

<b>DOCKETED</b>	
<b>Docket Number:</b>	24-OPT-04
<b>Project Title:</b>	Potentia-Viridi Battery Energy Storage System
<b>TN #:</b>	262574
<b>Document Title:</b>	Revised Paleontological Resources Memo
<b>Description:</b>	Revised Paleontological Resources Memo that addresses the CEC request for clarification. Confidential information was not revised and is not included in this document.
<b>Filer:</b>	Ronelle Candia
<b>Organization:</b>	Dudek
<b>Submitter Role:</b>	Applicant Consultant
<b>Submission Date:</b>	4/2/2025 8:26:19 PM
<b>Docketed Date:</b>	4/3/2025

## MEMORANDUM

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**To:** Lauren McLeod – Levy Alameda, LLC  
**From:** Sarah Siren, MSc and Michael Williams, PhD  
**Subject:** Paleontological Resources Review – Potentia-Viridi Battery Energy Storage System  
**Date:** February 16, 2024  
**cc:** Ronelle Candia, Dudek  
**Attachment(s):** Confidential Attachment A. Paleontological Records Search Results Letter; Attachment B. Field Survey Photographs

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Dudek has received and reviewed the results of a paleontological resources records search for the Potentia-Viridi Battery Energy Storage System Project (Project) and is providing this memo to Levy Alameda, LLC to summarize the results of a paleontological records search, paleontological survey, and geological map and paleontological literature review to consider the potential for project implementation to result in impacts to paleontological resources. The California Energy Commission (CEC) is the lead agency responsible for compliance with the California Environmental Quality Act (CEQA) for this Project. A paleontological resources records search was conducted by the Natural History Museum of Los Angeles County (NHMLA), and Dudek conducted a digital search of the University of California, Berkeley Museum of Paleontology (UCMP) online database. Dudek also conducted a review of published geological maps and paleontological literature. This paleontological resources study was completed in accordance with CEQA and guidelines from the Society of Vertebrate Paleontology ([SVP] 2010).

## Project Location and Description

The Project proponent, Levy Alameda, LLC is proposing to construct and operate the 400 MW/3,200 MWh Project in Alameda County. The proposed Project would include the construction, operations and maintenance, and decommissioning of a battery energy storage system (BESS) facility, including a Project substation, operations and maintenance building, and 500-kV overhead generation intertie transmission (gen-tie) line. The Project would interconnect to the PG&E Tesla Substation owned and operated by Pacific Gas and Electric (PG&E), located approximately 570 feet east of the Project's eastern boundary. Improvements to the PG&E Tesla Substation would be required as part of the Project.

The Project site is located near the eastern boundary of Alameda County, approximately 2.5 miles west of the City of Tracy, and 2 miles south of the interchange of Interstates 580 and 205. The Project site is mapped within Sections 31 and 32 of Township 2 South, Range 4 East as depicted on the U.S. Geological Survey (USGS) Midway, CA 7.5-minute Topographic Quadrangle map (Figure 1 – Project Location). The approximately 70-acre Project site is located within a larger 232-acre parcel which is surrounded by vacant, open space, rural roads, and the PG&E Tesla Substation (Figure 2 – Project Area).

## Regulatory Framework

### California Environmental Quality Act

Paleontological resources, which are limited, nonrenewable resources of scientific, cultural, and educational value, are recognized as part of the environment under the State CEQA Guidelines. This study satisfies project requirements in accordance with CEQA (13 PRC, 21000 et seq.) and Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the Society of Vertebrate Paleontology (SVP 2010).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the “Environmental Checklist Form,” which addresses the potential for adverse impacts to “unique paleontological resource[s] or site[s] or ... unique geological feature[s].” This provision covers fossils of signal importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth. Further, CEQA provides that a resource shall be considered “historically significant” if it has yielded or may be likely to yield information important in prehistory (PRC 15064.5 [a][3][D]). Paleontological resources would fall within this category. The PRC, Chapter 1.7, sections 5097.5 and 30244 also regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

### California PRC Section 5097.5

California PRC Section 5097.5 provides protection for paleontological resources on public lands, where Section 5097.5(a) states, in part, that:

*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 the lands.*

## Geological and Paleontological Setting

The Project site is relatively undeveloped, Table 1 and Figure 3 – Geological Map show the geological units that underlie the Project site as well as the geologic units that are mapped within a 2-mile radius buffer of the Project site.

**Table 1. Geological Units**

Name	Series/Epoch	Map Unit	Approximate Time Span
<b>Within Project Site</b>			
Holocene alluvium	Holocene	Qha	less than ~11,700 years ago
older Quaternary alluvium*	late Pleistocene	Qpf and Qop	~11,700 to 129,000 years ago
Neroly Formation	late Miocene	Mnr	~5.3 million years ago (Ma) to 11.6 Ma
<b>Within 2-mile radius</b>			
Artificial fill	Holocene	af	Recent
Alluvium, undivided	Holocene to late Pleistocene	Qa	Recent to 129,000
Landslide deposits	Holocene to Pleistocene	Qls	Recent to 2.58 Ma
Pleistocene alluvial fan deposits, undivided	latest Pleistocene	Qpf	~11,700 to 129,000 to years ago
Pleistocene old pediment deposits	late to early Pleistocene	Qop	11,700 years ago to 2.58 Ma
Carbona Formation	early Pliocene (?) to late Miocene	PMc	3.6 Ma to ~7.25 Ma
Neroly Formation	late Miocene	Mnr	~5.3 million years ago (Ma) to 11.6 Ma
Cierbo Sandstone	late Miocene	Mc	5.33 Ma to ~7.25 Ma
Unit C (upper member)- marine shale and siltstone	late Cretaceous	Kcu	66 Ma to ~ 85.7 Ma
Unit D- marine sandstone	late Cretaceous	Kd	66 Ma to ~ 85.7 Ma
Panoche Formation- sandstone	late Cretaceous	Kps	66 Ma to ~ 85.7 Ma

Sources: Dellatre et al., 2023; Cohen et al., 2024 for geological ages

\*Anticipated at depth beneath Holocene alluvium (Qha)

According to the Project-specific geotechnical report (Terracon 2023), bedrock could be as shallow as 1 foot below the ground surface (bgs). A field survey of the Project site was conducted on October 11, 2023 by Gregory Wada of Dudek, who is dual qualified in archaeology and paleontology, and Victoria Martin, archaeologist. In addition to examining the Project site for paleontological resources, Mr. Wada searched for outcrops to field check mapped geological units (Attachment B). No paleontological resources were observed during the pedestrian survey.

## Paleontological Records Search and Literature Review

Dudek requested a paleontological records search from the NHMLA on December 27, 2023, and the results were received on January 14, 2024. The NHMLA did not report any fossil localities from within the Project site, but they do have nearby localities from deposits similar to those underlying the site on the surface and at depth (Confidential Attachment A).



According to the NHMLA records search, the late Miocene age Neroly Formation has yielded invertebrate fossil specimens, including echinoderms, approximately 1.5 miles southeast of Burton Station, between Tice Valley and Grizzly Creek (Los Angeles County Museum (LACM) Invertebrate Paleontology (IP) localities 15355 and 15369) (Confidential Attachment A). Additional invertebrate fossil specimens from the Neroly Formation, including *Astrodapis whitneyi* (Whitney's sand dollar), have been recovered from the Cuyama Valley in Santa Barbara County (LACM IP 2975), as well as invertebrate shell beds with *Pecten crassicardo* (scallop) and other invertebrates from Mount Diablo Scenic Highway in Contra Costa County (LACM IP 7963-7968) (Confidential Attachment A). This formation has been described as a gray to blue, friable sandstone with pebbly clay (Dibblee and Minch 2006). A check of the UCMP online database also indicated plant fossil localities within the Neroly Formation from Alameda County (UCMP 2024). The Neroly Formation has been assigned a high paleontological resource sensitivity (Table 2; Table 3).

While older Quaternary alluvium is not mapped at the surface within the Project site, Jefferson (1991) reported a number of Rancholabrean North American Land Mammal Age (~11,700 to 250,000 years ago; Bell et al. 2004) localities from Alameda County that yielded Ice Age fossil megafaunal remains (e.g., sloth, mastodon, mammoth, bear, camel, and bison) (Bell et al. 2004; Cohen et al. 2024). Latest Pleistocene age alluvial fan deposits, consisting of brown, dense, gravely and clayey sand or clayey gravel that fines upward to sandy clay and is undifferentiated from other Latest Pleistocene age alluvial fan deposits in the area (Helley and Graymer 1997; Delattre et al. 2023). A search of the UCMP online database indicated there are known Pleistocene age invertebrate and vertebrate fossil localities from Alameda County. The Pleistocene deposits including Qpf and Qop in Tables 1 and 3, which are mapped within the 2-mile radius of the Project site (Figure 3.4-1), would also contain similar fossils and be assigned high paleontological resource sensitivity (Table 2; Table 3).

The following units are all mapped within the 2-mile radius of the Project site, but do not directly underlay the Project site as seen on Figure 3:

Artificial fill consists of man-made deposits of various materials and ages. Some are compacted and quite firm, but fills made before 1965 are nearly everywhere, not compacted, and consist simply of dumped materials (Helley and Graymer 1997; Delattre et al. 2023). The recent artificial fill, which has been disturbed and moved from its original location, has no paleontological resource sensitivity (Table 2; Table 3).

Quaternary alluvial deposits (Qa, Qha) consist of brown, poorly-sorted, dense, sandy or gravelly clay and the Pleistocene age alluvium consists of brown, dense, gravely and clayey sand or clayey gravel that fines upward to sandy clay (Helley and Graymer 1997; Delattre et al. 2023). Quaternary landslide deposits (Qls) are poorly sorted clay, silt, sand, and gravel that have been displaced from their original location due to a landslide (Helley and Graymer 1997; Delattre et al. 2023). The Quaternary alluvium, undivided, Quaternary landslide deposits, and Holocene alluvium would all have low paleontological resource sensitivity at the surface due to the young age of the sediments, but the deeper these sediments reach, the older they also become, being more conducive for fossilization. All three of these units have low paleontological sensitivity at the surface that becomes high paleontological sensitivity at depth (Table 2; Table 3).

The Carbona Formation, which is a local designation, is in part equivalent to the Oro Loma Formation (Dibblee and Minch 2006) and the Tehama Formation (Delattre et al. 2023), and in other areas would be mapped in with those two units. The Carbona Formation is composed of moderately well bedded, poorly to moderately consolidated conglomerate, sandstone, siltstone, and clay. The Oro Loma and Tehama Formations contain invertebrates, fish, reptiles, and mammal fossils (UCMP 2024; PBDB 2024), and the Carbona Formation would also yield similar fossils.

Both the Oro Loma and Tehama Formations are assigned high paleontological resource sensitivity, and so the Carbona Formation would also have high paleontological resource sensitivity (Table 2; Table 3).

The Cierbo Sandstone is a light-gray, blue, and white, fine to coarse grained marine sandstone that is thickly bedded, locally contains minor pebble conglomerate, siltstone, and tuff, and is also highly fossiliferous (Dellatre et al. 2023). Fossils that have been previous found with the unit are primarily marine invertebrates but plants and unnamed vertebrate material have also been documented (UCMP 2024). The Cierbo Sandstone has high paleontological resource sensitivity (Table 2; Table 3).

A comparison of mapping between Dellatre et al. (2023) and Dibblee and Minch (2006) shows that the Cretaceous Unit C-upper member and D are likely equivalent to members of the Panoche Formation and may also belong, in part, to the Miocene Briones Sandstone, which is often lumped together with the Neroly sandstone that Dibblee and Minch (2006) have mapped in the same area as Dellatre et al. (2023) Unit D. Unit C- upper member consists of marine shale and siltstones, while Unit D is made up of marine sandstone. The Panoche Formation of Dellatre et al. (2023) consists of a light gray to light brown, hard, fine to medium grained sandstone, and Dibblee and Minch (2006) further have the unit locally composed of interbedded clay shale with the sandstone, and a gray to dark gray claystone or clay shale portion of the formation. The Panoche Formation generally contains fossilized wood, marine invertebrates, fish, and marine reptiles (UCMP 2024; PBDB 2024). The Panoche Formation and the Cretaceous Unit C and D, which are likely Panoche equivalents, all have high paleontological resource sensitivity (Table 2; Table 3).

Table 2 gives the reasoning behind the paleontological sensitivity determinations assigned to geological units as proposed by the Society of Vertebrate Paleontology (2010) which provides an industry standard for paleontological resources. Paleontological resource sensitivity determinations for the geologic units that underlie the Project site and that are located within the 2-mile radius (Figure 3) are listed in Table 3, from youngest to oldest and low to high paleontological resource sensitivity.

**Table 2. Paleontological Sensitivity**

Resource Sensitivity/Potential	Definition
High	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 volcanoclastic formations (e. g., ashes or tephtras), 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 sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, 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

Resource Sensitivity/Potential	Definition
	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.
Undetermined	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 (see “definitions” section in this document) 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 located excavations into subsurface stratigraphy.
Low	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.
No Sensitivity	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 nor impact mitigation measures relative to paleontological resources.

Source: SVP (2010).

**Table 3. Paleontological Sensitivity determinations of Geologic units for Project.**

Name	Map unit	Paleontological Sensitivity
Artificial alluvium	af	Low
Holocene alluvium	Qha	Low at surface increasing to high at depth
Alluvium, undivided	Qa	Low at surface increasing to high at depth
Landslide deposits	Qls	Low at surface increasing to high at depth
Pleistocene alluvial fan deposits, undivided	Qpf	High

**Table 3. Paleontological Sensitivity determinations of Geologic units for Project.**

Pleistocene old pediment deposits	Qop	High
Carbona Formation	PMc	High
Neroly Sandstone	Mnr	High
Cierbo Sandstone	Mc	High
Unit C (upper member)-marine shale and siltstone	Kcu	High
Unit D- marine sandstone	Kd	High
Panoche Formation-sandstone	Kps	High

## Findings and Recommendations

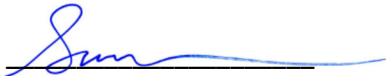
No paleontological resources were identified within the Project site as a result of the institutional records search and desktop geological and paleontological review. The NHMLA recommended a full paleontological assessment of the Project site which this study satisfies. Given the presence of the Neroly Formation mapped within the Project site and the invertebrate fossils recovered from this geological unit within Alameda County, and the potential for older Quaternary alluvium at depth, intact paleontological resources may be encountered below a surficial layer of topsoil or younger Quaternary alluvium during Project excavations. In the event that intact paleontological resources are located on the Project site, ground-disturbing activities associated with construction of the Project, such as grading during site preparation, large diameter (two-feet or greater) augering, and trenching for utilities, have the potential to destroy a unique paleontological resource or site that has not been previously recorded. Upon compliance with the proposed mitigation measure, resources would be protected to the extent feasible if discovered, and significant adverse impacts would not occur.

**MM PALEO-1: Paleontological Resources Impact Mitigation Program and Paleontological Monitoring.** Prior to commencement of any grading activity on site, the applicant shall retain a qualified paleontologist per the Society of Vertebrate Paleontology (2010) guidelines. The qualified paleontologist shall prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the project that shall be consistent with the SVP (2010) guidelines and outline requirements for preconstruction meeting attendance and worker environmental awareness training; where paleontological monitoring is required in areas of high sensitivity within the project site based on construction plans and/or

geotechnical reports; procedures for adequate paleontological monitoring and discoveries treatment; and paleontological methods (including sediment sampling for microinvertebrate and microvertebrate fossils), reporting, and collections management. A qualified paleontological monitor shall be on site during initial rough grading and other significant ground-disturbing activities (including augering) into all undisturbed Neroly Formation deposits and below a depth of five feet below the ground surface in areas underlain by younger Quaternary alluvium (Holocene age) to determine if deposits at depth are old enough (Pleistocene age) to preserve scientifically significant paleontological resources. No paleontological monitoring is necessary during ground disturbance within artificial fill or sediments determined by the qualified paleontologist to be too young to preserve fossils (e.g. younger Quaternary alluvium). In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow recovery of paleontological resources. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will allow grading to recommence in the area of the find. Fossil lab and curation costs are the responsibility of the project applicant or proponent.

If you have any questions regarding this memo, please feel free to contact me (760.479.4165 or ssiren@dudek.com).

Sincerely,



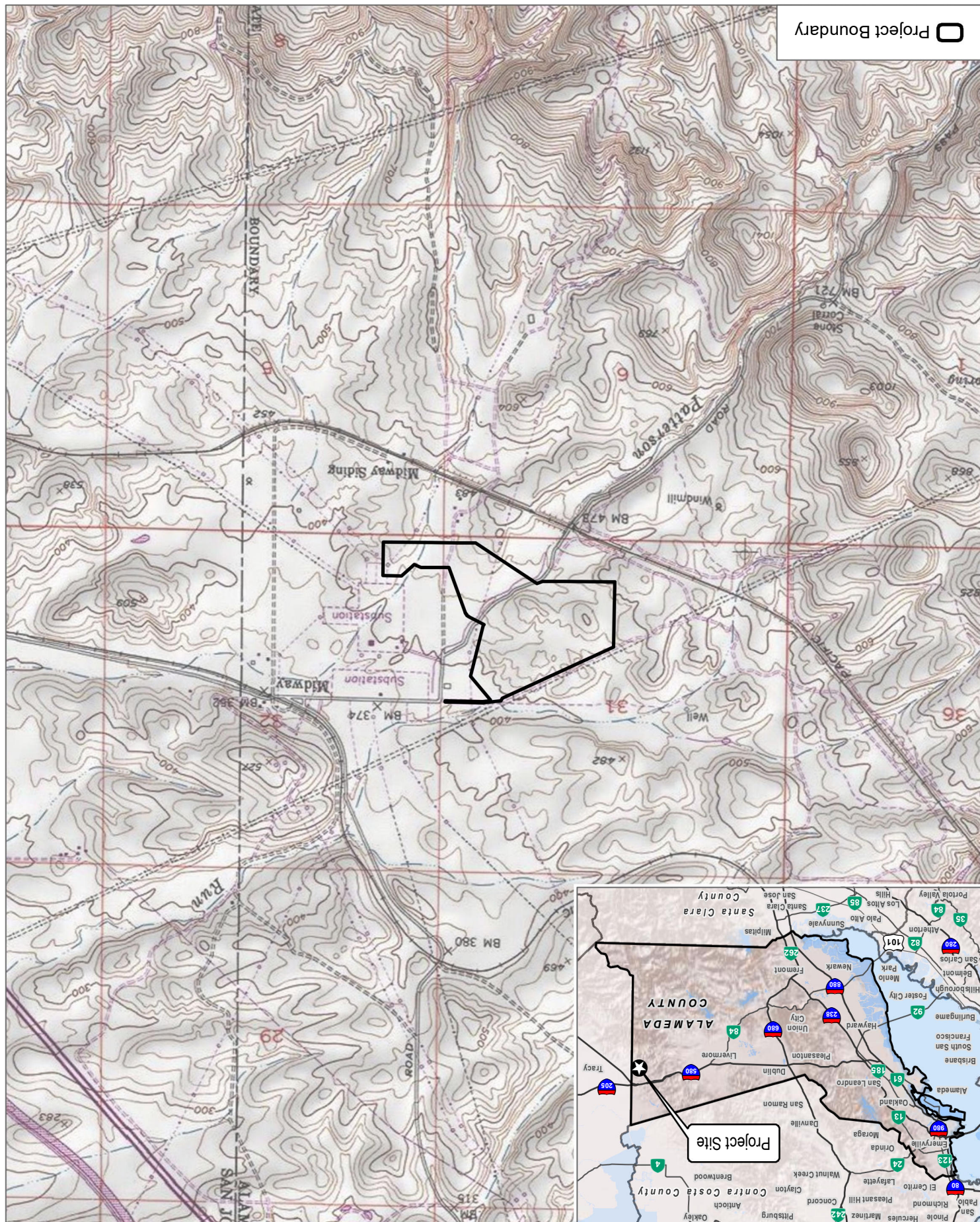
Sarah A. Siren, MSc  
Paleontologist

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SOURCE: USGS 7.5 min Midway Quadrangle



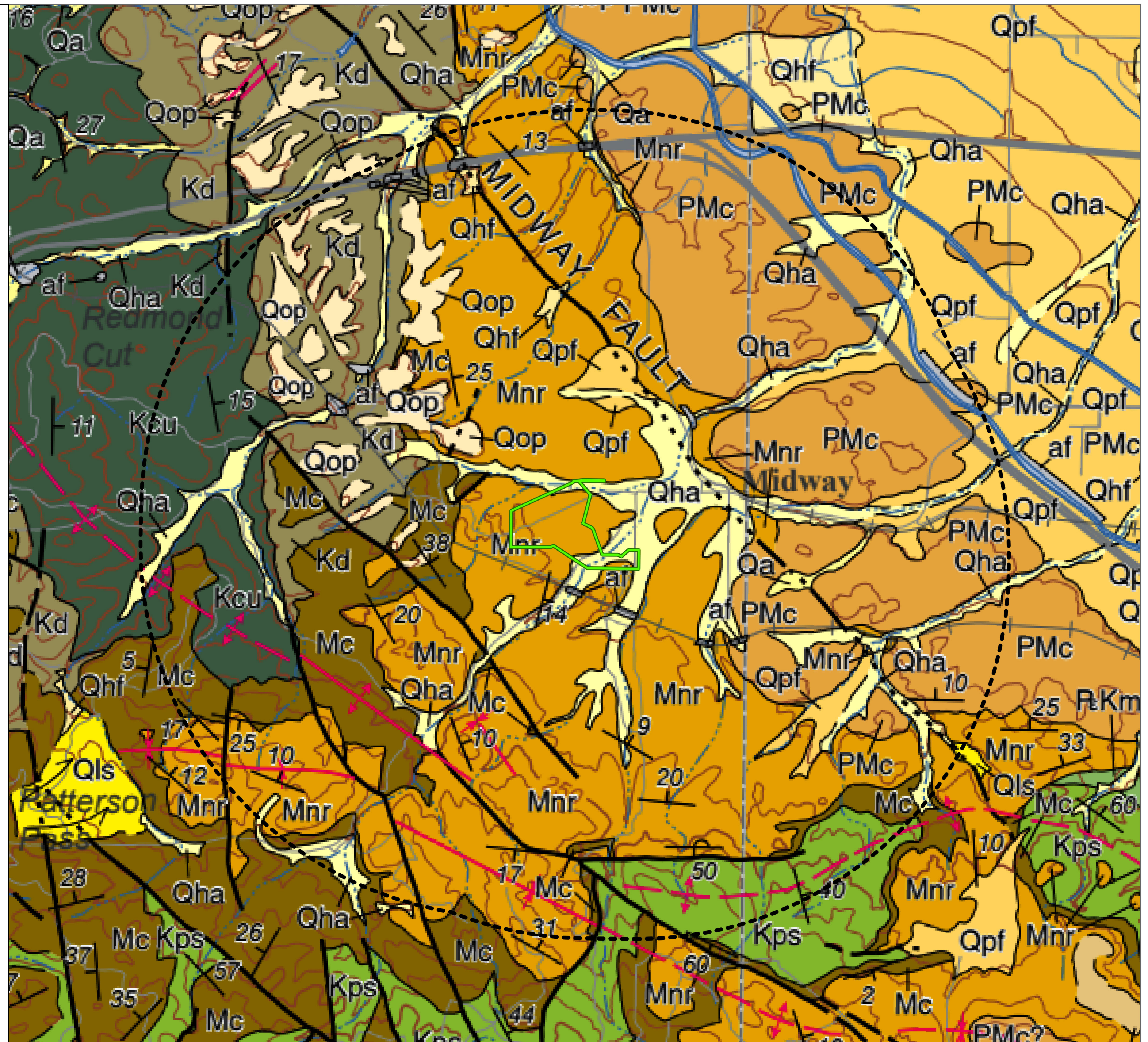




**FIGURE 2**  
**Project Area**  
Potentia-Viridi BESS Project



- Project Boundary
- 2-Mile Search Radius
- Fault, accurately located
- Fault, Inferred
- Geologic Contact
- Geologic Units**
- Af – Artificial fill
- Qa – Alluvium, undivided
- Qha – Holocene alluvium
- Qls – Landslide deposits
- Qpf – Pleistocene alluvial fan deposits, undivided
- Qop – Pleistocene old pediment deposits
- PMc – Pliocene to Miocene Carona Formation, conglomerate, sandstone, and siltstone
- Mnr – Miocene Neroly Formation blue sandstone
- Mc – Miocene Cierbo sandstone
- Kcu – Late Cretaceous (Campanian – Coniacian) Upper member – shale and siltstone
- Kd – Late Cretaceous (Campanian) Sandstone
- Kps – Panoche Formation (Late Cretaceous)



SOURCE: Delattre, et al. 2023

1:24,000



FIGURE 3

Surface Geology

Potential-Viridi BESS Project



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# **Confidential Attachment A**

## Paleontological Records Search Results Letter

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# **Attachment B**

## Field Survey Photographs

**Photograph 1:** Project overview. View looking southwest. Photograph taken by V. Martin across grass covered landscape on the north side of Patterson Pass Road (left side of photograph), generally within the central portion of the Project site.

