Paleontological Resources Technical Report for the American Jewish University – Camp Alonim Expansion Project, Ventura County, California

FEBRUARY 2025

PREPARED FOR

CAJA Environmental Services, LLC

PREPARED BY

SWCA Environmental Consultants

PALEONTOLOGICAL RESOURCES TECHNICAL REPORT FOR THE AMERICAN JEWISH UNIVERSITY – CAMP ALONIM EXPANSION PROJECT, VENTURA COUNTY, CALIFORNIA

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EXECUTIVE SUMMARY

Purpose and Scope: CAJA Environmental Services, LLC (CAJA) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment for the proposed American Jewish University – Camp Alonim Expansion Project (Project), which proposes to develop additional camp facilities at Camp Alonim within the Brandeis-Bardin campus at the American Jewish University. The Project Site is a 2,588-acre area located in the foothills of the Santa Susana Mountains along Meier Canyon Creek, south of the City of Simi Valley in unincorporated Ventura County. For purposes of analyzing potential impacts to paleontological resources, within the Project Site, the horizontal boundary of the ground-disturbing activities is referred to herein as the Area of Potential Impacts (API) and occupies approximately 8.5 in the central portion of the Project Site.

This assessment was conducted to determine the potential for the Project to impact paleontological resources that may be present in the API and provide mitigation recommendations, as appropriate, pursuant to the requirements of the California Environmental Quality Act (CEQA) and the County of Ventura General Plan. The County of Ventura Resource Management Agency Planning Division (Planning Division) is the lead CEQA agency. SWCA has prepared this paleontological resources technical report to summarize the methods and results of the paleontological resources assessment that includes a review of geologic maps, scientific literature, confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA), and other relevant information. This technical report also includes a discussion of potential impacts to scientifically important paleontological resources and provides mitigation recommendations to reduce potential impacts to less-than-significant levels.

Dates of Investigation: SWCA reviewed the relevant maps, literature, and Project information from August 2024 through January 2025, and received the results of a museum records search from the NHMLA on December 8, 2024.

Summary of Findings: Geologic mapping indicates the surface of the API contains Holocene to late Pleistocene (present–129,000 years ago) young alluvial fan deposits, Unit 2 and early Eocene to late Paleocene (48.1–59.2 million years ago) Santa Susana Formation. In addition, the geotechnical report prepared for the project noted unmapped Recent artificial fill at the API. The NHMLA (2024) does not possess records of paleontological resources from within the API; however, fossil localities have been recorded in the vicinity of the API from unnamed Pleistocene alluvial deposits and the Santa Susana Formation. Based on this assessment, artificial fill has no paleontological sensitivity, the young alluvial fan deposits, Unit 2 has low paleontological sensitivity, and the Santa Susana Formation has high paleontological sensitivity.

Conclusion and Recommendations: Based on the results of this assessment and the paleontological sensitivities of the geologic units in the API, ground-disturbing activities associated with the Project are expected to remain in deposits with no or low paleontological sensitivity and are unlikely to extend deep enough to reach deposits with high paleontological sensitivity. Therefore, impacts to scientifically significant paleontological resources from project activities are also unlikely. In accordance with state and local regulations, applicable guidelines, and best practices in mitigation paleontology (Murphey et al. 2019), SWCA recommends that in the event paleontological resources are encountered, work within 25 feet of the discovery shall be halted, and a Qualified Professional Paleontologist, defined as one who meets the standards set forth by the Society of Vertebrate Paleontology and the *County of Ventura Initial Study Assessment Guidelines* should be retained to assess the discovery and make appropriate recommendations regarding handling the resources and subsequent paleontological work.

Disposition of Data: This report has been submitted to CAJA, and a copy will remain on file at SWCA's Pasadena, California, office.

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INTRODUCTION

CAJA Environmental Services, LLC (CAJA) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment for the proposed American Jewish University – Camp Alonim Expansion Project (the Project). The Project proposes to develop additional camp facilities at Camp Alonim within the Brandeis-Bardin campus at the American Jewish University at 1101 Peppertree Lane in unincorporated Ventura County, California. The Project is subject to compliance with the California Environmental Quality Act (CEWQA), and the County of Ventura Resource Management Agency Planning Division (Planning Division) is the lead agency.

SWCA has prepared this paleontological resources technical report to summarize the results of this assessment, which includes a review of geologic maps, scientific literature, confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA), and other relevant information. This technical report also includes a discussion of the potential for the Project to impact scientifically important paleontological resources and provides recommendations for mitigation to reduce any potential impacts to less-than-significant levels, pursuant to CEQA. This assessment follows the guidelines of the Society of Vertebrate Paleontology (SVP) and best practices in mitigation paleontology (Murphey et al. 2019; SVP 2010).

This technical report was prepared by SWCA Staff Paleontologist, Kristina Akesson, B.S., and reviewed for technical quality by SWCA Lead Paleontologist, Sarah Rieboldt, Ph.D. SWCA Senior Archaeologist Chris Millington, M.A., RPA served as Project Manager and provided support and overall quality assurance/quality control (QA/QC). Figures were generated by SWCA geographic information systems (GIS) specialist Michelle Alvarado, B.S. Copies of the report are on file with SWCA's Pasadena, California, office.

PROJECT LOCATION AND DESCRIPTION

The Project Site is a 2,588-acre area located in the foothills of the Santa Susana Mountains along Meier Canyon Creek, south of the City of Simi Valley in unincorporated Ventura County (Figure 1). The Project Site comprises Assessor Parcel Numbers 685-0-051-040, 685-0-051-050, 685-0-051-140, 685-0-051-190, and 685-0-051-210 (Figure 2). For purposes of analyzing potential impacts to paleontological resources, within the Project Site, the horizontal boundary of the ground-disturbing activities is referred to herein as the Area of Potential Impacts (API). The API measures approximately 8.5 acres and is situated in the central portion of the Project Site (Figure 3). As depicted on the U.S. Geological Survey (USGS) *Simi Valley East, California* 7.5-minute topographic quadrangle, the API is in Section 18, Township 12 South, Range 17 West, San Bernardino Baseline and Meridian (**Error! Reference source not found.**4, USGS 1951).

The Project Applicant is requesting the Planning Division grant a Major Modification to Conditional Use Permit No. 1776 and a Discretionary Tree Permit that would authorize the development of additional facilities at Camp Alonim. The Project proposes the following additional facilities:

- Welcome Center: a 4,460 square foot building consisting of a lobby, staff lounge, offices, and meeting rooms.
- Camper Cabins: 13 camper cabins, each consisting of 1,930 square feet with two bunkrooms and two bathrooms.
- Head Counselor Cabins: three cabins of 441 square feet each.

- Arts Pavilion: a 2,307 square feet open-air shade structure for arts and crafts activities.

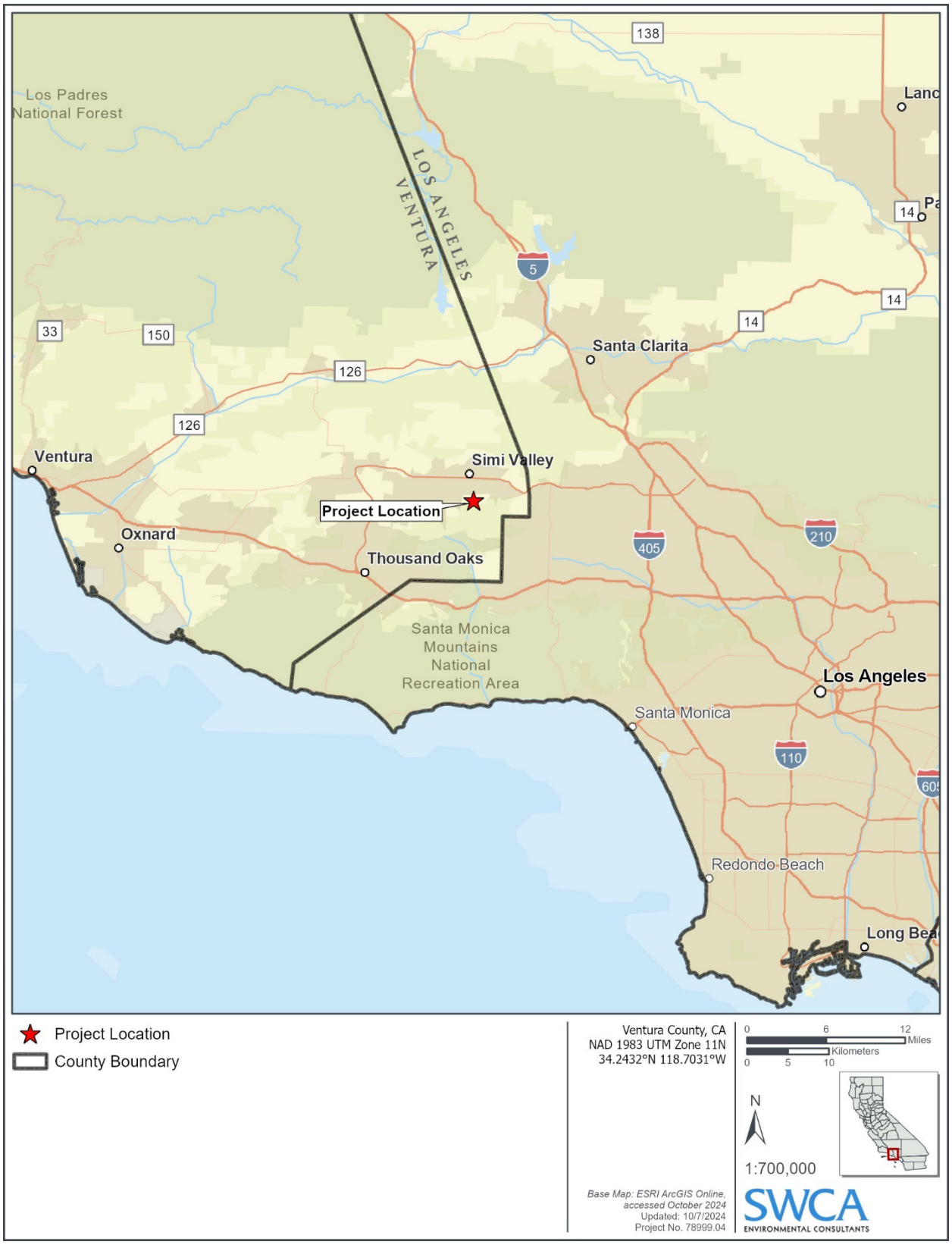

Figure 1. Project location and vicinity.

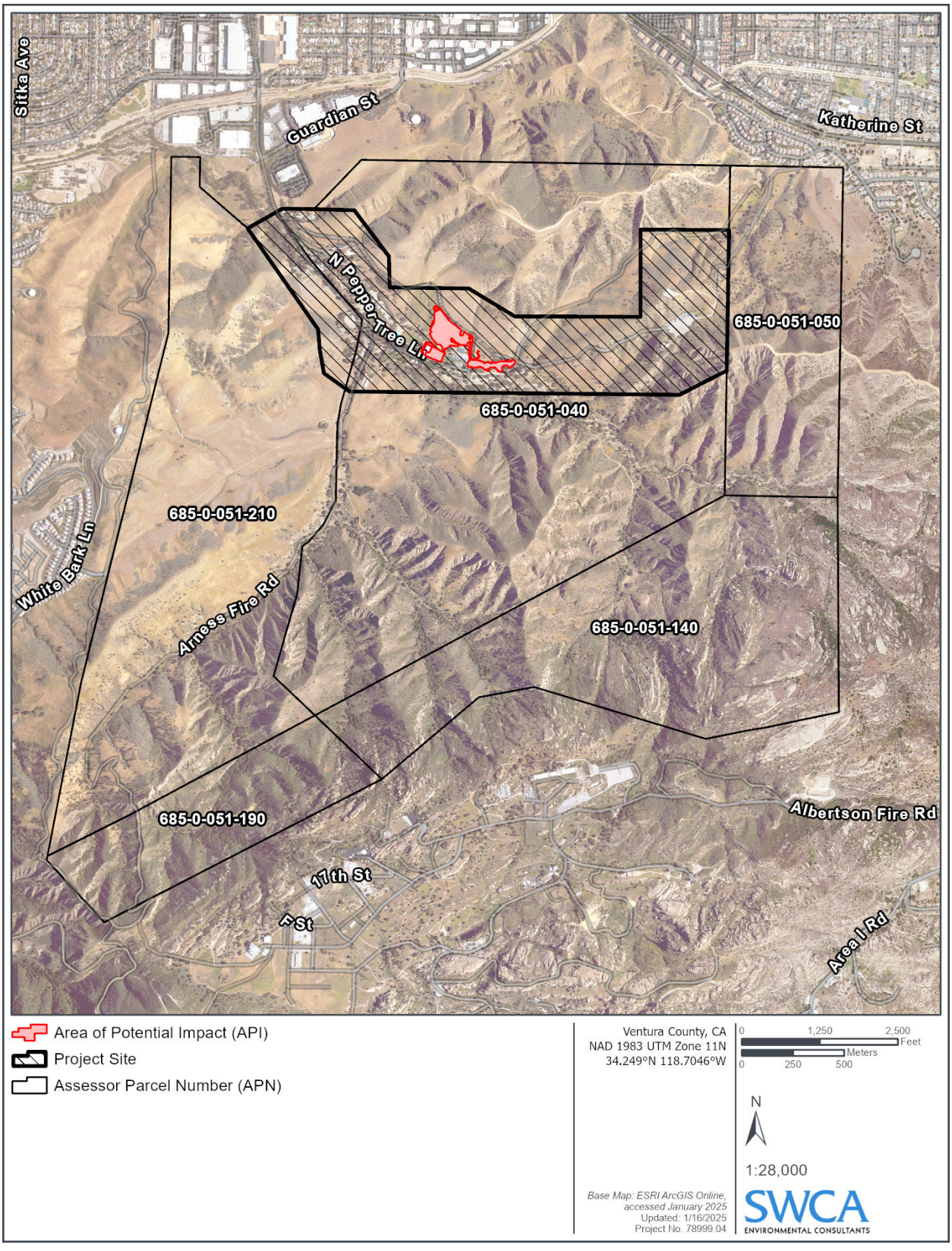

Figure 2. Assessor's Parcel Numbers for the Project Site and Area of Potential Impacts.

Figure 3. Area of Potential Impacts on an aerial photograph.

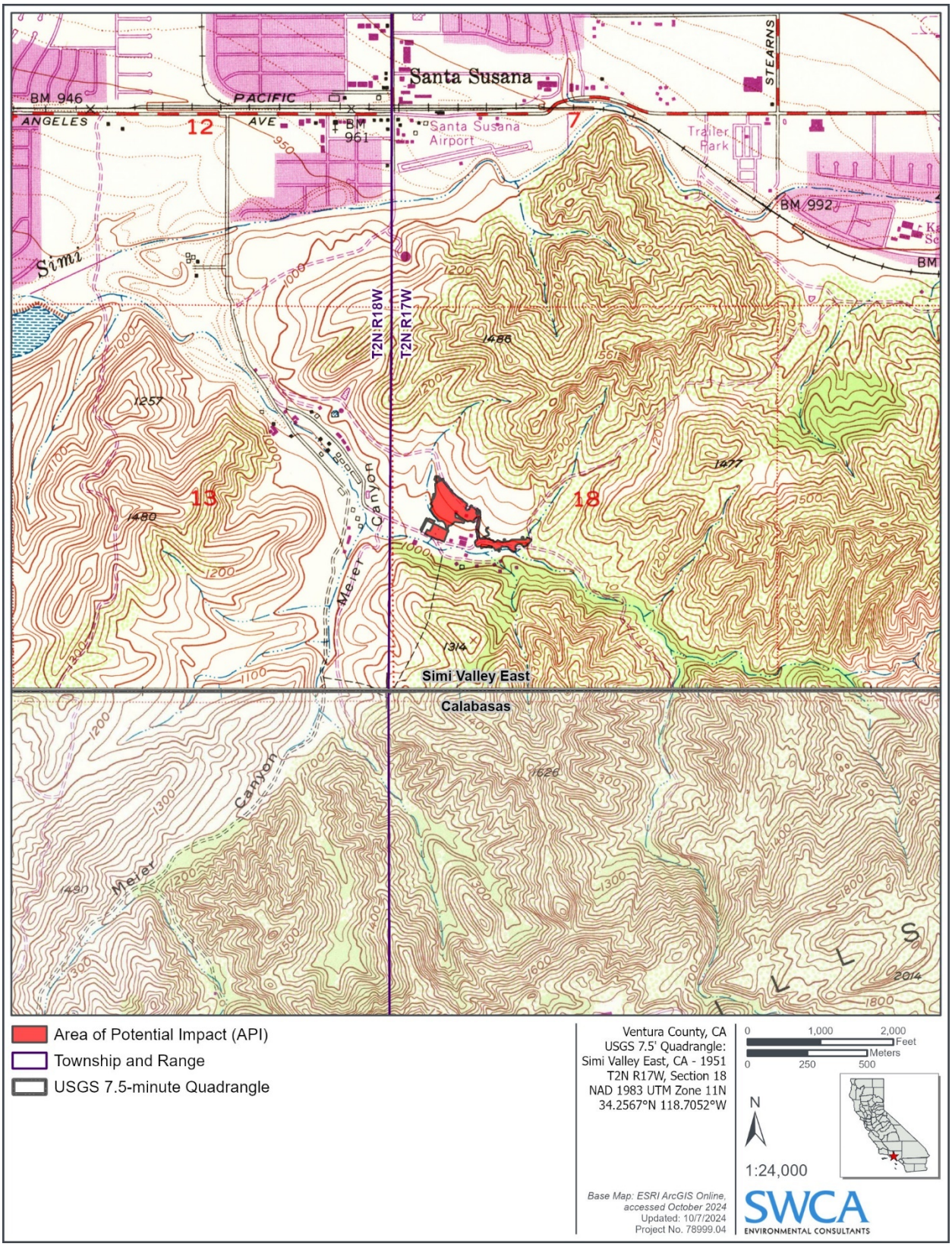

Figure 4. Area of Potential Impacts on *Simi Valley East, CA* 7.5-minute topographic map.

- Parking Lot: a new 58-space parking lot adjacent to the Welcome Center.
- Landscaping: landscaping improvements around the new structures.
- New sewer, water, and electrical lines that tie existing lines along Peppertree Road to Arts Pavilion.

The Project would involve demolition and tree removal as follows:

- Demolish 3 trailers used for staff housing (Building Nos. 55 through 57), 2 cottages used for staff housing (Building Nos. 9 and 10), 1 detached garage (Building No. 11), and 1 cabin structure (Building No. 116).
- Remove 67 trees.

According to preliminary grading plans, the Project would involve grading and excavation across an area measuring approximately 7.1 acres (Grading Area) within the API. With the exception of Cabin C13, all ground disturbing activities for the Project that are within the Grading Area would occur within a maximum estimated depth of 5 feet. Construction of Cabin C13 would require excavation for a foundation and footings to a depth of no more than 14.5 feet below grade. Outside the grading area, additional ground disturbance would occur for new utility line installation, landscaping, tree removals, and demolition. The depth of excavation required for the utility lines is estimated to be no more than 6 feet below grade. The new landscaping and tree removals that would occur outside the Grading Area would involve ground disturbance of no more than 2 and 5 feet below grade, respectively. The estimated depths of ground disturbance that would be required to complete the various Project components is summarized in Table 1, and their respective footprints are shown in Figure 5.

Table 1. Estimated Depth of Ground Disturbance for Project Components

Project Component/Activity	Depth of Ground Disturbance
Within Grading Area	
New construction	
• 1 Welcome Center	5 feet or less
• 13 “duplex-style” camper cabins	14.5 feet (Cabin C13); all others 5 feet or less
• 3 camper cabins	5 feet or less
• 1 shade structure to function as an Arts Pavilion	5 feet or less
• 1 parking lot construction	5 feet or less
• Various landscape improvements and new trails connecting the proposed cabins and other camp facilities	5 feet or less
Demolition/Removal	
• 67 tree removals	5 feet or less
• Remove 3 trailers used for staff housing (Building Nos. 55 through 57)	5 feet or less
• Demolish 2 cottages used for staff housing (Building Nos. 9 and 10)	5 feet or less
• Demolish 1 detached garage (Building No. 11)	5 feet or less

Project Component/Activity	Depth of Ground Disturbance
• Demolish 1 cabin structure (Building No. 116)	5 feet or less
Outside Grading Area	
Utility Trenches to Arts Pavilion (tie-in to existing lines along Peppertree Road)	
• New sewer line	6 feet or less
• New water line	6 feet or less
• New electrical line	6 feet or less
Landscaping	
• Central Garden	2 feet or less
• Various landscape improvements and new trails connecting the proposed cabins and other camp facilities	2 feet or less
Demolition/Removal	
• Tree Removals (#s 964, 965, 966: Pepper Trees)	5 feet or less

REGULATORY SETTING

Paleontological resources are limited, nonrenewable resources of scientific and educational value and are afforded protection under state and local laws and regulations.

State Regulations

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at California Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including significant effects on paleontological resources. Guidelines for the implementation of CEQA (*State CEQA Guidelines*: Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section VII(f) of the Environmental Checklist (*State CEQA Guidelines*: Appendix G) asks whether a project would directly or indirectly destroy a unique paleontological resource and result in impacts to the environment.

Public Resources Code Section 5097.5

Requirements for paleontological resource management are included in PRC Division 5, Chapter 1.7, Section 5097.5, which states,

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

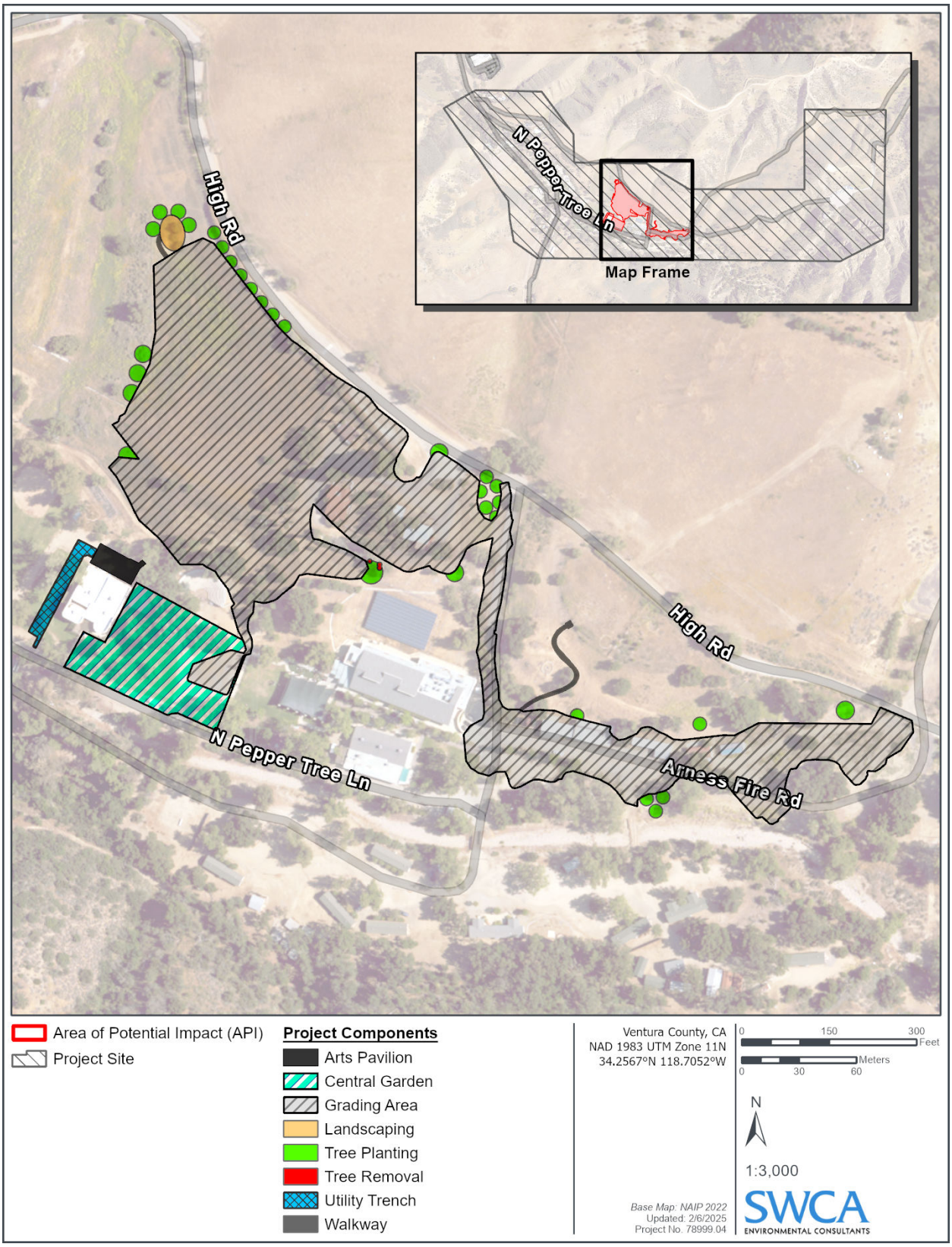

Figure 5. Project components within the Grading Area.

This statute prohibits the removal, without permission, of any paleontological site or feature from land under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, local agencies are required to comply with PRC Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

Local Regulations

County of Ventura General Plan

Section 6.4 (Cultural, Historical, Paleontological, and Archaeological Resources) of the *County of Ventura General Plan Conservation and Open Space Element* (Conservation and Open Space Element) recognizes paleontological resources (page 6-8) and contains an objective (page 6-9: COS-4) "to identify, inventory, preserve, and protect cultural, historical, paleontological, and archaeological resources in Ventura County, including Native American resources, for their scientific, education, and cultural value" (County of Ventura 2020). The Conservation and Open Space Element also contains the following policies:

> **COS-4.1:** The County shall maintain an inventory of tribal, cultural, historical, paleontological, and archaeological resources in Ventura County based on project studies and secondary resources, including record studies and reports filed with natural history programs, the California Historical Resources Information System and the Native American Heritage Commission.
>
> **COS-4.2:** (a) The County shall cooperate with cities, special districts, appropriate organizations and private landowners to identify known cultural, archaeological, historical, and paleontological resources to preserve identified resources within the county.
>
> **COS-4.4:** The County shall require that all discretionary development projects be assessed for potential tribal, cultural, historical, paleontological, and archaeological resources by a qualified professional and shall be designed to protect existing resources. Whenever possible, significant impacts shall be reduced to a less-than-significant level through the application of mitigation and/or extraction of maximum recoverable data. Priority shall be given to measures that avoid resources.

Additionally, the Conservation and Open Space Element contains the following ongoing programs to implement the policies relevant to paleontological resources:

> **Program K:** The County shall prepare, and regularly update as needed, specific guidelines for the preservation of significant cultural, historical, paleontological, and archaeological resources. (page 6-21)
>
> **Program EE:** The County shall amend the Initial Study Assessment Guidelines at Section 7, Paleontological Resources, Attachment: Minimum Qualifications for Paleontological Consultants, and at Section 8a., Cultural Resources – Archaeological, Attachment 2: Minimum Qualifications for Archaeologists, to indicate that archaeology and paleontology consultants shall meet the Secretary of the Interior's (SOI) Standards and Guidelines for archeology and historic preservation. The County shall also amend the

Initial Study Assessment Guidelines at Section 7, Paleontological Resources, at Section 8a., Cultural Resources – Archeological, and at Section 8b., Cultural Resources – Historic, to indicate that staff conducting field surveys shall be supervised by an archaeology, paleontology or architectural historian consultant that meets the SOI's Standards and Guidelines within one-year of adoption of the 2040 General Plan.

Program II: For discretionary projects, the County shall require the following:

- Projects shall be designed to protect existing resources and shall avoid potential impacts to the maximum extent feasible1.
- If determined necessary by the County, an archaeological or paleontological and/or Native American monitor shall be retained to monitor ground-disturbing activities during construction.
- If any materials or artifacts are discovered during ground disturbance and/or construction activities, construction shall halt until a qualified archaeologist, paleontologist, or Native American monitor can access the discovery. A report or memorandum shall be prepared by the qualified monitor documenting any findings and identifying recommendations for protection or avoidance of discovered resources. Recommendations or mitigation identified by the qualified monitor shall be implemented prior to commencing.

Program KK: During project-level ground disturbance activities for discretionary development, in areas where paleontologically rich sites or tribal cultural resources are known to be present, project sites shall be secured during non-construction hours to ensure that the unauthorized access and the unlawful curation of fossil materials or tribal cultural resources does not occur. Such security measures may include construction fencing, unauthorized access signage, security lighting, and security cameras. For large-scale development, a security plan may be prepared prior to construction activities to detail security measures and protocol for the project site.

PROFESSIONAL STANDARDS

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and curation (SVP 2010). Most practicing professional mitigation paleontologists in California adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines, and most state regulatory agencies accept and use the professional standards set forth by the SVP.

Scientific Importance

Numerous paleontological studies have developed criteria for the assessment of scientific importance (i.e., scientific significance) for fossil discoveries (e.g., Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003). In general, these studies assess fossils as important if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct.
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein.
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas.
4. The fossils demonstrate unusual or spectacular circumstances in the history of life.
5. The fossils are in short supply and/or are in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation and are not found in other geographic locations.

As defined by the SVP, scientifically important (i.e., scientifically significant) paleontological resources are:

> fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about [4,200 years ago (Cohen et al. 2023)]). (SVP 2010:11)

Geologic units known to preserve important fossils or fossil localities are likely to contain additional undiscovered and potentially important fossils and are generally considered sensitive for paleontological resources throughout their areal and stratigraphic extent.

Paleontological Sensitivity

Paleontological potential ("sensitivity") is defined as the potential for a geologic unit to produce scientifically important (i.e., significant) fossils. This is determined by rock type, history of the geologic unit in producing important fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. The sensitivity ranking provides the basis for determining which mitigation measures or recommendations, if any, are appropriate for a particular project.

In *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010:1–2), the SVP defines four categories of paleontological sensitivity for rock units: high, low, undetermined, and no potential:

> **High Potential**. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ash or tephra), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstone, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstone, fine-grained marine sandstone, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace

fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Low Potential. Reports in the paleontological literature or field surveys by a Qualified Professional Paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g., basalt flows or recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

Undetermined Potential. Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a Qualified Professional Paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically excavations into subsurface stratigraphy.

No Potential. Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources. (SVP 2010:1–2)

METHODS

The following sections present an overview of the methods used to determine the potential for paleontological resources to be present within the API.

Literature Review

The literature review included an examination of geologic maps of the API and vicinity and a review of relevant geological and paleontological literature to determine which geologic units are present in the API, and whether fossils have been recovered from those geologic units elsewhere in the region. The geologic mapping for the API used in this analysis is from Campbell et al. (2014) at a scale of 1:100,000. As geologic units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas beyond the API. The results of this literature review include a discussion of the geology and paleontological sensitivity (or potential) of the geologic units in the API.

Museum Records Search

The purpose of a museum records search is to establish the status and extent of previously recorded paleontological resources within and adjacent to the study area for a given project. This search provides another line of inquiry to assist in determining paleontological sensitivity of geologic units as not all information regarding fossil collections has been documented and published. Generally, this search is

conducted through the closest, regional institution that would have collections and information relevant to a project. As this project is in southern California, the museum records search request was submitted to the NHMLA on November 20, 2024. The results were received on December 8, 2024, and incorporated into the results section of this report. Appendix A (confidential) provides a copy of the museum records search results letter.

Field Survey

SWCA Staff Paleontologist Jasmyn Nolasco conducted a pedestrian survey of the API on January 23, 2025. The survey aimed to 1) note the geology observed with consideration of the geologic mapping by Campbell et al. (2014); 2) inspect exposures of previously undisturbed sediments or bedrock outcrops within the API, if any, as well as assess their potential to preserve paleontological resources; and 3) record newly identified or previously unrecorded paleontological localities that may be present within the API.

RESULTS

Literature Review

Regional Geology

The project is in the southern part of the Coast Ranges Geomorphic Province of California (California Geological Survey 2002). The Coast Ranges Geomorphic Province is characterized by mountain ranges and valleys that extend from Oregon to Santa Barbara County (Norris and Webb 1976). These mountains and valleys trend in a northwest-southeast direction, subparallel to the direction of the San Andreas Fault (California Geological Survey 2002; Norris and Webb 1976). Basement rocks in the province predominantly consist of igneous, metamorphic, and marine sedimentary rocks that formed during the Jurassic and Cretaceous (201.3–66 million years ago [Ma]) in island arc, subduction zone, and deep to shallow marine environments (Howard 1979; Norris and Webb 1976). These basement rocks are overlain by Cenozoic (less than 66 Ma) sedimentary rocks that were deposited in deep to shallow marine and continental environments (Howard 1979; Norris and Webb 1976). Dates for the geologic time intervals used in this report are derived from the *International Chronostratigraphic Chart* prepared by the International Commission on Stratigraphy (Cohen et al. 2023).

Local Geology and Paleontology

According to geologic mapping by Campbell et al. (2014), the surface of the API is mapped with Holocene to late Pleistocene (present–129,000 years ago) young alluvial fan deposits, Unit 2 (Qyf_2) and early Eocene to late Paleocene (48.1–59.2 million years ago) Santa Susana Formation (Figure 4). In addition, the geotechnical report prepared for the project noted unmapped Recent artificial fill at the API (GSC 2022). These geologic units are described in geochronological order (youngest to oldest) below.

ARTIFICIAL FILL

The field exploration for the geotechnical report prepared for the project noted unmapped Recent artificial fill from the surface to depths ranging from 2 to 15 feet across various portions of the API (GSC

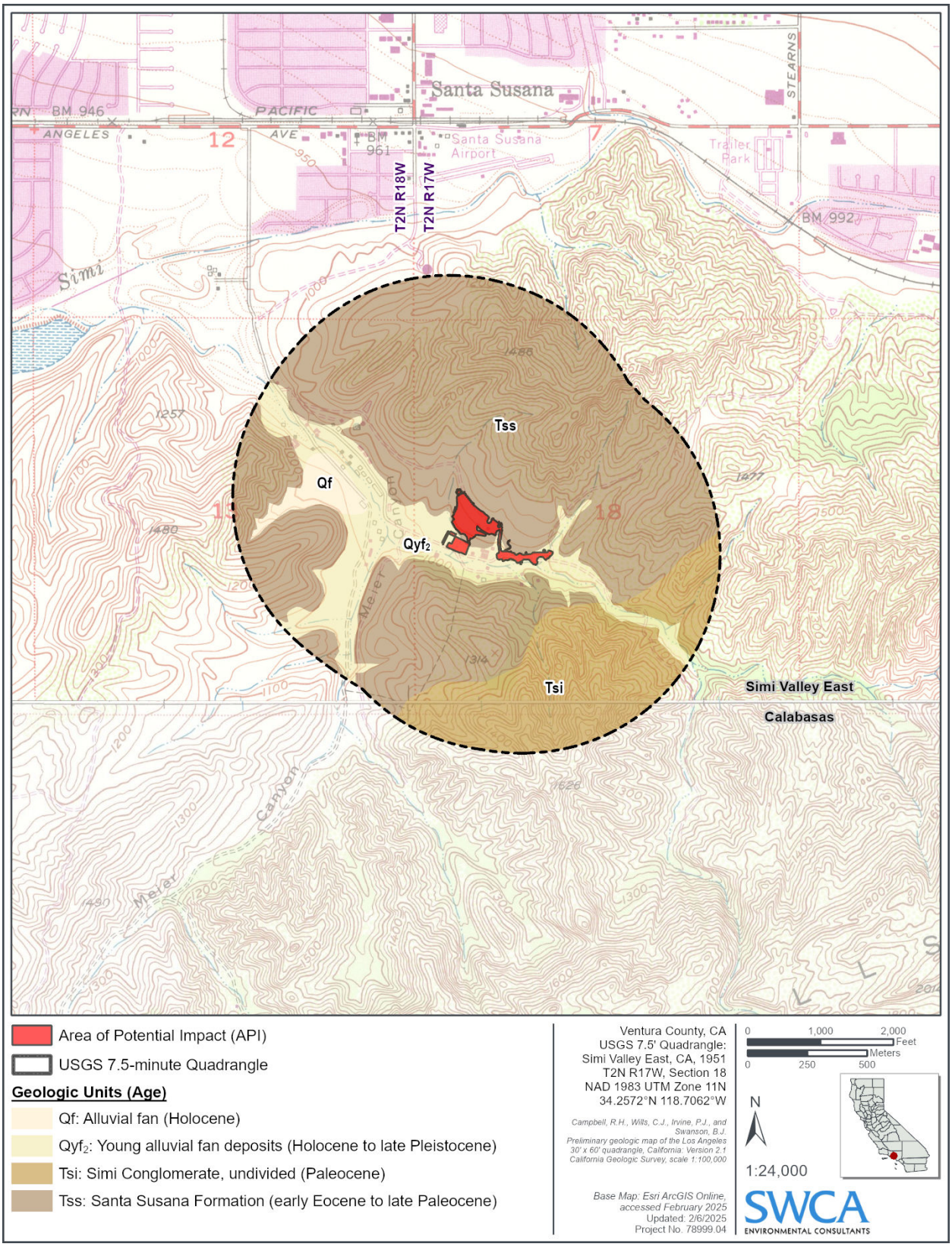

Figure 6. Geologic units and paleontological sensitivity within the Area of Potential Impacts and 0.5-mile buffer.

2022). The artificial fill consists of yellowish brown, silty, fine- to coarse-grained sand with gravel and some cobbles (GSC 2022).

Artificial fill consists of material that has been transported by humans and may originate from within a project site or be imported from other regions. Because artificial fill has been moved from its original location, any fossils it may contain have been removed from their original stratigraphic, taphonomic, or paleoenvironmental context (provenance), generally making them scientifically unimportant. Therefore, unmapped recent artificial fill is unlikely to yield important paleontological resources and has no paleontological sensitivity.

YOUNG ALLUVIAL FAN DEPOSITS, UNIT 2

According to geologic mapping by Campbell et al. (2014), Holocene to late Pleistocene young alluvial fan deposits, Unit 2 (Qyf_2) is present along the southern side of the API (see Figure 4). Young alluvial fan deposits, Unit 2 consist of unconsolidated silt, sand, and gravel, as well as boulders along hill slopes deposited from debris flows and floodplains (Campbell et al. 2014; Dibblee 1992). The geotechnical report prepared for this Project noted what it called "terrace deposits (Qt)" or "older alluvium (Qf/Qt)" at the surface or beneath up to 15 feet of artificial fill and extending to depths of 3 to 24 feet, the maximum depths of the test pits excavated during the explorations (GSC 2022). The description of the "older alluvium" is consistent with the young alluvial fan deposits, Unit 2 mapped within and near the API by Campbell and others (2014) and are considered equivalent for the purposes of this assessment.

Alluvial fans trap the bulk of the coarse-grained, poorly sorted sediment that is eroded from the highlands, thus serving as buffers for lowland areas, limiting the sediment supply to fine-grained sediment (Harvey et al. 2005). Within the fan, grain size decreases downslope, such that the coarsest sediments are found at the apex of the fan near the channel in the highlands, with progressively finer sediments deposited toward the toe of the fan where it meets the basin or valley floor (Blair and McPherson 1994). According to the geotechnical report prepared for this Project, the deposits in the API consist of very coarse-grained and poorly sorted sediments, with very large cobbles and boulders (GSC 2022), indicating these deposits formed closer to the apex of the fan in the highlands, which is consistent with their relative proximity to the surrounding hills.

According to the SVP (2010), only the remains of plants and animals from the middle to early Holocene (4,200 to 11,700 years ago) are considered scientifically important. A review of scientific literature did not identify fossils from the middle to early Holocene in the county from these or similar deposits. Whereas unnamed Pleistocene deposits in Simi Valley and elsewhere in Ventura County have yielded fossils of plants, invertebrates, birds, and mammals, including rodents, camel, horse, bison, mammoth, giant ground sloth, and mastodon (Jefferson 1991a and 1991b; UCMP 2024). Although there are many taphonomic factors that affect fossil preservation potential, the coarser-grained portions of the alluvial fans deposited upslope are herein inferred to have lower potential for preserving fossils, relative to the finer-grained deposits that accumulated near the toe of the fan, as they represent higher-energy environments in which the organisms would be more prone to decay, dissolution, breakage, and transport, actions that reduce preservation potential (Koster 2012; Loughney and Badgley 2017; Wilson 1988). Therefore, the young alluvial fan deposits, unit 2 in the API is considered to have low paleontological sensitivity.

SANTA SUSANA FORMATION

According to geologic mapping by Campbell et al. (2014), early Eocene to late Paleocene Santa Susana Formation (Tss) is present across the northern part of the API (see Figure 4). The Santa Susana Formation consists of marine dark gray clay shale, mudstone, and siltstone with interbeds of fine- to medium-grained sandstone, as well as lenses of pebble and cobble conglomerate (Campbell et al. 2014; Dibblee 1992).

The geotechnical report prepared for this Project noted that the Santa Susana Formation is present as bedrock in the hills around Simi Valley (GSC 2022), such as those on the north side of the API where it is mapped by Campbell et al. (2014). Although the field exploration for the geotechnical report did not identify the Santa Susana Formation in its test pits within the API (GSC 2022), this geologic unit may be present in the subsurface beneath the artificial fill and young alluvial fan deposits, Unit 2 (i.e., "older alluvium") that were noted during the field exploration, beginning at depths of 3 to 24 feet below the surface.

The Santa Susana Formation has yielded numerous invertebrate fossils within Ventura County including bivalves, marine corals, sea snails, nautiloid cephalopods, decapods, foraminifera, and calcareous nannoplankton, as well as trace fossils, such as crustacean burrows (Bell 1933; PBDB 2024; Squires 1997; Squires & Saul 2007; UCMP 2024; Zinsmeister 1983). As Zinsmeister (1983) notes, the diverse invertebrate fauna from this formation are instrumental in correlation and understanding the paleobiogeography of the Pacific Ocean during the early Tertiary. Therefore, the Santa Susana Formation has high paleontological sensitivity.

Museum Records Search

The NHMLA (2024) does not possess records of paleontological resources from within the API; however, several fossil localities have been recorded in the vicinity of the API, including two localities from unnamed Pleistocene deposits, one at an unknown depth and the other at a depth of 3 feet below the surface. The museum also has records of two localities from the Santa Susana Formation at surface in the Simi Hills. Table 2 summarizes the results of the NHMLA (2024) museum records search.

Table 2. Natural History Museum of Los Angeles County Fossil Localities near the API

Locality Number	Approximate Distance from the API	Formation	Taxa	Approximate Depth (bgs)
LACM VP 7594	3 miles	older alluvium	mastodon (Mammut)	unknown
LACM VP 1817	5.5 miles	unknown formation (Pleistocene)	horse (*Equus*)	3 feet
LACM VP 3216	1 mile	Santa Susana Formation	chimaerid fish (Chimaeroidea)	surface
LACM VP 4157	1 mile	Santa Susana Formation	cartilaginous fish (Chondrichthyes)	surface

Source: Natural History Museum of Los Angeles County (NHMLA 2024).

API = Area of Potential Impacts

bgs = below ground surface

LACM VP = Los Angeles County Museum Vertebrate Paleontology

Field Survey

The API is situated adjacent to Meier Canyon Creek in Meier Canyon within the Santa Susana Mountains. Topographically, the API sits on rolling hills (Figure 7), with shallow to moderately steep drainages that drop into a narrow, flat valley. Existing facilities were noted across the API, including buildings, power lines, parking lots, playgrounds, main roads, and access roads. All of these facilities indicate the API was subject to previous disturbance and contains variable amounts of artificial fill inferred or observed to be present throughout the API, such as in areas that have been graded and backfilled or covered in gravel (Figure 8). Alluvial deposits consistent with those mapped by Campbell et al. (2014) and noted in the geotechnical report for this Project (GSC 2022) were observed in different

portions of the API along road cuts, eroding hill slopes, and drainages, as well as at the surface in the southernmost portion of the API. The alluvial deposits contain poorly sorted, rounded to subangular gravel, cobbles, and boulders in a matrix that is poorly to moderately consolidated and predominantly composed of clay, silt, and sands. Rock types included granites, sandstones, cobble conglomerates, and metamorphic lithics, such as quartzite. The deposits show massive bedding, imbrication, and normal graded bedding, most of which was conglomeratic and ranged from 1 to 6 feet in height (Figure 9).

During the pedestrian survey, the Santa Susana Formation was not directly observed in outcrop, as much of the area where it is mapped by Campbell et al. (2014) was densely covered in dry vegetation (Figure 7 and Figure 10) or contained clayey-silty sediment with scattered large pebbles, cobbles, and boulders, indicative of the alluvial fan deposits, Unit 2.

No newly identified paleontological localities were discovered during this pedestrian survey.

Figure 7. Overview photo point P20250123-JN-08 showing an undeveloped area of the API; gentle hillslopes and mountain sides contain densely packed, dry grasses on Santa Susana Formation (Tss). View facing northwest.

Figure 8. Overview photo point P20250123-JN-11 of developed areas with structures, graded access roads, backfill/gravel; view facing east.

Figure 9. Overview photo point G20250123-JN-04 showing several conglomerate lenses and bedding along a steep hill slope, located within young alluvial fan deposits (Qyf_2); View facing north.

Figure 10. Area mapped as Santa Susana Formation (Tss); slope is partially covered in dry vegetation, pebbles and cobbles have eroded down slope; view facing east.

CONCLUSION AND RECOMMENDATIONS

The API contains artificial fill, which has no paleontological sensitivity and young alluvial fan deposits, Unit 2, which has low paleontological sensitivity based on its very coarse-grained nature and inferred high-energy depositional environment that would have a lower potential for preserving important paleontological resources. Although the Santa Susana Formation, which has high paleontological sensitivity, is mapped in the API, no evidence of this formation was noted during the field exploration for the geotechnical report for this Project (GSC 2022) or the field survey conducted for this analysis. Ground disturbance for this Project is limited in horizontal extent, with the majority of this disturbance anticipated to extend to depths of approximately 5 feet or less and only excavation for one cabin reaching a depth of approximately 14.5 feet.

As such, ground-disturbing activities associated with the Project are expected to remain in deposits with no or low paleontological sensitivity and are unlikely to extend deep enough to reach deposits with high paleontological sensitivity. Therefore, impacts to scientifically significant paleontological resources from Project activities are also unlikely. In accordance with the SVP (2010), state and local regulations, and best practices in mitigation paleontology (Murphey et al. 2019), SWCA recommends that in the event paleontological resources are encountered, work within 25 feet of the discovery should be halted, and a Qualified Professional Paleontologist, defined as one who meets the standards set forth by the Society of Vertebrate Paleontology and the *County of Ventura Initial Study Assessment Guidelines* should be retained to assess the discovery and make appropriate recommendations regarding handling the resources and subsequent paleontological work.

LITERATURE CITED

Bell, F.W. 1933. The Stratigraphy and Foraminiferal Fauna of the Santa Susana Formation. Unpublished Master's Thesis, California Institute of Technology, Pasadena, California.

Blair, T., and J. McPherson. 1994. Alluvial Fan Processes and Forms. In *Geomorphology of Desert Environments*, edited by A. Abrahams and A. Parsons, p. 354-402. Chapman & Hall, London.

California Geological Survey. 2002. *California Geomorphic Provinces*. California Geologic Survey Note 36. California Department of Conservation.

Campbell, R.H., C.J. Wills, P.J. Irvine, and B.J. Swanson. 2014. *Preliminary geologic map of the Los Angeles 30' x 60' quadrangle, California*, Version 2.1. California Geological Survey, scale 1:100,000.

County of Ventura. 2020. *Ventura County 2040 General Plan.* Adopted September 15, 2020. Ventura County, California. Accessed July 2024.

Cohen, K.M., S.C. Finney, P.L. Gibbard, and J.-X. Fan. 2023. The ICS International Chronostratigraphic Chart. (2013; Updated October 2023). *Episodes* 36: 199-204.

Dibblee, T.W., Jr. 1992. *Geologic map of the Santa Susana Quadrangle, Ventura and Los Angeles Counties, California*, ed. H.E. Ehrenspeck. Dibblee Geological Foundation Map DF-38, scale 1:24,000.

Eisentraut, P.J., and J.D. Cooper. 2002. *Development of a Model Curation Program for Orange County's Archaeological and Paleontological Collections – Final Report*. Prepared by California State University, Fullerton for County of Orange Public Facilities Resources Department/Orange County Harbors, Beaches, and Parks.

GeoSoils Consultants, Inc. (GSC). 2022. Preliminary Geologic and Geotechnical Engineering Investigation, Proposed Cabins and Welcome Center, Brandeis-Bardin Campus, Simi Valley, California. Prepared for American Jewish University February 17, 2022. W.O. 7588.

Harvey, A.M., A. Mather, and M. Stokes (eds). 2005. Alluvial Fans: Geomorphology, Sedimentology, Dynamics. *Geological Society, London, Special Publications* 251:1–7.

Howard, Arthur D. 1979. Geologic History of Middle California. California Natural History Guides No. 43. University of California Press, Berkeley, California. 113 pp.

Jefferson, G.T. 1991a. A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa. *Natural History Museum of Los Angeles County Technical Reports* No. 5. Los Angeles, California.

———. 1991b. A Catalogue of Late Quaternary Vertebrates from California: Part Two, Mammals. *Natural History Museum of Los Angeles County Technical Reports* No. 7. Los Angeles, California.

Koster, E.H. 1987. Vertebrate taphonomy applied to the analysis of ancient fluvial systems. In *The Society of Economic Paleontologists and Mineralogists Special Publication, Recent Developments in Fluvial Sedimentology 39*.

Loughney, K.M., and C. Badgley. 2020. The influence of depositional environment and basin history on the taphonomy of mammalian assemblages from the Barstow Formation (Middle Miocene), California. *PALAIOS* 35:175–190.

Murphey, P.C., G.E. Knauss, L.H. Fisk, T.A. Deméré, and R.E. Reynolds. 2019. Best practices in mitigation paleontology. *Proceedings of the San Diego Society of Natural History* 47.

Natural History Museum of Los Angeles County (NHMLA). 2024. *Paleontological resources records search for the Camp Alonim Expansion Project, Ventura County, California (#00078999)*. Letter report. Los Angeles, California: Natural History Museum of Los Angeles County.

Norris, R.M., and R.W. Webb. 1990. *Geology of California*. Second Edition. Santa Barbara, California: John Wiley & Sons, Inc.

Paleobiology Database (PBDB). 2024. The Paleobiology Database. Available at: https://paleobiodb.org/#/. Accessed August 2024.

Scott, E., and K. Springer. 2003. CEQA and fossil preservation in California. Association of Environmental Professionals, Sacramento, California: *Environmental Monitor* Fall:4-10.

Society of Vertebrate Paleontology (SVP). 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Available at: https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines.pdf.

Squires, R.L. 1997. Taxonomy and distribution of the Buccinid gastropod *Brachysphingus* from the uppermost Cretaceous and lower Cenozoic marine strata of the Pacific slope of North America. *Journal of Paleontology* 71(5):847-861.

Squires, R.L. and Saul, L.R. 2007. Paleocene pareorine turritellid gastropods from the Pacific slope of North America. *The Nautilus* 121(1):1-16.

United States Geological Survey (USGS). 1951. *Simi Valley East, California* 7.5' topographic quadrangle. United States Geological Survey, Denver, Colorado.

University of California Museum of Paleontology (UCMP). 2024. Online search of collections database. Available at: http://ucmpdb.berkeley.edu/. Accessed November 2024.

Wilson, M.V.H. 1988. PALEOSCENE #9. Taphonomic processes: Information loss and information gain. *Geoscience Canada* 15(2):131–148.

Zinsmeister, W.J. 1983. New late Paleocene molluscs from the Simi Hills, Ventura County, California. *Journal of Paleontology* 57(6):1282-1303.

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APPENDIX A

Natural History Museum of Los Angeles County
Paleontological Records Search

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Confidential Records Search Results on File

with the County of Ventura Resource Management Agency