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5.3 CULTURAL RESOURCES

Hydrogen Energy International LLC (HEI or Applicant) is jointly owned by BP Alternative Energy North America Inc. and Rio Tinto Hydrogen Energy LLC. HEI is proposing to build an Integrated Gasification Combined Cycle power generating facility called Hydrogen Energy California (HECA or Project) in Kern County, California. The Project will produce low-carbon baseload electricity by capturing carbon dioxide (CO₂) and transporting it for CO₂ enhanced oil recovery (EOR) and sequestration (storage)¹.

The 473-acre Project Site is located approximately 7 miles west of the outermost edge of the city of Bakersfield and 1.5 miles northwest of the unincorporated community of Tupman in western Kern County, California, as shown in Figure 2-1, Project Vicinity. HEI is also acquiring an additional 628 acres of land adjacent to the Project Site, herein referred to as “Controlled Area” (see Figure 2-4, Site Plan). HEI will own this property and have control over public access and future land use.

The Project Site is near a hydrocarbon-producing area known as the Elk Hills Field. The Project Site is currently used primarily for agricultural purposes. Existing surface elevations vary from about 282 feet to 291 feet above mean sea level.

The Project will gasify petroleum coke (petcoke) (or blends of petcoke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The Gasification Block feeds a 390-gross-megawatt (MW) combined cycle plant. The net electrical generation output from the Project will provide California with approximately 250 MW of low-carbon baseload power to the grid. The Gasification Block will also capture approximately 90 percent of the carbon from the raw syngas at steady-state operation, which will be transported to the Elk Hills Field for CO₂ EOR and Sequestration. In addition, approximately 100 MW of natural gas generated peaking power will be available from the Project.

The Project Site and linear facilities comprise the affected study area and are entirely located in Kern County, California. These Project components are described below.

Major on-site Project components will include, as shown on Figure 2-5, Preliminary Plot Plan:

- Solids Handling, Gasification, and Gas Treatment
 - Feedstock delivery, handling and storage
 - Gasification
 - Sour shift/gas cooling
 - Mercury removal
 - Acid gas removal

¹ This carbon dioxide will be compressed and transported via pipeline to the custody transfer point at the adjacent Elk Hills Field, where it will be injected. The CO₂ EOR process involves the injection and reinjection of carbon dioxide to reduce the viscosity and enhance other properties of the trapped oil, thus allowing it to flow through the reservoir and improve extraction. During the process, the injected carbon dioxide becomes sequestered in a secure geologic formation. This process is referred to herein as CO₂ EOR and Sequestration.

- Power Generation
 - Combined cycle power generation
 - Auxiliary combustion turbine generator
 - Electrical switching facilities
- Supporting Process Systems
 - Natural gas fuel systems
 - Air separation unit (ASU)
 - Sulfur recovery unit/Tail Gas Treating Unit
 - Zero liquid discharge (ZLD) units for process and plant waste water streams
 - Carbon dioxide compression
 - Raw water treatment plant
 - Other plant systems

The Project also includes the following offsite facilities, as shown on Figure 2-7, Project Location Map:

- **Electrical Transmission Line** – An electrical transmission line will interconnect the Project to Pacific Gas & Electric’s (PG&E) Midway Substation. Two alternative transmission line routes are proposed; each alternative is approximately 8 miles in length.
- **Natural Gas Supply** – A natural gas interconnection will be made with PG&E or SoCalGas natural gas pipelines, each of which are located southeast of the Project Site. The natural gas pipeline will be approximately 8 miles in length.
- **Water Supply Pipelines** – The Project will utilize brackish groundwater supplied from the Buena Vista Water Storage District (BVWSD) located to the northwest. The raw water supply pipeline will be approximately 15 miles in length. Potable water for drinking and sanitary use will be supplied by West Kern Water District to the southeast. The potable water supply pipeline will be approximately 7 miles in length.
- **Carbon Dioxide Pipeline** – The carbon dioxide pipeline will transfer the carbon dioxide captured during gasification from the Project Site southwest to the custody transfer point. Two alternative carbon dioxide pipeline routes are proposed; each alternative will be approximately 4 miles in length.

The Project components described above are shown on Figure 2-8, Project Location Details, which depicts the region, the vicinity, the Project Site and its immediate surroundings.

All temporary construction equipment laydown and parking, including construction parking, offices, and construction laydown areas, will be located on the Project Site.

In accordance with California Energy Commission (CEC) regulations (1992, 1997, and 2006), this section describes the environmental effects of the construction and operation of the Project on cultural resources in accordance with CEC requirements. Impacts are assessed for the site of the proposed Project, and the potential Rights-of-Way (ROW) for the various linear alternative alignments, including electrical transmission, process and potable water, carbon dioxide, and

natural gas supply. Archaeological resources are discussed in further detail in the technical report, which is attached in Appendix H3. Built environment resources are discussed in further detail in the technical report by JRP Historical Consulting, LLC (JRP, 2009), which is attached in Appendix H4.

Cultural resources are defined as buildings, sites, structures, objects, or traditional cultural properties, each of which might have historical, architectural, archaeological, cultural, or scientific importance.

This section documents the efforts undertaken to determine whether cultural resources could be adversely affected by the implementation of the Project. Section 5.3.1 presents the environment that could be affected; Section 5.3.2 identifies the environmental consequences; and Section 5.3.3 discusses the cumulative effects associated with the Project. Section 5.3.4 identifies the mitigation measures to be implemented to avoid identified impacts. The remaining sections present the regulatory context. Specifically, Section 5.3.5 identifies the cultural resources laws, ordinances, regulations, and standards (LORS) applicable to the Project; Section 5.3.6 lists the involved agencies and agency contacts; and Section 5.3.7 discusses permits and scheduling.

5.3.1 Affected Environment

The cultural resources analysis for the Project included a literature review and record search, archival research, review of collected data, pedestrian surveys, archaeological monitoring of the geotechnical investigation, and consultations with the Native American Heritage Commission (NAHC). The literature review and record search included ethnographic and historic literature and maps; federal, state, and local inventories of historic properties; archaeological base maps and site records; and survey reports on file at the Southern San Joaquin Valley Information Center at California State University, Bakersfield (SSJVIC). Archival research was conducted at a variety of libraries and repositories, including the California State Library, Sacramento; and Shields Library, University of California, Davis; and data collected from the Water Resources Center Archives and Earth Sciences Map Library at the University of California, Berkeley were reviewed. Pedestrian surveys were performed for both archaeological and historic architectural resources of each cultural resource subdiscipline's area of potential effect (APE). Consultation was carried out with the State of California's NAHC, with subsequent contact with Native American groups and individuals identified by the NAHC. No significant cultural resources were identified within the Project's cultural resources study areas.

Study areas for cultural resources comprise (1) the archaeological resources APE, which consists of the Project Site and the offsite areas where there will be new ground-disturbing activities for various alternative linear alignments, including electric transmission, potable and process water, natural gas, and carbon dioxide lines (see Figure 5.3-1); and (2) the historic architectural (built environment) resources APE (see Figure 5.3-2). The historic architectural resources APE exhibits a different configuration that includes a 0.5-mile radius from the Project Site and the proposed electrical transmission alignment, in order to address potential indirect effects to which archaeological resources are generally not subject.

5.3.1.1 Natural Environment

The San Joaquin Valley is bounded by the Sacramento-San Joaquin River Delta to the north, the Sierra Nevada Mountains to the east, the Tehachapi Mountains to the south, and the Coast Range to the west. The western slope of the Sierra Nevada Mountains is the source for rivers and streams that cross the San Joaquin Valley. The San Joaquin Valley is divided into two hydrologic sub-basins: (1) the San Joaquin Sub-Basin to the north; and (2) the Tulare Sub-Basin to the south. Rivers of the San Joaquin Sub-Basin join the San Joaquin River as it drains into the Sacramento River, flowing into San Francisco Bay. The rivers of the Tulare Sub-Basin have no natural perennial surface outlet; and in the past, formed large, shallow, semi-permanent inland lakes. Only in years of exceptional rainfall did water cross the divide and enter the San Joaquin Sub-Basin.

The San Joaquin Valley has a Mediterranean-type climate characterized by hot, dry summers and cool, moist winters. Summer daytime high temperatures frequently exceed 100 degrees Fahrenheit (°F). Mean annual temperature is 65°F. The San Joaquin Valley is separated from the influence of the ocean by the Coast Ranges, and is in a broad rain shadow. Precipitation primarily occurs from September through April, although in normal years 90 percent of the rain falls between December 1 and April 1. The eastern side of the valley receives about 2 inches more than the western side. Average annual rainfall for the San Joaquin Valley is 4.7 inches, and soil water deficits characterize the grassland and scrub habitats for 4 to 8 months every year. A dense, persistent, ground fog known as “tule fog” can develop in the winter months, resulting in overcast, damp, cool weather.

Historically, the San Joaquin Valley included a variety of ecological communities, with vast areas of woodlands, freshwater marshes, and grasslands prior to the establishment of the present land use patterns. In upland areas, several distinct communities of grasses and shrubs grew along rainfall and edaphic gradients. Today, agricultural development dominates the flat lands in the center of the valley. Undisturbed open space is largely restricted to the sloping margins of the valley.

Section 5.2, Biological Resources, and Section 5.14, Water Resources provide detailed descriptions of the natural environment in the region that includes the Project Site.

5.3.1.2 Prehistoric Background

There is a long history of archaeological research in the southern San Joaquin Valley, with much of the early, purely academic investigations focused on the Buena Vista Lake and adjacent Elk Hills vicinities (portions of both of which fall within 5 miles of the Project). In the last decade of the nineteenth century, professional and amateur archaeologists began investigating the numerous “Indian mounds” of the region. C.H. Merriam collected a large coiled basket that contained the mummified body of a child, found within a rock shelter near Bakersfield (Merriam 1905 in Heizer 1951:30). Other materials collected by Merriam included another basket, a net manufactured from the fibers of the milkweed, hemp cordage, portions of a rush mat, and fragments of a rabbit-skin blanket. In February 1909, N.C. Nelson of the University of California Archaeological Survey recovered a cache of baskets and other artifacts from a dry arroyo in the Elk Hills (Moratto 1984:174).

5.3 Cultural Resources

In 1926, Gifford and Schenk of the University of California published their volume on the archaeology of the southern San Joaquin Valley. The report included the documentation of approximately 40 sites, the results of their excavation of nine sites, and the examination of private collections. The results of their findings were that the only discernible change in, or in addition to, the culture of the Southern San Joaquin Valley is represented by steatite in the “Slough and Lake regions” (Gifford and Schenk 1926:118). This apparent lack of change in material culture resulted in their claim that the cultural remains recovered seemed to be as readily assignable to the “last century as to the last millennium” (Gifford and Schenk 1926:118).

During the Depression years of 1933 and 1934, the Civil Works Administration excavated five sites (two middens, two cemeteries, and a small grave site) adjacent to the southwestern shore of Buena Vista Lake, the northwestern shore of which lies less than 5 miles from the southern reaches of the Project. The midden sites, CA-Ker-39 and CA-Ker-60, exhibited stratified deposits that represented both prehistoric and protohistoric/historic occupations. Materials recovered from the two cemeteries, CA-Ker-40 and CA-Ker-41, appeared contemporaneous with materials from the upper deposits of CA-Ker-39 and -60, suggesting that they may have been the burial grounds for the inhabitants of the midden sites. Reported upon by Wedel (1941), this investigation stands as the “most intensive scientific excavation work so far in the southern San Joaquin Valley” (Moratto 1984:188).

In 1899, 1909, 1923, 1924, and 1925 test excavations took place at more than 20 different sites around Buena Vista Lake and Slough, and Tulare Lake, all focusing on the recovery of burials and grave goods from large village sites (Gifford and Schenck 1926; Hartzell 1992:122). This work was followed in the 1930s through 1960s by limited excavations in the southern San Joaquin Valley, primarily around Buena Vista Lake, by various researchers, including the Smithsonian Institute, Wedel, von Werlhof, Warren, and Fredrickson, also focusing on larger village and burial sites (Schiffman and Garfinkle 1981:3-4).

CA-Ker-39 and -40 were subsequently found to be components of a much larger site, CA-Ker-116. Excavated in the mid-1960s by Fredrickson and Grossman (1977), CA-Ker-116 was found to contain a deeply buried component that was not identified by Wedel. Situated at depths of greater than 280 centimeters, this component was dated to circa 6250 B.C. (Moratto 1984:99, 188).

From an archaeological perspective, research conducted within the southern San Joaquin Valley resulted in the identification and definition of a number of temporal components, periods, or phases that reflect prehistoric human lifeways and land use patterns. This research has predominately focused on sites along the ancient shoreline of Buena Vista Lake (Fredrickson and Grossman 1977; Gifford and Schenck 1926; Hartzell 1992; Riddell 1951; Walker 1947; Wedel 1941) and in the Tulare Basin area (Angel 1966; Hewes 1946; Siefkin 1999).

Wedel’s (1941) investigations included excavations at five sites on the southwestern edge of Buena Vista Lake, including two shell middens, two large cemeteries, and an additional small site in the adjacent hills. A general chronological framework was defined based on stratigraphic analyses and comparison of artifact assemblages, resulting in a two-phase sequence of pre-European late occupation and an earlier cultural complex (Wedel 1941). The early complex was correlated to the Oak Grove Culture of the Santa Barbara Coast, dated at 2,000 –

4,000 years ago (Meighan 1955) and 4000-7000 years ago (Heizer 1964). The late complex was clearly separated from the earlier by both stratigraphy and artifact types. Wedel (1941) subdivided the late complex into two phases: the early late phase, and the later protohistoric period. Wedel suggested that the early late phase began about A.D. 1400, and reflected a simple complex with similarities to the Tulare Basin to the north. The later protohistoric period, dating to after A.D. 1500 or 1600, revealed strong influence from Santa Barbara coastal cultures.

In the mid-1960s, additional investigations were conducted along the southwestern shoreline of Buena Vista Lake at CA-Ker-116 (Fredrickson and Grossman 1977), a small part of an extensive occupation zone that parallels the shoreline for a distance of about 2 miles (Fredrickson 1986). Incorporating data from both Wedel's (1941) study and his own 1960s work, Fredrickson (1986) has since proposed a four-phase cultural sequence for the Buena Vista Lake area.

The earliest occupation is represented by a meager inventory of distinctive artifacts, which include a ground-stone atlatl spur, three crescents, and fragments of several crude, leaf-shaped projectile points (Fredrickson 1986). Radiocarbon age determinations provided three dates of suggested cultural association: two dates were 6250 B.C., and a third 5650 B.C. (Fredrickson 1986; Fredrickson and Grossman 1977). Fredrickson (1986) notes that although similar style artifacts were recovered from Paleo-Indian period contexts at Tulare Lake (Riddell and Olsen 1969), similar conclusions regarding such antiquity at CA-Ker-116 should not be made in the absence of corroborative stratigraphic data.

The ensuing phase is represented by sparse remains that reflect an early milling stone assemblage with possible cultural relationship to the Oak Grove and other milling stone complexes of southern California (Fredrickson 1986). Hallmark attributes include handstones, milling stones, flake scrapers, and extended burial posture. This phase remains undated, but inferences may be drawn from the milling stone horizon elsewhere in southern California, which began as early as 5000 BC and persisted for 3,000 years or more (Fredrickson 1986 citing Wallace 1971).

The next cultural phase, the late period (ca. A.D. 900 – A.D. 1500), is separated from the milling stone complex by millennia, because no assemblage has been found along the southwestern lakeshore to fill in the presumed occupational gap (Fredrickson 1986). Based on stylistic and technological differences in artifact forms, Fredrickson (1986) has tentatively divided the late phase into two subphases: the earlier subphase and the later subphase. The earlier subphase is distinguished by split-punched and whole spire-lopped *Olivella* beads and crudely made leaf-shaped points. The later subphase is defined by more finished and rough disk *Olivella* beads and by a local bead-making industry, which may have used rare whole-shell *Olivella* (Fredrickson 1986). Small quantities of asphaltum are noted, as are hopper mortars, and clay-lined roasting ovens filled with freshwater clamshell; steatite is rare.

The final period at Buena Vista Lake is considered to represent the ancestral Yokuts' continuous use of the lakeshore environment. This protohistoric period, dating perhaps from A.D. 1500 to the ethnographic period, is represented by abundant use of asphaltum and steatite, the presence of baked clay objects, triangular projectile points, an elaborate bone technology, bowl hopper mortar, disk *Olivella* beads, *Halotis* beads and ornaments, marine clam shell disk beads, and small pendants and carvings of steatite (Fredrickson 1986).

More recent archaeological research conducted by Hartzell (1992) at sites along the southwestern margin of Buena Vista Lake (Wedel Site #1 and #2; CA-Ker-116) and near Buena Vista Slough (CA-Ker-180 and CA-Ker-1611) has resulted in the refinement of the lakeshore's chronological sequence as it relates to the Holocene epoch. A similar approach was taken by Siefkin and colleagues (1996) for the neighboring Tulare Basin area. Cumulatively, these studies provide definition of three broad temporal periods for the larger southern San Joaquin Valley area: (1) Early Holocene, (2) Middle Holocene, and (3) Late Holocene.

Early Holocene (12,000 to 7000 Years Before Present [B.P.]; 10,000 to 5000 B.C.)

The earliest known period of human use of the southern San Joaquin Valley dates to approximately 12,000 years ago (10,000 B.C.). During this time, native peoples lived in camps around lake margins and relied extensively on lacustrine resources (i.e., fish, turtle, freshwater mollusks, and waterfowls) and terrestrial resources (mainly rabbits and artiodactyls).

Populations are considered to have been small, considering the absence of imported items and the use of local resources from within a relatively small area centered on the lake marshes and the surrounding plains and foothills. Late Pleistocene/Early Holocene cultural deposits found in the Tulare Lake and Buena Vista Lake basins indicate that stemmed and lanceolate points and crescents were used (Hartzell 1992:317-331; Siefkin 1999:50). Also noted with these artifacts were species of extinct megafauna, although direct cultural association has not been proven (Siefkin 1999:49).

Fluted points have yet to be identified at Buena Vista Lake, a factor that Sutton (1996) correlates with the absence of a lacustrine habitat during the early human occupation of the southern San Joaquin Valley. Artifact distribution at Tulare Lake, however, indicates that water levels were lower during the Late Pleistocene, a trend that was likely reflected by Buena Vista Lake (Wallace and Riddell 1988:89). Siefkin (1999:51) considers the modern archaeological emphasis on the upper shorelines a more reasonable answer to the current lack of fluted points and other Paleo-Indian remains at Buena Vista Lake.

Middle Holocene (7000 to 4000 B.P.; 5000 to 2000 B.C.)

Few well-stratified archaeological deposits from the southern San Joaquin Valley date to this period. The paucity of such sites has been attributed to fluctuating lakeshores and the movement of campsites to locations above or below areas that have been previously studied by archaeologists (Hartzell 1992:318; Siefkin 1999:52).

This period is characterized by assemblages that are similar to Windmill Pattern sites in the northern part of the San Joaquin Valley, although it has been speculated that local deposits more closely resemble the Oak Grove and other millstone complexes of southern California. Hallmark artifacts include extended burials without funerary objects, Elko and Pinto projectile points, millstones, handstones, flake scrapers, and charmstones (e.g., Gerow 1974; Gifford and Schenk 1926; Hartzell 1992; Siefkin 1999; Wallace 1954:120-121). Mortuary patterns included extended burials without funerary objects. Also found during this period are imported items such as obsidian artifacts and beads and ornaments made of marine shell. Worked bone

and steatite implements occur in the archaeological record in limited amounts (Hartzell 1992:322).

From archaeological evidence, it appears that year-round acquisition of fauna occurred at lakeshore sites, and many logistical bases were set up along lakeshores. Rises above the lakes were likely occupied by hunting parties when they needed to retool weaponry and process game (Hartzell 1992:320).

Late Holocene (4000 B.P. to 150 B.P.; 2000 B.C. to A.D. 1850)

In contrast to earlier periods, the archaeological record of the Late Holocene period is significantly more complex. During the Late Holocene period, with the lowering of water levels and greater amounts of alkaline in the area lakes, a residential mobility pattern of land use began. This strategy involved more frequent moves, where an entire population or group traveled to resource areas.

Notable technological changes include the introduction of the hopper mortar, changes in *Olivella* shell bead forms, and the use of asphaltum in small quantities (Fredrickson 1986; Hartzell 1992:326). Also introduced into the tool kit were Cottonwood series projectile points, bi-pointed bone objects used as fish hooks, steatite H-shaped “reels,” and tule-covered clay ball net weights. Late-Holocene-period sites often contain freshwater mussels, turtle remains, ground stone, and marine shell beads (Peak and Associates 1991), and are generally found on knolls between ephemeral drainages (Hartzell 1992:328; Moratto 1984:189). Mortuary patterns included flexed or semi-flexed burials, somewhat similar to the Late Horizon of the Central Valley sequence.

The protohistoric period of the Late Holocene, dating from roughly 500 years B.P. (A.D. 1500) to the ethnographic period, is represented by a diversified artifact assemblage. Common implements included baked clay objects, triangular projectile points, elaborate bone work, bowl hopper mortars, *Olivella* disk beads, *Haliotis* beads and ornaments, clamshell disk beads, and small steatite pendants and carvings (Fredrickson 1986).

Elk Hills/Buena Vista Lake

The Project Site is on the northeastern flanks of the Elk Hills, northwest of the ancient shores of Buena Vista Lake. A large number of sites are represented in the archaeological record in the vicinity of the Elk Hills and Buena Vista Lake, dating (very tenuously) to between 5000 and 4000 years B.P. These dates are based on radiocarbon samples associated with deeply stratified freshwater mussel shell in the Elk Hills (Jackson et al. 1999).

As the environment began to normalize and approach near-modern conditions, the lakes, marshes, and sloughs on the valley floor began to revitalize. Oak trees and other temperate plant species began to spread to lower elevations along the river drainages and in the wetter valleys. Plant foods remained an important food supply, but freshwater mollusks, fish, water fowl, and elk returned as staple food sources. As the environment offered more and more stable food sources, the population of California began to steadily increase. By 3000 to 2000 B.P., this increase was leading many groups to the brink of starvation as more and more people competed for a large but limited food supply. It is believed that this stress led the people of California (as a

whole) to the development of massive trade networks and their reliance on acorns, which remained relatively unchanged until European contact in the late sixteenth and early seventeenth centuries.

From 3000 B.P. to the near protohistoric contact period, the archaeological record of the Elk Hills area shows an almost continual period of use. The extensive marshlands of Buena Vista Lake, Kern Lake, and their huge interconnected sloughs were fed seasonally by spring and winter flooding of the Kern River. These were the center of the sub-region's human occupation, because much of the immediately surrounding areas were near-desert scrub lands, much as they are today.

The Buena Vista Basin's cultural chronology has been categorized and seriated by Hartzell (1992) based on excavations at several Buena Vista Lake and Slough sites, including the Buena Vista site (KER-116) and the Wedel Sites #1 and #2. Hartzell's first phase for the Late Holocene extends from 4000 B.P. to 2000 B.P. and is identified by extended burials, Pinto and Elko projectile points, milling stones and manos, and an increase in the variety of lake fish and land mammals present in associated middens. This phase ends around 2000 B.P. and transitions into a second phase that lasts until approximately 1000 B.P.

This second phase is identified with flexed burials, Cottonwood triangular projectile points, the appearance of the first semi-permanent house structures, clay-lined storage pits, and an explosion in the variety and numbers of lake and land animal remains present in the site middens. This period also shows evidence of the revitalization of long-distance trade and the exploitation of animal and plant resources from well outside the immediate lake shore area being brought back to the lake villages for processing and consumption.

The final phase begins around 1000 B.P. and continues until the historic period. Hartzell (1992) notes that in this late period the lake shore sites are not as continually occupied as in earlier periods. This change coincides with a warm period that would have lowered lake shore levels and made the water more alkali. It is thought from sites along the eastern fringe of the Elk Hills and along the Buena Vista Slough that much of the area's population moved to where the pluvial environment was more stable, but also incorporated a larger amount of foraging and inter-area and regional trade. In this period, hopper-style mortars and associated groundstone pestles appear, suggesting the use of acorns as a dietary mainstay. An increase in trade material from the Santa Barbara Coast and Trans-Sierra locations gives evidence of this area being a possible focal point for inter-regional trade. The latter half of this phase correlates with a protohistoric period evidenced by the presence of glass trade beads. A primary village in this period is thought to be the historic Tulamni Yokut Village of *Tulamniu*, which was visited and attacked by the Spanish in the late eighteenth and early nineteenth centuries.

5.3.1.3 *Ethnographic Background*

The Project study area is within the homeland of the Southern Valley Yokuts (Wallace 1978:448-449), a geographic division of the much larger Yokuts linguistic group who occupied the entire San Joaquin Valley and adjoining Sierra Nevada foothills (Kroeber 1907, 1925, 1963; Latta 1977; Newman 1944). Yokutsan is one of four Penutian linguistic stocks that included Costanoan (Ohlonean); Miwok (Utian); Wintu, Nomlaki, and Patwin (Wintuan); and the Maidu, Nisenan, and

Koncow (Maiduan) (ShIPLEY 1978). Figure 5.3-3 depicts the ethnographic territories of the Southern Valley Yokuts and their neighbors.

In contrast to the typical California cultural grouping known as the tribelet, the Yokuts were organized into “true tribes,” in that each had “a name, a dialect, and a territory.” Kroeber (1925:474) estimated that as many as 50 Yokuts tribes may have originally existed, but that only 40 were “sufficiently known to be locatable.” Each tribe inhabited an area averaging “perhaps 300 square miles,” or about the distance one could walk in any direction in half a day from the center of the territory. Some Yokuts tribes only inhabited a single village, while others occupied several (Kroeber 1925: 474-475).

The Southern Valley Yokuts territory was centered near the basins of Tulare, Buena Vista, and Kern lakes, their connecting sloughs, and the lower portions of Kings, Kaweah, Tule, and Kern rivers (Figure 5.3-3). Sixteen subgroups, each speaking a different dialect of the Yokut language, made up the Southern Valley Yokuts, and included the Apyachi, Choynok, Chuxoxi, Chunut, Hewchi, Hometwoli, Hoyima, Koyeti, Nutunutu, Pitkachi, Tachi, Telamni, Tulamni, Yawelmani, Wowol, and Wechihit. Three of the groups, the Tachi, Chunut, and Wowol, claimed the shores of Tulare Lake, while the Nutunutu inhabited the swampy area north of Tulare Lake, south of Kings River. The Wimilchi, Wechihit, and Apyachi occupied the area to the north of Kings River, with the Apyachi living near the river’s outlet on the western side of the valley, and the Wimilchi and Wechithit to the east. The Choynok occupied an area east of Tulare Lake in the Kaweah River Delta, southwest of the Telamni and Choynok groups. The Koyeti’s territory was in the swampy sloughs of the Tule River. The Tulamni occupied Buena Vista Lake, with the Chuxoxi living in the channels and sloughs of the Kern River Delta. The Hometwoli occupied the area surrounding Kern Lake, while the Kawelmani lived to the northeast near Kern River and Poso Creeks (Wallace 1978:449).

Subsistence strategies focused on fishing, hunting waterfowl, and collecting shellfish, seeds, and roots. Fish species commonly hunted included lake trout, chubs, perch, steelhead, salmon, and sturgeon. Waterfowl were mainly caught in snares and nets. Plant foods played a key part in the Yokuts diet; the most important resource was tule, whose roots and seeds were eaten. Other plant foods included various species of grasses, clover, fiddleneck, and alfilaria. Acorns were not readily available, and groups often journeyed into foothill zones to trade for the nut (Wallace 1978:450).

Southern Valley Yokuts generally placed their settlements on top of low mounds near major watercourses, and constructed two types of permanent residences. The first was an oval, single-family dwelling with wooden framing covered by tule mats. The second type was a long, step-roofed communal residence that housed at least 10 families. Other structures included granaries and a communally owned sweathouse (Wallace 1978:450-451).

Southern Valley Yokuts relied heavily upon tule reeds for making woven baskets and mats. Basketry tools, such as awls, were made from bone (Wallace 1978:451-452). Flaked stone implements included projectile points, bifacial and unifacial tools, and edge-modified pieces. Ground stone tools consisted of mortars, pestles, handstones, and millstones.

5.3.1.4 Historical Background

Hispanic Period

Southern California and the Pacific Coast had been visited by Europeans since the early sixteenth century. With the development of the Spanish mission system and establishment of the first Franciscan mission at San Diego in 1769, California was firmly placed in the historic timeline. European trade goods were likely not unknown to the inhabitants of the southern San Joaquin Valley, but direct contact was rarely made. The Southern Valley Yokuts were no doubt keenly aware of the Franciscan missions as their southern and western neighbors, the Chumash, were strongly integrated into the mission system. European trade goods were not uncommon, and are often found in historic period burials in the form of trade beads. It is also well documented that many Chumash neophytes fleeing the oppressive mission system went to the *Tulares* area within the southern San Joaquin Valley and hid amongst the Yokuts inhabitants there (Castillo 1978, Grant 1978).

The southern San Joaquin Valley was not visited by Europeans until 1772, when Don Pedro Fages entered through the Tejon Pass, south and east of the Elk Hills, in a meandering overland search of southern California for fugitive Indian neophytes between San Diego and San Luis Obispo (Wallace 1978; Cook 1960). Fages' party traveled west along the foothills of the Tehachapi Mountain range, arriving at the Tulamni Yokut village of Tulamni along the shore of Buena Vista Lake. Fages named the village Buena Vista, making notes on the huge expanse of tule reeds, thus giving the region its historical Spanish name of *Tularenos*. The southern San Joaquin Valley was seen as uninhabitable and not suitable for settlement or a mission due to the marshy landscape and the perception of the interior Native population as dangerous heathens that actively aided in the corruption of the mission neophytes.

The next recorded visit by a European was Padre Francisco Garces in 1776, who entered the Valley through the Tehachapi Mountains and traveled around the Elk Hills and Bakersfield area looking for possible sites for a new mission, although no missions were constructed in the southern San Joaquin Valley. Other Franciscan monks came into the Elk Hills area, mainly traveling east from Santa Barbara and San Luis Obispo towards the Mojave Desert and the Colorado River. The region was only sporadically visited by Europeans over the following 50 years, usually by military or militia forces from the coastal missions and presidios searching for fugitive neophytes or stolen cattle or horses.

The largest incursion came in 1824 in the wake of the Chumash revolt at the Santa Barbara Mission. A vast majority of the Chumash neophytes, fighting against the oppressive mission system and rising death rate, took the Santa Barbara Mission and held it for several days against the Spanish military, trying to remove them. When the rebelling party, numbering over 400, left the mission, they fled north and east towards the southern San Joaquin Valley. This group of Chumash hid amongst the Tulamni villages along Buena Vista Lake and Slough. Several Spanish-led military forces entered the valley to apprehend the rebels but were foiled when they were defeated in small skirmishes with the Yokuts. Many of the Chumash rebels later returned to the mission after the Franciscan Padres, escorted by a military force, entered the Buena Vista Lake area and convinced them to return (Castillo 1978, Grant 1978).

The decades following this incident saw very few European visitors other than Spanish ranchers or militia attacking groups for punitive raids and to capture slaves. In 1833, a malaria epidemic swept through the tribes of the San Joaquin Valley, decimating the population. Many early American explorers of the mid-1800s commented on the land being essentially depopulated in the aftermath of the epidemic.

Explorers such as the American trapper Jedediah Smith passed through the area, and their routes became important transportation corridors used by later travelers, stage companies, and settlers. The Mexican government granted the first ranchos in the southern part of the valley in the early 1840s, the closest to the study area being the 17,710-acre *Rancho San Emigdio*, which was granted to Jose Antonio Dominguez in 1842 (Beck and Haase 1974: 34; Hoover et al. 1990:123). These ranchos, however, did not result in permanent settlement. Instead, Mexican rancho owners along the California coast allowed their cattle to wander and graze as far afield as the San Joaquin Valley during this period (Robinson 1961: 1-12, 17-20, 28-29).

The American Period

A major factor leading to the disintegration of Mexican control of California was pressure from the United States. Initial contacts were made by private citizens, such as the aforementioned November 1826 visit by Jedediah Smith to the San Gabriel Mission. Settlement by United States citizens greatly increased after discovery of gold in 1848. California became part of the United States as a consequence of the Mexican War of 1846–1847. The territory was formally ceded in the treaty of Guadalupe Hidalgo in 1848, and was admitted as a state in 1850 (Bethel, 1969).

In 1851, the Yokuts, along with several other San Joaquin Valley tribes, agreed to relinquish their land, opening it to settlement under federal land law. These laws fundamentally shaped the early history of Kern County. The study area, which lies along the Buena Vista Slough and the marshy area connecting Buena Vista Lake and Tulare Lake, was sold under the Arkansas Act of September 28, 1850, whereby Congress ceded to certain states the swamp and overflowed lands on the federal public domain within their borders. The state was then to use the proceeds from the sale of such lands to reclaim them, thereby making them useful to the new landowners. The land act was subject to abuse and fraud. The seasonable nature of swamp land in California led to disagreements between state and federal surveyors regarding the boundaries of swamp land. In some instances parcels sold as “dry” by the federal government were also sold by the state as swamp and allowed to be inundated. In the end the state made its own surveys, and on December 5, 1871, the Secretary of the Interior accepted the state’s boundaries.

The state also struggled to find a means of reclaiming the swamp lands. The Green Act of 1855 placed settler’s payments into an earmarked fund. When the settler could prove that the land was ‘reclaimed,’ usually by affidavit, they were given a cash credit, about \$1 an acre – for the purchase price. The Green Act also removed limits on acreage, allowing the assembly of large tracts. After 1868, the counties’ boards of supervisors served as reclamation commissioners. The purchase price (\$1 per acre) was paid into the county’s swampland fund, but the county swampland commissioners could waive payment if independent commissioners attested that the land had been reclaimed and cultivated for 3 years (Thompson, Ph.D. dissertation, 1958, 185-207). Upon the selection of a parcel, a settler received a certificate denoting their claim; a certificate of purchase upon partial payment; and a state patent for the lands followed upon

completion of payments and reclamation. It was under these provisions that Henry Miller, Charles Lux, John Redington, Horatio Stebbins, F.A. Tracy, H.L. Bonestell, and Horatio Livermore amassed their acreage on the lower Kern River west of Bakersfield. They acquired swampland certificates of purchase from would-be settlers or from local agents like Julius Chester, Duncan Beaumont, Richard Stretch and Thomas Baker, whose earliest claims were made in the area dated to January 28, 1870 (Cooper Zonlight, 1979). In this manner, Miller and Lux secured their “Southern Division” in Kern and Kings Counties.

The partnership between Henry Miller and Charles Lux, both German immigrants, began in San Francisco where they both worked as butchers in the early 1850s. They cemented their business partnership in 1858 when they joined forces to purchase a herd of Texas cattle. From that point forward they sought western lands to purchase for the purpose of operating ranches for their increasing herds (Igler 2001, Introduction). After acquiring their Southern Division, they organized it into ranches, the largest being the Buttonwillow Ranch, which served as the headquarters ranch of that division. Originally, the headquarters complex known as “Old Headquarters” lay in the south at the base of Tupman Road before moving to Buttonwillow in 1885. The Buttonwillow Ranch consisted of 52,440 acres, and the Project study area lies entirely within its former limits. The area operated under this single ownership from the 1870s until 1927, when Miller and Lux Incorporated (Miller & Lux) started selling the land.

The system of drainage, irrigation, and flood control canals built by Miller & Lux has left an enduring legacy in the area. Although some of their southern lands could immediately accommodate their herds of cattle, other areas required an output of time, money, and effort, primarily in the form of water control features. Construction of the drainage and irrigation canals was critical to the reclamation efforts of their newly acquired swampland along the Buena Vista Slough. If the waters of the Kern River could be diverted away from the slough, the swamp could be dried and then irrigated. Under the Arkansas Act, the Buena Vista Slough was to be reclaimed as a part of the purchase agreement.

In accordance with Assembly Bill 54 of 1861, Swampland District 121 was formed in May 1871, including swamplands along Buena Vista Slough. Miller and Lux, along with a few others who had pastured their cattle in the slough, organized the Kern Valley Water Company in 1876. The Kern Valley Water Company acted as agents for the district. The principal works of the company would be canals for irrigation and for reclamation, known as the Kern Valley Water Company Canal (KVVCC). The following year, canal construction began along the western side of the slough. Fifty-horse teams pulling one-ton “Fresno Scrapers” excavated the bed of what would come to be known as the Kern Valley Water Company’s Canal. When finished, the canal measured 125 feet wide and 24 miles long. It was a massive project that required a significant labor force. Fortunately for the Kern Valley Water Company, recently laid off Southern Pacific laborers gladly took the jobs.

The system of canals created during the Miller & Lux period consisted of canals dug and maintained by Miller and Lux, and a system of laterals dug and maintained by individual tenant farmers. After constructing the main flood control canal along the western side of the swamp, Miller & Lux also constructed the East Side and West Side Canals for distribution, sometime prior to the early 1890s. As their names indicate, these canals bordered the eastern and western sides of the Buttonwillow Ranch, with the West Side Canal running closely parallel to the

KVWCC. Much smaller in scale than the flood canal, the West side was only 30 feet wide and 2 feet deep, and the East Side 25 feet wide, and 3 to 5 feet deep. Miller & Lux also constructed a drainage canal, called Main Drain, from the southern end near the old headquarters northerly through the center of the ranch generally along the line of the original Buena Vista Slough (Barnes 1920, 9). Farmers in the north used the water from Main Drain, collected primarily by seepage, for irrigation. The remainder of the canals and laterals in the area were primarily the works of individual farmers who sought to hook in to the main canal system for irrigation of their farms (Miller n.d.; USGS 1898, 61-63; Lewis Publishing Company, 1892).

Miller & Lux also had an enduring water control feature built in the study area. Near Old Headquarters, a weir separated the KVWCC from the Outlet Canal that fed water directly from the Kern River. The weir allowed Kern River water to be diverted into the East and West Side Canals for distribution. Originally the first in a succession of timber weirs that controlled the flow of water up the canal, after decades of troublesome wash-outs and flood damage, Miller & Lux invested in a more permanent structure at the point where the main canals met, near Old Headquarters. In 1911, they hired John B. Leonard and W. P. Day to engineer a reinforced concrete structure to serve as both weir and bridge over the massive flood control canal (Leonard and Day 1913; Lippincott and Means 1919).

The canal system allowed Miller & Lux to support settlement in the area. By 1919, Miller & Lux farmed the entire area south of Buttonwillow between East Side and West Side Canals south to Old Headquarters. Individual ranches made up of one to four sections and staffed by Miller & Lux employees operated independently of one another. Each had its own set of buildings and a water supply system. Four ranches in addition to the headquarters operated in the study area by 1918: Deep Wells, Poplar Grove, Willow Grove, and Morton Place. These ranches grew almost all of the alfalfa farmed by the company at Buttonwillow. North of the railroad that crosses through Buttonwillow, the company rented their land to tenant farmers. Generally, the farmers grew crops Miller and Lux agreed to buy in their entirety, which often translated to corn and grains to serve as hog feed and winter feed storage (Barnes 1920, 17-18). Milo Maize and Sorghum were also planted and then grazed by herds brought in the Fall (Means 1919, 10-11; Stegeman 1918).

The town of Buttonwillow got its start when Miller & Lux established a ranch headquarters near a single landmark buttonwillow tree in the slough in 1885. They tried to name it Buena Vista, but the area had long been described relative to that Buttonwillow tree, and the name stuck (Burmeister 1977, 85). The Old Headquarters was not abandoned entirely; in 1919 an abattoir functioned at the site, supplying the company's ranches, Bakersfield, and the oil regions with a fresh supply of beef, pork, and mutton (Means 1919).

At the new headquarters in Buttonwillow, a company store provided needed supplies to the ranch hands. In 1893, Miller & Lux sold 71 acres to the Pacific Improvement Company to establish a station and town at Buttonwillow. In 1895, they advertised in San Francisco to promote the settlement of an Italian colony in the Buttonwillow region to grow wheat. A few families attracted by the offer established farms in the area on land leased from Miller & Lux (*Buttonwillow Times* 3 March 1960). Angelo Toriginni was one of the Italians attracted from San Francisco to the Buttonwillow area. In 1899, he joined a brother already employed at the Buttonwillow Ranch. In 1950, he reminisced that 23 families lived in the area when he arrived,

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only 3 of which were not Italian. He also stated that he was the only one of those 23 families remaining in the Buttonwillow area (*Shafter Press* 3 August 1950). A post office established in 1895 indicated a stable population. The majority of the townsite reverted to Miller & Lux though. In 1927, Miller & Lux Incorporated, under the direction of land agent C. E. Houchin, platted incarnation of the town (Burmeister 1977, 85; Smith Ph.D. Thesis 1976, 328). Eventually this area became the focus of a large-scale international marketing campaign that brought families from Europe and the eastern U.S. to start farms and vineyards.

Charles Lux died in 1887, and Henry Miller carried on the business until his death in 1916. By this time the company was in decline, unable or unwilling to meet the changing business environment. As the heirs to the company fought over the estate, the property was sold off following World War I, ushering in a new era for the Buena Vista slough (Iglar 2001, 180).

Miller & Lux entered a period of decline following the death of the two principals. Settlement of the estates and increasing competition resulted in a period of legal reorganization that would have a physical impact on the area south of Buttonwillow. Miller & Lux had both valuable land and valuable water rights. However, the profitability of the two was linked. In order to sell the land, a legal means of matching water to the land was necessary. In 1920, the California State Engineer released a report on the water resources of the Kern River and recommended that a large district, including the Haggin and Miller & Lux water rights, be formed to manage water distribution. Despite the effective implementation of the Miller-Haggin agreement, the two parties chose to protect their interests by forming two districts.

Miller & Lux's holdings became the nucleus for the Buena Vista Water Storage District. The district submitted a petition for formation to the State Engineer in 1922, and received approval in 1924 (Bonte 1930, 243). As a part of the district formation, Miller & Lux allocated water rights to the land within the district, making future sales possible. The district exchanged bonds with Miller & Lux for the existing canals, and additional bonds were sold for the construction of additional canals. The district, however, held off on construction until 1926 to see if it could work with other Kern River users to construct a mountain storage reservoir. Not seeing active progress, the district left the location of water storage flexible and continued operations. The first major construction project was to lessen water loss at the end of the Kern River through the construction of a direct connection to the canal system and a direct canal to Buena Vista Lake. Additional construction would focus on the northern portion of the district, because the southern end around Buttonwillow had been well developed by Miller & Lux (Harding 1935).

With water rights allocated to the land and an operating water storage district, the area became suitable for sale. Buttonwillow had been first platted by Southern Pacific in 1893 in conjunction with Miller & Lux. Now, with the need for cash, the town was replatted in 1927. Miller & Lux land agent C.E. Houchin organized and promoted the kick-off sale. As discussed above, Miller & Lux had previously leased land north of Buttonwillow and induced Italian immigrants to come to the Buttonwillow area. The descendants of some of the original immigrants now purchased former Miller & Lux land south of Buttonwillow. Along with the Italians, a few large-scale investors purchased land in the area, including Rhoda Rindge Adamson of Adohr Farms, and the Parsons.

A large oil deposit found in the Kern River Oil field near Bakersfield in 1899 sparked the interest of oil explorers throughout Kern County. By 1910, the entire Elk Hills had been bought. Standard Oil, Southern Pacific, and Associated Oil were the three largest land owners. The government, especially the Navy, became concerned at this rapid industrial growth and stepped in, stopping the sale of all public lands on the Elk Hills. In 1910, only 20 wells were dug with minimal output. By 1918, only 35 wells had been dug. In the fall of 1918, Standard Oil began the drilling of Hay No. 1, and in January 1919, the well struck oil and produced a modest 200 barrels of oil a day.

By the mid-1920s, several other companies had opened oil camps that were producing up to 4,000 barrels of oil a day. These strikes proved that oil reserves were present on the Elk Hills and another land rush began. The Navy, concerned at the possible depletion of this resource, moved to prevent claim filings. The Navy also began to drill along the edge of federal lease land in an attempt to slow the depletion. Through the 1930s, it was seen as a race against time and the Navy made several deals with private firms in an attempt to secure as much of the oil as possible.

At the height of World War II, the Navy began to post officers as guards throughout the Elk Hills oil camps. In 1944, an oil shortage compelled Congress to increase oil production from 15,000 barrels to 65,000 barrels per day. In June 1944, the federal government enacted Public Law 343 transferring all public land leases to the Navy's jurisdiction (Baker 2000). In less than 8 months, 312 new wells had been dug for the Navy, ending in 1945 with the end of the war.

It was during this period that the Navy began to maintain a small force in the Elk Hills. A Construction Battalion (CB) was stationed on the Elk Hills, and their first priority was to build and improve the roads of the area. Well operation was usually undertaken by skilled workmen, leaving the CBs time for other undertakings. The CBs surveyed section lines; installed brass section markers; built barracks; staked over 750 oil wells; graded for over 400 wells; and staked over 100 miles of roads, water lines, and oil and gas mains.

As discussed above, under the control of Miller & Lux, the types of crops were limited, and supported the cattle and ranching operations of the company. In 1920, the area south of Wasco produced alfalfa, grain, and volunteer pasturage (hay). The exact percentages of these crops depended upon the amount of water available from the Kern River runoff. A report from Thomas Means on the Miller & Lux Southern Division in 1919 pointed to the potential for other crops, notably cotton and fruits (Barnes 1920, 16-17; Raznoff 1945, 26; Means 1919). The variable volume and seasonability of water, as well as the demands of the Miller & Lux operation, had limited the development of these new crops. However, in 1928, these limits eased enough for the introduction of cotton as a new major crop.

Cotton had been grown in Kern County since 1862. A knowledge base for the cultivation of the plant and its processing slowly developed. Bakersfield became a center for processing and shipping of the processed fiber and oil. In 1906, the discovery of Acala cotton, a strong long-fibered variety, at the Shafter Experimental Farm boosted the industry. In 1928, the first cotton crops were planted in the area south of Buttonwillow. No longer restricted to supporting the cattle, the new farmers could exploit this commercial crop. Production was also assisted by the exploitation of groundwater (Burmeister 1977, 81-82; Raznoff 1945, 26).

Groundwater had not been considered as a part of the water supply for the Buena Vista Water Storage District when it was formed. Early attempts to drive wells were thwarted by sandy

subsoils, which collapsed into the wells. However, by 1928 new techniques were developed including a ‘gravel envelope’ which protected the wells from collapse. A series of dry years had encouraged farmers to develop wells, and between 1928 and 1937, nearly 130 wells were drilled in the area surrounding Buttonwillow (Harding 1935, 24; Raznoff 1945, 45).

One of the largest and most successful enterprises in the study area following Miller & Lux’s ranches was the Adohr Stock Farms, which occupied the southern portion of the study area. Adohr Stock Farms was a Southern California dairy company owned by Rhoda Rindge Adamson and her husband Merritt Adamson. Rhoda Rindge was the daughter of Frederick H. Rindge, a very wealthy, influential East-Coast transplant to California (Rindge 1972, prologue). Rhoda attended one year of college at Wellesley before purportedly missing the West and returning to finish her education in California. After marrying Merritt Adamson, an attorney and sheep rancher’s son, she used her family inheritance to start Adohr (her given name spelled backward) Farms with her husband (Los Angeles Times, August 31, 1930; Van Nuys News, January 10, 1949). By the late 1920s, they strove to vertically integrate their business, seeking to not only maintain a herd of productive dairy cows, but to rear “replacement” calves, and grow the alfalfa necessary to keep their herd fed (Ulery 1930).

In 1929, the Adamsons had an area northwest of Tupman, owned by Miller & Lux, analyzed to determine if the soil and conditions would support an alfalfa farm and a herd of cattle (Los Angeles Times, September 30, 1934). They learned that the land had rich soil, lay on top of an artesian belt, and had already been successfully planted with corn and wheat. After being satisfied that the land met their requirements, they purchased 1,500 acres from Miller & Lux in July 1930 for \$250,000. They designated \$50,000 for immediate improvements. Their plans to build a ranch headquarters and make irrigation improvements quickly came to fruition. By the fall of the same year, a field had been planted with alfalfa, ten new wells had been sunk, and construction of a headquarters building, dormitory, and dining hall had been completed on the southeastern corner of what became Adohr Road and Dairy Road (Los Angeles Times, July 26, 1930; November 9, 1930).

By May 1933, Adohr had expanded its Buttonwillow satellite ranch to 2,600 acres. Although this location was subsidiary to the main San Fernando Valley branch, its significance lay in that it allowed Adohr to hail their “independence.” Adohr ran an advertisement in the *Los Angeles Times* in 1933 with the headings, “Adohr grows its own feed; Adohr raises its own dairy cattle; Adohr operates its own stock farms; and Adohr, of course, has its own far-reaching delivery system” (Los Angeles Times, June 1, 1933). The rich land in Kern County, already within close proximity to numerous irrigation structures, played a pivotal role in allowing this southern California company to integrate their business model vertically and provide an affordable product to a broader clientele.

Although Adohr Farms reflected the continuing involvement of the stock industry in the study area, most of the area diversified. Between 1920 and 1935, cotton production grew to 3,800 acres, volunteer pasturage ceased, grain production nearly quadrupled, and milo was introduced (Raznoff 1945, 27). By 1945 the three major crops around Buttonwillow were alfalfa, cereal grains, and cotton. These commercial crops supported 187 farms, only 85 of which were tenant operated. The others were both home and work for 102 families (Raznoff 1945: 26).

In 1954, a new crop—rice—was introduced to the Buttonwillow area. The new reservoir at Lake Isabella had been completed in 1953, promising better regulation of irrigation water. Local farmers Wayne Smith, William Buerkle, Jack Thomson, Nelson Lewis, Charles Parsons, R.L. Adams, and Hall Smalstig harvested their first rice crops in 1954. Two rice dryers were constructed: one at the corner of Highway 58 and Wasco Avenue, and a second on Palm Farms, the former Adohr Farms site. The northern rice dryer was a co-operative investment managed by R.L. Adams, who also managed the Farmer's Cooperative Gin. The first 7,500 acres were planted and treated with weed control via airplane. Combines were used to harvest the crops. Despite the arid conditions in most of Kern County, 3,377 acres of rice remained in production in 1980; however, production has since ceased (Dane 1954; Day 1954; Watson et al. 1980).

Despite the changing crops in the study area, the extensive network of canals constructed during the Miller & Lux period remained sufficient. With the advent of groundwater pumping, farmers used the canals to move water from the wells to their fields, a practice that continues today. Several years of groundwater pumping raised the water table in the area to less than 6 feet for almost 95 percent of the Buttonwillow area by 1943. This rapid rise from 1935 levels called for improvements to the drainage system, including Main Drain. At that time, Main Drain was 4 to 10 feet deep, and suggestions were made for deepening it. Between 1943 and 1944, 4.8 miles of new drains were constructed in the water storage district. The drains also needed improvements to remove obstacles to water flow. Culverts and bridges that were added as the road system developed were insufficient to keep the water flowing. Redwood culverts and corrugated metal pipe culverts, some installed by Miller & Lux, began to be replaced. The Buena Vista Water Storage District also instituted a canal maintenance program in 1943 that called for regular hand maintenance, and mechanized maintenance every 4 years. Today, the canals are reshaped twice a year and re-excavated approximately every 5 years (Raznoff 1945:16, 18-19).

In 1948, the Navy and Standard Oil amended their unit plan, and Standard Oil was named the Elk Hills unit operator. By the 1950s, the Elk Hills produced nearly 20,000 barrels of oil a day. In 1976, the Elk Hills Reserve was opened to maximum production. The Elk Hills are currently privately owned by several oil companies; the Navy sold its reserves in 1998.

5.3.1.5 Resources Inventory

The methods used to inventory the study area for cultural resources consisted of archival research, Native American consultation, and both archaeological and architectural pedestrian surveys of each cultural resource subdiscipline's respective APEs. Comprehensive technical reports from the cultural resources sub-disciplines of archaeology and historic architecture are included as Appendix H3 and Appendix H4, respectively. Specifics of these efforts are presented below.

Archival Research

A record search of files of the California Historical Resources Information System (CHRIS) housed at the SSJVIC was conducted at the request of URS by the staff of the SSJVIC on February 11, 2009 (RS # 09-019). As the design of Project alternative linear alignments was refined, record searches of CHRIS were conducted on multiple occasions. The primary record search for the various linear alignments was conducted by the staff of the SSJVIC on February

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17, 2009 (RS # 09-056), while supplemental record searches to RS # 09-056 to account for refinements in the configuration of the linear alignments were conducted by URS staff.

The purpose of the records searches was to identify all previously conducted cultural resource surveys and studies, as well as all previously recorded archaeological (including both prehistoric and historic) sites and historic architectural resources within the cultural resources study area. The results of the records search are attached in Appendix H1. In addition to the historical resources files, the following publications, manuscripts, or correspondence were also consulted:

- National Register of Historic Places (NRHP);
- Office of Historic Preservation (OHP) Archaeological Determinations of Eligibility – Records entered into the OHP computer file, received quarterly (2006); and
- OHP Directory of Historic Properties – Records entered into the OHP computer file of historic resources, received quarterly (2006).

The records search revealed that neither the Project Site nor the adjacent Controlled Area had been previously inventoried for cultural resources. Portions of the electric transmission, water (process and potable), carbon dioxide, and natural gas pipeline alternative alignments had, however, been subjected to cultural resource inventory efforts. The complete record search is attached as a confidential appendix (Appendix H1).

The information obtained in these records searches shows that 50 previous cultural resources investigations were conducted within either 1 mile of the Project Site, and/or within 0.5 mile of the various linear alternatives (see Table 5.3-1).

A review of the studies presented in Table 5.3-1 resulted in the identification of 17 cultural resource sites within the Project APE. Two of the 17 identified sites have subsequently been combined (Jackson et al. 1998), resulting in 16 previously recorded cultural resource sites within the Project APE. All of the previously recorded cultural resources are situated along the various linear alternative alignments (see Table 5.3-2).

Maps indicating the location of previous studies and Department of Parks and Recreation (DPR) 523 forms for the identified resources are provided in Appendix H1.

JRP examined the aforementioned record search, including standard sources of information that list and identify known and potential historical resources, to determine whether any buildings, structures, objects, districts, or sites had been previously recorded or evaluated in or near the cultural resources study area. JRP reviewed the NRHP (2007), California Register of Historical Resources (CRHR), California Historical Landmarks (1996), and California Points of Historical Interest (1992). These lists did not include any historical resources within or near the Project study area. None of the farmsteads or processing facilities within the study area has been previously identified as potential historic resources, nor do they appear to have been previously evaluated for listing in the NRHP or CRHR. The California Aqueduct has been previously evaluated and found eligible for the CRHR. None of the other canals in the study area has been evaluated.

**Table 5.3-1
Previous Cultural Resource Investigations within 1.0 Mile of the Project Site
and/or 0.5 Mile of the Linear Alternatives**

Report Number	Title	Author	Affiliation	Date
KE-142	A Cultural Resources Assessment and Plan for the Kern Water Bank Authority Project Near Bakersfield, Kern County, California Addendum I-Emergency Flood Area	Pruett, Catherine L., Peggy Murphy, and Dorothy Fleagle	Three Girls and a Shovel, LLC.	1997
KE-233	Cultural Resource Assessment of a Surface Waste Dump Located South of Tupman in Section 25, Township 30S, Range 24E, MDBM, NPR-1	Parr, Robert E.	Cultural Resource Facility, CSU Bakersfield	1997
KE-239	Communications Project 2125A7D0, Expansion of Cable 25 Air Force Astronautics Laboratory, Edwards Air Force Base, California	Perry, Michael E.	Computer Sciences Corporation	1989
KE-251	Archaeological Resource Assessment of the Proposed 8.8 mile Gosford Intertie Pipeline Kern County, California; An Archaeological Report	Unknown	Ancient Enterprises, Inc	1979
KE-294	Caltrans: Archaeological Survey Report	Biorn, Margaret	Caltrans	1981
KE-403	West Coast Cogeneration Project: Belridge	Fredrickson, David A, Ph.D.	Sonoma State University Academic Foundation, Inc.	1985
KE-419	Archaeological Assessment of Three Proposed Powerline Routes on the Elk Hills Naval Petroleum Reserve No. 1 Near Taft, Kern County, California	Garcia, Juanita	Cultural Resource Facility, CSU Bakersfield	1998
KE-435	Assessment of Potential Impact upon Archaeological Resources of Construction of Proposed Kern River-California Aqueduct Intertie Project by the United States Army, Corps of Engineers	Clewlow, Carl William	Institute of Archaeology, UCLA	1974
KE-513	Archaeological Assessments for Two Pipeline Corridors, City of Tupman, Kern County, California	Jackson, Scott	Cultural Resource Facility, CSU Bakersfield	1990

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**Table 5.3-1
Previous Cultural Resource Investigations within 1.0 Mile of the Project Site
and/or 0.5 Mile of the Linear Alternatives (Continued)**

Report Number	Title	Author	Affiliation	Date
KE-578	Archaeological Survey Report for the Proposed Buena Vista Slough Bridge Replacement 06-KER-58 P.M. 24.01 Bridge 50-03 06200-225500	Levulett, Valerie	Caltrans	1982
KE-650	Archaeological Survey Report for Proposed Widening Project 06-KER-119 P.M. 14.9/19.8	McManus, J.	Caltrans	1985
KE-714	Negative Archeology Report	Noble, Daryl	Caltrans	1987
KE-751	Caltrans Archaeological Survey Report	O'Connor, Dennis	Caltrans	1981
KE-919	An Archaeological Assessment of the Arco Pipeline Company Lines #2 and #50 Pipeline Replacement Projects, Southwestern Kern County, California	Parr, Robert E.	Cultural Resource Facility, CSU Bakersfield	1997
KE-924	Cultural Resource Assessment of Sample Areas of Naval Petroleum Reserve No. 1, Kern County, California	Peak & Associates, Inc.	EG&G Energy Measurements, Inc.	1991
KE-1089	Archaeological Evaluation for the Proposed Belridge Field Cogeneration Plant Kern County, California	Schiffman, Robert A.	Archaeological Research, Bakersfield College	1982
KE-1290	Archaeological Investigation for Southern California Gas Company's 24" Gas Line Kern County, California	Schiffman, Robert A.	Archaeological Research, Bakersfield College	1987
KE-1485	Archaeological Evaluation for the Proposed Belridge Field Cogeneration Plant Kern County, California	Shiffman, Robert A. and Nyle Monday	Dames and Moore	1982
KE-1810	Proposed Capture Pen and Buried Telephone Lines	Woodward, Jim	DPR	1983
KE-01811	Hunter-gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County, California	Hartzell, Leslie Louise	Ph.D. Dissertation University of California, Davis	1992
KE-1813	Supplemental Report Cultural Resources Inventory South Belridge Cogeneration Project Application for Certification	Unknown	Woodward-Clyde	1985
KE-1877	Archaeological Testing at CA-KER-3397, Northeast of Dustin Acres, Kern County, California	Osborne, Richard	Cultural Resource Facility, CSU Bakersfield	1993

SECTION FIVE**Environmental Information**

**Table 5.3-1
Previous Cultural Resource Investigations within 1.0 Mile of the Project Site
and/or 0.5 Mile of the Linear Alternatives (Continued)**

Report Number	Title	Author	Affiliation	Date
KE-1892	Report on Archaeological Testing of Twelve Sites on Naval Petroleum Reserve No. 1, Kern County, California	Peak and Associates, INC.	Peak and Associates, INC.	1992
KE-2015	Tule Elk State Reserve Cultural Resource Survey	Reinoehl, Gary	California Department of Parks and Recreation	1991
KE-2055	Archaeological Inventory and Assessment for Proposed Trash Clean-Up at 17 Localities in Naval Petroleum Reserve No. 1, Elk Hills, Kern County, California	Eidsness, Janet P.	Pacific Legacy, Inc.	1998
KE-2162	Cultural Resources Technical Report for the La Paloma Generating Project	Hatoff, Brian W.	URS Greiner Woodward-Clyde	1998
KE-2219	Joint Environmental Assessment for the Construction and Routine Operation of a 12-Kilovolt (kV) Overhead Powerline ROW, and Formal Authorization for a 10-Inch and 8-Inch Fresh Water Pipeline ROW, Naval Petroleum Reserve No. 1, Kern County, California	DOE, BLM	Department of Energy, and the Bureau of Land Management	1994
KE-2268	Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Jackson, Thomas L, Ph.D. and Lisa Jackson, M.A.	Pacific Legacy, Inc.	1998
KE-2269	Prehistoric Archaeological Extended Inventory Research at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Jackson, Thomas L., Lisa Shapiro, and Jerome King	Pacific Legacy, Inc.	1997
KE-2271	Cultural Resources Technical Report for the La Paloma Generating Project Supplement #2 to Appendix L	Hatoff, Brian W.	URS Greiner Woodward-Clyde	1999
KE-2278	Cultural Resources Inventory Report for Williams Communication, Inc. Fiber Optic Cable System Installation Project San Luis Obispo to Bakersfield	Avina, Mike A.	Jones and Stokes Associates, Inc.	1999

5.3 Cultural Resources

**Table 5.3-1
Previous Cultural Resource Investigations within 1.0 Mile of the Project Site
and/or 0.5 Mile of the Linear Alternatives (Continued)**

Report Number	Title	Author	Affiliation	Date
KE-2323	Cultural Resources Inventory Report for the AT&T Corp, Cable Upgrade Project Los Angeles, Kern, and San Luis Obispo Counties, California	Jones and Stokes Associates, Inc.	Jones and Stokes Associates, Inc.	1999
KE-2375	Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Jackson, Thomas L., Lisa Shapiro, and Jerome King	Pacific Legacy, Inc.	1999
KE-2377	Cultural Resources Assessment at the Kern River-California Aqueduct Intertie Kern County, California	Deitz, Frank	U.S. Army Corps of Engineers	1999
KE-2391	Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys	Jackson, Thomas L. Ph.D. and William A. Shapiro	Pacific Legacy, Inc.	1999
KE-2452	Western Midway Sunset Cogeneration Company Project	Unknown	WZI Inc	2000
KE-2527	Archaeological Survey for the CALPEAK #3, Midway Kern County, California	Jones, Donna	Latham and Watkins	2001
KE-2561	La Paloma Generating Project Preliminary and Final Cultural Resources Report (Condition of Certification CUL-13)	Hatoff, Brian	URS Corporation	2001
KE-2581	Cultural Resources Inventory, Evaluation, and Mitigation Plan for the Water Supply Line (Route 2), Elk Hills Power Project (99-AFC-1): Addendum to the Elk Hills Power Project Cultural Resources Monitoring and Mitigation Plan, Kern County, California	Culleton, Brenden and Thomas Jackson	Pacific Legacy, Inc.	2001
KE-2584	Archaeological Investigation of the Energy Works Buttonwillow Project Kern County, California	Christy, Juliet L.	Greenwood and Associates	2001

SECTION FIVE**Environmental Information**

**Table 5.3-1
Previous Cultural Resource Investigations within 1.0 Mile of the Project Site
and/or 0.5 Mile of the Linear Alternatives (Continued)**

Report Number	Title	Author	Affiliation	Date
KE-2717	Cultural Resources Inventory, Evaluation, and Mitigation Plan for the Transmission Line (Route 1B), Elk Hills Power Project (99-AFC-1): Addendum to the Elk Hills Power Project Cultural Resources Monitoring and Mitigation Plan, Kern County, California	Culleton, Brenden and Thomas Jackson	Pacific Legacy, Inc.	2002
KE-2817	Archaeological Survey Report for the Cherry Avenue 4-Lane Project CA-KER-119 Kern County, California	Gassner, Sarah E.	Caltrans	2003
KE-2873	Draft Supplemental Environmental Impact Report Los Banos-Gates 500-kV Transmission Project	Aspen Environmental Group	Aspen Environmental Group	2001
KE-2885	Archaeological Testing Report for the Restroom Replacement Project at Tule Elk State Reserve	Mealy, Marla M.	California State Parks	2004
KE-3045	Final Cultural Resources Report for the Sunrise Power Project Phase I	Jackson, Thomas L. Ph.D. and Brendan Culleton	Pacific Legacy, Inc.	2003
KE-3054	New Tower Submission Packet: Semi-Tropic CA-3224A	Billat, Scott	Earth Touch, Inc.	2005
KE-3344	Archaeological Monitoring Report Central Valley District	Bissonnette, Linda	ASA	2006
KE-03503	Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Shapiro, Lisa	Pacific Legacy, Inc.	1999
KE-03508	Cultural Resources Management Plan Naval Petroleum Reserve No. 1 Elk Hills, Kern County, California	Jackson, Thomas L. Ph.D. and Lisa Shapiro	Pacific Legacy, Inc.	1997
KE-03509	Historical Resources Evaluation and Assessment Report of Western Naval Petroleum Reserve No. 1, Elk Hills, Kern County, California	Hamusek-McGann, Blossom, Cindy L Baker, and Mary L. Maniery	Par Environmental Services, Inc.	1997

Notes:
MDBM = Mount Diablo Baseline and Meridian

**Table 5.3-2
Previously Recorded Cultural Resources within the APE**

Primary # (P-15)	Site Type	Prehistoric/ Historic	Associated Project Component	NRHP Status	Trinomial (CA-KER)
125	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt 2A	Not Evaluated	125
126	Shell and Lithic Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	126
171	Burial Mound	Prehistoric	PRO H ₂ O	Not Evaluated	171
666	Shell Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	666
2422	Lithic and Shell Scatter	Prehistoric	NG/ H ₂ O	Not Evaluated	2422
3077	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt2, 3A	Recommended Ineligible	3077
3079	Shell and Lithic Scatter	Prehistoric	NG/POT H ₂ O	Listed	3079
3167	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt 3B	Recommended Ineligible	3167
3254	Trash scatter	Historic	NG/POT H ₂ O	Not Evaluated	3254
6073	Shell and Lithic Scatter *Now Part of 3079*	Prehistoric	NG/POT H ₂ O	Listed as part of 3079	5060
6736	Shell Scatter	Prehistoric	NG/POT H ₂ O	Recommended Ineligible	5364
6767	Habitation Site	Prehistoric	CO ₂ All Alts	Recommended Eligible	5392
6768	Shell Scatter	Prehistoric	CO ₂ Alt 1, 2B, 3B	Recommended Ineligible	5393
6769	Shell Scatter	Prehistoric	CO ₂ Alt 1	Recommended Ineligible	5394
6780	Habitation Site	Prehistoric	CO ₂ Alt 3B	Recommended Eligible	5404
9737	Steam Plant	Historic	T-Line	Not Evaluated	N/A
9738	Feed mill and ranch	Historic	T-Line	Not Evaluated	N/A

Notes:

NGL = Natural Gas Line

NRHP = National Register of Historic Places

POT H₂O = Potable Water Line

PRO H₂O = Process Water Line

T-Line = Electric Transmission Line

*P-15-6073 (CA-KER-5060) has been cojoined with P-15-3079 (Jackson et al. 1998)

Native American Consultation

The California NAHC was contacted on four occasions during the course of the Project, requesting a records search of the Sacred Lands File, and a list of local Native American contacts (individuals and/or organizations) that might have knowledge of cultural resources within the Project study areas and various linear alternative alignments. According to the NAHC, the searches were negative for the presence of Native American cultural resources in the

archaeological resources survey areas comprised of the Project Sited the various linear alignment alternatives.

The NAHC provided lists of individuals/organizations that might have knowledge of cultural resources in the Project APEs and surrounding vicinity. Contact letters describing the Project and a map depicting both the proposed Project Site and the various linear alignments were sent to the identified parties on March 14, 2008; June 24, 2008; and April 1, 2009. It should be noted herein that the lists provided by the NAHC were not exact duplicates of each other. Certain individuals only appeared on one list provided by the NAHC, and were thus only contacted once.

The letters inquired whether the individuals/organizations had any concerns regarding the Project or wished to provide input regarding cultural resources in the Project APEs.

Copies of the NAHC request letters, NAHC response letters, mailing lists, consultation letters and responses, are appended to the Cultural Resources Technical Report, which is provided in a confidential appendix to this report. Any future responses received after the date of this report will be directly forwarded to the Applicant. A synthesis of the Native American consultation efforts is provided in Table 5.3-3 and within Appendix H2.

Archaeological Field Reconnaissance

The pedestrian (field) reconnaissance required the use of both block survey for the Project Site and abutting Controlled Area, and linear survey for the various linear alternatives [electrical transmission, water (process and potable), carbon dioxide, natural gas] portions of the APE. The block survey was completed by walking an alternating series of parallel transects spaced 15 to 20 meters (50 to 65 feet) apart over the block until the entire land area was covered, while the linear survey involved walking similarly spaced parallel transects in a single direction. In areas where nonagricultural vegetation obscured the ground surface, 20-centimeter by 20-centimeter patches were occasionally cleared using hand tools or footwear to increase ground visibility. It should be noted herein that the Controlled Area was also subject to pedestrian reconnaissance to allow for changes in the configuration of the facility and/or adjustments to the routes of linear alternatives. As of this submission, however, the Controlled Area, although inventoried for archaeological resources, is not part of the proposed Project's APE.

As sites were located during the survey, they were assigned temporary field designations (e.g., HECA-1, HECA-2, etc.) and their locations were plotted onto USGS topographic maps with the aid of handheld Global Positioning System (GPS) units. Site recordation included site mapping, completion of primary and archaeological site record forms, feature illustrations, and site photographs. All site recordation was completed using State of California DPR Forms.

Site mapping included boundary delineation, location of features, mapping of diagnostic artifacts and artifact concentrations, and location of natural features of assistance in relocating the site. In addition, to assist in the assessment of site integrity and recognition of the extent of previous impacts to sites, observable surface disturbances were also mapped. Distance and bearings to these cultural points and features were recorded from a datum established for the site.

5.3 Cultural Resources

**Table 5.3-3
Native American Consultation Information**

Contact Name and Title	Address and Native American Groups Represented	Date Contacted	Comment Received	Note
Clarence Atwell, Chairperson	Santa Rosa Rancheria P.O. Box 8 Lemoore, CA 93245 Tache, Tachi, Yokuts	14 March 2008 24 June 2008 01 April 2009	Yes	Rancheria Representative Lalo Franco requested that a Cultural Resources Monitoring Plan and a Burial Agreement be considered.
Neil Peyron, Chairperson	Tule River Indian Tribe P.O. Box 589 Porterville, CA 93258 Yokuts	14 March 2008 24 June 2008 01 April 2009	No	
Ron Wermuth	P.O. Box 168 Kernville, CA 93238 Tubatulabal, Kawaiisu, Koso, Yokuts	14 March 2008 24 June 2008 01 April 2009	No	
Kathy Morgan, Chairperson	Tejon Indian Tribe 2234 – 4th Street Wasco, CA 93280 Yowlumne, Kitanemuk	14 March 2008 24 June 2008 01 April 2009	Yes	Asked to be kept informed of Project's progress.
Kenneth Woodrow	1179 Rock Haven Court Salinas, CA 93906 Foothill Yokuts, Mono	14 March 2008 24 June 2008 01 April 2009	No	
Donna Begay, Tribal Chairwoman	Tubatulabals of Kern Valley P.O. Box 226 Lake Isabella, CA 93240 Tubatulabal	14 March 2008 24 June 2008 01 April 2009	No	
James R. Leon Chairperson	Chumash Council of Bakersfield P.O. Box 902 Bakersfield, CA 93302	14 March 2008	No	
Arienne Garcia Chairperson	Chumash Council of Bakersfield P.O. Box 902 Bakersfield, CA 93302	01 April 2009	No	
Robert L. Gomez, Jr.	2619 Driller Avenue Bakersfield, CA 93306	14 March 2008	No	
Delia Dominguez	Kitanemuk & Yowlumne Tejon Indians 981 N. Virginia Covina, CA 91722 Yowlumne, Kitanemuk	01 April 2009	No	

The pedestrian reconnaissance of the current Project APE, except the process water line, was conducted by Leroy Laurie (URS Staff Archaeologist), Joe Fayer (URS Staff Archaeologist), Joshua Peabody, M.A. (URS Archaeological Technician), and Mark Kile, M.A. (URS Archaeological Technician). The pedestrian reconnaissance of the process water line was conducted by Joshua McNutt, M.A. (URS Senior Archaeologist), accompanied by Sarah Mattiussi (URS Staff Archaeologist), Kurt McLean (URS Archaeological Technician), and Brian Shaw (URS Architectural Historian).

All archaeological fieldwork for this Project, except the ROW for the process water line, was carried out under the supervision of Michael S. Kelly, M.A. (URS Principal Archaeologist), who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983). Archaeological fieldwork along the process water line was carried out under the supervision of Reid Farmer, M.A., who likewise meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (National Park Service 1983). All fieldwork is consistent with the procedures for compliance with Section 106 of the NHPA, set forth at 36 Code of Federal Regulations (CFR) 800.

Surface visibility was generally good (greater than 80 percent) throughout the portion of the archaeological resources APE where the Project Site is situated. Surface visibility within the adjacent Controlled Area was similar to that experienced within the Project Site. As required by the revised CEC regulations, an examination of a 200-foot-wide buffer radius around the Project Site was also completed. The majority of the buffer falls within the Controlled Area; which, as described above, were completely surveyed for archaeological resources.

Along the course of the alternative linear alignment ROWs [electrical transmission, water (process and potable), carbon dioxide, natural gas], surface visibility was variable. Along the route of the electric transmission alternatives and process water line, surface visibility was moderate (approximately 50 percent) given the presence of agricultural development through which these proposed alternatives passed. Along the routes of the carbon dioxide, natural gas, and potable water alternative linear alignments, surface visibility was good (greater than 80 percent).

As required by the revised CEC regulations, an examination of a 50-foot-wide buffer radius around the ROW for each of the various linear alternatives was completed. The exception was along the process water ROW. The process water line is to be placed adjacent to the north-northeast side of the West Side Canal, and construction would not occur on the south-southwest side of the Canal. Because the Canal would act as a physical barrier for construction, impacts to archaeological deposits situated across the canal from the construction area would not occur, therefore, the area south-southwest of the canal was not surveyed.

Twenty-four archaeological resources were identified within the archaeological resources APE as defined for the Project during the course of the current investigation. Of these, 16 were previously recorded sites, with the remaining 8 composed of newly discovered resources. Descriptions of these resources and their location in relationship to the proposed Project are presented within Section 5.3.3.4. The archaeological survey report documenting these efforts, including the DPR 523 forms, is attached to this document as a confidential appendix (Appendix H3).

In addition to the pedestrian reconnaissance, Mr. Laurie also conducted archaeological monitoring of the geotechnical investigation conducted within the Project Site (see Appendix P for the geotechnical investigation report). No archaeological materials were observed within any of the five geotechnical borings placed within the Project Site.

Built Environment Inventory

JRP conducted fieldwork in the study area and recorded the properties on the DPR 523 forms, included with the built environment technical report in Appendix H4. Based on the results of the background investigation and the field survey, JRP conducted research at a variety of libraries and repositories, including: California State Library, Sacramento; Shields Library, University of California, Davis; Bancroft Library, University of California, Berkeley; Water Resources Center Archives, University of California, Berkeley; Beale Memorial Library, Bakersfield; and the Kern County Museum, Bakersfield.

JRP then used the research data collected to prepare a historic context to address pertinent themes of Kern County irrigation history and agricultural history, and evaluated properties under CRHR and HRHP criteria on DPR 523 forms. Historic themes are discussed in Section 3 of the appended technical report (Appendix H4). JRP evaluated the resources within the study area in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code, and also under NRHP and CRHR criteria listed on the DPR 523 forms included in Appendix H4.

5.3.2 Environmental Consequences

5.3.2.1 Federal Regulations

Four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 CFR 800, are identified at 36 CFR 60.4. To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. That are associated with events that have made a significant contribution to the broad patterns of our history;
2. That are associated with the lives of persons significant in our past;
3. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. That have yielded, or may be likely to yield, information important in prehistory or history.

These evaluation criteria are used to help determine what properties should be considered for protection from destruction or impairment resulting from project-related activities (36 CFR 60.2).

5.3.2.2 State Regulations

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an “important archaeological resource” is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility to the CRHR.

Generally under CEQA, a historical resource (these include built-environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
2. Is associated with lives of persons important in our past;
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; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to “unique archaeological resources” are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

1. The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;
2. The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

3. The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Section 15064.5, a project potentially would have significant impacts if it would cause substantial adverse change in the significance of one of the following:

1. A historical resource (i.e., a cultural resource eligible for the CRHR);
2. An archaeological resource (defined as a unique archaeological resource that does not meet CRHR criteria);
3. A unique paleontological resource or unique geologic feature (i.e., where the project would directly or indirectly destroy a site or resources); or
4. Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological resource is given no further consideration, other than the simple recording of its existence, by the lead agency.

5.3.2.3 Conformity of Federal and State Evaluation Criteria

The criteria for eligibility for the CRHR are very similar to those that qualify a property for the NRHP, which is the significance assessment tool used under the NHPA. The criteria of the NRHP apply when a project has federal involvement.

A property that is eligible for the NRHP is also eligible for the CRHR. All potential impacts to significant resources under a federal agency must be assessed and addressed under the procedures of Section 106 of the NHPA, set forth in 36 CFR 800. Eligibility for listing in either the NHRP or CRHR rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it must also be considered ineligible.

5.3.2.4 Archaeological Resources

A total of 24 archaeological resources have been identified within the archaeological resources APE as defined for the current Project. Of this total, 16 were previously identified, while the remaining 8 sites were discovered as a result of the current efforts. Presented below are the archaeological sites situated within the current Project APE. It should be noted the total number of archaeological sites identified within the APE does not represent the actual number of known sites that may be affected by the proposed Project. Many of these resources occur along alternative ROWs (i.e., two transmission line alternatives and four carbon dioxide pipeline sub routes), and some of which will ultimately be eliminated from consideration upon final design.

P-15-125

P-15-125 (CA-KER-125) was originally recorded by L.A. Payen in 1963 as a site consisting of freshwater mussel shell and “chippage” (Payen 1963a). The site was recorded within what is now the California Aqueduct; however, definitive site boundaries were not identified at the time. The current study identified cultural constituents extending approximately 400 meters southward from the plotted site location. As currently recorded, P-15-125 consists of a moderate- to high-density scatter of freshwater mussel shell, and a low-density debitage scatter comprised entirely of cryptocrystalline (CCS) flakes including multi-colored Monterey chert specimens. No formed tools or artifacts were observed during recordation. Relative to other sites in the vicinity (e.g., P-15-6767, -6768), the observed shell densities were significantly higher within portions of P-15-125. The site is bisected by the proposed carbon dioxide Alternative 2A alignment. In addition, a proposed entry/exit pit for the line is just within the site’s boundaries. The National Register status of P-15-125 has not been determined as of this date.

P-15-126

P-15-126 (CA-KER-126) was originally recorded within what is now the California Aqueduct by L. A. Payen in 1963. He noted artifacts including “chippage, cooking stones, blade fragment, clamshell ornament,” but no boundaries were established at the time. The current study was able to locate the relative site area; however, extensive disturbance from the construction of the Aqueduct, several dirt roads, and Tupman Road appear to have destroyed what remained of the site. P-15-126 was not relocated by the current study. The proposed Natural Gas and Potable Water lines bisect the general vicinity of where the site was previously documented.

P-15-171

P-15-171 (CA-KER-171) was originally recorded only as an “occupation site” (Latta 1950). Site boundaries were not identified at the time of recordation, and no site constituent or condition information is provided. A relative site location is plotted within the Lokern 7.5-Foot U.S. Geological Survey (USGS) quadrangle. The site was not relocated during the current study. The purported site vicinity has been highly disturbed by various agricultural activities and the construction of the West Side Canal. The site, as it was plotted, is located along the proposed Process Water alignment.

P-15-666

P-15-666 (CA-KER-666) was originally recorded as a shell and flake scatter with a subsurface deposit (Foster 1977). The subsurface deposit was noted within a “bulldozed cut” and revealed three distinct shell lenses. No site boundaries were defined and no sketch map was produced. The site was revisited by Pacific Legacy in 2001, and several trench excavations were monitored during the construction of the West Kern Water District 36-inch water line. The same shell lenses were observed; however, due to the highly disturbed nature of the deposits and the immediate site vicinity, it is unclear whether they were primary or secondary deposits. The landscape in the vicinity has been significantly modified by the construction of several pipelines and berms. An extremely sparse distribution of freshwater mussel shell across a disturbed landscape was observed within the site area. No other artifacts were observed. The National

Register status of P-15-666 has not been determined at this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

P-15-2422

P-15-2422 (CA-KER-2422) was originally recorded in 1989 by Sutton as a small shell scatter with flakes and fire-affected rock. No boundaries were identified at the time. The current study identified surface artifacts consisting of a moderate-density freshwater mussel shell and lithic scatter, including a chert biface tool, a chert core tool, and an opaque Franciscan chert projectile point. The site is on a relatively flat terrace at the foot of the Elk Hills. Modern disturbances include the construction of Tupman Road and installation of several pipelines within the site vicinity. The National Register status of P-15-2422 has not been determined as of this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

P-15-3077

P-15-3077 (CA-KER-3077) was originally recorded in 1991 by Peak and Associates, Inc. (PAI) and consists of an extensive freshwater mussel shell, lithic, and artifact scatter. Two distinct concentrations of cultural materials (loci) have been identified within the site boundaries. Test excavations conducted at these loci by PAI in 1992 determined that the site is ineligible for listing in the NRHP. In 1997, Pacific Legacy, based on a distribution of freshwater mussel shell, extended the site's boundaries and conducted additional test excavations within the densest portions of the site. These excavations recovered an artifact assemblage consisting of shell, flaked stone artifacts, Olivella beads, groundstone, limited quantities of obsidian, and faunal bone. Radiocarbon dating of shell specimens recovered during excavation revealed that they were from the AD 1045-1145 time frame (Jackson et al. 1998). Again, the site was determined ineligible for NRHP listing. The current study observed site constituents and site conditions in concordance with the previous recordation. The site is bisected by the proposed Carbon Dioxide Alternative 2 and the Carbon Dioxide Alternative 3A alignments.

P-15-3079

P-15-3079 (CA-KER-3079) is an extensive prehistoric site just south of the town of Tupman. P-15-3079 was originally recorded by PAI in 1991. Subsequent test excavations at the site, conducted by PAI, revealed a varied artifact assemblage and an abundance of shell beads. It was posited that P-15-3079 was one of the most intensively occupied sites in the vicinity and that the potential for the existence of human remains was likely (Jackson et al. 1998). As a result of the findings, the site was recommended for NRHP listing.

An additional study by Pacific Legacy in 1997 extended the site's boundaries to include an area of approximately 0.5 square mile. This boundary extension subsumed the previously recorded prehistoric site P-15-6073 (CA-KER-5060). In addition, five distinct loci were identified, and test excavations were conducted at four of these loci. The excavations revealed an artifact assemblage composed of flaked stone artifacts, groundstone, faunal remains, and shell beads. An Andonta shell specimen, recovered from a subsurface feature, produced a calibrated result of AD 970-1230. In 1997, this site was determined eligible for NRHP listing by the Department of Energy (DOE) and State Historic Preservation Office (SHPO) according to 36 CFR 60.4,

Criterion D (Jackson et al. 1998). The site is bisected by the proposed Natural Gas and Potable Water alignment.

P-15-3167

P-15-3167 (CA-KER-3167) consists of a moderately dense scatter of freshwater mussel shell and lithic debitage. The site was originally recorded by PAI in 1991. The site was revisited and recorded by Pacific Legacy in 1997. Excavations by Pacific Legacy revealed a limited cultural assemblage consisting of shell fragments, flaked stone, and two Olivella beads (Jackson et al. 1998). The site's northeastern boundary was undefined at this time due to the access restrictions of that study. The current study observed similar site constituents and site conditions in concordance with the previous recordation by Pacific Legacy. The northeastern boundary was extended approximately 20 meters beyond the previously recorded boundary. The boundary extension was founded on a very sparse extension of freshwater mussel shell fragments. Based on the results of Pacific Legacy's excavations, P-15-3167 was recommended to be ineligible for NRHP listing (Jackson et al. 1998). The site is bisected by the Carbon Dioxide Alternative 3B alignment.

P-15-3254

P-15-3254 (CA-KER-3254H) was originally recorded by PAI in 1991 as a scatter of historic cans and other domestic debris. The site is in an ephemeral north-south trending wash. No features were observed during the initial recordation. The site was relocated during the current study and appears to be in similar condition. No new site components were observed, and the site boundaries are accurate. The National Register status of P-15-3254 has not been determined at this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

P-15-6073

P-15-6073 (CA-KER-5060) was subsumed by the extension of P-15-3079 site boundaries (Jackson et al. 1998). It was renamed as Locus B. See P-15-3079.

P-15-6736

P-15-6736 (CA-KER-5364) was originally recorded by Pacific Legacy in 1997 as a sparse scatter of freshwater mussel shell with no other artifacts observed. Site boundaries established at the time of recording did not identify portions of the site to the west due to access restrictions. The current study identified a continuation of the site to the west and extended the site's boundaries approximately 25 to 50 meters from what was previously recorded. No additional artifacts were noted aside from the ubiquitous shell within the site. Although the site was not included in Pacific Legacy's testing program, it was recommended as not eligible for NRHP listing. The site is bisected by the proposed Natural Gas and Potable Water alignment.

P-15-6767

P-15-6767 (CA-KER-5392) is a continuous but sparse surface scatter of freshwater mussel shell, with two loci of moderately dense shell and associated scatters of chert-flaked stone and other

artifacts. Test excavations at the site, conducted by Pacific Legacy in 1997, revealed a varied artifact assemblage including shell beads, formed tools, groundstone artifacts, and baked clay. Based on the results of these excavations, the site was determined eligible for listing in the NRHP (Jackson et al. 1998). The site is bisected by the Carbon Dioxide Alternatives 1, 2A, 2B, 3A, and 3B alignments.

P-15-6768

P-15-6768 (CA-KER-5393) was originally recorded by Pacific Legacy in 1997 as a sparse surface scatter of freshwater mussel shell; however, that study was limited to the Petroleum Reserve property. As such, site boundaries to the west and north were not determined. The current study extended the 1997 site boundaries approximately 400 meters to the north and approximately 50 meters to the west. The newly recorded portion of the site includes an extension of the shell scatter, a low-density lithic scatter, and a historic component composed of a debris scatter and oil-related features. Although no test excavations were conducted within P-15-6768, the portion of the site that was recorded by Pacific Legacy was recommended to be ineligible for NRHP listing (Jackson et al. 1998). The site is bisected by the Carbon Dioxide Alternatives 1, 2B, and 3B alignments.

P-15-6769

P-15-6769 (CA-KER-5394) consists of a low-density scatter of freshwater mussel shell found on a small rise in the local topography that was originally recorded by Pacific Legacy in 1997. Relative to other sites in the immediate vicinity (P-15-3077, -6767, -6768), P-15-6969 is a fairly discrete site limited to the landform. No other cultural material was observed on the surface of the site. Although no test excavations were conducted within P-15-6769 by Pacific Legacy, the site was recommended to be ineligible for NRHP listing (Jackson et al. 1998). The site is bisected by the Carbon Dioxide Alternative 1 alignment.

P-15-6780

P-15-6780 (CA-KER-5404) was recorded in 1997 by Pacific Legacy as a fairly discrete scatter of shell and lithic debris. Subsequent test excavations at the site revealed an abundance of shell beads and a subsurface feature consisting of a dense lens of freshwater mussel shell. Due to the abundance of ornamental artifacts and the presence and potential of unidentified subsurface features, the site was recommended as eligible for NRHP listing. The current study observed similar site constituents and site conditions in concordance with the previous recordation. The site is bisected by the proposed Carbon Dioxide Alternative 3B alignment.

P-15-9737

P-15-9737 is composed of the remains of the San Joaquin Power Company's Midway Steam Plant, constructed in 1921-1922. It was last recorded by Pacific Legacy in 1999; however, the current study lacked access to the current property. Consequently, the site was not re-recorded. At the time of its recordation in 1999, three standing structures, a foundation, and an artifact scatter were noted. The National Register status of P-15-9737 has not been determined as of this date. The site is bisected by the shared portion of the Electric Transmission Line alignment.

P-15-9738

P-15-9738 was originally recorded by Pacific Legacy in 1999 as the remains of a feed mill and cattle ranch complex. That study noted several standing and collapsed structures and an associated artifact scatter. The site appeared to represent a continuous occupation circa 1928 to 1999. The site was relocated during the current study; however, none of the buildings, structures, or foundations remained. It appears that the site was demolished. The area is now used as an orchard. A large, low-density historic trash scatter was noted in the area. The National Register status of P-15-9738 has not been determined as of this date. The site is bisected by the shared portion of the Electric Transmission Line alignment.

HECA-2008-1

This particular site consists of a prehistoric lithic scatter that was identified at the bottom of the West Side Canal. The sites artifact assemblage consists of lithic debitage, a projectile point tip fragment, and three pieces of burnt faunal bone. The debitage is composed of Monterey and Franciscan chert, which are both local source materials. This site is a small artifact scatter, but it is believed to represent a much larger site. The site was found at the bottom of a water canal along the eastern edge in a long, thin line. It was originally interpreted to be the re-deposition of artifacts from a site further up the canal. This was rejected because it was unlikely the artifacts would have deposited so regularly along one side of the canal. It is more likely that the canal construction and upkeep has cut horizontally into the edge of a deeply stratified site that is buried 1.8 meters below the modern ground surface; because this site is within the Buena Vista Slough, this is entirely probable. The presence of the artifacts suggests that further intact subsurface cultural context remain intact well below the levels of modern agricultural disturbances. The site area is bisected by the process water line alignment.

HECA-2009-1

HECA-2009-1 consists of a low- to moderate-density scatter of lithic artifacts including two chert bifaces and approximately 100 flakes of multi-colored CCS, quartzite, and basalt representing various stages of biface reduction. In addition, approximately 10 cobbles of fire-affected rock were observed. The site is situated in a sparsely vegetated, relatively flat area characterized by bare patches of ground and small stands of low-lying salt bush. Modern disturbances in the site vicinity include the construction of Highway 58, two electric transmission lines, and various agricultural activities. The National Register status of HECA-2009-1 has not been determined as of this date. The site is bisected by the shared portion of the proposed Electric Transmission Line alignment.

HECA-2009-2

HECA-2009-2 consists of a low-density scatter of lithic artifacts including two chert bifaces, a steatite fragment, and three yellow-brown CCS reduction flakes. The site is situated primarily on the eastern slope of a dirt road berm that parallels the Outlet Canal. Modern disturbances in the site vicinity include the grading of two dirt roads, the construction of the Outlet Canal, and the West Side Canal. The National Register status of HECA-2009-2 has not been determined as of

this date. This site is within the Controlled Area; however, it is outside of the Project Site, and therefore will not be disturbed as part of the Project.

HECA-2009-3

HECA-2009-3 consists of a low-density freshwater mussel shell and lithic scatter located in a highly disturbed strip of land between Tupman Road and the California Aqueduct. Modern disturbances include the construction of the road, the aqueduct, various pipelines, and two dirt roads within the site vicinity. The National Register status of HECA-2009-3 has not been determined at this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

HECA-2009-4

HECA-2009-4 consists of a high-density, fairly discrete shell midden located at the toe of a ridge adjacent to the southern edge of Tupman Road. Thousands of freshwater mussel shell fragments are visible on the surface of the site, as well as within the numerous animal burrows. Based on visual observation within the burrows, the site's depth is estimated to be at least 0.8 meter below the ground surface. A single chert flake was also observed on the surface. The National Register status of HECA-2009-4 has not been determined as of this date. The northeastern portion of the site is bisected by the proposed Natural Gas and Potable Water alignment.

HECA-2009-5

HECA-2009-5 consists of low-density scatter of freshwater mussel shell and lithic debris located on a gently sloping terrace located between Tupman Road and the California Aqueduct. Although lithic densities were low throughout the site as a whole, five flakes of obsidian were noted. The site boundary remains undefined along Tupman Road due to the access restrictions of the current study. Modern disturbances in the site vicinity include the construction of Tupman Road, the California Aqueduct, various pipelines that run through the site vicinity, and an electric transmission tower. The National Register status of HECA-2009-5 has not been determined at this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

HECA-2009-6

HECA-2009-6 consists of a low- to moderate-density scatter of freshwater mussel shell located on a gently sloping terrace at the foot of the Elk Hills between Tupman Road and the California Aqueduct. Two fairly discrete concentrations of shell were noted within the site boundaries, one in the extreme northern portion of the site, and the other in the southern portion of the site adjacent to Tupman Road. The site boundary remains undefined along Tupman Road due to the access restrictions of the current study. The National Register status of HECA-2009-6 has not been determined at this date. The site is bisected by the proposed Natural Gas and Potable Water alignment.

HECA-2009-7

HECA-2009-7 consists of a moderate-density scatter of freshwater mussel shell associated with a low-density scatter of lithic debitage. In addition to the prehistoric component, a historic trash scatter, consisting primarily of condensed milk and sanitary cans, was identified. A single *Olivella*-cupped wall shell bead was encountered in the northern portion of the site. The site is in a relatively flat area adjacent to Tupman Road that has been subject to various modern and historical disturbances, including the construction of the California Aqueduct, several dirt access roads, and two irrigation canals to the north. The site's boundary along Tupman Road remains undefined at this time due to the access limitations of the current study. The National Register status of HECA-2009-7 has not been determined at this date. The site is bisected by the Natural Gas and Potable Water alignment.

5.3.2.5 Built Environment Resources

The proposed Project and two potential transmission routes are located in a portion of the Buena Vista Water Storage District south of Buttonwillow. This area is mainly agricultural, supporting crops of alfalfa, cotton, and a growing orchard business. Within the study area are three types of structures: canals, farmsteads, and industrial sites. Although some of the canals date from the late nineteenth century, most of the buildings in the study area date from the 1930s and later. This is the result of the dominance of Miller & Lux in the area until 1927.

JRP recorded and evaluated all buildings constructed before 1964 within the study area. Many properties included buildings from several periods. In these cases, buildings constructed after 1964 may simply be noted in the forms and evaluation. Several mobile homes are installed within the study area; however, because these are movable structures they were not evaluated. The California Aqueduct, which brushes the southwestern edge of the study area, has been previously evaluated and found eligible. This property was not recorded as a part of this Project.

The following subsections describe the buildings and facilities at the existing canals, farmsteads, industrial sites, and transportation-related sites in the Project area. For more detailed descriptions of the properties see the individual DPR 523 forms attached in Appendix H4.

Canals

All the canals in the study area, except the California Aqueduct, are a part of the Buena Vista Water Storage District. Water flows through the district in a generally southeast to northwest direction. Canals in the southern portion of the district, where the proposed Project would take place, are all earthen lined with either a trapezoidal or U-shaped profile. The smaller canals and ditches, Depot Drain, Arizona Canal, Deep Wells Ditch, Weed Island Ditch, and Florida Ditch, are considered district laterals. These ditches have trapezoidal profiles and are between 15 and 27 feet wide at the top and 6 to 12 feet deep. These canals have few water control features, most of which are modern. Culverts tend to be large pipes without headwalls, and delivery gates are widely spaced. The gates are located along the sides of the canals and have concrete headwalls and flanking walls, with circular metal gates operated with a vertical screw mechanism. The drains are fed through corrugated metal pipes. Headgates for the Weed Island Ditch and the Florida Drain lie within the study area. Each of these is modern cast concrete. The gate into

Florida Ditch operates like the delivery gates, whereas the headgates at the division of the Weed Island and Arizona Canals are cast concrete with slots for boards to be inserted. Metal walkways provide access to the headgates.

The Main Drain is located in the center of the district. The drain was constructed between 1916 and 1918 and is slightly larger than the lateral canals. The drain follows the general route of the natural Buena Vista Slough, but straightens the route. Approximately 25 to 30 feet wide at the top, the canal is 5 to 9 feet deep. The drain becomes larger as it travels northwest. By the time it crosses under Highway 58 in Buttonwillow it requires a concrete bridge rather than a culvert.

The East Side and West Side Canals were constructed in the late 1870s as the main canals for the irrigation system serving the Buena Vista Slough area. The East Side Canal is slightly smaller at 45 feet across the top, compared to the 50 to 60 feet across for the West Side Canal. Both the East Side and West Side Canals are controlled by concrete check gates with metal frames for the gates, and metal mesh walkways across the top. The East Side Canal has more checks along its southern route than the West Side Canal. Pumps divert water from the East Side Canal, along with turnouts for lateral canals.

The oldest canal is the KVVCC originally constructed in 1876 as a 125-foot-wide canal. The U-shaped canal was partially dug and levied. As a result, the western slope of the canal appears as a hump of land in the flat plain. The height of the western side of the canal varies, as the original soil was not suitable for levies or compacted well. The eastern side of the canal is more regular, because it also makes up the western side of the West Side Canal. The central channel is uneven because flood waters have cut a meandering path in the center of the canal. The canal channel is trash- and debris-strewn and highly vegetated. Maintenance has included the removal of vegetation and reshaping by bulldozers. The Old Headquarters Weir is part of this system.

The California Aqueduct brings water from the San Joaquin Delta to Southern California. Over 210 feet across, the concrete lined canal is a major feature in the Central Valley landscape. The aqueduct has been previously evaluated and found eligible for the NRHP/CRHR despite being less than 50 years old. As a well-known resource, the aqueduct, which just brushes the edge of the study area, was not evaluated as a part of this study.

Farmsteads

The farmsteads in the study area are widely dispersed, and organization of the buildings on the properties depends upon the ownership, crop production, and individual property history. The architectural details and characteristics combined with mapping and aerial photographs indicate that a substantial number of buildings have been moved in this area. Interviews with residents further corroborate this conclusion. Buildings can be divided into four types: worker's housing, early-twentieth-century residences, mid- to late-twentieth-century ranch houses, and utilitarian out-buildings. Several generations of buildings are usually visible on each property. For example, at the Antongiovanni property (37760 Stockdale Road), the property contains a mid-twentieth century minimal traditional property, a newer ranch house from the 1970s, and a modern 1984 ranch house. Different generations of the family live in each house.

Other complexes, like the Franceschi complex at 38506 Stockdale Road, have multiple houses with similar construction dates. Its minimal traditional houses and early-twentieth-century house are used by tenant farmers or employees, and most of the migrant cotton labor housing has been removed. The former Curtis ranch at 5500 Buerkle Road once had a group of small buildings on the western side of the canal across from the house. The small cottages at the Romanini property, 37601 Stockdale Road, appear to be remnants of typical early-twentieth-century worker housing.

As noted, early-twentieth-century worker cottages are found as components of several properties. Many have been converted to other uses and exist in smaller numbers. As mentioned above, the largest number exists at the Romanini property (37601 Stockdale Road), but other examples exist at 5543 Freeborn Road, 6300 Brite, and 5920 Brite Road. Adohr Farms also provided housing for agricultural workers, although the remaining structures are larger than the small buildings provided for single workers or their immediate family. The workers' housing is wooden framed, and in all but the instance of the Romanini and Adohr Farm examples, lack a concrete foundation. The buildings have gable roofs and horizontal wood siding. Often they are narrow rectangles. The small shed at the Perruchi property (5920 Brite Road) is arranged in a T shape with crossed gables and is barely big enough for a bed. The remaining Adohr Farm building was most likely a dining hall for the workers. The building has a monitor roof and porches on either side.

Seven examples of early-twentieth-century vernacular craftsman houses stand within the study area. Common forms in California, these buildings are front-gabled rectangles with open eaves. Ornamentation in the form of decorative inset roofs and trim is common. Originally, these buildings were clad with horizontal wood siding, but frequently were stuccoed in an attempt at modernization. The original wood-frame double-hung windows are also often replaced with metal sliding windows. The 1948 Parsons home, at 5616 Brite Road, is a relatively unmodified example of the type; while the 1964 version at 6010 Buerkle Road has been stuccoed and had all its windows replaced. Other modified examples are located at the Pierucci property (5920 Brite Road), the Farmer's Cooperative Gin (Wasco Avenue), the Franceschi property (38506 Stockdale Road), 36242 Stockdale Road, 37401 Stockdale Road, and 6122 Tule Park.

The other common housing style is Ranch. These homes are irregular or rectangular in plan. The single-story buildings are covered with gable or hip roofs. Materials used to cover the buildings vary; some later versions have two different materials on the walls, and composition shingle roofs are common. Early examples date from the 1940s. The earliest example may be 5443 Brite Road. The Parsons, who owned the area, constructed housing in the vicinity between 1932 and 1942. This period corresponds with the horizontal wood siding and wood shingle roof used on this early ranch house. Rather than a modern Ranch style, the building resembles a twentieth century vernacular craftsman with side wings. The house at 5543 Freeborn has a similar central structure with a rectangle added across the front. In both cases, a majority of the windows have been updated with metal sliding frames. Mid-century versions such as 5648 Brite Road and 6300 Brite Road have stronger horizontal lines, with horizontal siding and shed-roofed porches. The most recent stands at one of the Antongiovanni properties at 37760 Stockdale. These most recent ranches use stucco and brick siding. The modern ranch homes were not evaluated, because they had not yet reached 50 years of age.

The farmsteads have a mix of sheds and storage facilities for farming equipment and products. The most common have wood framing with corrugated metal siding and roofing. The larger buildings are most often simple shelters without walls, like the hay shed adjoining 5543 Freeborn, or the more complex version at 5443 Brite Road. The mid- to small-sized shelters have either shed or gable roofs. The arched-roof storage building at 5443 Brite Road is unusual, with the only similar example a seed storage building at the Farmer's Cooperative Gin. A few wooden outbuildings are found in the study area. These tend to be small, rectangular structures with gable roofs and narrow, horizontal wood siding. Fenestration and entrances on these buildings varies. The example on the Pierucci property at 5920 Brite Road has sliding doors and appears to be used for storage, while that at 5543 Freeborn Road has windows on the northern side, and shelters animals. A third example at 37410 Stockdale has been carefully tended and may be used as a garden shed.

Some atypical structures are within the study area. The former Hair Ranch at 6300 Brite has two unusual buildings. The residence has a cross-gable roof, and windows divided into decorative lights. Behind the house is a structure that appears to be assembled from earlier buildings, including a water tower. The home at 5865 Adohr Road exhibits more style than other buildings in the study area. The building has a visual similarity to Craftsman plans and kit homes which were sold from the late-nineteenth century into the 1930s. The original Parsons home at 5632 Brite Road has an unusual plan. The Parsons built the house on the same plan as the family home in Northampton, Massachusetts. As a result, the home has some architectural features in common with New England farmhouses. Because of the harsh winters in New England, the barns are usually attached to the rear of the house. Instead of barns, garages are attached to the rear of the Parsons house. The central portion of the house also has two stories, typical of New England, but not well-suited to the heat of Southern California. Modifications, including alterations to the east-side porch and replacement of all the windows, have adversely affected its integrity.

The study area also contains four mobile homes. Two are on Highway 58, another on Buerkle Road, and the fourth on Brite Road. On Buerkle and Brite roads, the mobile homes have been used to replace earlier buildings. Those on Highway 58 have been moved in since 1973. None of the mobile homes were evaluated.

Industrial/Transportation

The study area contains several industrial properties. Most are in the northern end of the study area along Highway 58. The other industrial sites are associated with the former Adohr Farm property at the southeastern end of the study area. Although dates of construction span from 1893 to current alterations, construction remains utilitarian. For enclosed buildings, the most common material is corrugated metal, with concrete as the second-most common material. Equipment and piping are often left exposed. Most of the industrial properties are associated with processing local crops.

The most evident is the Farmer's Cooperative Gin, at 2531 Wasco Way. The gin includes five gins, three smaller gins from 1937-1951, and two super gins from the 1970s. These are simple structures of corrugated metal and grooved-metal siding to enclose the processing activities inside. Pipes and equipment protrude from the buildings conveying products to storage. The

rice processing facilities, one at the intersection of Highway 58 and Wasco Avenue, and the other near Adohr Road and Dairy Road, built in the late 1950s to early 1960s, share similar characteristics. Each has short metal silos for storing or drying rice. The northern facility appears to have focused on storage, with multiple concrete and metal silos for storage. The southern facility includes a grooved-metal-sided building containing processing machinery.

Near each of the rice-processing facilities is an airfield. The airfields are simple strips of packed earth used for landing small aircraft for either personal transportation or crop management. Each airfield has a single hangar. The hangars each use different plans, but are common to small airfields across the country. The northern airfield has an arch hangar clad in metal sheathing. The southern hangar is a rectangular building with shed roof (now collapsed) also clad in metal siding.

The other two industrial properties are not associated with the agricultural production of the area. The McKittrick Branch of the Southern Pacific Railroad parallels Highway 58. Constructed in 1893, it connected Bakersfield with Asphalto (now McKittrick). The line has been shortened and now ends in Buttonwillow. The lightweight metal rails are laid on wooden ties on gravel ballast, with trestles and culverts.

The Midway Substation is on the corner of Highway 58 and Wasco Avenue. A substation has been at this location since 1912 - 1914. Originally just providing rural, local service, the substation has grown as a part of the Pacific Northwest Intertie, which distributes power from Canada to Mexico. Like most substations, Midway has few buildings. One concrete building along the southern edge dates to 1921 and is a remnant of the site's oil-fired power plant, since demolished. Another concrete structure within the substation dates to its expansion in 1966. Both are highly simplified with simple symmetry and carefully measured proportion. Most of the substation is composed of metal latticework supports for the wires and electrical equipment.

Evaluations

In general, NRHP Criterion D (CRHR Criterion 4) is used to evaluate historic sites (as opposed to buildings, structures, or objects) and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, the properties within the study area for this Project are building types that are well documented. Thus, these properties are not principal sources of important information in this regard.

Certain property types are usually excluded from consideration for listing in the NRHP, but can be considered if they meet special requirements in addition to meeting the regular criteria. The following are the seven Criteria Considerations that address properties usually excluded from listing in the National Register:

- Consideration A: Religious Properties
- Consideration B: Moved Properties
- Consideration C: Birthplaces and Graves
- Consideration D: Cemeteries
- Consideration E: Reconstructed Properties

5.3 Cultural Resources

- Consideration F: Commemorative Properties
- Consideration G: Properties that have Achieved Significance within the Past Fifty Years

Integrity is determined under NRHP guidelines through applying seven factors to the historic resource. Those factors are location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

The CRHR definition of integrity and its special considerations for certain properties are slightly different from those for the NRHP. Integrity is defined as “the authenticity of an historical resource’s physical identity evidenced by the survival of characteristics that existed during the resource’s period of significance.” The CRHR further states that eligible resources must “retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance,” and it lists the same seven aspects of integrity used for evaluating properties under the NRHP criteria. The CRHR’s special considerations for certain properties types are limited to: 1) moved buildings, structures, or objects; 2) historical resources achieving significance within the past 50 years; and 3) reconstructed buildings.

Only two of the buildings or structures in the study area for the Project appear to meet the criteria for listing in the NRHP. All buildings or structures in the study area around the Project location over 50 years old were evaluated. None of the more recently constructed buildings appear to meet the exacting standards of exceptional significance. Therefore, none of the buildings in the study area appear to be significant historic properties subject to Section 106, nor do they appear to be historical resources for the purposes of CEQA.

Old Headquarters Weir appears eligible under Criterion 3 (C) at the local level as a significant example of the work of a master designer and as an early example of a significant new construction method applied to water structure/bridge building. The structure is important as a rare surviving example of Leonard & Day’s design of a reinforced concrete bridge/water control structure combination. Old Headquarters Weir, built in 1911, represents an early example of the type, and is only one of two known to have been built in this period by Leonard & Day. The structure also stands as an early example of use of reinforced concrete in construction of weirs. Furthermore, the bridge appears to retain a sufficient degree of integrity, and therefore retains the ability to convey its historic significance. Its character-defining features are its reinforced concrete benchwalls and flat slab roadway. For these reasons, Old Headquarters Weir appears to meet the criteria for listing in the California Register and National Register, and would therefore qualify as a significant historic property under Section 106, and a historical resource for the purposes of CEQA.

Old Headquarters Weir does not appear eligible under National Register Criteria A, B, or D (California Register Criteria 1, 2, or 4). Although it is a part of the necessary infrastructure for the development of the area, it does not have significance beyond its normal use. Old Headquarters Weir was built to replace an existing timber weir whose maintenance had become

too burdensome. Although Old Headquarters Weir was the first road bridge at this location, it did not fundamentally change transportation in the area. It connected an unimproved dirt road on the southwestern side of the canal to a more established road on the northeastern side of the canal. Its function as a bridge alone does not appear to represent a significant contribution to the transportation history of the area. Although it is the only structure remaining from Miller & Lux Old Headquarters, it alone does not convey the meaning of a ranch headquarters.

Under Criteria B (2), Old Headquarters Weir does not appear to be eligible for association with persons important in our history. It is not eligible for its association with Miller & Lux Inc., who commissioned the bridge.

In rare instances, buildings and structures themselves can serve as sources of important information about historic construction materials or technologies under Criteria D and 4; however, reinforced concrete bridge technology is well documented in published and photographic sources. Therefore, Old Headquarters Weir does not appear to be a source of important information in this regard.

The second eligible structure within the study area is the California Aqueduct, which was previously evaluated by other studies at various locations along its 444-mile length. It was found exceptionally significant under Criterion 1 or A for its association with the history of major water systems development in California; and as an exceptionally significant example of hydraulic engineering, under Criterion 3 or C.

Canals

The canals of the Buena Vista Water Storage District in the study area do not appear to meet the criteria for listing in the CRHR or the NRHP. The KVVCC, East Side Canal, and West Side Canal constructed in 1876, along with the Kern Island Canal (ca. 1870), and Calloway Canal (1874-1875), precipitated the seminal *Lux v Haggin* litigation which has shaped California water rights. However, on their own, the KVVCC, East Side Canal, and West Side Canal are not significant for their roles in the litigation. The upstream canals diverting water before it reached the Miller & Lux property also had a crucial role in setting the scene of the conflict. One particular canal or water diversion alone could not have been entirely responsible for *Lux v. Haggin*. Numerous conditions converged in Kern County to produce this fierce litigation over water. The shifting course of the Kern River, the construction of numerous canals and ditches diverting water from the river, and the competing interests of two large-scale landholders combined produced lengthy litigation. For this reason, the canals are not eligible under Criterion 1 or Criterion A.

Under Criterion 2 or Criterion B, the canals are not associated with a significant individual. Although the canals were constructed under the auspices of Miller & Lux, it is not directly associated with either of those individuals. Miller & Lux constructed numerous canals throughout their holdings to irrigate feed crops. Although Henry Miller did visit most of his holdings, including Buttonwillow, most of his time was spent in San Francisco or his home ranch, which are more appropriately associated with him and the business.

Under Criterion 3 or C, the canals were designed by S.W. Wible, a civil engineer who designed mines in El Dorado, Amador, and Calaveras counties before coming to Kern County, where he designed the Pioneer and Wible canals before designing the KVVCC. Despite his engineering knowledge, the KVVCC is not an engineering success, and is not significant for its design or construction. The smaller canals are farmer dug, and were constructed according to the common practice at the time.

In addition, these canals lack integrity to any historical period of significance, owing to their regular realignment, reshaping, and replacement of control structures.

Farmsteads

None of the farmsteads or residences in the study area appear to meet the criteria for listing in the CRHR or the NRHP, because they lack significance. The farmsteads were constructed as a part of the general settlement of the area following land sales by Miller & Lux. Farming and irrigation were established by Miller & Lux beginning in the 1870s; the farmsteads represent the ensuing years of crop diversification and family farming as practiced throughout the Central Valley (Criterion 1 or A). None of the farmsteads appear to be associated with significant individuals (Criterion 2 or B). The area has a tradition of multi-generational farms like the Antongiovanni farm and Parsons farm; however, no evidence was found that any of these families or individuals in the families played a significant role in the development of local agriculture.

Charles Parsons is perhaps the best known of the residents of the study area. He was involved in the development of rice culture, banking in Buttonwillow, the Farmer's Cooperative board, and community boosterism. The rice culture, however, was a short-term development which has not resulted in a lasting impact. His involvement with other institutions involved group activity, and the success of any of the ventures cannot be directly attributed to him.

Under Criterion 3 or C, none of the farmsteads possess any distinctive characteristics or high artistic value that would render them eligible under these criteria. The farm residences are common examples of Craftsman and Ranch-style houses found throughout the Central Valley of California. The residence at 5865 Adohr Road is similar to plans and catalog houses available from the end of the nineteenth century through the 1930s. The farm outbuildings are utilitarian and lack distinctive characteristics or artistic value. In rare instances, buildings themselves can serve as sources of important information about historic construction materials or technologies (Criteria D or 4); however, the building does not appear to be a principal source of important information in this regard.

In addition to their lack of significance, the farmsteads in the study area have frequently been altered, thus affecting their integrity. In addition, study of the architectural characteristics, style, and materials of the buildings, along with evidence from maps from various periods, indicates that many of the farm buildings within the study area have been relocated to their current locations. This relocation has by definition degraded their integrity, because moving the buildings and structures has separated them from their original setting, which may have included worker camps, and thereby removed their association with an important aspect of local history.

Industrial/Transportation Properties

None of the industrial properties within the study area appear to meet the criteria for listing in the CRHR or the NRHP. Under Criterion 1 or A, none of the properties is eligible for their association with significant events or trends. The McKittrick branch of the Southern Pacific Railroad, while an important piece of infrastructure for petroleum production southeast of Buttonwillow, is not significant for its association with petroleum production. Production had begun before the construction of the railroad in 1893. The railroad merely provided additional infrastructure supporting production. The Farmer's Cooperative Gin provided alternative ginning facilities in the area, but did not introduce cotton culture or processing to the area. Similarly, the rice elevators and processing plants were associated with the recent and brief period of rice culture in the area between 1954 and the 1980s. Rice culture was practiced as a means of conditioning the soil for other crops, and did not become a significant crop in the area. Numerous airfields exist in the area for crop management and private transportation. The two in the study area are not significant for their roles in transportation or agriculture. The Midway substation provides needed infrastructure to the state. None of the early equipment or structures for the electrification of the area remains. The current structures, as a part of the Pacific Northwest Intertie, do not meet the level of exceptional significance for Consideration G.

Under Criterion 2 or B, none of the industrial properties are associated with significant individuals. The industrial properties were developed by groups of individuals, whether corporations or cooperative efforts of farmers. Under Criterion 3 or C, none of the industrial properties have any distinctive characteristics or high artistic value that would render them eligible under these criteria. The industrial properties are all utilitarian in nature and use standard engineering available at the time of their construction. In rare instances, buildings themselves can serve as sources of important information about historic construction materials or technologies (Criteria D or 4); however, the building does not appear to be a principal source of important information in this regard.

In addition to their lack of significance, several properties have lost integrity. The McKittrick branch of the Southern Pacific Railroad has undergone regular maintenance, which has altered with materials and workmanship. The line has also been shortened, and tracks between Buttonwillow and McKittrick have been removed, significantly shortening the line and affecting the design, materials, workmanship, and association of the branch line.

The Midway Substation has undergone continual alteration since it was selected as the southern anchor point of the Pacific Northwest Intertie in 1966. Before that, the construction of the Midway steam plant in 1921 removed all portions of the previous substation. The steam plant was removed in 1956. These alterations have continuously disturbed the integrity of design, materials, and workmanship of previous periods.

These properties have been evaluated in accordance with Section 106 of the National Historic Preservation Act using criteria described in 36 CFR 30, and in accordance with Section 15064.5(a) (2)-(3) of the CEQA Guidelines, using the criteria outlines in Section 5024.1 of the California Public Resources Code, and does not appear to be a historical resource for the purposes of CEQA. Full evaluations of each of these properties are included on the DPR 523 inventory and evaluation forms in Appendix H4 of this document.

5.3.2.6 Impacts Analysis

For the proposed Project, potential significant impacts to known cultural resources, as well as inadvertent discoveries, have been evaluated using the criteria listed below. Under criteria based on the state CEQA Guidelines, the Project would be considered to have a significant impact on cultural resources if it would result in any of the following:

- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing on the NRHP, the CRHR, or a local register of historic resources;
- A substantial adverse change in the significance of a unique archaeological resource; or
- Disturbance of any human remains, including those interred outside of formal cemeteries.

Archaeological Resources

From the list of known archaeological sites presented in Section 5.3.2.4 and summarized in Table 5.3-4, the Project study area contains a wide and varied collection of archaeological resources. As a result of the current effort, it has been determined that 24 archaeological sites are situated within the archaeological APE as defined for the Project. As archaeological sites are generally only physically affected, only impacts resulting from Project-related construction were analyzed. Indirect impacts from Project operation are not expected to occur.

Under CEQA, however, only those archaeological resources deemed important (e.g., CRHR- or NRHP-eligible) or unique can be significantly affected (i.e., impacted) with Project implementation that would require mitigation measures by the Applicant. Of the 24 sites, one site, P-15-3079/6073, has been listed on the NRHP. Two other sites, P-15-6767 and -6780, have been recommended as eligible for listing, while five others, P-15-3077, -3167, -6736, -6768, and -6769 have been recommended as ineligible for listing. Unfortunately, no acceptance of these recommendations by an agency or formal concurrence by SHPO have been provided to the SSJVIC. Lacking such documentation, it must be assumed for the current investigation that those five archaeological resources recommended as “ineligible” be treated herein as important resources. Lastly, 16 sites have not been evaluated for eligibility for listing on the NRHP, the CRHR, or a local register of historic resources. As such, these unevaluated archaeological resources must also be treated as important resources until formally determined otherwise.

It should be noted herein that it is also possible that archaeological deposits could be inadvertently exposed during Project-related construction activities. Previously unidentified archaeological sites exposed during construction, if any, must be treated as important resources until formally determined otherwise.

The current analysis thus finds that all archaeological sites situated within the Project APE, including any previously unknown sites inadvertently exposed during construction activities, may potentially be affected by the proposed Project, and thus warrant the implementation of mitigation measures to reduce these potential impacts to less-than-significant levels.

**Table 5.3-4
Archaeological Sites within Project APE**

Primary # (P-15) or Temporary Designation	Site Type	Prehistoric/ Historic	Associated Project Component	NRHP Status	Trinomial (CA-KER)	Type of Documentation
125	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt 2A	Not Evaluated	125	Update
126	Shell and Lithic Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	126	Not Relocated
171	Burial Mound	Prehistoric	PRO H ₂ O	Not Evaluated	171	Not Relocated
666	Shell and Lithic Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	666	Update
2422	Lithic and Shell Scatter	Prehistoric	NG/ H ₂ O	Not Evaluated	2422	Update
3077	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt2, 3A	Recommended Ineligible	3077	Update
3079-6073	Shell and Lithic Scatter	Prehistoric	NG/POT H ₂ O	Listed	3079-6073	Update
3167	Shell and Lithic Scatter	Prehistoric	CO ₂ Alt 3B	Recommended Ineligible	3167	Update
3254	Trash scatter	Historic	NG/POT H ₂ O	Not Evaluated	3254	Update
6736	Shell Scatter	Prehistoric	NG/POT H ₂ O	Recommended Ineligible	5364	Update
6767	Habitation Site	Prehistoric	CO ₂ All Alts	Recommended Eligible	5392	Update
6768	Shell Scatter	Prehistoric/ Historic	CO ₂ Alt 1, 2B, 3B	Recommended Ineligible	5393	Update
6769	Shell Scatter	Prehistoric	CO ₂ Alt 1	Recommended Ineligible	5394	Update
6780	Habitation Site	Prehistoric	CO ₂ Alt 3B	Recommended Eligible	5404	Update
9737	Steam Plant	Historic	T-Line	Not Evaluated	N/A	No Access
9738	Feed Mill and Ranch	Historic	T-Line	Not Evaluated	N/A	Update
HECA-2008-1	Lithic and Shell Scatter	Prehistoric	PRO H ₂ O	Not Evaluated	N/A	New Site
HECA-2009-1	Lithic and Shell Scatter	Prehistoric	T-Line	Not Evaluated	N/A	New Site
HECA-2009-2	Lithic Scatter	Prehistoric	Project Site Control Area	Not Evaluated	N/A	New Site
HECA-2009-3	Lithic and Shell Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	N/A	New Site

**Table 5.3-4
Archaeological Sites within Project APE**

Primary # (P-15) or Temporary Designation	Site Type	Prehistoric/ Historic	Associated Project Component	NRHP Status	Trinomial (CA-KER)	Type of Documentation
HECA-2009-4	Shell Midden	Prehistoric	NG/POT H ₂ O	Not Evaluated	N/A	New Site
HECA-2009-5	Lithic and Shell Scatter	Prehistoric	NG/POT H ₂ O	Not Evaluated	N/A	New Site
HECA-2009-6	Shell Scatter	Prehistoric		Not Evaluated	N/A	New Site
HECA-2009-7	Lithic, Shell, and Trash Scatter	Prehistoric/ Historic		Not Evaluated	N/A	New Site

Notes:

NG=Natural Gas Line

POT H₂O =Potable Water Line

PRO H₂O =Process Water Line

T-Line=Electric Transmission Line

*P-15-6073 (CA-KER-5060) has been conjoined with P-15-3079 (Jackson et al. 1998)

Built Environment Resources

The following provides reference to the Project description as it relates to the Old Headquarters Weir, and the California Aqueduct, and provides an impacts analysis for both historical resources identified in this report. The Project activities will be situated primarily in Township 30 South, Range 24 East, Section 10, Mount Diablo Baseline, and Meridian. The Project excludes parcels in the northwestern and southeastern corners of the Section. The California Aqueduct and Old Headquarters Weir adjoin property controlled by the Project, but are not included in the Project area. None of the Project components or construction activities, therefore, will cause a substantial adverse change to the aqueduct or weir such that they will be materially impaired and unable to continue to convey their significance. Potential impacts to these resources are to the surrounding setting.

The Project proposes the construction of solids handling, gasification, gas-treatment, and power generating facilities at the site. These construction activities will not directly affect the aqueduct and weir, but represent a change to the setting from agricultural to industrial use. This change of use does not affect the aspects of the setting that allow the aqueduct or weir to convey their significance, and therefore does not pose a significant impact.

The weir is significant as an example of early reinforced-concrete construction. Additional significance is a result of the early use of this technique for a structure operating as both a weir and bridge. As a result, the important aspects of the setting for this resource are the KVVCC canal and the gravel access roads. The significant aspects of the weir are not conveyed by the surrounding land use. The Project will not affect the construction of the weir, canal, or roadway, only the surrounding land use. The aqueduct is a long, linear resource that passes through a

variety of settings, many of which have changed over time. Like the weir, this loss of setting does not significantly impact the aqueduct's ability to convey its significance. Neither the aqueduct nor the weir will be directly affected by the Project in terms of design, materials, workmanship, feeling, location, or association. Therefore, the proposed Project does not pose a significant impact under CEQA, and does not require mitigation.

5.3.3 Cumulative Impacts

Appendix J (List of Proposed Projects) of this Revised AFC presents information on other projects that could affect the same resources as the Project. Each of the identified projects was assessed in conjunction with the Project to ascertain the potential contribution of the project to cumulative impacts to the cultural resources base. From this analysis, it has been concluded that cumulative impacts from the Project on the regional cultural resources base are limited as implementation of the mitigation measures proposed below for cultural resources will reduce project-related impacts to less-than-significant levels. These measures would thus limit the contribution of the Project to cumulative impacts on the regional cultural resources base.

5.3.4 Mitigation Measures

This section discusses mitigation measures proposed that will be implemented in accordance with applicable laws and regulations; in particular, CEQA Section 15064.5 and 15126.4, and Section 106 of the NHPA, to reduce Project-related impacts to cultural resources. It should be noted herein that as described in Section 5.3.2.6, impacts to built environment resources are not anticipated. As such, mitigation measures specifically targeting the management of built environment resources are not included. In addition, as discussed previously, none of the known archaeological resources situated within the Project APE have been formally determined (e.g., SHPO concurrence) ineligible for listing to either the NHRP or CRHR. As such, all archaeological resources within the Project APE must be considered NRHP and/or CRHR eligible until formally determined otherwise.

CUL-1 Retain a Qualified Professional Archaeologist

Prior to the start of Project-related vegetation clearance, earth-disturbing activities, or Project Site preparation, a qualified professional archaeologist will be retained by the Project applicant (applicant) as the cultural resources specialist (CRS) who will be responsible for implementation of Mitigation Measures CUL-2 through CUL-7.

CUL-2 Avoidance

The exact number of archaeological resources that may be affected by Project implementation varies depending on which of the various alternative alignments are chosen. Because site avoidance is the Applicant's preferred treatment of archaeological resources, the alternatives that avoid the greatest number of archaeological sites, where feasible, will be used. Furthermore, if a potentially significant cultural resource is discovered during Project construction, the construction plans will be modified (if possible) to avoid that resource. If there are no feasible means to avoid the resource, then the cultural resource will be tested. If the cultural resource is

found to be significant, the measures for mitigation described below will be implemented in consultation with the CEC.

For any important or potentially important archaeological resource that can be avoided by modification of Project plans, the archaeological resource will be temporarily fenced or otherwise demarcated on the ground, and the area will be designated environmentally sensitive. Construction equipment will be directed away from the cultural resource, and construction personnel will be directed to avoid entering the area. Where cultural resource boundaries are unknown, the protected area will include a buffer zone with a 100-foot radius. In some cases, additional archaeological work could be required to demarcate the boundaries of the cultural resource to ascertain and ensure avoidance.

CUL-3 Testing

The applicant and the CRS shall prepare and submit to the CEC for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed Project, the testing method to be used, and locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of archaeological resources, to identify any archaeological resources found, and to evaluate the significance of any archaeological resources found as an historical resource.

At the completion of the archaeological testing program, the CRS shall submit a written report of the findings to the CEC. If the CRS finds that significant archaeological resources may be present, based on the archaeological testing program, the CEC, in consultation with the Applicant and the CRS, shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. If the CRS, in consultation with the CEC, determines that a significant archaeological resource is present, and that the resource could be adversely affected by the proposed Project, at the discretion of the Applicant, in consultation with the CEC, either:

- the proposed Project shall be re-designed to avoid any adverse effect on the important archaeological resource; or
- a data recovery program shall be implemented.

If the archaeological resource being subject to archaeological testing is associated with the Native American inhabitation of the region, it is further recommended that a Native American monitor be present during the implementation of this mitigation measure.

CUL-4 Data Recovery

Data recovery shall be implemented in the event an adverse impact to an important archaeological resource cannot be avoided. The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan (ADRP). The Applicant, the CRS, and the CEC shall meet and consult on the scope of the ADRP prior to preparation of a

draft ADRP. The Applicant and the CRS shall submit a draft ADRP to the CEC. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed Project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical. If the archaeological resource being subject to data recovery is associated with the Native American inhabitation of the region, it is further recommended that a Native American monitor be present during the implementation of this mitigation measure.

CUL-5 Construction Monitoring

Given the archaeological sensitivity of the Project APE, an archaeological monitoring program shall be implemented. A Cultural Resource Monitor (CRM) will be appointed who will be responsible for keeping a daily monitoring log of construction activities, observations, types of equipment used, problems encountered, and any new archaeological discovery (including the cultural material observed and location). Photographs will be taken as necessary to supplement the documentation. These logs will be signed and dated by the CRM and included within the monitoring report. It may be necessary that multiple CRMs be appointed given the geographical extent of the proposed Project.

The archaeological monitoring program shall minimally include the following provisions:

- The CEC in consultation with the applicant and the CRS shall determine what Project activities shall be archaeologically monitored. In most cases, any soils- disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), site remediation, etc., shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context;
- The applicant and the CRS shall advise all Project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;
- The CRM(s) shall be present on the Project Site until the CEC has, in consultation with the applicant and the CRS, determined that Project construction activities could have no effects on significant archaeological deposits;
- The CRM(s) shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;
- If an intact archaeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The CRM(s) shall be empowered to temporarily redirect

demolition/excavation/pile driving/construction activities, and equipment until the resource is evaluated. In the case of pile driving activity (foundation, shoring, etc.), if the CRM(s) has cause to believe that the pile-driving activity may affect an archaeological resource, the pile-driving activity shall be terminated until an appropriate evaluation of the resource has been made in consultation with the CEC. The CRS shall immediately notify the CEC of the encountered archaeological deposit. The CRS shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to the CEC.

If unanticipated resources are discovered during construction, they will be addressed under the procedures set forth in CEQA Section 15064.5. If possible, the resource will be avoided first through design modification, or second through protective measures as described above. If the resource cannot be avoided, the applicant and CRS will consult with the CEC with regard to resource importance/significance. If it is determined that the resource is important, then measures to mitigate impacts will be devised in consultation with the CEC, and will be carried out by the applicant.

Whether or not significant archaeological resources were encountered, the Applicant and the CRS shall submit monthly monitoring progress reports and a written report of the findings of the monitoring program to the CEC.

CUL-6 Crew Education

Prior to the beginning of construction, the construction crew will be informed of the regulatory protections afforded to cultural resources. The crew will also be informed of procedures relating to the inadvertent exposure of archaeological resources. The crew will be cautioned not to collect artifacts, and asked to inform a construction supervisor if cultural remains are uncovered.

CUL-7 Discovery of Human Remains

Some of the sites situated within the Project APE are suspected to contain human remains. Human remains are often fragile, and should be treated with care and respect at all times. The discovery of human remains involves both legal and archaeological issues. Discovery of any human remains within the Project's APE is subject to criteria set forth by the Native American Graves Protection and Repatriation Act, 43 CFR Part 10, as amended, 1999. As such, immediately upon the discovery of human remains, the following procedures will be implemented:

- Stop all excavation work, and using appropriate safety precautions, with a minimum of further disturbance to the remains, allow the monitoring archaeologist to verify that the discovery is, in fact, human skeletal material.
- If the remains are determined to be human, the Project Supervisor will call the Public Works Department who will in turn contact the Kern County Sheriff Department to report the discovery. In addition to the Sheriff, the County Coroner will also be contacted and informed of the discovery.

- In the event of the Coroner’s determination that the human remains are Native American, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The applicant, the CRS, and the MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Work within the immediate vicinity of the find shall remain halted until the CEC, after consultation with the applicant, CRS, MLD, and relevant agencies, provides written authorization for work to resume in the vicinity of the discovery.

5.3.5 Laws, Ordinances, Regulations, and Standards

The proposed Project will be constructed and operated in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to cultural resources. Federal, state, and local LORS applicable to cultural resources are discussed below and summarized in Table 5.3-5.

**Table 5.3-5
Applicable Laws, Ordinances, Regulations, and Standards**

LORS	Applicability	Administering Agency	AFC Section
Federal			
Section 106 of the National Historic Preservation Act	Federal regulation affecting the treatment of cultural resources.	State Historic Preservation Office	5.3.5.1
State			
California Environmental Quality Act	Requires evaluation of impacts of project on cultural resources.	California Energy Commission	5.3.5.2
Local			
Kern County General Plan	The County shall address archaeological resources for discretionary projects in accordance with CEQA	Kern County Planning Department	5.3.5.3

5.3.5.1 Federal

Federal laws, procedures, and policies affecting the treatment of cultural resources include the Antiquities Act of 1906, Public Law 59-209, Executive Order 11593, Section 106 of the NHPA of 1966 (Public Law 89-665), as amended, Public Law 93-291, the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190), the Federal Land Policy Management Act (Public Law 94-94-579), and regulations 36 CFR 60 and 36 CFR 800.

For management purposes, a cultural resource must be recommended as either eligible or not eligible for the NRHP to determine effect and the need for mitigation of effect. If the property (cultural resource) is determined eligible, then a determination of effect, in accordance with 36 CFR 800, must be provided. If the property is identified as not eligible, then no determination of effect or mitigation measures is necessary. Recommendations are reviewed and approved by the SHPO and the Advisory Council on Historic Preservation (ACHP).

The NHPA requires all federal agencies to assess the effects of any agency-sponsored undertaking on cultural resources. The federal agency is responsible for project compliance with Section 106 of the NHPA and its implementing regulations, set forth by the ACHP at 36 CFR 800.

Four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 CFR 800, are identified at 36 CFR 60.4. To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. That are associated with events that have made a significant contribution to the broad patterns of our history,
2. That are associated with the lives of persons significant in our past,
3. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
4. That have yielded, or may be likely to yield, information important in prehistory or history.

These evaluation criteria are used to help determine what properties should be considered for protection from destruction or impairment resulting from project-related activities (36 CFR 60.2).

5.3.5.2 *State*

The basic goal of CEQA is to develop and maintain a high-quality environment now and in the future. The CEQA Guidelines provide a framework for the analysis of impacts to archaeological resources.

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "important archaeological

resource” is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility to the CRHR.

Generally under CEQA, a historical resource (these include built-environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage,
2. Is associated with lives of persons important in our past,
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, or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to “unique archaeological resources” are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that — without merely adding to the current body of knowledge — there is a high probability that it meets one of the following criteria:

1. The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information,
2. The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type, or
3. The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Appendix G, a project would potentially have significant impacts if it would cause substantial adverse change in the significance of one of the following:

1. A historical resource (i.e., a cultural resource eligible for the CRHR),
2. An archaeological resource (defined as a unique archaeological resource that does not meet CRHR criteria),
3. A unique paleontological resource or unique geologic feature (i.e., where the project would directly or indirectly destroy a site), or
4. Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological or paleontological resource is given no further consideration other than the simple recording of its existence by the CEQA lead agency.

Potential impacts to identified cultural resources need only be considered if the resource is an “important” or “unique archaeological resource” under the provisions of CEQA Sections 15064.5 and 15126.4 and the eligibility criteria. If a resource cannot be avoided, then the resource must be examined vis-à-vis the provisions of CEQA Sections 15064.5 and 15126.4 and of the eligibility criteria as an “important” or “unique archaeological resource.” In many cases, determination of a resource’s eligibility can only be made through extensive research and archaeological testing. No mitigation measures are required unless previously undiscovered cultural resources are detected. Mitigation under CEQA must address impacts to the values for which a cultural resource is considered important. To mitigate adequately, it must therefore be determined what elements make a site eligible for the CRHR. The first line of mitigation is complete avoidance, when feasible, of all cultural resources.

5.3.5.3 *Local*

On the local level, compliance with the Kern County General Plan (Kern County 2007) is also necessary. According to the General Plan, the County shall address archaeological resources for discretionary projects in accordance with CEQA. As such, compliance with CEQA satisfies the County’s concerns for cultural resources.

5.3.6 Involved Agencies and Agency Contacts

Kern County was contacted regarding information about their General Plans. Unless consultation with SHPO becomes necessary, the NAHC is the only agency involved with the management of cultural resources for the Project. Appendix CUL-2 contains the correspondence with the NAHC concerning this Project.

Specific contacts for the NAHC and Kern County are listed in Table 5.3-6.

**Table 5.3-6
Involved Agencies and Agency Contacts**

Issue	Agency/Address	Contact/Title	Telephone
Native American traditional cultural properties	Native American Heritage Commission 915 Capitol Mall, Room 364 Sacramento, CA 95814	Ms. Debbie Pilas-Treadway Associate Government Program Analyst	(916) 653-4038
County compliance with CEQA	Kern County Planning Agency	Lorelei H. Oviatt, AICP Division Chief	661-862-8866

5.3.7 Permits Required and Permit Schedule

Other than certification from the CEC, no state, federal, or local permits are required by the Project for the management of cultural resources.

Consultation with SHPO and ACHP would be required under Section 106 if federal involvement is to occur (e.g., federal permits) and significant cultural resources were to be affected by the proposed Project.

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5.3 Cultural Resources

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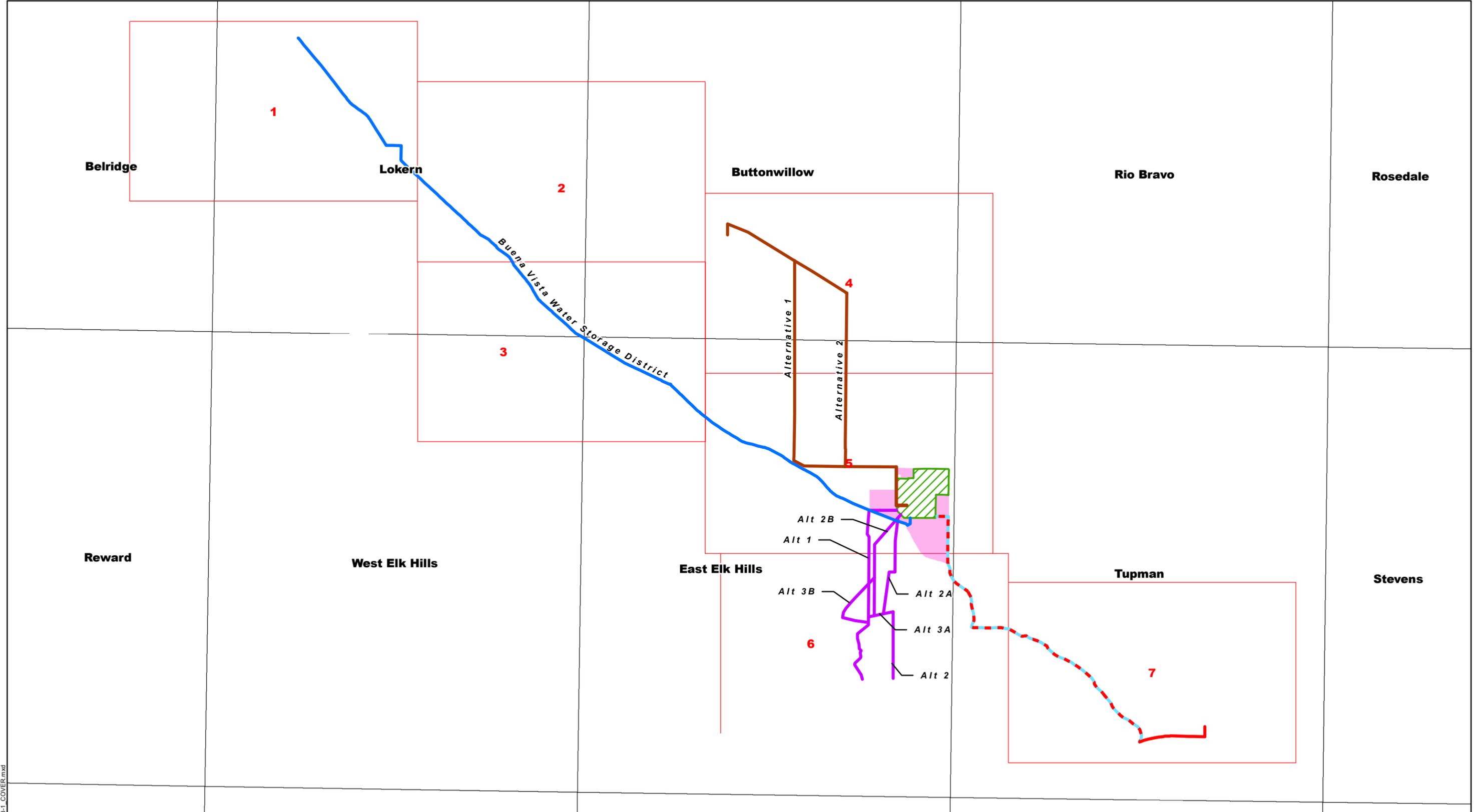
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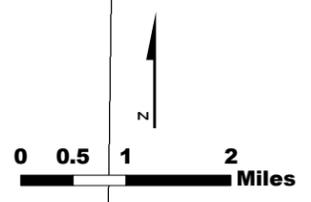


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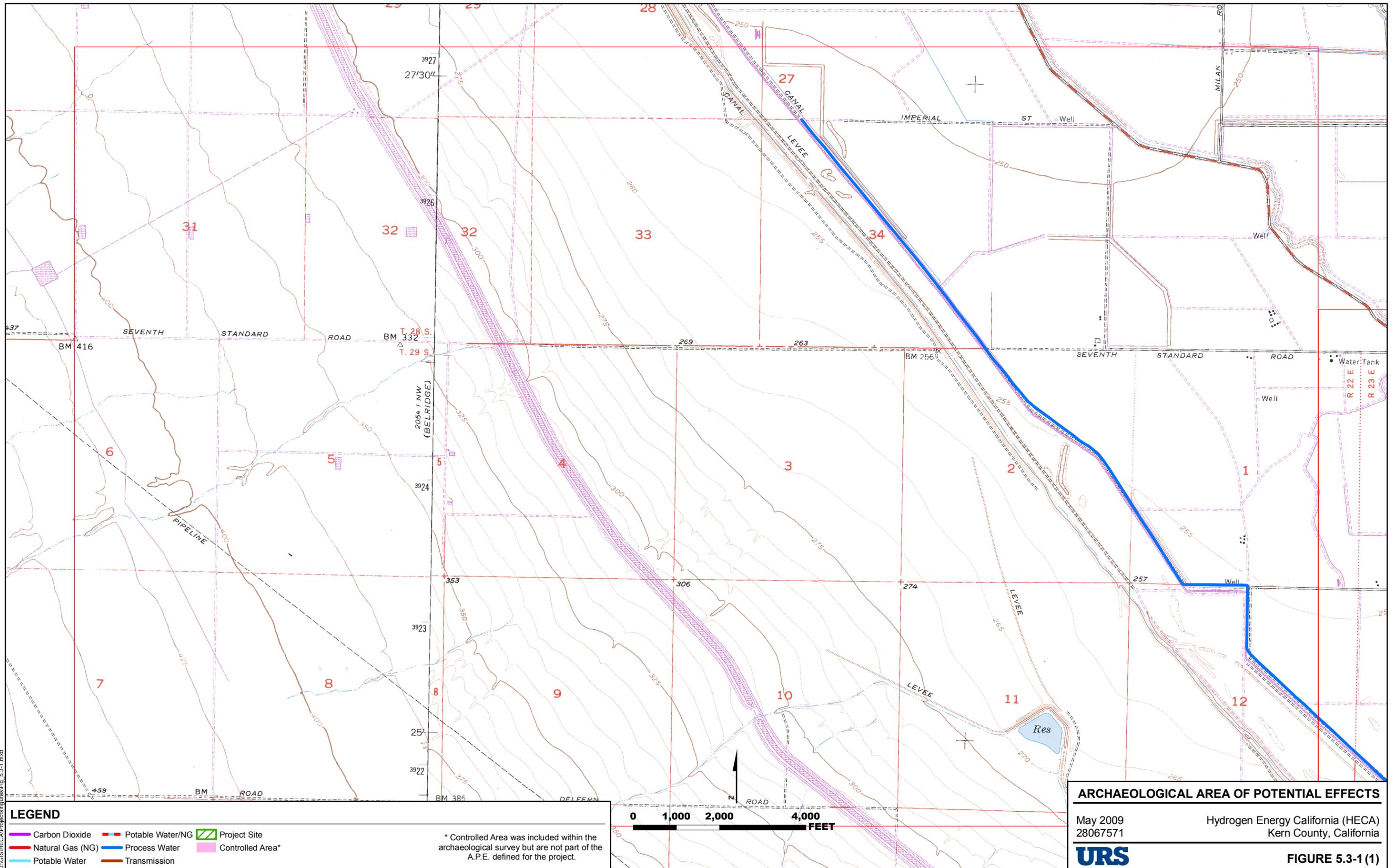
LEGEND

Carbon Dioxide	Potable Water/NG	Project Site
Natural Gas (NG)	Process Water	Controlled Area*
Potable Water	Transmission	

* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.



ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS	
May 2009 28067571	Hydrogen Energy California (HECA) Kern County, California
	FIGURE 5.3-1 - INDEX



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LEGEND		
— Carbon Dioxide	— Potable Water/NG	 Project Site
— Natural Gas (NG)	— Process Water	 Controlled Area*
— Potable Water	— Transmission	

* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.



ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS

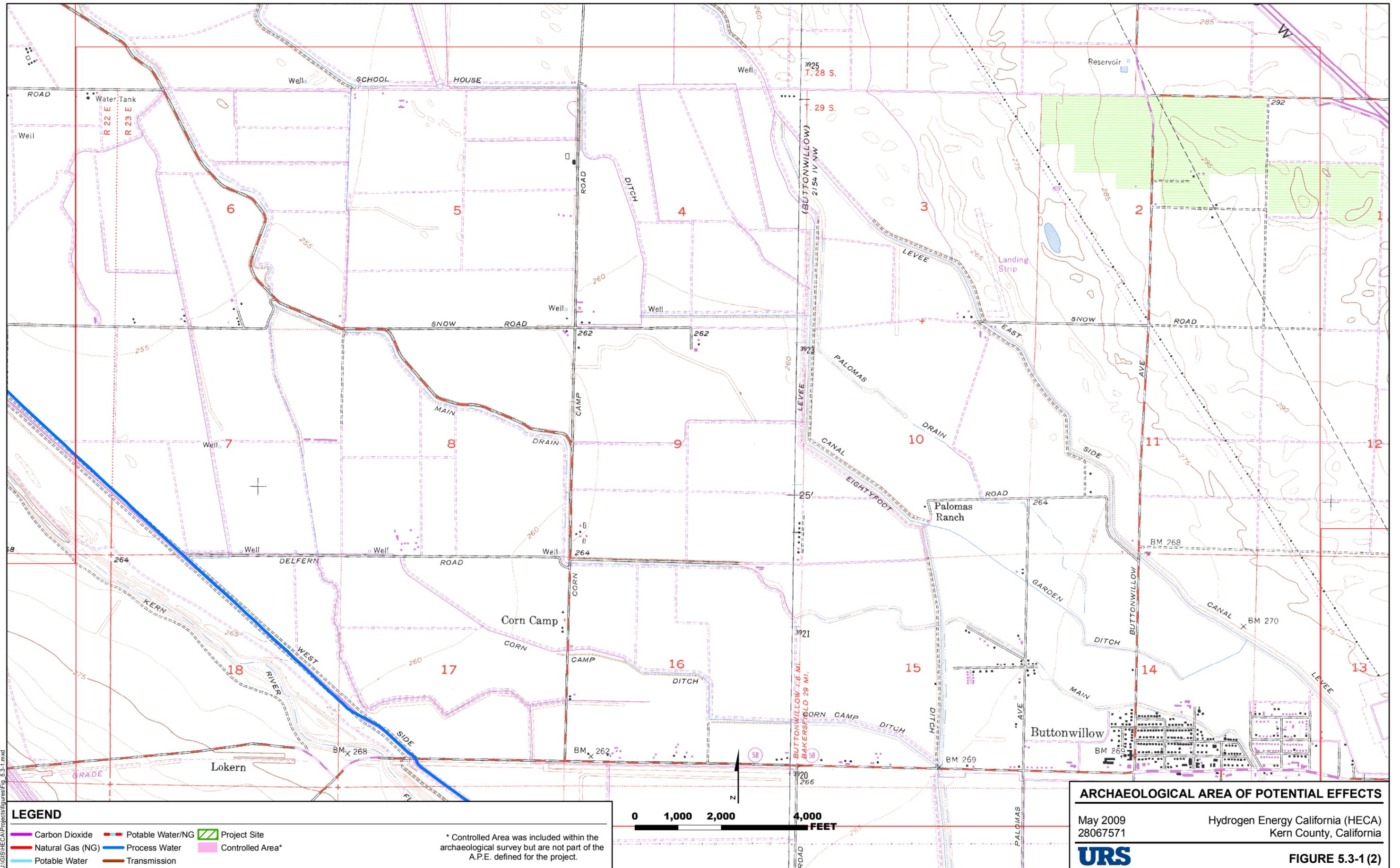
May 2009
28067571

Hydrogen Energy California (HECA)
Kern County, California



FIGURE 5.3-1 (1)

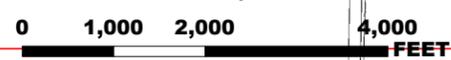
USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)



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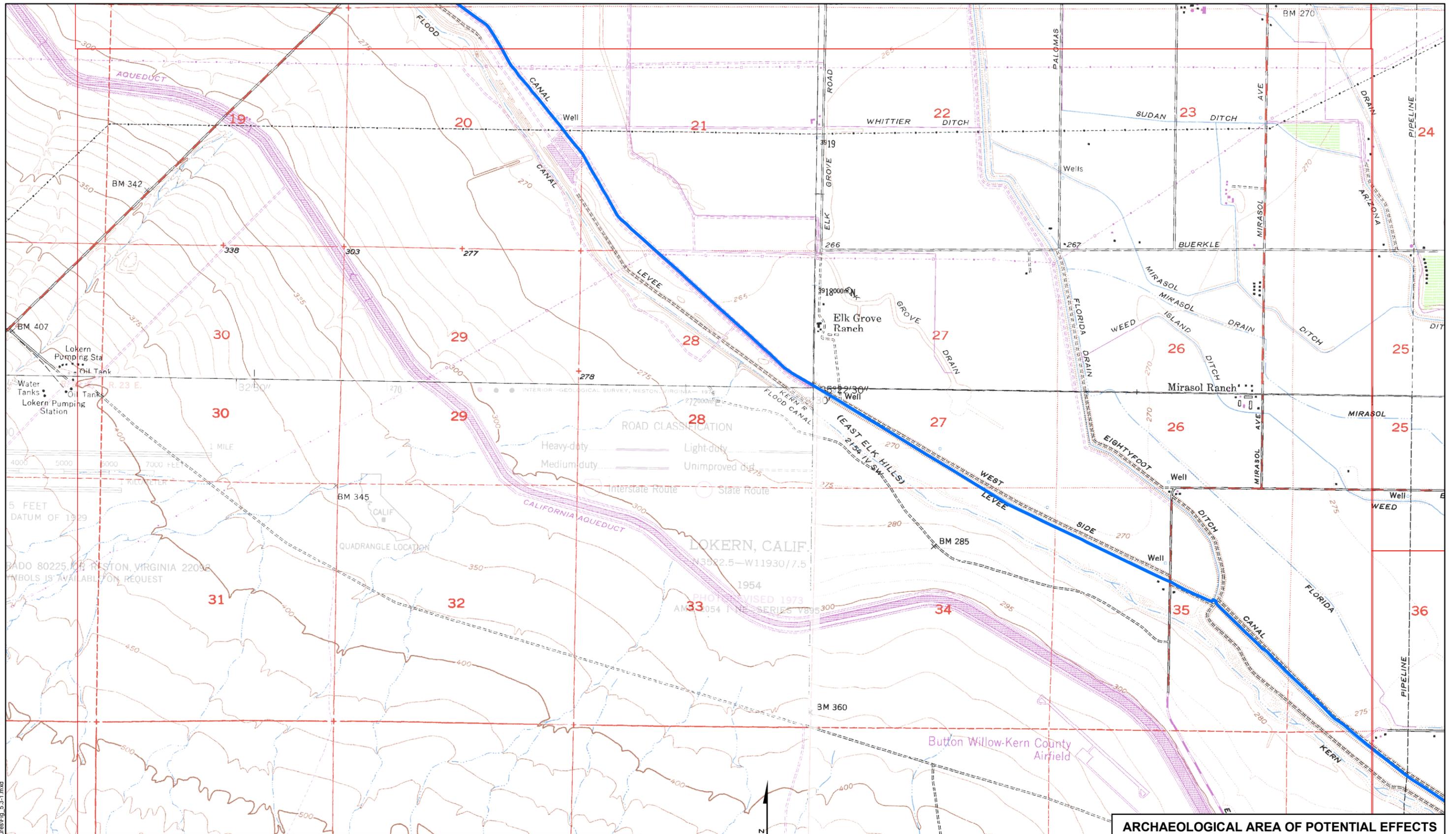
LEGEND		
—	Carbon Dioxide	▨ Project Site
—	Natural Gas (NG)	▨ Controlled Area*
—	Process Water	
—	Potable Water	
—	Transmission	

* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.



ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS	
May 2009 28067571	Hydrogen Energy California (HECA) Kern County, California
URS	FIGURE 5.3-1 (2)

USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)



LEGEND

Carbon Dioxide	Potable Water/NG	Project Site
Process Water	Controlled Area*	
Potable Water	Transmission	

* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.

0 1,000 2,000 4,000 FEET

USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)

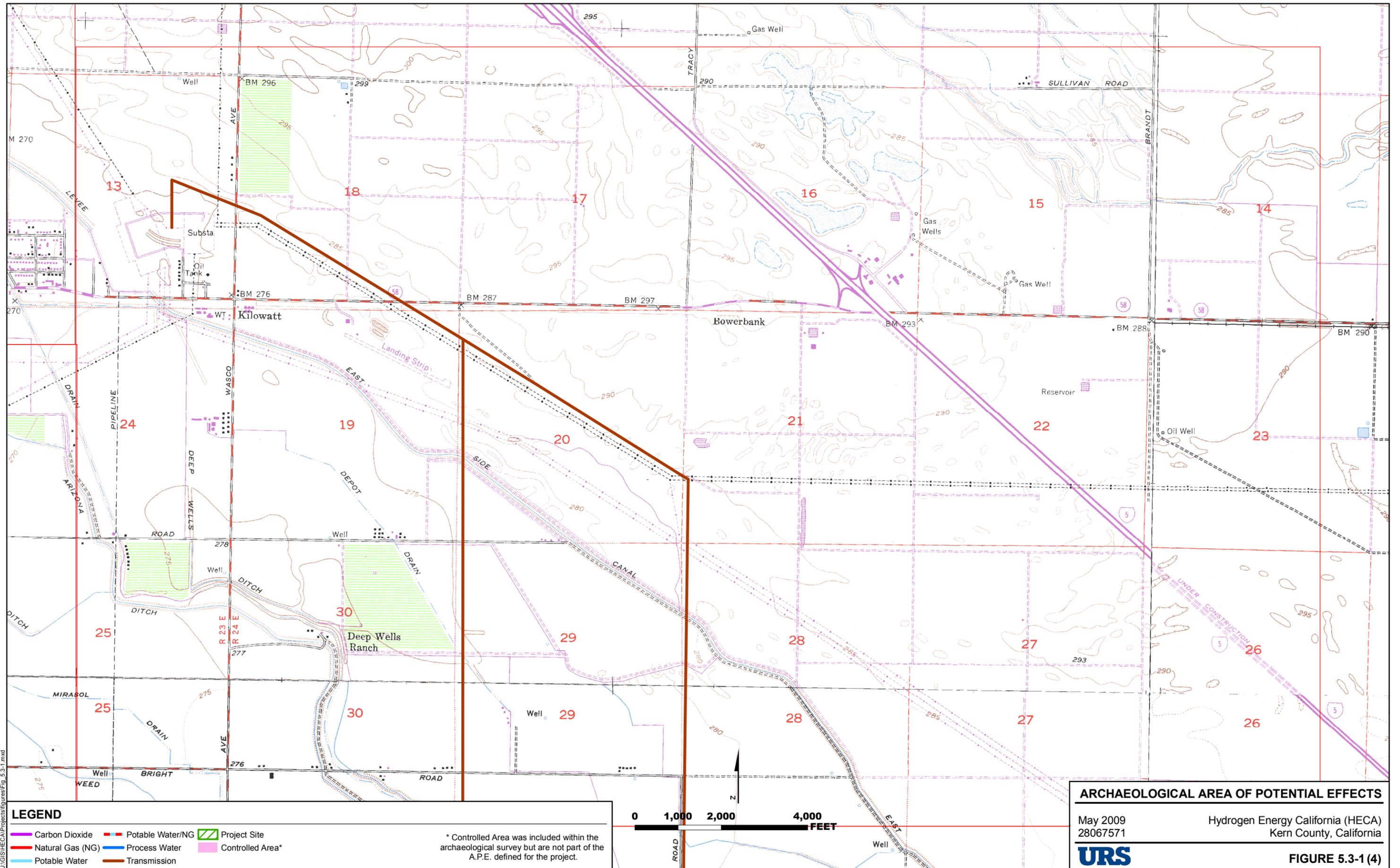
ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS

May 2009
28067571

Hydrogen Energy California (HECA)
Kern County, California

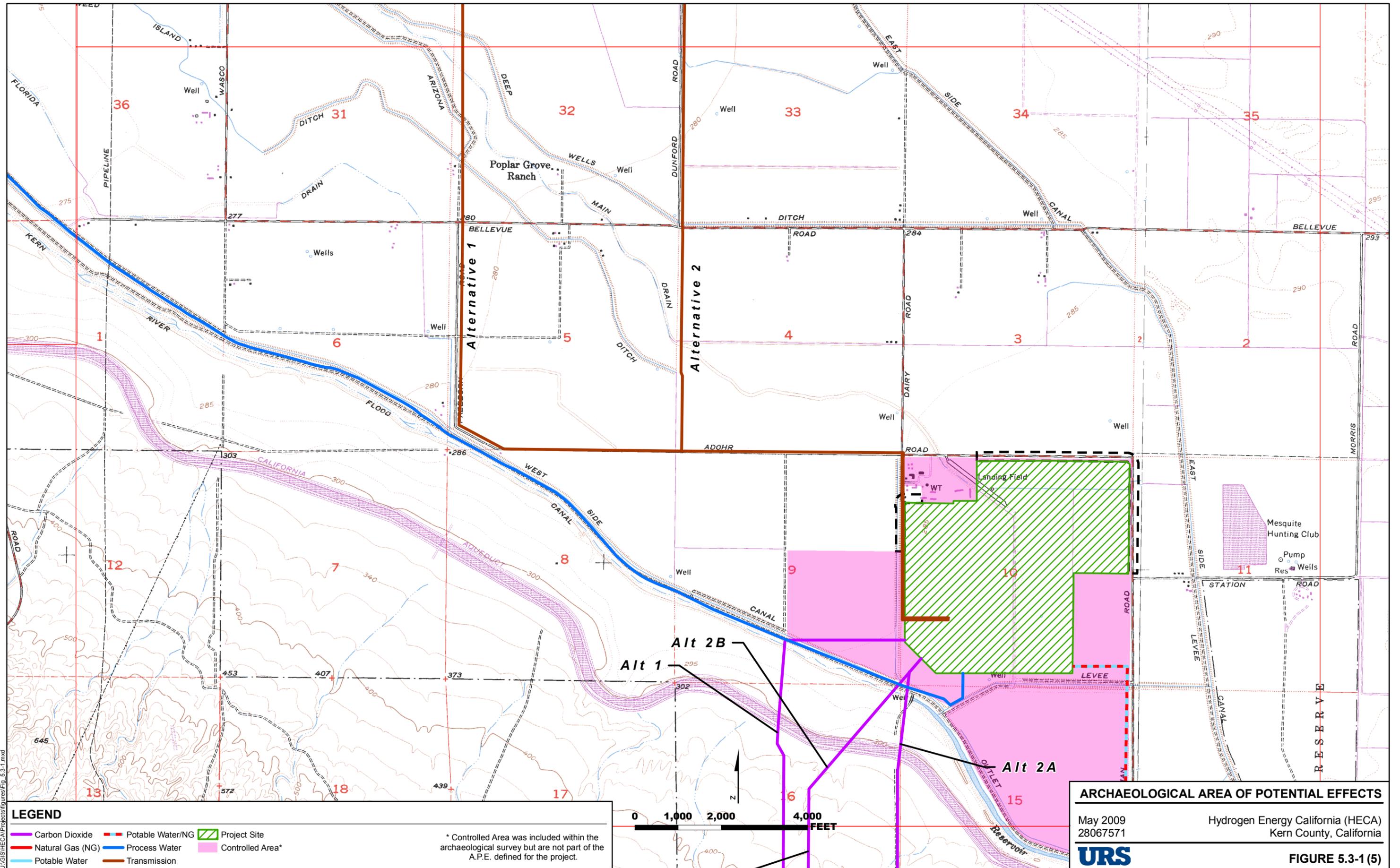
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FIGURE 5.3-1 (3)



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USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)



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LEGEND

— Carbon Dioxide	— Potable Water/NG	 Project Site
— Natural Gas (NG)	— Process Water	 Controlled Area*
— Potable Water	— Transmission	

* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.



ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS

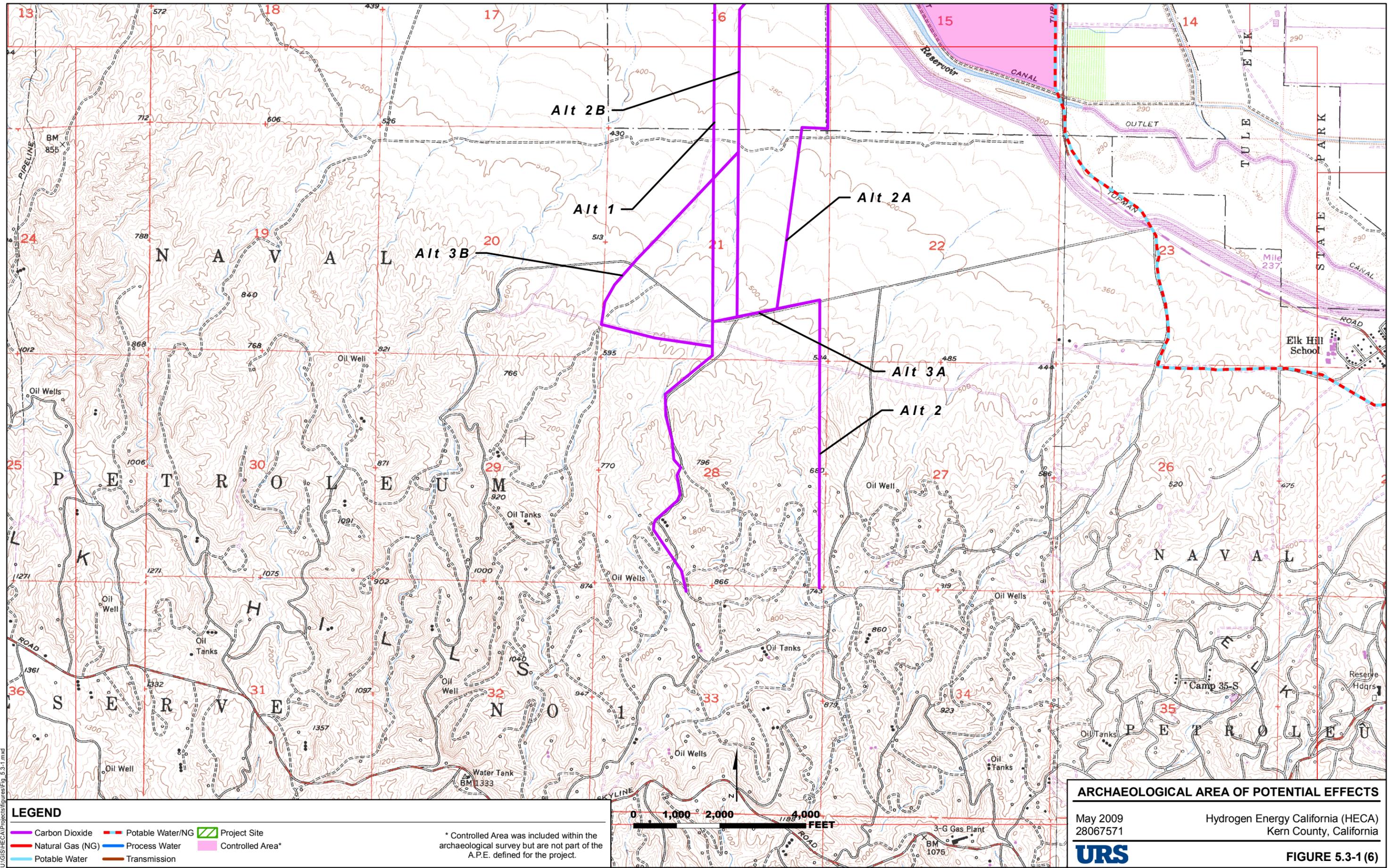
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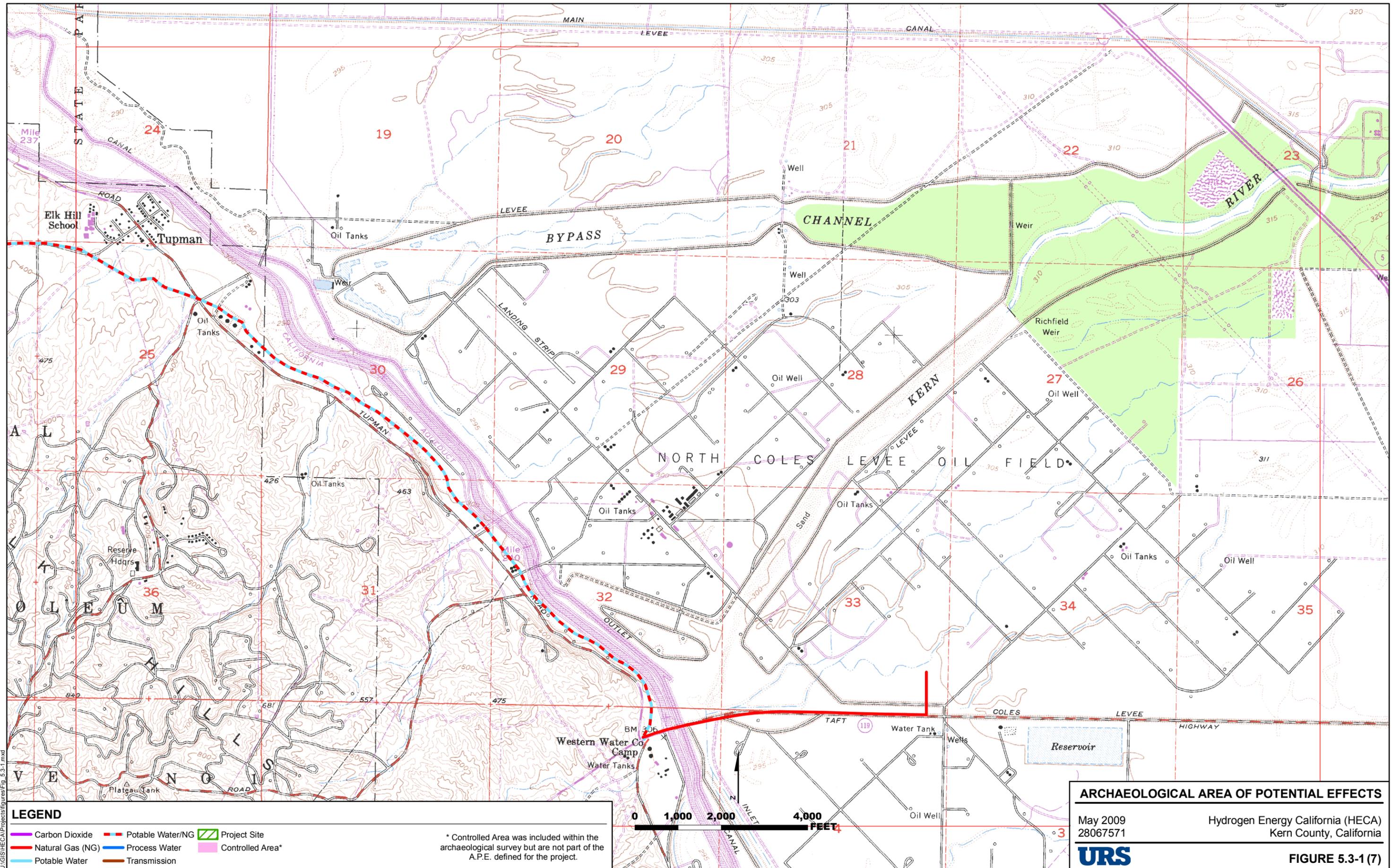
Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-1 (5)

USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)





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 USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976)

LEGEND

— Carbon Dioxide	- - - Potable Water/NG	 Project Site
— Natural Gas (NG)	— Process Water	 Controlled Area*
— Potable Water	— Transmission	

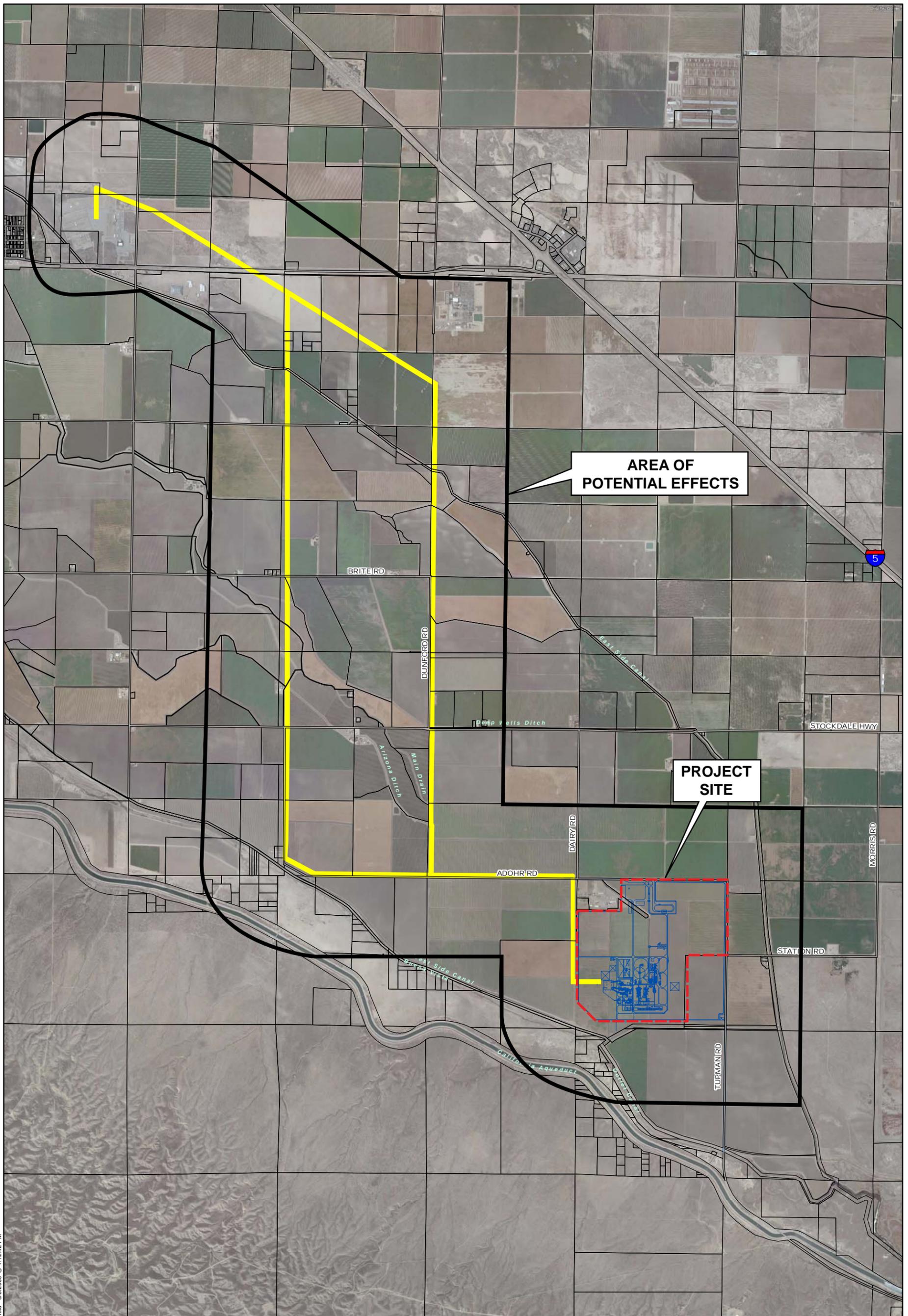
* Controlled Area was included within the archaeological survey but are not part of the A.P.E. defined for the project.

ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS

May 2009
 28067571

Hydrogen Energy California (HECA)
 Kern County, California

FIGURE 5.3-1 (7)



LEGEND

- Project Site
- Transmission Line Construction ROW: 175 ft.
- Area of Potential Effects (APE)
- Parcel Boundary



Source:
Aerial Photo, Digital Globe, June 1, 2008.

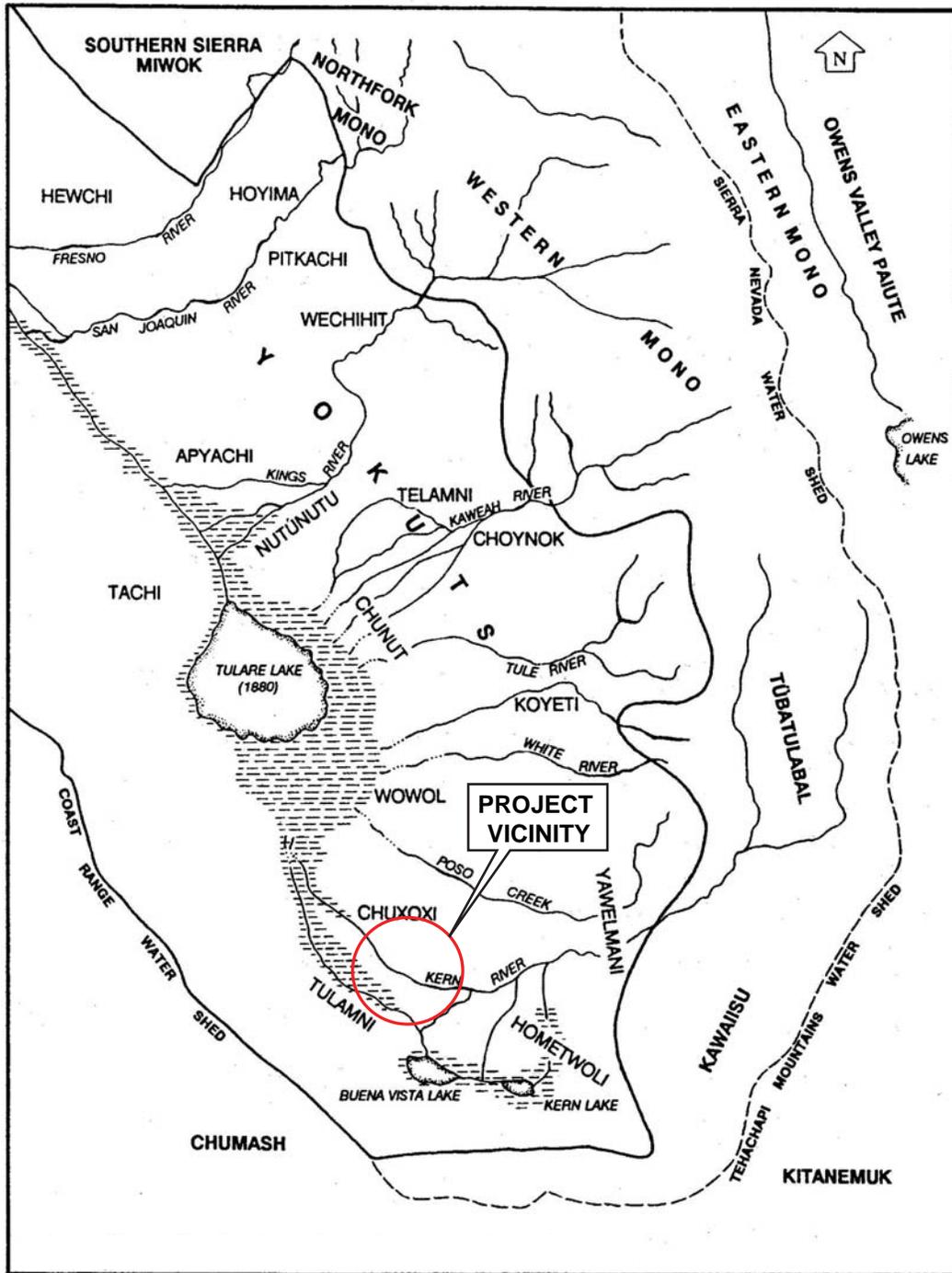


**HISTORIC ARCHITECTURE
AREA OF POTENTIAL EFFECTS (APE)**

May 2009 Hydrogen Energy California (HECA)
28067571 Kern County, California



FIGURE 5.3-2



ETHNOGRAPHIC TERRITORIES

May 2009 Hydrogen Energy California (HECA)
 28067571 Kern County, California



FIGURE 5.3-3

Source:
 Adopted from Kroeber 1925, Gayton 1948, and Wallace 1978.

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: **Cultural Resources**
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.3.1, p. 5.3-3 Section 5.3.2, p. 5.3-30 Section 5.3.3, p. 5.3-50 Section 5.3.4, p. 5.3-51		
Appendix B (g) (2) (A)	A summary of the ethnology, prehistory, and history of the region with emphasis on the area within no more than a 5-mile radius of the project location.	Section 5.3.1.1, p. 5.3-4 Section 5.3.1.2, p. 5.3-4 Section 5.3.1.3, p. 5.3-9 Section 5.3.1.4, p. 5.3-11		
Appendix B (g) (2) (B)	The results of a literature search to identify cultural resources within an area not less than a 1-mile radius around the project site and not less than one-quarter (0.25) mile on each side of the linear facilities. Identify any cultural resources listed pursuant to ordinance by a city or county, or recognized by any local historical or archaeological society or museum. Literature searches to identify the above cultural resources must be completed by, or under the direction of, individuals who meet the Secretary of the Interior's Professional Standards for the technical area addressed. Copies of California Department of Parks and Recreation (DPR) 523 forms (Title 14 CCR §4853) shall be provided for all cultural resources (ethnographic, architectural, historical, and archaeological) identified in the literature search as being 45 years or older or of exceptional importance as defined in the	Section 5.3.1.5, p. 5.3-18 Table 5.3-1, p. 5.3-20 Table 5.-2, p. 5.3-25 Appendix H1 and H4		

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: **Cultural Resources**
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
	<p>National Register Bulletin Guidelines, (36CFR60.4(g)). A copy of the USGS 7.5' quadrangle map of the literature search area delineating the areas of all past surveys and noting the California Historical Resources Information System (CHRIS) identifying number shall be provided. Copies also shall be provided of all technical reports whose survey coverage is wholly or partly within .25 mile of the area surveyed for the project under Section (g)(2)(C), or which report on any archaeological excavations or architectural surveys within the literature search area.</p>			
<p>Appendix B (g) (2) (C)</p>	<p>The results of new surveys or surveys less than 5 years old shall be provided if survey records of the area potentially affected by the project are more than five (5) years old. Surveys to identify new cultural resources must be completed by (or under the direction of) individuals who meet the Secretary of the Interior's Professional Standards for the technical area addressed.</p> <p>New pedestrian archaeological surveys shall be conducted inclusive of the project site and project linear facility routes, extending to no less than 200' around the project site, substations and staging areas, and to no less than 50' to either side of the right-of-way of project linear facility routes. New historic architecture field surveys in rural areas shall be conducted inclusive of the project site and the project linear facility routes, extending no less than 0.5 mile out from the proposed plant site and</p>	<p>Section 5.3.1.5, p. 5.3-18 Appendix H3 and H4</p>		

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: Cultural Resources
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
	<p>from the routes of all above-ground linear facilities. New historic architecture field surveys in urban and suburban areas shall be conducted inclusive of the project site, extending no less than one parcel's distance from all proposed plant site boundaries. New historic architecture field reconnaissance ("windshield survey") in urban and suburban areas shall be conducted along the routes of all linear facilities to identify, inventory, and characterize structures and districts that appear to be older than 45 years or that are exceptionally significant, whatever their age.</p> <p>A technical report of the results of the new surveys, conforming to the Archaeological Resource Management Report format (CA Office of Historic Preservation Feb 1990), which is incorporated by reference, shall be separately provided and submitted (under confidential cover if archaeological site locations are included).</p>			
Appendix B (g) (2) (C) cont.	<p>Information included in the technical report shall also be provided in the Application for Certification, except that confidential information (archaeological sites or areas of religious significance) shall be submitted under a request for confidentiality pursuant to Title 20, California Code of Regulations, § 2501 <i>et seq.</i> At a minimum, the technical report shall include the following:</p>			
Appendix B (g) (2) (C) (i)	<p>The summary from Appendix B (g)(2)(A) and the literature search results from Appendix B (g)(2)(B);</p>	Appendix H		

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: **Cultural Resources**
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (2) (C) (ii)	The survey procedures and methodology used to identify cultural resources and a discussion of the cultural resources identified by the survey;	Appendix H3 and H4		
Appendix B (g) (2) (C) (iii)	Copies of all new and updated DPR 523(A) forms. If a cultural resource may be impacted by the project, also include the appropriate DPR 523 detail form for each such resource;	Appendix H1		
Appendix B (g) (2) (C) (iv)	A map at a scale of 1:24,000 U.S. Geological Survey quadrangle depicting the locations of all previously known and newly identified cultural resources compiled through the research required by Appendix B (g)(2)(B) and Appendix B (g)(2)(C) (ii); and	Appendix H3		
Appendix B (g) (2) (C) (v)	The names and qualifications of the cultural resources specialists who contributed to and were responsible for literature searches, surveys, and preparation of the technical report.	Section 5.3.1.5, p. 5.3-18 Appendix H		
Appendix B (g) (2) (D)	Provide a copy of your request to the Native American Heritage Commission (NAHC) for information on Native American sacred sites and lists of Native Americans interested in the project vicinity, and copies of any correspondence received from the NAHC. Notify the Native Americans on the NAHC list about the project, including a project description and map. Provide a copy of all correspondence sent to Native American individuals and groups listed by the NAHC and copies of all responses. Provide a written summary of any oral responses.	Section 5.3.1.5, p. 5.3-18 Table 5.3-3, p. 5.3-27 Appendix H2		
Appendix B (g) (2) (E)	Include in the discussion of proposed mitigation measures required by subdivision (g)(1):			

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: **Cultural Resources**
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (2) (E) (i)	A discussion of measures proposed to mitigate project impacts to known cultural resources;	Section 5.3.4, p.5.3-51		
Appendix B (g) (2) (E) (ii)	A set of contingency measures proposed to mitigate potential impacts to previously unknown cultural resources and any unanticipated impacts to known cultural resources; and	Section 5.3.4, p. 5.3-51		
Appendix B (g) (2) (E) (iii)	Educational programs to enhance employee awareness during construction and operation to protect cultural resources.	Section 5.3.4, p. 5.3-51		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.3.5, p. 5.3-55 Table 5.3-6, p. 5.3-55		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.3.6, p. 5.3-58 Table 5.3-6, p. 5.3-58		

Adequacy Issue: Adequate _____ Inadequate _____
 Technical Area: **Cultural Resources**
 Project Manager: _____

DATA ADEQUACY WORKSHEET
 Project: _____
 Docket: _____

Revision No. 0 Date _____
 Technical Staff: _____
 Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Table 5.3-6, p. 5.3-58		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.3-7, p. 5.3-58		