

**Calavera Hills Phase II
Final Habitat Management Plan**

Carlsbad, CA

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I. Introduction

A. Background

The Calavera Hills Phase II Habitat Preserve (Preserve) is a 144 acre open space set aside for permanent conservation by Calavera Hills II, LLC, the developer of Calavera Hills Phase II. This conservation area has been set aside as partial mitigation for impacts to natural habitat resulting from the approved Phase II development.

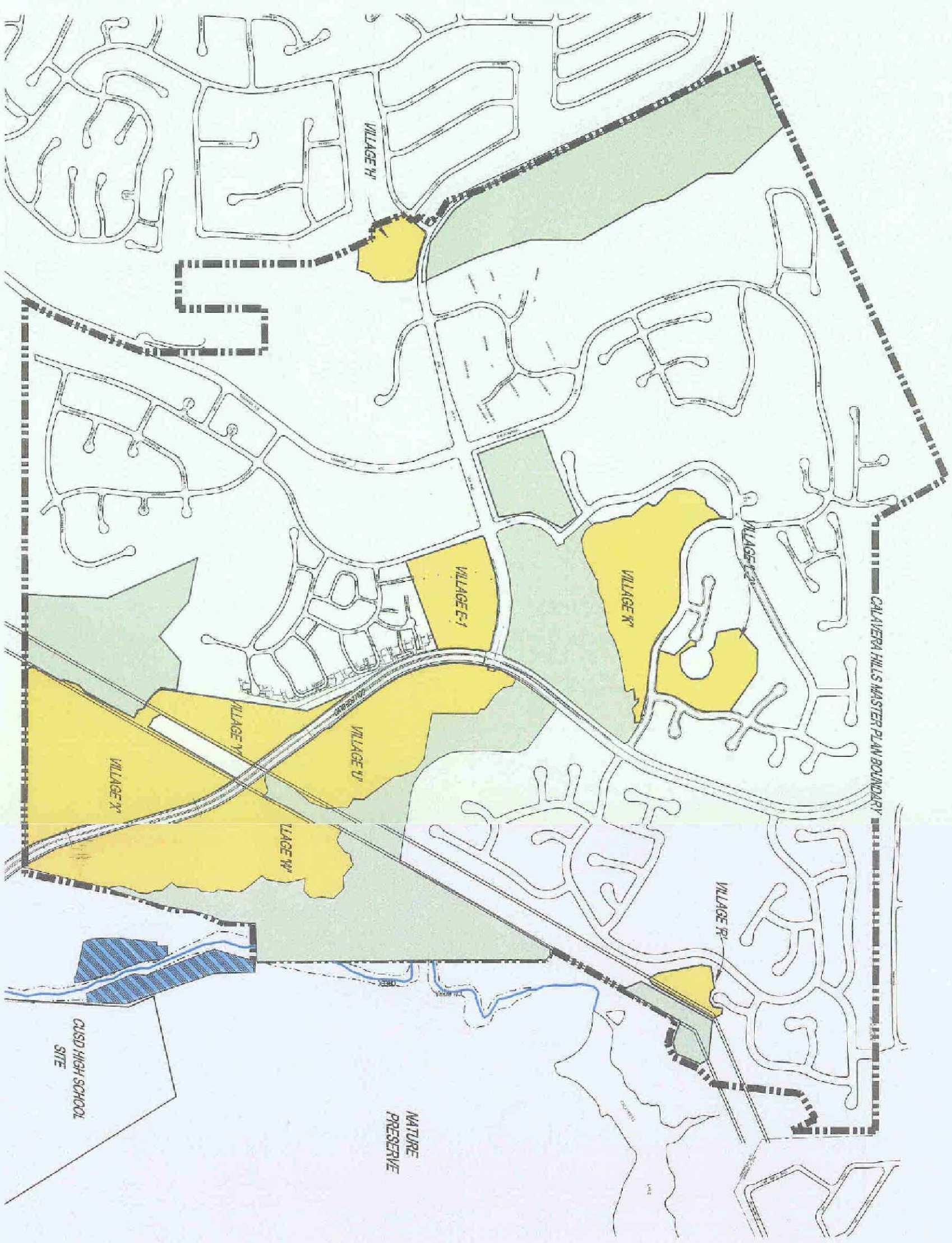
The limits of the Preserve (Figure 1) have been approved by the City of Carlsbad, the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) with the primary goal of protecting habitat of the federally listed coastal California gnatcatcher, as well as other listed species and other sensitive plant and wildlife species that are covered under the City of Carlsbad Habitat Management Plan (HMP). A varying number of gnatcatchers have been observed to occupy the preserve area in different yearly surveys.

The site has been evaluated through the Calavera Hills Phase II Environmental Impact Report. It contains approximately 110 acres of coastal sage scrub (CSS), approximately 8 acres of southern mixed and chamise chaparral (SMC), approximately 16 acres of non-native grasslands (NNG), 2 acres of eucalyptus woodland (EUC), and 8 acres of other vegetation types including disturbed and ruderal vegetation. Listed and sensitive animal and plant species also occupy the site.

Pursuant to the requirements of the U.S. Fish & Wildlife Service (USFWS) Biological Opinion dated March 14, 2002, Calavera Hills II, LLC is required to name and endow a public or private natural land management entity to manage the conserved area resources in perpetuity. The resource agencies and organizations have determined that setting lands aside and preventing development is not sufficient to preserve and protect biological integrity. Identifying the critical processes and elements that need protection, then planning, budgeting and funding for sustaining these processes and elements in perpetuity is the essence of long-term land protection.

The area affected by this Habitat Management Plan is identified as Habitat Conservation Area on the attached Figure 1.

FIGURE 1



LEGEND

-  Stream
-  Wetland
-  Restoration Area
-  Calavera Hills Phase II Habitat Conservation Area
-  Calavera Hills Phase II Development Envelope
-  Restoration of Easement Road in Planning Area "K"

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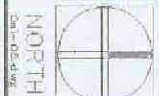
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B. Purpose

The purpose of this Habitat Management Plan is to establish the parameters for the permanent protection and management of the conservation area. The intent of this plan is to assure that the monitoring and management provides for the protection of vegetation within the area is protected from future disturbance in order that it can persist as viable California gnatcatcher nesting habitat and that the preserved area becomes biologically integrated into the overall open space network of the City of Carlsbad HMP and remains consistent with the MHCP. This document provides a management program to ensure an ecologically sustainable conservation area, conserving both the diversity and function of the ecosystem through the preservation and adaptive management of the vegetation communities. The plan will outline the Preserve's resources and characteristics and will provide a brief overview of general tenets of conservation biology for natural areas management as it applies to this Preserve.

This Habitat Management Plan is consistent with the California Natural Communities Conservation Planning (NCCP) Act and with the City of Carlsbad's Habitat Management Plan (HMP) and the North County Multiple Habitat Conservation Program (MHCP). It is expected that future development activity within San Diego County will necessitate the mitigation of impacts to endangered and sensitive species and biologically sensitive habitats through the preservation of on-site lands which possess comparable habitat values. The Calavera Hills property is predominantly coastal sage scrub, which provides habitat that is suitable for a variety of these sensitive species. The biological values on-site, along with the property's proximity to adjacent large areas of natural habitat and surrounding preserves, and its connectivity to the protected open space lands occupied by listed and sensitive species, led to its conservation.

II. **Site Characteristics**

A. Physical Characteristics

The Calavera Hills Phase II Habitat Preserve is located approximately 2 miles inland from the Pacific Ocean and lies east of El Camino Real and both east and west of College Boulevard. The preserve involves several separate areas of open spaces, all within the Calavera Hills Master Plan area. Residential neighborhoods exist and will be constructed along the edges of this preserve.

The site's topography is significantly varied. Elevations range from approximately 360 ft. above MSL at the central portion of Village K open space, to approximately 150 ft. MSL at the southern end of Village W open space. The area is totally undeveloped, with native biology covering the vast majority of the rolling hillsides of the site. The conservation area involves five distinct separate geographical areas, separated from one another by existing roadways and residential neighborhoods.

The site is generally located within the western portion of Core #3 FPA (Focus Planning Area) of the Draft City of Carlsbad Habitat Management Plan (Dec. 1999). This open space program is to be maintained as a functional biological linkage between preserve lands around Lake Calavera and the Calavera Mitigation Parcel, and Link A to the northwest, and Link B, to Robertson Ranch to the south and west.

B. Biological Characteristics

Although predominantly coastal sage scrub, eight vegetation communities occur in the on-site open space area to be preserved, including those listed below. The biological information was gathered from site visits and biological reconnaissance surveys conducted in 2001 by RECON.

1.	Diegan coastal sage scrub	110.3 ac
2.	Southern Mixed and Chamise Chaparral	7.9 ac.
3.	Native Grassland	4.2 ac.
4.	Riparian Woodland	0.4 ac.
5.	Riparian Scrub	2.8 ac.
6.	Freshwater marsh	0.2 ac
7.	Non-native grassland	16.1 ac.
8.	Eucalyptus Woodland	2.2 ac.
	TOTAL	144.1 ac.

Diegan coastal sage scrub is considered sensitive by federal and state resource agencies and the City of Carlsbad. This plant community is considered occupied by Coastal California gnatcatcher.

Two listed species occupy the preserve area:

1.	<i>Polioptila californica californica</i>	California gnatcatcher	FT /CSC
2.	<i>Brodiaea filifolia</i>	thread-leaved brodiaea	FT / CE

The Preserve will protect approximately 2 to 6 pair of gnatcatchers, and approximately 300 individual thread-leaved brodiaea.

Sensitive animal species also occupying the preserve area:

<i>Phrynosoma coronatum blainvillii</i>	San Diego horned lizard	CSC
<i>Cnemidophorus hyperythrus beldingi</i>	Belding's orangethroat whiptail	CSC
<i>Elanus leucurus</i>	White-tailed kite	CFP
<i>Circus caneus</i>	Northern harrier hawk	CSC
<i>Accipiter cooperii</i>	Copper's hawk	CSC
<i>Lanius ludovicianus</i>	Loggerhead shirke	CSC
<i>Aimophila ruficeps canescens</i>	Ca. rufous-crowned sparrow	CSC
<i>Amphispiza belli belli</i>	Bell's sage sparrow	CSC

Sensitive plant species also occupying the preserve area:

<i>Adolphia californica</i>	California adolphia	CNPS
<i>Dichondra occidentalis</i>	Western dichondra	CNPS
<i>Harpagonella palmeri</i>	Palmer's grappling hook	CNPS
<i>Quercus dumosa</i>	Nuttall's scrub oak	CNPS
<i>Selaginella cinerascens</i>	Ashy spike-moss	CNPS

Sensitivity Codes:

FT	Federally listed, threatened
CE	State listed, endangered
CSC	CDFG Species of Special Concern
CFP	California fully protected species
CNPS	California Native Plant Society listed

C. Threats

Habitat preserves that are located at the interface of urban areas are under regular threat of habitat deterioration and resulting species decline. Maintaining the existing habitat quality is fundamental to the continued biological health of the preserve.

The most severe threat to preserving the existing quality of the preserve is the invasion of non-native plant species that have the ability to out-compete native species and change the vegetation community structure and composition. This change can lead to a deterioration or elimination of habitat quality and thus a decline of the sensitive plant and animal species normally found within the Preserve area.

Other threats include unauthorized uses such as off-road vehicle use, camping and other recreational uses, feral or domestic animal occupation, and edge condition deterioration caused by impacts from adjacent urban owner uses. Human impacts from recreational use tend to trample and disturb plants and the soil layer leading to habitat destruction and erosion. In high impact circumstances, habitat fragmentation and isolation can result in extirpation of species. Feral animals, particularly cats, can dramatically impact native animal populations.

In the absence of a natural disturbance regime, such as fire, the coastal sage scrub community may undergo gradual change. Among other possible changes, maturation of the stand of coastal sage scrub is likely to result in a more dense, taller vegetation structure, with greater abundance of large shrubs. Such changes may, over a period of years or decades, affect gnatcatcher habitat quality in the preserve, in ways that are not currently well-understood.

Historically, fire is naturally occurring disturbance in coastal sage scrub habitat, and animals and plants within this habitat are to varying degrees adapted to persist in a mosaic of stands of vegetation in various stages of post-fire succession. However, within the Calavera Hills II preserve, fire poses a greater threat to the ecosystem than it did prehistorically. The small size of the preserve increases the likelihood that a fire may affect the entire preserve at once, resulting in local extirpation of many species. The relative isolation of the preserve reduces the likelihood and/or rate of recolonization by

native wildlife after local extirpation by fire. Fire affecting a significant portion of the preserve is likely to result in decreased habitat availability, thus decreased carrying capacity, and higher probability of local extirpation of species by stochastic events. Increased human population in southern California has resulting in an increase in the frequency of fire starts (Keely and Fotheringham 2001), increasing the potential for fire-related deleterious effects to wildlife.

USFWS has indicated that fire the habitat types prevalent in this Preserve, including coastal sage scrub and chaparral, a re-burn within the same footprint within ten years of the original burn can adversely hamper natural re-growth and interrupt the ability of the habitat to rejuvenate. After ten years, habitat types prevalent in the Preserve are expected to be fully re-established and capable of natural regeneration. A "Repetitive Fire" (a fire anticipated to occur and to create the potential for type conversion) is therefore considered a fire incident which occurs in the same location as a previous fire incident (initial fire) no more than ten years subsequent to the initial fire.

III. Management Goals and Objectives

A. Preservation of Natural Communities

The natural communities that exist on-site appear stable in as much as they continue to persist, but the composition and extent of existing habitat has been profoundly affected by past agricultural practice and urban development. In recent years, residential development near the Calavera Hills preserve area has been particularly intense, and its ultimate affect on the ecology of these natural habitats may not yet be fully evidenced.

Habitats occurring in the preserve area can be assigned to three categories, native uplands, native wetlands, and non-natives. Native uplands are the predominant habitat of the preserve area, and the habitats least affected by urbanization, at present. A generally diverse population of plants and animals are presently represented. However, with new construction, existing upland habitats will be dissected and isolated from one another. Newly created edge conditions will further pressure the existing habitat.

Agricultural uses and residential urbanization can assist the expansion of wetland habitats, in areas not developed, by providing runoff from supplemental irrigation, and through increased runoff from natural rain events. Increased freshwater availability encourages freshwater plant community expansion over salt-tolerant wetland communities. The existing wetland habitats are probably partially dependant on supplemental freshwater. To the extent that additional freshwater is available from Phase II development, wetland habitats may actually expand.

Non-native habitats within the Calavera Hills Phase II preserve area are largely the result past agricultural uses. These non-native habitats are now a component of the local ecology, providing foraging and nesting opportunities to native animals. The elimination of these habitats would affect the local ecology in ways that may not be completely desirable. Assessing the threat posed to native populations by these non-natives and developing a program to manage highly invasive non-native populations must be a component of an adaptive and flexible management strategy.

B. Objectives

The preserve area should be managed based on objectives that can be modified over time as knowledge and experience dictate. The management recommendations proposed in this document are based on assumptions that should be tested for specifics on the site. The still developing urban environment nearby will increase pressure on existing habitats, at least for the near term, and the management mission must have the ability to adapt, and potentially reallocate management resources as the preserve situation evolves. The first five years of data gathering should be applied to developing a baseline range of data.

Urbanization of the area will also fundamentally affect management practices employed. It is not likely that a naturally occurring fire would be allowed to burn unchecked in the preserve area. Fire suppression maintenance will be implemented along development edges in consultation with the Carlsbad Fire Department.

Management Objectives:

1. Determine the distribution and abundance of plants and animals found at the Preserve and building a baseline database from this information to guide management practices.
2. Monitor specific taxonomic groups to determine whether the site is functioning naturally or if the biological diversity of the site is being degraded or diminished.
3. Assess the occurrence and threat from human encroachment. Maintain signage and perform trash removal. Control and reduce the opportunity for human impacts to the natural environment.
4. Assess the occurrence and threat from non-native plants and animals. Perform exotic species removal.
5. Monitor and manage all threats to the natural biology in a manner which encourages the maintenance, enhancement and re-establishment of natural habitats.

IV. Management Mechanisms

A. Fee Owner/Conservation Easement/Management

The open spaces are presently owned by Calavera Hills II, LLC. These open spaces are the subject of an open space easement, to be recorded in conjunction with the final map for City of Carlsbad CT 00-02. The subject open spaces shall remain in continued ownership of Calavera Hills II, LLC until they are transferred via fee title and/or easement to a professional environmental management entity as required pursuant to the USFWS Biological Opinion.

The subject property will ultimately be owned by a private, non-profit entity experienced in habitat management, or by a public entity, as approved by the USFWS. A conservation easement will be recorded over the property to ensure long-term management by the manager, and preservation of the property in a "natural condition", including third-party right of enforcement by the USFWS, CDFG, the City of Carlsbad, or their delegate. The transfer of easement and fee title rights from Calavera Hills II, LLC to a professional environmental management entity shall not preclude the transfer of such management rights to the City of Carlsbad at some future date, as determined by the City of Carlsbad.

Conservation management of the subject area will be performed by The Environmental Trust (TET) or other comparable entity with equivalent experience and credentials acceptable to the USFWS, CDFG and the City of Carlsbad.

Execution of a management contract between Calavera Hills II, LLC and the management entity, including provision of the appropriate endowment referenced in Section V of this Plan, will occur within 60 days of the issuance of a grading permit by the City of Carlsbad for Carlsbad Tract CT 00-02 (Calavera Hills Phase II Master Tentative Map). Transfer of title of the subject land to the management entity will occur within 30 days after the recordation of CT 00-02. In the event either of these actions does not take place within these designated timeframes, the City of Carlsbad will issue a stop work order for the Phase II construction operation until the actions are completed to the satisfaction of the City.

While the open spaces are in continued private ownership, prior to transfer of the management rights described above, Calavera Hills II, LLC shall actively manage the lands to protect and preserve the biological quality of the habitat. These interim management activities shall include, at a minimum, trash removal and reasonable prevention of trespass.

B. Permit and Legal Requirements

The manager will obtain all necessary state and federal survey permits authorizing the managing entity to manage state and federally listed plant and animal species, as may be required.

C. Inventory, Monitoring, and Adaptive Management

Inventory and monitoring are used to track the condition of targeted habitats and populations relative to current ecological goals. Adaptive management is a comparative process between the monitoring results and the stated goals, so that management practices can be changed to affect desirable preserve area change.

No standardized monitoring protocols or success criteria have been established by the USFWS or CDFG for the NCCP preserve areas. This management plan proposes what is considered a reasonable monitoring scenario that allows for the analysis of multiple taxonomic groups, to assist a preserve manager in crafting measures of success, and in guiding appropriate management decisions. The goal of the monitoring effort is to determine if populations are declining or increasing, identification of the cause(s), and the implementation of an appropriate remedial action if necessary.

The initial monitoring program will measure vegetation types occurring in the preserve area, and include a rare plant spring survey component. A general Avian survey will be performed in the spring (preferably in May) with a focus on Coastal California gnatcatcher. Pit-fall trapping will be utilized to monitor sensitive reptile species. All listed or sensitive species identified in the project EIR will be monitored. If during monitoring visits a sensitive species not receiving focused survey attention is identified, that annual management report will recommend survey measures to inventory the species.

1. General Avian Survey

Monitoring the avian community will provide information regarding how the threats, such as habitat fragmentation and feral animals are impacting the Preserve. The distribution, abundance and composition of the bird community found at the Preserve will be determined using annual point counts. Permanent point count locations will be established and monitored for three days in the spring. If declines are noted within the community, or within individual species, then the monitoring emphasis will change to nest searches and reproductive success determinations. These surveys shall be coupled with predator base analyses such as track stations to determine cause and effect correlations.

Coastal California Gnatcatcher. A primary goal of preserve management is to maintain the population of gnatcatchers occupying the Preserve. The

management entity will track population trends of the gnatcatcher in the first 5 years to ascertain the baseline range of pairs that are likely to persist on the site. Once a baseline range has been determined, management of the site shall focus on maintaining the population within this range. Gnatcatcher populations may fluctuate naturally with "natural" oscillations of resource levels. This natural variability will eventually be determined and the target population size will be managed to be within a nominal high and low range, rather than at a static level.

If it is determined that the population of gnatcatchers is appearing to fall permanently below the baseline range, attempts will be made to determine the causes of the decline. Potential causes for declines could be site specific in nature, such as cowbird parasitism, or regional, such as low rainfall, resulting in a reduction in foraging materials. Management actions, such as cowbird trapping, will be taken based on what is determined to be the cause of gnatcatcher decline. If it is determined that gnatcatcher nest monitoring is necessary, this work will be conducted only by an individual who is permitted through USFWS to conduct such monitoring.

2. Pit-fall Trapping

Reptiles, amphibian, invertebrate and small mammal (shrews) populations are extremely susceptible to the threats associated with habitat change. Approximately two pit fall arrays will be established within the Preserve to monitor reptile, amphibian, invertebrate and small mammal (shrews) population and abundance. Each array will be opened for one 10 day period every year. The value of data collected from the pitfalls will be evaluated over time for their utility, and methods will evolve to maximize the collection of useful information. Coupled with these pitfalls will be ant traps to monitor the composition and abundance of ant populations which are known to have substantial impacts on reptile and ground nesting bird populations.

3. Sensitive Plant Species

Sensitive plant species monitoring and management will focus on population distribution and abundance, and on evaluating and minimizing the threats to these species caused by human encroachment or habitat fragmentation. Populations of all sensitive plant species will be mapped during an initial baseline data gathering period of five years. In successive years these populations will be confirmed as existing or not found. Every five years, a new distribution map and population count will be generated. Sensitive plant species that are determined to have low numbers, limited distribution, or are particularly susceptible fragmentation and other anthropogenic sources will be monitored or assessed annually.

Thread-leaved Brodiaea. The thread-leaved brodiaea is estimated to be 300 individuals spread out over several sub-populations in the northwest corner of the site. This species will be counted and mapped annually. The main threats to these populations will likely be trampling from any uncontrolled human access. All populations will be adequately mapped and protected from trampling or other potential threats to the degree feasible.

4. Vegetation Sampling

To detect changes in vegetation structure, species composition, and percent cover, such as might result from succession or type conversion, vegetation sampling will be conducted on the preserve in the spring. This sampling will be conducted in the initial year and subsequently at five-year intervals. Within the coastal sage scrub, 30 randomly placed permanent sampling points will be established. A grid consisting of 1 acre parcels will be superimposed on a map of the sage scrub vegetation community in the preserve and numbered. Thirty squares will be selected randomly using random number generator (e.g., handheld computer or Excel). The center of each square will be the center of the point-center quadrant. Rules for sampling will be decided prior to data collection. Possible rules include; 1) only those 400 sq. meter plots that are fully within the sage scrub community and the preserve will be sampled; 2) If the shrub nearest to the point is partially outside of the vegetation community, 400 sq. meter, or preserve, it will/not be sampled. Points will be marked with an enduring marker in the field and their location recorded with a GPA. At each point, sample according to the following protocol:

- a. Use a point-centered quarter technique (Cottam and Curtis 1956, Higgins et al. 1996) to estimate density of shrubs of any species. Distance to the first shrub from the center point will be measured. The density of 1) *Artemisia californica*, 2) *Eriogonum fasciculatum*, 3) *Malosma laurina*, and 4) *Rhus integrifolia* will be estimated separately by measuring each quadrant from each point (Higgins et al. 1996).
- b. Plot technique. A plot consisting of a 400-square meter area (a square, 20 m on a side) centered on the point to be sampled. Within the plot:

Visually estimate the percentage of bare ground and assign to a class (<25%, 25-75%, >75%).

Visually estimate the percentage of canopy contact between adjacent shrubs and assign to a class (<25%, 25-75%, >75%).

To estimate cover, list the 5 most dominant (highest % cover) species of shrubs, ranked in order of abundance. No two species may receive the same abundance ranking. For each of these species, assign of the following cover classes. Cover classes can add up to more than 100% and more than one shrub species can receive the same cover class:

- Cover Class A = covers <1% of the plot
- Cover Class B = covers 1-5% of the plot
- Cover Class C = covers 5-25% of the plot
- Cover Class D = covers 25-50% of the plot
- Cover Class E = covers 50-75% of the plot
- Cover Class F = covers >75% of the plot

To estimate shrub height, use the previous cover classes, assign the appropriate cover class to vegetation in each of the following height classes:

- Height Class I = vegetation <0.5 m
- Height Class II = vegetation 0.5-1.0 m
- Height Class III = vegetation 1.0-1.5 m
- Height Class IV = vegetation 1.5-2.0 m
- Height Class V = vegetation 2.0-2.5 m
- Height Class VI = vegetation >2.5 m

Reference materials to minimize observer bias (e.g., a 2.5 meter rod marked at 0.5 meter intervals should be employed.

Using the previous cover classes, assign the appropriate cover class to vegetation in each of the following vegetation categories to estimate cover of vegetation other than shrubs;

- Annual grasses
- Perennial grasses

- Short herbs (<0.5 m)
- Tall herbs (>m)
- Vines

Data will be analyzed to describe the change in vegetation variables between the initial state and each subsequent sampling period. Because vegetation communities such as coastal sage scrub and chaparral, dominated by woody vegetation, are unlikely to show pronounced changes from year to year, vegetation sampling will be conducted in the initial year and at 5 year intervals. At ten-year intervals, the preserve manager, in cooperation with the USFWS, will re-examine current knowledge of the relationship between vegetation variables and gnatcatcher habitat quality, to determine whether a change in management of the preserve is warranted. Change in management of the preserve should optimize gnatcatcher habitat quality and preserve the ecological function and wildlife habitat value of the preserve. If a more appropriate sampling methodology is discovered in the future, this sampling methodology can be changed with the written approval of the USFWS.

D. Site Visit Management Schedule

The first year of management shall include a major one-time effort to rehabilitate the preserve area as necessary. This effort shall include trash removal, exotic species removal, closing of unauthorized trails, erosion control measures, installation of fences, repair of damaged fences, installation of signs, and revegetation as determined by the manager.

In addition, on a routine basis, the conservation manager shall visit the entire conservation area for a review of its status in accordance with the following schedule.

Proposed Open Space Management Schedule

<i>Activity</i>	<i>Purpose of Activity</i>	<i>Approximate Year 1 One-time Effort (Person-hours)</i>	<i>Approximate Regular Person-hours per year</i>
Property acquisition, Plan update	Finalize easements, update internal plans	74	
Reporting	GIS and CAD data reporting, Annual report	74	50
Office administration	Administration efforts, Operations	92	22
Site Assessment	Site assessment (edge effects; brief bio-survey with focus on sensitive species)/Maintenance Photo Documentation. Patrol for trespass and encroachment.		96
Spring Avian survey/Veg. Assess.	Avifauna Inventory during May	96	24
CAGN Survey	Every 3 to 5 years		24
Habitat restoration	Exotic species removal, revegetation	230	92
Vegetation/sensitive species surveys			48
Community outreach, Trash, Signs and Locks	Trash and larger debris removal / Check and replace signs / check and replace locks and fences	158	58
Total Person-hours per year		724	414

Approximately 96 hours of site assessments will be conducted specifically for overall site management and maintenance. In general, the tasks included in this site visit type include, but are not limited to, a full site assessment that determines the edge effects, trespass, and/or any other disturbances on or near the site, an evaluation of habitat conditions including all significant observations of plant and wildlife, regular access control and trash removal among other maintenance activities, and photo documentation of any significant observation including photographs taken from established points, twice yearly. All other site visits are to incorporate these tasks when and where necessary into the specified site visit procedures. This ensures more sustainable site conditions as the frequency of site visits will reduce the amount of disturbances incurred due to the proximity of residents, recreational users and other public entities. All of the management activities will be accomplished in accordance with this approved management plan.

E. Management and Maintenance Activities

During inspections in the first year of management, the site will be reviewed for any unauthorized fences or other man-made structures that are potentially detrimental to wildlife or preserve purposes. Such features will be targeted for removal from the site.

As a result of the close proximity of a significant number of residential neighborhoods, standard site maintenance inspections are to occur in accordance with the previous table. In general, maintenance activities will be directed towards the following issues: trash dumping, encroachments, increased use by the public for unauthorized trails or recreation (paintball, etc.), preparation of an annual educational newsletter, and placing of signage, as necessary.

Specific management directives will include measures to reduce edge effects and minimize disturbance, especially during the nesting period of the above listed sensitive bird species, between February 15 and August 30. A community flyer may be distributed as houses become occupied and prior to the nesting period mentioned above in order to remind residents to avoid trespassing, especially during that period. This proactive management should minimize the amount of edge effects and disturbances within the designated open space. Monitoring of open space areas adjacent to residential areas will occur on all site visits to ensure that the Preserve is not damaged by trash dumping, supplemental clearing of fire breaks, or unauthorized buffer landscaping.

Specifically, management and maintenance site visit activities will consist of, but are not limited to, the following:

Disturbance Patrol. Patrolling for signs of trespassing, dumping, vandalism, off-road vehicle use, homeowner encroachment, and/or other disturbances by humans will occur during all site visits on the schedule identified in Section IV(D) of this Plan, as remedial measures will be provided in a timely manner to repair, reduce or eliminate current and future disturbances. This may involve the placement, reparation, and/or replacement of signs, access control, and barriers. In the event that general trespassing, transients or transient encampments are discovered on-site, the manager will note the location of the incident and report any such activities to the appropriate law enforcement agency, if deemed necessary. In the event of habitat alteration or human disturbances, the manager will evaluate the damage so as to restore the native habitat at the responsible party's expense. Physical barriers to trespass may be placed at strategic locations if trespassing, dumping or other activities are determined by the manager to be a disturbance to the Preserve environment.

Trash Removal. An initial major removal of trash shall be conducted immediately upon transfer of management responsibilities to the manager. Thereafter, removal of trash will be on an as-needed basis during every site visit in order to avoid the attraction of nuisance species or artificial increases in the presence of species such as crows and ravens. Each year, one specific site visit will be designated for the removal of accumulated trash and larger debris due to the amount of public activity surrounding the Preserve. Debris shall be collected from within the Preserve and properly disposed of as needed, but no less frequently than every six months. Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed, blown-in or left within the Preserve. However, pruning or clearing of any native vegetation will not be provided. Downed logs and leaf litter provide valuable microhabitats for invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of deadwood and leaf litter is essential for the replenishment of soil nutrients and minerals.

Community Outreach. Due to the site's location in an urban setting, TET will distribute an educational flyer to the surrounding property owners as the houses become occupied to educate them about the importance and reason why the open space was set aside and why it is important to control the use of the site by humans as well as domesticated animals. TET will sign the site with information that states that the site is an area of protected habitat and no trespassing is allowed.

Photograph Documentation. The manager will take photographs from locations established during baseline surveys and will be used to illustrate site conditions or other uses relevant to site management. Prints of all monitoring photographs will be kept in the permanent files of the manager.

F. Restoration, Enhancement, and Reintroduction

Most of the native habitats within the Preserve are of high biological quality. Areas now occupied by non-native plants are not proposed for restoration, except for the revegetation of one abandoned easement road within Village K. Areas now supporting non-native species will be managed to limit expansion of the existing habitat, and to prevent substantial further colonizing by non-natives.

Area K abandoned easement restoration. As mentioned, habitat (coastal sage scrub) restoration is scheduled for only one location in Area K. This restoration effort will be conducted either by the developer or the manager, with ongoing monitoring and management by the manager. This restoration shall be performed as required in the Village K CSS Restoration Plan, prepared by Howard and Associates and approved by the USFWS and the City of Carlsbad.

Other restoration. Other restoration may be needed in the future if degradation of existing habitat is sufficient to warrant remedial planting. Causes of habitat degradation include intensive weed removal, fire management damage, extreme vandalism, natural processes that displace habitat, or other degradation of this magnitude.

Enhancement as referenced in this plan is defined as the removal or suppression of exotic and invasive plant species. Enhancement is a very important management tool, particularly because existing non-native habitat will be allowed to remain in the preserve area. At this time, no introduction of any new plant or animal species is anticipated in the Preserve.

1. Restoration

An existing abandoned access easement road in Planning Area K (See Figure 1) will be restored to coastal sage scrub habitat similar in composition to the existing adjacent habitat. A plan to restore this area has been prepared by Howard and Associates and has been approved by the USFWS and the City of Carlsbad. This plan specifies the following:

- site preparation, including scarification, weed eradication, and erosion control
- seed and/or container species quantities and sizes
- method of installation
- establishment maintenance requirements
- five year maintenance requirements
- performance monitoring requirements, including performance standards
- reporting requirements

2. Enhancement

Native habitats in the preserve area will be weeded if it is determined that significant displacement of native species is occurring or imminent. In most cases no remedial planting will be required in areas that have been weeded. However, where weed removal has occurred in intensively infested areas, the loss of native habitat may be so extensive that natives may not reoccupy the site without remedial planting. When weed removal is anticipated to be extensive, the preserve manager should have a program of remedial planting ready to implement prior to initiating weed control activity. The annual report should explain all weed removal and replanting activities, and the work program for the following year should propose these types of activities for the following year.

Non-native habitats existing in the preserve area are subject to enhancement under certain conditions. The manager is required to monitor and report the status of these non-native habitats with the same level of analysis provided to native habitats. If it is determined that colonizing of non-native species is occurring in adjacent native habitat, the manager is required to develop a program to control the infestation in the next yearly work plan. Control measures must be implemented within the following calendar year, timed seasonally as necessary to best control the infestation.

G. Invasive Pests/Exotic Plant Species Control

Invasive pests or diseases are not likely to become a problem requiring corrective action. Mention of significant pest or disease problems should be included in annual reports. If it is determined that a pest or disease is threatening the sustainability of a habitat or a sensitive species, the manager is required to develop a program to control the infestation in the next yearly work plan. Any use of biological or chemical controls must be approved by resource agencies prior to dispersal or application. Only in circumstances of extreme plant duress should chemical controls be utilized, and then they must be applied only by a California licensed applicator, in strict adherence to state and federal law.

1. Exotic Plant Control Concepts

The preserve supports both native and non-native plant communities. Non-native plant communities are not subject to restoration requirements. Preserve management must focus on both protection of native resources in an undisturbed state, and the containment of non-native resources. The preserve manager must educate maintenance supervisor and crew regarding where a weed is to be tolerated and where it must be removed.

Exotics control will be one of the ongoing and most important responsibilities of the preserve manager. Each year the manager shall assess the types of infestations observed, and implement a plan to control the most threatening ones. The manager shall stay abreast of current control practices, and seek to provide the least environmentally damaging control method available to provide adequate results. (The California Exotic Pest Plant Invasive Plants of Greatest Ecological Concern (CalEPPC) is a good information source). Of particular concern are species that are highly invasive, and aggressively, out-compete native plants. By

focusing on the most threatening exotics observed, less invasive exotics may be tolerated, perhaps indefinitely.

In the first year of management, a list of all non-native species, with map, shall be generated that specifies where weeds were located, whether the habitat is native or non-native, what degree of infestation was observed, and rate what level of concern exists for that site. A system of rating concern for a site can evolve as knowledge develops. As a point of beginning, a one to three point system is recommended. A Level One rating is highly threatening to infest habitat, a Level Two infestation is considered moderate, and can be addressed after all Level One ratings. A Level Three rating may not require any treatment in the near term, if at all. This list of exotic species shall be updated annually, and accompanied by an updated map. A sample table is provided below.

SAMPLE Exotic Species Observed in Preserve Area, (Year 200?)

Latin name	Common name	Preserve Area observed	Native / non-native habitat	Intensity high / med/low	level of concern 1 / 2 / 3
Cortaderia jubata	Pampas Grass	PA 1- SE corner	Native	H	1
Cortaderia jubata	Pampas Grass	PA 3 - scattered	Non-Native	L	2
Arundo donax	Giant reed	PA -4	Native	H	1
Tamarix spp.	Salt cedar		Non-native	L	1

Infestation of highly-invasive exotics, including pampas grass, artichoke thistle, acacia, fennel, iceplant, castor bean, giant reed, tree tobacco and tamarisk shall be targeted for early removal and continue to be controlled in the preserve. Native habitats occurring adjacent to non-native habitats may require ongoing controls to prohibit the establishment of exotics. Some exotics infestation may be tolerated if it becomes apparent that problem can not be effectively managed by the methods available to the manager. The yearly management plans should describe this type of circumstance. If it is observed that a gradual loss of native habitat is occurring, the next five year plan should propose opportunities for a permanent solution.

Non-native habitats are expected to persist in the preserve, and will likely provide a constant source of seed and other regenerative parts. Management of non-native habitat will involve a reasonable, limited effort to convert non-native communities to natives. . Some species of exotics discussed above are so aggressive that their destruction or removal is necessary. In these cases, opportunistic control of exotic vegetation will allow more rapid natural recovery of native vegetation. Other species may be allowed to persist unchecked, as determined by the manager. In concept, the choice and method of control should be formulated based on the likelihood of native habitats becoming infested. Young, isolated eucalyptus trees growing away from established groups shall be removed and replaced with native trees such as oaks, if determined desirable by the manager.

Herbicides. Some exotic plants, including some highly invasive ones, can not be effectively controlled except by the use of herbicides. No herbicides may be used unless approved by resource agencies prior to use. Herbicides should only be used when no other control will be effective in handling the type of problem encountered. The manager should err on the side of caution when using herbicides. If herbicide use has left an area greater than fifty square feet devoid of plant material, remedial planting of the disturbed area must be accomplished.

2. Specific Control Methods

Weeds with shallow, sturdy root systems can be eradicated effectively by vigilant hand pulling which removes the plant with roots attached. It is essential that these species be pulled out and removed from the site on a regular basis before the seeds ripen and drop. While this is labor intensive it does not require expensive herbicides and eliminates the problem of overspray. Examples of weeds that can be manually controlled are black mustard, wild radish and crystalline ice plant.

Other species that have deep roots and/or rapid re-growth cannot be controlled using manual methods alone. Examples of these weeds include giant reed, pampas grass and salt cedar. Eradication of these weeds will require herbicide application either by spraying the entire plant or by cutting the plant and painting the severed stem with herbicide.

Typically the systemic herbicide Roundup is used for upland species while Rodeo is the herbicide licensed for use near wetland environments. Herbicides must be used sparingly to minimize impact to non-target species and to control the overall cost of the weed eradication program. The preserve manager must determine when herbicide use is appropriate based on safety, environmental constraints, degree of infestation, proximity to native vegetation and permitted use of the herbicide. Only state licensed applicators will be allowed to use herbicides onsite.

The manager shall conduct a weed eradication training session where weed removal procedures are discussed prior to worker activity in the field. All maintenance personnel involved in the weeding process must attend this start-up meeting. The manager must designate a weed crew manager who will be the contact supervisor for weed removal information.

H. Fire Management

Included within the developed portion of the site, and not located within the Preserve area is a fire suppression zone that satisfies Carlsbad Fire Department standards for protection of residential and other urban structures and facilities. The fire suppression zone as established is considered adequate to protect properties on the preserve area edge. Preserve areas are not subject to fire suppression maintenance of any kind. The Calavera Hills Master Association is responsible for managing fire suppression activities.

No fire management activities are proposed within the preserve areas. All brush will be allowed to grow unchecked. Leaf litter and dead limbs and other biomass will be allowed to remain undisturbed in place.

Existing utility easement roads will remain in place in preserve areas. If a wildland fire were to approach the area, the fire department may utilize these utility access roads in an effort to control the fire. Typical fire fighting techniques include: fire break clearing, controlled back burning, and use of fire-retardant chemicals. If the preserve area is disturbed by fire, the preserve manager's annual report should describe techniques employed and specifically address any threats posed to the habitat by these techniques. If permanent damage has occurred, the manager shall propose a remedial plan.

Upon the occurrence of a fire in the preserve, the preserve manager will notify the wildlife agencies. The preserve manager shall evaluate the potential for erosion in the fire-affected area, and promptly take appropriate measures to control erosion. The preserve manager will develop and implement a monitoring program to monitor natural re-growth, and erosion, within the burned area for a period of up to two years. The monitoring program will provide for site visits on a regular basis, as determined by the preserve manager to be appropriate to the severity and size of the burn. If monitoring observations indicate that allowing the habitat to re-grow without interference is resulting in increased opportunity for invasion by exotic plants and/or increased potential for type conversion, the preserve management program will be modified to reduce the potential for such invasion or type conversion. Measures may include increased exotic plant control, or revegetation with native plants, including hydroseeding and/or planting with container stock.

I. Public Use

The Preserve is a significant amenity to the surrounding community. The provision of information and education of the local residents of the value of the Preserve as open space and wildlife habitat will be essential to maintaining the current resource levels found onsite. Without that local support, there will be an ongoing degradation through misuse, vandalism, poaching and trash dumping. With an actively involved community there will be hundreds of eyes and ears keeping a vigilant watch over the habitat. The Calavera Hills Master Association is responsible for public areas of the development. The association can be helpful in disseminating information regarding trail use and edge condition problems. The preserve manager must keep the Master Association informed of activities occurring in the preserve area, particularly as these activities may affect the health or safety of residents.

Preserve management will include sending information brochures to the members of the surrounding community, guided nature walks, and possible volunteer programs. Trail head signs should be posted for visitor information.

J. Trails

Two official pedestrian trails are located within the Preserve area as shown on Figure 2.

Easterly Trail

The easterly trail has a north-south "spur", serving also as a sewer line easement and maintenance road aligned parallel with Calavera Creek, and an east west "link", connecting the north-south spur with College Boulevard. This east-west link serves also as a water line easement and maintenance road. These trails are intended for pedestrians

only. They will be maintained by the local water/sewer utility company. Access to these trails by vehicles is prohibited, except for authorized utility vehicles. The trail is approximately 8 feet in width, with a compacted dirt surface.

Westerly Trail

On the western portion of the Preserve, within Village H, a separate pedestrian trail exists. This trail does not constitute any dual role, and therefore maintenance of this trail shall be the responsibility of the Preserve managing entity. No new trails through the Preserve will be established without consent from the City of Carlsbad and the wildlife agencies. This trail shall be maintained in its existing alignment, no wider than 8 feet in width.

A handful of minor, unauthorized trails exists on the preserve. Temporary fencing will be placed across unauthorized trails to discourage their continued use. Additionally, informational signage and kiosks will be utilized as necessary to inform trail users of the importance of staying on the trail. Barriers and gates will be installed where necessary to reduce the opportunity for access from off road vehicles (ORV's).

Signage will be posted at trail entries informing pedestrians of the rules of trail use. The rules of access include:

1. Dogs on leashes only
2. No motorized vehicles
3. Horseback riding, mountain biking and hiking on designated trails only
4. No collecting of plant and wildlife species
5. No hunting or shooting
6. No camping

If certain sections of trail pass through a zone of work they may threaten the public or the success of the preserve effort, a temporary closing of the trail may be necessary. A temporary sign must be posted describing the work maintenance effort, including the date of trail re-opening. In order to avoid disruption of gnatcatcher breeding, some trails may be closed to public use during the Gnatcatcher breeding season if required by both the USFWS and the City of Carlsbad.

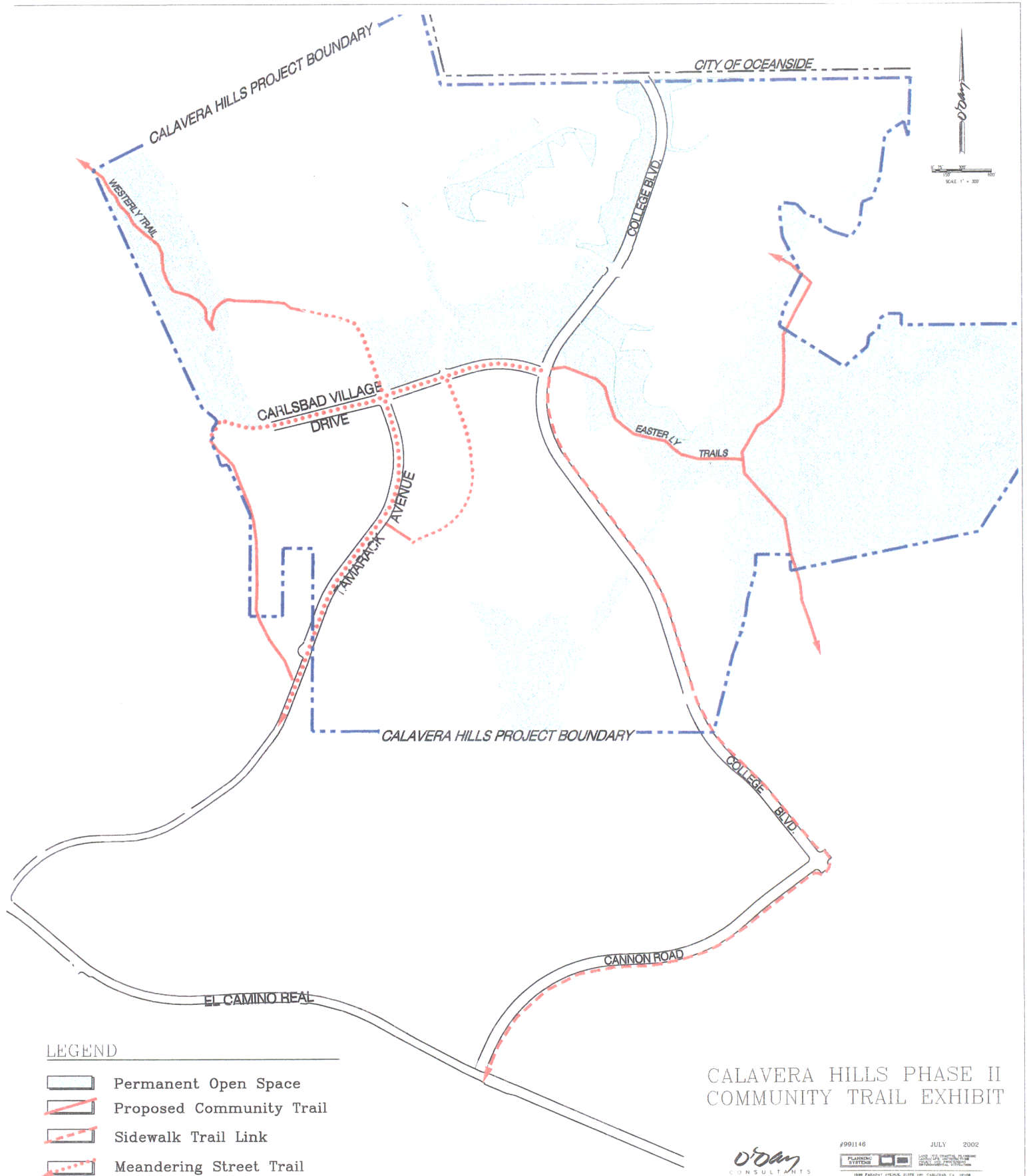
If trail users misuse sections of the trail, the Master Homeowner's Association (HOA) will be contacted to assist in educating the public regarding proper resource use. Signage cautioning against improper trail use should be placed at the point of damage.

K. Trash Removal and Vandalism Control

Generally dead wood and leaf litter should remain undisturbed and in place on the site. Clippings may be left on site, or removed as deemed undesirable by the restoration ecologist. All weed contaminated clippings must be removed from the property and disposed of at a recognized disposal site. Trash removal must be performed by hand, at least twice a year during the monitoring period. Vandalism of planting, and/or other revegetation associated equipment shall be reported in writing by the maintenance contractor and/or other owner's representatives to the owner within 3 working days of discovery. Replacement of poorly performing or vandalized equipment must be accomplished immediately to ensure proper plant growth. Plantings damaged by lack of

proper irrigation are the responsibility of the contractor, even if vandalism is the cause. The contractor will be required to replace planting that die due to lack of proper irrigation.

FIGURE 2



L. Erosion Control

Repair of significant erosion problems is the responsibility of the Preserve manager. Erosion problems should be repaired when they are first noticed, and not allowed to become major problems. If significant damage has occurred remedial planting may be required.

V. **Funding Mechanisms**

The developer shall provide an amount sufficient to fund the initial Year 1 start up costs identified in Section IVD of this Plan, including property acquisition, Perpetual Land Management Plan update, spring avian surveys, habitat surveys, community outreach, reporting, office administration and direct costs. This amount has been determined by the manager, and included as a line item in the Property Analysis Record (PAR) approved by the USFWS. In addition, to ensure that long-term management of the subject open spaces will be funded, an endowment fund shall be established which shall finance the net perpetual annual costs of management of the open spaces pursuant to this Plan. Further, prior to issuance of the Grading Permit for CT 00-02, the developer shall deposit not less than 50% of the total amount required for the endowment as determined in the PAR, with the remaining balance being funded by the developer temporarily through a bond or similar security approved by the City of Carlsbad. The financing program for the balance of the endowment may be through full funding by the developer, or alternatively funding by an HOA fee financing mechanism, or a combination thereof if approved by the City of Carlsbad and the USFWS. The finalization of the financing program must be completed within 60 days after issuance of the Grading Permit. In the event that the financing program for the remaining balance of the endowment has not been finalized within 60 days of issuance of the Grading Permit, the City of Carlsbad may issue a stop work order for the Phase II construction operation. Additionally, the City shall not approve any final map of any Phase II individual market-rate village until the entire endowment financing has been determined and approved to the satisfaction of the City of Carlsbad Planning Director.

The endowment funds shall be deposited in a secure investment paying a rate of interest sufficient to generate the amount needed for annual maintenance expenses. Endowment funds shall not be co-mingled with other funds, and the proceeds shall be used solely for the management of the open spaces, in accordance with the applicable permit conditions. The endowment principal must remain intact in perpetuity. The endowment funds shall be deposited by the developer prior to execution of the management contract referenced in Section IV(A) of this Plan.

Other funding mechanisms could include volunteerism, public and private donations or grants from wildlife groups or entities.

VI. Reporting Requirements

A. Management Reports and Annual Reports

An annual summary report will be prepared and finalized by January 31st of any year for the previous year's monitoring and maintenance. A copy will be kept in the permanent files of the manager as well as provided to the City of Carlsbad Planning Dept., the USFWS, and CDFG. Preparation of the annual summary report will contain the following information:

- A summary of management actions taken during the report period;
- An analysis of the annual sensitive species surveys, plotted on site maps as appropriate, as well as documentation and mapping within the project area. Other information relevant to the management of target species will also be documented in the annual report. The report will analyze any of the sensitive species surveyed in that year, describing the status of the populations' viability;
- Maps indicating cumulative areas of exotics, trespass, dumping, fire, etc. for the management period;
- Discussion of any of the above mentioned management problems encountered within the report period. The report shall describe any on-site measures undertaken to remove exotic species the prior year, review the effectiveness of those actions or actions performed in prior years, and identify measures (e.g., methods, locations, etc.) to be performed in the coming year.
- Recommendations for changes in management for the following year. These recommendations will be formatted as an annual addendum to this management plan and will be finalized after being submitted to the appropriate agencies. The changes in management could also include a recommended re-allocation of funds within the established budget;
- Photographs from the established photo points for the given report period and of any significant management issues or biological observations;
- The monitoring reports shall describe the existing conditions in the Preserve for that particular year. It will identify wildlife use of the site, significant changes on the property, and recommend remedial measures necessary for the continued success of the Preserve;
- A list of names, titles, and companies who prepared the content of the annual report and participated in the monitoring activities.

B. Budgets

The status of the endowment will be included in every five year management plan, and yearly budgets will be reported in every annual work plan.

VII. References

RECON, Calavera Hill Master Plan Phase II, Bridge and Thoroughfare District No. 4, and Detention Basins Final Environmental Impact Report, EIR No. 98-02, November 2001.

Invasive Plants of California's Wildlands, Bossard, Randall, and Hoshovsky, 2000.

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Higgins, K. F. J. L. Oldemeyer, K. J. Jenkins, G. K. Clambey, and R. F. Harlow. 1996. Vegetation sampling and measurement. Pages 567-591. in T. A. Bookhout, ed. Research and management techniques for wildlife and habitats. Fifth ed., rev. The wildlife Society.

Keely, Jon E., and C. J. Fotheringham. 2001. Historic fire regime in southern California shrublands. Conservation Biology 15(6): 1536-1548.