7.16 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) may be defined as remains or other indications (trace fossils) of prehistoric animals and plants. Fossils are important scientific and educational resources because of their use in (1) documenting the presence and evolutionary history of particular groups of now extinct organisms, (2) reconstructing the environments in which these organisms lived, and (3) in determining the relative ages of the strata in which they occur. Fossils also have direct application for investigating the geologic events that resulted in the deposition of the sediments in which they were buried.

This section of the Application for Certification (AFC) summarizes the potential environmental impacts on paleontological resources that could result from construction of the Marsh Landing Generating Station (MLGS). Section 7.16.1 describes the existing environment that could be affected by the project. Section 7.16.2 describes the potential impacts on paleontological resources resulting from construction and operation of the project. The potential cumulative impacts to paleontological resources are discussed in Section 7.16.3. Proposed mitigation measures to reduce potential adverse impacts to paleontological resources are discussed in Section 7.16.4. Section 7.16.5 lists the federal, state, and local laws, ordinances, regulations and standards (LORS) and the professional standards that protect paleontological resources. The involved agencies and agency contacts are provided in Section 7.16.6. Section 7.16.7 discusses the status of permits required and permit schedule. Section 7.16.8 discusses professional standards for paleontological work. Section 7.16.9 lists the references used in preparing this document.

This paleontological resources inventory and impact assessment was prepared by Dr. Joe Stewart, Ph.D. It meets all requirements of the California Energy Commission and the standard measures for mitigating adverse construction-related environmental impacts on significant paleontological resources established by the Society of Vertebrate Paleontology (SVP, 1995, 1996). The complete technical report, Paleontological Resources Assessment, Marsh Landing Generating Station, is included as Appendix S (submitted separately under rules of confidentiality).

7.16.1 Affected Environment

The MLGS is in northern Contra Costa County, on the south bank of the San Joaquin River, near the City of Antioch. Contra Costa County lies in northern California 35 miles east of San Francisco. Most of the project lies within the boundaries of the 114-acre Contra Costa Power Plant (CCPP), including the construction laydown and parking areas. The MLGS will occupy approximately 27 acres of the northwestern portion of the CCPP site. Two pipelines (i.e., for water supply and wastewater) will be constructed to connect the MLGS to the Delta Diablo Sanitary District's Bridgehead Lift Station (BLS) approximately one mile to the southeast. A satellite water treatment facility will be constructed on approximately 1.7 acres of the BLS site as well.

Since 1952, the CCPP site has been used as a power generating facility. Much of the surrounding land is also used for industrial and commercial purposes. Some of the surrounding land is also used for agriculture. A more extensive discussion of land use in this vicinity is provided in Section 7.4, Land Use and Agriculture.

7.16.1.1 Geographic Location

The project is in unincorporated Contra Costa County, near the City of Antioch. The City of Antioch is pursuing annexation of 500 acres within the region of its Sphere of Influence, which includes the project site. The main portion of the project is within Section 16 of T2 N, R2 E. on the Antioch North U.S. Geological Survey (USGS) 7.5 minute quadrangle, along the southern bank of the San Joaquin River in northern Contra Costa County, California (Figures 7.16-1). Access to the MLGS is via Wilbur Avenue. New water supply and wastewater discharge pipelines will be installed along Wilbur Avenue

between the MLGS and Delta Diablo Sanitary District's Bridgehead Lift Station in the northeastern quarter of Section 21 of that township on Bridgehead Road. There will also be a satellite facility for wastewater treatment at the Bridgehead Lift Station. The center of the proposed unit site is 38° 1.04' N, 121° 45.90' W. The relief of the MLGS unit site and the route connecting it to the Bridgehead Lift Station is low, with elevations less than 20 feet above mean sea level.

The project site lies at the interface of the Great Valley and Coastal Ranges physiographic provinces. More specifically, it is at the western end of the Sacramento/San Joaquin River delta. The site is situated on the south bank of the San Joaquin River, just upstream from that river's confluence with the Sacramento River. Between the MLGS site and the north bank of the river/delta complex is a series of islands, wetlands, and bodies of water including the San Joaquin River, West Island, Donion Island, Mayberry Slough, Sherman Lake, and the Sacramento River. Highlands (the Montezuma Hills) are immediately adjacent to the north bank. The south bank, where the MLGS will be located, is separated from the nearest highlands (Mount Diablo) to the southwest by a more extensive plain.

7.16.1.2 Regional Geologic Setting

The general geology of the Antioch area has been described in some detail by Wagner et al. (1981) at a scale of 1:250,000, Weaver, 1949 at a scale of 1:62,500, and Atwater 1984 at a scale of 1:24,000. The information in these geologic maps and published and unpublished reports form the basis of the following discussion. Individual maps and publications are incorporated into this report and referenced where appropriate. The aspects of geology pertinent to this report are the types, distribution, and age of sediments immediately underlying the MLGS project area and their probability of producing fossils during project construction. The site-specific geology in the vicinity of the MLGS site is discussed separately below.

Because the project setting is the Sacramento/San Joaquin River delta, the geology and the physiography are dominated by alluvial processes. Figure 7.16-2 shows the regional geology in the vicinity of MLGS.

7.16.1.3 Resource Inventory Methods

To develop a baseline paleontological resource inventory of the MLGS site and surrounding area and to assess the potential paleontological productivity of each stratigraphic unit present, the published as well as available unpublished geological and paleontological literature was reviewed, and stratigraphic and paleontologic inventories were compiled, synthesized, and evaluated (see below). These methods are consistent with CEC (2007) and SVP (1995) guidelines for assessing the importance of paleontological resources in areas of potential environmental effect.

Geologic maps and reports covering the bedrock and surficial geology of the MLGS project vicinity were reviewed to determine the exposed and subsurface rock units, to assess the potential paleontological productivity of each rock unit, and to delineate their respective areal distribution in the project area.

An archival database search was executed by the University of California Museum of Paleontology at Berkeley (UCMP) to determine whether any of the stratigraphic units found within the project vicinity had previously yielded significant paleontological resources. In addition, aerial photographs of the area were examined to aid in determining the areal distribution of distinctive sediment and soil types. No subsurface exploration was conducted for this assessment.

A field survey, which included visual inspection of sedimentary exposures in the project area, was conducted to assess the presence of sediments suitable for containing fossil remains and the presence of any previously unrecorded fossil sites. The field survey for this assessment was conducted on March 6, 2008 by Joe D. Stewart, URS paleontologist. During the field survey, attempts were made to detect the

presence and nature of native sediments, but none were exposed due to the intensive modification of the area due to industrial and commercial history of the area.

7.16.1.4 Paleontological Resource Assessment Criteria

The SVP (1995), in common with other environmental disciplines such as archaeology and biology (specifically in regard to listed species), considers any fossil specimen significant unless demonstrated otherwise, and they are protected by environmental statutes. This position is held because vertebrate fossils are uncommon and only rarely will a fossil locality yield a statistically significant number of specimens.

In fact, vertebrate fossils are so uncommon that, in most cases, each fossil specimen found will provide additional important information about the characteristics or distribution of the species it represents.

A stratigraphic unit (such as a formation, member, or bed) known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains. This definition of sensitivity differs fundamentally from that for archaeological resources:

> *"It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case"* (SVP, 1995).

This distinction between archaeological and paleontological sites is important. Most archaeological sites have a surface expression that allows for their geographic location. Fossils, on the other hand, are an integral component of the rock unit below the ground surface; therefore, they are not observable unless exposed by erosion or human activity. Thus, a paleontologist cannot know either the quality or quantity of fossils present before the rock unit is exposed as a result of natural erosion processes or earth-moving activities. The paleontologist can only make conclusions on sensitivity to impact based upon what fossils have been found in the rock unit in the past, along with a judgment on whether or not the depositional environment of the sediments that compose the rock unit was likely to result in the burial and preservation of fossils.

Fossils are seldom uniformly distributed within a rock unit. Most of a rock unit may lack fossils, but at other locations within the same rock unit concentrations of fossils may exist. Even within a fossiliferous portion of the rock unit, fossils may occur in local concentrations. For example, Shipman (1977, 1981) excavated a fossiliferous site using a three-dimensional grid and removed blocks of matrix of a consistent size. The site chosen was known prior to excavation to be richly fossiliferous, yet only 17 percent of the blocks actually contained fossils. These studies demonstrate the physical basis for the difficulty in predicting the location and quantity of fossils in advance of project-related ground disturbance.

Since it is unfortunately not possible to determine where fossils are located without actually disturbing a rock unit, monitoring of excavations by an experienced paleontologist during construction increases the probability that fossils will be discovered and preserved. Preconstruction mitigation measures such as surface prospecting and collecting will not prevent adverse impacts on fossils because many sites will be unknown in advance due to an absence of fossils at the surface.

The non-uniform distribution of fossils within a rock unit is essentially universal and many paleontological resource assessment and mitigation reports conducted in support of environmental impact

documents and mitigation plan summary reports document similar findings In fact, most fossil sites recorded in reports of impact mitigation where construction monitoring has been implemented had no previous surface expression. Because the presence or location of fossils within a rock unit cannot be known without exposure resulting from erosion or excavation, under SVP (1995) standard guidelines, an entire rock unit is assigned the same level of sensitivity based on recorded fossil occurrences.

Using SVP (1995) criteria, the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to assessing the significance of paleontological resources because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects: (1) its potential paleontological productivity (and sensitivity), and (2) the scientific significance of the fossils it has produced. This method of paleontological resources assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

The potential paleontological productivity of a stratigraphic unit exposed in a project area is based on the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near a project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit in a project site are most likely to yield fossil remains both in quantity and density similar to those previously recorded from that stratigraphic unit in and near the project site.

Under California Environmental Quality Act (CEQA) Guidelines section 15064.5 (a) (2), public agencies must treat all historical and cultural resources as significant unless the preponderance of evidence demonstrates that they are not historically or culturally significant. An individual fossil specimen is considered scientifically important if it is:

- Identifiable.
- Complete.
- Well preserved.
- Age diagnostic.
- Useful in paleoenvironmental reconstruction.
- A type or topotypic specimen.
- A member of a rare species.
- A species that is part of a diverse assemblage.
- A skeletal element different from, or a specimen more complete than, those now available for that species.

All identifiable vertebrate fossils are considered scientifically important because of their potential use in providing relative age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Although fossil plants are usually considered of lesser importance because they are less helpful in age determination, they are actually more sensitive indicators of their environment (Miller, 1971) and as sedentary organisms, are more valuable than mobile animals for paleoenvironmental reconstructions. The value or importance of different fossil groups varies depending on the age and depositional environment of the stratigraphic unit that contains the fossils.

The following tasks were completed to establish the paleontological importance and sensitivity of each stratigraphic unit exposed in or near the MLGS project site:

- The potential paleontological productivity of each rock unit was assessed based on previously recorded and newly documented fossil sites it contains at and/or near the project site.

- The scientific importance of fossil remains recorded from a stratigraphic unit exposed at and/or near the project site was assessed.
- The paleontological importance of a rock unit was assessed, based on its documented and/or potential fossil content in the area surrounding the project site.

Categories of Sensitivity

In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined.

High Sensitivity. Stratigraphic units in which fossils have been previously found have a high potential to produce additional fossils and are therefore considered to be highly sensitive. In the significance criteria of the SVP (1995), all vertebrate fossils are categorized as having significant scientific value and all stratigraphic units in which vertebrate fossils have previously been found have high sensitivity. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

Low Sensitivity. Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are considered to have low sensitivity. Monitoring is usually not recommended or needed during excavation in a stratigraphic unit with low sensitivity.

Undetermined Sensitivity. Stratigraphic units that have not had any previous paleontological resource surveys or any fossil finds are considered to have undetermined sensitivity. After reconnaissance surveys, observation of artificial exposures (such as road cuts) and natural exposures (such as stream banks), and possible subsurface testing (such as augering or trenching), an experienced professional paleontologist can often determine whether the stratigraphic unit should be categorized as having high or low sensitivity.

7.16.1.5 Resource Inventory Results

The geologic units described below are present within the project area. The paleontologic sensitivity rating is based on the results of both the field survey and archival research.

Eolian Deposits (Qm2e): Although represented elsewhere by large relict dunes, in the proposed project area this unit is represented by a generally flat-lying sedimentary unit. The fossil site nearest the project is mapped as occurring in this unit. Therefore, Unit Qm2e is assigned a high sensitivity rating.

Although no fossils are known to directly underlie the MLGS site, the presence of fossil sites in sediments of the Quaternary nearby suggests that there is a potential for additional similar fossil remains to be uncovered by excavations in this sedimentary unit during project construction. Under SVP (1995) criteria, this sedimentary unit has high sensitivity for potential to produce additional paleontological resources.

Identifiable fossil remains salvaged from these formations during project construction could be scientifically important and significant. Identifiable fossil remains discovered during project construction could represent new taxa or new fossil records for the area, or for the State of California. They could also represent geographic or temporal range extensions. Moreover, discovered fossil remains could make it possible to more accurately determine the age, paleoclimate, and depositional environment of the sediments from which they are salvaged. Finally, fossil remains salvaged during project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in Contra Costa County.

7.16.2 Environmental Consequences

Potential Impacts from Project Construction. Potential impacts on paleontological resources resulting from construction of the project primarily involve terrain modification (excavations and drainage diversion measures) and excavations for structure foundations. Paleontological resources that could be adversely impacted by ground disturbance and earth moving include an undetermined number of fossil remains and unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. Direct impacts could result from vegetation clearing, grading,

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excavations or trenching for structures, and any other earth-moving activities that disturb or bury previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation.

Clearing, grading, and deeper excavations at the project site could result in significant adverse impacts to paleontological resources. In addition, the construction of supporting facilities, such as temporary construction offices, laydown areas, and parking areas, has potential to cause adverse impacts to significant paleontological resources, as they also will involve extensive new ground disturbance. Thus, any project-related ground disturbance could have adverse impacts on significant paleontological resources. However, with a properly designed and implemented mitigation program, these impacts could be reduced to a less-than-significant level.

Potential Impacts from Project Operation. No impacts on paleontological resources are expected to occur from the continuing operation of the MLGS or any of its related facilities.

7.16.3 Cumulative Impacts

If paleontological finds were to be encountered during construction of the MLGS, the potential cumulative impacts would be low, as long as mitigation measures were implemented to salvage the resources. The mitigation measures proposed in Section 7.13.4 would effectively preserve the value to science of any significant fossils uncovered during project-related excavations.

7.16.4 Mitigation Measures

This section describes proposed mitigation measures that would be implemented to reduce potential adverse impacts to significant paleontological resources resulting from project construction. Mitigation measures are necessary because of potential adverse impacts of project construction on significant paleontological resources within native Quaternary alluvium. The proposed paleontological resource impact mitigation program would reduce to an insignificant level the direct, indirect, and cumulative adverse environmental impacts on paleontological resources that could result from project construction. The mitigation measures proposed below are consistent with SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources (SVP, 1995, 1996).

PALEO-1 Monitoring and Mitigation Program

Prior to construction, a qualified paleontologist should be retained to both design a monitoring and mitigation program and implement the program during all Project-related ground disturbance. The paleontological resource monitoring and mitigation program should include:

- Preconstruction coordination;
- Construction monitoring;
- Emergency discovery procedures;
- Sampling and data recovery, if needed;
- Preparation, identification, and analysis of the significance of fossil specimens salvaged, if any;
- Museum storage of any specimens and data recovered; and
- Reporting.

Earth-moving construction activities should be monitored wherever these activities will disturb previously undisturbed sediment. Monitoring will not need to be conducted in areas where sediments have been previously disturbed or in areas where exposed sediments will be buried but not otherwise disturbed.

PALEO-2 Pre-Construction Meetings

Pre-construction meetings will be held with key construction personnel to provide brief discussions pertaining to paleontological resource significance, visual identification, and fossil discovery notification procedures. A qualified paleontologist will consult with the project geologist and project engineer on a periodic basis regarding the scheduling and extent of subsurface excavations, particularly where undisturbed areas may be encountered.

PALEO-3 Construction Personnel Education

Prior to the start of construction, construction personnel involved with earth-moving activities should be informed that fossils may be discovered during excavating; that these fossils are protected by laws; on the appearance of common fossils; and on proper notification procedures. This worker training should be prepared and presented by a qualified paleontologist.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of project-related ground disturbance and earth-moving on paleontological resources to an insignificant level by allowing for the salvage of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might be lost to earth-moving and to unauthorized fossil collecting.

With a well-designed and implemented paleontological resource monitoring and mitigation plan, project construction could actually result in beneficial effects on paleontological resources through the discovery of fossil remains that would not have been exposed without project construction, and therefore would not have been available for study. The salvage of fossil remains as part of project construction could help answer important questions regarding the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the project area.

7.16.5 Laws, Ordinances, Regulations and Standards

Paleontological resources are classified as nonrenewable scientific resources and are protected by several federal and state statutes, most notably by the 1906 Federal Antiquities Act and other subsequent federal legislation and policies and by the State of California's environmental regulations (CEQA, Section 15064.5). Professional standards for assessment and mitigation of adverse impacts on paleontological resources have been established by the SVP (1995, 1996). Design, construction, and operation of the project, including ancillary facilities, will be conducted in accordance with LORS applicable to paleontological resources. Federal and state LORS applicable to paleontological resources are summarized in Table 7.16-1 and discussed briefly below, together with county and city requirements and SVP professional standards.

7.16.5.1 Federal

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (Public Law [P.L.] 59-209; 16 United States Code [U.S.C.] 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. The Antiquities Act of 1906 forbids disturbance of any object of antiquity on federal land without a permit issued by the responsible managing agency. This act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities. The Federal Highways Act of 1958 clarified that the Antiquities Act applied to paleontological resources and authorized the use of funds appropriated under the Federal-Aid Highways Act of 1956 to be used for paleontological salvage in compliance with the Antiquities Act and any applicable state laws.

In addition to the Antiquities Act, other federal statutes protect fossils. The Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666, 16 U.S.C. 461 et seq.) declares it national policy to preserve objects of historical significance for public use and gives the Secretary of the Interior broad powers to execute this policy, including criminal sanctions. The National Environmental Policy Act of 1969 (P.L. 91-190, 31 Stat. 852, 42 U.S.C. 4321-4327) requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any proposed project. The Federal Land Policy Management Act of 1976 (P.L. 94-579; 90 Stat. 2743, U.S.C. 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under 40 Code of Federal Regulations 1508.27 as a subset of scientific resources. Federal protection for significant paleontological resources would apply to this project if any construction or other related project impacts occurred on federally owned or managed lands.

7.16.5.2 State

Guidelines for the Implementation of the California Environmental Quality Act, as amended 7 September 2004 (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "*Will the proposed project directly or indirectly destroy a unique paleontological resource or site?*"

Although neither CEQA nor the Guidelines define what is *"a unique paleontological resource or site,"* CEQA Section 21083.2 defines *"unique archaeological resources"* as *". . . any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:*

1. *Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.*

2. *It has a special and particular quality such as being the oldest of its type or the best available example of its type.*

3. *Is directly associated with a scientifically recognized import prehistoric or historic event."*

With only slight modification, this definition is equally applicable to recognizing "*a unique paleontological resource or site.*" Additional guidance is provided in CEQA Guidelines Section 15064.5(a)(3)(D), which indicates "*generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history.*"

Paleontological resources are considered to be significant if they:

- Provide important information on the evolutionary trends among organisms, relating living organisms to extinct organisms.

- Provide important information regarding development of biological communities or interaction between botanical and zoological biota.

- Demonstrate unusual circumstances in biotic history.

- Are in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic localities.

CEQA Guidelines Section XVII, part a, of the Environmental Checklist asks a second question equally applicable to paleontological resources: "*Does the project have the potential to . . . eliminate important examples of the major periods of California history or pre-history?*" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is yes or possibly, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resources management are in Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the project if any construction or other related project impacts occurred on lands owned or managed by the state, if the state or a state agency were to obtain ownership of project lands during the term of the project license, or if construction of the project linear features (natural gas pipeline, process and potable water lines, and/or sewer line) were built on state-, county-, or city-owned lands, including streets and highway rights-of-way.

7.16.5.3 Local

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term general plan for its development. The general plan is a policy document designed to give long-range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The general plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction informs these groups of its goals, policies, and development standards, thereby communicating what must be done to meet the objectives of the general plan. State planning law requires each jurisdiction to identify environmental resources and to prepare and implement policies which relate to the use and management of these resources.

The current Contra Costa County General Plan does not mention policies for paleontological resources, but does list three paleontological sites in its inventory of significant ecological resource areas. Likewise, the Environmental Impact Statement/Environmental Report for the East Contra Costa County Habitat Plan and Natural Community Conservation Plan does not have specific policies for paleontological resources, but it does make the point that fossils are considered to be covered by the cultural resources policies. URS is unaware of any current specific local-level requirements, regulations, ordinances, goals, or objectives specifically designed to mitigate the negative impacts of development on paleontological resources other than these two documents.

The General Plan of the City of Antioch will be applicable to the project because the site will be annexed by the City of Antioch. Subsection C of the Cultural Policies section requires grading activities be monitored by paleontological monitor and collection, curation, and reporting of any resources detected.

7.16.5.4 Professional Standards

The Society of Vertebrate Paleontology, a national scientific organization of professional vertebrate paleontologists, has established standard guidelines (SVP, 1995, 1996) that outline acceptable professional practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil salvage, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically spelled out in its standard guidelines. The SVP's standard guidelines were approved by a consensus of professional paleontologists and are the standard against which all paleontological monitoring and mitigation programs are judged. Many federal and California state regulatory agencies have either formally or informally adopted the SVP's "standard guidelines" for the mitigation of construction-related adverse impacts on paleontological resources as a measure of professional practice.

Briefly, SVP guidelines recommend that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during project construction, a mitigation plan that includes monitoring by a qualified paleontologist to salvage fossils encountered, identify salvaged fossils, determine their significance, and place curated fossil specimens into a permanent public museum collection (such as the designated California State repository for fossils, the UCMP at Berkeley).

7.16.6 Agencies and Agency Contacts

No state or local agencies have specific jurisdiction over paleontological resources. The project area is unincorporated Contra Costa County land. Neither state nor federal lands are involved in this project. The Contra Costa County General Plan does not mention policies for paleontological resources, but does list three paleontological sites in its inventory of significant ecological resource areas. Table 7.16-2 lists agency contact information for the county.

7.16.7 Permits Required and Permitting Schedule

No state or county agency requires a paleontological collecting permit to allow for the salvage of fossil remains discovered as a result of construction-related earth moving on state or private land in a project site.

7.16.8 References

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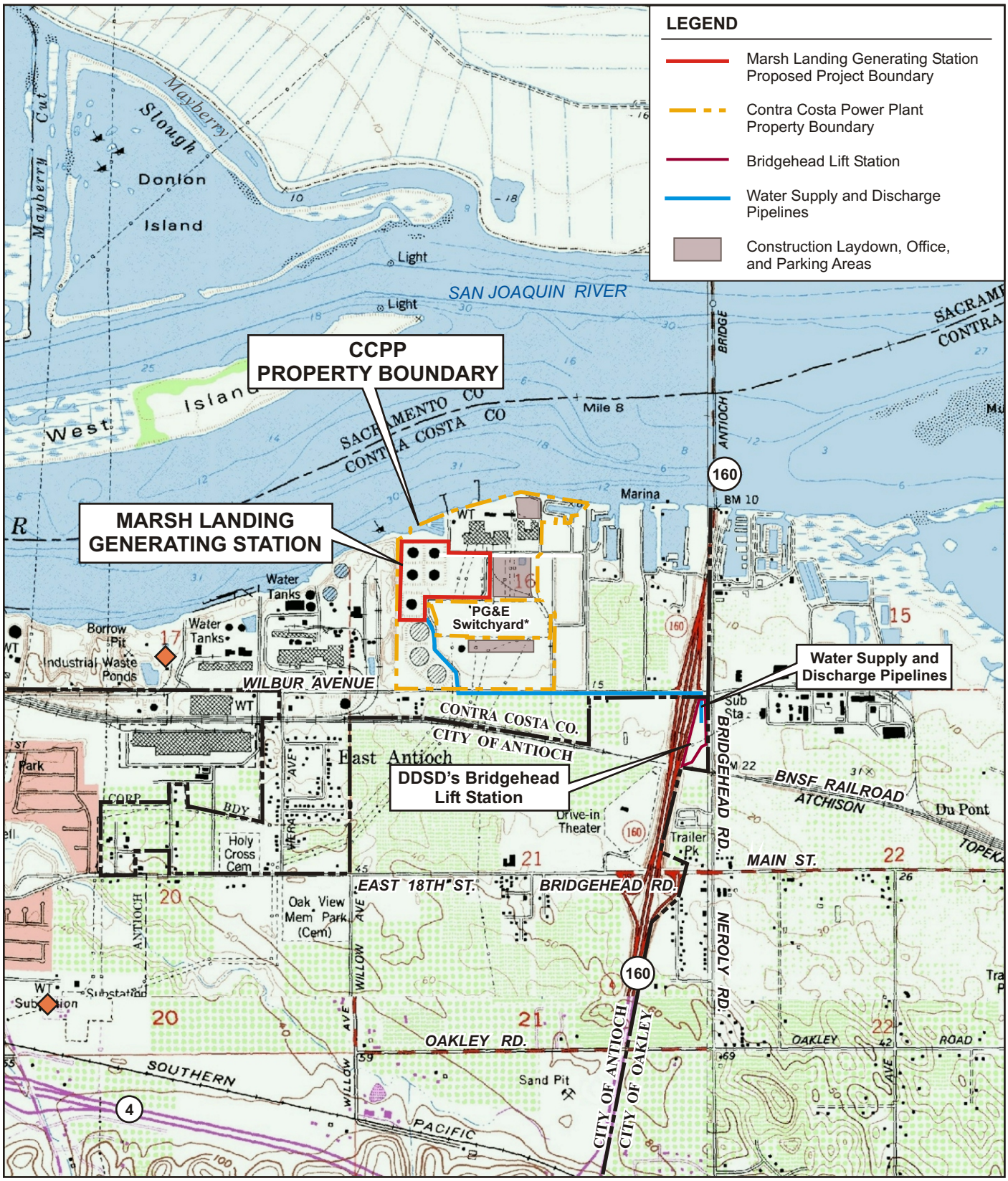
Table 7.16-1
Applicable Paleontological Resources Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Agency	Section
Federal			
Antiquities Act of 1906	Protects paleontological resources on federal lands, therefore not applicable		7.16.5.1
National Environmental Policy Act, 1969	Protects paleontological resources on federal lands, therefore not applicable	EPA	7.16.5.1
State			
California Environmental Quality Act	Regulates industrial/residential development projects. Project direct or indirect impacts on unique paleontological resources or site – resource assessment, monitoring and mitigation required (superseded by CEC process)	CEC	7.16.5.2
Public Resources Code Sections 5097.5/5097.9	Protects paleontological resources on state owned or managed lands		7.16.5.2
Local			
Contra Costa County General Plan	Addresses conservation/ protection of three paleontological sites in its inventory of significant ecological resource areas.	Contra Costa County Planning Department	7.16.5.3
City of Antioch General Plan	Requires grading activities by paleontological monitor and collection, curation and reporting of any resources detected.	City of Antioch Planning Department	7.16.5.3
Professional Standards			
Society of Vertebrate Paleontologists	Paleontological Resources – Nationwide. Recommended set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources.	n/a	7.16.5.4

Table 7.16-2
Involved Agencies and Agency Contacts

Agency	Contact	Address	Telephone
Department of Community Development Contra Costa County	Patrick Roche, Advanced Planner	651 Pine Street, 4th floor North Wing.1 Martinez, CA 94553	(925) 335-1212
Department of Community Development, Planning Division, City of Antioch	Alejandro Diaz, Junior Planner	3rd and H Streets Antioch, CA 94531	(925) 779-6176



Source:
USGS Topographic Maps, 7.5 Minute Series:
Antioch North, California, 1978
Antioch South, California, 1980
Jersey Island, California, 1978
Brentwood, California, 1978

* The PG&E Switchyard and PG&E Gateway Project are not part of the Mirant Property.

0 2000 4000
Scale in Feet
1:24,000

N

PROJECT LOCATION

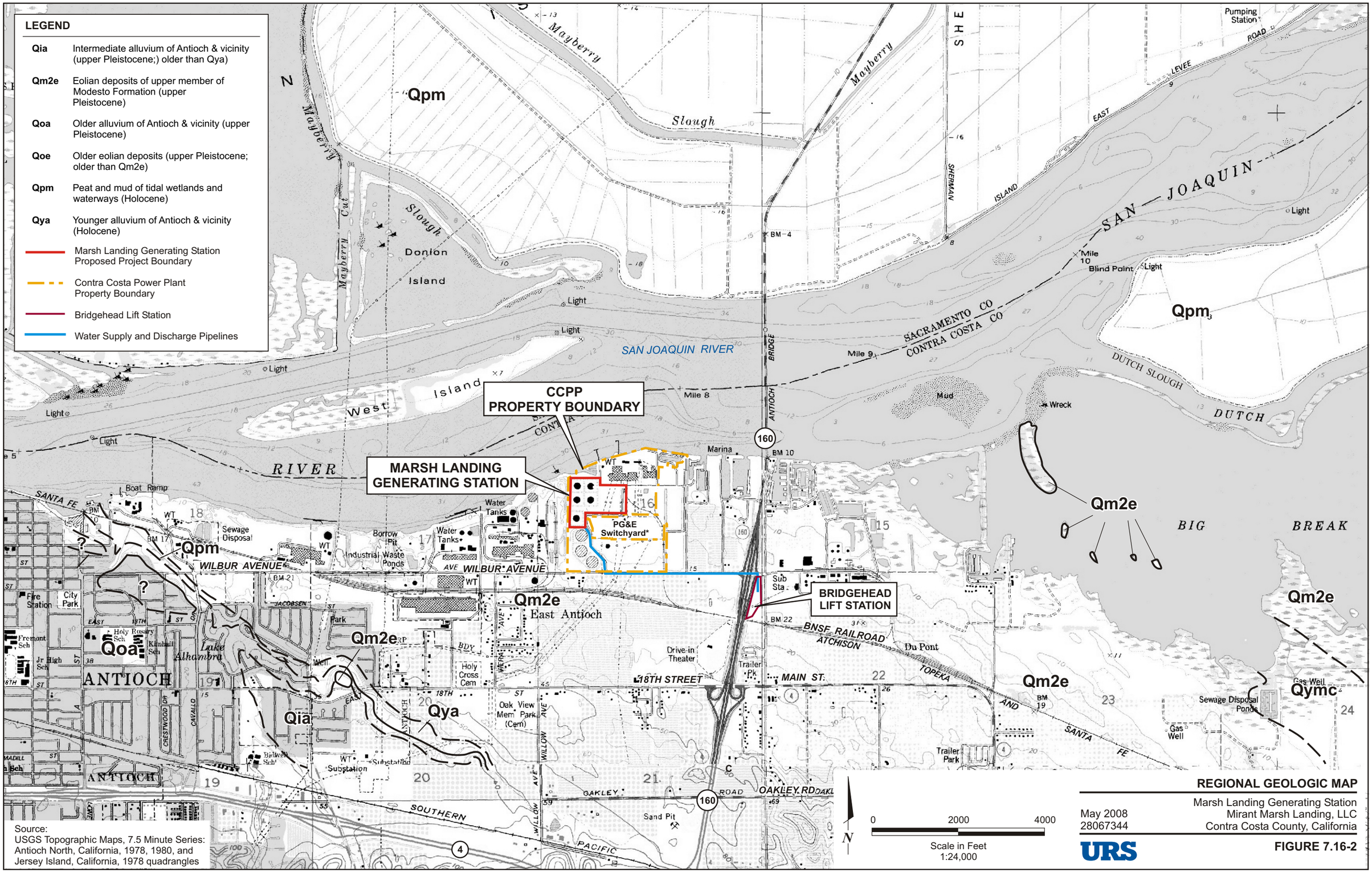
May 2008
28067344

Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

URS

FIGURE 7.16-1

5/22/08 vsa ..T:\Mirant Contra Costa-Marsh Landing\Graphics\7.16 Paleontology\7.16-1_projloc.cdr



REGIONAL GEOLOGIC MAP

Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

May 2008
28067344

URS

FIGURE 7.16-2

5/22/08 vsa ..T:\Mirant Contra Costa-Marsh Landing\Graphics\7.16 Paleontology\7.16-2_geo.cdr