APPENDIX O-6:
E. BRUCE LANDER, PH.D., PALEO ENVIRONMENTAL ASSOCIATES, INC., PALEONTOLOGIC RESOURCE INVENTORY/IMPACT ASSESSMENT TECHNICAL REPORT PREPARED IN SUPPORT OF THE VILLAGE AT PLAYA VISTA, LOS ANGELES, CALIFORNIA, JUNE 2003

PALEONTOLOGIC RESOURCE INVENTORY/ IMPACT ASSESSMENT TECHNICAL REPORT prepared in support of THE VILLAGE AT PLAYA VISTA LOS ANGELES, CALIFORNIA

Submitted to:

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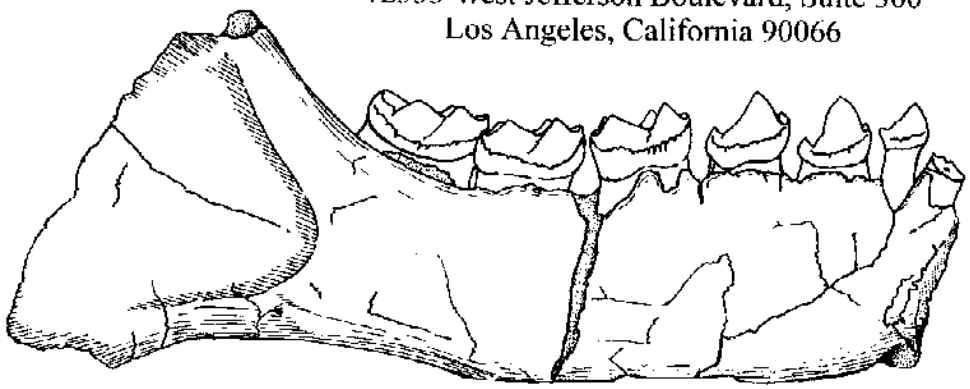

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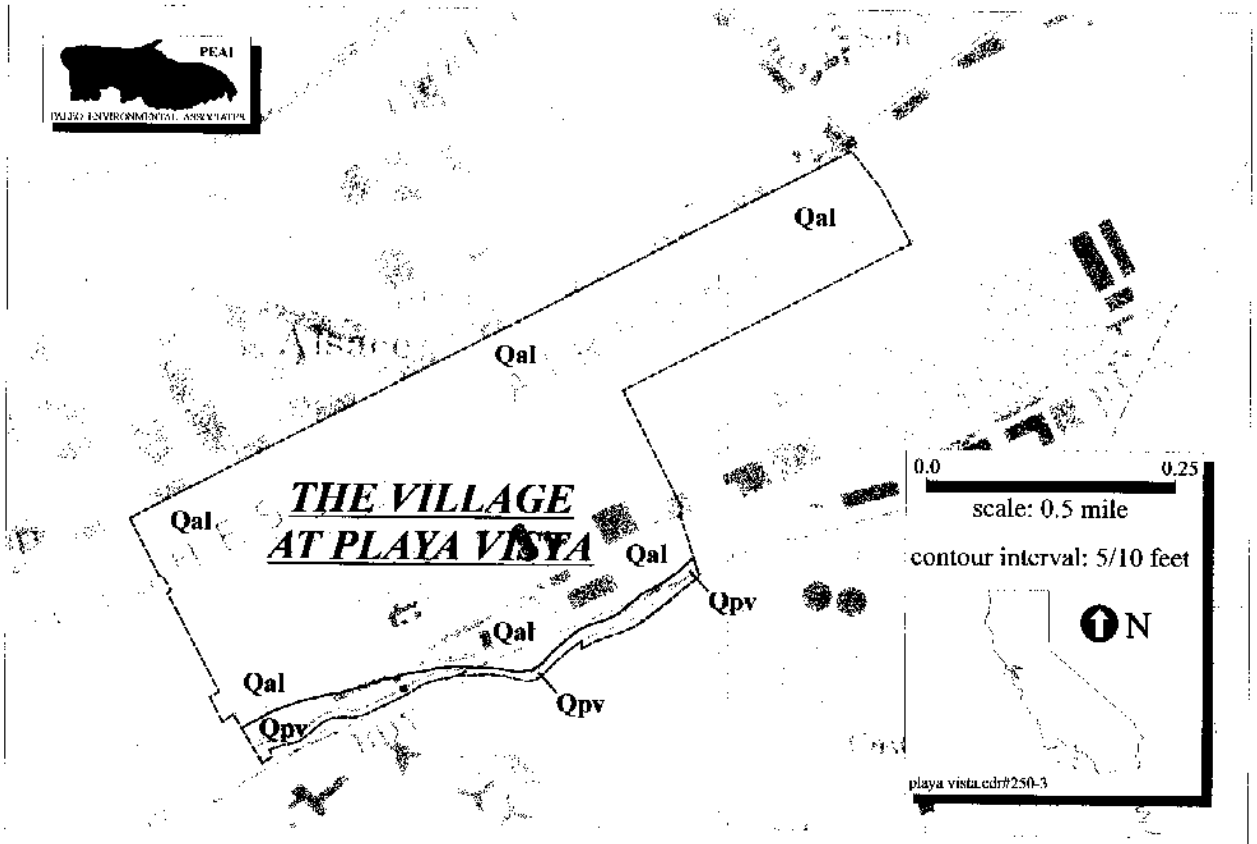

EXPLANATION

Qal	alluvium (Holocene; continental/marine) (high paleontologic sensitivity below water table; undetermined/low paleontologic sensitivity above water table at depth/at or near surface)
Qpv	Palos Verdes Sand (Pleistocene; marine) (high paleontologic sensitivity)
——	geologic contact

Figure 1.—Topographic/surficial geologic/paleontologic sensitivity map, The Village at Playa Vista, Los Angeles, California. Base map: United States Geological Survey Venice Quadrangle, 7.5-Minute Series (Topographic) (1964, photorevised 1981). Surficial geology after Poland and others (1959). Note: artificial fill not mapped.

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SECTION 1

INTRODUCTION

1.1 BACKGROUND

Paleontologic resources include fossil remains, fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. This technical report summarizes the results of the paleontologic resource inventory/impact assessment conducted by Paleo Environmental Associates, Inc. (PEAI), in support of The Village at Playa Vista Project (Proposed Project) environmental impact report (EIR). The City of Los Angeles has required this inventory/impact assessment be conducted because of the potential for fossil sites and remains being encountered by earth-moving activities associated with development of the Proposed Project site.

1.2 PERSONNEL

This technical report was prepared by Dr. E. Bruce Lander (EBL), a paleontologist with PEAI, Altadena, California. Dr. Lander has a Ph.D. degree in paleontology and has conducted research, authored published scientific contributions, and prepared environmental impact review documents on the paleontologic resources of California in support of other major construction projects, including the Playa Vista First Phase Project (Lander, 1990).

SECTION 2

ENVIRONMENTAL SETTING

The Village at Playa Vista Project site lies on the southern side of the Ballona Creek floodplain and at the foot of the adjacent bluff (Ballona Escarpment or Westchester Bluffs), and is bounded to the north by Jefferson Boulevard, to the west by Lincoln Boulevard, and to the south by Hughes Terrace (see Figure 1). The Proposed Project site is located in the unsurveyed portion of Township 2 North, Range 15 West. Topographic map coverage of the Project site is provided at a scale of 1:24,000 by the United States Geological Survey Venice Quadrangle, California, 7.5-Minute Series (Topographic) (1964, photorevised 1981).

Paleontologic resources of the Project site include stratigraphic or sedimentary rock units that immediately underlie the surface and have a potential for yielding particular types of fossil remains because they have yielded similar fossil remains at previously recorded fossil sites in the immediate vicinity of the Project site. Fossils, the remains or indications of once-living organisms, are a very important scientific resource because of their use in 1) documenting the evolution of particular groups of organisms, 2) reconstructing the environments in which they lived, 3) and in determining the ages of the strata in which they occur and of the geologic events that resulted in the deposition of the sediments constituting these strata.

2.1 METHODS

The following tasks were conducted to develop a baseline paleontologic resource inventory of the Proposed Project site by rock unit and to assess the potential paleontologic productivity and the paleontologic/scientific importance of each rock unit. These assessments are based on the fossil remains previously recorded from the rock unit in the immediate vicinity of the Project site. These tasks were completed in compliance with Society of Vertebrate Paleontology (SVP, 1995) guidelines for assessing the scientific importance of the paleontologic resources in an area of potential environmental effect. Some of the tasks were conducted as part of an earlier inventory/assessment (Lander, 1990) that was conducted in support of the environmental review documentation that, in turn, was compiled in support of development of Playa Vista First Phase Project.

2.1.1 Stratigraphic Inventory

Geologic maps and reports covering the surficial geology of the Proposed Project site were reviewed 1) to determine the rock units exposed at the Project site, particularly those rock units known to be fossiliferous, and 2) to delineate their respective areal distributions.

2.1.2 Paleontologic Resource Inventory

Published and unpublished geologic and paleontologic literature was reviewed to document 1) the number and locations of previously recorded fossil sites at and near the Project site from each rock unit exposed at the Project site, and 2) the types of fossil remains the rock unit has produced locally. The Playa Vista First Phase Project literature review was supplemented by an archival search conducted at the Natural History Museum of Los Angeles County Vertebrate Paleontology Department (LACMVP) for additional information regarding the occurrences of fossil sites and remains at and near the First Phase Project site. A second archival search was conducted in support of the Proposed Project literature review to document the occurrence of any new fossil site recorded since completion of the First Phase Project archival search. No paleontologic resource field survey of the Proposed Project site was conducted because the entire Playa Vista parcel was surveyed as part of the Playa Vista First Phase Project inventory/assessment.

2.1.3 Paleontologic Resource Assessment Criteria

The paleontologic importance (high, moderate, low, none, undetermined) of a rock unit exposed at the Proposed Project site is the measure most amenable to assessing the scientific importance of the paleontologic resources of the Project site because the areal distribution of a rock unit can be delineated on a topographic map. The paleontologic importance of a rock unit reflects 1) its potential paleontologic productivity and 2) the scientific importance of the

fossils it has produced locally.

The potential paleontologic productivity (high, moderate, low, none, undetermined) of a rock unit exposed at the Project site is based on the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit at and near the Project site. Exposures of a specific rock unit at the Project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit at and near the Project site. The criteria for establishing the potential paleontologic productivity of a rock unit exposed at the Project site are described below.

1) High potential: rock unit contains comparatively high density of previously recorded fossil sites and has produced numerous fossil remains at and/or near Project site, and is very likely to yield additional similar remains at Project site.

2) Moderate potential: rock unit contains relatively moderate density of previously recorded fossil sites and has produced some fossil remains at and/or near Project site, and is somewhat likely to yield additional similar remains at Project site.

3) Low potential: rock unit contains no or comparatively low density of previously recorded fossil sites and has yielded very few or no fossil remains near Project site, and is not likely to yield any remains at Project site.

4) Undetermined potential: rock unit has limited or no exposure at Project site, is poorly studied, contains no previously recorded fossil site, and has produced no fossil remains near Project site. However, in Project site region, same or correlative and/or lithologically similar rock unit contains sufficient recorded fossil sites to suggest rock unit at Project site has at least a moderate potential for containing unrecorded fossil sites (note: elsewhere in California, exposures of rock units with few or no prior recorded fossil sites recently have proven abundantly fossiliferous during surveying, monitoring, or processing of fossiliferous rock samples as part of mitigation programs conducted in support of other earth-moving projects).

5) No potential: unfossiliferous artificial fill and igneous and high-grade metamorphic rock units with no potential for containing any unrecorded fossil site or yielding any fossil remains.

A fossil specimen is considered scientifically highly important if it is 1) identifiable, 2) complete, 3) well preserved, 4) age diagnostic, 5) useful in environmental reconstruction, 6) a type or topotypic specimen, 7) a member of a rare species, 8) a species that is part of a diverse assemblage, and/or 9) a skeletal element different from, or a specimen more complete than those now available for its respective species. Identifiable fossil land mammal remains, for example, are considered scientifically highly important because of their potential use in providing very accurate age determinations and environmental reconstructions for the rock units in which they occur. The geologic age of some fossil mollusk and land mammal and plant remains can be determined by carbon-14 dating analysis. Moreover, land mammal and plant remains are comparatively rare in the fossil record.

Using the definitions presented above, the paleontologic importance of a rock unit exposed at the Project site would be assessed using the following criteria.

1) High importance: rock unit has comparatively high potential for containing unrecorded fossil sites and for yielding scientifically important fossil remains at Project site similar to those previously recorded from rock unit at and/or near Project site.

2) Moderate importance: rock unit has relatively moderate potential for containing unrecorded fossil sites and for yielding scientifically important fossil remains at Project site similar to those previously recorded from rock unit near Project site.

3) Low importance: rock unit has comparatively low potential for containing any unrecorded fossil site or for yielding any scientifically important fossil remains at Project site.

4) Undetermined importance: rock unit for which too few data are available from Project site and vicinity to allow an accurate assessment of its potential for containing any unrecorded fossil site or for yielding any scientifically important fossil remains at Project site.

5) No importance: unfossiliferous artificial fill and igneous and high-grade metamorphic rock units having no potential for containing any unrecorded fossil site or for yielding any fossil remains.

Note, however, that any fossil site containing identifiable fossil remains and the fossil-bearing layer are considered highly important paleontologically, regardless of the paleontologic importance of the rock unit in which the site and layer occur.

The following tasks were completed to establish the paleontologic importance of each rock unit exposed at the Project site.

1) The scientific importance of fossil remains recorded from a rock unit exposed at the Project site was assessed.

2) The potential paleontologic productivity of the rock unit was assessed, based on the density of fossil remains and/or previously recorded and newly documented fossil sites it contains at and/or near the Project site.

3) The paleontologic importance of the rock unit was assessed, based on its documented and/or potential fossil content at the Project site.

This method of resource assessment is the most appropriate for an areal paleontologic resource investigation of the Project site because discrete levels of paleontologic importance can be delineated on a topographic/geologic map.

2.2 RESULTS

2.2.1 Stratigraphic Inventory

The Proposed Project site lies along western margin of a coastal floodplain (Santa Monica plain), which, in turn lies near the northwestern corner of the western Peninsular Ranges Province, where major linear geographic features (mountains, valleys) and the underlying geologic structures (faults, folds) trend mostly in a northwesterly direction (see Jahns, 1954). The Santa Monica plain is underlain of stratigraphic or sedimentary rock units consisting of late Cenozoic near-shore marine and stratigraphically overlying nonmarine strata reflecting the final filling of the Los Angeles basin and its emergence above sea level.

Regional surficial geologic mapping of the Project site and vicinity is provided by Jennings and Strand (1969) at a scale of 1:250,000. Larger-scale (1:31,680) geologic mapping of the area by Poland and others (1959) indicates that the Project site is underlain by two late Cenozoic rock units, including 1) the late Pleistocene marine Palo Verdes Sand, which forms the lower part of the bluff (Ballona Escarpment or Westchester Bluffs) below Hughes Terrace, which forms the southern margin of the Project site, and 2) Holocene alluvium, which floors the remainder of the Project site north of the bluff. A surficial geologic map of the Project site is presented at a scale of 1:12,000 in Figure 1. Parts of the Project site, particularly the foot of the bluff, also are underlain by artificial fill, which is not mapped in Figure 1.

2.2.2 Paleontologic Resource Inventory and Assessment by Rock Unit

An inventory of the paleontologic resources of the rock units exposed at the Proposed Project site is presented below and the scientific importance of these resources is assessed. Although neither the literature reviews nor the archival searches conducted in support of the inventories compiled for the Playa Vista First Phase Project and the Proposed Project documented any previously recorded fossil site as occurring at the Proposed Project site, a number of previously recorded fossil sites were documented as occurring in areas mapped as being underlain by these rock

units in the immediate vicinity of the Project site. The fossil remains from at least one of these fossil sites were uncovered as a result of earth-moving activities associated with earlier earth-moving projects.

2.2.2.1 Palos Verdes Sand.—Although no previously recorded fossil site is reported as occurring in the Palos Verdes Sand at the Project site, one previously recorded fossil site (LACMVP fossil site 1024 = Natural History Museum of Los Angeles County Invertebrate Paleontology Department fossil site 59) lies on the upper part of the Ballona Escarpment along Lincoln Boulevard immediately south of its intersection with Cabora Drive. Willett (1937) reported shells and other remains representing over 300 species of marine megainvertebrate species, as well as fossilized bones and teeth representing a number of marine vertebrate species (fish, shark, seal, porpoise), 10 species of birds, and one species of land mammal (gopher), as occurring at this site. The site is the type locality for an extinct species of bird and is still highly productive. Poland and others (1959) considered the fossil-bearing interval to be a sandstone layer constituting the lower 6 feet of the Palos Verdes Sand. During the Playa Vista First Phase Project paleontologic resource field survey, a second fossil site (PEAI EBL 1), which yielded the fossilized shell of a marine clam, was discovered less than 10 feet above and south of Cabora Drive, and a third fossil site (PEAI EBL 2), which yielded fossilized marine snail and abundant clam shells and the fossilized remains of echinoids (sand dollars/sea urchins), was found a short distance above and west of LACMVP fossil site 1024 (Lander, 1990). These three previously recorded fossil sites lie only 0.6 mile southwest of the Proposed Project site.

The fossil assemblages from the Palos Verdes Sand are scientifically important because they have allowed an estimate of the age of the rock unit and contain associated marine and nonmarine species that record the final transition from marine to nonmarine conditions in this part of the Los Angeles basin. Fossil remains from the Proposed Project site would be useful in refining the timing of this transition, in reconstructing the successive depositional environments and climates that existed during this transition, and in further documenting the animal life that existed in the area just before the end of the Pleistocene. Moreover, there would be a potential for recovering remains representing species previously unrecorded or only rarely recorded from the Palos Verdes Sand in the area.

The occurrence of three previously recorded fossil sites along the Ballona Escarpment only 0.6 mile from the Project site and the probable extension of the fossil-bearing interval into the Project site along the lower part of the escarpment suggests that the Palos Verdes Sand has a high potential for containing fossil remains at the Project site.

2.2.2.2 Alluvium.—Alluvium underlies the entire Proposed Project site north of the Ballona Escarpment. In other areas of the Los Angeles Basin, the alluvium has yielded the fossilized bones and teeth of Holocene continental vertebrates, the fossilized shells of fresh-water snails and clams and land snails, and the fossilized wood of land plants at a number of fossil sites uncovered by excavation (Lander, 2000). Converse Consultants, Inc. (1981), Lander (1990), and LeRoy Crandall and Associates (1987, 1988) reported the occurrence of fossil marine mollusk shells in 28 borings from the Playa Vista First Phase Project site. These fossil remains, all encountered below the water table, are recorded from depths of 31 to only 2 feet below previous grade, and fossilized wood was encountered at a depth of nearly 70 feet in one of the borings (LeRoy Crandall and Associates, 1988; see Lander, 1990).

The fossil assemblages from the alluvium are scientifically important because they have allowed an estimate of the age of the rock unit and contain associated marine and nonmarine species that record the final transition from marine to nonmarine conditions in this part of the Los Angeles basin. Fossil remains from the Proposed Project site would be useful in refining the timing of this transition, in reconstructing the successive depositional environments and climates that existed during this transition, and in further documenting the animal life that existed in the area during the Holocene. Moreover, there would be a potential for recovering remains representing species previously unrecorded or only rarely recorded from the alluvium in the area.

The occurrence of numerous previously recorded fossil sites north the Ballona Escarpment at the Playa Vista First Phase Project site suggests that the alluvium has a high potential for containing fossil remains below the water table at the Proposed Project site. However, the potential for the alluvium containing fossils remains above the water table is undetermined at depth, but only low at and very near the surface, where any remains probably would be too young to be considered fossilized.

2.2.2.3 Artificial Fill.—Much of the lower part of the Ballona Escarpment and most of the area north of the escarpment are covered by unfossiliferous artificial fill.

SECTION 3

ENVIRONMENTAL IMPACTS

3.1 DEVELOPMENT IMPACTS

Paleontologic resources, including 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, could be adversely affected by (i.e., would be sensitive to) the significant direct and indirect environmental impacts resulting from earth-moving activities associated with development of The Village at Playa Vista Project site.

Direct impacts would result mostly from earth-moving activities in previously undisturbed strata, but also would result from any earth-moving or other construction activity that covered previously undisturbed strata with artificial fill or buildings, making the strata and their paleontologic resources unavailable for future scientific investigation. Although earth-moving and other construction activities would be comparatively short term, the possible accompanying loss of some fossil remains, unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata is a potentially significant long-term adverse environmental impact.

Easier access to fresh exposures of fossiliferous strata and the accompanying potential for unauthorized fossil collecting by construction personnel, rock hounds, and amateur and commercial fossil collectors could result in the loss of some additional fossil remains, unrecorded fossil sites, and associated specimen data and corresponding geologic and geographic site data. The loss of these additional paleontologic resources is another potentially significant long-term environmental impact.

3.1.1 Significance Criteria

The following tasks were conducted in compliance with SVP (1995) guidelines for assessing the significance of construction-related adverse environmental impacts on paleontologic resources, or the paleontologic sensitivity of a particular rock unit to adverse impacts.

The paleontologic significance (high, moderate, low, none, undetermined) of the potential adverse impacts of earth-moving activities on the paleontologic resources of each rock unit at the Proposed Project site was assessed and reflects the paleontologic importance/impact sensitivity of the rock unit, which, in turn, primarily reflects the potential for fossil remains and fossil sites being encountered by these activities. Note, however, that any impact on a fossil site and the fossil-bearing layer would be considered highly significant paleontologically, regardless of the paleontologic importance of the rock unit in which the site and layer occur. For example, excavation in an area underlain by a moderately important rock unit would have only a moderate potential for the disturbance or burial of fossil remains and sites (i.e., the rock unit would be moderately sensitive to adverse impacts). Although the accompanying loss of any fossil remains and site would be a highly significant impact paleontologically, the impact of excavation would be considered only moderately significant because of the moderate potential for the loss of paleontologic resources. This method of impact assessment is most appropriate to an areal paleontologic resource investigation of the Project site because discrete levels of paleontologic impact sensitivity/significance can be delineated on a topographic/geologic map of the Project site.

A paleontologic resource impact sensitivity assessment of the Project site is presented below and on the geologic map of the Project site presented as Figure 1.

3.1.2 Impact Assessment

3.1.2.1 Palos Verdes Sand.—The Palos Verdes Sand has yielded fossil remains at three previously recorded fossil sites only 0.6 mile from the Project site. For this reason, adverse environmental impacts on the paleontologic resources of the Palos Verdes Sand resulting from earth-moving activities at the Project site would be considered to be of high paleontologic significance because there is a high potential for the loss of scientifically important fossil remains, unrecorded fossil sites, and associated specimen data and corresponding geologic and geographic site data

as a result of these activities. The activities would occur in those areas of the Ballona Escarpment where slope remediation would be required to stabilize the bluff and where the Palos Verdes Sand would be encountered below any artificial fill.

3.1.2.2 **Alluvium**.—The alluvium has yielded fossil remains at a number of previously recorded fossil sites below the water table at the Playa Vista First Phase Project site. For this reason, adverse environmental impacts on the paleontologic resources of the alluvium resulting from earth-moving activities below the water table at the Proposed Project site would be considered to be of high paleontologic significance because there is a high potential for the loss of scientifically important fossil remains, unrecorded fossil sites, and associated specimen data and corresponding geologic and geographic site data as a result of these activities, particularly excavation for subterranean parking structures. Although some areas underlain by alluvium would be covered by new construction, other areas would remain undeveloped or as open space and available for future study.

However, any adverse environmental impact on paleontologic resources resulting from earth-moving activities in the younger alluvium above the water table probably would be of undetermined significance at depth, but only of low significance at and near the surface, where the younger alluvium probably is too young to contain remains old enough to be considered fossilized.

3.1.2.3 **Artificial Fill**.—There would be no impact on paleontologic resources associated with earth-moving activities in the artificial fill, which is unfossiliferous.

3.3 CUMULATIVE IMPACTS

The Proposed Project, in combination with other projects in the region where a project site is underlain by the Palos Verdes Sand or alluvium, might lead to cumulative impacts on paleontologic resources. These impacts would include the loss of paleontologic resources as a result of earth-moving activities and unauthorized fossil collecting, as well as the loss of access to these resources where they are covered by the construction of new buildings. However, there would be no loss of access to the Palos Verdes Sand at the foot of the Ballona Escarpment and, therefore, there would be no cumulative impact on the paleontologic resources of the Palos Verdes Sand associated with development of the Proposed Project site. Moreover, some areas at the Proposed Project site and at the Playa Vista First Phase Project site north of the Ballona Escarpment would remain undeveloped and access to some areas underlain by alluvium would be maintained for possible future scientific investigation. Continued access to these areas would substantially reduce the cumulative impact of the Proposed Project on paleontologic resources. In addition, mitigation measures presented below would reduce cumulative impacts of the Proposed Project on paleontologic resources to an insignificant level by allowing for the recovery of some fossil remains that would not have been exposed without the Proposed Project, particularly in areas north of the Ballona Escarpment that are underlain by alluvium.

SECTION 4

MITIGATION MEASURES

4.1 MITIGATION PROGRAM

The following measures comprise a paleontologic resource impact mitigation program that would reduce, to an insignificant level, the direct, indirect, and cumulative adverse environmental impacts on paleontologic resources that might accompany earth-moving activities (particularly excavation for subterranean parking structures and stabilization of bluff) associated with development of The Village at Playa Vista Project site. The program would allow for the recovery of some scientifically highly important fossil remains, should any be encountered by these activities, as well as associated specimen data and corresponding geologic and geographic site data; their preservation in a recognized museum repository; and their availability for future study by qualified scientific investigators. These specimens and data otherwise might have been lost to these earth-moving activities and to unauthorized fossil collecting. Fossil recovery would be allowed under CEQA Appendix G (5.c).

4.1.1 Mitigation Program Design Criteria

The recommended level and type of mitigation effort in a particular area of the Proposed Project site reflects the paleontologic importance/impact sensitivity of the rock unit underlying the area and the corresponding potential for fossil remains being encountered by earth moving activities at the Project site, the type of rock comprising the rock unit, and the types and magnitudes of the significant impacts that would occur in the area. For example, excavation in an area underlain by a highly important rock unit or in one containing a fossil site would require more intensive paleontologic construction monitoring than excavation in an area underlain by a rock unit of moderate, low, or undetermined importance. Monitoring would not be required in an area underlain by artificial fill or a rock unit of no importance (unless a rock unit of higher importance would be encountered at depth), or one in which a rock unit of high, moderate, low, or undetermined importance would be buried, but not otherwise disturbed. No rock sample would be processed if the rock were too coarse grained or resistant to breaking down in water.

The discovery and subsequent recovery of fossil remains as part of the mitigation program could result in a slight delay of some earth-moving activities. However, the mitigation measures presented below have been designed to eliminate or reduce any delay to the greatest extent possible by ensuring that a paleontologic construction monitor would be present when and where fossil remains were most likely to be uncovered by earth-moving activities, thereby allowing for the rapid recovery of fossil remains, should any be encountered by these activities, and associated specimen and site data. Similar paleontologic resource impact mitigation programs usually have resulted in no delay of earth-moving activities.

4.1.2 Beneficial Environmental Effects of Mitigation Program

If the paleontologic resource impact mitigation program recommended below were implemented, earth-moving activities at the Project site could produce some beneficial effects. The fresh exposure of fossil-bearing strata could allow for the discovery of an undetermined number of unrecorded fossil sites and the recovery of some scientifically highly important fossil remains that otherwise might not even have been exposed without these activities. Moreover, these remains and associated specimen data and corresponding geologic and geographic site data, instead of being lost to earth-moving activities or to unauthorized fossil collecting, would be preserved in a museum repository, where they would be available for future study by qualified scientific investigators. There also is the potential that some of these remains might represent new or rare species; new geologic or geographic records; and/or skeletal elements different from, or specimens more complete than those now available for their respective species. Finally, these remains would provide a more comprehensive paleontologic resource inventory of the Project site and vicinity than is now available or would have been available without the Project.

4.1.3 Compliance with City of Los Angeles and Professional Society Guidelines

The mitigation measures recommended below would be in compliance with any City of Los Angeles environmental guideline and with SVP (1995, 1996) standard guidelines for mitigating adverse construction-related impacts on

paleontologic resources. The paleontologist would ensure implementation of these measures and verify the effectiveness of the measures. The results of the program would be reported in a final report of results and findings submitted to the City of Los Angeles.

4.1.4 Proposed Mitigation Measures

The literature review, archival search, and a review of the geologic maps covering the Proposed Project site indicated that the Project site is underlain partly by paleontologically highly sensitive rock units in which Project-related earth-moving activities would have an high potential for encountering fossil remains (see Figure 1). Mitigation measures that would be implemented at the Project site are based on the sensitivities of the underlying rock units.

Prior to issuance of grading/excavation permits, a qualified paleontologist will be retained to develop an acceptable monitoring and treatment plan and to monitor construction activities at the Project site that might adversely impact paleontologic resources in the Proposed Project area. The qualifications of the paleontologist and his designee will be evaluated, and the development of the monitoring and treatment plan will be made in consultation with the Vertebrate Paleontology Department of the Natural History Museum of Los Angeles County to ensure Project compliance with Society of Vertebrate Paleontology standard guidelines, as appropriate.

A paleontologic monitoring and treatment plan will include the following measures.

The paleontologist or his designee will monitor ground disturbing activities at the Project site on a full time basis along the lower part of the bluff where the Palos Verdes Sand will be disturbed. Monitoring will consist of visually inspecting fresh exposures of rock for fossil remains large enough to be seen and, where appropriate, collecting and processing rock samples or excavated spoils to allow for the recovery of smaller fossil remains that are too small to be seen in the field.

If auguring or excavation is implemented in the alluvium of the Project site north of the bluff and extends to a depth below the water table, the paleontologist or his designee will monitor these activities on a full-time basis. Excavation or auguring in the alluvium at a depth above the water table will be monitored on a half-time basis. Monitoring will not be implemented until these activities have penetrated 5 feet of previously undisturbed strata under any artificial fill.

With City of Los Angeles approval, if no fossil remains are found once 50 percent of earth-moving activities have been completed in an area underlain by a particular rock unit, monitoring can be reduced or suspended in that area.

If fossil remains large enough to be seen are uncovered by earth-moving activities, the paleontologist or his designee will divert these activities temporarily around the fossil site until the remains have been recovered, a rock sample has then been collected to process to allow for the recovery of smaller fossil remains, if warranted, and construction has been allowed to proceed through the site by the paleontologist or his designee.

The paleontologist or his designee will collect all identifiable vertebrate fossil remains and samples of megainvertebrate fossil remains. All fossil sites will be plotted on a topographic map of the Project site.

If the paleontologist or his designee is not present when fossil remains are uncovered by earth-moving activities, these activities will be stopped and the paleontologist or his designee will be called to the site immediately to recover the remains.

At the paleontologist's or his designee's discretion and to reduce any construction delay, a construction worker will assist in removing fossiliferous rock samples to an adjacent location for temporary stockpiling pending eventual transport to a laboratory facility for processing.

The paleontologist or his designee will conduct the processing (wet and/or dry screening and heavy-liquid flotation) of the rock samples to allow for the recovery of smaller fossil remains . Additional rock samples will be collected from a fossil site considered sufficiently productive to warrant processing. However, no more than 6,000 pounds (12,000 pounds total) of rock from either the Palos Verdes Sand or the alluvium will be processed.

All fossil remains recovered in the field as a result of monitoring or by processing rock samples will be prepared, identified, catalogued, curated, and accessioned into the fossil collections of the Natural History Museum of Los Angeles County or another museum repository complying with the Society of Vertebrate Paleontology standard guidelines. Accompanying specimen and site data, notes, maps, and photographs also shall be archived at the repository.

Within 6 months following completion of the above tasks and prior to the issuance of a Certificate of Occupancy, the paleontologist or his designee will prepare a final report summarizing the results of the mitigation program and presenting an inventory and describing the scientific significance of any fossil remains accessioned into the museum repository. Moreover, any site or geologic data indicating the possible presence and locations of additional fossil sites underlying the Project site will be discussed in the report so that future access to these sites will be maintained in the event of any future demolition, alteration, or removal of buildings built in connection with the Project. The report will be submitted to the City of Los Angeles Planning Department and the museum repository. The report will comply with the Society of Vertebrate Paleontology standard guidelines for assessing and mitigating impacts on paleontologic resources.

4.2 ENVIRONMENTAL COMPLIANCE

The Proposed Project will comply with any applicable environmental law, ordinance, regulation, or standard regarding paleontologic resources during earth-moving activities at the Project site.

Paleontologic resources, including fossil remains, associated specimen data and corresponding geologic and geographic site data, fossil sites, and the fossil-bearing strata, are a limited, nonrenewable, and very sensitive scientific and educational resource and, particularly with regard to fossil sites, are afforded protection under the following state environmental legislation (see California Office of Historic Preservation, 1983).

California Environmental Quality Act of 1970 (CEQA) (Division 13, California Public Resources Code: 21000 *et seq.*).—Requires that a public agency or private interest identify the environmental consequences of its proposed project on any object or site of significance to the scientific annals of California (Division I, Public Resources Code: 5020.1 [b]).

Guidelines for the Implementation of CEQA, as amended May 10, 1980, and March 29, 1999 (Title 14, Chapter 3, California Administrative Code: 15000 *et seq.*).—Define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include definitions of significant impacts on a fossil locality (Section 15023, Appendix G [5.c]).

California Public Resources Code, Section 5097.5 (Statute 1965, Chapter 1136, Paragraph 2792). -Defines any unauthorized disturbance or removal of a fossil locality or remains on public land as a misdemeanor.

California Public Resources Code, Section 30244.—Requires reasonable mitigation of adverse environmental impacts that result from development of public land and affect paleontologic resources.

In response to CEQA and subsequent acts, many regulatory agencies in California, including the City of Los Angeles, also have developed environmental guidelines for protecting paleontologic resources in areas under their respective jurisdictions. Under its guidelines, a CEQA lead agency can require a paleontologic resource inventory/impact assessment of an area to be adversely impacted by a discretionary project deemed nonexempt under its guidelines. As part of such an assessment, the agency can require an inventory and the mapping of fossil-bearing

rock units and previously recorded and newly documented fossil sites by a qualified paleontologist in the area to be affected, an evaluation of the scientific importance of these resources, a determination of the adverse environmental impacts that might arise from the project and an appraisal of their significance, and the formulation of measures to mitigate these impacts to an insignificant level. The City of Los Angeles has required that such an assessment be conducted in support of The Village at Playa Vista Project EIR because of the potential for earth-moving activities associated with development of the Proposed Project site resulting in the loss of fossil sites and remains. This paleontologic resource assessment technical report, particularly with regard to the mitigation measures presented above, is in compliance with SVP (1995, 1996) standard measures for assessing the scientific importance of paleontologic resources in an area of potential environmental effect, mitigating significant adverse construction-related environmental impacts on these resources, and with conditions for the acceptance of an paleontologic resource impact mitigation program fossil collection by a museum repository.

SECTION 5

ACRONYMS

CEQA	California Environmental Quality Act
EBL	E. Bruce Lander, PEAI
EIR	environmental impact report
LACMVP	Natural History Museum of Los Angeles County Vertebrate Paleontology Department
PEAI	Paleo Environmental Associates, Inc.
SVP	Society of Vertebrate Paleontology

SECTION 6

LITERATURE CITED

California Office of Historic Preservation. 1983. Summary of state laws protecting cultural resources.

Converse Consultants, Inc. 1981. Comprehensive geotechnical report, Playa Vista parcel, Marina del Rey area. Prepared for Summa Corporation.

Jahns, R.H. 1954. Investigations and problems of southern California geology. *In* Jahns, R.H., editor. Geology of southern California. California Division of Mines Bulletin 170(1:1):5-29.

Jennings, C.W., and Strand, R.G., compilers. 1969. Geologic map of California, Olaf P. Jenkins Edition—Los Angeles Sheet. California Division of Mines and Geology.

Lander, E.B. 1990. Paleontologic resource assessment, revised Playa Vista Plan, Los Angeles, California. Paleo Environmental Associates, Inc., project no. EBL 90-5. Prepared for Planning Consultants Research.

LeRoy Crandall and Associates (LC&A). 1987. Report of preliminary geotechnical investigation, proposed Playa Vista Project, Tentative Tract No. 44880, Lots 2, 4, 5, and 7, and proposed Falmouth Avenue extension south of Ballona Creek and west of Lincoln Boulevard, Los Angeles, California. LC&A job no. AE-87133. Prepared for Howard Hughes Properties.

LeRoy Crandall and Associates. 1988. Geotechnical studies, Tentative Tract No. 44857, Jefferson Boulevard between Lincoln and Centinella Avenues, Los Angeles, California, for Howard Hughes Properties.

Poland, J.F., Garrett, A.A., and Sinnott, A. 1959. Geology, hydrology, and chemical character of ground waters in the Torrance-Santa Monica area, California. United States Geological Survey Water-Supply Paper 1461:1-425.

Society of Vertebrate Paleontology. 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: Standard guidelines. Society of Vertebrate Paleontology News Bulletin 163:22-27.

Society of Vertebrate Paleontology. 1996. Conditions of receivership for paleontologic salvage collections [final draft]. Society of Vertebrate Paleontology News Bulletin 166:31-32.

Willett, G. 1937. An upper Pleistocene fauna from the Baldwin Hills, Los Angeles County, California. Transactions of the San Diego Society of Natural History 8(30):379-406.