APPENDIX C

Cultural and Paleontological Resources Identification Memorandum

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RE: CULTURAL AND PALEONTOLOGICAL RESOURCES IDENTIFICATION MEMORANDUM FOR THE GROUND MOUNT SOLAR AND BATTERY PROJECT, CALIFORNIA STATE UNIVERSITY, BAKERSFIELD, CALIFORNIA

Dear Ms. De Young:

California State University, Bakersfield (CSUB), proposes to install ground-mounted solar panels and a battery on the east side of campus (project). The project requires discretionary permitting and so triggers the California Environmental Quality Act (CEQA). In support of the project, Michael Baker International, Inc. (Michael Baker) completed a Southern San Joaquin Valley Information Center (SSJVIC) records search and consultation; a Native American Heritage Commission (NAHC) Sacred Lands File search; a paleontological records search at the Natural History Museum of Los Angeles County (NHMLAC); a literature, aerial photograph, geologic map, paleontology database, and historical map review; an archaeological survey; and archaeological and paleontological sensitivity assessments, and a California Register of Historical Resources (California Register) evaluation of the James Canal to determine whether the project could result in adverse impacts to paleontological resources, historical resources, or tribal historical resources. The study found that no resources are documented within the project area, but that the project has the potential to impact unknown buried resources. Methods, results, and recommendations are summarized below.

PROJECT DESCRIPTION

CSUB proposes to install ground-mounted solar panels on the east side of campus. A battery will also be constructed.

PROJECT LOCATION

The proposed project is located within the City of Bakersfield, in the eastern portion of the CSUB campus, south of Kroll Way and west of the Arvin-Edison Canal. The project site is located within Section 5 of Township 30 South, Range 27 East, as depicted on the Gosford, California, 1:24,000 scale US Geological Survey (USGS) topographic map. **Attachment 1: Map Figure 1** shows the location of the proposed project in a regional context and **Attachment 1: Map Figure 2 and Map Figure 3** show the proposed project site.

REGULATORY CONTEXT

Cultural resources in California are protected by a number of federal, state, and local regulations, statutes, and ordinances. Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. State

and federal laws use different terms for cultural resources. California state law discusses significant cultural resources as "historical resources," whereas federal law uses the terms "historic properties" and "historic resources." In all instances where the term "resource" or "resources" is used, it is intended to convey the sense of both state and federal law.

Paleontological resources in California are protected by several federal, state, and local regulations, statutes, and ordinances. Paleontological resources are defined as any fossilized remains, traces, or imprints of organisms of paleontological interest preserved in the geologic record that provide information about the history of life on Earth (excluding cultural and archaeological resources). These resources include bones, teeth, soft tissues, shells, plant material, microscopic organisms, footprints, trackways, and burrows. Fossils record the natural history of life on Earth. Despite the frequency of sedimentary rock in the geologic record and the number of organisms that have lived throughout the planet's history, only a minimal number of remains have been preserved in the fossil record. Numerous laws and regulations require federal, state, and local agencies to consider the effects a project may have on paleontological resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe relationships among other involved agencies.

National Register of Historic Places

Although the project does not trigger federal law, the California Register of Historical Resources is largely modeled on the National Register of Historic Places (NRHP), and state law references the NRHP. The National Historic Preservation Act establishes the NRHP, which is "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 Code of Federal Regulations 60.2). To be eligible for listing in the NRHP, a property must be at least 50 years old (or have reached 50 years old by the project completion date) and possess significance in American history and culture, architecture, or archaeology to meet one or more of four established criteria (36 Code of Federal Regulations 60.4):

A. Associated with events that have made a significant contribution to the broad patterns of our history;
B. Associated with the lives of persons significant in our past;
C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; and/or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

Historic resources eligible for listing in the NRHP are considered "historic properties," and may include buildings, sites, structures, objects and historic districts. A potential historic property less than 50 years of age may be eligible under NRHP Criteria Consideration G (Properties that have Achieved Significance within the Past 50 Years) if it can be demonstrated that sufficient time has passed to understand its historic importance (National Park Service 1995: 43). To be eligible for listing in the NRHP, a property must also have integrity, which is defined as "the ability of a property to convey its significance." Within the concept of integrity, the NRHP recognizes seven aspects or qualities that, in various combinations, define integrity: feeling, association, workmanship, location, design, setting and materials (National Park Service 1995: 44-45).

California Environmental Quality Act

CEQA applies to all discretionary projects undertaken or subject to approval by the state's public agencies (California Code of Regulations [CCR] Title 14[3] Section 15002[i]). CEQA conditions state that it is the policy of the state of California to "take all action necessary to provide the people of this state with historic environmental qualities and preserve for future generations examples of the major periods of California history" (Public Resources Code [PRC] Section 21001[b], [c]). Under the provisions of CEQA, "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (CCR Title 14[3] Section 15064.5[b]).

CEQA Guidelines Section 15064.5(a) defines a "historical resource" as a resource that meets one or more of the following criteria:

- Listed in, or eligible for listing in, the California Register.
- Listed in a local register of historical resources (as defined in PRC Section 5020.1[k]).
- Identified as significant in a historical resource survey meeting PRC Section 5024.1(g) requirements.
- Determined to be a historical resource by a project's lead agency (CCR Title 14[3] Section 15064.5[a]).

A historical resource consists of "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. … Generally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing in the California Register of Historical Resources" (CCR Title 14[3] Section 15064.5[a][3]).

The CEQA planning process requires considering historical resources and unique archaeological resources (CCR Title 14[3] Section 15064.5; PRC Section 21083.2). If feasible, adverse effects to the significance of historical resources must be avoided or mitigated (CCR Title 14[3] Section 15064.5[b][4]). The significance of a historical resource is impaired when a project demolishes or materially alters adversely those physical characteristics of a historical resource that convey its historical significance and justify its eligibility for the California Register. If there is a substantial adverse change in the significance of a historical resource, the preparation of an environmental impact report may be required (CCR Title 14[3] Section 15065[a]).

If the cultural resource in question is an archaeological site, CEQA (CCR Title 14[3] Section 15064.5[c][1]) requires that the lead agency first determine if the site is a historical resource as defined in CCR Title 14(3) Section 15064.5(a). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource (OHP 2001a). If the archaeological site does not qualify as a historical resource but does qualify as a unique archaeological site, then the archaeological site is treated in accordance with PRC Section 21083.2 (CCR Title 14[3] Section 15069.5[c][3]). In practice, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource. CEQA defines a "unique archaeological resource" as an archaeological artifact, object, or site about which it can be demonstrated that, without merely adding

to the current body of knowledge, there is a high probability that it meets one or more of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Section 21083.2[g]).

If an impact to a historical or archaeological resource is significant, CEQA requires feasible mitigation measures to minimize the impact (CCR Title 14[3] Section 15126.4[a][1]). Mitigation must lessen or eliminate the physical impact that the project will have on the resource. Generally, drawings, photographs, and/or displays do not mitigate the physical impact on the environment caused by the demolition or the destruction of a historical resource. However, CEQA (PRC Section 21002.1[b]) requires that all feasible mitigation be undertaken even if it does not mitigate impacts to a less than significant level (OHP 2001a:9).

CEQA requires public agencies and private interests to identify potential environmental consequences and/or adverse impacts of their proposed projects to any object or site important to the scientific annals of California (Division I, PRC 5020.1 [b]). Guidelines for the Implementation of CEQA (PRC Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G in Section 15023 provides an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts. One of the questions to be answered in the Environmental Checklist Form (Section 15023, Appendix G, Section VII, part f) is the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?"

California Register of Historical Resources

The California Register is a guide to cultural resources that must be considered when a government agency undertakes a discretionary action subject to CEQA. The California Register helps government agencies identify and evaluate California's historical resources (OHP 2001b:1) and indicates which properties are to be protected, to the extent prudent and feasible, from substantial adverse change (PRC Section 5024.1[a]). Any resource listed in, or eligible for listing in, the California Register is to be considered during the CEQA process (OHP 2001a:7).

A cultural resource is evaluated under four criteria to determine its historical significance. A resource must be significant in accordance with one or more of the following criteria:

- Criterion 1: Is associated with events that have made a significant contribution to the broad pattern of California's history and cultural heritage.
- Criterion 2: Is associated with the lives of persons important in our past.
- Criterion 3: Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- Criterion 4: Has yielded, or may be likely to yield, information important in prehistory or history.

Age

In addition to meeting one or more of the above criteria, the California Register requires that sufficient time must have passed to allow a "scholarly perspective on the events or individuals associated with the resource." Fifty years is used as a general estimate of the time needed to understand the historical importance of a resource (OHP 2006: 3). The California Office of Historic Preservation (OHP) recommends documenting, and taking into consideration in the planning process, any cultural resource that is 45 years or older (OHP 1995: 2).

Period of Significance

The period of significance for a property is "the length of time when a property was associated with important events, activities, persons, or attained the characteristics which qualify it for National Register listing" (National Park Service 1995: 42). The period of significance begins with the date of the earliest important land use or activity that is reflected by historic characteristics tangible today. The period closes with the date when events having historical importance ended. The period of significance for an archaeological property is "the broad span of time about which the site or district is likely to provide information" (National Park Service 1995: 42). Archaeological properties may have more than one period of significance.

Integrity

The California Register also requires a resource to possess integrity, which is defined as "the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association" (OHP 2006: 2).

Archaeologists use the term "integrity" to describe the level of preservation or quality of information contained within a district, site, or excavated assemblage. Integrity is relative to the specific significance that the resource conveys. Although it is possible to correlate the seven aspects of integrity with standard archaeological site characteristics, those aspects are often unclear for evaluating the ability of an archaeological resource to convey significance under Criterion 4. The integrity of archaeological resources is judged according to the site's ability to yield scientific and cultural information that can be used to address important research questions (National Park Service 1995: 44–49).

California Public Resources Code Section 5097.5

PRC Section 5097.5 prohibits excavation or removal of any "vertebrate paleontological site … or any other archaeological, paleontological or historical feature, situated on public lands, except with express permission of the public agency having jurisdiction over such lands." Public lands are defined to include lands owned by or under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

California Health and Safety Code Section 7050.5

California Health and Safety Code Section 7050.5 states that in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the remains are discovered has determined whether

or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify the NAHC within 24 hours of this identification. The NAHC will identify a Native American most likely descendant to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Tribal Cultural Resources

Tribal cultural resources are defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

> a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
>
> b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Paleontological Resources Preservation Act (PRPA)

The Paleontological Resources Preservation, Omnibus Public Lands Act (Public Law 111-011, Title VI, Subtitle D) of 2009 directs the Secretaries of the U.S. Department of the Interior and U.S. Department of Agriculture to manage and protect paleontological resources on federal land controlled or administered by these departments using "scientific principles and expertise." PRPA codifies existing policies of the Bureau of Land Management, National Park Service, U.S. Forest Service, Bureau of Reclamation, and U.S. Fish and Wildlife Service, and provides the following:

- definitions of "paleontological resources" and "casual collecting".
- criteria for the issuance of resource-use permits.
- requirements for the collection of paleontological resources and their curation in approved repositories.
- penalties (criminal and civil) for the illegal removal, sale, purchase, transport, theft and/or vandalism of fossils from federal lands.

National Environmental Policy Act

The National Environmental Policy Act (42 USC 4321) of 1969 directs federal agencies to use all practicable means to "preserve important historic, cultural, and natural aspects of our national heritage" (Section 101[b][4]). Consideration of paleontological resources may be required under the National Environmental Policy Act when a project is proposed for development on federal land, or land under federal jurisdiction.

Kern County General Plan 1.10.3 Archaeological, Paleontological, Cultural and Historic Preservation Policy

As stated in Policy 25 of the Land Use/Conservation/Open Space Element, "The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors" (Kern Planning Group 2026). This is implemented by the following measures and applies to all types of discretionary projects:

K. Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.
L. The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act (CEQA).
M. In areas of known paleontological resources, the County should address the preservation of these resources where feasible.
N. The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
O. On a project specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

California State University, Bakersfield, Master Plan Environmental Impact Report

In 2007, CSUB certified an Environmental Impact Report (EIR) to accompany a new CSUB Master Plan. The Master Plan EIR found that no significant resources are known on campus, but that resources are anticipated to exist within the campus or its vicinity.

The Master Plan EIR includes two Mitigation Measures (MM) designed to reduce impacts to cultural resources, which at the time of the preparation of the EIR included paleontological resources:

3.5-1a: Prior to any proposed activity that will result in the excavation of sub-surface sediment within the Project site, the Center for Archaeological Research at California State University, Bakersfield, and the Kern County Native American contacts as listed in the Native American Heritage Commission's comment letter on the Initial Study/Notice of Preparation for this Project (Appendix A) shall be notified prior to the commencement of ground disturbing activities.

3.5-1b: If any as-yet undetected (i.e. buried) cultural resources are encountered during any future excavation of subsurface sediment within the Project site, work shall cease within a 50-foot area of the find, and a qualified archaeologist shall be contacted to evaluate any such discoveries. Also, an archaeological monitor shall to be present during construction. In the event that an artifact is discovered, the monitor shall note and photograph the discovery. These measures will mitigate any potentially significant impact to a less than significant level.

The Ground Mount Solar and Battery Project was not specifically identified in the 2007 Master Plan EIR; however, as a project proposed within the CSUB campus, it is subject to the policies and mitigation framework established by the Master Plan EIR.

PALEONTOLOGICAL RESOURCES IDENTIFICATION

The paleontological resources identification efforts included a consultation of documented paleontological localities held by the NHMLAC. At Michael Baker's request, NHMLAC staff searched its holdings for information regarding documented paleontological resources. Michael Baker staff supplemented the information from the NHMLAC with data from museum holdings documented in relevant online databases and a review of the scientific literature.

GEOLOGICAL CONTEXT

Eleven geomorphic provinces divide California, each defined by unique geologic and geomorphic characteristics (CGS 2002). The project is located in the Great Valley geomorphic region, which is designated by its large alluvial plain about 50 miles wide and 400 miles long in the central part of California. The whole valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). The project area is located in the southern part of this valley, within what is known as the San Joaquin Valley. This region is drained by the San Joaquin River and great oil fields are found along its southernmost edges and anticlinal uplifts.

The project area is located in the Central California Valley and sits within the South Valley Alluvium Ecoregion (7T), which occurs on nearly level alluvial fans along the southwestern edge of the San Joaquin Valley. Soils at the project site fall into two units. The northern part of the project site, consisting of approximately 43.8 percent of the project site, is composed of Kimberlina fine sandy loam, 0 to 2 percent slopes. The remainder of the project site is composed of Wasco sandy loam (NRCS 2026). The soil temperature regime is thermic and soil moisture is aridic. Vegetation includes perennial bunchgrasses and annual grasslands, allscale scrub, mesquite dunelands, and some iodinebush. Basin ponding occurs seasonally. The land is often used for cropland, pasture, and grassland, and numerous natural oil fields occur here (Griffith et al. 2016).

Geologic maps of the region, including Bedrossian et al. (2012) and Hanna et al. (1974), describe the underlying geology of the project area as alluvial fan deposits from the Late Holocene (4,200 years ago to present). Alluvial fan deposits consist of unconsolidated boulders, cobbles, gravel, sand and silt recently deposited by river and streams travelling through a confined valley or canyon. These sediments are typically deposited in a fan-shaped cone and the region is generally dominated by larger gravel-sized particles. Deposits are derived from the detritus of the Sierra Nevada Mountains, and the dissected uplands to the north and east, and were carried into the valley by the Kern River and related streams that have existed in the region during the past 1.6 million years (Dale et al. 1966). This unit varies in character depending on distance from its eastern margin, but in general is predominantly gravel with silt and sand which lessens in grainsize to the west. These alluvial fan deposits have been found to be up to 150 feet deep in areas (Wood and Dale 1964). Although Late Holocene-aged sediments are generally too young to produce fossils, there is potential for the underlying sediments to be old enough to contain fossils if these sediments are 5,000 years or older (SVP 2010). Because of this, the alluvial fan deposits are considered to have low potential for paleontology sensitivity at the surface, and a moderate sensitivity at depth (SVP 2025). The depth of this transition is unknown unless a geotechnical study is conducted but may be as shallow as 5 feet when comparing sedimentary deposition rates with similar Southern California and Central Valley units and known fossil localities (UCMP 2026).

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY RECORDS SEARCH

On February 15, 2026, Michael Baker International staff requested the NHMLAC search its holdings for documented paleontological resources within and near the CSUB campus. The NHMLAC responded in a letter dated February 16, 2025 (**Attachment 2**). The records search showed no previously identified fossil localities within the campus or the project site. However, three fossil localities from similar Pleistocene deposits to those found within the project site were listed (Table 1). No other localities were identified by the NHMLAC. These localities are from units that are Pleistocene in age, and although the underlying units at the project site are listed as Holocene in age, it is possible that Pleistocene-aged sediments similar to those at the listed localities may be impacted at depth.

TABLE 1: NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY LOCALITIES NEAR THE PROJECT SITE

Locality Number	Taxa	Formation	Chronological Unit	Location/Depth
LACM VP 5777	Unidentified mammal	Walker Formation	Pleistocene	40 miles east at surface
LACM VP 7844-7845	Deer (Cervidae cf. *Odocoileus*); and microvertebrate assemblage including lizards (Lacertilia), snakes (Serpentes), rodents (Rodentia), and rabbits/hares/pikas (Lagomorpha)	Unknown formation (Pleistocene; discontinuous light grey silty sandstone)	Pleistocene	65 miles west unknown depth

ONLINE MUSEUM DATABASES RECORDS SEARCH

Michael Baker International conducted supplemental paleontological records searches within 10 miles of the CSUB project site using the following websites:

- University of California Museum of Paleontology Locality Search (UCMP 2026)
- The Paleobiology Database (PBDB 2026)

The fossil locality search in the UCMP online database found one locality within Kern County from Pleistocene sediments. The exact location of this locality was unknown but it included 7 specimens of fossil plant material from pine and magnolia species. No Holocene-aged localities were found within this search.

The PBDB locality search listed one locality within Pleistocene-aged sediments approximately 2 miles south of the project area, which contained an assemblage of vertebrate fossils including treefrogs (*Hyla* sp.), Lizards (Lancertilia indet.), a canid (Canidae indet), rabbit (Leporidae indet.) and rodents (*Thomomys* sp., *Microtus* sp., *Neotoma* sp., *Dipodomys* sp.). No other localities were listed from Pleistocene or Holocene aged sediments within 10 miles of the project area.

PALEONTOLOGICAL SENSITIVITY ANALYSIS

Per the guidelines set forth by the Society of Vertebrate Paleontology (SVP 2025) and based on the fossil sensitivity of the formations present within the project area (alluvial fan deposits of Holocene age), there is low potential at the surface and moderate potential at depth to disturb paleontological resources within undisturbed geologic contexts (i.e., undisturbed bedrock or subsurface geologic deposits in previously undisturbed areas) in the project area. No paleontological resources are documented within the project area and similarly Holocene and Pleistocene aged resources occur, but are rare within a reasonable distance of the project area.

ARCHAEOLOGICAL, ETHNOGRAPHIC, AND HISTORIC CONTEXT

Precontact Context

Within Central California specifically, including the San Joaquin Valley, the pre-contact period is divided into the Paleoindian period, the Lower, Middle, and Upper Archaic periods, and the Emergent period. Each of these periods is poorly known, and there is nowhere in the San Joaquin Valley that the entire sequence of precontact archaeological remains has been uncovered. This is due largely to the area's history of disturbance, but even more the deep sedimentation in the central valley (Arnold and Walsh 2010: 92). The chronology presented here remains tentative.

Paleoindian Period (ca. 13,000–10,000 BP)

The Paleoindian period in California as a whole is typically dated to approximately 10,000–6000 BC. Archaeological evidence of Paleoindian sites indicated hunting adaptation characterized by large, fluted projectile points and hunting of megafauna and other faunal resources for inland sites. Fluted projectile points throughout California indicated that Paleoindians at least traveled through the region, but few stratified sites of this culture have been found (Chartkoff and Chartkoff 1984). Due to climate change during the Holocene, periods of erosion and deposition have altered large segments of the Pleistocene landscape, particularly in areas of heavy sediment accumulation (Rosenthal et al. 2004). In the Central Valley, the Paleoindian period is best represented at Tulare Lake (Arnold and Walsh 2010: 93).

Lower Archaic Period (10,000–7500 BP) The Lower Archaic period is marked by the presence of chipped crescents and stemmed projectile points. The artifacts are consistent with a mobile hunting and gathering economy. Mobile foragers appeared to have resided in camps situated along marshes and on grasslands and took advantage of a wide array of resources, including freshwater mussels (Arnold and Walsh 2010: 92-93). The ubiquity of artifact styles through space indicates a high degree of generalization compared to the more specialized assemblages of those practicing low residential mobility seen in latter periods (King et al. 2016).

Middle Archaic Period (7500–2500 BP) As in the preceding period, mobile foragers in the resided in camps situated along marshes and on grasslands. The Middle Archaic period was also marked by new groundstone technology and increased trade, evidenced by cut marine shell (*Olivella* sp.) beads. Formalized exchange relationships appeared to have been established in the flake stone industry as well. Mortars and pestles first appeared in sites dating to this period, which is thought to signal an increased dietary reliance on acorns rather than hard seeds and an associated increase in sedentism.

Upper Archaic Period (2500-850 BP) The Upper Archaic period coincided with the Medieval Climatic Anomaly and was characterized by cooler conditions and increased precipitation in central California, which resulted in increased sedentism. These sites are characterized by utilitarian objects, numerous mortars, and pestles, implying greater reliance on acorns and a highly developed bone tool industry. In the San Joaquin Valley, a robust trade in obsidian developed. The specialized nature of these artifact assemblages seems to indicate a high degree of sedentism (King et al. 2016).

Emergent Period (850 BP-AD 1769) The Emergent period coincided with the end of the Medieval Climatic Anomaly and is associated with a new level of sedentism, status ascription, ceremonial integration, and regional trade, as indicated by the presence of finished artifacts and food remains that could not be obtained locally. The period coincides with the Augustine pattern in the San Francisco Bay

area and Sacramento Valley. New ornament forms and technologies emerged, such as the bow and arrow, toggle harpoon, hopper mortar, clamshell disk beads, and steatite and magnesite beads and tubes (Fredrickson 1974: 563). This period was marked by wide-ranging changes in *Olivella* bead forms and their distribution patterns. The *Olivella* saucer bead trade network appears to have collapsed suddenly between AD 430 and 1050, and the *Olivella* saucer bead industry was replaced by more regionally integrated shell bead forms, such as *Olivella* wall beads and clamshell disk beads, possibly indicating the increased importance of communicating cultural affiliation within an increasingly populated region (Bennyhoff 1994).

Ethnographic Context

At the time of Spanish intrusion into California, California's Central Valley was home to approximately one-third of the state's indigenous inhabitants. Most of these were in the northern part of the Central Valley, which was drained by the Sacramento River and its tributaries. The southern part of the Central Valley, the San Joaquin Valley, was drier and warmer but well-watered by rivers such as the Kern and San Joaquin Rivers and held many lakes and marshes.

The southern San Joaquin Valley was occupied by the Southern Valley Yokuts, whose territory stretched throughout the valley from the lower Kings River to the Tehachapi Mountains (Kroeber 1925). Rather than a united political entity, the Yokuts consisted of self-governing groups—sometimes called tribes or tribelets by anthropologists—averaging about 350 members. Approximately 40 to 50 different but related languages made up the Yokutsan language family, which encompassed the Northern Valley Yokuts and Foothill Yokuts in addition to the Southern Valley Yokuts. The Yokutsan languages were all part of the Penutian stock, which also includes the Winutan, Maiduan, and Utian language families (Shipley 1978: 82-85).

The Yokuts made extensive use of the tule (bullrush; *Schoenoplectus acutus*) endemic to the Central Valley marshes. The Spanish referred to the Yokuts and other natives with similar lifeways as *Tulareños*. Tule watercraft were used for transportation, hunting, and fishing. The Yokuts were adept basket makers, and baskets were used for a variety of purposes including food storage and preparation. Dwellings were made of wood frames covered with tule mats, and ranged in size from single-family homes to long communal residences that held up to ten families (Wallace 1978).

The Yokuts food and food gathering were well adapted to their environment. Tule roots were processed in mortars and made into mush. Other plant foods were also eaten raw and cooked. When available, acorns were processed in a similar way. A number of plant seeds were ground, or roasted by placing and tossing them alongside live coals in basketry trays. Mammals, reptiles, and birds were hunted among the tules using snares and bows and arrows, generally with stone or bone arrowheads, and nets were used for both trapping and fishing. Freshwater mussels were collected in large quantities (Wallace 1978).

These tribes or tribelets generally included several sedentary settlements, led by one dominant settlement, within a specific geographic area. These settlements were spread along the shores of the southern valley's major lakes—Tulare Lake, Buena Vista Lake, and Kern Lake—and along the major rivers such as the Kings River, the Kaweah River, and the Kern River (Wallace 1978).

The project site lies within the territory of the Yowlumne tribe of the Yokuts. The Yowlumne possessed two villages within what is now Bakersfield, Woilo, on a high knoll overlooking the Kern River, and

another village across the river to the west. Both villages are believed to have been in the area of historic downtown Bakersfield (Latta 1977: 278-279).

Historic Context Post-Contact

Spanish explorers first visited the coast of Southern California in 1542. However, European settlement did not begin in the area until 1769, when Gaspar de Portolá led an exploratory mission intended to open up Alta California to settlement. The first documented Spaniard to enter the San Joaquin Valley was the intrepid missionary Fray Francisco Garcés, who visited the valley and camped beside the Kern River in 1776 (Brewer 2001). However, while the indigenous inhabitants of the San Joaquin Valley interacted with both the Spanish and missionized Native Americans who grazed livestock and traveled in the valley, they retained much of their autonomy.

In 1821, Mexico won its independence from Spain. The new state was secular in nature and moved increasingly towards secularization of the missions and dispersal of the mission properties among politically connected elites. In 1834, the missions were secularized and their lands divided up into large grants known as ranchos, continuing a practice that had been introduced by the Spanish. A few of these grants lay within the San Joaquin Valley. The closest land grant to the project area was Rancho El Tejón, approximately 19 miles east, which Governor Manuel Micheltorena granted José Antonio Aguirre and Ygnacio del Valle in 1843. Native Americans continued to serve as the primary source of labor for the ranchos. But the increasing numbers of Mexicans in California came to see the Central Valley as a place where fugitive natives and bandits found refuge, and punitive expeditions were often launched into the valley (Brewer 2001).

The Mexican-American War (1846–1848) ended with American victory. In the Treaty of Guadalupe Hidalgo, Mexico ceded lands, including California, to the United States. The treaty required landowners to comply with a lengthy and expensive legal process to prove their land rights. Those who successfully did so entered an economic system unsuited to their traditional way of life. Gold discovered in 1848 led to a massive influx of Americans, many of whom began purchasing the lands of the old Californios.

The project site was never a part of a Spanish or Mexican land grant, and so was claimed by the federal government. In 1854, the project vicinity was surveyed by United States Deputy Surveyor Brice M. Henry. Henry mapped the Kern River flowing north-south approximately 2.5 miles east of the project site. A trail segment is shown in the northeast quarter of Township 30 South, Range 27 East, Section 5, which may have entered the project site, but no other development is visible (Henry 1855).

In the 1850s, settlers moved into the southern San Joaquin Valley, turning the area into farmland. Because of the shifting nature of the Kern River, the area of what became Bakersfield was known as Kern Island. In the early 1860s, Thomas Baker moved into the area, settling on the Los Angeles to Stockton Road in what would become Bakersfield. Settlers built canals to tame the land for farming, beginning with Baker's Kern Island Canal (Brewer 2001).

The project site is located west of the historic core of Bakersfield, but it saw a similar agricultural development. By the early twentieth century, the Kern River followed its current course. The 1910 and 1912 Buena Vista Lake 1:125,000 topographic maps show the James Canal cutting through what would become the CSUB campus, including the project site. The Stockdale Highway follows its current route north of today's campus, and two buildings, probably farmhouses, stand just to the east of what would become the campus (USGS 1910, 1912). No development is seen in the project area itself.

By the time of the 1932 Gosford 1:31,680 topographic map, what would become the CSUB campus is a network of levees, canals, and berms (USGS 1932). The 1950 Gosford 1:24,000 map shows much the same (USGS 1950). But by 1954, many of the canals and berms disappear, either no longer depicted in maps or actually leveled (USGS 1954).

In the middle 1960s, what would become the CSUB campus was a beet field when it was acquired for the new Kern State College. "Imagine 375 acres of sugar beets with one dying cottonwood tree ... That was the campus when I first saw it in 1967," Ken Secor, the new Vice President for Administrative Services, remembered decades later. Secor designed many of the campus's original buildings, which were quickly constructed so the college could begin classes on October 1, 1970. But much of the campus remained undeveloped (CSUB, n.d.). Notably, the 1978 Gosford 1:24000 map—actually an aerial photograph—shows the project site still under cultivation (USGS 1978).

The indigenous population persists despite severe impacts caused by non-indigenous intrusion into the valley. The Yokuts and their indigenous neighbors have formed several tribes which continue to steward the land and their cultural resources. The only federally recognized tribe with lands in Kern County is the Tejon Indian Tribe, which consists of Yokuts, Chumash, Tataviam, Tubatulabal, and Paiute peoples. The tribe was first recognized by the United States government in 1851 in one of eighteen treaties entered into with indigenous Californians but not ratified by the United States Senate. Their status was subsequently reaffirmed by the Bureau of Indian Affairs in 2012 (American Indian Alaska Native Tourism Association 2025; Tejon Indian Tribe, n.d.).

Kern River Hydrology

The Kern River is the southernmost major Sierra Nevada River entering the San Joaquin Valley and was a foundational driver of agricultural settlement and irrigation development in the Bakersfield region during the mid- to late nineteenth century. Emerging from a steep granite canyon approximately ten miles east of Bakersfield, the river spreads across a broad alluvial plain, depositing sand and gravel and forming an extensive, shifting delta system characterized by multiple channels and sloughs. This deltaic environment—commonly referred to as **Kern Island**—was historically unstable, with river channels frequently changing course due to seasonal floods and major freshet events, notably those of 1861–62 and 1867–68 (Grunsky 1898:37-38).

Hydrologically, the Kern River is dominated by **snowmelt-driven flows** from its 2,345-square-mile Sierra Nevada watershed. Peak discharges typically occurred between April and July, while late summer and fall flows were comparatively low. Average annual discharge during the late nineteenth century was estimated at approximately 1,100 cubic feet per second, though year-to-year variability was substantial. These fluctuations necessitated the construction of diversion works, weirs, and canals to stabilize water supply for irrigation (Grunsky 1898:37-38)

By the 1870s–1890s, human intervention had significantly altered the river's natural hydrology. Levees, headgates, and canals increasingly confined high flows to selected channels, redirected water away from historic lakebeds, and converted Buena Vista Lake into a managed reservoir. Collectively, these actions transformed the Kern River from a dynamic, multi-channel river into a highly engineered irrigation source supporting large-scale agricultural production, particularly alfalfa and grain cultivation (Grunsky 1898:37-38).

James Canal

The James Canal, constructed beginning in 1871, was an early irrigation canal developed to serve agricultural lands, specifically the odd-numbered land sections west of Old Kern River. Its construction reflects the transition from small, informal water diversions to more substantial, capitalized irrigation infrastructure during the post–Gold Rush agricultural expansion of Kern County (Grunsky 1898:49-50).

Water for the James Canal was diverted from the Kern River just below the head of Buena Vista Slough, using a low timber-and-flashboard river weir. This same structure also served the adjacent Buena Vista Canal. The upper portion of the James Canal was built with unusually large dimensions for its time—up to 100 feet wide near its head—reflecting both the high sediment loads of the river and the need to convey substantial volumes of water across permeable delta soils (Grunsky 1898:49-50).

The main canal originally extended approximately 18 miles, though its lower reaches were later abandoned after irrigation attempts on strongly alkaline lands near Kern Lake proved unsuccessful. By the late 1870s, total expenditures for the James Canal were estimated at roughly $16,000, a significant investment indicative of the economic importance placed on irrigation development (Grunsky 1898:49-50).

Historically, the James Canal functioned as part of a broader network of Kern River canals that collectively reshaped the delta landscape. It was one of the many water conveyance and control features that contributed to stabilizing water delivery while simultaneously reducing overbank flooding and natural wetland conditions (Grunsky 1898:49-50).

James Canal Development History

The James Canal was constructed in 1871 (Grunsky 1898:50). The canal is first visible on 1912 USGS map (**Figure 1**) (USGS 1910, rev. 1912). Archival records and maps show the canal was originally approximately 18 miles long and had widths ranging from 100 feet wide at north end at the Kern River, and 30-40 feet wide along most of the rest of its length, with a depth of 3 feet average. In 1898, a USGS report commented the southern portion of the canal was already in disuse due to the abandonment of Lake Ranch as a source of irrigation due to alkalinity (Grunsky 1898:49-50; USGS 1910, rev. 1912). By 1932, the canal started in the north at an unnamed canal that flowed west from the Buena Vista Canal (USGS 1932). A 1954 USGS map shows the name of this origin canal as Gates Canal and the James Canal appears to have a similar path (USGS 1954). By 1976, the James Canal crosses the new north-south Arvin-Edison Canal and terminates in a new unnamed canal that runs south from the Gates Canal to the west, along Old River Road, and connects to the Buena Vista Canal (**Figure 2**) (USGS 1954, rev. 1976). By 1981, an aerial-type USGS map shows the James Canal appears to have been disrupted by development and only segments remain in place, including the portion documented in this recording at the Arvin-Edison Canal (**Figure 3**) (USGS 1981).

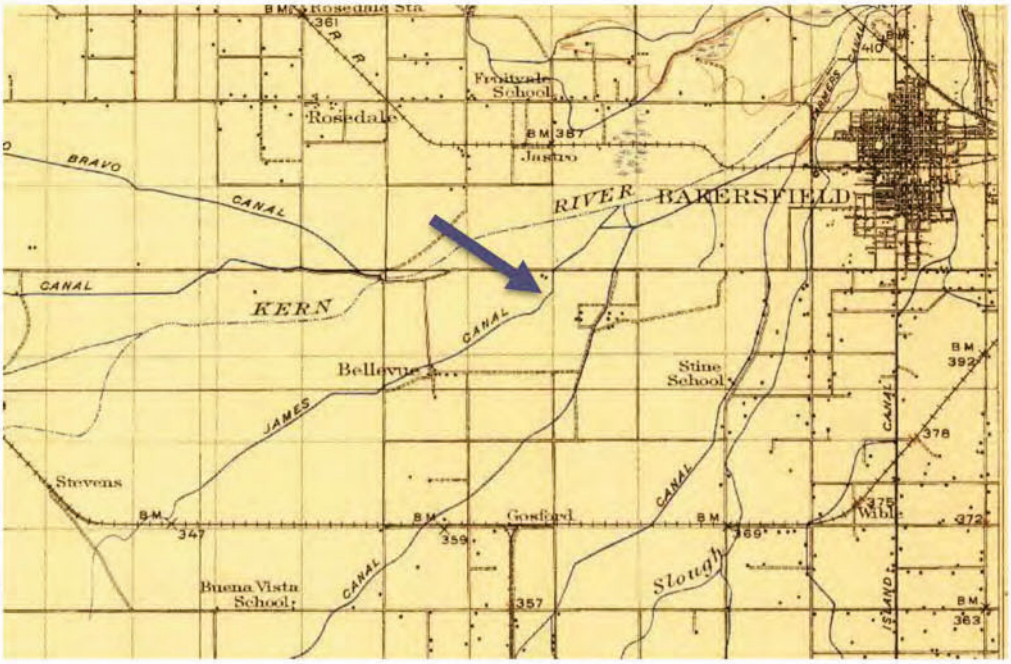

FIGURE 1: THE JAMES CANAL PORTRAYED ON THE 1912 USGS MAP. A BLUE AROW POINTS TO THE EXTANT SEGMENT RECORDED AS PART OF THIS STUDY (USGS 1910, REV. 1912).

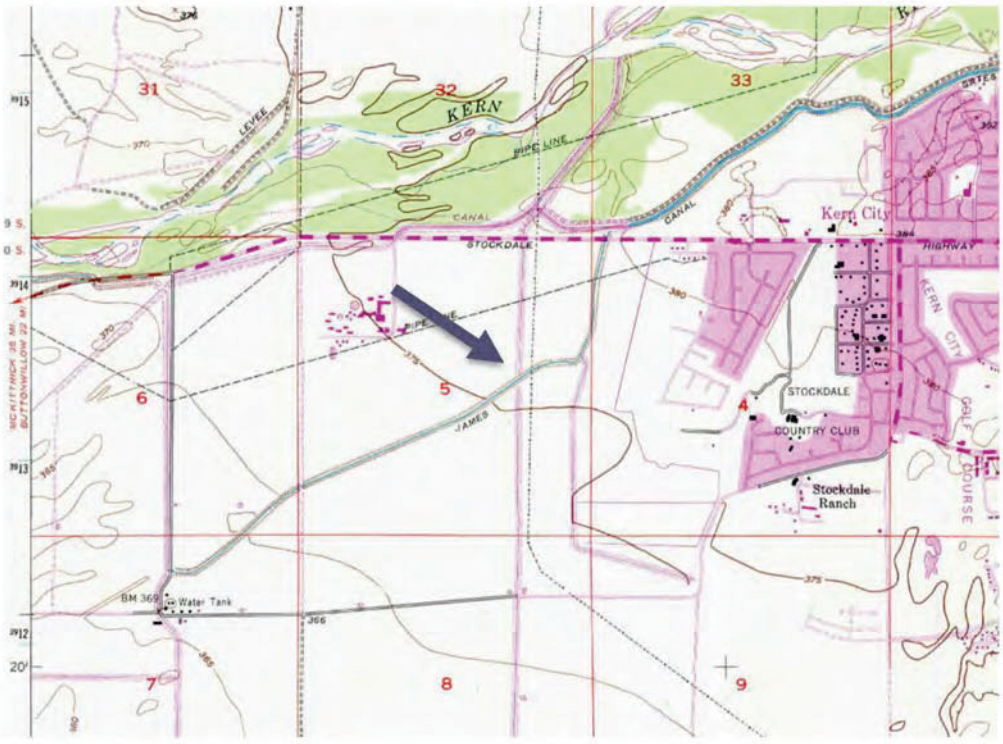

FIGURE 2: THE JAMES CANAL PORTRAYED ON THE 1976 USGS MAP. THE CANAL ORIGINATED AT THE GATES CANAL TO THE NORTH, CROSSES THE NEW ALVA-EDISON CANAL, AND TERMINATES TO THE SOUTH AT AN UNNAMED CANAL THAT RUNS ALONG OLD RIVER ROAD AND FLOWS INTO THE BUENA VISTA CANAL. A BLUE AROW POINTS TO THE EXTANT SEGMENT RECORDED AS PART OF THIS STUDY WHERE IT CROSSED THE ALVA-EDISON CANAL (USGS 1954, REV. 1976).