procedures define the type of activities, persons, and public agencies required to comply with CEQA. In the Environmental Checklist, one of the questions to answer is, "Will the project directly or indirectly destroy a unique paleontological resource or site geologic feature?" (Section 15023, Appendix G, Section XIV, Part a). The California Public Resources Code (PRC) Section 5097.5 states:

- a) No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or 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.
- b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

County of Orange

Section 2-5-27 (c) of the Codified Ordinances of the County of Orange (Orange County 1973) includes protection measures for “natural, cultural, structural, and archeological resources” and mandates that:

No person shall possess, destroy, injure, deface, remove, dig, or disturb from its natural state any fossilized or nonfossilized paleontological specimens, cultural or archaeological resources, or the parts thereof in any park, beach or recreational facility.

In the 1970s, the County of Orange, recognizing the need to protect its archaeological heritage and paleontological resources during a period of rampant growth and development, instituted a policy of requiring all fossils recovered during construction projects be retained within Orange County. This was subsequently amended when it became apparent that there were no appropriate places to house the enormous numbers of fossils and artifacts that were continuing to be deposited. In 2002, Eisentraut and Cooper (2002) produced a document that provided a curation model and monitoring and mitigation guidelines for the conservation of archaeological and paleontological materials in the County of Orange. This document and its recommendations were subsequently adopted by the Orange County Board of Supervisors, and now provides a standard by which the paleontological profession can use in the paleontological mitigation process in Orange County. In 2011, the John D. Cooper Archaeology and Paleontology Center was opened in Santa Ana, with the intent to provide a place to receive future incoming collections.

City of Mission Viejo

A “CEQA Initial Study” (Study) dated March 2012 was provided in Appendix A-1 of Mission Viejo’s Environmental Impact Report (EIR; City of Mission Viejo 2013). Section 3.5.c of the Study asks, “Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?” The Study responded by stating that implementation of the “project” would have less than significant impacts to paleontological resources, and that potential future development plans filed with the City would be subject to discretionary consideration and environmental analysis. The “project” is defined in Section 1.1 of the Study and “includes the preparation of a program EIR to analyze impacts related to the comprehensive update of the [City of Mission Viejo’s] General Plan’s Land Use, Conservation/Open Space, and Circulation elements, as well as the preparation of a Sustainability Action Plan and the related update to the Conservation/Open Space Element.”

III. GEOLOGY

The geology mapped underlying the project site and immediate area indicates that the

western portion of the site is underlain by the siltstone facies of the upper Miocene Capistrano Formation, and by the Pliocene Niguel Formation on the eastern portion (areas indicated as “Tcs” in olive and “Tn” in brown, in Figure 3, respectively; Morton 2004). Holocene to upper Pleistocene young sandy axial channel deposits are mapped as partly underlying the western edge of the project (“Qya_a” in pale pink with red dots, in Figure 3). The siltstone facies of the marine Capistrano Formation is composed of white to gray siltstones and mudstones that contain sandstones and limey mudstones, and sparse diatomaceous and tuffaceous beds (Morton 2004). The unnamed siltstone facies (member) interfingers with the Oso Member of the Capistrano Formation in southern Orange County. The Oso Member has an age range of 7.7 to 5.3 million old (Barboza et al. 2017). The younger marine Niguel Formation is approximately two to three million years old and is composed of interbedded, poorly sorted, coarse-grained sandstones and conglomerates (Morton 2004), but in the Dana Point quadrangle, it is composed of gray, fine-grained sandstones and siltstones (Kennedy and Tan 2005). Both the Capistrano and Niguel Formations are fossiliferous (Eisentraut and Cooper 2002; Morton 2004; Kennedy and Tan 2005).

Morton (2004) assigns an age of Holocene to upper Pleistocene for the undifferentiated young axial channel deposits, a time span suggesting the last 125,000 years, but in the map unit correlation chart, a Holocene age is mostly indicated for these deposits, about 12,000 years old and less. Mapped nearby to the south are Quaternary very old sandy axial channel deposits, undifferentiated (“Qvoa_a” in amber, in Figure 3). Morton’s (2004) map unit correlation chart suggests a middle Quaternary (Pleistocene) age, or a span of about 775,000 to 125,000 years ago.

According to Roe and Haertle (2019), approximately three to 15 feet of artificial fill overlies the geologic formations at the project site. The fill materials are said to be composed of silty clay and clayey silt derived from the Capistrano Formation.

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 11,000 years of age, but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a non-renewable resource under state, county, and local guidelines (Section II of this report).

Fossil Records Search

A paleontological literature review and collections and records search for the MorningStar Marguerite Project site was conducted by the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (LACM; McLeod 2019, attached). McLeod (2019)

indicates that, while no fossils are known from within the project boundaries, any excavation into the Niguel and Capistrano Formations, as well as potential older Quaternary deposits that may underlie the younger alluvium, may very well encounter significant vertebrate fossils. Vertebrate fossils from the Niguel Formation in the vicinity of the site include remains from great white shark, sea lion, sea cow, and whale. Mammalian fossils from the Capistrano Formation in the vicinity of the MorningStar Marguerite Project site include whale and porpoise remains, as well as those from sharks and bony fish, and an extinct species of auklet, a marine bird.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. Both the Capistrano Formation and the Niguel Formation are potentially very fossiliferous, yielding a variety of microfossils, mollusks, fish, sharks, and whales and other marine mammals, as well as fossil plants (Ehlig 1979; Bonner and Gilmour 1988; South Coast Geological Society 2006; Eisentraut and Cooper 2002; Barboza et al. 2017), and are assigned a High paleontological resource sensitivity.

Late Quaternary (Holocene, or “modern”) alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (i.e., fossils) and is thus typically assigned a low paleontological sensitivity. The older, Pleistocene (> 12,000 year old), alluvial and alluvial fan deposits in Orange County, however, often yield important Ice Age terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, and camel, saber-tooth cat, and others (Reynolds 2003; Jefferson 2009a, 2009b). These older Pleistocene sediments are thus accorded a High paleontological resource sensitivity.

Professional Standard

The Society of Vertebrate Paleontology (SVP) drafted guidelines outlining procedures that include:

[E]valuating the potential for impacts of a proposed action on paleontological resources and for mitigating those impacts. Impact mitigation includes pre-project survey and salvage, monitoring and screen washing during excavation to salvage fossils, conservation and inventory, and final reports and specimen curation. The objective of these procedures is to offer standard methods for assessing potential

impacts to fossils and mitigating these impacts. (SVP 2010)

The guidelines include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.
- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based upon a general scientific consensus that only preserve fossils in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

VI. RECOMMENDATIONS

The existence of the potentially fossiliferous Capistrano Formation and the Niguel Formation mapped across the project (“Tcs” and “Tn,” respectively, on Figure 3); the known occurrence of vertebrate and invertebrate fossils from the Capistrano and Niguel Formations in Orange County; and the High paleontological sensitivity typically assigned to Miocene and Pliocene-aged marine sediments in coastal southern California for yielding paleontological resources all support the recommendation that paleontological monitoring be required during mass grading and excavation activities in undisturbed Capistrano and Niguel Formation sediments in order to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Monitoring is recommended full time starting at the surface, where the Capistrano and Niguel Formations are exposed, and when exposed below the young alluvial sediments along the west edge of the project site, during earth disturbance activities. Paleontological monitoring of the young alluvial sediments present along the west edge is not recommended, however, monitoring is recommended for any potentially fossiliferous, older Pleistocene alluvial sediments that may underlie the young alluvium. In addition, monitoring of the overlying fill materials is not warranted. A Mitigation Monitoring and Reporting Program (MMRP) is recommended and is outlined below. This MMRP is consistent with the provisions of CEQA, the County of Orange (1973), the City of Mission Viejo (2013), and those of the guidelines of the SVP (2010). When implemented, this MMRP will mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources (fossils), if present, to a level below significant. At a minimum, mitigation requirements should include the following for areas mapped as the Miocene Capistrano Formation and the Pliocene Niguel Formation:

1. Monitoring of mass grading and excavation activities in areas identified as likely to contain paleontological resources by a qualified paleontologist or paleontological monitor. Monitoring will be conducted in areas of grading or excavation in undisturbed Miocene Capistrano Formation and the Miocene Capistrano Formation (Tcs and Tn on Figure 3, respectively), as well as where over-excavation of surficial alluvial sediments will encounter these formational sediments in the subsurface. Monitoring is not required for artificial fill materials or the Pleistocene/Holocene young sandy axial channel deposits (Qya_a in Figure 3), however monitoring of the Pleistocene very old sandy axial channel deposits (Qvoa_a in Figure 3) is required, should these deposits underlie the young channel deposits. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediment that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.

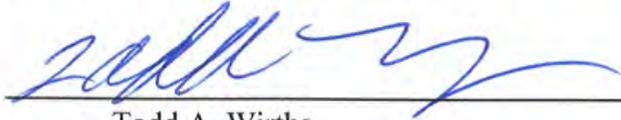
2. Preparation of recovered specimens to a point of identification and permanent preservation (not display), including screen-washing of sediments to recover small invertebrates and vertebrates if necessary. Preparation of individual vertebrate fossils is often more time consuming than for accumulations of invertebrate fossils.

3. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.*, the Cooper Center in Santa Ana, Orange County, California). The paleontological program should include a written repository agreement prior to the initiation of mitigation activities. The Lead Agency may select another repository if it so desires.

4. Preparation of a final monitoring and mitigation report of findings and significance, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location. The report, when submitted to, and accepted by, the appropriate Lead Agency, will signify satisfactory completion of the project program to mitigate impacts to any potential non-renewable paleontological resources (*i.e.*, fossils) that might have been lost or otherwise adversely affected without such a program in place.

VII. CERTIFICATION

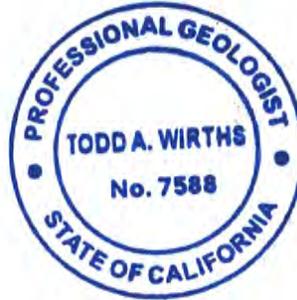
I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief, and have been compiled in accordance with CEQA criteria.



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July 8, 2019

Date



VIII. ATTACHMENT A

References

Resumes

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- Roe, J., and Haertle, J.E. 2019. Preliminary geotechnical exploration report, proposed senior housing, 28570 Marguerite Parkway, Mission Viejo, California. Unpublished report prepared for Confluent Development LLC, Denver, Colorado, by Leighton and Associates, Inc., Irvine, California.
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Education

Master of Science, Geological Sciences, San Diego State University, California	1995
Bachelor of Arts, Earth Sciences, University of California, Santa Cruz	1993
Associate of Arts, Geological Sciences, Santa Barbara City College	1992

Professional Certifications

Professional Geologist, California (#7588), 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist (applied, 2019)
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists (President, 2012; Vice President, 2011)
South Coast Geological Society

Publications

Picacho and the Cargo Muchachos: Guns, Gold, and Geology of Eastern Imperial County, California:
San Diego Associations of Geologists/Sunbelt Publications, 2012 (1st ed.), 2014 (2nd ed.).
"Picacho, the Golden Road," *Dezert Magazine*, Winter, 2013.

Experience

Senior Paleontologist Brian F. Smith and Associates, Inc.	October 2012–Present Poway, California
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Mr. Wirths serves as the director of the paleontology department at BFSa. Mr. Wirths oversees all phases of project-related paleontology, including management of field and junior staff, planning, organizing, and implementing monitoring projects, research, report drafting, regulatory compliance, and laboratory oversight. Mr. Wirths directs or performs resource mitigation monitoring of construction sites, fossil salvage activities, paleontological field surveys and assessments, laboratory fossil preparation and curation. He has drafted dozens of technical reports, including paleontological assessments, site reports, and paleontological resource impact mitigation program (PRIMP) reports. Mr. Wirths created and implemented BFSa-specific fossil-recovery data sheets for field use by monitoring staff. The field

experience of Mr. Wirths includes the use of Trimble GPS data recording, burlap and plaster techniques, collection of microfossils, and wet and dry-screening techniques. Mr. Wirths provides expert identification of fossil marine invertebrates.

Lead Geological/Paleontological Consultant
Cogstone Resource Management

November 2011–February 2009
San Diego and Orange, California

Mr. Wirths conducted on-site paleontological monitoring, drafted/evaluated RFP responses, work plans, and reports; planned, organized, and implemented projects, and trained and supervised junior staff. Field localities include projects in Calaveras, Merced, Tulare, San Joaquin, Kern, San Bernardino, Los Angeles, and Riverside Counties. At the Highway 99 Caltrans expansion project near Merced, Mr. Wirths recovered dozens of Rancholabrean-age vertebrate fossils using plaster and burlap casting techniques.

Paleontological/Geological Monitor
San Diego Natural History Museum

February 2011–November 2011
San Diego, California

Oversaw construction and development sites for fossil resources and logged and interpreted geology during drilling and trenching activities/recovery of fossils. Monitoring projects include the SDG&E Sunrise Powerlink, several SDG&E Wood to Steel projects, San Diego City College expansion, The Bishops School, and the Prebys Cardiovascular Institute.

Project Manager/Geologist
Wirths Consulting

March 2010–February 2011
San Diego, California

Provided environmental consulting services for Apex Companies, H.M. Pitt Labs, Ninyo & Moore, and TRC Solutions, providing project management, reporting, and certified professional field oversight, designing/budgeting an *in situ* chemical oxidation project, and obtaining a City of San Diego business license.

Senior Project Manager
ETIC Engineering, Inc.

April 2007–August 2009
Santa Diego, California

Operated as senior project manager for 10 ExxonMobil retail sites, designed and implemented assessment and remediation projects (including project forecasting/budgeting, managing subcontractors, and composing work plans), composed work plans, assessment reports, and corrective action plans, and managed/mentored staff-level associates.

Project Manager
TRC Solution, Inc./TRC Alton Geoscience

January 2000–April 2007
San Diego and Imperial Counties, California

Operated as project manager for various projects throughout San Diego County, including ExxonMobil Oil Corporation and Unocal Corporation remediation activities, BNSF Railway Company groundwater assessment and remediation, and Ultramar/Valero, Inc., which involved supervising/managing on-site personnel, collecting/managing soils, groundwater, and wood samples, writing reports, and conducting remediation feasibility testing and remedial planning.

Staff Geologist
IT Corp./Pacific Environmental Group

May 1997–September 2000
San Diego, Orange, and Los Angeles Counties, California

Tracked progress of excavation and delineation of impact, sampled/managed soil, and conducted drilling and groundwater monitoring/well installation activities.

Selected Technical Reports

Glover, Amy, Todd **Wirths**, and Sherri Gust

2012 *Paleontological assessment for the Paradise Creek Housing Development, National City, San Diego County, California.* Prepared for The Related Companies of California, Irvine, CA, by Cogstone Resource Mgt., Inc.

Gust, Sherri, Kim Scott, and Todd **Wirths**

2012 *Paleontological resources assessment for the WECC Path 42 Project in Riverside County, California.* Prepared for Southern California Edison, Monrovia, CA, by Cogstone Resource Mgt., Inc.

Horne, Melinda, Todd **Wirths**, and Amy Glover

2012 *Paleontological and cultural resources assessment for the town of Yucca Valley General Plan update, San Bernardino County, California.* Prepared for The Planning Center – DC&E, Santa Ana, CA, by Cogstone Resource Mgt., Inc.

Wirths, Todd A., and Sherri Gust

2012 *Paleontological resources assessment for the Truckhaven geothermal expansion project, Imperial County, California.* Prepared for NGP Truckhaven, LLC, Reno, NV, by Cogstone Resource Mgt., Inc.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Aztec Court Apartments, 6237 Montezuma Road, San Diego, San Diego County, California.* Prepared for Warmington Residential California, Inc., Southern California Division. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Citywide Sewer Pump Station Upgrades, Group II, Pump Station 60A, Scripps Ranch neighborhood, City of San Diego, San Diego County, California (PTS No. 31233 and WBS No. S-00304).* Prepared for Ortiz Corporation General Engineering Contractors. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological Resource Impact Mitigation Program (PRIMP), Rancho Paseo de Valencia, City of Corona and unincorporated Riverside County, California (Tentative Tract Map 34760; APNs 114-040-019, 114-040-020, 275-100-003, and 275-100-004).* Prepared for Rancho Paseo de Valencia. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological monitoring report, Casa Aldea Phase II, University City Village Apartments, 6112, 6122, and 6132 Gullstrand Street, University City, San Diego, San Diego County (LDR No. 98-0408, PTS No. 303550).* Prepared for Wise River Builders, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological Resource Assessment, Ballpark Village Development, East Village, San Diego, San Diego County, California.* Prepared for Ballpark Village, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *An Updated Phase I Paleontological Resources Assessment for Tentative Tract Maps 36484 and 36485, Audie Murphy Ranch, City of Menifee, County of Riverside, California.* Prepared for Brookfield Residential. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Paleontological Resource Impact Mitigation Program (PRIMP), Ridge Park project, city of Temecula, Riverside County, California (APNs 922-210-049; 940-310-013, 940-310-015, and 940-310-016; 940-310-044 through 940-310-048; and 940-320-001 through 940-320-007).* Prepared for Ambient Communities. Report on file at Brian F. Smith and Associates, Inc., Poway, CA.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Monitoring Report, Chino Desalter Phase III Expansion Project, 11301 Harrel Street, City of Jurupa Valley, Riverside County, California.* Prepared for W.M. Lyles Co. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological resource and monitoring assessment, proposed Avanti North housing development, Lancaster, Los Angeles County, California (Tentative Tract Map No. 53229).* Prepared for Avanti North, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, CA.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological monitoring report for the Montezuma Trunk Sewer project, College and Mid-Cities Community Plan Areas, San Diego, San Diego County, California (Project No. 240104).* Prepared for Ortiz Corporation General Engineering Contractors. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological resource impact assessment for the Lake Ranch project site, unincorporated Riverside County, California (APNs 270-060-010, 270-160-001, 270-170-010, 270-170-011, and 270-180-010; TR 36730).* Prepared for Christopher Development Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Menifee Heights Development, City of Menifee, Riverside County, California (Tract No. 32277).* Prepared for CV Communities, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Assessment, Shoshone Valley Road solar array project, Twentynine Palms, San Bernardino County, California (APNs 613-233-01, -02, -03, -04, -27, -28, -29, and -30).* Prepared for Ecos Energy, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, CA.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Assessment, Utah Trail solar array project, Twentynine Palms, San Bernardino County, California (APNs 621-281-22 through 621-281-25).* Prepared for Ecos Energy, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Monitoring Report, San Diego Community College District, César Chávez Campus, Barrio Logan, San Diego, California.* Prepared for San Diego Community College District. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Monitoring Report, Sewer and Water Group 761, Uptown Community Plan Area, San Diego, San Diego County, California.* Prepared for Burtech Pipeline. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Blessed Teresa of Calcutta Catholic Parish project site, French Valley, unincorporated Riverside County, California (APN 480-040-044; Project No. PP24903).* Prepared for Blessed Teresa of Calcutta Catholic Parish, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Impact Mitigation Program (PRIMP), Salton City Landfill Expansion Project, unincorporated Imperial County, California (SCH No. 2010071072).* Prepared for Burrtec Waste Industries, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Yates Road housing development site, Tract Map TR 36437, northeast of Murrieta, unincorporated Riverside County, California (APNs 467-390-001 through 467-390-016).* Prepared for CV Communities, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Monitoring Report, Construction of the Park and G Project, East Village, Downtown San Diego, San Diego County, California.* Prepared for Oliver McMillan. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2014 *Paleontological Monitoring Report, Construction of Pinnacle 15th & Island Project, East Village, Downtown San Diego, San Diego County, California.* Prepared for Pinnacle International Development, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., N. Scott Rugh, and Todd A. **Wirths**

2012 *Paleontological Monitoring Report, Construction of 13th & Market Project, East Village, Downtown San Diego, San Diego County, California.* Prepared for The Hanover Company. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., N. Scott Rugh, and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Ariel Suites, Little Italy, City of San Diego, San Diego County, California.* Prepared for Ariel Suites, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., N. Scott Rugh, and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Village Lindo Paseo Dormitories, SDSU College Area, City of San Diego, San Diego County, California.* Prepared for Village Lindo Paseo, L.P. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., N. Scott Rugh, and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Grit Processing Improvements Project, Point Loma Wastewater Treatment Plant, San Diego, San Diego County, California (Sewer WO No. 176001; WBS No. S-00315)*. Prepared for Archer Western Contractors. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., N. Scott Rugh, and Todd A. **Wirths**

2013 *Paleontological Monitoring Report, Harbor Drive Trunk Sewer, City of San Diego, San Diego County, California (Project No. 38789)*. Prepared for Burtech Pipeline. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., Todd A. **Wirths**, and Brian F. Smith

2013 *Paleontological and Archaeological Monitoring and Mitigation Report, Lake Forest Sports Park, City of Lake Forest, Orange County, California*. Prepared for Road Builders, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2013 *Negative Paleontological Monitoring and Mitigation Report, San Clemente Senior Housing Project, 2350 South El Camino Real, City of San Clemente, Orange County, California (CUP No. 06-065; APN 060-032-04)*. Prepared for Primus Building Solutions. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2014 *Paleontological Monitoring Report, Sewer Main Replacement Group Job 685 (Part of Sewer and Water Group Job 685 (Part of Sewer and Water Group 3014), City Heights Neighborhood of the City of San Diego, San Diego County, California (Project No. 131446; Sewer WBS No. B-00333)*. Prepared for Ortiz Corporation General Engineering Contractors. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2015 *Paleontological Monitoring Report, 951 South Beach Boulevard Project, La Habra, Orange County, California (MND No. 14-01)*. Prepared for Fairfield 951 Beach, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2015 *Paleontological Monitoring Report, Casa Aldea Lots 4 & 6, Fairbanks Ranch-Santaluz Area, Northern San Diego, California*. Prepared for Wise River Builders, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2015 *Paleontological Monitoring Report, Pendry Hotel San Diego, Gaslamp Quarter, Downtown San Diego, California*. Prepared for The Robert Green Company. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2016 *Paleontological Monitoring Report, The Rey Project, 840 B Street, Downtown San Diego, San Diego County, California*. Prepared for Blue/WP San Diego, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2016 *Paleontological Monitoring Report, Atmosphere Affordable Housing Project, 1453 Fourth Avenue, Downtown San Diego, San Diego County, California.* Prepared for Wakeland Housing & Development Corp. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2017 *Paleontological Monitoring Report, Ballpark Village, Lower East Village, Downtown San Diego, California.* Prepared for Ballpark Village, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2017 *Paleontological Monitoring Report, 460 16th Street, East Village, Downtown San Diego, San Diego County, California.* Prepared for Lennar Multifamily Communities, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2017 *Paleontological Resource Impact Mitigation Program (PRIMP) for the La Habra North Project, La Habra, Orange County, California (Tract Map 17809).* Prepared for City Ventures. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2017 *Paleontological Monitoring Report, Imagine Coachella project at the Jordan Christian Academy, West of Coachella in Unincorporated Riverside County, California.* Prepared for M-13 Construction, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., and Todd A. **Wirths**

2017 *Paleontological Monitoring Report, Kettner and Ash Condominiums Project, Columbia District of Downtown San Diego, San Diego County, California.* Prepared for Bosa Development California, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., Todd A. **Wirths**, and N. Scott Rugh

2018 *Paleontological Monitoring Report, Manning Canyon Sewer and Water Replacement Project, Linda Vista, City of San Diego, San Diego County, California.* Prepared for Red Tail Monitoring & Research, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., Todd A. **Wirths**, and N. Scott Rugh

2018 *Paleontological Monitoring Report, Westfield University Towne Center Expansion Project, Phase 2A, La Jolla Village Drive, San Diego, San Diego County, California.* Prepared for Westfield UTC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Wirths, Todd A., and George L. Kennedy

2018 *Negative Paleontological Monitoring Report, Verizon Capistrano Depot Project, 32400 Paseo Adelanto, San Juan Capistrano, Orange County, California (CUP No. 16-003; APN 668-10-023).* Prepared for Trileaf Environmental and Property Consultants. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

Kennedy, George L., Todd A. **Wirths**, and N. Scott Rugh

2019 *Paleontological Monitoring Report, Saint Demiana Coptic Orthodox Church, Santaluz-Torrey Highlands Neighborhood, San Diego, San Diego County, California.* Prepared for Barnhart-Reese Construction, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

IX. ATTACHMENT B

**Project Maps:
General Location Map
USGS Project Location Map
Geologic Map**

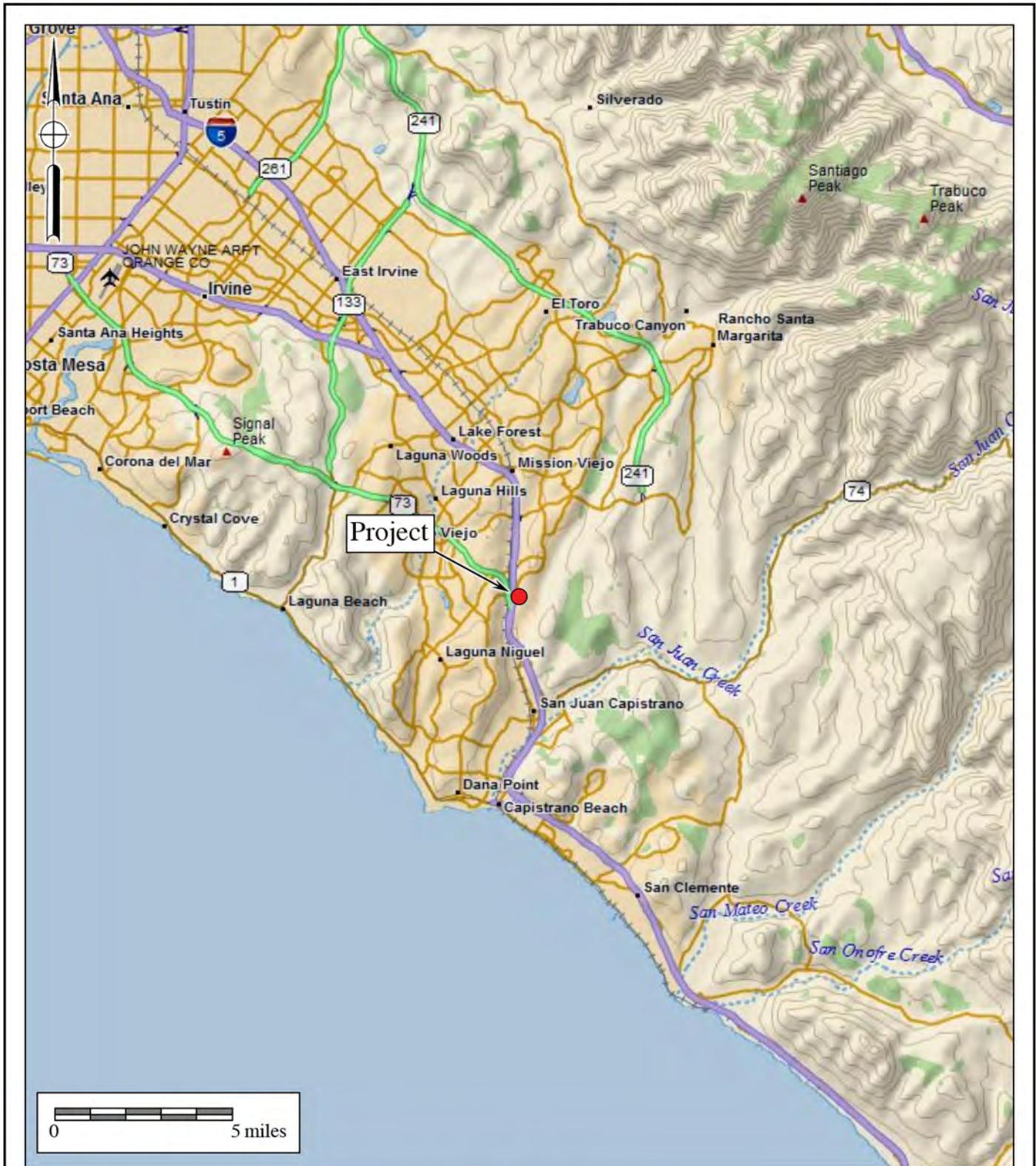


Figure 1
General Location Map
 The MorningStar Marguerite Project
 DeLorme (1:250,000)



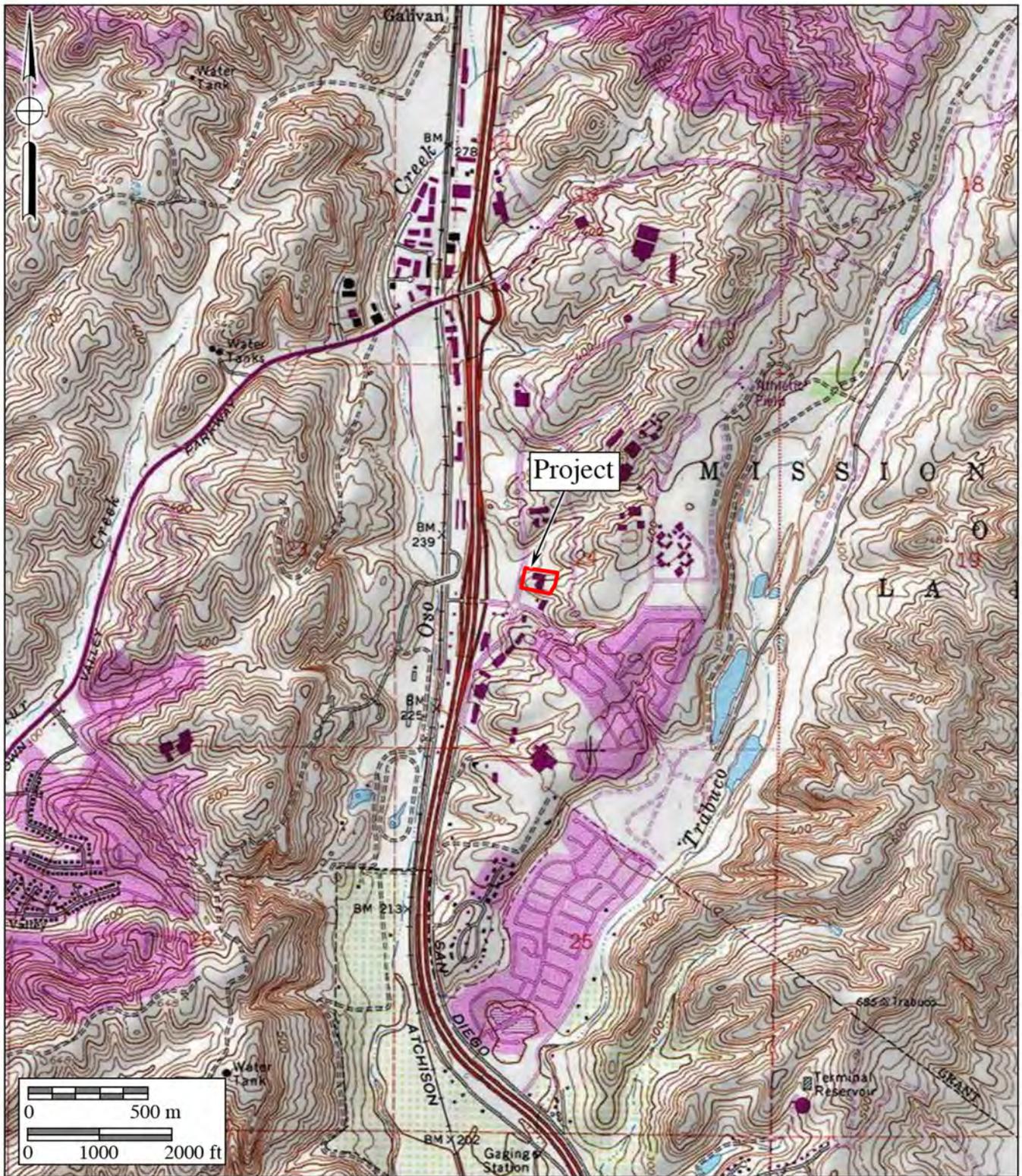


Figure 2

Project Location Map

The MorningStar Marguerite Project

USGS San Juan Capistrano Quadrangle (7.5-minute series)



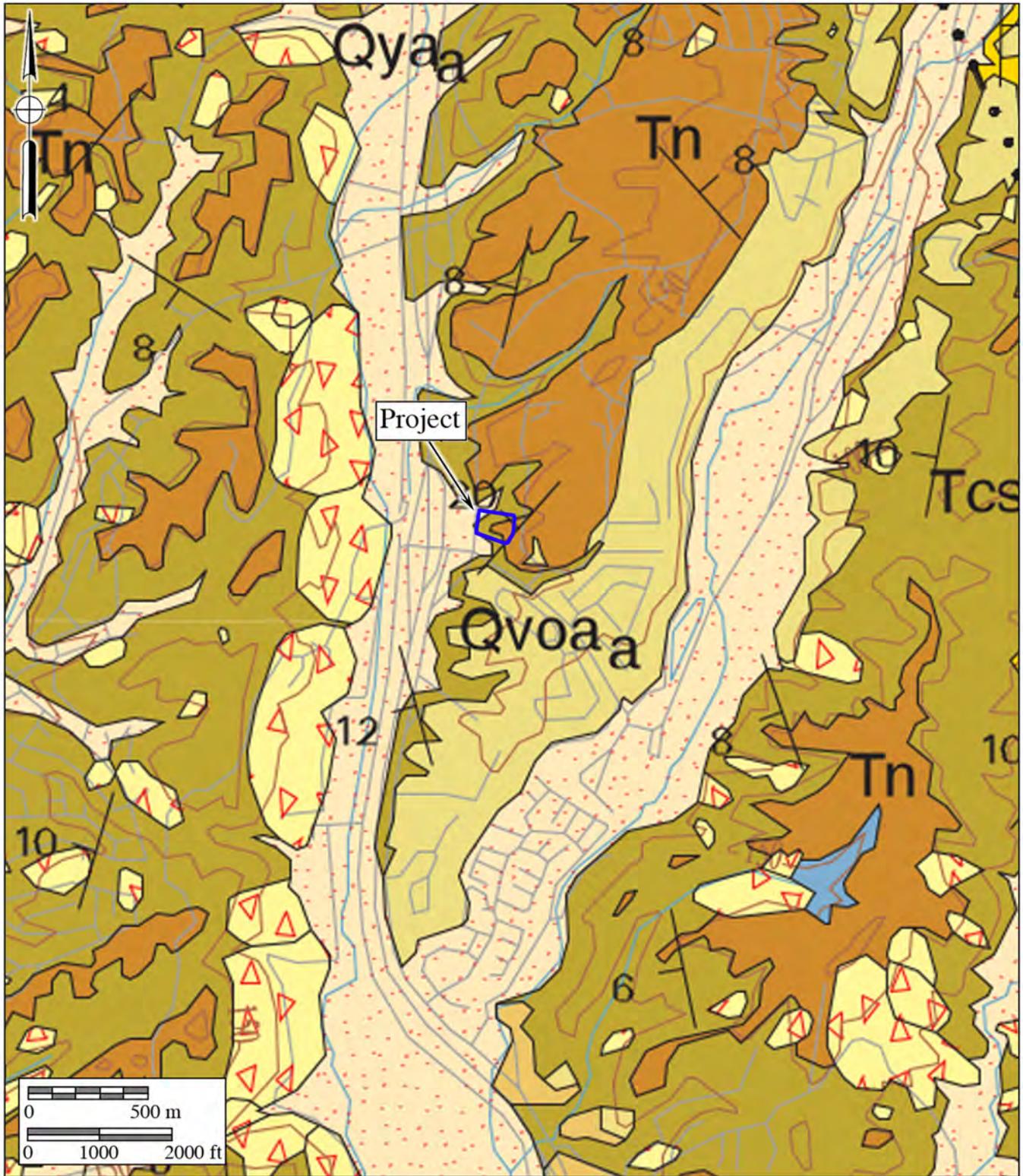


Figure 3
Geologic Map

The MorningStar Marguerite Project
Geology after Morton (2004)



X. ATTACHMENT C

Paleontological Records Search Results

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org



Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

26 June 2019

Brian F. Smith & Associates, Inc.
14010 Poway Road, Suite A
Poway, CA 92064

Attn: Todd Wirths, Senior Paleontologist

re: Paleontological Resources Records Search for the proposed MorningStar Marguerite Project,
BFSA Project # 19-120, in the City of Mission Viejo, Orange County, project area

Dear Todd:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed MorningStar Marguerite Project, BFSA Project # 19-120, in the City of Mission Viejo, Orange County, project area as outlined on the portion of the San Juan Capistrano USGS topographic quadrangle map that you sent to me via e-mail on 14 June 2019. We do not have any vertebrate fossil localities that lie within the boundaries of the proposed project area, but we do have localities nearby from the same sedimentary deposits that occur within the proposed project area.

Geological mapping seems to indicate that in the very western portion of the proposed project area there are surficial deposits of younger Quaternary Alluvium, derived as alluvial fan deposits from the elevated terrain adjacent to the east. These deposits usually do not contain significant vertebrate fossils, at least in the uppermost layers, but older sedimentary deposits that occur at shallow depth may well contain significant fossil vertebrate remains. In the rest of the proposed project area there are exposures of the marine late Miocene siltstone facies of the Capistrano Formation, and at higher elevation in the east the marine Pliocene Niguel Formation that also overlies the Capistrano Formation.

Our closest vertebrate fossil locality from the Niguel Formation is LACM 3804, north-northwest of the proposed project area, that produced a fossil specimen of white shark, *Carcharodon sulcidens*. Our next closest vertebrate fossil localities from the Niguel Formation are LACM 5551 and 65187, both north-northwest of the proposed project area near the intersection of La Paz Road and Paseo de Valencia, that produced fossil specimens of white shark, *Carcharocles megalodon*, sea lion, Otariidae, sea cow, Dugongidae, and baleen whale, *Herpetocetus*.

We have a great number of vertebrate fossil localities from the Capistrano Formation in this portion of Orange County but our closest locality is LACM 5002, just north of due west of the proposed project area across the Golden State Freeway (I-5), that produced a fossil specimen of baleen whale, Mysticeti. Along Crown Valley Parkway northwest of the proposed project area, our Capistrano Formation locality LACM 3184 produced fossil specimens of ratfish, *Chimaera*, blue shark, *Prionace*, cookie cutter shark, *Isistius*, bony fish, Teleostei, auklet, *Mancalla*, and porpoise, Phocoenidae.

Shallow excavations in the younger Quaternary Alluvium in the very western portion of the proposed project area are unlikely to uncover any significant vertebrate fossils. Deeper excavations there that extend down into older sedimentary deposits, as well as any excavations in the exposures of the Niguel Formation and the Capistrano Formation, however, may very well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,



Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice