

A Report Prepared for

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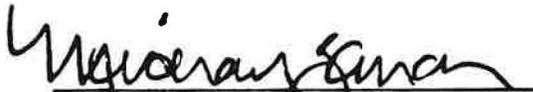
**BIOLOGICAL RESOURCE MANAGEMENT PLAN
SAND CITY REGIONAL SHOPPING CENTER
SAND CITY, CALIFORNIA**

HLA Job Number: 18993,001.02

by



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February 1, 1989

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS.....	iii
LIST OF TABLES	iii
INTRODUCTION	1
BACKGROUND	1
OBJECTIVES.....	4
PROJECT DESCRIPTION	5
LOCATION	5
PROJECT OBJECTIVES.....	5
TECHNICAL PROJECT DESCRIPTION	6
DESCRIPTION OF EXISTING CONDITIONS	8
VEGETATIVE COMMUNITIES	8
WILDLIFE	10
THREATENED, ENDANGERED, AND CANDIDATE SPECIES.....	10
SOIL-PLANT-HABITAT RELATIONSHIPS.....	14
MANAGEMENT AREAS.....	15
POTENTIAL IMPACTS.....	17
RESOURCE MANAGEMENT PLAN.....	19
MANAGEMENT GOALS	19
MANAGEMENT TECHNIQUES	21
MANAGEMENT AREA PRESCRIPTIONS.....	32
FUNDING MECHANISMS AND RESPONSIBILITIES	42
IMPLEMENTATION RESPONSIBILITIES.....	44
LITERATURE CITED.....	46
Appendices	
A GUIDELINES FOR PLAN PREPARATION	
B LOCAL COASTAL PROGRAM LAND USE PLAN	
C SAND CITY BIOLOGICAL FIELD SURVEYS FOR RARE PLANTS, SMITH'S BLUE BUTTERFLY, AND BLACK LEGLESS LIZARD	

DISTRIBUTION

LIST OF FIGURES

Figure 1	Regional Location
Figure 2	Project Site
Figure 3	Development Plan
Figure 4	Vegetation and Habitat Types
Figure 5	Sensitive Species Values
Figure 6	Management Areas
Figure 7	Retaining Wall Detail
Figure 8	Summary of Resource Management Plan (Map Pocket)
Figure 9	Grading Plan (Map Pocket)

LIST OF TABLES

Table 1	Seed and Seedling Mixes
Table 2	Estimated Costs for Management Plan Implementation

INTRODUCTION

BACKGROUND

Monterey Sand Co. proposes to develop a 243,260-square-foot regional commercial center on approximately 22 acres of a 42-acre parcel in Sand City, California. The parcel is located east of Highway 1 between Tioga Avenue, La Playa Avenue, and the Southern Pacific Railroad (Figure 1). The parcel is currently owned by Monterey Sand Co. and includes 6.4 acres within the California Coastal Zone.

Portions of the site are actively mined for sand and it is primarily on this portion of the site that development is proposed. Habitats on the site include Central Dune Scrub, Central Maritime Chaparral, Ruderal Scrub/Chaparral, and mined bare sand.

Six species of special concern to both state and federal wildlife agencies are present on the site and are found primarily in areas that are not slated for development. These species include the following:^{*1}

Smith's Blue Butterfly (*Euphilotes enoptes smithi*) FE, SE
California Black Legless Lizard (*Anniella pulchra nigra*) FC2, SSC
Monterey Bay Gilia (*Gilia tenuiflora*), FC2, ST
Sandmat Manzanita (*Arctostaphylos pumila*), FC2, SSC
Coast wallflower (*Erysimum ammophilium*), FC2, SSC
Monterey Ceanothus (*Ceanothus rigidus*), FC2, SSC

Federal and state threatened or endangered status (ST, FE, SE) indicates that the species is in danger of becoming extinct throughout all or a portion of its range. Both state and federal endangered species acts (Calif. Fish and Game Code, Sec 2050-2098; 16 USC 1531 et seq.) mandate protection for species that are officially listed in these categories and prohibit

^{*1} FE-Federal Endangered; FC2 - Federal Candidate Category 2; SE - State Endangered; ST - State Threatened; SSC - State Special Concern

"taking"² of those species. Federal candidate (FC) or state special concern species (SSC) are currently not offered the same protection under the law as officially listed species. However, it is the policy of the California Department of Fish and Game and U.S. Fish and Wildlife Service to recommend "no net loss of in-kind habitat value" for habitats that support candidate or special concern species (FWS mitigation policy, Federal Register, 46:15:7656-7663; Cummings and Nicola 1986).

This plan describes the program for the long-term restoration, enhancement, and protection of the sensitive species located on the project site. The project has been designed by Monterey Sand Co. to avoid any potential direct or indirect "take" of Smith's Blue Butterfly or its habitat. The plan will compensate fully for any potential effects of the project on other sensitive species.

The City of Sand City is currently embarking upon preparation of a Habitat Conservation Plan (HCP) to obtain a Section 10(a) permit from FWS. Section 10(a) of the Endangered Species Act (ESA) allows the Secretary of Interior (through FWS) to issue a permit to "take" endangered species if the take is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (16 USC 1531 et seq.). The City is preparing the HCP and seeking the Section 10(a) permit to implement a city-wide habitat protection plan and authorize the incidental "take" of endangered species in various parts of the city slated for development. In order for the City of Sand City to obtain the Section 10(a) incidental "take" permit, under FWS regulations, the City must submit an HCP. An HCP is currently being prepared for the City by Thomas Reid Associates of Palo Alto, California (TRA). The HCP must specify (i) the impact which will likely result from such taking; (ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be

² "Take" of an endangered species is defined in the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" (16 USC 1531 et seq.).

available to implement such steps; (iii) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and (iv) such other measures that the Secretary may require as being necessary or appropriate for the purposes of the plan. [Section 10(a)(2)(A), 16 USC 1531 et seq.]

All of Monterey Sand Co.'s parcels in Sand City are currently included in the city-wide HCP. It is anticipated that the HCP process could take up to two years to complete (T. Reid, TRA, pers. comm.). Specific draft guidelines, prepared by TRA to cover development on the project site (which constitutes a portion of Monterey Sand Co.'s property) are provided in Appendix A. This plan has been prepared in compliance with those guidelines.*³

The Sand City Local Coastal Program requires restoration and preservation of identified sensitive habitat areas including certain portions of the project site as a condition of development. Section 4.3.22 of the Sand City Local Coastal Program Land Use Plan (LUP) requires a Habitat Protection/Restoration Plan in connection with development affecting certain portions of the project site located within the coastal zone. The specific standards outlined for such a plan in the LUP are set forth in Appendix B. This plan was prepared in accordance with those standards.

Although this project will not result in a "take" of a federally listed endangered species, this project will be the first to provide habitat conservation mechanisms suitable for inclusion in the city-wide HCP, and this plan will insure continued participation of Monterey Sand Co. in Sand City's HCP process.

*³ It is noteworthy that several HCP's developed in California in the past have provided for measures during development of the HCP (T. Reid, TRA, pers. comm). For example, an HCP currently being developed for the Morro Bay kangaroo rat (Dipodomys heermanii morroensis) includes interim measures for development within suitable, yet unoccupied kangaroo rat habitat (V. Harris, TRA, pers. comm.). Interim measures are also currently being used in the city of Bakersfield to permit development within the area to be covered by the HCP. While this plan does not involve "interim measures" in the same sense, it is similar in that the provisions of this plan will ultimately be integrated with those of the city-wide HCP (V. Harris, TRA, pers. comm.).

OBJECTIVES

The primary objectives of this document are to comply with the need for a Habitat Protection/Restoration Plan as required by the Sand City LUP while ensuring maximum compatibility with the requirements for the city-wide Habitat Conservation Plan currently under preparation by TRA.

This Resource Management Plan is designed to provide a mechanism to preserve and enhance habitat for one endangered species (Smith's blue butterfly), and five candidate endangered species (California black legless lizard, sandmat manzanita, Monterey Bay gilia, coast wallflower, and Monterey ceanothus) in conjunction with limited development on approximately 22 acres of a 42-acre parcel in Sand City, California. This document has been developed to be compatible with the HCP currently being developed by Thomas Reid Associates for the City of Sand City.

PROJECT DESCRIPTION

Excerpts from the Draft EIR prepared by LSA Associates for the Sand City Regional Shopping Center (LSA, 1988) are included as part of the following description of the proposed project.

LOCATION

The Draft EIR addresses the Draft McDonald Property Specific Plan, the proposed General Plan amendment and zone change, and certain preceding and subsequent actions described elsewhere in this section, which are intended to allow for a regional commercial center project proposed for portions of a 42-acre parcel in of Sand City, California. Figure 1 shows the regional location. As shown in Figure 2, the planning area (hereinafter called the project site) is located east of State Highway 1, between that thoroughfare and the Southern Pacific Railroad right-of-way, which is also the eastern boundary of the City. Tioga Avenue and La Playa Avenue border the site on the south and north, respectively. Access is provided from Tioga Avenue. La Playa Avenue is unimproved and does not provide public access to the site in its present condition.

The project site included in the Specific Plan consists of approximately 29 acres. It is part of Assessor's Parcel Number 11-011-27, a 42-acre parcel owned by the Monterey Sand Co. Approximately 21 acres of the 29-acre project site are proposed for development. Approximately 6.4 acres are designated within the California Coastal Zone and include continuous strips of land along both the east and west sides of the parcel.

PROJECT OBJECTIVES

The Draft McDonald Property Specific Plan has been prepared by the City of Sand City to address applications for a general plan amendment and a rezoning of most of the project site. These applications were submitted by the Monterey Sand Co., a partnership of

Monterey Sand Company (a California Corporation) and Robert E. McDonald III, who is the property owner, master developer, and applicant for the proposed regional commercial center, and hereinafter called the Project Sponsor. The objective of the Project Sponsor is to develop the site for light commercial uses of a regional character, incorporating a mix of relatively large tenants who depend on a regional market with a variety of smaller commercial uses.

In preparing its Specific Plan, the City has set forth its objectives for development of the site. These may be summarized as follows:

- o Strengthen the economic base of Sand City by expanding opportunities for development of diverse commercial facilities.
- o Encourage development to utilize an architectural and landscape theme that incorporates the historical, cultural, and physical characteristics of Sand City and the Monterey peninsula.
- o Provide an aesthetic approach as viewed from the surrounding road network.
- o Preserve and enhance the environmental resources within the City of Sand City.

TECHNICAL PROJECT DESCRIPTION

Specific Plan of Development

The Draft McDonald Property Specific Plan addresses the development of a regional commercial center containing approximately 283,000 square feet of building area. As a result of the findings of the draft EIR and other site-specific studies, Monterey Sand Co. has revised its proposed site plan, principally to modify building, road, and construction activity locations so as to eliminate any possible "take" of Smith's blue butterfly. The current site plan calls for 243,260 square feet of building, of which approximately 120,000 square feet would be occupied by a regional retail warehouse club. The remaining 123,260 square feet would be occupied by tenants and users of various size, ranging from major retail tenants occupying up to 42,400 square feet to small commercial shops. Two smaller building pads consisting of 4,000 and 3,500 square feet respectively, on which users may construct their own customized

buildings, are included within this latter square footage. The proposed project includes truck access and loading areas behind the buildings, approximately 1,103 parking spaces, and dune and habitat restoration and preservation. Figure 3 illustrates the arrangement of these uses and activities on the site.

All other necessary on-site and off-site infrastructure to serve the development will be constructed as a part of the project. Major improvements will include the following.

- o A realignment of the privately owned Metz Road, now traversing the site, to the west side of the developed area, but still providing access to the industrial operations north of La Playa Avenue.
- o Improvements to the privately owned La Playa Avenue to provide a 48-foot curb-to-curb width along the project frontage as well as the eventual extension easterly to Del Monte Boulevard.
- o Improvements to Tioga Avenue, to provide a two-lane arterial with a left-turn lane, in a 48-foot curb-to-curb width from California Avenue to re-aligned Metz Road; improvements will also include curbs and gutters on both sides, sidewalks on the project side, and street lights.
- o Construction of a percolation pond to accommodate all surface storm-water runoff from the project site and from areas south of Tioga Road to East Avenue. The pond will be located off the site to the north of La Playa Avenue and east of Metz Road, as shown in Figure 3. It will occupy 1.0 surface acre and is sized to retain 2.7 acre-feet of runoff.
- o About 3,000 feet of 12-inch water lines will be constructed, from an existing line now terminating on Tioga Avenue, through the project site to La Playa Avenue and thence to the existing line in Del Monte Boulevard, where it would form a loop system.
- o Construction of on-site sewer lines with a tie to the existing 10-inch main in the Gateway sewer, about 1,000 feet east of the site. Construction is subject to approval of the Seaside County Sanitation District which is beginning preparation of a Master Sewer Plan for the Sand City tributary area.

DESCRIPTION OF EXISTING CONDITIONS

VEGETATIVE COMMUNITIES

The project site comprises Central Dune Scrub, Central Maritime Chaparral, ruderal scrub/chaparral, and mined bare sand habitats (LSA 1988, HLA field notes 1988).

Central dune scrub is a dense coastal scrub community of scattered shrubs, subshrubs, and herbs, generally less than 3 feet tall and often developing considerable cover (Holland 1986). Central dune scrub habitat is found on approximately 4.12 acres of the higher elevations of the site and along the Highway 1 corridor (Figure 4).

Central dune scrub habitat includes seacliff buckwheat (Eriogonum parvifolium), and coast buckwheat (Eriogonum latifolium), the two host species for the endangered Smith's blue butterfly. Much of this habitat on the site is degraded by the presence of iceplant (Carpobrotus edule). Iceplant has been used by Caltrans as a bank stabilizer for road construction projects throughout the area and is an aggressive invader species that has dominated native coastal habitats on the site.

Other plant species present on the site include beach sagewort (Artemisia pycnocephala), dune aster (Corethrogyne filaginifolia), silver bush lupine (Lupinus chamissonis), liveforever (Dudleya farinosa), beach mock heather (Haplopappus ericoides), beach bur (Franseria chamissonis), sea rocket (Cakile maritima), California poppy (Eschscholtzia californica), deer weed (Lotus scoparius), dune grass (Poa douglasii), lizard tail (Eriophyllum staechadifolium), and purple sand verbena (Abronia umbellata). Disturbed and open sandy areas are dominated by beach evening primrose (Camissonia cheiranthifolia), spineflower (Chorizanthe sp.), and Monterey Bay gilia (Gilia tenuiflora) (LSA 1988).

Central maritime chaparral is found on well drained, sandy soils that are more highly compacted than those characteristic of central dune scrub habitat (Holland, 1986). This habitat type is present at isolated locations near Monterey and in southern San Luis Obispo

county (Holland, 1986). Disturbed central maritime chaparral habitat is found immediately northeast of the project site and within the proposed percolation pond area. The chaparral habitat in the percolation pond area is more disturbed than that found in the remainder of the area. On the basis of examination of recent aerial photographs and an ocular estimation of plant density, HLA biologists estimate a total vegetation cover of less than 30 percent in the percolation pond area. Vegetation cover appears to be greater than 70 percent in the remaining areas of the habitat. Although neither the percolation pond area nor the remainder of the habitat is in pristine or natural condition, the percolation pond area appears to provide significantly less habitat value than that found elsewhere near the project site.

Plant species found in this habitat type include sandmat manzanita (*Arctostaphylos pumila*), Monterey ceanothus (*Ceanothus rigidus*), coyotebush (*Baccharis pilularis*), monkeyflower (*Diplacus aurantiacus*), chamise (*Adenostoma fasciculatum*), wooly sunflower (*Eriophyllum lanatum*), beach mock heather, beach sagewort, and iceplant (LSA, 1988).

Ruderal chaparral/scrub is found on approximately 12.42 acres both east and west of Metz Road (Figure 4) and includes relatively flat topography that has been variously disturbed over the years. Dominant plant species include coyotebush, oats (*Avena* sp.), hare barley (*Hordeum leporinum*), soft chess (*Bromus mollis*), ripgut brome (*Bromus diandrus*), and rabbitsfoot grass (*Polypogon* sp.). Other plant species present include iceplant, cudweed (*Gnathalium* sp.), telegraph weed (*Heterotheca* sp.), mustard (*Brassica geniculata*), kikuyu grass (*Pennisetum clandestinum*), anise (*Foeniculum vulgare*), wild radish (*Raphanus* sp.), mallow (*Malva* sp.), plantain (*Plantago lanceolata*), and dock (*Rumex salicifolia*) (LSA, 1988). Ruderal chaparral/scrub habitat located west of Metz Road include native species such as sandmat manzanita, Monterey ceanothus, and California rose (*Rosa californica*). Consideration was given to classifying the vegetation community found in the percolation

pond area as ruderal chaparral/scrub. However, because the area was contiguous with less disturbed maritime chaparral, it was classified as a highly disturbed version of that habitat type.

Mined bare sand habitat is characterized by disturbed and unvegetated sands and subsoils of previously mined central dune scrub habitat. This habitat type, shown on Figure 4, covers approximately 10.88 acres. A substantial portion of the project site has been mined for sand for approximately 38 years. Areas where active mining has occurred in the past 3 years remain as open sand. Areas which were mined previously are characterized by the presence of ruderal chaparral/scrub or elements of disturbed maritime chaparral habitat.

WILDLIFE

Wildlife species present on the site are characterized by those species adapted to sand dune and ruderal plant communities. The insect fauna of the sand dunes is well developed and includes abundant species of bees, wasps, flies, butterflies, and moths (LSA 1988). Reptiles present on the site likely include western fence lizard (Sceloporus occidentalis), southern alligator lizard (Gerrhonotus multicarinatus), and gopher snake (Pituophis melanoleucus). Songbirds such as Brewer's blackbird (Euphagus cyanocephalus), white-crowned sparrow (Zonotrichia leucophrys), and killdeer (Charadrius vociferus) would also be expected. Mammals present on the site include ornate shrew (Sorex ornatus), black tailed jackrabbit (Lepus californicus), deer mouse (Peromyscus maniculatus), and feral cat (Felis domesticus).

THREATENED, ENDANGERED, AND CANDIDATE SPECIES

Six species of special concern are found on the project site and could be affected by the project. These include four plant species (coast wallflower, sandmat manzanita, Monterey ceanothus, Monterey Bay gilia), one lizard (California black legless lizard), and one butterfly (Smith's blue butterfly).

Smith's Blue Butterfly

Smith's blue butterfly is the only species on the site listed as endangered by both the state and federal governments. The butterfly occurs along the coast of Monterey County from Big Sur to the Salinas River. Larvae of the butterfly feed exclusively on two species of buckwheat. Seacliff buckwheat (*Eriogonum parvifolium*) is used to the south of the project site, while coast buckwheat (*E. latifolium*) is used to the north. The project site is located in the transition zone between the distribution of the two species of buckwheat and Smith's blue butterfly have been observed using both species on the site (TRA, 1987; LSA, 1988). Figure 5 shows the extent of buckwheat host species and Smith's blue butterfly observations on the site.

Smith's blue butterfly and both species of buckwheat are found on the site only in central dune scrub habitats. Individual and isolated buckwheat plants have been located in ruderal and disturbed chaparral habitats on the site. Smith's blue butterfly have been observed using buckwheat in the maritime chaparral habitat immediately north of La Playa Avenue but have not been observed in ruderal habitats in the development or percolation pond areas (LSA 1988; C. Kelner, LSA, pers. comm.).

Smith's blue butterfly adults are found close to their larval host plants, which also serve as adult nectar sources and egg-laying sites for females. The close relationship between the butterfly and its food plant allows Smith's blue butterfly to colonize and maintain populations on habitat areas as small as a few acres. Such populations may frequently go extinct, however, and can only be reestablished by migrants from more persistent colonies (TRA, 1987) A detailed discussion of Smith's blue butterfly in Sand City is provided by Thomas Reid Associates' survey provided as Appendix C to this report.

California Black Legless Lizard

The California black legless lizard is a federal candidate category 2 and state-designated species of special concern. The lizard is known only from the Monterey Peninsula

and the southern part of Monterey Bay (Bury 1985). Macey and Pappenfus (1987) examined three locations on the project site and observed black legless lizards at all three (Figure 5). Black legless lizards were observed in both central dune scrub and disturbed central maritime chaparral habitats. None have been observed in ruderal habitats.

Monterey Bay Gilia

Monterey Bay gilia is a state-listed threatened species and a federal candidate category 2 species. The plant is found only in isolated populations between Monterey Harbor and an area just north of the mouth of the Salinas River. The gilia is found on the site in central dune scrub habitats (Figure 5).

Sandmat Manzanita

Sandmat manzanita is a federal candidate category 2 species and is found only in maritime chaparral habitats around Monterey Bay. Sandmat manzanita is found on the project site in less disturbed and ruderal central maritime chaparral habitat. Individual plants or clusters of plants present within the development area were staked and surveyed in November 1988. The sandmat manzanita in the development area includes one large cluster approximately 10 to 12 feet in diameter, one individual approximately 6 feet in diameter, three individuals approximately 3 feet in diameter, and one individual approximately 18 inches in diameter (Figure 5). Sandmat manzanita is also scattered throughout the area north of La Playa Avenue in an area not currently proposed for development. Because of the lack of proposed development in the area northeast of the percolation pond site, individual plants were not staked or identified.

Monterey Ceanothus

Monterey ceanothus is a federal candidate category 2 species and has a similar distribution to sandmat manzanita. The ceanothus is found on the site, north of La Playa

Avenue, and within the railroad right-of-way (Figure 5). Numerous individuals are present and scattered throughout an off-site area of approximately 6 acres north of La Playa Avenue. Twelve individual ceanothus plants are located in the proposed percolation pond area. Each location in the pond area was staked and surveyed in November 1988. Three of the smallest plants are less than 10 inches in diameter. Six plants are between 10 inches and 24 inches in diameter, and three plants are up to 36 inches in diameter.

Ceanothus found within or near the main proposed development area are readily separated into three groups. Twenty-seven established individuals are present directly adjacent to La Playa Avenue. These plants are interspersed with sandmat manzanita and ruderal chaparral/scrub species. Four of the individuals are smaller than 10 inches in diameter, thirteen individuals are between 10 and 24 inches in diameter, and ten individuals are larger than 24 inches. The second group comprises 41 individual seedlings between 2 and 12 inches in diameter. This second group is located approximately 150 feet southwest of La Playa Road and is partially contiguous with the first group. The presence of ceanothus seedlings in this highly disturbed area suggests that the species is an aggressive colonizer and should do well in transplant or revegetation efforts. The third group consists of approximately ten individuals between 24 and 36 inches in diameter located within the railroad right-of-way adjacent to the extreme southeastern portion of the project site.

Coast Wallflower

Coast wallflower is a federal candidate category 2 plant that grows in central dune scrub habitats. Scattered individual coast wallflower have been found on the southwestern portion of the project site (Figure 5) (LSA 1988). Coast wallflower grows in association with spineflower, California poppy, coast buckwheat, and deerweed (LSA 1988). The project as proposed would not directly affect any individual coast wallflower plants.

SOIL-PLANT-HABITAT RELATIONSHIPS

An understanding of existing relationships between soils, hydrology, and micro-climate is necessary to design and select appropriate management options. Several natural and man-caused factors influence the extent of existing habitats on the site. These include 1) local climate - primarily wind direction and force, 2) soil type, texture and grain size, 3) seasonally variable soil moisture and water holding capacity, 4) topographic and hydrologic variations, 5) existing and historic land uses, and 6) the physical presence of Highway 1 and other developments. Together, these physical characteristics interact with the biological components of the site in a way that has resulted in the formation of distinct functional zones. These functional zones are summarized below.

High dune

Soil:	Wind blown sand, lightly compacted, Relatively stable if vegetated
Climate:	Seasonally and locally intense maritime winds
Topography:	Historic: Rounded dune Existing: Variable depressions and ridges, sheltered and exposed
Hydrology:	Limited water holding capacity in soils, very well drained
Vegetation:	Central dune scrub, Native, Ruderal
Land Use:	Open Space, Highway Embankment

Inland plain

Soil: Compacted sand, Relatively stable

Climate: Seasonally and locally intense maritime winds

Topography: **Historic:** Unknown,
Existing: Relatively flat, gentle slope

Hydrology: Limited water holding capacity in soils Greater than High dune, Well drained

Vegetation: Central maritime chaparral, Native, Disturbed and Ruderal

Land Use: Open Space, Sand Mining

Open Sand

Soil: Open disturbed sand, Subsoil of High Dune, Relatively unstable

Climate: Seasonally and locally intense maritime winds

Topography: Variable, Man-caused depressions and ridges

Hydrology: Well drained, Limited water holding capacity, Less than High dune

Vegetation: **Historic:** Central dune scrub
Existing: None

Land Use: Sand Mining

MANAGEMENT AREAS

By combining the physical characteristics of the functional zones with the existing habitat types, the land uses, and the proposed development scenario, it is possible to divide the site into distinct management areas. Each management area has unique characteristics that can be used to help plan and design the appropriate action for management or development.

Management Areas are shown on Figure 6 and are classified as follows: .

Management Area 1:	Existing Central Dune Scrub
1A:	Project Area
1B:	Off Site

Management Area 2:	Disturbed Central Dune Scrub
2A:	Vegetated
2B:	Unvegetated
Management Area 3:	Existing Maritime Chaparral
3A:	Highly Disturbed/Percolation Pond
3B:	Off Site
Management Area 4:	Proposed Development Area
4A:	Ruderal Chaparral/Scrub
4B:	Unvegetated

POTENTIAL IMPACTS

Construction of the Sand City Regional Shopping Center would result in the direct loss of approximately 12.45 acres of ruderal chaparral/scrub, 8.68 acres of open sand, and 1.36 acres of highly disturbed central maritime chaparral. Approximately 0.18 acres of central dune scrub habitat would be temporarily disturbed during initial grading. The following provides a description of potential effects of project construction on sensitive species and their habitats.

The project and the western-most retaining wall have been designed to cause no direct disturbance to existing buckwheat plants or Smith's blue butterfly. The wall will be constructed and placed to allow initial trenching, backfill, and slope stabilization actions to occur without direct damage to individual buckwheat plants. Figure 3 shows the proposed location of the retaining wall and associated slope stabilization grading. Figure 7 provides a cross-section of the retaining wall plan.

Central dune scrub habitat in the temporarily disturbed area consists of primarily iceplant and scattered individual specimens of beach sagebrush and coffeeberry. Two individual Eriogonum latifolium are located near the proposed grading area (HLA field survey, January 1989). These two individuals are approximately 85 and 100 feet southwest of the cadastral survey control point located atop the main ridge (Figure 5). Careful grading and temporary fence placement will ensure that there will be no direct loss of or effect on Eriogonum near the temporary grading area.

The project as proposed would result in the direct loss of four individual buckwheat plants found in isolation from the remainder of the main population. These plants are located in Management Area 4A, approximately 250 to 300 feet from the nearest other existing buckwheat. Several surveys of the site have recorded no Smith's blue butterflies using these particular plants (LSA, 1988; TRA, 1987). Although Smith's blue butterfly is known to use

Eriogonum on other portions of the project site, the isolation of these particular plants and the lack of data substantiating butterfly use of these individuals suggests that these plants do not serve as habitat for the Smith's blue butterfly. While, in a general sense, the loss of these individual plants might be considered as a loss of potential butterfly habitat, it is unlikely that the loss of these four isolated individual buckwheat plants would result in any effects on the resident butterfly population. Thomas Reid also indicates that the loss of these four individual buckweats should not be considered to be significantly adverse to the resident population of Smith's blue butterfly (Appendix A; T. Reid, V. Harris, TRA, pers. comm.).

Construction of the project as proposed would result in the direct loss of approximately 72 individual Monterey ceanothus (48 of which are seedlings between 5 and 12 inches in diameter), 10 individual sandmat manzanita, and 12.45 acres of ruderal chaparral/scrub in Management Area 4A and 4B. Excavation of the proposed percolation pond in Management Area 3A would result in the direct loss of 9 individual Monterey ceanothus and approximately 1.3 acres of highly disturbed central maritime chaparral.

Known and occupied black legless lizard habitat would be reduced by approximately 1.3 acres with excavation of the percolation pond as proposed.

The existing population of Monterey Bay gilia and coast wallflower would not be directly affected by construction as proposed.

The proposed project could result in indirect effects on remaining sensitive habitats if visitors to the site were allowed to trample vegetation.

RESOURCE MANAGEMENT PLAN

MANAGEMENT GOALS

In developing a management plan for a specific area, it is necessary to start with a clear description of the goals and objectives of that plan. To help develop a statement of goals and objectives, and to obtain input and recommendations, several meetings were held with representatives of Monterey Sand Co., Thomas Reid Associates, Fish and Wildlife Service (FWS), California Department of Fish and Game (CDFG), Sierra Club, and California Native Plant Society (CNPS). As a result of information gathered at these meetings, the following statement of goals and objectives was developed:

THE PRIMARY GOAL OF THIS RESOURCE MANAGEMENT PLAN IS TO PROVIDE 8.3 ACRES OF AN ENHANCED, UNIFIED, AND PERMANENTLY MAINTAINED AND PROTECTED BLOCK OF CENTRAL DUNE SCRUB HABITAT ON THE PROJECT SITE THAT WILL SUPPORT MICROCLIMATES SUITABLE FOR EXPANSION OF THE RESIDENT POPULATION OF SMITH'S BLUE BUTTERFLY, IN CONJUNCTION WITH COMMERCIAL DEVELOPMENT ON A PORTION OF THE REMAINDER OF THE SITE.

Specific goals were also established for each of the defined management areas. These are as follows:

Management Area 1:

1A:

- o Removal and control of exotic vegetation
- o Enhancement of existing central dune scrub habitat including expansion of buckwheat and establishing a full palette of other appropriate plant species
- o Slope stabilization where necessary
- o Permanent protection of habitat values
- o Monitoring and maintenance of habitat values

- 1B:
- o No action until the HCP is completed

Management Area 2:

- 2A:
- o Removal and control of exotic vegetation
 - o Creation of central dune scrub habitat in open sand areas, and enhancement of existing ruderal habitat using a full palette of appropriate plant species
 - o Expansion of buckwheat cover
 - o Establishment of approximately 1 acre of habitat that includes sandmat manzanita and Monterey ceanothus
 - o Slope stabilization where necessary
 - o Permanent protection of habitat values
 - o Monitoring and maintenance of habitat values

- 2B:
- o Removal and control of exotic vegetation
 - o Creation of central dune scrub habitat in open sand areas, and enhancement of existing ruderal habitat using a full palette of appropriate plant species
 - o Expansion of buckwheat cover
 - o Slope stabilization where necessary
 - o Permanent protection of habitat values
 - o Monitoring and maintenance of habitat values

Management Area 3:

- 3A:
- o Excavation of 1.3 acres for a percolation pond
- 3B:
- o No action until the HCP is completed.

Management Area 4:

- o Commercial development

The principal techniques to be used to meet these goals will include avoidance of development in existing habitat areas, grading and slope stabilization in selected areas, habitat enhancement and revegetation, fencing and permanent protection, maintenance and monitoring of the restoration program.

MANAGEMENT TECHNIQUES

Approximately 12.45 acres of ruderal chaparral/scrub and 7.92 acres of bare sand habitats are planned for development as a regional commercial center. Approximately 1.3 acres of highly disturbed central maritime chaparral will be excavated to create a percolation pond. Descriptions of development planning and engineering requirements are provided in the Project Description section of this plan.

The following provides descriptions of specific management techniques that will be used to meet the goals for each defined management area. A summary of management elements for each Management Area is provided on Figure 8, located in the map pocket inside the back cover of this report. Specific prescriptions for each Management Area are provided in a subsequent section of this plan.

Avoidance of Sensitive Habitats

One of the most successful forms of management is to avoid disturbance of sensitive habitats. The project site includes approximately 3.5 acres of central dune scrub that supports the endangered Smith's blue butterfly. Project design has been revised since publication of the draft EIR to avoid any direct disturbance to this habitat type and specifically to avoid disturbance of existing buckwheat plants. No development is proposed within central dune scrub habitat that is known to currently support Smith's blue butterfly, black legless lizard, coast wallflower, and Monterey Bay gilia (Management Area 1A).

Slope Stabilization

Current mining operations on the site have resulted in relatively unstable, highly erodible open sand slopes. These slopes will be stabilized through a combination of grading to between 2 and 2-1/2 to 1 (horizontal to vertical) grade and revegetation. A proposed retaining wall will separate development from the habitat area. Sand slopes behind the retaining wall will be backfilled where necessary and graded to specifications (Figure 7).

Construction of the wall will require digging a footing trench approximately 4 to 5 feet deep. A concrete footing will be poured and the wall will also be constructed of poured concrete. The wall will be 15.5 feet high at the center, tapering to grade within 90 feet in each direction. The footing will vary up to ten feet in horizontal width and a sheetpile will be driven to hold the sand slopes behind the wall. Disturbance will occur only within 12 horizontal feet behind the face of the wall. Screw-type anchors will be installed on the sheetpile and left in place to provide support and to anchor the wall to the slope. The location of the wall has been designed so that slope failure in areas that currently support buckwheat will not occur. Backfill and grading operations are also not expected to result in existing slope failure or disturbance to existing stands of buckwheat.

Two cut banks on the site are currently eroding. In order to stabilize these banks, sand backfill will be placed immediately adjacent to the eroding slope and packed, gently, into a 2.5 to 1 horizontal slope. Special care will be taken to ensure that no vegetation is disturbed. A portion of the westernmost bank will be graded to meet slope requirements. No buckwheat plants will be disturbed, and the area will be revegetated. Figure 9 (in map pocket) shows the proposed grading plans for the site.

A temporary fence will be constructed between the backfill operations and existing buckwheat stands. Heavy equipment will not be permitted beyond the fence. Equipment operators will be informed of the reasons for installation of the fence and will be required to cease work and notify the project engineer immediately should bank failure appear imminent.

Control of Exotic Species

Iceplant has been used by Caltrans as a bank stabilizer along the Highway 1 embankment. Iceplant is a non-native, invasive, and aggressive colonizer. The presence of iceplant has significantly degraded the habitat value throughout the project site, and it is out-competing buckweats and other native plants in Management Areas 1A and 2A.

In an effort to expand the cover of native plant species and to enhance habitat values, iceplant will be eliminated from the project site. Several methods are available for removal of iceplant. The most efficient method is to spray with Roundup or a similar herbicide and to allow the iceplant to die on-site without removal. Left in place, dried and dead iceplant will provide a mulch for revegetation efforts and a temporary erosion control method to hold soil in place.

Herbicides such as Roundup break down rapidly (within 2 weeks) and should be applied at a rate consistent with label directions. The herbicide should be applied by a certified applicator using selective, low-drift spray equipment to cover only individual iceplants. Label directions involving application rates, methods, and wind speed should be strictly adhered to. The nozzle of the sprayer should be placed as close to the individual iceplant as possible to decrease the possibility of unwanted drift of the herbicide. (Ferreira and Gray, 1987; TRA, 1982, 1987)

Special care will be required in areas where iceplant and native plants (such as buckwheat) are growing together so that native plants are not killed. The applicator should be informed of the necessity to protect native plants in the area of spraying. It may be necessary to remove iceplant by hand within a one- to two-foot diameter around native plants. Temporary covers for buckwheat plants may also be required during spraying operations to prevent wind drift of the herbicide onto nearby plants (Ferreira and Gray, 1987).

A qualified individual will monitor the effectiveness of the herbicide application and will assess whether an additional application is required. Application of additional herbicide will not occur any earlier than six weeks after the previous application. It is expected that up to three applications may be necessary to completely eliminate the iceplant.

Revegetation and Habitat Enhancement

Establishment of viable populations of native plants in degraded habitat areas on the project site, when combined with other enhancement techniques, has the greatest potential to maximize habitat values on the project site for species of concern.

Site Preparation. Several methods of establishing new populations or enhancing existing populations are available, including seeding, propagation, planting nursery stock, or natural succession. All of these methods will be used on the project site. However, prior to any revegetation effort it will be necessary to sculpt the contours and prepare the soil to maximize the potential for vegetation establishment.

In order to assure that proposed revegetation efforts will be successful, physical characteristics of the area to be revegetated must be compatible with the goals of the revegetation effort. These characteristics include topography, soil condition, hydrology, and microclimate features. For example, Smith's blue butterfly typically uses only those buckwheat plants that are located in sheltered locations and not exposed to the full force of the maritime winds. Planting of buckwheat on exposed ridge tops would likely not yield as substantial an increase in habitat value for the butterfly as would plantings occurring in sheltered depressions (E. Lorenzon, FWS, pers. comm.; V. Harris, TRA, pers. comm.). Planting of buckwheat, or other species, also may not be successful if soil conditions are not suitable for plant survival. Site preparation techniques that will be used for various Management Areas include vegetation removal, mulching, soil compaction, application of fertilizer, raking, scarifying, and irrigation. Specific prescriptions for each management area are provided in a subsequent section of this report.

Seeding. Seeding will include the hand-broadcast of specific seed mixes directly onto the soil of the management areas either prior to or following site preparation. Plants to be considered for seeding include not only the host buckwheats for the Smith's blue butterfly but also the full palette of other central dune scrub or central maritime chaparral species. Seed

will be collected by local experts from specified native plants on site or nearby areas and prepared or treated as required for each species. Seeding will likely be accomplished by hand and will be completed following specific seasonal and climate requirements for each species or mix of species. Specific seed mixes are prescribed for each management area and are provided in a subsequent section of this report. These mixes are guidelines, at present, and percentages may change with the practicality of collection of each species.

Propagation. Experimental propagation of several sensitive plant species is currently underway. Mr. Gerd Schneider of Aptos, California, a locally respected native plant specialist, has collected cuttings from the site of both sandmat manzanita and Monterey ceanothus and is in the process of attempting to propagate each species in small nursery containers. In addition, seeds of sandmat manzanita were collected and given to native plant specialists at Mostly Natives Nursery in Tomales, California in an attempt to grow the plant from seed.

It is expected that propagation of these plants will be more successful from the cuttings rather than from seed. Manzanita species typically require substantial pre-germination care and treatment, and success rates are often low. Once established, the cuttings (or seedlings) will be available for transplant back to the project site, and methods for propagation of the species will be established for future use.

Seed from other native species found on site or nearby in the Monterey Bay Area will also be collected and/or propagated in an effort to provide stock for revegetation and habitat enhancement efforts. It is likely that species selected for propagation would include individuals from both central maritime chaparral and central dune scrub habitats.

Planting of Nursery Stock. It is anticipated that many of the native shrubs and forbs that inhabit the site are either available through local commercial native plant nurseries or can be propagated readily. Nursery stock will be used as much as necessary in order to establish

appropriate habitat composition and diversity. Stock will be planted during appropriate seasons and in appropriate manners so as to facilitate the highest degree of success.

It is anticipated that either nursery flats or 1- or 5-gallon stock will be used. Ferreira and Gray (1987) grew plants in supercell containers, 8 inches long and 1.5 inches in diameter, in a peat-vermiculite mix. Fertilizing, mulching, irrigation, monitoring, and maintenance will likely be required for each plant. Specific revegetation prescriptions and methods are provided in subsequent sections of this report for each of the Management Areas.

Transplant and Salvage of Existing Plants

Individuals of selected plant species on the site will be relocated from areas of direct impact (Management Area 4) to permanently protected habitat areas (Management Area 1A, 2A, and 2B). An experiment has been initiated to examine the feasibility of transplanting individual Monterey ceanothus from Management Areas 3 and 4 to Management Area 2. Experimental samples of Ceanothus seedlings were collected by Mr. Gerd Schneider in January 1989 from Management Area 4A and placed immediately in a Test Plot Area in Management Area 2A (Plate 1). If transplanting appears to be successful, as many as feasible of the individual Monterey ceanothus which would be impacted in Management Areas 3 and 4 will be transplanted prior to site grading. It is possible that plants may require placement in nursery pots in an effort to stabilize the plants before planting. It is anticipated that the plants will be held for approximately one month and then transplanted to an appropriate location in Management Area 2B (Plate 1). The plants will be maintained throughout the spring and monitored to assess their vigor and the success of transplant efforts.

Sandmat manzanita has a large taproot system, while Monterey ceanothus is supported by a shallower lateral root system. Transplant efforts are expected to be more successful with the ceanothus than with the manzanita. Cuttings and seeds will be collected from plants deemed to support too large a root system for successful transplant efforts.

The four buckwheat plants located in Management Area 4A will also be collected and relocated. Seeds will be collected prior to removal of the plants and stored for use in later revegetation efforts. Buckwheat has a fairly extensive taproot system and as much of the root as possible will be collected with each plant. The plants will be immediately relocated in Management Area 1A and maintained through appropriate irrigation and monitoring. Because the root system of established buckweats is relatively deep, successful transplanting of these individuals is not anticipated.

Collection and Relocation of Black Legless Lizard

Black legless lizards have been observed in central maritime chaparral habitat near Management Area 3A. In order to ensure that no legless lizards are effected by excavation of the percolation pond, a pre-excavation survey will be conducted of the affected area immediately prior to initiation of grading. The entire affected area will be raked in an effort to locate legless lizards. Individuals which are located will be collected and relocated to appropriate habitat such as that found in Management Area 3B. Legless lizards are relatively sedentary, and it is likely that if raking occurs within three days prior to excavation, none would be present during excavation operations.

Habitat Protection During Construction

In order to ensure that existing coastal dune scrub habitat and, particularly, existing buckwheat plants are not disturbed during construction, a temporary fence will be constructed within 15 feet to the east of the current vegetation boundary (Plate 1). One area of approximately 0.18 acre within the existing vegetation will be temporarily disturbed and recontoured in an effort to stabilize the sand banks associated with retaining wall construction. Two buckwheat plants are near this grading area and special care will be required to ensure that these plants are not disturbed. A qualified biologist will stake the temporary fence location with the project engineer prior to initial grading. Signs will be

placed on the fence at 100-foot intervals informing grader operators of the presence of sensitive species. Signs will include the following language:

"NOTICE: SENSITIVE HABITAT AREA. GRADING PROHIBITED."

Temporary fences and signs will also be placed along the railroad right-of-way and along La Playa Avenue to ensure that construction equipment will not disturb existing resource values in those areas. The fence along the railroad right-of-way will encroach into the right-of-way by no more than 10 feet. This encroachment is required to allow for on-site construction of project facilities. No project facilities will permanently encroach on the right-of-way.

Temporary fences will be constructed of 3-strand wire, wooden lathe, or "snow fence". Permanent fences are described in a subsequent section.

Prior to initiation of construction, all equipment operators and field supervisors will attend a pre-grading conference. The purpose of the conference will be to inform equipment operators and field supervisors of the presence of endangered species values on and adjacent to the project site and to conduct a site visit to show participants where grading can and cannot occur. All heavy equipment operators and field supervisors will sign a standard form acknowledging their understanding of the resource values on the site and the penalties they may incur if those values are disturbed. Signed statements will be in substantially the following form:

"I understand that certain areas on the project site contain endangered, threatened, and sensitive species - Smith's blue butterfly, black legless lizard, Monterey ceanothus, Monterey Bay gilia, sandmat manzanita, and coast wallflower. I also understand that grading is permitted only inside fenced areas. I understand that grading beyond the fence is not permitted and that it may be a violation of federal and state law to grade beyond the fenced area."

A qualified biologist or agency representative (i.e., CDFG warden) will monitor grading on a daily basis during the initial grading, retaining wall installation, and construction phases. Should the identified resource values be disturbed, a "stop work" order will be issued

immediately. CDFG and FWS will be contacted and the "stop work" order will remain in effect until the problem is resolved.

Permanent Fencing

In order to ensure that the enhanced habitat blocks within the management areas are protected from unauthorized human activity, a permanent fence will be installed around the project perimeter including Management Areas 1A, 2A, and 2B (See Plate 1 in Map Pocket). It is likely that the permanent fence will be a wooden snow fence similar to those used for the Marina State Beach Restoration Project (Ferreira and Gray, 1987). Signs posted at approximately 100-foot intervals along the fence will prohibit entry of unauthorized persons and explain the value of the site for sensitive species.

Permanent Protection.

Monterey Sand Co. is fully committed to the enhancement and preservation of the enhanced habitat areas. Several methods are available to guarantee that values of these areas are protected in perpetuity and to ensure the survival of Smith's blue butterfly, California black legless lizard, coast wallflower, Monterey ceanothus, sandmat manzanita, and Monterey Bay gilia on the project site. These may include granting a permanent conservation easement over the property that forever prohibits development within the management areas, transferring development rights to a conservation organization or agency, dedicating title in fee to a conservation organization or government agency, or a combination of these or other methods.

The city-wide HCP process will likely identify a recommended method for preserving habitat values in perpetuity in the city as a whole. For this project, Monterey Sand Co. will grant a conservation easement over Management Areas 1A, 2A, and 2B in perpetuity to insure long-term protection and preservation of the habitat. This conservation easement will be integrated with the covenants and restrictions for the shopping center in a manner that will

assure that the provisions of this plan, including the long-term financial responsibilities associated with it, will be carried out by the owners of the project. When the city-wide HCP is completed, if it identifies an entity to hold habitat preservation areas other than the landowner, Monterey Sand Co. (or its successors or assignees) can and will commit to convey the areas (Management Areas 1A, 2A and 2B) to such entity.

Monitoring and Maintenance

A source of permanent funding will be established to ensure that habitat values are monitored and maintained. Initial monitoring and maintenance of the habitat improvements will be the responsibility of the owners of the project. Once improvements begin, the project owners will provide funding for necessary maintenance and monitoring for at least five years. Specific funding and maintenance requirements as well as the funding mechanism to be established are described for each Management Area in subsequent sections of this report.

Monterey Sand Co. or its assignees and/or successors will also provide funding for a qualified individual to monitor implementation of the improvements and habitat enhancements. This individual could be a privately hired biologist, a local citizen familiar with the project, or a local CDFG warden. (Funding in the case of using a warden would be directed through the State of California.) It is anticipated that this individual would visit the site daily during the initial grading and retaining wall installation, and approximately once a month during construction of the project and during implementation of the various management measures. Problems arising from implementation of management efforts could then be dealt with effectively and efficiently. Brief progress reports would be prepared and forwarded to responsible or interested agencies such as the Sand City Planning Department, CDFG, and FWS.

Once habitat improvements have been completed, a continuing assessment of the success of those measures will be necessary. Specific goals for survival and success rates for

each enhancement will be defined for each Management Area in subsequent sections of this report. The individual responsible for monitoring success will visit the site once every four months for the first three years of the project and will provide a brief written report to the project owners, the City of Sand City, CDFG, and FWS outlining success of the management efforts, problems encountered, and suggested remedies for any problems. Should the management efforts not be effective following the end of the third year, a new plan will be developed that will meet the same goals. Specific monitoring field forms will be developed for use on this project.

After the first three years, monitoring will occur once every year, up to the fifth year from initiation of the measures. A yearly progress report will be prepared and forwarded to appropriate agencies. Every effort should be made to maintain continuity in the personnel responsible for monitoring and maintenance of the management areas.

In order to quantify changes in the vegetation cover over time, several permanent 100-foot-long line transects will be established in the revegetation and enhancement areas. Data gathered from the transects will provide adequate assessments of the relative success or failure of enhancement efforts. Vegetation cover will be assessed using standard line-intercept methods (Canfield, 1941). Data to be collected will include species type, relative cover, species abundance, species diversity, and relative vigor of individual plants. Transect data will be collected prior to any management action to provide a baseline from which to compare future conditions. Data will be collected once a year for the first five years of the project.

Vertical color infrared aerial photographs of the site will be obtained of the project site in the fifth year of the project. It is likely that these photographs could be coordinated with the needs of the city-wide HCP. These aerials will provide documentation of vegetation cover over the entire site. In addition to aerial photography, six permanent photo points will be established and both color prints and slides of the revegetation areas will be obtained each

year for the first five years. Copies of the photographs will be forwarded with progress reports to Sand City Planning Department, CDFG, and FWS.

Surveys to assess use by Smith's blue butterfly of revegetated and enhanced habitat areas will be conducted each year for the first five years of the project. Because both species of buckwheat are to be used for habitat enhancement, and because the butterfly uses the two species at different times of the year, surveys will be conducted once every two weeks from mid-May through mid-August. Data to be collected will include number of adults observed flying, location of butterfly use, plant species of use (if known), date, time, and weather conditions. Because a goal of this management plan is to increase the habitat use and perhaps population numbers of Smith's blue butterfly on the site, these surveys will document observable changes in these parameters.

Upon completion of the city-wide HCP, the monitoring and maintenance program outlined herein will be integrated with the monitoring and maintenance program of the city-wide HCP. Initial funding will be borne by the project owners through utilization of construction funds, or dedication of funds to a special account specifically set up for monitoring and maintenance. Initial costs for implementing management efforts are estimated to be approximately \$100,000, with an additional \$60,000 for monitoring and maintenance. Long-term funding will include assessment of a special annual fee. Specific funding requirements are described in subsequent sections of this plan.

MANAGEMENT AREA PRESCRIPTIONS

Specific prescriptions are provided for each Management Area. These prescriptions include guidelines for the various management techniques described in the previous section, including avoidance of development in existing habitat areas, grading and slope stabilization in selected areas, control of exotic species, habitat enhancement and revegetation, fencing, permanent protection, and maintenance and monitoring of the management program. Specific

prescriptions and techniques have been modified from successful revegetation technologies developed by the California Department of Parks and Recreation for dune revegetation at Marina State Beach (Ferreira and Gray, 1987) and from general guidelines for restoration and revegetation described in similar documents and professional literature (Lewis, 1982; Weaver et al., 1987; Cook et al., 1974; Shonman, 1988; Alameda County, 1983; USFWS, 1981; Sharp and Adams, 1974).

Specific seed mixes have been developed by HLA for this revegetation and management effort. The seed mixes were derived from similar mixes successfully used by California Department of Parks and Recreation for their work at Marina State Beach (Ferreira and Gray, 1987). In addition, several species have been chosen for propagation and planting as seedlings. Seed mixes and seedlings will be planted in a manner to assure habitat diversity. Seed and seedling mixes are shown in Table 1 and include a diverse palette of species common in dune scrub habitats. It should be noted that guidelines for seed mixes, herbicide concentrations, mulch, application rates, and other items are preliminary and should be subject to change if site conditions or product types warrant it. Guidelines for development scenarios, fence locations, easement dedication, and land use should not and will not be as readily altered.

Management Area 1A

Development Scenario: Avoidance of Direct Impact

(Temporary disturbance of 0.18 acre)

Slope Stabilization: Grading of 0.18 acre to between 2 and 2 1/2:1 slope

Control of Exotic Species and Site Preparation: Management Area 1A includes existing central dune scrub habitat that currently supports both species of buckwheat, Smith's blue butterfly, Monterey Bay gilia, and California black legless lizard. Soil preparation on these areas will require special care because of the presence of these species.

Management Area 1A also includes a population of iceplant that will be removed by hand and through careful application of herbicide.

The dry and dying iceplant will be left in place as a mulch for seeding and planting efforts. The area will be fertilized. No soil compaction or raking will occur in these areas because of the presence of sensitive plant and animal species.

The following summarizes iceplant removal techniques that may be used in this Management Area:

1. **Goal: Removal of iceplant from entire area**
2. **Technique:**
 - o Hand spray remaining iceplant with selective low-drift equipment with herbicide mix of 1.5 to 2% Roundup, 1% surfactant. (Special care will be required to avoid contact of herbicide with desirable native species).
 - o Leave dead iceplant in place as a mulch.

Revegetation Prescription:

1. **Mulch:**
 - o Mulch application in areas of bare sand and iceplant greater than 10 feet in diameter
 - o Hand application of vertical straw mulch
2000 lbs/acre wheat or rice straw
32 person-hours/acre
Handful planted 3-4" deep (6-10" exposed)
bundles 1-2 feet apart
2. **Seed Mix:**
 - o Seed mix Number 1, Applied at a rate of 25 lbs per acre
 - o Seed mix Number 2, applied at a rate of 10 lbs per acre
3. **Season of seeding: Fall**
4. **Nursery Stock Planting:**
 - o Stock Mix Number 1 planted at a rate of 1000 plants per acre
 - o Stock Mix Number 2 planted at a rate of 500 plants per acre

- o Season for planting: Fall
5. Irrigation: Immediately following planting

Fencing:

1. Temporary fence and signing during initial grading and construction
2. Permanent fence and signing along Tioga Road and property boundary

Maintenance Requirement:

1. Irrigation: By hand immediately following planting.
2. Fertilization: 16-6-0 granular fertilizer spread by hand during reseeding effort at a rate of 200 lbs per acre, reapplication in early spring each year for the first 3 years.
3. Pruning: None.
4. Iceplant control: Monitor re-emergence of iceplant and treat once a year by hand pulling or spraying using guidelines described above.

Monitoring Requirement:

1. Monitoring Transects
 - o Three 100-foot-long line-intercept transects will be set up to evaluate changes in cover throughout time.
 - o Data will be collected using the line-intercept method and will include a) species, b) cover, and c) relative vigor.
2. Photo Interpretation
 - o Vertical color air photos will be obtained after year 5 to assess the success of revegetation efforts.
 - o Two ground-photo points will be established in this Management Area.
3. Success Rate Goal
 - o The goal of this revegetation effort is to obtain the following success rates:
 - o Seed Mix 1: 60 percent total cover

- o Seed Mix 2: 400 plants per acre
 - o Shrub Plantings: 70 percent survival
4. **Butterfly Use:** Use of the habitat by Smith's blue butterfly will be monitored to assess the actual use of revegetated areas by endangered species. Surveys for Smith's blue butterfly will be conducted on site, once every 2 weeks from mid-May through mid-August. Numbers of individuals, areas of use, and plant species used will be recorded.

Management Area 1B

Development Scenario: No direct impact; this Management Area will remain as is until completion of the city-wide HCP.

Fencing: A permanent fence will be constructed between Management Area 1B and Management Area 2A. It is expected that this fence will preclude unauthorized entrance into the area.

Management Area 2A

Development Scenario: Partial disturbance of slopes for installation of retaining wall and slope stabilization.

Slope Stabilization: Minimal, as required on a specific local basis.

Control of Exotic Species and Site Preparation: Management Area 2A includes existing central dune scrub habitat that currently does not support either species of buckwheat, Smith's blue butterfly, Monterey Bay gilia, or California black legless lizard. Soil preparation in these areas will not require the special care required for Management Area 1A.

Management Area 2A also includes a population of iceplant that will be removed by hand and through careful application of herbicide.

The dry and dying iceplant will be left in place as a mulch for seeding and planting efforts. A fertilizer will be applied over the entire area by hand at a rate of 200 pounds per acre. No soil compaction or raking will occur in these areas because of the presence of sensitive plant and animal species.

The following summarizes iceplant removal techniques which may be used in this

Management Area:

1. **Goal: Removal of Iceplant from entire area**
2. **Technique:**
 - o **Hand spray with selective low-drift spray equipment remaining iceplant with herbicide mix of 1.5 to 2% Roundup, 1% surfactant**
 - o **Leave dead iceplant in place as a mulch**

Revegetation Prescription:

1. **Mulch:**
 - o **Mulch application in areas of bare sand and iceplant greater than 10 feet in diameter**
 - o **Hand application of vertical straw mulch
2000 lbs/acre wheat or rice straw
32 person-hours/acre
Handful planted 3-4" deep (6-10" exposed)
bundles 1-2 feet apart**
2. **Seed Mix:**
 - o **Seed mix Number 1, applied at a rate of 50 lbs per acre.**
 - o **Seed mix Number 2, applied at a rate of 20 lbs per acre.**
3. **Season of seeding: Fall**
4. **Nursery Stock Planting:**
 - o **Stock Mix Number 1 planted at a rate of 1500 plants per acre.**
 - o **Stock Mix Number 2 planted at a rate of 500 plants per acre.**
 - o **Stock mix Number 3 planted at a rate of 100 plants per acre.**
 - o **Season for planting: Fall.**
5. **Irrigation: Immediately following planting only; no long-term irrigation required.**

Fencing:

1. **Permanent fence and signing along La Playa Avenue and Management Area 4A.**

Maintenance Requirement:

1. **Irrigation:** By hand, immediately following planting.
2. **Fertilization:** 16-6-0 granular fertilizer spread by hand during reseeding effort at a rate of 200 lbs per acre, reapplication in early spring each year for the first 3 years.
3. **Pruning:** None.
4. **Iceplant control:** Monitor re-emergence of iceplant and treat once a year by hand pulling or spraying using guidelines described above.

Monitoring Requirement:

1. **Monitoring Transects**
 - o Three 100-foot-long line-intercept transects will be set up to evaluate changes in cover throughout time.
 - o Data will be collected using line-intercept method and will include a) species, b) cover, and c) relative vigor.
2. **Photo Interpretation**
 - o Vertical color air photos will be obtained after year 5 to assess the success of revegetation efforts.
 - o Two photo points will be established in this Management Area.
3. **Success Rate Goal**
 - o The goal of this revegetation effort is to obtain the following success rates:
 - o Seed Mix 1: 60 percent total cover
 - o Seed Mix 2: 400 plants per acre
 - o Shrub Plantings: 70 percent survival
4. **Butterfly Use:** Use of the habitat by Smith's blue butterfly will be monitored to assess the actual use of revegetated areas by endangered species. Surveys for Smith's blue butterfly will be conducted on site, once every two weeks from mid May through mid August. Numbers of individuals, areas of use, and plant species used will be recorded.

Management Area 2B

Development Scenario: Partial disturbance from installation of the project retaining wall.

Slope Stabilization: Selected slopes behind retaining wall will be graded to between 2 and 2.5:1 grade.

Control of Exotic Species and Site Preparation: Existing topography in Management Area 2B has been modified by active sand mining operations. The mining operations have resulted in a series of excavated and relatively sheltered basins. Portions of these basins would be appropriate for attempts to re-establish buckwheat plants that would be expected to be used by Smith's blue butterfly. These basins will remain intact as much as possible.

These basins are currently bare of vegetation and have been disturbed to such a degree that natural succession would likely require decades to fully vegetate the area. Soils in these areas are relatively loose, highly erodible, and unstable. Some soil preparation would be required prior to revegetation efforts.

Revegetation Prescription:

1. **Mulch:**
 - o Mulch application in areas of bare sand
 - o Mechanical application of straw mulch
8000 lbs/acre wheat or rice straw in 2 applications
Spread 4000 lbs per acre using mechanical straw blower
Crimp with dozer tracks
Apply seed
Plant shrubs
Fertilize
Apply second layer of straw (4000 lbs per acre)
Crimp using roller (Caltrans Standard Specifications 20-1.03)
2. **Seed Mix:**
 - o Seed mix Number 1, applied at a rate of 50 lbs per acre.
 - o Seed mix Number 2, applied at a rate of 20 lbs per acre.

3. Season of seeding: Fall
4. Nursery Stock Planting:
 - o Stock Mix Number 1 planted at a rate of 2000 plants per acre
 - o Stock Mix Number 2 planted at a rate of 800 plants per acre
 - o Season for planting: Fall
5. Irrigation: Immediately following planting; none thereafter.

Fencing:

1. Temporary fence along boundary with Management Area 1A during initial grading and construction.
2. Permanent fence along Development boundary.

Maintenance Requirement:

1. Irrigation: By hand immediately following planting; none thereafter.
2. Fertilization: 16-6-0 granular fertilizer spread by hand during reseeding effort at a rate of 500 lbs per acre, reapplication in early spring each year for the first 3 years.
3. Pruning: None.
4. Iceplant control: Monitor re-emergence of iceplant and treat once a year by hand pulling or spraying using guidelines described above.

Monitoring Requirement:

1. Monitoring Transects

- o Two 100-foot-long line-intercept transects will be set up to evaluate changes in cover throughout time.
- o Data will be collected using the line-intercept method and will include a) species, b) cover, and c) relative vigor.

2. Photo interpretation

- o Vertical color air photos will be obtained after year 5 to assess the success of revegetation efforts.
- o Two photo points will be established in this Management Area

3. Success Rate Goal

- o The goal of this revegetation effort is to obtain the following success rates:
- o Seed Mix 1: 60 percent total cover
- o Seed Mix 2: 400 plants per acre
- o Shrub Plantings: 70 percent survival

4. Butterfly Use:

- o Use of the habitat by Smith's blue butterfly will be monitored to assess the actual use of revegetated areas by endangered species.
- o Surveys for Smith's blue butterfly will be conducted on site, once every 2 weeks from mid-May through mid-August. Numbers of individuals, areas of use, and plant species used will be recorded.

Management Area 3A:

Development Scenario: Excavation for a percolation pond. No further action until completion of the city-wide HCP.

Salvage Prescription: Individual Monterey ceanothus will be transplanted from Management Area 3A to Management Area 1A or 2A. Selected individuals will be excavated with extreme care, ensuring that as much of the rootball as possible is collected, stabilized in a greenhouse, and then transplanted to an appropriate site outside of the development envelope. Seeds and cuttings will be obtained from these and other native plant species observed in these areas to use as stock for revegetation efforts in other Management Areas.

Management Area 3B:

Development Scenario: No action until completion of the City-wide HCP.

Fencing: A temporary fence will be installed along La Playa Avenue to prevent disturbance to existing habitat values during construction.

Management Area 4A:

Development Scenario: Commercial development.

Salvage Prescription: Individual sandmat manzanita, Monterey ceanothus, and buckwheat will be transplanted from Management Area 4A to Management Area 1A or 2A. Selected individuals will be excavated with extreme care, ensuring as much of the rootball as possible is collected, stabilized in a greenhouse, then transplanted to an appropriate site outside of the development envelope.

Seeds and cuttings will be obtained from these and other native plant species observed in these areas to use as stock for revegetation efforts in other Management Areas.

Fencing.

A temporary fence will be installed along the railroad right-of-way to prevent disturbance to existing habitat values during construction.

Management Area 4B

Development Scenario: Commercial Development.

Salvage Prescription: Individual Monterey ceanothus will not be directly transplanted from Management Area 4B. Seeds and cuttings will be obtained from the individuals within the railroad right-of-way and other native plant species observed in these areas to use as stock for revegetation efforts in other Management Areas.

FUNDING MECHANISMS AND RESPONSIBILITIES

In order to ensure success of this management plan, adequate funding must be obtained. Funding must also be available for continued monitoring and maintenance of the revegetation and habitat enhancement efforts.

Table 2 provides a breakdown of expected initial management costs and estimates for yearly maintenance and monitoring. Total initial cost for implementing this management plan

is estimated at \$103,536 (or approximately \$0.425 per square foot of development).

Maintenance and monitoring costs for the first three years are estimated to be \$62,000 (or approximately \$0.254 per square foot). Future costs for monitoring beyond year 3 are estimated to be \$12,700 (or \$0.052 per square foot). Total cost estimated for implementation of this plan over a five-year period is \$178,236 (or \$0.732 per square foot).

In order to provide for the long-term protection of the sensitive habitat areas, Monterey Sand Co. will grant a conservation easement in perpetuity over Management Areas 1A, 2A, and 2B. This conservation easement will permit the use of the area only for purposes of habitat restoration, enhancement, and protection and activities consistent therewith, and will prohibit further development of the property. The conservation easement will be granted to the City of Sand City or some other governmental or conservation entity, approved by Sand City and Monterey Sand Co., and the covenants and restrictions of the conservation easement shall be enforceable against the owners by the entity that is granted the conservation easement.

The implementation costs described in Table 2 will be paid by Monterey Sand Co. as a part of construction costs of the project. The monitoring costs described in Table 2 will be assured in the following manner. Monterey Sand Co. will impose upon the project site recorded covenants and restrictions which will obligate the owners of the project site to manage and maintain the sensitive habitat area in accordance with this plan. These covenants and restrictions, as a part of this obligation, will require the landowners to pay the amounts necessary to cover the cost of monitoring and maintenance over time. This fee imposed upon the landowners will be collected either by an association of the landowners, or an agent of the landowners designated for that purpose. The obligation to pay applicable fees will constitute a lien upon the property. These fees will be levied, collected, and devoted exclusively to the management and maintenance of the sensitive habitat area, and if necessary, a special separate account for the deposit and holding of these funds will be established. This method of funding

is a common and accepted method of assuring the payment of so called "common area" costs and expenses in shopping center developments.

It is anticipated that the HCP, when completed, will provide a mechanism for long-term funding for monitoring and maintenance of mitigation and management plans (T. Reid, TRA, pers. comm.). The funding mechanism established under this plan will assure the long-term funding of the preservation of the sensitive habitat areas of the project site. In the event that the HCP establishes a different mechanism, Monterey Sand Co. will participate in that funding mechanism as a substitute for the mechanism established under this plan to the extent of the financial obligations set forth in this plan.

IMPLEMENTATION RESPONSIBILITIES

The following describes procedures and administrative details of this management plan including formulation of a formal agreement between Monterey Sand Co. and Sand City, landowner commitments, and amendment procedures.

Formal Agreement

As a condition to issuance of any building or grading permits by Sand City for commencement of construction of the project, Monterey Sand Co. and all owners of the project site will enter into a formal agreement with Sand City and applicable regulatory agencies to ensure that the provisions of this plan are carried out. As a part of this agreement, Monterey Sand Co. and these owners will commit to participate in the city-wide HCP with respect to this project and commit the level of funding required herein for the project site to the city-wide HCP in the event the HCP establishes a different entity for management of the sensitive habitat areas on the project site. Monterey Sand Co. will also commit to participate in the city-wide HCP with respect to the remainder of its property as and when such property is developed. Monterey Sand Co. and all owners of the project site will further agree to grant

habitat access, easement, or fee title for permanently conserved lands to the appropriate entity selected by the HCP.

Landowner Responsibilities and Commitments

Monterey Sand Company agrees to grade and excavate only those areas identified as Management Areas 3A, 4A, and 4B in this mitigation plan. Partial slope stabilization operations will also occur in Management Areas 2A and 2B. An area of approximately 0.18 acre will be stabilized in Management Area 1A. No further grading, excavation or disturbance will occur in Management Areas 1A, 1B, and 3B. Management efforts will be initiated prior to initial site grading as described in this plan and will be the responsibility of Monterey Sand Co.

Should a "stop work" order be duly and properly issued by the local government having jurisdiction, Monterey Sand Co. will stop grading work immediately.

Amendment Procedures:

Amendments to this plan shall be in writing, may be proposed by any party, and shall become effective upon written approval by all parties. Technical specifications, including seed mix, herbicide concentrations, mulch type, application rates, planting techniques, iceplant removal and control techniques, and others should be subject to change without the requirement of a full round of signatures. Prior to completion of this agreement, technical guidelines which are subject to revision without full party approval will be identified and extracted as an exhibit to the final agreement.

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TABLES

**Table 1. Proposed Seed and Seedling Mixes for
Revegetation Efforts for the Sand City Regional
Shopping Center Mitigation Plan**

SEED MIX 1

<u>Common Name</u>	<u>Scientific Name</u>	<u>Percent of Mix</u>
Yellow Sand Verbena	<i>Abronia latifolia</i>	10
Pink Sand Verbena	<i>Abronia umbellata</i>	10
Dune Sagebrush	<i>Artemisia pycnocephala</i>	7
Dune Saltbush	<i>Atriplex leucophylla</i>	7
Coyote Bush	<i>Baccharis pilularis</i>	7
Beach Primrose	<i>Camissonia cheiranthifolia</i>	10
Beach Aster	<i>Corethrogyne californica</i>	5
Liveforever	<i>Dudleya caespitosa</i>	10
Lizard Tail	<i>Eriophyllum staechadifolium</i>	10
California Poppy	<i>Eschscholzia californica var. maritime</i>	5
Mock Heather	<i>Haplopappus ericoides</i>	10
Eastwood's Golden Fleece	<i>Haplopappus eastwoodii</i>	1
Dune Lupine	<i>Lupinus chamissonsis</i>	5
Dune Bluegrass	<i>Boa douglasii</i>	5

SEED MIX 2

Coast Buckwheat	<i>Eriogonum latifolium</i>	50
Dune Buckwheat	<i>Eriogonum parvifolium</i>	50

**Table 1. Proposed Seed and Seedling Mixes for
Revegetation Efforts for the Sand City Regional
Shopping Center Mitigation Plan
(continued)**

SEEDLING MIX 1

<u>Common Name</u>	<u>Scientific Name</u>	<u>Number of Seedlings</u>	<u>Percent of Mix</u>
Yellow Sand Verbena	<i>Abronia latifolia</i>	900	7.5
Pink Sand Verbena	<i>Abronia umbellata</i>	480	4
	<i>Ambrosia chamissonsis</i>	1200	10
Dune Sagebrush	<i>Artemisia pycnocephala</i>	3000	25
Coyote Bush	<i>Baccharis pilularis</i>	600	5
Beach Primrose	<i>Camissonia cheiranthifolia</i>	2400	20
Beach Aster	<i>Corethrogyne californica</i>	1200	10
Lizardtail	<i>Eriophyllum staechadifolium</i>	1800	15
Mock Heather	<i>Haplopappus ericoides</i>	300	2.5
Eastwood's Golden Fleece	<i>Haplopappus eastwoodii</i>	40	0.2
Dune Lupine	<i>Lupinus chamissonsis</i>	<u>60</u>	0.5
	TOTAL:	12,000	

SEEDLING MIX 2

Coast Buckwheat	<i>Eriogonum latifolium</i>	2500	50
Dune Buckwheat	<i>Eriogonum parvifolium</i>	<u>2500</u>	50
	TOTAL:	5,000	

SEEDLING MIX 3

Sandmat Manzanita	<i>Arctostaphylos pumilla</i>	500	50
Monterey Ceanothus	<i>Ceanothus rigidis</i>	<u>500</u>	50
	TOTAL:	1000	

**Table 2. Estimated Costs for Implementation of the
Biological Mitigation Plan for the Proposed
Sand City Regional Shopping Center**

IMPLEMENTATION COSTS
Initial Costs

Seed Collection		\$25,000
Plant Propagation		20,000
Fencing (temporary)	\$2 per foot	6,000
Fencing (permanent)	\$3 per foot	<u>7,500</u>
TOTAL:		\$58,500

Management Area 1A (3.53 acres)

Iceplant Removal	\$500 per acre	\$1,765
Mulch/Seed/Plant	\$1500 per acre	5,295
Fertilizer	\$200 per acre	<u>706</u>
TOTAL:		\$7,766

Management Area 2A (3.24 acres)

Iceplant Removal	\$250 per acre	\$ 810
Mulch/Seed/Plant	\$3,000 per acre	9,720
Fertilizer	\$200 per acre	<u>648</u>
TOTAL:		\$11,178

Management Area 2B (1.60 acres)

Slope Contour	\$1,600 per acre	\$2,560
Mulch/Seed/Plant	\$3,000 per acre	4,800
Fertilizer	\$200 per acre	<u>320</u>
TOTAL:		\$7,680

Management Areas 3A & 4A

Transplant		\$5,000
Black Legless Lizard Survey		<u>4,000</u>
TOTAL:		\$9,000

TOTAL IMPLEMENTATION COSTS: **\$94,124**

10% Contingency for revegation and further iceplant removal: **\$ 9,412**

TOTAL: **\$103,536**

Estimated cost of \$0.425 per square foot of commercial development

**Table 2. Estimated Costs for Implementation of the
Biological Mitigation Plan for the Proposed
Sand City Regional Shopping Center
(continued)**

MONITORING COSTS
Year 0-3

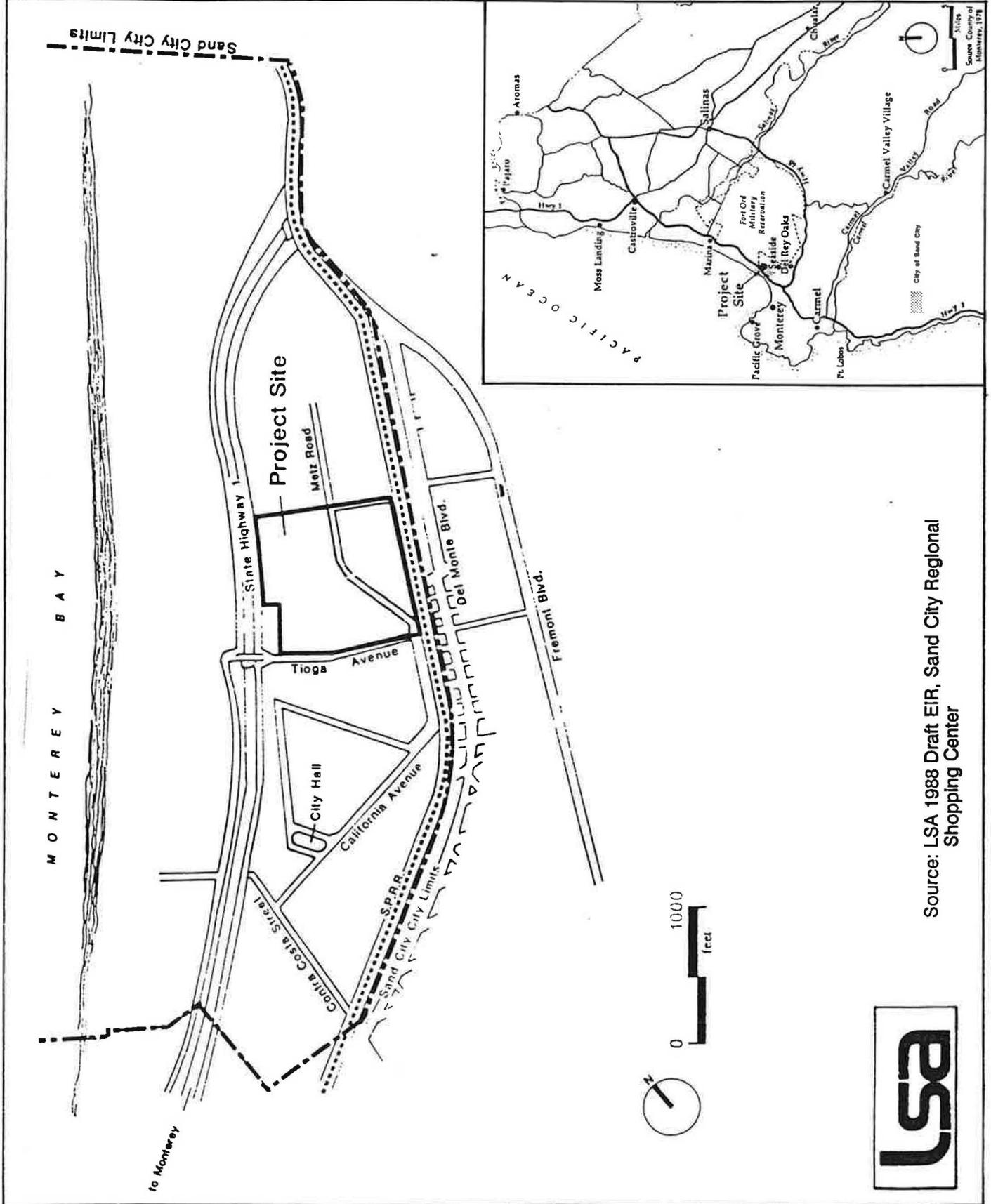
Initial Construction of Wall	24 days @ \$700/day	\$16,800
Transect Set-Up	2 days @ \$700/day	1,400
On-Going Construction Monitoring:		
Year 1	50 days @ \$700/day	35,000
Year 2-3	12 days @ \$700/day	8,400
Ground Photos	4 yrs @ \$100/yr	<u>400</u>
	TOTAL	\$62,000

Year 4-5

On-Going Monitoring	11 days @ \$1,000/day	\$11,000
Ground Photos	2 yrs @ \$100/yr	200
Aerial Photos	1 set @ \$1,500/set	<u>1,500</u>
	TOTAL	\$12,700

TOTAL MONITORING COSTS: \$74,700

Estimated cost of \$0.307 per square foot of commercial development



Source: LSA 1988 Draft EIR, Sand City Regional Shopping Center



FIGURE

1



Harding Lawson Associates
Engineers and Geoscientists

Project Location
Sand City Regional Shopping Center
Sand City, California

DRAWN
JS

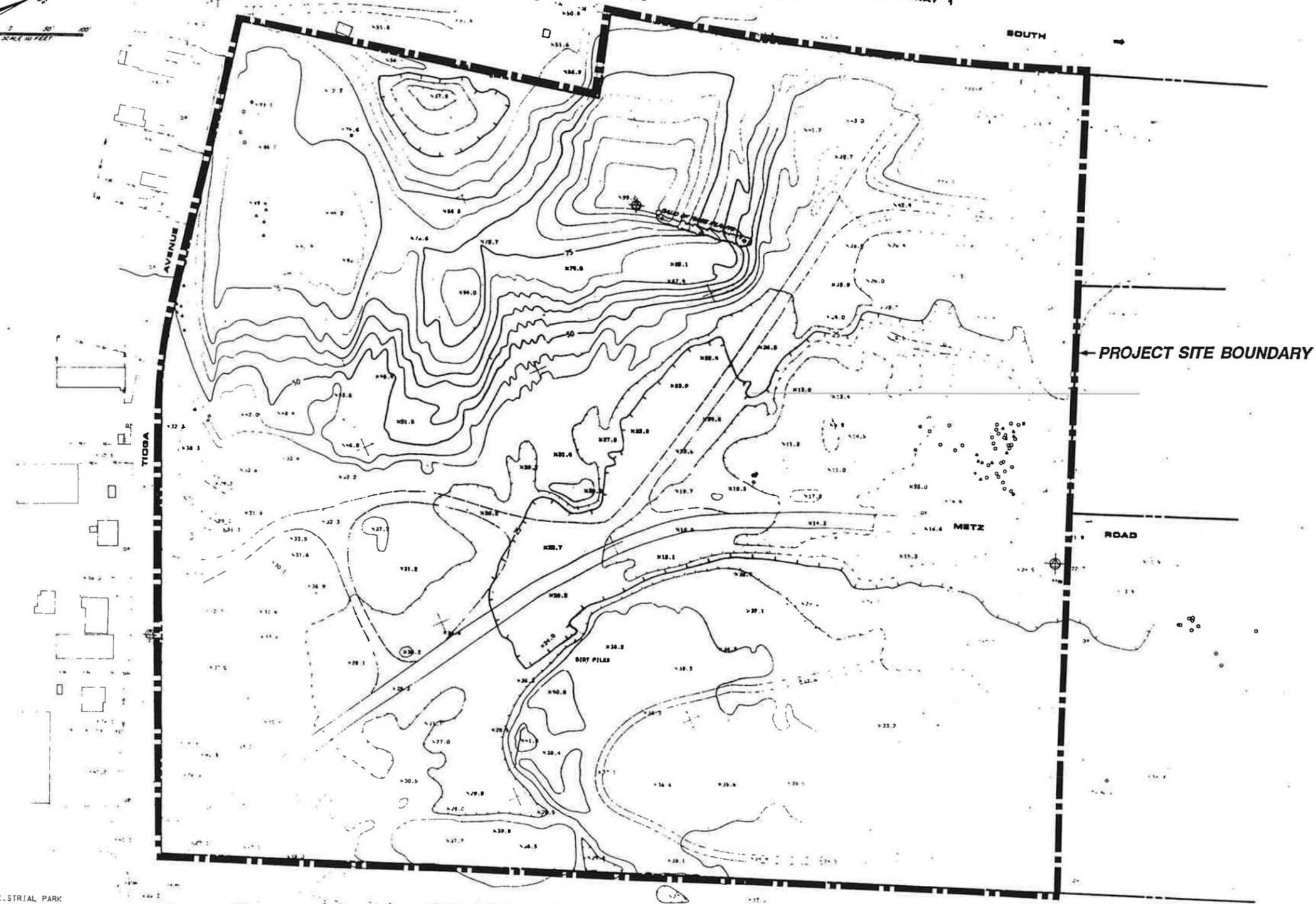
JOB NUMBER
18993,001.02

APPROVED
KF

DATE
1/89

REVISED

DATE



Mc DONALD INDUSTRIAL PARK
MAP SCALE 1"=50' CI 5'
DATE OF PHOTOGRAPHY 11-28-88
HJV #7044



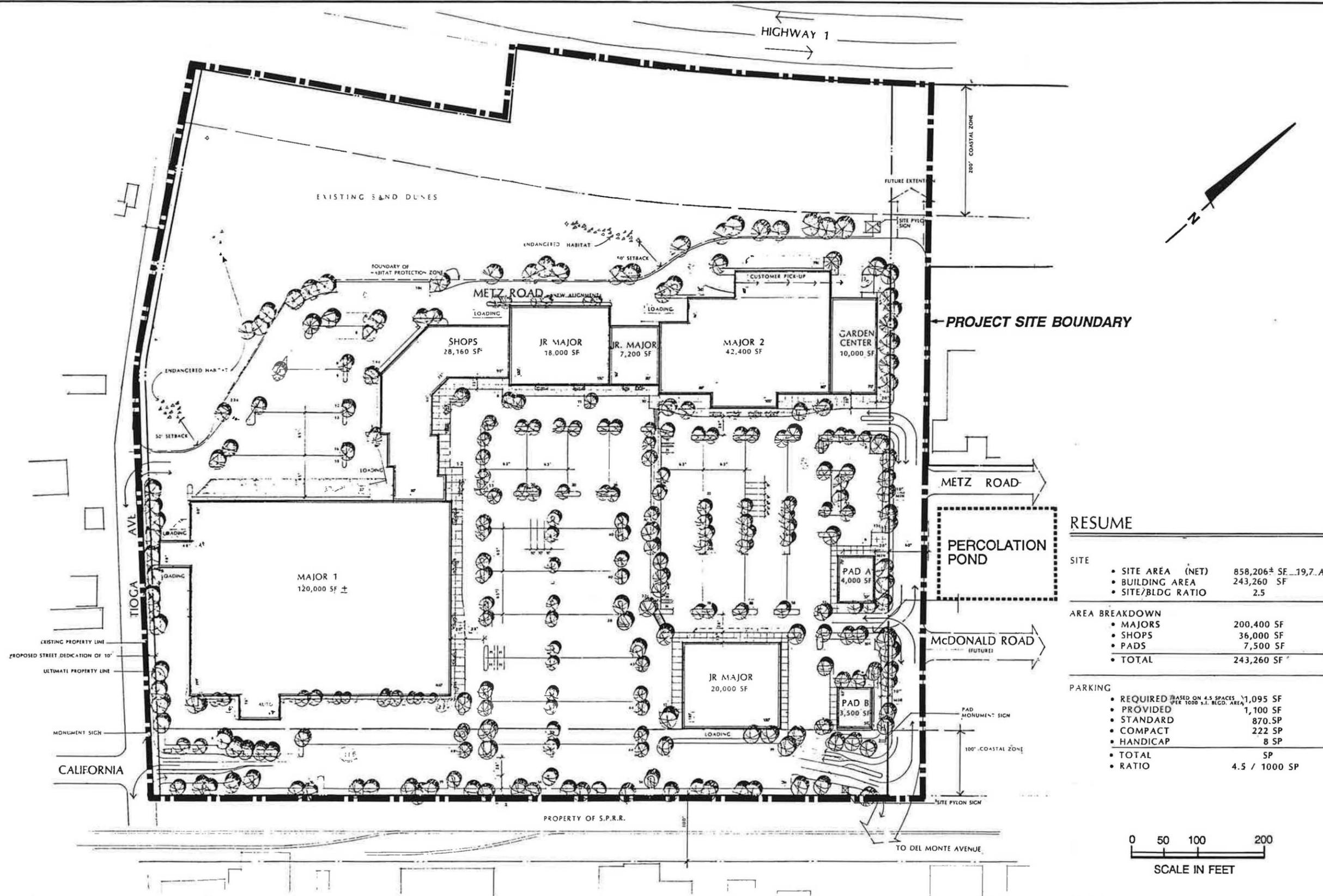
Harding Lawson Associates
Engineers and Geoscientists

Project Site
Sand City Regional Shopping Center
Sand City, California

FIGURE
2

Base Map from Bestor Engineers Inc., 12/88.

DRAWN JS	JOB NUMBER 18993,001.02	APPROVED KF	DATE 1/89	REVISED	DATE
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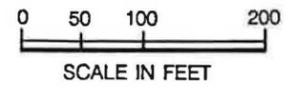


RESUME

SITE		
• SITE AREA (NET)	858,206± SF	19.7 A
• BUILDING AREA	243,260 SF	
• SITE/BLDG RATIO	2.5	

AREA BREAKDOWN		
• MAJORS	200,400 SF	
• SHOPS	36,000 SF	
• PADS	7,500 SF	
• TOTAL	243,260 SF	

PARKING		
• REQUIRED (BASED ON 4.5 SPACES PER 1000 S.F. BLDG. AREA)	1,095 SF	
• PROVIDED	1,100 SF	
• STANDARD	870 SP	
• COMPACT	222 SP	
• HANDICAP	8 SP	
• TOTAL	SP	
• RATIO	4.5 / 1000 SP	



Source: SGPA Planning and Architecture, 1/89.

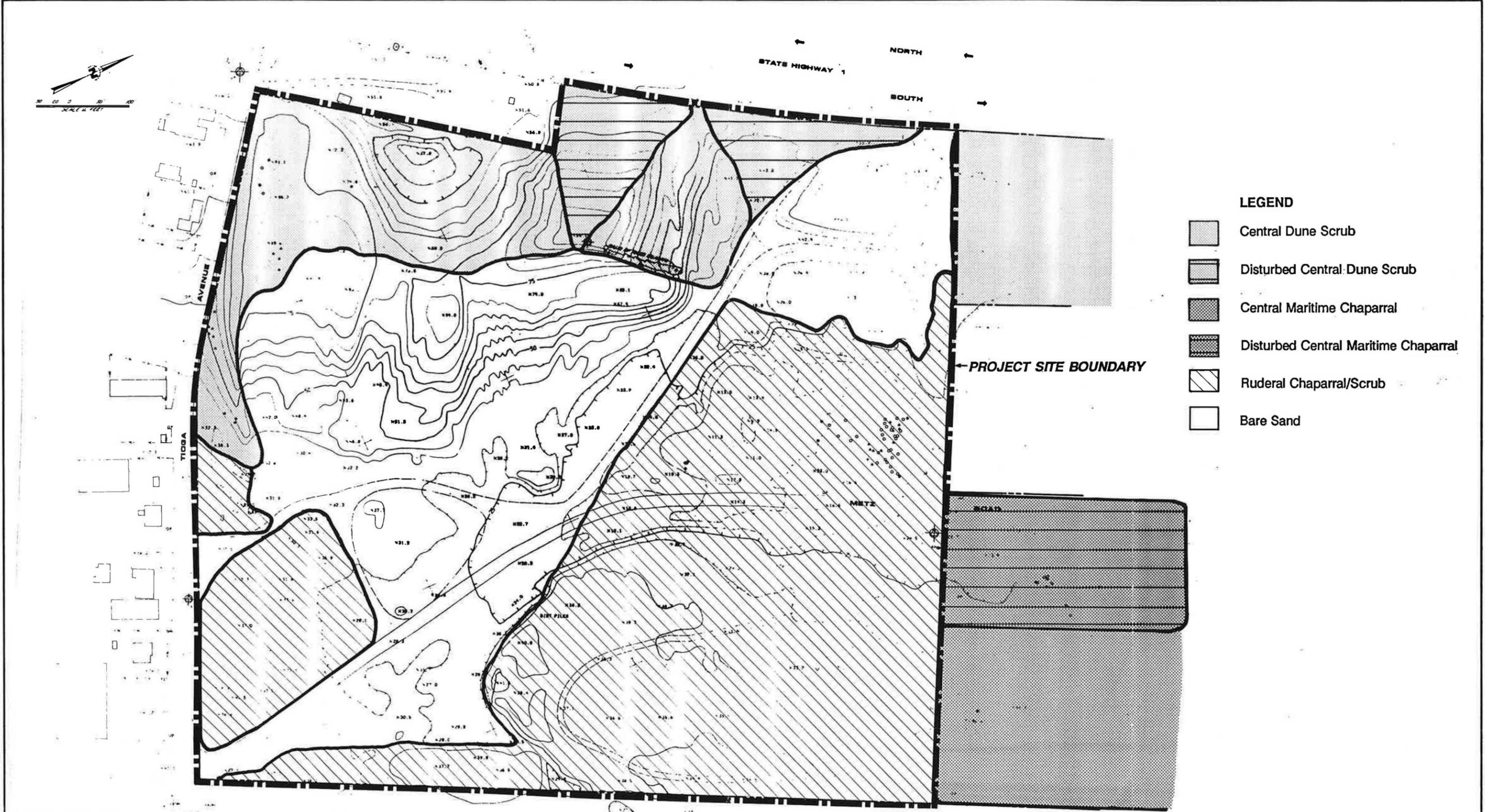


Harding Lawson Associates
Engineers and Geoscientists

Development Plan
Sand City Regional Shopping Center
Sand City, California

FIGURE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JS	18993,001.02	KF	1/89		



LEGEND

-  Central Dune Scrub
-  Disturbed Central Dune Scrub
-  Central Maritime Chaparral
-  Disturbed Central Maritime Chaparral
-  Ruderal Chaparral/Scrub
-  Bare Sand

← PROJECT SITE BOUNDARY

Mc DONALD INDUSTRIAL PARK
 MAP SCALE 1"=50' ± 5'
 DATE OF PHOTOGRAPH 11-28-88
 HJV #7044

Base Map from Bestor Engineers Inc., 12/88.

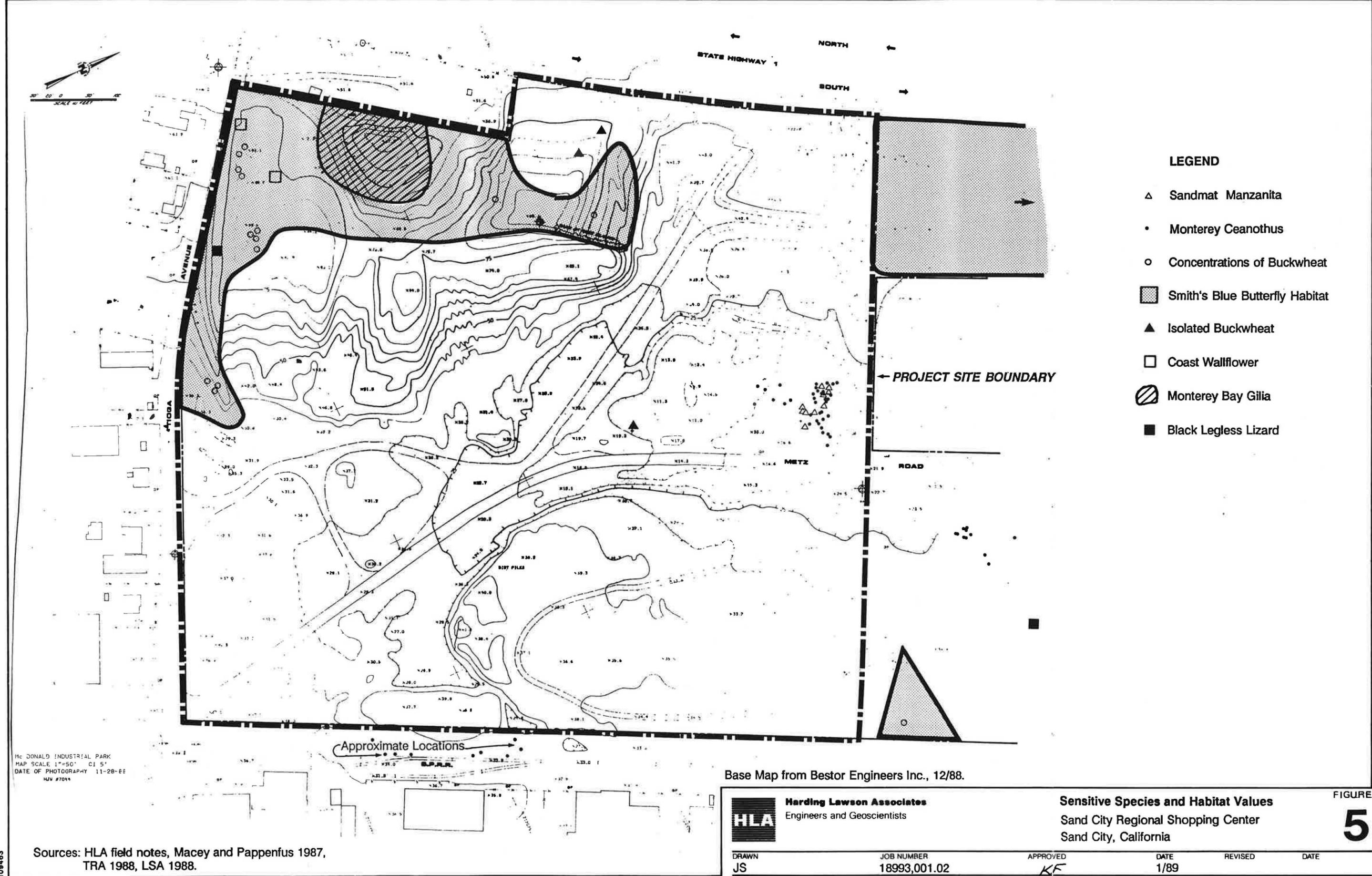
HLA **Harding Lawson Associates**
 Engineers and Geoscientists

Habitat Types
 Sand City Regional Shopping Center
 Sand City, California

FIGURE **4**

Source: Color IR Aerial Photographs, Hammond, Jensen, and Wallen
 11/28/88; 1:7200 scale; FMC CIR-AV3422.

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JS	18993,001.02	<i>KLF</i>	1/89		



LEGEND

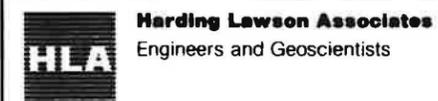
- △ Sandmat Manzanita
- Monterey Ceanothus
- Concentrations of Buckwheat
- ▨ Smith's Blue Butterfly Habitat
- ▲ Isolated Buckwheat
- Coast Wallflower
- ◌ Monterey Bay Gilia
- Black Legless Lizard

← PROJECT SITE BOUNDARY

Approximate Locations →

Mc DONALD INDUSTRIAL PARK
 MAP SCALE 1"=50' CI 5'
 DATE OF PHOTOGRAPHY 11-28-88
 HJV #7014

Base Map from Bestor Engineers Inc., 12/88.

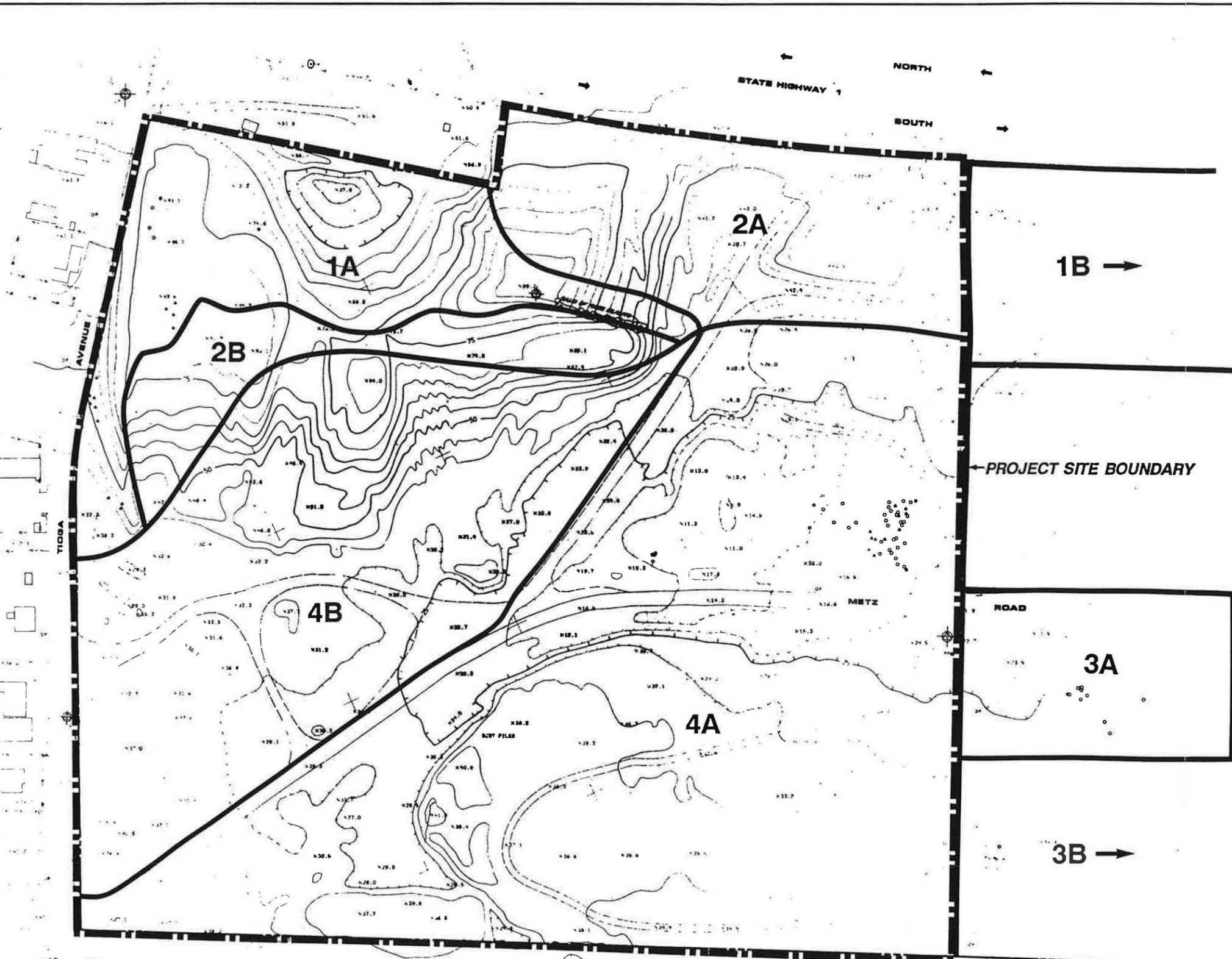
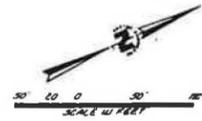


Sensitive Species and Habitat Values
 Sand City Regional Shopping Center
 Sand City, California

FIGURE 5

Sources: HLA field notes, Macey and Pappenfus 1987,
 TRA 1988, LSA 1988.

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JS	18993,001.02	KF	1/89		



- Management Area 1:**
Existing Central Dune Scrub Habitat
1A: Project Area
1B: Off-Site
- Management Area 2:**
Disturbed Central Dune Scrub
2A: Vegetated
2B: Unvegetated
- Management Area 3:**
Disturbed Central Maritime Chaparral
3A: Highly Disturbed, Ruderal/
Percolation Pond
3B: Off-Site
- Management Area 4:**
Proposed Development Area
4A: Ruderal Chaparral/Scrub
4B: Unvegetated

Mc DONALD INDUSTRIAL PARK
 MAP SCALE 1"=50' CI 5'
 DATE OF PHOTOGRAPHY 11-26-88
 MW #7049

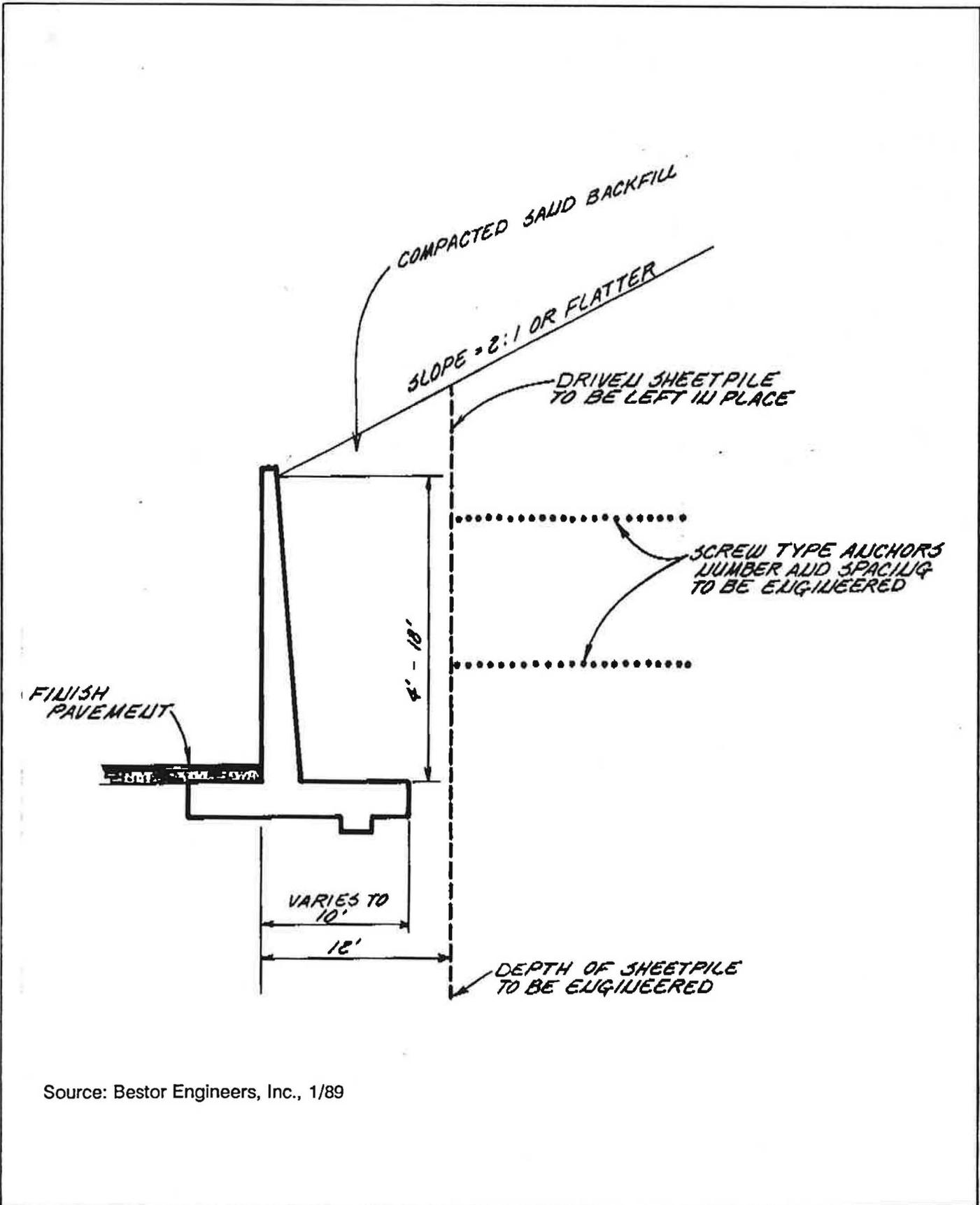
Base Map from Bestor Engineers Inc., 12/88.

HLA Harding Lawson Associates
 Engineers and Geoscientists

Management Areas
 Sand City Regional Shopping Center
 Sand City, California

FIGURE
6

DRAWN JS	JOB NUMBER 18993,001.02	APPROVED KF	DATE 1/89	REVISED	DATE
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Source: Bestor Engineers, Inc., 1/89



Harding Lawson Associates
Engineers and Geoscientists

Retaining Wall Cross Section
At Endangered Plant Location
Sand City Regional Shopping Center
Sand City, California

FIGURE

7

DRAWN
DA

JOB NUMBER
18993,001.02

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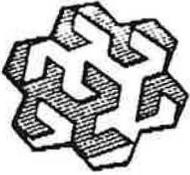
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1/89

REVISED

DATE

Appendix A

GUIDELINES FOR PLAN PREPARATION



THOMAS REID ASSOCIATES

505 HAMILTON AVE., SUITE 201
BOX 872 PALO ALTO, CA 94301

Tel: 415-327-0429
Fax: 415-327-4024

December 28, 1988
TRA File: BSCP

Mr. Richard Arjo
Acting Planning Director
City of Sand City
1 Sylvan Park
Sand City, CA 93955

Dear Mr. Arjo:

Thomas Reid Associates (TRA) is assisting the City of Sand City in preparation of a Habitat Conservation Plan for the whole of Sand City to resolve issues pertaining to the presence of the endangered Smith's blue butterfly and other rare species found in the City.

The proposed "Sand Dollar Shopping Center" project, located between Tioga Ave. and La Playa just east of Highway 1, is pending approval from the City Council. An EIR has already been circulated and is awaiting certification pending the preparation of the Final EIR. The draft EIR discusses the possible impact of the project on Smith's blue butterfly and several comments have been received on the subject. Smith's blue butterfly issues need to be resolved in the Final EIR prior to its certification.

The Smith's blue butterfly population in Sand City has been well studied over the past two years. TRA performed a survey of the butterfly for the City in 1987. An additional survey for the butterfly and its host plants was performed in 1988 by Clint Kellner of LSA Associates. Subsequently a detailed survey of the butterfly's host plants on the project site and in the project vicinity was made in November 1988 by TRA staff and Harding Lawson Associates (HLA) staff. During November 1988 surveys, the exact locations of the host plants were mapped by engineering surveyors. The locations of the host plants were precisely marked on project grading plans. The purpose of this was to more precisely assess the impact on the butterfly from development of the Sand Dollar Shopping Center project.

The current shopping center plan (December 1988) avoids all but four individual specimens of the host plant Eriogonum parvifolium located in the middle of project site. It would be impossible for construction of the project to avoid these plants. The four individual plants are small and isolated from other significant patches of Eriogonum.

Based on our studies of the Smith's blue butterfly we deem it highly

Mr. Richard Arjo -- December 28, 1988

Page 2

unlikely that these four plants materially support the Sand City population of the butterfly. Any host plant associated with an established population of the Smith's blue butterfly may be used for oviposition (egg laying) and hence have larvae feeding on or diapausing near it. However, in actual field surveys, butterflies are rarely observed visiting insignificant outlying host plant individuals such as those plants located on the shopping center site. Thus the loss of the host plants per se is not likely to result in a take of individuals of the endangered species, nor would it have a significant impact on the habitat resource for the population as a whole.

Nonetheless, impacts of the overall loss of open space, impacts on rare plants found in the project site, and impacts of cumulative habitat loss for the Smith's blue will require mitigation. It would be appropriate for the City to require the project sponsor to submit a restoration plan with specific mitigating measures. HLA is now in the process of preparing such a site specific restoration plan on lands owned by Monterey Sand Company just west of the shopping center site. These lands support a population of Smith's blue and are badly in need of exotic species control and habitat restoration.

It is also appropriate for the landowner to participate in the City-wide HCP effort. That HCP will include a long-term funding program aimed at providing continued enhancement activities and ongoing species monitoring. It will include provisions for improving the population status of all species of concern including the Smith's blue butterfly, Black legless lizard, and the rare plants found in Sand City.

Based on the above discussion, the City could certify the Final EIR for the shopping center project with the following conditions added to specifically address endangered species issues:

1. Require the Applicant to submit a site specific restoration plan for the Shopping Center. The restoration plan should be submitted to U.S. Fish and Wildlife Service for review and comment. The plan should show on a sufficiently detailed map:
 - a. the area of the site which will be permanently disturbed,
 - b. the area of the site which will be temporarily disturbed during construction, but which will be revegetated and restored to habitat,
 - c. the area of the site which will be permanently set aside for coastal habitat, and
 - d. the location of a fence (e.g. a three-strand wire fence) that will be erected prior to site activities to serve as a monitoring barrier to limit habitat disturbance.

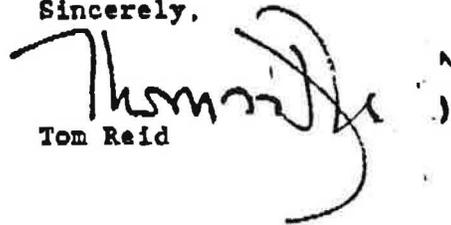
The plan should specify what methods will be used to restore areas of temporary disturbance ("b" above) and areas of permanent habitat set-aside ("c" above). The methods should address control of exotic species (primarily iceplant) and list types and amounts of native species to be used.

2. Require the Applicant to participate in the City-wide HCP program. The agreement to participate should be binding on the current landowner and

its successors. The participation will entail sharing in any long term funding program that applies to all now open or vacant lands and will include a provision to grant habitat access, easement, or fee title for permanently conserved lands to the appropriate entity selected by the HCP.

We are available to assist the City in reviewing the elements of the site specific restoration program that HLA is preparing for the shopping center project. If you need further assistance on this matter please feel free to contact us.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Tom Reid', with a large, sweeping flourish extending from the end of the name.

Tom Reid

cc: George Kurilko
George Robinette
Ed Lorentzen
Mike Zander

Appendix B

LOCAL COASTAL PROGRAM LAND USE PLAN

SAND CITY LCP LUP

4.0 COASTAL RESOURCE MANAGEMENT

4.1 Coastal Act Policies

Section 30230

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific and educational purposes.

Section 30231

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Section 30233

- (a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:
- (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.
 - ...
 - (5) Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.
 - (6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

- (7) Restoration purposes.
- (b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable longshore current systems.

...

Section 30235

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible.

Section 30240

- (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.
- (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

Section 30244

Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

Section 30253

New development shall:

- (1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

- (2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

4.2 Background

4.2.1 Shoreline Sand Supply and Sand Mining

Permanent long-term erosion of the coastline has generally occurred along Monterey Bay over the past 60 years. In the past, there has been quite a bit of data generated in an attempt to calculate a sand budget for the southern Monterey Bay region. However, because various researchers have made different assumptions regarding the various factors influencing sand transport, an accurate sand budget has not been agreed upon.

Average annual erosion rates for Sand City in general, as estimated by previous researchers, range between 1.4 and 5 feet per year. Typically, it has been found that permanent coastal erosion takes place along the cliffs and bluffs as a result of major storms. There may be no erosion for many years, and then significant erosion will result. In addition, erosion rates will vary at different points along the coast due to differences in wave refraction, type of topography, and location. Thus, an average uniform erosion rate cannot be applied to Sand City's coastline.

Currently, two existing sand mining operations in Sand City utilize the surf zone and sand dunes as sources of sand. The sand mined by Monterey Sand Company is from the surf zone and is unique and classified as "specialty" due to its physical characteristics, including its range of grain size. The surf zone of southern Monterey Bay is one of few locations which produces this type of sand. As a result, Monterey Sand Company's mining operations have been determined to be "coastal dependent" by the Coastal Commission. Lone Star Industries currently mines sand on its property for use as construction grade sand, which is not considered a specialty use.

The major issues regarding surf zone sand mining are whether it contributes significantly to erosion (because it removes sand from beaches that protect bluffs) and its overall impact on longshore sand transport. Based on review of available documented studies to date, there is no conclusive evidence regarding the contribution of sand mining to coastal erosion.

Most researchers are of the opinion that sand mining probably contributes to coastal erosion, but studies conducted to date have not reliably quantified the extent of the presumed contribution to erosion and thus provide limited basis for attempting to determine whether the presumed contribution is "significant." In the absence of reliable quan-

tified documented evidence, it cannot be concluded that sand mining contributes significantly to coastal erosion.

The actual sand mining operations (bucket and drag line) apparently do not permanently damage the surf zone, because the removed sand is quickly replaced. However, in late summer and early fall, it may take several hours for the sand to be replaced. It appears that the impact of sand excavation is insignificant in comparison with the disturbance caused by common rip currents.

Determining the quantitative impacts of surf zone sand mining on coastal erosion would require an expensive, involved study because it would deal with monitoring the coastline and movement of sand over time. Several years ago, it was projected that over a period of five years such a study would cost at least \$500,000. While it was generally agreed that such a study would provide meaningful data, it was also recognized that there was no assurance that the study, or even a study over a duration as long as 20 or 30 years, would yield a conclusive result on the issue of sand mining's contribution to coastal erosion. Consequently, requiring such a study as a condition of approval of new or expanded surf zone sand mining appears to be unjustified and infeasible.

If new surf zone mining operations or expansion of existing operations are proposed in the City, data should be required in order to fully assess impacts, if any, and mitigations. Expanded operations mean a significant increase in dragline capacity through the use of multiple drag-lines. Any proposed new or expanded surf zone mining operations will require a Mining Permit. The Mining Permit will be processed according to the standards of the State Mining and Reclamation Act as well as the LUP Policies. The City will in its Implementation Program, through a mining ordinance, require that existing mining participate in a shoreline erosion monitoring program. The City cannot approve a permit if it finds that the mining has a significant adverse impact on the shoreline, as set forth in the policies. It is also noted that the Coastal Commission (and the State Lands Commission) will retain jurisdiction over mining seaward of the Mean High Water (MHW) line and the City will regulate through the Mining Permit and Coastal Permit the areas above the State's boundary. Mining either below or above the MHW line impacts shoreline erosion and therefore the City finds the following policies as being necessary to implement its LCP.

Sand dune mining has also occurred within the City. The quality of sand from dunes is not as high as that mined from the surf zone for use as specialty sands. Lone Star Industries mines dune areas on their property in the northern portion of the City, west of State Highway One. The sand dunes west of Highway One are in a disturbed condition and contain no natural habitat communities. While sand dune mining may not affect habitat areas, it removes vegetation, thereby reducing dune stability and creating conditions for blowouts. Dune mining may also impact visual resources by causing alteration or loss of a unique landform.

Several agencies regulate mining operations in the City. Permits are required from the U.S. Army Corps of Engineers and the California State

Lands Commission for surf zone mining. The State Surface Mining and Reclamation Act of 1975 requires cities and counties to prepare an ordinance to regulate surface mining operations and the preparation of reclamation plans. Pursuant to this Act, the City will require all surface mining operations to obtain a mining permit from the City. In addition, all surface mining operations must submit to the City for approval, a reclamation plan prepared on City applications as called for by the Act. The plan must identify uses of the land after reclamation and how the reclamation will be accomplished. Sand City has a draft ordinance and reclamation plan application, which has been reviewed by the State and has been determined to be in conformance with State law.

4.2.2 Protective Shoreline Structures

Coastal bluffs and dunes within Sand City are subject to erosion, and efforts to protect these bluffs from erosion have been made over the past twenty years. There are three areas of existing seawalls within the City. These seawalls are actually bluff protective structures rather than an actual wall and consist of rip-rap and liquid concrete being poured into the voids of the structure to bind the structure together. There is no documented evidence that existing seawalls in Sand City have had negative effects on the local sand supply, and long-term impacts of seawalls on sand movement cannot be determined without data from a coastal monitoring study.

In the past, seawalls in Sand City have been maintained to a large extent with unconsolidated materials. This method of maintenance is not efficient for long-term bluff protection, is unsafe, may interfere with public access, and may visually degrade the shoreline area. Concerns also have been expressed regarding impacts of liquid concrete on onshore marine organisms. However, this appears to be a minimal impact.

The Coastal Act permits the construction of seawalls, groins, breakwaters, revetments, cliff retaining walls and other similar devices that alter natural shoreline processes in the following situations:

1. to serve coastal-dependent uses; and
2. to protect existing structures or public beaches in danger from erosion.

The Coastal Act prohibits the construction of protective devices for new development which would substantially alter natural landforms along cliffs and bluffs. The portions of Sand City's coastline which are not currently protected by seawalls are not in a natural condition. Most of the unprotected area consists of active shifting sands that have been severely impacted over time and are not in a natural condition. The dune area in the northern part of the City has been mined and also is not in a natural condition. There is also a bluff area that was once used as a landfill site. As a result, part of the bluff is manmade, and unconsolidated materials from this use are eroding from the bluff.

Nearly half of Sand City's coastline is undeveloped and is susceptible to coastal erosion. In the Monterey Sand Company Case (P-78-552), Com-

mission staff seemed to suggest that the threat of erosion to existing public facilities (Vista del Mar Street and the Sewage Treatment Plant) was a real possibility when they stated:

Much of the erosion occurs during major ocean storms Public beaches and dunes at Marina, Sand City, and Seaside are affected by erosion. Public works facilities at Sand City and Marina are located just inland from the retreating bluffs. Also there are some private properties which lie close to the receding shoreline, most notable the Holiday Inn within the City of Monterey's boundaries.

Protection of Sand City's shoreline from further erosion, whether developed or vacant is a critical factor in securing the long term protection of the City's existing structures, public facilities, and public health and safety. Protection of Vista del Mar Street will secure an important public access route. The existing sewage treatment plant and new regional pump station and pipeline are critical links in a regional sewage treatment program. It is apparent that the existing structures and public facilities near the City's shoreline are vital to serve the public benefit, and their long term protection must be secured. In considering future coastal developments as well as existing structures (such as Vista Del Mar Street, the sewage treatment plant, individual privately owned businesses, and State Highway One), some type of structural protective device may be necessary. The structures should be designed to eliminate or mitigate adverse impacts on local shoreline sand supply, based on findings of site specific geologic reports.

Once constructed, seawalls require periodic maintenance, including replacement of rocks that have become dislodged, or addition of rocks. Appropriate materials for maintenance of seawalls include liquid concrete, granitic rocks and sand. Methods of maintenance of existing seawalls will be in accordance with standards adopted by the City.

Construction of new seawalls is the dominant issue regarding shoreline protective measures. However, it should be mentioned that devices such as groins and breakwaters also could affect shoreline processes because they serve to trap sand upcoast and may accelerate erosion downcoast. In 1972, construction of a groin to create a public beach north of Bay Avenue to Tioga Avenue was determined feasible from an engineering standpoint. It also was found that there would be sufficient recreational demand to warrant its development. At the time, it was determined to be economically feasible, although it would not have been financially feasible for the City of Sand City. The project never was initiated.

If similar proposals were developed in the future for recreational or coastal dependent uses, there would be additional environmental factors to be considered, such as the impacts on sand transport. In addition, complete economic and engineering studies would be necessary. However, the options for this type of project should be left open, even though the costs of such a project today may be prohibitive. It should be noted that Sand City does not have jurisdiction over projects seaward of the mean high tide line.

4.2.3 Natural Hazards

Several natural hazards have been identified within the Coastal Zone. These hazards have been grouped into three categories, as follows:

1. geologic hazards, including seismic hazards, fault rupture, groundshaking, liquefaction, ground lurching and lateral spreading, tsunamis and seiches, landslides and erosion;
2. flooding; and
3. fire.

Sand City, as well as the surrounding region, is located in a seismically active area. The major fault zones in the vicinity are the San Andreas (located approximately 20 miles to the northeast), the Monterey Bay fault zone (located immediately west of Sand City in the Monterey Bay), and the Hosgri-Palo Colorado-San Gregorio. These are all considered to be seismically active and capable of generating major earthquakes. In addition, there are fault traces underlying Sand City which are essentially concealed onshore traces of the Monterey Bay Fault Zone, and therefore should be considered to be active for preliminary planning purposes. These faults are buried and their locations are inferred, as shown in Figure 6. In order to assess the potential hazard to any proposed structures, these faults should be located accurately in the field, and an investigation of their degree of activity should be made.

Recognizing the seismic risk in the region, several potential earthquake hazards should be considered for impact in the Sand City area. These hazards include primary effects of fault surface rupture and ground shaking, as well as secondary effects, such as liquefaction, landsliding, ground lurching, lateral spreading, tsunamis and seiches. It is likely that the Sand City area will experience strong seismic shaking in the future. Fault movement causing ground shaking is the most significant hazard to manmade structures, which could cause widespread damage.

Investigation by Geoconsultants indicates that the liquefaction potential of sand deposits along the Monterey Coast beaches ranges between "moderate to high" and "low to moderate." The possibility that liquefaction may occur exists in Sand City, although there is not any data to identify specific locations. Liquefaction potential should be investigated as part of geologic investigation required for individual project proposals. Such investigations will determine site locations that will be subject to liquefaction and will present mitigation measures.

Because Sand City lies along the Pacific Coast, it may be subject to tsunami hazards. Tsunami, also known as seismic sea wave, is a large ocean wave generated by an earthquake or some other force causing water displacement in the ocean. Projections of distant source tsunamis indicate that the 100- and 500-year events would have a runup of 1.8 meters (6 feet) and 3.5 meters (11.5 feet), respectively. It should be noted

LEGEND

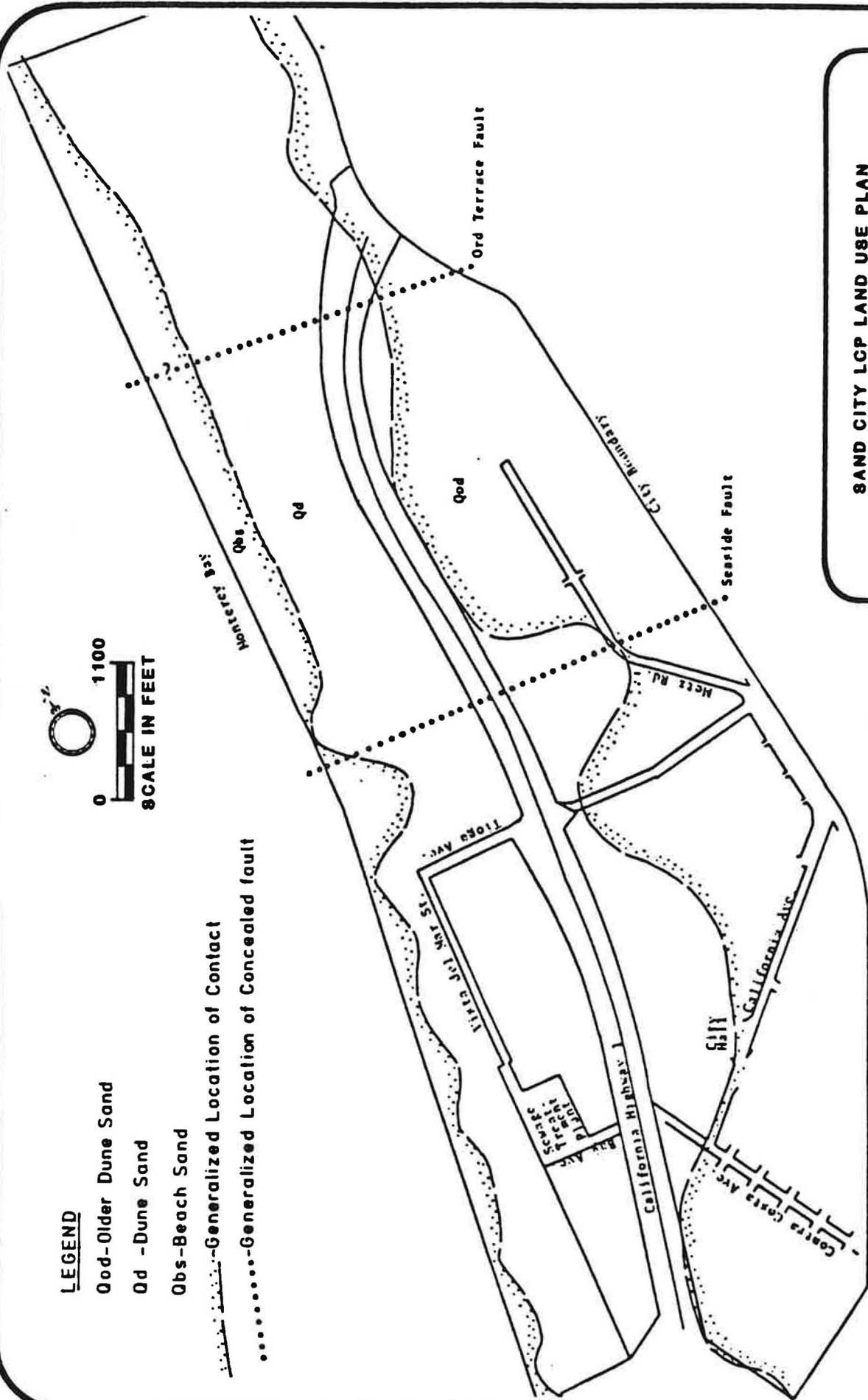
Qod-Older Dune Sand

Qd -Dune Sand

Obs-Beach Sand

---Generalized Location of Contact

.....Generalized Location of Concealed fault



SAND CITY LCP LAND USE PLAN

LOCAL GEOLOGY

Figure 6

SOURCE: GEOCONSULTANTS INC.

that although local-source tsunamis also may affect the area, no precise run-up hazard has been determined for these events as yet. In view of the potential hazard impacts resulting from tsunamis, these hazards should be evaluated in all future development plans for the lowest lying portions of the City.

The unconsolidated beach sands and dunes of Sand City may be considered to be unstable in that the loose sands are easily transported by wind or water. Landsliding, in the form of slumps, however, presents a potential hazard only in areas of steep bluffs.

It is generally agreed that the Monterey Bay shoreline has experienced permanent long-term coastline erosion. However, there have been substantial differences in calculations regarding an estimated average annual erosion rate. It is apparent that the relative amount of cliff retreat, with particular response to the influence of human activities, including mining and urbanization, cannot be quantified with any degree of certainty at the present time.

Floods become catastrophic only when people occupy the floodplain of a major drainage area. The 13.4 square mile Canyon Del Rey Basin bordering Sand City to the south is the largest drainage basin of the Monterey Peninsula. The Monterey County Flood Control and Water Conservation District has classified this basin as having inadequate drainage to handle historical and future floods. However, Sand City is not in a flood hazard area as determined by the Department of Housing and Urban Development Federal Flood Insurance Maps, except for the southwestern tip of the City and the potential for inundation by storm waves, tsunamis or seiches. Individual project proposals should specifically analyze and mitigate these potential hazards.

Fire hazards are assessed according to structure size and occupancy, type of use and distance from the fire protection agency. The hazard can be increased when water lines are inadequately sized and pumping capacities are below requirements.

In Sand City fire hazard problems do exist. Large warehouses and manufacturing areas create safety concerns. The type of use should be evaluated and an appropriate safety program implemented for each one of these businesses. In addition, undersized water lines should be replaced, pumping and storage capacities increased and the street circulation system improved and upgraded.

It is not expected that limited access to land on the oceanside of Highway One will influence response times. The existing fire response time is less than 5 minutes. Any new development in Sand City will be required to provide fire hydrants, access and fire prevention infrastructure as required by the Uniform Building Code.

4.2.4 Sand Dunes and Environmentally Sensitive Habitats

One of the most distinctive coastal landforms in the Monterey Bay region is that of the Monterey Sand Dune complex, which extends from the Salinas River south to Canyon del Rey. The State and previous Coastal

Commission decisions have identified the Monterey Sand Dune complex as one of the largest dune complexes on the west coast, and therefore, as a whole, is characterized as a unique resource.

Generally, dunes provide aesthetic amenities, erosion protection from wind and storms when stabilized by dune vegetation, and in some areas dune habitats continue to display fine examples of native vegetation within a fragile ecological community. On a regional level, the best example of natural dune environment is at Salinas River State Beach.

Sand City's Coastal Zone has two distinct dune areas: the area west of State Highway One and the area east of State Highway One. An ecological survey performed in Sand City found that, generally, all dune areas have been highly degraded and are in a disturbed state, especially in the area west of State Highway One. As such, the City's dunes are probably the most degraded within the regional Monterey dune complex.

The remaining dune areas also comprise a large portion of the City's vacant land. As such, they are left to compete with other land uses and resource demands such as mining, recreation, potential residential/urban development, habitat areas, potential storm protection, and visual resources.

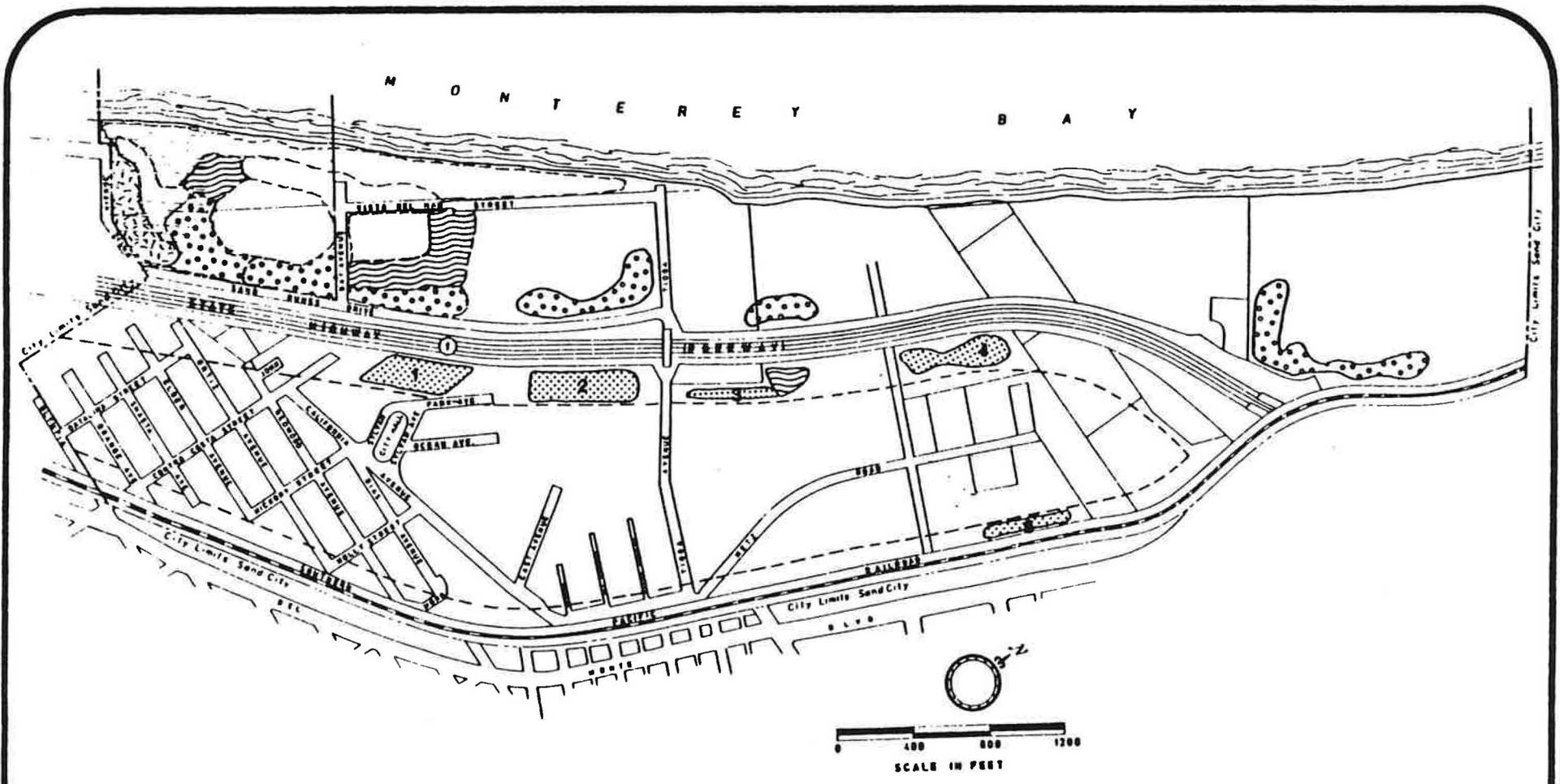
The dunes west of State Highway One are in a severely disturbed state. Due to human uses over time, the original dune landform in this area is generally absent. The majority of the dunes are active, characterized by shifting sand. Little plant life has established itself on these dunes, and where there is vegetation, it is dominated by non-native invasive vegetation. The area provides no natural habitats, although some native species are found. The dunes have other valuable qualities, however, including visual qualities and the potential for wind and erosion protection when stabilized with vegetation.

The area east of State Highway One is more diverse compared to the area west of State Highway One, having been impacted less; however, it is still a disturbed area. Within this area (east of State Highway One), there are 5 scattered locations which contain remnants of the fragile Coastal Strand community or ecotones between it and inland communities. These areas contain a variety of native species and some rare and endangered species, including the rare wallflower, the rare Monterey Ceanothus, the rare and endangered Sandmat Manzanita, and the food species, buckwheat, for the rare and endangered Smith's Blue Butterfly.

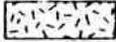
The Coastal Act defines "environmentally sensitive" habitat areas as:

any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

Due to the presence of rare and endangered species east of State Highway One, these areas are considered environmentally sensitive habitats, even though they have been impacted over time and are in a disturbed state. These areas are shown on Figure 7 and indicate generalized locations of habitat areas. The biological survey conducted as a part of the LCP



Legend :

-  **SENSITIVE HABITAT AREAS**
(Generalized Locations)
-  **HABITAT RESTORATION AREAS**
-  **DUNE STABILIZATION/RESTORATION AREAS**
(Within Future Development) Note: For more detail and additional land uses allowed south of Bay Avenue, refer to Figure 12
-  **BUTTERFLY HABITAT RESTORATION ZONE**
-  **AREA OF HIGH ARCHAEOLOGICAL SENSITIVITY**

SAND CITY LCP LAND USE PLAN

COASTAL RESOURCES

Figure 7

identified only generalized locations of potential rare and endangered species. No specific locations were identified. In many instances, only a "few" rare species were noted within a large area.

The Coastal Act requires protection of habitat values within environmentally sensitive areas. This means not only protection of rare and endangered plants, but also protection and/or enhancement of the dune coastal strand community within the environmentally sensitive habitat area. In Sand City, generalized locations of sensitive areas have been identified. Future developments within these areas will be subject to site specific review to determine exact locations of habitats and to incorporate mitigation measures to minimize habitat impacts. The entire area identified as an environmentally sensitive habitat must be protected, not just individual plants. Because these areas consist mostly of disturbed remnants of the coastal strand habitat, mitigation based on individual project proposals is the best method to minimize impacts.

Future development west of Highway One (where no environmentally sensitive habitats exist) should consider dune management programs as part of the development. Future dune management programs can take the form of stabilization and/or restoration. Dune restoration means that the dunes are restored to their native plant condition. This is a long-range, laborious process which generally cannot be applied on a large scale, and requires rigid control of human access in order to be effective. It appears that dune stabilization is a more practical process than dune restoration; however, it involves utilization of exotic species. While stabilization provides an immediate solution to the problems of active sand dunes, it often leads to long-range elimination of native plant communities. The existing State Parks property offers an opportunity for reconstruction or restoration of the native dune habitat (the portion of Area 2 owned by the State, identified in the Land Use Analysis in Appendix E).

4.2.5 Marine and Water Resources

Section 30230 of the Coastal Act refers to the protection of marine resources. Currently there are two uses which may impact marine resources. One relates to use of liquid concrete for seawall maintenance. There has been concern in the past that water used to wash empty concrete trucks was being discharged into Monterey Bay. As a result, the property owner agreed to construct an on-site percolation pond in order to retain the washwater. Another concern was that liquid concrete smothers organisms found in the sand. However, this appears to be a minimal impact, which can be mitigated through regulation of seawall maintenance methods.

The other impact relates to the sewage treatment plant in Sand City. Currently the plant discharges primary treated sewage into the Monterey Bay. As part of a regional sewage treatment program, a pipeline is currently being constructed which will extend from the City of Monterey's treatment plant to a location north of Marina. It will carry the discharge from all Peninsula cities, including Sand City, and discharge into the Bay via a deep water outfall north of Marina. Discharge into

the Bay from Sand City will be eliminated upon completion of the pipeline, which is anticipated in 1982.

The Seaside Aquifer provides water for Sand City and other Peninsula areas. The general location of the aquifer, as it is presently known, is shown on Figure 8.

There has been concern in the past regarding water supply and quality in this aquifer. According to the U.S. Geological Survey (U.S.G.S.) Water Resources Inventory Report #82, the aquifer was overdrafted between 1966 and 1977. However, the aquifer is presently not in an overdrafted condition. There is a surplus of water which has been recommended to aid in the prevention of saltwater intrusion.

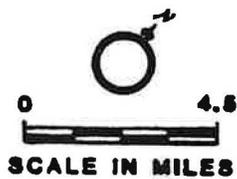
Saltwater intrusion has occurred within the Seaside/Sand City vicinity, in two wells monitored by the U.S.G.S. This was a localized situation, occurring in wells close to the coast, where pumpage has lowered water levels to below sea level. Well analyses in other Seaside wells do not show that seawater intrusion has occurred. A well monitoring program was recommended by the U.S.G.S. to be used as an early warning system for potential groundwater problems.

Additional new water wells in Sand City could create an overdraft which could lead to seawater intrusion; however, this cannot be substantiated. It would depend on the location and pumpage of the well, and the accuracy of available water supply data. A new well water system would not be allowed without the approval of the Monterey Peninsula Water Management District (MPWMD). The District has the authority to approve or deny any new water well system proposals. The City only has authority over new water well systems through conditioning of development proposals. Permit authority is granted to the MPWMD for new well water systems. The District would review the available water data, the proposed well water system, its use and pumpage, and evaluate potential overdraft and saltwater intrusion impacts. Review and approval through MPWMD provides adequate management of potential overdraft and saltwater intrusion impacts. In support of MPWMD's review and permit authority, the City should incorporate these requirements into City development review.

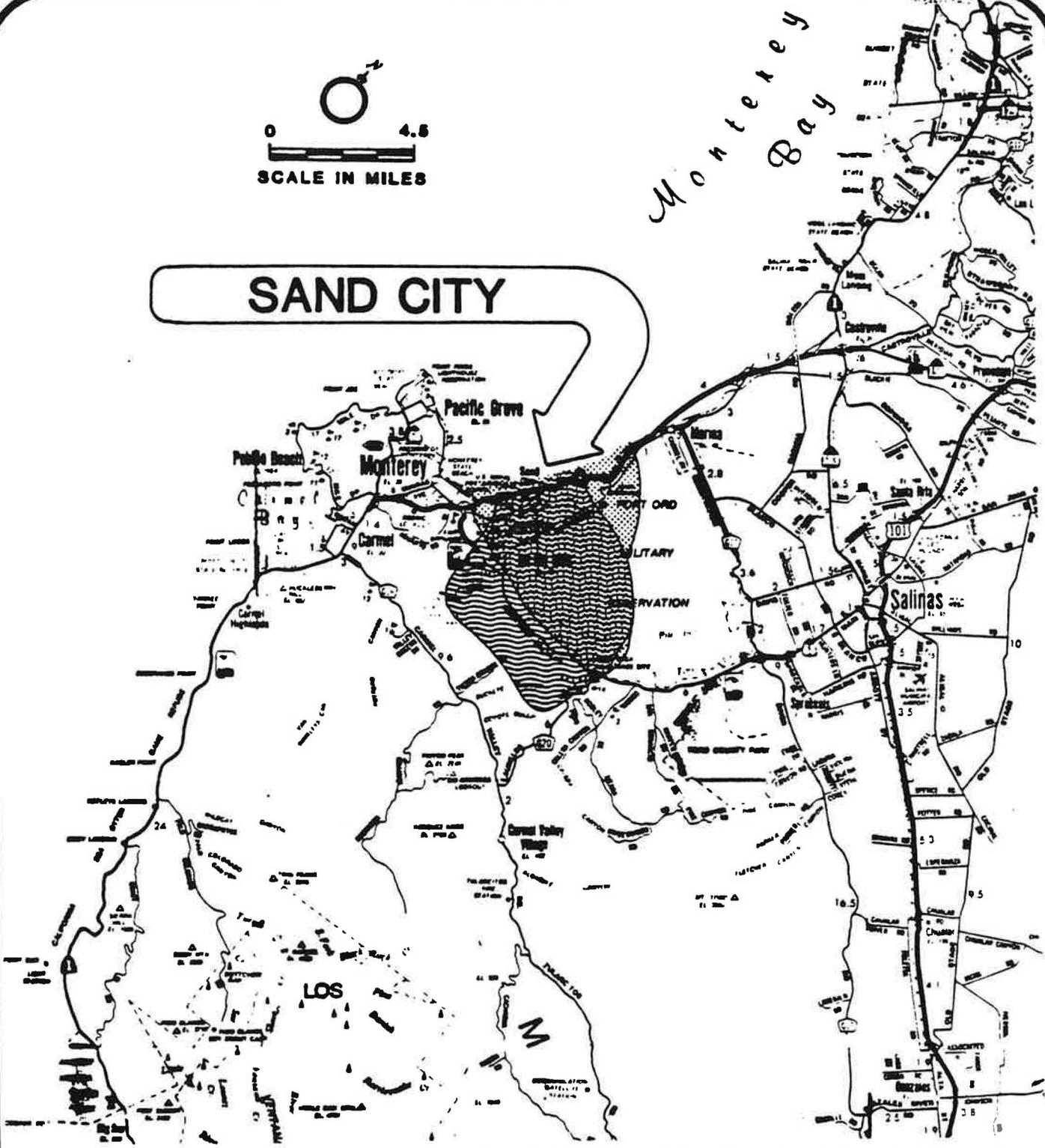
In addition, requiring quality monitoring on new wells would be enforced through the MPWMD and the County Environmental Health Department if they were to allow any new water well systems in Sand City. The MPWMD has indicated that they will embark on drilling a well in Sand City for the purpose of monitoring saltwater intrusion (quality) along the coast.

4.2.6 Archaeological Resources

A preliminary archaeological survey prepared for Sand City indicated that there is one potential area of archaeological sensitivity in the southwestern coastal portion of the City, as shown on Figure 7. This area is of potential archaeological significance because there is a recorded resource in the area. It is possible that buried prehistoric resources may be found within the City, although currently there is not sufficient available data to predict any locations, nor is there reason



SAND CITY



Source: AAA

Legend:

-  APPROXIMATE GROUNDWATER STORAGE BASIN
-  APPROXIMATE WATERSHED BOUNDARIES

SAND CITY LCP LAND USE PLAN

SEASIDE AQUIFER

Figure 8

to believe that any extensive archaeological resources will be located. Any resources that may be found should be small, such as temporary occupation areas in the dunes, specific resource gathering or processing areas, and relatively isolated burial sites. Development proposals in this area should be required to submit archaeological surveys by a qualified archaeologist to determine the presence and significance of archaeological resources, if any, and to recommend mitigations if necessary.

4.3 LCP Policies

Shoreline Sand Supply and Sand Mining

4.3.1 Support the continuation of coastal-dependent sand mining operations.

4.3.2 New surf zone sand mining or expansion of existing surf zone sand mining shall be allowed only pursuant to approval of a Coastal Permit, Mining Permit and a Reclamation Plan. Expansion of existing surf zone mining operations means a significant increase in dragline capacity through multiple draglines, larger buckets, or change in dragline location.

The City shall also establish in its Implementation Plan a method of monitoring shoreline erosion along the Sand City coast for the purpose of analyzing future mining proposals. This method shall consist of the submission by sand mining operations, on an annual basis, of meaningful information on shoreline retreat by way of a benchmark program or other equally effective measurement.

The City shall not approve or renew a Coastal Permit for new or expanded surf zone sand mining if it finds that such new or expanded sand mining, either individually or cumulatively, will have significant adverse impacts on shoreline erosion. Such determination shall be made upon consideration of the results of the continuing shoreline erosion monitoring program, available evidence on the impact of surf zone sand mining on coastal erosion, and other relevant social, economic, environmental and technological factors.

Any Coastal Permit shall be issued subject to a condition that will permit the City to require that sand mining activity be reduced to previous levels (prior to the issuance of a Coastal Permit) or terminated (in the case of a new sand mining operation) if the continuing analysis or other available evidence on the impact of beach and surf zone sand mining on shoreline erosion shows that such operations have a significant adverse impact on shoreline erosion.

4.3.3 Enact an ordinance relating to surface mining and reclamation standards pursuant to the California Surface Mining and Reclamation Act of 1975 in order to regulate dune mining opera-

tions and reclamation procedures. As part of reclamation plans, require development of dune management programs within dune stabilization-restoration areas shown on the Coastal Resources Map.

- 4.3.4 Limit dune mining operations to areas which meet any of the following criteria except for areas designated as sensitive habitat, restoration or restoration/stabilization on the Coastal Resources Map:
- a) areas where previous dune mining activity has occurred;
 - b) areas where dunes are in a severely disturbed condition. Severely disturbed dunes are those without stabilizing vegetation and those which are active; and
 - c) areas which have been severely disturbed by activities related to and in support of coastal dependent sand mining.

An otherwise authorized existing dune-mining operation may continue to operate under this policy without an industrial designation as a non-conforming use.

Protective Shoreline Structures

- 4.3.5 Permit construction and maintenance of all shoreline protection devices (including seawalls) in situations where they are necessary to protect existing structures, coastal-dependent uses, public beaches and recreational areas, and public works. In the area south of Tioga Avenue, permit repair and expansion of a shoreline protective device only to protect Vista del Mar Street, an existing structure and major shoreline access route. Permit the construction and maintenance of new shoreline protective devices between existing shoreline protective devices north of Tioga Avenue where the geologic report has determined the technical feasibility of such construction. Permit construction of shoreline protective structures on the old landfill site if the geologic report demonstrates the necessity of such construction and if the development includes removal of all former landfill debris and garbage, in order to improve geologic stability and public health and safety. Such structures must not reduce or restrict public access, adversely affect shoreline processes, or increase erosion on adjacent properties.
- 4.3.6 If shoreline protection devices are found to be necessary, require complete geologic and engineering studies to determine the proper design appropriate to identified site conditions. The device should be designed to minimize visual intrusion.
- 4.3.7 Allow periodic maintenance of existing shoreline protection devices (including seawalls) and replacement of reinforcement with liquid concrete, granitic rocks, sand, or any material deemed appropriate from an engineering and visual standpoint.

Appropriate maintenance materials shall be in accordance with standards adopted by the City. Prohibit dumping of other unconsolidated materials onto seawalls.

Natural Hazards

4.3.8 All developments shall be sited and designed to minimize risk from geologic, flood or fire hazards.

4.3.9 Require preparation of geologic and soils reports for all new developments located in the coastal zone. The report should address existing and potential impacts, including ground shaking from earthquakes, direct fault offset, liquefaction, landslides, slope stability, coastal bluff and beach erosion, and storm wave and tsunami inundation. The report shall identify appropriate hazard setbacks or identify the need for shoreline protective devices to secure long-term protection of Sand City's shoreline, and shall recommend mitigation measures to minimize identified impacts. The reports shall be prepared by qualified individuals in accordance with guidelines of the California Division of Mines and Geology, the California Coastal Commission, and the City of Sand City. Geologic reports shall include the following:

- a) setback measurements that are determined from the most inland extent of wave erosion, i.e., blufftop or dune or beach scarp; if no such feature is identifiable, determine setback from the point of maximum expected design storm wave runup;
- b) setbacks based on at least a 50-year economic life for the project;
- c) the California Division of Mines and Geology criteria for reports, as well as the following:
 - 1) description of site topography;
 - 2) test soil borings and evaluation of suitability of the land for the proposed use;
 - 3) evaluation of historic, current and foreseeable cliff and beach erosion, utilizing available data;
 - 4) discussion of impacts of construction activity on stability of site and adjacent area;
 - 5) analysis of ground and surface water conditions, including any hydrologic changes caused by the development;
 - 6) indication of potential erodibility of site and recommended mitigation measures;

- 7) potential effects of seismic impacts resulting from a maximum credible earthquake and recommended building design factors and mitigation measures;
 - 8) evaluation of off-site impacts; and
 - 9) alternatives (including non-structural) to the project.
- 4.3.10 Encourage the clustering of developments away from potentially hazardous areas and condition project permits based upon recommendations presented in the geologic report.
- a) South of Bay Avenue, in no event shall the setback be less than 200 feet from the mean high water line. The mean high water line shall be established and adopted by the City as a part of the Implementation Plan for this area.
 - b) An active recreation beach zone and public amenity zone shall be established between the mean high water line and the building envelope (refer ahead to Figures 12 and 13). Uses allowed in the active beach and public amenity zones are described in Policy 6.4.1 of this Plan.
- 4.3.11 No development will be allowed in the tsunami runup zone, unless adequately mitigated. The tsunami run-up zone and appropriate mitigations, if necessary, will be determined by the required site-specific geological investigation.
- 4.3.12 Deny a proposed development if it is found that natural hazards cannot be mitigated as recommended in the geologic report, and approve proposed developments only if the project's density reflects consideration of the degree of the on-site hazard, as determined by available geotechnical data.
- 4.3.13 Implement building setbacks from active or potentially active fault traces of at least 50 feet for all structures. Greater setbacks may be required where it is warranted by site specific geologic conditions and as determined by the geologic report.
- 4.3.14 Require all new developments to be designed to withstand expected ground shaking during a major earthquake.
- 4.3.15 Require the developer of a parcel in an area of known geologic hazards to record a deed restriction with the County Recorder indicating the hazards on the parcel and the level of geotechnical investigations that have been conducted.
- 4.3.16 Require drainage plans for developments proposed on coastal bluffs that would result in significant runoff which could adversely affect unstable coastal bluffs or slopes.
- 4.3.17 Require all new developments to conform to minimum road design standards to ensure adequate fire protection access.

- 4.3.18 Require minimal water flow rates and fire response times for all developments in the coastal zone.

Sand Dunes and Environmentally Sensitive Habitats

- 4.3.19 Designate general areas as sensitive habitats as shown on the Coastal Resources Map (Figure 7). Where development is proposed in these areas, require field surveys by qualified biologists or agencies in order to determine exact locations of environmentally sensitive habitat areas and to recommend mitigation measures to minimize habitat impacts. Standards for biological field surveys will be set forth by the City.
- 4.3.20 Environmentally sensitive habitat areas shall be protected as follows:
- a) Habitat Areas 1 and 2 (shown on Figure 7; south of Tioga along the inland side of the freeway) are designated as habitat consolidation and preservation areas. In these small-lot areas, where a specific plan is required for future development, habitat areas shall be consolidated, enhanced, and preserved thereafter, and development shall be clustered. Any adverse impacts of such a specific development plan on native plant habitat (destruction of individual plants, elimination of natural dune area) may be mitigated, in addition to the required consolidation, off-site in designated restoration areas (see Policy 4.3.22b).
 - b) Habitat Area 3 (shown on Figure 7; north of Tioga along the freeway) is designated as a habitat preservation area. Development shall be limited to research and education, removal of iceplant, and fencing or other means of public access control.
 - c) Habitat Area 4 (shown on Figure 7; north of the Monterey Sand Company road along the freeway) is designated as a habitat preservation and enhancement area. No development shall occur except for native habitat enhancement activities, research and education, including removal of iceplant, planting of suitable native plant species, installation of temporary irrigation systems, and fencing or other means of public access control. Existing native plant communities in this area shall not be disrupted by enhancement activities.
 - d) Habitat Area 5 (shown on Figure 7; north of Tioga along the SPRR) is designated as a habitat relocation area. In this area, no development (such as grading or removal of major vegetation) shall occur unless and until the endangered species Monterey Ceanothus (*C. rigidus*) and Sandmat Manzanita (*Arcostaphylos pumila*) are both successfully established in Area 4 or another suitable area of the coastal zone (see Policy 4.3.22b).

- e) New uses proposed adjacent to locations of known environmentally sensitive habitats shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

4.3.21 Protect environmentally sensitive habitat areas by developing and implementing standards for development (including vegetation removal, excavation, grading, filling and the construction of roads and structures). Standards should include, but may not be limited to:

- a) encourage retention of open space through deed restrictions or conservation easements;
- b) restrict land disturbance and the removal of indigenous plants to the minimum amount necessary for structural improvements;
- c) require incorporation of appropriate mitigation measures such as setbacks, buffer strips, landscape plans, drainage control plans and restoration;
- d) where appropriate and feasible, allow the exchange of existing resource areas for other open space areas that would provide a more logical location for open space and that could be planted with those species found in the resource area; and
- e) require landscaping with native coastal plants in development proposals.

4.3.22 Plans for protection of environmentally sensitive habitat shall be subject to the following standards:

- a) prior to any development or specific plan approval which affects habitat areas identified on Figure 7, a qualified professional botanist shall prepare a plant survey and plan for the affected area which includes:
 - 1) description of type and location of existing native and other species;
 - 2) protection goals consistent with Policy 4.3.20;
 - 3) in habitat preservation areas: methods for controlling public access and eliminating invasive non-native species (iceplant);
 - 4) in habitat enhancement and consolidation areas: irrigation, fertilization and long-term maintenance requirements, and methods of establishing new native plants (e.g., seeding, transplanting) and eliminating iceplant;

- 5) mitigation measures for adverse impacts, such as loss of transplants to shock; and
 - 6) schedule setting forth time requirements for plant establishment, dune stabilization, access controls, etc.;
- b) Prior to approval of any development, specific plan, public works project or tentative subdivision map for these areas which may require habitat relocation or off-site restoration activities, a qualified professional botanist shall prepare a plan which, to the satisfaction of the California Department of Fish and Game, demonstrates:
- 1) the long-term suitability of the restored habitat for these species, including but not limited to wind protection, soil condition, and acre-for-acre replacement of habitat;
 - 2) the management methods needed for installation, nurturing, and permanent protection of the restored habitat, including but not limited to the method of establishment (seed, hydromulch, transplant), and access restrictions;
 - 3) the requirements for successful establishment of each species in another location, after which removal of the original plants may be possible.

Prior to the commencement of any development which affects Areas 1, 2, or 5, the rare and endangered species located in these areas shall be successfully established in the appropriate locations (see Policies 4.3.20.a and 4.3.20.d).

- c) All habitat protection plans shall include the maximum feasible planting or protection of dune buckwheat (Eriogonum parvifolium) and E. latifolium) as a food source for the endangered Smith's Blue Butterfly (Shijimiaeoides enoptes smithi).
- d) All habitat protection plans shall contain an implementation and management component which provides for:
- 1) fencing, signing, or other appropriate access control measures to be installed as a condition of development (or as a condition of permits for restoration activities if no other development is proposed);
 - 2) responsibility by the developer for habitat installation, maintenance and preservation for at least five years. Permanent maintenance shall also be provided for, with reliance on public and/or private funding sources and ownership. Options for such management may be further pursued as part of the Implementation Plan, and shall include at least:

- (a) contribution of funds by developments requiring habitat preservation/enhancement/relocation measures; and
- (b) dedication of restored habitats to a public agency or private conservation organization with habitat management capabilities.

4.3.23 Require implementation of dune stabilization and/or restoration Programs as a part of new developments west of Highway One, in areas shown on Figure 7. Requirements for these programs shall include:

- a) a professional survey and habitat protection plan including relevant items set forth in Policy 4.3.22a;
- b) identification of any grading proposed for recontouring and/or dune stabilization;
- c) maximum use of native plant materials, including rare and endangered species;
- d) a maintenance program which includes:
 - 1) initiation of restoration activities prior to occupancy of new developments;
 - 2) completion of restoration activities within a five-year period, during which the owner, developer, homeowners association, an assessment district or other appropriate management agency accepts responsibility for the restoration activity;
 - 3) permanent preservation and maintenance of the restored habitat by integration with a development's general landscape program, dedication to a public agency, or other method; and
 - 4) effective restrictions for prohibiting vehicular access and managing pedestrian access to and through such areas.
- e) any restoration/stabilization plans for that area south of Bay Avenue shall be subject to review and approval of the State Department of Fish and Game and Department of Parks and Recreation. The State Department of Parks and Recreation shall only have review and approval authority if the stabilization/restoration area occurs on state park lands. Prior to issuance of a permit for development south of Bay Avenue, a field survey shall be performed by a qualified botanist and lepidopterist. If any host plants for the Smith Blue Butterfly (SBB) are found (*Eriogonum latifolium* and *Eriogonum parvifolium*), or the SBB itself, then Policies 4.3.21 and 4.3.22 shall apply and habitat preservation/mitigation shall occur subject to the review and approval of

the California Department of Fish and Game and the U.S. Fish and Wildlife Service;

- f) allowed as a part of dune stabilization/restoration programs in Area 4a south of Bay Avenue, and dune stabilization programs in Area 2 shall be the provision for concealed and/or underground land uses as described in Policy 6.1.4b and illustrated in Figure 12; and
- g) south of Fell Street (a paper street), areas designated as public amenity zones shall not be considered dune restoration/stabilization areas. Although these areas may contain dune stabilization and bluff top enhancement, and may be required by the City to concur with some or all of the dune restoration/stabilization policy criteria, they will be allowed additional uses as described in the Land Use Component of this Plan (Policy 6.4.1).

4.3.24 Designate areas especially suitable for dune habitat restoration on the Coastal Resources Map (Figure 7). These include:

- a) a triangular area of dune face, north of Tioga and inland of the freeway, which is vegetated with iceplant;
- b) the area currently used as the Seaside Sanitation District Treatment Plant, which will be retained in open space after the plant is demolished;
- c) the area between the Treatment Plant and Sand Dunes Drive, which is vegetated with iceplant;
- d) portions of Sensitive Habitat Area #4, which contain iceplant and other non-native species; and
- e) three areas west of the freeway north of Bay Avenue designated for stabilization/restoration as part of future development.

Require these areas to be maintained in open space, and prohibit grading except in conjunction with an approved habitat restoration activity, or in area (b) in conjunction with treatment plant construction, operation, or demolition, or in area (c) in conjunction with a development approved pursuant to Policy 6.4.10 (Option 2). Permit these areas to be used for restoration or enhancement of native dune plant habitats, establishment of new habitat for rare or endangered species, and in conjunction with approved development for off-site habitat mitigation.

- f) south of Bay Avenue and west of Sand Dunes Drive, require the following programs:
 - 1) dune stabilization/restoration, designated as Area 4a, and illustrated in Figure 12. This shall include the provision for underground visitor-serving land uses and

parking structures, concealed by the dune stabilization/ restoration program;

- 2) dune stabilization with concealed private recreation, underground private recreational and parking uses, public access and recreation, a floating plan line and underground visitor-serving commercial uses, designated as Area 2 on Figure 12. This area shall include the provision for concealed and/or underground uses as described in Policy 6.4.1b and illustrated in Figure 12;
- 3) dune restoration designated as Area 6 on the Resubmittal Map. This area shall be restored as a native dune area with restricted public access; and
- 4) butterfly habitat restoration designated as Area 7a on Figure 12. This area shall be restored, based on the recommendations of a qualified biologist/ ecologist, to a habitat area for the rare Smith's Blue Butterfly. A full biological report shall be required by the City prior to restoration, as is required in other dune restoration areas. This report shall be made available for review and comment by the State Department of Fish and Game and the Coastal Commission.

Dune stabilization and restoration programs in these areas shall be implemented so as not to conflict with visual policies of this Plan. All dune restoration and stabilization activities south of Bay Avenue shall be consistent with Policies 4.3.23, 4.3.25, 4.3.26, and 4.3.27. Any portion of the sewage transmission line easement outside of the permitted building envelope south of Bay Avenue shall be restored (stabilized and replanted) as a condition of development approval.

- 4.3.25 Enhance coastal plant communities by requiring new developments to utilize appropriate native coastal plants in landscaping plans that are compatible with existing native species. Prohibit the use of invasive plants in landscaping schemes.
- 4.3.26 All off-road vehicles shall be prohibited on the dunes, except those necessary for emergency and to support coastal dependent uses and shall be limited to existing paths and stockpiles in order to protect dune vegetation.
- 4.3.27 Where major access routes are available or desirable through sand dunes to the coast, boardwalks or other appropriate pathways constructed of permeable materials should be provided to protect the vegetation stabilizing the dunes.

Marine and Water Resources

- 4.3.28 Protect marine resources for long term commercial, recreational, scientific and educational purposes.

- 4.3.29 Protect the water quality of the ocean. Sources of pollution to coastal waters shall be controlled and minimized.
- 4.3.30 Regulate seawall maintenance methods in order to prevent potential impacts to marine resources.
- 4.3.31 Require future developments which utilize private wells for water supply to complete adequate water analyses in order to prevent impacts on Cal-Am wells in the Seaside Aquifer. These analyses will be subject to the review and approval of the Monterey Peninsula Water Management District. In support of MPWMD's review and permit authority, the City should incorporate these requirements into City development review.
- 4.3.32 Encourage well monitoring programs which will provide an early warning system for potential groundwater quality problems resulting from seawater intrusion.

Archaeological Resources

- 4.3.33 Designate general locations as areas of archaeological sensitivity as shown on Figure 7. Where development is proposed in these areas, require a survey by a qualified archaeologist to determine the existence and significance of any on-site archaeological resources and recommend mitigation measures. If such resources are found reasonable, site-specific mitigation measures shall be required as a condition of the development permit.
- 4.4.34 Require protection, evaluation, and/or removal under supervision by a qualified archaeologist and consultation with a qualified Native American representative, archaeological resources that may be found during the construction process.

4.4 Recommended Implementation Actions

- 4.4.1 Adopt Surface Mining and Reclamation Ordinance.
- 4.4.2 Develop standards and guidelines for required geologic report.
- 4.4.3 Develop standards to determine acceptable risk levels associated with geologic, flood or fire hazards.
- 4.4.4 Develop standards and guidelines for required biological surveys.
- 4.4.5 Develop standards for development within and adjacent to environmentally sensitive habitats as identified by biological surveys.

- 4.4.6 Develop landscaping guidelines for utilization of native plants.
- 4.4.7 Develop design and maintenance guidelines for dune stabilization programs.

Appendix C

**SAND CITY BIOLOGICAL FIELD SURVEYS FOR RARE PLANTS,
SMITH'S BLUE BUTTERFLY, AND BLACK LEGLESS LIZARD**

**SAND CITY BIOLOGICAL FIELD SURVEYS FOR
RARE PLANTS, SMITH'S BLUE BUTTERFLY, BLACK LEGLESS LIZARD**

FINAL REPORTS

September 1987

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CITY OF SAND CITY

**Prepared for
City of Sand City
California**

**Compiled by
Thomas Reid Associates
Palo Alto, California**

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TABLE OF CONTENTS

REPORT	PAGE
Sand City Rare Plant Survey	1
Smith's Blue Butterfly at Sand City	16
Sand City Black Legless Lizard Survey	29

LIST OF FIGURES

FIGURE	PAGE
1 Rare Plant Locations	15
2 Known Locations of Smith' Blue through 1983	25
3 Illustrations of Eriogonum Host Plants	26
4 Distribution of Eriogonum Host Plants	27
5 Distribution of Smith's Blue at Sand City 1987	28
6 Observations of Black Legless Lizards	34

SAND CITY RARE PLANT SURVEY

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July 1987

Introduction

Sand City is built on the Monterey Bay dune system, which extends from north of Monterey harbor northward to just beyond the Salinas River mouth in Monterey County, California. The system is comprised of three dune types defined by their geologic age: 1) recent dunes, formed from recent alluvial depositions of the Salinas and Pajaro Rivers, 2) Flandrian dunes formed and stabilized during the Wisconsin glaciation, and 3) pre-Flandrian dunes formed and stabilized before the Wisconsin glaciation (Cooper 1967, Pavlik, 1980).

The pre-Flandrian dunes support a restricted and rapidly disappearing habitat type known as maritime chaparral (Griffin, 1978). Many RTE plant species are endemic to maritime chaparral, including two of the species found during this survey. There are other rare, threatened and endangered (RTE) plant species that occur on the recent and Flandrian dunes as well (Zoger and Pavlik 1987). It is not surprising, therefore, to find three RTE plant species growing in Sand City: *Arctostaphylos pumila* Nuttall, *Ceanothus rigidus* Nuttall and *Gilia tenuiflora* Benth. ssp. *arenaria* (Benth.) A.& V. Grant (Table 1).

The objectives of this survey were 1) to locate known and previously undescribed populations of RTE species, 2) to map these RTE plant populations, and 3) to describe the characteristics of these populations near Sand City.

Methods

Study Location

Two areas in Sand City were surveyed for RTE plant species: 1) the western parcel, consisting of the recent dunes that run north to south from the Holiday Inn to the Ft. Ord property line on the west side of Highway 1, and 2) the eastern parcel, consisting of the open areas of Flandrian and pre-Flandrian dunes in the section of Sand City to the east of Highway 1. Both areas have been heavily disturbed by sand mining, off-road vehicle (ORV) use, heavy foot traffic and garbage dumping.

Selection of Sites for RTE Plant Population Search

Sites of Known Occurance

In order to document the distribution, demographic attributes and habitat requirements of known RTE plant populations in the Monterey Dunes near Sand City, the following institutional sources were consulted: California Natural Diversity Data Base (CNDDB, administered by the state of California, Department of Fish and Game), herbaria administered by the University of California at Berkeley, the California Academy of

Science in San Francisco and the Pacific Grove Natural History Museum, the Nature Conservancy and the Monterey Chapter of the California Native Plant Society.

Expert individuals were also contacted: 1) Ms. Jean Ferriera, California state parks resource ecologist, has been surveying *Gilia tenuiflora* ssp. *arenaria* for several years and was able to provide detailed information on habitat and specific locations, and 2) Dr. James Griffin, director of University of California at Berkeley's Hastings Preserve, has done extensive work with *Arctostaphylos pumila* and *Ceanothus rigidus*.

Sites of Potential Occurance

The survey site was also searched for previously unknown populations of RTE plant species using the habitat information obtained from herbarium labels, CNDDDB, CNPS rare plant status reports and the individuals cited above.

RTE Plant Population Survey

The site was surveyed from May 9 through May 13, 1987 taking a total of 60 manhours.

Description of RTE Plant Populations and Their Habitat Requirements

Once the previously known and new populations of the RTE plant species were located, their density, spatial distribution, phenology, vigor and microhabitat were either quantified or described in detail. The limits and boundaries of each population were determined and measured on site, if possible. If not, the area was then estimated using an aerial photo of Sand City (supplied by the Sand City City Hall). The area was then thoroughly surveyed by two individuals, walking the area in a parallel fashion, in order to estimate the number of RTE plant individuals. That number was then divided by the area in order to generate and estimate of the population density. The percent cover of *Arctostaphylos pumila* and *Ceanothus rigidus* was calculated by dividing the actual area covered by each species by the total area in which they occurred. The location of each population was then recorded and are shown on the RTE plant survey map (Map 1.)

Results and Discussion

Presence of RTE Plant Populations

There were three RTE plant species found in the eastern parcel of Sand City: *Arctostaphylos pumila*, *Ceanothus rigidus*, and *Gilia tenuiflora* ssp. *arenaria*.

RTE Plant Population Survey

Using the habitat requirements of each taxon and information from institutions and individuals, known populations of *Arctostaphylos pumila*, *Ceanothus rigidus* and *Gilia tenuiflora* ssp. *arenaria* were located and described. New populations were also found and described. Both the previously known and the new populations are shown on the RTE plant survey map (Map 1).

Arctostaphylos pumila

Arctostaphylos pumila is a low growing shrub that occurs on pre-Flandrian dunes in maritime chaparral around the Monterey Bay (Griffin, 1978). *Arctostaphylos pumila* was found in the eastern parcel of Sand City in an area that had been disturbed by sand mining in the past. There were a few outlying individuals found growing in other open areas of Sand City. A total of 51 individuals were counted, and the population had a density of 0.017/ m². Of the total 3000 m² area that *A. pumila* occupied, *A. pumila* contributed 45.7% cover (Table 2). The population was in good condition with no apparent disease or insect damage.

Ceanothus rigidus

Ceanothus rigidus is a large shrub that is found on pre-Flandrian sand hills and flats within maritime chaparral in the Monterey Peninsula (Griffin, 1978). A total of 113 individuals was counted, giving a density of 0.038/m². Of the total 3000 m² area that *C. rigidus* occupied, *C. rigidus* contributed 3.5% cover (Table 3). Several of the individuals had unidentified caterpillars on their branches and leaves. No serious damage due to these or any other insects was observed.

Gilia tenuiflora ssp. arenaria

Gilia tenuiflora ssp. arenaria is an annual that occurs on Flandrian dunes from just north of Monterey Bay harbor to just north of the Salinas River mouth (Zoger and Pavlik 1987). Two different populations were found in Sand City comprising a total of 5090 individuals and a density of 0.391/ m² (Table 4). 1986-87 was a particularly dry year, thus only 0.37% of the population was still flowering, with 99% of the population senescent (Table 4) at the time of the survey (late May 1987). Because most botanists use the bright purple flower as a search image for this species in the field, and very few of the individuals were still in bloom, it is likely that the 1987 census underestimated the size of the population. In addition, the poor rainfall year would have resulted in a smaller population of this annual species because many seeds in the seed bank probably remained dormant. Thus, the actual population size could be several orders of magnitude greater than the 1987 census indicates. This population of *Gilia tenuiflora ssp. arenaria* is one of the two largest found throughout this species' range (Table 5), if not the largest known. The only comparable population is the one found at Salinas River State Beach which has approximately 1,165 individuals, about one-fifth the size of the Sand City population.

Other Taxa of Concern

Erysimum menziesii is a RTE plant species that occurs on the coastal strand of Monterey and Mendocino Counties (Zoger and Pavlik 1987). Because the habitat of this species is so dynamic and vulnerable to wind, wave and storm disturbances, Monterey Bay populations of *E. menziesii* are known to appear and disappear all along the coastal strand. Storm waves, tides, strong winds and water currents remove established plants and deposit their fruits and seeds in a new locality. A large population of *E. menziesii* was known to occur in the strand just south of the Salinas River mouth (specimens from this locality were collected by A. Johnson and deposited at the U.C. Davis herbarium). By 1980, storms and changes in the course of the river mouth had removed all traces of this population (Pavlik, 1980). The seeds and propagules from this population were probably transported southward, perhaps contributing to the wide distribution of *E. menziesii* along the coastal strand of the Marina Dunes. With a species that demonstrates this kind of dynamism, it is important to recognize that there is a strong possibility that new populations will occur in areas with suitable potential habitat. The coastal strand that occurs in Sand City, is half way between the two main populations of *E. menziesii* in the Monterey Bay area; Asilomar and Marina. It is possible that propagules of *E. menziesii* could wash ashore and establish themselves in Sand City some time in the future. Future RTE plant surveys should not exclude this species, simply because it was not found in 1987. A new population of *E. menziesii* in Sand City is a strong possibility in the years to come.

Conclusions and Recommendations

The growth of California's population and the accompanying development of its land and resources threatens a large and growing number of rare and endangered plant species. California's dune systems are among the areas that are rapidly being developed for minerals, construction materials, housing and recreation. The dunes upon which Sand City is built are no exception to this trend. This area is unique, however, in that three RTE plant species occur here; *Arctostaphylos pumila*, *Ceanothus rigidus*, and *Gilia tenuiflora* ssp. *arenaria*.

Maritime chaparral is a vegetation type found on the pre-Flandrian dunes. Griffin (1978) commented on the swift disappearance of this vegetation type due to development for industry, housing and agricultural purposes. Today, Ft. Ord (U.S. Army) has the largest and best preserved segment of maritime chaparral. The eastern parcel of Sand City (east of Highway 1), is built on pre-Flandrian dunes, within maritime chaparral, neighboring Ft. Ord. The presence of these RTE plant species in Sand City indicates that a certain amount of recovery of the habitat from sand mining and other extreme disturbance is possible.

Gilia tenuiflora ssp. *arenaria* is limited to the Monterey Bay dunes. There are six major populations scattered up and down Monterey Bay (Table 5). Of these six, the Sand City population represents well over half all known *G. t.* ssp. *arenaria* individuals censused in 1987. In order to ensure a future for this species, it is important to preserve and protect this particular population.

In order to protect these species and their habitat, it is essential to implement several planning and management practices:

- 1) Have a conservation plan for RTE plant species habitat at Sand City prepared by a qualified biological consultant. The plan should result in the ultimate preservation and enhancement of RTE plant habitat in Sand City.
- 2) Preserve and enhance contiguous areas of potential RTE plant habitat to allow for the expansion of RTE species (either naturally or artificially) to these areas.
- 3) Control invasive, exotic plant species (such as *Ammophila arenaria* and *Carpobrotus* spp.) and regulate actions that encourage their propagation, primarily landscaping and gardening practices.

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Table 1. Endangerment status of *Arctostaphylos pumila* (ARPU), *Ceanothus rigidus* (CERI) and *Gilia tenuiflora* ssp. *arenaria* (GITE) . CNPS (California Native Plant Society) listing: rarity (r; 1= rare, 2 = several populations, 3 = one population), endangerment (e; 1=not endangered, 2 = endangered in portion of range, 3 = endangered throughout range), vigor (v; 1= increasing, 2= declining, 3 = near extinction), and distribution (d; 1 = widespread, 2 = rare outside of California , 3 = endemic to California.), state of California listing and federal listing.

	<u>CNPS</u> r-e-v-d	<u>State</u>	<u>Federal</u>
ARPU	2-2-1-3	-----	-----
CERI	1-2-1-3	-----	-----
GITE	3-3-3-3	threatened	considered for listing
ERME	1-2-2-3	threatened	considered for listing

Table 2. Population data for *Arctostaphylos pumilla*. Collected from Sand City, eastern parcel in May 1987.

Population attributes

Number of plants	51
Area of population	3000 m ²
Density of population	0.017/m ²
Percentage of total area covered by species	45.7%
Vigor of population	strong
Associated species	<i>Artemisia pycnocephala</i> <i>Carpobrotus aquilateralis</i> <i>Ceanothus dentatus</i> <i>Ceanothus rigidus</i> <i>Ericameria ericoides</i> <i>Heliotropium curassavicum</i> <i>Lotus scoparius</i>

Table 3. Population data for *Ceanothus rigidus*, collected in Sand City eastern parcel, May 1987.

Population attributes

Number of plants	113
Area of population	3000m ²
Density of population	0.038/m ²
Percentage of total area covered by species	3.54%
Vigor of population	strong
Associated species	<i>Arctostaphylos pumila</i> <i>Artemisia pycnocephala</i> <i>Bromus diandrus</i> <i>Carpobrotus aquilateralis</i> <i>Ceanothus dentatus</i> <i>Ericameria ericoides</i> <i>Lotus scoparius</i>

Table 4. Population data for *Gilia tenuiflora* ssp. *arenaria*, data collected in Sand City eastern parcel in May 1987.

Population attributes

Number of plants	5090
Area of population	13050 m ²
Density of population	0.39/ m ²
Percent flowering	0.37 %
Percent senescent	99 %
Associated species:	<i>Armeria maritima</i> <i>Artemisia pycnocephala</i> <i>Bromus diandrus</i> <i>Carpobrotus aquilateralis</i> <i>Carpobrotus edule</i> <i>Cardionema ramosissimum</i> <i>Chorizanthe</i> spp. <i>Eriognum latifolium</i> <i>Festuca octoflora</i> <i>Linaria canadensis</i> <i>Plagiobothrys</i> sp. <i>Polygonum paronychia</i>

Table 5. Comparative size of *Gilia tenuiflora* ssp. *arenaria* populations from Sand City (SC), Marina State Beach (MSB), Salinas River State Beach (SRSB), Lone Star properties (LS), Granite Rock properties (GR), and the Martin properties (MP). For 1987, the percentage each population represents out of the total number of individuals censused in 1987 (Total), appears in parenthesis.

Year	SC	MSB	SRSB	LS	GR	MP	Total
1985	----	10,000	----	----	----	----	----
1986	10,000*	300*	10,000*	----	----	----	----
1987	5,090	----	1,165*	2229	6	60	8550
1987	(59.5%)	----	(13.6%)	(26.1%)	(0.07%)	(0.7%)	(100%)

* Data collected by California State Parks.

---- Data unavailable for this year.

Appendix: List of some species occurring in Sand City survey sites and their acronyms.

Western Parcel

ABUM-	<i>Abronia umbellata</i>
AGAP-	<i>Agoseris apargioides</i>
AMCH-	<i>Ambrosia chamissonis</i>
Brassica-	<i>Brassica</i> spp.
BRDI-	<i>Bromus diandrus</i>
CAMA-	<i>Cakile maritima</i>
CACH-	<i>Camissonia cheiranthifolia</i>
CAED-	<i>Carpobrotus edule</i>
CA sp.-	<i>Carpobrotus christilynum</i>
ERLA-	<i>Eriognum latifolium</i>
ERPA-	<i>Eriognum parvifolium</i>
LOSC-	<i>Lotus scoparius</i>
LUCH-	<i>Lupinus chamissonis</i>
Stock-	<i>Mattholia incana</i>
PLER-	<i>Plantago erecta</i>
PODO-	<i>Poa douglasii</i>
SPMA-	<i>Spergularia macrotheca</i>

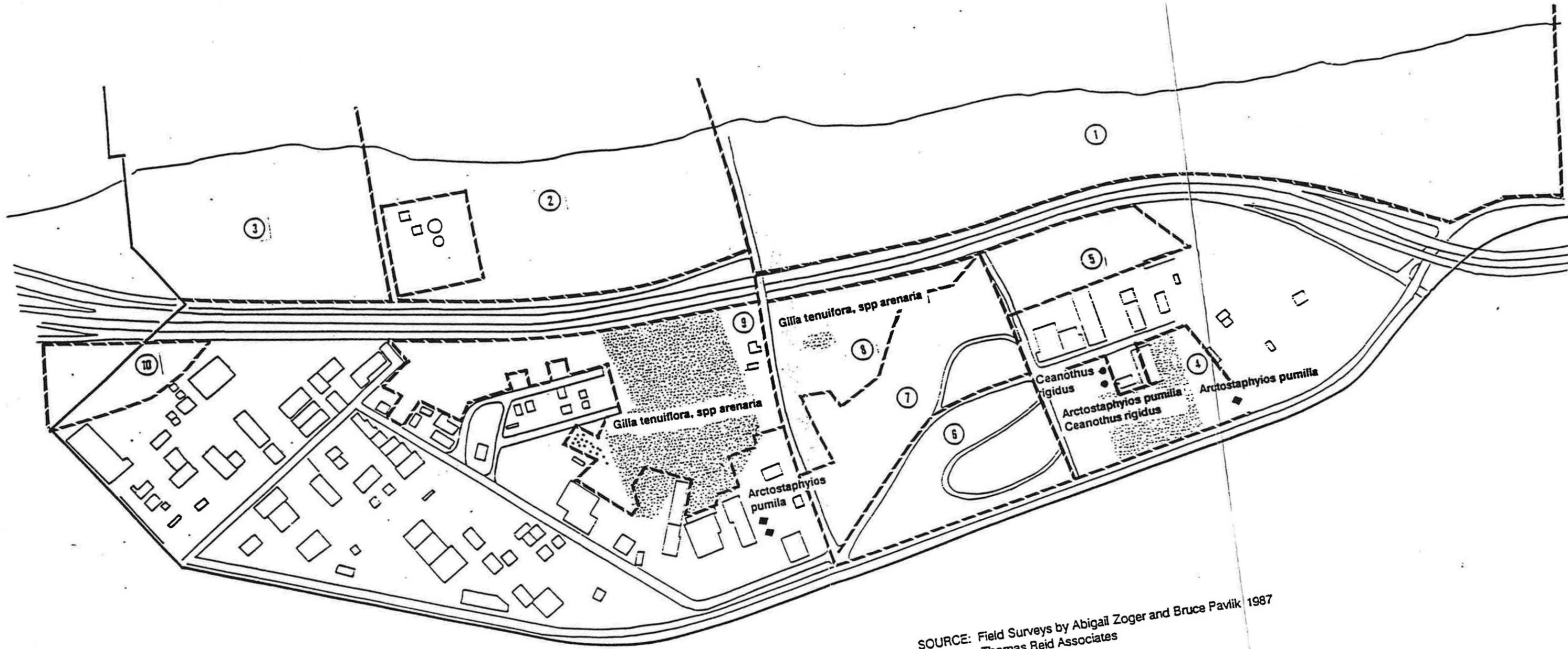
Eastern Parcel

ABUM-	<i>Abronia umbellata</i>
AMCH-	<i>Ambrosia chamissonis</i>
ARPU-	<i>Arctostaphylos pumila</i>
ARPY-	<i>Artemisia pycnocephala</i>
BRDI-	<i>Bromus diandrus</i>
CACH-	<i>Camissonia cheiranthifolia</i>
CAAQ-	<i>Carpobrotus aquilateralis</i>
CAED-	<i>Carpobrotus edule</i>
CHCU-	<i>Chorizanthe cuspidata</i>
CEDE-	<i>Ceanothus dentatus</i>
CERI-	<i>Ceanothus rigidus</i>
COLE-	<i>Corethrogyne leucophylla</i>
CRCA-	<i>Croton californica</i>
ERER-	<i>Ericameria ericoides</i>
ERLA-	<i>Eriognum latifolium</i>
ERPA-	<i>Eriognum parvifolium</i>
Erodium-	<i>Erodium cicutarium</i>
ESCA-	<i>Eschscholzia californica</i>
HECU-	<i>Heliotropium curassavicum</i>

Eastern Parcel (cont.)

LOSC-	<i>Lotus scoparius</i>
LUCH-	<i>Lupinus chamissonis</i>
PLER-	<i>Plantago erecta</i>
RHCA-	<i>Rhamnus californica</i>
RHDI-	<i>Rhus diversiloba</i>
SAMU-	<i>Salvia mulifera</i>
TIER-	<i>Tillaea erecta</i>

FIGURE 1: RARE PLANT LOCATIONS AT SAND CITY 15



SOURCE: Field Surveys by Abigail Zoger and Bruce Pavlik 1987
Thomas Reid Associates

1" = 440 Feet
NORTH

SMITH'S BLUE BUTTERFLY AT SAND CITY

Smith's Blue butterfly is listed as an endangered species by the United States Fish and Wildlife Service. Because Smith's Blue is found in Sand City, land use planning there requires information on the ecology and population distribution of Smith's Blue.

The information presented here is based on field work by Robert Langston, Paul Reeberg, Ray White, and Michael Baumgartner for Thomas Reid Associates in 1987. A concurrent field survey of Smith's Blue was performed at the Marina Dunes for the Marina Dunes Coastal Zoning Task Force; where appropriate comparisons are made between the two studies. Much of the background material presented in this paper is taken from an issue paper on Smith's Blue butterfly at Marina Dunes prepared in July 1987.

A. SUMMARY

Smith's Blue Butterfly is found along the coastal dunes of Monterey County, where the larvae (caterpillar form) feed on two species of buckwheat: the seacliff buckwheat, Eriogonum parvifolium, used to the south, and the coast buckwheat, Eriogonum latifolium, used in the north. While the overall distribution of Smith's Blue is smaller than the geographic range of its larval food plants, Sand City is clearly within the present range of the butterfly. The butterfly's host plants at Sand City are found in 5 of the 9 open areas in the City studied. However, in 1987, the butterflies were found in only two sites, those containing large stands (100's of plants) of E. parvifolium.

Smith's Blue Adults are found close to their larval host plants, which also serve as adult nectar sources as well as egg-laying sites for females. The close relationship between the butterfly and its food plant allows Smith's Blue to colonize and maintain populations on habitat areas as small as a few acres. Such small populations may frequently go extinct, however, and can only be reestablished by migrants from more persistent colonies.

Although Smith's Blue at Sand City was only found at two study sites, they were observed using both species of Eriogonum at one of the sites. However, due to the small size of the two sites which had butterflies (site numbers 5 and 8), the large area of E. latifolium in study site 9 should be considered potential habitat. With the exception of the extreme northwest portion of the study site, the whole west side of Highway 1 is not now considered good habitat for Smith's Blue.

B. TAXONOMY

1. Description of the Butterfly

Smith's Blue is a small lycaenid butterfly. The adults have a 1 inch wingspan. The wing has a pale grey underside speckled with black dots and a reddish-orange band on the hind-wing border. The topside of the male is a lustrous blue, the female has a brown topside with a band of orange bordering the hind wing (1984 SB Recovery Plan). Larvae are slug-shaped and vary from in color from cream to pale yellow or rose, changing with the color of the flowerheads on which they are feeding.

2. Subspecies Relationships

The species Euphilotes enoptes comprises nine described subspecies, including Smith's Blue (Euphilotes enoptes smithi). The following paragraph is a general introduction to the species biology adapted from Langston (1975).

The species group distribution is restricted to western North America, Western Canada and Baja California. Adults are closely associated with their host plants, several species of wild buckwheat, Eriogonum (Polygonaceae). Eggs are deposited on late buds or early flower heads of the buckwheat plants. Young larvae feed solely on the flowerheads of the plant. Each subspecies is generally restricted to one or a few closely related host species of buckwheat. There is only one generation per year. Depending upon subspecies, the adults may fly in early-late spring, early summer, mid-summer or early fall.

Smith's Blue (Euphilotes enoptes smithi) was originally described in 1954 by R.H.T. Mattoni from specimens collected on 20 Aug. 1948 at Burns Creek, State Highway One, Monterey County, California. Dr. Jerry A. Powell found many along Tioga Ave. south of Fort Ord (in the Seaside Dunes) on 4 July 1959. Robert Langston confirmed it at the Seaside Dunes (later Sand City) in 1962, 1963, 1969, 1971, 1986 and 1987.

Two other subspecies of Euphilotes enoptes are found in the greater San Francisco Bay Area. E. e. bayensis is found in the northern San Francisco Bay area: including Marin, Contra Costa, and Solano Counties, ranging northward in Sonoma, Mendocino and Humboldt Counties. E. e. tildenii is also more widespread than smithi: it occurs in the inner coast range foothills and mountains in Santa Clara, Stanislaus, San Benito, Monterey, San Luis Obispo, Kern and Ventura Counties.

The most recent distribution of SB is described in the U.S. Fish and Wildlife Service (USFWS) Smith's Blue Butterfly Recovery Plan (1984). Figure 1 (taken from the Recovery Plan) shows the known collection locations of Smith's Blue through 1983. Note that the Santa Cruz and San Mateo County locations are not considered to be assignable to Euphilotes enoptes smithi.

Robert Langston and Dennis Murphy, Ph.D. (Thomas Reid Associates) conducted a survey of Euphilotes enoptes in 1986 in inland Santa Cruz County for the USFWS to determine the taxonomic status of the insect and its distribution. That study concluded that Euphilotes enoptes found in inland Santa Cruz Co. and San Mateo County are phenotypically intermediate between E. e. smithi and E. e. tildenii.

C. ECOLOGY

1. Life Cycle

The following is summarized from the Smith's Blue Recovery Plan (USFWS 1984). Smith's Blue butterflies are univoltine -- there is only a single generation per year. The butterflies overwinter as pupae, emerging as adults in the late spring or early summer. The males emerge a few days to a week ahead of the females. Once the females emerge, they are quickly mated. All courtship and mating behavior takes place around the buckwheat plants.

The females lay their eggs singly on flower heads of the plants. The

larvae hatch in about a week. After hatching the larvae begin eating the flowering heads of the buckwheat. As larvae grow they molt, passing through 5 growing stages (or instars). Following the fifth instar stage the larvae pupate (August - November), and then overwinter in the leaf litter at the base of the plants.

2. Larval Food Plants

Smith's Blue is known to use two buckwheat species as larval food plants: seacliff or dune buckwheat, Eriogonum parvifolium, and coast buckwheat, Eriogonum latifolium. In California, Eriogonum parvifolium is found in dunes and hillsides along the California coast from Monterey County south to San Diego County (Abrams, 1944). Sand City is near the northern range limit for Eriogonum parvifolium and the butterfly. The dune buckwheat is a shrub with slender leafy branches (Figure 2). It has a single inflorescence; the flower is white aging to a pale rose color. Eriogonum latifolium is found in bluffs and dunes along the coast from Oregon south to San Luis Obispo (Munz 1968). It has mostly basal oval leaves (Figure 2), and also has a single white or pale rose inflorescence.

The most southerly populations of Smith's Blue are solely associated with E. parvifolium. Dr. R. A. Arnold first proved the butterfly using a different species of Eriogonum (E. latifolium) at Fort Ord in 1983. At Marina Dunes in 1986 and 1987, the blue was observed using only E. latifolium. Although Smith's Blue was observed using both species at Sand City in 1987, they were more closely associated with E. parvifolium.

3. Oviposition Suitability

Female butterflies lay their eggs singly on the buds and newly opened flowering heads of buckwheat. Because the plants bloom earlier in the more sheltered aft dunes, the earliest emerging adults are found flying in these locations. The adults subsequently emerge in the mid dunes, and ultimately in the more exposed areas of the fore dunes.

4. Nectaring

Adult Smith's Blue butterflies nectar (feed) almost exclusively on buckwheat flowers. Under inclement weather conditions when butterflies do not get sufficient warmth from sunlight to allow flight, adult feeding is also curtailed.

5. Interaction with Other Animal Species

There are several species of lepidoptera which also feed on buckwheat species at Sand City: the Mormon Metalmark (Apodemia mormo), the Green Hairstreak (Callophrys viridis), the Acmon Blue (Plebejus acmon), and the Common Hairstreak (Strymon melinus pudica). These species overlap in flight period with Smith's Blue. The extent of larval competition among these species is not known, however, due to the abundance of buckwheat relative to the distribution of the butterfly at Sand City, competitive exclusion among the species is not likely to occur across large portions of the habitat.

As with other lycaenids, Smith's Blue larvae appear to be tended by ants during later instars (Arnold 1980). Arnold also observed predation by spiders and occasionally heavy parasitism by wasps. The role of other species in Smith's

Blue population dynamics is unknown.

6. Dispersal and Barriers to Movement

Smith's Blue is a weak flying species and long distance dispersal is certainly extremely rare. Mark-release-recapture studies are required to demonstrate actual movement of individuals and were not done for the Sand City study. Arnold (1983) examined Smith's Blue at Fort Ord and at the Marina State Beach (1986), reporting common dispersal of distances of a few hundred yards. Flight usually occurs within one or two meters above the ground. Observations of extended flight – more than a few minutes for an individual butterfly – are rare.

Since Smith's Blue spends the majority of its time in short flights within patches of buckwheat, any area of non-habitat, such as active mining areas, large blow-outs, or extensive dense patches of vegetation which does not contain buckwheat (such as ice plant), will act as barriers to dispersal. Where there is no visual continuity of habitat, as with areas of urban development or plantings of shrubs or trees, the barrier is likely to be significant. Some dispersal may be passive, by the wind, but the typical response of adults under high wind conditions is to avoid flight altogether.

D. SMITH'S BLUE POPULATIONS AT SAND CITY

1. Host Plant Utilization

Prior to construction of Highway 1 through the Seaside Dunes (now Sand City) in late 1960's, the seacliff buckwheat, Eriogonum parvifolium, was more widespread than it is today. After construction of Highway 1, African ice plant used by CalTrans to revegetate open sand spread onto undisturbed dunes. Competition with ice plant resulted in a drastic decrease in the distribution of E. parvifolium at Sand City, and caused a concomitant decline in the population of the butterfly. The coast buckwheat, Eriogonum latifolium, was also found at Sand City in the 1960's, but it did not appear at that time to be used by Smith's Blue (Langston). This loss of habitat was a major factor in the decision to list the butterfly as an Endangered Species in 1974.

The distributions of both buckwheat species at Sand City were determined in 1987. Figure 3 shows the distribution of Eriogonum latifolium and Eriogonum parvifolium at Sand City. Eriogonum parvifolium is found in two stands in study sites 5 and 8, and in smaller stands in sites 1 and 9. Eriogonum latifolium had a somewhat broader distribution. A description of the vegetation at each study site is provided in Table 1.

TABLE 1

<u>Study Site</u>	<u>Site Characteristics</u>	<u># of Smith's Blue Observed</u>
1	ice plant and bare sand some <i>Eriogonum parvifolium</i> (<i>E. p.</i>) at extreme north end	0
2	ice plant and bare sand, small amounts of <i>E. p.</i> and <i>E. latifolium</i> (<i>E. l.</i>)	0
3	ice plant and bare sand	0
4	Rare <i>Ceanothus</i> and <i>Manzanita</i> no <i>E. p.</i> or <i>E. l.</i>	0
5	lots of <i>E. p.</i> and <i>E. l.</i>	199
6	no <i>E. l.</i> or <i>E. p.</i>	0
7	rare plants, no <i>E. l.</i> or <i>E. p.</i> ice plant	0
8	lots of <i>E. p.</i> , some <i>E. l.</i>	14
9	lots of <i>E. l.</i> , small amount of <i>E. p.</i>	0

Although Smith's Blue was observed nectaring on *E. latifolium* at Sand City in 1987, the butterfly is primarily associated with *E. parvifolium*. This is shown by 1) the later flight period at Sand City compared with Marina Dunes, 2) adults were only found where *E. parvifolium* was relatively dense, and 3) no adults were found in pure stands of *E. latifolium* where *E. parvifolium* was absent.

At the Marina Dunes north of Sand City, apparently the decline of the *E. parvifolium* population caused the butterfly to oviposit on *E. latifolium*, which is more widespread in the Dunes and which appears to better withstand competition from alien ice plant. *E. latifolium* blooms in June and July; *E. parvifolium* blooms from July through September. Because *E. latifolium* blooms earlier than *E. parvifolium* and because the larvae feed on the flowerheads, Smith's blue at the Marina Dunes began to exhibit an earlier adult flight period. Where Smith's Blue is primarily associated with *E. latifolium*, the butterfly flies in June and early July, and where primarily associated with *E. parvifolium*, the butterfly flies from July to September. Morphologically, the adults fall within the same range of variation from either host.

Smith's Blue at Sand City has adapted to using both host plants. However, it appears to be more dependent on the *E. parvifolium* since it was not found in pure stands of *E. latifolium*. Depending on the continued availability of *E. parvifolium* relative to *E. latifolium*, the butterfly could adapt to using pure stands of *E. latifolium*, as it appears to have done at Marina.

2. Smith's Blue Survey

The adult survey of Smith' Blue Butterfly was performed at Sand City in June - August 1987. Over 40 person hours were spent in the field in transect studies of Smith's Blue at Sand City, with a total of 213 butterfly sightings. For this survey an effort was made to cover the entirety of Sand City, including the extreme northwest corner which was not included on the City's aerial photo. The actual census, that is individual observations, are shown in Figure 4. Due to the limited areas of host plant found at Sand City, each study site was thoroughly searched during each visit. The Dates of the visits and numbers of sightings are provided in Table 2. For comparison, the dates and number of observations at the Marina Dunes is shown with those for Sand City.

TABLE 2

VISITS TO SAND CITY		VISITS TO MARINA	
Dates	# of Smith's Blue Observed	Dates	# of Smith's Blue Observed
June 12	0	June 10, 11	637
June 24	0	June 23, 25	258
July 8	0	July 7, 8	188
July 22	117	July 22	8
July 31	94	July 30	3
Aug. 19	2	Aug. 19	0
TOTALS	213		1,094

Note that no mark-release-recapture work was done by TRA in 1987. Such a study technique is needed to get quantitative population and dispersion estimates. Because of the availability of population parameter data from the work of Arnold and because of the close dependency of Smith's Blue on the larval host plant distribution, mark-release was judged to be unnecessary for this study. Handling during mark-release has a distinct adverse impact on a fragile butterfly such as Smith's Blue. Mark-release also requires a level of effort at least 10 to 20 fold greater than do transect methods for the same area studied.

The distribution of the butterfly at Sand City is limited due to the extensive area of disturbed land in the City and the wide distribution of alien ice plant. There were two sub-colonies found on the east side of Highway 1 (Figure 4). At study site 8, 14 adults were observed, while at site 5, 199 adults were observed. There may have been a larger population at site 8 a year ago, however, a significant amount of host plant was bulldozed away in that area since July 1986. Although adult Smith's blue were observed at the southern end of the Fort Ord property, none were observed at the northern end of the Sand City City limit line, where some *E. parvifolium* was found. The patch of host plant is contiguous across the property line, but, the portion of the patch on the Sand City side is less dense (about 30-50 plants) than the portion on the Fort Ord side (100's of plants).

The survey methods used do not support quantitative population estimates. Clearly, at Sand City, Smith's Blue is restricted to areas where there are relatively good stands (100's of plants) of *E. parvifolium*. They were not found in areas where there were few plants (10's of plants). Over 200 observations were made in on six survey days in 1987. Based on this there were undoubtedly

hundreds of adults at Sand City in 1987.

E. HABITAT REQUIREMENTS FOR PRESERVE DESIGN

1. Objectives

The population of Smith's Blue at Sand City is only a small part of the entire population. As such, whatever conservation is achieved at Sand City will affect and be affected by conservation efforts elsewhere in the butterfly's range. With minor updating for recent studies, the US Fish and Wildlife Recovery Plan is a good guide to the sort of range-wide protection that would be appropriate to maximize the long term survival of Smith's Blue.

In considering habitat requirements for preserve design, we consider first the need to preserve areas of adequate size, integrity and resource quality to maximize the long term survival of the butterfly at Sand City. Second we consider the proximity to other colonies (primarily to the south).

2. Resource Quality Within Colonies

The quality of habitat for Smith's Blue is similar over the Sand City study area. Most of the stands of the butterfly's host plants have already been invaded by ice plant or are threatened by invading ice plant. Some areas, like study site 8, are threatened by grading or by expanding sand mining activities.

Adult Smith's Blue can find basic requirements (mating, nectaring, egg-laying) within a very small area (less than an acre). In locations where there is abundant host plant the local butterfly densities may vary from year to year, thus, Smith's Blue "hotspots" may shift over a period of years -- partially in response to declining buckwheat quality (Arnold, 1980, 1986). The limited distribution of host plant at Sand City has resulted in a limited distribution of Smith's Blue.

3. Colony Extinction and Species Survival

The butterfly probably has a stepping-stone dispersal pattern, (Murphy 1986). Although few individuals travel substantial distances, individuals do leave colonies and disperse into adjacent unpopulated areas throughout the range of the butterfly. Surveys of Smith's Blue habitat in its northern range (Salinas State Beach, Marina Dunes, Fort Ord and Sand City) in 1987 suggest that gene flow may be realized across the entirety of the butterfly's distribution along the coast of Monterey Bay.

Large, continuous habitat areas with high resource density are the of greatest habitat value. Small isolated areas, even with high resource density, may be unable to support Smith's Blue butterflies in the long term. Even with high buckwheat density, small areas may not be able to support enough butterflies to avoid extinction due to random fluctuations in population size. While it is plausible that sufficient long-range dispersal (on the order of a mile) could accomplish recolonization and gene flow through the stepping stone model, the rate of recolonization may be too low to functionally sustain colonies at many of the isolated habitat patches noted along the dunes at Fort Ord, for example.

Large areas with low resource density may continue to support colonies of Smith's Blue if the resource density is above some critical value (not now known explicitly). Results from this study and others (Arnold, 1980, 1986) indicate that the flight behavior of Smith's Blue is well adapted to exploit a host plant of moderate density with a patchy distribution on a small scale and which shifts in density and distribution over time.

F. STUDY RECOMMENDATIONS

- 1) Preserve and protect the entire existing area of host plant contained in study sites 5 and 8, (sites where Smith's Blue were found).
- 2) Mimimize the overall reduction of potential habitat areas (areas where host plants are found but where no butterflies were observed).
- 3) In exchange for the elimination of potential habitat areas for urban uses, create new habitat in appropriate non-development areas. As a general guideline, most of the Caltrans Highway 1 right-of-way should be converted to native vegetation.
- 4) Eliminate vehicle access to the protected preserved and potential habitat sites.
- 5) Control heavy foot traffic in particularly sensitive areas.
- 6) Begin an immediate program for controlling invasive non-native iceplant in the preserved sites and in protected potential habitat areas.
- 7) Protect the preserved sites from activities taking place in adjacent non-habitat areas through the use of fences and/or signs.
- 8) Preserved sites should be joined by a habitat corridor to allow adequate dispersal between butterfly populations. Similarly, a corridor could be established along Highway 1 to connect with the colony at the north end of Sand City on the Fort Ord side. The corridor may require native species and other host plant enhancement.
- 9) Monitor the adult population of Smith's blue butterfly each year to determine the effects of management programs. Use transect surveys rather than mark-recapture surveys to reduce damage to the butterflies caused by excessive handling.

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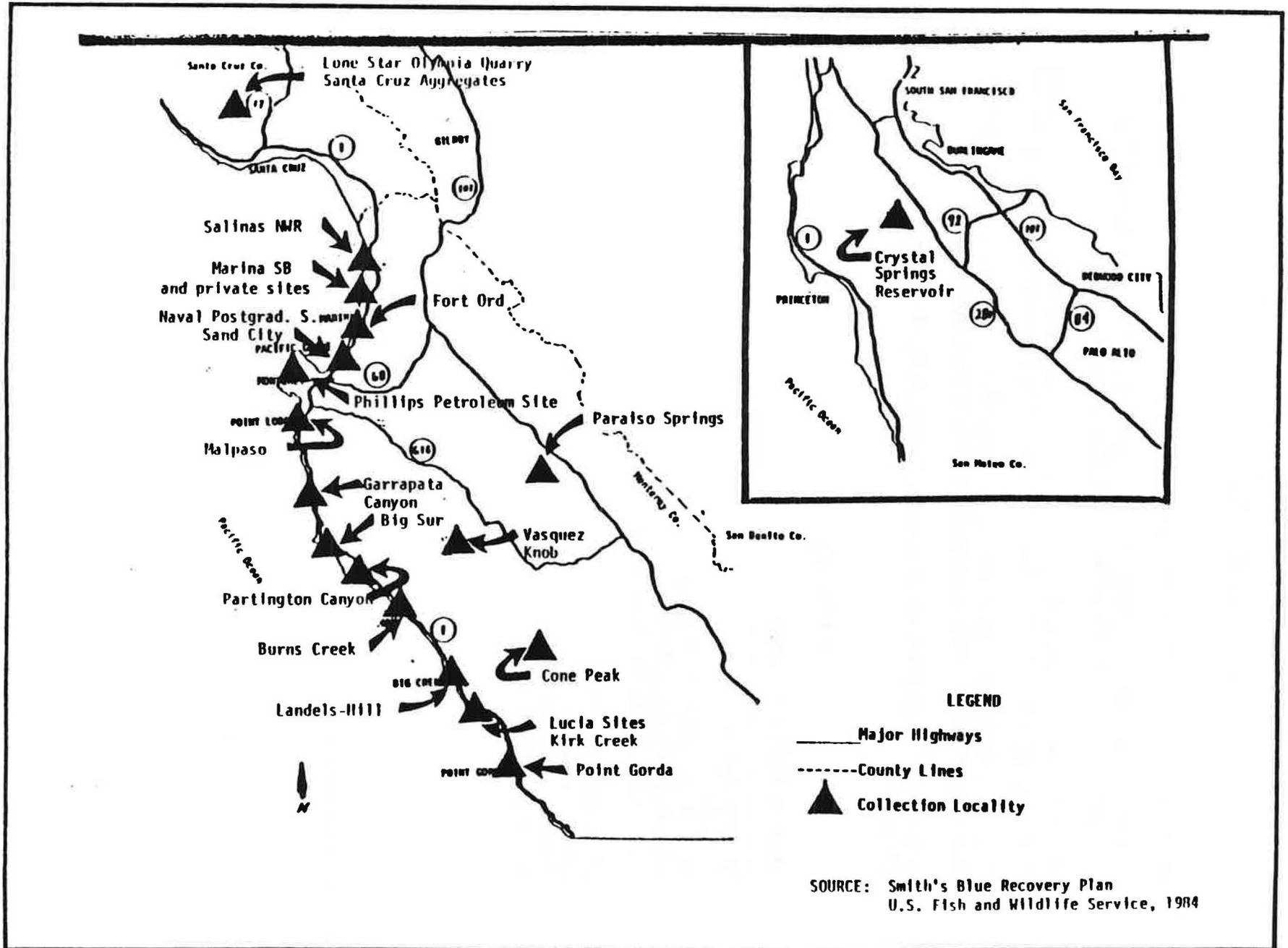
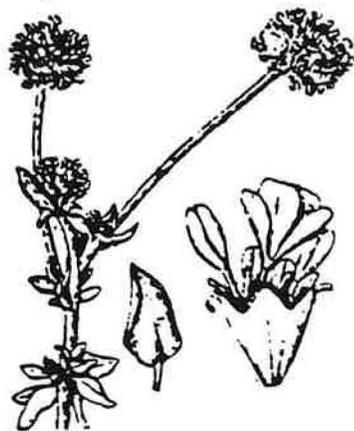


FIGURE 2: KNOWN LOCATIONS OF SMITH'S BLUE BUTTERFLY THROUGH 1983

FIGURE 3: ILLUSTRATIONS OF ERIOGONUM HOST PLANTS

PLANTS OF CONCERN



Eriogonum parvifolium

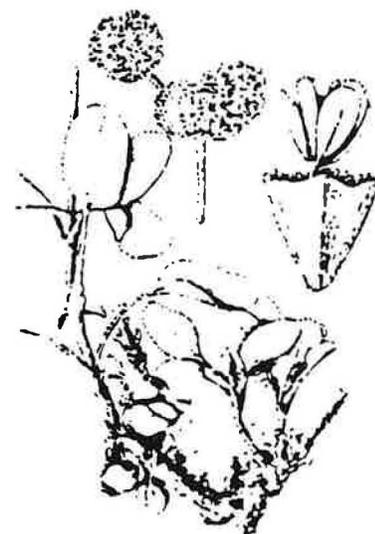
75. Eriogonum parvifolium Smith. Dune Eriogonum. Fig. 1423.

Eriogonum parvifolium Smith in Rees, Cycl. 13: No. 2. 1809.

Eriogonum parvifolium subsp. *lucidum* Howell ex Stokes, Gen. Eriog. 87. 1936.

Low spreading shrub, 3-10 dm. high, with slender densely leafy branches, thinly floccose. Leaves fasciculate at the nodes, round-ovate to oblong-lanceolate, 8-12 mm. long, short-petioled; thick, revolute on the margins, densely white-tomentose beneath, dark green and shining above; heads solitary or racemously disposed on a simple or umbellately branched peduncle; involucre 4 mm. long, glabrate outside, woolly on the throat within; calyx white or tinged with rose, glabrous, 3-4 mm. long, the lobes obovate; filaments sparsely hairy.

Dunes and hillsides along the coast, mainly Upper Sonoran Zone, Monterey Bay to San Diego County, California. Type locality: California (Menzies), probably Monterey. June-Dec.



Eriogonum latifolium

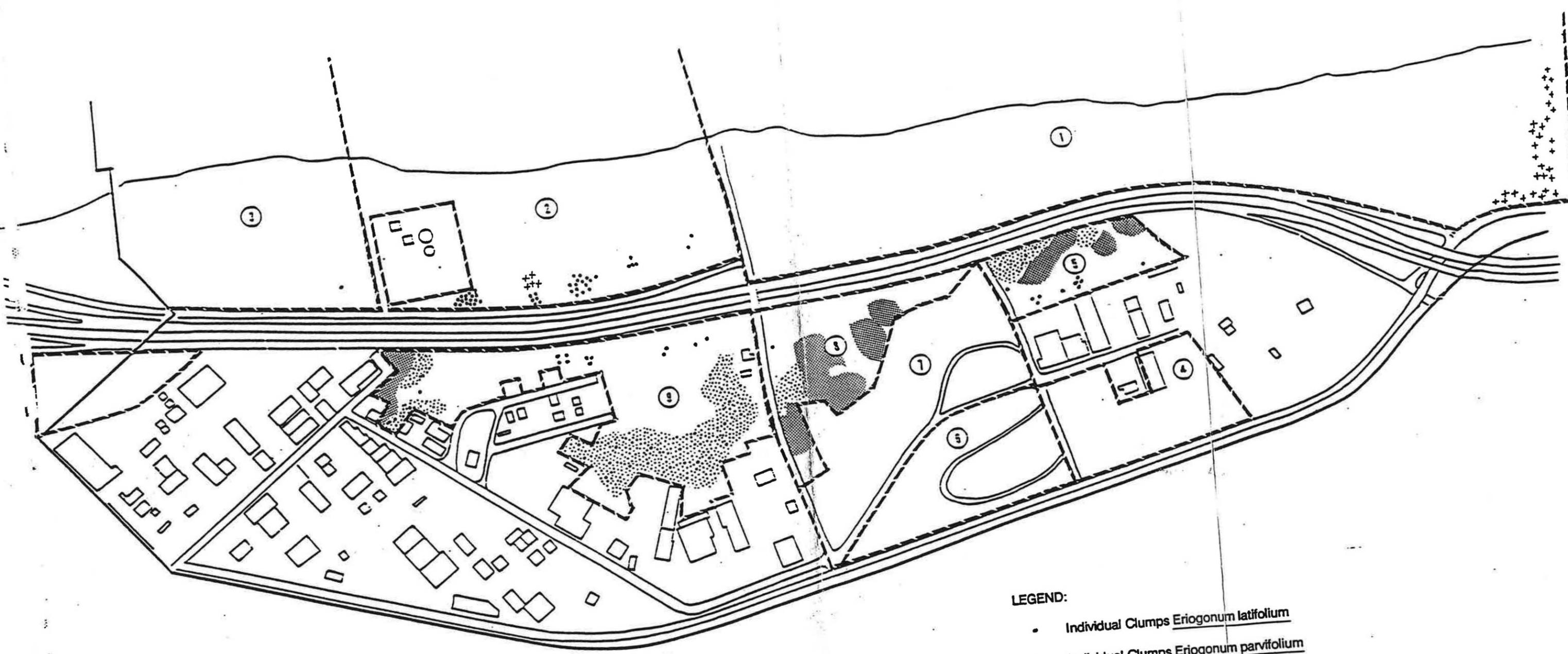
70. Eriogonum latifolium Smith. Coast Eriogonum, Tibinagua. Fig. 1418.

Eriogonum latifolium Smith in Rees, Cycl. 13: No. 3. 1809.

Leaves persistent, densely clothing the branches of the low woody caudex, ovate or ovate-oblong, rounded or cordate at base, densely white-woolly beneath, lanate or glabrate above, 2.5-4 cm. long, the margins plane or somewhat crisped; flowering stems leafless, floccose-tomentose, stout, 2-6 dm. high, simple or 2-4-forked, the forks simple or again forked; involucre congested forming a large terminal head or in the forms with forked stems the heads more reduced and occurring in the forks as well as the ends of the branches, shallowly 5-toothed, tomentose, 4 mm. long; calyx white or pale rose, glabrous, 3 mm. long, the lobes obovate, rounded at apex; filaments densely villous at base.

Bluffs and dunes along the coast, Humid Transition Zone; Cape Blanco, Oregon, to Monterey County, California. Type locality: California (Menzies). June-Dec.

FIGURE 4. DISTRIBUTION OF HOST PLANTS AT SAND CITY

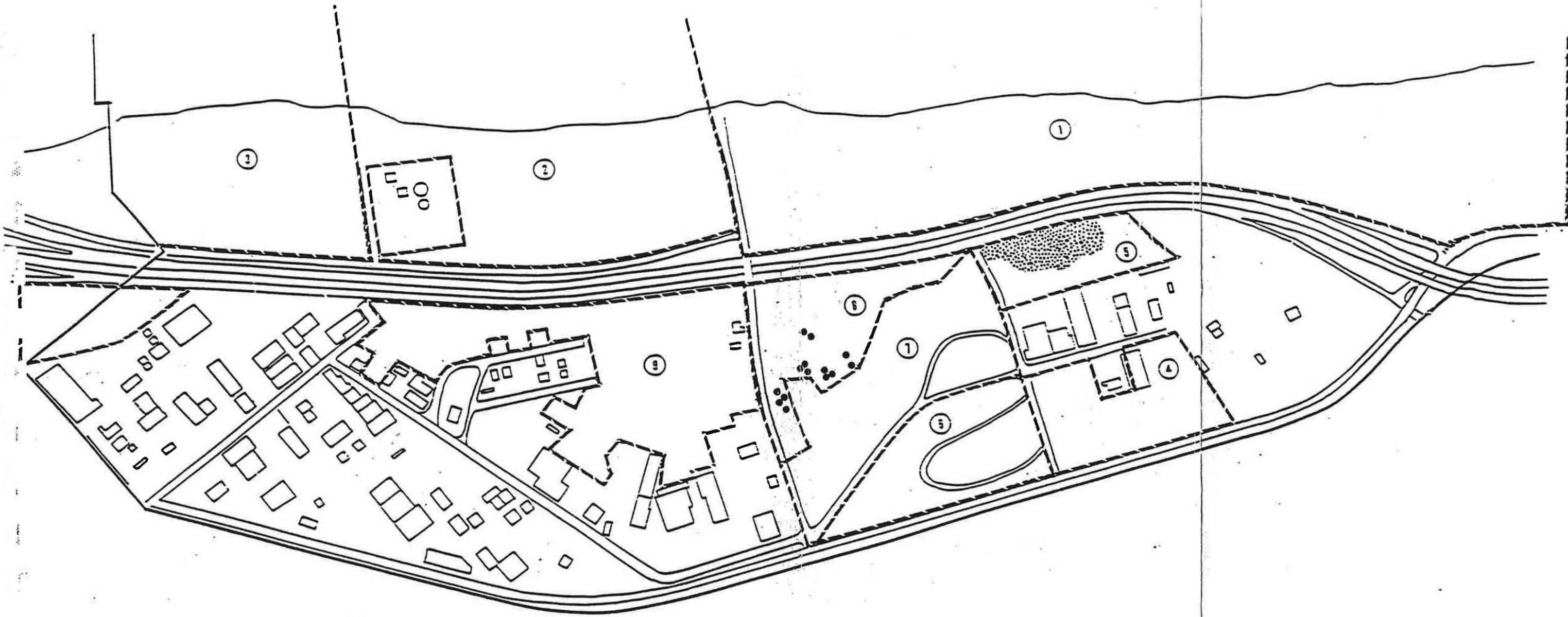


- LEGEND:
- Individual Clumps *Eriogonum latifolium*
 - + Individual Clumps *Eriogonum parvifolium*
 - Concentrations *Eriogonum latifolium*
 - Concentrations *Eriogonum parvifolium*

SOURCE: Surveyed by Bob Langston and Paul Reeberg,
June, July, August, 1987
Thomas Reid Associates

1" = 440 feet





LEGEND

- Smith's Blue Butterfly Single Observation
- ◼ Smith's Blue Butterfly Concentration Observed

SOURCE Surveyed by Bob Langston, June, July, August 1987
Thomas Reid Associates

1" = 440 feet



SAND CITY BLACK LEGLESS LIZARD SURVEY

INTRODUCTION

The Black Legless Lizard (*Anniella pulchra nigra*) is a Federal Candidate Species, Category 2. This is a listing for species which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking (California Department of Fish & Game Diversity Data Base April, 1986).

The Black Legless Lizard has a limited range. According to Stebbins (1966), it is found only on the Monterey Peninsula and adjacent coastal sand dunes along the southern part of Monterey Bay. Intergrades between the Black and Silver Legless Lizard (*Anniella pulchra pulchra*) occur along Monterey Bay north of the Salinas River just into Santa Cruz Co. (Miller, 1943). Dark individuals from coastal San Luis Obispo Co. have in the past been tentively referred to as integrades (Stebbins, 1954). However, recent biochemical studies conducted at the University of California at Berkeley indicate that these populations are most closely related to the normal Silver Legless Lizards that occur in other parts of central and southern California (William Rainey, pers. comm.). The dark coloration of the San Luis Obispo Co. population has evolved independently from Silver Legless Lizards and has no relation to Black Legless Lizards in Monterey Co.

Historically, the Black Legless Lizard had a continuous distribution along coastal sand dunes from the Salinas River to the Carmel River. However, habitat has been greatly reduced and fragmented by human activities. This habitat reduction is caused by urban development, vegetation destruction through human trampling and off-road vehicle use, sand mining, and the introduction of iceplant that forms large mats under which Black Legless Lizards are not able to live (Bury, 1985).

Black Legless Lizards occur throughout the coastal dune system from above high tide line to the dune crests. They burrow in the sand and are found by raking in the leaf litter under native vegetation such as Sagewort, Lupine, and Mock Heather. Bury (1985) reported that 71% of the lizards he found were in association with Mock Heather and Lupine. However, in 1985 at Spanish Bay on the

Monterey Peninsula, we found over 70% under sagewort. At this site Mock Heather and Lupine were not common.

Black Legless Lizards are relatively sedentary and populations occur even in small patches of natural habitat. Miller (1944) found 62 lizards on a small islet off Point Pinos on the Monterey Peninsula. This islet was cut off from the Mainland by tidal action and the 62 lizards were found in an area only approximately one hundred feet on a side. The lizards were marked and 10 that were recaptured two months later had moved from 1.87 to 27.5 feet.

A status report prepared for the Office of Endangered Species stated that the Black Legless Lizard was probably threatened (Bury, 1985). The report recommended that further studies were needed to determine the extent of remaining habitat, to assess threats at each site, to determine appropriate protective measures, to find means to restore habitat, and to monitor populations over time. The report listed the species from the southern end of Fort Ord and from Monterey Dunes State Beach, but not from Sand City.

METHODS

All the undeveloped areas within the Sand City limits were surveyed to determine if Black Legless Lizards were present. Lizards were located by digging with a rake under vegetation. Since this method has an adverse effect on the plants, no attempt was made to locate large numbers of Black Legless Lizards. An attempt was made to find one individual at each separate undeveloped site. Lots were considered to be separate if they were surrounded by buildings or roads.

Areas of suitable habitat were mapped in the field based on the presence or absence of lizards.

RESULTS

Ten potential Black Legless Lizard sites were surveyed in Sand City (see map). Lizards were found on seven of the sites (see map). Each site is discussed below.

1. The coastal dunes west of Highway 1, south of Fort Ord and north of Tioga Ave. No Black Legless lizards were found. This site

has almost no native vegetation. There is a large mat of Iceplant at the north end and the rest of the property has had extensive sand mining.

2. The coastal dunes west of Highway 1 , south of Tioga Ave., and north of Bay Street. Black Legless Lizards present. Habitat consists of some native vegetation, but mostly Iceplant and open dune.

3. The coastal dunes west of Highway 1 , south of Bay Street, and north of the southern boundary of Sand City. Black Legless Lizards present. The habitat is similar to site #2.

4. The lot between north end of Metz Rd. and railroad tracks. Black Legless Lizards present. Habitat consists of native vegetation and isolated patches of Iceplant.

5. The sandy slope west of site #4 and east of Highway 1 . Black Legless Lizards present. Habitat consists of native vegetation and isolated patches of Iceplant.

6. The lot between south end of Metz Rd. and railroad tracks. Black Legless Lizards absent. Sand appears to have been removed.

7. The sand mine west of Metz Rd. and north of Tioga Ave. Black Legless Lizards absent. Most native vegetation gone and large patches of Iceplant present.

8. The lot north of Tioga Ave., east of Highway 1 , and west of site #7. Black Legless Lizards present. Habitat consists of native vegetation and isolated patches of Iceplant.

9. The large lot south of Tioga Ave. and east of Highway 1 . Black Legless Lizards present. Habitat consists of native vegetation and many patches of Iceplant.

10. The lot east of Highway 1 extending into Seaside from southern boundary of Sand City. Black Legless Lizards present. Habitat consists of native vegetation and isolated patches of Iceplant.

RECOMMENDATIONS

Black Legless Lizards populations are found on seven of the ten sites surveyed. All these sites show impacts from Iceplant. Areas of open, unvegetated dune and Iceplant can be restored by implementing the methods in use at Marina State Beach. Once areas are restored, Black Legless Lizard populations will increase. Site seven is continuous with site eight, where Black Legless Lizards are present. If native vegetation was planted on site seven, Black Legless Lizards would naturally colonize from site eight.

PERSONS CONTACTED

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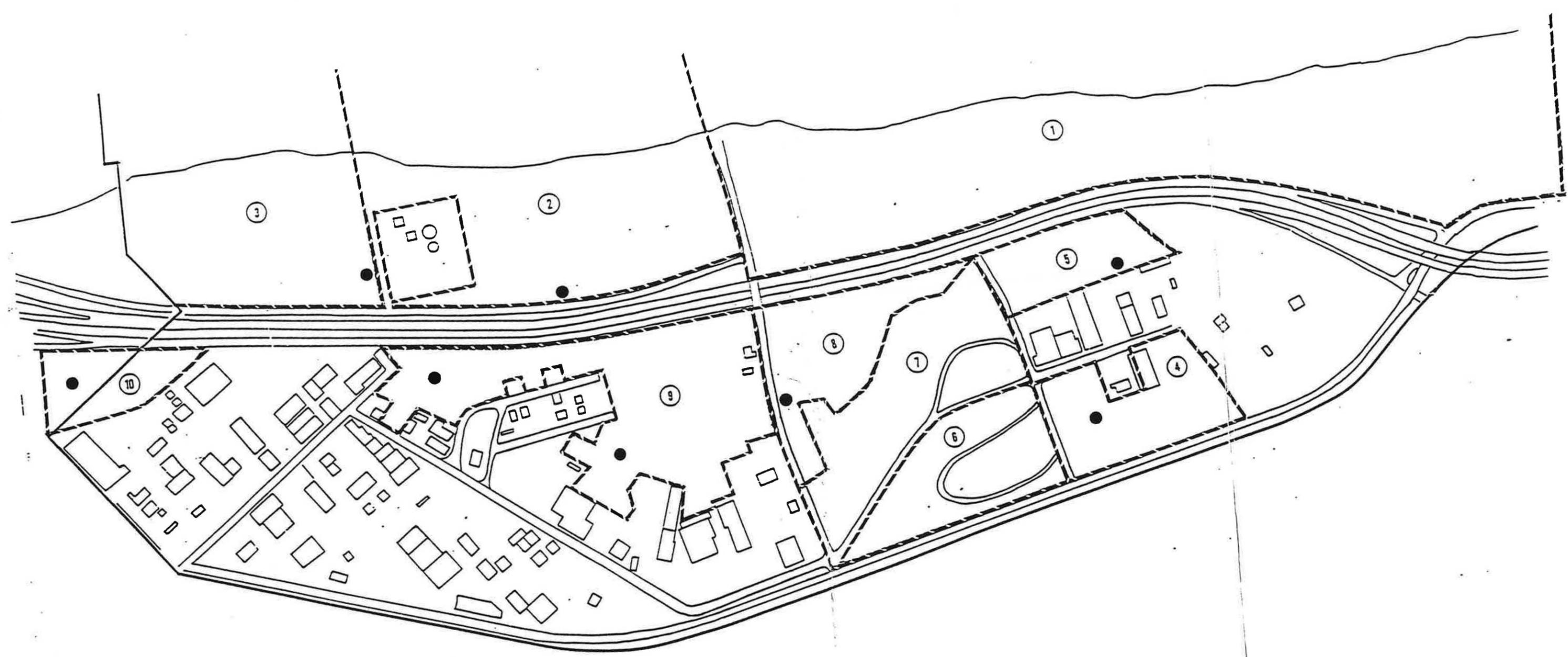
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- LEGEND
- BLACK LEGLESS LIZARD
 - ① SURVEY SITES

SOURCE Field Surveys by Ted Papenfuss and Bob Macey 1987
Thomas Reid Associates

1" = 440 feet



NORTH

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SAND CITY REGIONAL SHOPPING CENTER
SAND CITY, CALIFORNIA
February 1, 1989**

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