Appendix F

Cultural Resources Survey Report

PHASE I CULTURAL RESOURCES SURVEY REPORT WHITTIER MAIN OIL FIELD DEVELOPMENT PROJECT WHITTIER, CALIFORNIA

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MANAGEMENT SUMMARY

The Whittier Main Oil Field Development Project (Project) site is located within property owned by the City of Whittier (City) and is part of the Puente Hills Landfill Native Habitat Preserve (Preserve). The City has entered into an Oil, Gas and Mineral Lease Agreement with Matrix Oil Corporation ("Matrix") of Santa Barbara, California. This agreement leases the City's mineral rights underlying the Whittier Main Field to Matrix and provides them certain rights including the drilling of exploratory oil wells and the extraction of oil, gas and other hydrocarbons from the land.

As proposed, the fully developed Project will consist of ground disturbances including the construction of wells, oil processing and gas plant facilities, underground oil, water, sewer and gas pipelines, underground electrical lines, and oil truck loading facilities, to be located within portions of the 1,290-acre City owned Whittier Main Field, now part of the Preserve. The oil and gas production and processing facilities will be physically located at three different sites within the Whittier Main Oil Field. At the request of Marine Research Specialists (MRS) of Ventura, California, Applied EarthWorks, Inc. (Æ), conducted cultural resources investigations of the Project area in support of the Project Environmental Impact Report (EIR) and in accordance with the California Environmental Quality Act (CEQA).

An archaeological literature and records search indicates that one cultural resource is present within the current Project area. Site 19-003341, the Whittier Oil Field consists of level pads marking the former location of oil wells, well markers, surface pipelines, and graded access roads associated with the Whittier Oil Field, which was first developed ca. 1885 and continued in production until the latter part of the twentieth century (DPR 19-003341, 2004). The site has been previously evaluated and is considered eligible for the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP). This current assessment further evaluated the resource and explores mitigation measures.

On May 11, 2010, a site visit of the Project area was performed by Æ Historical Archaeologist Josh Smallwood. The archaeological survey included visits to the proposed well sites and road and pipeline locations. Additionally, the Native American consultation process did not indicate the presence of Native American cultural resources in the immediate Project area and no specific concerns were raised by the tribal representatives contacted.

A copy of this report will be placed on file at the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System, housed at California State University, Fullerton.

1
INTRODUCTION

1.1 PROJECT LOCATION AND DESCRIPTION

The Project site is located within property owned by the City of Whittier and is part of the Puente Hills Landfill Native Habitat Preserve (Preserve). The Preserve is located at the eastern edge of Los Angeles County, bounded by the San Gabriel River on the west and the Chino Hills to the east (Figure 1.1). With 3,860 acres, the Preserve extends across the boundaries of three municipalities: the cities of La Habra Heights, Whittier, and the communities of Rowland Heights and Hacienda Heights, both of which are located in unincorporated Los Angeles County. The Project location is depicted on portions of the USGS 7.5 minute series, Whittier and La Habra, CA Quadrangles located within Section 26 Township 2 South, Range 11 West, in Los Angeles County (Figure 1.2).

Within the Preserve, the City of Whittier owns approximately 1,290 acres of former oil field lands commonly known as Whittier Main Field. The majority of this land was purchased by the City from Chevron and Unocal Corporations with a grant from Proposition A funds. The land is managed for the City by the Puente Hills Landfill Native Habitat Preservation Authority ("Habitat Authority"), a joint powers agency with members including the City of Whittier, the County of Los Angeles, the Los Angeles County Sanitation District, and the Hacienda Heights Improvement Association.

On October 28, 2008, the City entered into an Oil, Gas and Mineral Lease Agreement with Matrix Oil Corporation (Matrix) of Santa Barbara, California. This Agreement leases the City's mineral rights underlying the Whittier Main Field to Matrix and provides them certain rights including the drilling of exploratory oil wells and the extraction of oil, gas and other hydrocarbons from the land. As proposed, the fully developed Project will consist of wells, oil processing, gas plant, underground oil, water, sewer and gas pipelines, underground electrical lines, and oil truck loading facilities, to be located within portions of the 1,290-acre City owned Whittier Main Field, now part of the Habitat Authority Preserve. The oil and gas production and processing facilities will be physically located at three different sites within the Whittier Main Oil Field (Figure 1.3). These sites are the West Well Site, the Central Site, and the East Well Site. As shown on Figure 1.3, the Central Site is divided into two sub-areas, the central well area and the central oil and gas processing area.

As currently planned, the proposed Project entails construction during two phases. The drilling and testing phase, or Pilot Project will include clearance of portions of the Central and West well areas, road improvements, and drilling activities. The design and construction phase will include the construction of a new access road, oil and gas processing facilities, truck loading facility, backbone pipeline system, gas and crude pipelines and well sites, cellars and related vessels. If developed, all three of the sites will contain well cellars, well test stations, and liquid and gas separating equipment. In addition, the Central Site will contain the oil processing facility and gas plant. The total pad area required for the oil and gas production and processing at all three sites will be approximately 6.0 acres. In order to construct these pad areas, an additional 4.4 acres may have to be temporarily disturbed to allow for construction and grading of the pads. In addition, Los Angeles County Fire Department may require a fuel modification zone (FMZ)

Figure 1.1 Project vicinity.

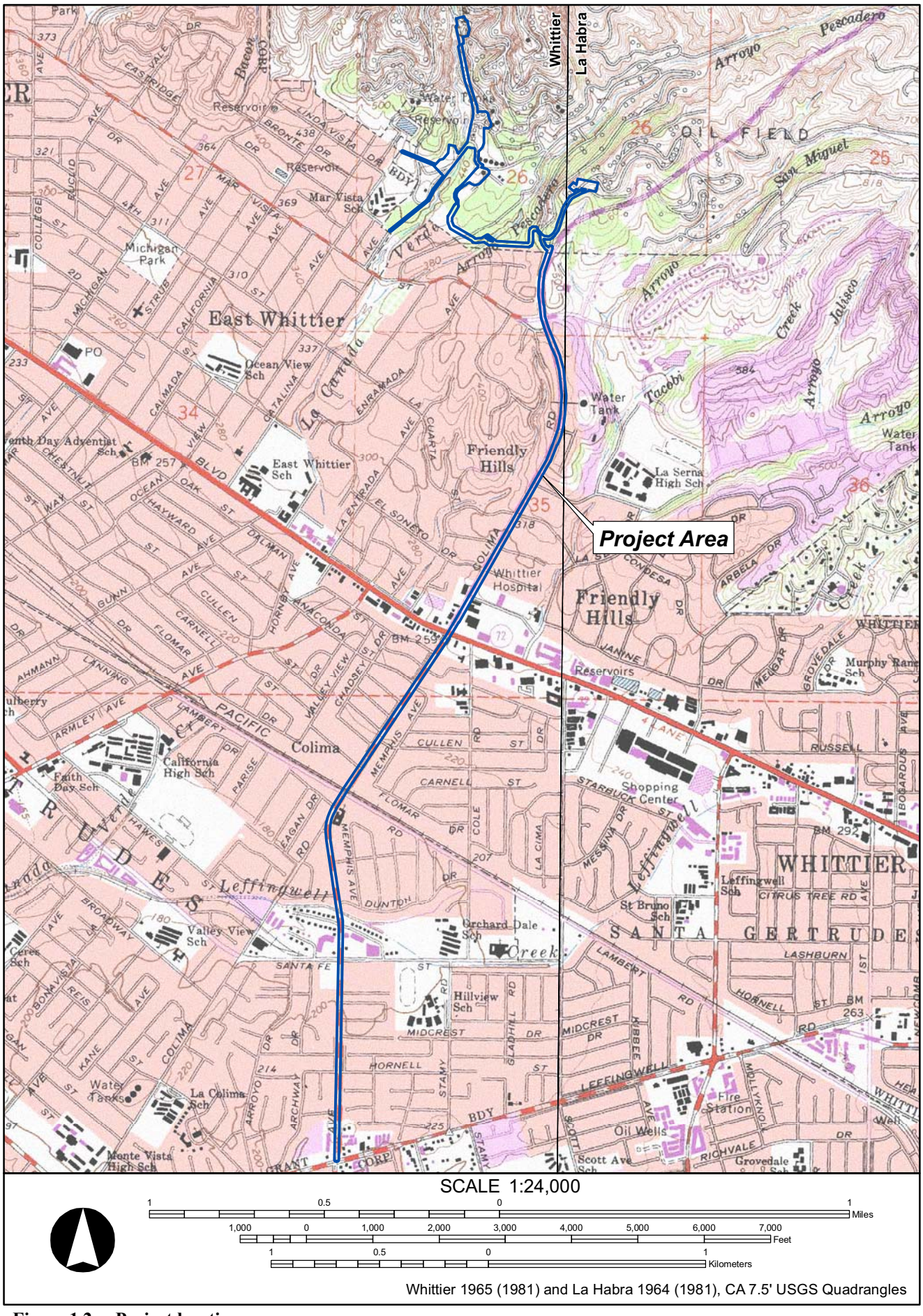

Figure 1.2 Project location.

Figure 1.3 Project construction sites.

around each pad area. A fuel modification zone is a strip of land where combustible native or ornamental vegetation has been modified and/or partially or totally replaced with drought-tolerant, low-fuel-volume plants. The truck loading facility will encompass 1.1 acres. An additional 0.6 acres may be temporarily disturbed for constructing and grading the truck loading area.

In addition, roads, pipelines, and electrical conduit corridors, called the "backbone" will be constructed to connect these various site locations. Oil, gas and produced water pipelines, and electrical conduits will be constructed below ground mostly within the existing road system. Electrical and pipeline interconnections will be made to the Southern California Edison (SCE) grid, and the City of Whittier Sewer and Water District systems. The Project will utilize approximately 1.1 miles of existing roads within the Preserve and will construct 0.5 miles of new roadways within the preserve.

1.2. SUMMARY OF FINDINGS

An archaeological literature and records search indicates that one cultural resource is present within the current Project area. Site 19-003341, the Whittier Oil Field consists of level pads marking the former location of oil wells, well markers, surface pipelines, and graded access roads associated with the Whittier Oil Field, which was first developed ca. 1885 and continued in production until the latter part of the twentieth century (DPR 19-003341, 2004). A 2007 site evaluation by LSA and Associates (LSA) recommended that the site is eligible for the California Register of Historical Resources (CRHR) under Criteria 1 (LSA 207:65). It may also be eligible under Criterion 4 where subsurface components, structural features, or remnants of workers camps remain. LSA also recommended that the site is eligible the National Register of Historic Places (NRHP).

The current archaeological survey included visits to the Project well sites and road and pipeline locations. Components of Site 19-003341 were identified and are described in Chapter 5. No other cultural resources were identified.

1.3 PROSPECTUS

Chapter 1 has provided an overview of the Project and a summary of survey findings. Chapter 2 details the regulatory context within which the Project is evaluated, while Chapter 3 discusses the background research undertaken for the project, and Chapter 4 presents the results of that research. Chapter 5 provides the results of the site inspection, and management recommendations are presented in Chapter 6. Correspondence regarding the records and literature search and the Native American Consultation process are included in the appendix**.**

2
REGULATORY CONTEXT

The California Register of Historical Resources (CRHR) is an authoritative guide to be used by state and local agencies, private groups, and citizens to identify and evaluate the state's historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The criteria for listing resources on the CRHR are based on those developed by the National Park Service for listing on the National Register of Historic Places (NRHP) with modifications in order to include a broader range of resources which better reflect the history of California. Under CEQA, a historical resource is considered significant if it:

1. Is associated with events or patterns of events that have made a significant contribution to the broad patterns of the history and cultural heritage of California and the United States.
2. Is associated with the lives of persons important to the nation or to California's 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 to the prehistory or history of the State and the Nation.

According to CEQA Guidelines, a resource shall generally be considered "historically significant" if the resource meets the criteria for listing on the CRHR. The fact that a resource is not listed in, or determined to be eligible for listing in the CRHR, not included in a local register of historical resources [pursuant to Section 5020.1(k) of the Public Resources Code], or identified in a historical resources survey [meeting the criteria in Section 5024.1(g) of the Public Resources Code] does not preclude a lead agency from determining that the resource may be a historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

2.1 SIGNIFICANCE CRITERIA

Under CEQA, an impact on a historical resource is considered significant if the impact lessens the integrity of the qualities of the properties that qualify it for the CRHR. If the proposed project may cause damage to a significant historical resource, the project may have a significant effect on the environment. The CEQA Guidelines, Section 15064.5, provide significance threshold criteria for determining a substantial adverse change to the significance of a cultural resource:

- Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.
- The significance of a historical resource is materially impaired when a project:

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources;
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the PRC or its identification in a historical resources survey meeting the requirements of section 5024.1(g) of the PRC; or
- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for the purposes of CEQA.

CEQA Guidelines §15064.5 (d) prohibit disturbance of any human remains, including those interred outside of formal cemeteries, without proper treatment and reburial with appropriate dignity. Human remains must also be treated in compliance with Health and Safety Code, Section7050.5 and Public Resources Code, Section 5097.98.

Paleontological resources are afforded protection under CEQA. Appendix G (V) of the CEQA Guidelines indicates that a project would have a significant impact on paleontological resources if it will disturb or destroy a unique paleontological resource or site or unique geologic feature. Section 5097.5 of the California Public Resources Code prohibits knowing and willful excavation, removal, destruction, injury, and defacement of any paleontological site or feature on public lands (lands under jurisdiction of state, county, city, district, authority, or public corporation, or any agency thereof), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation measures for impacts on paleontological resources that occur as a result of development on public lands.

Indirect impacts result primarily from the effects of project-induced population growth. Such growth can result in increased construction as well as increased recreational activities that can disturb or destroy cultural resources.

2.2 PRESERVE RESOURCE MANAGEMENT PLAN

The Preserve Resource Management Plan (RMP) prepared by LSA in 2007 set goals and objectives for management of cultural resources within the Preserve (LSA 2007a:81–82).

Goal: CULT-1. Protect and preserve important cultural resources.

Objectives:

- CULT-1.1: For internal use, maintain maps of all cultural and paleontological sites. Monitor these sites to ensure that they are not harmed. Protect these sites using generally accepted methods of preservation.
- CULT-1.2: Perform cultural resources surveys in sensitive areas that are currently obscured by vegetation if there is a fire or other activity where the ground visibility becomes clear.

- CULT-1.3: Allow local Tongva/Gabrieleno tribes to use these sites if compatible with the RMP.

Goal: CULT-2. Preserve and interpret the remains of the Whittier Oil Field as a significant historic site for the education and enjoyment of preserve visitors.
Objectives:

- CULT-2.1: Allow the definitive elements of the oil field to remain in place and be passively managed.

Goal: CULT-3. Follow established protocol if human remains are encountered during ground-disturbing activities in the Preserve.
Objectives:

- CULT-3.1: Comply with State Health and Safety Code Section 7050.5 which states that no further disturbance should occur at a site until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98.

Additionally:

- CULT-4: If any paleontological resources are encountered during ground-disturbing activities in the Project area, activities in the immediate area of the find shall be halted and the discovery assessed. The Habitat Authority shall contact a qualified paleontologist to recommend appropriate mitigation measures pursuant to guidelines developed by the Society of Vertebrate Paleontology (SVP) and a standard Paleontological Resource Impact Mitigation Program (PRIMP) for treatment of the resources will be developed and followed.

In achieving the above stated goals, the RMP recommended the following management actions be undertaken for cultural resources within the Preserve (LSA 2007a:108–109).

- Conduct a search of Native American Heritage Commission (NAHC) Sacred Lands files in order to identify Traditional Cultural Areas within the Preserve. Native American Groups should be appropriately consulted by Preserve management personnel in identifying sacred sites and natural resources procurement areas and to help develop management programs for these resources (PRC Section 5097.9).
- For any cultural resource work conducted within the Preserve, a Los Angeles County certified archaeologist should prepare a research design that identifies research strategies to be implemented during the research program. A review of cultural resource professionals should establish research priorities for the Preserve, and cultural resource work within the preserve should be designed to address these priorities.
- Create a cultural resources interpretive display to help disseminate information about the Whittier Oil Field remains to the public.
- Monitoring of any project that involves earth-disturbing activities in culturally rich soils should be conducted by a trained archaeologist under the supervision of a Los Angeles County Certified Archaeologist. Artifacts that are unearthed during this

construction should be collected with provenience information where available (PRC Section 21083.2[c]).

- When sites and/isolates are located, they should be recorded on California Department of Parks and Recreation (DPR) 523 series forms. Location data should be recorded using a hand-held GPS unit. Site updates, including photos and maps, should be completed for previously documented sites that are reevaluated. Surface collection is recommended for any materials encountered if the site appears to be threatened by natural or human factors (PRC Section 5020.4).
- When the significance of a site is unknown, a Los Angeles County certified archaeologist should conduct test excavations at those sites to determine if they are eligible for listing on the National Register and/or the California Register. The archaeologist shall provide recommendations for further action based on the findings of the test-level excavations (PRC 5020.1; PRC Section 21083.2; and California Code of Regulations, Title 14, Chapter 2, Section 15064.5).
- Implement an emergency response plan for sites that have been exposed by erosion. When cultural resources, including artifacts or features are encountered, either during a planned patrol or in an unexpected manner, a Los Angeles County certified archaeologist should be consulted. The certified archaeologist will both recommend and, with Habitat Authority approval, implement mitigation measures that are appropriate for the impacts to the sites (Section 110 of the National Historic Preservation act (NHPA).
- Presence/absence archaeological surveys are considered to have a five-year lifetime. A preserve-wide systematic reconnaissance survey should be conducted every five years under the direction of a Los Angeles County certified archaeologist. To help staff with this endeavor, qualified volunteer groups could be utilized to assist in the survey of the Preserve. Update the Preserve-wide survey every five years, particularly in high visitation and high erosion areas.

3
BACKGROUND RESEARCH

3.1 ARCHIVAL RESEARCH

In January of 2010, Æ's archaeologist Keith Warren conducted archival research for historical documents pertaining to the Whittier Oil Field. Websites considered included the Library of Congress, American Memory (http://memory.loc.gov/ammem/ index.html), the online Archive of California, (http://www.oac.cdlib.org/), the Los Angeles Public Library (http://www.lapl.org/), and Melvyl, the Catalog of the University of California Libraries (http://melvyl.cdlib.org/F/?func=file&file_name=find-b&local_base=cdl90). Mr. Warren also visited the Young Research Library at University of California Los Angeles, the Whittier Library, the Grant R. Brimhall Library Thousand Oaks, and the Los Angeles Public Library, and the Los Angeles County Library. Additionally, the historical data presented by LSA in the Resource Management Plan: Puente Hills Landfill Native Habitat Preservation Authority (LSA 2007a) was reviewed. The information recovered from archival research was then compiled and used to focus field efforts and formulate a context for evaluation. Chapter 5 summarizes the results of the archival research.

3.2 ARCHAEOLOGICAL LITERATURE AND RECORDS SEARCH

A records search of the California Historical Resources Information System at the South Central Coastal Information Center (SCCIC) housed at California State University, Fullerton was performed December 9, 2009 to identify previously recorded archaeological sites, built environment resources, and traditional cultural properties within a one mile radius of the Whittier Main Oil Field Project area. A list of previous studies in the area was also compiled. Among the sources consulted were the California Points of Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CRHR), the National Register of Historic Places (NRHP), and the California State Historic Resources Inventory (HRI). The following provides a summary of those findings.

The PHI lists one property within the search radius, identified as the East Whittier Woman's Improvement Club located at 14148 E. Second Street, Whittier, built in 1905.. While in proximity, this property is not within the Project site. The HRI lists ten properties that have been evaluated for historical significance within the search radius. These properties consist of historical structures in the city of Whittier that are beyond the study area. No other properties are listed on the CHL, CRHR, or NRHP.

Seven previous cultural resource studies have been conducted within the search radius. Of these, three are linear surveys that include the current Project area. Results of the 2004 survey by Fulton and Michalsky are included in the *Resource Management Plan. Puente Hills Landfill Native Habitat Preservation Authority* (LSA 2007a). Additionally, the *Cultural Resource Survey Report on the Whittier Property* (Scientific Resource Surveys Inc. [SRS] 1989), and the *Archaeological Survey of the Colima Vegetation Management Plan (Prescribed Burn), Los Angeles County, California* (Dillon 1997) each covered the entire current Project area.

The records search identified one archaeological site (19-003341) within the current Whittier Main Oil Field Project area—the Whittier Main Oil Field itself. This site was first recorded on the Department of Parks and Recreation (DPR) forms by LSA Associates in 2004, and was documented in the Resource Management Plan (RMP) for the Puente Hills Landfill Native Habitat Preservation Authority by LSA Associates in 2007.

3.3 PREVIOUS INVESTIGATIONS

The SRS 1989 cultural resource assessment identified five historic wooden pumping units associated with the oil field and historic artifacts possibly associated with a post 1920s residence (SRS 1989:21). No prehistoric resources were identified as a result of that study. SRS recommended monitoring of grading in the artifact scatter area to collect whole artifacts for donation to local institutions (SRS 1989:21). SRS also noted that complete wooden pumping units are preserved by Chevron U.S.A in La Habra and that the extant pumps (as of 1989) be removed by local historical societies for display purposes (SRS 1989:22).

The Dillon survey completed for a prescribed burn in1989 did not identify any cultural resources (Dillon 1997:2), and no further recommendations were made.

A survey of the Preserve undertaken by LSA in 2004 (Fulton and Michalsky 2004) identified nine historical resources determined to be over 50 years old and two isolated prehistoric resources. Those resources were assigned temporary numbers and are described briefly below.

19-003342: Early twentieth-century concrete structure measuring 8.5 x 8.5 x12 ft, located in Sycamore Canyon.

19-186935: Undated rock and mortar water storage feature/reservoir.

19-186936: 1937 Azimuth mark.

19-186937: Possible 1930s Sycamore Canyon house.

19-186937: Possible 1930s Sycamore Canyon apartment.

19-186939: Possible 1930s concrete Storage facility.

19-003345: 1930s -1960s Farm equipment, artifact scatter and foundation.

19-186943: Remains of 1930s Cal-Baden mineral springs.

19-100504: Isolated granitic bifacially ground mano.

19-100505: Isolated metavolcanic scraper.

19-003341: The Whittier Oil Field consists of level pads marking the former location of oil wells, well markers, surface pipelines, and graded access roads associated with the Whittier Oil Field, which was first developed ca. 1885 and continued in production until the latter part of the twentieth century (DPR 19-003341, 2004).

LSA found that the oil field still shows character of setting and association between the pads and pipelines (DPR 19-003341, 2004). The lack of development in the area has preserved the setting and the oil field is eligible for listing on the National and California Registers under Criterion A(1) for its association with the development of the petroleum industry in southern California.

None of the previously recorded resources, with the exception of parts of the Whittier Oil Field, are situated within the current Project area (Figure 3.1).

3.4 SACRED LANDS SEARCH

Æ contacted the Native American Heritage Commission (NAHC) on November 24, 2009 for a review of the *Sacred Lands File* to determine if any known Native American cultural properties (e.g., traditional use or gathering areas, places of religious or sacred activity, etc.) are present within or adjacent to the Project Area of Potential Effect (APE) (Appendix B). The NAHC responded on December 10, 2009, stating that no Native American cultural resources are known to exist within the immediate Project area; however, the NAHC requested that Native American individuals and organizations be contacted to solicit information and/or concerns regarding cultural resource issues related to the proposed Project. Seven individuals and organizations were contacted by letter on December 30, 2009. Mr. John Tommy Rosas of the Tongva Ancestral Territorial Tribal Nation responded via email on December 30, 2009 and Æ replied on January 11, 2010 (see Appendix B). On January 13, 2010, Keith Warren of Æ contacted each individual by telephone. Mr. Anthony Morales of the Gabrieleno/Tongva Tribal Council of San Gabriel contacted Mr. Warren on January 15, 2010 and discussed the Project. Mr. Morales expressed concerns that previously unidentified cultural properties may exist within the current Project area and requested monitoring of all ground-disturbing activities. On January 21, 2010 Mr. Robert Dorame of the Gabrieleno Tongva Indians of California Tribal Council discussed the Project with Mr. Warren but expressed no specific concerns. No other responses to voice mails were received.

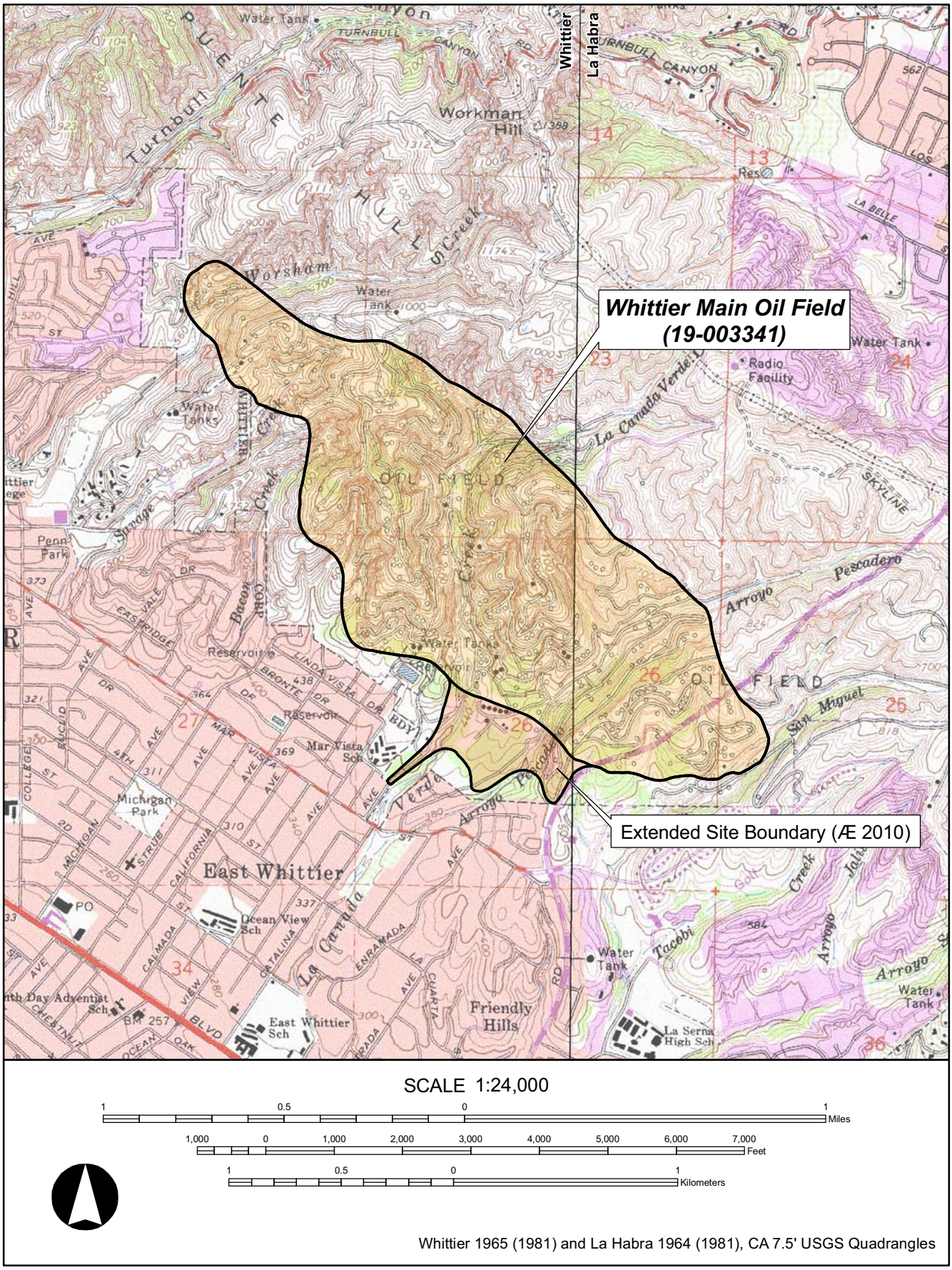

Figure 3.1 Whittier Main Oil Field site boundary (LSA 2004).

4
SETTING

4.1 ENVIRONMENTAL SETTING

The preserve is generally situated within topography characterized by steep hillsides surrounding deep canyons. Major canyons include Sycamore Canyon, Turnbull Canyon, and Powder Canyon. Most hilltops in the Preserve range from 700 feet (ft) above mean sea level (amsl) to just over 1,300 ft amsl and decrease in the low lying drainages varying from 400 ft to 600 ft asml (LSA 2007a:7). The preserve supports coastal sage scrub, chaparral, native and non-native grassland, oak woodland, walnut woodland, and riparian woodland (LSA 2007a:7). The soils are alluvium and colluvium underlain by the Miocene Puente Formation. The hills are gently rolling with some steep ravines. Geological faulting and folding of the crust in the area has trapped oil deposits beneath the surface (Fulton and Michalsky 2004:2). Within the current Project area the well sites and pipeline locations are covered with moderate to dense vegetation and paved roads.

4.2 PREHISTORY

A number of cultural chronologies and archaeological sequences have been proposed for coastal and littoral southern California since the 1920s. These have attempted to track the development of terrestrial hunting-foraging and marine resource exploitation adaptations among populations in the area since at least the beginning of the Holocene. These proposed sequences have generally been based on changes in artifact types rather than linkage to socio-cultural systems in the region. In other words, the archaeological record is believed to evidence cultural continuity for much of the Holocene, in the context of population increase, intensification of resource use, and techno-economic innovations in maritime and terrestrial resource exploitation (e.g., circular shell fish hooks, bow and arrow, and mortar and pestle). Absent unequivocal archaeological evidence for major episodes of cultural change, researchers have proposed a range of different cultural periodizations for the region. Variants of the southern California prehistoric chronology, include those proposed by King (1981, 1990) for the Santa Barbara Channel, Koerper and Drover (1983) for Coastal Orange County, and Erlandson and Colten (1991) for southern California and generally reflected the common use of an essentially tripartite division of early, middle, and late for Holocene cultures in the region. Chronologies developed by Mason and Peterson (1994) for coastal Orange County, and by Altschul and others (2007) for coastal Los Angeles County have been followed here, with a few modifications.

4.2.1 The Early Period (Millingstone Horizon)–Phase I–10,500 B.P–8000/7500 B.P.

Recent research in the Santa Barbara Channel region and elsewhere on the southern California coast has pushed back dates for early human occupation of the coastal region to 10,500 Before Present (B.P.) or earlier. This change reflects apparent canoe travel to the Channel Islands, and a human presence in the northern Channel Islands as early as 13,000 years ago (Erlandson et al. 2008; Rick et al. 2001). The presence during the Terminal Pleistocene/Early Holocene of migrants using watercraft has also been proposed (Jones et al. 2002). New data on early Holocene exploitation of marine fauna using ocean-going craft has been suggested (Dallas 2004). The nature of these watercraft and the antiquity of the plank canoe in southern California have been subjects of debate, with some proposing a Late Holocene date for planked vessels,

while others recommend an Early Holocene date (Fagan 2004; Gamble 2002). Parallel to this development has been disagreement about the antiquity of open-water fishing from canoes using nets, and by extension, the importance of fish in Early Holocene coastal subsistence (Rick and Erlandson 2000). Rick and Erlandson (2000) recovered fish remains from several sites on the Santa Barbara coast and in the northern Channel Islands dating to 8000–9000 B.P., and believe that nets were being used at that time.

Several cultural chronologies (Koerper and Drover 1983; Mason and Peterson 1994) have assigned the greater part of the early and middle Holocene, from 8500–8000 B.P. to 3000 B.P., to a millingstone period or horizon, characterized by the increase of millingstones and handstones found in sites of this period. However, Wallace, who helped develop the Millingstone Horizon concept and excavated several sites in the 1950s, places the terminal date for this period at 5000 B.P. (Wallace 1955). This change proposed as occurring between 5000 B.P. and 3000 B.P has created some confusion in the literature, although the chronology used here ends the Early Period or Millingstone Horizon at 3000 B.P.

A distinction has traditionally been made between a pre-millingstone occupation in southern California, expressed as a "hunting" culture in the interior (San Dieguito) and a "pre-millingstone" shellfish-based subsistence on the coast. This phase was proposed to have later been followed by the development of a millingstone-based adaptation dependent on hard seed and shellfish exploitation after about 8000–7000 B.P. However, there is some disagreement in the time period represented and the magnitude of this change. Researchers on the Santa Barbara coast have recently treated the period before 8000 B.P. as an early phase of millingstone cultural expression (Erlandson et al. 2008). The discovery of the earliest large millingstone assemblage on the California coast (or interior) at Cross Creek, San Luis Obispo County, dating to over 10,000 B.P., has caused a rethinking of dates for the commencement of the Millingstone Horizon (Jones et al. 2002). In the Los Angeles region, at Malaga Cove at Redondo Beach, the earliest occupation of the site may date from the end of this Early Period - Phase I. While it lacks groundstone assemblages, recovered artifacts include crude chert flake tools such as scrapers and dart points, cores and hammerstones, clamshell and *Olivella* beads, some incised stones, and bone artifacts, including bone beads (Moratto 1984:13–132).

4.2.2 The Early Period (Millingstone Horizon)–Phase II–8000/7500 B.P.–5000 B.P.

Southern California coastal and littoral sites after 8000/7500 B.P. were typified by an increase in relative quantities of millingstones and handstones, although some sites on San Clemente and the Catalina Islands lacked such assemblages (Meighan 2000). Sites from this phase of the Millingstone Horizon have also been observed to contain crude scraper planes, scrapers and choppers, and large projectile points. Millingstones and handstones were associated with a subsistence regime based on the exploitation of hard seeds, although they were also used to process other resources. The coastal environment was shaped by early Holocene rising sea levels which did not stabilize until 5000 B.P. (Altschul et al. 2007). This delayed the full development of estuarine marshes and the onset of sedimentation of open estuaries and lagoons. Resultant instability of water levels in stream mouths and estuaries may have caused the frequent movement of sites between estuary bank and bluff top. Early Millingstone Horizon sites in coastal western Los Angeles County featured exploitation of fish and shellfish and coastal prairie grasses, supplemented with opportunistic terrestrial hunting. The coastal foraging populations in the Ballona Creek area at this time were small and liable to move between lagoon bank and bluff

top camps (Altschul et al. 2007). Sites Ca-Ven-1 and Ca-Lan-92, located up the Los Angeles County coast west of Malibu, show a dependence on marine resources and the processing of seeds with groundstone. Sea mammal remains were recovered, and the procurement of fish was a major activity at Ca-Ven-1, with bone gorges having been used. It is presumed that canoes were employed to catch the deep-water fish species identified at the site (Dallas 2004). Shell beads, worked bone, and choppers were also encountered. In contrast, at Ca-Lan-958 at Malibu, an early Millingstone groundstone assemblage was accompanied by shellfish and very little evidence of either terrestrial fauna or fish exploitation was found (Porcasi and Porcasi 2002).

Radiometric data from coastal sites across a broad expanse of the southern California coast from San Luis Obispo to Orange counties have suggested a drop in the number of coastal sites that is most pronounced between 6000–5500 B.P. (Dallas 2004; Glassow 1999). It is not known, of course, if this trend denotes a decline in coastal population or the aggregation of population in a smaller number of sites. Sites at the Ballona Creek estuary were reportedly abandoned from 6000 to 5000 B.P. (Altschul et al. 1992:43).

4.2.3 The Early Period (Millingstone Horizon)–Phase III–5000 B.P.–3000 B.P.

Later on during the Millingstone Horizon, coastal sites present evidence of a diversification of subsistence strategies, with increased procurement of small terrestrial game. From 5000 through 3500 B.P. there is a substantial increase in the number of southern California coastal sites especially notable in Orange County (Glassow 1999). Later sites of the Millingstone complex dating from after 5000 B.P. also include cogged stones and discoidals. Found with flexed or extended primary interments and secondary reburials under cairns are groundstone possibly which reflects the importance of the tool type (Koerper et al. 2006). Smaller-sized dart points have also been recovered. Bone artifacts are not abundant, but include bone awls, antler flakers, and atlatl hooks. Tarring pebbles and asphaltum with basketry impressions, along with the bone awls, attest to basketry manufacture. Glassow (1996) has suggested that the increased frequency of mortars and pestles late in the Millingstone period may be linked to processing of foods other than acorns, but that evidence of the use of basketry hoppers on mortars marks the proliferation of acorn processing. He dates these hopper mortars in the Santa Barbara region to after 4500 B.P., while the earliest crude mortars and pestles are dated from 5500–4500 B.P. (Glassow 1996:18). The hopper mortars became more common during the following Intermediate Period.

4.2.4 The Intermediate Period—3000 B.P.–1300 B.P.

Early in the Intermediate Period, both on the coast and in the littoral zones, mortars and pestles tend to replace millingstones and handstones in groundstone assemblages. As noted above, this is believed to reflect a long-term shift from hard seed exploitation to acorn processing, although the exploitation of grasses and hard seeds continued to figure in the coastal and interior subsistence regimes. This shift is earlier and more prevalent at coastal sites as opposed to interior sites, in Los Angeles County and elsewhere. On the Santa Barbara coast, millingstones were completely replaced by mortars and pestles by 2200 B.P. (Glassow 1996:18). In some areas of the southern California interior, millingstones and handstones remained common through historic times, although mortars and pestles (and bedrock mortars) were also found.

It was also formerly supposed that during the first 1,500 years of the Intermediate Period, there was a decrease in intensity of occupation of coastal sites, ending around A.D. 400–500 with the

arrival of Takic groups from the interior deserts. While cases of a settlement hiatus can be found in the southern California coastal region—at the Newport Bay estuary in Orange County, for example—this is not a generalized phenomenon (Grenda et al. 1998). Paleoclimate data have suggested a period of heavier than average rainfall between circa 3000 and 1700 B.P. in coastal Los Angeles and Orange counties, followed by variable but drier conditions until the end of this period (Davis 1992).

At the Ballona Creek lagoon, by around 2000 B.P., coastal habitation sites became more numerous, larger, and more complex, featuring house features, associated hearths, and mortuary areas. The diversity of faunal assemblages increased, and mortars, pestles, and stone bowls became more abundant. Primary and secondary inhumations and secondary cremations have been encountered at bluff-top sites in this area. At Malaga Cove, bone harpoon barbs were recovered, along with circular shell fishhooks. These fishhooks first appeared in coastal archaeological assemblages during the Intermediate Period, the oldest dates for these artifacts came from the southern Channel Islands (Raab et al. 1995).

By circa 2500 B.P., after the beginning of the Intermediate Period, settlement and population levels in interior areas in Los Angeles County, such as the San Fernando Valley, had also increased. While the Santa Monica Mountains, for example, were close enough to the coast to depend on Millingstone Horizon subsistence patterns, this was not true further inland (Keller and Ciolek-Torello 2006). This interior settlement has been linked to the gradual spread of acorn processing, an increase in exploited subsistence resources, and more moderate rainfall conditions. By circa 1500 B.P. or perhaps a little earlier, the bow and arrow were introduced.

A major issue in regard to Intermediate Period occupation of the coastal littoral zones in Los Angeles County was the timing of the arrival of groups of Takic language affiliation in the region. It was long hypothesized that the arrival of these linguistic ancestors of the Gabrielino/Tongva, Serrano, Cahuilla, Luiseño, and other southern California Takic language groups was coeval with the appearance of arrow points and the use of the bow, around circa AD 500. The idea of a "Takic wedge" descending from the interior deserts at around this time or even later has been generally accepted (Moratto 1984). However, a number of investigators have recommended an earlier presence of Takic groups in the region dating to as early as circa 3000–3500 B.P., based on both linguistic and archaeological evidence (Kowta 1969; Sutton 2009). This earlier arrival appears plausible, in part because of the relative timing of the presence of Numic and Tubatulabalic Uto-Aztecan groups in the southern California interior.

4.2.5 The Late Prehistoric–Phase I–1300 B.P.–700 B.P.

During the period from 1100–700 B.P., unstable and intermittently dry climate conditions affected the southern California region. A period of heavy precipitation from 1300–1100 B.P. has been proposed for the beginning of this period, followed by prolonged episodes of extreme drought. These droughts represented a widespread global warming episode, referred to as the Medieval Climatic Anomaly, which also impacted native cultures in the North American southwest and elsewhere. The effects of this xeric episode and of a proposed rise in seawater temperatures at around this time on the southern California coast and interior has been widely studied and debated during the last 20 years. Persistent severe drought episodes have been dated as having occurred from circa A.D. 900–1000 through A.D. 1300 (Erlandson et al. 2008:95–96; Kennett 2005; Kennett and Kennett 2000; Raab and Larson 1997; Stine 1994). It has been

argued that these persistent droughts and rise in seawater temperatures caused subsistence and nutritional stress, and increased inter-group conflict in both the southern California interior and on the coast. They resulted in a decrease in availability of both terrestrial and marine subsistence resources (Arnold 1997; Arnold et al. 1997; Lambert and Walker 1991; Lambert 1993).

The proposed subsistence crisis during this era has been viewed as leading to the emergence of more highly ranked social systems with more complex patterns of specialized craft production and distribution; that is, "emergent social complexity" among the Island Chumash of the northern Channel Islands. This has been seen as generating a Late Prehistoric pattern of relative social complexity among the Chumash and, to a perhaps lesser degree, among their Gabrielino/Tongva and Serrano neighbors to the east in Los Angeles County (King 2004). The severity of the subsistence impact for coastal settlements of alleged long-term increases in average seawater temperatures has been debated. Some researchers have provided evidence that while negative changes in seawater temperatures and marine productivity during this period may have occurred, these were not severe enough to devastate coastal fisheries (Kennett 2005; Kennett and Kennett 2000).

4.2.6 The Late Prehistoric Period–Phase II–700 B.P.–240 B.P.

By the beginning of Phase II of the Late Prehistoric, rainfall conditions increased with some researchers arguing for a period of greater available moisture than at present, the so-called "Little Ice Age," after circa A.D. 1400 (Boxt et al. 1999). There is agreement about a substantial expansion of coastal and littoral populations in southern California after 700 B.P. (A.D. 1300). Interestingly, there are indications of an expansion of numbers of sites in several near-coastal areas in the Long Beach and Newport Beach areas during the A.D. 1400–1660 period, and a subsequent decline from A.D. 1600–1800 (Boxt et al. 1999:27; Altschul et al. 1998:27).

During this period, the northern Channel Islands populations further developed craft specializations, including shell bead manufacture, that sustained trade with mainland settlements and with far-distant trade destinations to the east, and provided an exchange medium for the regional economy. Steatite quarried on Santa Catalina Island was used to make stone bowls, pipes, comals, sucking tubes, pendants, beads, and effigies. A festival system developed in part around periodic mourning ceremonies involved the amassing of wealth in beads and other resources, particularly among political elites.

Many major settlements documented after the Spanish conquest were occupied during this period. In areas of inland settlement, by the end of the Intermediate Period, mobility and long-distance migration towards the coast from seasonal camps was replaced by the development of permanent settlements. The pattern of settlement at this time included a permanent winter village with a cemetery, sweat lodge, chief's house, dance and sacred enclosure, and a variety of subsidiary temporary camps and activity areas (Mason and Peterson 1994). Some village sites from this period have preserved elements of site structure, including the floors and foundations of residential units and sweat lodges (Ciolek-Torello 1998). Marriage ties and political alliances linked individual village territories, while alliances allowed communities to, in effect, "lend" access to resources to other communities. The development of the large coastal and littoral territorial villages of the Gabrielino/Tongva recorded in ethnohistoric accounts has fueled speculation about the achievement of a completely sedentary type of settlement. Temporary

seasonal camps appear to have been utilized even in coastal areas where large village sites were located close to one another.

4.3 ETHNOHISTORY

4.3.1 Gabrielino/Tongva Territory and Population

The Gabrielino/Tongva of the Los Angeles region is a linguistically defined ethnic group that belongs to the Takic family of the Uto-Aztecan language stock (Bean and Smith 1978:538; Shipley 1978:88–90). A linguistically closely-related group, the Fernandeño, occupied the San Fernando Valley portion of the Los Angeles region, and is oftentimes linked with the Gabrielino/Tongva as a single linguistic and ethnic group, as they will be linked here. Bordering the Gabrielino/Tongva were the Chumash to the west, the Tataviam of the Santa Clarita Valley, Serrano divisions located in the northern San Gabriel Mountains and the San Bernardino region, the Cahuilla in Riverside County, and the Juaneño and Luiseño located to the southeast of the Santa Ana River and Newport Bay in Orange, Riverside, and San Diego counties. The Gabrielino/Tongva has traditionally been placed in the Los Angeles basin. They range from the San Fernando Valley and the south slopes of the San Gabriel Mountains southward to the Palos Verdes Peninsula, Long Beach, and Orange County southeast of Newport Bay, and extending at least as far east as Cucamonga. Suggestions of Gabrielino occupation of the San Bernardino-Redlands region, per McCawley (1996:47–51) and others, appear incorrect, and are based on the nineteenth-century movement of neophyte populations to that area from Mission San Gabriel. King (2004) has recently suggested that the Serrano occupied a large foothill swath within the northern portion of this Los Angeles region territory, and he has relocated the Tataviam southward to occupy the northern San Fernando Valley, but the ethnohistoric evidence does not appear to support these revised ethnic boundaries. The populations of the southern channel islands of Santa Catalina, San Nicolas, and San Clemente were also of Gabrielino/Tongva cultural affiliation, as confirmed by Gabrielino reports to ethnographer John Harrington (Bean and Smith 1978:538; McCawley 1996:79, 82, 85).

Villages named in the Franciscan Mission records and in other historical documents and in ethnographic testimony include at least 50 named places on the mainland that are believed to be settlements of the Gabrielino/Tongva (Johnston 1962; McCawley 1996:35–74; Reid 1968). This group occupied village territories in which political authority rested with patrilineal hereditary chiefs. The Gabrielino chief (*Tomyaar*) belonged to a cultural tradition in which chiefs maintained a sacred bundle in the chief's house, which was linked to supernatural powers. The *Tomyaar* practiced polygyny as a privilege of office, which helped to extend political elite marriage ties between villages. Father Gerónimo Boscana, a Franciscan missionary who wrote a brief "ethnography" of the Gabrielino and Juaneño, states that the multiple wives of chiefs helped to maintain chiefly hospitality and generosity (Boscana 1978:43–44). As was the case elsewhere in southern California, principal villages within the political territories of chiefs were the sites of dance areas and sacred enclosures where social gatherings, including the mourning ceremony, were held. These were also the locations of cemeteries and sweathouses (Johnston 1962:47–55; McCawley 1996:97; Strong 1929:32–35). The Gabrielino/Tongva practiced both interment and cremation in historic times and also prehistorically. Some of the largest villages had populations of 200 or more, with other smaller territories supporting populations in the 100–200 range or smaller. Estimates of Gabrielino/Tongva population in the eighteenth century have been placed upward of 5,000 (Bean and Smith 1978:540; Kroeber 1925:883).

4.3.2 Gabrielino/Tongva Social Organization

The Serrano, Juaneño, and Gabrielino appear to have occupied village territories that were both a political unit led by a single hereditary chief and, at the same time, a single exogamous or out-marrying clan/sibling unit (Earle 2004b:178–183; Earle and O'Neil 1994:114–118, 173–174). Conversely, the Cahuilla had single territorial clans living in several named subsidiary villages, while the Luiseño had political territories headed by what White (1963:161) called "war" chiefs that contained subsidiary religious clan chiefs within them (Earle and O'Neil 1994:114–115; Johnson and Crawford 1999). Given the large village populations sometimes found among the Gabrielino/Tongva, it has been suggested by King that some of their major territory may have contained multiple clans within them that intermarried with each other (King 1994). Other's research does not confirm this among the Juaneño and Gabrielino and the issue remains unresolved (Boscana 1978:43–44; Earle and O'Neil 1994:116–118, 173–174).

4.3.3 Political Organization and Warfare

Each Gabrielino/Tongva territorial village was at least nominally politically independent. However, ethnohistorical sources hint that some territories were politically and perhaps militarily prominent enough to influence and/or dominate neighboring villages as in the case of Xuxoonga in the San Pedro area and 'Ahwiinga at la Puente (Johnston 1962:88,143). The Chiefdom was inherited patrilineally, usually from father to son (Boscana 1978:41–44). Chiefs were responsible for leading religious rituals, including important ceremonial events such as periodic mourning gatherings, which members of many surrounding villages attended. Chiefs were responsible for amassing food and other resources from the community that were necessary for hosting such events, and were enjoined by custom from diverting these resources to other purposes (Boscana 1978:41–44). Chiefs sometimes received voluntary food or other gifts from their followers. The mourning ceremony was held periodically to honor a community's recent dead. It was the most important of a series of gatherings that combined religious, political, and prestige functions. The emergences of shell bead wealth in particular helped to drive this ceremonial system of status display as a motivator for community labor mobilization, economic productivity, and resource accumulation (Spielman 2008).

Territorial armed conflict between communities occurred with some frequency. War was decided on by the chief and community elders, and food stores were then prepared. War parties might include women whose task it was to collect arrows expended by the enemy. Females and children also might be captured and held as captives (Boscana 1978:69–70). Archaeological evidence from very late prehistoric Gabrielino/Tongva inhumations supports the notion of frequent armed violence (Luhnow 2000:168). Father Palou noted in 1773 that natives in the Los Angeles region could not reach the San Pedro Bay area to fish because of warfare between villages (Palou 1966219–220).

Refusal of the invitation by a chief to attend a mourning ceremony he was hosting was reportedly a motive for war. Conflicts over the treatment of women by neighboring groups or trespass of gathering areas were also sources of conflict (Boscana 1978:69–70). In addition to this, accusations of sorcery motivated inter-community violence. Even during social gatherings, where "friendly" communities were invited to attend, underlying rivalries between communities might result in the singing of so-called "enemy songs" by attendees from different territories (Harrington 1986: Reel 122:Fr. 058; Johnston 1962:26).

4.3.4 Religious Institutions

Sorcery accusations were related to the religious organization of the Gabrielino. A clearly pre-European religious deity of possible Channel Islands origin was known as Chengichngech or Kwawar. The veneration of Chengichngech was prominent among the Gabrielino and neighboring Juaneño in the eighteenth century (Boscana 1978:31–35). It overlay an older pantheon of six gods (Hudson and Blackburn 1978:228–233). The Chingichnich "religion" was associated with the ingestion of toloache (*Datura*), and with a sort of sodality or cult brotherhood/sisterhood linked to the Antap cult among the neighboring Ventureño Chumash. It featured a sacred enclosure, the *Yoovar*, with access limited to sodality members during festivals. This religious tradition appears to have increased the political power of chiefs and highlighted differences of social rank within communities. Shamans associated with this cult, especially those residents on the coast and on San Nicolas Island, were believed to have great powers as sorcerers and weather shamans (Harrington Reel 105: Fr. 565–568). Father Boscana (1978:31–35) stated that both the Dying God of Luiseño and Serrano creation, Wiyot, and the deity Chengichngech appeared in former times at the Gabrielino/Tongva village of Povuu'nga, east of Long Beach. This and other evidence suggests that the Wiyot tradition found to the south and east of the Los Angeles region was known to the Gabrielino/Tongva.

4.3.5 Economic Organization, Wealth, and Social Rank

Gabrielino/Tongva communities featured a social and economic elitism. Individuals and families enjoyed special insignia of status and wealth, reflected in the differential treatment of the dead. This elite status appears to have been associated with religious sodality membership, as previously noted. While McCawley (1996:104–105) refers to the Gabrielino as having a class-based social system, this is more properly, identified as a system based on social rank. Wealth particularly took the form of *Olivella* shell bead display, quantities of which were obtained from Chumash communities in the northern Channel Islands, and from Gabrielino at San Nicolas and San Clemente islands. Shell beads were exchanged eastward from the Los Angeles region to the Colorado River and the Oraibi region, in return for ochre, textiles, deerhides, and other goods (Earle 2005:12–17). Gabrielino/Tongva craft production included cordage, matting, netting, basketry, weapons, groundstone, wooden vessels, fishing tackle, lithic tools, and plank canoes. Limited quantities of ceramic pots and pipes may have been made or imported into the region at the end of the prehistoric era. Steatite and steatite bowls were obtained from Santa Catalina Island.

4.3.6 Subsistence and Settlement Patterns

For the Gabrielino/Tongva and neighboring groups, the degree of centralization of population and kin groups within "headquarters" territorial villages has been debated (Earle 2005:184; Altschul et al.1998:17). Seasonal occupation of special use sites accounts for the temporary dispersal of the population within and beyond tribal territories. Boscana (1978) and other sources suggest that populations in inland villages in the Gabrielino and Juaneño areas may have moved seasonally to a greater extent than coastal villages, presumably because of a sometimes greater dispersion of key terrestrial resources, particularly with movements into upland areas or out toward the coast (Koerper et al. 1991:35–36). Temporary movement included the securing of permission to exploit resources in territories of other groups, or to join other allied groups in foraging or extractive activities, sometimes combined with feasting.

The location of known Gabrielino/Tongva villages suggests three principal settlement and subsistence strategies in their mainland territory (McCawley 1996:35–74). In the valley zones located closest to the transverse ranges, including the San Fernando and San Gabriel valleys, villages were located at springs and smaller watercourses fed from the mountains, and were situated near foothills or the base of canyons. This zone accounts for approximately 28 ethnohistorically recorded villages. For these interior communities, acorn exploitation was the basis of subsistence, but foothill resources such as chia (S*alvia columbariae*), and yucca (*Y. whipplei*) were also seasonally important. Pinyon nuts (*pinus monophylla*) and juniper (*juniperus* spp.) berries were also significant resources for some communities located near the transverse ranges, either gathered or exchanged from further inland (Geiger and Meighan 1976:81).

A second settlement system involves village sites on the coastal plain on high ground along the middle or lower (coastward) reaches of major river courses. These communities totaled at least nine. Upriver coastal plain villages sometimes had access to acorn stands, while downriver ones had closer access to marine resources. Some of these communities, such as those in the Whittier Narrows area, and *Yangna*, at the site of the later Pueblo de Los Angeles, were located close to areas of low hills where acorns could be found, along with grasses and other hard seed resources of the coastal plain (McCawley 1996: 43-44, 55, 57).

The third settlement type included both bluff and estuary coastal villages, which total at least 12 ethnohistorical settlements. These appear to have clustered in the Palos Verdes Peninsula and San Pedro shore and estuary areas. Both sheltered conditions and canoe traffic to Santa Catalina and the other Gabrielino-occupied Channel Islands may help account for this aggregation. Other coastal areas—the shore southeast of Long Beach, and the west-facing coast north of Palos Verdes—had relatively few ethnohistorically known village sites located on the coastline itself. Offshore fishing from plank canoes was carried out, along with inshore fishing and shellfish gathering. Both shell hooks and nets were used in obtaining fish which were dried for storage (McCawley 1996:62–71, 122–127).

The economy of the Gabrielino/Tongva reflected a complementarily subsistence strategy between interior and coastal villages as also seen along the Santa Barbara Channel coast (McCawley 1996:112–114). For example, the large village of Suangna, located on a marsh northeast of San Pedro, was recalled by a native consultant as having an abundance of fish but having to obtain acorns from mountain regions outside its territory (Earle and O'Neil 1994:161–162), and either exchange or gathering expeditions with permission to exploit resources in territories of other groups was resorted to in such a case. There are suggestions in the historical record that interior communities secured permission to fish and gather shell fish while maintaining their alliances with coastal settlements (Palou 1966:III:219–220). The ceremonial prestation of food was an additional mechanism for moving subsistence resources between groups, and this was apparently sometimes combined with foraging festivals involving several villages (Earle 2005:19, McCawley 1996:112-115). Villages that were allied in ritual activities and provided each other access to their resources were usually linked by marriage ties as well.

4.3.7 Spanish Contact and Occupation

Early Spanish contact with the Gabrielino/Tongva involved visits by Spanish ships to Santa Catalina Island under Cabrillo in 1542 and Vizcaíno in 1602. Colonization of Gabrielino/Tongva territory began after the inland expedition by the Portolá expedition in 1769. By 1771, four

missions were constructed in the region, including Mission San Gabriel founded by the Franciscans in September 1771 (McCawley 1996:189).

The Franciscans undertook a program of conversion of natives with the long-term objective of permanently moving the missionized native populations from their villages to the mission. Mission San Fernando del Rey was founded in 1797, and came to house Gabrielino converts from that area. While mission life did provide indigenous Native Americans skills needed to survive in a rapidly changing world, much traditional cultural knowledge was lost during this era as populations were moved and decimated by lack of immunity to introduced diseases.

With the establishment of Pueblo de Los Angeles in 1781, civilian settlers and retiring military men and their families arrived in the region. The soldiers were granted land titles by the Spanish authorities within the Gabrielino/Tongva subsistence area and Native American (both neophytes and natives) worked on the Ranchos. Many Gabrielinos chose to work away from the missions as laborers rather than entering Missions San Gabriel or San Fernando (Bean and Smith 1978:541; Earle 2004a; McCawley 1996:200–203). El Pueblo de Los Angeles was settled in 1781 near the Gabrielino/Tongva village of *Yangna* by Mexican colonists, who depended on native labor (Earle 2005:18, McCawley 1996:200). The granting of usufruct land titles to retired military men from the California mission guards led to the emergence of a local ranching economy by the 1790s. Native involvement in the non-mission economy was greater than among the Chumash in the Santa Barbara region, partly due to a larger Hispanic settler population. However, native resistance to the missionization played a role as well (Earle 2005:17-23). Once baptized at the missions, native neophyte converts were required to remain there, and runaways were punished. By the decade of 1810–1820, mission livestock populations had increased substantially, while native mortality and reproductive failure caused native populations at the missions to shrink.

In the autumn of 1810, a neophyte revolt took place at Mission San Gabriel, with the assistance of Serrano Indians from the mountains northeast of the mission and Mojave Indians from the Colorado River (Earle 2005:19–21). Within a few years after this date, further recruitment of Gabrielinos was in decline, with former Gabrielino village residents now living either at the mission, on Spanish ranchos, or in the el Pueblo de Los Angeles, where they formed a servant class (Earle 2004a).

After the mission Secularization Act in 1833, some surviving mission-resident Gabrielinos resettled back in their former village areas, but many migrated elsewhere. By this time, most individuals who had originally been missionized in the 1780s and 1790s were no longer living, partly due to high mission mortality. However, a native population, partly Gabrielino, continued to be found in Los Angeles and on the Spanish/Mexican ranchos. The subsequent breakup of the ranchos and urban development of the Los Angeles area in the late nineteenth century tended to scatter surviving Gabrielino families (McCawley 1996:203-208). Migration to other native communities, including the Tejón settlements in the southern San Joaquin Valley and Luiseño villages to the southeast, occurred. The surviving families and individuals in the Los Angeles region enjoyed no reservation, land base, or federal recognition. In the late twentieth century, many Gabrielino/Tongva descendants in southern California became active in reviving their cultural heritage.

4.4 HISTORICAL CONTEXT

The history of the oil industry in Southern California is a vast subject that is not discussed in detail here. However, what follows provides a context within which to assess historical resources found within the project area, including portions of the Whittier Oil field. Early pioneers in California included George Gilbert who began distilling liquid bitumen and asphaltum from seepages, first in San Francisco and then on the Ojai Ranch in Ventura County, establishing the first commercial refinery in California. The first commercial oil well in California was drilled on the Davis Ranch in Humboldt County around 1861 (Union Oil no date: 1).

Early in 1842, John Rowland and William Workman applied for a land grant from Governor Juan B. Alvarado at Monterey-then the state capital-and obtained title to the nearly 49,000-acre Rancho La Puente for only $1,000 in gold and a pledge to hire the local Native Americans. Rancho La Puente prospered and by 1850 was practically self-sufficient. Though the two men split the property in 1851, they continued working the land successfully, operating grist mills, cattle ranching, wheat cultivation, and wine and brandy production (County of Los Angeles Public Library 2009:np).

Oil was first discovered in the Puente Hills in 1880 protruding from seeps (Yerkes 1972:np). In 1884, approximately seven miles north of Fullerton and four miles south of Puente, William "Billy" Rowland discovered oil on his father Williams' former ranch and the first discovery well was drilled in 1896 (Figure 4.1).

> The first oil well was drilled in Whittier when the Home Oil Co. drilled a hole on a tract of land east of Whittier college and at a site from which local citizens had obtained quantities of crude oil seeping from the ground [Daily News 1962:np].

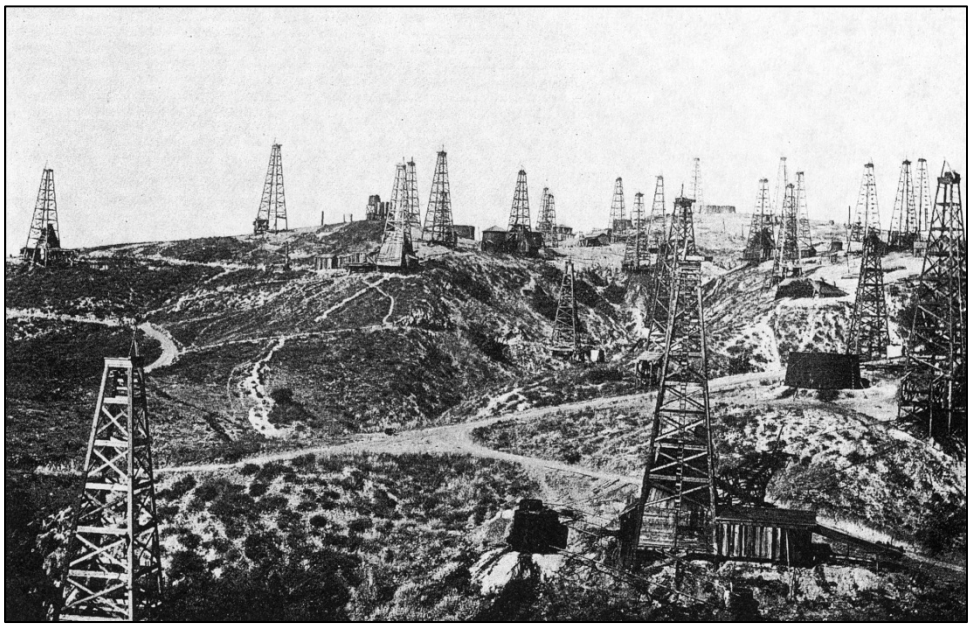

Figure 4.1 Wells of the Home Oil Company, Whittier. ("Old Whittier" 1904 on file, Whittier Public Library.)

More wells were drilled along a fault line and the wells began producing 10 barrels a day (Holman 1943:np). In 1897 the Los Angeles Times reported:

> The total daily output of the Whittier oil field is reported to be less than seventy-five barrels. There are but three producing wells in this district but valuable addition will be made to the number in the near future. Six drilling rigs are now being operated in that field, and their demands for fuel consume the major part of the output. Of the drilling rigs industriously developing oil, three are under the direction of Mr. Neuer, a capitalist of Los Angeles and the owner of valuable oil territory at Whittier. He is operating under the name of the Central Oil Company [*Los Angeles Times* 1897:8].

The Central Oil Company's No. 1-A well flowed at a rate of ten barrels a day from 984 feet (Franks and Lambert 1985:75) although general productivity was slow.

> The formation at Whittier is far more resistant than that of the Los Angeles district. Much of the formation above petroleum rock is granite, making drilling operations necessarily slow and requiring at least three months of persistent, continuous drilling to develop a productive oil well. The oil is of a much lighter gravity than the product of the local field, hence is far more valuable when brought to the surface and placed upon the market. This compensates for the heavy expense in developing oil in that field, but operates against the would-be producer of a moderate capital [*Los Angeles Times* 1897:8].

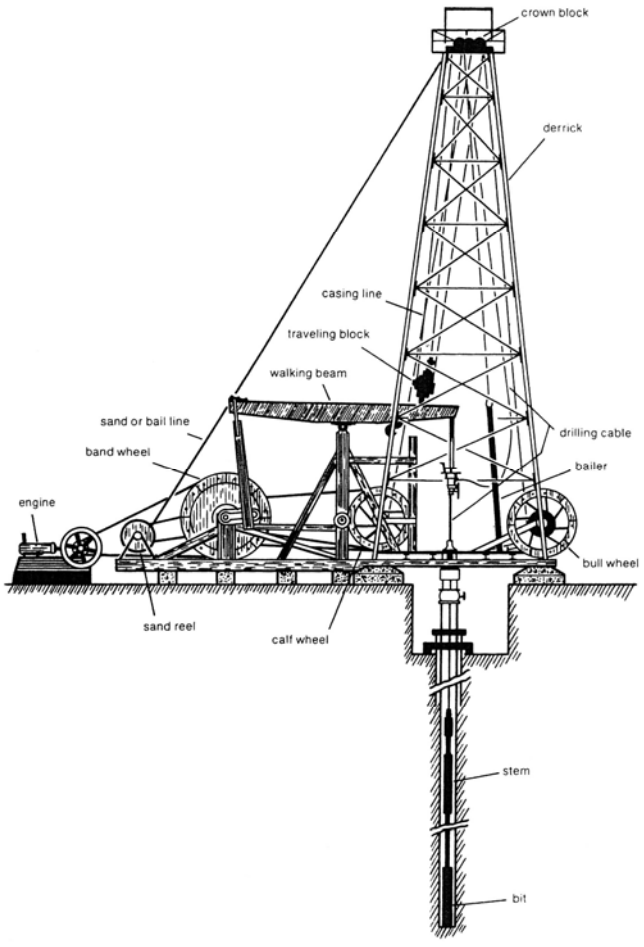

Figure 4.2 Standard Cable Tool Rig (Rintoul 1976).

Exploration at that time used empirical methods, first by following seeps, then by geological principles using anticlines and the Whittier Oil field was initially developed using cable tools. The cable method utilized a heavy bit driven into the rock by the action of gravity. By the 1890s, oil men had developed a cable tool known as the standard rig (Figure 4.2). A steam engine provided power to the band wheel which was connected by means of a crank and rod to a wooden beam balanced near its center on a large wooden frame. The revolving motion of the band wheel caused the walking beam to move up and down and work the attached drilling cable. An iron bar (the stem) was attached to the end of the drilling cable and to the stem was attached the drill bit. The continual lifting and dropping of the bit pulverized strata at the bottom of the hole. After drilling a short distance the driller changed cables and ran a bailer into the hole to clear the debris. The process was repeated until oil was reached (Rintoul 1976:22).

The drilling crew consisted of the driller and his tool dresser. The dresser's tasks included sharpening the bits on a forge to the required diameter or gauge (Rintoul 1976:22). Earl Delaney migrated from West Virginia to the California oil fields in the early 1900s and provided the following report:

> We worked twelve hour shifts, and the driller and tool dresser made up the crew. The drillers and tool dressers would dress their bits at the well, according to the kind of formation being drilled. A forge was erected in the derrick using coal, gas or oil for heating the bits. Boiler fuel was the same fuel that was used for the forge [Delaney in Rintoul 1976:22–24].

> Transportation was all by horse and mule power. You could hire a man with a horse and wagon for five dollars per day. Room and board was seventy-five cents per day. The drillers were paid $5.00 per day, and the tool dressers were paid $4.00. The company for which the drilling was done furnished the derrick, boilers, and engines. The contractor doing the drilling furnished tools, cordage, and personnel. In this area, the contactor would get $1.00 per foot and in a wet hole area, they'd get a dime extra or $1.10 per foot [Delaney in Rintoul 1976:24–25].

Wooden derricks were used until the 1920s when they began to be replaced by steel derricks (Rintoul 1976:26), and cable tools were the means of drilling for oil until to the 1930s when rotary bits were developed (Holman 1943:np).

By 1901, numerous companies were operating in the Whittier Oil Field, these included the Home Company, East Whittier Oil, Whittier Oil and Development, Raymond Oil, New England Oil, Los Angeles Petroleum, Central Oil, Fidelity Oil, Turner Oil, El More, Warner Oil, and Whittier Consolidated Oil (Los Angeles Times 1901:A11). In 1902, construction began on a pipe line that would connect the Whittier Oil Field with the Union Oil tanks in Los Angeles (Los Angeles Times 1902:A4)

> The pipe of the Union Oil Company which is to put the product of the Whittier Field on a competitive basis with the heavier fuel oil of the local field is working this way at a lively rate, and it is confidently expected that before the middle of this month, this line will be in operation [*Los Angeles Times* 1902:A4].

The main rival to Union Oil was the Standard Oil Company. Standard had minimal interest in the formative years of the Whittier Oil Field and in 1908 produced only a 2 percent share of California's crude (3031 barrels per day [White 1962:576]). That year, Colonel J.J., Carter, representing Standard Oil visited the Whittier field and observed:

> At Whittier the wells were producing about 700 barrels per day, but were poorly maintained, badly equipped and menaced by water which the field management did not know how to handle [White 1962:339].

In 1910, Standard Oil entered into an agreement with the Central Oil Company, a small producer of both light and heavy crude in the Whittier Field, to take all of Central Oil not under contract to other purchasers (White 1962:463-464). This one -year agreement established Standard in the Whittier Field and by 1919 the company's crude production in California had grown to a 26 percent share (71,415 barrels per day [White 1962:576]). This growth was partly due to the

Whittier- Fullerton fields producing refinable oil for which Standard's refineries were built (White 1962:472)

In 1925, the Los Angeles Times reported on competition among various companies in the Whittier Oil field:

> The total output of the Whittier Field is about 62,000 barrels a month. Of this total, the Standard Oil Company produce about 30,000 barrels, mostly from its Murphy property, although the small Home property produces about 1000 barrels a month. The Central Oil company producers about 15,000 barrels a month, the remaining 17,000 barrels being divided among the Pan American Petroleum Company, the California Petroleum Company, the Whittier Refining Company, the Colorado Oil Company and the Whittier Crude Oil Company [*Los Angeles Times* 1925:14].

The Whittier Oil Field became well known in California and out of State (Whittier News 1917:56, 1920:20-21). The quality of oil was consistent throughout the field, was low in sulfur, easily refined and made good lubricating stock (Holman 1943:np). The Whittier oil was thought by many to be the best in the State because of the specific gravity of the oil, the richness of the field and the fields close proximity to railroads and ports (Whittier News 1920:20–21). Local land owners became wealthy through leases to oil companies who paid between $250 and $500 per acre plus a royalty of one–sixth of the oil produced (Whittier News 1920:20-21). Many workers of the Whittier Oil Field and surrounding fields lived in Whittier and the payroll bolstered the local economy. In 1920, the payroll amounted to $250,000 per month and much of that income was spent in Whittier (Whittier News 1920:20–21). Workers also lived on camps in the field. The 1912 Standard Oil Emery Camp in the Whittier Field included dwellings with all-around porches and out houses to the rear (Figure 4.3).

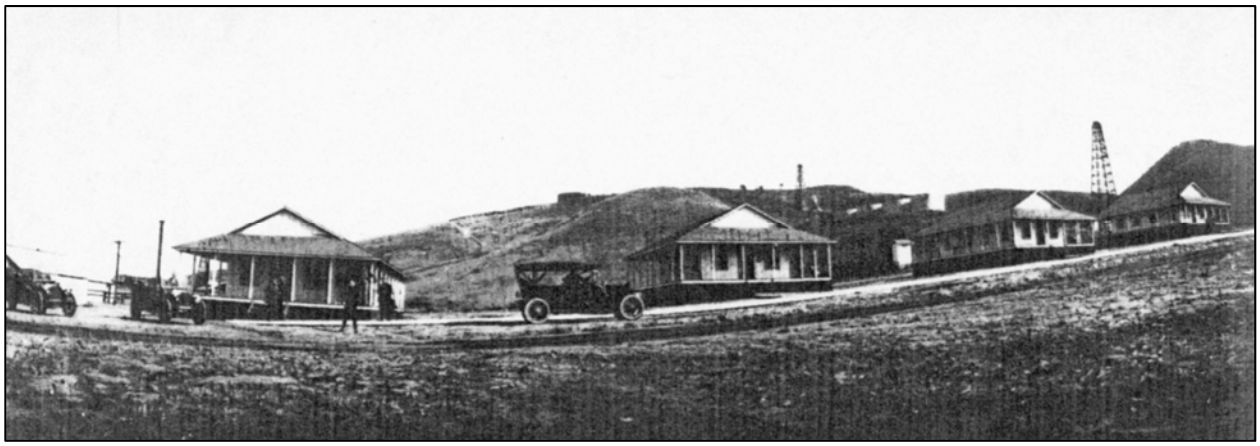

Figure 4.3 Standard Oil of California Emery Camp. Whittier Field, 1912. (Reproduced from Franks and Lambert 1985:86.)

Two California State Mining Bureau Department of Petroleum and Gas maps depict the Whittier –Fullerton and Whittier Fields in 1921 and 1944 (on file Young Research Library, UCLA) and show numerous wells in the current Project area (California State Mining Department 1921, 1944). The 1921 map covers sections 22, 23 and 26 which are dominated by the Standard and Central Oil companies. Approximately 200 wells are depicted on the map and include rigs described as "in place, in place abandoned, uncompleted, uncompleted and abandoned, completed, and completed and abandoned." Also depicted are water and gas rigs and oil tanks

(Figure 4.4). The 1944 map depicts approximately the same amount of rigs (200) and appears to include a larger number of "completed abandoned and "completed producing" rigs. The map covers section 22, 23, 26 and 27 and Standard have taken over production from Central in section 23 (Figure 4.5).

According to the California Division of Oil, Gas and Geothermal Resources (DOGGR) online database (DOGGR 2009; MRS 2010:2–4), almost 30,000 wells have been drilled in the Los Angeles Basin over the last 100 to 150 years. Of these, the DOGGR indicates that historically 494 wells have been located in the central region of the Whittier field which had a great impact on the landscape (MRS 2010:2-4).

Aerial photographs are available for the Project area and include 1954, 1972, and 1980 photographs (Historicaerials.com 2010). A comparison of these views demonstrates that the landscape changed extensively between 1954 and 1972. Much of the terrain was cleared of vegetation and roads have been added. Less change is noted between 1972 and 1980. The 1978 production figures indicate Whittier wells produced .8 million barrels of oil and .8 million cubic feet of gas with reserves of seven million and four million respectively (The Daily News 1980:5). During the 1980s until 1989 when abandonment began, the Whittier Main Oil Field produced approximately 800 barrels per day. In 1989, the last year of full production, the field produced 269,000 barrels of oil. The DOGGR database also indicates some minimal production of gas until 1999 with most activity ceasing in 1992. In 1995, the Whittier Oil Field area was sold to the Trust for Public Lands. The sale included an environmental remediation program overseen by Chevron and the City of Whittier and completed in 1997 (MRS 2009:4.2).

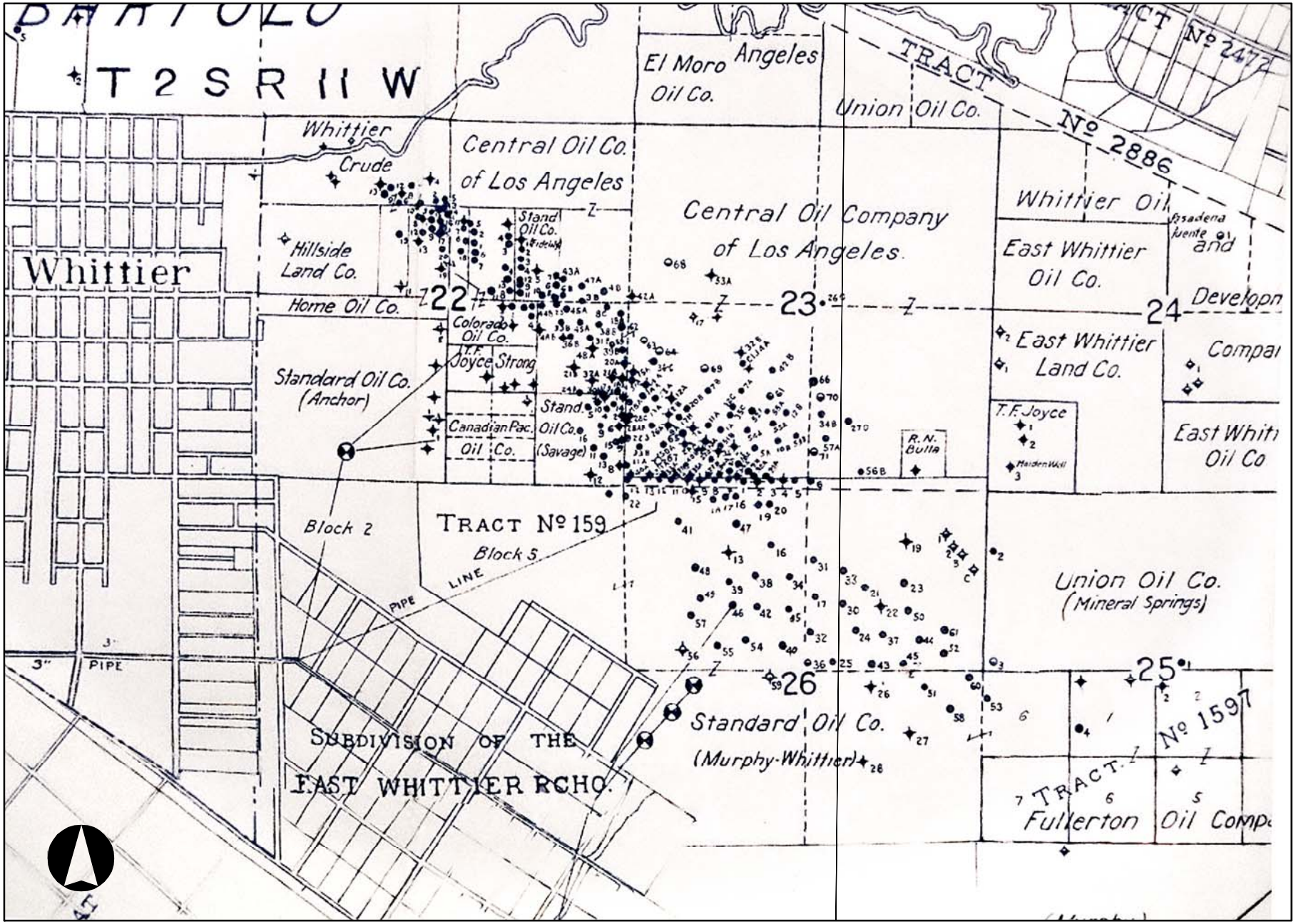

Figure 4.4 California State Mining Bureau Department of Petroleum and Gas. Whittier and Fullerton Fields 1921.

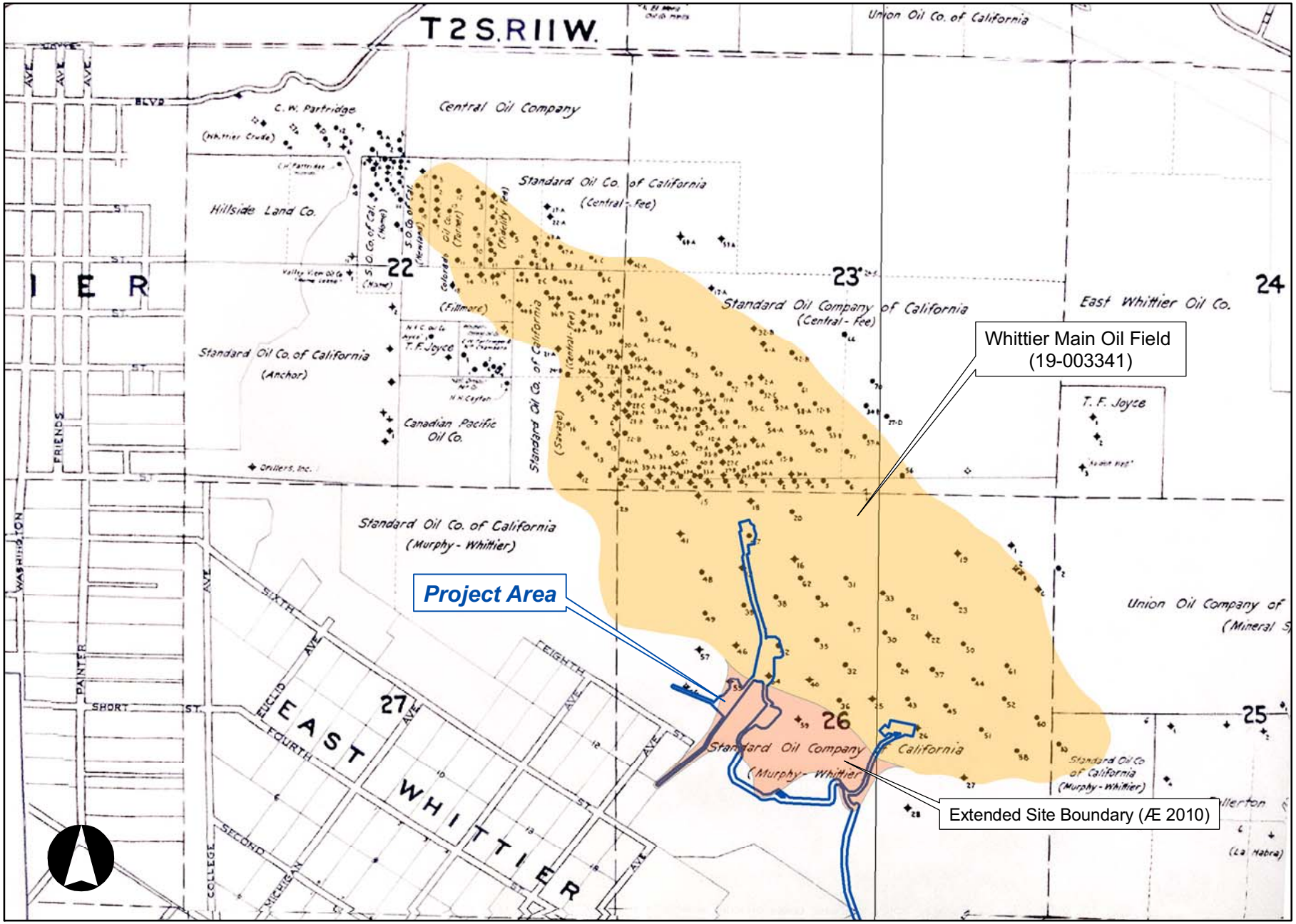

Figure 4.5 California State Mining Bureau Department of Petroleum and Gas. Whittier and Fullerton Fields 1944.

5
SITE INSPECTION

The Project area consists of several proposed construction areas on the southwest side of the Puente Hills Native Habitat Preserve, as well as an approximately 2.5-mile long gas and crude pipeline route along Colima Road and La Mirada Boulevard. Development within the Puente Hills Native Habitat Preserve will consist of three proposed well site areas, a truck loading area, existing paved roadways, and a proposed new road. The three well site areas include the West Well Site (single tract, 1.1 acres), the Central Well Site (two tracts, 3.8 acres), and the East Well Site (single tract, 1.1 acres).

The West Well Site and both tracts of the Central Well Site and access roads are situated along La Canada Verde, a narrow canyon covered with dense grasses and chaparral vegetation. The truck loading area is situated on a low ridge line covered with dense vegetation, and the East Well Site is located on a high ridge covered with a moderate amount of vegetation. Portions of the proposed new road have recently been graded as part of a fuel-reduction effort, while other segments cross undeveloped areas covered with dense grasses and chaparral. The existing paved roadways within the Puente Hills Native Habitat Preserve are approximately 12 ft wide and paved with a thin cover of asphalt. Vegetation along these roads is very dense in some areas, and has been mowed in others as part of a fuels-reduction effort.

The 2.5-mile long gas and crude pipeline route will begin at the Colima Road entrance and traverse southwesterly along Colima Road to La Mirada Boulevard, then south to Leffingwell Road. The roadway along this segment is a paved four-lane with curbs, sidewalks, and a center median. The roadway is bordered by residential and commercial development (Figure 5.1)

5.1 FIELD METHODS

On May 11, 2010, Applied EarthWorks archaeologist Josh Smallwood carried out an intensive-level field survey of the Project area. All of the access roads within the Project area were surveyed on foot by walking a transect along both sides of the centerline of the proposed or existing roadway. Each of the Well Site areas and the truck loading area were surveyed by walking parallel transects spaced 15 meters apart. Due to the dense vegetation covering these areas, often impenetrable and measuring more than 10 ft high, much of these areas were surveyed by walking along accessible animal trails that meandered through the brush. Surface visibility in these areas was often less than 10 percent. Special attention was paid to finding and identifying surface features, structural remains, or artifacts associated with the historic-period use of the Whittier Oil Field (Site 19-003341).

Colima Road and La Mirada Boulevard are both paved and landscaped and modern in appearance. They are bordered by dense commercial and residential development, most of which are modern in appearance, but some of which date to at least the early 1900s. As such, the survey of the 2.5-mile long gas and crude pipeline route was carried out by driving these roads and inspecting the route from the windshield of a moving automobile. No undeveloped parcels were observed along the route that could be more thoroughly inspected for archaeological resources. A segment of the Southern Pacific Railroad (SP) spur to Whittier (ca. 1888) crosses the Project route along Colima Road near the intersection of Lambert Road, but the proposed

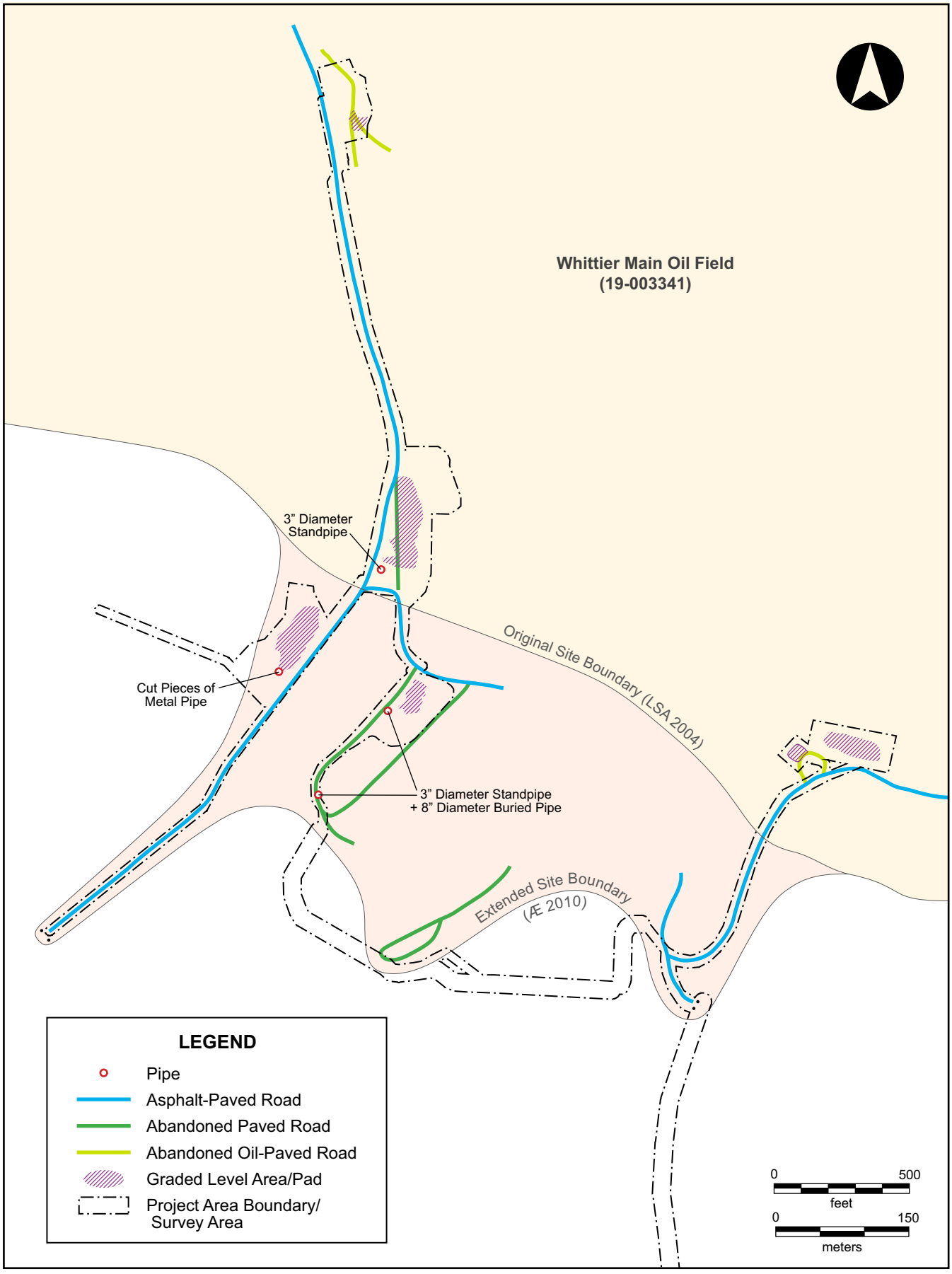

Figure 5.1 Archaeological survey map.

pipeline will be underground at this location, and therefore the Project has no potential to affect this segment of the SP line. As such, this segment of the SP Railway was not recorded during the field survey.

5.2 FINDINGS

No prehistoric archaeological materials were found during the intensive-level field survey. Numerous features associated with Site 19-003341 (Whittier Oil Field), however, were encountered, and are discussed below.

A segment of the SP spur to Whittier (ca. 1888) crosses the Project route along Colima Road near the intersection of Lambert Road, but the proposed pipeline will be underground at this location, and therefore the Project has no potential to affect this segment of the SP line. As such, this segment of the SP railway was not recorded during the field survey, although it is recognized that the SP is a historical resource for the purpose of CEQA.

No other historic-period sites, features, or artifacts other than those associated with the Whittier Oil Field (19-003341) were found.

The windshield survey of the pipeline route and the records and literature search did not identify any historical structures or archaeological features that would be potentially altered as a result of the proposed Project. The archaeological sensitivity of the pipeline route is considered low.

Site 19-003341 (Whittier Oil Field): All of the existing paved roads found within the Project area are associated with the historic-period use of the Whittier Oil Field and were therefore recorded as historic-period features (Figure 5.2). Along some segments of these roads, erosion had exposed an older, oil-paved road beneath the modern asphalt. These roadways typically measured approximately 12 ft in width and appear to be part of a network of roadways that traverse the hillsides and canyons throughout the historic Oil Field.

Level pads marking the former locations of oil wells were encountered at each of the proposed well site areas and at the proposed truck loading area. A total of five pads was recorded as historic-period features. These five level pads were densely overgrown with grass and chaparral. The pads typically consisted of a loose gravel layer or paved asphalt that was exposed in eroded areas and could be seen where vegetation did not obscure the surface. Precise measurements of these graded areas could not be obtained due to the presence of overburden soils and vegetation. Additionally, none of the pads could be positively identified as those recorded during previous surveys (SRS1989, LSA 2004). The five well pad locations identified in 2010 represent less than 1 percent of the 494 wells documented by DOGGR.

Three vertical pipes measuring 3 inches in diameter and 3 ft tall were found at different locations and recorded. Two of these pipes were found in eroded areas that revealed an 8-inch diameter buried pipeline. Presumably, all three of these pipes are standpipes interspersed along a buried pipeline. Short, dismantled pieces of 3-inch diameter steel pipe were also observed within the southwestern tract of the proposed Central Well Site. The pieces found measured approximately 1.5 to 2 ft long and appeared to be discarded as refuse. The buried segments of pipelines could not be followed at the surface, as there was no clear indication as to their direction or orientation.

Figure 5.2 Paved access road.

No surface pipelines or well markers were encountered during the field survey. Numerous monitoring well-heads of modern construction, usually painted yellow, were observed, but not recorded.

5.2.1 Paleontological Resources

No fossils, paleontological resources, or unique geologic features were identified within the Project boundaries during the current field survey. The following discussion on Project impacts to paleontological resources is taken from *Final Initial Study/Mitigated Negative Declaration* for the *Puente Hills Landfill Native Habitat Preservation Authority's Resource Management Plan* (LSA 2007b:38–40).

The Preserve is known to be underlain by Cenozoic-age sediments of the Puente, Fernando, Coyote Hills, and La Habra geological formations. The Puente, Coyote Hills, and La Habra formations are known to contain extensive fossils of marine and terrestrial plants, invertebrates, and vertebrates. These Formations are considered to have a high sensitivity in regard to their potential for containing fossils. Recent alluvial sediments filling the valley bottoms of the Preserve, however, are considered to have a low sensitivity because they were deposited after the Pleistocene.

The results of a paleontological locality search initiated by LSA (2007), and carried out by the Natural History Museum of Los Angeles County indicate that no vertebrate fossil localities have been documented directly within the Preserve boundaries. However, the same sedimentary deposits that occur within the Preserve are also found in the nearby vicinity. The closest fossil vertebrate localities to the Project are all from around the Puente Hills Landfill immediately

north of the Preserve. Fossil localities in that area have produced a collection of fossil marine vertebrates, including great white shark, herring, hake, lanternfish, mackerels, swordfish, flounder, and whale.

At present, there are no known paleontological resources or unique geologic features or sites located within the Preserve. However, the Preserve is underlain by sedimentary formations that are considered to have a High Sensitivity in regard to their potential for containing fossils. It is possible that previously unknown paleontological resources could be discovered during ground disturbing activities associated with construction of new trails and/or trailhead facilities. However, implementation of the following mitigation measure would reduce potential impacts to unknown paleontological resources to a level less than significant.

As defined by LSA (2007b), Mitigation Measure CULT-4 states that if any paleontological resources are encountered during ground-disturbing activities in the Project area, activities in the immediate area of the find shall be halted and the discovery assessed. The Habitat Authority shall contact a qualified paleontologist to recommend appropriate mitigation measures pursuant to guidelines developed by the Society of Vertebrate Paleontology (SVP) and a standard Paleontological Resource Impact Mitigation Program (PRIMP) for treatment of the resources will be developed and followed.

6
MANAGEMENT RECOMMENDATIONS

The archaeological survey of the Project area failed to identify any new potentially significant cultural resources of either prehistoric or historical origin. The records and literature search completed at the Regional Information Center revealed that no significant previously recorded prehistoric archaeological sites have been reported within the Project area. One previously documented site (19-003341–Whittier Oil Field) was identified by the records and literature search and components of this site were identified within the Project boundaries during the archaeological survey. The oil field still retains integrity of setting and association between the pads and pipelines and the lack of development in the area has preserved the setting. The oil field is eligible for listing on the National and California Registers under Criterion A(1) for its association with the development of the petroleum industry in southern California. It may also be eligible under Criterion D(4) where subsurface components, structural features, or remnants of workers camps remain.

6.1 ASSESSMENT OF AN ADVERSE EFFECT ON A HISTORICAL RESOURCE

As discussed in Section 2 "Regulatory Context," CEQA Guideline Section 15064.5 provides criteria for determining a substantial adverse change to the significance of a cultural resource:

- Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.

- The significance of an historical resource is materially impaired when a project:

  Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources.

As currently planned, the proposed Project entails construction during two phases. The drilling and testing phase will include clearance of portions of the Central and West Well Sites, road improvements, and drilling activities. The design and construction phase will include the construction of a new access road, oil, and gas processing facilities, truck loading facility, backbone pipeline system, gas and crude pipelines and well sites, and cellars and related vessels. These proposed construction activities have the potential to physically alter or destroy the historic-period oil well pad features and roadways identified within the Project area and recorded as part of the historic Whittier Oil Field.. These remnant features are a principal element of the Historic Whittier Oil Field as it exists today, and are considered contributing components of this historical resource. While numerous roadways and oil well pads associated with the historic Whittier Oil Field likely exist throughout the Preserve, removal of the features within the project area does constitute a "substantial adverse change in the significance of an historical resource" as defined by CEQA.

At present, the RMP provides measures which should be applied to the proposed project and proposed project alternatives. The alternatives assessment (MRS 2010 5-21) determined that impacts to cultural resources would be less or the same at the proposed alternative sites. The current study findings support the previously proposed mitigation measures formulated for the RMP. Goals and objectives specific to the oil field presented in the RMP include:

Goal:

RMP CULT-2: Preserve and interpret the remains of the Whittier Oil Field as a significant historic site for the education and enjoyment of preserve visitors.

Objectives

RMP CULT-2.1: Allow the definitive elements of the oil field to remain in place and be passively managed.

If the proposed Project cannot avoid physical demolition, destruction, relocation, or alteration of these components, then a thoughtful mitigation plan should be carried out to reduce the project impacts to a level less than significant.

General mitigation measures proposed in the RMP include:

- For any cultural resource work conducted within the Preserve, a Los Angeles County certified archaeologist should prepare a research design that identifies research strategies to be implemented during the research program. A review by cultural resource professionals should establish research priorities for the Preserve, and cultural resource work within the preserve should be designed to address these priorities.
- Create a cultural resources interpretive display to help disseminate information about the Whittier Oil Field remains to the public.
- Monitoring of any project that involves earth-disturbing activities in culturally rich soils should be conducted by a trained archaeologist under the supervision of a Los Angeles County Certified Archaeologist. Artifacts that are unearthed during this construction should be collected with provenience information where available (PRC Section 21083.2[c]).
- When sites and/or isolates are located, they should be recorded on California Department of Parks and Recreation (DPR) 523 series forms. Location data should be recorded using a hand-held GPS unit. Site updates, including photo[graphs] and maps, should be completed for previously documented sites that are reevaluated. Surface collection is recommended for any materials encountered if the site appears to be threatened by natural or human factors (PRC Section 5020.4).

As provided in the Final Initial Study/Mitigated Negative Declaration for the Puente Hills Landfill Native Habitat Preservation Authority's Resource Management Plan (LSA 2007:39), if the Habitat Authority must alter the Whittier Oil Field (19-003341), through removal/alteration of roads, well pads, or markers, documentation of those resource would be required. Given the non-renewable nature of features within the oil field, level of existing documentation on existing features (roads, pads, and markers), and the historical background of the site including the context related to oil production at the site and in southern California, implementation of the

following mitigation measure as described by LSA (2007) would be needed to reduce potential impacts to a level below significant:

- Mitigation Measure CULT-1: If the Habitat Authority finds it necessary to alter any of the qualities of the historic Whittier Oil Field (19-003341), such as the roads, well pads, or markers that make it eligible for the California Register, the Habitat Authority shall retain a qualified historian to document the resource prior to any grading activities within the oilfield. This documentation should include, but is not limited to, additional research, detailed mapping, HAER level photo documentation, and possible interviews with persons knowledgeable as to the workings of the historic oil field.

The Pilot Project as currently planned involves alteration of a limited number of well pad locations within the historic Whittier Oil Field as a historical resource. As such, HAER level documentation is not required at this stage of the project. However, if the Pilot Project is expanded to include development in additional areas not covered under the current study, then the full extent of Mitigation Measure CULT-1 as outlined in the Preserve RMP shall be incorporated as an appropriate means of reducing Project impacts to less than significant. To ensure that the current Pilot Project does not result in a substantial adverse change to the significance of the historic Whittier Oil Field as a historical resource under CEQA, the mitigation measure will include:

CR-1a *Development of a monitoring plan for treatment of areas of direct impact to elements identified as contributing components of Whittier Oil Field to include but not limited to the following:*

CR-1b *Monitoring concurrent with construction grubbing at the locations of all oil well pads, allowing time for detailed field recordation of each pad that could not be obtained during survey level recording efforts due to heavy vegetation. Recordation is to include photographs in digital or 35mm format, scaled plan-view drawings of the well pads, and written documentation that describes construction methods, details, and associated material composition;*

Monitoring concurrent with alteration of existing historic-period roadways to allow for detailed mapping of existing roadways as well as recordation of construction along a representative segment(s) of the roadway to document the methods used over time as the oil fields evolved; first relying on dirt roads, followed by oil-paved roads, and finally asphalt-paved roads;

CR-1c *Collection, analysis, reporting, and curation of any associated artifacts that might be unearthed during monitoring activities described above;*

CR-1d *Completion of a report of findings and update of appropriate DPR 523 forms to document the information obtained as a result of the mitigation/monitoring program.*

Monitoring must be conducted by a trained archaeologist under the supervision of a Los Angeles County Certified Archaeologist. The monitor must be empowered to halt or redirect construction equipment so as to be able to documenting any oil field related features exposed as a result of construction, as well as evaluating and documenting any previously unanticipated discoveries that may be uncovered.

If isolated artifacts are collected during monitoring, once analyzed, they will be donated to the Preserve for display purposes. Monitoring of the Colima Road gas and crude pipeline is not recommended as archaeological sensitivity along the developed roadway appears low. Nonetheless, if unidentified archaeological deposits are exposed construction must cease and a qualified monitor must evaluate the find.

According to CEQA, "Archaeological sites known to contain human remains shall be treated in accordance with the provisions of Section (7050.5) Health and Safety Code." The protection of human remains is also ensured by California Public Resources Codes, Section 5097.94, 5097.98, and 5097.99.

CR-2 *If human remains are exposed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has been notified and can made the necessary findings as to origin and disposition of the remains pursuant to Public Resources Code 5097.98. Construction must halt in the area of the discovery of human remains, the area must be protected, and consultation and treatment shall occur as prescribed by law.*

In the event that the remains are determined to be of Native American origin the remains will be protected in place and the Native American Heritage Commission (NAHC) must be contacted by the Los Angeles County Coroner, and a Most Likely Descendant must be designated. Any further treatment of the remains will occur in consultation with the MLD, the NAHC, and a qualified archaeologist.

At present, there are no known paleontological resources or unique geologic formations or sites located within the Pilot Project area. However, the Preserve is underlain by sedimentary formations that are considered to have a high sensitivity in regard to their potential for containing fossilized remains. Therefore, it is possible that paleontological resources could be discovered during ground disturbing activities associated with construction of Project components including wells, pipeline, the backbone, or other project infrastructure. However, implementation of the following mitigation measure would reduce potential impacts to unknown paleontological resources to a level less than significant. This same recommendation applies to the current project. The responsibility for contacting a paleontologist lies with the Project proponent

CR-3 *As defined by LSA (2007:CULT-4) if any paleontological resources are encountered during ground-disturbing activities in the Project area, activities in the immediate area of the find shall be halted and the discovery assessed. A qualified paleontologist must evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology (SVP). A paleontological resource impact mitigation program (PRIMP) for treatment of the resources will be developed and implemented.*

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APPENDIX A
ARCHAEOLOGICAL LITERATURE AND RECORDS SEARCH

South Central Coastal Information Center
California State University, Fullerton
Department of Anthropology MH-426
800 North State College Boulevard
Fullerton, CA 92834-6846
657.278.5395 / FAX 657.278.5542
anthro.fullerton.edu/sccic.html - sccic@fullerton.edu
California Historical Resources Information System
Orange, Los Angeles, and Ventura Counties

December 9, 2009

SCCIC # 10066.6921

Ms. Colleen Hamilton
Applied Earth Works
3292 E. Florida Avenue
Suite A
Hemet, CA. 92544-4941
(951) 766-2000

RE: Record Search Results for Whittier Main Oil Field Development Project Located in the County of Los Angeles, California

Dear Ms. Hamilton,

As per your request received on November 24, 2009, a records search was conducted for the above referenced project. The search includes a review of all recorded archaeological sites within a 1-mile radius of the project site as well as a review of cultural resource reports on file. In addition, the California Points of Historical Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CR), the National Register of Historic Places (NR), and the California State Historic Resources Inventory (HRI) listings were reviewed for the above referenced project. The following is a discussion of the findings.

Whittier and La Habra, CA. USGS 7.5' Quadrangles

ARCHAEOLOGICAL RESOURCES:

One archaeological site (19-003341*) has been identified within a 1-mile radius of the project site. This archaeological site is located within the project site. The site is not listed on the Archaeological Determination of Eligibility (DOE) list. No isolates have been identified within a 1-mile radius of the project site. No isolates are located within the project site.
(= Located within the project site)*

HISTORIC RESOURCES:

Copies of our historic maps – Anaheim and Downey (1896 and 1942) 15' USGS, La Habra (1927) and Whittier (1925) 6' USGS - are enclosed for your review.

The California Point of Historical Interest of the Office of Historic Preservation, Department of Parks and Recreation, lists one property within a 1-mile radius of the project site (see below).

LAN-039 East Whittier Woman's Improvement Club
14148 E. Second Street

The club, constructed in 1905, is sited on the original site of a pump house built in 1897. The pump house was purchased by the East Whittier Woman's Improvement Club in 1905 from the East Whittier Land and Water Company. In 1910 when a local school was destroyed by fire, the club house was transformed into a class room. Again in 1933 the club served as a classroom for earthquake damaged East Whittier Schools.

The California Historical Landmarks of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a 1-mile radius of the project site.

The California Register of Historic Places lists no properties within a 1-mile radius of the project site. These are properties determined to have a National Register of Historic Places Status of 1 or 2, a California Historical Landmark numbering 770 and higher, or a Point of Historical Interest listed after 1/1/1998.

The National Register of Historic Places lists no properties within a 1-mile radius of the project site.

The California Historic Resources Inventory lists ten properties that have been evaluated for historical significance within a 1-mile radius of the project site (see enclosed list).

PREVIOUS CULTURAL RESOURCES INVESTIGATIONS:

Seven studies (LA-1211, LA-1776*, LA1809, LA3737*, LA4197, LA5476, and LA9815) have been conducted within a 1-mile radius of the project site. Of these, two are located within the project site. There are sixteen additional investigations located on the Whittier and La Habra 7.5' USGS Quadrangles that are potentially within a 1-mile radius of the project site. These reports are not mapped due to insufficient locational information.
(= Located within the project site)*

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you **do not include** resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at 657.278.5395 Monday through Thursday 9:00 am to 3:30 pm.

Should you require any additional information for the above referenced project, reference the SCCIC number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Sincerely,
SCCIC

Thomas David Shackford
Assistant Coordinator

APPENDIX B
NATIVE AMERICAN CORRESPONDANCE

Applied EarthWorks Inc.
3292 E. Florida Avenue
Suite A
Hemet, CA 92544-4941
(951) 766-2000
FAX (951) 766-0020

24 November 2009

Mr. Dave Singleton
Native American Heritage Commission
915 Capitol Avenue, Room, 364
Sacramento, CA 95814

Dear Mr. Singleton:

This letter serves as a request for a review of the Sacred Lands Inventory to determine if any known cultural resources are present within the vicinity of the Whittier Main Oil Field Project. The project location is depicted on the enclosed portions of the USGS 7.5 minute Series, Whittier and La Habra, CA Quadrangles located within Township 2 South , Range 11 West, Section 26 of Los Angeles County.

The project will include ground disturbing activities associated with drilling, oil processing, a gas plant and oil loading facilities at three locations within the Whittier Main Field. Additionally roads and pipelines will be constructed to connect the three locations. Æ will also be conducting an updated records and literature search.

I would appreciate it if you would inform me of any knowledgeable Native American individuals who should be contacted regarding this Project.

Please do not hesitate to call me at (951) 766-2000 if you have questions or require additional information. Results can also be faxed to (951)766-0020. Thank you for your assistance.

Sincerely

M.Colleen Hamilton, M.A., R.P.A
Historical Division Manager

Applied EarthWorks Inc.
3292 E. Florida Avenue
Suite A
Hemet, CA 92544-4941
(951) 766-2000
FAX (951) 766-0020

December 30, 2009

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas
Tribal Administrator

Dear Mr. Rosas,

On behalf of the Matrix Oil Corporation, Applied EarthWorks, Inc. (Æ) is preparing a cultural resources investigation in support of proposed oil exploration. The purpose of the Project is to explore for oil in an area known as the Whittier Main Oil Field in the City of Whittier. The project is also within the Puente Hills Landfill Native Habitat Preservation Area. The location of the Project area is depicted on portions of the USGS 7.5 minute Whittier and La Habra quadrangles.

As part of our research, Æ is contacting interested parties, including Native American groups and individuals, to help identify any prehistoric sites or sacred sites or landscapes located in the vicinity of, or which might be affected by, the proposed Project. As a matter of procedure, Æ has already consulted the Native American Heritage Commission in Sacramento. No sacred sites or landscapes were identified with the Project area. An archaeological records search has been undertaken at the South Central Coastal Information Center. One site, the historical Whittier Main Oil Field was identified.

If you have any information that would be relevant to our analysis of the proposed Project's potential effect on cultural resources or traditional cultural property, please provide a written or verbal response by January 13, 2010 to Project Archaeologist Keith Warren at kwarren@appliedearthworks.com or (323) 240-591. Please feel free to contact Mr. Warren if you have any questions or comments. Thank you for taking the time to review our request.

Sincerely,

for M. Colleen Hamilton, M.A., RPA
Historical Division Manager.

Date: Wed, 30 Dec 2009 15:59:23 -0800
Subject: Re: Whittier Oil Field
From: tattnlaw@gmail.com
To: kwarren@appliedearthworks.com
CC: ds_nahc@pacbell.net; ECARROLL@parks.ca.gov; rgarcia@cityprojectca.org

THANKS WE OPPOSE AND OBJECT TO THIS PROJECT

WE ALSO BELIEVE STRONGLY THIS PURPORTED PROJECT REQUIRES AND NEPA -COMPLIANT EIS WITH FULL SEC 106 NHPA TRIBAL CONSULTATION WHICH WE ARE DEMANDING NOW-

THAT AREA HAS NUMEROUS CULTURAL RESOURCES OF OURS AND IS SACRED AND HAS SACRED SITES

SO PLEASE BEGIN THE SEC 106 NHPA WITH USE OF THE FEDERAL GUIDELINES AND THE NEPA PROCESS

YOU ALSO FAILED TO MENTION ANY FEDERAL OR STATE AGENCY REVIEWS OR REQUIRED PROCESSING SO

THAT NEEDS TO BE DISCLOSED SOON-

ANY WATER USE IS ILLEGAL AS WE HAVE THE SENIOR WATER RIGHT AND DRILLING FOR OIL USES WATER OUR CULTURAL RESOURCE

THANKS JOHNTOMMY

Applied EarthWorks Inc.
3292 E. Florida Avenue
Suite A
Hemet, CA 92544-4941
(951) 766-2000
FAX (951) 766-0020

January 11, 2010

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas
Tribal Administrator

Dear Mr. Rosas,

In response to your comments regarding the Whittier Main Oil Field Project, Applied EarthWorks, Inc. (Æ) would like to offer the following information.

The project is not federally funded and no Section 106 or NEPA compliance is required at this time. The project is subject to CEQA oversight, however, and an EIR will be prepared that includes mitigation measures for cultural resources. If you have specific information regarding sacred sites within the project area we would appreciate that information being shared so that those sites can be fully documented and any necessary mitigations can be addressed in the EIR. The resulting technical documentation will be provided for pubic and agency review as required by state law.

Any water use and issues of water rights are beyond the cultural resources evaluation. These issues will be considered as required by CEQA under other sections of the EIR document.

Æ is maintaining a record of this correspondence which will be included in a cultural resources technical report that will be appended to the EIR. If you have additional comments please contact Project Archaeologist Keith Warren at kwarren@appliedearthworks.com. Thank you for taking the time to review our response.

Sincerely,

for M. Colleen Hamilton, M.A., RPA
Historical Division Manager.