

Arastradero Preserve Trails Management Plan



Prepared for City of Palo Alto
by:

Amphion Environmental, Inc.
&
Thomas Reid Associates

March 2001

Arastradero Preserve Trails Management Program Table of Contents

	Page
I. Executive Summary	I-1
I.1 Overview and Purpose	I-1
I.2 Existing Trail System	I-1
I.3 Proposed Trail Management System	I-2
1. Introduction	1-1
1.1 Trail Handbook Objectives	1-1
2. History & Use	2-1
2.1 Overview	2-1
2.2 Management and Operations Policy	2-1
2.3 Existing Internal Trail System	2-1
2.4 Regional Connections	2-3
2.5 Ancillary Trail Facilities- Existing & Proposed	2-5
3. Environmental Setting	3-1
3.1 Biotic and Cultural Resources	3-1
3.2 Land Uses	3-1
3.3 Hazardous Fire Area (HFA)	3-2
3.4 Utilities	3-2
4. General Objectives, Strategies & Recommended Actions	4-1
4.1 Resource Management	4-1
4.2 Trail Use	4-2
4.3 Trail Design & Management	4-4
4.4 Good Neighbors – Respecting Private Property Privacy & Security Objectives	4-7
4.5 Managing to Meet Multiple Department Objectives – Coordinating with the Fire Department	4-7
4.6 Managing to Meet Multiple Department Objectives – Coordinating with the Utility Department	4-10

5.	Trail Maintenance Classification System	5-1
5.1	Use and Maintenance Evaluation Criteria	5-1
5.2	Primary Trail Uses Guiding Trail Maintenance Standards & Work Priorities	5-1
5.3	Environmental Sensitivity - Resource Considerations Guiding Trail Maintenance Standards & Work Priorities	5-3
5.4	Tiered Approach Trail Management	5-12
6.	The Trail Maintenance Program	6-1
6.1	Trail Maintenance Defined	6-1
6.2	The Trail Maintenance System	6-1
6.3	Assessment of Trail Routes	6-6
6.4	Trail Implementation Programs by Tiered Classification	6-11
6.5	Trails to Be Abandoned & Closed for Restoration	6-56
7.	Trail Maintenance Techniques and Tools	7-1
7.1	Overview	7-1
7.2	Improving Access & Accessibility	7-1
7.3	Trail Tread Construction Techniques	7-12
7.4	Grading and Drainage	7-26
7.5	Vegetation Management	7-36
7.6	Trail Signing & Mapping	7-44
8.	Staffing & Funding	8-1
8.1	Staffing	8-1
8.2	Program Development	8-2
8.3	Funding	8-4
9.	Sources	9-1
9.1	Acknowledgements	9-1
9.2	Bibliography	9-2
10.	Appendices	
	A. Sample Survey Questionnaire with Compiled Results	
	B. Compiled Results from Public Workshop #1	

Arastradero Preserve Trails Management Program Maps & Figures

Maps	page
Map 1 Location	2-2
Map 2 Existing Trail System	2-8
Map 3 Habitat Types	3-4
Map 4 Fire Protection & Emergency & Maintenance Access	4-14
Map 5 Environmental Sensitivity “High Constraint”	5-5
Map 6 Environmental Sensitivity Moderate Constraint”	5-6
Map 7 Environmental Sensitivity “Low Constraint”	5-8
Map 8 Soil/Slope Sensitivity	5-10
Map 9 Proposed Trail System	5-13
Map 10 Implementation Program - High Maintenance Trails and Moderate Maintenance Trails	6-12
Map 11 Implementation Program - Trail Routes that are to be Closed or Rerouted to Protect Resources	6- 57

Figures	page
Figure 1 Hardened Trail Tread	7-6
Figure 2 Trail Gates & Entry Treatments	7-10
Figure 3 Standard ‘Hammerhead’ Turn-Around	7-11
Figure 4 Trail Structure Terminology	7-13
Figure 5 Trail Tread & Side Slopes – Typical Cross Sections	7-15
Figure 6 Switchbacks: Trail Stability on Excessive Slopes	7-16
Figure 7 Entrenched Trail Repair – Flat Areas	7-18
Figure 8 Restoration Plan – Trails Closed for Permanent Abandonment or Re-route	7-20
Figure 9 Rock Drain	7-22
Figure 10 Puncheon	7-23
Figure 11 Bridges & Boardwalks	7-25
Figure 12 Trail Grading & Drainage	7-27
Figure 13 Drain Dip	7-30
Figure 14 Earthen Water Bar	7-32
Figure 15 Culvert Cross Section	7-35
Figure 16 Trail Clearing & Brushing Limits	7-38
Figure 17 Trail Marker Post	7-46
Figure 18 Prototypical Educational Sign	7-48
Figure 19 Removable Metal Bollard	7-50

Tables

	page
Table 1 Special Status Species That Could Occur in Arastradero Preserve	3-5
Table 2 Sample Maintenance Log	6-8
Table 3 Calendar of Maintenance Activities	6-10
Table 4 Trail Assessment - Summary of the Proposed Trail System	6-13
Table 5 Trail Implementation Program -Recommended Capital Improvements	6-70
Table 6 Trail Implementation Program -Recommended Annual Maintenance Tasks	6-74
Table 7 Trail Implementation Program - Recommended Cyclical Maintenance Improvements	6-78
Table 8 Trail Surface Synopsis	7-51
Table 9 Vehicle Turn-around Design Summary	7-54

I. Executive Summary



I The Executive Summary

I.1 Overview & Purpose

Arastradero Preserve is located in the foothills within the city limits of Palo Alto. It is bordered on its eastern boundary by the Town of Los Altos Hills and on the western boundary by the Town of Portola Valley. Stanford University lies to the north. (See Map 1 - Location). The Preserve was acquired in 1976 and opened to the public in 1986. The primary recreational uses are hiking, jogging, biking, horseback riding, dog walking and nature study, which are all dependent on the Preserve's trail system.

The **Preserve Mission** was established in 1984 and sets the framework for the development of this trails management plan. Simply stated the Preserve Mission is to create and maintain *"a low intensity and minimal cost park, with emphasis on the natural and open space amenities of the land and sensitivity to the fragile foothills ecology. Uses planned for the park should not duplicate those provided in urban neighborhoods or regional parks."*

The purpose of this handbook is to identify a variety of structures and techniques that can be employed to design and maintain a trail system that fits the specific circumstances of this Preserve. It has been designed to address the specific needs and desires of the users of this Preserve, while taking into account the local topography, geology, climate, soils and vegetation of the site. This site specific, resource oriented, trail maintenance program is intended to correct current trail deficiencies and to route the trails around areas with biotic and soil constraints to minimize impacts to sensitive resources.

This trails management handbook:

- Establishes trail management objectives, strategies and recommendations
- Incorporates a thorough environmental constraints analysis for providing trails on the Preserve
- Develops a hierarchy for performing trail maintenance, using well-defined trail classifications tailored to user expectations and available staffing.

I.2 Existing Trail System

The existing Preserve trail system (See Map 2 - Existing Trail System) consists of:

- A little under 9 miles of designated trails, which are located largely on utility maintenance roads that were not originally designed for trail use.
- Several miles of "volunteer" or informal two to three foot wide trails, many of which pass through environmentally sensitive areas resulting in

degradation of the very resources that people expect to see when visiting the Preserve.

Many of these trails have evolved informally through usage by recreational users and by utility and fire equipment used to respond to emergencies within the Preserve. Few of the trails have been designed and constructed to any specific standard. As a result some of the existing trails have deficiencies that are potentially hazardous and/or are adversely impacting the environment.

I.3 Proposed Trails Management Plan

Using trail evaluation criteria developed from public input and scientific analysis, the Preserve Trail Maintenance System has been developed as a three-tier system, "*High Maintenance Trails*", "*Moderate Maintenance Trails*" and "*Trail Routes that are to be Rerouted or Closed to Protect Resources*". Where deficiencies have been identified along specific trail alignments, these deficiencies are to be corrected or the route is to be closed by repairing environmental degradation and restoring the site to a condition that reflects the native habitat for the immediate area.

Generally, the High Maintenance trail system, which is to be oriented toward year-round use, is located on the northern two-thirds of the Preserve closest to the parking lot. Much of the back one-third of the Preserve will receive a Moderate Level of maintenance and most of the trails will be limited to seasonal use.

The overall objectives in developing this tiered approach to trail maintenance is to provide for:

- Visitor safety
- Resource Protection
- Public access

This trail system is to be developed for use by a wide range of people participating in different activities at varying skill levels with minimum adverse impact on the environment impacts. In response to public input, most of the Preserve trail system will be developed and maintained as single-track trails. These trails will be 4 to 6 feet wide to accommodate shared use by hikers, runners, equestrians, bicyclists, and dogs on leashes. In some cases the trail system will also need to accommodate the utility vehicles that maintain the utility infrastructure that is located in the Preserve. In these cases the trail tread will be surfaced with a compacted base rock material and maintained at a width of 10 feet.

The Trails Management Plan proposes that: 5 miles of trail be designated and maintained for year round recreational use and 5.3 miles of trail be designated

and maintained for limited (e.g. hiking only) or seasonal use, for a total of 10.3 miles of trails (See Map 9 - Proposed Trail System).

The Trail Management Plan recommends that 6.8 miles of existing, informal trails that are causing environmental damage or provide a duplicate experience (parallel trail) be designated for closure and the sites restored to their natural condition.

Where trails are designated for seasonal winter closure, closure will be dependent on seasonal precipitation and will occur when the trail surface becomes saturated to the point where continued use could cause damage to the integrity of the trail surface. The trail tread may be considered saturated when:

- precipitation exceeds one inch of rainfall over a 24-hour period
- standing water remains on the trail for twenty-four hours; and
- a ranger testing riding a mountain bicycle on the trail leaves a running indentation in the trail after the 24-hour "wait period".

Typically these conditions can be expected between November 1st and March 30th. In dry years this "wet season" may be shorter or there may be a long dry period where it may be appropriate to reopen trails for part of the winter.

Primary access to the Preserve will be from the existing staging area located on the north side of Arastradero Road. Access will also be provided by the regional connections that connect with the internal trail system and then extend beyond the Preserve boundaries. These connections include:

- The Juan Bautista de Anza National Historic Trail, which will form an east-west year-round spine route through the Preserve
- The Bay to Ridge Trail, which will provide a hiking connection through the City of Palo Alto from the Bay Trail to the Bay Area Ridge Trail along Skyline Blvd.
- Local community connections from the City of Palo Alto, Town of Portola Valley, the Town of Los Altos Hills and Stanford University.

1. Introduction



1. Introduction

1.1 Trail Handbook Objectives

This Trails Management Program is intended as an administrative and field tool for the maintenance of the Arastradero Preserve Trail system. These maintenance techniques and tools are intended to provide guidelines for:

- Arastradero administrative staff in developing staffing and budgeting priorities for trail management, maintenance and rehabilitation programs
- Field staff responsible for trail construction and maintenance activities
- Bay Area Action –Peninsula Conservation Center Foundation (BAA + PCCF) in developing volunteer programs

The handbook is intended to compliment the *Arastradero Preserve Management Plan (1996)*, which is a comprehensive resource guide that describes specific guidelines for:

- Interpretive and research activities
- Open space management and habitat protection, construction and maintenance of facilities
- City Department and Steward responsibilities on the Preserve.

This trails management guide was prepared to expand on the *Arastradero Preserve Management Plan (1996)*, by:

- Establishing trail management objectives, strategies and recommendations
- Preparing a thorough environmental constraints analysis for providing trails on the Preserve
- Developing a hierarchy for performing trail maintenance using well-defined trail classifications tailored to:
 - user expectations
 - available staffing

The plan was designed to address the specific needs and desires of the users of this Preserve, while taking into account the local topography, geology, climate, soils and vegetation of the site.

The handbook has been written with the assumption that it will be used to supplement the knowledge of experienced field staff and that it will enable them to operate more efficiently and to be able to make more informed decisions in budgeting future expenditures and in performing their daily work.

This plan is not a construction manual, but it does include prototype design diagrams that can serve as a useful guide in developing construction documents where needed to provide a new trail alignment, or to reroute or correct an existing trail alignment. It can also serve as a useful a guide for routine maintenance tasks.

This handbook does not substitute or replace any existing codes, rules or regulations of the City or the permitting agencies that may govern trail development, but is designed to compliment them.

2. Preserve History & Use



2. Preserve History & Use

2.1 Overview

Arastradero Preserve is located in the foothills within the city limits of Palo Alto. On its eastern boundary is the Town of Los Altos Hills and on the western boundary is the Town of Portola Valley. Stanford University lies to the north. (See Map 1 - Location). The Preserve was acquired in 1976 and opened to the public in 1986. The primary recreational uses are hiking, jogging, biking, horseback riding, dog walking and nature study, which are all dependent on the Preserve's trail system.

2.2 Management and Operations Policy

In March 1969 the City prepared citywide *Policies and Proposals for the Trails and Paths Plan*. This set of guidelines was designed to serve as the general framework for developing trails and pathways in the City of Palo Alto. This plan incorporates habitat preservation as its primary goal, while providing for appropriate public access and activities. In instances where public access and activities conflict with the natural values of the Preserve, the preservation of the natural values of the Preserve shall prevail.

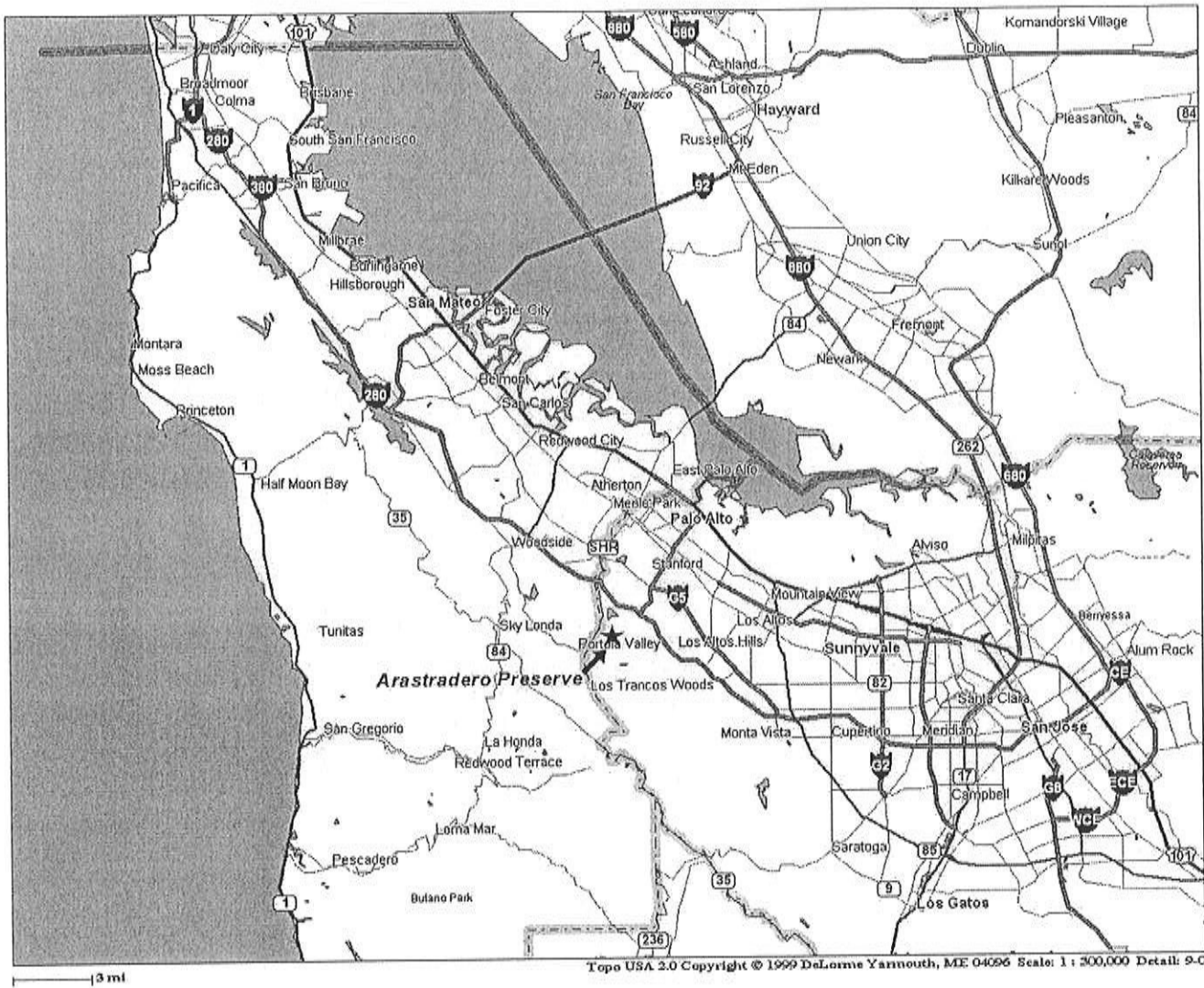
The **Preserve Mission** was established in 1984 and sets the framework for the development of this trails management plan. Simply stated the Preserve Mission is to create and maintain *"a low intensity and minimal cost park, with emphasis on the natural and open space amenities of the land and sensitivity to the fragile foothills ecology. Uses planned for the park should not duplicate those provided in urban neighborhoods or regional parks."*

The *Arastradero Preserve Management Plan (1996)* is a comprehensive document that describes specific guidelines for interpretive and research activities, open space management and habitat protection, construction and maintenance of facilities, and City Department and Steward responsibilities on the Preserve.

2.3 Existing Internal Trail System

The existing Preserve trail system (See Map 2 - Existing Trail System) consists of:

- One gravel parking lot located adjacent to Arastradero Road, which serves as the primary access into the Preserve Trail system
- Several non-vehicular access points, which serve local neighborhoods and an adjoining major equestrian boarding facility.



LOCATION MAP

MAP 1

- A little under 9 miles of designated trails, which are located largely on utility maintenance roads that were not originally designed for trail use
- Several miles of “volunteer” or informal two to three foot wide trails, many of which pass through environmentally sensitive areas resulting in degradation of the very resources that people expect to see when visiting the Preserve.

Most of these trails are available for use by hikers, runners, equestrians, bicyclists, and dogs on leashes.

2.4 Regional Connections

Regional connections will be considered those trails that connect with the internal trail system and then extend beyond the Preserve boundaries. There are three primary types of external connections in the Preserve trail system:

- The Juan Bautista de Anza National Historic Trail, which will form an east-west year-round spine route through the Preserve
- The Bay to Ridge Trail, which will provide a hiking connection through the City of Palo Alto from the Bay Trail to the Bay Area Ridge Trail along Skyline Blvd.
- Local community connections from the City of Palo Alto, Town of Portola Valley, the Town of Los Altos Hills and Stanford University.

Juan Bautista de Anza National Historic Trail

In August 1990, Congress designated the Juan Bautista de Anza National Historic Trail as one of the trails in the National Trails system. This trail commemorates the route taken by Anza in 1775-76 when he led a group of colonists from what is now Horasitas, Sonora, Mexico to the San Francisco Bay where they established a presidio and mission for New Spain. To recognize this historic journey, markers and information displays along the actual route of the 1775-76 Anza expedition will be constructed for interpretive purposes. Within Santa Clara County a trail will not be constructed along most of the actual route. Instead a series of “recreation retracement trails” will be developed to more closely represent the “experience of the landscape” that the explorers would have encountered in Santa Clara County. These “recreation retracement trails” are intended to be shared use trails. The Juan Bautista de Anza National Historic Trail shown in the Arastradero Preserve Trails Management Plan is consistent with the *1995 Santa Clara Countywide Trails Master Plan* and the *1996 Juan Bautista de Anza Comprehensive Management and Use Plan Final Environmental Impact Statement*.

Bay to Ridge Trail

The Bay to Ridge Trail is proposed to provide a hiking link between the Bay Trail, which is located along the shoreline of the San Francisco Bay and the Bay Area Ridge Trail, which parallels Skyline Blvd. in the Open Space Preserves of Midpeninsula Regional Open Space District. The connection from Arastradero Preserve to the south will eventually be through Foothills Park, if and when the present ordinance is modified to allow entry into the Park at points other than the main gate. This conceptual connection to Foothills Park is recommended to follow the existing maintenance access trail. This route will be designated as a hiking only route. The Palo Alto Parks and Recreation Commission at its December 15, 2000 meeting tabled a discussion of a Foothills Park connection until it could be adequately publicized and discussed in greater detail.

The route towards the Bay will pass through Stanford lands. It also will be designated as a hiking only route. The trail is intended to be open for year round use. However, the Stanford connection may be subject to seasonal closure where it will travel through the Highway 280 underpass, as this route is subject to flooding in the winter months. Currently there are no dedicated routes where Stanford allows public access near the Preserve. This connection will need to be coordinated with Stanford University. Approval of this route could be subject to acceptance of the jurisdictions that review and approve development proposals for the University. The University is now in the process of developing a new land use plan for the campus. A connection to Arastradero Preserve is one of many issues under consideration.

Local Connections

The intent of designating local connections on the Preserve Trails plan is to augment the only formal access into the Preserve that is provided at the staging area off Arastradero Road. This staging area can accommodate approximately 35 cars, and provides little staging for horse trailers. By providing trail connections from local neighborhoods it will allow people to recreate without having to get in their cars and travel to the Preserve. All of the local connections are to accommodate all users and are to be opened at a minimum to hikers on a year round basis.

Within the City of Palo Alto there are two neighborhood connections. One connection would be primarily oriented to equestrians, as it would connect with the Portola Pasture Stables (Stanford property).

Two connections will be provided from the Los Altos Hills Trails and Pathways system. One connection will be off of Arastradero Road. The second connection will be from Paseo del Roble Court.

There is one connection from Portola Valley. It is from John Marthens Lane. Here local residents enter the Preserve from Gate C. Other connections to Portola Valley will be dependent on securing easements from adjacent landowners. In the case of Arastradero Road, most of the trail may be accommodated within the road right-of-way. Where this road right-of-way is not adequate, the Countywide Trails Plan does show a trail route and the County could work with the local agencies to develop a trail adjacent to the road to connect with the Portola Valley trail system along Alpine Road. Connections from the southwest corner of the Preserve adjacent to the John Law property would have to cross the unincorporated area of Santa Clara County. Because no trail connection is identified on the Countywide Trails Master Plan in this location, the County would not be able to require an easement as a condition of development on any of the parcels that would provide a connection to Portola Valley. Therefore, the Arastradero Trails Management Plan does not show a trail connection from the southern end of the Preserve into the Town of Portola Valley at this time.

2.5 Ancillary Trail Facilities - Existing & Proposed

Access into the Preserve

A **Gateway Facility** was proposed in an earlier public planning process. It would accommodate among other users and activities:

- A storage area for trail maintenance tools
- An area for demonstrating trail maintenance techniques and habitat restoration techniques on the Preserve
- Ranger and Steward work space including, desk and phones and check-in and docking capabilities for portable computers for staff use.

The **Gravel Parking Lot** was built in 1984 at a cost of \$285,000 and has 35 spaces. This parking area is to be retained as is and is to be the only designated parking area for the entire Preserve. It is to remain unlighted and closed when the Preserve is closed.

A **new staging area** is proposed as part of the Gateway facility. It would include a 70-foot long by 20 wide area on the east side of the parking lot for amenities, which may include:

- Six to eight enclosed bike lockers in roofed enclosures
- Informational signs with a trellis above to post information about the Preserve and allow posting of messages by Preserve users

- Benches with nearby shade trees
- Pay phone

Overflow parking typically occurs during the weekends and can be accommodated by the Park and Ride facility on Page Mill Road. Currently there is a gap in the on-street, non-vehicular access route between the Los Altos Hills city limit line and the Preserve parking lot entry. At this point, the bike lanes end abruptly. Safe bicycle and pedestrian access to the Preserve is needed if the Park and Ride facility is to continue to accommodate overflow parking.

Crosswalk Enhancements are recommended to improve crossing safety between the parking lot and the remainder of the Preserve. These devices are also intended to inform those traveling on Arastradero Road that they have entered a special, natural area, which requires respect for the environment. Safety improvements may include the addition of traffic calming devices including:

- Placement of additional caution signs for either approach
- Upright visual identity markers (such as a large sign or other vertical object(s) that enhance Preserve identity) in the vicinity of the crosswalk that do not compromise sight distance for either the trail users or motorists.

Trail Amenities

33 Gallon Trash Cans are to be provided in the parking lot in a location not visible from the road. Signs are to be posted in the parking lot requesting people to pack out their garbage.

Benches are to be comparable to those used in other City parks. Benches are to be made of unfinished wood, constructed in a way to minimize maintenance and vandalism. Benches are to be located in areas where they will not diminish the natural values of the Preserve and where they will enhance visitor accessibility by providing resting points along a trail route.

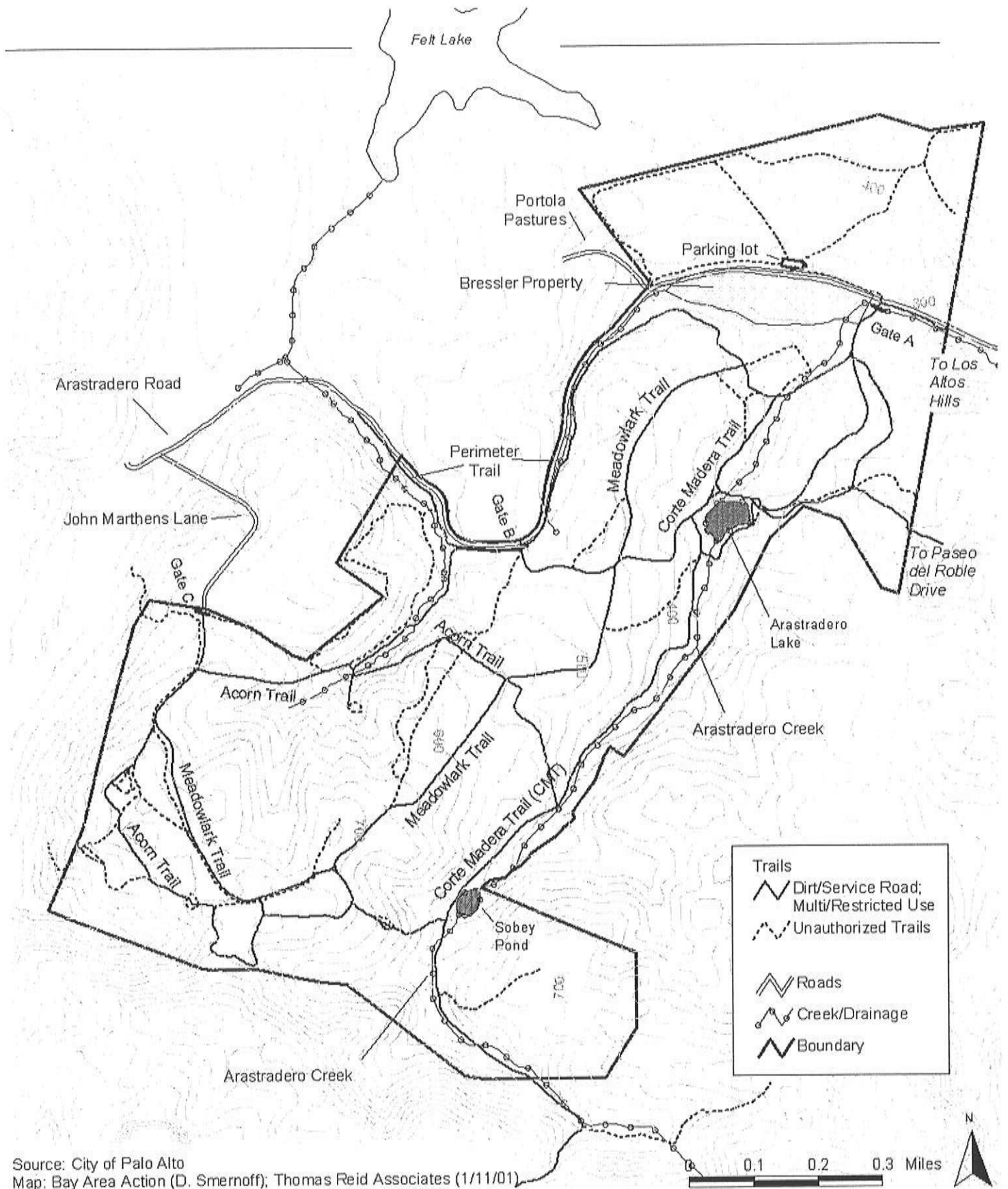
Two portable **restrooms** are located at the parking lot. One is ADA accessible. These are proposed to be replaced with full restrooms, which will be located in the gateway facility.

There is one **drinking fountain**, which is located in the Preserve parking lot. A new **horse-watering trough** is also to be developed as part of the proposed Gateway facility in the parking area. Installation of a **dog-watering trough** at Arastradero Lake should also be considered, as dog use of the lake is to be highly discouraged due to potential impacts they could have on red-legged frogs (if they are present).

The City of Palo Alto is developing a new sign program. It will generally follow the trail signage program developed for Poganip Park in Santa Cruz County. This standard has 6"x6" redwood posts with **Trail Markers** bolted in place that will show trail names, destinations and mileage.

Trail maps will continue to be distributed as brochures to reduce the potential for vandalism associated with an on-site display board.

The standard for new **fencing** will be split rail. It will be constructed as a two-rail fence 3 feet –6 inches high. Posts will be set 6 feet on center. The existing perimeter barbwire fencing will eventually be replaced to meet this standard.



Source: City of Palo Alto
 Map: Bay Area Action (D. Smernoff); Thomas Reid Associates (1/11/01)

EXISTING TRAILS SYSTEM

MAP 2

3. Environmental Setting



3 Environmental Setting

3.1 Biotic and Cultural Resources

The Preserve is comprised of 609 acres of rolling savanna grasslands, oak woodland and riparian forests with a diverse and abundant variety of species of flora and fauna. The area of the Preserve was originally inhabited by the Ohlone Indian tribe, and was later part of a Spanish land grant. No known cultural resources exist there today.

The vegetation types in order of predominance are grassland, oak woodland, creek riparian, lake or pond, and chaparral. The topography is hilly. The Preserve rises from 300-foot elevation at Arastradero Road to 425-foot elevation on the north side of the Preserve and 750-foot elevation on the south side of the Preserve. The Preserve contains three creeks: Arastradero Creek, an unnamed tributary to Arastradero Creek, and an unnamed tributary to Los Trancos Creek. It also contains a small reservoir called Arastradero Lake, which is a dammed portion of Arastradero Creek, and a pond called John Sobey Pond, which is also on Arastradero Creek upstream of the lake.

Primarily because of its foothill location and variety of vegetation types, the Preserve supports a diverse assemblage of plant and animal species. It provides potential habitat for several protected species (Table 1). Several bird species of concern and one plant have been observed at the Preserve, but no federally or state listed species have as yet been confirmed present.

The soils in the Preserve include Azule loams, Los Gatos gravelly loam, Los Osos clay loam, Pacheco clay loam, and Pleasanton loam. These soils are well drained, slightly acid, and are typically used for range, recreation and watershed.

3.2 Land Uses

Arastradero Preserve, located in the City of Palo Alto, lies in the foothills of the Santa Cruz Mountains, generally between Interstate 280 and Highway 35 (Skyline Boulevard). The 609-acre Preserve straddles Arastradero Road, with most of the Preserve lying on the south side of the road. Adjacent lands are open space owned by Stanford University, private residences in the Town of Los Altos Hills, City of Palo Alto and Santa Clara County, the Palo Alto Hills Golf and Country Club, Foothills

Park (City of Palo Alto), and a private research facility (the American Institute of Research).

Arastradero Road is a two-lane connector between Page Mill Road in Los Altos Hills and Alpine Road in Portola Valley. The road is fairly straight between Page Mill Road and the driveway to Portola Stables, just past the parking lot for the Preserve, then it is a windy road as it climbs over a hill to get to Alpine Road. The road does not have a posted speed as it cuts across the Preserve. The travel corridor has several views of the Preserve. Arastradero Road is a popular bicycle route. There is one pedestrian crosswalk at Gate A, which provides the primary access from the parking lot into the Preserve. This crossing is currently signed to warn drivers of pedestrians.

The Preserve is undeveloped except for a gravel parking lot with portable restrooms, utility lines and access roads, a lake with a dam, and trails for hiking, bicycling and equestrian use. It previously contained a house, a barn and a cottage, but these have been removed. A "Gateway Facility" is proposed to be built adjacent to the parking lot of the Preserve. This facility is currently under review by the City of Palo Alto.

3.3 Hazardous Fire Area (HFA)

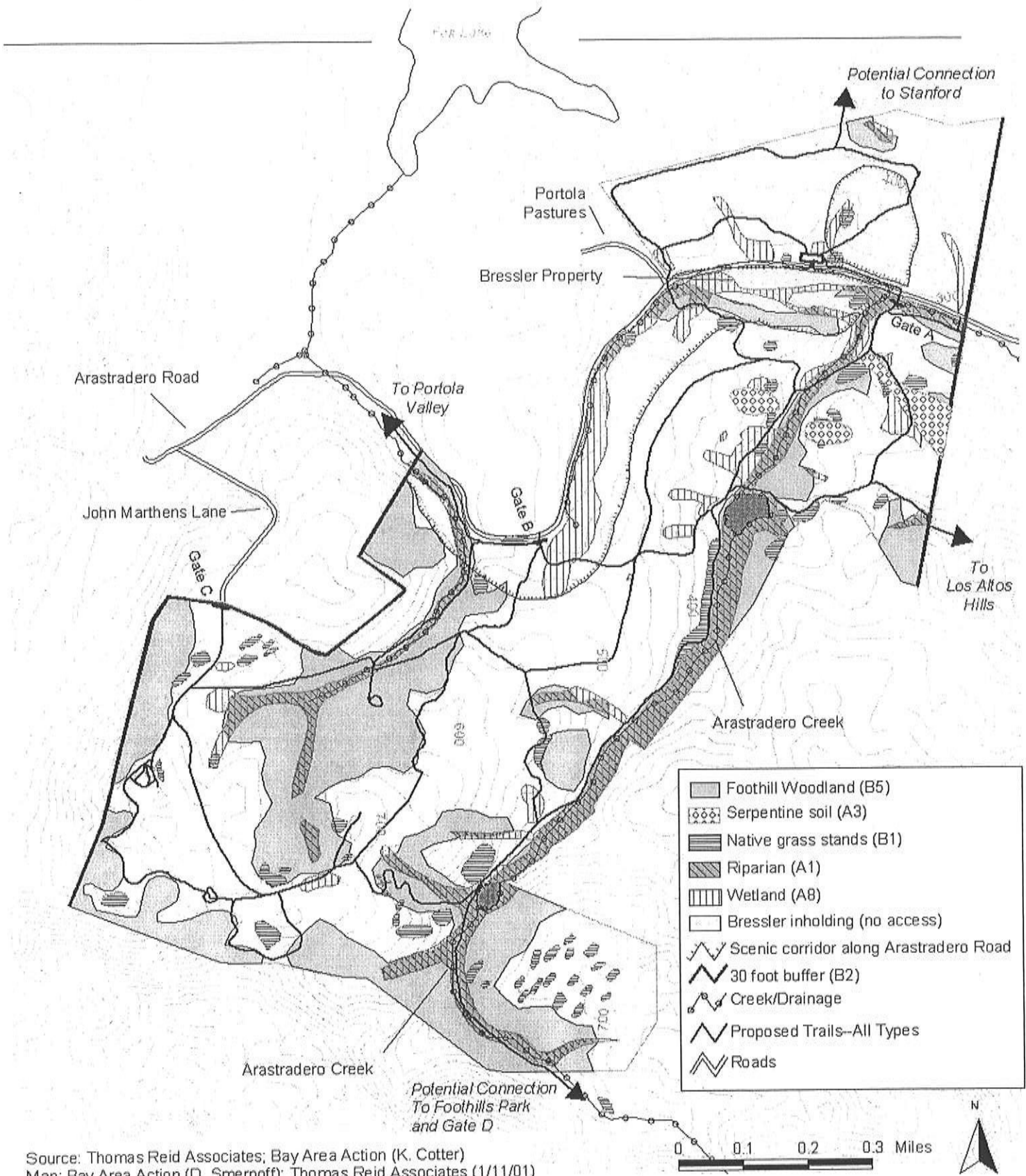
The Preserve is in a designated Hazardous Fire Area (HFA). This means that there is threat of fire spread where there is vegetation fuel load and that there may be long response times in the event of a fire due to limited access/egress along narrow roads that provide access to the Preserve. The area has also been designated as a Mutual Threat Zone (MTZ) by agreement with the California Department of Forestry and Fire Protection. This means that a fire within the City's jurisdiction is a threat to the State's jurisdiction and vice versa. The fire season at the Preserve typically begins June 1 and runs for 150 days to October 1, though the duration of the season can vary based on weather conditions. Until the late 1800's fires were a regular occurrence in the Palo Alto Foothills, burning portions of the foothills every 20 to 40 years. More recently fires have been suppressed and the hills in and around the Preserve have not burned since the 1985 Liddicoat Lane fire, which was located along Arastradero Road.

3.4 Utilities

The Preserve contains electrical, water, gas and wastewater utility lines and utility access roads which are used by the City of Palo Alto Utilities Department and maintained by the City of Palo Alto Public Works Department.

Overhead electrical utility lines enter the Preserve from Arastradero Road near Tracy Court, and extend through the Preserve essentially along Arastradero Creek. There is also a booster station near Arastradero Lake called the Corte Madera Booster Station. Access for maintenance and repair of these facilities is on all-weather gravel surface roads. These roads can accommodate the heavy vehicles needed for repairs. The primary entry point is Gate B. A ten-foot radius around poles having operable devices (switches, fuses, transformers, corner poles) is kept clear of fuel sources (trees, grasses and brush) by the Utilities Department. Tree trimming is generally done every two to three years and ground clearing is done annually.

Water, gas and wastewater lines enter the Preserve from the south side of Arastradero Road approximately 3/8 of a mile west of Page Mill Road. The water and sewer lines continue westerly along Arastradero Road from the Preserve boundary for about a mile, at which point the sewer line terminates. The water line continues along Arastradero Road, then enters the Preserve and extends to the 1.5 million-gallon steel Corte Madera water tank located on the west side of the Preserve near the headwaters of the unnamed tributary to Los Trancos Creek. An all-weather access road suitable for heavy equipment extends from Gate B of the Preserve to the water tank for maintenance and repair of the water line and tank.



HABITAT TYPES

MAP 3

Table 1
Special Status Species That Could Occur in Arastradero Preserve

SPECIES	STATUS	HABITAT	HABITAT ON SITE
California red-legged frog (<i>Rana aurora draytonii</i>)	FT	pond, creek, riparian, grassland	potential breeding habitat in John Sobey pond and Arastradero Lake; estivation habitat in riparian zone; may enter grassland in heavy rains
Foothill yellow-legged frog (<i>Rana boylei</i>)	FSC, CSSC, CP	in or near rocky streams in a variety of habitats; requires permanent water and dense cover	suitable habitat in Arastradero Creek and the unnamed tributary to Los Trancos Creek
Western Pond Turtle (<i>Clemmys marmorata</i>)	FSC, CSSC, CP	ponds, creeks in woodland, grassland	possible sighting in Arastradero Lake; habitat onsite includes Arastradero Creek, John Sobey Pond, Arastradero Lake, and the unnamed tributary to Los Trancos Creek
California Tiger Salamander (<i>Ambystoma californiense</i>)	FC, CSSC, CP	seasonal wetlands in grassland and oak- savannah	breeding habitat may occur in the "bowl" near the top of the Preserve, which is in proximity to the unnamed tributary to Los Trancos Creek
San Francisco Garter Snake (<i>Thamnophis sirtalis</i> <i>tetrataenia</i>)	FE; CE	ponds, marshes	suitable habitat in Arastradero Lake
Bay checkerspot butterfly (<i>Euphydryas editha bayensis</i>)	FT	serpentine grassland with host plant <i>Plantago</i> <i>erecta</i> and nectar plants <i>Layia platyglossa</i> and <i>Lasthenia californica</i>	Host plants not present; area of serpentine grassland in Preserve is too small to support a population

<p>Serpentine-based plants: <i>Lessingia arachnoidea</i> (CNPS List 1B); <i>L. hololeuca</i> (CNPS List 3); <i>Lessingia micradenia glabrata</i> (CNPS List 1B); <i>Pentachaeta bellidiflora</i> (Calif Endangered, Federal Endangered, CNPS List 1B); <i>Erysimum franciscanum</i> (CNPS List 4); <i>Streptanthus albidus albidus</i> (FE, CNPS List 1B); <i>S. albidus peramoenus</i> (CNPS List 1B) <i>Acanthomintha duttonii</i> (CE, FE, CNPS List 1B); <i>A. lanceolata</i> (CNPS List 4); <i>Calochortus umbellatus</i> (CNPS List 4); <i>Eriogonum argillosum</i> (CNPS List 4); <i>Fritillaria agrestis</i> (CNPS List 4); <i>F. biflora ineziana</i> (CNPS List 1B); <i>F. falcata</i> (CNPS List 1B); <i>F. liliacea</i> (CNPS List 1B); <i>Hesperolinon congestum</i> (CT, FT, CNPS List 1B); <i>Malacothamnus arcuatus</i> (CNPS List 4); <i>M. hallii</i> (CNPS List 1B); <i>Sidalcea hickmanii viridis</i> (CNPS List 1B); <i>Clarkia breweri</i> (CNPS List 4); <i>Cypripedium fasciculatum</i> (CNPS List 4), <i>Linanthus ambiguus</i> (CNPS List 4); <i>E. luteolum caninum</i> (CNPS List 3); <i>Galium andrewsii gatense</i> (CNPS List 4); <i>Castilleja affinis neglecta</i> (CT, FE, CNPS List 1B)</p>	<p>see species column</p>	<p>serpentine or ultramafic soils mostly in grassland habitats, chaparral, sometimes foothill woodland, open coniferous forest, streambanks and seeps</p>	<p>Yes, two areas of serpentine soil have been identified; one is in grassland and the other is in chaparral. <i>Malacothamnus arcuatus</i> is historically known to have occurred in the preserve. It grows in serpentine chaparral. Habitat for <i>Cypripedium fasciculatum</i>, which is seeps and streambanks in serpentine is not present.</p>
---	---------------------------	---	---

White-flowered rein orchid (<i>Piperia candida</i>)	CNPS List 4	open to shaded coniferous forest and mixed evergreen forest. Associated with tanoak, madrone, redwood	possibly in oak woodland
San Francisco collinsia (<i>Collinsia multicolor</i>)	CNPS List 4	moist shady woodland, associated with California buckeye, honeysuckle, ferns, coast live oak, poison oak	yes, in oak woodland
Western leatherwood (<i>Dirca occidentalis</i>)	CNPS List 1B	cool, moist slopes in foothill woodland and riparian habitat. Associated with California buckeye, Coast live oak, California bay laurel, ferns, poison oak	yes, in oak woodland and riparian
Gairdner's yampah (<i>Perideridia gairdneri gairdneri</i>)	CNPS List 4	moist soil of flats, meadows, stream sides, grasslands and pine forests. Associated with Kellogg's yampah, rushes, sedges, blue- eyed grass, California oat grass, clarkia, hairgrass	yes, in grassland, riparian. More common <i>P. kelloggii</i> occurs on the Preserve
Big-scale balsamroot (<i>Balsamorhiza macrolepis macrolepis</i>)	CNPS List 1B	valley and foothill grassland and foothill woodland slopes. Associated with yarrow, oat grass, brome grass, soap plant, rye grass, blue wildrye, tarweed, yampah, coast live oak, valley oak, poison oak, coffeeberry	yes, in grassland and oak woodland

Congdon's tarplant (<i>Hemizonia parryi congonii</i>)	CNPS List 1B	alkaline soils and valley and foothill grassland, disturbed sites where water collects. Associated with mustard, rattlesnake grass, thistles, bristly ox tongue, tarweed	yes, in seeps in grassland, although the soils at the site tend to be acid, not alkaline
Contra Costa goldfields (<i>Lasthenia conjugens</i>)	CNPS List 1B	vernal pools, moist valley and foothill grassland. Associated with other goldfields, lupine, peppergrass, muilla, butter and eggs.	Vernal pools do not occur in the Preserve. Could possibly occur in wet areas in grassland, although plant associates are not common there and the likelihood is very low
Mexican mosquito fern (<i>Azolla mexicana</i>)	CNPS List 4	ponds, slow streams, wet ditches, marshes and swamps. Associated with tule, cattail, mannagrass, hydrocotyle	Arastradero Creek from John Sobey Pond to Arastradero Lake
Forget-me-not popcorn flower (<i>Plagiobothrys myosotoides</i>)	CNPS List 4	chaparral. Associated with chamise, golden yarrow	chaparral is very limited in the Preserve, likelihood of occurrence is very low
Santa Cruz manzanita (<i>Arctostaphylos andersonii</i>)	FSC; CNPS List 1B	open sites and edges of chaparral, coniferous and evergreen forest. Associated with madrone, oaks, other manzanitas, pine, redwood	low possibility in oak woodland
Delta tule pea (<i>Lathyrus jepsonii jepsonii</i>)	CNPS List 1B	fresh water and brackish marshes. Associated with alder, mugwort, aster, teasel, horsetail, peppergrass, sycamore, valley oak, California rose, blackberry, arroyo willow, tule	fresh water marsh occurs in Arastradero Lake, and may occur in Arastradero Creek and the tributary to Arastradero Creek.

Showy Indian clover (<i>Trifolium amoenum</i>)	CNPS List 1B	moist, heavy soils and disturbed areas in valley and foothill grassland, sometimes serpentine	seeps in grassland; presumed extinct in Santa Clara County; not known from San Mateo County
Point Reye's meadowfoam (<i>Limnanthes douglasii sulphurea</i>)	CE; CNPS List 1B	meadows, freshwater marshes, vernal pools and coastal prairie. Associated with alder, mustard, brome grass, sedge, horsetail, velvet grass, rushes, lupine, Ca buttercup, blackberry, tule, beeplant	freshwater marsh occurs in Arastradero Lake; some wet areas in grassland near Arastradero Creek may provide habitat. No vernal pools or coastal prairie occur on the Preserve
Santa Clara red ribbons (<i>Clarkia concinna automixa</i>)	FSSC; CNPS List 1B	Mesic shaded oak woodland. Associated with oat grass, clarkia, eriogonum, white globe lily, yarrow, bedstraw, monkey flower, phacelia, sage, poison oak	oak woodland
Slender-leaved pondweed (<i>Potamogeton filiformis</i>)	CNPS List 2	shallow, clear fresh water of lakes and drainage channels, marshes and swamps	Possibly in Arastradero Creek and unnamed creeks in the Preserve, presumed extinct in Santa Clara County; not known from San Mateo County. Likelihood of occurrence is very low.
Saltmarsh Common Yellowthroat (<i>Geothlypis trichas sinuosa</i>)	FSC; CSSC	fresh and brackish marsh	nesting and forage habitat in riparian habitat, John Sobey pond and Arastradero Lake
San Francisco Dusky-footed Woodrat (<i>Neotoma fuscipes annectens</i>)	CSSC	chaparral, riparian, woodland; needs grasses for nest building material	nesting habitat in riparian vegetation and oak woodland, forage in all habitats on site

Ringtail (<i>Bassariscus astutus</i>)	CFP	brush, rocky areas, near water	forage habitat in riparian zone; possible nesting habitat in hollow trees in riparian zone
Pallid bat (<i>Antrozous pallidus</i>)	CSSC	arid habitat, open woods, crevices or chambers in rocky areas or buildings. Sensitive to human intrusion.	Throughout Preserve
Townsend's western big-eared bat (<i>Corynorhinus townsendii townsendii</i>)	CSSC	mesic habitat, roosts in caves, old buildings. Sensitive to human intrusion.	Forage habitat available in Preserve; only trees available for roosting
Mexican free-tailed bat (<i>Tadarida brasiliensis</i>)	CSSC	open areas, buildings, highly colonial	forage habitat available in Preserve; no buildings available for roosting
Big brown bat (<i>Eptesicus fuscus</i>)	CSSC	closely associated with humans, often colonizes buildings, roosts in hollow trees, hibernates in caves, prefers deciduous to coniferous forest	Forage habitat available; roosting trees available; no deciduous or coniferous forest present
Silver haired bat (<i>Lasionycteris noctavigans</i>)	CSSC	woods near ponds and streams; roosts in trees and buildings	forage and roosting habitat available
California myotis (<i>Myotis californicus</i>)	CSSC	rocky canyons with trees and open water; desert scrub; roosts in buildings	rocky canyon, desert scrub habitat not at site. Pond and lake may provide open water forage habitat
Long-eared myotis (<i>Myotis evotis</i>)	CSSC	forest, woodland; roosts in buildings and caves	forage habitat available; no buildings or caves
Long-legged myotis (<i>Myotis volans</i>)	CSSC	coniferous forest, desert, riparian, roosts in buildings, rocks, trees; forages over open water and open woods	Riparian, open water, open woods, trees available for forage and roosting. No desert habitat, rocky outcrops or buildings

Yuma myotis (<i>Myotis yumanensis</i>)	CSSC	variable habitats and open water. Roosts in buildings	Forage habitat available; no buildings for roosting
--	------	---	---

Table 1 Notes: FT - Federal threatened; FSC - Federal species of concern; CSSC - California species of special concern; CP - California protected; FE - Federal endangered; CE - California endangered; CFP- California fully protected; CNPS List 1B - plants rare, threatened or endangered in California and elsewhere; CNPS List 2 - plants rare, threatened, or endangered in California but common elsewhere; CNPS List 3 - plants about which we need more information, a review list; CNPS List 4 - plants of limited distribution, a watch list.

4. General Objectives, Strategies & Recommended Actions



4. General Objectives, Strategies & Recommended Actions

4.1 Resource Management

Objectives

In keeping with the Preserve Mission to create and maintain the Preserve with an *“emphasis on the natural and open space amenities of the land and sensitivity to the fragile foothills ecology”* the Preserve trail system should be maintained in concert with the environment.

Strategies

- Encourage the growth of native vegetation
- Minimize impacts to water quality
- Minimize impacts to sensitive plant or animal species
- Ensure there are no impacts to jurisdictional wetlands
- Minimize opportunities for invasive, non-native plants to gain a foothold in areas not already impacted by these species
- Minimize potential harassment to nesting birds
- Minimize impacts to habitat for endangered and sensitive species to avoid a “taking”
- Control/remove invasive, non-native plant species

Actions

- Whenever possible, trails should be routed to avoid wet areas including riparian and pond habitats
- New trail alignments should avoid areas of predominately native vegetation
- Whenever possible, trails should be routed to avoid serpentine soils. If a route must go through serpentine, it should first be surveyed for the presence of rare plants and insects.
- Native vegetation should not be removed except in areas:
 - where qualified City personnel certify that plants create a fire hazard or on firebreaks
 - within the tread of routinely maintained roads and trails
- Areas where informal trails are currently degrading Preserve habitat should be closed and restored

4.2 Trail Use

Objectives

The Use Policies call for the Preserve to be managed as “*an open space park available to the general public, residents and non-residents alike*” while not “*duplicating those [uses] provided in urban neighborhoods or regional parks.*”

Strategies

User Experience

- Provide a high quality user experience including opportunities to experience nature, solitude, skill testing, and social interaction

Accepted Uses

- Provide for the needs of equestrians, off-road bicyclists, joggers, hikers, and dog walkers by creating a shared use trail system
- Provide an interesting and varied recreational experience taking maximum advantage of the varying landforms, ecological zones and vista points located on the Preserve
- Limit use of the Preserve to designated trails. To prevent damage to the Preserve’s resources, off-trail use will only be allowed through a special use permit that must be secured from the City

Creating a System to be Used and Useful

- Provide a backbone system of multiple (shared) use trails for year-round use that will lead to a destination (e.g. Arastradero Lake) or provide a loop that will direct users back to their starting point with minimal retracing of one’s path
- Provide a secondary tier of trails that may be closed during the wet months or other times of high sensitivity to meet other management objects
- Utilize existing trails and correct the deficiencies instead of building new trails (where appropriate) to minimize potential environmental disturbance caused during construction
- Include access to regional trails that connect the Preserve from:
 - Midpeninsula Regional Open Space District Preserves through Foothills Park (hiking only)
 - the Town of Portola Valley
 - the Town of Los Altos Hills
 - Stanford University
- Provide connectivity for the Juan Bautista de Anza National Historic Trail

Recommended Actions

User Experience

- Key experiences as set forth by the public should be made available to the widest range of users possible

Accepted Uses

- An emphasis should be made on evaluating the trails to determine their suitability for hikers, joggers, dog walkers, bicyclists, and equestrians on a year-round or seasonal basis
- Consideration should be given to providing tranquil park experiences

Creating a System to be Used and Useful

Divide the trail system into two distinct categories Primary or “backbone” Trails and Secondary Trails:

- **Primary or “backbone” trails** – These shared use trails will provide access to the primary elements at the Preserve and should be considered basic to the recreation experience being offered at the site. Every effort should be made to make this backbone trail system as accessible as possible to the widest range of trail users throughout the year. While all of the trails identified in the first tier may not meet the desired accessibility goals with regard to trail steepness or width, these trails should be developed so:
 - there are no physical obstructions to access
 - the trail tread is a minimum of 4 feet wide for internal recreation trails, 6 feet wide for regional recreation trails (e.g. Juan Bautista de Anza National Historic Trail and connections to other jurisdictions) and 10 feet wide for maintenance access trails
 - the trail surface is firm enough to accommodate a wheelchair during the dry season
- **Secondary trails** – These trails will provide access to elements that are not primary to the overall experience of the Preserve. These trails can provide varying levels of accessibility, based on the nature of the site and the visitor’s expectations. Efforts towards improving access to and along these trails should not undermine the very nature of the recreation activity that is being pursued or the resource that is being enjoyed by the Preserve visitor. Typically the trail tread will be a minimum of 4 feet wide on these trails.

Defining Trail Tread Widths

To meet a range of recreation and utilitarian needs the trail tread will be developed in three different widths. A description of each of these trail tread types and the intended purposes they will serve are provided below.

- 4-foot Wide Recreation Trails. Internal recreation trails will be developed to a minimum width of 4 feet. This trail type will make up the majority of the trail

system and will provide for a “single track” experience desired by many users. This is the minimum width that can comfortably accommodate strollers and wheelchairs. It will also accommodate rangers who must carry injured users out of the Preserve on foot in emergency situations. In addition, a 4-foot trail tread that is well designed will still be able to accommodate trail use if other staffing duties prevent a section of trail from being brushed backed for one or more seasons. This trail width will still require one trail user to step off the trail if they want to pass another. Therefore, it will be important to provide adequate sight lines to avoid use conflicts. In addition, in situations where trail users will not be able to move off the trail to allow passing, additional width should be considered for that distance to minimize potential conflicts and hazardous use conditions (e.g. falling off a steep slope to avoid an oncoming user).

- **6-foot Wide Recreation Trails.** Trail entry points and trail routes that link to other trail systems will be developed to a minimum width of 6 feet to: create a welcoming, well-defined point of entry at the Preserve boundaries; allow for people to pass at the most congested use points, thereby minimizing potential user conflicts; permit easier access during emergencies if rangers must carry injured users out of the Preserve on foot; and improve accessibility for most trail users.
- **10-foot Wide Maintenance Access Trails.** A consistent, well defined, uniform width of 10 feet is the minimum width that can adequately accommodate utility vehicles without causing breakdown of hardened trail edges (which will reduce the life of the trail tread) and intrusions onto the adjacent natural environment. Hardening recommendations will reduce potential long-term impacts on water quality and erosion of the trail tread, while improving accessibility of the trail for many users.

4.3 Trail Design & Management

Objectives

In keeping with the Preserve Mission, trail design and management practices at the Preserve should focus on creating and maintaining “*a low intensity and minimal cost park*” while working to comply with City’s policy to “*retain natural habitat of the Preserve*”.

Strategies

Establishing a Level of Service for Maintenance

- Design a system that will require minimal maintenance over the long-term, even if the initial construction costs are higher.
- Focus on providing a “*reasonably safe facility*” by:
 - Eliminating hazardous situations by removing overhanging vegetation, repairing trail tread, and controlling erosion

- Developing procedures for periodic inspection and maintenance
- Developing policies and procedures for trail management (e.g. seasonal closures, signing, monitoring and enforcement)
- Designating an “all-weather backbone” trail system that will become the highest priority for improvement and repair

Meeting User Needs

- Upgrade the trail system to follow the intent of the *Americans with Disabilities Act Guidelines for Outdoor Recreation – Trails (Final Report September 1999)*
- Provide safe access for park users beginning their visit to the Preserve from the Page Mill Road Park and Ride and for local residents accessing the Preserve from the surrounding areas
- Provide a system of trail use and identity signs and maps that explain the Preserve rules, trail use designations and highlight destinations
- Incorporate an interpretive educational component into the programming and design of the trail system

Meeting Resource Objectives

- Reduce the visibility of the trails from adjacent lands and orient users views away from private residences

Recommended Actions

Establishing a Level of Service for Maintenance

- Provide a balance between:
 - The degree of structural modification
 - Customer expectations for accessibility
 - Preservation of natural features
 - Primary purpose of the site
 - Anticipated amount of use
 - Customer expectations for risk and safety

- Provide a core route that will:
 - Meet Preserve’s Management Plan’s definition of accessibility
 - Provide access to “favorite” places
 - Consolidate parallel trails
 - Remove trails in extremely environmentally sensitive areas to protect endangered species
 - Promote seasonal closure, where appropriate

- Focus on allocating labor and hours to:
 - Removing overhanging vegetation, repairing trail tread, and controlling erosion

- Correcting key areas along the designated “year-round” trail route to maximize accessibility and minimize degradation of the trail tread
- Providing a tiered approach to use and maintenance of Preserve trails that will include: minimizing risk to users, maintaining the structural integrity of the trail tread, and protecting the environmental resources

Meeting User Needs –Designing to Minimize Use Conflicts

- Focus trail modifications on correcting trail conditions that contribute to trail use conflicts by:
 - Enhancing sight lines
 - Minimizing steep slopes
 - Minimizing long, wide open stretches of trail that can encourage excessive speeds
 - Concentrating use in certain areas

Meeting User Needs –Designing to Maximize Accessibility

- Focus trail modifications on correcting trail conditions to maximize trail accessibility for a wide range of skill levels and recreation types by:
 - Eliminating physical barriers
 - Providing signage, brochures or information that describes trail conditions

Meeting User Needs - Designing to Maximize Health & Safety

- Focus any trail modifications on enhancing user health and safety by:
 - Using dust suppression techniques, such as watering during trail construction
 - Evaluating existing trails on steep slopes for re-routing or improvement to improve accessibility and visitor safety
 - Developing switchbacks when routing trails on slopes greater than 15% where tread will become too steep for safe use
 - Avoiding locating trails along disk lines as trail tread would be too rough to accommodate visitors safely

Meeting Resource Objectives –Designing to Protect Viewshed

- Focus trail modifications on protecting viewshed by:
 - Building new trails in the visual corridor of Arastradero Road along contour lines to reduce their visibility
 - Locating new trails away from private residential properties to reduce views into the private property

4.4 Good Neighbors – Respecting Private Property Privacy & Security

Objectives

Recognize the rights of adjacent private property owners and their relationship to the Preserve. Work to facilitate coordination between the City and private landowners to provide a balance between respecting private property privacy and security and providing opportunities for access from adjacent lands. Recognize that natural systems do not typically follow boundary lines.

Strategies

- Locate, design and develop new trails with sensitivity to potential environmental, recreational and privacy impacts on adjacent private lands
- Provide a buffer, fence and signs, as appropriate, to designate the Preserve boundary

Recommended Actions

Private Property Privacy & Security

- Provide a 30' minimum trail privacy buffer along those Preserve boundaries where there are residential yard uses

Resource Enhancement

- Work with neighbors, including Stanford University and the Palo Alto Hills Golf and Country Club, who share a common boundary with the Preserve to develop cooperative programs that will extend the Preserve management objectives beyond the Preserve boundaries

4.5 Managing to Meet Multiple Department Objectives - Coordinating with the Fire Department

Objectives

In keeping with City's policy to "*retain natural habitat of the Preserve*", Preserve practices should focus on coordinating with the Fire Department to develop and implement a fire suppression plan that will maximize the safety of the users and the adjacent properties, without adversely impacting the natural environment.

Strategies

Responsibilities and Coordination

- The City **Fire Department** will serve as the primary providers for fire suppression and life saving emergency services

Access

- Provide adequate access to the City Fire Department for Type 3 and 4 vehicles

Fire Prevention Techniques

- Use the least environmentally intrusive fire prevention methods at the Preserve that can be implemented safely and effectively to meet the objectives of fire prevention and fire suppression

Firebreak and Control Strategies

- The firebreak and control program should be developed to provide protection from fires spreading onto adjacent properties, as well as coming into the Preserve
- Firebreaks/disk lines should be provided only where they serve their intended function in fire prevention and suppression

Temporary Closures

- Provide an option to close the Preserve when conditions such as high fire danger could pose a threat to the public

Recommendations

Responsibilities and Coordination

The City **Fire Department** will continue to be responsible for:

- Developing and implementing the fire suppression plan
- Responding to fires and life safety emergencies by:
 - Preventing and suppressing fire
 - Responding to medical emergencies
 - Assisting citizens with many other types of service requests

The City **Fire Department** will work with the City **Open Space Division** to:

- Develop fire hazard reduction and fuel management strategies

While the primary responsibility for fire and medical emergencies lies with the City Fire Department, **Park Rangers** will typically be the first response team for fire and medical emergencies within the Preserve.

As the Preserve is located in a Hazardous Fire Area (HFA), the **City Open Space Division** should maintain the mutual support system between inter-departmental staff and the **California Department of Forestry and Fire Protection** as established in the Mutual Threat Zone (MTZ) Agreement.

Access

- Provide a 40 to 45 foot “drive” between Arastradero Road and Access Gates A and B to provide a safe place for Fire Department staff to safely park their Type 3 and 4 vehicles when opening the Preserve entry gates
- Ensure that all six access points can accommodate fire vehicles at all times. These access points include:
 - The parking lot
 - The access gate on Arastradero Road adjacent to the west of the parking lot
 - Gate A (access limited to the existing turn-around on the west side of the first concrete bridge spanning Arastradero Creek)
 - Gate B, which serves as the primary Utility Department access
 - Gate C, which is located off John Marthens Lane
 - Gate D - Vista Hill Gate in Foothills Park (one-way downhill, except in emergency situations)
- Close, restore and annually mow designated emergency access routes within the Preserve as needed to create a circulation route for Type 3 and 4 vehicles in the case of emergency
- Provide emergency turn arounds where access roads dead-end (hammer-head configuration needed for vehicle turn around)
- Use a uniform maintenance gate at all major entry points with a universal locking device to facilitate routine and emergency access into the Preserve by multiple department staff

Fire prevention methods

- Fire prevention methods to be used at the Preserve include:
 - Establishing fire lines on the perimeters of open space lands, leaving the interior areas in their natural condition
 - Disking fire lines and mow fuel reduction zones to compartmentalize the Preserve for fire suppression in the event of a fire
 - Posting signs indicating the severity of the fire danger (low, moderate, high extreme) during the fire season
 - Posting signs “No Fireworks” June 20 to July 10
 - Use herbicides as approved by the Superintendent of the Open Space Division, where appropriate in implementing the wildland fire prevention plan

In addition, though not currently used, maintain an option for the Fire Department to perform controlled burns in the future as part of their overall fire prevention plan.

Firebreak and Control

- Firebreaks should be disked 24 feet wide or 1 1/2 times the fuel height adjacent to the road, structures and where they can compartmentalize an area to reduce the risk of a fire igniting and/or spreading
- Firebreaks should be eliminated where they are not providing any benefit to fire prevention or suppression
- Ideally disking should be performed twice a year, first in late spring and then when the disk lines have “cured”
- If new activities/developments occur inside or adjacent to the Preserve perimeters, then the location of the disk lines should be reevaluated and expanded as appropriate.

Map 4 shows the emergency/maintenance access points of entry, trail travel routes to be maintained for use by the Fire Department and Utility Department when servicing the Preserve. This map also shows disk lines and indicates those sensitive resource areas in the Preserve that should not be accessed by heavy vehicles.

Temporary Closures

The City Fire Department may close the Preserve when there is a threat to public safety. When such emergencies occur the Fire Department is to notify Open Space Division staff of emergency closures so they can notify the public. Emergency closures may occur when:

- Weather conditions create a critical fire danger
- Arsonists are known to be present in the area
- Staff resources have been pulled away for other emergencies

4.6 Managing to Meet Multiple Department Objectives - Coordinating with the Utility Department

Objectives

In keeping with City’s policy to “*retain natural habitat of the Preserve*”, Preserve Park practices should focus on coordinating with the Utility Department to develop and implement a utility maintenance plan that will maximize use of the utility roads for public recreational use without adversely impacting the Utility Department operations or the natural environment.

Strategies

Responsibilities and Coordination

- The **Utilities Department** is responsible for maintenance of electric, gas, and wastewater facilities on the Preserve.

- Maintenance of the maintenance access trails that provide access for recreation and maintenance of utility infrastructure should be coordinated to develop the most skilled, cost effective and environmentally sound trail maintenance program. Where the use of herbicides is to be considered in the utility maintenance program, the Superintendent of the Open Space Division must be notified and the timing and application of the herbicide must be approved by that Superintendent.

Access

- Provide access and use of the “maintenance access trails” by Utility Department staff utilizing heavy vehicle to access inspect, repair and operate utility infrastructure and substations within the Preserve. This function is not to be compromised by recreational trail use.

Temporary Closures

- Provide an option to close the Preserve when conditions could pose a threat to the public.

Recommended Actions

Responsibilities and Coordination

The **Utility Department** is to oversee maintenance of:

- Access roads to the standard that the Department needs to inspect, repair and operate all overhead facilities, with heavy vehicles.
- Adequate clearance for overhead transformer poles
- A 10' radius minimum area around poles having operable devices such as switches, fuses, transformers and corner poles near the overhead facilities. This area will be kept clear of trees, grasses and brush (fuel sources). Tree trimming will typically be done every two to three years. Ground clearing with weed trimmers will be done annually. Utility pole replacement typically occurs on a 20-year life cycle.

The **Utility Department** is to notify the **Open Space Division staff** when they are to perform routine and emergency maintenance tasks so that the staff:

- Can notify the public about any potential dangers and/or inconveniences

- Evaluate the maintenance area to determine if there are any nesting animals and/or endangered habitat in the maintenance area that must be protected or relocated prior to performing routine maintenance procedures.

The **Open Space Division** and the **Utility Department** are to coordinate with other City Departments to develop a joint parties agreement to ensure that existing trails within utility corridors are maintained for year-round use utilizing the most skilled, cost effective and environmentally sound trail maintenance techniques. It is assumed that recreation trails will be maintained by the **Open Space Division** in accordance with guidelines provided in this Trails Management Handbook as the primary function of these trails is to provide recreation opportunities for a variety of trail users. It is assumed that the **Public Works Department** will maintain the maintenance access trails to utility standards because the primary purpose of these trails is to provide access to the utility infrastructure that crosses through the Preserve.

Access

- The **Open Space Division** should continue to coordinate access with the **Utility Department** to retain the following as trails “all-weather maintenance access trails” suitable for utility access and year-round trail use:
 - The utility route that services the Corte Madera Water Tank (utility access suitable for heavy equipment is continuous from Gate B to the water tank)
 - The utility route that parallels the creek between Arastradero Lake and the boundary of Foothills Park (utility access suitable for heavy equipment is continuous from Gate B to Gate D at Vista Hill)
 - The Juan Bautista de Anza Trail – Segment 2 (utility access suitable for heavy equipment is continuous from Gate A to the existing turn-around on the west side of the first concrete bridge spanning Arastradero Creek)
 - The Meadowlark Trail – Segment 1, which extends from John Marthens Lane to the old house site (this access may be used by utility vehicles, but is more typically used by park staff.

- Provide a 40 to 45 foot “drive” between Arastradero Road and Access Gates A and B to provide a safe place for Utility Department staff to safely park their maintenance vehicles when opening the Preserve entry gates.

- Use a uniform maintenance gate at all major entry points with a universal locking device to facilitate routine and emergency access into the Preserve by multiple department staff

- Ensure that these access points can accommodate utility vehicles:
 - The parking lot

- Gate A (access limited to the existing turn-around on the west side of the first concrete bridge spanning Arastradero Creek)
- Gate B, which is to continue to serve as the primary Utility Department access
- Gate C, which is located off John Marthens Lane
- Vista Hill Gate in Foothills Park (one-way downhill, except in emergency situations)
- Provide emergency road turn arounds where access roads dead end (hammer-head configuration needed for turn around)

Temporary Closures.

- The City **Utility Department** may close the Preserve when there is a threat to public safety. When such emergencies occur the **Utility Department** is to notify **Open Space Division** staff of emergency closures so they can notify the public. For example the Preserve may be closed when:
 - There is storm damage to the utility infrastructure
 - Heavy equipment or materials are being moved through the Preserve to perform maintenance on the infrastructure
 - The utility trail system is undergoing maintenance

ARASTRADERO

MAP 4 FIRE PROTECTION & EMERGENCY & MAINTENANCE ACCESS

FINAL
MARCH 2001
4-14



Amphion

LEGEND

FIRE PROTECTION & EMERGENCY ACCESS

- | | | | |
|--|---|--|---|
| | 4'-6" TRAIL | | BOUNDARY LINES |
| | EXISTING ACCESS GATES & MAINTENANCE ACCESS (8'-12') | | CREEK/ DRAINAGE |
| | PROPOSED TO BE MAINTAINED TO ACCOMMODATE VEHICLE ACCESS (DRY SEASON ONLY) | | CONTOUR LINES |
| | PROPOSED MOWED ALIGNMENT FOR EMERGENCY ACCESS (10' WIDTH/ TYPE III VEHICLE ACCESS) | | ROAD |
| | DISK LINE FOR FIRE MANAGEMENT (10'-12' WIDE) | | PRIVATE PROPERTY |
| | AREAS OF HIGH & MODERATE ENVIRONMENTAL CONSTRAINTS. COORDINATE W/ PARKS BEFORE PERFORMING MAINTENANCE. AVOID ENTRY W/ HEAVY VEHICLES, EXCEPT ON DESIGNATED MAINTENANCE TRAILS OR "MOWED ACCESS ROUTES." | | TURN AROUND POINTS INCORPORATED INTO TRAIL |
| | | | PRIMARY EMERGENCY VEHICLE ACCESS |
| | | | SECONDARY EMERGENCY VEHICLE ACCESS |
| | | | MOWED AREA TO ACCOMMODATE EMERGENCY VEHICLE TURN AROUND |

NOTE: TURN AROUND NUMBER 8 HAS A TIGHT TURNING RADIUS & WILL NOT ACCOMMODATE TYPE 3 & 4 VEHICLES

5. Trail Maintenance Classification System



5. Trail Maintenance Classification System

5.1 Use and Maintenance Evaluation Criteria

One of the first steps in developing a trails maintenance program for the Preserve was to analyze the trail system considering its **primary uses** and **environmental sensitivities**. This analysis included field investigations by a professional team of landscape architects, biologists and soil erosion experts. Input from the public was also solicited at two community workshops and in the form of a questionnaire that was distributed by City staff, Bay Area Action staff and over the Internet.

5.2 Primary Trail Uses Guiding Trail Maintenance Standards & Work Priorities

Summary of Public Desires

Based on input received from the public questionnaire (see Appendix A) and the two public workshops, the Preserve visitors would like to see the Preserve trail system managed to:

- Accommodate shared use by hikers, runners, mountain bicyclists, dog walkers, and naturalists
- Provide a core system of trails that could be used year-round

Community participants would like the trail system maintained as an unpaved, single track system that would:

- Accommodate a variety of skill levels
- Provide access to key points of interest including:
 - Arastradero Lake
 - "the bowl"
 - viewpoints such as the overlook near the old house site and the Stanford/Preserve boundary
- Provide a link in the regional Juan Baustista de Anza National Historic Trail

Most of the respondents thought that preservation and restoration of the Preserve's natural resources was a top priority and they were willing to see trails closed under the following conditions:

- Where a existing trail is degrading an environmentally sensitive area
- Where there are parallel trails providing the same experience

Most of the participants did not want to see major upgrades of the overall trail system. However, there were a few areas that many people felt could use improvement. These included:

- Safety improvements to Arastradero Road crossings
 - At Gate A which provides the primary access into the Preserve at Gate A (This recommendation is in keeping with the guidelines established in the proposed Gateway Plan)
 - At the Portola Stables access drive
- Safe connections between the Preserve and Town of Los Altos Hills, the Town of Portola Valley, Stanford Lands and Midpenninsula Regional Open Space trail systems
- Management of non-native, invasive species where they are impacting the visitors' trail experience

Accessibility

An effort should be made to meet the needs of all people, regardless of their physical limitations, who may wish to visit the Preserve's natural and recreational resources. In striving to meet a balance between accessibility and resource protection, this handbook strives to follow the intent of the *Americans with Disabilities Act Outdoor Guidelines for Outdoor Recreation – Trails, Final Report, September 1999*.

Access into the Preserve

All entry points into the Preserve should be developed so that there are no physical obstructions (such as log motorcycles barriers or gates with difficult latches) precluding entry by people with mobility limitations. At Gate A, which serves as the primary access into the Preserve special care should be taken to design an accessible route of travel. The primary access route from the parking lot into the Preserve should be designed to:

- Eliminate any physical obstructions greater than 2" in height along the primary access to the Preserve from the main parking lot
- Maintain a minimum trail width of 6 feet
- Maintain a gradient of less than 8%

Accessibility of High Maintenance Trails

Within the Preserve, on those trails designated High Maintenance, the trail design should provide, as environmentally appropriate:

- Level passing/rest areas every 1,000 feet where the trail width is less than 5 feet and where sight lines and/or adjacent side slopes do not allow for other users to step off the trail to allow for wheelchairs to pass
- A trail surface that is firm and stable enough to provide traction and free movement of wheels so as to accommodate a wheelchair during the dry season

Where it is not possible to meet these design objectives, either in the long-term or the short-term, the City should make information available to the Preserve visitor describing the trail system. This information should note trail lengths that are and are

not accessible and conditions that may present obstacles to potential trail users. Such obstacles may include:

- Those trails whose running slope exceeds 5% for a sustained distance and where the trail exceeds 10% maximum for more than 30 feet
- Those trails whose cross slope exceeds 3%
- The anticipated level of intensity
- The overall tread type (e.g. 4-foot wide tread of native soil)
- Those trail locations where there are any barriers to access

Accessibility of Moderate Maintenance Trails

In many of the more remote areas of the Preserve the design guidelines described above may not be met under the following conditions:

- Where a trail is not connected to accessible trails or accessible trailheads and
 - There is an opportunity to meet the request of many of the Preserve users to provide “challenging” trail experiences
 - The cost of constructing a trail to meet these standards would be prohibitive
 - A significantly adverse environmental impact would result from meeting those guidelines

5.3 Environmental Sensitivity - Resource Considerations Guiding Trail Maintenance Standards & Work Priorities

Overview

Trails provide the primary access to the natural, cultural and scenic resources of the Preserve and are intended to enhance the visitor’s enjoyment of those resources. Yet the land areas they traverse have an inherent and variable ability to sustain recreational use without suffering damage to soils, vegetation and water. This ability can be relatively low, especially where soils are wet for long periods of time, where slopes are steep and soils are highly erosive, or where vegetative habitats are very fragile. Therefore, decisions regarding design, layout and construction of trails should be based on what is best for the Preserve’s resources.

To increase the Preserve’s ability to withstand recreational use without resource damage, it is important to analyze the biotic resources, soils and aesthetic sensitivity of the site and to respond with sound trail construction and maintenance techniques.

Trail conditions warranting correcting and/or rerouting trails include situations where:

- A trail can be rerouted to cross a slope instead of climbing directly up a slope to more closely match topographic conditions
- A trail can be rerouted to improve user safety and to circumnavigate or repair eroded areas

- A trail is exceeding width guidelines or paralleling a second trail and the overall trail route should be narrowed to the desired width

Conditions warranting temporary or permanent trail closure include situations where:

- A trail is significantly impacting natural resources of the Preserve
- A trail is not passable in wet weather
- A trail is too costly to maintain because additional structures are required to bypass sensitive resources or mitigations are required to address impacts to sensitive resources

Biological Sensitivity

Arastradero Preserve is biologically diverse with areas of high biological value, and it contains some legally protected species. The biological constraints to trail construction or use have been divided into three categories: High, Moderate and Low.

Specific Areas of High Constraint

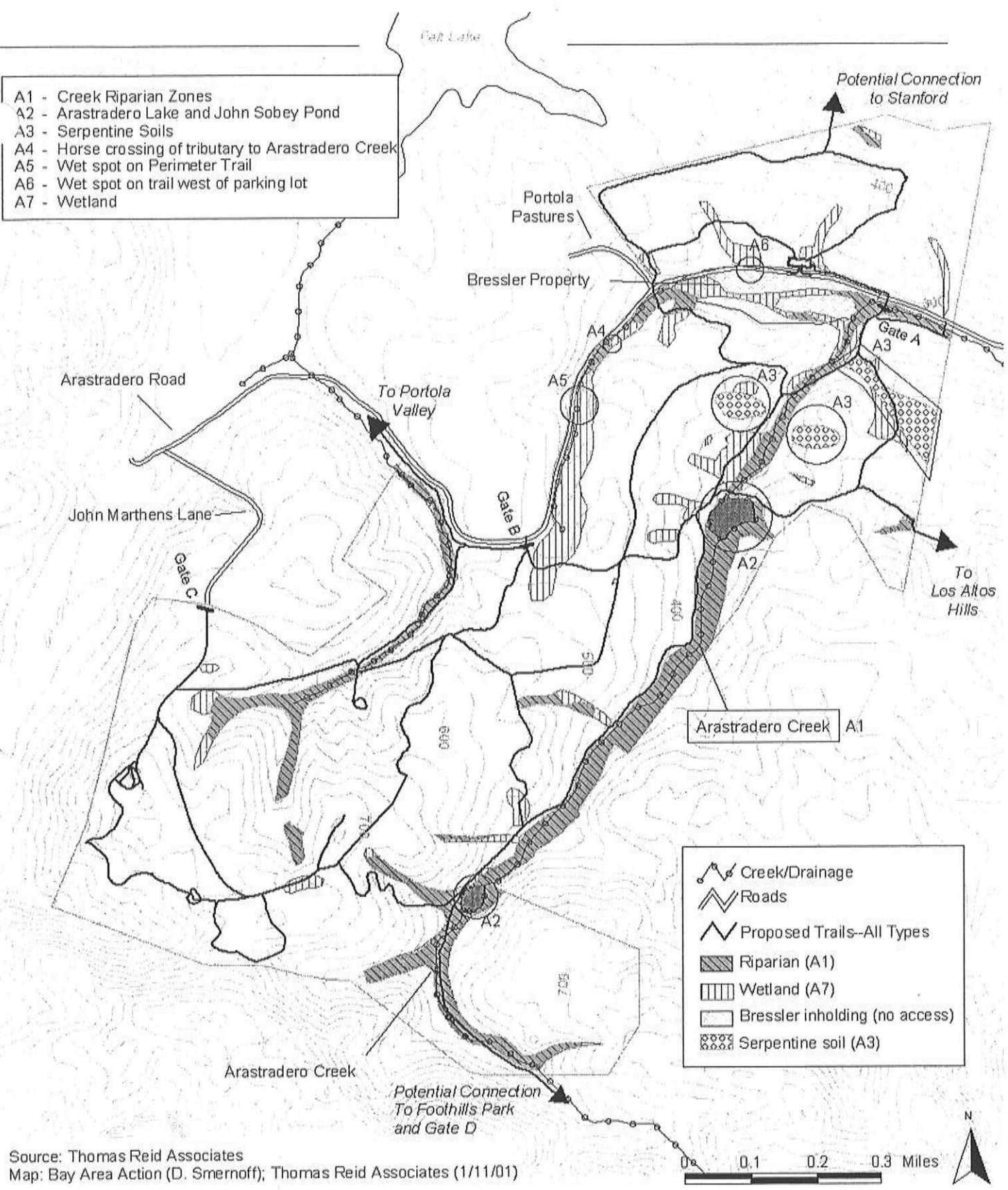
“High constraint” applies to areas with particularly sensitive resources, which require either avoidance or special measures, and possibly additional permits for trail construction, modification, or maintenance. Avoidance or very low impact design is necessary for compliance with state and possibly federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts). These particularly sensitive resources are habitat for listed animal and plant species.

Biological areas of “High Constraint” (See Map 5) are:

- Arastradero Creek riparian zone and tributary to Los Trancos Creek riparian zone
- Arastradero Lake and John Sobey Pond
- Serpentine Soils at the trail junction near the first cement bridge over Arastradero Creek reached from Gate A and first trail junction to the east
- Riparian zone along tributary to Arastradero Creek (along the existing Perimeter Trail)
- Wetland area on trail west of parking lot
- Wetlands along the existing trail that parallels Arastradero Creek north of Arastradero Lake

Areas of Moderate Constraint

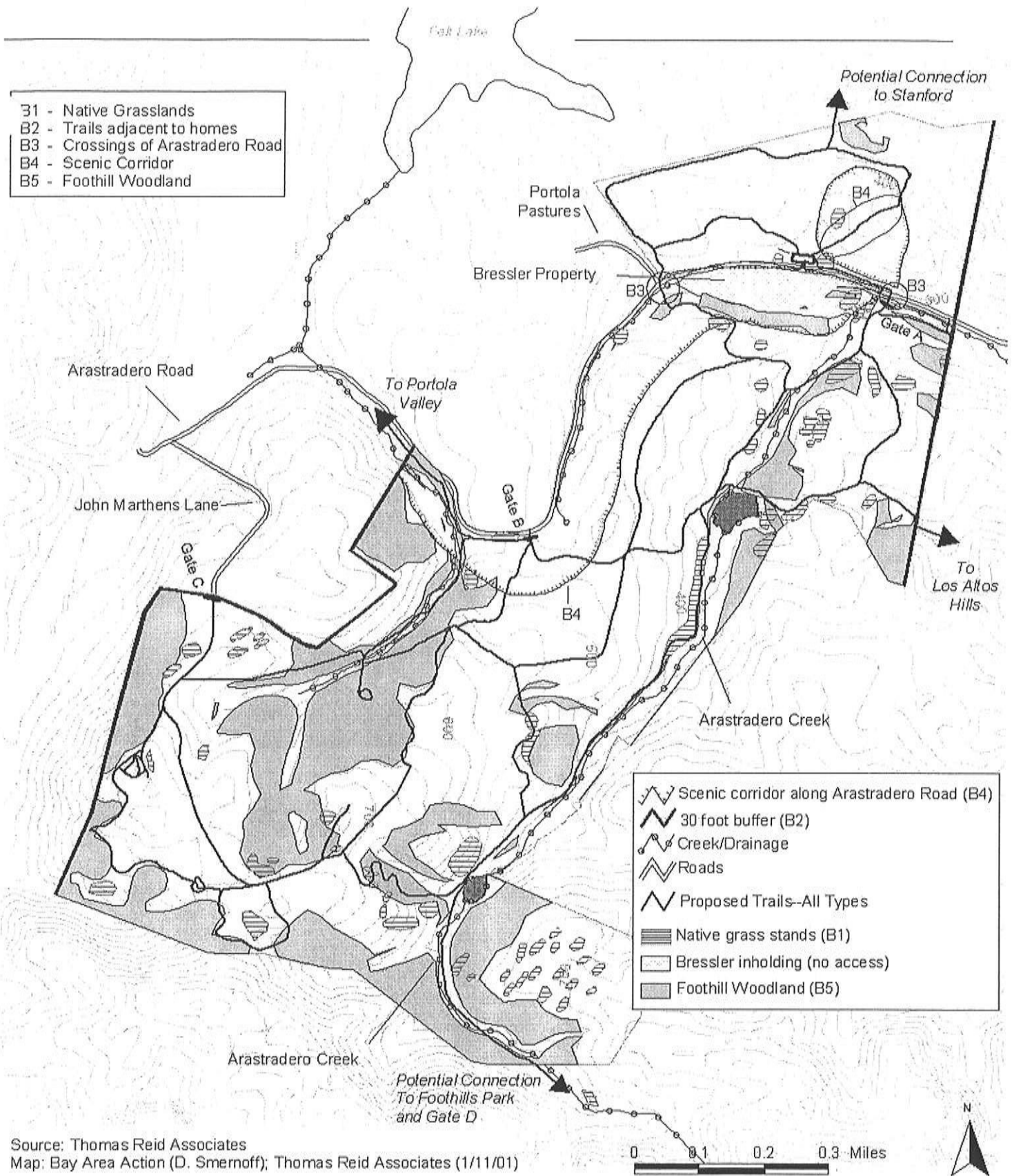
These are areas where trail alignments need to be changed, special trail building materials need to be used, or the trail needs to be maintained in particular way. The impacts relate to Preserve management goals, but do not require permitting from outside agencies or result in potential violation of state or federal statutes.



Source: Thomas Reid Associates
 Map: Bay Area Action (D. Smernoff); Thomas Reid Associates (1/11/01)

ENVIRONMENTAL SENSITIVITY "HIGH CONSTRAINT"

MAP 5



ENVIRONMENTAL SENSITIVITY "MODERATE CONSTRAINT"

MAP 6

Biological areas of “Moderate Constraint” (See Map 6) are:

- Native grass stands most notably along the existing trail that parallels Arastradero Creek south of Arastradero Lake and in the southern quadrant of the Preserve
- Foothill Woodlands, most notably in the southern half of the Preserve
- Undisturbed areas of high biological value, most notably in the southeastern corner of the Preserve north of Arastradero Creek

Areas of Low Constraint

These are areas where existing trail alignments do not pose impacts to sensitive resources, but where trail *use* could have a negative impact. Seasonal closure is recommended to prevent significant impacts.

Biological area of “Low Constraint” (See Map 7):

- “The Bowl”

Soil/Slope Sensitivity

Soil/slope sensitivity is an important consideration in trail development. A trail that is improperly located and/or designed will be susceptible to erosion resulting in:

- Potential water quality impacts
- Impacts to user safety
- Higher maintenance costs
- And ultimately, the potential loss of the trail

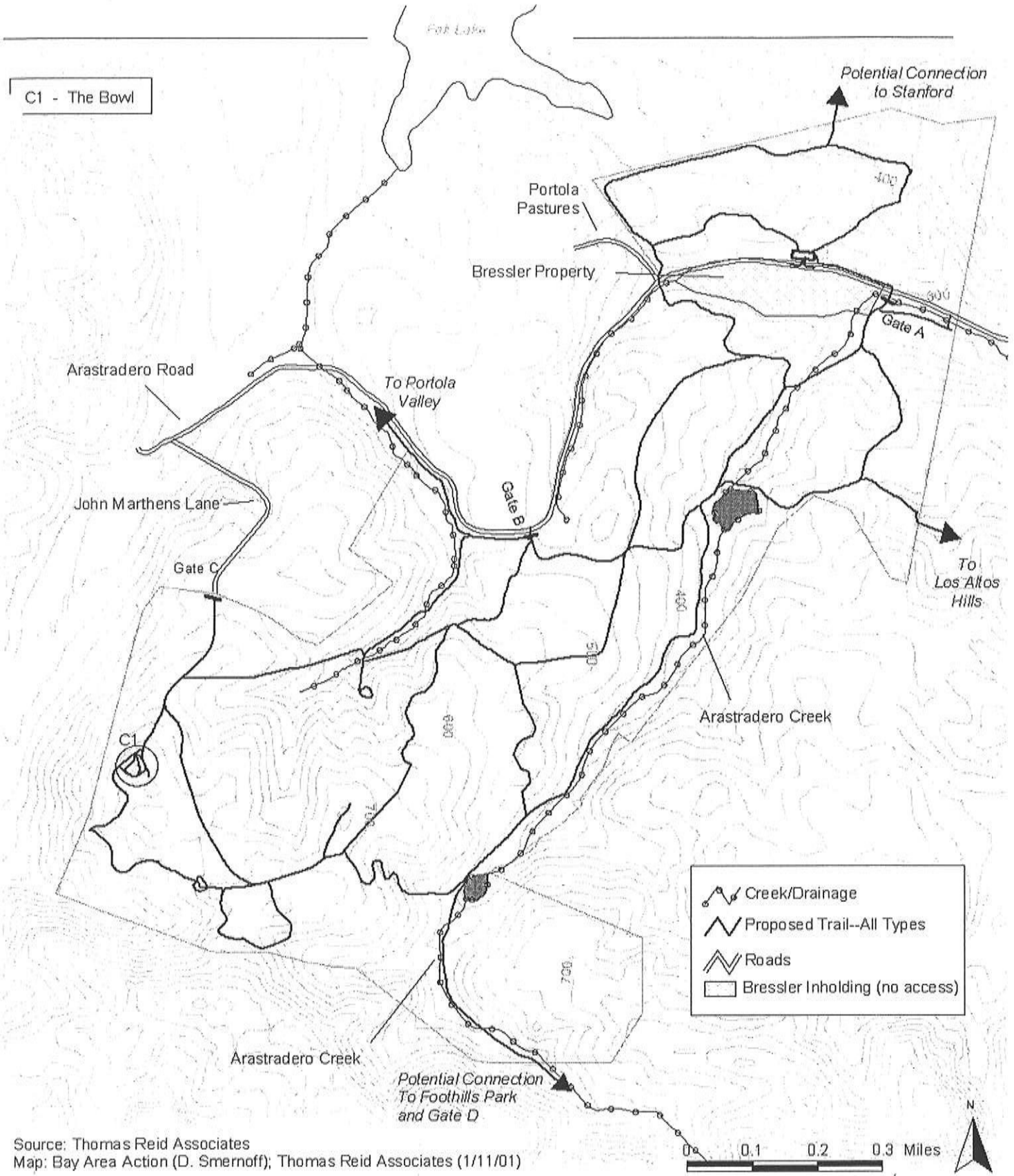
There are several factors involved in determining soil/slope suitability for trail development. These include:

- The physical characteristics of the environment (i.e. erosive soils, saturated soils)
- Physical characteristics of the trail (e.g. trail width, and grade, line of sight, and side slopes)
- Trail use (e.g. is this trail being designed to be “accessible by all” or designed as a challenged course for use by a few)

Physical Characteristics of the Environment

There are several factors influencing the determination on whether development of a trail in a particular location will result in creating “excessive slope”. Physical parameters that contribute to the soil's susceptibility to erosion and thus, the creation of an “excessively steep” trail include:

- Soil texture (sandy, loam or heavy clay)
- Soil depth (to rock)
- Quantity of organic matter
- Presence or absence of stones
- Soil percolation rate



ENVIRONMENTAL SENSITIVITY "LOW CONSTRAINT"

MAP 7

- Surface run-off patterns
- Slope of the terrain
- Aspect (northern or southern exposure)
- Topographic position in the landform (ridgelines will typically have little standing water, while water will tend to concentrate at the toe/bottom of the slope)
- Quantity and type of vegetation adjacent to the trail

In the Preserve several soils are considered to have moderate limitations for trail development due to the excessive slope based on the features described above (See Map 8). These soils are:

- Azure clay loam (AuE) - 15% -30% slope
- Los Gatos gravelly loam (LfE2) - 15% -30% slope
- Los Gatos gravelly loam (LfE) - 30% -50% slope
- Los Osos clay loam (LoE) - 15% -30% slope

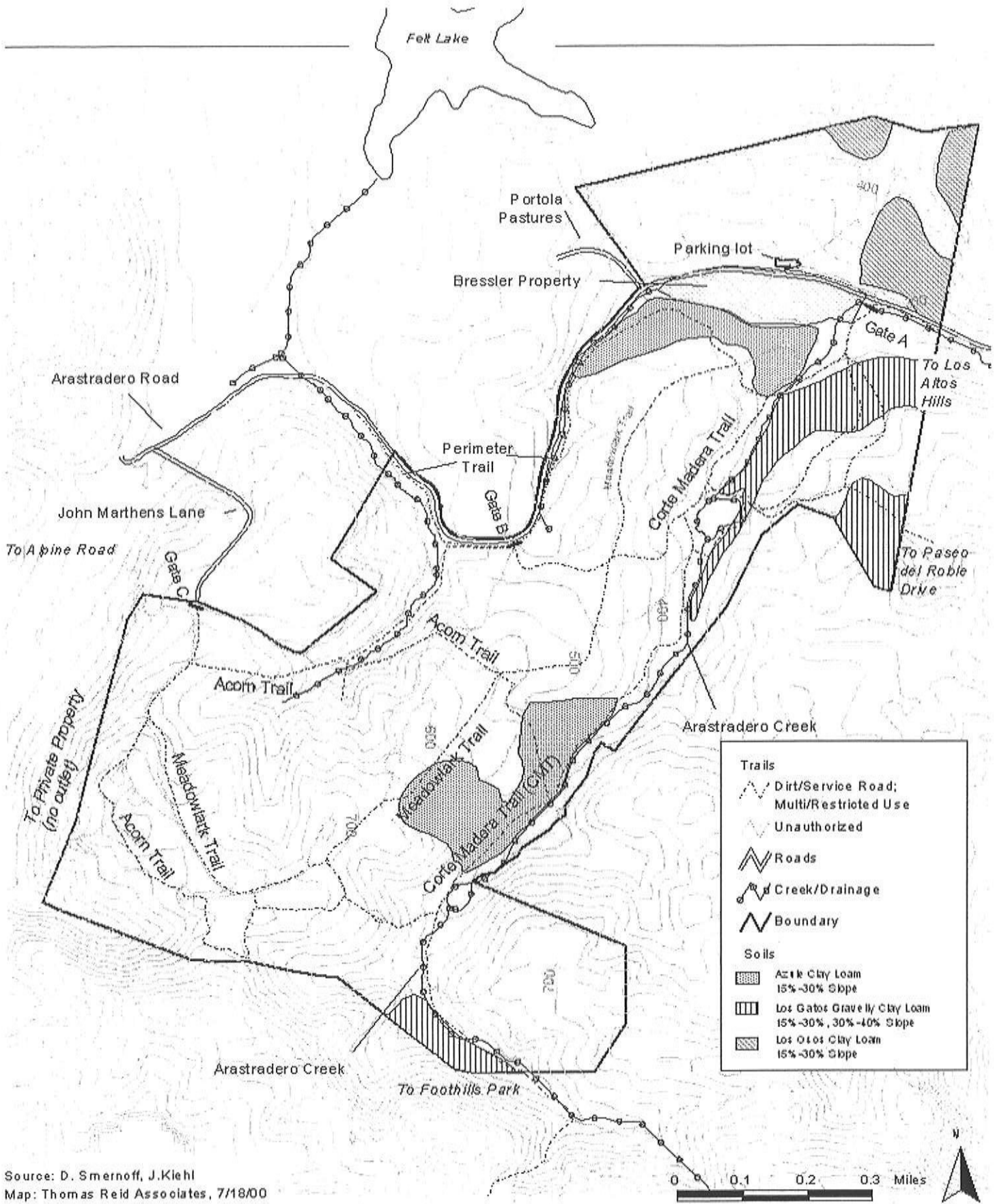
Physical Characteristics of the Trail

When determining the upper limit of the trail tread grade, the nature of the trail surface and the relative degree of traction it provides must be considered. Typically the more the trail runs perpendicular to the slope, the greater its potential to become eroded. Ideally, trails should be developed with gently rolling curves that fit into the contours of the land. This type of trail design will provide opportunities to drain water off the trail so that erosion does not become a problem. Where long stretches of a given grade cannot be avoided, then these trails should be broken into shorter segments with water bars or water dips to inhibit water gaining speed and causing gullying over a long downhill course. While suitable maximum gradients will vary based on the conditions described above, trails developed on most soils will begin to be susceptible to erosion where the gradient exceeds 10-12%. On the other hand, trails should not be developed with zero grades as this can cause water to pond within the trail bed. This condition can create saturated soils and breakdown of the trail surface as people leave the trail to avoid the wet areas.

Seasonal factors can also be key in determining whether a trail slope is excessive. For example, a clay trail that may resist erosion and be firm, stable and easy to travel when dry, can become erosive and difficult to travel when wet. Therefore, it may be best to limit use of trails located in areas with heavy clay soils to the dry season.

Trail Use

As a general rule, trails should not be steeper than 10% (10 foot rise in 100 linear feet). Grades of 1 to 7% are ideal for the **High Maintenance Trails** that are to be defined as “accessible”. The grade should undulate gently to provide natural



SOILS/ SLOPE SENSITIVITY

MAP 8

drainage and to eliminate monotonous, level stretches and long, steep grades that promote excessive speeds and increase the potential for user conflicts.

For **Moderate Maintenance Trails**, that are designed for use by moderate to highly skilled users with little to no mobility constraints, a trail may be defined as steep when the tread of the trail is greater than 15% and switchbacks or steps become necessary to improve safety. Once a trail grade reaches this angle, trail use conflicts can become more common on downhill stretches where bicycles are likely to increase their speed and potentially skid out of control. On uphill grades trails exceeding 15%, the casual or inexperienced bicyclist may need to dismount and push their bikes.

Trail routes are to be closed or rerouted to protect resources where use of an alignment is resulting in degradation of slopes, and causing excessive erosion and/or impacts to habitat or water quality,.

Aesthetics

The natural setting of the Preserve is one of the primary reasons why people use the trail system. The sights, smells, sounds textures which stimulate the mind, senses and spirit are all related to the overall aesthetics of the Preserve. Views from the trail, as well as the visual impacts a trail creates on the land should be considered when siting a trail. Trail construction and maintenance should also take into consideration the visitor's perception of the Preserve. A well-constructed and maintained trail will:

- Encourage the visitor to stay on the trail
- Provide the trail user with a pleasant and memorable experience
- Minimize adverse physical impacts on the Preserve's resources

Cultural, Archaeological and Paleontological Resources

There are no known archaeological and paleontological resources or geological features at the Preserve, and no impact to these resources is anticipated. However, according to the Palo Alto Comprehensive Plan, Arastradero Preserve contains two areas that have moderate sensitive as archaeological resources. These are the riparian zones along Arastradero Creek and the tributary to Los Trancos Creek. Therefore, construction activities should be conducted with an awareness of the potential for archaeological and paleontological resources or geological features at the Preserve. If evidence of an archaeological and paleontological resource is uncovered during trail construction or restoration activities, work on the trail shall stop and the area shall be temporarily fenced off. The City shall contact the Coroner's office for evaluation of the situation and advice on further measures.

5.4 Tiered Approach Trail Management

Based on the findings from this analysis of desired trail uses and potential environmental opportunities and constraints a program of maintenance guidelines and work priorities has been developed for the Preserve. This maintenance program calls for a three-tiered approach to trail development, realignment, maintenance and environmental trail closure and site restoration. Map 9 shows the proposed trail system, which has been divided into **High Maintenance Trails** and **Moderate Maintenance Trails**.

High Maintenance Trails

These trails are to be maintained to the highest trail construction and maintenance standards to accommodate year-round use. They will provide direct access from the parking lot and proposed future gateway facility into the Preserve. Typically these trails will offer opportunities to “loop” through the Preserve and return to the parking area and or provide links to neighboring communities and regional trail systems. A portion of the high maintenance trail network will incorporate maintenance access trails that are used by the City Utility Department to maintain the utility infrastructure located within the Preserve.

High Maintenance Trails will form the “all-weather” core system in the Preserve. They will include the regional Juan Bautista de Anza National Historic Trail and connections to the local communities of the Town of Los Altos Hills, the Town of Portola Valley and potentially to the Stanford lands and Foothills Park. These trails will be regularly maintained to the highest standard for the highest volume of use for people with the lowest skill and experience levels and will be oriented towards meeting accessibility standards for families with young children, seniors and individuals with special needs.

Moderate Maintenance Trails

These trails are to be maintained to accommodate seasonal use. These trails will be maintained for moderate volumes of use for people with trail experience seeking a “remote” or “challenging” experience. These trails will form a secondary loop to the High Maintenance Trails. The moderate maintenance program is oriented towards balancing recreation use with resource preservation and enhancement. Maintenance priorities are focused on repairing unsafe conditions and mitigating potentially degrading environmental impacts. Inspections to detect these problems should be conducted on an annual basis at a minimum.

Trail Routes that are to be Rerouted or Closed to Protect Resources

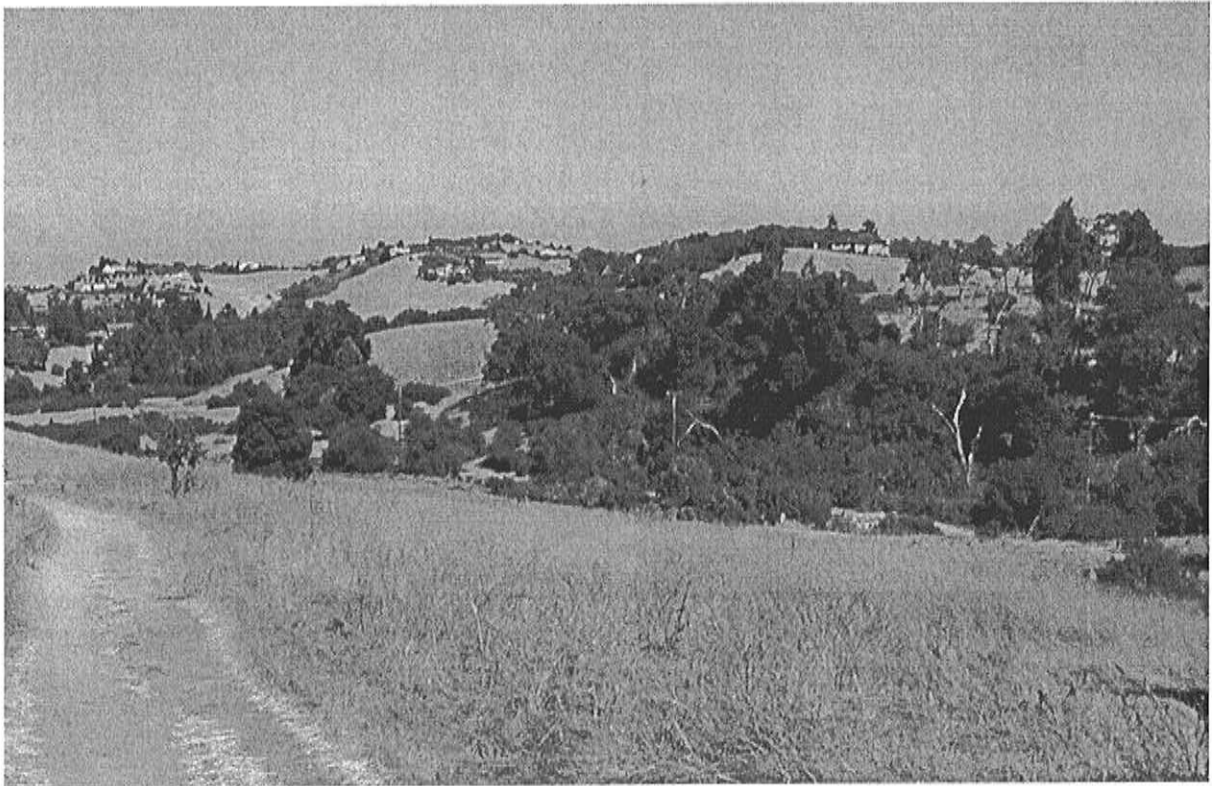
These are trail alignments that have been found to:

- Pass through sensitive biotic resource areas

- Be causing damage to the resources due to deficient design or construction techniques
- Parallel another route offering similar experiences

These trails are to be closed by repairing environmental degradation and restoring the site to a condition that reflects the natural, native habitat of the immediate area. Where appropriate, a new alignment has been proposed as a High or Moderate Maintenance Trail in an environmentally superior location. The purpose of these new routes is to provide enhanced recreation experiences, while minimizing impacts on sensitive resources over the long term, thereby reducing maintenance requirements. Refer to Map 11 (Section 6) for trail routes that are to be closed or rerouted to protect resources.

6. The Trail Maintenance Program



6. The Trail Maintenance Program

6.1 Trail Maintenance Defined

Trail maintenance is the process of keeping a trail at or near its original constructed or intended design standard. It includes all work required to correct any damage or disturbance to the trail and to adjacent vegetation and slopes.

To elaborate, this trail maintenance program includes guidelines for the following tasks:

- Keeping trail structures such as bridges safe for travel
- Adequately maintaining the trail tread surface to provide a walking or riding surface free from obstacles or hazards
- Building and maintaining drainage facilities to prevent loss from erosion
- Clearing and brushing adjacent to the trail to define and protect the established tread

The function of this section of the handbook is to identify a variety of structures and techniques that can be employed to design and maintain a trail system that fits the specific circumstances of this Preserve. This trail system is to be developed for use by a wide range of people participating in different activities at varying skill levels with minimum adverse impact on the environment impacts. This site specific, resource oriented, trail maintenance program is intended to correct current trail deficiencies and to route the trails around areas with biotic and soil constraints to minimize impacts to sensitive resources.

6.2 The Trail Maintenance System

Using the Trail Use and Management Evaluation Criteria described in Section 5, the Preserve trail maintenance system has been divided into three tiers, "***High Maintenance Trails***", "***Moderate Maintenance Trails***" and "***Trail Routes that are to be Rerouted or Closed to Protect Resources***". The overall objectives in developing this tiered approach to trail maintenance is to provide for:

- Visitor safety
- Resource Protection
- Public access

High Maintenance Trails

Level of Service

These trails are to be maintained to the highest trail construction and maintenance standards to accommodate year-round use. Maintenance priorities will focus on:

- Repairing unsafe or unpleasant experience conditions
- Removing any barriers to access
- Maintaining the trail system to accommodate the highest volumes of use and the lowest skill levels including families, seniors and individuals with special needs.

Inspections to detect maintenance problems should be performed on a routine basis in the Spring and Fall months. When unsafe conditions are identified they should be corrected immediately or the trail section should be barricaded from use until the trail can be made safe for public access.

- While the focus will be on providing year-round use, these High Maintenance Trails may be closed to protect the public and the resources under the following conditions:
 - Up to 72 hours after heavy winter storms where wet soils could result in damaging the integrity of the trail bed
 - During sensitive nesting or foraging periods for wildlife
 - When there is a threat to public safety

Trail Tread Widths and Surface Materials

The High Maintenance Recreation Trail tread will generally be 4 feet wide. Exceptions will include the regional Juan Bautista de Anza National Historic Trail, which will be 6 feet wide. Connections to the local communities of the Town of Los Altos Hills, the Town of Portola Valley and Stanford lands will also typically be 6 feet wide. The existing maintenance access routes that are used by the City Utility Department will also form a part of the High Maintenance Trail system. These existing maintenance access routes will be maintained with a 10-foot wide trail tread.

The trail tread surface (refer to Figure 4 to reference trail terminology) will typically be composed of cleared, compacted native material where a firm, stable surface can be sufficiently maintained to accommodate a wheelchair. Where native materials may limit use, trail hardeners may be incorporated to:

- Provide a firm surface
- Protect sensitive habitat
- Make an otherwise saturated trail useable during the winter months

Trail surface hardeners may include:

- Compacted aggregate base materials

- Polymers applied to harden base materials
- Paver blocks
- Puncheons
- Boardwalks

Refer to Section 7 for guidelines on trail tread construction techniques and Table 8-*Trail Surface Synopsis* for a summary of trail surfacing options.

Other techniques for improving the firmness and stability of the trail surface include a variety of drainage techniques and structures that are discussed in Section 7 under “Grading and Drainage”.

Clearing and Brushing

The trail clearing limits for down logs and tree limbing should be 10 feet high and 3 feet wide on each side of the trail. (Refer to Section 7, Figure 16 for trail clearing and brushing limits). Trail brushing limits for shrubby and herbaceous plant species extending into the trail should be 10 feet high and 3 feet wide on each side of the trail. These plants should be cleared to ground level. Clearing widths should be directed to providing clear passage and providing an average sight line of 100-feet. Low growing and slow growing shrubs and ground cover less than two feet in height should be left undisturbed.

Moderate Maintenance Trails

Level of Service

These trails are to be maintained to accommodate seasonal use. They typically will be closed to trail use:

- During the winter season when trail use could damage the integrity of a saturated trail bed
- During sensitive nesting or breeding periods for wildlife.

Most seasonal closures will apply to all trail uses, including maintenance vehicles. However, the Meadowlark Trail between Access Gate C and the old Barn site will remain open for use by hikers and emergency vehicles year round. It will serve as a seasonal trail for routine maintenance, equestrians and bicyclists.

Refer to Maps 9 and 10 for the locations of the moderate maintenance trails.

Winter seasonal closure will be dependent on seasonal precipitation and will occur when the trail surface becomes saturated to the point that continued use could damage the integrity of the trail surface. The trail tread may be considered saturated when:

- Precipitation exceeds one inch of rainfall over a 24-hour period
- Standing water remains on the trail for twenty-four hours; and
- A ranger riding a mountain bicycle on the trail leaves a noticeable running indentation in the trail after the 24-hour "wait period".

Typically these conditions can be expected between November 1st and March 30th. In dry years this "wet season" may be shorter or there may be a long dry period where it may be appropriate to reopen trails for part of the winter.

Initially hours of patrol to inform users and enforce the seasonal closure policies may be increased during the "wet season", though the long-term hours for patrol should be reduced once trail users understand the seasonal use rules. Safety of the users should be improved because they will not be using trails that the ranger staff can not easily access to rescue injured trail users during the winter months. Long-term maintenance requirements should be reduced because use will be limited on a portion of the trail system during the wet winter season and the level of maintenance on these seasonal trails will be limited to accommodating use in the dry season. In addition, as with the High Maintenance trails, all or any part of the Preserve may be temporarily closed when there is a threat to public safety.

Moderate Level Maintenance tasks will be oriented towards maintaining the trail for the dry season. Emphasis will be placed on repairing unsafe conditions and mitigating potentially degrading environmental impacts. Trails will be maintained for moderate volumes of use by moderate and highly skilled trail users with no mobility limitations. Inspections to detect problem areas on these trails should be conducted in the Spring, prior to seasonal opening, to identify any unsafe conditions. Unsafe conditions should be corrected or the trail section barricaded from use until the trail can be made safe for public access. Additional maintenance will be required in the fall to prepare these trails for winter closure. Tasks will typically include installation of water bars and monitoring trail tread to determine when trail closure bollards/signs should be put in place.

Trail Tread Widths and Surface Materials

Moderate Maintenance Trail tread will typically be 4 feet wide and the trail tread surface will be composed of cleared, compacted native material. This surface may be augmented by employing occasional trail surface treatments or drainage structures where needed to protect sensitive habitat. As long sections of these trail routes pass through sensitive habitat or saturated or erosive soils, these trails will be closed on a seasonal basis.

Moderate Maintenance trail clearing limits for down logs and tree limbing should be 10 feet high and 3 feet wide on each side of the trail. Trail brushing limits for shrubby and herbaceous plant species extending into the trail should be 10 feet high and 2 feet wide on each side of the trail. These plants should be cleared to ground level. Clearing widths should be directed to providing clear passage and providing an average sight line of 100-feet. Low growing and slow growing shrubs and ground cover less than two feet in height should be left undisturbed. Refer to Section 7, Figure 16 for trail clearing and brushing limits.

Trail Routes that are to be Closed or Rerouted to Protect Resources

Many of the trails within the Preserve have evolved informally through usage. Few of the trails have been designed and constructed to any specific standard. As a result some of the existing trails have deficiencies that are potentially hazardous and/or are adversely impacting the environment. These deficient trail alignments are to be closed by repairing environmental degradation and restoring the site to a condition that reflects suitable native habitat for the immediate area. Closures may be temporary or permanent depending on the severity of the condition.

Temporary Trail Closures

Trails are to be temporarily closed when conditions become unsafe or environmental resources are in danger of becoming severely impacted. Notice of trail closures should be posted on the parking lot display board, at the trail entrances and posted on the City of Palo Alto Arastradero Internet Web page. Notices should be as detailed as possible and include information regarding the reason and duration of closure. The notice should also include a number to call for more information. Entrances should be barricaded where feasible and appropriate.

Conditions which may warranted temporary trail closure include:

- Closure of Moderate maintenance trails during the wet winter months
- Construction (and “settling period”) of new trail sections
- High fire hazard in the immediate area
- Major seasonal repairs to existing segments
- Seasonal periods critical to special status species
- Hazardous conditions (e.g. landslide, washout, gully erosion, flooding, extremely wet weather)
- Special use events
- Overuse which threatens natural resources

Permanent Trail Closures

Trails are to be permanently closed when continued use of a trail alignment is

unwarranted because the trail does not meet the objectives of the trail management program and/or corrective actions would be too expensive.

Conditions warranting permanent closures (and in some cases rerouting of trails) include situations where:

- There are particularly sensitive resources, which require either avoidance or special measures, and possibly environmental regulatory permits for trail construction, modification, or maintenance
- Shortcuts and informal trails are causing damage to vegetation, soil erosion, and creating drainage problems
- Gullies and ruts may be so severe and deep that filling them with native soils is impractical
- There are parallel trails located immediately adjacent to one another that are providing the same experience and providing access to the same destination
- There is a documented history of accidents or serious conflicts that cannot be corrected through design or regulation

In areas where an existing trail is being relocated or abandoned, the existing trail should be obliterated and restored to as natural a condition as possible. This will avoid:

- Confusions as to which trail to use
- Eliminate sources of erosion
- Restore the site to provide a more natural appearance
- Help to eliminate short cutting

Refer to Map 11 for Trail Routes to Be Closed or Rerouted.

6.3 Assessment of Trail Routes

Understanding that there is a limited amount of money and labor for trail work, that work should be directed toward the factors that have the potential to be the most hazardous to the public and are causing the most damage.

Safety and Structural Integrity of the Trail System

Trail work should be divided into those tasks, which are essential and non-essential in maintaining the integrity of the trail system. Essential tasks are those, which provide for visitor safety, protect the resource and protect the structural integrity of the trail investment. Essential tasks include correcting damage to a trail structure that could fester over time, ultimately resulting in potential loss of the trail. Non-essential tasks are those which are directed solely toward visitor convenience. For example, neglect of drainage maintenance can develop into a situation where a trail system could literally be washed away. On the other hand, a trail that receives no clearing or

brushing could grow over to a point of physical closure with little resource or safety problems.

Developing and Maintaining a Field Log

All trail and trail structures/features should be inspected at least once a year at the close of the winter “wet season”. These inspections will help identify public safety and resource management problems, as well as routine maintenance needs. This process involves hiking each trail and noting the general condition of the trail bed and tread surface, as well as every structure (e.g. bridges, puncheon, safety rails, drain dips). Deficiencies should be noted and recorded into a field log. Once identified, these problems can be scheduled for correction through the annual maintenance program. Table 2 – *Sample Maintenance Log* provides a sample maintenance log for recording maintenance inspections, categorizing needed repairs and identifying completed tasks.

Annual Trail Maintenance

Ideally drainage maintenance, tread maintenance and vegetative clearing and brushing are considered as annual trail maintenance tasks and are performed as a unit. Table 3 – *Calendar of Maintenance Activities* provides a summary breakdown of routine tasks and timing for performing these work activities.

Cyclic Trail Replacement Projects

Construction, reconstruction, rehabilitation and restoration are considered facility trail maintenance projects and are performed on a project basis. These cyclic replacement projects are contingent on normal wear-out life spans. Storm damage, vandalism, and other uncontrollable acts can greatly reduce replacement times. An example of a facility maintenance project would be the repair of the drainage channel and surfacing of the maintenance access trail that parallels Arastradero Creek. Periodic trail inspections will keep staff abreast of current trail conditions.

Proposed Trail Upgrade and Restoration Projects

Many of the existing trails within the Preserve do not meet the guidelines shown in this handbook. This handbook provides recommendations for upgrading the existing and developing proposed High and Moderate Maintenance trails. It also identifies restoration projects for the trails that are to be abandoned and permanently eliminated from the Preserve Trail system. *Map 10 Implementation Program - High Maintenance Trails and Moderate Maintenance Trails* shows the High Maintenance and Moderate Trail Routes identified by trail segments. *Map 11 Implementation Program - Trail Routes that are to be Closed or Rerouted to Protect Resources*

Table 2 Trail Maintenance Log -Sample

Date _____

Inspectors _____

Trail Segment _____

Daily/Weekly Inspections

Winter Inspection

Spring Inspection

Summer Inspection

Fall Inspection

This list is only to serve as a guide in reporting use violations, safety hazards, and accidents, damaged or missing trail features in an expeditious manner. Look for other conditions. Mark as noted below. Where hazardous conditions are found close and sign that trail section and report hazard and determine appropriate remedial action (e.g. repair condition, apply for emergency funds to repair condition, close trail segment for season until funds can be allocated in capital budget or volunteer work efforts can be organized)

() Satisfactory (U) Unsatisfactory (X) Immediate Attention Needed (M) Monitor Condition

1. TRAIL STAGING/ACCESS A. Traffic Control ___ 1. Signs ___ 2. Sight Lines Cleared ___ 3. Crosswalk striping B. Barriers ___ 1. Fences ___ 2. Seasonal Bollards ___ 3. Maintenance Gates	3. SUPPORT FACILITIES A. Water Supply ___ 1. Potable water/drinking fountain ___ 2. Non-potable water animal water troughs) ___ B. Portable Toilets ___ C. Benches, bike racks ___ D. Litter	___ 2. Tread damage from seasonal wash outs ___ 3. High C. Visitor Interface ___ 1. Citation Issued ___ 2. Accident assistance ___ 3. Education/Outreach	___ 2. Moderate ___ 3. High C. Visitor Interface ___ 1. Citation Issued ___ 2. Accident assistance ___ 3. Education/Outreach
2. VEGETATION ENHANCEMENT A. Replacement Trees/shrubs B. Staking cages C. Weed abatement	4. TRAIL SEGMENTS A. Clearance ___ 1. Sight Lines Maintained ___ 2. 10' Overhead clearance B. Surface ___ 1. Tread free of fallen limbs, trees, debris	5. TRAIL USE A. Type of Use ___ 1. Hiking/Running ___ 2. Equestrians ___ 3. Dogs ___ 4. Biking ___ 5. Wheelchairs B. Level of Use ___ 1. Low	6. REVIEW OF PREVIOUS TRIL MANAMGMENT PROVISIONS A. Trail/Staging Condition ___ 1. Satisfactory ___ 2. Unsatisfactory B. Previous Deficiencies ___ 1. Outstanding ___ 2. Have been repaired

Items Requiring Attention

Condition or Problem	Recommendations to Correct Problem	Estimated Cost	Problem Corrected By	Date	Initials

Table 3 Calendar of Trail Maintenance Activities

Months	Activities
Daily – All Months of the Year	<input type="checkbox"/> Empty trash cans & collect litter <input type="checkbox"/> Graffiti removal (within 2 days of occurrence)
All Months of the Year as Needed for Hazard Abatement & User Safety	<input type="checkbox"/> Update Information Panel at parking lot <input type="checkbox"/> Monitor unauthorized encroachments <input type="checkbox"/> Remove fallen trees, limbs & debris <input type="checkbox"/> Repair/replace signs <input type="checkbox"/> Conduct inspections & repair facilities (benches, bridges, etc)
January, February, March, October, November, December	<input type="checkbox"/> Post “storm damage signs” as needed <input type="checkbox"/> Monitor & install “seasonal closure” bollards as appropriate (Nov.- Mar.) <input type="checkbox"/> Remove “Fire danger signs” at end of fire season <input type="checkbox"/> Perform mid-winter culvert, water bar, & drain check on all-weather trails
February, March	<input type="checkbox"/> Assess storm damage & erosion damage <input type="checkbox"/> Erosion mitigation work <input type="checkbox"/> Habitat Enhancement – native plant seeding/planting <input type="checkbox"/> Weed Abatement – non-native control*
April, May	<input type="checkbox"/> Clean, inspect & repair culverts, drains & water dips & water bars <input type="checkbox"/> Perform drainage & ditch work <input type="checkbox"/> Perform storm damage, & erosion repairs <input type="checkbox"/> Remove “storm damage signs” <input type="checkbox"/> Remove “seasonal closure” bollards as appropriate <input type="checkbox"/> Repair/replace fences & gates <input type="checkbox"/> Remove Poison Oak <input type="checkbox"/> Weed Abatement – non-native control & fire hazard reduction*
May, June, July	<input type="checkbox"/> Perform storm damage & erosion repairs <input type="checkbox"/> Repair washouts & damaged trail tread <input type="checkbox"/> Brush & prune trail to provide clearance & improve sight- lines* <input type="checkbox"/> Post “No fireworks” signs (June) <input type="checkbox"/> Post and monitor “Fire danger signs” <input type="checkbox"/> Remove “No fireworks” signs (July) <input type="checkbox"/> Mow “emergency fire roads” & disk fire breaks
July, August	<input type="checkbox"/> Repair damage to “hardened” trail tread <input type="checkbox"/> Perform routine maintenance on native soil trail tread
August, September, October	<input type="checkbox"/> Monitor “Fire danger signs” <input type="checkbox"/> Repair/replace fences & gates <input type="checkbox"/> Install/repair seasonal water bars to prepare for winter (mid-Sept- Oct) <input type="checkbox"/> Clean, inspect & repair culverts, drains & water bars (mid-Sept-mid Oct) <input type="checkbox"/> Perform drainage & ditch work to prepare for winter (mid-Sept-mid Oct) <input type="checkbox"/> Habitat Enhancement – native plant seeding/planting (October)

* Weed abatement and pruning activities must not occur in known or potential locations of rare plant or animal species except under the direction of the Open Space Superintendent

shows those existing trails that are recommended for abandonment. These sites are to be restored to blend with the surrounding area. The implementation program provided below in Section 6.4 Trail Upgrade and Restoration Projects is correlated to Maps 4, 10 and 11. Providing recommendations for trail work on a segment by segment basis will allow staff to plan future trail maintenance projects, taking into account the differing types of maintenance tasks involved in upgrading the existing trail system.

6.4 Trail Implementation Programs by Tiered Classification

Overview

Generally the High Maintenance trail system, which is to be oriented toward year-round use, is located on the northern two-thirds of the Preserve closest to the parking lot. The back one-third of the Preserve will typically receive a Moderate Level of maintenance and most of the trails will be limited to seasonal use.

Following is a breakdown of each trail section and recommendations for trail construction, rerouting, maintenance and restoration work. This discussion of recommended trail improvement projects correlates to *Map 10 Implementation Program - High Maintenance Trails and Moderate Maintenance Trails* and *Table 4 - Trail Assessment - Summary of the Proposed Trail System*. Map 10 delineates the proposed trails plan (Refer to Map 9) in a series of workable trail segments. Table 4 – *Trail Assessment Summary* identifies the existing trail conditions for the proposed trail system according to the segments shown on Map 10.

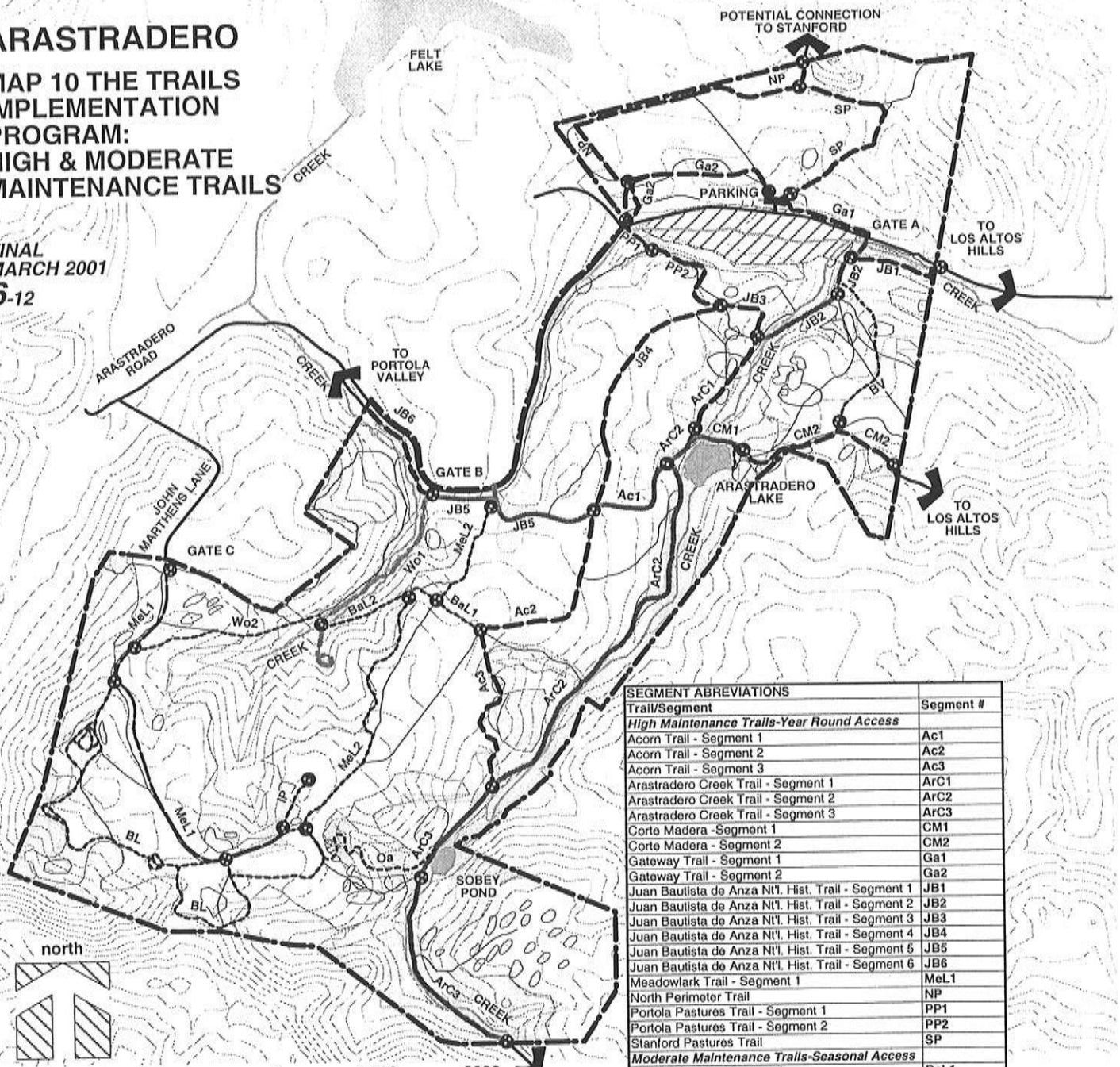
Table 5 - Trail Implementation Program -Recommended Capital Improvements, *Table 6 - Trail Implementation Program -Recommended Annual Maintenance Tasks* and *Table 7 - Trail Implementation Program - Recommended Cyclical Maintenance Improvements* provide summaries of recommended actions. These tables are provided at the end of this section. *Map 11 - Implementation Program - Trail Routes that are to be Closed or Rerouted to Protect Resources* identifies those trails are proposed to be closed and the sites restored to reflect the adjacent conditions. Descriptions of recommended actions for each segment are then linked to Section 7. Section 7 provides figures and text describing management guidelines and construction techniques for a variety of trail conditions.

The maintenance program provided in this section is not all inclusive of every construction, rerouting, maintenance and restoration task that may be required for every trail in the Preserve. However, it does provide prototype solutions for a wide variety of trail conditions. These solutions can then be applied, as appropriate, to

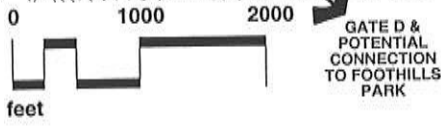
ARASTRADERO

MAP 10 THE TRAILS IMPLEMENTATION PROGRAM: HIGH & MODERATE MAINTENANCE TRAILS

FINAL
MARCH 2001
6-12



SEGMENT ABBREVIATIONS	
Trail/Segment	Segment #
High Maintenance Trails-Year Round Access	
Acorn Trail - Segment 1	Ac1
Acorn Trail - Segment 2	Ac2
Acorn Trail - Segment 3	Ac3
Arastradero Creek Trail - Segment 1	ArC1
Arastradero Creek Trail - Segment 2	ArC2
Arastradero Creek Trail - Segment 3	ArC3
Corte Madera - Segment 1	CM1
Corte Madera - Segment 2	CM2
Gateway Trail - Segment 1	Ga1
Gateway Trail - Segment 2	Ga2
Juan Bautista de Anza N'l. Hist. Trail - Segment 1	JB1
Juan Bautista de Anza N'l. Hist. Trail - Segment 2	JB2
Juan Bautista de Anza N'l. Hist. Trail - Segment 3	JB3
Juan Bautista de Anza N'l. Hist. Trail - Segment 4	JB4
Juan Bautista de Anza N'l. Hist. Trail - Segment 5	JB5
Juan Bautista de Anza N'l. Hist. Trail - Segment 6	JB6
Meadowlark Trail - Segment 1	MeL1
North Perimeter Trail	NP
Portola Pastures Trail - Segment 1	PP1
Portola Pastures Trail - Segment 2	PP2
Stanford Pastures Trail	SP
Moderate Maintenance Trails-Seasonal Access	
Bay Leaf Trail - Segment 1	BaL1
Bay Leaf Trail - Segment 2	BaL2
Bay View Trail	BV
Bowl Loop Trail	BL
Inspiration Point	IP
Meadowlark Trail - Segment 2	MeL2
Oak Trail	Oa
Woodland Trail - Segment 1	Wo1
Woodland Trail - Segment 2	Wo2



Amphion

LEGEND

- | | | | |
|--|--|--|--|
| | MAINTENANCE ACCESS TRAIL - YEAR ROUND RECREATION & MAINTENANCE ACCESS (HIGH LEVEL MAINTENANCE 10' WIDE) | | BOUNDARY LINES |
| | MAINTENANCE ACCESS TRAIL - WINTER RECREATION ACCESS FOR HIKERS ONLY (HIGH LEVEL MAINTENANCE 10' WIDE) (MeL1) | | CREEK/ DRAINAGE |
| | RECREATION TRAIL - YEAR ROUND ACCESS (HIGH LEVEL MAINTENANCE 4'-6' WIDE) | | CONTOUR LINES |
| | RECREATION TRAIL - SEASONAL ACCESS (MODERATE LEVEL MAINTENANCE 4' WIDE) | | ROAD |
| | MAINTENANCE ACCESS TRAIL - MAINTENANCE ACCESS YEAR ROUND ACCESS & SEASONAL RECREATION USE (Wo1) | | PRIVATE PROPERTY |
| | TRAILS TO BE ABANDONED & RESTORED TO PROTECT RESOURCES (SEE MAP #11) | | HIGH, MODERATE, LOW ENVIRONMENTAL CONSTRAINTS (SEE MAPS 5,6 & 7) |
| | SEGMENT END | | |

Table 4 Trail Assessment - Summary of the Proposed Trail System

Trail Segment	Segment #	Description	Trail Length	Ex. Trail Width	Ex. Trail Accessibility/ Difficulty			Trail Deficiency			Ex. Environmental Constraints
					Surface Stability	Barriers to Access	Max. Grade/ Length	Entrenched/ Eroded	Drainage	Poor Sight Lines	
High Maintenance Trails											
Acorn Trail - Segment 1	Ac1	Arastradero Creek Trail to Juan Bautista de Anza Trail	954 LF	10' +/-	Compacted aggregate, loose gravels - unstable surface	Steep section of trail	> 15%	■	■		
Acorn Trail - Segment 2	Ac2	Juan Bautista de Anza Trail to Bay Leaf Trail	1666 LF	Greater than 4 Ft.	Native Soil			■	■		
Acorn Trail - Segment 3	Ac3	Bay Leaf Trail to Arastradero Creek Trail	1512 LF	4 ft	native soil, loose material across culverts	Narrow width			■		Serpentine soils
Arastradero Creek Trail - Segment 1	ArC1	Juan Bautista de Anza Trail to Arastradero Creek Trail - Segment 2	1072 LF	4' +/-	Native Soil & concrete pavers	Uneven, width surface, Steep section of trail	> 12% (portion)				Wet soils & Serpentine soils
Arastradero Creek Trail - Segment 2	ArC2	Arastradero Creek Trail - Segment 1 (at Lake) to South Terminus of Acorn Trail	3607 LF	10' +/-	Compacted engineered aggregate base	Steep section of trail	1 short section >12%	■	■		Riparian habitat
Arastradero Creek Trail - Segment 3	ArC3	South Terminus of Acorn Trail to Foothills Park Boundary	2797 LF	10' +/-	Compacted engineered aggregate base	Trail subject to flooding		■	■		Riparian habitat
Corte Madre Trail - Segment 1	CM1	Arastradero Creek Trail @ Arastradero Lake across bridge & top of Dam & to Corte Madera 2	405 LF	10' +/-	compacted engineered fill						

Table 4 Trail Assessment - Summary of the Proposed Trail System (continued)

Trail Segment	Segment #	Description	Trail Length	Ex. Trail Width	Ex. Trail Accessibility/ Difficulty			Trail Deficiency			Ex. Environmental Constraints
					Surface Stability	Barriers to Access	Max. Grade/ Length	Entrrenched/ Eroded	Drainage	Poor Sight Lines	
Corte Madre Trail - Segment 2	CM2	East Preserve Perimeter Boundary to Arastradero Lake	1724 LF	10' +/-	deteriorated asphalt road		>15%				
Gateway Trail - Segment 1	Ga1	Parking Lot to Gate A	985 LF	6' +/-	native soil, uneven surface along trail	uneven surface at road edge, log barriers	9%		■ at Arastradero Rd.		Safety of Arastradero Rd.
Gateway Trail - Segment 2	Ga2	Parking Lot to Arastradero Road/Portola Pastures Access Road	1632 LF	NA, new trail construction to avoid wet soils	native soil	wet soils			■		Wetland area
Juan Bautista de Anza National Historic Trail - Segment 1	JB1	Arastradero Road to Gate A	752 LF	NA, new trail construction to avoid wet soils							Riparian & wetland areas & safety accessing Arastradero Rd.
Juan Bautista de Anza National Historic Trail - Segment 2	JB2	Gate A to Arastradero Creek Trail	1115 LF	10'-12'	Compacted native soil	Raised manholes in trail tread create a tipping hazard					
Juan Bautista de Anza National Historic Trail - Segment 3	JB3	Arastradero Creek Trail to jct. of Juan Bautista de Anza Trail - Seg. 4 & Portola Pastures Trail	540 LF	<4'	Wet, eroded native soils	Trail steep & narrow	> 15% near jct. with Arastradero Creek Trail		■		Wet & Serpentine soils

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 1666 linear feet

Recommended Maintenance/Development Program :

- Maintain trail to uniform width of 4 feet. Surface to be cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- Mow both trail shoulders between the Juan Bautista de Anza National Historic Trail Segment 5 and the Acorn Trail Segment 3 to provide an overall width of 10 feet to accommodate emergency vehicle access. Maintain a minimum cover of two inches to minimize potential erosion impacts.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Acorn Trail - Segment 3 (Ac3)

Description: Bay Leaf Trail Segment 1 to jct. of Arastradero Creek Trail Segments 2 and 3

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Compacted Native Soil, 4 feet wide

Trail Length: 1512 linear feet

Recommended Maintenance/Development Program :

- Monitor and evaluate structural integrity of trail tread after the first winter rains for potential erosion. Potential areas to be monitored include:

- Where trail cut slope is vertical and starting to sluff, the slope may need to be feathered back at a 2:1 minimum slope
- Fill sections of the trail where trail tread does not appear to have been compacted to 95%. If signs of sloughing appear, remove excess material and recompact tread surface to 95%.
- ☐ Correct drainage at junction of Arastradero Creek Trail so that Acorn Trail will drain into the drainage ditch that parallels Arastradero Creek Trail. This work should be done as part of the Arastradero Creek Trail utility maintenance access improvements.
- ☐ Remove existing tread overlaying both the culverts on this trail segment and replace with a sub-base of compacted aggregate and overlay with native soil. Compact sub-base and tread to 95%. Repair trail edging defining the trail tread over the culverts to eliminate tripping hazard and to provide a more finished look.
- ☐ After first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- ☐ Special vegetation management techniques may be required to control poison oak along this trail segment.

For guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage- Culverts
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Arastradero Creek Trail Segment 1 (ArC1)

Description: Juan Bautista de Anza Trail Segment 3 to jct. of Arastradero Creek Trail Segment 3 and Corte Madera Trail Segment 1

Proposed Trail Type: Recreation Trail, Year-round Use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Concrete Pavers with Aggregate sub-base, fill (in cells) and top dressing, 6 feet wide

Trail Length: 1072 linear feet

Recommended Maintenance/Development Program :

Southerly portion of trail segment shows indicators of soil creep, including clay soils, soil moisture and plant indicators for wet areas. Cross slope immediately adjacent to the trail is gentle enough that there is no clear evidence of current movement at this point. These physical soil characteristics create a need for on-going monitoring and

maintenance of this trail section, even though a high cost solution was provided for the trail tread.

- Retain concrete pavers on southern section of trail as a solution for wet soils, but perform corrective action to eliminate tripping hazard as follows:
 - Remove steel rebar ties where they are exposed and create a tripping hazard.
 - Annually overlay exposed sections of block with a compacted aggregate base rock top dressing. Refer to Table 8 - *Trail Surface Synopsis*.
 - Remove concrete pavers where uplifting is creating an uneven surface. Repair sub-base and relay pavers. Refill cells and replace top dressing with aggregate base rock. Compact to 95%.
- Narrow northerly portions of trail in serpentine area that has been widened by bicyclists riding on the upslope and define a uniform 6-foot wide tread in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques* and:
 - Provide drain dip in trail southerly of the eroded, serpentine area.
 - Install an erosion blanket up slope of the trail within the eroded area. Erosion control blanket should be of a variety that will not damage or inhibit the growth of the native grasses and serpentine plants that can be found in this area.
 - Place logs along inside edge of the trail tread at the base of the slope to deter further activity on the slope by mountain bicyclists.
- New trail construction. Reroute the trail near the junction of the Juan Bautista de Anza Trail Segment 3 to reduce trail steepness to lessen slope susceptibility to erosion and to improve accessibility. Flag new trail alignment as follows:
 - Survey the portion of the trail that will follow a new alignment for sensitive plant species before initiating construction following procedures in *Section 7.5 - Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*.
 - Route trail between the wooden bridge and the junction of the Juan Bautista de Anza Trail to minimize impacts to wetland and serpentine areas. Try to maintain a maximum gradient of 8% and a uniform trail width of 6 feet.
 - Once trail tread alignment and width have been delineated, harden the entire trail segment with a sub-base that includes filter fabric and concrete pavers. Fill cells and provide a top dressing of aggregate base rock. Define trail edge with bender board to contain base rock. Compact top dressing to 95%.
- Conduct a pre-construction biological survey for sensitive bird and animal

species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Act).

- Close and abandon the existing alignment located within the environmentally sensitive serpentine soils located between the Arastradero Creek Trail and the Portola Pastures Trail route in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route K*.
- Do not perform restorative work while any sensitive bird or animal species are nesting or breeding in a location where they could be directly impacted by the construction work.
- During trail construction in serpentine areas use appropriate dust control measures to prevent (unconfirmed) hazards of inhaling chrysotile asbestos fibers.
- After side slopes have been stabilized for one year, perform annual vegetative clearing and brushing to maintain a uniform 6-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5. Special care must be taken to avoid any impact to sensitive serpentine and wetland plants.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.2 Improving Access and Accessibility - Promoting Accessibility
- 7.3 Trail Tread Construction Techniques – Wet Soils
- 7.4 Grading and Drainage - Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Arastradero Creek Trail - Segment 2 (ArC2)

Description: North Terminus of Acorn Trail Segment 1 to South Terminus of Acorn Trail Segment 3

Proposed Trail Type: Maintenance Access Trail, Year-round Use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Compacted aggregate sub-base with hardened, “natural appearing” tread surface material, 10 feet wide

Trail Length: 3607 linear feet

Recommended Maintenance/Development Program:

- Coordinate with the Utility Department to ensure that existing trails within utility corridors are maintained for year-round use by:
 - Surfacing the compacted aggregate sub-base with hardened “natural appearing” tread surface material that will improve the firmness and stability of the surface. Any hardening agents that are used on the Preserve shall be assessed for potential impacts to water quality, and no agent shall be used which could result in physical or reproductive harm to wildlife.
 - Correcting gullying by improving existing drainage structures along toe of slope/inside road edge by defining and lining the roadside ditch and installing culverts or drain dips to divert water from channel where gullying is occurring
 - Providing drain dips to dissipate water runoff from the adjacent drainage ditch. Where drain dips are used to cross the roadbed, compare the benefits and limitations of continuing with the designated trail hardening material versus paving with other materials to increase the life of these drainage structure (Refer to Table 8 – *Trail Surface Synopsis*).
 - Maintaining the existing vehicle turn-around at booster pump station. No additional grading or vegetation removal should be performed to enlarge this turn-around. Refer to Map 4 - *Fire Protection & Emergency & Maintenance Access – Turn-around Point 3*.
 - Providing a new vehicle turn-around in a hammerhead configuration near intersection of former Acorn Trail (now Route F, which is scheduled for closure) to accommodate Type 3 and 4 emergency fire vehicles. The turn around area should be defined using the following: grading a level area and landscaping. Such vegetation should consist of native species, similar to nearby, existing vegetation and should be placed in a natural configuration to prevent the vegetation from creating an unsafe condition or adverse visual impact. The final siting of the turn around should be completed under the advisement of the Open Space Superintendent. Refer to Map 4 - *Fire Protection & Emergency & Maintenance Access – Turn-around Point 5*.
 - Retaining existing wood rail fence along creekside of trail edge on the steep slope to keep vehicles from widening the trail in this section.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.2 Improving Access and Accessibility - Accommodating Utility Vehicles

Arastradero Creek Trail - Segment 3 (ArC3)

Description: South Terminus of Acorn Trail to Foothills Park Boundary (Gate D)

Proposed Trail Type: Maintenance Access Trail, Year-round maintenance and hiking access, Seasonal biking and equestrian use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Compacted aggregate sub-base with hardened “natural appearing” tread surface material and concrete drainage crossings, 10 feet wide

Trail Length: 2797 linear feet

Recommended Maintenance/Development Program :

- Coordinate with the Utility Department to ensure that existing trails within utility corridors are maintained for year-round use. To ensure that maintenance along this trail is done under the guidance or with recommendations from professional field biologist. Anticipated trail maintenance activities for this trail segment include:
 - Surfacing the compacted aggregate sub-base with hardened “natural appearing” tread surface material that will improve the firmness and stability of the surface. Any hardening agents that are used on the Preserve shall be assessed for potential impacts to water quality, and no agent shall be used which could result in physical or reproductive harm to wildlife.
 - Correcting gulying by improving existing drainage structures along toe of slope/inside road edge by defining and lining the roadside ditch and installing culverts or drain dips to divert water from channel where gulying is occurring
 - Correcting drainage in area of wet soils/seepage south of Acorn Trail Segment 3 by improving drainage ditch at the toe of the slope and culverting under the trail below the wet hillside area.
 - Providing drain dips to dissipate water runoff from the adjacent drainage ditch. Where drain dips are used to cross the roadbed, compare the benefits and limitations of continuing with the designated trail hardening material versus paving with other materials to increase the life of these drainage structure (Refer to Table 8 – *Trail Surface Synopsis*).
 - Raising the “wet” area adjacent to Sobey Pond one foot and surfacing the entire area with a trail surface hardener to increase the life of the roadbed and reduce siltation into the pond from the existing road (Refer to Table 8 – *Trail Surface Synopsis*).
- Locate an emergency/maintenance vehicle turn around in a hammerhead configuration at the existing gate on the east side of the trail. Move the gate back to accommodate Type 3 and 4 emergency fire vehicles. Improvements

to the turn-around area should be confined to the existing, flat graded pad. Minimize annual pruning to area necessary to provide for vehicle access. Refer to Map 4 - *Fire Protection & Emergency & Maintenance Access - Turn-around Point 6*.

- Beginning at junction of turn around and continuing south into Foothills Park, designate the utility trail as a one-way downhill for routine maintenance traffic.
- Due to the sensitive nature of this woodland trail alignment an annual biological survey for sensitive species should be performed during nesting season prior to: performing annual vegetative clearing **OR** the annual brushing and clearing should be completed between October 1 and March 14th. In either case, maintenance along this trail should be done according to the recommendations of a professional field biologist.
- Do not perform routine maintenance or open trail for public use if any sensitive species are found to be nesting or breeding in a location where they could be directly impacted by trail use.
- Perform annual vegetative clearing and brushing to maintain a uniform 10-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*, except as noted above.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.3 Improving Access and Accessibility - Accommodating Utility Vehicles
- 7.4 Grading and Drainage – Culverts, Drain Drips or Drainage Swales
- 7.5 Vegetation Management – Techniques for Maintaining a Clear Passageway

Corte Madera Trail - Segment 1(CM1)

Description: Arastradero Creek Trail jct. Segments 1 and 2 across the wooden bridge along the top of Dam to Corte Madera Trail Segment 2 on the east side of the Lake

Proposed Trail Type: Maintenance Access Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 10 feet wide, wooden bridge (existing)

Trail Length: 405 linear feet

Recommended Maintenance/Development Program:

- Scarify and reseed former trail alignment with appropriate native plants at junction of Arastradero Creek Trail extending from the west end of the dam to Arastradero Creek.
- Coordinate future improvements to the surface of the dam with the Public Works Department to ensure that the integrity of the dam is not altered.

- The Public Works Department should notify the Open Space Division Superintendent of any dam maintenance activities that could impact recreational use of the levee.
- Install interpretive signage and a 3-foot 6-inch high split rail fence along the northern perimeter of Arastradero Lake. The purpose of this fence and the signs is to educate the public about the importance of this lake habitat, the possible presence of sensitive species, and to discourage dogs using the lake.
- Provide an alternative drinking source for dogs to discourage dogs from using the lake.
- Install a new bench under the existing tree along the northeast edge of the lake. Integrate the placement of the bench with the natural setting where a view of the lake can be provided. Set the bench back from the trail tread two feet to accommodate leg space and prevent conflicts with passing trail users. Provide a clear, graded space adjacent to the bench large enough to accommodate a bike, wheelchair or stroller.
- Following seismic events inspect the bridge to make sure that there has been no damage. If damage has occurred close bridge until repairs can be made in order to protect public safety.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.2 Improving Access and Accessibility - Accommodating Utility Vehicles
- 7.5 Vegetation Management - Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments
- 7.6 Trail Signing & Mapping

Corte Madera Trail - Segment 2(CM2)

Description: East Preserve Perimeter Boundary to Arastradero Lake

Proposed Trail Type: Recreation Trail (& mowed emergency fire access), Year-round Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 6 feet wide

Trail Length: 1724 linear feet

Recommended Maintenance/Development Program :

- Survey trail alignment for sensitive species before initiating reconstructive work.
- Remove remnants of existing asphalt or chip seal paving.
- Regrade trail alignment to narrow trail tread to a uniform width of 6 feet.
- Create a 6-foot wide tread by clearing and compacting the native soil tread to 95%.

- Provide a barrier free, non-vehicular entry with a minimum width of 5 feet at the Preserve boundary.
- Install identity signage at Preserve boundary.
- Scarify and seed surplus width of former alignment with native grasses.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- One year after the trail tread and grasses have been established:
 - Mow both trail shoulders to provide an overall width of 10 feet to accommodate emergency vehicles. Maintain a minimum cover of 2 inches to minimize potential erosion impacts
 - Mow the area at junction with Bay View Trail to provide room for Type 3 and 4 emergency vehicles to perform a hammer head vehicle turn around following procedures outlined in Section 7.2. Maintain a minimum cover of 2 inches to minimize potential erosion impacts. Refer to *Map 4 Fire Protection & Emergency & Maintenance Access - Turn Around Point 4*.
- After the first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.2 Improving Access and Accessibility- Accommodating Utility Vehicles
- 7.3 Trail Tread Construction Techniques - Multiple Parallel Trails/Overwide Trails
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Gateway Trail - Segment 1 (Ga1)

Description: Parking Lot to Gate A

Proposed Trail Type: Recreation Trail, Year-round Use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Compacted Native Soil, 6 feet wide & Road Crossing

Trail Length: 995 linear feet

Recommended Maintenance/Development Program:

- Improve existing drainage patterns between parking lot and Arastradero Road to repair existing rilling (small cut in the soil surface caused by runoff) by:
 - Installing a diversion ditch on the north side of the trail
 - Placing a 15" culvert under the trail and extending drainage down to road
 - Connecting the trail drainage to the existing roadside drainage ditch.
- Improve accessibility between parking lot and Arastradero Road by:
 - Correcting the existing transitions between the paved edges along Arastradero Road and the trail so that these two surfaces are flush and mirror the trail width at a minimum
 - Reducing the existing longitudinal gradient to between 5% and 8%
 - Removing the existing bollard and narrowing and defining the trail entry point to 5 feet, reseeding disturbed areas and signing the entry to discourage unauthorized vehicular entry
 - Eliminating any physical obstructions greater than 2" in height along the primary route of travel
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- Maintain the existing trail crosswalk and improve the safety of the Arastradero Road trail crossing by following the guidelines in Section 7.2 - *Improving Access and Accessibility*, sub-sections - *Accessing the Preserve* and *Promoting Accessibility*, which include recommendations for:
 - Installing adequate directional, safety and regulatory definitions between trail and road system
 - Working with the City Transportation Division on additional crosswalk enhancements that will meet with City standards.
- Improve accessibility on south side of Arastradero Road by following the guidelines in Section 7.2 - *Improving Access and Accessibility*, sub-sections - *Promoting Accessibility* and *Accommodating Utility Vehicles*, which include recommendations for:
 - Regrading the transition between the road and the trail
 - Removing existing wood log barriers
 - Providing a 40 to 45 foot "driveway" between Arastradero Road and Access Gate A to allow a safe pull out for maintenance and emergency vehicles accessing the Preserve. Design of maintenance drive must take into account the existing 10-foot wide crossing over a concrete culvert. The culvert is located approximately 28 feet from the edge of pavement

- Consider surfacing the trail with a hardening solution to improve the firmness and stability of the surface if the soils limit year-round use. The hardener should have a natural appearance and no water quality impacts. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
 - Provide identity signage noting this entry as "Gate A " to expedite emergency response.
- Provide signage that clearly identifies the Preserve and designates the Preserve trail system as a shared use facility that welcomes pedestrians, equestrians, bicyclists and dogs on leash.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.2 Improving Access and Accessibility - Promoting Accessibility
- 7.4 Grading and Drainage - Culverts
- 7.5 Vegetation Management – Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail
- 7.6 Trail Signing & Mapping

Gateway Trail - Segment 2 (Ga2)

Description: Parking Lot to Arastradero Road/Portola Pastures Access Road

Proposed Trail Type: High Maintenance Recreation Trail, year-round use

Proposed Trail Width/Surface Treatment: Compacted Native Soil, 4 feet wide

Trail Length: 1632 linear feet

Recommended Maintenance/Development Program :

- Reroute a portion of the trail north of the existing route to avoid the majority of the wetland area by flagging new trail alignment as follows:
 - Beginning at the parking lot reroute trail north of existing alignment
 - Provide a small bridge across the drainage approximately 40 feet north of the stand of baccharis. Height of bridge railings should be a minimum of 4 feet – 6 inches. Bridge tread should be a minimum of 6 feet wide with the structural capacity to accommodate equestrians
 - Connect back to the existing trail alignment near the Portola Stables Drive.
- Survey trail alignment for sensitive plant species before initiating construction following procedures in Section 7.5 - *Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments.*
- Conduct a pre-construction biological survey for sensitive bird and animal species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code,

Migratory Bird Treaty Act, state and federal Endangered Species Act). Verify with the California Department of Fish and Game whether a streambed alteration agreement is necessary for specific restoration activities that affect the bed or bank of the seasonal drainage once the bridge placement and design are known.

- Close and abandon the existing alignment in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route O*.
- Close and abandon the informal access across Arastradero Road once the improvements have been made to Gateway Trail Segment 2 to improve equestrian access from the Portola Pastures Stables. Also close existing alignment located within the environmentally sensitive Arastradero Creek riparian zone (formerly known as Perimeter Trail). Closures and restoration work should be performed in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route A*. Do not reopen the Arastradero Road crossing until; a) a traffic study has been completed to identify what the crossing improvements will be needed, and b) all the trail improvements have been constructed for Portola Pastures Trail Segment 2.
- Do not perform restorative work while any sensitive animal or bird species are nesting or breeding in a location where they could be directly impacted by the construction work.
- Create a 4-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- After the first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- Following seismic events inspect the bridge to make sure that there has been no damage. If damage has occurred close bridge until repairs can be made in order to protect public safety.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails & Trail Routes that are to be Closed or Rerouted to Protect Resources

- 7.2 Improving Access and Accessibility - Promoting Accessibility
- 7.3 Trail Tread Construction Techniques – Stream Crossings
- 7.4 Grading and Drainage - Outsloping the Outside Edge of a Trail
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail

Juan Bautista de Anza National Historic Trail – Segment 1 (JB1)

Description: Arastradero Road (Los Altos Hills Town Limit) to Gate A

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Road Crossing with Class II/Class I Transition into Preserve, Single Span Non-Vehicular Bridge across Creek & Cleared Compacted Native Soil Trail Tread, 6 Feet Wide Within Preserve

Trail Length: 752 linear feet

Recommended Maintenance/Development Program:

- Coordinate with the City Traffic Engineer on developing the design of crossing of Arastradero Road to provide safe access into the Preserve using the guidelines in Section 7.2 *Improving Access and Accessibility* sub-sections *Access Defined* and *Accessing the Preserve*. The design should incorporate:
 - The extension of the Juan Bautista de Anza National Historic Trail on the south side of Arastradero Road as it extends into the Town of Los Altos Hills with the cooperation of the Town of Los Altos Hills
 - Signage that clearly identifies the Preserve and designates the Preserve trail system as a shared use facility that welcomes pedestrians, equestrians, bicyclists and dogs on leash
 - A barrier free, non-vehicular entry at trailhead
 - A posted speed limit for motorists along Arastradero Road in accordance with the results of the traffic engineering study
 - Additional caution signs for motorists at an optimum of 100 feet before entering the “Preserve Crossing Zone” (speed bumps and/or clatter bars are not recommended because they pose hazards to bicyclists)
 - Warning signs for trail users on the trail at an optimum of 100 feet before the road crossings
 - Bike crossing signs (W79/W80) at where access is provided to Juan Bautista de Anza National Historic Trail Segment 1
 - A respite on the north side of Arastradero Road for bicyclists to wait for a safe time to cross the road
 - Sight lines at the Preserve entry at this point need to be improved by trimming the vegetation back from the roadway. The sight line distance should be determined based on the results of a traffic study. Riparian

vegetation (willows, cottonwoods) that is removed should be replaced elsewhere on the drainage.

- New trail construction. Reroute the trail south of the existing route to avoid the riparian corridor that parallels Arastradero Road area by flagging new trail alignment as follows:
 - Enter the Preserve at the Town of Los Altos Hills boundary and follow the existing trail alignment west approximately 75 feet
 - Cross the creek in an existing clearing between mature willows and oaks. Install a single span, pre-fabricated bridge of a durable, low maintenance material that will fit into the natural setting, (e.g. cortan steel). Height of bridge railings should be a minimum of 4 feet – 6 inches. Bridge tread should be a minimum of 6 feet wide with the structural capacity to accommodate equestrians
 - Trail alignment is to continue in a westerly direction to the junction of the Juan Bautista de Anza National Historic Trail- Segment 2. The trail should be located outside of the riparian corridor to the north and away from the wetland area to the south.
- Survey trail alignment for sensitive plant species before initiating construction following procedures in Section 7.5 - *Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*.
- Conduct a pre-construction biological survey for sensitive animal or bird species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts). Verify with the California Department of Fish and Game whether a Streambed Alteration Agreement is necessary for the creek crossing once the bridge placement and design are known.
- Close and abandon the existing alignment located within the environmentally sensitive Arastradero Creek riparian zone adjacent to the road in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route P*.
- Do not perform restorative work while any sensitive animal or bird species are nesting or breeding in a location where they could be directly impacted by the construction work.
- Create a 6-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.

- After first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 6-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the Arastradero Preserve Management Plan objectives and Section 7.5.
- Following seismic events inspect the bridge to make sure that there has been no damage. If damage has occurred, close bridge until repairs can be made in order to protect public safety.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Stream Crossings Wet Soils
- 7.4 Grading and Drainage - Wet Soils
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments
- 7.6 Trail Signing & Mapping

Juan Bautista de Anza National Historic Trail - Segment 2 (JB2)

Description: Gate A to Arastradero Creek Trail Segment 1

Proposed Trail Type: Maintenance Access Trail, Year-round use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Hardened trail tread, 10 feet wide, concrete bridge (existing)

Trail Length: 1115 linear feet

Recommended Maintenance/Development Program :

- Clarify maintenance responsibilities to ensure that the existing trails within utility corridors are maintained for year-round use. Currently the Utility Department uses this trail as a secondary access, but road maintenance responsibilities have not been clearly articulated.
- Coordinate with the Utility Department to ensure that existing trails within utility corridors are maintained for year-round use to the highest degree of accessibility by:
 - Considering surfacing the trail (or at a minimum the utility turn around area just past the concrete bridge) with a hardening solution to improve the firmness and stability of the surface if the soils limit year-round recreation use and maintenance access. The hardener should have a natural appearance and no water quality impacts. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.

- Regrading areas where utility manholes protrude above grade creating a tripping hazard. Manhole covers should be flush with the surface of the trail.
- ☐ Develop turn around in a hammerhead configuration so as to accommodate Type 3 and 4 emergency fire vehicles. Locate on west side of bridge in the area that is nearly flat and already contains hardened surfaces and non-native grassland. Avoid nearby riparian habitat and serpentine soils. Refer to *Map 4 Fire Protection & Emergency & Maintenance Access - Turn Around Point 2*.
- ☐ Perform annual vegetative clearing and brushing to maintain a 10-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- ☐ Following seismic events inspect the bridge to make sure that there has been no damage. If damage has occurred, close bridge until repairs can be made in order to protect public safety.

For guidelines on performing the recommended actions refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.2 Improving Access and Accessibility - Promoting Accessibility & Accommodating Utility Vehicles
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Juan Bautista de Anza National Historic Trail - Segment 3 (JB3)

Description: Arastradero Creek Trail Segment 1 to Portola Pastures Trail Segment 2

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Compacted Native Soil, 6 feet wide

Trail Length: 540 linear feet

Recommended Maintenance/Development Program:

- ☐ New trail construction. Reroute the trail to reduce trail steepness to lessen slope susceptibility to erosion and to improve accessibility. Flag new trail alignment as follows:
 - Use switchbacks between the Arastradero Creek Trail and the Portola Pastures Trail to align the trail to avoid wetland and serpentine areas. Try to maintain a maximum gradient of 8% and a uniform trail width of 6 feet
 - At the trail junction with the Portola Pastures Trail join with the existing alignment of the Juan Bautista de Anza National Historic Trail- Segment 4 that continues to the south.
- ☐ Survey the portion of the trail that will follow a new alignment for sensitive plant species before initiating construction following procedures in Section

7.5 - Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments.

- Conduct a pre-construction biological survey for sensitive bird and animal species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Act).
- During trail construction in serpentine areas use appropriate dust control measures to prevent (unconfirmed) hazards of inhaling chrysotile asbestos fibers.
- Close and abandon the existing alignment located within the environmentally sensitive serpentine soils located between the Arastradero Creek Trail and the Portola Pastures Trail route in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route K.*
- Do not perform restorative work while any sensitive animal or bird species are nesting or breeding in a location where they could be directly impacted by the construction work.
- Create a 6-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques.*
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to *Table 3 Trail Surface Synopsis* for tread surfacing options.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- After first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 6-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5.*

For guidelines on performing the recommended actions refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail, Excessive Trail Grade
- 7.4 Grading and Drainage - Wet Soils
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Juan Bautista de Anza National Historic Trail - Segment 4 (JB4)

Description: Portola Pastures Trail Segment 2 to Acorn Trail jct. Segment 1 and 2

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Compacted Native Soil, 6 feet wide

Trail Length: 2268 linear feet

Recommended Maintenance/Development Program:

- Trail should be widened to a uniform width of 6 feet and trail surface should be modified to correct any drainage deficiencies that are impacting the structural integrity of the trail. Trail tread should be composed of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- One year after the trail tread has been established:
 - Mow both trail shoulders between the Portola Pastures Trail Segment 2 and the Juan Bautista de Anza National Historic Trail Segment 5 to provide an overall width of 10 feet to accommodate emergency vehicle access. Maintain a minimum cover of 2 inches to minimize potential erosion impacts
 - Mow an area near the junction of the Portola Pastures Trail to provide room for Type 3 and 4 emergency fire vehicles to turn-around following procedures outlined in Section 7.2. Maintain a minimum cover of 2 inches to minimize potential erosion impacts. Refer to *Map 4 Fire Protection & Emergency & Maintenance Access - Turn Around Point 10*.
- After the first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 6-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Install a new bench in a location to take best advantage of the view. Integrate the placement of the bench with the natural setting where a view of the lake can be provided. Set the bench back from the trail tread two feet to accommodate leg space and prevent conflicts with passing trail users. Provide a clear, graded space adjacent to the bench large enough to accommodate a bike, wheelchair or stroller.

For guidelines on performing the recommended actions refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail,
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Juan Bautista de Anza National Historic Trail - Segment 5 (JB5)

Description: Acorn Trail to junction with Woodland Trail Segment 1 (utility access is continuous from Gate B to Corte Madera Water Tank)

Proposed Trail Type: Maintenance Access Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Compacted aggregate trail tread, 10 feet wide

Trail Length: 1079 linear feet

Recommended Maintenance/Development Program :

- Coordinate with the Utility Department to ensure that existing trails within utility corridors are maintained for year-round use by:
 - Maintain the existing compacted aggregate trail tread to provide a firm and stable surface and/or consider surfacing the trail a hardening solution to improve the firmness and stability of the surface if the soils are limiting year-round use. The hardener should have a natural appearance and no water quality impacts. Refer to *Table 3 Trail Surface Synopsis* for tread surfacing options.
- Facilitate maintenance and emergency operations by:
 - Developing an emergency Type 3 and 4 vehicle hammerhead turn-around at the junction with Segment 4 of the Juan Bautista de Anza Trail. Improvements to the area should be confined, to the greatest extent possible, to the existing graded area at the trail junction. Refer to Map 4 - *Fire Protection & Emergency & Maintenance Access – Turn-around Point 9*.
 - Providing a 40 to 45 foot “driveway” between Arastradero Road and Access Gate B to allow a safe pull out for maintenance and emergency vehicles accessing the Preserve
 - Using a uniform maintenance gate at all major entry points with a universal locking device to facilitate routine and emergency access into the Preserve by multiple department staff
 - Providing a sign identifying this entry as “Gate B” to expedite emergency response.

For Guidelines on Performing the Recommended Actions Refer To Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.2 Improving Access and Accessibility - Accommodating Utility Vehicles

Juan Bautista de Anza National Historic Trail - Segment 6 (JB6)

Description: Junction with Woodland Trail Segment 1 to West Preserve Perimeter Boundary

Proposed Trail Type: High Maintenance Recreation Trail, year-round use

Proposed Trail Width/Surface Treatment: Cleared Compacted Native Soil Trail, 6 feet wide

Trail Length: 1542 linear feet

Recommended Maintenance/Development Program :

- Widen the trail to provide a uniform width of 6 feet of compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Modify drainage to correct wet trail tread where it is impacting the structural integrity of the trail using the following techniques:
 - Build up earthen berm along the southern edge of Arastradero Road
 - Install a drainage structure consisting of: an open ditch at top of road; a 15" diameter black plastic corrugated drain pipe approximately 75 feet long extending from the top of the road down the slope and under the trail; and a rock energy dissipater at end of pipe.
- Survey the alignment for sensitive plant species before initiating trail modifications following procedures in *Section 7.5 - Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*.
- Conduct a pre-construction biological survey for sensitive animal species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts).
- Do not perform restorative work while any sensitive animal species are nesting, breeding or foraging in a location where they could be directly impacted by the construction work.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to *Table 8 - Trail Surface Synopsis* for tread surfacing options.
- After first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 6-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.

- ❑ Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- ❑ Coordinate with the City Traffic Engineer on developing the design of crossing of Arastradero Road to provide safe access into the Preserve using the guidelines in Section 7.2 *Improving Access and Accessibility* sub-sections *Access Defined* and *Accessing the Preserve*. The design should incorporate:
 - The extension of the Juan Bautista de Anza National Historic Trail on the south side of Arastradero Road as it extends along Arastradero Road into the Town of Portola Valley with the cooperation of the Town of Portola Valley. It would be preferable to extend the trail west to the driveway at the American Institute for Research driveway to create the respite on the north side of the road, rather than at the Palo Alto City limits.
 - Signage that clearly identifies the Preserve and designates the Preserve trail system as a shared use facility that welcomes pedestrians, equestrians, bicyclists and dogs on leash
 - A barrier free, non-vehicular entry at trailhead
 - Adequate directional, safety and regulatory definition between trail and road system
 - Bike Crossing signs (W79/W80)
 - A respite on the north side of Arastradero Road for bicyclists to wait for a safe time to cross the road
 - Major trimming vegetation on the south side of Arastradero Road to provide adequate sight distance (200 feet minimum).

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Wet Soils
- 7.4 Grading and Drainage - Culverts
- 7.5 Vegetation Management - Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments
- 7.6 Trail Signing & Mapping

North Perimeter Trail (NP)

Description: Gateway Trail to Stanford Pastures Trail

Proposed Trail Type: High Maintenance Recreation Trail, year-round use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 3608 linear feet

Recommended Maintenance/Development Program :

- Maintain trail to uniform width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread
- Realign any portions of the trail that may be impacted by annual disking. New construction should be in accordance with *Section 7.3 Trail Tread Construction Techniques*.
- Monitor soils during first winter season to evaluate year-round accessibility. If trails become impassible during winter months consider either;
 - Installing soil hardeners Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing option, **Or** limiting usage of trail to the dry season
 - Close and abandon the existing alignment in accordance with Section 6.5 Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route O.
 - Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
 - Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Portola Pastures Trail – Segment 1 (PP1)

Description: Portola Pastures Access Road to connect with existing Trail (Portola Pastures Segment 2 – Former Perimeter Trail to be closed. See discussion of Segment A)

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Road Crossing, Bridge Crossing & Cleared, Compacted Native Soil Trail Tread, 4 Feet Wide within the Preserve

Trail Length: 365 linear feet

Recommended Maintenance/Development Program:

- Providing a crossing at this location will be problematic due to the need to maintain adequate sight distance at the vertical curve of the road.. Before determining whether to provide a marked crosswalk at the Portola Pastures Driveway a complete traffic study including traffic counts, and speed counts will need to be performed. The design of the crossing will need to follow the mid-block crosswalk guidelines recently adopted by the City Council.
- Development of a future crossing at this location will need to be coordinated with the City Transportation Division and should take into consideration:
 - A posted speed limit for motorists along Arastradero Road in accordance with the results of the traffic engineering study
 - Additional caution signs for motorists at an optimum of 100 feet before the crossing (speed bumps and/or clatter bars are not recommended because they pose hazards to bicyclists)
 - Warning signs for trail users on the trail at an optimum of 100 feet before the road crossings
 - Removing baccharis and the eucalyptus adjacent to the road on Preserve property to maintain a clear sight distance for 200 feet (or more depending on the recommendation of a traffic engineering study) where the trail meets Arastradero Road. Riparian vegetation that is removed to improve sight distance shall be replaced elsewhere on the stream corridor, in the near vicinity, if possible.
 - Correcting the existing transitions between the paved edges along Arastradero Road and the trail so that these two surfaces are flush and mirror the trail width at a minimum
 - Narrowing the public trail entry points to 5 feet and signing the entry to discourage unauthorized vehicular entry
- Provide a connection from Gateway Trail Segment 2 to Portola Pastures Drive as part of the crossing improvements.
- Provide signage that clearly identifies the Preserve and designates the Preserve trail system as a shared use facility that welcomes pedestrians, equestrians, bicyclists and dogs on leash.
- New trail construction. New trail construction up this slope will be problematic as the proposed route contains an area of Azule Clay Loam on 15 to 30 percent slopes. This soil type is considered to have moderate limitations for trail development due to the soil's susceptibility to erosion. In addition, there are seeps in the area above and west of the proposed connection to Portola Pastures Trail Segment 2 that will need to be avoided. Taking these constrains into account, reroute the section of the trail between Arastradero Road and the upslope connection with the existing trail east of the existing route by flagging new trail alignment as follows:

- Cross Arastradero Road at the Portola Pastures drive at a 90° angle approximately 75 feet west of the Preserve property line
 - Continuing in the same direction, cross the tributary to Arastradero Creek where impacts to the riparian corridor can be minimized. Span the tributary with a single span pre-fabricated bridge structure of a durable, low maintenance material that will fit into the natural setting, (e.g. cortan steel). Height of bridge railings should be a minimum of 4 feet – 6 inches. Bridge tread to be a minimum of 6 feet wide with the structural capacity to accommodate equestrians
 - Continue the new trail up the hill towards the east to meet the existing trail (formerly known as part of Perimeter Trail) aligning the trail generally along contours to minimize visual impacts to travelers on Arastradero Road. Connect with the existing trail between mature oaks easterly of the upslope drainage area that shows evidence of movement.
 - Due to the steepness of the slope (15% -30%) and the erosive soil type (Azule Clay Loam) reinforce switchbacks using retaining walls at the corners in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
 - Because of the soils and the anticipated heavy use year-round use by equestrians on this hillside trail, a hardening solution should be considered to improve the firmness and stability of the surface. The hardener should have a natural appearance, provide adequate traction for horses and create no water quality impacts. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- ☐ Survey trail alignment for sensitive plant species before initiating construction following procedures in *Section 7.5 - Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*.
 - ☐ Conduct a pre-construction biological survey for sensitive bird and animal species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts). Once the bridge crossing is designed and located, verify with the California Department of Fish and Game whether a Streambed Alteration Agreement is needed.
 - ☐ Do not perform restorative work while any sensitive animal or bird species are nesting or breeding in a location where they could be directly impacted by the construction work.
 - ☐ Create a 4-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.

- After the first year, once trail tread has been stabilized, perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.
- Following seismic events inspect the bridge to make sure that there has been no damage. If damage has occurred, close bridge until repairs can be made in order to protect public safety.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Stream Crossings, Wet Soils
- 7.4 Grading and Drainage - Wet Soils
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments
- 7.6 Trail Signing & Mapping

Portola Pastures Trail – Segment 2 (PP2)

Description: Connect with new trail segment (PP1) to Juan Bautista de Anza Trail jct. Segments 3 and 4

Proposed Trail Type: Recreation Trail, Year-round Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 1016 linear feet

Recommended Maintenance/Development Program :

- Maintain trail to provide a uniform width of 4 feet of compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to *Table 8 - Trail Surface Synopsis* for tread surfacing options.
- Develop an aggressive weed management strategy as necessary to control thistles that are encroaching onto the trail. Management strategies should be in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.

- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway, Revegetation Techniques – New Trail Construction

Stanford Pastures Trail (SP)

Description: Parking Lot to Preserve Stanford Lands Boundary

Proposed Trail Type: Recreation Trail, Year-round Use (Part of future regional Bay to Ridge Trail)

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4-6 feet wide

Trail Length: 1773 linear feet

Recommended Maintenance/Development Program :

- Provide a barrier free, non-vehicular entry with a minimum width of 5 feet at the Preserve boundary.
- Install identity signage at Preserve boundary.
- Maintain trail to uniform width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques* to minimize erosion and impacts to view corridor.
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread.
- Monitor soils during first winter season to evaluate year-round accessibility. If trails become impassible during winter months consider installing soil hardeners. Refer to Table 8 - *Trail Surface Synopsis* for tread surfacing options.
- Within the area of scenic impact, consider rerouting the trail when a connection is opened to Stanford lands. New alignment should follow contours to minimize visual impacts and steepness of the slope rather than climbing straight uphill. Use the following procedures:
 - Survey the portion of the trail that will follow a new alignment for sensitive plant species before initiating construction following procedures in Section 7.5 - *Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*

- Conduct a pre-construction biological survey for sensitive animal and bird species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts)
- Create a 6-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Once new alignment has been completed, close and abandon the existing alignment in accordance with the guidelines in *Section 6.5 Trail Routes that are to be Closed or Rerouted to Protect Resources Erosive Slopes*.
- Do not perform new or restorative work while any sensitive animal or bird species are nesting or breeding in a location where they could be directly impacted by the construction work.
- Monitor soils during first winter season to evaluate year-round accessibility. Consider installing soil hardeners if trails become impassible during winter months. Refer to *Table 3 Trail Surface Synopsis* for tread surfacing options.
- One year after the trail tread has been established mow an area near the boundary of the Preserve to provide room for Type 3 and 4 emergency fire vehicles to turn around following procedures outlined in section 7.2. Maintain a minimum cover of 2 inches to minimize potential erosion impacts. Refer to *Map 4 Fire Protection & Emergency & Maintenance Access - Turn Around Point 1*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - High Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway & Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Moderate Maintenance Trail Construction, Rerouting, and Maintenance Recommendations

Bay Leaf Trail Segment 1 (BaL1)

Description: Acorn Trail jct. Segments 2 and 3 to Meadowlark Trail Segment 2

Proposed Trail Type: Recreation Trail, Seasonal use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil 4 feet wide

Trail Length: 676 linear feet

Recommended Maintenance/Development Program:

- Maintain trail to uniform width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread. This trail segment is susceptible to becoming entrenched as it crosses the saddle of the slope. Monitor this trail for drainage problems and install drain dips as needed.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail
- 7.4 Grading and Drainage - Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Bay Leaf Trail Segment 2 (BaL2)

Description: Meadowlark Trail jct. Segments 1 and 2 to Woodland Trail jct. Segments 1 and 2

Proposed Trail Type: Recreation Trail, Seasonal use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil 4 feet wide

Trail Length: 1510 linear feet

Recommended Maintenance/Development Program:

- Regrade trail as needed to maintain a uniform width of 4 feet of compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are being caused by the earthen berms that have formed along the westerly, outside edge of the trail. To correct:
 - Remove the berms using excess materials to fill rills (cuts caused by water runoff) within the trail tread
 - Install drain dips or drain turnouts as needed.
- Due to the sensitive nature of this trail alignment, perform an annual biological survey for sensitive species prior to:
 - Performing annual vegetative clearing and brushing
 - Opening this loop trail to public use.
- Do not perform routine maintenance or open trail for public use if any sensitive species are found to be nesting or breeding in a location where they could be directly impacted by trail use.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Incorporate vegetation management strategies as necessary to control weeds and invasive non-native plant species along the trail in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*. Exercise care in implementing management strategies so as not to impact water quality of the adjacent creek.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail
- 7.4 Grading and Drainage - Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Bay View Trail (BV)

Description: Juan Bautista de Anza Trail Segment 2 to Corte Madera Trail Segment 2

Proposed Trail Type: Recreation Trail, Seasonal Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil 4 feet wide

Trail Length: 1510 linear feet

Recommended Maintenance/Development Program:

- Maintain trail to uniform width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread*

Construction Techniques.

- ❑ Correct drainage deficiencies that are impacting the structural integrity of the trail tread. To correct deficiencies use the following trail construction and trail drainage techniques:
 - Create a drain dip across the trail at base of slope near junction with the Juan Bautista de Anza Trail to correct a seasonal boggy area
 - Construct a swale extending from the drain dip in a northeasterly direction to connect with the existing wetland area. Drainage should be developed as a broad swale approximately 8" deep
 - Develop water bars to divert water approximately every 50 feet on steeper sections of the trail.
- ❑ Conduct a pre-construction biological survey for sensitive plant species which may occur in the serpentine soils in this area to prevent impacts to the habitat in accordance with recommended guidelines in *Section 7.5 Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments.*
- ❑ During trail construction in serpentine areas use appropriate dust control measures to prevent (unconfirmed) hazards of inhaling chrysotile asbestos fibers.
- ❑ Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5.*
- ❑ Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5.*

For Guidelines on Performing the Recommended Actions Refer to sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail
- 7.4 Grading and Drainage - Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments

Bowl Loop Trail (BL)

Description: Meadowlark Trail Segment 1 to Oak Trail

Proposed Trail Type: Recreation Trail, Seasonal Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil 4 feet wide

Trail Length: 7399 linear feet

Recommended Maintenance/Development Program :

- Seasonal ponds, such as the one found on the Bowl Loop Trail can be important breeding habitat for amphibians, including the California tiger salamander (federal candidate for listing, state species of special concern) The presence of the salamander has not been studied in the Preserve. Therefore, a biotic survey should be conducted to determine if the pond (“the Bowl”) provides suitable breeding habitat and if the salamander is present there or in the nearby riparian zone. In any event this trail should be closed during the wet season to protect amphibian breeding habitat and wetland values. The trail should not be opened for public use while any sensitive species are found to be nesting or breeding in a location where they could be directly impacted by trail use.
- Regrade trail segments outside the “bowl” as needed to maintain a uniform width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are affecting the structural integrity of the trail.
- Close the “bowl” at the onset of the rainy season (generally November) and keep this site closed to public use until it is completely dry.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5* except as noted above.
- Incorporate vegetation management strategies as necessary to control weeds and invasive non-native plant species along the trail in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*. Exercise care in implementing management strategies so that they will not to impact the seasonal wetland at the bottom of “the Bowl”.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Inspiration Point Trail (IP)

Description: Spur off Meadowlark Trail Near Old Barn Site

Proposed Trail Type: Recreation Trail, Seasonal Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 550 linear feet

Recommended Maintenance/Development Program :

- Maintain trail to provide a uniform width of 4 feet of compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Correct any drainage deficiencies that are impacting the structural integrity of the trail tread.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*.
- Maintain a bench in a location to take best advantage of the panoramic view. Set the bench back from the trail tread two feet to accommodate leg space and prevent conflicts with passing trail users. Provide a clear, graded space adjacent to the bench large enough to accommodate a bike, wheelchair or stroller.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Meadowlark Trail (MeL1)

Description: Gate C to Oak Trail

Proposed Trail Type: Maintenance Access Trail, hikers and emergency vehicle access year-round. Routine maintenance access and bike and horse use limited to dry season

Proposed Trail Width/Surface Treatment: compacted aggregate trail tread, 10 feet wide

Trail Length: 3710 linear feet

Recommended Maintenance/Development Program:

- Clarify maintenance responsibilities to ensure that this existing trail can accommodate emergency vehicles year-round. Currently the Fire Department and the Open Space Division use this trail as a secondary access, but road maintenance responsibilities have not been clearly articulated.

- Coordinate with the Public Works Department to ensure that this maintenance/emergency access is adequately maintained to service the southern portion of the Preserve. Level of maintenance service should be for moderate, seasonal trails (dry season use). Corrective action should include construction of water dips every 50 feet to downhill side of slope to divert water and prevent further gullying of the portion of road that is deeply gullied.
- Eliminate narrow, single track volunteer trail located adjacent to the maintenance/emergency access trail between Gate C and the old barn site by scarifying and seeding former alignment with native grasses.
- Provide a barrier free, non-vehicular entry adjacent to Vehicle Access "Gate C" with a minimum width of 5 feet at the Preserve boundary.
- Install identity signage at Preserve boundary.
- Designate the Meadowlark Trail Segment 1 as hiking (including dogs on leash) and emergency vehicle access only year round.
- Permit routine patrol and maintenance vehicles and biking and equestrian use on a seasonal basis.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.
- Develop a hammerhead vehicle turn around for Type 3 and 4 emergency vehicles to turn around near the old barn site. Improvements to the turn-around should be confined to the existing graded pad that formerly served as the driveway for the old barn. Refer to *Map 4 Fire Protection & Emergency & Maintenance Access – Turn-around Point 7*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.2 Improving Access and Accessibility - Accommodating Utility Vehicles
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Meadowlark Trail (MeL2)

Description: Oak Trail to Bay Leaf Trail Segment 2

Proposed Trail Type: Recreation Trail, Seasonal Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 4586 linear feet

Recommended Maintenance/Development Program:

- Regrade trail to provide a uniform trail width of 4 feet of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail*

Tread Construction Techniques.

- Correct areas that have become entrenched by incorporating water bars or drain dips as slope allows approximately every 50 feet to divert water to downhill side of slope.
- As portions of this trail are located along the eastern edge of a potentially sensitive woodland habitat, perform an annual biological survey for sensitive species prior to:
 - Performing annual vegetative clearing and brushing during the nesting season
 - Opening this loop trail to public use during the nesting season.
- Do not perform routine maintenance or open trail for public use if any sensitive species are found to be nesting or breeding in a location where they could be directly impacted by trail use.
- Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*, except as noted above.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.
- In the future, reevaluate the potential to provide a year round access route by realigning the trail to reduce the trail grade to 10% using switchbacks, incorporating drain dips or water bars as the terrain allows and hardening the trail surface to minimize potential impacts from erosion. New construction should be in accordance with the recommended guidelines in *Section 7.3 Trail Tread Construction Techniques.*

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques - Entrenched Trail
- 7.4 Grading and Drainage - Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Oak Trail (Oa)

Description: Meadowlark Trail to Arastradero Creek Trail Segment 3

Proposed Trail Type: Recreation Trail, Seasonal Use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 1804 linear feet

Recommended Maintenance/Development Program:

This trail is excessively steep according to factors described in Section 5. The trail

grade ranges from 12% at top to 24% in middle and 32% at the lower end. Trails this steep, especially this close to a water source (Arastradero Creek, Sobey Pond) are a significant source of sedimentation in water bodies as horses loosen soils and bikes create a channel for carrying water downstream.

- New trail construction alignment. To provide connectivity between the Arastradero Creek Trail and the Meadowlark Trail reroute lower two-thirds of the trail to reduce trail steepness and to lessen slope susceptibility to erosion. Flag new trail alignment as follows:
 - Tie lower end of trail into the Arastradero Creek Trail a little north of the existing trail avoiding a stand of native grasses.
 - Develop a new trail just north of the existing alignment incorporating a series of switchbacks along the south side of the wooded drainage.
 - Tie the upper end of the new alignment into the existing trail above the mature stand of oak trees that are located within the existing trail alignment.
 - Maintain the existing alignment where the slope is running between 12% and 15% and install water bars on upper portion of existing alignment at close of season.
 - Due to the steepness of the terrain and the soil's susceptibility to erosion in this area, have a soil erosion expert review the flagged alignment and provide recommendations to prevent erosive damage to slope during and after the trail construction.
- Once the trail route has been flagged, but prior to constructing the trail:
 - Survey the portion of the trail that will follow a new alignment for sensitive plant species before initiating construction following procedures in Section 7.5 - *Vegetation Management, Revegetation Techniques to Restore and Enhance Trail Edges and Former Trail Alignments*. The biological survey needs to occur during the winter/spring bloom period of the sensitive species that would be expected in this area.
- Conduct a pre-construction biological survey for sensitive animal and bird species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts).
- Trail Construction:
 - Create a 4-foot wide tread of cleared, compacted native soil in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.

- Trail construction should not occur in the winter, rainy season as red-legged frogs (if present in Sobey Pond) can be expected to move into the grasslands where the trail route is proposed during this season.
- ☐ Develop a trail construction and long-term maintenance strategy that takes into account the presence of large stands of poison oak.
- ☐ Close and abandon the existing alignment that is excessively steep using “Best Management Practices” in accordance with the Regional Water Quality non-point source pollution program to keep siltation from entering Sobey Pond during construction in accordance with the guidelines in Section 6.5 *Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route Q.*
- ☐ Do not perform restorative work while any sensitive animal species are nesting or breeding in a location where they could be directly impacted by the construction work.
- ☐ Block restoration area from further use and install signs stating “*Area Closed: Habitat Restoration*” at trail junctions of trails leading into the restoration area.
- ☐ Due to the sensitive nature of this woodland trail alignment, perform an annual biological survey for sensitive species during nesting periods prior to:
 - Performing annual vegetative clearing and brushing
 - Opening this loop trail to public use
- ☐ Do not perform routine maintenance or open trail for public use if any sensitive species are found to be nesting in a location where they could be directly impacted by trail use.
- ☐ Perform annual vegetative clearing and brushing to maintain a uniform 4-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5*, except as noted above.
- ☐ Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and Section 7.5.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques -Excessive Trail Grade
- 7.4 Grading and Drainage - Outsloping the Outside Edge of a Trail & Drain Drips or Drainage Swales
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

Woodland Trail Segment 1(Wo1)

Description: Juan Bautista de Anza Trail jct. Segment 5 & Segment 6 to Bay Leaf Trail Segment 2 (utility access is continuous from Gate B to Corte Madera Water Tank)

Proposed Trail Type: Maintenance Access Trail, Year-round maintenance access, Seasonal recreational use

Proposed Trail Width/Surface Treatment: Compacted aggregate trail tread, 10 feet wide

Trail Length: 1478 linear feet

Recommended Maintenance/Development Program :

- Coordinate with the Utility Department to ensure that existing trails within utility corridors are maintained for year-round utility use and seasonal recreational use by:
 - Maintaining the existing compacted aggregate trail tread to provide a firm and stable surface
 - Maintain existing, paved vehicular turn-around that encircles the water tank for utility vehicles. Note that this turn-around is not suitable for Type 3 and 4 fire vehicles due to the tight turning radius around the tank. Refer to Map 4 - *Fire Protection & Emergency & Maintenance Access – Turn-around Point 8*.
 - Remove the existing chainlink gate near the turn that leads up to the tank.
 - Remove existing signage that states “no equestrian use allowed”
- Due to the sensitive nature of this woodland trail alignment, perform an annual biological survey for sensitive species during sensitive nesting, season prior to:
 - Performing annual vegetative clearing and brushing
 - Opening this trail to seasonal public use
 - Do not perform routine maintenance or open trail for public use if any sensitive species are found to be nesting or breeding in a location where they could be directly impacted by trail use
- Perform annual vegetative clearing and brushing to maintain a uniform 10-foot wide trail tread in accordance with recommended guidelines in *Section 6.2* and *Section 7.5* except as noted above.
- Close and abandon parallel trails on the opposite side of the creek located within the environmentally sensitive riparian corridor in accordance with the guidelines in *Section 6.5 Trail Routes that are to be Closed or Rerouted to Protect Resources - Trail Route B*.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System -High Maintenance Trails
- 7.2 Improving Access and Accessibility - Accommodating Utility Vehicles

Woodland Trail Segment 2(Wo2)

Description: Bay Leaf Trail Segment 2 to Meadowlark Trail Segment 1

Proposed Trail Type: Recreation Trail, Seasonal use

Proposed Trail Width/Surface Treatment: Cleared, Compacted Native Soil, 4 feet wide

Trail Length: 1671 linear feet

Recommended Maintenance/Development Program :

- Maintain trail at a uniform width of 4 feet. Tread to be cleared, compacted native soil and should be maintained in accordance with recommended guidelines in *Section 7.3 Trail Tread Construction Techniques*.
- Reroute the upper portion of the trail to: a) avoid a small wetland; b) reduce trail steepness to lessen slope susceptibility to erosion; and c) modify drainage to correct trail tread where it is impacting the structural integrity of the trail. Flag new trail alignment and employ the following techniques as follows:
 - Close and restore upper portion of trail where slope runs at about an 8% grade through open grassland and small wetland area. In this location the trail tread has become deeply incised and should be restored in accordance with the guidelines in *Section 6.5 Trail Routes that are to be Closed or Rerouted to Protect Resources - Correcting Eroded Slopes*
 - Relocate a 4-foot wide compacted native soil trail within the grassland area staying east of the standing dead tree
 - Where the trail begins to steepen at the edge of the woodland, connect to the existing trail alignment. Correct trail incisions by incorporating water dips towards downhill side of slope to divert water
 - Where the existing drainage channel runs across the trail tread, create a low flow drainage across trail and modify lower end of existing channel to reduce side slopes
 - Install a water bar at the junction of the Bay Leaf Trail.
- Do not perform restorative work while any sensitive animal species are nesting or breeding in a location where they could be directly impacted by the construction work.
- Incorporate management strategies as necessary to control weeds and invasive non-native plant species along the new trail alignment in accordance with the *Arastradero Preserve Management Plan* objectives and *Section 7.5*.

- Block area restored area from further use and install signs stating “Area Closed: Habitat Restoration” at the junctions of trails leading into the restoration area.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 6.2 The Trail Maintenance System - Moderate Maintenance Trails
- 7.3 Trail Tread Construction Techniques
- 7.4 Grading and Drainage
- 7.5 Vegetation Management - Techniques for Maintaining a Clear Passageway

6.5 Trails to Be Abandoned & Closed for Restoration

Restoration work should focus on repairing any existing environmental degradation and trail tread conditions that could fester and cause major problems in the future. In some cases the trail that is to be abandoned will require extensive work to remedy existing conditions that are severely impacting the terrain, water quality, and/or sensitive habitat. A trail closure may also require extensive educational outreach because current use is quite heavy. In other cases the “trail” may simply be an animal track that has had minimal impact on the land and may be receiving little use. To address each of these conditions, this section has been divided into a two tiered strategy for closure: technical requirements; and educational and enforcement requirements (Refer to Map 11 - *Implementation Program - Trail Routes that are to be Closed or Rerouted to Protect Resources* for location of trail closures).

Trail Closures - Technical Requirements

The first tier relates to the technical requirements associated with closing a trail under differing environmental conditions. This tier is broken down into three categories - correcting eroded slopes, preparing trails for closure in riparian or wetland areas, and preparing trails for closure in serpentine areas. Within the category that defines the requirements for correcting eroded slopes there are – sub sets with where other factors are were the guiding factor in determining that a trail route should be rerouted or closed. These subsets are - providing a privacy buffer, protecting pristine woodlands and protecting native grass stands.

Correcting Eroded Sites

Few of the trails on the Preserve were originally engineered to withstand continual use and as a result, the trail tread on many of the trails has eroded and requires corrective action. In some cases, the closure will only involve rerouting a small portion of a trail to mitigate a troublesome area. In other cases, an entire segment is recommended for closure because a superior trail route with a similar experience can be provided and/or

ARASTRADERO

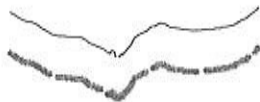
MAP 11 THE TRAILS IMPLEMENTATION PROGRAM: CLOSED TRAILS

FINAL
MARCH 2001
6-57



LEGEND

TRAIL IMPLEMENTATION PROGRAM: CLOSED TRAILS



PROPOSED TRAIL SYSTEM
TRAILS ALIGNMENTS TO BE CLOSED OR
REROUTED AND RESTORED TO PROTECT
RESOURCES 6.8 MILES



IMPLEMENTATION PROGRAM,
SEE SECTION 6.5 FOR CLOSURE
TECHNIQUES



BOUNDARY LINES



CREEK/ DRAINAGE



CONTOUR LINES



ROAD



PRIVATE PROPERTY

continued use of the trail would require major reconstruction and more ongoing maintenance. In addition to those trails that have been identified for rerouting or closure because of erosion problems, there are several trails that are recommended for closure based on another management goal. These trails should also be closed using the techniques described for correcting eroded area. These trail conditions are described below.

- *Providing a Privacy Buffer* – While these trail segments may include some rutting and /or erosion, the primary reason for the trail closure is that the trail directs the public into adjacent private property. These trail segments should generally be closed in accordance with the techniques used for correcting eroded slopes, though repair work in some cases may be focussed more on maintaining boundary fences and perimeter signage than on correcting soil or habitat.
- *Protecting Pristine Woodlands* – The purpose of this type of trail closure is to limit access into a natural area that has had little public access in the past. By limiting access, disturbance, which can result in infestations of non-native, invasive plant species that can degrade the quality of the habitat over time, will be limited. This trail segment should generally be closed in accordance with the techniques used for correcting eroded slopes, though repair work should be minimal.
- *Protecting Native Grass Stands* – Relative to most of the grasslands in the bay area, Arastradero Preserve contains a substantial amount of native bunch grasses. The existing native grass stands are highly valued as a source of seed and information about native ecology. The purpose of this type of trail closure is to limit access into the existing grass stands and thereby limit disturbance, which can result in infestations of non-native, invasive plant species that can degrade the quality of the habitat over time. These trail segments should generally be closed in accordance with the techniques used for correcting eroded slopes, though repair work should be minimal.

Typically the work required to prepare an eroded site for abandonment will include the following procedures:

- Correct water problems caused by water flowing into and down the trail by:
 - filling in ruts and gullies with local soils and gravel
 - further stabilizing the slope using rocks, erosion cloth, net or other biodegradable covering agents to impede the speed of water and inhibit gullying and riling, as directed by an erosion control specialist
 - grading the trail bed and adjacent area to return the surface to its original shape and contour
- Scarify the trail to break up the compacted soils and allow new vegetation to grow

- Reestablish vegetation with native species appropriate to the specific site using hand collected seed from native plants near the site as appropriate, or use other methods recommended by a restoration expert or botanist with expertise in revegetating the species. Seed should be collected prior to initiating the restoration work and store. Upon completion of the construction work, the seed should be sown on the site in the fall prior to the onset of the winter rains, typically late September – October.
- Block area from further use and install signs stating “Area Closed: Habitat Restoration” at trail junctions leading into the restoration area. In some cases it may also be prudent to construct some type of temporary fencing to prevent access.

Erosive Trail Conditions Apply to Trail Segments: D, E, F, G, J, Q, N

Providing a Privacy Buffer Applies to Trail Segments: C, M, H

Protecting Pristine Woodlands Applies to Trail Segment: R (portions).

Protecting Native Grass Stands Applies to Trail Segments: D, Q, R (portions).

For Guidelines on Performing the Recommended Actions Refer to Sections:

7.4 Grading and Drainage

7.5 Vegetation Management

Preparing Trails for Closure in Riparian or Wetland Areas

Ideally wet areas should be avoided where possible to reduce impacts to water quality and nesting birds and because trails through wetlands are often muddy and difficult to use. As a result users try step to the side of the mud and the trail becomes wider, impacting more of the wetlands. Within the Preserve there are several trails that have been developed within wetland and riparian areas and /or pass through boggy areas. To avoid wetland delineation and US Army Corps of Engineers reporting requirements, the trails plan must impact less than 0.1 acre of wetland and riparian areas in the Preserve where trail construction and maintenance will occur. To reduce further impacts to the wetland and riparian habitats, several trails are recommended be rerouted or closed.

Typically the work required to prepare a site for abandonment in riparian or wetland areas will include the following procedures:

- Conduct a pre-construction biological survey for sensitive species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, State and Federal Endangered Species Acts). In streambed areas, the construction period is typically April 15 to October 15 when the flow is low. If rare species are present, the construction period should be modified as

recommended by a biologist with expertise in the habits of the species. This may limit the construction period to the post-nesting season, typically late summer, fall.

- Prior to beginning any restorative corrective work, collect seed from sensitive plants, if appropriate, or use other methods recommended by a restoration expert or botanist with expertise in revegetating the species. Conduct the work under permits from the US Fish and Wildlife Service or California Department of Fish and Game, if required.
- If the restoration area is located in or adjacent to a streambed environmental permits may be required. Verify with the California Department of Fish and Game if a Streambed Alteration Agreement is necessary for restoration activities that will affect the bed or bank of the stream.
- Do not perform restorative work while any sensitive species are nesting, or breeding in a location where they could be directly impacted by the restoration work.
- Incorporate National Pollutant Discharge Elimination System (NPDES), a provision of the Clean Water Act "Best Management Practices" when closing a trail to prevent soils and other pollutants from entering creeks, ponds, lakes and springs and degrading water quality. "Best Management Practices" may include techniques relating to storage (detention), filtration and infiltration practices. Determination of the most appropriate techniques will be dependent on the specific conditions of each situation. Typical construction measures used to prevent soils from entering creeks, ponds, lakes and springs include: the placement of hay bales or siltation fences between the construction site and the water body (stream, seasonal drainage or pond) or diverting the creek water when actually working within the creek bed. NPDES permits may be required to perform restoration work.
- Scarify the trail to break up the compacted soils and allow new vegetation to grow.
- Reestablish vegetation with native species appropriate to the specific site.
- Block area from further use and install signs stating "Area Closed: Habitat Restoration" at trail junctions leading into the restoration area. In some cases it may also be prudent to construct some type of temporary fencing to prevent access.

Riparian or Wetland Trail Conditions Apply to Trail Segments: A, B, O, P, S

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 7.4 Grading and Drainage
- 7.5 Vegetation Management

Preparing Trails for Closure in Serpentine Areas

There are three areas in the Preserve where serpentine bedrock has been mapped. If exposed, serpentine bedrock will weather into soils, which are nutrient poor and often support rare plant and insect species. Because of the sensitive habitat that occurs in these soils, redundant trails that could result in impacts to this habitat type are recommended for closure.

Typically the work required to prepare a site for abandonment in serpentine areas will include the following procedures:

- Conduct a pre-construction biological survey for sensitive species to ensure compliance with state and federal law (California Environmental Quality Act, California Department of Fish and Game Code, Migratory Bird Treaty Act, state and federal Endangered Species Acts) prior to commencing restorative work.
- Flag rare plants and route trails to avoid area.
- Prior to commencing restorative construction work, hand collect seed from sensitive plants if appropriate, or use other methods recommended by a restoration expert or botanist with expertise in revegetation of the species. Conduct the work under permits from the United States Fish and Wildlife Service or the California Department of Fish and Game, if required.
- Store collected seed from native plants from the immediate area and store for later use.
- During trail construction, stockpile native topsoil for reuse in revegetating areas adjacent to the trail tread.
- Scarify the trail to break up the compacted soils and reseed hand-collected seed to enlarge population of sensitive plants.
- Block area from further use and install signs stating "Area Closed: Habitat Restoration" at trails junctions leading into the restoration area. In some cases it may also be prudent to construct some type of temporary fencing to prevent access.

Serpentine Areas Apply to Trail Segments: I, K, L, M.

For Guidelines on Performing the Recommended Actions Refer to Sections:

- 7.4 Grading and Drainage
- 7.5 Vegetation Management

Trail Closures - Educational and Enforcement Requirements

The second tier relates to the level of education, enforcement, and intensity of construction that may be required to effectively close a trail. This tier is divided into

four categories: close tacitly, close with educational notice, close assertively and close aggressively.

Close Tacitly

This type of closure can be applied where the "trail" may simply be an animal track that has had minimal impact on the surrounding environment. Little to no erosion is occurring and vegetation is adequate to fully cover the trail without any need for scarifying or reseeding the alignment. Typically these trails will be receiving little human use. Adequate closure techniques in this case may be limited to:

- Placing branches, stones or other light obstructions at the trail heads
- Allowing grasses and other plants to encroach onto the trail tread

This technique could be applied to trail segments: D (portions), E (portions), G, L, R, O (portions along disk line)

Close with Educational Notice

This type of closure can be applied where the trail is having minimal impact on the surrounding environment. Little to no erosion is occurring and vegetation is adequate to fully cover the trail without any need for scarifying or reseeding the alignment. Typically these trails will be receiving a higher volume of human use than the "animal tracks". Adequate closure techniques in this case may be limited to:

- Placing branches, stones or other light obstructions at the trail heads
- Allowing grasses and other plants to encroach the trail tread
- Providing signage to explain alternate routes and why the former path was inappropriate.

This technique could be applied to trail segments: D (portions), P

Close Assertively

This type of closure will be the most prevalent in the Preserve. It is recommended where the trail is having an impact on the surrounding environment. Trail design, soil types and frequent use is resulting in one or more of the following conditions:

- Erosion is degrading the trail tread and/or impacting the surrounding environment
- Sensitive biotic resources are being impacted
- Water quality of adjacent water bodies is, or may be impacted by continued use of the trail
- Abandonment without correction will result in trail tread conditions that could fester and cause major problems in the future
- Native vegetation is not adequate to fully cover the trail without any need for scarifying or reseeding the alignment

- Infestation of non-native invasive species needs to be controlled.

In addition, these trails typically will be receiving a higher volume of human use than under the two trail closure types discussed above.

Adequate closure techniques in this case are addressed under the three technical techniques *Correcting Eroded Slopes*; *Preparing Trails for Closure in Riparian or Wetland Areas* and *Preparing Trails for Closure in Serpentine Areas* described above. Education outreach will include:

- Providing signage to explain alternate routes and why the former path was inappropriate
- Rangers educational outreach on the trail – e.g. stopping and talking to people using these trails.

This technique could be applied to trail segments: B, C, D (portions), E, F, H, I, J, M, N, O (portions)

Close Aggressively

This closure technique would follow the same steps as above except educational outreach could be augmented with aggressive enforcement including:

- Systematically patrolling for trespassers
- Issuing citations for trespassing.

This technique could be applied to trail segments: A, K, S

Trail A (Formerly Known as Perimeter Trail)

Trail Length: 2050 linear feet

Reason for Closure:

- Safety. Informal trail crossing of Arastradero Road creates a safety hazard
- Biotic Resources. Trail is located in a riparian zone that provides potential habitat for sensitive species
- Soils. There are two seeps resulting in soil movement upslope from the trail and wetland areas along the trail
- Soils. Wet areas within trail tread are causing users to step around the boggy areas resulting in the trail becoming wider and impacting more of the wetland

Recommended Trail Alternatives: Portola Pastures Trail and Juan Bautista De Anza Trail

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing trail in riparian or wetland areas.

Trail B

Trail Length: 6301 linear feet

Reason for Closure:

- Biotic Resources. Trail is located in a riparian zone that provides habitat for sensitive species
- Parallel Trails. Trail parallels Woodland Trail

Recommended Trail Alternative: Woodland Trail

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing trail in riparian or wetland areas.

Trail C

Trail Length: 1605 linear feet

Reason for Closure:

- Privacy Buffer. Trail directs public into adjacent private property
- Lack of Connectivity. Trail does not provide connectivity to overall trail system. Potential to reevaluate a trail connection to Portola Valley is dependent on the Santa Clara County and Portola Valley Trails Plans. Currently the adjacent lands are in the unincorporated area of Santa Clara County. No trail connection is identified on the Countywide Trails Master Plan. Therefore, the County would not be able to require an easement as a condition of development of any of the parcels that would provide a connection to Portola Valley.

Recommended Trail Alternative: Access into the Portola Valley Trail System to be provided by the Juan Bautista de Anza Trail.

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing eroded trails.

Trail D

Trail Length: 6302 linear feet

Reason for Closure:

- Biotic Resources. Trails go through native grass stands.
- Parallel Trails. There is currently a maze of parallel, undefined, "volunteer" trail routes that provide similar experiences and connect to the same destinations. There is also a narrow trail that parallels the maintenance access road. The maintenance access road will be repaired and retained as the Meadowlark Trail. The parallel trail is to be closed.
- Privacy Buffer. One of the trails in this group directs public into adjacent private property

Recommended Trail Alternative: Meadowlark Trail and Bowl Loop Trail

Recommended Procedures for Abandonment and Site Restoration:

Hand collect native grass seed at start of restoration work and store. Reseed area with hand collected seed upon completion of procedures for closing eroded trails.

Trail E (formerly known as Meadowlark Trail)

Trail Length: 3151 linear feet

Reason for Closure:

- Soils. Steep, entrenched trails
- Parallel Trails. There are parallel trail routes that provide similar experiences and connect to the same destinations

Recommended Trail Alternative: Meadowlark Trail Segment 2

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing eroded trails.

Trail F (formerly known as Acorn Trail)

Trail Length 1051 linear feet

Reason for Closure:

- Soils. Steep, entrenched trails
- Soils. Wet areas within trail tread are causing users to step around the boggy areas resulting in the trail becoming wider and impacting more of the wetland
- Parallel Trails. There are parallel trail routes that provide similar experiences and connect to the same destinations.

Recommended Trail Alternative: Acorn Trail Segment 3

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing eroded trails.

Trail G

Trail Length: 1141 linear feet

Reason for Closure:

Parallel Trails. There are parallel trail routes that provide similar experiences and connect to the same destinations

Recommended Trail Alternative: Acorn Trail Segment 1

Recommended Procedures for Abandonment and Site Restoration:

See procedures for closing eroded trails.

Trail H

Trail Length: 11237 linear feet

Reason for Closure:

- Privacy Buffer. Trail directs public into adjacent private property
- Lack of Connectivity. Trail does not provide connectivity to overall trail system