ENVIRONMENTAL ASSESSMENT

SOIL DISPOSAL
HAMILTON ARMY AIRFIELD
MARIN COUNTY, CALIFORNIA

U.S. Army Corps of Engineers
Sacramento District
Evironmental Resources Branch

June 1997

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FIGURES

APPENDIXES

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

This environmental assessment (EA) addresses the impacts of utilizing approximately 105,000 cubic yards of low level contaminated soil on the former Hamilton Army Airfield (HAAF). Approximately 80,000 cubic yards of this soil will be placed within the perimeter berm along the southern boundary of the property. An additional 25,000 cubic yards of soil that is considered to be safe for residential use by regulating agencies would be placed on the former airfield property. This EA also addresses the removal of the existing south berm, which is required in order to encapsulate the contaminated soil.

1.2 Background and Overview

In 1974, the U.S. Air Force decommissioned Hamilton Air Force Base. In 1976 the Army received permission to use the runway and ancillary airfield facilities and several other buildings for Army aircraft operations and Army Reserve operations. At this time HAFB was renamed HAAF. The Army continued to use portions of HAAF on a permit basis until July 1984, when approximately 644 acres of the former airfield were officially acquired by the Army and management responsibility for this portion was transferred to the Presidio of San Francisco (Earth Technology Corporation 1994). When the Presidio closed in 1994, the management responsibility for the Army portion of HAAF was transferred to Fort Lewis, Washington.

The Defense Base Closure and Realignment Act of 1988 (BRAC), Public Law 100-526, mandated the closure of HAAF. As part of the BRAC action, the Department of Defense property on the airfield is being "outparceled" (sold or transferred) to nonmilitary entities. As part of the BRAC activities a variety of engineering, environmental, and cultural studies have been done to meet laws and regulations.

In 1995 an EA and finding of no significant impact were prepared for the excavation of the soil that is currently stockpiled on the runways (Corps 1995). The stockpiled soil was tested prior, during, and after excavation from the various sites. Low levels of petroleum hydrocarbon fuel products (gasoline, diesel, and aviation fuel) were the most frequently encountered contaminants. These soils were evaluated, placed in discrete piles, and characterized in order to assess suitable disposal alternatives. Storage on the runways was temporary and the Army now needs to permanently dispose of the soil.

1.3 Location of the Proposed Action

HAAF is located approximately 25 miles north of San Francisco on the southeast edge of the City of Novato, Marin County, California. Adjacent to the airfield on the southeast side is the San Pablo Bay (see Figure 1-1). The airfield occupies approximately 644 acres of the former 2,184-acre Hamilton Air Force Base. The area proposed for remediation under this EA is the former airfield. This EA only addresses the disposal of the stockpiled soil planned for encapsulation into the south berm and the placement on upland areas.

1.4 Purpose and Need for the Action

The Army has been directed by Congress to dispose of the airfield. If the soil remains on the runways disposal of the property would not be possible. The State of California Department of Toxic Substance Control has also mandated the Army to remediate the site or continue with maintenance and monitoring of the soils.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 No Action

Under this alternative the Army would take no action. The 100,000 cubic yards of soil would remain on the runways. maintenance and monitoring of the stockpiled soil would continue. The existing berm would not be removed, and no berm would be constructed. Because the State of California Department of Toxic Substance Control and Congress have mandated the Army to remediate the site, legally the no action alternative is not feasible or practicable. The no action alternative is included in this environmental assessment to provide a baseline against which project changes in the environment and public risks can be compared and because it is legally required.

2.2 Proposed Alternative (Encapsulate the Soil into South Berm and Place on Upland Areas on the Former Airfield Property)

The proposed plan would entail excavating the existing levee located at the southern border of HAAF to 2 feet below grade and replacing it with a berm designed to encapsulate 60,000 cubic yards of contaminated soil (see Figure 2-1). This soil would be placed in the core of the berm and would be encapsulated by at the least contaminated soil (up to 20,000 cubic yards). This outermost soil cover will be no less than 3 feet in thickness (see Figure 2-2). There would be no exposure pathway to the environment once the contaminated soil is encapsulated in the berm. It should also be noted that the contaminants in the soil have low mobility in the environment. This results from the chemical properties of the contaminants, the high organic content of the soil, the high degree of compaction specified for berm construction, and the relative

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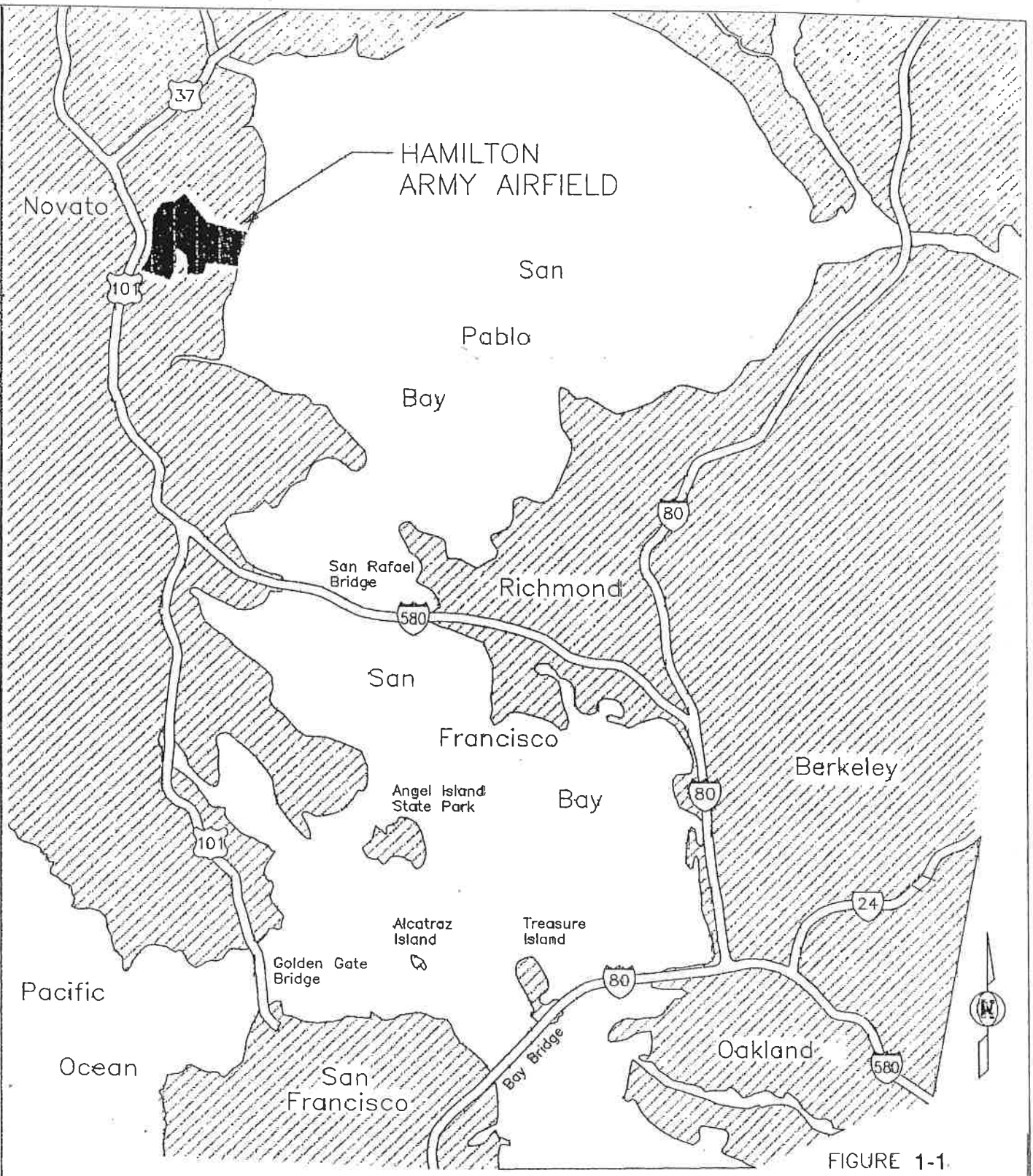

FIGURE 1-1
SITE LOCATION MAP
HAMILTON ARMY AIRFIELD
PREPARED FOR
USACE SACRAMENTO
TOTAL ENVIRONMENTAL
RESTORATION CONTRACT

INTERNATIONAL TECHNOLOGY CORPORATION

REFERENCE: WCFS DWG. SK-1 F. 1-1

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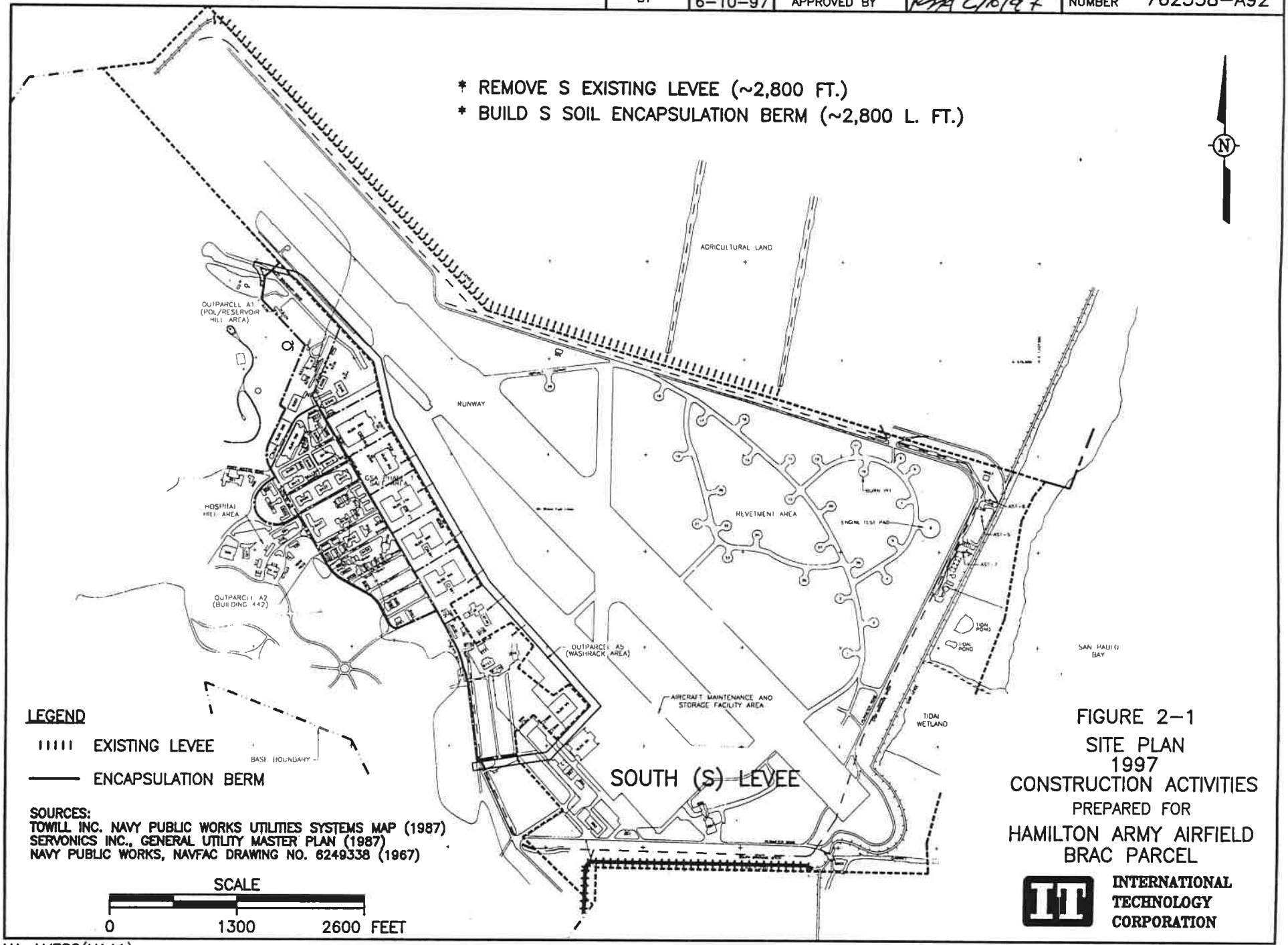

FIGURE 2-1
SITE PLAN
1997
CONSTRUCTION ACTIVITIES
PREPARED FOR
HAMILTON ARMY AIRFIELD
BRAC PARCEL

INTERNATIONAL TECHNOLOGY CORPORATION

HA-LVES2(HA41)

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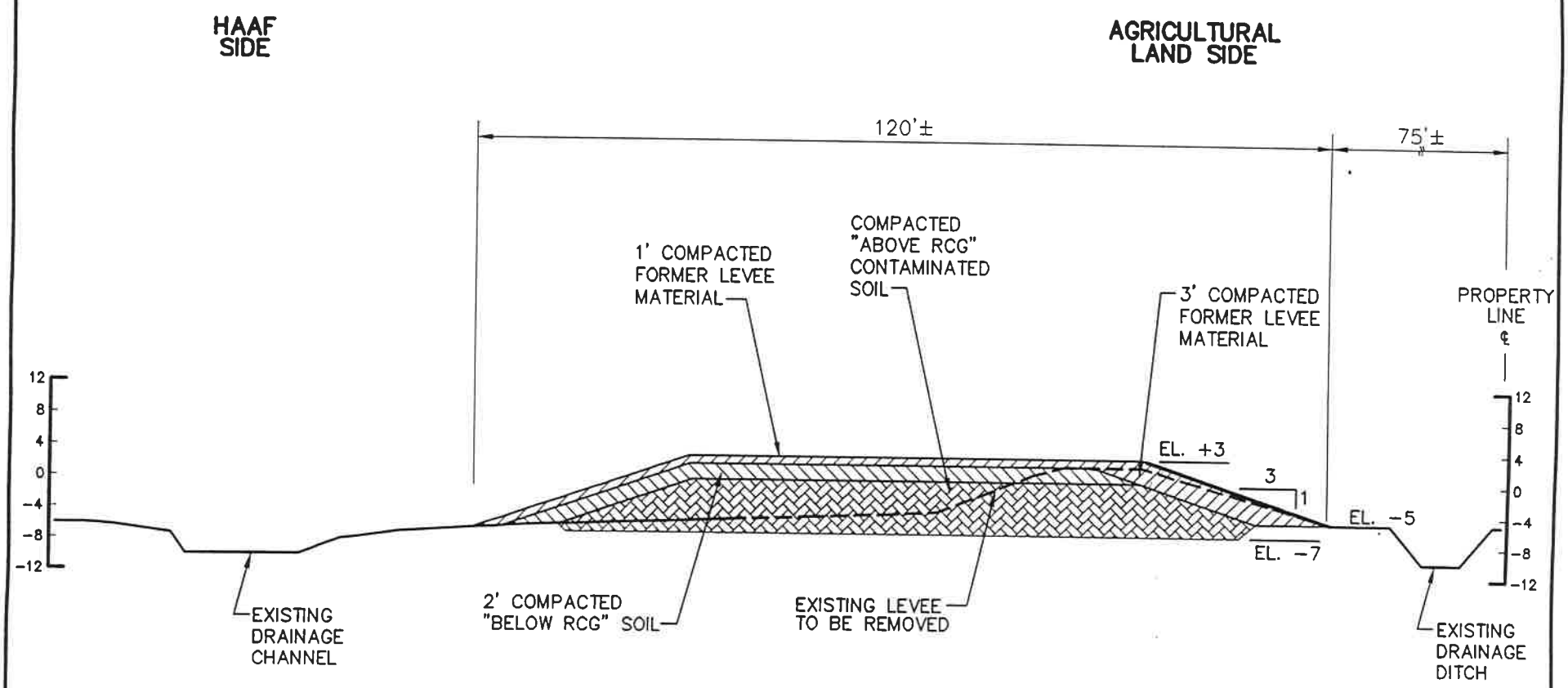


FIGURE 2-2
TYPICAL CROSS SECTION
SOUTH ENCAPSULATION BERM

PREPARED FOR

HAMILTON ARMY AIRFIELD (HAAF)
NOVATO, CALIFORNIA

INTERNATIONAL TECHNOLOGY CORPORATION

HAMSb(HA41)

impermeability of this soil type (known as "Bay Mud") to water. Up to 25,000 cubic yards of the remaining least contaminated soil would be placed on the former airfield property. The soil would be placed on the airfield in disturbed areas and would not be placed in areas containing wetland habitat. Prior to placement a biologist would survey the area to ensure that no wetland habitat is present. Soil found to have elevated levels of contamination would either be treated to concentrations below human residential exposure values or it would be removed from the site to an approved off-site disposal facility.

2.3 Dispose of the Contaminated Soil to an Off-site Location.

Under this alternative the stockpiled soil would be transferred to an approved off-site location such as an established landfill. In order to dispose of the soil to an off-site location, the Army would be required to perform detailed characterization of the soil. Economically this alternative is not feasible for the Army. The soil would be loaded into trucks and hauled to the site. Although the exact location is unknown at this time, the selected disposal site would be required to meet Federal and State environmental standards and therefore could accept the contaminated soil with no additional adverse environmental impacts or required mitigation. As a result, the exact location of the disposal site is not necessary to evaluate the environmental impacts of the proposed action.

3.0 AFFECTED ENVIRONMENT

This section briefly describes the existing environmental conditions in the proposed construction area. These existing conditions provide a framework to compare the project conditions and to determine project-induced effects described in section 4.0. Resources not affected by the project are described in section 3.1, followed in section 3.2 by the resources that may be affected by the alternatives.

3.1 Environmental Setting

3.1.1 Climate

The climate at HAAF is characterized by warm, dry summers and cool, moist winters. The Pacific Ocean to the west and San Pablo Bay to the east have a significant effect on the weather patterns at HAAF. During the summer months a marine layer of cool, moist air helps to keep the daytime temperatures within the moderate range of 75 degrees to 95 degrees Fahrenheit. Mean wind speed ranges from 5 to 10 miles per hour. Winds characterized as mild occur about 31.3 percent of the time. Average precipitation in the area is approximately 21 inches a year.

3.1.2 Esthetics

An area's esthetic character is determined by the variety of visual features, quality of those features, and the scope and scale of the setting. The visual components of an area can include landforms, vegetation, wildlife, manmade structures, and land use patterns. Esthetic evaluation involves subjective evaluation based on the perceptions of the viewers.

The site proposed for soil remediation is visually common to the area. The airfield generally consists of concrete runways surrounded by disturbed vegetation. The contaminated soil has been stockpiled on these runways for the past 2 years. The marshland of San Pablo Bay borders the airfield, imparting a natural quality to this view scape.

Visibility is an important aspect in assessing the visual character of the areas proposed for berm construction. Because the topography of the airfield is largely below sea level, much of this area is not visible from adjacent vantage points. Additionally, because of the inactive state of the airfield runway, this area is not visible at night.

Factors that contribute to the project site's generally low visual quality include a lack of vividness, intactness, and unity of the site's landscape features. The airfield is uniformly flat, offering little visual variety. The weedy appearance of the vegetation, combined with the deteriorating condition of the air strip, creates a viewshed that lacks intactness and visual unity. The stockpiling of soil on the runways has contributed to the lack of visual quality.

Currently, the stockpiled soil is covered with high density polyethelene that are anchored with sand bags and railroad ties. Removing the soil from the runways would increase the visual quality of the area. The new berm would be revegetated to previously existing conditions and visually would only appear larger than current conditions. In a short period of time the upland disposal area would naturally revegetate and look similar to current conditions. Because there would be no adverse impacts to esthetics, it is not discussed in the environmental consequences section of this EA.

3.1.3 Noise

Land uses with residences, hospitals, libraries, recreation areas, and other similar uses are generally considered to be sensitive to noise. Land uses in the project area are shown on Figure 3-1. As can be seen on this figure, there are no sensitive receptors in the area. During construction there would be an increase in noise, which could cause a temporary displacement of wildlife species. However, this impact is not

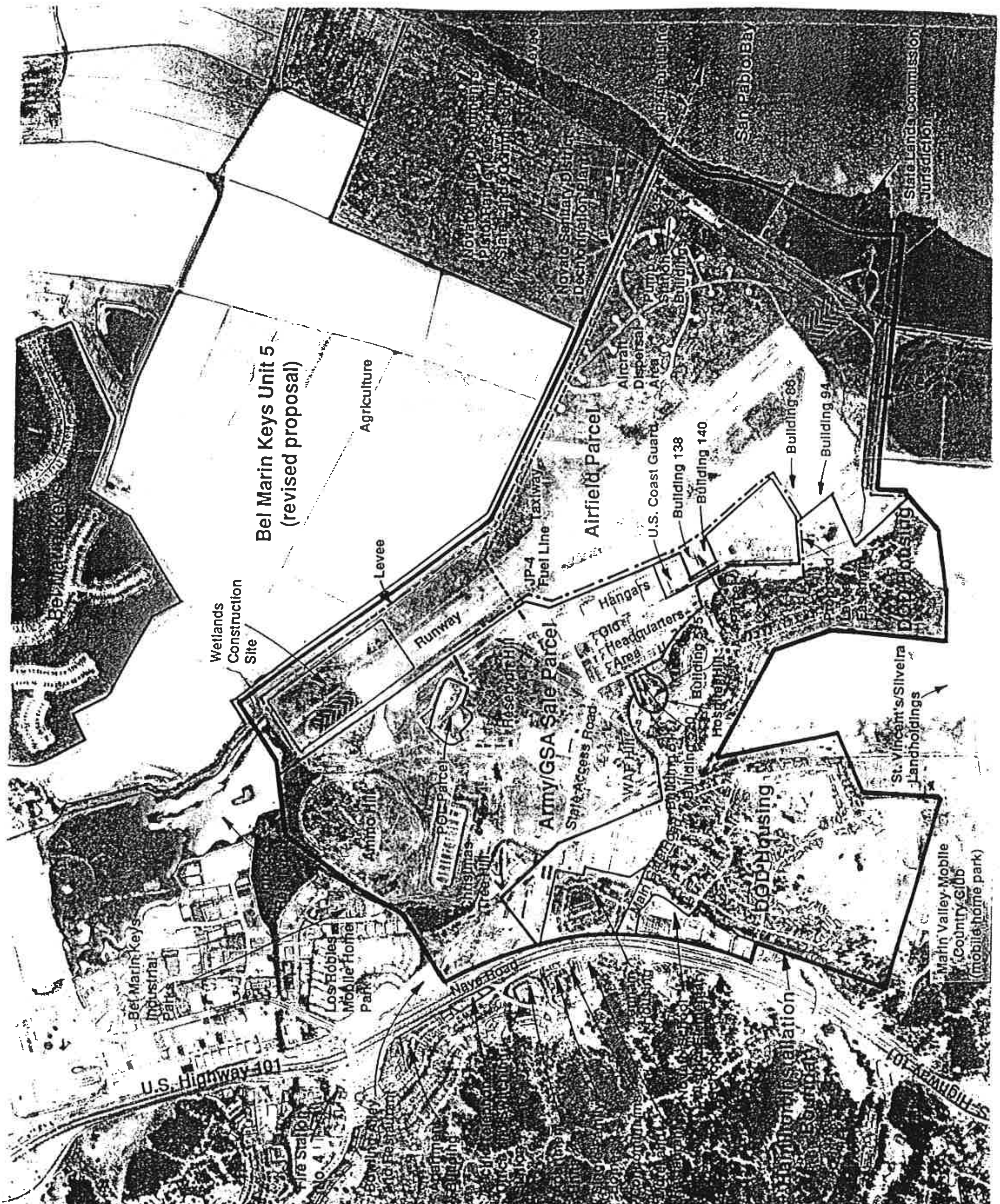

Bel Marin Keys Unit 5
(revised proposal)
Agriculture
Levee
Wetlands
Construction
Site
Runway
Taxiway
JP-4
Fuel Line
Airfield Parcel
U.S. Coast Guard
Building 138
Building 140
Building 86
Building 94
Hangars
Old
Headquarters
Area
Army/GSA Sale Parcel
State Access Road
POL Parcel
Ammo Hill
DOD Housing
St. Vincent's/Silveira
Landholdings
Marin Valley Mobile
Country Club
(mobile home park)
Nave Road
U.S. Highway 101
Los Robles
Mobile Home
Park
Bel Marin Keys
Industrial
Park
San Pablo Bay
State Lands Commission
Jurisdiction
Aircraft
Dispersal
Area
Pump
Station
Building

FIGURE 3-1

significant because the increase in noise would only be temporary, and wildlife species would likely return to the area.

3.1.4 Socioeconomics

The socioeconomic impacts associated with the closure and reuse of Hamilton Air Force Base were discussed in the February 1996 environmental impact statement. There are no residents, housing, or schools in the study area. No other socioeconomic factors such as tax base, employment, ethnic composition, or public services would be affected by this project. Skilled workers would be needed for the construction of the berms. However, this work would be short term, and workers can be supplied by the existing local work force.

3.1.5 Cultural Resources

Numerous archeological investigations have been conducted within the boundaries of HAAF. No known archeological sites are present in the study area. An evaluation of the built environment in 1992 resulted in the identification of the Hamilton Historic District, and the State Historic Preservation Officer (SHPO) concurred with the district's eligibility for the National Register of Historic Places.

An evaluation of the effects of out parceling HAAF resulted in an adverse effect on the Hamilton Historic District. As a result, a Memorandum of Agreement (MOA) was executed between the Army, General Services Administration, SHPO, and the Advisory Council on Historic Preservation in 1994 to mitigate for these adverse effects. The study area is included in this 1994 MOA.

The construction of encapsulation berms along the perimeter of the airfield would have no effect on historic properties. As a result, no additional mitigation (other than in the 1994 MOA) is required.

3.1.6 Hazardous and Toxic Waste

According to the Resource Conservation and Recovery Act of 1976, Section 1004(5), hazardous and toxic waste is defined as "waste that poses a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed." The U.S. Environmental Protection Agency (EPA) and the Department of Toxic Substance Control are the regulating agencies for hazardous and toxic waste. The predominant soil contaminants are petroleum products such as gasoline, diesel, and aviation fuel. which are not considered to be hazardous waste by either agency. The berm would be constructed using existing levee materials and the contaminated soil. The soil that is safe for residential use would be placed on the former airfield parcel. Although there

are hazardous and toxic waste products on the airfield, they will not be disturbed under this project. Since the project does not contain any hazardous or toxic waste, it is not discussed further in this EA.

3.2 Affected Environment

This section of the EA is arranged by resources. Impacts of each alternative are discussed in section 4.0 under each resource.

3.2.1 Vegetation and Wildlife

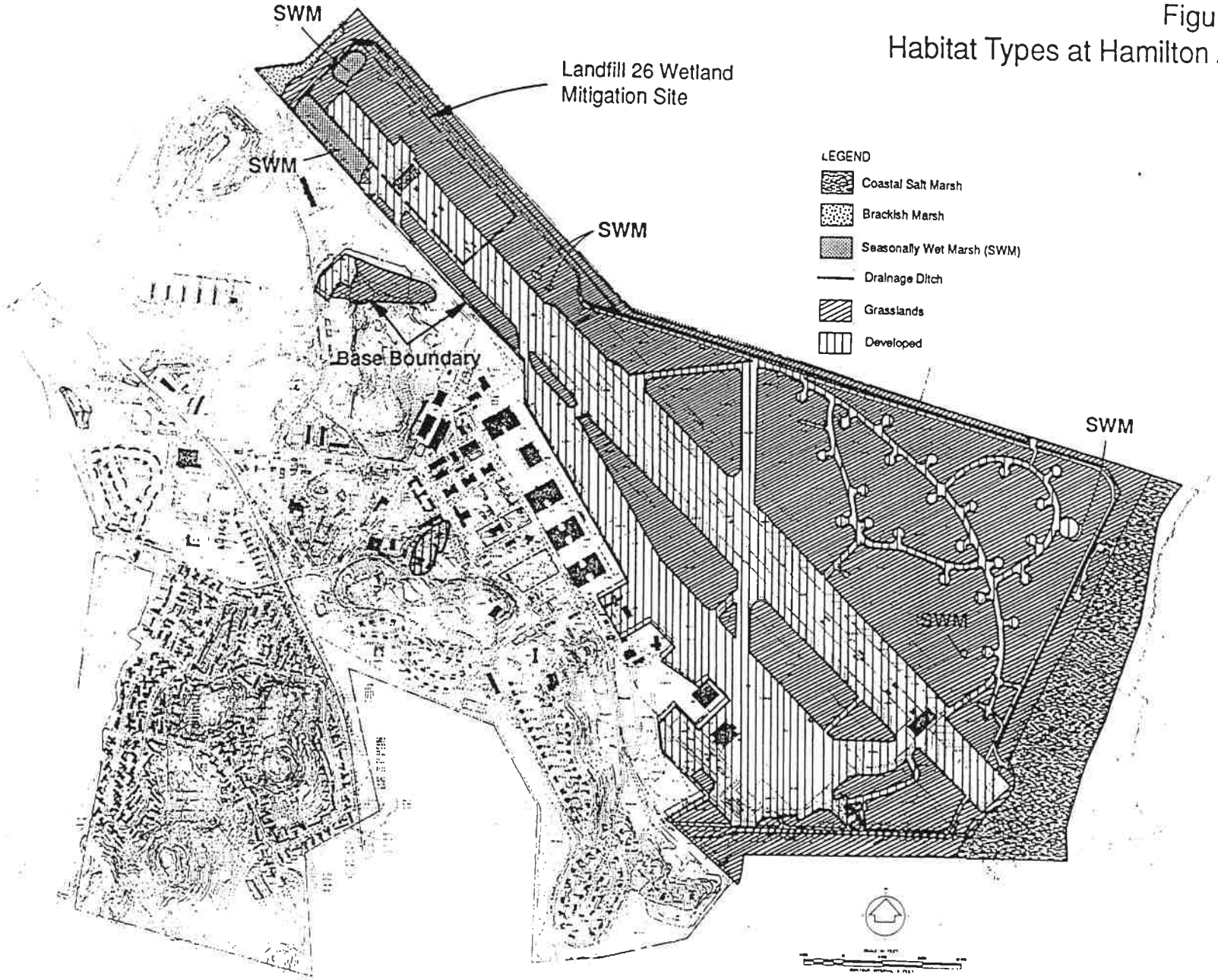
HAAF is a developed property located adjacent to San Pablo Bay. The site is occupied by areas of urban development including roadways, buildings, and a runway, as well as open space. Habitats at HAAF that may be affected by project features include nonnative grassland and wetlands (Figure 3-2).

Nonnative grassland is the most common habitat at HAAF. Typical nonnative species in this habitat include ripgut brome, wild oat, fennel, wild radish, and Himalayan blackberry. Native species include saltgrass, tall fescue, coyote brush, and California rose. Wildlife associated with grassland at HAAF include black-tailed deer, coyote, raccoon, black-tailed hare, western meadowlark, ring-necked pheasant, California quail, American kestrel, red-tailed hawk, turkey vulture, western fence lizard, and gopher snake (Corps 1996).

Wetlands historically covered much of HAAF. Construction of levees along San Pablo Bay and the subsequent draining of historic marshland resulted in the conversion of hundreds of acres of coastal wetland into farmland. Following the establishment of HAAF, portions of the site naturally converted to grassland, while low-lying areas were recolonized by wetland vegetation. According to a 1992 delineation of waters of the U.S., which was re-verified by the U.S. Army Corps of Engineers, San Francisco District in 1996, wetland types occurring at HAAF include coastal salt marsh, brackish marsh, seasonal wetland, and a cattail-dominated ditch.

Extensive salt marsh dominated by pickleweed occurs on the bayside of the levee along the eastern border of the site. A small, isolated patch of pickleweed marsh approximately 0.5 acre in size occupies a depression adjacent to the south side of the southern levee. The isolated, nontidal pickleweed marsh drains westward into a saltgrass marsh and eventually into a small basin dominated by cattails. Wildlife observed or expected to occur in the salt marsh at HAAF include raccoon, double-crested cormorant, great blue heron, great egret, American coot, killdeer, northern harrier, and San Pablo song sparrow.

Figure 7
Habitat Types at Hamilton Airfield



The perimeter ditch supports cattails and typically is bordered by stands of saltgrass and/or cattail. The ditch is classified as a jurisdictional water of the U.S. and covers about 0.5 acre adjacent to the inboard side of the southern levee. Small, seasonal wetlands dominated by sedges, rushes, tall fescue, and saltgrass are scattered throughout HAAF. Wildlife observed or expected to occur in ditches and seasonal wetlands at HAAF include raccoon, mallard, great blue heron, great egret, red-winged blackbird, and killdeer.

In addition to wetlands that have recolonized topographic depressions, a 12.4 acre wetland was created at the northern end of the runway to mitigate for the loss of 4.1 acres of wetland at HAAF during a previous Army action. The mitigation wetland is predominantly emergent marsh dominated by cattail and tules and shallow open water habitat. A flooded borrow pit located near the center of the runway also provides wetland habitat.

3.2.2 Sensitive Species

Sixty-nine special status species occur or potentially occur at HAAF based on information obtained from the U. S. Fish and Wildlife Service (Appendix A), California Natural Diversity Data Base (CDFG 1996), California Native Plant Society (Skinner and Pavlik 1994), and previous environmental documents and field surveys (Corps 1989; Corps 1995; Corps 1996; Appendix B). Special status species include State and Federally listed endangered and threatened species, species proposed or identified as candidates for State or Federal listing, plants listed as rare under the California Native Plant Protection Act, species identified by the State as species of special concern or otherwise warranting protection, and plants included on the California Native Plant Society's 1B list. Only 13 of the 69 identified special status species occur or potentially occur in areas that may be affected by the actions evaluated in this EA (Table 3-1).

The remaining 56 special status species were determined to be absent from potentially affected areas based on a review of existing information, including species distributions and habitat and life history requirements, and the results of field surveys (Corps 1989; Corps 1995; Corps 1996; Appendix B). Special status species with no suitable habitat in project areas at HAAF or for which known distributions do not include HAAF, include greater western mastiff bat, Pacific western big-eared bat, Townsend's big-eared bat, Point Reyes jumping mouse, Point Reyes mountain beaver, Steller sea-lion, Suisun ornate shrew, bald eagle, Bell's sage sparrow, California least tern, double-crested cormorant, ferruginous hawk, little willow flycatcher, marbled murrelet, northern spotted owl, western snowy plover, California tiger salamander, foothill yellow-legged frog, western spadefoot toad, leatherback sea turtle, loggerhead sea turtle, green sea turtle, olive ridley sea turtle, San Joaquin whipsnake, central California steelhead, Coho salmon-central California coast, delta smelt, Sacramento splittail, winter-run chinook salmon, California freshwater shrimp, tidewater goby, mission blue

butterfly, San Bruno elfin butterfly, Myrtle's silverspot butterfly, beach layia, Mount Tamalpais jewelflower, Point Reyes clover lupine, Sonoma spineflower, Tiburon jewelflower, Tiburon mariposa lily, Tiburon paintbrush, Tidestrom's clover lupine, and white-rayed pentachaeta. Special status species which were determined to be absent from HAAF based on the results of field surveys include California red-legged frog, California horned lizard, California suaeda, Marin dwarf-flax, Petaluma popcornflower, fragrant fritillary, Mason's quillwort, soft bird's-beak, Point Reyes bird's-beak, Sonoma alopecurus, Suisun thistle, and swamp harebell.

Although portions of critical habitats for the marbled murrelet and the winter-run chinook salmon have been designated in Marin County, neither of these habitats are present in the project area and neither would be affected by the proposed action.

Table 3-1

SPECIAL STATUS SPECIES WHICH OCCUR IN THE PROJECT AREA

Species	Status[1] Fed/ State	Habitat Requirements	Occurrence in Project Area
		Mammals	
salt marsh harvest mouse *Reithrodontomys raviventris*	E/E	Middle to upper levels of pickleweed stands in coastal salt marsh.[4]	Recorded occurrence in salt marsh near HAAF.[5]
		Birds	
American peregrine falcon *Falco peregrinus*	E/E	Cliffs near open wetlands; cities, bridges, and tall buildings.[6]	No suitable nesting habitat at HAAF. Observed foraging in marsh and riparian areas.[7]
burrowing owl *Athene cunicularia*	-/CSC	Grasslands and open areas including golf courses, road cuts, and airports.[6]	Historic occurrences at HAAF.[3] Observations representing at least 7 owls were recorded at 9 den sites in January 1997; 4 additional potential dens also were noted. All 13 dens were on or adjacent to the runway. No owls or evidence of owls were found in association with squirrel burrows along the perimeter berm.[8]
California black rail *Laterallus jamaicensis coturniculus*	-/E	Year-round resident of coastal salt marsh[6] and adjacent upland.	Recorded occurrences in salt marsh adjacent to HAAF.[3,5]
California brown pelican *Pelecanus occidentalis californicus*	E/E	Pacific coast breakwaters, jetties, and offshore rocks.	No suitable nesting habitat at HAAF. Observed by Corps personnel in 1996 roosting adjacent to open water areas of San Pablo Bay.
California clapper rail *Rallus longirostris obsoletus*	E/E	Marshes, swamps, and wet meadows[6] and adjacent upland.	Recorded occurrences in salt marsh adjacent to HAAF.[3,5]
northern harrier *Circus cyaneus*	-/CSC	Wetlands and open fields.[6]	Recorded occurrences (nesting and foraging) on HAAF property.[3]
saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	-/CSC	Salt marsh, grassy fields, and shrublands.[6]	Recorded occurrence in salt marsh adjacent to HAAF.[3]
San Pablo song sparrow *Melospiza melodia samuelis*	-/CSC	Brushy areas, especially dense riparian scrub.[6]	Recorded occurrence in salt marsh adjacent to HAAF.[3]

Table 3-1

SPECIAL STATUS SPECIES WHICH OCCUR IN THE PROJECT AREA

Species	Status[1] Fed/ State	Habitat Requirements	Occurrence in Project Area
short-eared owl *Asio flammeus*	-/CSC	Grassland, marshes, weedy fields.[6]	Recorded occurrence at HAAF.[8]
white-tailed kite *Elanus caeruleus*	-/CPS	Brushy grasslands, farmlands, or other open areas.[6]	Historic occurrences at HAAF.[7]
Reptiles and Amphibians			
northwestern pond turtle *Clemmys marmorata marmorata*	-/CSC	Ponds, small lakes, marshes, slow-moving streams, reservoirs, and occasionally brackish water with abundant vegetation.[9]	Recorded occurrence at Pacheco Creek along the western and northern border of HAAF.[7]
Fish			
longfin smelt *Spirinchus thaleichthys*	-/CSC	Moderately saline bays and estuaries in the summer; lower reaches of freshwater rivers for the rest of the year.[10]	No recorded occurrences although potential habitat occurs at HAAF.

[1] E - State and Federally listed endangered species
T - State and Federally listed threatened species
P - Species proposed or identified as candidate for State and Federal listing
R - Plants listed as rare under the California Native Plant Protection Act
CSC - State species of special concern
CPS - State protected species
1B - Plants included on the California Native Plant Society 1B list

[2] Zeiner et al. 1990
[3] Corps 1996
[4] Thelander 1994
[5] CDFG 1996
[6] National Geographic Society 1987
[7] Corps 1989
[8] Granholm, 1997
[9] National Audubon Society 1995
[10] McGinnis 1984
[11] Hickman 1993

3.2.3 Water Quality

The shallow ground water at HAAF has the high salinity content of San Pablo Bay. Ground water is of poor quality and is not used as a potable water source. Because of the prevalence of bay mud, it is unlikely that runoff recharges the deeper ground water under the airfield (EIP Associates 1992). Surface water discharges to the stormwater drainage ditch located around the perimeter of the base. This concrete-lined ditch runs along the south berm and is considered jurisdictional wetlands. San Pablo Bay is the receiving water for all drainage from HAAF.

Surface water results from runoff due to low-frequency storms where many of the grassy areas catch and hold water. Rapid surface water runoff is exhibited on much of the surface soils of HAAF. Much of the airfield is developed and therefore exhibits high surface water runoff rates typically associated with urban development. The airfield consists of depressed grassy areas and raised concrete and asphalt areas associated with taxiways and perimeter roads. Because the runway has extensive impervious surfaces of concrete and asphalt, it also exhibits high, localized surface water runoff rates (Corps 1994).

3.2.4 Air Quality

HAAF falls under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The San Francisco Area Air Basin, which includes HAAF, is in attainment for ozone at this time (Mike Baso, pers. comm. 1997). Attainment means that the region conforms to specific Federal standards for that pollutant. Based on recent monitoring data, BAAQMD is in the process of obtaining attainment for carbon monoxide from EPA. The air basin is currently unclassified for particulate matter (PM_{10}).

3.2.5 Soils

HAAF is located on the San Pablo intertidal deposits commonly known as bay mud. This type of soil is composed of silt, clay, and organic matter that has accumulated around the rim of San Pablo Bay. Bay mud is a very soft soil that continues to consolidate over time; however, this process does slow after many years.

There are approximately 105,000 cubic yards of soil being considered for disposal under this EA. The predominant soil contaminants are petroleum products such as gasoline, diesel, and aviation fuel. Small quantities of solvents such as trichloroethylene (TCE), have also been discovered. Testing of the soil has shown that approximately 88 percent (92,300 cubic yards) contains either no detectable contaminant concentrations or contains levels that do not pose a risk under a human residential exposure scenario. For petroleum products, the human residential

concentrations of concern range from 100 mg/kg for gasoline to 200 mg/kg for diesel and aviation fuel. However, most of the 92,300 cubic yards contains concentrations much lower than those values. For the remaining 12 percent (12,700 cubic yards) of soil, the Army would either treat the soil to concentrations below human residential exposure values or it would remove such soil off site for disposal at an approved facility.

3.2.6 Land Use

HAAF is located on the western shore of San Pablo Bay in the City of Novato in Marin County. The area is generally characterized by moderately dense pockets of urban development surrounded by large tracts of open space, including areas with wetlands, flood plains, and steep terrain.

Portions of the former base, including the airfield, were once marshland and are now separated from the bay by berms and levees. Although much of the base has been developed or urbanized, grassland, oak woodland, and wetland habitats occur on the base.

The airfield includes an 8,000-foot-long runway, aprons, taxiways, an aircraft dispersal area, an airplane hangar, and other miscellaneous support structures. The land at the northeast end of the runway has been used as the Landfill 26 freshwater wetland mitigation site. The airfield is surrounded by a system of low levees on the north, east, and south sides. On the east side is the San Pablo Bay front, which has no public access from the Army property.

3.2.7 Transportation

Existing traffic volumes and circulation patterns near HAAF are minimal due to the lack of activities in the area. Vehicles traveling to and from HAAF currently use Nave Drive. The typical vehicles in this area are cars and light utility trucks. This two-lane road extends north from Alameda del Prado to the U.S. Highway 101 interchange at Ignacio Boulevard. Nave Drive connects to Main Gate Road and State Access Road, which provide direct access to the airfield.

3.2.8 Public Health and Safety

Most of the soil being considered for disposal under this EA is contaminated with low concentrations of petroleum hydrocarbons. The remaining soil is contaminated with low levels of solvents. At high concentrations, or with long exposure times, these contaminates are potentially harmful to humans.

4.0 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

4.1 Vegetation and Wildlife

No Action

Under this alternative, contaminated soil would not be encapsulated into the southern berm and other soil would not be placed on the former airfield property. No adverse effects on vegetation and wildlife would occur under this alternative and no mitigation would be required.

Proposed Alternative

Under the proposed alternative, contaminated soil would be encapsulated into the southern berm and remaining soil would be placed on the former airfield property. No significant or permanent adverse effects on vegetation and wildlife would occur under this alternative providing that the mitigation described in this EA is implemented.

Approximately 8 acres of nonnative grassland is present on the southern levee and would be removed during berm construction; wildlife associated with this grassland would be temporarily displaced into surrounding habitats. Following construction, grassland would be restored by redistributing topsoil and its associated seedbank over the constructed berm. The source for topsoil used to re-establish grassland on the berm would be soil that previously had been excavated from the berm at the outset of construction and that had been stockpiled on the runway. As grassland recovered, displaced wildlife would be expected to return to the berm. Similar effects and recovery of grassland habitat would be expected to occur on any area of the airfield where soil is deposited.

Mitigation for effects on vegetation and wildlife would comprise (1) stockpiling topsoil collected from the existing levee prior to constructing the new berm and redistributing the stockpiled topsoil over the new berm following construction and (2) avoiding and protecting wetlands and other waters of the U.S. during construction by constructing a highly visible boundary composed of posts and yellow flagging tape (or similar) at least 10 feet upland from the edge of wetlands and ditches and instructing workers to avoid disturbing flagged areas. Prior to the placing of the residential safe soil on any airfield area, a biologist would survey for and flag wetland habitat areas.

Dispose of the Contaminated Soil to an Off-Site Location

Under this alternative, contaminated soil would be transferred to an approved off-site facility. No significant adverse effects on vegetation and wildlife would occur under this alternative and no mitigation would be required.

4.2 Sensitive Species

No Action

Under this alternative, contaminated soil would not be encapsulated into perimeter berms or removed from the site. No significant adverse effects on special status species would occur under this alternative and no mitigation would be required.

Proposed Alternative

Under the proposed alternative, contaminated soil would be encapsulated into the southern berm and remaining soil would be deposited in upland areas. Providing that the mitigation described in this EA is implemented, no significant adverse effects on any special status species would occur under this alternative. Without implementation of described mitigation however, the following species might be affected: (1) salt marsh harvest mouse, (2) burrowing owl, (3) California black rail, (4) California brown pelican, (5) California clapper rail, (6) northern harrier, (7) saltmarsh common yellowthroat, (8) San Pablo song sparrow, (9) short-eared owl, (10) northwestern pond turtle, and (11) longfin smelt.. Although American peregrine falcon and white-tailed kite are listed in Table 3-1 due to their transitory presence in the vicinity of HAAF, these species would not be affected by the proposed action. Without mitigation, take of special status species might result from direct harm and harassment, such as the death or injury of a mouse or nest after being run over by heavy equipment or interference with a species' breeding habits due to the operation of noisy equipment during reproductively sensitive times; take also might result from the destruction of habitat on which a species depends, including the loss of ditch and coastal salt marsh habitats.

Mitigation for potential effects on salt marsh harvest mouse, California black rail, California brown pelican, California clapper rail, saltmarsh common yellowthroat, San Pablo song sparrow, northwestern pond turtle, and longfin smelt would comprise:

- Avoiding and protecting the salt marsh on the bay-side of the perimeter levee. The marsh would be protected by constructing a highly visible boundary composed of posts and yellow flagging tape (or similar material) a minimum of 50 feet inland from the edge of the pickleweed marsh. Construction workers would be instructed to avoid disturbing areas on the bay-side of the boundary.

- Avoiding and protecting the perimeter ditch which along the inboard side of the perimeter levee. The ditch would be protected by constructing a highly visible boundary composed of posts and yellow flagging tape (or similar) a minimum of 10 feet upland from the edge of the ditch. Construction workers would be instructed to avoid disturbing the ditch.

- Prohibiting heavy equipment operation, night lighting, and ground-disturbing activities within 100 feet of the coastal salt marsh during the clapper rail breeding season from February 1 through August 31.

- Avoiding and protecting the small, isolated salt marsh immediately south of the southern levee. The marsh would be protected by constructing a highly visible boundary composed of posts and yellow flagging tape (or similar material) a minimum of 10 feet upland from the edge of the pickleweed marsh. Construction workers would be instructed to avoid disturbing areas on the marsh-side of the fence.

Mitigation for potential effects on northern harrier and short-eared owl would comprise (1) completing pre-construction field surveys to identify nesting sites, (2) establishing construction exclusion or buffer zones of 300 feet around identified nesting sites, (3) marking construction exclusion zones with a highly visible boundary composed of posts and yellow flagging tape (or similar material) and instructing workers to avoid disturbing these areas.

Mitigation for potential effects on burrowing owl would entail habitat compensation and creation in accordance with the California Department of Fish and Game's (CDFG) "Staff Report on Burrowing Owl Mitigation" dated October 17, 1995.

Dispose of the Contaminated Soil to an Off-Site Location

Under this alternative, contaminated soil would be transferred to an approved off-site location. No significant adverse effects on any of the 13 special status species known to occur or potentially occurring in the study area at HAAF would occur providing that described mitigation is implemented.

Mitigation for potential effects on burrowing owl, that may recolonize in the stockpiled soil mounds, would entail habitat compensation and creation in accordance with CDFG's "Staff Report on Burrowing Owl Mitigation" dated October 17, 1995. No other special status species would be affected by disposal of contaminated soils at an approved off-site location.

4.3 Water Quality

No Action

Under the no-action alternative, the contaminated soil would continue to be stockpiled on the runways. Continued maintenance would be required to prevent the soil from impacting water quality. This maintenance is very expensive and remediation of the site could not occur. Therefore, this alternative is not legal or practicable for the Army.

Proposed Alternative

Construction of the encapsulation berm would not affect water quality on HAAF or surrounding areas. Because the contaminated soil would be covered with 3 feet of clean material, exposure to water in the area would not occur. The soil being placed on the former airfield property is safe for residential use and would not affect water quality in the area.

To avoid impacts to the drainage ditches, construction equipment will use existing runways, taxiways, unpaved roads and bridges. No work would occur within the drainage ditches adjacent to the south berm under the proposed alternative. The new berm would provide equal or better flood protection in the area, and no additional runoff would occur under this alternative.

Dispose of the Contaminated Soil to an Off-Site Location

There would be no impacts to water quality under this alternative. All soil removed from the runways would be disposed of at an approved facility. Soils would not be placed in any local drainage areas or waterways. Water conditions at HAAF would remain the same as stated under existing conditions. The levees that currently exist at HAAF would remain the same, and no work would occur in existing waterways.

4.4 Air Quality

No Action

Under the no-action alternative, the soil would remain in the current location on the runways. Although maintenance would occur, there would be a slight increase chance for humans to inhale airborne contaminates. Over a long period of time there the inhalation of the contaminates could become harmful to human health.

Proposed Alternative

The adverse impacts to air quality under the proposed alternative are short-term construction impacts. Once construction is complete, there would be no continuous project operations under the proposed alternative. BAAQMD has established air quality emission thresholds for nonattainment elements in the study area (see Table 4-1). These thresholds are used to determine if an air quality conformity determination is required. As can seen in the Table 4-1 the proposed project does not require a conformity determination from the BAAQMD.

Construction related emissions are generally short-term in duration, but may still cause adverse air quality impacts. PM_{10} is the pollutant of greatest concern with respect to construction activities. PM_{10} emissions can result from a variety of construction activities including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction related emissions can cause substantial increases in localized concentrations of PM_{10}. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces. Table 4-1 shows the amount of emissions expected during construction of this alternative.

Table 4-1

BAAQMD Air Quality Thresholds and Construction Emission

Criteria Pollutant	BAAQMD Threshold[1] (tons per year)	Exhaust Emission Factors[2] (gm/yd[3])	Total Emission from Project Construction (tons)
Carbon Monoxide	100	138.0	46
Particulate Matter	100	2.2	0.73
Nitrogen Oxides	100	42.4	14.2
Reactive Organic Gas	50	9.2	3.1

[1] Irwin Mussen, pers. comm. 1997
[2] BAAQMD 1996

According to BAAQMD (1996), the following control measures should be implemented at all construction sites. Impacts to air quality during construction would be reduced to less than significant by following these control measures.

Basic Control Measures

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.

- Pave, apply water as needed, or apply nontoxic soil stabilizers on all unpaved access roads, and staging areas at construction sites.

- Sweep as needed (with road brooms) all paved access roads, parking areas, and staging areas at construction sites.

- Sweep streets as necessary (with road brooms) if visible soil material is carried onto adjacent public streets.

Enhanced Control Measures

- Hydroseed or apply nontoxic soil stabilizers to the exposed construction areas at the completion of activities.

- Enclose, cover, water as needed, or apply nontoxic soil binders to exposed stockpiles (dirt or sand) to control dust.

- Limit traffic speeds on unpaved roads to 15 miles per hour.

- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

- Replant vegetation in disturbed areas as quickly as possible.

Dispose of the Contaminated Soil to an Off-Site Location

Impacts under this alternative would be the similar to those under the proposed alternative. Although the amount of soil being moved is less, the trucks would be traveling a farther distance to haul the soil to an approved facility. Under this alternative there would be less PM_{10} emissions and more vehicle exhaust. However, the amount of vehicle exhaust would be under the BAAQMD threshold limit. The same control measures would be implemented under this alternative. As a result, adverse impacts under this alternative would be less than significant.

4.5 Soils

No Action

Under this alternative, the contaminated soil would not be encapsulated into a perimeter berm, placed on the former airfield area, or removed from the site. Only maintenance of the site would occur. The California Department of Toxic and

Substance Control (DTSC) has required the Army to remediate this site. Legally the no-action alternative may not be selected.

Proposed Alternative

Under the proposed alternative, all contaminated soil would be encapsulated in the core of the south berm. Contaminants in the soil have very low mobility in the environment. This results from the chemical properties of the contaminants, the high organic content of the soil, the high degree of compaction specified for berm construction, and the relative impermeability of this soil type (known as "bay mud") to water. Because the soil would be encapsulated with 3 feet of clean material, exposure of contaminates to other soils in the area would be eliminated. Because the soil being placed on the former airfield property is considered to be safe for residential use, there would be no impacts to surrounding soil.

The soil would be compacted as the berm is constructed to create a stable structure. The weight of the berm would further compact the bay mud over time. The berm would be revegetated with existing plant species to prevent erosion. No adverse impacts to soil would occur, and no mitigation is required.

Dispose of the Contaminated Soil to an Off-Site Location

All stockpiled soil would be removed from HAAF and disposed of in an approved facility under this alternative. The receiving facility would be required to meet all Federal and State regulations. There would be no adverse impacts to soil, and no mitigation is required.

4.6 Land Use

No Action

Current land use would remain the same under this alternative. The contaminated soil would continue to be stockpiled on the runway, which would limit future reuse options. The public would continue to have no access to the San Pablo Bay front from the Army property.

Proposed Alternative

The proposed construction of encapsulation berm and disposal on the former airfield property would have no adverse impacts to land use. Current land uses in and around the study area would remain the same under this alternative. Future land use and reuse options would not be limited by the construction of an encapsulation berm. By covering the contaminated soil with 3 feet of clean compacted material the risk of

human exposure would be negligible. The residential safe soil placed on the former airfield property would not change existing land uses nor would the future land use plans be limited. The public would continue to be denied bay front access through Army property.

Dispose of the Contaminated Soil to an Off-Site Location

The impacts under this alternative are similar to those under the proposed alternative. There would continue to be no public access to the bay front.

4.7 Transportation

No Action

Under the no-action alternative the contaminated soil would remain on the runway, and no construction would occur. As a result, there would be no impact to transportation.

Proposed Alternative

The equipment needed under this alternative would be brought onto HAAF via Nave Drive and would remain on the HAAF during construction. The existing berm would be removed and used as encapsulation material over the contaminated soil. No borrow material would be needed from outside HAAF. Because all work under this alternative would be within HAAF and no continuous road access would occur, there would be no impacts to transportation.

Dispose of the Contaminated Soil to an Off-Site Location

Under this alternative the contaminated soil would be loaded into large trucks and removed from HAAF. Removal of the soil would require an estimated 7,223 loads of the standard haul truck. This removal would require 96 loads per day for 75 days. The trucks would most likely travel down Nave Drive and enter HAAF on State Access Road. Nave Drive ends approximately 0.25 mile from the entrance to HAAF at the Highway 101 onramp. During commute hours vehicles at this onramp may have to wait to merge onto Highway 101. Trucks would only operate during noncommute hours to minimize possible traffic congestion at the Nave Road onramp intersection.

4.8 Public Health and Safety

No Action

Although the soil would be covered and maintained under the no-action alternative, individuals could still have access to the soil. There would be an increased chance of harm to human health if long term contact to the soil were to occur. However, because the Army has been manadated to remediate the site, this alternative would not be selected.

Proposed Alternative

Under the proposed alternative the risk to public health and safety would be eliminated. The encapsulation of the contaminated soil would prevent the exposure to humans and the environment. The residential safe soil being placed on the former airfield property does not pose an increased risk of cancer to humans or the environment. During project construction workers would be required to take preventive measure to reduce the risk of exposure to the contaminated soil. Preventive measures include wearing protective mask and watering down the area to reduce dust.

Dispose of the Contaminated Soil to an Off-site Location

Under this alternative the soil would be removed from HAAF and taken to an approved facility. Because the soil would be removed and the public would have no access to the soil there would be no threat to human health or the environment under this alternative. During construction, workers would be required to take preventative measure to reduce possible exposure to the contaminates.

5.0 CONCLUSIONS

If all mitigation measures are implemented, the proposed action at Hamilton Army Airfield to dispose of the contaminated soil in the south berm and place residential safe soil on the upland areas of the former airfield property is not anticipated to affect the environmental resources in the study area. Since the soil would no longer be exposed to humans or the environment there would be a positive impact on public health and safety. By implementing the proposed alternative the Army would have meet all regulatory requirements for disposal of the contaminated soil. The proposed alternative is the most economical alternative for the Army select in order to remediate the site.

The proposed action would not adversely affect the continued existence of any endangered or threatened species of plant or animal that inhabits the area. The proposed project would not affect the integrity of the National Historic District. This EA has been coordinated with the U.S. Fish and Wildlife Service.

6.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

This EA has been prepared in accordance with NEPA and Army Regulation 200-2. Army Regulation 200-2 establishes policy, procedures, and responsibilities for assessing the environmental effects of Army actions.

National Environmental Policy Act of 1969 (Public Law 91-190). This draft was prepared in accordance with the requirements of this Act. The proposed project complies with the applicable environmental regulations contained in this Act.

National Historic Preservation Act (Public Law 94-43). The MOA between the Army, General Services, Administration, SHPO, and the Advisory Council on Historic Preservation will be followed.

Endangered Species Act of 1973, as amended (Public Law 93-203). Section 7© of this Act requires consultation with the FWS to determine if the Federal action will affect threatened or endangered species, and to ensure that any action would not jeopardize the continued existence of habitat of any endangered or threatened species.

Fish and Wildlife coordination Act (Public Law 85-624). The Corps of Engineers has coordinated with the FWS and the California Department of Fish and Game regarding the proposed project.

Clean Water Act of 1977, as amended (Public Law 95-217). The proposed project poses no significant impacts to water quality as defined in this act. The project does not involve dredging or filling operations nor does it involve construction activities that would degrade water quality.

Clean Air Act, as amended (Public Law 91-204). This act required that Federal agencies comply with all Federal, state or local requirements with respect to the control and abatement of air quality. The Bay Area Air Quality Management District (BAAQMD) was informed of the proposed project, and informal coordination achieved during the preparation of this EA. BAAQMD will review this document for conformity with air quality standards. The proposed project would not have significant long-term adverse impacts on air quality in the region.

Coastal Consistency Determination (CCD). Coordination with the Bay Conservation and Development Commission (BCDC) is ongoing. BCDC will review this draft EA to determine if the project is consistent with future uses planned for this coastal area. The project will not change existing access to the bay front nor will it preclude any future land uses in the area. The contaminated soil will encapsulated and would not affect water quality in the area. The proposed project would not have an adverse impact on the coastal zone.

7.0 DISTRIBUTION LIST

ELECTED OFFICIALS AND REPRESENTATIVES

United States Senate
Honorable Barbara Boxer
Honorable Dianne Feinstein

UNITED STATES GOVERNMENT DEPARTMENTS AND AGENCIES

Fish and Wildlife Services, Endangered Species
National Marine Fisheries Service
Department of the Navy
Environmental Protection Agency- Region 9

STATE OF CALIFORNIA GOVERNMENT AGENCIES

Department of Fish and Game- BRAC/IR
Regional Water Quality Control Board
State Lands Commission
State Coastal Conservancy

LOCAL GOVERNMENT

City of Novato
Novato Planning Commission
Novato Sanitary District
Marin County Flood Control District
Marin County Development Agency

ORGANIZATIONS/BUSINESSES

Marin Conservation League
Marin Audubon Society
Sierra Club- Marin Group
Novato Bicycle Pedestrian Advisory Commission
Port of Oakland
Bay Dredging Action Coalition
Save San Francisco Bay Association
Bay Planning Coalition
The Presidio Group
Martin Group
Estuary Newsletter

CSW/Stuber Stroeh
Point Reyes Bird Observatory
New Hamilton Partnership
University of California at Berkeley
Bel Marin Keys
Greenbrae Environmental
Badcat
Navy Real Estate
Eric Polson, P.E. Consulting Engineer

INDIVIDUALS

Robert Farnham
Rosalie Webb
James Wilson
Jack Walton
Elizabeth Moody
Jeffery Morshead
Phil Peterson
Susan Stompe
Christopher Valentino

8.0 REFERENCES

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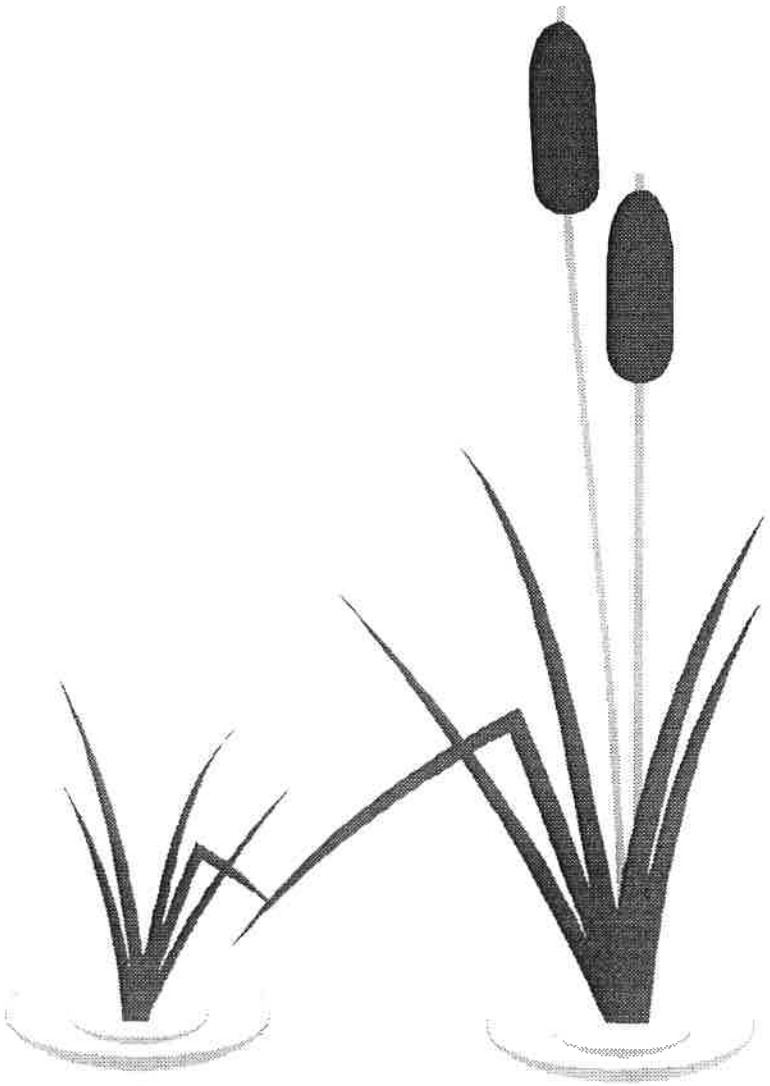
9.0 LIST OF PREPARERS

Bradley A. Call P.E. Technical Manager	8 years U.S. Army Corps of Engineers, Environmental Engineering	Report Review and Preparation
Gary Cawood Technical Manager	Registered Professional Mechanical Engineer 35 years Engineering	Report Review
Chris Davis Biological Environmental Manager	2 Years U.S. Army Corps of Engineers, Environmental Planning	Report Preparation
Elizabeth Davis Social Science Environmental Manager	11 years U.S. Army Corps of Engineers, Environmental Planning	Report Preparation
Jerry Fuentes Social Science Environmental Manager	9 years U.S. Army Corps of Engineers, Environmental Planning	Report Preparation
Robert Koenigs Biological Senior Environmental Manager	15 years U.S. Army Corps of Engineers, Environmental Planning	Report Review
Keith Montag Project Manager	19 years U.S. Army Corps of Engineers, Engineering	Report Review
Sannie Osborn Chief, Environmental Analysis Section	14 years U.S. Army Corps of Engineers, Environmental Planning	Report Review
Lynne Stevenson Technical Writer	11 years U.S. Army Corps of Engineers, Environmental Planning	Report Review and editing

APPENDIX A

ENDANGERED SPECIES LIST



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

1-1-97-SP-903 April 9, 1997

Mr. Chris Davis
US Army Corps of Engineers
Environmental Resources
1325 J Street
Sacramento, California 95814-2922

Subject: Species Lists for Hamilton Army Air Field, Marin County, California

Dear Mr. Davis:

As requested by letter from your agency dated March 5, 1997, you will find enclosed lists of sensitive species that may be present in *or may be affected by* projects in the subject project area (see Enclosure A). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide species lists pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The animal species listed in Enclosure A are those species we believe may occur within, *or be affected by projects within*, the USGS Novato and Petaluma Point quads, where your project is planned.

The plants listed in Enclosure A are those *that have actually been observed* in the project quads. Plants on the enclosed county list may also occur in the quads where your project is planned.

Some of the species listed in Enclosure A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for these species may be affected by the proposed action. For plant surveys, the Service recommends using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available

upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office pursuant to 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Candidate species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

In the Federal Register of February 28, 1996, the Service changed its policy on candidate species. The term *candidate* now strictly refers to species for which the Service has on file enough information to propose listing as endangered or threatened. Former *category 2* candidate species - species for which listing is possibly appropriate but for which the Service lacks sufficient information to support a listing proposal - are now called *species of concern*. They are no longer monitored by the Service. However we have retained them on the enclosed list for general information. We encourage consideration of them in project planning, as they may become candidate species in the future.

Please contact Mr. Michael Thabault, Coast-Bay-Delta Branch Chief, at (916) 979-2725 if you have any questions regarding the enclosed list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of the section 7 office assistant at this address. If you have any questions about possible impacts to other fish and wildlife, please contact Mike Fris at (916) 979-2107.

Sincerely,

Wayne S. White
Field Supervisor

Enclosures

Enclosure B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: (1) federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; (2) Consultation with FWS when a federal action may affect a listed endangered or threatened species to insure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining the action may affect a listed species; and (3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment-Major Construction Activity[1]

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat is present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirement; interviews with experts, including those within FWS, State conservation departments. universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, and problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

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[1] A construction project (or other undertaking having similar physical impacts) which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Following Selected Quads
Reference File No. 1-1-97-SP-903
April 7, 1997

QUAD : 483C PETALUMA POINT

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

northern spotted owl, *Strix occidentalis caurina* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon crit. habitat, *Oncorhynchus tshawytscha* (E)

delta smelt, *Hypomesus transpacificus* (T)

Coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Invertebrates

California freshwater shrimp, *Syncaris pacifica* (E)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

QUAD : 483C PETALUMA POINT

Species of Concern

Mammals

- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)
- Point Reyes jumping mouse, *Zapus trinotatus orarius* (SC)

Birds

- tricolored blackbird, *Agelaius tricolor* (SC)
- Bell's sage sparrow, *Amphispiza belli belli* (SC)
- western burrowing owl, *Athene cunicularia hypugea* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
- black rail, *Laterallus jamaicensis* (SC)
- San Pablo song sparrow, *Melospiza melodia samuelis* (SC)

Reptiles

- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- northern red-legged frog, *Rana aurora aurora* (SC)
- foothill yellow-legged frog, *Rana boylii* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
- Marin elfin butterfly, *Incisalia mossii* (SC)

QUAD : 484D NOVATO

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

northern spotted owl, *Strix occidentalis caurina* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

Coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Invertebrates

California freshwater shrimp, *Syncaris pacifica* (E)

Plants

Marin dwarf-flax, *Hesperolinon congestum* (T)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

Point Reyes mountain beaver, *Aplodontia rufa phaea* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

QUAD : 484D NOVATO

Species of Concern

Mammals

- long-eared myotis bat, *Myotis evotis* (SC)
- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)
- Point Reyes jumping mouse, *Zapus trinotatus orarius* (SC)

Birds

- tricolored blackbird, *Agelaius tricolor* (SC)
- Bell's sage sparrow, *Amphispiza belli belli* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
- black rail, *Laterallus jamaicensis* (SC)
- San Pablo song sparrow, *Melospiza melodia samuelis* (SC)

Reptiles

- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- foothill yellow-legged frog, *Rana boylii* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
- Marin elfin butterfly, *Incisalia mossii* (SC)

Plants

- northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC)
- fragrant fritillary, *Fritillaria liliacea* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)		Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by Projects in the Area of the Following California County or Counties
Reference File No. 1-1-97-SP-903
April 7, 1997

MARIN COUNTY

Listed Species

Mammals
- salt marsh harvest mouse, *Reithrodontomys raviventris* (E)
- Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Birds
- American peregrine falcon, *Falco peregrinus anatum* (E)
- California brown pelican, *Pelecanus occidentalis californicus* (E)
- California clapper rail, *Rallus longirostris obsoletus* (E)
- marbled murrelet, *Brachyramphus marmoratus* (T)
- marbled murrelet critical habitat, *Brachyramphus marmoratus* (T)
- western snowy plover, *Charadrius alexandrinus nivosus* (T)
- bald eagle, *Haliaeetus leucocephalus* (T)
- northern spotted owl, *Strix occidentalis caurina* (T)

Reptiles
- Leatherback sea turtle, *Dermochelys coriacea* (E)
- Loggerhead sea turtle, *Caretta caretta* (T)
- Green Sea turtle, *Chelonia mydas (incl. agassizi)* (T)
- Olive (=Pacific) ridley sea turtle, *Lepidochelys olivacea* (T)

Amphibians
- California red-legged frog, *Rana aurora draytonii* (T)

Fish
- tidewater goby, *Eucyclogobius newberryi* (E)
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
- winter-run chinook salmon crit. habitat, *Oncorhynchus tshawytscha* (E)
- delta smelt, *Hypomesus transpacificus* (T)
- Coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Invertebrates
- mission blue butterfly, *Icaricia icarioides missionensis* (E)
- San Bruno elfin butterfly, *Incisalia mossii bayensis* (E)
- Myrtle's silverspot butterfly, *Speyeria zerene myrtleae* (E)
- California freshwater shrimp, *Syncaris pacifica* (E)

MARIN COUNTY

Listed Species

Plants

Tiburon paintbrush, *Castilleja affinis ssp. neglecta* (E)
Sonoma spineflower, *Chorizanthe valida* (E)
beach layia, *Layia carnosa* (E)
Pt. Reyes clover lupine, *Lupinus tidestromii var. layneae* (E)
Tidestrom's clover lupine, *Lupinus tidestromii var. tidestromii* (E)
Tiburon jewelflower, *Streptanthus niger* (E)
Tiburon mariposa lily, *Calochortus tiburonensis* (T)
Marin dwarf-flax, *Hesperolinon congestum* (T)
white-rayed pentachaeta, *Pentachaeta bellidiflora* (E)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)
Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

Sonoma alopecurus, *Alopecurus aequalis var. sonomensis* (PE)
soft bird's-beak, *Cordylanthus mollis ssp. mollis* (PE)
showy Indian clover, *Trifolium amoenum* (PE)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Plants

Baker's larkspur, *Delphinium bakeri* (C)
Santa Cruz tarweed, *Holocarpha macradenia* (C)

Species of Concern

Mammals

Point Reyes mountain beaver, *Aplodontia rufa phaea* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
long-eared myotis bat, *Myotis evotis* (SC)
fringed myotis bat, *Myotis thysanodes* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)

MARIN COUNTY

Species of Concern

Mammals
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Point Reyes jumping mouse, *Zapus trinotatus orarius* (SC)

Birds
- tricolored blackbird, *Agelaius tricolor* (SC)
- Bell's sage sparrow, *Amphispiza belli belli* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
- Harlequin duck, *Histrionicus histrionicus* (SC)
- black rail, *Laterallus jamaicensis* (SC)
- San Pablo song sparrow, *Melospiza melodia samuelis* (SC)

Reptiles
- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians
- northern red-legged frog, *Rana aurora aurora* (SC)
- foothill yellow-legged frog, *Rana boylii* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish
- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates
- Opler's longhorn moth, *Adela oplerella* (SC)
- Sonoma arctic skipper, *Carterocephalus palaemon ssp* (SC)
- sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)
- globose dune beetle, *Coelus globosus* (SC)
- William's bronze shoulderband snail, *Helminthoglypta arrosa williamsi* (SC)
- Nicklin's Peninsula Coast Range ....., *Helminthoglypta nickliniana awania* (SC)
- Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
- Point Reyes blue butterfly, *Icaricia icarioides ssp* (SC)
- Marin elfin butterfly, *Incisalia mossii* (SC)

MARIN COUNTY

Species of Concern

Invertebrates

bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

Blasdale's bentgrass, *Agrostis blasdalei var. blasdalei* (SC)
Tamalpais manzanita, *Arctostaphylos hookeri ssp. montana* (SC)
Point Reyes stickyseed, *Blennosperma nanum var. robustum* (SC)
Thurber's reedgrass, *Calamagrostis crassiglumis* (SC)
swamp harebell, *Campanula californica* (SC)
Humboldt Bay owl's-clover, *Castilleja ambigua ssp. humboldtiensis* (SC)
Mt. Vision ceanothus, *Ceanothus gloriosus var. porrectus* (SC)
Mason's ceanothus, *Ceanothus masonii* (SC)
San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)
Mt. Tamalpais thistle, *Cirsium hydrophilum var. vaseyi* (SC)
Tomales clarkia, *Clarkia concinna ssp. raichei* (SC)
northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC)
San Francisco wallflower, *Erysimum franciscanum* (SC)
fragrant fritillary, *Fritillaria liliacea* (SC)
San Francisco gumplant, *Grindelia hirsutula var. maritima* (SC)
seaside tarweed, *Hemizonia multicaulis ssp. multicaulis* (SC)
Tiburon tarweed, *Hemizonia multicaulis ssp. vernalis* (SC)
Point Reyes horkelia, *Horkelia marinensis* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
Tamalpais lessingia, *Lessingia micradenia var. micradenia* (SC)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
Point Reyes meadowfoam, *Limnanthes douglasii ssp. sulphurea* (SC)
Santa Cruz microseris, *Microseris decipiens* (SC)
Gairdner's yampah, *Perideridia gairdneri ssp. gairdneri* (SC)
northcoast phacelia, *Phacelia insularis var. continentis* (SC)
northcoast semaphore grass, *Pleuropogon hooverianus* (SC)
Marin knotweed, *Polygonum marinense* (SC)
California beaked-rush, *Rhynchospora californica* (SC)
valley sagittaria, *Sagittaria sanfordii* (SC)
Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)
Tamalpais streptanthus, *Streptanthus batrachopus* (SC)
San Francisco owl's-clover, *Triphysaria floribunda* (SC)
supple daisy, *Erigeron supplex* (SC)
Diablo rock-rose, *Helianthella castanea* (SC)

MARIN COUNTY

Species of Concern

Plants

Kellogg's (wedge-leaved) horkelia, *Horkelia cuneata ssp. sericea* (SC)

coast lily, *Lilium maritimum* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
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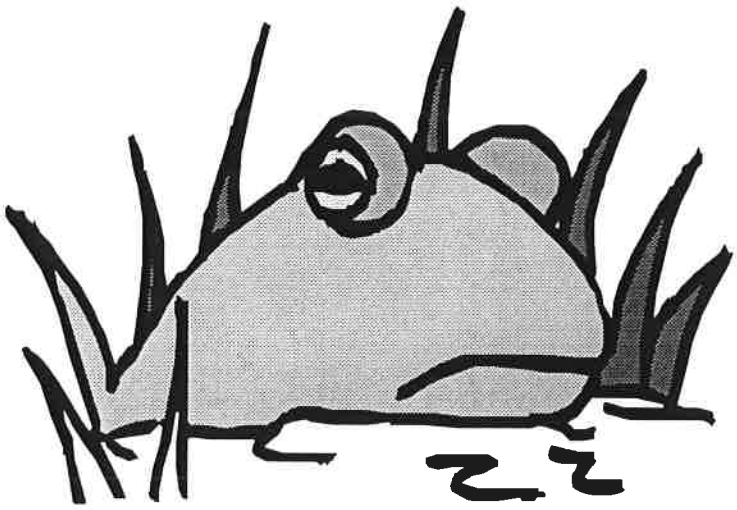
(*)	Possibly extinct.	
	Critical Habitat	Area essential to the conservation of a species.

APPENDIX B

RED-LEGGED FROG SURVEY REPORT



RED-LEGGED FROG SURVEY:
HAMILTON ARMY AIRFIELD

April 14, 1997

Prepared for:

IT Corporation
4585 Pacheco Boulevard
Martinez, CA 94553

and

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2022

Prepared by:

LSA Associates, Inc.
157 Park Place
Point Richmond, California 94801
(510) 236-6810
LSA Project #PWA631

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INTRODUCTION

PURPOSE OF STUDY

This report presents the results of an LSA Associates, Inc. (LSA) survey for the California red-legged frog on Hamilton Army Airfield (HAAF) in March 1997. The airfield property is within the limits of the City of Novato in Marin County, California (see Figure 1). The U.S. Army (Army) has closed the airfield and is preparing the site for disposal.

The California red-legged frog is a federally listed threatened species. Any impacts to individuals of this species or habitat occupied by this species would represent take as defined by the federal Endangered Species Act. Because HAAF contains habitat types known to support populations of California red-legged frog, LSA conducted a survey of the HAAF site and surrounding habitat to determine the potential for impacts on this species due to the Army's activities in preparing the site for disposal. This study was conducted under the direction of the U.S. Army Corps of Engineers, Sacramento District.

PRIOR RECORDS AT HAMILTON ARMY AIRFIELD AND VICINITY

LSA conducted an intensive search for records of California red-legged frogs in the Novato area, but found no records for the HAAF site or the surrounding area, within 5 miles. California red-legged frogs are known to occur in Marin County, but all records listed by the Natural Diversity Data Base (1997) are from the Pacific side of the county. Based on LSA's search, the red-legged frog observation closest to HAAF was from the Tolay Creek area, north of Highway 37 and east of Lakeville Road (S. Bacchini, personal communication). This observation was about 6 miles northeast of HAAF. Surveys of Arroyo San Antonio and Pacheco Creek in the GSA portion of Hamilton Air Force Base during 1996 did not locate any California red-legged frogs (Tetra Tech, Inc. and Swaim 1996). These surveys followed the standard U.S. Fish and Wildlife Service (USFWS) protocol. No red-legged frogs were observed in surveys of Novato Creek conducted in spring, 1996 by Gary Fellers (Kathleen Freal, personal communication).

LSA's data search included a review of recent wildlife surveys within the southern Novato area (EIP 1986, Rich and Associates 1988, EIP 1993, and Tetra Tech 1996). LSA also obtained verbal summaries of recent surveys (noted above) of Novato Creek (conducted by Gary Fellers of the National Park Service) and of the Tolay Creek watershed in Sonoma County (conducted by Sam Bacchini of Harlan Bartholomew Associates). LSA also reviewed relevant documents prepared by Wright and Wright (1949); Jennings (1993); Jennings and Hayes (1994); Jennings, Hayes, and Holland (1994); USWFS (1994); and USFWS (1996).

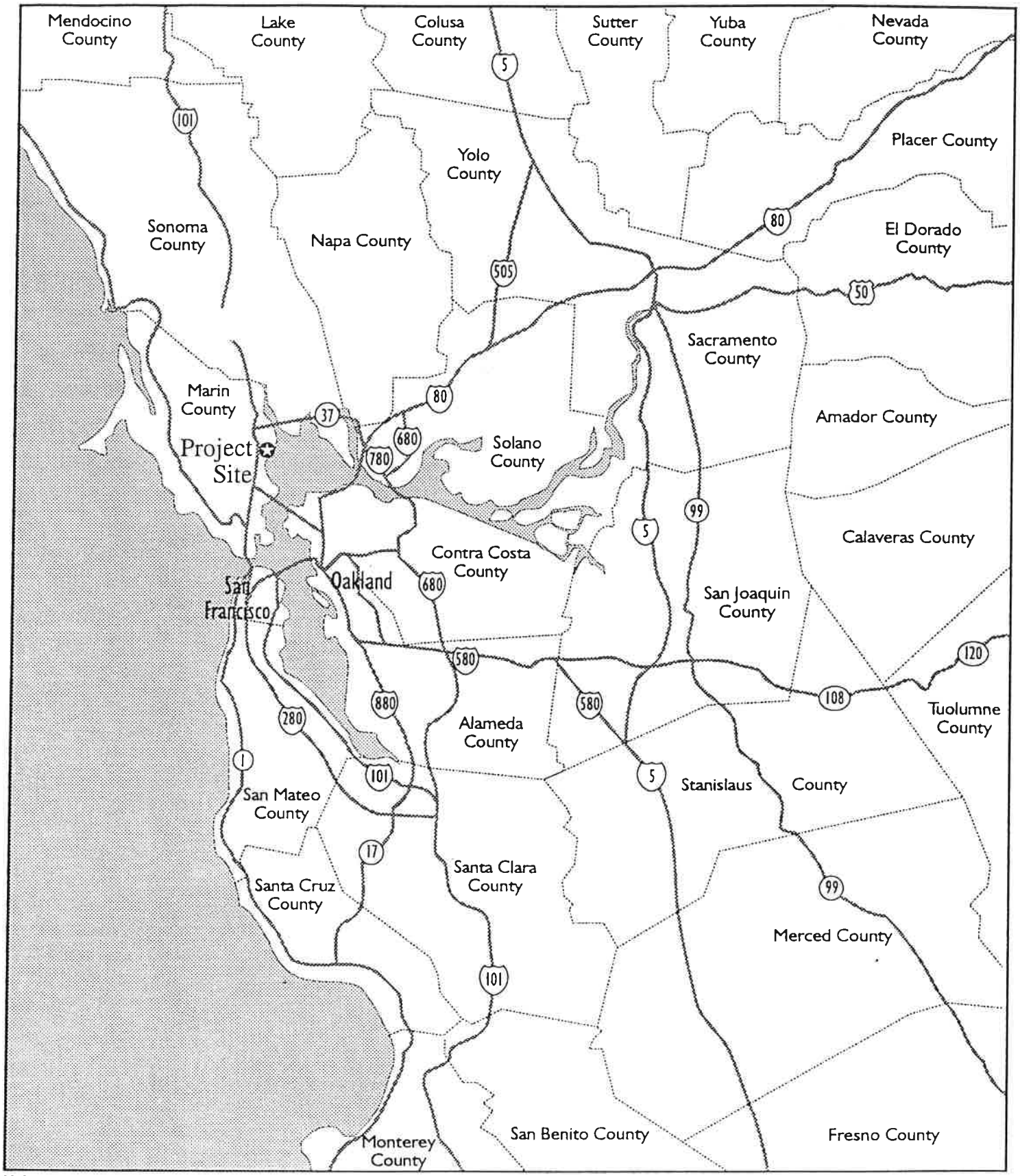

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Figure 1

N

LSA

Scale in miles

0 20

Regional Location

None of these information sources reported any observations of red-legged frogs within 5 miles of HAAF. The map of California red-legged frog localities by Jennings and Hayes (1994) shows a museum record from eastern central Marin County, but according to Mark Jennings (personal communication), the museum record was not from the Novato area. Dr Jennings reviewed his own data base and could not locate any records of red-legged frog in the Novato area. An EIR prepared by EIP (1993) stated that red-legged frogs had been reliably reported to be in Pacheco Pond. David Mullen (personal communication), who conducted the field surveys for this EIR, stated that these frogs were reported by security staff, with no supporting details, and the frogs could easily have been Pacific treefrog or bullfrog. A red-legged frog observation in Miller Creek mentioned in the report by Tetra Tech, Inc. and Swaim (1996) was found to be erroneous. According to Steve Foreman (personal communication), the field observation was made by a person not familiar with red-legged frog identification, and the location was rechecked by RMI biologists, who found only bullfrogs.

To search for additional records, LSA contacted the following biologists: Mark Jennings (California Academy of Sciences), John M. Brode (California Department of Fish and Game), Bill Cox (California Department of Fish and Game), Mike Westphal (USFWS), David Mullen (private consultant), David Cook (California State University, Sonoma), Karen Swaim (private consultant), and LSA staff (David Muth, Malcolm Sproul). None of these biologists was aware of any red-legged frog observations (personal or otherwise) for the Novato area.

METHODS

Field surveys for California red-legged frog on the Hamilton Army Airfield were conducted in accordance with protocol guidelines developed specifically for this project by the USFWS (Attachment 1). As outlined in the protocol, LSA defined the study area to include the HAAF site and any potential habitat within 1 mile of the site.

Any perennial waterbody or waterbody supporting emergent plant species such as cattail or tule, or riparian species such as willows, was considered to have potential to support California red-legged frog. LSA identified potential habitat in the study area using USGS topographic maps, a November 25, 1996 aerial photograph, and personal knowledge of the study area, followed by a field reconnaissance in daylight hours.

The potential habitat on and within 1 mile included the following (see Figures 2 and 3):

- all perennial wetland habitat on Hamilton Army Airfield including the perimeter ditch, the central borrow pit, the Landfill 26 mitigation site, and a ditch south of the south levee,
- all portions of Pacheco Pond (mostly north of the HAAF site),
- Arroyo San Jose up to Rafael Village,
- Pacheco Creek up to Highway 101,
- Miller Creek up to Highway 101, and
- a ditch on the east side of the Marinwood exit from Highway 101.

During March 5-26, two surveys were conducted at each of these potential habitat areas, except for two areas (noted below) that were inaccessible (see Table A). Areas surveyed are shown on Figures 2 and 4. The Marin County Flood Control and Water Conservation District was consulted for permission to survey Pacheco Pond and the lower reaches of Arroyo San Jose and Pacheco Creek. Potential habitat located on fenced private property was not surveyed. This included the entire portion of Miller Creek located within 1 mile of the HAAF site. A section of Miller Creek upstream and outside of the 1-mile radius, but along an open space area, was selected for the survey instead. A pond located in the Indian Valley Open Space Preserve was also surveyed. This pond provided the best accessible potential habitat and was located in the Arroyo San Jose drainage. A section of Pacheco Creek between Commercial Boulevard and Pacheco Pond was not surveyed because it was inaccessible due to an extensive thicket of undergrowth (mainly Himalayaberry).

Surveyors included biologists David Muth, David Cook, Karen Swaim, and Danica Snyder. Surveys were conducted by a two-person team consisting of Muth plus one of the other biologists. Muth, Cook, and Swaim are herpetologists with experience in identifying and surveying for red-legged frogs.

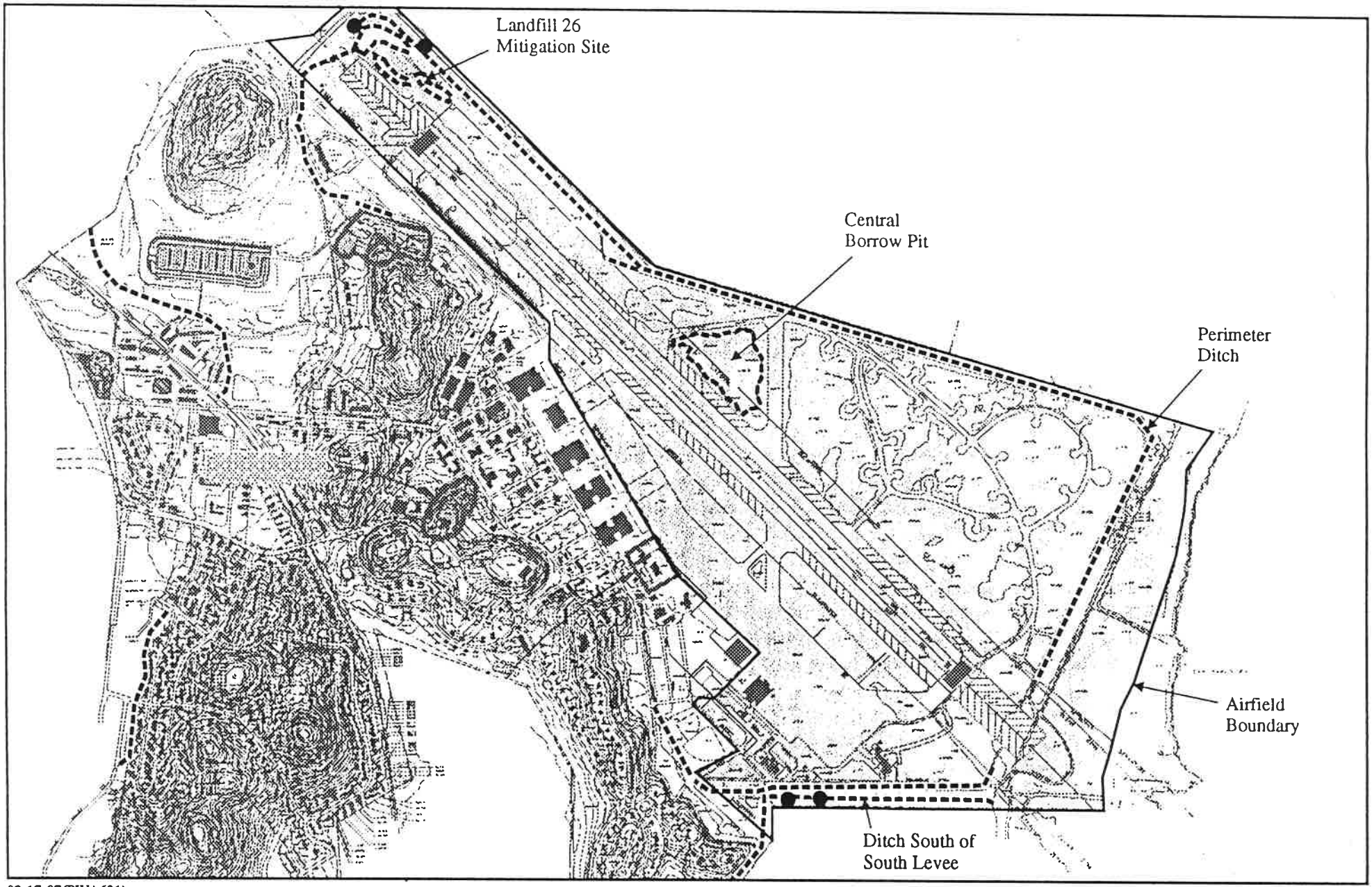

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Figure 2

Potential Habitat

Bullfrog Observation

Note: All potential habitat was surveyed twice in March 1997.

N

LSA

Approximate scale in feet

0 1600

Potential Red-legged Frog Habitat on the Hamilton Army Airfield Site

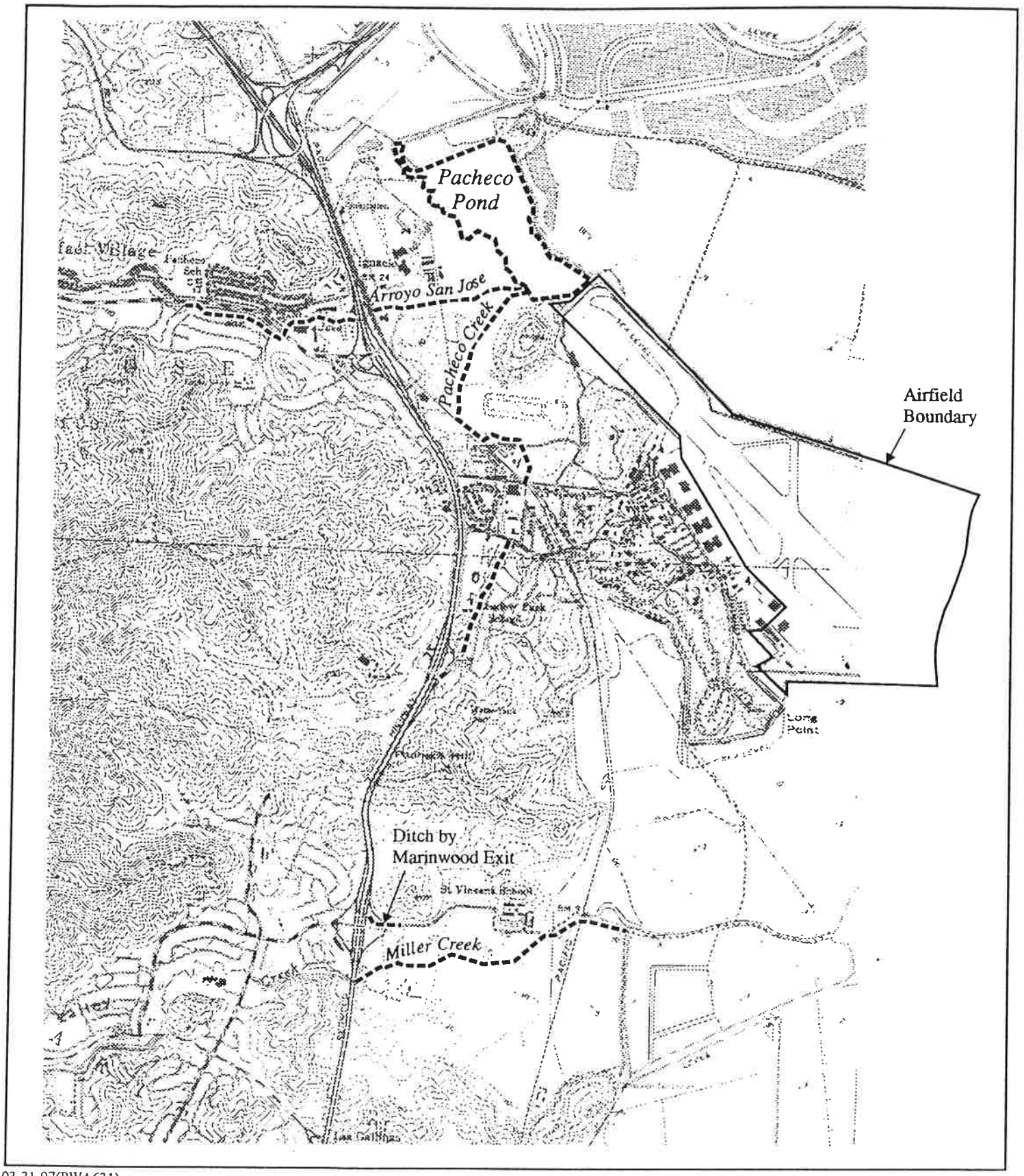

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Figure 3

Potential Habitat

N

LSA

Approximate scale in feet

0 2650

Potential Red-legged Frog Habitat Within One Mile of the Hamilton Army Airfield Site

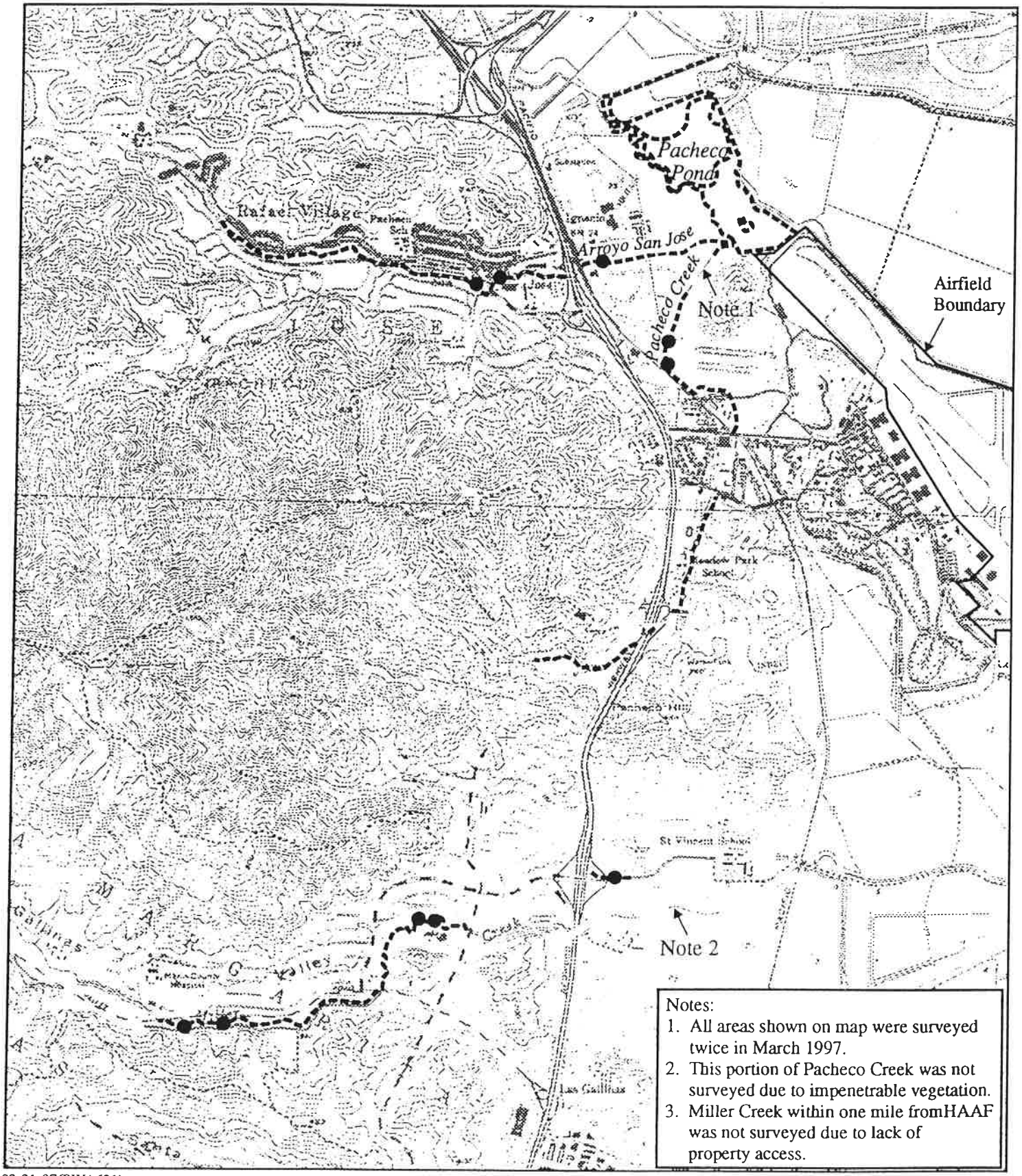

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Figure 4

Areas Surveyed
Bullfrog Observation

N

LSA

Approximate scale in feet
0 2650

Areas Surveyed for Red-legged Frog,
Off the Hamilton Army Airfield Site

Survey methods included examining all potential habitat at night with flashlights, searching for frogs or their eyeshine, and listening for male red-legged frog vocalizations. When frogs were observed, they were examined to determine species.

The entire perimeter of Pacheco Pond was surveyed by boat. Pacheco Pond surveys were conducted early during the survey period (March 5 and 7) to maximize the chance of observing any breeding activity such as male vocalization.

All other habitats were surveyed by wading through the watercourse and examining the edges or, where emergent vegetation made wading difficult, walking along the shoreline. Biologists examined the banks, shoreline, vegetation edges, cavities within exposed roots, and areas under undercut banks, as well as the water and water's edge. Surveys were limited to warm, windless nights, except for one night with a light wind.

Data were recorded on survey sheets and in field notes and included crayfish, fish, and amphibian species observed, air and water temperatures, and wind speed (if any).

Table A - Survey Dates for Specific Areas

Date	Survey Area	Surveyors
March 5	Pacheco Pond	Muth/Cook
March 6	Lower Arroyo San Jose Lower Miller Creek Indian Valley Pond	Muth/Cook
March 7	Pacheco Pond	Muth/Snyder
March 12	Upper Arroyo San Jose Upper Miller Creek Mid-Pacheco Creek	Muth/Cook
March 13	Perimeter Ditch North Seasonal Wetlands Central Pond	Muth/Swaim
March 17	Perimeter Ditch North Seasonal Wetlands Central Pond	Muth/Swaim
March 20	Lower Arroyo San Jose Miller Creek Indian Valley Pond Marinwood Exit	Muth/Cook

Date	Survey Area	Surveyors
March 22	Upper Arroyo San Jose Mid and Upper Pacheco Creek Southern Perimeter Ditch St. Vincent Boarder Ditch Marinwood Exit	Muth/Cook
March 24	Upper Pacheco Creek St. Vincent Boarder Ditch Lower Pacheco Creek	Muth/Cook
March 26	Lower Pacheco Creek	Muth/Cook

RESULTS

No red-legged frogs were observed in the study area during these surveys. Amphibians observed were bullfrog, Pacific treefrog (*Pseudacris regilla*) and California newt (*Taricha torosa*). Other amphibians observed during LSA's 1997 surveys on the site were arboreal salamander (*Aneides lugubris*) and California slender salamander (*Batrachoseps attenuatus*). Numerous fish species were identified from the creek systems (see below).

Landfill 26 Mitigation Site

These wetlands held shallow water (to about 4 inches deep) and were choked with cattails and bulrushes. Water was stagnant and full of decaying detritus. Animal species observed here included Pacific treefrog and wading birds.

A ditch flowing into the mitigation site held water at the time of the surveys, but had little emergent vegetation except near its southern end. Pacific treefrogs were observed in this ditch.

Perimeter Ditch

Water depth in the perimeter ditch varied from 4-6 inches along the entire northern and southern sections to 2-4 feet (or more) along the eastern section (which parallels the outboard levee). Except for the northernmost section (in the "panhandle" of HAAF), the ditch is cement-lined and barren with isolated clumps of cattails or smartweed (*Polygonum*) where enough silt has built up to support them. The northernmost section is earthen and densely choked with cattails.

Bullfrogs were observed in the southern section of the perimeter ditch during a previous survey in 1996 (Tetra Tech 1996). During LSA's 1997 surveys, two bullfrogs were observed at the northern end of the ditch and Pacific treefrogs were heard or observed for the length of the ditch. Mosquito fish (*Gambusia affinis*) and red swamp crayfish were also seen in the ditch. Salinities were measured at three points (in the panhandle, and near both ends of the outboard levee), and found to be 2 parts per thousand or less.

Central Borrow Pit

The central borrow pit was excavated within the last two years and has filled with water. The edges are vegetated with cattail, and water depths appear greater than 3 feet. Pacific treefrogs and ducks were observed in this pond.

Ditch South of South Levee

This wetland has salt marsh plant species such as alkali heath and pickleweed at its southeastern end, where salinities were 8 parts per thousand. Near its northwestern terminus, the ditch appears to be freshwater and supports dense stands of cattails. Two adult bullfrogs were observed in this ditch at its northwestern end.

Pacheco Pond

Pacheco Pond is a large body of water appearing fresh at its southern end and brackish or saline at the north end (barnacles were observed on bridge footings at Bel Marin Keys Road). The pond was reported by fishermen (personal communication) to have populations of catfish and striped bass. No amphibians were observed or heard calling in Pacheco Pond. Numerous black-crowned night herons and great blue herons were observed.

Arroyo San Jose

This is a clear to slightly turbid creek with a dense riparian canopy and under- story for most of its length. The bottom is silty sand and frequently cluttered with riprap material or junk.

Two juvenile bullfrogs were observed near the intersection with Ignacio Boulevard. A single bullfrog tadpole was observed just north of the creeks' intersection with Bel Marin Keys Boulevard. Fish observed included sunfish (*Lepomis*), bass (*Micropterus*), threespine stickleback (*Gasterosteus aculeatus*), sculpin (*Cottus*), roach (*Lavinia symmetricus*), Sacramento sucker (*Catostomus occidentalis*), and mosquito fish. The introduced red swamp crayfish was also seen in this creek system.

Pacheco Creek

Pacheco Creek is a clear-water creek with two distinct sections in the study area. The lower section exits a culvert north of State Access Road into a cement-lined ditch, where it circles the compound to the west before becoming an earthen channel again. The lower section is a sluggish channel with a sandy silt bottom. The sides are heavily vegetated in Himalayaberry and willow and the creek becomes impassable due to this vegetation several thousand feet prior to entering Pacheco Pond. Two juvenile bullfrogs were found in this creek section.

The upper section runs to Main Gate Road, where it enters a culvert. The upper section is less vegetated than the lower section, on a more compacted soil, and the water flows more quickly. No frogs were observed

in this section. Fish species included threespine stickleback, roach, sculpin and goldfish (*Carassius auratus*). Crayfish in this section were the native genus *Pacifasticus*.

Miller Creek

Miller Creek is a clear-water creek with a combination of sand or bedrock bottom. The creek is vegetated with alder (*Alnus rhombifolia*) and willow. Four young adult bullfrogs were observed in this creek. Fish species included stickleback, roach, rainbow trout (*Oncorhynchus mykiss*), and suckers. Crayfish were the native genus *Pacifasticus*.

Ditch by Marinwood Exit

The ditch by the northeast portion of the Highway 101 Marinwood exit is a murky earthen ditch heavily choked with cattails. The only open water area is located adjacent to the on-ramp, where a culvert exits into the ditch. One adult bullfrog was observed here.

CONCLUSIONS

No California red-legged frogs were observed during March 1997 surveys on or within 1 mile of the Hamilton Army Airfield, and none have been observed in the area during previous surveys. No data could be located to indicate the species presently or historically occurred in the area within 5 miles of HAAF. In addition, numerous predators on red-legged frog, including bullfrogs, crayfish, and various fish species, were observed in the study area. Thus, it is unlikely that California red-legged frogs occur on Hamilton Army Airfield or adjacent areas.

Some of the areas surveyed, particularly Miller Creek, Pacheco Creek, and Arroyo San Jose, provide what appears to be suitable habitat for the red-legged frog. In fact, the habitat in these creeks appeared suitable enough to support a larger population of frogs than the small numbers of bullfrogs that were observed. This may indicate that the habitat has elements not outwardly obvious making it unsuitable for use by red-legged frog, possibly the diversity or abundance of fish and crayfish.

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PERSONAL COMMUNICATIONS

Bacchini, Sam. Biologist, Harlan Bartholomew Associates, February 27, 1997.

Brode, John. Fisheries Biologist, California Department of Fish and Game, Inland Fisheries Division, February 28, 1997.

Cook, David. Consulting Biologist and graduate student, California State University, Sonoma, March 5, 1997.

Cox, Bill. Fisheries Biologist, California Department Fish and Game, Region 3, February 28, 1997.

Foreman, Steve. Associate Biologist, RMI Associates, February 27, 1997.

Freal, Kathleen. Biologist, National Park Service, February 27, 1997 and April 7, 1997.

Mullen, David. Consulting Biologist, February 27, 1997.

Jennings, Mark. Associate, California Academy of Sciences, January 2, 1997 and April 7, 1997.

Swaim, Karen. Consulting Biologist, February 27, 1997 and March 31, 1997.

Westphal, Mike. Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, March 3, 1997.

ATTACHMENT 1

Site specific protocols for California red-legged frog surveys at Hamilton Air Field (U.S. Fish and Wildlife Service letter, March 5, 1997).

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

1-1-97-TA-877

March 5, 1997

Mr. David Muth
LSA Associates, Inc.
157 Park Place
Pt. Richmond, California 94801

Subject: Site specific protocols for California red-legged frog surveys at Hamilton Air Field, Ignacio, Marin County, CA

Dear Mr Muth:

The following are California red-legged frog survey requirements for Hamilton Air Field Disposal Project as Jim Browning and Mike Westphal of my staff discussed with Steve Granholm of LSA Associates, Inc. during a site visit to Hamilton Air Field on February 26, 1997 and as Mike Westphal discussed with David Muth of LSA Associates, Inc. during a telephone conversation on March 3, 1997.

1. All surveys should take place on warm, windless nights between one hour after sunset and 12 midnight.

2. All shoreline habitat (including the perimeters of any freestanding thickets of *Typha* or *Scirpus*) within one mile of project area should be surveyed for amphibians. This will include portions of Arroyo San Jose, Pacheco Creek, and Miller Creek in the vicinity of Novato, California. Pacheco Pond should be surveyed by boat.

3. Remainder of aquatic habitat can be surveyed by wading or boat as necessary. Ditches should be waded where possible.

4. Ditch along St. Vincent's property line should be surveyed from a point 100 meters downstream of the point where saltgrass, *Distichlis*, becomes predominant shoreline vegetation, upstream to the end of the channel.

5. Surveying should include auditory surveys for calling California red-legged frogs.

6. Report should include a summary of survey dates and times, names of surveyors, air and water temperature, wind speed (estimated), map of areas surveyed, all amphibians noted, and presence or absence of fish and crayfish. Copies of all field notes and data sheets should accompany report.

7. Two complete surveys of all shoreline habitat should be performed. The repeat visit to any specific locality should occur no sooner that 24 hours after the first visit and should occur on a warm, windless night.

IMPORTANT NOTE: These guidelines have been designed according to site- and project- specific criteria for the Hamilton Air Field fill disposal project and are applicable only for surveys in the immediate vicinity of Hamilton Air Field in the spring of 1997. If you have any questions please contact Mr. Mike Westphal of my staff at (916) 979-2725 extension 437.

Sincerely,

for Wayne S. White
Field Supervisor

cc: AES-Portland, OR
FWS-ES, Wetlands Branch, Sacramento, CA