Appendix
LAX Master Plan EIS/EIR

J1. Biological Assessment Technical Report

January 2001

Prepared for:

Los Angeles World Airports
Federal Aviation Administration
U.S. Department of Transportation

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1.0 INTRODUCTION

The U.S. Department of Transportation -- Federal Aviation Administration (FAA) and the City of Los Angeles are preparing a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) regarding proposed further development of Los Angeles International Airport (LAX). As required by the National Environmental Policy Act of 1969 (NEPA), the FAA will evaluate the various Master Plan development alternatives that meet the purpose and need for the proposed improvements and the No Action/No Project Alternative in the EIS/EIR. The Master Plan evaluates numerous project components including, but not limited to: one or two additional 6,000-foot-long runways; relocation/extension of existing runways; improved taxiway system; new passenger terminal facilities west of Tom Bradley International Terminal connected by an automatic people-mover system; expanded air cargo facilities; improvements to the ground access system, including connections to the regional highway and transit networks; the relocation of ancillary uses and other support facilities; and related land acquisition.

The joint EIS/EIR is being prepared to satisfy the requirements of NEPA and the California Environmental Quality Act (CEQA) in accordance with procedures described in 40 CFR Parts 1500-1508,[1] FAA Order 5050.4A[2], *Airport Environmental Handbook* and in California Environmental Quality Act statutes.[3] LAX is a commercial service airport located within a standard metropolitan statistical area, and the proposed development includes construction of new runway(s) capable of accommodating air carrier aircraft requiring FAA approval of the Airport Layout Plan.

1.1 Purpose and Need of the Biological Assessment

The FAA has prepared this Biological Assessment in partial fulfillment of its responsibilities under Section 7(a)(2) of the Federal Endangered Species Act (16 USC 1536[c]); the intent of this document is to be used by the FAA to complete consultation with the U.S. Department of the Interior Fish and Wildlife Service. The subject of the consultation will be the proposed project's effect on any federally-listed or candidate threatened or endangered species or designated critical habitat.

1.2 Location

Los Angeles International Airport (LAX) is located in the southwestern portion of the County of Los Angeles, adjacent to the Santa Monica Bay and 14 miles southwest of downtown Los Angeles (**Figure 1**, Regional Location Map). Reference point coordinates for the airport are 33 degrees 56 minutes north latitude by 118 degrees 24 minutes west longitude. The LAX airfield is located entirely in the City of Los Angeles, Los Angeles County, California, as depicted on U.S.G.S. Venice Quadrangle, within the boundaries of Township 2 South and Township 3 South and Range 14 West and Range 15 West of the San Bernardino Principal Meridian. The airfield lies within the Sausal Redondo Land Grant Boundary (**Figure 2**, Project Location), and is bordered to the north by Westchester Parkway, to the east by Aviation Boulevard, to the south by Interstate 105, and to the west by Dockweiler State Beach. LAX encompasses approximately 3,350 acres with an average elevation of 125.5 feet above mean sea level (msl), and constitutes a large industrial district presently made up of the following facilities and uses:

- Four east/west runways
- 3.9 million square feet of domestic and international terminal space, including 145 narrow body equivalent gates and nine passenger terminals
- 200 acres of cargo area, including 1.9 million square feet of building space
- 384 acres of ancillary space, including 30 acres of LAWA administrative and support facilities
- 21,930 automobile parking spaces
- 900 acres of open space, including 302 acres of Los Angeles/El Segundo Dunes

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1 Title 40, Code of Federal Regulations (CFR), Part 1500-1508.

2 United States Department of Transportation, Federal Aviation Administration, *Airport Environmental Handbook*, October 8, 1985.

3 Public Resources Code, Division 13, Sections 21000-21177.

The composite acreage of all alternative plans and the No Action/No Project Alternative is 4,260 acres.

1.3 Scope of Biological Assessment

The scope of the Biological Assessment is to evaluate the potential impacts of various Master Plan development projects at Los Angeles International Airport on federally-listed threatened and endangered species that are or may be present in the vicinity of the Airport and designated critical habitat for those species. Impacts on other federally- or state-designated sensitive species are evaluated in the *Biotic Communities* section of the *Los Angeles International Airport 2015 Master Plan* (Master Plan) EIS/EIR to determine if implementation of the Master Plan project would catalyze the need for federal listing of a species.

1.4 Species Considered

The FAA published a Notice of Intent to prepare an EIS in the Federal Register (Volume 62, Number 112, Page 31860-31861) on June 11, 1997; the Notice of Intent served as the FAA's Request for Information to the U.S. Fish and Wildlife Service (USFWS), pursuant to Section 7 of the Federal Endangered Species Act. The USFWS responded with two letters, dated July 31 and August 29, 1997, identifying a total of nine federally-listed endangered species to be addressed in the EIS/EIR (**Table 1**, Federally- and State-Listed Plant and Wildlife Species Potentially Occurring within the LAX Master Plan Study Area). The USFWS's letters recommended the consideration of two listed plant species, two listed aquatic invertebrate species, one listed butterfly, three bird species, and one listed mammal species. Following receipt of the USFWS' letter, a review of the California Natural Diversity Database resulted in the identification of six additional federally-listed threatened or endangered plant species and one state-listed threatened plant species that warranted consideration in this Biological Assessment. Finally, the site falls within the range of two additional listed bird species; therefore, they were also evaluated.

Proposed survey protocols and schedules were submitted to the USFWS and the California Department of Fish and Game (CDFG) at least ten days in advance of all directed surveys for listed species. Additional aspects of the project and impact analysis were discussed with the USFWS on July 9, July 15, and August 27, 1997, and on July 16 and July 21, 1998. Directed surveys for endangered and threatened species of flora and fauna were conducted in the spring, and will continue through the summer and fall of 2000. Upon completion, results of directed surveys for endangered and threatened species of flora and fauna will be provided to the FAA and to the City.

1.5 Findings and Conclusions

As a result of the literature review, directed surveys, and coordination with the USFWS and the CDFG, it has been determined that the proposed project may affect one federally- and state-listed endangered invertebrate species, Riverside fairy shrimp (*Stretocephalus woottoni*), and one federally-listed endangered insect species, El Segundo blue butterfly (*Euphilotes battoides allyni*). Under Alternatives B and C, construction avoidance measures have been developed to avoid impacts to the El Segundo blue butterfly and its habitat. It is not feasible to avoid impacts on the embedded cysts of the Riverside fairy shrimp. Conservation measures have been recommended to ensure the Master Plan will not likely jeopardize the continued existence of Riverside fairy shrimp or cause adverse modification of designated critical habitat. Impact to the El Segundo blue butterfly under Alternative A will be minimal. Under Alternative A, conservation measures have been developed to reduce impacts and insure no net loss of occupied habitat; under Alternative C, the City of Los Angeles' preferred alternative, no construction-related activities will occur within the El Segundo blue butterfly Habitat Restoration Area (Habitat Restoration Area), and construction avoidance measures have been developed to reduce or eliminate any indirect impacts.

As a result of the literature review, directed surveys, and coordination with the USFWS, it has been determined that the proposed project may affect four sensitive species potentially occurring within the Master Plan study area: western spadefoot toad (*Scaphopus hammondi*), loggerhead shrike (*Lanius ludovicianus*), Lewis' evening primrose (*Camissonia lewisii*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Impacts on these sensitive plant and wildlife species and recommended Mitigation Measures are addressed in Section 4.10, *Biotic Communities* of the EIS/EIR. Impacts on sensitive species are not expected to catalyze the need for federal listing of a species.

Los Angeles International Airport Master Plan Biological Assessment	Regional Location Map	Figure 1

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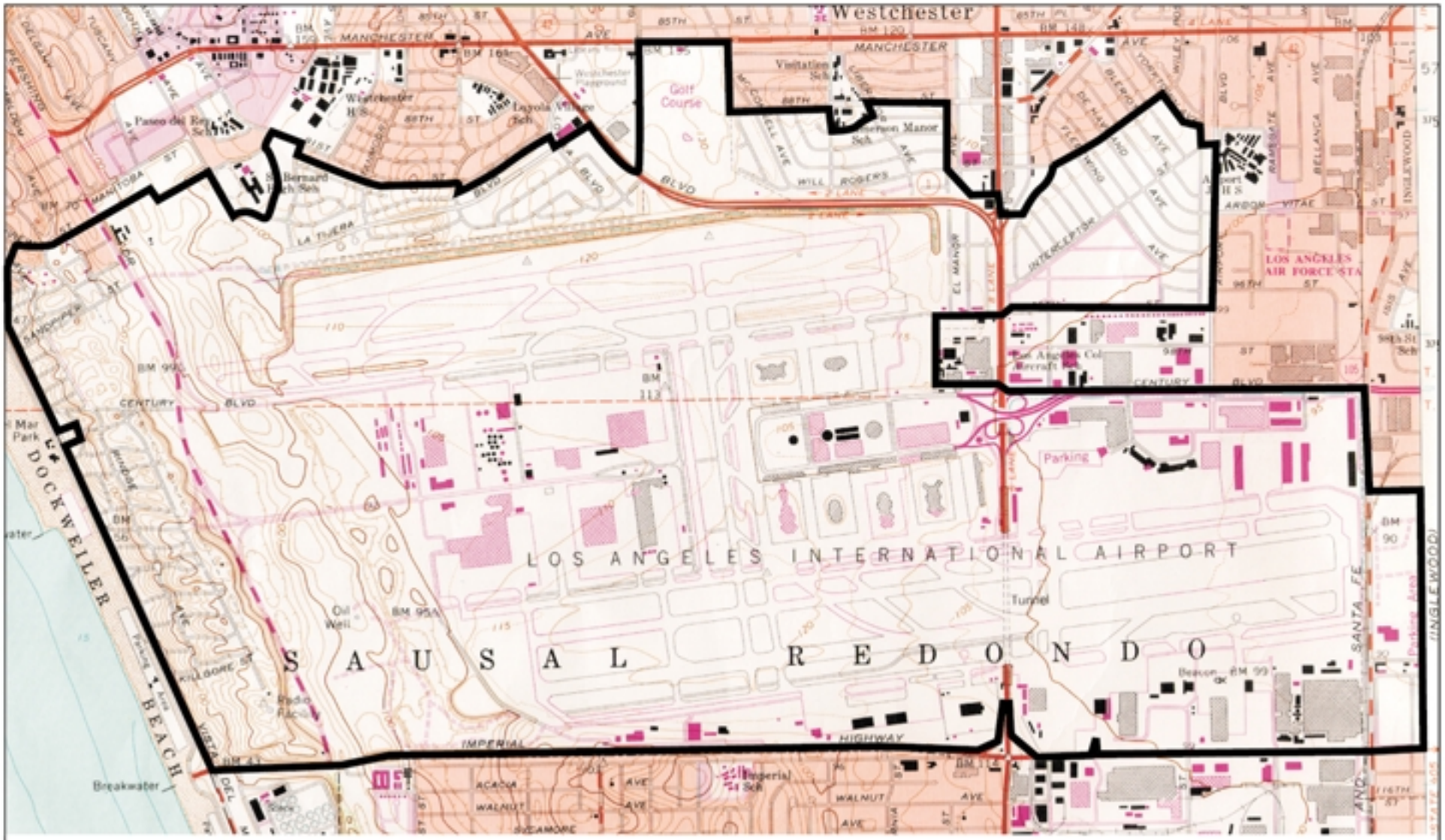

Los Angeles International Airport Master Plan Biological Assessment	**Project Location**	Figure **2**

Table 1

Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

	Status			
	Federal	**State**	**Local**	**Habitat Requirements and Distribution**
Flora				
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	FE	SE	Determined absent as a result of directed surveys undertaken within all ephemerally wetted areas of the AOA in late spring/early summer 1998 and 2000.	Vernal pools, marshes and chaparral from 1-150 meters above mean sea level.[1, 2] Once occurred from Riverside County, California south to northern Baja California, Mexico.[3] Historic topographic maps indicate that potentially suitable habitat was present between the backdune of what is now the Los Angeles/El Segundo Dunes and the approximate location of the Theme Restaurant. Potentially suitable habitat has been developed or substantially altered as a result of the construction and realignment of Pershing Drive and development of operations and maintenance activities of LAX. Extant locations include vernal pools found at the Santa Rosa Plateau in Riverside County, Otay Mesa, Kearny Mesa, Del Mar Mesa, Miramar Naval Station, and Camp Pendleton in San Diego County;[3] and south to the mesas of Ensenada, Mesa de Colonet, and San Quintin, Baja California, Mexico.[4]
Beach spectacle-pod (*Dithyrea maritima*)	C	ST	Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes for 1995, 1996, 1997, 1998, 1999 and directed surveys in 1998 and 2000.	Coastal strand,[1] coastal dunes and scrub, and sandy soils below 50 meters above mean sea level.[2] Historically, this species ranged from the central coast of California south into Baja California. Known in California from less than twenty occurrences; extirpated from half of its historical range.[5] Historically known from the Los Angeles/El Segundo Dunes. Historic topographic maps and aerial photographs indicate that potentially suitable habitat for this species within the Los Angeles/El Segundo Dunes was largely converted due to residential development between 1940 and 1974. This species has not been successfully reintroduced as a result of revegetation efforts undertaken between 1990 and 1994. Nearest known location is in the vicinity of the Ballona Marshes near Marina del Rey.[6]
Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*)	FT		No suitable habitat present within the Master Plan boundaries including the Los Angeles/El Segundo Dunes. Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes in 1995, 1996, 1997, 1998, and 1999. Determined absent as a result of directed surveys conducted in 1998 and 2000. Therefore, this species is not further addressed in this document.	Shaded, rocky slopes from 150-500 meters above mean sea level;[2] on volcanic cliff faces and rocky outcrops in chaparral and coastal sage scrub.[6] Found in the Santa Monica Mountains from near Westlake Village to Agoura and in deep canyon bottoms along lower Malibu Creek and Topanga Creek. Populations in Malibu and Topanga Canyons largely on lands owned and managed by the County of Los Angeles Department of Parks and Recreation, two populations on land designated as open space by Conejo Open Space Conservation Agency, and several on private land along the northern slope of Ladyface Mountain.[7] In 1980, locally abundant in Topanga State Park, Santa Monica Mountains.[6]

FE = Listed as endangered under the Federal Endangered Species Act
C = Candidate for federal listing. Formerly classified as "Category 1;" these are species for which the USFWS has information on file to support issuance of proposed rule to list as endangered or threatened.
FT = Listed as threatened under the Federal Endangered Species Act
SE = Listed as endangered by the State of California
ST = Listed as threatened by the State of California

Braunton's milkvetch (*Astragalus brauntonii*)	FE		Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes in 1995, 1996, 1997, 1998, 1999, and directed surveys in 1998 and 2000. This species is limestone-endemic. No limestone is present within the Los Angeles/El Segundo Dunes; therefore, this species is not further addressed in this document.	Brushy places, firebreaks and disturbed areas in chaparral below 450 meters above mean sea level.[1, 2] Recent burns or disturbed areas in closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland.[6] Strong substrate preference, considered a limestone-endemic. Currently known from four general areas in Ventura, Los Angeles, and Orange counties. One population in Simi Hills, one in Santa Ynez Canyon, one in Coal Canyon and one in Gypsum Canyon. Remaining population estimated at less than 100 individuals.[7] Documented at five sites in the Santa Monica Mountains; four out of five populations are presumed extant.[6] There are no limestone outcrops or limestone derived soils within the Master Plan boundaries or Los Angeles/El Segundo Dunes.

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Ventura Marsh milkvetch (*Astragalus pycnostachyus* var. *lanosissimus*)	FPE	SC	Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes in 1995, 1996, 1997, 1998, 1999, and directed surveys in 1998 and 2000.	Coastal marshes or seeps below 30 meters above mean sea level.[1, 2] Within reach of high tide or protected barrier beaches in coastal salt marsh or sandy bluffs.[6] Believed extinct until its rediscovery in 1997. Only known extant population on McGrath State Beach in Ventura County.[8] Historically known from the Ballona marshes and a meadow near the seashore in Santa Monica; presumed extirpated at both sites. Potentially suitable habitat to the species is limited to the fore dune, west of the Los Angeles/El Segundo Dunes immediately adjacent to Vista del Mar Boulevard. The Master Plan would not affect foredune habitat.
Coastal dunes milkvetch (*Astragalus tener* var. *titi*)	FPE	SE	Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes in 1995, 1996, 1997, 1998, 1999, and directed surveys in 1998 and 2000.	Moist sandy depressions near the coast, typically coastal bluffs and dunes below 15 meters above mean sea level.[2, 6] Historically, range was known to include Monterey, Los Angeles, and San Diego Counties. It is presumed extant at three locations, one in Monterey County and two in San Diego County.
Salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*)	FE	SE	Determined absent as a result of qualitative surveys conducted at the Los Angeles/El Segundo Dunes in 1995, 1996, 1997, 1998, 1999, and directed surveys in 1998 and 2000.	Generally found in coastal salt marsh and in higher zones of salt marsh habitat between 0 and 30m. Once distributed along the coast from lower California to Oregon.[1] Historically known from Terminal Island in San Pedro Harbor and in the vicinity of Santa Monica; presumed extirpated at both sites.[6] Known to be extant at Point Mugu Air Station, Ventura County. No suitable habitat exists for this species of the Los Angeles/El Segundo Dunes; therefore, this species is not further addressed in this document.

FE = Listed as endangered under the Federal Endangered Species Act
FPE = Proposed for federal listing as endangered under the Federal Endangered Species Act
SC = State Candidate
SE = Listed as endangered by the State of California

Mexican flannelbush (*Fremontodendron mexicanum*)	FE	SE	No suitable habitat present within the Master Plan boundaries. Determined absent as a result of directed spring surveys conducted in 2000.	Occurs primarily in closed-cone coniferous forest and southern mixed chaparral, often associated with meta-volcanic soils between 300-1000 meters above mean sea level.[10] Also known from southern oak woodland.[1] Associated with Southern California cypress groves.[11] Historically, less than ten native locations reported in the United States. Current distribution includes Cedar Canyon in southern San Diego County and Arroyo Seco, Baja California, Mexico. Reported occurrences in Los Angeles County likely based on garden escapees.[10] Known from Palos Verdes, but considered an erroneous occurrence.[6] The Master Plan boundaries are not within the historic range of this species. No suitable habitat for this species exists within the Master Plan boundaries and the Los Angeles/El Segundo Dunes; therefore, this species is not further addressed in this document.

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Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

	Status			
	Federal	**State**	**Local**	**Habitat Requirements and Distribution**
California orcutt grass (*Orcuttia californica*)	FE	SE	Determined absent as a result of directed surveys of all ephemerally wetted areas within the AOA in late spring/early summer 1998 and 2000.	Vernal pools below 625 meters above mean sea level.[2] Drying mud flats and valley grassland.[1] Once occurred in vernal pools from San Quintin, Baja California, Mexico northward to Riverside, Los Angeles, and San Diego Counties in Southern California. Currently known from the Santa Rosa Plateau and a site near Hemet, Skunk Hollow pool in Riverside County; two pools at Marine Corps Air Station Miramar (Carlsbad) and four pool complexes at the Cruzan Mesa near Santa Clarita; Carlsberg vernal pool in the City of Moorpark, Ventura County; Otay Mesa in San Diego County; and Woodland Hills in Los Angeles County. In Baja California, Mexico, the species is found on Mesa de Colonet and in pools in San Quintin. The nearest record for this species is 6 miles east southeast of LAX in the City of Gardena near the junction of Rosecrans and Western Avenues. Last seen in 1946. Known from less than twenty occurrences.[5] Populations face high degree of threat and have low potential for recovery.[4]
Fauna				
Crustaceans				
San Diego fairy shrimp (*Branchinecta sandiegoensis*)	FE		Surveys were conducted based on the USFWS's letter of comment[28] recommending protocol surveys to be conducted within the Los Angeles International Airport. This species was determined absent within the Master Plan boundaries and the Los Angeles/El Segundo Dunes as a result of directed wet and dry season surveys performed in winter 1997 and spring 1998.	Vernal pool specialist, found in shallow depressions containing a clay hard pan soil layer. Historically, known to occur within San Diego County.[15] Currently, discontinuously distributed along coastal Southern California and northern Baja California. They are most frequently found in San Diego County.[4] The largest number of vernal pools inhabited by the San Diego fairy shrimp is found from Marine Corps Base Camp Pendleton, inland to Ramona, and south through Del Mar Mesa, Kearney Mesa, Proctor Valley, Otay Mesa, and into northwestern Baja California, Mexico. In Baja California, it has been recorded at two localities (Valle de las Palmas south of Tecate and Baja Mar, north of Ensenada).[18] Small populations occur in Orange County, and a single isolated female was reported from a vernal pool in Isla Vista, Santa Barbara County, California.[20] The San Diego fairy shrimp occurs in San Diego County from San Marcos and Ramona south to Otay Mesa and at Valle de las Palmas in northwestern Baja California, Mexico. All known localities are below 700 meters (2,300 feet) and within 50 kilometers (30 miles) of the Pacific coast.[15] The fairy shrimp presently occurs in fewer than 70 vernal pools within 11 vernal pool complexes in coastal San Diego County.[15] The San Diego fairy shrimp has also been reported in Isla Vista in Santa Barbara County, California, but the identification of the single female individual is unconfirmed (Michael Fugate, University of Oregon, personal communication, 1993).[15] There are no records from Los Angeles and Orange Counties.[16] The embedded cysts were discovered in disturbed non-native grassland areas that do not retain the habitat characteristics of extent vernal pools. Therefore, no suitable habitat exists within the Master Plan boundaries or the Los Angeles/El Segundo Dunes.

FE = Listed as endangered under the Federal Endangered Species Act
SE = Listed as endangered by the State of California

Table 1

Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

	Status			
	Federal	**State**	**Local**	**Habitat Requirements and Distribution**
Riverside fairy shrimp (*Streptocephalus woottoni*)	FE		Surveys were conducted based on the USFWS's letter of comment[28] recommending protocol surveys to be conducted within the Los Angeles International Airport. Embedded cysts determined present on the western LAX airfield as a result of directed dry season surveys performed in winter 1997. Adult shrimp determined absent on the western LAX airfield as a result of directed dry season surveys performed in winter 1997. Adult shrimp determined absent on the western LAX airfield based on the result of directed wet season surveys in spring 1998.	Vernal pool specialist, adults found in deep vernal pools which retain water through the warm weather of late April and May, road cuts, and depressions that support suitable habitat.[4] The embedded cysts were discovered in disturbed non-native grassland areas that do not retain the habitat characteristics of extent vernal pools. Therefore, no suitable habitat exists within the Master Plan boundaries or the Los Angeles/El Segundo Dunes. Distribution is limited to discrete localities from Los Angeles County (LAX), Orange County, Riverside County, San Diego County, and south to Baja California. San Diego County contains the most known localities.[4] The northern range of the Riverside fairy shrimp is defined by Skunk Hollow and the Santa Rosa Plateau in Riverside County and coastal sites in San Diego and Orange Counties; it is documented from one complex on Marine Corps Air Station Miramar, throughout Marine Corps Base Camp Pendleton, and eight complexes on Otay Mesa. In Baja California, Mexico, it has been found in Valle de las Palmas, and at Bajamar north of Ensenada.[18] Embedded cysts are present within the Master Plan boundaries. The nearest known location occurs from one coastal site at Dana Point in Orange County.
Insects				
El Segundo blue butterfly (*Euphilotes battoides allyni*)	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined present within the Los Angeles/El Segundo Dunes as a result of directed surveys performed in 1995, 1996, 1997, 1998, 1999, and 2000.	Coastal sand dunes that support populations of its food plant: coastal buckwheat. Historically ranged over the entire Los Angeles/El Segundo Dunes and the northwestern Palos Verdes Peninsula in southwestern Los Angeles County. Currently distributed on three remnant habitats within its former range; Los Angeles/El Segundo Dunes, the 1.5 acre site at the oil refinery located south of the airport, and a half-acre site at Malaga Cove, all in Los Angeles County.[12] There are currently 150.2 acres of occupied habitat for the El Segundo blue butterfly within the Los Angeles/El Segundo Dunes. Directed surveys of the El Segundo blue butterfly at the Los Angeles/El Segundo Dunes indicated continued decline in numbers between 1977 and 1979 with an estimated total of less than 2,000 adults. The City of Los Angeles initiated active habitat management measures for the El Segundo blue butterfly in 1987, and continues those work efforts as part of its annual operations and maintenance activities. Population estimates for 1999 range from 10,000 – 40,000 butterflies.
Birds				
California brown pelican *(Pelecanus occidentalis californicus*)	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined absent within the Master Plan Boundaries and the Los Angeles/El Segundo Dunes as a result of directed surveys performed in spring 1998 and 2000.	Open ocean, near-shore coastal waters, and coastal estuaries.[20] Historic nesting range extended from Central Mexico north to Monterey.[21] Currently breeds on Channel Islands off Southern California coast.[14] This species is a year round resident in Southern California.[13] The nearest roosting site is located at the San Pedro Harbor in Los Angeles County.[14] The nearest known seasonal visitor sighting is located at Dockweiler State Beach.[24]

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SE = Listed as endangered by the State of California

Table 1

Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

	Status			
	Federal	**State**	**Local**	**Habitat Requirements and Distribution**
American peregrine falcon (*Falco peregrinus anatum*)		SE	Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined absent within the Master Plan Boundaries and the Los Angeles/El Segundo Dunes as a result of directed surveys performed in summer 1998 and 2000.	Breeds primarily in woodland, forest, and coastal habitats.[6] Non-breeding habitat occurs in riparian, coastal, and inland wetlands. De-listed as federally-endangered on August 25, 1999.[22] The peregrine falcon has reoccupied most of its historic breeding range in California, including the Channel Islands, the coast and Cascade ranges, and Sierra Nevada. It can inhabit all counties in California throughout the year, except during breeding season.[6] This species is an occasional visitor to the Master Plan boundaries, however no breeding habitat occurs within the Master Plan boundaries or Los Angeles/El Segundo Dunes.[17] Therefore, this species is not further addressed in this document.
California least tern (*Sterna antillarum browni*)	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined absent within the Master Plan Boundaries and the Los Angeles/El Segundo Dunes as a result of directed surveys performed in spring 1998 and 2000.	Open ocean and a colonial breeder on bare or sparsely vegetated flat substrate located along marine shores, estuarine shores, alkali flats, landfills, or paved areas throughout the year.[6] This federally-listed endangered species[23] comes to shore only to breed. Historically nested along the central and Southern California coast to the coast of Mexico.[14] Currently nests sporadically along coast from San Francisco to Baja California.[13] Nearest known breeding colony is located 3 miles north of the Master Plan boundaries.[6] Observed as a seasonal visitor to waters offshore of Dockweiler State Beach.[17] This species is not known to breed within the Master Plan boundaries or Los Angeles/El Segundo Dunes. Therefore, this species is not further addressed in this document.
Southwestern willow flycatcher (*Empidonax extimus traillii*)	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined absent within the Master Plan Boundaries and the Los Angeles/El Segundo Dunes as a result of directed surveys performed in summer 1998 and 2000.	Riparian acres with thick willow forests.[6] Historically nested throughout California, wherever willow thickets or other riparian habitat was found.[25] Regular nesting is currently known only from a few mountain meadows in the Sierra Nevada and several rivers in Trinity, Inyo, Kern, Santa Barbara, Los Angeles, and San Diego Counties.[14] Species becomes more widely distributed in the spring and fall migration period.[14] This species is not known to occur within the Master Plan boundaries or Los Angeles/El Segundo Dunes. Therefore, this species is not further addressed in this document.
Least Bell's vireo (*Vireo belli pusillus*)	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined absent within the Master Plan Boundaries and the Los Angeles/El Segundo Dunes as a result of directed surveys performed in summer 1998 and 2000.	Inhabits rivers with riparian vegetation associated with willows and other low, dense valley foothill riparian habitat, lower portions of canyons, and desert and coastal slopes.[13] Historically ranged from the northern tip of the Sierra Nevada along valleys and rivers south to Baja California, Mexico.[26] Currently breeds only in a few scattered areas of riparian habitat along the coast and western edges of the Mohave Desert in the following counties: Santa Barbara, Ventura, Riverside, Orange, San Bernardino, and San Diego.[14] This species is not known to occur within the Master Plan boundaries or Los Angeles/El Segundo Dunes. Therefore, this species is not further addressed in this document.
Mammals				
Pacific pocket mouse (*Perognathus longimembris pacificus)*	FE		Surveys were conducted based on the USFWS's letter of comment[29] recommending directed surveys be conducted within the Master Plan boundaries and the Los Angeles/El Segundo Dunes. This species was determined present within the Los Angeles/El Segundo Dunes as a result of directed surveys performed in 1995, 1996, 1997, 1998, 1999, and 2000.	Occurs on fine-grained, sand substrates in open coastal sage scrub, coastal dunes, coastal strand, and river alluvium habitats.[14] Species occurred historically along Southern California coast from Los Angeles County south to Baja, California.[27] Now restricted to less than five populations, one in Orange County and others in San Diego County.[14] This species was last seen in 1938 at Marina del Rey in the El Segundo Area.[6] This species is not known to occur within the Master Plan boundaries therefore this species is not further addressed in this document.

Table 1

Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

Status			
Federal	**State**	**Local**	**Habitat Requirements and Distribution**

FE = Listed as endangered under the Federal Endangered Species Act
SC = State Candidate
FPE = Proposed for federal listing as endangered under the Federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
SE = Listed as endangered by the State of California
ST = Listed as threatened by the State of California
C = Candidate for federal listing. Formerly classified as "Category 1;" these are species for which the USFWS has information on file to support issuance of proposed rule to list as endangered or threatened.

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16 California Department of Fish and Game, California Statewide Wildlife Habitat Relationship System, *California Wildlife*, Volume II, Birds. State of California Resource Agency. 1990.
17 Sapphos Environmental, Inc. Memorandum for the Record (1043-008.M06), Subject: Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo and Loggerhead Shrike at LAX/El Segundo Dunes. From Sapphos Environmental, Inc, 133 Martin Alley, Pasadena, California, 90808. September 8, 1998.
18 Brown, J. W., M. A. Wier, and D. Belk, 1993, New records of fairy shrimp (Crustacea: Anostraca) from Baja California, Mexico, *The Southwestern Naturalist*, 38 (4): 389-390.
19 U.S. Fish and Wildlife Service, 1994c: Endangered and Threatened Wildlife and Plants; Proposed rule to list the San Diego fairy shrimp as endangered. *Federal Register* 59: 39874-39878.
20 Fugate, Michael, 1993, "*Branchinacta sandiegonensis*, A New Species of Fairy Shrimp (Crustacea: Anostraca) from Western North America," *Proceedings of the Biological Society of Washington*, 106 (2): 296-304.
21 Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Removal of the Brown Pelican in the Southeastern United States from the List of Endangered and Threatened Wildlife, February 4, 1985.
22 Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Final Rule to Remove the American Peregrine Falcon from the Federal List of Endangered and Wildlife and to Remove the Similarity of Appearance Provision for Free-Flying Peregrines in the Conterminous United States; Final Rule, August 25, 1999.
23 Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, United States List of Endangered Native Fish and Wildlife, October 13, 1970.
24 Sapphos Environmental, Inc., Memorandum for the Record (1067-007.M15), Subject: Results of Directed Summer Surveys for Sensitive Amphibians, Reptiles, California Brown Pelican, California Least Tern, and the Endangered El Segundo Blue Butterfly at LAX/El Segundo Dunes, December 21, 1998.

Table 1

Federally - and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area

	Status			
	Federal	**State**	**Local**	**Habitat Requirements and Distribution**

[25] Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher, July 22, 1997.

[26] Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Least Bell's Vireo, May 2, 1986.

[27] Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Pacific Pocket Mouse; Final Rule, September 29, 1994.

[28] U.S. Fish and Wildlife Service. 1997b. Letter dated August 29 to Mr. David B. Kessler, Federal Aviation Administration, U.S. Department of Transportation, P.O. Box 92007, World Way Postal Center, Los Angeles, CA 90009-2007.

[29] U.S. Fish and Wildlife Service. 1997a. Letter dated July 31 to Mr. David B. Kessler, Federal Aviation Administration, U.S. Department of Transportation, P.O. Box 92007, World Way Postal Center, Los Angeles, CA 90009-2007.

Source: Sapphos Environmental, Inc.

2.0 ALTERNATIVES

Description of Proposed Action and Alternatives

The City of Los Angeles intends to provide additional airport capacity in the Los Angeles metropolitan area that will sustain the economic growth and vitality of the South Coast Basin while meeting environmental and land use compatibility goals. The City of Los Angeles has projected future aviation demand at Los Angeles International Airport (LAX) to the year 2015 in the *Forecasts of Aviation Demand Study* dated February 26, 1996, which shows that LAX will have to accommodate approximately twice as many passengers and more than twice the cargo tonnage it currently supports. This section describes the three development alternative scenarios for the *Los Angeles International Airport 2015 Master Plan* (Master Plan), as well as the No Action/No Project Alternative, which respond to projected growth in passenger and cargo service and are to be addressed in the Draft Joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) being prepared by the Federal Aviation Administration (FAA) and the City of Los Angeles. The role of the FAA in the master planning process is to ensure the safe and efficient use of navigable airspace through approval of the revised Airport Layout Plan and to act on any applications for Airport Improvement Program grants and/or the use of Passenger Facility Changes for eligible projects. The City of Los Angeles is solely responsible for implementing any future improvements at LAX.

2.1 Background to the Master Plan Process

In 1981, the *LAX Interim Master Plan* was adopted as a short-term, general guide for coordinating the development of airport facilities with that of surrounding communities. The study considered future demand issues, and called for the initiation of a long-range plan to address capacity requirements at LAX.

In 1986, the City of Los Angeles Department of Airports (now known as the Los Angeles World Airports [LAWA]) initiated preparation of environmental documentation to evaluate projected growth of LAX to the year 2000. Upon review of the draft document, the City Planning Department recommended that the capacity issue at LAX would be more properly resolved through preparation of a new master plan.

Based on this recommendation, the Master Plan was initiated to address the long-term issues of airport capacity, ground access, and environmental impacts. Preparation of the Master Plan consisted of three phases: (1) detailed data gathering regarding existing airport and environmental conditions, as well as the development of aviation demand forecasts through the year 2015; (2) identification of facility requirements to accommodate projected future activity levels and evaluation of over 30 airport development concepts with respect to technical feasibility, safety, environmental issues, and policy considerations; and (3) development of an airport layout and implementation plan and an evaluation of the associated environmental impacts.

The Master Plan evaluates numerous project components including, but not limited to: one or more additional 6,000-foot-long runways; relocation/extensions of existing runways; improved taxiway system; new passenger terminal facilities west of Tom Bradley International Terminal (TBIT) connected by an automated people-mover system; expanded air cargo facilities; improvements to the ground access system, including connections to the regional highway and transit networks; and the relocation of ancillary uses and other support facilities. The FAA and the City of Los Angeles are preparing a joint EIS/EIR that evaluates the proposed Master Plan and its alternatives, including the Alternative of No Action/No Project.

2.2 Surrounding Land Uses and Constraints

LAX is bounded on the north by Westchester Parkway and the communities of Westchester and Playa del Rey; on the east by Aviation Boulevard, the City of Inglewood, and the community of Lennox; on the south by Imperial Highway, the City of El Segundo, and the community of Del Aire; and on the west by Vista del Mar Street, Dockweiler State Beach, and the Santa Monica Bay.

The communities surrounding LAX comprise a diverse mix of land uses. Land use immediately to the east is primarily commercial/industrial, but Lennox, South Central Los Angeles, and Inglewood also contain residential use. Generally, this tends to be low-density single-family residential development supported by a full range of neighborhood and regional commercial and institutional services. There are large areas of mixed single-family and multi-family uses in the City of Hawthorne and in the unincorporated Los Angeles County area known as Lennox. Concentrations of multi-family residential areas are also located in the Cities of El Segundo and Inglewood and the southwestern portion of the

Westchester/Playa del Rey area of the City of Los Angeles. Commercial uses generally occur as strip development along major streets. Industrial uses are clustered adjacent to LAX, particularly within the City of El Segundo. Industrial and public land uses are scattered throughout the entire area.

Below are the primary communities surrounding LAX by area:

North/Northeast:

- The City of Los Angeles encompasses 302,596 acres with a 1990 resident population of 3,485,398.
- The Westchester/Playa del Rey area of the City of Los Angeles directly borders LAX property to the north, east, and west. It encompasses 9,281 acres with a 1990 resident population of 60,000.

East:

- The City of Inglewood is located adjacent to the eastern boundary of LAX and partially beneath the flight approach paths for LAX. Inglewood encompasses 5,664 acres with a 1990 resident population of 109,602.
- Lennox is an unincorporated area of the County of Los Angeles located directly east of the LAX south runway complex. Lennox encompasses 800 acres with a 1990 resident population of 22,757.

South/Southeast:

- The City of El Segundo is located adjacent to the southern boundary of LAX. El Segundo encompasses 3,495 acres with a 1990 resident population of 15,223.
- The City of Hawthorne is located approximately one mile southeast of LAX. Hawthorne encompasses 2,752 acres with a 1990 resident population of 71,349.
- Del Aire is an unincorporated area of the County of Los Angeles located directly south of LAX and east of Aviation Boulevard, between the City of El Segundo to the west and south, and west of the City of Hawthorne. Del Aire encompasses 530 acres with a 1990 resident population of 3,359.

West/Coast:

- West and southwest of LAX, much of the coastline is occupied by the City of Los Angeles. Immediately to the west of the LAX airfield lies the 302-acre Los Angeles/El Segundo Dunes area, which lies within the Master Plan study area. The southern two-thirds of the Los Angeles/El Segundo Dunes, approximately 200 acres, comprise the El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area), a habitat for the federally-listed endangered El Segundo blue butterfly (*Euphilotes battoides allyni*) and its host foodplant, coast buckwheat (*Eriogonum parvifolium*). The remaining 100 acres are north of the Habitat Restoration Area, and consist of degraded habitat, invasive species, roads, and remnants of houses. The City of Los Angeles also operates two facilities in this area, the Hyperion Sewage Treatment Plant, located immediately south of the Habitat Restoration Area, and the Los Angeles Department of Water and Power Scattergood Generating Station. The El Segundo power plant and a coastal portion of the oil refinery located south of the airport are located in this area. Dockweiler State Beach, located directly west of LAX, west of Vista del Mar, and west of the Los Angeles/El Segundo Dunes, is a 3.7-mile sandy beach comprised of approximately 288 acres. This beach is a public beach with a variety of facilities, including 1,440 parking spaces on 19 acres of paved lots, a 118-space, five-acre recreational vehicle (RV) park, 12 restrooms, playground equipment, volleyball courts, a bicycle path, a picnic area, a concession stand, and lifeguard facilities. Dockweiler State Beach is owned by the California Department of Parks and Recreation, and is managed through its Angeles District Office in Calabasas.

The feasible range of on-site development alternatives is severely constrained because of existing land uses in surrounding areas. Impacts on biological resources under any of the development alternatives considered would be limited primarily to the West/Coast area.

2.3 Master Plan Objectives

It is the intention of the City of Los Angeles to provide, in an environmentally sound manner that is compatible with surrounding land uses, additional airport capacity for passengers and freight in the Los Angeles metropolitan area that will sustain and advance the economic growth and vitality of Southern California. The objectives are: (1) to respond to local and regional demand for air transportation during the period 2000-2015, taking into consideration the amount, type, location, and timing of such demand; (2) to ensure that new investments in airport capacity are efficient and cost-effective, maximizing the

return on existing infrastructure capital; and (3) to sustain and advance the international trade component of the regional economy and the international commercial gateway role of the City of Los Angeles.

- 2000 - 2015 Air Transportation Needs. The need for additional airport capacity in Southern California between 2000 and 2015 has been widely acknowledged. Commercial service airports in the region already operate at or near their maximum peak-hour capacities. Regionwide demand for air transportation services has been identified in terms of when and where demands are likely to occur and the type of airport capacity increments that will be required to meet them. The City of Los Angeles has reviewed the potential contributions of existing and planned commercial service airports in the region relative to meeting the increased demand, and has concluded that, in order to accommodate projected increases in demand for all transportation services, the capacity of Los Angeles International Airport (LAX) needs to be increased to an appropriate level.
- Efficient and Cost-Effective Investments. Public and private capital investment in Los Angeles International Airport and associated commercial facilities already totals billions of dollars. The City of Los Angeles is considering ways that, through incremental investments in additional LAX capacity, it can maximize the return on that invested capital and help the region avoid making less productive investments in duplicate facilities.
- The International Trade Component. The recent surge in the absolute amount and relative importance of international trade to the Southern California economy is likely to continue during the next two decades if enough airport capacity exists in the region. To whatever extent such capacity is not added in the right place(s) and in a timely manner, economic activity, jobs, and investment will locate in or relocate to other metropolitan areas, such as San Francisco, Phoenix, Seattle, Las Vegas, and Denver (all of which are making or have recently made substantial investments in new capacity at their principle commercial service airports). The City of Los Angeles is considering ways to create additional capacity at LAX that would maintain Los Angeles' role as an international commercial gateway.

Within the alternatives to be analyzed, potential project components will be evaluated, including, but not limited to: one or two additional runways; an improved taxiway system; new passenger terminal facilities; an automated people-mover system; expanded cargo facilities; improvements to the ground access system, including connections to the regional highway and transit networks; relocation of ancillary uses and other support facilities; and land acquisition necessary for each concept. All alternatives have been analyzed in accordance with the California Environmental Quality Act (CEQA).

2.4 Master Plan Alternatives

This section describes the three future airport improvement concepts being considered as alternative development scenarios for the Master Plan, as well as the No Action/No Project Alternative addressed in the Draft Joint EIS/EIR. Evaluation of these three improvement alternatives is based in part on an assessment of LAX's existing airside and landside facilities and the facility requirements needed to accommodate projected demand for commercial passenger and cargo operations by the year 2015.

Forecast to 2015

LAX's potential aviation demand to the year 2015 is projected in the *Forecasts of Aviation Demand* study dated February 26, 1996. Forecasts show that, by the year 2015, unconstrained demand for LAX services and facilities will entail a need for LAX to accommodate approximately twice as many passengers and more than twice the amount of cargo tonnage than LAX facilities currently utilize. These forecasts represent an "unconstrained" demand in that they assume facilities and infrastructure will be in place to accommodate projected growth; they take into account aviation demand within the entire Southern California market, and assume other airports within the region take an increasing share of domestic origin and destination (O&D) passengers.

LAX is currently experiencing substantial operation inefficiencies because airport facilities are handling aviation demands above their designed capacities. The projections for potential aviation demand for the year 2015 (as compared to existing conditions) are identified in **Table 2**, Projected Aviation Demand to the Year 2015.

Table 2

Projected Aviation Demand To The Year 2015

	Existing (1996)	Projected (2015)
Air Passengers	58.0 MAP[1]	98 MAP*
Air Cargo	1.9 million tons	4.2 million tons
Aircraft operations	763,000	1,000,000

[1] Million Annual Passengers

Source: Landrum & Brown

Facility Requirements

The *LAX Master Plan Facilities Study*, dated May 8, 1996, identified the need for additional capacity in each component of the airport system to accommodate forecasted increases in aircraft operations, passenger, and cargo activity by the year 2015, as summarized above. To meet the unconstrained forecasted demand of 98 million annual passengers (MAP), 4.2 million annual tons of cargo, and 1.0 million annual aircraft operations, the facility requirements identified in **Table 3**, LAX Projected 2015 Facility Requirements, would be needed.

Table 3

LAX Projected 2015 Facility Requirements

	Requirement	
Component	**1996**	**2015**
Runways	4	5 or 6
Gates	145 NBEG[1]	276 NBEG[1]
Terminal Facilities	3.9 million square feet	7.9 million square feet
Cargo Facilities	200 acres	437 acres
Ancillary Facilities	384 acres	228 acres
Parking (employee and public)	21,930 spaces	48,750 spaces
Rental Car Facilities	81.84 acres	101 acres

[1] Narrow Body Equivalent Gate

Source: Landrum & Brown

Aviation activity is projected to increase significantly at virtually all commercial airports in the regional system over the next 20 years, and LAX needs to address plans to provide both near-term and mid-term capacity enhancements to service forecasted demand. If the region's future air transportation needs cannot be met, short-term economic disruption is likely to lead to permanent job losses and lost opportunities as airport-related business activities relocate to other regions that provide more efficient and reliable air transportation service.

Ground Access System

It is also anticipated that there will be the need for an integrated ground transportation system, which may feature the following components:

- A region-serving roadway system that would connect LAX to the greater Southern California region via linkages to the Interstate 405 and Interstate 105 freeways;
- A ring road encircling LAX that would provide direct freeway access to the passenger terminals and better separate airport-related traffic from non-airport traffic, thereby minimizing traffic impacts to neighboring communities;
- Surface access roads to facilitate traffic in and around LAX;

- An inter-terminal people-mover system that would connect the eastern side of LAX to the proposed newly developed western side, and connect to a future MTA Green Line transit system extension.

The City of Los Angeles has identified three action alternatives capable of meeting most of the basic objectives of the proposed project. None of the action alternatives are capable of fully accommodating the unconstrained 2015 forecast for passenger demand and airport operations, however, all three would be expected to accommodate the anticipated 2015 cargo demand forecast of 4.2 million annual tons. A description of the three action alternatives and the No Action/No Project Alternative, including discussion of feature components, capacity data, and summaries of various components, follows.

2.4.1 Existing Conditions

Three scenarios are presented to describe the No Action/No Project Alternative.

Environmental Baseline Scenario (1996)

Existing conditions are described first by a baseline that describes current conditions both on-airport and off-airport. The environmental baseline scenario is shown in **Figure 3**, Existing Conditions - 1996. The North Airfield Complex has two runways. Runway 6L/24R is 8,925 feet long; runway 6R/24L is 10,285 feet long, and is 700 feet south of runway 6L/24R. The South Airfield Complex also has two runways. Runway 7L/25R is 12,091 feet long; runway 7R/25L is 11,096 feet long, and is 745 feet south of runway 7L/25R. There are eight passenger terminals in the Central Terminal Area (CTA) of LAX that service domestic and international passengers. There are three cargo facilities at LAX: the Century Cargo Complex, the Imperial Cargo Complex, and the South Cargo Complex. The transportation and circulation system is represented by 1996 existing facilities.

Properties scheduled for acquisition under the ongoing Airport Noise Mitigation Program (ANMP) (Belford and Manchester Square Areas) are currently developed as residential uses; undeveloped properties owned by the airport and entitled for development are reported as vacant. These areas (shown in **Figure 4**, No Action/No Project Alternative – Proposed Development Areas) include LAX Northside and 28.5 acres of property known as “Continental City” located at the northeast corner of Aviation Boulevard and Imperial Highway.

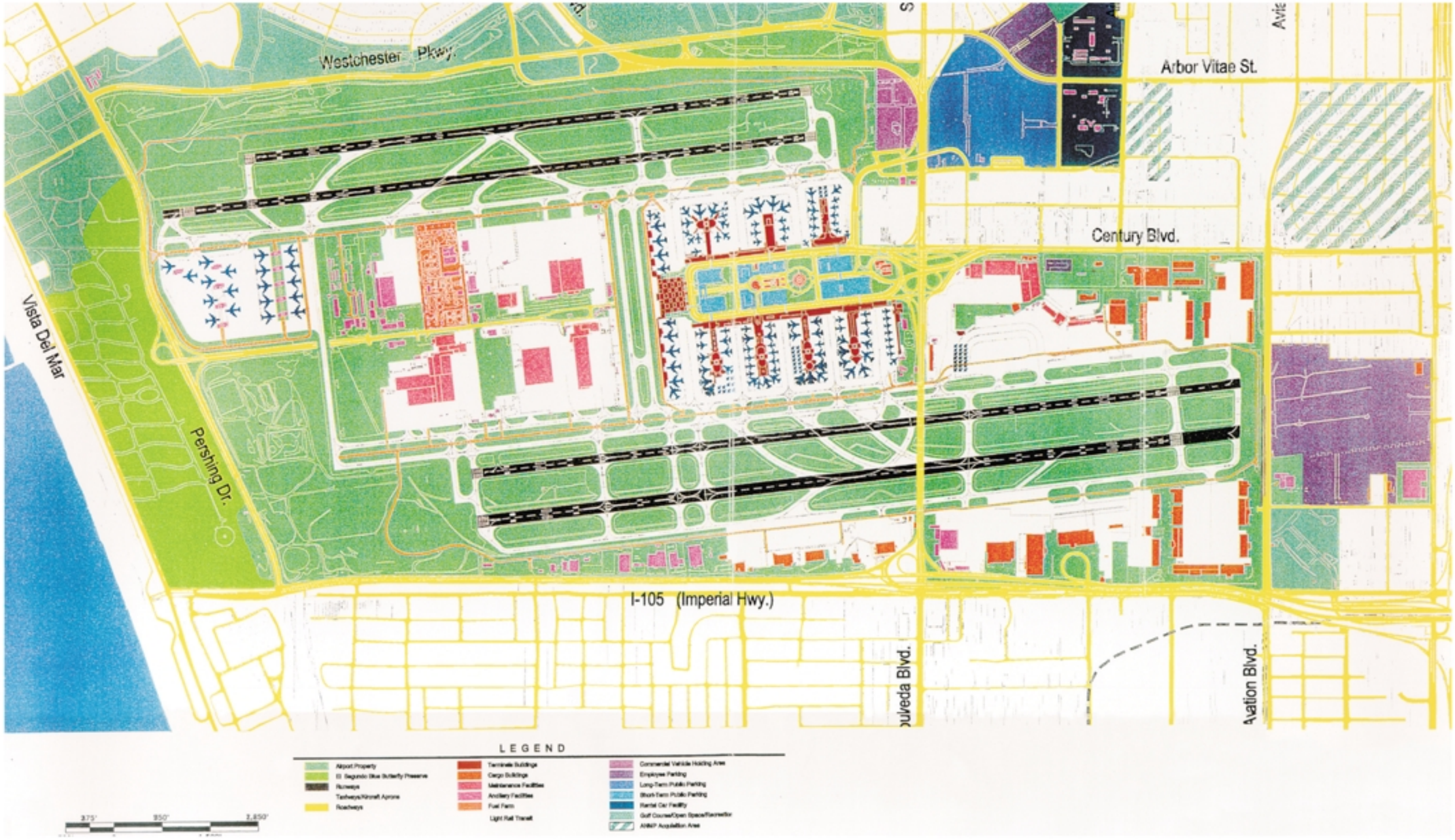
CEQA Adjusted Baseline Conditions (2005, 2015)

The adjusted baseline describes historical airport activity for 1996, while taking into account projected levels of additional off-airport background land use development and other growth activity anticipated for plan years 2005 and 2015. The adjusted baseline is used principally as a means of providing useful cumulative impact analysis for future years. The adjusted baseline scenario for these future years assumes land acquisition (Belford and Manchester Square Areas) has occurred as part of the previously approved ANMP, and that they will be vacant. Previously acquired, now-vacant properties, including LAX Northside and Continental City, are assumed to continue to remain vacant through 2005 and 2015.

2.4.2 No Action/No Project Alternative (2005, 2015)

No Action/No Project Alternative (2005, 2015)

This scenario is based on both airport and land use activities anticipated for the plan years 2005 and 2015 in the absence of any Master Plan development. The No Action/No Project scenario for 2005 and 2015 is shown in **Figure 5**, No Action/No Project Alternative (2005 & 2015). This alternative assumes the continual implementation of the 1981 Interim Plan adopted by the City of Los Angeles for the LAX area. It is based on the activity levels projected to be experienced at LAX during 2005 and 2015 utilizing modest facility improvements previously approved by LAWA that are presently underway, but does not include the substantial improvements proposed by the various Master Plan alternatives. Aircraft operations are expected to reflect a fleet mix of larger aircraft and increased loads as airlines react to capacity constraints. Besides anticipated continued growth in airport activity, this alternative also assumes that certain existing airport properties that are now vacant will be built out in accord with prior approvals, including previously obtained final map approvals (LAX Northside) and development agreements (Continental City). Cargo facilities are anticipated to gain approximately 250,000 net square feet of building space from previously approved construction of facilities that will replace existing older and functionally obsolete air freight facilities currently being demolished.



Los Angeles International Airport Master Plan	Existing Conditions - 1996	Figure 3

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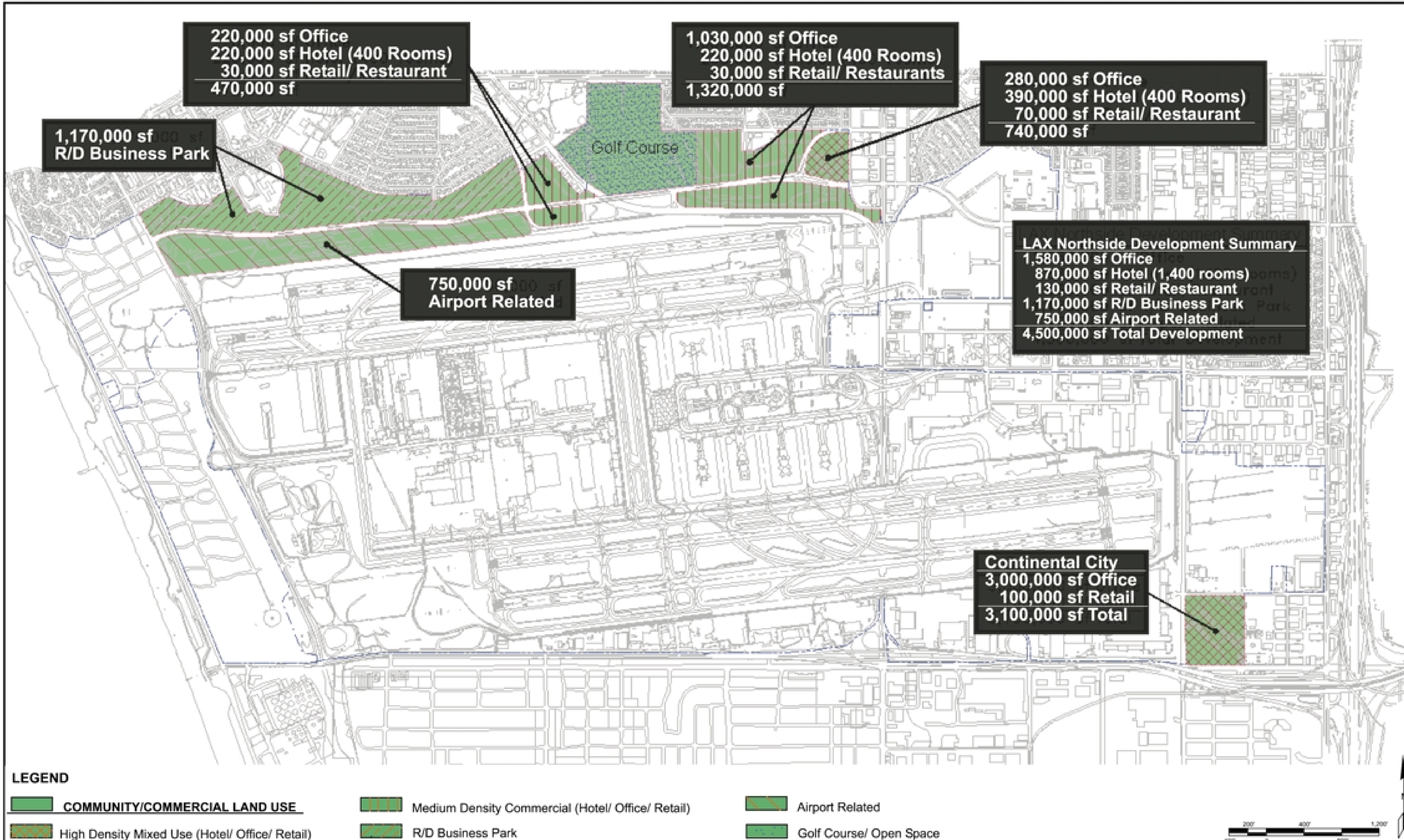

220,000 sf Office
220,000 sf Hotel (400 Rooms)
30,000 sf Retail/ Restaurant
470,000 sf
1,030,000 sf Office
220,000 sf Hotel (400 Rooms)
30,000 sf Retail/ Restaurants
1,320,000 sf
280,000 sf Office
390,000 sf Hotel (400 Rooms)
70,000 sf Retail/ Restaurant
740,000 sf
1,170,000 sf
R/D Business Park
Golf Course
750,000 sf
Airport Related
LAX Northside Development Summary
1,580,000 sf Office
870,000 sf Hotel (1,400 rooms)
130,000 sf Retail/ Restaurant
1,170,000 sf R/D Business Park
750,000 sf Airport Related
4,500,000 sf Total Development
Continental City
3,000,000 sf Office
100,000 sf Retail
3,100,000 sf Total
LEGEND
COMMUNITY/COMMERCIAL LAND USE
High Density Mixed Use (Hotel/ Office/ Retail)
Medium Density Commercial (Hotel/ Office/ Retail)
R/D Business Park
Airport Related
Golf Course/ Open Space

Los Angeles International Airport Master Plan Biological Assessment	No Action/ No Project Alternative - Proposed Development Areas	Figure 4

Land use and regional transportation are represented as they are forecast to exist during the plan years of 2005 and 2015 with demand for airport-related land uses in surrounding areas and dramatically increased traffic congestion. The Manchester Square and Belford residential areas are represented as acquired and vacant. The Continental City and LAX Northside properties are represented as built out to their full entitlement.

2.4.3 Alternative A - Added Runway North

Alternative A would add a new runway, Runway 24R, with a length of 6,700 feet and a width of 200 feet, on the North Airfield approximately 400 feet north of current Runway 6L/24R. In 2005, Alternative A would still only have four runways, as shown in **Figure 6**, Alternative A - 2005. However, **Figure 6** can be compared to Alternative A in 2015 with the addition of the fifth runway, shown in **Figure 7**, Alternative A – 2015. To complete this alternative, existing Runway 6L/24R in the North Airfield would be relocated approximately 400 feet south of existing Runway 6L/24R's centerline and extended to 12,000 feet (to create new Runway 24C). Runway 6R/24L would be relocated 500 feet south of existing Runway 6R/24L's centerline and extended to 12,000 feet. The lateral separation between the relocated inbound runway and the new runway would be 1,600 feet, which would provide for an instrument approach with a visual segment to the new Runway 24R (e.g., Localizer Direction Aid [LDA]) in conditions down to 1,200-foot ceilings and four miles of visibility (or possibly 1,000 feet and three miles). In the South Airfield, Runway 7L/25R would be reconstructed and widened to 200 feet on the existing runway centerline. Runway 7R/25L would be reconstructed and extended to 12,000 feet long and 200 feet wide, on a centerline 156 feet south of the existing runway centerline to allow construction of a center taxiway between Runways 7R/25L and 7L/25R. The terminal facilities would be expanded to the west with a new western entrance and landside terminal facilities to accommodate the growing number of international operations at LAX and the increase in fleet size and passenger volume that accompanies such growth. The core passenger areas in the CTA remain the same as they are today. The pier concourses on the CTA's north terminals and the Tom Bradley International Terminal (TBIT) would be reconfigured to allow a total of 195 gates split between the reconfigured CTA and the New West Terminal Development. The West Terminal Area (WTA) would be located on the west side of the airport, east of Pershing Drive, and would include construction of a new passenger processing terminal and new concourses 11, 12, and 13. A people-mover would provide access to the new west short-term parking garage and the West Terminal to the concourses west of the TBIT and the CTA. Vehicular access to the CTA, TBIT, and other airport facilities would be enhanced by a new ring road around the perimeter that would connect with the Interstate 405 and Interstate 105 freeways. Cargo facilities would be expanded in the southeast corner of the airport, and additional land would be acquired in that area to provide more area for cargo facility expansion. The MTA Green Line rail system would then be extended from the current station at Aviation Boulevard to provide services to the WTA via the Imperial Highway corridor after 2005.

To accommodate new facilities as planned in Alternative A, approximately 273 acres of land must be acquired. All residents and businesses displaced in such a land acquisition would be relocated in compliance with all federal, state, and local regulations. The LAX Northside property, as described in the No Action/No Project Alternative, would be replaced by a substantially smaller Westchester Southside development as shown in **Figure 8**, Alternative A, Proposed Development – Westchester Southside.

2.4.4 Alternative B - Added Runway South

Alternative B would add a new 6,700-foot runway (Runway 25L) on the south side in the existing cargo area. In 2005, Alternative B still only has four runways, as shown in **Figure 9**, Alternative B - 2005. However, **Figure 5** can be compared to Alternative B in 2015 with the addition of the fifth runway shown in **Figure 10**, Alternative B – 2015. To complete this alternative, the current south runways (Runways 7R/25L and 7L/25R) would be relocated to the north so that the lateral separation between the south inboard runway and the new runway would be 2,500 feet. This separation would provide for staggered approach capability on the south complex with Category 1 weather minimums (200-foot ceilings and one mile visibility). In the North Airfield, existing Runway 6R/24L would be extended to the east, while the west end of this runway would be relocated to the east. These changes result in a runway that is 12,000 feet long and 200 feet wide. In addition, existing Runway 6L/24R's centerline would be shifted to the north to allow room for a new taxiway between 6L/24R and 6R/24L. Terminal improvements in this alternative are similar to those in other alternatives. The core passenger areas in the CTA remain the same as they are today. The pier concourses on the CTA's south terminals and the south concourses of TBIT would be reconfigured to allow a total of 199 gates split between the reconfigured CTA and the New West Terminal Development. The WTA would be located on the west side of the airport, east of Pershing Drive. It would

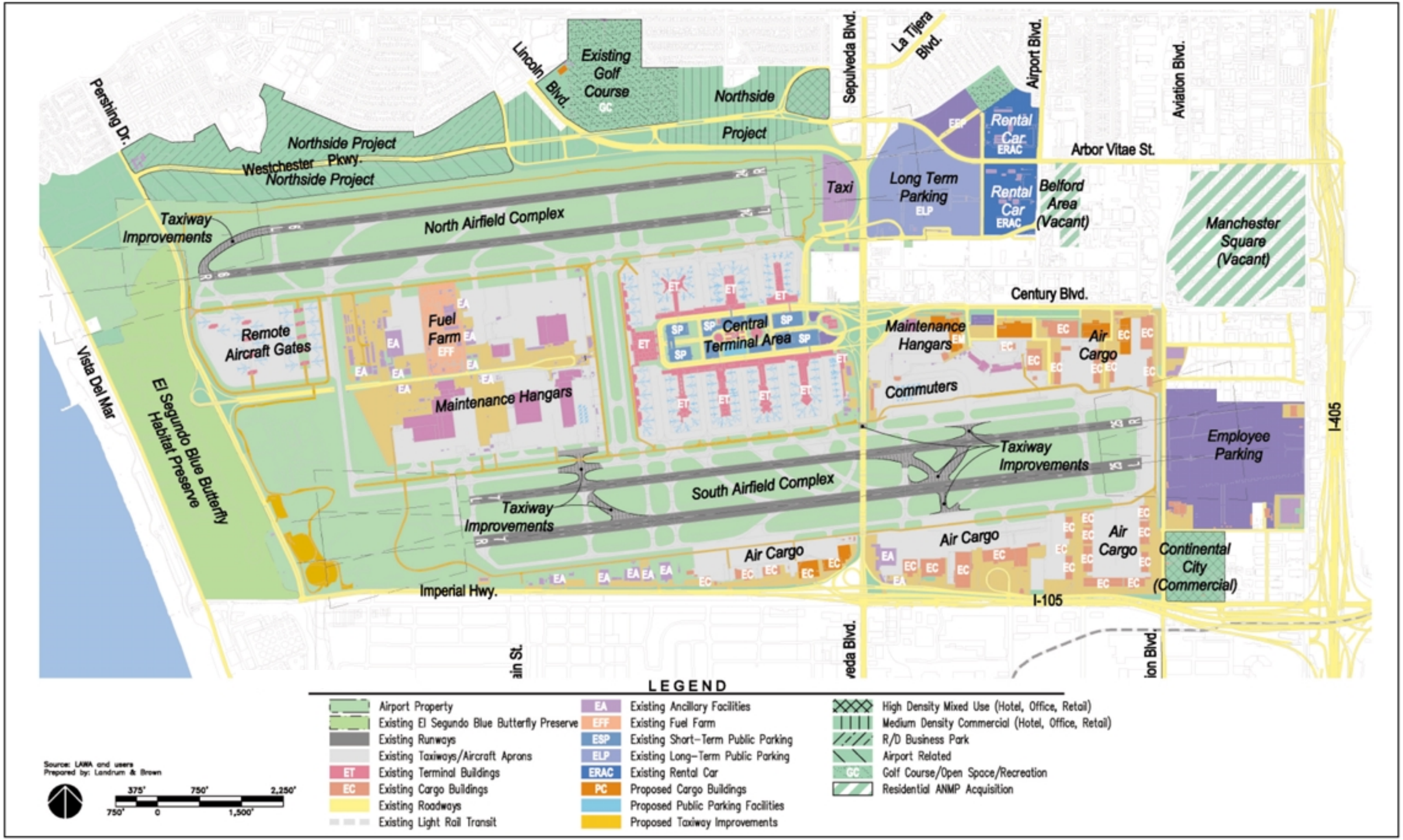
include construction of a new passenger-processing terminal and construction of new concourses 11, 12, and 13. A people-mover would provide access to the new west short-term parking garage and the West Terminal to the concourses west of the TBIT and the CTA. Vehicular access to the West Terminal, CTA, TBIT, and other airport facilities would be enhanced by a new ring road around the perimeter that would connect with the Interstate 405 and Interstate 105 freeways. The MTA Green Line rail system would then be extended from the current station at Aviation Boulevard to provide service to the new WTA via the Imperial Highway corridor after 2005. Alternative B would have the most significant impact on existing cargo facilities in the Imperial and South Cargo Complex facilities. Nearly all the existing Imperial and South Cargo Complexes would be demolished, and new cargo facilities would be provided in the Continental City/Imperial East area. Additional cargo facilities would be located north of the existing hotels and in the redeveloped area of Manchester Square.

To accommodate new facilities as planned in Alternative B, approximately 345 acres of land must be acquired. All residents and businesses displaced in such a land acquisition would be relocated in compliance with all federal, state, and local regulations. In Alternative B, property that is owned by LAX but is not required for airport facilities would be developed for non-aviation uses. The LAX Northside properties, as described in the No Action/No Project scenario, would be replaced by the Westchester Southside development as shown in **Figure 11**, Alternative B, Proposed Development – Westchester Southside.

2.4.5 Alternative C – No Additional Runway

Alternative C, the City's proposed action, improves the existing four runways by increasing their length and lateral separation to airfield operations. **Figure 12**, Alternative C – 2005 shows the alternative in 2005 and **Figure 13**, Alternative C – 2015 displays all additions made to the four runways by 2015. In the North Airfield, Runway 6L/24R would be reconstructed approximately 350 feet north of existing Runway 6L/24R's centerline, and would be extended to 9,400 feet long and 200 feet wide. Runway 6R/24L would be extended to 12,000 feet long and 200 feet wide along its existing centerline. In the South Airfield, Runway 7R/25L would be relocated approximately 50 feet south of the existing Runway 7R/25L centerline at a length of 11,096 to allow construction of a center taxiway between Runways 7R/25L and 7L/25R. Alternative C provides a total of 172 gates split between the CTA and the new WTA, which would be located on the west side of the airport, east of Pershing Drive. It would include construction of a new passenger-processing terminal and construction of new concourses 11, 12, and 13. A people-mover would provide access to the new west short-term parking garage and the West Terminal to the concourses west of the TBIT and the CTA. Vehicular access to the West Terminal, CTA, TBIT, and other airport facilities would be enhanced by a new ring road around the perimeter that would connect with the Interstate 405 and Interstate 105 freeways. The MTA Green Line rail system would then be extended from the current station at Aviation Boulevard to provide service to the new WTA via the Imperial Highway corridor after 2005. Alternative C retains the majority of cargo facilities in the Imperial and South Cargo complexes, redevelops portions of the Century Cargo complex, and constructs new cargo facilities in the Westchester Parkway and Manchester Square areas.

To accommodate new facilities as planned in Alternative C, approximately 224 acres of land must be acquired. All residents and businesses displaced in such a land acquisition would be relocated in compliance with all federal, state, and local regulations. In Alternative C, property that is owned by LAX but is not required for airport facilities would be developed for non-aviation uses. The LAX Northside properties, as described in the No Action/No Project scenario, would be replaced by the Westchester Southside development, as shown in **Figure 14**, Alternative C, Proposed Development – Westchester Southside.



LEGEND

- Airport Property
- Existing El Segundo Blue Butterfly Preserve
- Existing Runways
- Existing Taxiways/Aircraft Aprons
- ET Existing Terminal Buildings
- EC Existing Cargo Buildings
- Existing Roadways
- Existing Light Rail Transit
- EA Existing Ancillary Facilities
- EFF Existing Fuel Farm
- ESP Existing Short-Term Public Parking
- ELP Existing Long-Term Public Parking
- ERAC Existing Rental Car
- PC Proposed Cargo Buildings
- Proposed Public Parking Facilities
- Proposed Taxiway Improvements
- High Density Mixed Use (Hotel, Office, Retail)
- Medium Density Commercial (Hotel, Office, Retail)
- R/D Business Park
- Airport Related
- GC Golf Course/Open Space/Recreation
- Residential ANMP Acquisition

Source: LAWA and users
Prepared by: Landrum & Brown

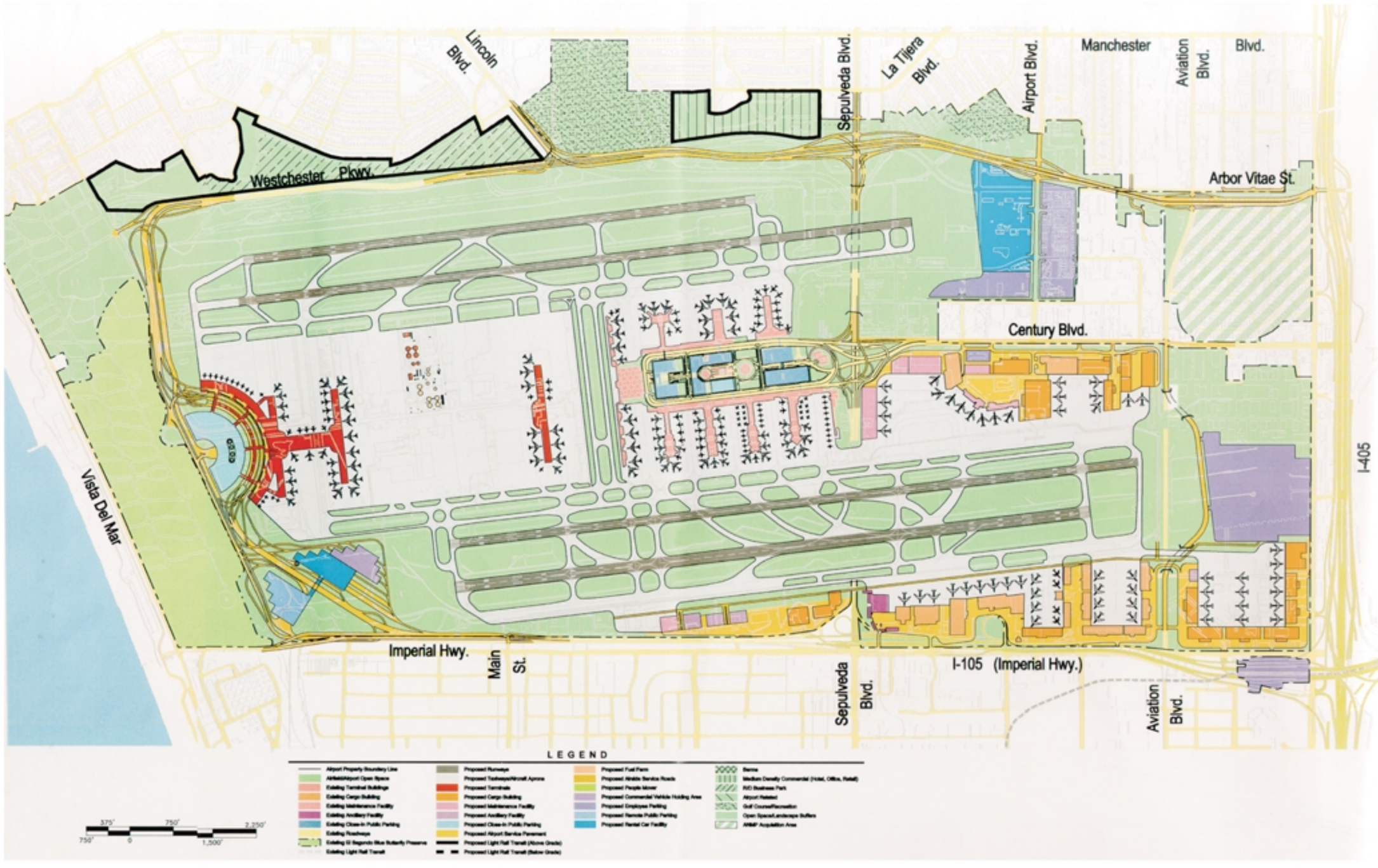
375' 750' 2,250'
750' 0 1,500'

Los Angeles International Airport Master Plan Biological Assessment

No Action/ No Project Alternative (2005 & 2015)

Figure 5

k:\1049-002\ba\section2\figure2.4.1-3.fh8



Los Angeles International Airport Master Plan Biological Assessment	Alternative A - 2005	Figure 6

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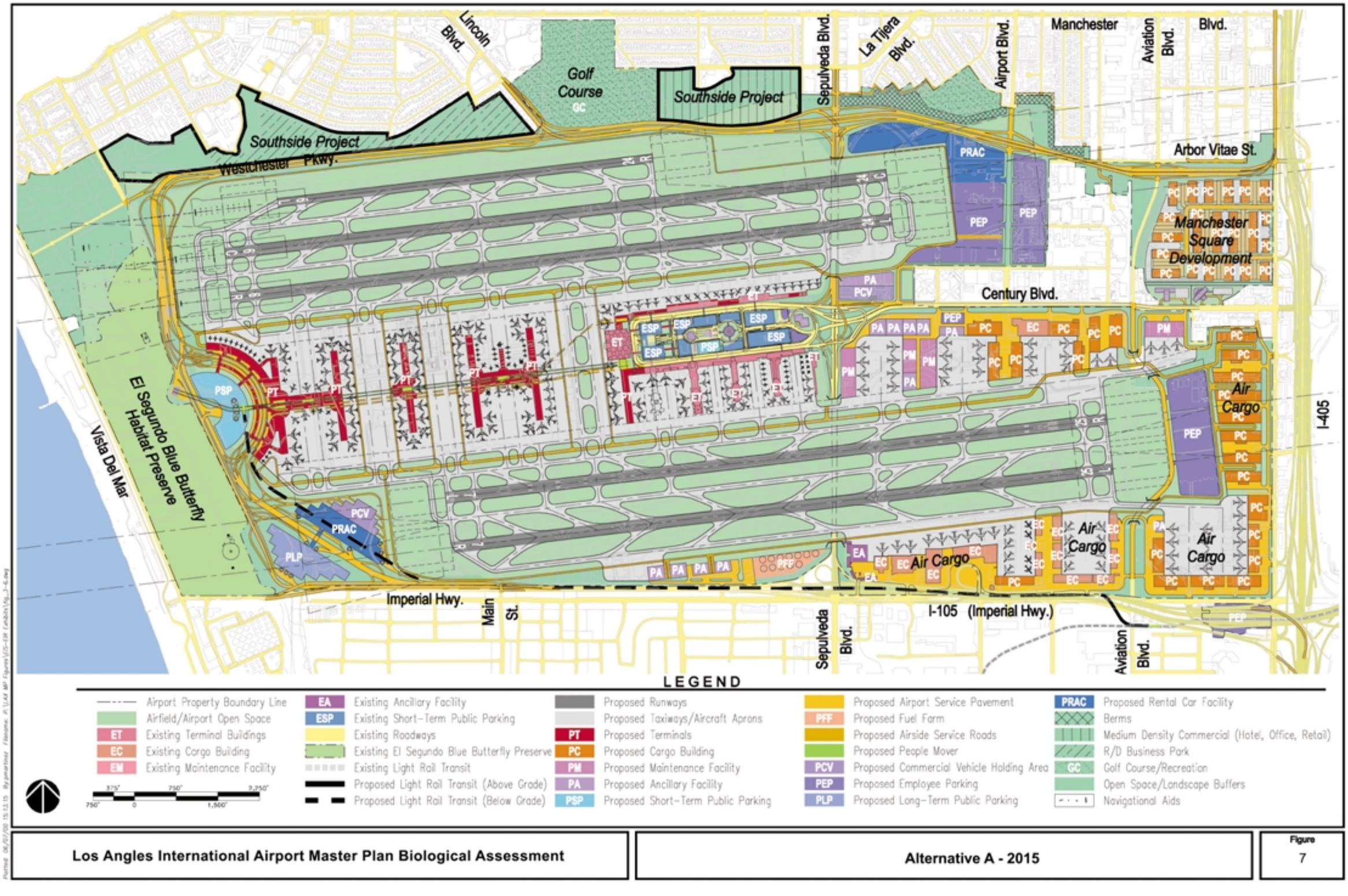
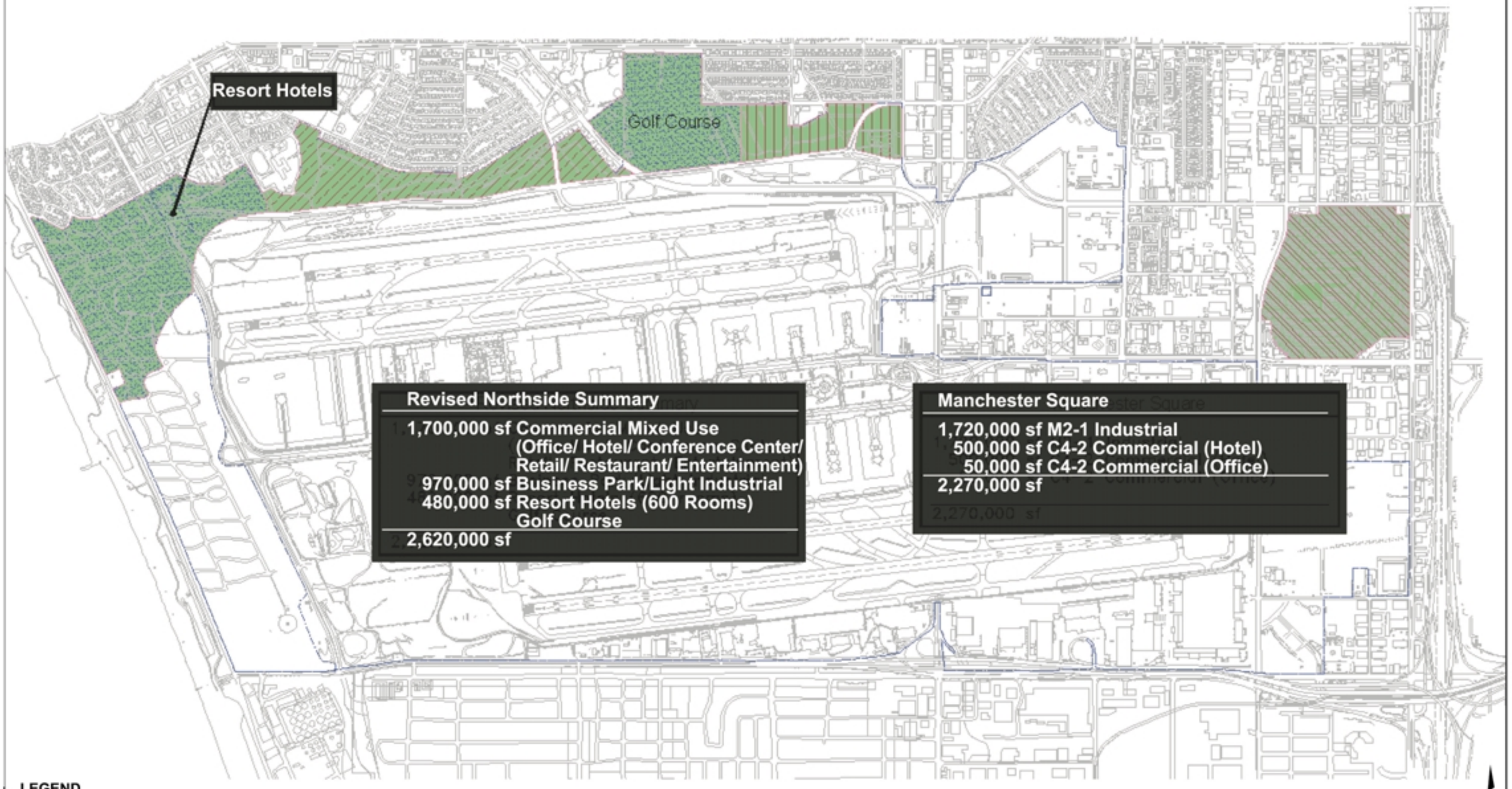


Los Angles International Airport Master Plan Biological Assessment

Alternative A - 2015

Figure 7



Los Angeles International Airport Master Plan Biological Assessment	Alternative A, Proposed Development - Westchester Southside	Figure 8

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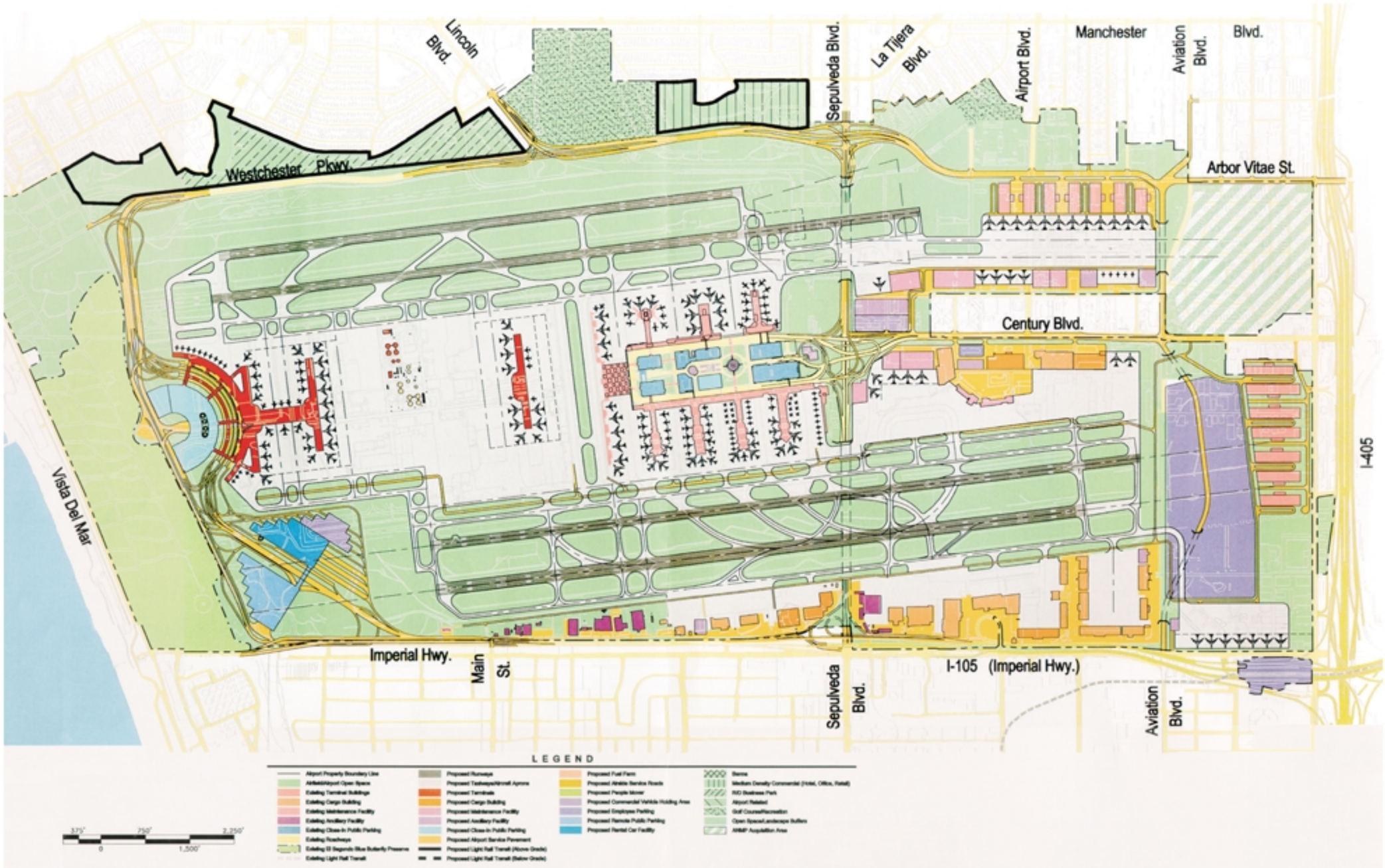

Los Angeles International Airport Master Plan Biological Assessment	Alternative B - 2005	Figure 9

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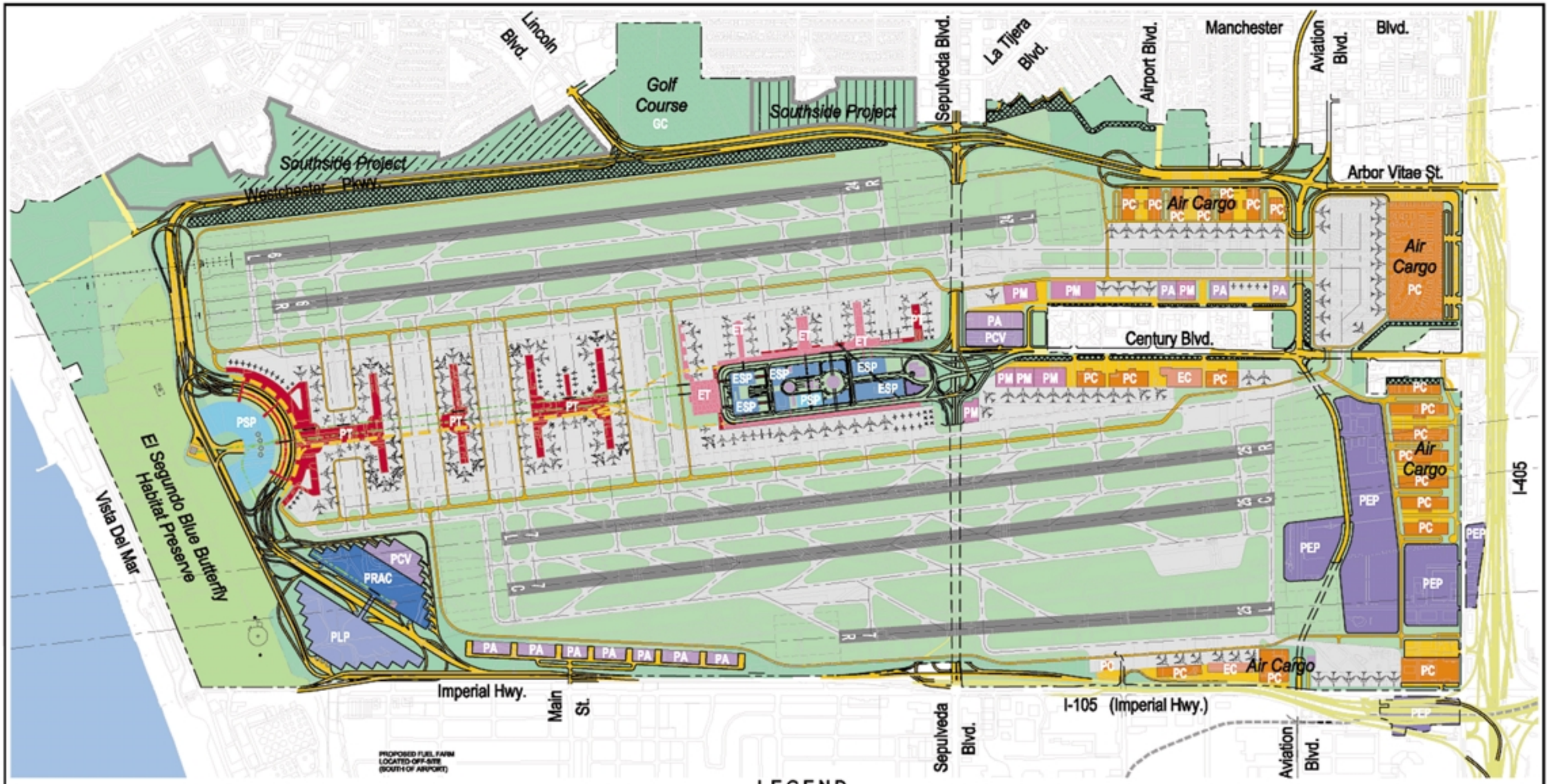


LEGEND

- Airport Property Boundary Line
- Airfield/Airport Open Space
- ET Existing Terminal Buildings
- EC Existing Cargo Building
- EM Existing Maintenance Facility
- EA Existing Ancillary Facility
- ESP Existing Short-Term Public Parking
- Existing Roadways
- Existing El Segundo Blue Butterfly Preserve
- Existing Light Rail Transit
- Proposed Light Rail Transit (Above Grade)
- Proposed Light Rail Transit (Below Grade)
- Proposed Runways
- Proposed Taxiways/Aircraft Aprons
- PT Proposed Terminals
- PC Proposed Cargo Building
- PM Proposed Maintenance Facility
- PA Proposed Ancillary Facility
- PSP Proposed Short-Term Public Parking
- Proposed Airport Service Pavement
- PFF Proposed Fuel Farm
- Proposed Airside Service Roads
- Proposed People Mover
- PCV Proposed Commercial Vehicle Holding Area
- PEP Proposed Employee Parking
- PLP Proposed Long-Term Public Parking
- PRAC Proposed Rental Car Facility
- Berms
- Medium Density Commercial (Hotel, Office, Retail)
- R/D Business Park
- Airport Related
- GC Golf Course/Recreation
- Open Space/Landscape Buffers
- Navigational Aids

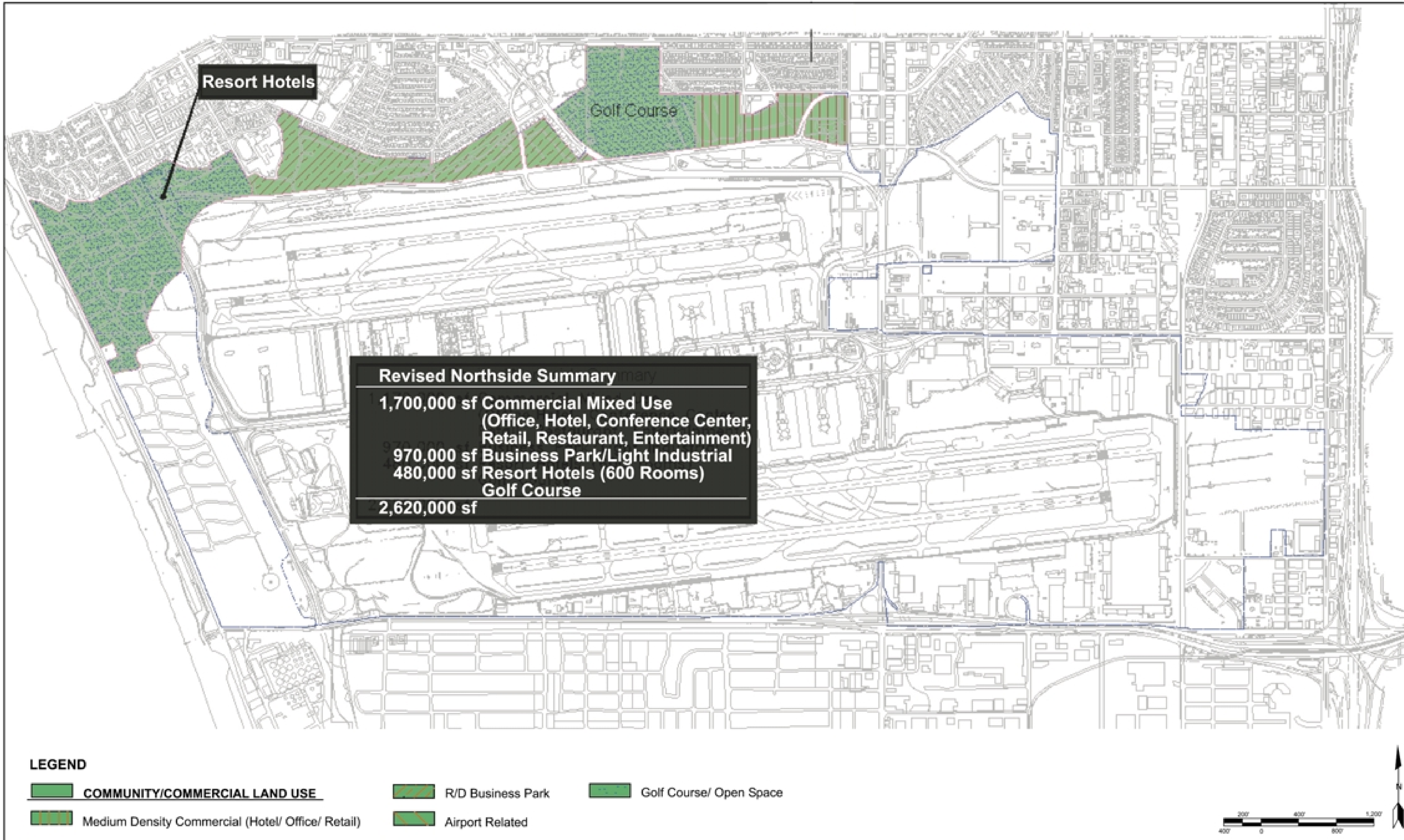
375' 750' 2,250' 750' 0 1,500'

Los Angeles International Airport Master Plan Biological Assessment

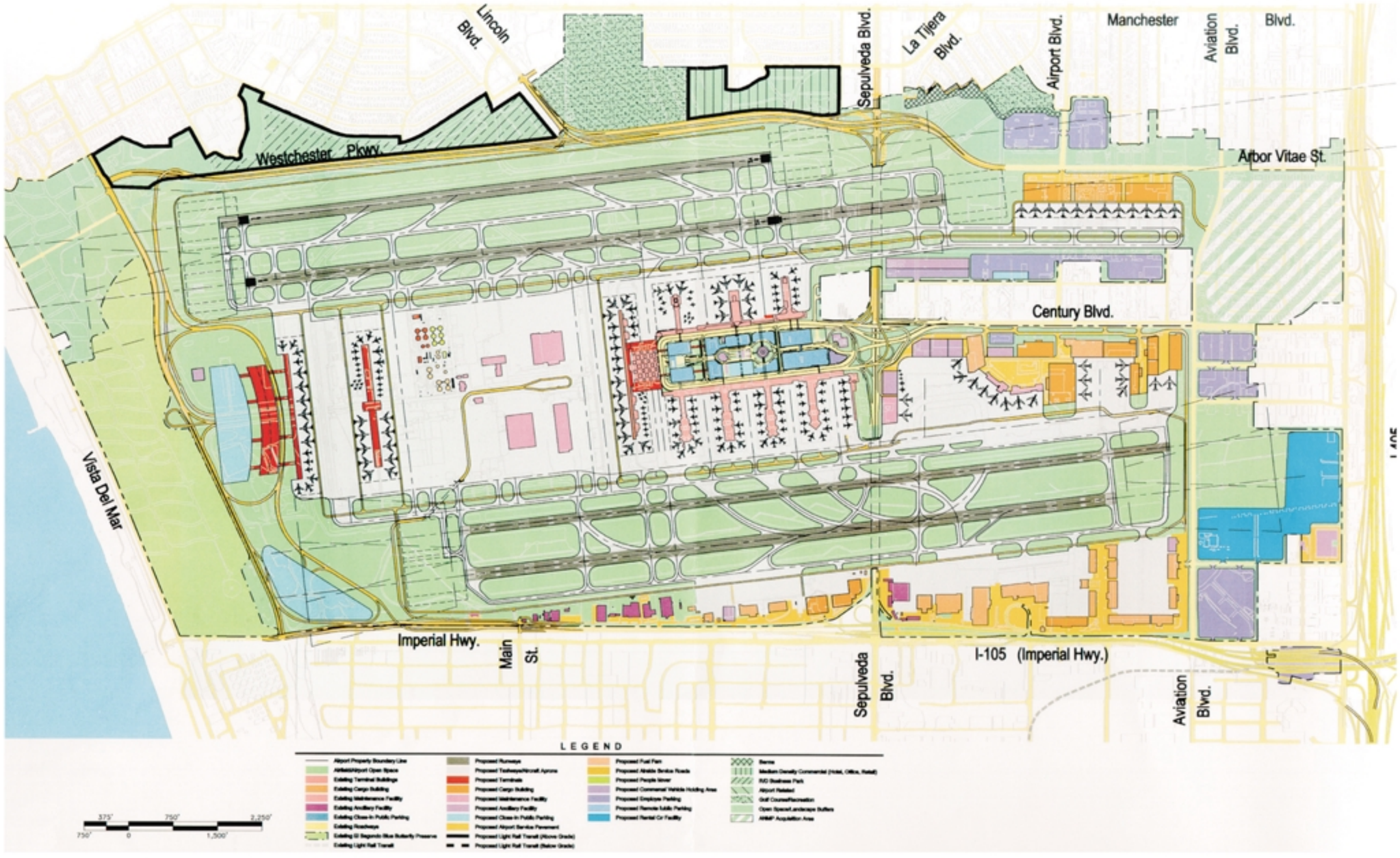
Alternative B - 2015

Figure *10*

k:\1049-002\biasection2\figure2.4.4-2.fh8



Los Angeles International Airport Master Plan Biological Assessment	Alternative B, Proposed Development- LAX Northside	Figure 11



Los Angeles International Airport Master Plan Biological Assessment	Alternative C - 2005	Figure 12

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Los Angeles International Airport Master Plan Biological Assessment

Alternative C - 2015

Figure *13*

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3.0 STUDY METHODS AND RESULTS

Directed surveys were conducted for 18 federally- and state-listed species determined to have the potential to exist within the Master Plan boundaries. The species surveyed included those identified in comments received in response to the Notice of Preparation (NOP) and Notice of Intent (NOI) to prepare a joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) in support of the Los Angeles International Airport Master Plan, issued concurrently by Los Angeles World Airports (LAWA) and the Federal Aviation Administration (FAA) in June 1997. The U.S. Fish and Wildlife Service (USFWS) responded to the NOP/NOI in its letters dated July 31 and August 29, 1997. Based on the letters from the USFWS and a query of the California Natural Diversity Database (CNDDB)[4] for the topographic quadrangle in which the project occurs (Venice), as well as adjacent quadrangles (Torrance, Inglewood, San Pedro, Redondo Beach, Beverly Hills, and Hollywood), nine federally- and state-listed plant species and nine federally- and state-listed wildlife species were identified as having the potential to exist within the Master Plan boundaries. Additional documentation reviewed includes: published and unpublished literature, historic and recent aerial photographs, and consultation with persons knowledgeable about the biology of the site area. The baseline information for the plant and animal species historically present at the Los Angeles/El Segundo Dunes is provided in the published writings and unpublished field notes of Dr. W. Dwight Pierce, entomologist and former curator of the County of Los Angeles Museum of Natural History. Pierce recognized the sand dunes as a unique habitat, and conducted systematic studies there in 1938 and 1939. With the collaboration of his colleagues, he published a series of 15 papers under the title "The Flora and Fauna of the El Segundo Sand Dunes" in the *Bulletin of the Southern California Academy of Sciences*[5, 6]. Aerial photographs of the area have also served as a rich resource for reconstructing the land use history, particularly at the Dunes. Los Angeles World Airports began biannual aerial photo surveys of the entire airport property in 1966, and their oblique photographs date back to 1924. Other documents that provided information were the Long Term Habitat Management Plan,[7] the Pacific Pocket Mouse Draft Recovery Plan,[8] the Vernal Pool Recovery Plan[9], and the El Segundo Blue Butterfly Recovery Plan.[10]

An additional 34 other sensitive wildlife and plant species were identified as having the potential to exist within the LAX Master Plan boundaries as a result of the USFWS' letter in response to the NOP/NOI

and a query of the up-to-date CNDDB.[11] These species are listed and described in Section 4.10, *Biotic Communities* of the EIS/EIR.

The purpose of the directed surveys for this Biological Assessment was to provide both the FAA and LAWA with adequate, up-to-date information on the existing biological resources within the Master Plan project area. This information will allow the FAA and LAWA to fulfill their responsibilities outlined in the State and Federal Endangered Species Acts, the California Environmental Quality Act (CEQA), and the National Environmental Protection Act (NEPA).

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4 California Department of Fish and Game, 1999, *California Natural Diversity Database—Rarefind 2*, Sacramento, California.

5 W. D. Pierce and D. Pool, 1938, "The Fauna and Flora of the El Segundo Sand Dunes," *Bulletin of the Southern California Academy of Sciences* 37: 93-97.

6 W. D. Pierce, 1938-1939, Field Notes from Pierce Expedition to the Los Angeles/El Segundo Dunes, on file at Natural History Museum of Los Angeles County, Department of Entomology.

7 Environmental Science Associates, 1994, "Long-Term Habitat Management Plan for Los Angeles Airport/El Segundo Dunes," Prepared by Sapphos Environmental, Inc.

8 United States Fish and Wildlife Service, 1997, "Draft Recovery Plan for the Pacific Mouse," Carlsbad Field Office, Ecological Services, Carlsbad, California.

9 United States Fish and Wildlife Service, 1997, "Vernal Pools of Southern California Draft Recovery Plan," U. S. Fish and Wildlife Service, Portland, Oregon.

10 United States Fish and Wildlife Service, 1997, "El Segundo Blue Butterfly (*Euphilotes battoides allyni)* Draft Recovery Plan," Portland, Oregon.

11 California Department of Fish and Game, 1999, *California Natural Diversity Database—Rarefind 2*, Sacramento, California.

The first step in conducting the directed surveys was to map the existing plant communities within the Master Plan project area. The second effort was to complete a delineation of ponded areas that are possibly subject to the jurisdiction of the U.S. Army Corps of Engineers (USACOE). The third step in the process was to conduct directed surveys for both state- and federally-designated threatened and endangered species, as well as other designated sensitive species. All of the surveys were conducted in accordance with applicable state and federal protocols, and the USFWS and the CDFG were notified ten days prior to the commencement of the directed surveys for listed species.

3.1 Plant Communities

General plant surveys within the LAX Master Plan boundaries were conducted on February 14 and 15, 1996 by Sapphos Environmental, Inc. Areas surveyed within the LAX Master Plan boundaries include: the Airfield Operations Area (AOA) (specifically, the vegetation between and along the north and south runway complexes), Westchester Golf Course, ex-residential sites on the north perimeter of the airport, the southern approach zone, open areas located to the west of the north and south runway complexes and to the east of Pershing Drive, and open areas bounded by Sandpiper, Waterview, and Napoleon Streets at the northwest corner of the LAX Master Plan boundaries. Open areas bounded by Sandpiper Street, Imperial Highway, Vista del Mar Boulevard, and Pershing Drive along the western perimeter of the LAX Master Plan boundaries, including the El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area), were also surveyed. During these field visits, the following observations were made and recorded:

- Dominant and characteristic floral components comprising the plant communities and associated wildlife resources present within the LAX Master Plan boundaries
- The presence or absence of sensitive species and the potential of the site to support such species
- The presence or absence of wetlands habitat
- The presence or absence of other sensitive habitat
- The proximity to wildlife dispersal or migration corridors

Boundaries of plant communities were marked on a one inch:3,500 feet aerial photograph of the LAX Master Plan boundaries dated December 17, 1995 (W. O. # 96-0052 by I. K. Curtis Services, Inc., 2919 Empire Avenue, Burbank, California 91504). As a result of general plant surveys, a plant communities map was generated for the Master Plan boundaries and Los Angeles/El Segundo Dunes, and is provided in **Figure 15**, Plant Communities. Plant communities are described in accordance with the definitions provided in *Preliminary Descriptions of the Terrestrial Natural Communities of California*[12] and in *A Manual of California Vegetation*.[13] The plant communities identified include: Southern Foredune (CNDDB Element Code 21230), Southern Dune Scrub (CNDDB Element Code 21330), Valley Needlegrass Grassland (CNDDB Element Code 42110), Disturbed Dune Scrub/Foredune, Disturbed/Bare Ground, Non-Native Grassland/Ruderal, Landscaped, and Developed.

Historic aerial photographs of the LAX airfield area and interviews with airport operations staff reveal that even areas that are currently undeveloped on the airfield have been subject to substantial past disturbances of various kinds.[14] Most of the open areas on the LAX airfield are under the jurisdiction of Airfield Operations. Routine airport operations require that Safety Areas be maintained around the runways and terminals. In order to accomplish this, open areas on the airfield are regularly mowed, graded, disced, tilled, and controlled for weeds and small mammal populations by operations personnel. As a result of this maintenance work, the top layer of soil on the airfield is subject to persistent turnover and regular disturbance, making it difficult for native plant communities to take hold and prosper.[15]

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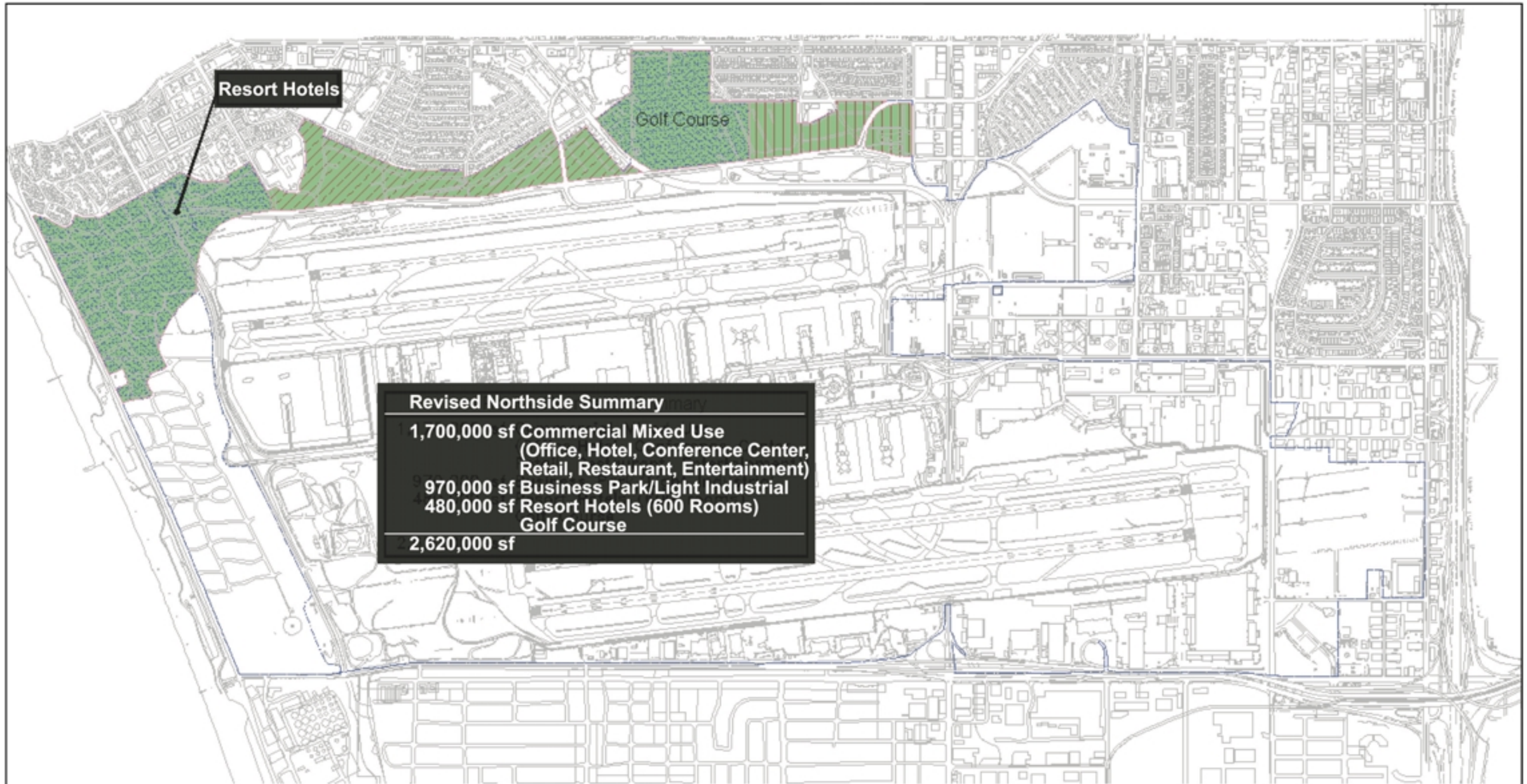
[12] R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California,* California Department of Fish and Game, Sacramento, California.

[13] J. O. Sawyer and T. Keeler-Wolf, 1995, *A Manual of California Vegetation*, California Native Plant Society, Sacramento, California.

[14] Sapphos Environmental, Inc., 1998, "Results of Soil Characterization Study Jurisdictional Delineation for Vernal Pools in Support of Los Angeles International Airport Master Plan 2015 Expansion," City of Los Angeles, Los Angeles County, California, Prepared for Landrum and Brown, February 6.

[15] Sapphos Environmental, Inc., 1998, "Results of Soil Characterization Study Jurisdictional Delineation for Vernal Pools in Support of Los Angeles International Airport Master Plan 2015 Expansion," City of Los Angeles, Los Angeles County, California, Prepared for Landrum and Brown, February 6.



Los Angeles International Airport Master Plan Biological Assessment	Alternative C, Proposed Development - Westchester Southside	Figure *14*

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LEGEND

- Southern Foredune
- Southern Dune Scrub
- Disturbed Dune Scrub/Foredune
- Valley Needlegrass Grassland
- Non-Native Grassland/Ruderal
- Disturbed/Bare Ground
- Landscaped
- Developed

N

Los Angeles International Airport Master Plan Biological Assessment	Plant Communities	Figure *15*

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3.2 Directed Surveys for Listed Plants

Directed surveys for listed plant species were undertaken by Sapphos Environmental, Inc. in 1996, 1997, 1998, and 2000. In addition, information on listed plant species was incorporated from annual qualitative and quantitative plant surveys conducted by Sapphos Environmental, Inc. within the Habitat Restoration Area since 1995. A query of the CNDDB was conducted to identify federally- and state-listed plant species with potential to exist in the LAX Master Plan boundaries. The CNDDB was consulted for the Venice quadrangle and adjacent quadrangles. Qualitative plant surveys were conducted during the late winter and spring of 1995 (January 17 and 19; February 1, 7, 13, 15, 19, 21, 22, 26, and 28; and March 2, 9, 21, 23, 24, 28, and 30, 1995). The floristic survey was repeated during the fall of 1996 (September 12, 14, 19, 20, and 26; October 4, 5, 10, 11, 17, 19, 24, 26, and 29; and November 2 and 4, 1996),[16] spring of 1997 (March 14, 18, 21, 25, 27, and 28; and April 1, 1997),[17] and spring of 1998 (April 21 and 22; May 5, 7, 20, and 27; and June 3, 16, and 23, 1998).[18] Directed surveys for listed plant species were repeated in 2000. Directed spring surveys for listed plant species were conducted on June 1, 6 and 30, 2000. The results of summer 2000 surveys for federally- or state-listed flora are pending completion. During these surveys, observations were made and recorded of the dominant and characteristic floral components comprising the plant communities, the presence or absence of listed species (including San Diego button-celery, beach spectacle-pod, Santa Monica Mountains dudleya, Braunton's milkvetch, coastal dune milkvetch, Mexican flannelbush, and California orcutt grass, all surveyed for during the spring; Ventura marsh milkvetch, and salt marsh bird's-beak, surveyed for during the summer), and the potential of the site to support such species and non-native weedy pest plant species.

Surveys for listed plant species were undertaken during the seasons most appropriate for detection of each individual species. Listed annual species identified as potentially present within the LAX Master Plan boundaries were searched for in the spring. Survey times for listed species were adjusted for El Niño and La Niña weather patterns. Additionally, surveys were performed during confirmed flowering periods for each listed species. Flowering for each listed species was confirmed either by direct observation or by telephone confirmation with a recognized expert that had seen the species flowering during the survey period at a known extant population site. For each directed survey, the LAX Master Plan boundaries were surveyed on foot. Each surveyor had an in-depth knowledge of the vegetative and floral characteristics of the target species. The survey pattern consisted of parallel transects approximately six meters apart. Each surveyor walked the center of the six-meter transect recording individuals of each species encountered, which were then counted and mapped onto a one inch:600 feet topographic base map of the survey site. Transects ran either north and south or east and west, depending on site boundaries (**Figure 16**), 1998 and 2000 Survey Locations for Listed Plant Species).

Sapphos Environmental, Inc. conducted directed surveys for vernal pool-associated plant species in the LAX Master Plan boundaries on November 11 and December 19, 1997, and January 8 and 23, March 5 and 26, April 16, July 9, 1998, June 1, 2000. Two federally-listed endangered plant species, California orcutt grass (*Orcuttia californica*) and San Diego button-celery (*Eryngium aristulatum* var. *parishii*), were described by the USFWS as potentially occurring within the LAX Master Plan boundaries.[19] Both species are associated with vernal pool habitats. A delineation of ponded and ephemerally wetted areas within the airfield conducted by Sapphos Environmental Inc. on January 6, 7, and 23, 1998 revealed no extant vernal pools within the LAX Master Plan boundaries.[20] However, surveys for vernal pool-associated branchiopods and plants were continued in 20 areas determined to have potential to support vernal pool species **(Figure 17),** Ephemeral Aquatic Habitat at Los Angeles International Airport Northern Survey Area and **Figure 18,** Ephemeral Aquatic Habitat at Los Angeles International Airport Southern Survey Area).

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16 Sapphos Environmental, Inc., 1996, "Biweekly Monitoring Reports 1996."

17 Sapphos Environmental, Inc., 1997, "Biweekly Monitoring Reports 1997."

18 Sapphos Environmental, Inc., 1999, "1998-1999 Vegetation Monitoring Report and Schedule for On-Going Maintenance Activities, El Segundo Blue Butterfly Habitat Restoration Area at Los Angeles International Airport, Los Angeles, California."

19 United States Fish and Wildlife Service, 1997, letter dated August 29 to Mr. David B. Kessler, Federal Aviation Administration, U.S. Department of Transportation.

20 Sapphos Environmental, Inc., 1998, "Results of Soil Characterization Study Jurisdictional Delineation for Vernal Pools in Support of Los Angeles International Airport Master Plan 2015 Expansion," City of Los Angeles, Los Angeles County, California, Prepared for Landrum and Brown, February 6.

Surveys were conducted by walking the perimeters of all wetted areas and observing plant life growing within the ponded area. Neither California orcutt grass nor San Diego button-celery were observed during directed surveys within the LAX Master Plan boundaries (approximately 105 miles from LAX).

In addition to surveys for California orcutt grass and San Diego button-celery in ponded areas within the LAX Master Plan boundaries, Sapphos Environmental, Inc. surveyed extant vernal pools known to support populations of these species in order to observe their life stages and use those observations to confirm their presence/absence within the LAX Master Plan boundaries. Vernal pools south of the Master Plan boundaries at Marine Corps Air Station (MCAS) Miramar (approximately 105 miles from LAX) and Santa Rosa Plateau (approximately 71 miles from LAX) were surveyed on February 20, April 15, and July 8, 1998. Surveys of vernal pools north of the Master Plan boundaries at the Cruzan Mesa (approximately 39 miles from LAX) were conducted on March 27 and June 30, 1998. San Diego button-celery was observed at the vernal pools south of the LAX Master Plan boundaries, and California orcutt grass was observed in the pools north of the LAX Master Plan boundaries at the Cruzan Mesa. Both species were observed in vegetative and flowering stages of their life cycles. Observations of these reference populations were then used to determine the presence/absence of these species during directed surveys of ponded areas within the Master Plan boundaries. Based on the results of these surveys, California orcutt grass and San Diego button-celery were determined not to be present within the LAX Master Plan boundaries.

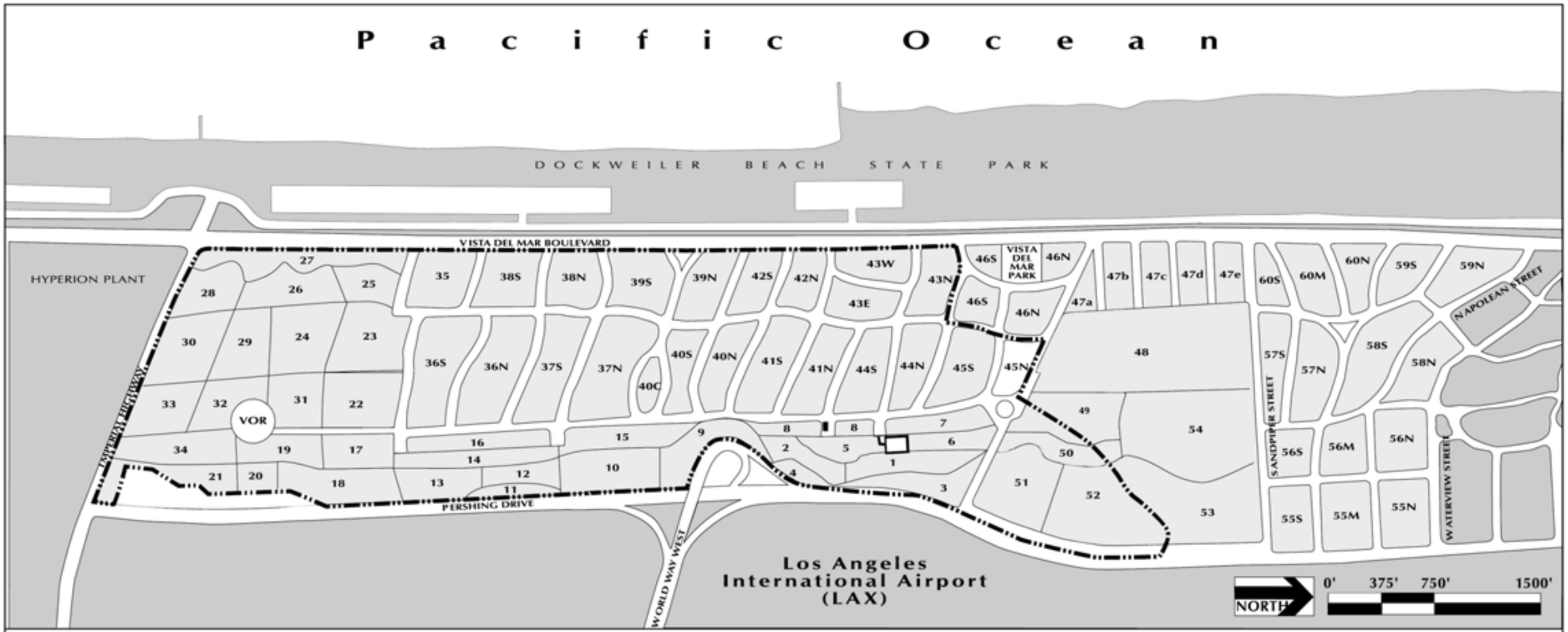
No federally- or state-listed plant species with the potential to exist within the Master Plan boundaries were determined to be present as a result of directed surveys conducted in support of the Master Plan EIS/EIR. Results of replicate directed surveys for federally- or state-listed plant species to be conducted for spring of the year 2000 have been completed. Results of replicate directed surveys for summer of 2000 are pending completion; however, results are not expected to change.

3.3 Directed Wildlife Surveys

Directed surveys were undertaken for all federally- and state-listed wildlife species with the potential to exist in the LAX Master Plan boundaries. The list of wildlife species subject to directed surveys includes those species identified by the USFWS in its letters of July 31 and August 29, 1997, the CDFG's letter dated August 29, 1997, those identified by the CDFG's CNDDB,[21] and those addressed as potentially present in the literature review.[22] As a result, nine federally- and state-listed endangered wildlife species were identified as potentially present in the LAX Master Plan boundaries: Riverside fairy shrimp (*Streptocephalus wootoni)*, San Diego fairy shrimp (*Branchinecta sandiegonsis)*, El Segundo blue butterfly (*Euphilotes battoides allyni*), California brown pelican (*Pelecanus occidentalis californicus*), American peregrine falcon (*Falco peregrinus anatum*), California least tern (*Sterna antillarum brownii*), southwestern willow flycatcher (*Empidonax extimus traillii*), least Bell's vireo (*Vireo belli pusillus*), and Pacific pocket mouse (*Perognathus longimembris pacificus*). All surveys were performed by Sapphos Environmental, Inc. personnel and permitted subconsultants under the guidelines of the USFWS and the CDFG protocols when required. Permitted subconsultants included Mr. Peter Bloom (USFWS Permit Number PRT 787376), Mr. John Konecny (USFWS Permit Number PRT 837308), Mr. Bill Vanherweg (USFWS Permit Number PRT 787644), Dr. Michael O'Farrell (USFWS Permit Number PRT 744707), Dr. Richard Arnold (USFWS Recovery Subpermit Number PRT FWSCFO-11), and Sapphos Environmental, Inc. technical staff supervised by Dr. Irena Mendez, also of Sapphos Environmental, Inc. (USFWS Permit Number PRT 830990).

[21] California Department of Fish and Game, 1997 and 1999, *California Natural Diversity Database—Rarefind 2*, Sacramento, California.

[22] Sapphos Environmental, Inc., 1996, Technical Memorandum, November 8, 1996, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team.



LEGEND

- Road System (Many Subsites Are Delineated by Road System)
- Habitat Restoration Area Boundary
- 21 — Subsite Number
- Remote Communications Site
- VOR — Very High Omni Range Navigation Beacon
- Trailer
- Transect Lines Used to Survey for Listed Plants

Los Angeles International Airport Master Plan Biological Assessment	1998 and 2000 Survey Locations for Listed Plant Species	Figure 16

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Not to Scale

Los Angeles International Airport Master Plan Biological Assessment	Ephemeral Aquatic Habitat at Los Angeles International Airport Northern Survey Area	Figure 17

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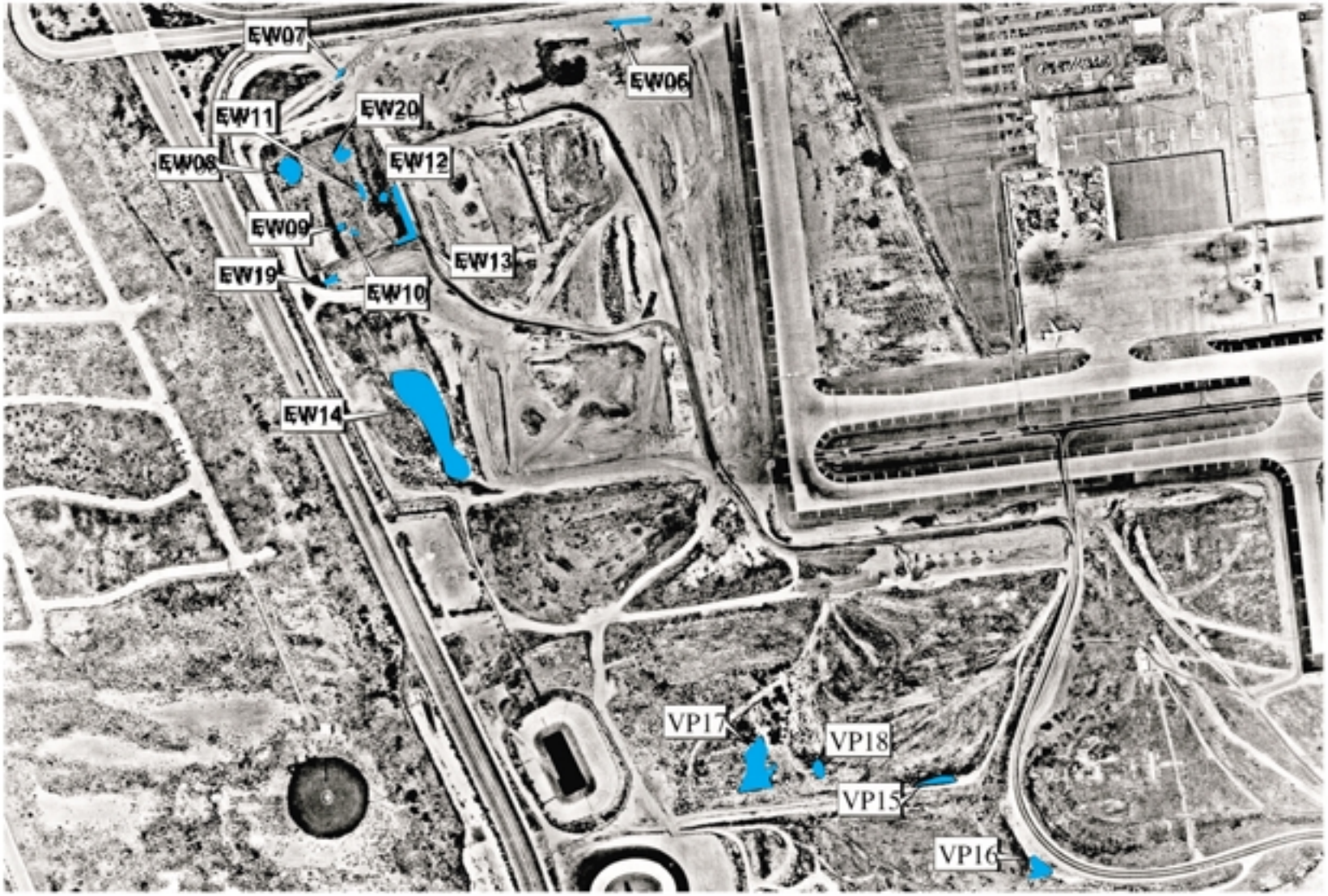

Not to Scale

Los Angeles International Airport Master Plan Biological Assessment	Ephemeral Aquatic Habitat at Los Angeles International Airport Southern Survey Area	Figure 18

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Listed Species

Crustaceans

Riverside and San Diego Fairy Shrimp

Directed dry and wet season surveys for federally-endangered Riverside fairy shrimp and San Diego fairy shrimp were conducted by permitted subconsultants of Sapphos Environmental, Inc., in accordance with survey protocols established by the USFWS.[23] (**Figure 17** and **Figure 18**) Dry season and wet season surveys were performed in conjunction with mapping of ephemerally wetted areas. Dry season sampling was performed on September 18 and November 6, 1997. Dry season soil samples were collected from at least ten localities and sent to Jones and Stokes Associates, Inc. for identification of fairy shrimp cysts. Heavy El Niño-influenced rains in the Los Angeles basin during the winter/spring of 1997/1998 enabled ponding of enough water for a duration suitable for versatile fairy shrimp to hatch. Wet season surveys were conducted on December 19, 1997, January 8 and 23, March 5 and 26, and April 16, 1998. Wet season surveys were conducted following significant rainfall in which pools remained inundated for a minimum of ten days. Sampling of fairy shrimp was accomplished with sweep nets, and sampling periods were timed to coincide with observed hatching of fairy shrimp at other sites throughout Southern California being surveyed by the permitted subconsultant. Adult fairy shrimp were identified in the field to species level. The only fairy shrimp identified as a result of wet season surveys were a common species know as versatile fairy shrimp.

As a result of 1997 dry season surveys, Riverside fairy shrimp cysts were determined to be present. Subsequent rearing of fairy shrimp cysts confirmed the identity as Riverside fairy shrimp.[24] Wet season surveys to be undertaken in 2000/2001 are pending completion.

Arthropods

El Segundo Blue Butterfly

Sapphos Environmental, Inc. has employed two methodologies to survey for the federally-endangered El Segundo blue butterfly (ESB): the transect count method and the block count census method. The area surveyed is depicted in **Figure 19**, ESB Survey Site and Historical Transect. The transect count method utilizes the visual scoring of individuals (both males and females) while walking a transect, maintaining a constant gait over the transect, and recording those insects within an imaginary box about five meters square, projected ahead of the observer.[25] The transect route is staked, and is easily followed along an established footpath approximately 12 inches wide. Mattoni established this monitoring method at the Dunes in 1984. This same transect has been walked since that time. Based upon the review of the results of these previous surveys[26] and on the results of qualitative surveys, Sapphos Environmental, Inc. initiated a different method of block census counts at each subsite. However, Sapphos Environmental,

Inc. has continued to walk the transect established by Mattoni. This historic transect was not expanded or modified over the years in order to be able to compare current data with data collected during previous years' surveys. Sapphos Environmental, Inc. initiated block counts because the El Segundo blue butterfly had expanded its range greatly from the time the transect was established. Block counts were then determined preferable to transect counts because they are more accurate, and provide a total census of the ESB. Both methods, however, feature similar levels of intrinsic accuracy.

Sapphos Environmental, Inc. employed the transect count method in 1995, 1996, 1997, 1998, and 2000. Transects are walked at one-week intervals at the height of the flight season, usually from mid-June to mid-August,[27] thus ensuring that the majority of butterflies have emerged from the pupal stage.

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[23] Sapphos Environmental, Inc., 1998, "Results of Soil Characterization Study Jurisdictional Delineation for Vernal Pools in Support of Los Angeles International Airport Master Plan 2015 Expansion," City of Los Angeles, Los Angeles County, California, Prepared for Landrum and Brown, February 6.

[24] Christoper Rogers, 1999, Jones & Stokes Associates, Inc., *Personal Communications*, June 1.

[25] R. Mattoni, 1990, "Species Diversity and Habitat Evaluation Across the El Segundo Dunes at LAX," Final Report prepared for the Board of Airport Commissioners.

[26] R. Mattoni, 1992, "The Endangered El Segundo Blue Butterfly," *Journal of Research on Lepidoptera* 29: 277-304.

[27] R. Mattoni, 1990, "Species Diversity and Habitat Evaluation Across the El Segundo Dunes at LAX," Final Report prepared for the Board of Airport Commissioners.

Conducting transects at one-week intervals reduces the likelihood of counting the same butterfly twice. The block count census method consists of surveying all subsites of the Habitat Restoration Area during the height of the flight season in 1996, 1997, 1998, 1999, and 2000. Teams of individuals experienced in counting El Segundo blue butterfly survey the subsites. Team members are supervised by an experienced and permitted biologist on identification of all butterflies occurring at the site and the sensitivity of El Segundo blue butterfly and coast buckwheat (*Eriogonum parvifolium*) to disturbance. Subsites are surveyed on foot, following established footpaths and avoiding native vegetation, especially coast buckwheat. Each subsite is completely surveyed, and all male and female butterflies are counted and mapped onto a one inch: 40 feet aerial photograph of the subsite. In addition, data is recorded on a standardized data sheet. Each aerial photograph is then signed and dated by the permitted biologist performing the survey.

Two sets of surveys were conducted in 1995.[28] The first set involved ten surveys conducted between June 29 and August 29, 1995 at seven-day intervals. These surveys were conducted to replicate the historical transect established by Mattoni in 1984. A second set of transects was established to survey for El Segundo blue butterfly in areas outside of known historically occupied habitat. In 1996, surveys were conducted during the height of the flight season from July 12 to August 1.[29] The 1997 directed surveys for El Segundo blue butterfly were conducted using the two methodologies described under El Segundo blue butterfly Survey Methods: four replicates of historic transects, and the block count census method.[30] The historic transect established early in the history of the El Segundo blue butterfly monitoring was replicated four times by a permitted subconsultant on July 24 and August 2, 7, and 16, 1997.

Presence/absence surveys for coastal buckwheat were conducted on foot on the undeveloped areas of the LAX airfield. No coast buckwheat was identified outside the Habitat Restoration Area. The block counts were performed between July 22 and July 26, 1997 on each subsite within the Habitat Restoration Area.[31]

ESB survey efforts during 1998 were undertaken on July 11, 17, and 24; August 3, 11, and 25; and September 9, 1998 along the historical transect, and from July 24 through July 28, 1998, when block counts were performed (**Figure 20**, ESB Survey Site and Block Counts, 1998).[32]

During 1999, the surveys along the historical transect were conducted on July 8, 10, 15, 22, and 27; August 3, 11, 17, 24, and 31; and September 9, 1999. Block counts were performed from July 28 through July 31, 1999.[33] During 2000, the surveys along the historical transect were conducted on July 1, 5, 14, 17, and 25; August 1, 5, 12, 21, 24, and 26, 2000. Block counts were performed on July 14 through 17, 2000. Formal reporting of results of 2000 monitoring efforts to the USFWS is pending. **Table 4**, El Segundo Blue Butterfly Population Figures, summarizes El Segundo blue butterfly monitoring efforts from 1995 to 2000 at LAX.

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[28] Sapphos Environmental, Inc., 1996, Memorandum for the Record 1043-004.M01, Subject: 1996 ESB Numbers at LAX El Segundo Dunes, October 25.

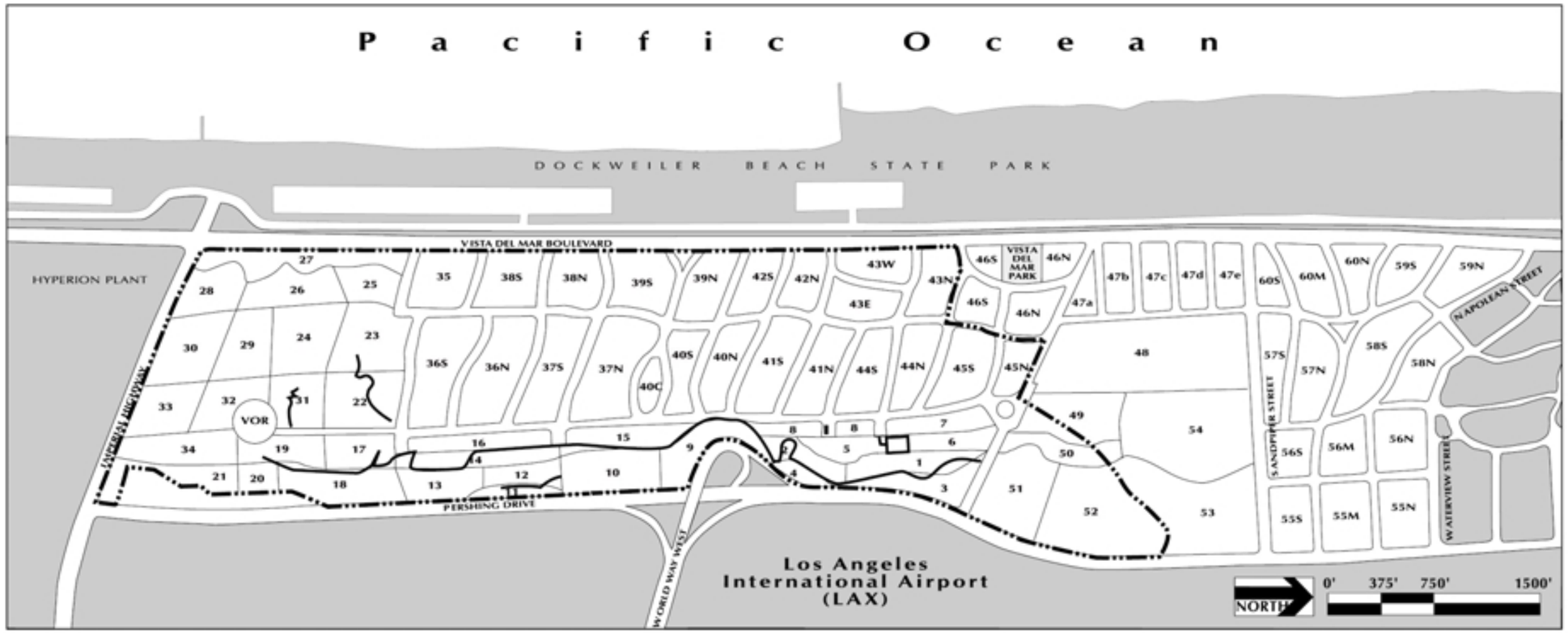
[29] Sapphos Environmental, Inc., 1996, Memorandum for the Record 1043-004.M01, Subject: 1996 ESB Numbers at LAX El Segundo Dunes, October 25

[30] R. A. Arnold, 1997, "Preliminary Report of El Segundo Blue Monitoring Activities at the Los Angeles International Airport in July and August 1997," prepared for Sapphos Environmental, Inc. and the U.S. Fish and Wildlife Service.

[31] R. A. Arnold, 1997, "Report of El Segundo Blue Monitoring Activities at the Los Angeles International Airport in July, August, and September 1999", Prepared for Sapphos Environmental, Inc., and the U. S. Fish and Wildlife Service.

[32] R. A. Arnold, 1998, "Report of El Segundo Blue Monitoring Activities at the Los Angeles International Airport in July, August, and September 1998", Prepared for Sapphos Environmental, Inc., and the U. S. Fish and Wildlife Service.

[33] R. A. Arnold, 1999, "Report of El Segundo Blue Monitoring Activities at the Los Angeles International Airport in July, August, and September 1999", Prepared for Sapphos Environmental, Inc., and the U. S. Fish and Wildlife Service.



LEGEND

- Road System (Many Subsites Are Delineated by Road System)
- Habitat Restoration Area Boundary
- Subsite Number (21)
- Remote Communications Site
- Very High Omni Range Navigation Beacon (VOR)
- Trailer
- Historical Route for El Segundo Blue Transect
- Transect Interval Number (35)

Not to Scale

Los Angeles International Airport Master Plan Biological Assessment	ESB Survey Site and Historical Transect	Figure 19

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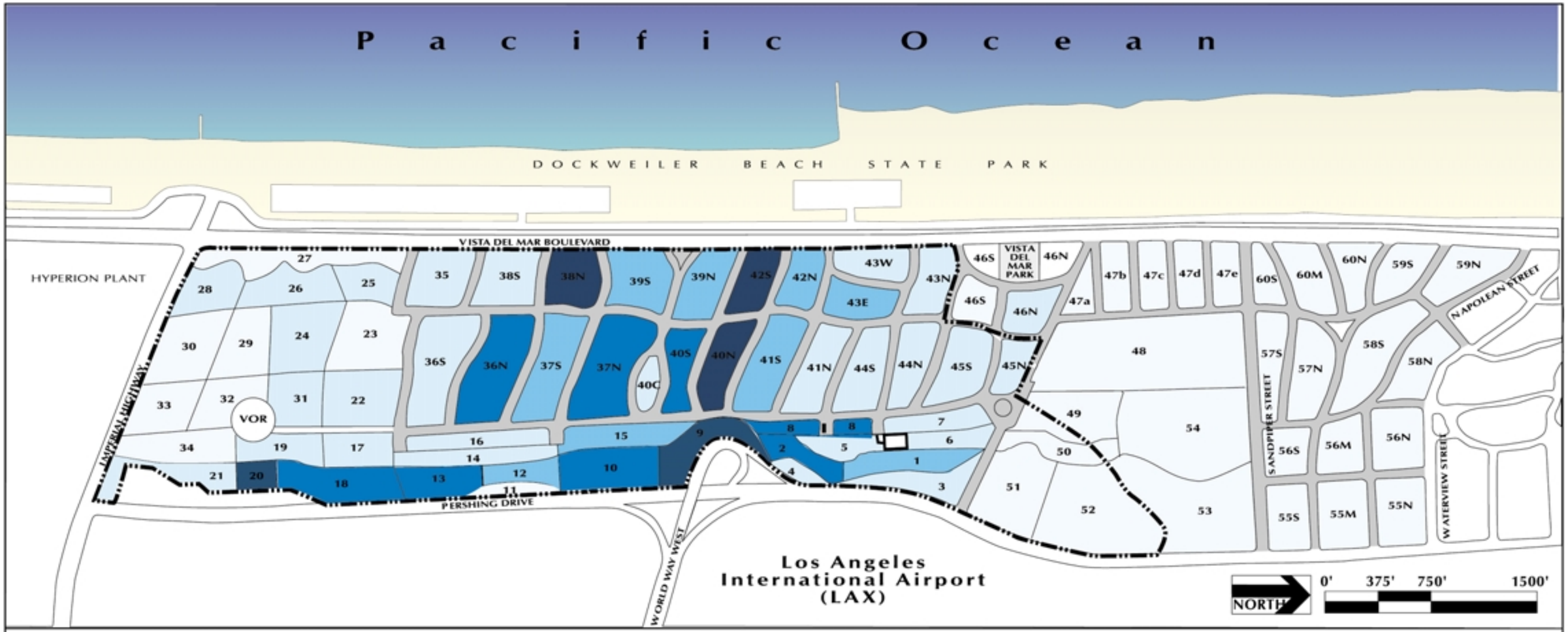

LEGEND

- Road System (Many Subsites Are Delineated by Road System)
- Habitat Restoration Area Boundary
- Subsite Number (21)
- Remote Communications Site
- Very High Omni Range Navigation Beacon (VOR)
- Trailer

- 0
- 1-50
- 51-100
- 101-150
- 151-200
- 201-250

- Street

Los Angeles International Airport Master Plan Biological Assessment

ESB Survey Site and Block Counts, 1998

Figure 20

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Table 4

El Segundo Blue Butterfly Population Figures

Year	Acreage	Block[1]	Historic Transects[2]	Estimated Population
1995	200	Not Performed	1240	Not Performed
1996[3]	200	2063	1455	7,092 to 31,000
1997	200	723	126	Not Performed
1998	200	4069	2129	16,978 to 87,000
1999	200	2125	1741	9,867 to 39,000
2000	200	2933	2104	18,000 to 69,500

1 Block counts are peak numbers taken during one week of the butterfly's flight season (June 1 through September 30).
2 Historic transects represent numbers of butterflies observed along specific transect lines crossing the El Segundo Blue Butterfly Habitat Restoration Area during the entire flight season.
3 Prior to 1996, only historic transect counts were performed. Block counts were begun during the 1996 flight season.

Source: Sapphos Environmental, Inc. 2000

Birds

California Brown Pelican and California Least Tern

Directed surveys for the federally- and state-endangered California brown pelican and California least tern were performed by Sapphos Environmental, Inc. qualified biologists (Ms. Tracy Alsobrook, Ms. Michelle Dohrnand Dr. Brad Blood) to determine the status of these species. Surveys were conducted during an eight-week session in July and August of 1998 and 2000. The survey area included the Los Angeles/El Segundo Dunes area, with an observation station located west of the Very Long Omni Range Navigation beacon (VOR) area, which afforded observers a view of the coast immediately adjacent to Dockweiler State Beach and the western extent of the Los Angeles/El Segundo Dunes, as shown in **Figure 21**, California Brown Pelican and California Least Tern Survey Area 1998 and 2000. Surveys were performed by scanning with binoculars and a spotting scope. Additional California least tern surveys were performed during April, May, and June of 1998 by Sapphos Environmental, Inc.[34] At no time were any California brown pelicans or California least terns observed over the Los Angeles/El Segundo Dunes or over the LAX airfield, during directed surveys undertaken in 1998 and 2000.

American Peregrine Falcon

Directed surveys for the state-endangered American peregrine falcon were undertaken as part of the 1998 spring bird surveys, and were conducted by Sapphos Environmental, Inc. qualified biologists (Mr. Peter Bloom, Mr. John Konecny, and Ms. Tracey Alsobrook) on April 1, 17, and 29; May 13 and 27; and June 10 and 24, 1998. These surveys were performed on the Los Angeles/El Segundo Dunes and the LAX airfield (**Figure 22,** American Peregrine Falcon Survey Area 1998) by scanning all potential perching sites with binoculars and listening for call notes. No American peregrine falcons were found over the Los Angeles/El Segundo Dunes or over the LAX airfield during directed surveys, undertaken in 1998. Directed surveys for American peregrine falcon were undertaken for 2000 within the survey locations shown in **Figure 23,** 2000 Directed Survey Area For American Peregrine Falcon. The results of 2000 directed surveys for American peregrine falcon revealed that the study area supports foraging roost sites in the tall buildings within and adjacent to LAX, but does not support nesting habitat.

Least Bell's Vireo and Southwestern Willow Flycatcher

Directed surveys were conducted by Sapphos Environmental, Inc. permitted biologists possessing 10(a)(1) permits from the USFWS in accordance with the USFWS's guidelines for the state- and federally-endangered least Bell's vireo and the federally-endangered southwestern willow flycatcher. Surveys were performed on April 1, 15, and 29, May 13 and 27, and June 10, 1998, and on May 10, 2000 for least Bell's

34 Sapphos Environmental, Inc., 1998, Memorandum for the Record 1043-008.M06, Subject: Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo and Loggerhead Shrike at LAX/El Segundo Dunes, August 18.

vireo and on May 27 and June 10, 1998 and May 10, 2000 for southwestern willow flycatcher. Surveys were conducted in disturbed areas with emergent mulefat (*Baccharis salicifolia*) and willows (*Salix* sp.) within the LAX Master Plan boundaries on foot (**Figure 24**, Southern Willow Flycatcher and Least Bell's Vireo Habitat Assessment Survey Area 1998 and 2000). All surveys were performed by Peter Bloom (USFWS Permit Number 787376) and Mr. Jon Konecny (USFWS Permit Number 837308). These surveys were discontinued after June 10, 1998 with approval from the USFWS and the CDFG due to lack of suitable habitat.[35]

No listed bird species were determined present based on directed surveys within the LAX Master Plan boundaries and the Los Angeles/El Segundo Dunes.

As a result of directed surveys performed in 1997 and 2000, it was determined that no listed mammal species are present within the Los Angeles/El Segundo Dunes.

Mammals

Pacific Pocket Mouse

A preliminary survey was conducted by Sapphos Environmental, Inc. between June 23 and 27, 1997 according to USFWS protocol for federally endangered Pacific pocket mouse.[36] The survey area is shown in **Figure 25**, Pacific Pocket Mouse Survey Area 1998. This survey was performed in preparation for a comprehensive survey of the entire Los Angeles/El Segundo Dunes and LAX airfield. Prior to the comprehensive September 1997 survey the USFWS provided the FAA with a list of individuals authorized to conduct directed surveys for Pacific pocket mouse. The Pacific pocket mouse permit holders were retained to perform the trapping. The permit holders for the 1997 surveys were: Mr. Peter Bloom (USFWS Permit Number PRT 787376), Mr. Bill Vanherweg (USFWS Permit Number PRT 787644) and Dr. Michael O'Farrell (USFWS Permit Number PRT 744707). Surveys began on September 1 and ended on September 26, 1997. The permit holder retained for the 2000 survey season was Mr. Bill Vanherweg (USFWS Permit Number PRT 787644), who was assisted by Sapphos Environmental, Inc. Surveys performed in May of 2000 began May 15 and ended May 21, 2000. This survey was restricted to the Southern Foredune, Southern Dune Scrub, and Valley Needlegrass Grassland plant communities located west of Pershing Drive along the eastern and northern perimeter of the Los Angeles/El Segundo Dunes and in the Southern Foredune and Southern Dune Scrub plant communities adjacent to the VOR. Surveys were restricted under guidance from the USFWS. All field team members were briefed on the sensitivity of the coastal buckwheat and its relationship with the El Segundo blue butterfly prior to survey initiation. At least one Pacific pocket mouse permit holder was present and within supervising range at all times during the survey. The survey equipment consisted of Sherman live traps and Stoddard live traps. Two sizes of Sherman live traps were used (a standard 7.5 x 9 x 23 cm trap and the longer 35 cm trap). Traps were deployed in trap lines with distances between individual traps varying from 10 m to 15 m, depending on the suitability of the habitat. The 1997 survey was divided into five sessions, each session consisting of five consecutive nights, following protocol established by the USFWS for the Pacific pocket mouse. The May 2000 survey consisted of one five-night session under consultation with the USFWS.

As a result of directed surveys performed in 1997 and 2000, it was determined that no listed mammal species are present within the Los Angeles/El Segundo Dunes.

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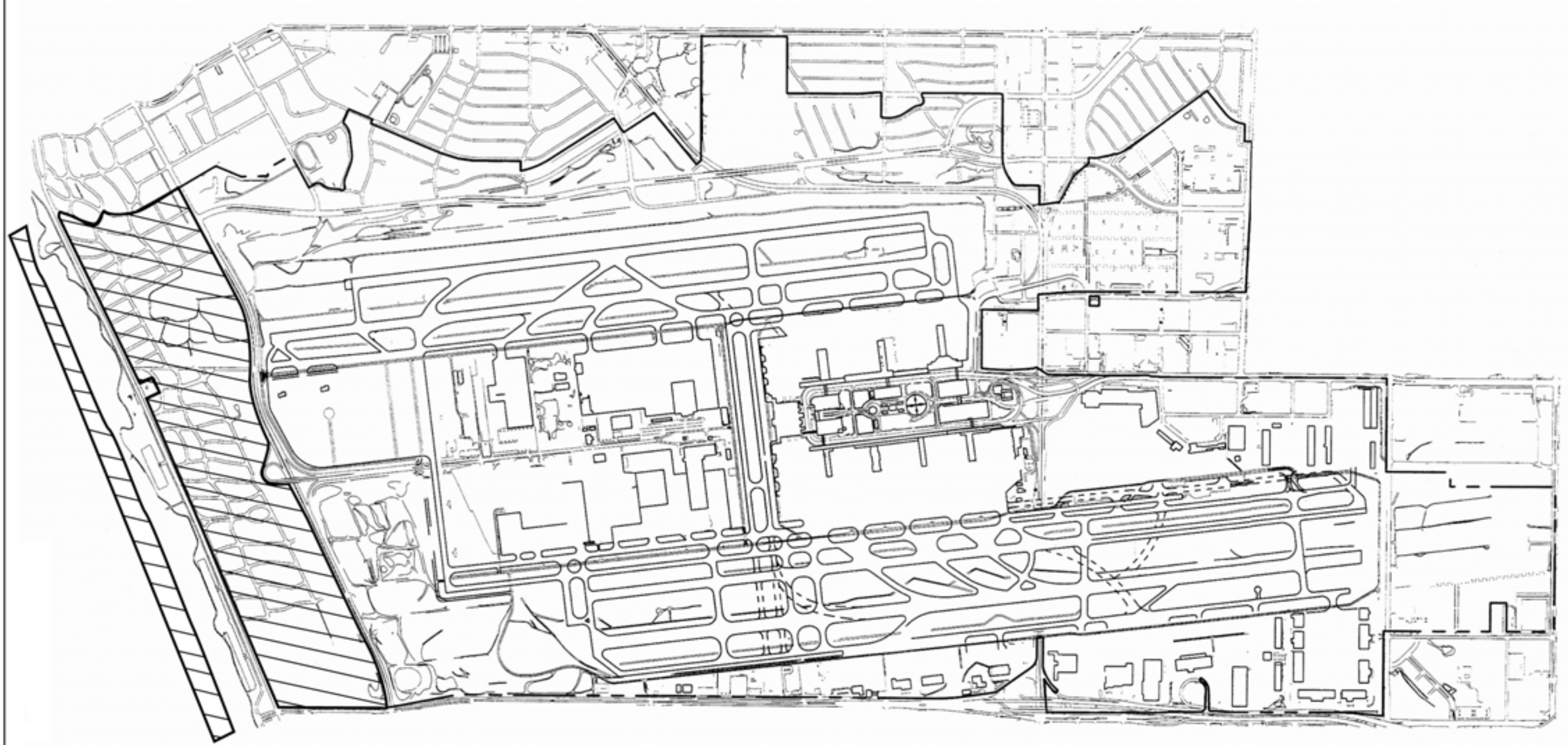
[35] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1043-008.M04, Subject: Recommendation to Discontinue Remaining Sensitive Bird Surveys at LAX/El Segundo Dunes in Support of the LAX 2015 Master Plan Project, June 17.

[36] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1067-005.M04, Subject: Final Report of Pacific Pocket Mouse Survey at LAX/El Segundo Dunes in Support of the LAX 2015 Master Plan Project, January 13.



LEGEND

Survey Area

Los Angeles International Airport Master Plan Biological Assessment	California Brown Pelican and California Least Tern Survey Area 1998 and 2000	Figure 21

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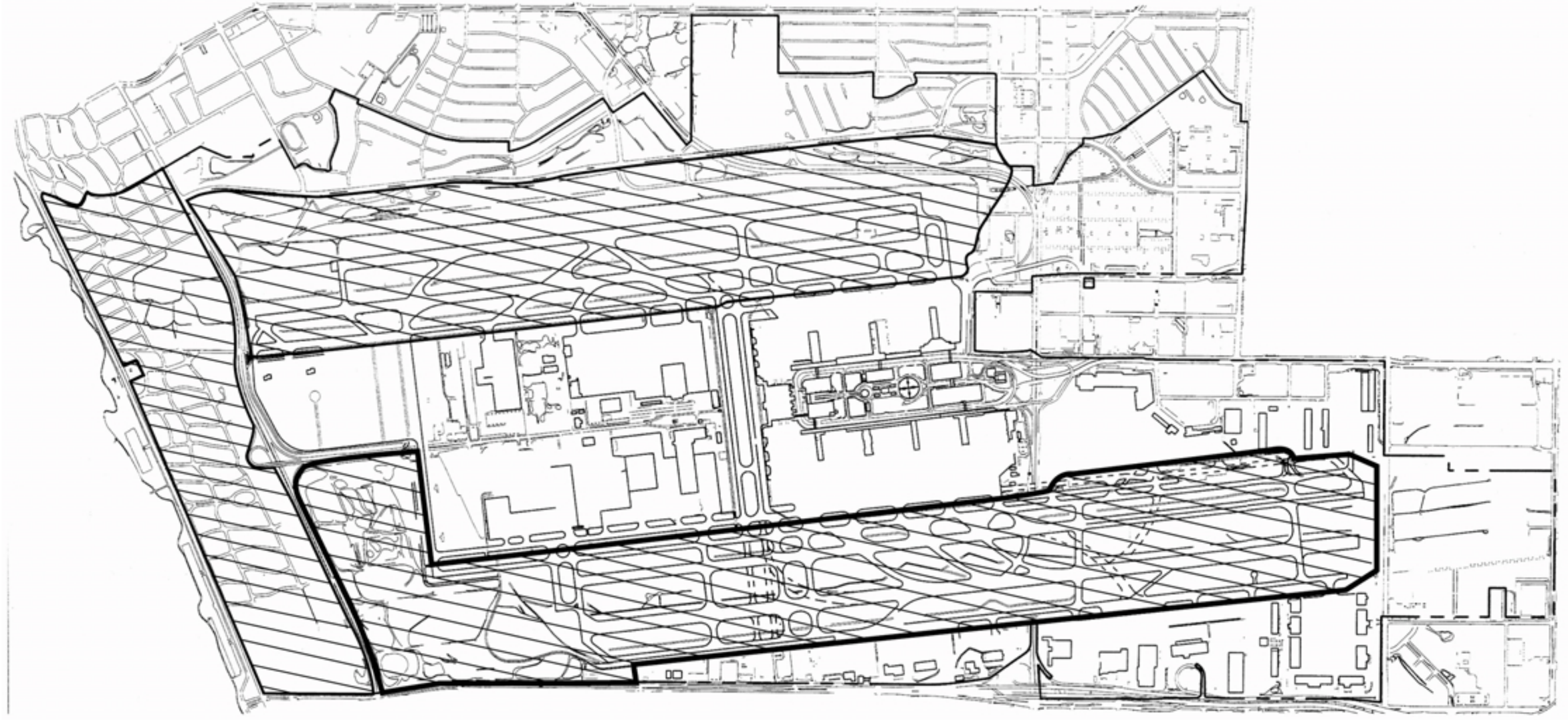

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Survey Area

Los Angeles International Airport Master Plan Biological Assessment	American Pelegrine Falcon Survey Area 1998	Figure 22

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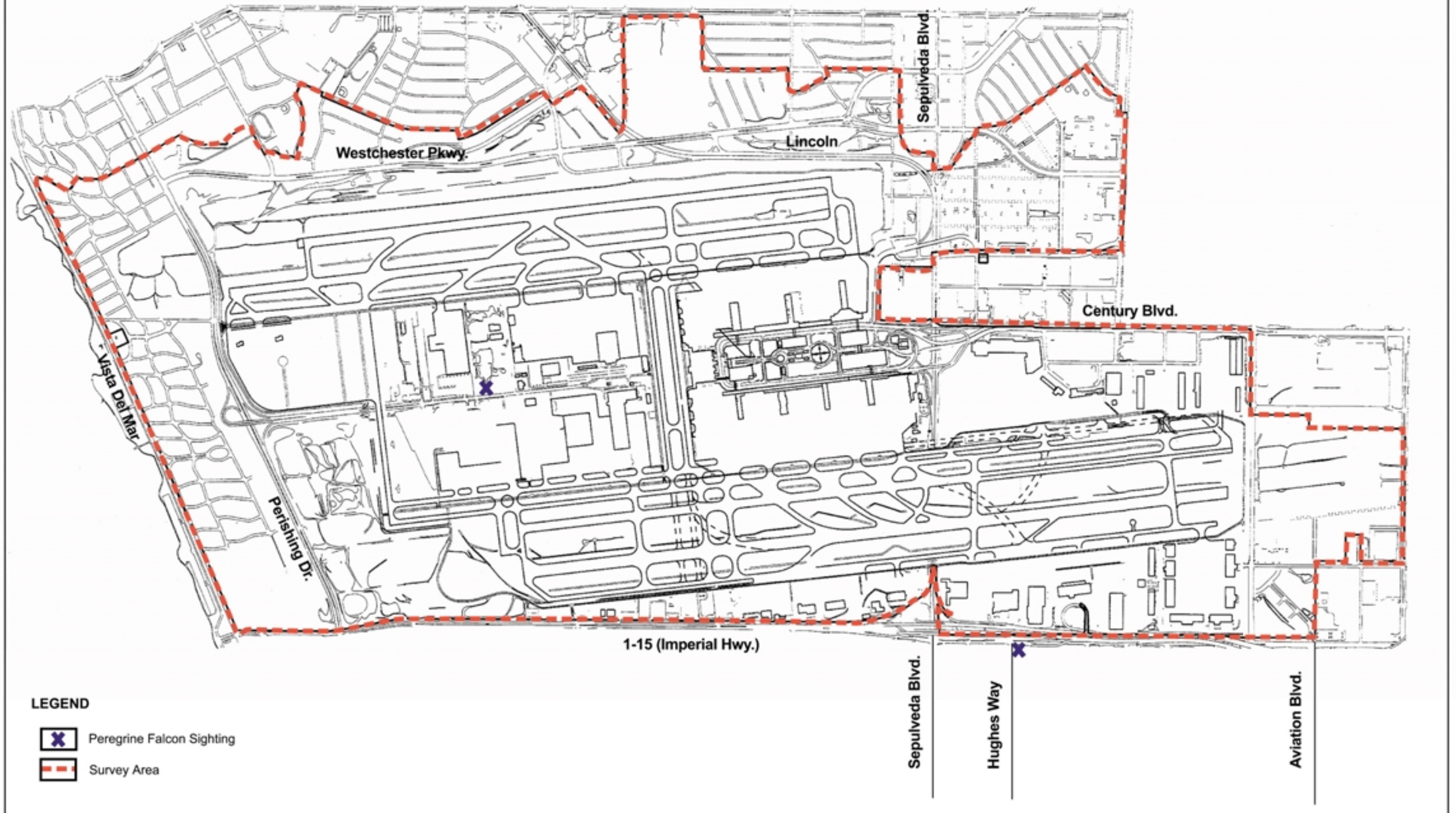

Los Angeles International Airport Master Plan - Biological Assessment	2000 Directed Survey Area For American Peregrine Falcon	Figure 23

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LEGEND

Survey Area

Los Angeles International Airport Master Plan Biological Assessment	Southern Willow Flycatcher and Least Bell's Vireo Habitat Assessment Survey Area 1998 and 2000	Figure 24

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A total of two federally-endangered wildlife species were determined to be present as a result of all directed surveys conducted in support of the Master Plan EIS/EIR, the Riverside fairy shrimp, and the El Segundo blue butterfly. Results of replicate directed surveys for all federally- or state-listed wildlife species to be conducted from spring through fall of the year 2000 are pending completion; however, results are not expected to change, depending on the suitability of the habitat. Traplines were also spaced from 10 m to 15 m apart based upon the suitability of the habitat. The 1997 survey was divided into five sessions with each session consisting of five consecutive nights following protocol established by the USFWS for the Pacific pocket mouse. The May 2000 survey consisted of one five-night session under consultation with the USFWS.

As a result of directed surveys performed in 1997 and 2000, it was determined that no listed mammal species are present within the Los Angeles/El Segundo Dunes.

A total of two federally endangered wildlife species were determined to be present as a result of all directed surveys conducted in support of the Master Plan EIS/EIR, the Riverside fairy shrimp and the El Segundo blue butterfly. Results of replicate directed surveys for all federal- or state-listed wildlife species to be conducted from spring through fall of the year 2000 are pending completion, however, results are not expected to change.

4.0 EXISTING CONDITIONS

Los Angeles International Airport is located along the western margin of the Los Angeles Basin where the coastal plain approaches the Pacific Ocean. Historic land uses of the area were predominantly agricultural. In the early 1920s the Bennett Rancho farmed soybeans on a 640-acre field that was later leased by William M. Mines for use as an aircraft landing strip. The area became known as the Mines Field. The City of Los Angeles then leased Mines Field in the late 1920s and passed an ordinance creating the Department of Airports. Douglas Aircraft established operations there in 1932, followed by North American Airlines in 1936. The City of Los Angeles purchased the property in 1937 and made extensive improvements and runway expansions. In 1941 Mines Field became known as Los Angeles Airport.

World War II created increased demand on the Airport and additional land was purchased. The two main runways were expanded and an instrument landing system was installed. Additional land was purchased in 1949 and the runways further expanded. At this time, the Airport was approximately 3,000 acres in size. Post-war years brought increasing changes including the inauguration of commercial airline service in 1946. The importance of the Airport's new role was recognized when its name was officially changed to Los Angeles International Airport in 1949. Post-war years also stimulated residential development in the vicinity of the Airport. By the late 1950s, development around the Airport was essentially complete. From 1956 to 1961, the Airport experienced additional expansion with the development of a new Central Terminal Area, which became necessary with the advent of jet service and increased passenger demand. Conflicts with the now-nearby residential areas and the Airport arose in 1963 with the creation of the north runway complex, which brought aircraft within one-quarter mile of residential land use. The range and intensity of aircraft noise had increased to the point where annoying levels could no longer be contained within airport boundaries. As a result, the Airport acquired noise-impacted residences, relocated residents, and removed structures from the mid 1960s through the late 1970s. A total of 2,834 residences were acquired to the east, north, and west of the Airport, and approximately 7,000 residents were relocated.

Today, Los Angeles International Airport (LAX) encompasses 3,550 acres. It is located 14 miles southwest of downtown Los Angeles, and is situated at an average elevation of 125.5 feet above mean sea level. Reference point coordinates for the Airport are 33 degrees 56 minutes north latitude by 118 degrees 24 minutes west longitude. LAX constitutes a large industrial district presently made up of the following facilities and uses:

- Four runways
- 3.9 million square feet of domestic and international terminal space, including 145 narrow body equivalent gates
- 200 acres of cargo area, including 1.9 million square feet of building space
- 384 acres of ancillary space, including 30 acres of Los Angeles World Airports administrative and support facilities
- 21,930 parking spaces

- 900 acres of open space, including 302 acres of Los Angeles/El Segundo Dunes

The 302-acre site known today as the Los Angeles/El Segundo Dunes housed 822 residences between 1945 and 1964, at which time they were included in the areas to be acquired by the Airport due to noise impacts. The site was once an extensive complex of coastal dune and coastal strand habitat fringing the Santa Monica Bay. Windblown sand deposits extend inland from the coast for up to four miles, and underlie much of current LAX. These sandy deposits form soils quite distinct from the surrounding clay and silt-derived soils of the coastal plain and adjacent slopes. The sand dune system itself historically was known to support a distinctive flora, and the sand-derived soils inland from the Dunes apparently supported a largely herbaceous grassland community. Distinctive fauna known to inhabit the Dunes included the El Segundo blue butterfly, recognized by Emmel and Emmel (1973),[37] who illustrated it and called attention to its potential extinction. It was then formally described by Shields (1975),[38] and in 1976, was listed as a federally-endangered species.[39] In the same year, Los Angeles County designated the Los Angeles/El Segundo Dunes as a Significant Ecological Area (SEA No. 28) and revised the Los Angeles County General Plan. Two independent studies of El Segundo blue butterfly populations were performed in 1984, both indicating serious and deteriorating habitat conditions. After completion of detailed biological inventories and analysis in 1989,[40] the City adopted the concept and boundaries of the 200-acre El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area) and initiated revisions to the Airport Dunes Specific Plan in 1991, designating the Habitat Restoration Area south of Ocean Vista Boulevard and a northern 100-acre parcel for a proposed golf course or other recreational use.[41]

The California Coastal Commission (CCC) approved three interim ecological restoration plans, which were implemented in 1987, 1990, and 1992. Initial restoration efforts began in 1997; studies conducted in 1984, however, indicated that low numbers of El Segundo blue butterfly appeared to be related to competition with and parasitism of other butterfly and moth species utilizing introduced California buckwheat (*Eriogonum fasciculatum*), and the CCC issued a permit for its eradication from the Habitat Restoration Area. (California buckwheat, while native to Southern California, is not one of the plant species that historically comprised the El Segundo Dunes; it was introduced to the Dunes through its use in a hydrodseed mix utilized for slope stabilization after the reconfiguration of Pershing Drive in 1975.) The CDFG also provided funding to further analyze the population densities of the El Segundo blue butterfly and its host foodplant, coast buckwheat, and the Airport Commission, in response to the inherent threat posed by the presence of California buckwheat, provided emergency funding for its removal in 1987. Habitat enhancement efforts were then expanded to include revegetation of native coastal dune plant communities that historically occurred on-site as part of an interim permit issued by the CCC in 1990. In 1992, the CCC approved a third coastal development permit for implementation of a conceptual restoration plan within the Habitat Restoration Area. The revegetation program was completed in 1994, and resulted in the revegetation of close to 120 acres of coastal dune. The City of Los Angeles prepared the *Long-Term Habitat Management Plan for the Los Angeles Airport/El Segundo Dunes* in 1994 to satisfy a special condition of the last permit (City of Los Angeles 1994). However, in order to obtain a certified Local Coastal Program, the City must also complete the plan for the Habitat Restoration Area and the adjoining open space for CCC approval. Until the Local Coastal Program is certified, the CCC retains permit jurisdiction over the Dunes site. The *Long-Term Habitat Management Plan for the Los Angeles Airport/El Segundo Dunes* has not been formally adopted; however, LAWA is currently following its recommendations in its management of the Habitat Restoration Area.

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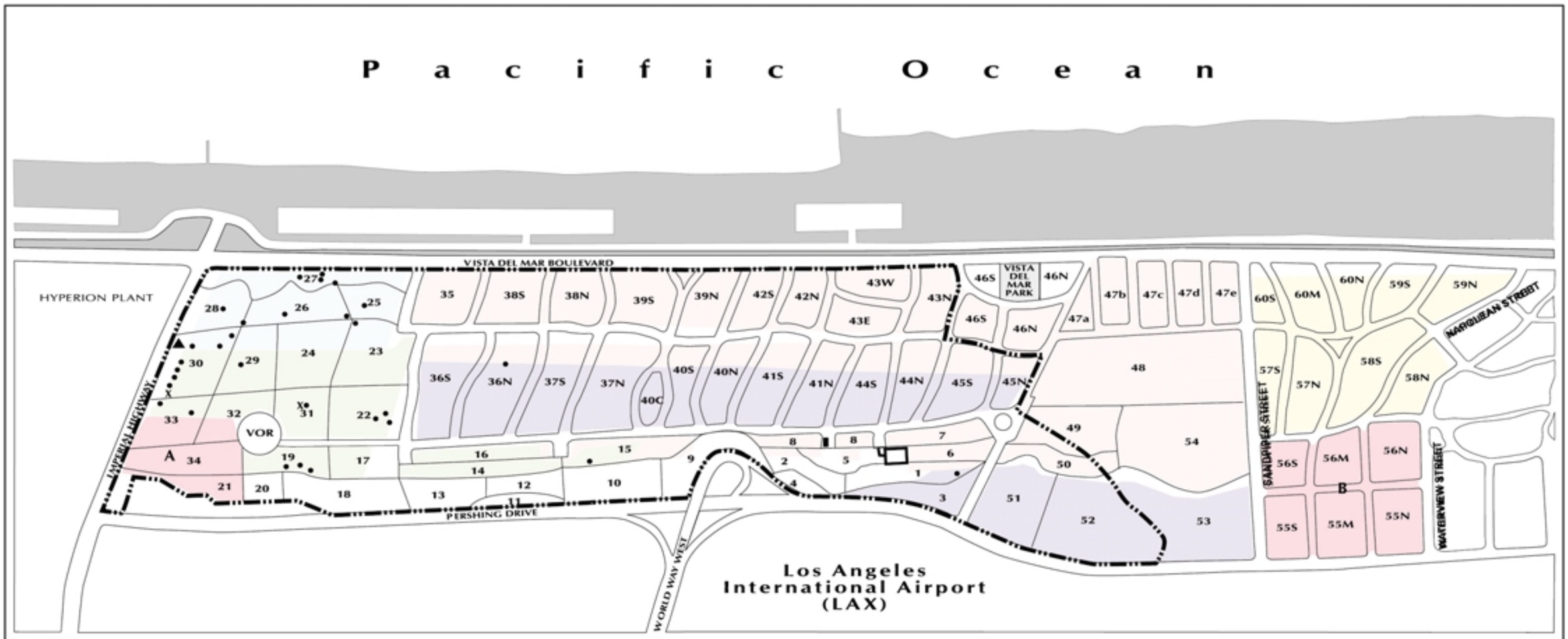
[37] T. C. Emmel and J. F. Emmel, 1973, "The Butterflies of Southern California," Natural History Museum of Los Angeles County, *Science Series* 26: 70.

[38] O. Shields, 1975, "Studies on North American Philotes IV. Taxonomic and Biological Notes and New Subspecies," *Bulletin Allyn Museum* 28: 30.

[39] 50 CFR Part 17.

[40] City of Los Angeles, Department of Airports (DOA), 1990, *Species Diversity and Habitat Evaluation Across the El Segundo Sand Dunes at LAX,* Prepared by Mattoni, R. H. T. Agresearch, Inc., Prepared for the Los Angeles Environmental Affairs Department (EAD), City of Los Angeles, The Board of Airport Commissioners, One World Way West, Los Angeles, California 90009.

[41] City of Los Angeles, Ordinance No. 167940, May 18, 1992, Establishing the Los Angeles Airport/El Segundo Dunes Specific Plan Area.



Los Angeles International Airport Master Plan Biological Assessment

Pacific Pocket Mouse Survey Area 1998

Figure 25

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4.1 Plant Communities

Native plant communities that once occupied the Los Angeles basin included Coastal Strand, Coastal Salt Marsh, Freshwater Marsh, Coastal Sage Scrub, Chaparral, Valley Needlegrass Grassland, and Southern Oak Woodland.[42] The primary plant communities of the Master Plan study area were coastal dune scrub (considered as a subtype of coastal sage scrub) and grassland. Surrounding hill slopes supported coastal sage scrub. Vegetation along the interface between soil types and slopes was probably a mosaic of adjacent communities. Intensive land use, however, has initiated the fragmentation, degradation, and/or replacement of the natural plant communities that once occupied the area, and has led to the creation of additional plant communities characteristic of the urbanized environment. Development within the Airport and surrounding residential, industrial, and commercial land uses has created large areas of landscape plantings; non-native grassland species are present on abandoned lots and mowed areas, and ruderal species occupy areas routinely subject to disturbance. By far, the most predominant community within the Master Plan study area is the Developed community followed by Non-native Grassland (CNDDB Element Code 42220)/Ruderal, Disturbed/Bare Ground, Southern Foredune (CNDDB Element Code 21230), Landscaped, Disturbed Dune Scrub, Southern Dune Scrub (CNDDB Element Code 21330), and Valley Needlegrass Grassland (CNDDB Element Code 42110). The acreage associated with each of these plant communities was determined by planimetering the communities present within the study area for each of the three build alternatives and the No Action/No Project Alternative. Plant communities in the Master Plan study area are shown in **Figure 15,** and are described below.

Southern Foredune (CNDDB Element Code 21230)

The Southern Foredune plant community is a state-designated sensitive habitat.[43] Southern Foredune plant communities are typically dominated by perennial species with a high proportion of suffrutescent plants up to 30 cm tall.[44] Species such as red sand verbena (*Abronia maritima*), beach bur (*Ambrosia* sp.), and sea rocket (*Cakile* sp.) usually occur in exposed sites, and pink sand verbena (*Abronia umbellata*) and morning-glory (*Calystegia* sp.) in less exposed sites.[45] Establishment of these plants reduces the amount of blowing sand and partially stabilizes the dunes. Southern foredunes may intergrade with Southern Dune Scrub (CNDDB Element Code 21330).[46] Within the LAX Master Plan study area, 135.6 acres of this community are found within the Habitat Restoration Area west of Pershing Drive. Relatively undisturbed areas (approximately 40 acres) surrounding the Very High Omni Range Navigation Beacon (VOR) provide the most representative example of this community. Ecological restoration efforts during 1987–1994 also have restored an additional 95.6 acres. Species identified in the successfully restored foredune habitat are: burbush (*Ambrosia chamissonis*), coast buckwheat (*Eriogonum parvifolium*), lemonade-berry (*Rhus integrifolia*), coast goldenbush (*Ericameria ericoides*), California encelia (*Encelia californica*), bladderpod (*Isomeris arborea*), prickly pear (*Opuntia littoralis*), groundsel (*Senecio flaccidus* var. *douglasii*), California poppy (*Eschscholzia californica*), wild morning glory (*Calystegia macrostegia*), Lewis' evening primrose (*Camissonia lewisii*), beach evening primrose (*Camissonia chieranthifolia*), deerweed (*Lotus scoparius*), bush lupine (*Lupinus chamissonis*), and pink sand verbena.[47] Characteristic species not present on-site include red sand verbena, beach morning glory (*Calystegia soldanella*), and beach spectacle-pod (*Dithyrea maritima*). Non-native species present include several species of iceplant (including *Carpobrotus edulis* and *C. aequilaterus*), and acacia (*Acacia cyclops* and *A. retinoides*).

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42 Philip A. Munz, 1974, *A Flora of Southern California* , Berkeley: University of California Press.

43 M. R. Jennings and M. P. Hayes, 1994, *Amphibian and Reptile Species of Special Concern in California,* California Department of Fish and Game.

44 R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

45 R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

46 R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

47 Sapphos Environmental, Inc., 1995, Memorandum for the Record 1043-001.M06, Subject: "State of the Dunes and Recommendations for Management," May 3.

Southern Dune Scrub (CNDDB Element Code 21330)

The Southern Dune Scrub plant community is a state-designated sensitive habitat.[48] Southern Dune Scrub vegetation is a dense coastal scrub community of scattered shrubs, subshrubs, and herbs, generally less than one meter tall, often developing considerable cover, and often somewhat succulent.[49] Characteristic species include saltbush (*Atriplex leucophylla*), California croton (*Croton californicus*), desert tea (*Ephedra californica*), coast goldenbush, goldenbush (*Isocoma menziesii* var. *vernonioides*), bush lupine, box thorn (*Lycium brevipes*), crystalline iceplant (*Mesembryanthemum crystallinum*), prickly pear, lemonade-berry (*Rhus integrifolia*), and jojoba (*Simmondis chinensis*). Along the coast, Southern Dune Scrub intergrades with Southern Foredune (CNDDB Element Code 21230).[50] The Los Angeles/El Segundo Dunes are virtually the only remaining example of this plant community in mainland Southern California. Within the LAX Master Plan study area, the southern dune scrub community is found on approximately 24.4 acres within the Habitat Restoration Area along the steep slope of the backdune. Because the backdune is subject to lower thermal stress and wind dehydration, the vegetative cover of the Southern Dune Scrub community is typically denser than the Southern Foredune community. Characteristic plant species observed during surveys conducted in 1995, 1996, 1997, and repeated in 1998 by Sapphos Environmental, Inc. included California croton, coast goldenbush, bush lupine, and lemonade-berry. Other species found on the backdune include: burbush, coast buckwheat, bladderpod, deerweed, beach evening primrose, hedge-leafed horkelia (*Horkelia cuneatus*), morning glory, Lewis' evening primrose (*Camissonia lewisii*), beach evening primrose, pink sand verbena, and California sagebrush (*Artemisia californica*). The richest biota of the entire dune complex occurs along the toe of the backdune slope.[51] A pest species present in the Southern Dune Scrub community is California buckwheat, which, though native to other Southern California plant communities, is not native to the Dunes site, and serves as a host foodplant for competitors of the El Segundo blue butterfly. California buckwheat is, therefore, destabilizing the butterfly populations.[52] Removal of California buckwheat has been and continues to be a major component of management efforts within the Habitat Restoration Area. Iceplant was noted on over half the Habitat Restoration Area Southern Dune Scrub subsites during 1995 qualitative assessments (Sapphos Environmental, Inc. 1995b).[53]

Valley Needlegrass Grassland (CNDDB Element Code 42110)

The Valley Needlegrass Grassland plant community is a state-designated sensitive habitat.[54] Within the Master Plan study area, the deflation plain east of the backdune consists of loosely consolidated (incipient) sandstone covered to variable depths with aeolian (wind-transported) sand. Such deflation areas are commonly found behind coastal dune systems, where they are eroded down to or near the water table, and commonly support vernal pools.[55] The historic vegetation of the deflation plain of the Los Angeles/El Segundo Dunes, and of the sand-dominated substrates that extend inland from it, is very poorly known. Extensive disturbance occurred long before any botanical studies could be conducted.

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48 M. R. Jennings and M. P. Hayes, 1994, *Amphibian and Reptile Species of Special Concern in California,* California Department of Fish and Game.

49 R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

50 R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

51 City of Los Angeles, Department of Airports (DOA), 1990, *Species Diversity and Habitat Evaluation Across the El Segundo Sand Dunes at LAX,* Prepared by Mattoni, R. H. T. Agresearch, Inc., Prepared for the Los Angeles Environmental Affairs Department (EAD), City of Los Angeles, The Board of Airport Commissioners, One World Way West, Los Angeles, California 90009.

52 G. Pratt, 1987, "Competition as a Controlling Factor of *Euphilotes battoides allyni* Larval Abundance," *Atala* 15:1-9.

53 Sapphos Environmental, Inc., 1995, Memorandum for the Record 1043-001.M06, Subject: "State of the Dunes and Recommendations for Management," May 3.

54 M. R. Jennings and M. P. Hayes, 1994, *Amphibian and Reptile Species of Special Concern in California,* California Department of Fish and Game.

55 M. G. Barbour and A. F. Johnson, 1988, "Beach and Dune," in M. G. Barbour and J. Major. (eds.), *Terrestrial Vegetation of California*, California Native Plant Society.

Pierce and Pool (1938)[56] refer to the area as "meadow," and provide some information. Mattoni (1992)[57] refers to the area as the "Los Angeles Coastal Prairie." It is considered here as an instance of Valley Needlegrass Grassland as classified by Holland (1986). According to Pierce and Pool (1938),[58] the "meadow" was composed of the perennial nodding needlegrass (*Nassell*a *[Stipa] cernua*), several annual native grasses, and a number of flowering forbs (herbaceous plants that are not grasses, but are associated with grasses). A photograph of the area taken in 1938 and reproduced in City of Los Angeles, DOA,[59] shows a predominance of forbs over grasses. The grassland community of the LAX Master Plan study area that was historically described as occurring on the deflation plain has been significantly altered and degraded by development activities. The plant community typically associated with this grassland is now almost completely absent due to extensive grading and paving and the invasion of exotic annual grasses. No vernal pools currently exist within the deflation plain. At the present time, the Valley Needlegrass Grassland community occupies 17.1 acres within the Habitat Restoration Area. Native dunes species that were found to be present in this area include: beach evening primrose, Lewis' evening primrose, deerweed, bush lupine, rattail fescue *(Vulpia myurous* [*Festuca megalura*]), and perennial nodding needlegrass. Non-native species found include: California buckwheat, iceplant, ripgut grass, wild oat, and slender wild oat.

Disturbed Dune Scrub/Foredune

This community is made up of approximately 74.6 acres, and is located north of the Habitat Restoration Area, east of Vista del Mar Boulevard, south of Waterview Street, west of Pershing, and is bisected by Sandpiper Street. The site is considered disturbed former dune, as evidenced by the sandy substrates and scattered coastal dune elements; however, acacia, iceplant, and exotic annual grass species dominate the vegetation. In addition, there are several large patches of giant reed (*Arundo donax*). Coastal dune vegetation is patchy, and includes burbush, dunes evening primrose, bush lupine, pink sand verbena, and deerweed. Coast buckwheat is absent from the site. There are remnant structures belonging to former residences, which include several walls, and abundant debris can be found among the sandy substrate.

Non-Native Grassland (CNDDB Element Code 42220)/Ruderal

This community consists of open space between and surrounding the runways and taxiways on the airfield, and is subjected to regular operations maintenance. This community is also found on a small portion of the Los Angeles/El Segundo Dunes. It is comprised of a total of 721.8 acres. Non-Native Grassland is characterized by a dense to sparse cover of annual grasses up to one meter in height. Annual forbs are often found in association with the non-native grasses, and many of these forbs have attractive flowers. They are especially noted in years of good rainfall. Seed germination occurs with the onset of winter rains. Some plant growth occurs in the winter, but most growth and flowering occurs in the spring. The plants then die in the summer, and persist as seeds in the uppermost layers of soil until the next rainy season.[60] Non-native annual grasses found as a result of surveys conducted by Sapphos Environmental, Inc. include: slender wild oat (*Avena barbata*), wild oat (*A. fatua*), ripgut grass (*Bromus diandrus*), felty softchess (*B. hordaceus*), foxtail chess (*B. madritensis*), and fountain grass (*Pennisetum setaceum*). Interspersed within annual grasses, non-native forbs were found to be present, and include: storksbill (*Erodium* sp.), black mustard (*Brassica nigra*), common sow thistle *(Sonchus oleraceus*), California burclover (*Medicago polymorpha)*, sourclover (*Melilotus indica*), radish (*Raphanus sativus*), and crown daisy (*Chrysanthemum coronarium*).

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[56] W. D. Pierce and D. Pool, 1938, "The Fauna and Flora of the El Segundo Sand Dunes," *Bulletin of the Southern California Academy of Sciences* 37: 93-97.

[57] R. Mattoni, 1992, "The Endangered El Segundo Blue Butterfly," *Journal of Research on Lepidoptera* 29: 277-304.

[58] W. D. Pierce and D. Pool, 1938, "The Fauna and Flora of the El Segundo Sand Dunes," *Bulletin of the Southern California Academy of Sciences* 37: 93-97

[59] City of Los Angeles, Department of Airports (DOA), 1990, *Species Diversity and Habitat Evaluation Across the El Segundo Sand Dunes at LAX,* Prepared by Mattoni, R. H. T. Agresearch, Inc., Prepared for the Los Angeles Environmental Affairs Department (EAD), City of Los Angeles, The Board of Airport Commissioners, One World Way West, Los Angeles, California 90009

[60] R. F. Holland, 1986, *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program,* California Department of Fish and Game.

Landscaped

Areas within the LAX Master Plan study area that support landscaped vegetation include a golf course located within the northern boundary of the study area, a small park located in the northeast sector, and most roadway medians. The landscaped plant community is comprised of approximately 79.2 acres. Landscape treatments are variable, and include lawn and ornamental tree plantings; ornamental shrubs, groundcover, and annual plantings are also present. Ornamental trees include: coral tree (*Erythrina caffra*), magnolia (*Magnolia* sp.), myoporum (*Myoporum* sp.), and eucalyptus (*Eucalyptus* sp.). Ornamental shrubs found within landscaped portions of the study area include: oleander (*Nerium oleander*), pyracantha (*Pyracantha* sp.), lantana (*Lantana* sp.), bird of paradise (*Strelitzia reginae*), sea lavender (*Limonium latifolium*), and hawthorn *(Rhaphiolepis sp.)*. Common ground cover species typically occurring in landscape treatments within the study area include iceplant (*Carpobrotus* sp. and *Mesembryanthemum* sp.) and gazania (*Gazania* sp.).

Disturbed/Bare Ground

Areas of Disturbed/Bare Ground consist of large open spaces within the Master Plan boundaries where regular soil disturbance does not allow vegetation to become established. There are approximately 103.1 acres of Disturbed/Bare Ground community. The areas mapped as disturbed have been continuously scraped, and are bare due to vehicle use. This highly disturbed condition renders these areas unsuitable to support vegetation.

Developed

Developed areas within the LAX Master Plan study area occupy 2,644.9 acres, and include the AOA, terminals, parking, and support facilities. The hardscape associated with this community, largely paved and built areas, make it unsuitable to support vegetation.

4.2 Federally- and State-Listed Threatened and Endangered Plant Species

General and directed surveys were undertaken for all federally- or state-listed or other sensitive plant species that had the potential to exist in the study area. The list of species surveyed includes: plants identified by the U. S. Fish and Wildlife Service (USFWS) in its letters of July 31[61] and August 29, 1997;[62] those identified on the CDFG's Natural Diversity Database; and those addressed as potentially being present in the literature review.[63] The USFWS identified two federally-listed endangered vernal pool associated plant species, California orcutt grass (*Orcuttia californica*) and San Diego button-celery *(Eryngium aristulatum*), as having the potential to be present within the study area. All directed surveys for federally- or state-listed plant species were conducted in accordance with the CDFG's *August 1987 Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities*. **Table 1**, Federally- and State-Listed Plant and Wildlife Species Potentially Occurring within the Master Plan Study Area, summarizes the status, local status, habitat requirement and distribution of plant species that are the subject of this Biological Assessment.

San Diego button-celery (*Eryngium aristulatum* var. *parishii*) is a biennial herb with weak spreading stems; the main stem branches above the basal rosette.[64] It is a federally- and state-endangered species.[65, 66] It

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61 United States Fish and Wildlife Service, 1997, letter to Mr. David B. Kessler dated July 31, Federal Aviation Administration, U.S. Department of Transportation.

62 United States Fish and Wildlife Service, letter to Mr. David B. Kessler dated August 29, Federal Aviation Administration, U.S. Department of Transportation.

63 Sapphos Environmental, Inc., 1996, Technical Memorandum, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," November 8, Prepared for the City of Los Angeles, Department of Airports, Program Management Team.

64 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

65 California Department of Fish and Game, 1997, Letter to Mr. Jack Graham, August 13, City of Los Angeles, Department of Airports.

66 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento,

is associated with vernal pools and marshes in San Diego and Riverside Counties and into Baja California, and is currently believed to be confined to mesas near San Diego and Santa Rosa Mesa.[67] San Diego button-celery has not been reported in the vicinity of the Master Plan study area. Fifty-one ephemerally ponded sites within the study area were surveyed for potential to support vernal pool species, and of the 51 monitored locations, 20 demonstrated sufficient vernal pool characteristics to continue to be monitored for the presence or absence of vernal pool associated endangered species. San Diego button-celery was not observed in the study area as a result of dry season surveys in fall 1997, or during directed surveys on July 16, 1998 and in May 2000.

Beach spectacle-pod (*Dithyrea maritima*) is a perennial rhizomatous herb with yellowish flowers that blooms throughout the year. It is typically found in coastal dunes and scrub.[68] It is a state-listed threatened species, and is known in California from less than 20 occurrences.[69] Beach spectacle-pod was historically present at the Dunes.[70] The recently observed population at Hermosa Beach, approximately three miles south of the study area, was extirpated in 1998.[71] Currently, the nearest presumed extant occurrence of beach spectacle-pod is approximately two miles north of the study area, in the vicinity of the Ballona Marshes.[72] This occurrence was most recently observed in 1903. This species was not observed during directed surveys in spring 1996, 1997, 1998, or 2000, and is not expected to occur in the Master Plan study area.[73]

California orcutt grass (*Orcuttia californica*) is a prostrate and glandular annual grass that blooms April through June.[74] It is a federally- and state-listed endangered species.[75] It is historically known from vernal pools occurring in the deflation plain of the Dunes.[76] California orcutt grass was not observed in the study area as a result of dry season surveys in fall 1997 or during directed surveys on July 16, 1998 and June 2000.

Santa Monica Mountains dudleya (*Dudleya cymosa ssp. marcescens*) is a perennial with fleshy, smooth leaves and bright yellow flowers, occasionally with orange or red marks.[77] It blooms from March to June.[78] It is typically known to grow on shaded, rocky outcrops among chaparral and coastal sage scrub habitats.[79] Santa Monica Mountains dudleya is a federally-listed threatened species. The nearest recorded occurrence of this species is approximately 15 miles north of the study area in Topanga State

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California.

67 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

68 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

69 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society.

70 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

71 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

72 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

73 Sapphos Environmental, Inc., 1996, Technical Memorandum, November 8, 1996, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team.

74 California Department of Fish and Game, 1997, Letter to Mr. Jack Graham (DOA).

75 California Department of Fish and Game, 1997, Letter to Mr. Jack Graham (DOA).

76 California Department of Fish and Game, 1997, Letter to Mr. Jack Graham (DOA).

77 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

78 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

79 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

Park.[80] It has not been observed in the study area as a result of directed surveys undertaken in June 2000, and is not expected to occur due to lack of suitable habitat.

Braunton's milkvetch (*Astragalus brauntonii*) is a perennial herb with dull purple flowers that bloom from March through July.[81, 82] It is a federally listed endangered species. This species is typically found in disturbed chaparral or gravelly, clay soils overlying granite or limestone.[83, 84] The nearest recorded occurrence of it is near Will Rogers State Park, approximately ten miles northwest of the Master Plan study area. This species has not been observed in the study area, and is not expected to occur due to lack of suitable habitat.

Coastal dunes milkvetch (*Astragalus tener* var. *titi*) is an annual herb with purple flowers that blooms from April through May. It is found in moist, sandy depressions near the coast, typically coastal bluffs or dunes.[85] It is a state-listed endangered species and a potential candidate for federal-listing as endangered. Historic records indicate it has occurred in the study area.[86] Currently, it is known only from a site in Monterey Bay, approximately 270 miles north of the study area, with the possibility of persistence on military dune property in San Diego, approximately 80 miles south of the study area. Coastal dunes milkvetch was not observed in the Master Plan study area during surveys conducted in spring 1996, 1997, 1998, and 2000, and is not expected to occur.[87]

Ventura marsh milkvetch (*Astragalus pycnostachyus* var. *lanosissimus*) is a perennial herb with greenish-white to cream-colored flowers that bloom from July through October.[88, 89]. It is proposed for federal and state listing as endangered. Its occurrence was recorded at the Ballona Marsh, two miles north of the study area, in two collections dated 1881 and 1902. It was considered extinct for approximately 30 years, but was rediscovered in 1997 at a site in Oxnard (Ventura County).[90] Though the characteristic habitat of this species is described as coastal marshes and seeps, the recently rediscovered specimen was found on degraded coastal dune on imported fill.[91] This species has not been observed in the study area, and is not expected to occur.

Salt marsh bird's-beak (*Cordylanthus maritimus* ssp*. maritimus*) is an annual herb, gray-green in color, often tinged purple, that blooms from May through October.[92, 93] It is both a federally- and state-listed

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80 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

81 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

82 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

83 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

84 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

85 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

86 W. D. Pierce and D. Pool, 1938, "The Fauna and Flora of the El Segundo Sand Dunes," *Bulletin of the Southern California Academy of Sciences* 37: 93-97

87 Sapphos Environmental, Inc., 1996, Technical Memorandum, November 8, 1996, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team.

88 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

89 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

90 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

91 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

92 James C. Hickman, ed., 1993, *The Jepson Manual: Higher Plants of California*, Berkeley: University of California Press.

endangered species.[94] It is known to occur in coastal dunes and salt marshes.[95] Salt marsh bird's-beak was historically known to exist in the vicinity approximately five miles northwest and 17 miles southeast of the study area. No exact location is known in the Santa Monica vicinity, and the species was probably extirpated at this site.[96] At the southwest location, the species has been presumed extirpated.[97] The species is not expected to occur in the study area due to unsuitable habitat and based on qualitative and directed surveys.[98]

Mexican flannelbush (*Fremonfodendon mexicana*) is an evergreen shrub with red-orange flowers that bloom from April through June.[99] It is a federally-listed endangered species. Mexican flannel bush is typically found in canyons in chaparral habitat on gabbroic or serpentine soils.[100] The nearest record for this species is from the vicinity of the Los Verdes Golf Course, approximately 12 miles south of the study area; however, it is considered an erroneous occurrence. This species has not been observed in the study area, and is not expected to occur due to lack of suitable habitat.

4.3 Federally- and State-Listed Threatened and Endangered Wildlife Species

Directed surveys were undertaken for all federally- or state-listed wildlife species that had the potential to occur within the Master Plan study area and Los Angeles/El Segundo Dunes. The list of wildlife species, which were the subject of directed surveys, includes those species identified by the USFWS in its letters of July 31[101] and August 29, 1997[102], those identified on the CDFG's Natural Diversity Database,[103] and those addressed as potentially being present in the literature review.[104] The USFWS identified nine endangered or threatened wildlife species that had the potential to be present within the Master Plan study area: San Diego fairy shrimp (*Branchinecta sandiegoensis*), Riverside fairy shrimp (*Streptocephalus woottoni*), El Segundo blue butterfly (*Euphilotes battoides allyni*), California brown pelican (*Pelecanus occidentalis californicus*), American peregrine falcon (*Falco peregrinus anatum*), California least tern (*Sterna antillarum browni*), southwestern willow flycatcher (*Empidonax extimus traillii*), least Bell's vireo (*Vireo belli pusillus*), and Pacific pocket mouse (*Perognathus longimembris pacificus*). All directed

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93 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

94 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

95 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

96 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

97 California Department of Fish and Game, 1999, *California Natural Diversity Database – Rarefind 2*, Sacramento, California.

98 Sapphos Environmental, Inc., 1996, Technical Memorandum, November 8, 1996, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team.

99 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

100 M. W. Skinner and B. M. Pavlik, 1994, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, Sacramento: California Native Plant Society

101 United States Fish and Wildlife Service, 1997, letter to Mr. David B. Kessler dated July 31, Federal Aviation Administration, U.S. Department of Transportation.

102 United States Fish and Wildlife Service, letter to Mr. David B. Kessler dated August 29, Federal Aviation Administration, U.S. Department of Transportation.

103 California Department of Fish and Game, 1997, *Rarefind 2: California Natural Diversity Database,* Sacramento, California.

104 Sapphos Environmental, Inc., 1996, Technical Memorandum, November 8, 1996, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team.

surveys for federally- or state-listed wildlife species were conducted in accordance with the protocols published by the USFWS.

Of these nine potentially occurring species, only three were found to be present during directed surveys: Riverside fairy shrimp, El Segundo blue butterfly and American peregrine falcon.

Embedded cysts of the federally-listed endangered Riverside fairy shrimp were found in soil samples taken from nine locations within the AOA located in the western portion of the Master Plan study area. Despite the optimal conditions that occurred during the winter of 1997/1998 and spring 1998, the Riverside fairy shrimp was not observed in the adult phase of its life cycle within the Master Plan study area during directed surveys of ephemerally wetted areas. The extent of alteration of the 1.3 acres of ephemerally wetted area coupled with the wildlife hazards management activities required by the FAA reduce the likelihood of the Riverside fairy shrimp completing the adult phase of its life cycle at these locations. Riverside fairy shrimp require a month or more to complete a full life cycle, including reproduction.[105] For this reason, they are restricted to deeper pools that remain full of water for more than a month.

Riverside fairy shrimp have the most restricted distribution of all the species of fairy shrimp known in Southern California, but have been found in five pools located within an 8.1 x 4.4-mile area in western Riverside County, California.[106] Outside of this area, Riverside fairy shrimp have only been found in a small number of pools in San Diego and Orange Counties, California and near the border in Baja California, Mexico.[107] It is documented from one complex on Marine Corps Air Station Miramar, throughout Marine Corps Base Camp Pendleton, and eight complexes on Otay Mesa.[108]

Male Riverside fairy shrimp range from 0.5 to one inch in length, and can be distinguished from other Streptocephalid species by careful examination of the morphology of the finger. The female Riverside fairy shrimp range from 0.5 to slightly less than one inch in length. Live Riverside fairy shrimp specimens, both male and female, have a red color covering the entire ninth abdominal segment and 30%-40% of the eighth abdominal segment.[109]

Riverside fairy shrimp are commonly found in association with vernal pools interspersed in coastal sage scrub vegetation. The pools are typically at depths greater than 12 inches, and occasionally are found in depressions, which include road ruts and ditches that support suitable habitat.[110, 111] These pools are filled with rainwater during the winter and spring, and generally persist from November through May.[112]

Streptocephalids reproduce by laying 300 eggs or more in one season.[113] When laid, eggs fall to the soil surface, where they develop to the early embryo stage. They then become dormant, entering a state of diapause encysted in their shells. These cysts remain dormant in the soil until the pool again fills with

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[105] Stacie A. Hathaway and Marie A. Simovich, 1996, "Factors Affecting the Distribution and Co-occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonenis* and *Streptocephalus woottoni," Journal of Crustacean Biology* 16(4): 669-677.

[106] Larry L. Eng, Denton Belk and Clyde H. Eriksen, 1990, "Californian Anostraca: Distribution, Habitat and Status," *Journal of Crustacean Biology* 10(2): 247-277.

[107] Stacie A. Hathaway and Marie A. Simovich, 1996, "Factors Affecting the Distribution and Co-occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonenis* and *Streptocephalus woottoni," Journal of Crustacean Biology* 16(4): 669-677.

[108] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

[109] Larry L. Eng, Denton Belk and Clyde H. Eriksen, 1990, "Californian Anostraca: Distribution, Habitat and Status," *Journal of Crustacean Biology* 10(2): 247-277.

[110] Larry L. Eng, Denton Belk and Clyde H. Eriksen, 1990, "Californian Anostraca: Distribution, Habitat and Status," *Journal of Crustacean Biology* 10(2): 247-277.

[111] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

[112] Larry L. Eng, Denton Belk and Clyde H. Eriksen, 1990, "Californian Anostraca: Distribution, Habitat and Status," *Journal of Crustacean Biology* 10(2): 247-277.

[113] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

water and the proper conditions are met for hatching.[114] Cysts can survive in dry soil for several seasons before hatching, thus allowing the species to persist even in times of low rainfall.[115] Riverside fairy shrimp cysts have been known to hatch under laboratory conditions after having been stored for 15 years or more.[116]

The *Recovery Plan for Vernal Pools of Southern California* (*VP Recovery Plan*) does not designate critical habitat for the Riverside fairy shrimp.[117] However, as a result of a recent agreement between the USFWS and the Center for Biological Diversity[118], the USFWS proposed designation of critical habitat for the Riverside fairy shrimp on September 21, 2000.[119] The *VP Recovery Plan* recommends that existing vernal pools and their associated watersheds within the Los Angeles Basin-Orange Management Areas (which includes LAX) be secured from further loss and degradation. As indicated in Section 4.10, *Biotic Communities*, there are no extant vernal pools within the AOA. The USFWS has proposed critical habitat for the Riverside fairy shrimp throughout the species' worldwide range, which includes Ventura, Los Angeles, Orange, Riverside, and San Diego Counties. **Table 5**, USFWS Proposed Critical Habitat, lists the counties and geographic locations.

Table 5

USFWS Proposed Critical Habitat

County	Geographic Location[1]
Ventura	Former Carlsberg Ranch
Los Angeles	Cruzan Mesa; Los Angeles coastal prairie unit, includes 30 acres within and adjacent to the El Segundo Blue Butterfly Preserve, west of Pershing Drive
Orange	Marine Corps Air Station El Toro; Chiquita Ridge; Tejeras Creek; Rancho Viejo; Saddleback Meadows; along the southern Orange County foothills
Western Riverside	Santa Rosa Plateau; Murrieta; Skunk Hollow
North San Diego	Marine Corps Base Camp Pendleton; City of Carlsbad at the Poinsettia Lane Train Station
Central San Diego	Marine Corps Air Station, Miramar
South San Diego	Ephemeral basin along the United States/Mexico border

[1] Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Riverside Fairy Shrimp, September 21, 2000.

Source: U.S. Fish and Wildlife Service

The USFWS proposed designated critical habitat for the Riverside fairy shrimp at the Los Angeles Coastal Prairie Unit is depicted in **Figure 26**, Proposed Designation of Critical Habitat For The Riverside Fairy Shrimp.

In general, Streptocephalids eat many different organisms, including algae, nematodes, and rotifers, as well as other crustaceans.[120]

[114] Stacie A. Hathaway and Marie A. Simovich, 1996, "Factors Affecting the Distribution and Co-occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonenis* and *Streptocephalus woottoni," Journal of Crustacean Biology* 16(4): 669-677.

[115] Marie A. Simovich and Stacie A. Hathaway, 1997, "Diversified Bet-Hedging as a Reproductive Strategy of Some Ephemeral Pool Anostracans (Branchiopoda)," *Journal of Crustacean Biology* 17(1): 38-44.

[116] Christoper Rogers, 1999, Jones & Stokes Associates, Inc., *Personal Communications*, June 1.

[117] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

[118] United States District Court for the Northern District of California, San Francisco Division. Stipulated Settlement Agreement: Center for Biological Diversity vs. Bruce Babbit, Secretary of the Department of the Interior. Civil No. C99-3202 SC, dated February 15, 2000.

[119] 50 CFR Part 17.

[120] Stacie A. Hathaway and Marie A. Simovich, 1996, "Factors Affecting the Distribution and Co-occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonenis* and *Streptocephalus woottoni," Journal of Crustacean Biology* 16(4): 669-677.

San Diego fairy shrimp are federally-listed as endangered and are found mainly in vernal pools within San Diego County. San Diego fairy shrimp are a small species of fairy shrimp; adults reach no more than 16 mm in total length.[121] This species inhabits pools of variable inundation durations, with depths ranging from 5 cm to 30 cm.[122] San Diego fairy shrimp reproduce during the wet season, and the eggs become encased in a hard shell called a cyst. The cysts remain in the top layer of soil until the next favorable wet season. No cysts or adults of San Diego fairy shrimp were recovered or observed during the 1997/1998 dry or wet season surveys for listed fairy shrimp at Los Angeles International Airport.[123]

The El Segundo blue butterfly is known from only two other small localities, a 1.5-acre site at the oil refinery located south of the airport, and a half-acre site at Malaga Cove. The Dunes population represents over 90% of the known population of this species.

The California brown pelican is a federally- and state-listed endangered species that breeds on the Channel Islands and is present off the Southern California coast year-round. This species is a bird of the open ocean and near-shore coastal waters and coastal estuaries. It is commonly observed off the coast of the Master Plan study area. However, no California brown pelican have been observed within the Master Plan study area during directed surveys (Sapphos Environmental, Inc., 1998, 2000).[124, 125]

The American peregrine falcon is a state-listed endangered species. It is a large falcon with blue-gray above, white below, and a black cap and "moustache" on the head. This species breeds throughout California in habitat characterized by tall cliffs, ridges, and rocky promontories.[126] It is a rare visitor to the Master Plan study area, and was not observed during directed surveys undertaken in 1995, 1996 and 1998.[127, 128, 129] However, the results of 2000 directed surveys revealed that the study area supports foraging roost sites in the tall buildings within and adjacent to LAX, but does not support nesting habitat.

California least tern is a federally- and state-listed endangered species. This is a small species of tern with a short, deeply forked tail and a yellow bill with a black tip. Males have a black cap and white forehead.[130] The California least tern breeds statewide along the coast in flat open areas, especially on sandy beaches. The nearest breeding colony is located at Venice Beach, approximately three miles north of the Master Plan study area. No least terns have been observed within the Master Plan study area.[131, 132]

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[121] Michael Fugate, 1993, *"Branchinecta sandiegonenis*, A New Species of Fairy Shrimp (Crustacea: Anostraca) from Western North America," *Proceedings of the Biological Society of Washington* 106(2): 296-304.

[122] Stacie A. Hathaway and Marie A. Simovich, 1996, "Factors Affecting the Distribution and Co-occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonenis* and *Streptocephalus woottoni," Journal of Crustacean Biology* 16(4): 669-677.

[123] RECON (Patterson and Ayers),1998, *Fairy Shrimp Surveys at Los Angeles International Airport*, Prepared for Sapphos Environmental, Inc., July 1.

[124] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1067-007.M01, Subject: Winter Bird Count at El Segundo Dunes, January 29.

[125] Pending completion of final Memorandum for the Record.

[126] P. A. Johnsgard, 1990, *Hawks, Eagles, and Falcons of North America*, Washington D.C.: Smithsonian Institution.

[127] Sapphos Environmental, Inc., 1996 Memorandum for the Record 1043-002.M07, Subject: "Results of 1995 Spring Surveys for Birds at the Los Angeles International Airport El Segundo Dunes," March 7.

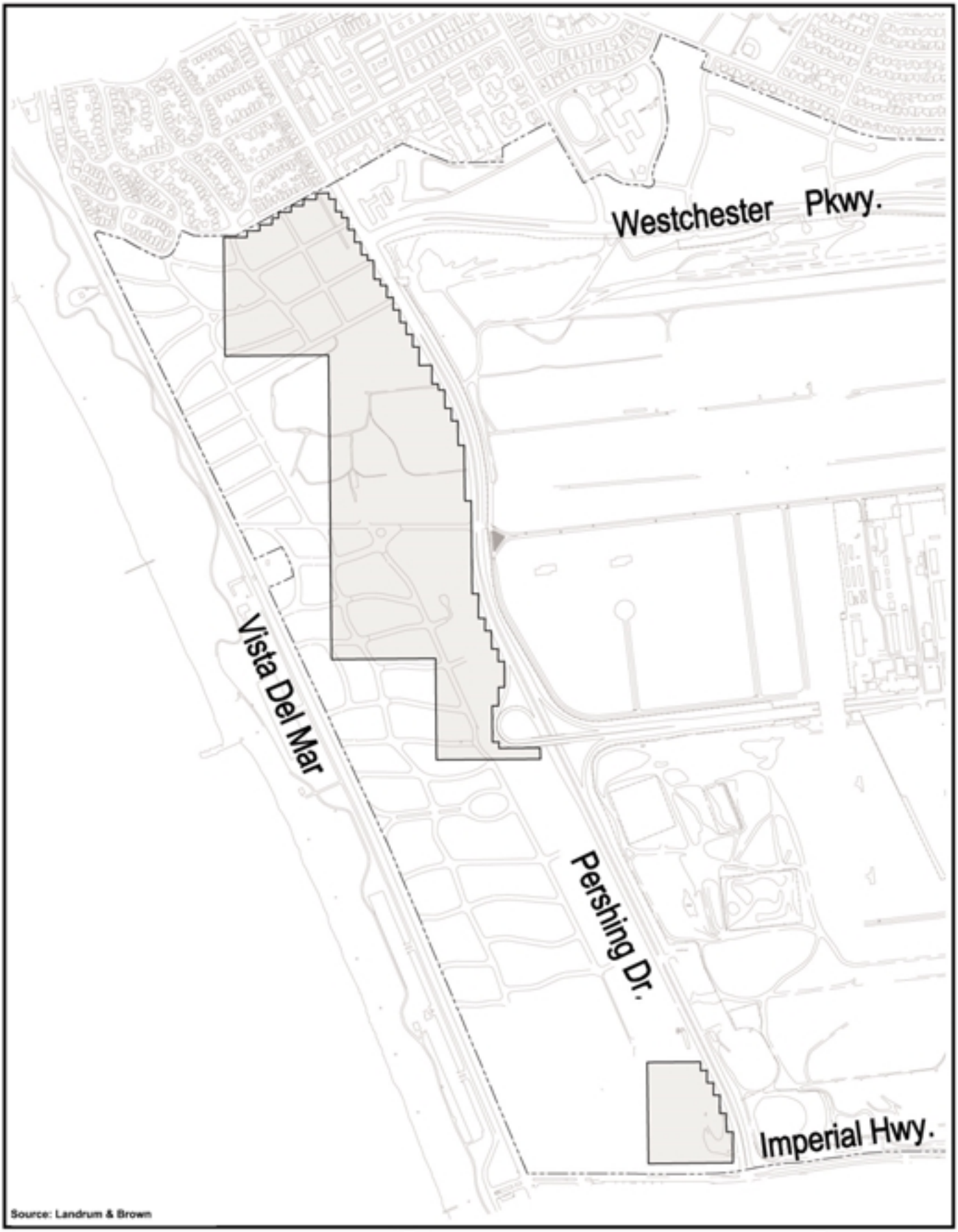
[128] Sapphos Environmental, Inc., 1996, Memorandum for the Record 1067-001.M19, Subject: "1996 Breeding Birds of Prey Survey at the Los Angeles International Airport (LAX) in March of 1996," April 3.

[129] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8.

[130] J. Farrand, 1988, *Western Birds - An Audubon Handbook*, New York: McGraw-Hill Book Company.

[131] Sapphos Environmental, Inc., Memorandum for the Record 1067-007.M01, dated January 29, 1998, Subject: Winter Bird Count at El Segundo Dunes.

[132] Pending completion of final Memorandum for the Record.



Source: Landrum & Brown

Los Angeles International Airport Master Plan Biological Assessment

Proposed Designation Of Critical Habitat For The Riverside Fairy Shrimp

Figure 26

Southwestern willow flycatcher is a federally- and state-listed endangered species. It is currently known to breed at fewer than 75 sites, in riparian areas throughout the southwest. This species is not present in the project area due to lack of suitable habitat.[133]

Least Bell's vireo is found in Southern California, and breeds in riparian areas. It is not present within the study area due to lack of suitable habitat.[134]

The Pacific pocket mouse is a federally-listed endangered species known from only three localities in coastal Southern California. It has not been observed within the Master Plan study area during directed surveys to determine its presence/absence.

4.4 Sensitive Plant Species

Sensitive plant species that are not federally- or state-designated as rare, threatened, or endangered are not addressed in this Biological Assessment. However, they are addressed in Section 4.10, *Biotic Communities,* of the EIS/EIR.

4.5 Sensitive Wildlife Species

Sensitive wildlife species that are not federally- or state-designated as rare, threatened, or endangered, are not addressed in this Biological Assessment. However, they are addressed in Section 4.10 *Biotic Communities,* of the EIS/EIR.

5.0 IMPACTS

This section describes the impacts on federally-listed threatened and endangered plant and wildlife species from the No Action/No Project Alternative and the three build alternatives identified for the Los Angeles International Airport Master Plan (Master Plan). The scope of the impact analysis includes the Master Plan study area. Of the nine plant species described in **Table 1** as having the potential to be present within the study area, all were determined to be absent as a result of directed surveys within the Master Plan study area. Of the nine wildlife species described in **Table 1**, three species were determined to be present as a result of directed surveys: Riverside fairy shrimp (*Streptocephalus woottoni*), El Segundo blue butterfly (*Euphilotes battoides allyni*) and American peregrine falcon (*Falco peregrinus anatum*). Embedded cysts of the Riverside fairy shrimp were found in dry soil samples taken from approximately 1.3 acres of the AOA. The El Segundo blue butterfly was determined to be present within the El Segundo Blue Butterfly Habitat Restoration Area of the Los Angeles/El Segundo Dunes and absent within existing undeveloped areas of the AOA. The American peregrine falcon was observed flying over and foraging within and adjacent to LAX, but was not observed nesting within the Master Plan study area.

Impacts on other sensitive plant and wildlife species are addressed in Section 4.10, *Biotic Communities,* of the joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR), and do not indicate any need to pursue designation as threatened or endangered. Of the 20 sensitive plant species recognized by the USFWS and the CDFG, three plant species were determined present as a result of directed surveys. The LAX Master Plan has the potential for impacts on Lewis' evening primrose *(Camissonia lewisii*). Impacts on this sensitive plant and recommended Mitigation Measures are addressed in the EIS/EIR. Of the 34 sensitive wildlife species recognized by the USFWS and CDFG, 22 were determined present or potentially present as a result of directed surveys. The LAX Master Plan has the potential for impacts on: western spadefoot toad (*Scaphiopus hammondii*), loggerhead shrike (*Lanius ludovicianus*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Impacts on these sensitive wildlife species and recommended Mitigation Measures are addressed in Section 4.10, *Biotic Communities,* of the EIS/EIR.

This section describes the potential environmental impacts of the No Action/No Project Alternative and the three build alternatives on the three endangered wildlife species known to be present within the Master

[133] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8.

[134] Sapphos Environmental, Inc., 1998, Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8.

Plan study area: Riverside fairy shrimp, El Segundo blue butterfly, and American peregrine falcon. For each build alternative, the potential effects are discussed as they relate to the potential to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of federally-designated critical habitat in the affected area.

Potential adverse impacts to endangered species could result from conversion of open areas/degraded habitat to developed uses within the airfield, changes in ambient levels of light and glare within the southeastern portion of the Los Angeles/El Segundo Dunes, construction activities adjacent to the Los Angeles/El Segundo Dunes, and increased jet exhaust emissions. Construction of navigational aids in the Los Angeles/El Segundo Dunes under Alternative A could also affect the El Segundo blue butterfly and its host plant.

5.1 Flora

No Action/No Project Alternative

Implementation of the No Action/No Project Alternative will not result in impacts to any federally- or state-listed plant species because no federally- or state-listed plant species occur within the LAX Master Plan boundaries.

Alternatives A, B, and C

Implementation of build alternatives A, B, or C will not result in impacts to any federally- or state-listed plant species because no federally- or state-listed plant species occur within the LAX Master Plan boundaries.

Implementation of build alternatives A, B, or C will result in impacts to one sensitive plant: Lewis' evening primrose. Impacts to Lewis' evening primrose are discussed in Section 4.10, *Biotic Communities,* of the LAX Master Plan EIS/EIR.

5.2 Fauna

Riverside Fairy Shrimp

No Action/No Project Alternative

Under this Alternative, the 1.3 acres of degraded habitat containing embedded cysts of the Riverside fairy shrimp would remain in the AOA. Enhancement to the Riverside fairy shrimp habitat in these areas is not feasible due to FAA Wildlife Hazards Management guidelines to ensure public safety of certificated airports. Due to continuous implementation of these guidelines, no habitat currently exists on the airfield that retains standing water for a sufficient duration to allow the Riverside fairy shrimp to complete its life cycle (six to eight weeks). Implementation of FAA Wildlife Hazard Management guidelines continues under this Alternative, thus, it is anticipated that Riverside fairy shrimp would continue to be present within the Master Plan study area only in the form of embedded cysts. The No Action/No Project Alternative would not affect the continued existence of embedded cysts of the Riverside fairy shrimp, nor will it further the recovery of the species.

All Alternatives (Alternatives A, B, and C)

Implementation of any of the Master Plan build alternatives would result in direct impacts to the 1.3 acres of degraded habitat containing embedded cysts of the Riverside fairy shrimp. Direct impacts would result from conversion of the Disturbed/Ruderal habitat, in which the embedded cysts are currently found, to developed areas for the proposed western terminal complex, runway construction, and associated construction staging areas. Any remaining open areas would be subject to operations and maintenance activities as described in the No Action/No Project Alternative. These activities would therefore result in substantial habitat modification and loss of Riverside fairy shrimp cysts. However, with implementation of the Master Plan Mitigation Measures, soils containing cysts of Riverside fairy shrimp shall be moved to a suitable alternate location in coordination with the USFWS, thus providing an opportunity for the species' recovery. Recommendations to reduce impacts to below a level of significance are discussed in Section 6.0, *Recommendations*.

El Segundo Blue Butterfly

No Action/No Project Alternative

Under this Alternative, the 202-acre El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area) will be maintained, including the current level of maintenance. Increased levels of airport activity are anticipated under this alternative, including an increase in the number of jet flyovers as discussed in the Master Plan EIS/EIR. Analysis of the potential effects of jet exhaust emissions has determined that under this alternative, there would be no effects to the El Segundo blue butterfly.[135, 136] Therefore, the No Action/No Project Alternative would not impact the El Segundo blue butterfly.

Alternative A

Under this Alternative, the 202-acre Habitat Restoration Area will be maintained, including the current level of maintenance. Implementation of Alternative A would require the relocation of the Approach Lighting with Sequence Flashers (ALSF) mounted on a small tower structure associated with the relocation of Runway 6R/24L slightly to the south. A photograph of an ALSF Tower is provided in **Figure 27**, Photograph of ALSF Tower at LAX, which shows the tower and its concrete base. The towers would be located within habitat occupied by the El Segundo blue butterfly. Permanent impacts to habitat occupied by the El Segundo blue butterfly and its host plant are anticipated at 320 square feet. This conversion is considered a significant impact. Recommendations are discussed in Section 6.0, *Recommendations*, to ensure no net loss of occupied habitat results under this Alternative. Construction activities, including staging and stockpiling of materials proximal to the Habitat Restoration Area, have the potential to result in deposition of fugitive dust within occupied habitat of the El Segundo blue butterfly, specifically during implementation of the ring road, parking facilities, West Terminal Area, and people mover components of the proposed project. Recommendations are discussed in Section 6.0, *Recommendations*, to ensure avoidance of potential impacts to El Segundo blue butterfly habitat and to the El Segundo blue butterfly. Sapphos Environmental, Inc. retained the services of the University of California at Los Angeles to assist in the collection and evaluation of particulate aircraft emission data. The following data were collected and analyzed: measurements of ambient concentrations of airborne particulate matter; polycyclic aromatic hydrocarbons (PAHs) and trace metal content in PM_{10} fractions; passive deposition monitoring using coast buckwheat (*Erigonum parvifolium*);[137] PAH and trace metal content in soil samples; and ambient deposition of PAHs and saturated hydrocarbons. Analysis of the potential effects of jet exhaust emissions has determined that under Alternative A, there would be no effects to the El Segundo blue butterfly.[138, 139] An analysis of light and glare evaluated the current facility site plans and the results of observations of current airport lighting sources in order to assess future lighting effects based on the proposed site plans and design features of this Alternative. The analysis of existing lighting conditions within the southern half of the Habitat Restoration Area and Pershing Drive measured illuminance values (the light energy incident at a given point in foot-candles) that ranged from 0.004 to 0.26 foot-candles.[140] Under this Alternative, the net change in lighting associated with installation of navigational aids within the Habitat Restoration Area

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[135] M. I. Venkatesan and K. A. Boyle, 1999, "Analysis of Hydrocarbons and Trace Metals in the Environmental Samples in Support of Los Angeles International Airport 2015 Master Plan Expansion Project EIS/EIR," prepared for Sapphos Environmental, Inc., June 28.

[136] Elevated levels of vanadium were found in buckwheat within the Habitat Restoration Area. However, there is no evidence that the El Segundo blue butterfly is adversely affected by vanadium. Monitoring results indicate that current levels of vanadium are not adversely affecting the El Segundo blue butterfly population at the Habitat Restoration Area since counts for the year 2000 showed a significant increase in the population when compared to 1999.

[137] Of 16 trace metals analyzed, vanadium was found to be present at significantly higher levels in buckwheat tissue exposed at the runway and to a lesser extent in buckwheat exposed within the Habitat Restoration Area when compared to the reference site. Vanadium is not known to adversely impact the El Segundo blue butterfly.

[138] M. I. Venkatesan and K. A. Boyle, 1999, "Analysis of Hydrocarbons and Trace Metals in the Environmental Samples in Support of Los Angeles International Airport 2015 Master Plan Expansion Project EIS/EIR," prepared for Sapphos Environmental, Inc., June 28.

[139] As noted above, vanadium was found to be present at higher levels in buckwheat tissue exposed within the Habitat Restoration Area when compared to the reference site. Vanadium is not known to adversely impact the El Segundo blue butterfly.

[140] Light Emission Supplemental Report, Located in Supplemental Report 8, LAX Master Plan EIS/EIR, Section 5.0, *Environmental Consequences*, pp. 10-11.

shows a minimal increase in lighting within occupied habitat. The new light sources associated with the West Terminal and parking facilities would increase ambient light levels to an estimated 0.60 foot-candles on the Habitat Restoration Area,[141] as described in Section 4.18, *Light Emissions*. Kenneth Frank undertook an assessment of the impact of outdoor lighting on moths, based on published literature[142]. His assessment revealed that outdoor lighting disturbs the behavior (flight, navigation, vision, migration, dispersal, egg-laying, mating, feeding, and crypsis) of some nocturnal moths due to elicitation of flight-to-light behavior. In addition, outdoor lighting exposes moths to increased predation by birds, bats, spiders, and other predators. Approximately half of all the orders of insects, including moths, exhibit a nocturnal habit. By contrast, butterflies are diurnal specialists; that is, they are active during the day. In fact, a distinctive characteristic between butterflies and moths is that moths are primarily active at night, and butterflies are active during the day.[143] Due to their diurnal habit, butterflies in general do not exhibit flight-to-light behavior. The El Segundo blue butterfly is a diurnal species, remaining perched around the coastal buckwheat food plant during the night. Therefore, the additional lighting associated with the proposed improvements under this Alternative would not impact the El Segundo blue butterfly.

Alternative B/Alternative C

Implementation of either Alternative B or Alternative C would not affect the El Segundo blue butterfly, as there are no proposals under these alternatives to conduct work within the Habitat Restoration Area west of Pershing Drive. The 202-acre Habitat Restoration Area would continue under both alternatives. In an effort to ensure that construction associated with improvements to World Way West and construction of the people-mover adjacent to the Habitat Restoration Area do not have the potential to indirectly impact habitat occupied by the El Segundo blue butterfly and its host plant, construction avoidance measures (as discussed in Section 6.0, *Recommendations*) will be implemented. Analysis of potential effects of jet exhaust emissions determined that under both alternatives, there would be no effect on the El Segundo blue butterfly.[144, 145] Analysis of the effects of the proposed additional lighting has likewise determined that under these alternatives, increased light and glare would not impact the El Segundo blue butterfly, as described under Alternative A.

American Peregrine Falcon

No Action/No Project Alternative

The No Action/No Project Alternative would not affect the continued existence of the American peregrine falcon due to the absence of breeding sites within the Master Plan study area.

Alternative A

Alternative A would require realignment of navigational aids within the Habitat Restoration Area. The American peregrine falcon has not been observed within the Habitat Restoration Area, and rarely hunts from a perch. It will usually swoop from flight onto flying prey,[146] therefore, installation of navigational aids within the Habitat Restoration Area will not affect the continued existence of this species.

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[141] Light Emission Supplemental Report, Located in Supplemental Report 8, LAX Master Plan EIS/EIR, Section 5.0, *Environmental Consequences*, pp. 10-11.

[142] Frank, K. D., Impact of Outdoor Lighting on Moths: An Assessment, Journal of the Lepidopterists' Society, Vol. 42, Number 2, pages 63-93, 1988.

[143] Hogue, C. L., Insects of the Los Angeles Basin, Natural History Museum Foundation, 1974, pp. 151 and 152.

[144] M. I. Venkatesan and K. A. Boyle, 1999, "Analysis of Hydrocarbons and Trace Metals in the Environmental Samples in Support of Los Angeles International Airport 2015 Master Plan Expansion Project EIS/EIR," prepared for Sapphos Environmental, Inc., June 28.

[145] As noted above, vanadium was the only element associated with jet aircraft exhaust found at elevated levels within the Habitat Restoration Area. There is no evidence that the El Segundo blue butterfly is adversely affected by vanadium, and monitoring results indicate that current levels of vanadium are not adversely affecting the El Segundo blue butterfly population at the Habitat Restoration Area since counts for the year 2000 showed a significant increase in the population when compared to 1999.

[146] California Department of Fish and Game, California Statewide Wildlife Habitat Relationships System, *California Wildlife*, Volume II, Birds, State of California Resource Agency, 1990.

Los Angeles International Airport	Photograph of ALSF tower at LAX	Figure 27

k:\1049-002\fig5.2-1.fh8

Alternative B/Alternative C

Alternatives B and C would not affect the continued existence of the American peregrine falcon because this species does not occupy habitat in the proposed developed facilities, construction staging, or associated support activities areas.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section of the Biological Assessment describes those measures to be undertaken by the Federal Aviation Administration (FAA) or its designee to ensure that the Los Angeles International Airport Master Plan (Master Plan) will not affect the survival and recovery in the wild of any federally- or state-listed endangered or threatened species of flora or fauna. Recommendations developed for conservation of federally- and state-listed species determined to be present include conservation strategies in association with construction, operation, and maintenance of the Master Plan elements. Specific consideration has been given to the Riverside fairy shrimp that was determined to be present as embedded cysts within soil samples taken from approximately 1.3 acres in the AOA within the Master Plan boundaries. In addition, installation of navigational aids required in association with one of the build alternatives would result in impacts on less than 0.01 acre of occupied habitat for the El Segundo blue butterfly within the El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area). Under the No Action/No Project Alternative and all build alternatives, no impacts to the American peregrine falcon would occur, and therefore, the species is not further considered. Recommended Mitigation Measures that address both Riverside fairy shrimp and El Segundo blue butterfly would reduce impacts below the level of significance. Implementation of these recommendations would fulfill the responsibilities of the FAA pursuant to the Fish and Wildlife Coordination Act and the federal Endangered Species Act.

A primary concern when discussing the potential enhancement of native habitat within the airport is the continued safe operation of the facility as an airport. Any recommendations for restoration of habitats near the airport must take into consideration the potential for derogating safety and airfield security and increasing the potential for bird strikes.

6.1 Flora

As a result of directed surveys undertaken in the spring and summer of 1998 and 2000, it has been determined that there are no federally- or state-listed rare, threatened, or endangered plant species present within the Master Plan boundaries or the immediately adjacent Los Angeles/El Segundo Dunes.

The approximately 200-acre Habitat Restoration Area is currently managed by LAWA consistent with the high-priority management measures prescribed by the *Long-Term Habitat Management Plan for the Los Angeles/El Segundo Dunes*.[147] Currently, management and restoration efforts within the Habitat Restoration Area are concentrated on removal of invasive non-native plant species and propagation of native plant species for restoration planting. Invasive non-native plant species such as iceplant (*Carprobrotus* sp.), acacia (*Acacia* sp.), and non-native grasses pose a significant threat to native habitats in the Habitat Restoration Area. Removal of these species is an ongoing effort conducted by LAWA, landscape maintenance staff, community service work crews, and volunteer work groups. As the non-native species are removed, restoration and recolonization by native plant species is facilitated. An on-site nursery was developed in late 1997 to allow propagation of native species for restoration planting. As the removal of non-native species and utilization of the nursery become increasingly successful, the enhancement and reintroduction of the listed species described as historically or potentially occurring within the Master Plan study area will be facilitated. Of the nine federally- or state-listed plants whose historic range includes the Master Plan boundaries or the Los Angeles/El Segundo Dunes, the Habitat Restoration Area provides suitable habitat for the following species:

- Beach spectacle-pod
- Ventura marsh milkvetch
- Coastal dunes milkvetch

[147] Los Angeles World Airports, 1994, *Long-Term Habitat Management Plan for Los Angeles Airport/El Segundo Dunes*. Prepared for City of Los Angeles, Environmental Affairs Department, Prepared by Environmental Science Associates in association with Sapphos Environmental, Inc. and Rudolf H. T. Mattoni, Ph.D.

Areas within the Master Plan study area do not currently provide suitable habitat for San Diego button-celery, Santa Monica Mountains dudleya, Braunton's milkvetch, salt marsh birds-beak, Mexican flannelbush, and California orcutt grass.

No Action/No Project Alternative, Alternatives A, B, and C

No federally- or state-listed plant species that have the potential to occur within the Master Plan study area were determined to be present; therefore, no recommendations for mitigating project impacts to flora are provided.

6.2 Fauna

The potential for significant impacts on the Riverside fairy shrimp was identified under each of the three build alternatives in association with construction staging activities and the development of the ring road, runway improvements, and appurtenant facilities. These impacts result from the permanent conversion of 1.3 acres of soils containing embedded cysts of the Riverside fairy shrimp.

The potential for impacts on the El Segundo blue butterfly in association with relocation of navigational aids was identified for Alternative A. These impacts result from relocation of five navigational aids, each requiring an accessible area measuring eight feet by eight feet.

Restoration of suitable habitat for the Riverside fairy shrimp must be compatible with FAA Wildlife Hazard Management guidelines for ensuring aviation safety, pursuant to 14 CFR Part 139.[148] Likewise, reintroduction of any other federally- or state-listed wildlife species whose historic range included areas within the Master Plan boundaries that are not currently present (e. g., Pacific pocket mouse) must be compatible with FAA Wildlife Hazard Management guidelines for ensuring aviation safety, pursuant to 14 CFR Part 139. The FAA has stated that introduction of new attractants to birds is contrary to the FAA's mission.[149]

Riverside Fairy Shrimp

No Action/No Project Alternative

Under the No Action/No Project Alternative, facility improvements (including those currently underway and those scheduled for construction in support of continued growth in airport activity in the absence of the Master Plan) will be undertaken; these consist of fully entitled projects, and are anticipated to require no environmental clearance. Under this alternative, degraded habitat containing Riverside fairy shrimp cysts would be retained, but could not be improved due to FAA Wildlife Hazards Management guidelines. It is anticipated that the USFWS would require that ongoing routine operations and maintenance activities in areas containing cysts be undertaken by hand and without the use of machinery that may be detrimental to cysts. However, even with these measures intended to avoid taking the cysts, the Riverside fairy shrimp would unlikely be able to complete the adult phase of its life cycle.

Alternatives A, B, and C

As discussed in Section 5.2, implementation of any of the proposed Master Plan build alternatives would result in the removal of 1.3 acres of degraded habitat containing embedded cysts of the Riverside fairy shrimp located within the AOA. Any remaining open areas would be subject to operations and maintenance activities in order to comply with Wildlife Hazards guidelines pursuant to 14 CFR Part 139.

On-site conservation of Riverside fairy shrimp within the AOA would be incompatible with FAA guidelines pursuant to 14 CFR, Section 139.337, because ponded water, associated vegetation, and the presence of the fairy shrimp themselves could attract birds, which in turn pose hazards to aircraft. Hazard management activities performed under these guidelines with respect to vegetation management include mowing, discing, and grading activities to ensure safety, which is in direct conflict with habitat improvements.

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[148] United States Department of Transportation, Federal Aviation Administration, Title 14, Code of Federal Regulations (CFR), Part 139, Section 139.337: Wildlife Hazard Management.

[149] United States Department of Transportation, Federal Aviation Administration Letter to Mr. James Ritchie (LAWA), June 30, 2000.

The FAA will oversee the development of a Riverside Fairy Shrimp Wetland Habitat Restoration Program for the embedded cysts to ensure that the selected build Alternative or the No Action/No Project Alternative would be consistent with the recommendations provided in the *Recovery Plan for Vernal Pools of Southern California.*[150]

RIVERSIDE FAIRY SHRIMP WETLAND HABITAT RESTORATION MEASURE

LAWA or its designee shall undertake mitigation for impacts to 1.3 acres of degraded habitat containing embedded cysts of Riverside fairy shrimp. The degraded habitat containing embedded cysts of Riverside fairy shrimp was determined to have a habitat value of 0.15, based on results of a modified HEP analysis (see Section 4.10**,** *Biotic Communities*). Habitat occupied by embedded cysts of Riverside fairy shrimp shall be replaced at a suitable alternate location at a ratio of not more than 1 to 1. Replacement habitat shall have a habitat value of not less than 0.75, as determined by the modified HEP analysis.

LAWA or its designee, in coordination with the USFWS, shall identify a location suitable for the creation of high-quality habitat to which the soil containing embedded cysts of Riverside fairy shrimp can be relocated. The FAA determined that the creation of suitable habitat within the Los Angeles/El Segundo Dunes presents an unacceptable wildlife hazard pursuant to Title 14 CFR 139.339.[151] Therefore, LAWA shall identify opportunities for creation of suitable habitat for embedded cysts of Riverside fairy shrimp outside of the areas subject to wildlife hazards management.

Eight potentially suitable relocation sites for soils containing embedded cysts of Riverside fairy shrimp have been identified. The site closest to the AOA may exist north of LAX, on the bluffs overlooking the Ballona Wetlands.[152] The site is approximately 44 acres in size and is located in the 7400 block of 80th Street and Berger Avenue (**Figure 28**, Ballona Bluff Site). The site is currently proposed for development of 120 single-family residences by the Catellus Residential Group.[153] Several comment letters on the

Subsequent Environmental Impact Report for the project have indicated that the site supports vernal pool habitat. In addition, the USFWS has recommended that the applicant address the potential impacts to vernal pool species from the proposed project through an assessment of the site by a qualified biologist familiar with the site and the listed vernal pool species.[154] Presence/absence of vernal pools at the Catellus site has not been verified. In the event that the site supports vernal pool habitat or suitable conditions for creation or enhancement of such habitat, it may be possible for the USFWS to work with the project applicant to incorporate the relocation of Riverside fairy shrimp cysts from LAX into suitable conserved areas of the development project. The USFWS has indicated that this would be a beneficial resolution to impacts to Riverside fairy shrimp cysts at LAX.

LAWA shall evaluate the feasibility of Henrietta Basin for use as a location for the creation of suitable habitat for the Riverside fairy shrimp. Henrietta Basin is a flood control basin located in and owned by the City of Torrance. It is located approximately eight miles south of LAX, west of the intersection of Spencer Street and Henrietta Street and north of Edgemere Drive (**Figure 29**, Henrietta Basin Site). A preliminary report prepared for the site states that the basin may have historically been a part of the vernal marsh complex

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[150] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

[151] United States Department of Transportation, Federal Aviation Administration Letter to Mr. James Ritchie (LAWA), June 30, 2000.

[152] Brenda MacMillan, 1999, U.S. Fish and Wildlife Service, *Personal Communication*, April 27.

[153] City of Los Angeles, 1998, Department of Planning, Environmental Review Section, *West Bluffs Project, Subsequent Draft Environmental Impact Report*, May.

[154] U. S. Fish and Wildlife Service, 1999, Letter to Hadar Plafkin, RE: West Bluffs Project, City of Los Angeles-State Clearing House No. 97111005; Coastal Development Permit No. CDP-93-013, Project Coordinator, Department of City Planning, City of Los Angeles, from Jim A. Bartel, Assistant Field Supervisor, Carlsbad Field Office.

that once existed on the Los Angeles coastal prairie.[155] The report lacks a strong scientific foundation, but it does describe seasonally ponded portions of the basin that seem to exhibit some vernal characteristics. A difference in characteristic vegetation has been observed between the north and south portions of the basin, potentially due to vernal properties in the southern portion. The report describes a true vernal marsh existing in the basin. Additional surveys of this site by a biologist familiar with vernal pool habitats and the species associated with them would be required to determine the suitability of the basin for relocation of Riverside fairy cysts identified at LAX.

An historic location for California orcutt grass approximately six miles east-southeast of LAX will also be evaluated for its potential suitability as a restoration site.

Should use of sites within Los Angeles County be determined infeasible, LAWA shall evaluate the feasibility of the remaining six vernal pools or vernal pool complexes in the Los Angeles Basin/Orange Management Area identified by the USFWS: Chiquita Ridge, El Toro, Fairview Park, Orange County Foothills, Saddleback Meadows, and San Clemente State Park.[156] The USFWS indicated that it was their belief that all of these complexes had succumbed to development and were no longer potential enhancement sites.[157] However, in subsequent discussions with the Service, it was indicated that a potentially suitable enhancement site might be present in the City of El Segundo, associated with a golf course adjacent to Sepulveda Boulevard.[158] A review of aerial photographs of the area revealed a large open area south of The Lakes Golf Course and east of Sepulveda Boulevard. The area is bounded on the north and south by Union Pacific and Burlington Northern Santa Fe Railway easements, respectively. Suitability of the site is not currently known (**Figure 30)**, Open Space Bounded by Railway Easements, El Segundo). The complex closest to LAX, Fairview Park, is approximately 40 miles to the south. Riverside fairy shrimp are known to occur in five of the six complexes, with Fairview Park being the only complex in which the species is not known to occur.

Fairview Park is located near the coast, similar to LAX, and is owned by the City of Costa Mesa (**Figure 31**, Fairview Park Site). The park is largely used for passive recreation and, based on the presence of existing vernal pool complexes, may provide a suitable area for introduction of the cysts identified at LAX. LAWA considers the Fairview Park site as the preferred alternative for disposition of salvaged Riverside fairy shrimp cysts identified at Los Angeles International Airport.

Once a suitable location has been identified and secured, LAWA or its designee shall undertake the relocation of soils containing embedded cysts of Riverside fairy shrimp from the western portion of the airfield to the identified location. Salvage shall be undertaken from all sites containing embedded cysts of the Riverside fairy shrimp. The top six to twelve inches of soil containing the cysts shall be transplanted during the dry season to minimize damage to the cysts during transport. The soil would then be deposited and spread out in a small basin or pool-like area of similar size without active mechanical compaction to minimize potential damage to the cysts.

LAWA or its designee, in conjunction with the USFWS and a qualified wildlife biologist, shall develop a program to monitor the progress of habitat creation prior to relocation of the embedded cysts of Riverside fairy shrimp, and to monitor created habitat for the presence of adult Riverside fairy shrimp following relocation of embedded cysts of Riverside fairy shrimp annually for a period of not more than five years.

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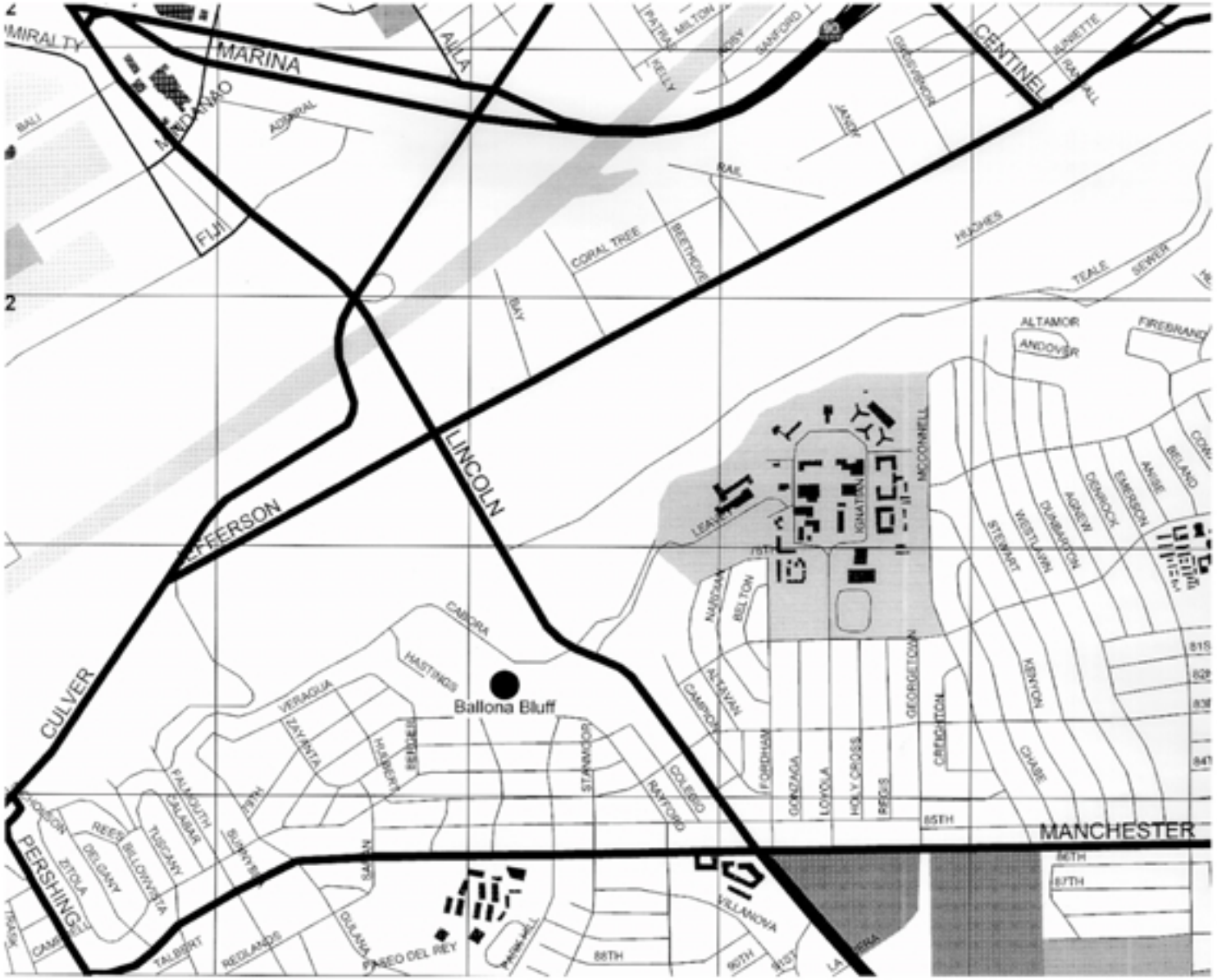
[155] Dale Lincoln, 1992, "The Ecology, Preservation, and Use of Henrietta Basin Marsh, Torrance, California (A Layman's Study)," Prepared for: The Honorable Mayor, City Council, Planning Commission, and Parks and Recreation Commission of the City of Torrance, and the Board of Education, Torrance Unified School District.

[156] United States Fish and Wildlife Service, 1998, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.

[157] Brenda MacMillan, 1999, U.S. Fish and Wildlife Service, *Personal Communication*, April 27.

[158] Brenda MacMillan, 1999, U.S. Fish and Wildlife Service, *Personal Communication*, April 27.



Not to Scale

Los Angeles International Airport Master Plan Biological Assessment	Ballona Bluff Site	Figure *28*

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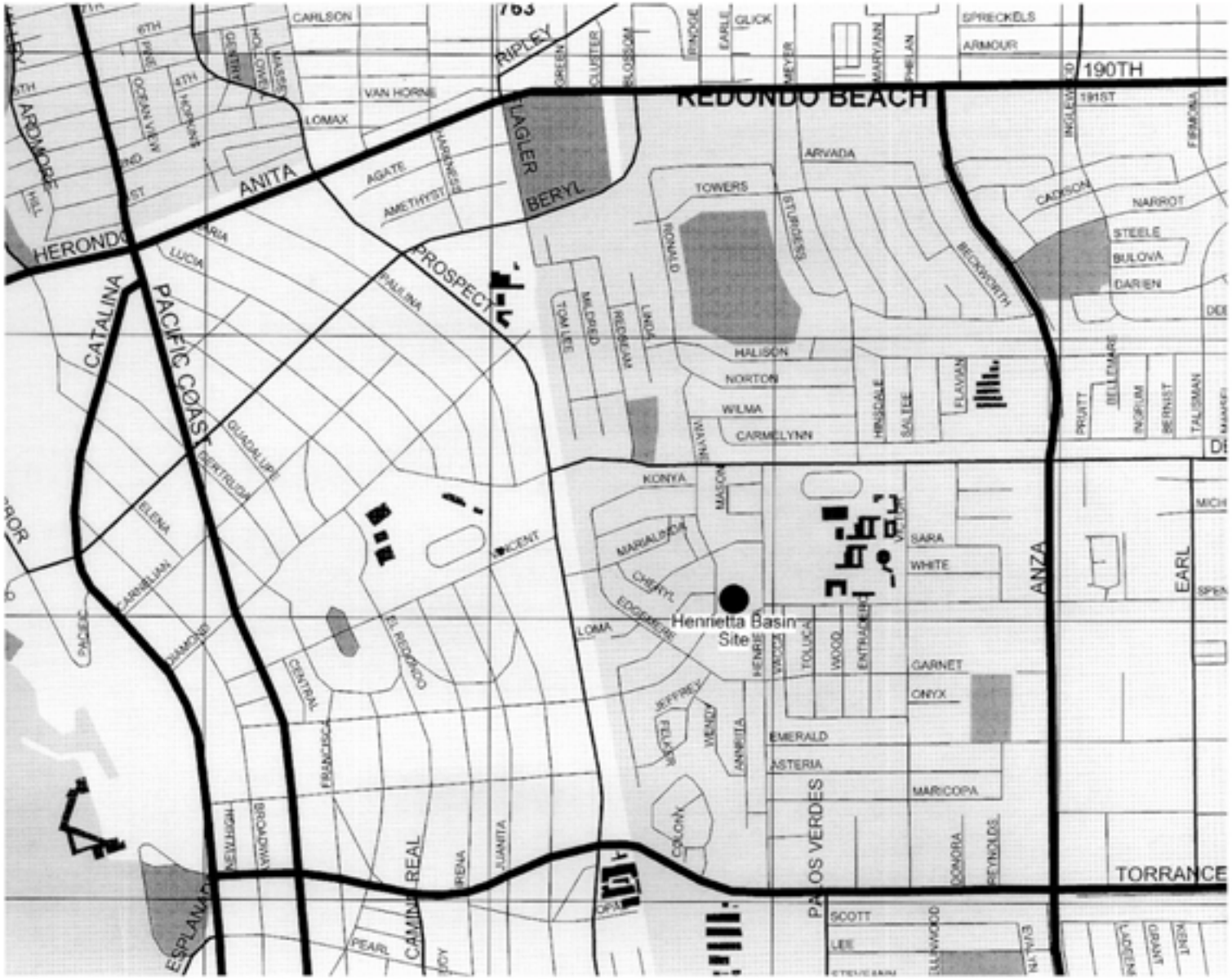

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Los Angeles International Airport Master Plan Biological Assessment	Henrietta Basin Site	Figure 29

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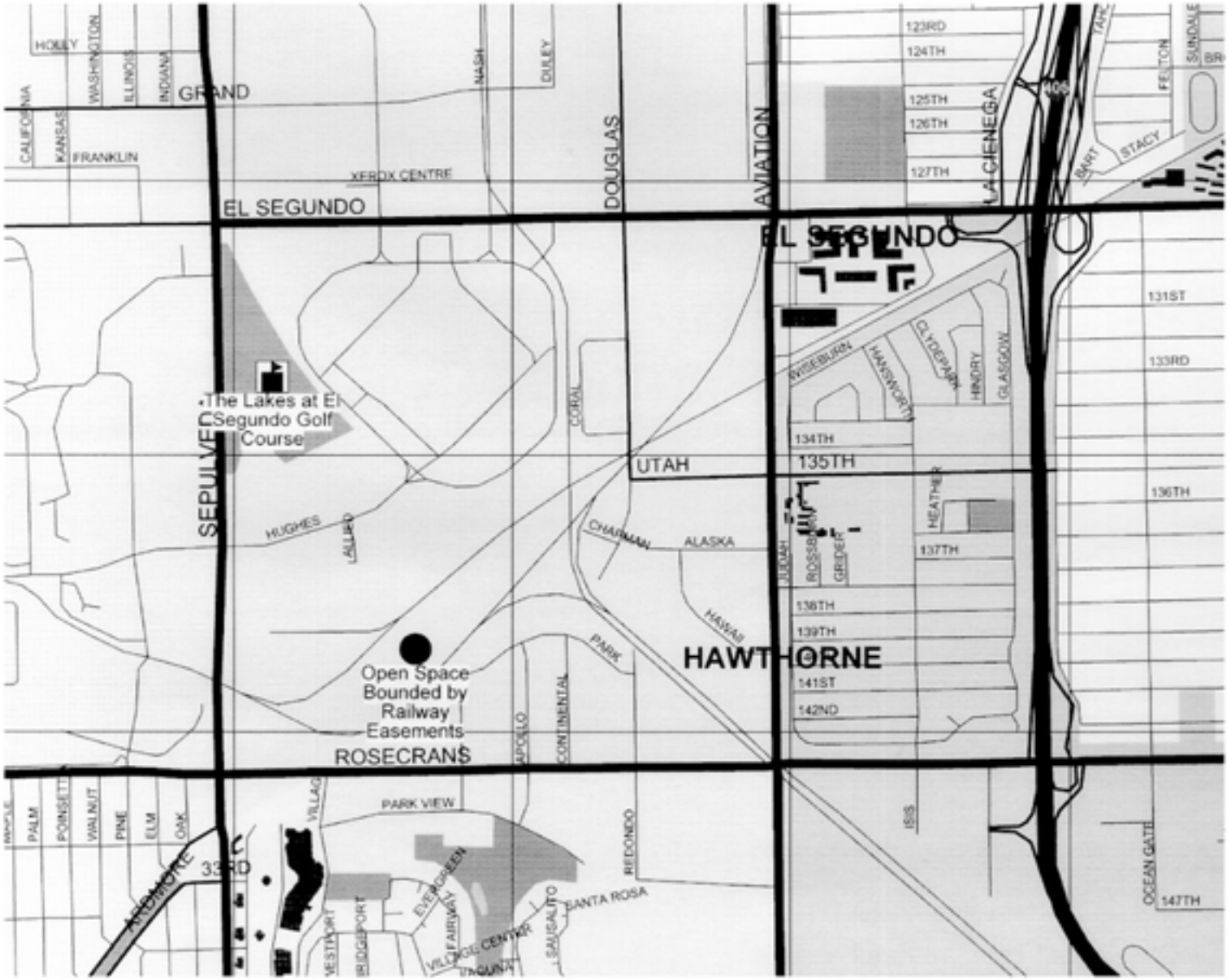

Not to Scale

Los Angeles International Airport Master Plan Biological Assessment	Open Space Bounded by Railway Easements, El Segundo	Figure 30

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The Riverside Fairy Shrimp Wetland Habitat Restoration Measure is adequate to resolve impacts on Riverside fairy shrimp.

Implementation of the Riverside Fairy Shrimp Wetland Habitat Restoration Measure would provide for replacement of 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp (with estimated habitat value of 0.15) with an equal number of acres with estimated habitat value of 0.75. It is anticipated that created vernal pool habitat could achieve habitat values of 0.75 (see **Table 6**), Modified Habitat Evaluation Procedure for the Mitigation Site). By relocating embedded cysts to a habitat restoration site that is not subject to wildlife hazard management, the opportunity for embedded cysts to complete the adult phase of their life cycle will be enhanced.

Table 6

Modified Habitat Evaluation Procedure for the Mitigation Site

	Habitat Reference Sites	Riverside Fairy Shrimp Wetland Habitat Mitigation Site
Topography/Hydrology	**0.20**	**0.20**
Mound-Depression Microrelief	0.05	0.05
Native Soils w/Slope <10%	0.05	0.05
Areas w/Period of Inundation ≥30 days	0.05	0.05
Summer Desiccation	0.05	0.05
Flora	**0.20**	**0.20**
>10% Vegetative Cover	0.05	0.05
Native Grasses >10%	0.05	0.05
Vernal Pool Associated Species	0.05	0.05
Listed Vernal Pool Associated Species	0.05	0.05
Fauna	**0.20**	**0.15**
Dominated by Native Fauna (reproducing)	0.05	0.05
Grassland-Associated Species (reproducing)	0.05	0.05
Sensitive Vernal Pool Associated Species (reproducing)	0.05	0.05
Listed Vernal Pool Associated Species (reproducing)	0.05	0.00
Ecosystem Functional Integrity	**0.40**	**0.20**
Contiguous w/Wetland and State-Designated Sensitive Terrestrial Habitat	0.10	0.00
Under Regulatory Conservation	0.10	0.10
Variety of Pollinator/Dispersal Mechanisms Present (Wind, Wildlife)	0.10	0.10
Contiguous Native Habitat >40 Acres	0.10	0.00
TOTAL HABITAT VALUE (HV)	**1.00**	**0.75**

Source: Sapphos Environmental, Inc. 2000

El Segundo Blue Butterfly

No Action/No Project Alternative

Under the No Action/No Project Alternative, facility improvements (including those currently under way and those scheduled for construction in support of continued growth in airport activity in the absence of the Master Plan) will be undertaken. These consist of fully entitled projects, and are anticipated to require no environmental clearance. In addition to ongoing development projects in support of continued airport growth, ongoing management and monitoring efforts are anticipated to continue within the El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area). It is recommended, then, that ongoing management and monitoring efforts continue to focus on a regular and aggressive weed abatement program, annual qualitative and quantitative vegetation monitoring, and annual monitoring of the El Segundo blue butterfly.

Alternative A Only

Implementation of Alternative A would require the relocation of navigational aids within the Southern Foredune and Southern Dune Scrub habitat occupied by the El Segundo blue butterfly.

- El Segundo Blue Butterfly Conservation

  LAWA or its designee shall take all necessary steps to avoid the flight season of the El Segundo blue butterfly (June 14 - September 30) when undertaking installation of navigational aids proposed under

Master Plan Alternative A within habitat occupied by the El Segundo blue butterfly. Installation of navigational aids within the Habitat Restoration Area would be required to take place between October 1st and May 31st. The number of coast buckwheat plants impacted will be mitigated at a ratio of 1:1 and planted a minimum of three years prior to the impact to allow not only for establishment of the plants, but also to ensure that plants are mature enough to bloom. The plantings of coast buckwheat will be located within the southwest corner of subsite 23 of the Habitat Restoration Area as depicted in **Figure 32,** Mitigation Site for El Segundo Blue Butterfly Relocation, and will encompass 320 square feet. The area depicted will be the designated mitigation site for planting coast buckwheat and the site to which El Segundo blue butterfly pupae will be relocated. Prior to navigational aid installation, a permitted and qualified biologist will salvage El Segundo blue butterfly larvae in coordination with the USFWS in order to minimize impacts to the butterfly. Based on LAWA's restoration experience within the Habitat Restoration Area, occupation of restored habitat can occur within two to three years of restoration efforts. Therefore, there would be no net loss in acres or value of occupied habitat.

Implementation of the El Segundo Blue Butterfly Conservation Measure would provide for replacement of 320 square feet of occupied habitat of the El Segundo blue butterfly.

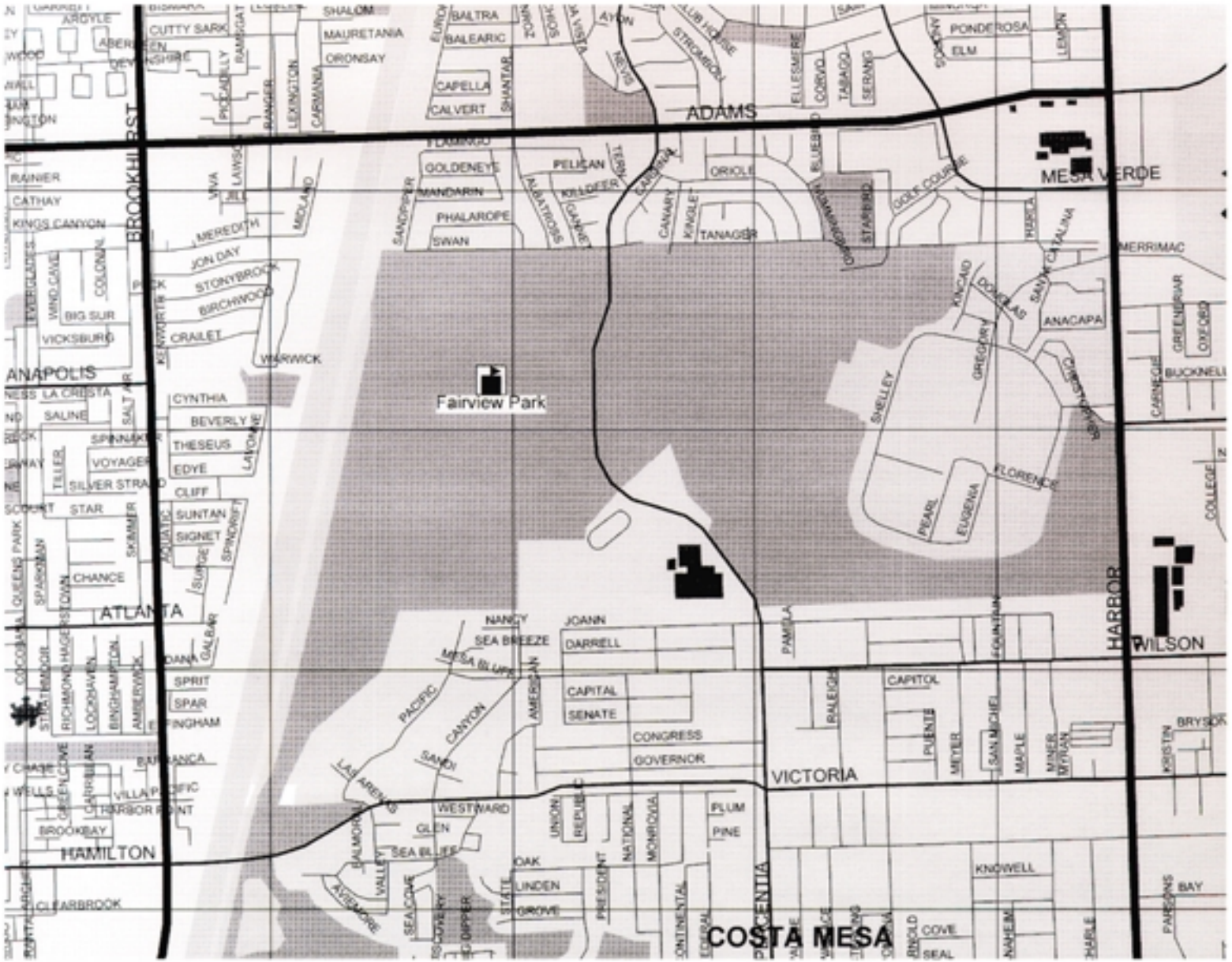
Alternatives A, B, and C

A common component of Alternatives A, B, and C is the construction of a people mover at the location of the present World Way loop adjacent to Pershing Drive. Activities associated with this construction will be located outside of but adjacent to the Habitat Restoration Area as shown in the close-up views of construction along World Way Loop in **Figure 33,** 2015 Alternative A, **Figure 34**, Alternative B, and **Figure 35**, Alternative C. These views can be compared to the close-up view of the World Way Loop in **Figure 36**, No Action/No Project Alternative. In an effort to ensure that construction and staging activities associated with the people mover do not have the potential to indirectly impact the El Segundo blue butterfly and its host plant, coastal buckwheat, it is recommended that construction avoidance measures be implemented to protect against potential impacts to the El Segundo blue butterfly and its habitat.

EL SEGUNDO BLUE BUTTERFLY CONSTRUCTION AVOIDANCE MEASURE

Prior to the initiation of construction of LAX Master Plan components to be located adjacent to the Habitat Restoration Area, LAWA or its designee shall conduct a pre-construction evaluation to identify and flag specific areas of state-designated sensitive habitats located within 100 feet of construction areas. Subsequent to the pre-construction evaluation, LAWA or its designee shall conduct a pre-construction meeting and provide written construction avoidance measures to be implemented in areas adjacent to state-designated sensitive habitats. Construction avoidance measures include erecting a ten-foot-high tarped chain-link fence where the construction or staging area is adjacent to state-designated sensitive habitats to reduce the transport of fugitive dust particles related to construction activities. Soil stabilization and/or watering to reduce fugitive dust emissions during construction will be implemented to reduce particulate matter emissions by 90% to 95% (as described in Section 4.6, *Air Quality* of the EIS/EIR). In addition, to the extent feasible, no grading or stockpiling for construction activities should take place within 100 feet of a state-designated sensitive habitat. LAWA or its designee shall incorporate provisions for the identification of additional construction avoidance measures to be implemented adjacent to state-designated sensitive areas. All construction avoidance measures that address Best Management Practices shall be clearly stated within construction bid documents. In addition, LAWA will include a provision in all construction bid documents requiring the presence of a qualified environmental monitor. Construction drawings shall indicate vegetated areas within the Habitat Restoration Area as "Off-Limits Zone."

Implementation of the El Segundo Blue Butterfly Construction Avoidance Measure would avoid potential indirect impacts on the El Segundo blue butterfly.



Los Angeles International Airport Master Plan Biological Assessment	Fairview Park Site	Figure 31

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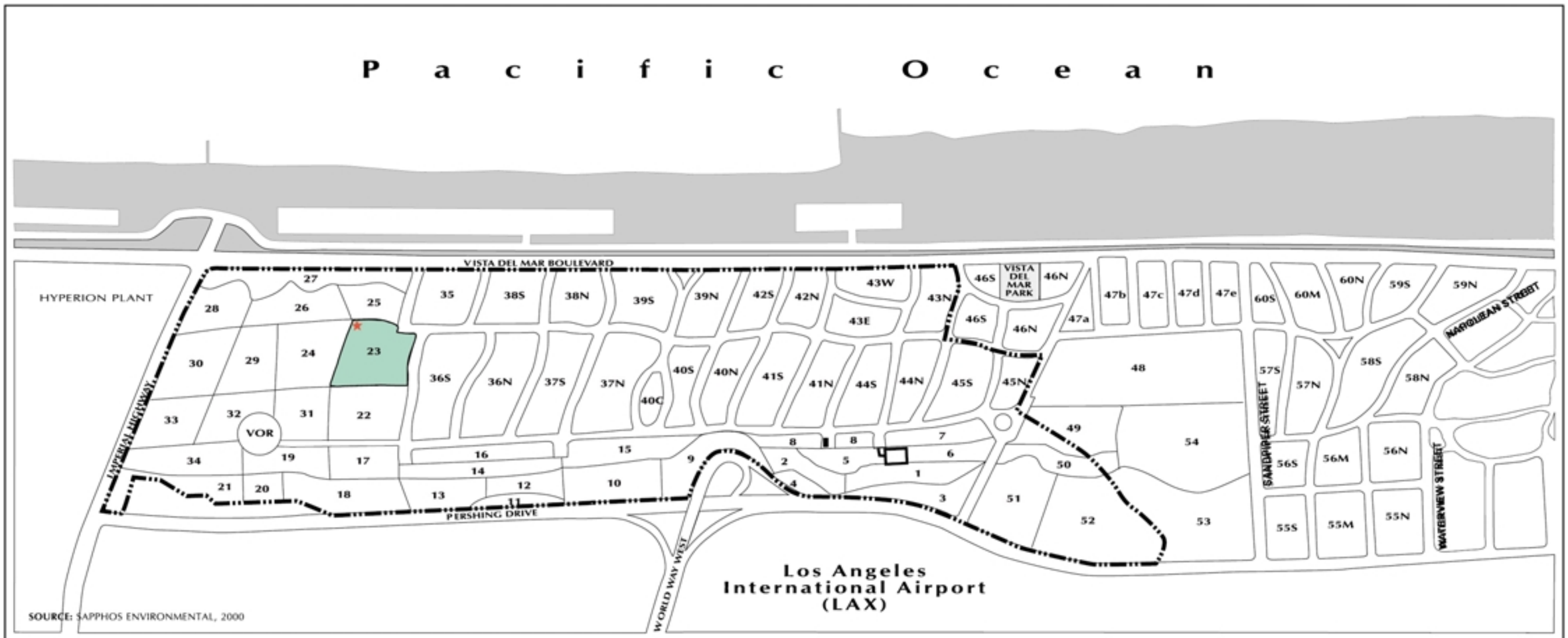

LEGEND

- Reserve Boundary
- Remote Communications Site
- Very High Omni Range Navigations Beacon
- Trailer
- Subsite 23
- Mitigation site

Scale: 1" = 1500'

0' 375' 750' 1500'

Los Angeles International Airport Master Plan Biological Assessment	Mitigation Site for El Segundo Blue Butterfly Relocation	Figure 32

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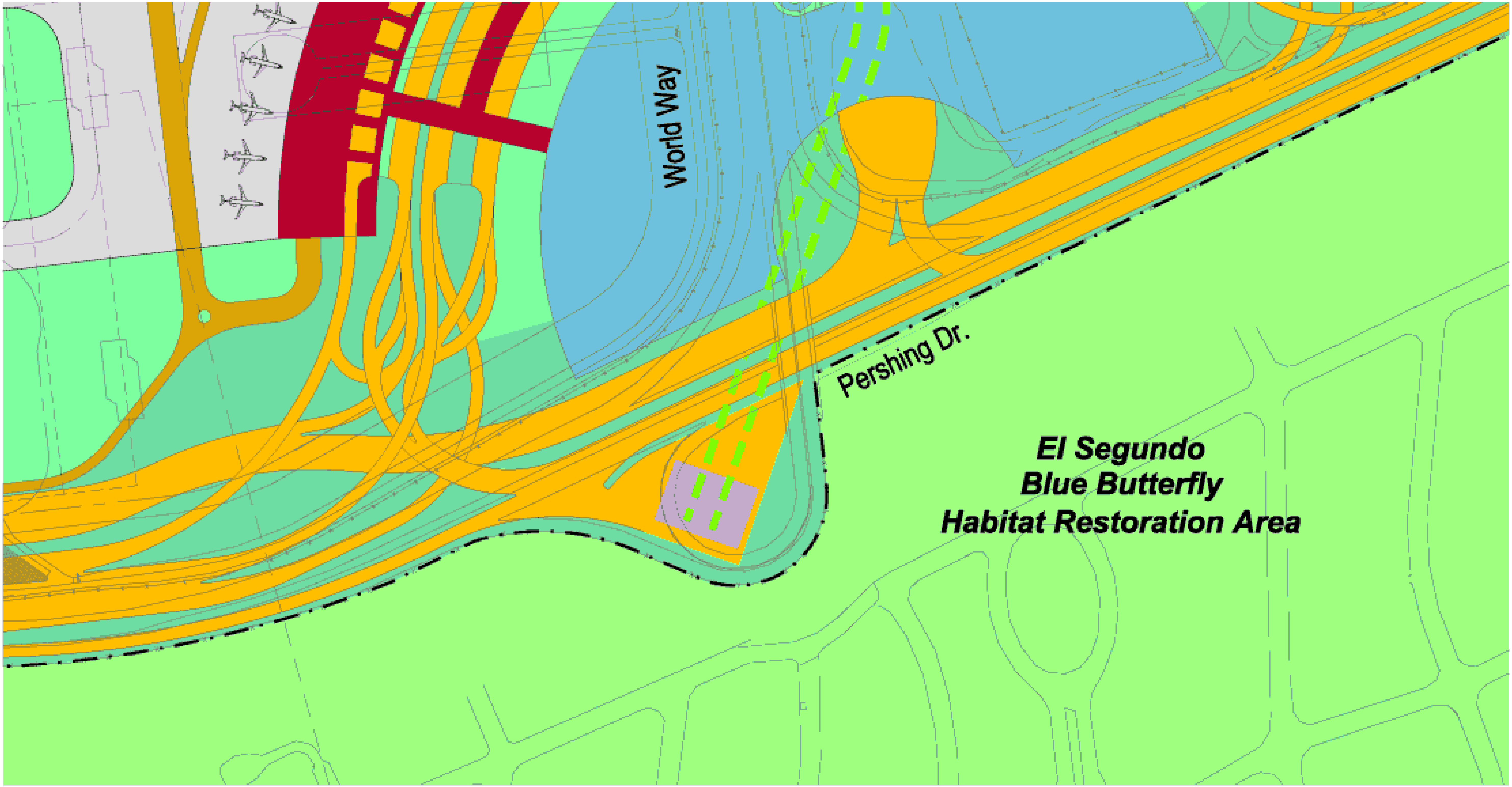

50' 100' 300'
100' 0 200'

LEGEND

El Segundo Blue Butterfly Habitat Restoration Area Boundary

Existing Fence Line

Existing Conditions

Prepared by: Landrum & Brown
Draft, Date: October, 2000
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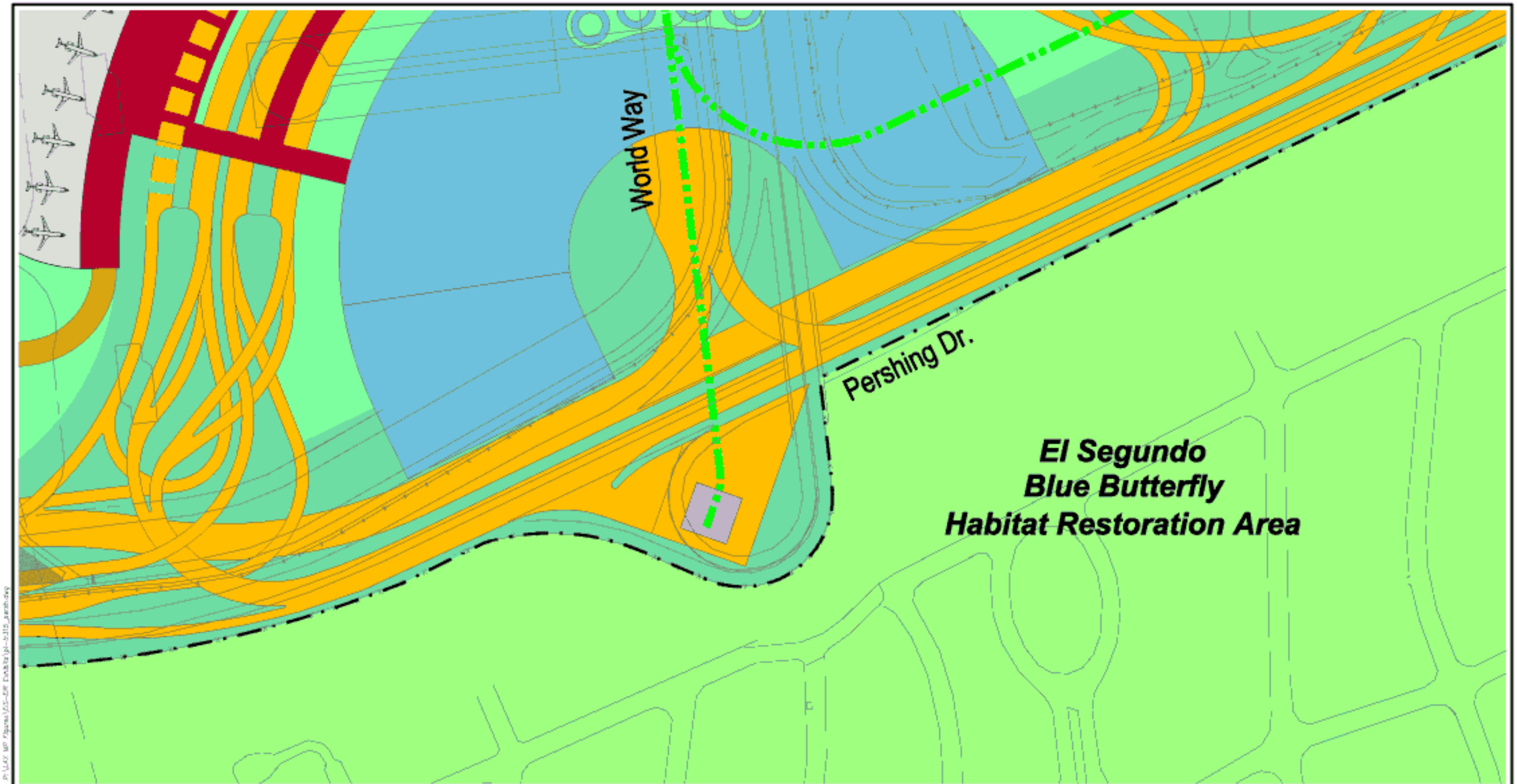
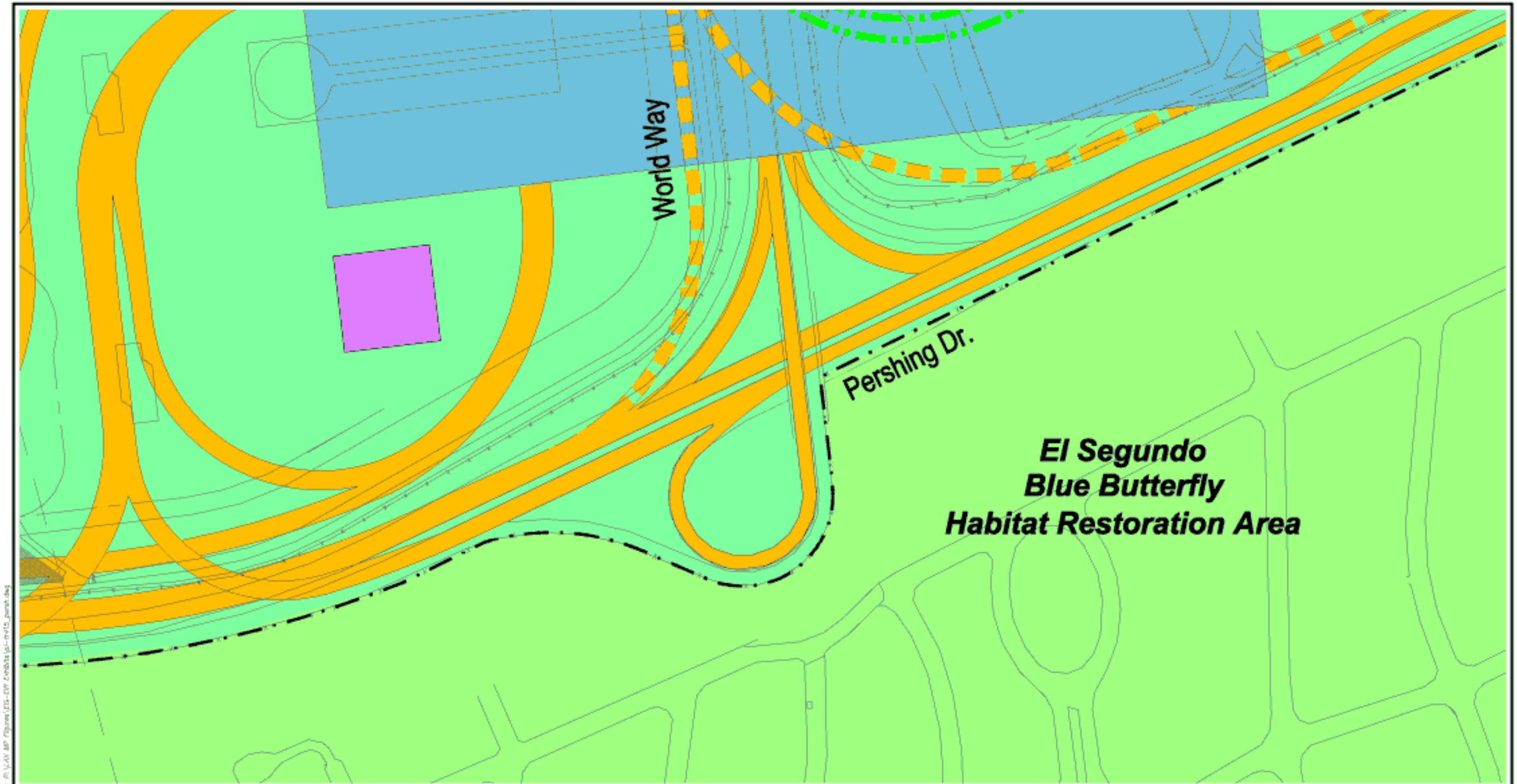
Los Angeles International Airport Master Plan	Alternative A - 2015	Figure 33



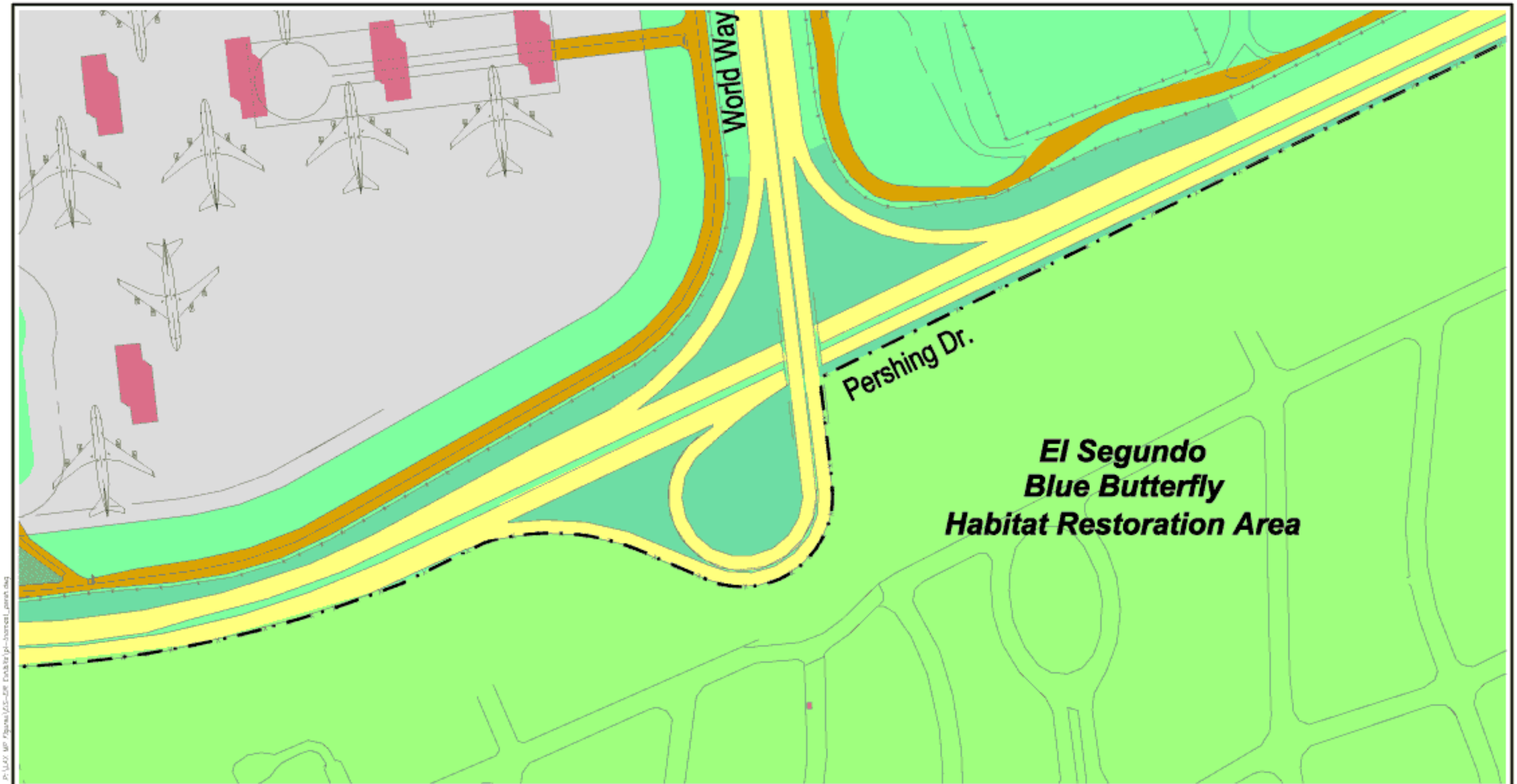
Los Angeles International Airport Master Plan

Alternative B - 2015

Figure 34



Los Angeles International Airport Master Plan	Alternative C - 2015	Figure 35



Los Angeles International Airport Master Plan

No Action/No Project Alternative

Figure 36

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Appendix A
Floral and Faunal Compendium

FLORAL COMPENDIUM[1]

LEGEND

HABITAT

The Los Angeles/El Segundo Dunes study area is bordered by residential development to the north; industrial development to the south; Los Angeles International Airport to the east; and the Pacific Ocean to the west. The area comprises several natural communities which include: Southern Foredune, Southern Dune Scrub, and Valley Needlegrass Grassland. A significant number of non-native weedy plant species which are commonly found in association with these natural communities are also present. In addition, Landscaped and Disturbed vegetation were encountered within the LAX Master Plan study area.

STATUS

*Non-native

#Non-native to the site

VASCULAR PLANTS	
ANTHOPHYTA	
DICOTYLEDONES	
COMMON NAME	**TAXONOMIC NAME**
AIZOACEAE - Carpet-Weed Family	
sea fig	*Carpobrotus chilensis
hottentot fig	*Carpobrotus edulis
flowery iceplant	*Drosanthemum floribundum
crystalline iceplant	*Mesembryanthemum crystallinum
AMARANTHACEAE - Amaranth Family	
tumbleweed	**Amaranthus albus*
ANACARDIACEAE - Sumac Family	
lemonadeberry	*Rhus integrifolia*
Peruvian pepper tree	**Schinus molle*
ASTERACEAE - Sunflower Family	
annual bur-sage	*Ambrosia acanthicarpa*
beach-bur	*Ambrosia chamissonis*
California sagebrush	*Artemisia californica*
slender aster	*Aster subulatus*
coyote brush	*Baccharis pilularis*
mule fat	*Baccharis salicifolia*
tocalote (star-thistle)	**Centaurea melitensis*
yellow pincushion	*Chaenactis glabriuscula*
garland or crown daisy	*Chrysanthemum coronarium*
cobwebby thistle	*Cirsium* var. *occidentale*
flax-leaved horseweed	**Conyza bonariensis*
common horseweed	**Conyza canadensis*
giant coreopsis	*Coreopsis gigantea*
California encelia	*Encelia californica*
mock heather	*Ericameria* [*Haplopappus*] *ericoides*
California filago or fluffweed	*Filago gallica*
gazania	**Gazania linearis*
bicolored cudweed	*Gnaphalium bicolor*
weedy cudweed	*Gnaphalium luteo-album*
white everlasting	*Gnaphalium canescens* var. *microcephalum*
telegraph weed	*Heterotheca grandiflora*
Fastigate golden aster	*Heterotheca sessiliflora* ssp. *fastigiata*
smooth cat's-ear	**Hypochaeris glabra*
prickly lettuce	**Lactuca serriola*
California aster	*Lessingia filaginifolia*
bristly ox-tongue	**Picris echioides*
common sow thistle	**Sonchus oleraceus*
tall wreath plant	*Stephanomeria virgata*

[1] This is not an exhaustive listing of the plant species occurring on site; some annual herbs or uncommon species may not have been detected by the field survey.

BORAGINACEAE - Borage Family	
Cleveland's large cryptantha	*Cryptantha clevelandii*
common cryptantha	*Cryptantha intermedia*
BRASSICACEAE - Mustard Family	
wild turnip	**Brassica tournefortii*
searocket	**Cakile maritima*
western tansy-mustard	*Descurainia pinnata*
suffrutescent wallflower	*Erysimum insulare* ssp. *suffrutescens*
short-pod mustard	**Hirschfeldia incana*
sand peppergrass	*Lepidium lasiocarpum*
sweet alyssum	**Lobularia maritima*
common stock	**Matthiola incana*
radish	**Raphanus sativus*
tumble mustard or Jim Hill mustard	**Sisymbrium altissimum*
CACTACEAE - Cactus Family	
coastal prickly pear	*Opuntia littoralis*
CAPPARACEAE - Caper Family	
bladderpod	*Isomeris arborea*
CARYOPHYLLACEAE - Pink Family	
four-leaved allseed	**Polycarpon tetraphyllum*
common catchfly or windmill pink	**Silene gallica*
salt-marsh sand spurry	*Spergularia marina*
CHENOPODIACEAE - Goosefoot Family	
fourwing saltbush or shad scale	*Atriplex canescens*
big saltbush	*Atriplex lentiformis*
brewer's saltbush	**Atriplex nummularia*
Parish's brittlescale	*Atriplex parishii*
Australian saltbush	**Atriplex semibaccata*
lamb's quarters or pigweed	**Chenopodium album*
California goosefoot	*Chenopodium californicum*
cut-leaved goosefoot	**Chenopodium multifidum*
nettle-leaved goosefoot	**Chenopodium murale*
Russian thistle or tumbleweed	**Salsola tragus* [*S. iberica; S. kali*]
CRASSULACEAE - Stonecrop Family	
aeonium	**Aeonium arboreum* var. *arboreum*
pinwheel plant	**Aeonium haworthii*
jade plant	**Crassula argentea*
pygmy-weed	*Crassula connata* [*C. erecta*]
Chinese pine	**Crassula tetragona*
lanceleaf or coastal dudleya or live-forever	*Dudleya lanceolata*
CUCURBITACEAE - Gourd Family	
calabazilla	*Cucurbita foetidissima*
wild cucumber or Cucamonga manroot	*Marah macrocarpus*
CUSCUTACEAE - Dodder Family	
California witch's hair	*Cuscuta californica*
EUPHORBIACEAE - Spurge Family	
spotted spurge	**Chamaesyce* [*Euphorbia*] *maculata*
California croton	*Croton californicus*
doveweed	*Eremocarpus setigerus*
castor-bean	**Ricinus communis*
FABACEAE - Pea Family	
acacia	**Acacia cyclops*
everblooming acacia	**Acacia retinodes*
Spanish lotus	*Lotus purshianus*
California broom	*Lotus scoparius*
strigose lotus	*Lotus strigosus*
minature lupine	*Lupinus bicolor*
lupinus	*Lupinus chamissonis*
grape soda lupine	*Lupinus excubitus*
collar lupine	*Lupinus truncatus*
black medick or yellow trefoil	**Medicago lupulina*
California burclover	**Medicago polymorpha*
yellow sweet-clover or sourclover	**Melilotus indica*
red clover	**Trifolium pratense*
winter vetch or hairy vetch	**Vicia tetrasperma* ssp. *villosa*
GERANIACEAE - Geranium Family	
long-beaked filaree	**Erodium botrys*
red-stemmed filaree	**Erodium cicutarium*
white-stemmed filaree	**Erodium moschatum*
HYDROPHYLLACEAE - Waterleaf Family	
branching phacelia	*Phacelia ramosissima* var. *latifolia*
LENNOACEAE - Lennoa Family	

pholisma	*Pholisma arenarium* [*P. paniculatumTempleton*]
LOASACEAE – Stick Leaf Family	
blazing star [hydra stick leaf]	*Mentzelia affinis*
MALVACEAE - Mallow Family	
bull mallow	**Malva nicaeensis*
cheeseweed, little mallow	**Malva parviflora*
NYCTAGINACEAE – Four O'Clock Family	
beach sand verbena	*Abronia umbellata*
ONAGRACEAE – Evening Primrose Family	
California sun cup	*Camissonia bistorta*
beach evening primrose	*Camissonia cheiranthifolia*
Lewis' evening primrose	*Camissonia lewisii*
small primrose	*Camissonia micrantha*
OXALIDACEAE - Wood-Sorrel Family	
yellow sorrel	**Oxalis corniculata*
Bermuda buttercup or sourgrass	**Oxalis pes-caprae*
PAPAVERACEAE - Poppy Family	
California poppy	*Eschscholzia californica*
PLANTAGINACEAE - Plantain Family	
California plantain	*Plantago erecta*
plantain	**Plantago indica*
English plantain	**Plantago lanceolata*
PLUMBAGINACEAE - Leadwort Family	
Perez's sea lavender	**Limonium perezii*
winged sea lavender	**Limonium sinuatum*
POLYGONACEAE - Buckwheat Family	
grey coast buckwheat	*Eriogonum cinereum*
California buckwheat	*Eriogonum fasciculatum*
Catalina Island buckwheat	*Eriogonum giganteum*
bluff buckwheat	*Eriogonum parvifolium*
common knotweed or doorweed	**Polygonum arenastrum*
PORTULACACEAE - Purslane Family	
common calyptridium	*Calyptridium monandrum*
PRIMULACEAE - Primrose Family	
scarlet pimpernel or poor-man's weatherglass	**Anagallis arvensis*
ROSACEAE - Rose Family	
hedge-leaved horkelia	*Horkelia cuneata*
RUBIACEAE - Madder Family	
chaparral bedstraw or narrow-leaved bedstraw	*Galium angustifolium*
SALICACEAE - Willow Family	
red willow	*Salix laevigata*
arroyo willow	*Salix lasiolepis*
SCROPHULARIACEAE - Figwort Family	
sharp-leaved fluellin	**Kickxia elatine*
larger blue toadflax	*Linaria canadensis*
SOLANACEAE - Nightshade Family	
jimson weed	*Datura wrightii*
tree tobacco	**Nicotiana glauca*
black nightshade	**Solanum nigrum*
TAMARICACEAE - Tamarisk Family	
Mediterranean tamarisk	**Tamarix ramosissima*
ZYGOPHYLLACEAE - Caltrop Family	
puncture vine	**Tribulus terrestris*
MONOCOTYLEDONES	
ARECACEAE - Palm Family	
Canary Island date palm	**Phoenix canariensis*
Mexican fan palm	**Washingtonia robusta*
CYPERACEAE - Sedge Family	
tall umbrella cyperus	*Cyperus eragrostis*
LILIACEAE - Lily Family	
century plant	**Agave americana*
blue dicks	*Dichlostemma capitatum*
POACEAE - Grass Family	
bent grass	**Agrostis viridis*
giant reed	**Arundo donax*
slender wild oat	**Avena barbata*
wild oat	**Avena fatua*
Arizona chess	*Bromus arizonicus*
rescue grass	**Bromus catharticus*
ripgut grass	**Bromus diandrus*
soft chess	**Bromus hordeaceus* [*B. mollis*]

foxtail chess	**Bromus madritensis* ssp.*rubens*
southern sandbur	**Cenchrus echinatus*
pampas grass	**Cortaderia selloana*
Bermuda grass	**Cynodon dactylon*
crabgrass	**Digitaria sanguinalis*
coastal salt grass	*Distichlis spicata*
veldt grass	**Ehrharta calycina*
veldt grass	**Ehrharta erecta*
lovegrass	**Eragrostis pectinacea*
hare barley	**Hordeum murinum* ssp. *leporinum*
goldentop	**Lamarckia aurea*
beardless wild rye	*Leymus triticoides*
Italian ryegrass	**Lolium multiflorum*
small-flowered melic grass	*Melica imperfecta*
nodding needlegrass	*Nassella* [*Stipa*] *cernua*
dallis grass	**Paspalum dilatatum*
African fountain grass	**Pennisetum setaceum*
smilo grass	*Piptatherum miliaceum*
annual bluegrass	**Poa annua*
annual beard grass	**Polypogon monspeliensis*
Mediterranean schismus	**Schismus barbatus*
setaria	**Setaria gracilis*
foxtail fescue	*Vulpia myuros* [*Festuca megalura*]
TYPHACEAE - Cattail Family	
broad-leaved cattail	*Typha latifolia*

FAUNAL COMPENDIUM[2]

INVERTEBRATES

TAXONOMIC NAME	COMMON NAME
PHYLUM: MOLLUSCA	
CLASS: GASTEROPODA	
Helix aspera	
Otala lactea	
Herminthoglypta traskei	
Vertigo trinotata	
Vertigo californica	
PHYLUM: ARTHROPODA	
CLASS: DIPLOPODA	**MILLIPEDES**
ORDER: SPIROBOLIDA	
2 unidentified species	
CLASS: CHILOPODA	**CENTIPEDES**
ORDER: GEOPHILOMORPHA	
1 unidentified species	
ORDER: LITHOBIOMORPHA	
Lithobius	
CLASS: MALACOSTRACA	
ORDER: ISOPODA	**SOWBUGS, PILLBUGS**
BATHYTROPIDAE	
Alloniscus peronvexus	
Mauritanicus littorinus	
PORCELLIONIDAE	
Armadillium vulgare	
Porcellio dillitatum	
P. laevis	
CLASS: ARACHNIDA	
ORDER: SCORPIONES	**SCORPIONS**
VEJOVIDAE	
Paraoroclonus silvestri	
ORDER: PSEUDOSCORPIONES	**PSEUDOSCORPIONS**
Garypus californicus	
ORDER: SOLFUGAE	**WHIPSCORPIONS**
Eremobates sp.	
ORDER: OPILIONES	**HARVESTMEN**
Protolophus nr. *singularis*	
ORDER: ACARI	**MITES & TICKS**

[2] List includes species observed or expected to occur on or in the immediate vicinity of the site.

TROMBIDIDAE	
Trombidium sp.	
3 unidentified species	
1 unidentified species	
ORDER: ARANEAE	**SPIDERS**
CTENIZIDAE	**Trapdoor Spiders**
Apostichus simus	
ZODARIIDAE	
Lutica sp.	
OONIPIDAE	
Scapiella hesperus	
Opopaea sp.	
OECOBIIDAE	
Oecobius sp.	
DYSDERIDAE	
Dysdera crocata	
CLUBIONIDAE	**Sac Spiders**
Chiracanthium inclusum	
Trachelis sp.	
Castianeira	
unidentified species	
AGELENIDAE	**Sheetweb or Grass Spiders**
Hololena curta n ssp.	
Calilena angelina	
Calymaria sp.	
Agelenopsis sp	
THERIDIIDAE	**Cobweb Spiders**
Theridion sp.	
Tidarron sp.	
Steatoda grossa	
S. fulva	
Crustulina sp.	
Latrodectus hesperus	
THOMASIDAE	**Crab Spiders**
Misumenoides formosipes	
Misumenops rothi	
Xysticus gulosus	
X. montanensis	
PHILODROMIDAE	**Crab Spiders**
Ebo pepinensis	
Ebo n. sp.	
Tibellus nr. *californicus*	
ARANEIDAE	**Orbweaver Spiders**
Argiope argentata	
Eustala conchlea	
Neoscona oaxacensis	
Cyclosa turbinata	
C. conica	
Tetragnatha sp.	
LYCOSIDAE	**Wolf Spiders**
Allocosa sp.	
Alopecosa sp.	
Pirata sp.	
SALTICIDAE	**Jumping Spiders**
2 unidentified species	
Metacybra sp.	
ANYPHAENIDAE	
Anyphaena sp.	
GNAPHOSIDAE	**Running or Mouse Spiders**
Zelotes unidentified	
Herpyllus propinquis	
Trachyzelotes sp.	
Gnaphosa sp.	
Micaria sp.	
Mimetus hesperus	
PHOLCIDAE	
1 unidentified species	
OXYOPIDAE	**Lynx Spiders**
Oxyopes sp. unidentified	
Peucetia viridens	
LINYPHIIDAE	

3 unidentified species	
FILISTATIDAE	
Filistatinella sp.	
CLASS: HEXAPODA	**INSECTS**
ORDER: COLLEMBOLA	**SPRINGTAILS**
ENTOMOBRYIDAE	
Entomobrya atrocinta	
E. multifasciata	
E. unostrigata	
E. californica	
Xenylla wilsoni	
ORDER: THYSANURA	**SILVERFISH**
LEPISMATIDAE	
Lepisma saccharina	
ORDER: MICROCORYPHIA	**JUMPING BRISTLETAILS**
MACHILIDAE	
2 unidentified species	
ORDER: EPHEMEROPTERA	**MAYFLIES**
Family & species undet. coll. by Pierce 1939 ext. (these are probably not “extirpated” but most likely represent migrants or temp. residents - aquatic immatures)	
ORDER: ODONATA	**DRAGONFLIES & DAMSELFLIES**
AESHNIDAE	
Aeshna multicolor	
Anax junius	
LIBELLULIDAE	
Tarnetrum illotum	
Tarnetrum corruptum	
Tramea lacerata	
COENARGIONIDAE	
1 unidentified species	
ORDER: ORTHOPTERA	**(Grasshoppers, Crickets, Mantids, Cockroaches)**
ACRIDIDAE	
Conozoa texana	
Trimeritropis californica	
Trimeritropis pallidipennis	
Schistocerca vaga	
Melanoplus devastator	
Psoloessa thamnogaea	
TETTIGONIIDAE	
Scudderia mexicana	
Neduba morsei	
Brachyinsara hemiptera	
Ideostatus aequalis	
GRYLLIDAE	
Gryllus integer	
Oecanthus argentinus	
Cycloptilum distinctum	
STENOPELMATIDAE	
Stenopelmatus n. sp. I. *Weissman*	
Stenopelmatus n. sp. II. *Weissman*	
RHAPHIDOPHORIDAE	
Ceuthophilus californianus	
PHASMATIDAE	
Parabacillus hesperus	
MANTIDAE	
Litaneutria minor	
Stagmomantis californica	
Iris oratoria	
POLYPHAGIDAE	
Arenivaga n. sp*. Nickel*	
ORDER: DERMAPTERA	**EARWIGS**
FORFICULIDAE	
Forficula auricularia	
ORDER: ISOPTERA	**TERMITES**
RHINOTERMITIDAE	
Reticulitermes hesperus	
ORDER: PSOCOPTERA	**PSOCIDS**
1 unidentified species	
ORDER: THYSANOPTERA	**THRIPS**
PHLAEOTHRIPIDAE	

Haplothrips robusta	
Haplothrips clarisetis	
THRIPIDAE	
Apterothrips apteris	
Neohydatothrips moultoni	
Limothrips cerealum	
Aphanothrips obscurus	
Frankliniella minuta	
Frankliniella occidentalis	
Taeniothrips sp. 1	
Thrips madronii	
Thrips tabaci	
ORDER: HEMIPTERA	**BUGS**
CORIXIDAE	
1 unidentified species	
REDUVIIDAE	
Zelus sp.	
Rhinocoris ventralis	
ALYDIDAE	
Stachyonemus sp.	
Alydus sp.	
LYGAEIDAE	
Geocoris sp.	
Emblethis vicarius	
Lygaeus kalmii	
Lygaeus reclivatus	
Melanopleuris bicolor	
Nysius ericae	
Nysius sp.	
COREIDAE	
Stachyocnemus	
Scolopocerus sp.	
Narnia inornata	
RHOPALIDAE	
Arhyssus	
Liorhyssus hyalinus	
MIRIDAE	
Lopidea nigridea	
Lopidea marginata	
Lygus hesperius	
Closterocoris amoenus	
Darcurla sp.	
4 unidentified species	
LARGIDAE	
Largus cinctus	
PENTATOMIDAE	
Petidia uhleri	
Petidia sayi	
Acrosternum hilari	
Banasa sp.	
Thyanta custator accerra	
Chlorochroa congrua	
Thyanta rugulosa	
Eurygaster alternata	
SCUTELLARIDAE	
Acanthoma sp.	
2 unidentified species	
Euptychodera corrugata	
CYDNIDAE	
Pangaeus bilineatus	
1 unidentified species	
NABIDAE	
Nabis sp.	
VELIIDAE	
1 unidentified species	
ORDER: HOMOPTERA	**CICADAS, LEAFHOPPERS, APHIDS, SCALES, WHITEFLIES**
DICTYOPHORIDAE	
Orgerius triquestra complex	
CICADELLIDAE	
Aceratagallia pallida	
Alconeura necopinata	
Amblysellusgrex	

Amphigonalia bispinosa
Blaclutha sp.
Ballana sera
Ballana sp.
Carneocephala fulgida
Circulifertenellus
Calladonisgeminatus
Dikrania carneola
Empoasca cerea
Exitianus exitiosus
Friscanus friscanus
Giprus angulata
Lystidea nuda
Momoria rufoscutella
Osbornellus n.sp
Osbornellus sp.
Penestragania robusta
Ponana punctipennis
Prairiana sp
Scaphytopius sp.
Texananus sp.
Tiaja interrupta
Xerophloea brunnea
Xerophloea vanduzeei
Xerophloea peltata

CIXIIDAE

Oliarus sp.

MEMBRACIDAE

Stictocephala bubalis
Tortistylus albidosparsus

DELPHACIDAE

Stobaera sp.

Stobaera muiri

Toya propinqua

CERCOPIDAE

Clastoptera brunnea

MARGARODIDAE

Icerya purchasi

COCCIDAE

Pulvinaria sp.
Saissetia hemispherica
Saissetia oleae
Odonapis ruthae
1 unidentified species

PSYLLIDAE

Calophya californica
Paratrioza lavaterae

FLATIDAE

Mistharnophantia sonorana

ISSIDAE

Danepteryx robusta

PSEUDOCOCCIDAE

Pseudococcus maritimus
Pseudococcus eriogoni
Pseudococcus citri
Pseudococcus aurilanatus

ERIOSOMATIDAE

1 unidentified species

APHIDIDAE

Uroleucon katankae
Uroleucon rudbeckiae
Acrythosiphon kondoi
Acrythosiphon pisum
Myzus persicae
Cryptomyzus ribis
Aphis eriogoni
Aphis helichrysi
Aphis medicaginis
Brevicoryne brassicae
Macrosiphon albifrons
Macrosiphon ambrosiae
Macrosiphon sp.
Rhopalosiphon lactucae
Capitophrus glandulosis
Lipaphis pseudobrassicae
Myzus convolvulae
Myzus persicae

ORDER: NEUROPTERA — **LACEWINGS, ANTLIONS**

MYRMELEONTIDAE

Myrmeleon arizonicus
Brachynemurus brunneus

HEMEROBIIDAE

2 unidentified species

CHRYSOPIDAE

Chrysoperla floribunda
Eremochrysa punctinervis

ORDER: COLEOPTERA — **BEETLES**

Cicindella hirticollis gravida

CARABIDAE

Calosoma semilaeve
Pterostichus californicus
Amarara californica
Calathus ruficollis
Tanystoma maculicolle
Agonum crenistrictum
Agonum californicum
Bembidium nr. *quadrulum*
Tachys corax
Anisodactylus californica
Bradycellus sp.
Stenolophus sp.
Apristus laticollis

HISTERIDAE

Xerosaprinus fimbriatus
Geomysaprinus pasminosus
Spilodiscus sellatus
Hypocaecus lucidolis
Saprinus discoidalis

SCARABAEIDAE

Parathyce palpalis
Diplotaxis sp.
Serica sp.
Aegialia convexa
Psammodius mcclayi
Aphodius rugatus
Aphodius militaris
Aphodius fuscosus
Aphodius lividus
Ligyrus gibbosus
Dichromina dimidiata

HETEROCERIDAE

Heterocerus gnatho
BUPRESTIDAE
Acmaeodera fenyesi
Agrilus lacustris
ELATERIDAE
Hypolithus sp.
Anchastus cineripennis
3 unidentified species
CANTHARIDAE
Cantharis consors
DERMESTIDAE
Dermestes sp.
Anthrenus lepidus
ANOBIIDAE
Megorama viduum

PTINIDAE

Ptinus fur

MELYRIADE

Collops cribrosus
Collops marginicollis
Attalus lobulatus
1 unidentified species
Trichochrous squalidus
Trichochrous antennatus
Dasytastes bicolor
Eschatocrepis constrictus

COCCINELLIDAE

Rodolia cardinalis
Crytolaemus montrouzieri
Olla v-nigrum
Psyllobora taedata
Cycloneda munda
Cycloneda polita
Coccinella californica
Hippodamia convergens
2 unidentified species
Scymnus marginicollis

COLYDIIDAE

Anchomma costatum
Rhagodera tuberculata

TENEBRIONIDAE

Metaponium convexicolle
Eleodes omissa
Eleodes gracilis
Eleodes nigropilosa
Eleodes littoralis
Blapstinus sp.
Nyctoporis carinata
Cratidus osculans
Helops blaisdellli
Stenotrichus rufipes
Coelus globosus
Coelus ciliatus
Coniontis affinis
Hylocrinus longulus

STAPHYLINIDAE

Sepedophilus sp.
4 unidentified species

ALLECULIDAE

Isomira sp.

MORDELLIDAE

1 unidentified species

CERAMBYCIDAE

Ipochus fasciatus

BRUCHIDAE

Stator limbratus
Stator pruininus

CHRYSOMELIDAE

Exema conspersa
Lema trilineata daturiphila
Diabrotica undecimpunctata
Diabrotica soror (Curcubita)
Cryptocephalus sanguinicollis
Crytocephalus sprucus
Crytocephalus confluentus
Altica obliterata
Altica sp. no. 1
Diachus auratus
Microrhopala rubrolineata

CURCULIONIDAE

Cleonus cristatus
Cleonus sparsus
Cleonidius pericollis
Apion proclive
Pantomorus cervinus
Rhigopsis effracta
Listeroderes obliquua
Sitona cylindricollis
Trigonoscuta dorothea
Trichobaris compacta
Onychobaris langei
Smicronyx calaenus
Smicronyx cuscutiflorae
Smicronyx elsegundis
Baris sp.
Cylindrocopturus sp.
Pselaphorhynchites aeratoides

SCOLYTIDAE

Phloeosinus sp.
Chaetophloeus hystrix

UNIDENTIFIED

Octinodes sp.
Dinocleus albovestitus

ORDER: LEPIDOPTERA — **BUTTERFLIES and MOTHS**

PAPILIONIDAE

Papilio zelicaon
Papilio rutulus
Battus philenor philenor

PIERIDAE

Pieris rapae
Pieris protodice
Anthocharis sara sara
Colias eurytheme
Colias hardfordii
Phoebis sennae marcellina
Eurema nicippe
Nathalis iole
Coenonympha tullia california
Danaus gilippus strigosus
Danaus plexippus
Agraulis vanillae incarnata
Chlosyne gabbii gabbii
Vanessa atalanta rubria
V. cardui
V. anabella
V. virginiensis
Nymphalis antiopa
Precis coenia
Apodemia mormo nr. vigulti
Strymon melinus
Incisalia augustus iroides

C. perplexa
Brephidium exilis
Leptotes marina
Everes amyntula
Plebejus acmon acmon
Glaucopsyche lygdamus australis
Euphilotes battoides allyni

HESPERIIDAE

Polites sabuleti sabuleti
Hylephila phyleus
Pyrgus albescens
Erynnis funeralis
Panaquina errans
Paratrytone melane
Lerodea eufala
Atalopetes campestris

GEOMETRIDAE

Elpiste marcesaria
Semiothisa californiaria
S. napensis
S. irrorata
Animomyia morta
Pero macdunnoughi
Anacamptodes fragilaria
Neoterpes edwardsata
Sabulodes aegrotata
Nemoria leptalea
Dichorda illustraria
Synchlora aerata liquoraria
Chlorochlamys appellaria
Cheteoscelis faseolaria
Cyclophora nanaria
Idaea microphysa
Archiroe neomexicana
Perizoma custodiata
Sparganita magnoliata
Euphyia implicata multilineata
Zenophleps lignocolorata
Orthonama obstipata
Eupithecia misturata
E. miserulata zela
E. maestosa

SPHINGIDAE

Manduca sexta
Hyles lineata

ARCTIIDAE

Apantesis proxima
Estigmene acrea
Arachnis picta
Leptarctia californiae

NOTODONTIDAE

Furcula scolopendrina
F. cinerea cineriodes

LYMANTRIDAE

Orgyia magna

NOCTUIDAE

Tetanoleta palligera
Hemeroplanis finitima
Caenurgia togataria
Zalelunata
Autographa californica
A. biloba
Trichoplusia ni
Nola apera
Eumicremma minima n. ssp.
Tarachidia candefacta
Heliothis virescens
H. zea
H. phloxiphagus
Schinia scarletina
S. pulchripennis
Agrotis ipsilon
A. subterrane

Peridroma saucia
Copeblepharon sanctaemonicae
Xestia adela
Hermieuxoa rudens
Spaelotis havilae
Euxoa messoria
E. septentrionalis
E. riversii
Lacinipolia stricta ssp.
L. leucogramma
L. quadrilineata
L. vicina acutipennis
Zosteropoda hirtipes
Leucania oaxacana
Protorthodes alfkeni
P. melanopis ssp.
P. rufula
Pseudaletia unipuncta
Dargida procincta
Stylopoda cephalica
Platypergia extima
P. mona
Apamea cinefacta
Spodoptera exigua
Prodenia Ornithogalli
Catabena esula

PYRALIDAE

Psammobotys fordi
Abegesta remellallis
Stega salutalis riparialis
Dicymolomia metaliferalis
Hellula rogatalis
Uresiphita reversalis
Loxostege immerans
Udea profundalis
Pyrausta laticlava
Lineodes integra
Nomophila nearctica
Diastichtis fracturalis
Achyra occidentalis
Tehama bonifatella
Crambus sperryellus
Euchromius ocelleus ocelleus
Arta n. sp. nr. *epicornallis*
Jocara trabalis
Alphaias transferrans
Etiella zinckenella
unident. genus nr. *Etiella* n sp.
Adelphia ochripunctella
Heterographis morrisonella
Staudingeria albipenella
Hulstia undulatella
Phycitodes albatella mucidella
Ephestiodes gilvescentella
Vitula edmondsii bombylicolella
Elasmopalpus lignosellus

PTEROPHORIDAE

Platyptilia williamsi
Anstenoptilia marmarodactyla
Oidaematophorus nr. grisescens

TINEIDAE

Opogona omoscopa
Opogona sp.
Amydria sp.
Tinea sp.

SESSIIDAE

Synanthedon polygoni

COSSIDAE

Comadia intrusa

BLASTOBASIDAE

Holcocera sp.

COLEOPHORIDAE

1 unidentified species

OECOPHORIDAE

Pressariodea gracillis

MOMPHIDAE

Mompha sp.

COSMOPTERIGIDAE

Walshia miscecolorella
Pyroderces badia
Telodoma helianti

SCYTHRIDIDAE

2 unidentified species

GELECHIIDAE

Gelechia paraplutella
Anacampsis lacteusocrella
Aristotelia argentifera
Chionodes mediofuscella
C. lophocella
Syncopacma nr. *nigrella*
1 unidentified species
Arogo nr. *unifascilla*
Rifseria fuscotaenirella
Dichomeris baxa

ORDER: STREPSIPTERA — **TWISTER-WINGED INSECTS**

HALICTOPHAGIDAE

Diozocera comstocki

ORDER: DIPTERA — **FLIES**

TIPULIDAE

Tipula sp. 1
Tipula beatula
Gonomyia flavibasis
Limonia communis

PSYCHODIDAE

1 unidentified species

CULICIDAE

Culex sp.
Culiseta sp.
Aedes squamiger

CHIRONOMIDAE

Chironomus stigmaterus
Crictopus sp.
Dicrotendipes sp.

SIMULIIDAE

1 unidentified species

BIBIONIDAE

Bibio hirtus
2 unidentified species

SCIARIDAE

1 unidentified species

CECIDOMYIIDAE

Asphondylia sp.
1 unidentified species

STRATIOMYIDAE

Nemotelus sp.

TABANIDAE

Brennania belkini

THEREVIDAE

Cromolepidia sp.
Psilocephala aldrichi
Thereva sp. 1
Thereva sp. 2
1 unidentified species

SCENOPINIDAE

Scenopinus sp.

APIOCERIDAE

Rhaphiomidas terminatus terminatus

MYDIDAE

Nemomydas pantherinus

ASILIDAE

Metapogon pictus
Ablautus coquilleti
Stenopogon brevisculus
Cophura clausa

Mallophora fautrix
Protocantha coquilleti
Asilus sp.
Nicocles sp.
Leptogaster sp.
Saropogon luteus

ACROCERIDAE

Opsebius diligens
Ogcodes sp.

BOMBYLIIDAE

Conophorus collinius
C. fenestratus
C. cristatus
Villa atrata
V. lateralis
V. molitor
Ligyra gazophylax
Poecilanthrax arethusa
Thyridanthrax hugator
Lepidanthrax homologus
L. oribates
L. agrestis
Neodiplocampta mira
Bombylius flavipilosus
3 unidentified species
Paravilla syrtis
Poecilognathus loewi
Acreophthiria similis
Phthiria sp. no. 1
Phthiria sp. no 2
Geron nigripes
Geron n. unidentifed species
Mythicomyia pictipes
Mythicomyia sp.
Anastoechus melanohalteralis

DOLICHOPODIDAE

5 unidentified species

PHORIDAE

2 unidentified species

PIPUNCULIDAE

Pipunculus sp.

SYRPHIDAE

Copestylum mexicana
Volucella tau
Syrphus sp.
Metasyphus sp.
Eristalis tenax
Sphaerophoria sp.
Syritta pipiens
Allograpta micrura
A. obliqua
Scaeva pyrastri
Eupeodes volucris
Baccha clavata
Paragus sp.
Carposcalis sp.

CONOPIDAE

Physocephala texana

OTITIDAE

2 unidentified species

TEPHRITIDAE

Euaresta bellula
Proceidochares minuta
Trupanea signata
T. jonesi
Tephritis sp.

LAUXANIIDAE

2 unidentified species

CHAMAEMYIIDAE

Leucopis sp.

PIOPHILIDAE

1 unidentified species

LONCHAEIDAE

1 unidentified species

EPHYDRIDAE

1 unidentified species

DROSOPHILIDAE

Drosophila melanogaster

CHLOROPIDAE

2 unidentified species

AGROMYZIDAE

Melanagromyza sp. 1
1 unidentified species

HELEOMYZIDAE

2 unidentified species

TRIXOSCELIDIDAE

1 unidentified species

ASTEIIDAE

1 unidentified species

ANTHOMYIIDAE

7 unidentified species

MUSCIDAE

Musca domestica
Stomoxys calcitrans
1 unidentified species

CALLIPHORIDAE

Calliphora sp. no. 1
Calliphora sp. no 2
1 unidentified species

SARCOPHAGIDAE

3 unidentified species
Eumacronychia sp.
Miltogrammini
1 unidentified species

TACHINIDAE

Ptilodexia sabroskyi
Archytas california
Peleteria texensis
Deopalpus gemminatus
Chaetogaedia vilis
Eriathririni sp. no 1
Gonia sp.
Microglossa hesperidarum
7 unidentified species

ORDER: HYMENOPTERA — **WASPS, BEES, ANTS, SAWFLIES**

BRACONIDAE

Apanteles thurberi
Apanteles nr. *aristoteliae*
Diadegma sp.
Opius sp.
Agathis sp.
3 unidentified species

UNIDENTIFIED

7 unidentified species

ICHNEUMONIDAE

Ichneumona sp. no 1
13 unidentified species

TRICHOGRAMMATIDAE

Trichogramma minutum
Trichogramma sp.

EULOPHIDAE

Necremnus sp.
Chrysocharis sp.
ENCYRTIDAE
Homalotylus sp.
Anysotylus sp.
EUPELMIDAE
Anastatus
BRADYNOBAENIDAE
Chyphotes petiolatus
TORYMIDAE
Podagrion sp.
Megastigmus sp.
Torymus sp.
PTEROMALIDAE
1 unidentified species
EURYTOMIDAE
Eurytoma sp.
CHALCIDIDAE
Spilochaclis sp.
FIGITIDAE
1 unidentified species
CYNIPIDAE
1 unidentified species
SCELIONIDAE
1 unidentified species
DRYINIDAE
1 unidentified species
FORMICIDAE
Pogonomyrmex californicus
Iridomyrmex humilis
Conomyrma sp.
Formica piliformis
Monomorium minimum
TIPHIIDAE
2 unidentified species
MUTILLIDAE
Dasymutilla californica
Sphaeropthalma sp. 1
Sphaeropthalma sp. 2
SCOLIIDAE
Campsomeris toltera
Crioscolia alcione
POMPILIDAE
Ageniella blaisdelli
Aporus hirsutis
A. luxus
A. sp.
Episyron snowi
E. quinquenotatus hurdi
E. conterminus posterus
Pepsis chrysothemis
Evagetes hyacinthus
Tachypompilus unicolor
Aproenellus medianus
A. yucatanensis
Pompilus angularis
VESPIDAE
Polistes aurifer
SPHECIDAE
Tachysphex amplus
T. ashmeadi
T. texanus
T. sp.
Clypeadon californicus
Larropsis tenuicornis
Sphex ichneumoneus
Isodontia elegans
Ammophila azteca
A. pruinosa
A. cleopatra
A. aberti
Microbembix californica

Bembix americana comata
Steniola duplicata
Plenoculus sp.
Mimesia calruilla
Mimesia sp.
Miscophis sp. no. 1
Miscophis sp. no. 2
Tachytes distinctus
Prionyx parkeri
Astata sp.

COLLETIDAE

Colletes angelica
C. slevini
C. hyalinus gaudialus

HALICTIDAE

Lasioglossum sisymbrii
L. Pavonotum
Agapostemon texanus
A. femoratus
Dialictus pilosicaudis
D. microlepoides
D. perichlarum
D. brunneventis
1 unidentified species

ANDRENIDAE

Andrena oenothera

MELITTIDAE

Hesperaspis fuchsi

MEGACHILIDAE

Anthidium palliventre
Megachile lippiae
Osmia intera
Osmis sp.

ANTHOPHORIDAE

Habropoda tristissima
Micranthophora curta
Peponapsis pruinosa
Anthrophora urbana
Melissodes lupina
M. moorei
Emphoropsis sp.

APIDAE

Apis mellifera
Bombus sonorus
B. crotchii
B. californicus
B. vosnesenskii

TERRESTRIAL VERTEBRATES

COMMON NAME	TAXONOMIC NAME
AMPHIBIANS	
PLETHODONTIDAE	**Lungless Salamanders**
black-bellied slender salamander	*Batrachoseps nigriventris*
Pacific slender salamander	*Batrachoseps pacificus*
garden slender salamander	*Batrachoseps pacificus major*
PELOBATIDAE -	
western spadefoot	*Scaphiopus hammondii*
BUFONIDAE	**True Toads**
western toad	*Bufo boreas*
HYLIDAE	**Treefrogs**
Pacific treefrog	*Hyla regilla*
REPTILES	
IGUANIDAE	**Iguanid Lizards**
San Diego horned lizard	*Phrynosoma coronatum blainvillii*
western fence lizard	*Sceloporus occidentalis*
side-blotched lizard	*Uta stansburiana*
TEIIDAE	**Whiptail Lizards**
coastal whiptail	*Cnemidophorus tigris multiscutatus*
ANGUIDAE	**Alligator Lizards**
San Diego alligator lizard	*Gerrhonotus multicarinatus webbii*
ANNIELLIDAE	**California Legless Lizards**
silvery legless lizard	*Anniella pulchra pulchra*
COLUBRIDAE	**Colubrid Snakes**
San Bernardino ringneck snake	*Diadophis punctatus modestus*
night snake	*Hypsiglena torquata*
common kingsnake	*Lampropeltis getulus*
striped racer	*Masticophis lateralis*
gopher snake	*Pituophis melanoleucus*
long-nosed snake	*Rhinocheilus lecontei*
western patch-nosed snake	*Salvadora hexalepis*
western black-headed snake	*Tantilla planiceps*
BIRDS	
PODICIPEDIDAE	**Grebes**
western grebe	*Aechmophorus occidentalis*
PELECANIDAE	**Pelicans**
brown pelican	*Pelecanus occidentalis*
PHALACROCORACIDAE	**Cormorants**
double-crested cormorant	*Phalacrocorax auritus*
ARDEIDAE	**Herons**
great blue heron	*Ardea herodias*

ANATIDAE	**Waterfowl**
mallard	*Anas platyrhynchos*
chinese goose	*Anser cygnoides*
domestic goose	*Anser "domesticus"*
CATHARTIDAE	**New World Vultures**
turkey vulture	*Cathartes aura*
ACCIPITRIDAE	**Hawks**
white-tailed kite	*Elanus leucurus*
northen harrier	*Circus cyaneus*
sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
red-shouldered hawk	*Buteo lineatus*
red-tailed hawk	*Buteo jamaicensis*
golden eagle	*Aquila chrysaetos*
FALCONIDAE	**Falcons**
merlin	*Falco columbarius*
American kestrel	*Falco sparverius*
prairie falcon	*Falco mexicanus*
peregrine falcon	*Falco peregrinus*
CHARADRIIDAE	**Plovers**
black-bellied plover	Pluvialis squatarola
snowy plover	*Charadrius alexandrinus*
semipalmated plover	Charadrius semipalmatus
killdeer	*Charadrius vociferus*
COLOPACIDAE	**Sandpipers**
long-billed curlew	*Numenius americanus*
LARIDAE	**Gulls & Terns**
Heermann's gull	*Larus heermanni*
ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
western gull	*Larus occidentalis*
least tern	*Sterna antillarum*[3]
COLUMBIDAE	**Pigeons & Doves**
rock dove	*Columba livia*
spotted dove	*Streptopelia chinensis*
mourning dove	*Zenaida macroura*
TYTONIDAE	**Barn Owls**
barn owl	*Tyto alba*
STRIGIDAE	**True Owls**
short-eared owl	*Asio flammeus*
great horned owl	*Bubo virginianus*
burrowing owl	*Athene cunicularia*
CAPRIMULGIDAE	**Goatsuckers**
lesser nighthawk	*Chordeiles acutipennis*
common poorwill	*Phalaenoptilus nuttallii*
APODIDAE	**Swifts**
Vaux's swift	*Chaetura vauxi*
white-throated swift	*Aeronautes saxatalis*
TROCHILIDAE	**Hummingbirds**
Anna's hummingbird	*Calypte anna*
Costa's hummingbird	*Calypte costae*
Allen's hummingbird	*Selasphorus sasin*
PICIDAE	**Woodpeckers**
acorn woodpecker	*Melanerpes formicivorus*
red-breasted sapsucker	*Shyrapicus ruber*
Nutall's woodpecker	*Picoides nuttallii*
downy woodpecker	*Picoides pubescens*
hairy woodpecker	*Picoides villosus*
northern flicker	*Colaptes auratus*
TYRANNIDAE	**Tyrant Flycatchers**
olive-sided flycatcher	*Contopus borealis*
western wood-pewee	*Contopus sordidulus*
willow flycatcher	*Empidonax traillii*
Hammond's flycatcher	*Empidonax hammondii*
Pacific-slope flycatcher	*Empidonax difficilis*
black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*

[3] The least tern is known to have bred at El Segundo Dunes, probably near the high tide line. The breeding component of this species has been extirpated.

ash-throated flycatcher	*Myiarchus cinerascens*
Cassin's kingbird	*Tyrannus vociferans*
western kingbird	*Tyrannus verticalis*
ALAUDIDAE	**Larks**
horned lark	*Eremophila alpestris*
HIRUNDINIDAE	**Swallows**
tree swallow	*Tachycineta bicolor*
violet-green swallow	*Tachycineta thalassina*
northern rough-winged swallow	*Stelgidopteryx serripennis*
rough-winged swallow	*Stelgidopteryx ruficollis*
cliff swallow	*Hirundo pyrrhonota*
bank swallow	*Riparia riparia*
CORVIDAE	**Jays & Crows**
Steller's jay	Cyanocitta stelleri
scrub jay	*Aphelocoma coerulescens*
black-billed magpie	*Pica pica*
American crow	*Corvus brachyrhynchos*
common raven	*Corvus corax*
PARIDAE	**Titmice**
plain titmouse	*Parus inornatus*
TROGLODYTIDAE	**Wrens**
rock wren	*Salpinctes obsoletus*
MUSCICAPIDAE	**Kinglets, Gnatcatchers, Thrushes & Babblers**
golden-crowned kinglet	*Regulus satrapa*
blue-gray gnatcatcher	*Polioptila caerulea*
mountain bluebird	*Sialia currucoides*
Swainson's thrush	*Catharus ustulatus*
MIMIDAE	**Thrashers**
northern mockingbird	*Mimus polyglottos*
BOMBYCILLIDAE	**Waxwings**
cedar waxwing	*Bombycilla cedrorum*
PTILOGONATIDAE	**Silky-Flycatchers**
phainopepla	*Phainopepla nitens*
LANIIDAE	**Shrikes**
loggerhead shrike	*Lanius ludovicianus*
STURNIDAE	**Starlings**
European starling	*Sturnus vulgaris*
VIREONIDAE	**Vireos**
solitary vireo	*Vireo solitarius*
warbling vireo	*Vireo gilvus*
Bell's vireo	*Vireo bellii*
EMBERIZIDAE	**Wood Warblers, Tanagers, Buntings & Blackbirds**
orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
yellow warbler	*Dendroica petechia*
yellow-rumped warbler	*Dendroica coronata*
black-throated gray warbler	*Dendroica nigrescens*
Townsend's warbler	*Dendroica townsendi*
hermit warbler	*Dendroica occidentalis*
MacGillivray's warbler	*Oporornis tolmiei*
Wilson's warbler	*Wilsonia pusilla*
yellow-breasted chat	*Icteria virens*
western tanager	*Piranga ludoviciana*
black-headed grosbeak	*Pheucticus melanocephalus*
blue grosbeak	*Guiraca caerulea*
lazuli bunting	*Passerina amoena*
rufous-sided towhee	*Pipilo erythrophthalmus*
California towhee	*Pipilo crissalis*
rufous-crowned sparrow	*Aimophila ruficeps*
chipping sparrow	*Spizella passerina*
Brewer's sparrow	*Spizella breweri*
black-chinned sparrow	*Spizella atrogularis*
vesper sparrow	*Pooecetes gramineus*
sage sparrow	*Amphispiza belli*
savannah sparrow	*Passerculus sandwichensis*
grasshopper sparrow	*Ammodramus savannarum*
fox sparrow	*Passerella iliaca*
song sparrow	*Melospiza melodia*
white-crowned sparrow	*Zonotrichia leucophrys*
dark-eyed junco	*Junco hyemalis*
red-winged blackbird	*Agelaius phoeniceus*
tricolored blackbird	*Agelaius tricolor*

western meadowlark	*Sturnella neglecta*
brown-headed cowbird	*Molothrus ater*
hooded oriole	*Icterus cucullatus*
northern oriole	*Icterus galbula*
Scott's oriole	*Icterus parisorum*
FRINGILLIDAE	**Finches**
house finch	*Carpodacus mexicanus*
pine siskin	*Carduelis pinus*
Lawrence's goldfinch	*Carduelis lawrencei*
PASSERIDAE	**Old World Sparrows**
house sparrow	*Passer domesticus*
MAMMALS	
DIDELPHIDAE	**New World Opossums**
Virginia opossum	*Didelphis virginiana*
GEOMYIDAE	**Pocket Gophers**
Botta's pocket gopher	*Thomomys bottae*
CRICETIDAE	**New World Rats & Mice**
brush mouse	*Peromyscus boylii*
desert wood rat	*Neotoma lepida*
California vole	*Microtus californicus*
MURIDAE	**Old World Rats & Mice**
Norway rat	*Rattus norvegicus*
black rat	*Rattus rattus*
house mouse	*Mus musculus*
CANIDAE	**Wolves & Foxes**
domestic dog	*Canis familiaris*
red fox	*Vulpes vulpes*
PROCYONIDAE	**Raccoons**
raccoon	*Procyon lotor*
MUSTELIDAE -	**Weasels, Skunks & Otters**
striped skunk	*Mephitis mephitis*
FELIDAE	**Cats**
domestic cat	*Felis cattus*

Appendix B

U.S. Fish and Wildlife Service
Letter Dated August 29, 1997

United States Departm
FISH AND WILDLI
Ecological Se
Carlsbad Field
2730 Loker Avenue West
Carlsbad, California 92008

AUG 29 1997

Mr. David B. Kessler
Federal Aviation Administration
U. S. Department of Transportation
P. O. Box 92007
Worldway Postal Center
Los Angeles, California 90009-2007

Subject: Vernal Pools and Associated Listed Species at the Los Angeles International Airport, Los Angeles, California

Dear Mr. Kessler:

This letter concerns vernal pools and other ephemeral waterbodies, the Riverside fairy shrimp (*Stretocephalus woottoni*), San Diego fairy shrimp (*Branchinecta sandiegonensis*), California orcutt grass (*Orcuttia californica*), San Diego button-celery (*Eryngium aristulatum* var. *parishii*), and western spadefoot toad (*Scaphiopus hammondii*) at the Los Angeles International Airport, Los Angeles, California. The two fairy shrimp and the two plants are listed as endangered species under the Endangered Species Act of 1973, as amended (Act). The toad is a State of California Species of Special Concern. Our comments and recommendations are based on a letter from the U. S. Fish and Wildlife Service (Service) to the Federal Aviation Administration dated July 31, 1997; a field meeting at the Los Angeles International Airport between Chris Nagano and Bob James of my staff, the Federal Aviation Administration (FAA), the Los Angeles Department of Airports (LAX), and their consultants on August 27, 1997; and other information available to the Service.

On August 27, 1997, my staff located potential vernal and ephemeral water bodies during a site visit to provide assistance to the FAA and LAX with the methodology for the field survey for the endangered Pacific pocket mouse (*Perognathus longimembris pacificus*). The mouse survey is being conducted for the environmental impact report/ environmental impact statement being prepared for the proposed expansion of the Los Angeles International Airport. The potential vernal pools were observed adjacent to the northwest side of Runway 24R and the ephemeral water body was located east of Pershing Drive in the vicinity of the fire department training area. This area of Los Angeles historically contained substantial numbers of vernal pools (Mattoni and Longcore undated). California orcutt grass and San Diego button-celery historically occurred in this area of Los Angeles County (Davidson and Moxley 1923). The soil and hydrologic conditions appear to be suitable for vernal pools, even though land disturbance likely occurred in the past. The vernal pools and ephemeral water body at the Los Angeles International Airport

may provide habitat for the two fairy shrimp, California orcutt grass, and San Diego button-celery. The toad has been observed in the ephemeral water body by recent surveys. Both of these areas are readily visible from the Airport Dunes, Westchester Parkway, and San Piper Street.

The Service recommends that a wetland delineation be completed for the Los Angeles International Airport, especially the areas located east and north of Runway 24R, and south of World Way West, east of Pershing Drive and west of the Service Road. We recommend that surveys for the federally listed fairy shrimp, plants, and the toad be completed following Service protocol. The surveys for the two listed shrimp only should be conducted by a biologist who possess a valid section 10(a)(1)(A) recovery permit from the Service. The Service recommends that adverse impacts to these areas, including filling, grading, or driving into them be avoided until these issues are resolved.

We are interested in working with the FAA and the LAX in resolving the issues regarding endangered species, vernal pools and other wetlands, and sensitive wildlife. Please contact Chris Nagano or Bob James of my staff at the letterhead address or at 760/431-9440 if you have any questions.

Sincerely,

for Gail C. Kobetich
Field Supervisor

1-6-97-TA-182

cc: DOI:SOL, San Francisco, CA (Attn: Asst. Solicitor R. Kohn Glazer)
COE, Los Angeles, CA (Attn: M. Durham)
CDFG, San Diego, CA (Attn: B. Tippets)
CDFG, Long Beach, CA (Attn: ES Supervisor)
CDFG, Long Beach, CA (Attn: J. Hernandez)
CCC, Long Beach, CA (Attn: P. Emerson)
LAX, Los Angeles, CA (Attn: S. Murphy)

References

Davidson, A. and G. Moxley. 1923. Flora of southern California. Times-Mirror Press, Los Angeles, California.

Mattoni, R. H. T. and T. Longcore. Undated. Down memory lane: the Los Angeles coastal prairie, a vanished community. Unpublished report. Department of Geography, University of California, Los Angeles, California.

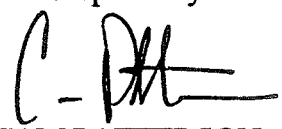
Appendix C
RECON Report

FAIRY SHRIMP SURVEYS
AT
LOS ANGELES INTERNATIONAL AIRPORT

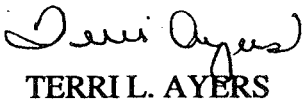
Prepared for

SAPPHOS ENVIRONMENTAL
50 SOUTH DELACEY, SUITE 210
PASADENA, CA 91105

Prepared by



CAM PATTERSON
BIOLOGIST



TERRI L. AYERS
BIOLOGIST

RECON NUMBER 2964C
JULY 1, 1998

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RECON
REGIONAL ENVIRONMENTAL CONSULTANTS

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Introduction

RECON was contracted by Sapphos Environmental to conduct directed surveys for listed vernal pool branchiopods (fairy shrimp) at Los Angeles International Airport in areas of vernal pool or other ephemeral aquatic habitat. These surveys were conducted according to the protocol developed by the U.S. Fish and Wildlife Service (USFWS 1996) for studying listed vernal pool branchiopods, which included dry-phase soil sampling of the pools and biweekly site visits during the wet season. RECON used global positioning systems (GPS) hardware and software to map the boundaries of the pools, and incorporated these data into a geographic information system (GIS). This report describes the survey methods and presents the results of the surveys.

A. Physical Setting

Los Angeles International Airport (LAX) is located within Los Angeles County, California, north of the city of El Segundo. The area surveyed for this project is situated at the northwestern end of LAX, just east of the El Segundo Dunes (Figure 1).

The lands within the LAX boundary have largely been developed to support airport operations. During the course of the wet season surveys, it was apparent that no vernal pool species associations occur in the study area. Therefore, this report refers to the habitats surveyed as "ephemeral aquatic pools." The open area around the runway where the pools are located was filled many years ago to eliminate topographic relief, and is currently disked and/or mowed regularly to remove vegetation for safety purposes. The routine disturbance of the soils and vegetation in and around the pools has altered the remnant pools' boundaries and reduced or eliminated the flora normally associated with vernal pools.

B. Fairy Shrimp

Fairy shrimp are freshwater crustaceans of the Order Anostraca. They inhabit temporary bodies of water (vernal pools), and are able to hatch, attain maturity, and reproduce within the short period of time the pools are inundated. Habitat loss has resulted in the decline of many species of fairy shrimp, resulting in their need for listing and protection under the federal Endangered Species Act (ESA) of 1973, as amended. There are four species of fairy shrimp found in California that are listed as endangered under the provisions of the ESA: Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*B. longiantenna*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*Streptocephalus woottoni*). Vernal pool fairy shrimp (*B. lynchi*) are listed as threatened. Conservancy fairy shrimp and longhorn fairy shrimp are known from California's Central Valley, while San Diego fairy shrimp, vernal pool fairy shrimp,

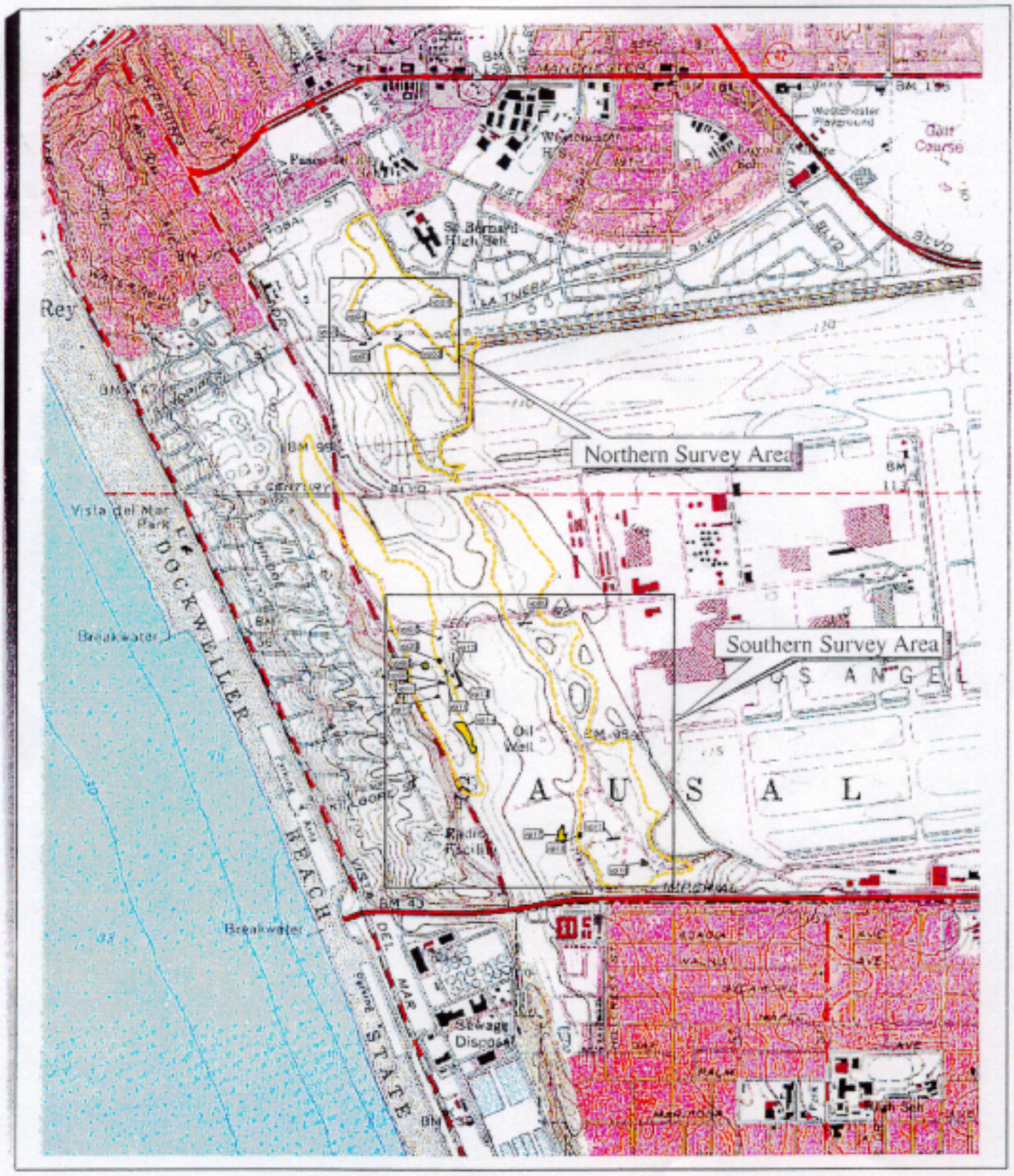


FIGURE 1

Regional Location of Ephemeral Aquatic Habitat at Los Angeles International Airport

RECON

and Riverside fairy shrimp are known to occur in southern California. Versatile fairy shrimp (*B. lindahli*) are commonly found in southern California vernal pools and are not listed for protection under the ESA.

Methods

A. Vernal Pool Mapping

RECON biologists, along with Dr. Irena Mendez of Sapphos Environmental, located potential vernal pools on the project site during fall 1997 based on field reconnaissance. Using a GPS receiver, the geographic coordinates of each pool perimeter were mapped by surveying a number of points around the edge of each pool basin adequate to record the size and location of the basin. The raw location data from the GPS were post-processed to submeter accuracy. These data were incorporated into the RECON GIS and processed to construct data layers of pool basin locations using the State Plane Coordinate System, North American Datum 1983 (NAD83). During the course of the 1998 wet season surveys for fairy shrimp, several additional pools were located and mapped with the GPS receiver.

B. Fairy Shrimp Surveys

USFWS guidelines (1996) for conducting fairy shrimp surveys specify that two years' data must be collected to determine the presence/absence of fairy shrimp species within vernal pools. In lieu of two separate years of wet season sampling, one season of dry soil sampling was substituted.

Dry season soil sampling for the presence of fairy shrimp cysts was conducted in conjunction with mapping the pools at LAX, in accordance with RECON's USFWS endangered species permit and the survey guidelines for vernal pool branchiopods (USFWS 1996). Samples of soil were collected from at least 10 locations within each pool basin and sent to Christopher Rogers of Jones and Stokes Associates, Inc. in Sacramento, California, for examination and cyst identification.

El Niño-influenced rainfall occurred early within the wet season of 1997-98, and resulted in the ponding of water for periods of sufficient duration to allow for the hatching of fairy shrimp in the pools at LAX. RECON biologists visited each pool and conducted sampling to determine the presence of fairy shrimp within the pools a number of times during the wet phase of the pools (Table 1).

TABLE 1
SURVEY DETAILS
LOS ANGELES INTERNATIONAL AIRPORT

Date	Personnel	Type of Survey
11/06/97	Cam Patterson, Terri Ayers	Dry season soil sampling
12/19/97	Cam Patterson, Terri Ayers	Wet season fairy shrimp survey
01/08/98	Cam Patterson	Wet season fairy shrimp survey
01/23/98	Cam Patterson	Wet season fairy shrimp survey
03/05/98	Cam Patterson	Wet season fairy shrimp survey
03/26/98	Cam Patterson	Wet season fairy shrimp survey
04/16/98	Cam Patterson	Wet season fairy shrimp survey

Within five to seven days of rain events, personnel from Sapphos Environmental were contacted by phone to ascertain if rainfall amounts were sufficient to fill the pool basins. If pools remained inundated for at least 10 days, fairy shrimp sampling was conducted by RECON personnel. All fairy shrimp surveys were conducted by personnel authorized under USFWS permit PRT-797665. Fairy shrimp were sampled by sweeping either a hand-held net or a pole-mounted net through the water column in the pool and examining the net for invertebrates. Mature fairy shrimp species were identified to the species level. Survey visits were timed to correspond with observed hatching of fairy shrimp at other sites throughout southern California being concurrently surveyed by RECON (March Air Reserve Base, Hemet, Camp Pendleton Marine Base, Marine Corps Air Station Miramar, and Otay Mesa).

Results

A. Pool Mapping

Sixteen ephemeral aquatic pools were located and mapped at LAX in the fall of 1997. Four additional pools were identified mid-way through the wet season surveys. Table 2 lists the dimensions and areas of these pool basins. All pools are illustrated in Figures 2 and 3.

B. Dry Season Soil Samples

A copy of the report prepared by C. Rogers of Jones and Stokes Associates detailing the results of the dry season vernal pool soil analysis is included as Attachment 1. Cysts from the genus *Branchinecta* were found in the soils samples from pools numbered 1, 2, 6, 8,

TABLE 2
POOL DIMENSIONS
LOS ANGELES INTERNATIONAL AIRPORT

Pool Number	Approximate Length and Width (feet)	Approximate Area ($feet^2$)
1	55 X 13	123
2	97 X 12	292
3	23 X 12	74
4	30 X 15	95
5	82 X 28	212
6	177 X 20	1,438
7	46 X 10	275
8	98 X 82	5,706
9	33 X 26	577
10	27 X 19	312
11	64 X 18	809
12	34 X 22	548
13	208 X 84	4,808
14	454 X 130	39,199
15	165 X 15	2,086
16	96 X 94	3,936
17	201 X 130	13,719
18	63 X 42	1,659
19	53 X 28	807
20	63 X 51	1,691

FIGURE 2

Ephemeral Aquatic Habitat at Los Angeles International Airport - Northern Survey Area

RECON

M:\JOBS\2964\VPOOLS.APR-FIGURE 2

FIGURE 3

Ephemeral Aquatic Habitat at Los Angeles International Airport - Southern Survey Area

14, 15, and 16. Cysts from the genus *Streptocephalus* were found in the soil samples from pools numbered 1, 2, 6, 9, and 12 through 16. As described in Roger's report, *Branchinecta* cysts are identifiable only to the genus level because of the overlapping characteristics of cysts from the various species. Cysts from *Streptocephalus woottoni* may resemble the cysts of other species of *Streptocephalus*, but no other species occur in the area; therefore, it was assumed that the cysts were those of *S. woottoni.*

C. Wet Season Fairy Shrimp Surveys

Versatile fairy shrimp (*B. lindahli*) were observed in pools numbered 1, 2, 8, and 12 through 19 (see Figure 1). This was the only species of fairy shrimp observed in the pools at LAX during the 1997-98 wet season. Pools numbered 3, 4, and 5 did not pool water at any time during the wet season for long enough to allow fairy shrimp cysts to hatch if they were present in the soil. Table 3 lists the combined results of the dry season soil sampling and wet season surveys.

Discussion

Ephemeral aquatic pools observed on the LAX survey area consist entirely of non-natural man-made depressions in highly disturbed soil conditions. A review of historical topographic maps and aerial photographs indicate that natural vernal pools and back-dune ponds were present on the airport property in the past. However, none of the ephemeral aquatic (temporarily ponded) sites observed during the course of the current survey were natural habitat. No typical vernal pool plant community exists in any of the habitat surveyed. Of the plant species present, all are typical of roadside ditches and disturbed wetlands and none were vernal pool endemics.

In the northern survey area (see Figure 2), the surveyed ponded areas were tire ruts in heavy soil. As shown on the USGS topographic map, this area was near the edge of a large depression that formerly existed near the western end of the northern runways 20 or more years ago. The dry samples in this area had low levels of Riverside fairy shrimp cysts, which probably indicates that this species formerly occupied these large ponds which are now filled. No habitat with water durations long enough (six to eight weeks minimum) to support Riverside fairy shrimp currently exists in this area. The only live fairy shrimp observed during the wet season surveys in this area were versatile fairy shrimp, a common and widespread species of all kinds of ephemeral aquatic water bodies including natural vernal pools and highly disturbed sites.

In the southern survey area (see Figure 3; Photograph Sheets 1-3), the surveyed ponded areas included road ruts and roadside ditches, compacted gravel road surfaces, a hazardous materials runoff containment pond, depressions on old artificial fill, and a earthen-bottom flood control basin. All of these areas were considered potential fairy

TABLE 3
FAIRY SHRIMP SURVEY RESULTS
LOS ANGELES INTERNATIONAL AIRPORT

Pool Number	Dry Season Soil Sampling	Wet Season Surveys
1	*Branchinecta* sp. *Streptocephalus woottoni*	*Branchinecta lindahli*
2	*Branchinecta* sp. *Streptocephalus woottoni*	*Branchinecta lindahli*
3		Water did not pond
4		Water did not pond
5		Water did not pond
6	*Branchinecta* sp. *Streptocephalus woottoni*	none
7		
8	*Branchinecta* sp.	*Branchinecta lindahli*
9	*Streptocephalus woottoni*	*Branchinecta lindahli*
10		*Branchinecta lindahli*
11		*Branchinecta lindahli*
12	*Streptocephalus woottoni*	*Branchinecta lindahli*
13	*Streptocephalus woottoni*	*Branchinecta lindahli*
14	*Branchinecta* sp. *Streptocephalus woottoni*	*Branchinecta lindahli*
15	*Branchinecta* sp. *Streptocephalus woottoni*	*Branchinecta lindahli*
16	*Branchinecta* sp. *Streptocephalus woottoni*	*Branchinecta lindahli*
17	Not sampled	*Branchinecta lindahli*
18	Not sampled	*Branchinecta lindahli*
19	Not sampled	*Branchinecta lindahli*
20	Not sampled	none

Pool 8

Pool 10

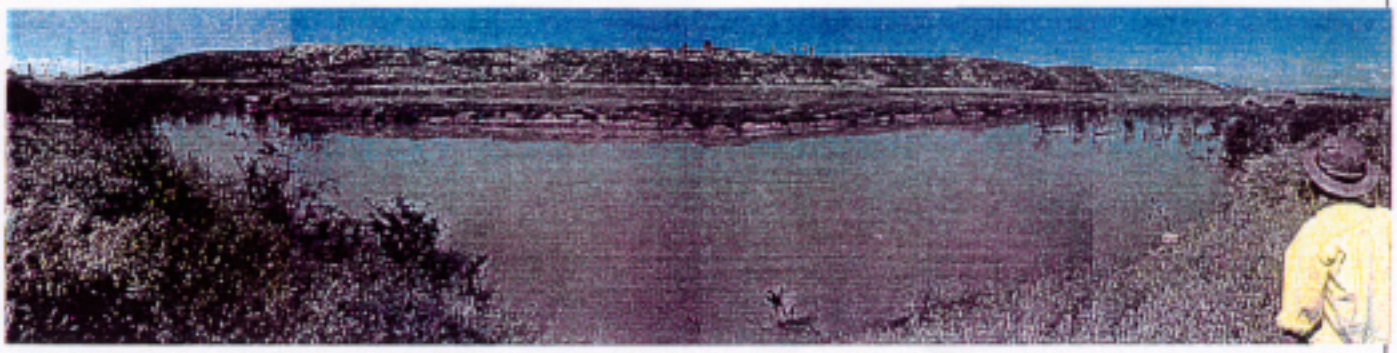
Pool 12

Pool 11

Pool 13

Photographs, Sheet 1

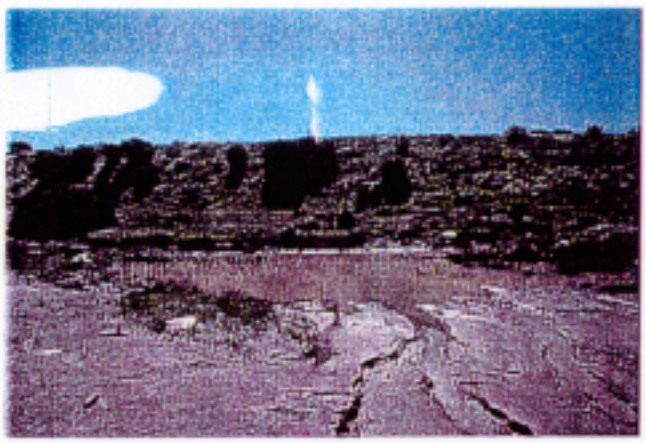
Vernal Pool Photographs



Pool 14

Pool 15

Pool 17



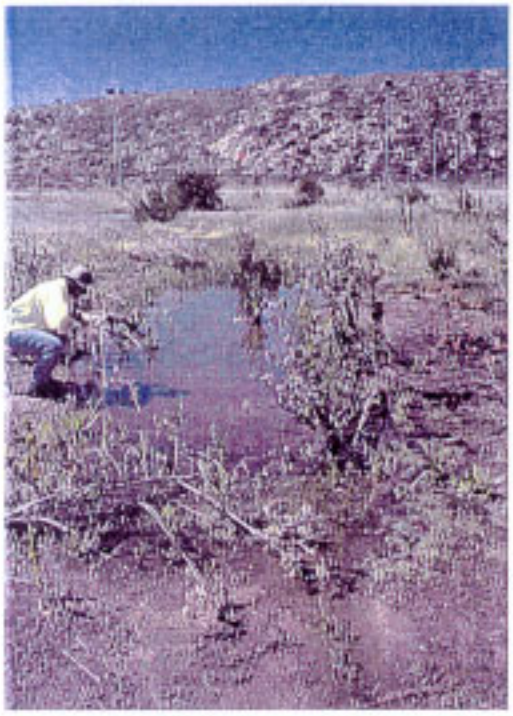
Pool 16

Photographs, Sheet 2

Vernal Pool Photographs

Pool 18

Pool 20



Pool 19

shrimp habitat because of potentially appropriate hydrologic conditions. As for the northern survey area, these sites are all on non-natural substrate with ponding caused by man-made factors. As shown on Figure 1, these areas were also formerly within a large system of depressions and temporary ponding located between the runway complex and the dunes to the west. Although Riverside fairy shrimp cysts were observed in dry season samples from several of these ponds, no live animals of this species were observed during intensive sampling of the habitat over the season. Only one location (pool 14) had appropriate water duration characteristics for this species. This pond had an intensive *B. lindahli* hatch, with animal densities throughout the large pond exceeding 100 animals per cubic meter early in the season. By late January, when *S. woottoni* were appearing in monitored pools elsewhere in southern California, no anostracans were present in pool 14. Spadefoot toads were observed in pools 8, 14, and 18.

The results of the 1998 surveys indicate that the ephemeral aquatic habitat remaining at LAX is of very poor quality, and does not appear to support any listed endangered or threatened vernal pool anostracans. The dry season sample results, which contained *S. woottoni* (Riverside fairy shrimp) cysts, indicate that vernal pool habitat which was formerly extensive on the western part of the airport property, did support this species in the past. Based on the condition and quality of habitat presently on the airport, and the favorable survey conditions during the 1998 season, we consider it likely that *S. woottoni* has been extirpated from the site (with the possible exception of pool 14). Because of the very favorable hydrologic conditions present during the survey season, we also consider it to be unlikely that either of the two potentially present listed branchinectids, *Branchinecta sandiegonensis,* or *B. lynchii* are present at LAX, but were missed during the survey. Both of these species were easily detected at other locations where they are present during surveys conducted on the same schedule.

If future impacts to these poor-quality ephemeral aquatic wetlands result in mitigation requirements, we recommend that the feasibility of a vernal pool habitat restoration program be considered. Although habitat restoration on the airport property is probably infeasible due to the attractiveness of wetlands to waterfowl and shorebirds, there may be other former vernal pool sites within Los Angeles County (such as in the Santa Clara River valley) which may be appropriate.

Reference Cited

U.S. Fish and Wildlife Service (USFWS)

1996 Interim survey guidelines to permittees for recovery permits under Section 10 (a)(1)(A) of the Endangered Species Act for the listed vernal pool branchiopods. Carlsbad Field Office, Carlsbad, California.

ATTACHMENT 1

June 11, 1998

Cameron Patterson
RECON
4241 Jutland Drive, Suite 201
San Diego, CA 92117-3653

SUBJECT: Analysis of Vernal Pool Soils from LAX to Determine the Potential Presence of Special-Status Shrimp Species.

Dear Cameron Patterson:

Jones & Stokes Associates conducted an analysis of 80 soil samples for RECON to determine the presence of special-status shrimp at LAX, Los Angeles County, California. The soil samples were collected by RECON, and were received by Jones & Stokes Associates on April 30, 1998. Jones & Stokes Associates assumes that RECON will submit this report and all other pertinent materials and information to the U.S. Fish and Wildlife Service (USFWS), the Natural History Museum of Los Angeles County and the California Department of Fish and Game, as required by the USFWS guidelines for a protocol-level survey.

DEFINITIONS

For the purpose of this report, special-status shrimp are defined to include shrimp species in the following categories:

- shrimp listed as threatened or endangered under the federal Endangered Species Act (50 CFR 17.11 for listed animals and various Federal Register notices for proposed species),
- other shrimp species meeting the definition of rare or endangered species under the California Environmental Quality Act (CEQA) (State CEQA Guidelines, Section 15380).

METHODS

Soil samples were prepared for examination in the laboratory by dissolving the clumps of soil in water and sieving the material through 500-, and 150-μm pore-size screens. The small size of

these screens ensured that the eggs from the shrimp species would be retained. The portion of each sample retained in the screens was dissolved in a brine solution to separate the organic material from the inorganic material. The organic fraction was then examined under a microscope.

Scanning electron micrographs and reference specimens were used to identify shrimp cysts to the lowest justifiable taxon. Cysts from the genus *Branchinecta* were identifiable only to genus level, because of the overlapping characters of the cysts among species, and the potential for two species, *B. lindahli* and *B. sandiegonensis*, to occur in this region. *B. lindahli* is a common species with no regulatory status, and *B. sandiegonensis* is federally listed as endangered (62 CFR 4925). *Streptocephalus wootoni* cysts may resemble those of other species of *Streptocephalus*; however, no other species of *Streptocephalus* occur in the survey region.

RESULTS

Shrimp cysts were identified in 35 of 80 samples. Cysts for the federally listed endangered species *Streptocephalus wootoni* were identified in 21 of the samples, and the cysts for the genus *Branchinecta* were identified in 32 of the samples. It cannot be determined from observation of the cysts if these samples contain *B. sandiegonensis*. Adult shrimp must be observed to make this determination. The specific findings are in Table 1.

If you have any questions please call me at (916)737-3000.

Sincerely,

D. Christopher Rogers
Invertebrate Ecologist

DCR/CR/clm

Table 1. Specific Findings

Pool Number	Branchinecta (cysts/liter)	Streptocephalus (cysts/liter)	Pool Number	Branchinecta (cysts/liter)	Streptocephalus (cysts/liter)
1-3	2,378	30	9-3	0	0
1-5	2,579	24	9-4	0	0
1-6	3,293	16	9-5	0	0
1-8	106	14	9-6	0	0
1-9	97	112	9-7	0	32
2-5	105	0	10-2	0	0
2-6	36	0	10-5	0	0
2-7	36	0	10-8	0	0
2-8	200	23	10-9	0	0
2-10	82	0	10-10	0	0
3-5	0	0	11-2	0	0
3-6	0	0	11-5	0	0
3-7	0	0	11-8	0	0
3-9	0	0	11-9	0	0
3-10	0	0	11-10	0	0
4-1	0	0	12-1	0	32
4-5	0	0	12-2	0	0
4-7	0	0	12-3	0	0
4-9	0	0	12-4	0	0
4-10	0	0	12-7	0	0
5-3	0	0	13-3	0	0
5-5	0	0	13-5	0	64
5-6	0	0	13-8	0	0
5-7	0	0	13-9	0	32
5-9	0	0	13-10	0	0
6-2	0	0	14-1	433	2
6-3	0	0	14-2	342	4
6-4	0	0	14-3	483	0
6-8	1	0	14-4	1,062	1
6-10	15	3	14-10	1,326	0
7-3	0	0	15-4	39	42
7-4	0	0	15-5	12	4
7-5	0	0	15-6	4	1
7-7	0	0	15-7	14	9
7-9	0	0	15-10	63	3
8-2	934	0	16-2	485	32
8-3	466	0	16-3	316	0
8-4	404	0	16-8	388	1
8-6	305	0	16-9	87	0
8-7	72	0	16-10	270	0